CMD 25-H12-REF3 CNSC Staff Submission

Reference Package 3 for CMD 25-H12 CNSC Staff Submission on NexGen Energy Ltd. Licence Application to Prepare Site and Construct the Rook I Project

Classification	Unclassified
Type of CMD	References
CMD Number	CMD 25-H12.REF3
Original CMD	CMD 25-H12
Public hearing date	09-12 February 2026
SharePoint ID	QQQVZZNDK725-166150894-9660
Summary	This document contains documents referenced in the Environmental Assessment Report appended to 25-H12, to be placed on the Record for the proceeding.
Actions required	There are no actions requested of the Commission. This CMD is in support of the actions and recommendations set out in CNSC staff CMD 25-H12.

CMD 25-H12-REF3 Soumission par le personnel de la CCSN

Références liées 3 au CMD 25-H12 Soumission par le personnel de la CCSN la demande de permis de préparation de l'emplacement et de construction du projet de Rook I présentée par NexGen Energy Ltd.

Classification	NON CLASSIFIÉ
Type de CMD	Références
Numéro de CMD	CMD 25-H12.REF3
CMD Original	CMD 25-H12
Date de l'audience	09 au 12 février 2026
SharePoint ID	QQQVZZNDK725-166150894-9660
Résumé	Ce document contient les documents cités dans le rapport d'évaluation environnementale annexé à 25-H12, qui seront versés au dossier de l'instance.
Mesures requises	Aucune mesure n'est requise de la Commission. Le présent CMD appuie les mesures et les recommandations énoncées dans le CMD CMD 25-H12 du personnel de la CCSN.

CMD 25-H12-REF3

Reference Package 3 for CMD 25-H12 CNSC Staff Submission on NexGen Energy Ltd. Licence Application to Prepare Site and Construct the Rook I Project

Signed by: 2026-01-09

X DBeaton

Signed by: Beaton, Dana

Dana Beaton
Director General, DERPA

Rook I Project

Notice of Commencement of an Environmental Assessment

Rook I Project

The Canadian Nuclear Safety Commission (CNSC) has received a project description from NexGen Energy Ltd. for the Rook I Project, a proposed new uranium mining and milling operation, located on the Patterson Lake peninsula in the southwestern Athabasca Basin in northern Saskatchewan, approximately 155 km north of the town of La Loche, SK.

The proposed project includes underground and surface facilities to support the mining and processing of uranium ore. The main components include: underground mine development; an on-site mill to process an average of 1,400 tonnes of ore per day; surface facilities to support the short and long term storage of waste rock and ore; an underground tailings management facility; water handling infrastructure and an effluent treatment circuit and additional infrastructure to support mining activities.

The CNSC has determined that the project requires a federal environmental assessment (EA) pursuant to the *Canadian Environmental Assessment Act, 2012 (CEAA 2012)*. An EA under CEAA 2012 is a planning and decision-making tool. Its objectives are to minimize or avoid adverse environmental effects before they occur, incorporate environmental factors into decision making, and identify the elements of a follow-up monitoring program.

The availability of PFP funding for this project will be announced at a later date.

For further information on this EA, please contact:

Nicole Frigault, Environmental Assessment Specialist

Canadian Nuclear Safety Commission
P.O. Box 1046 Station B
280 Slater Street
Ottawa ON K1P 5S9
Telephone: 1-800-668-5284
Fax: 613-995-5086
Email: cnsc.ea-ee.ccsn@canada.ca

Document reference number: 1

Date modified: 2019-05-02

Generic Guidelines for the Preparation of an Environmental Impact Statement – Pursuant to the Canadian Environmental Assessment Act, 2012

Disclaimer

This document is not a legal authority, nor does it provide legal advice or direction; it provides information only, and must not be used as a substitute for the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) or its regulations. In the event of a discrepancy, the CEAA 2012 and its regulations prevail. Portions of the CEAA 2012 have been paraphrased in this document, but will not be relied upon for legal purposes.

Top of page

Part 1 – Background

1. Introduction

The purpose of this document is to provide information to proponents on the requirements for the preparation of an environmental impact statement (EIS) for a designated project to be assessed pursuant to the *Canadian Environmental Assessment Act, 2012* (CEAA 2012). This document specifies the nature, scope and extent of the information required. Part 1 of this document provides guidance and general instruction on the preparation of the EIS, and Part 2 outlines the information that must be included in the EIS.

Section 5 of the CEAA 2012 requires an assessment of the proposed project's potential environmental effects:

> 5. (1) For the purposes of this Act, the environmental effects that are to be taken into account in relation to an act or thing, a physical activity, a designated project or a project are:
>
> - (a) a change that may be caused to the following components of the environment that are within the legislative authority of Parliament:
>
>   (i) fish and fish habitat as defined in subsection 2(1) of the *Fisheries Act*
>
>   (ii) aquatic species as defined in subsection 2(1) of the *Species at Risk Act*
>
>   (iii) migratory birds as defined in subsection 2(1) of the *Migratory Birds Convention Act, 1994*
>
>   (iv) any other component of the environment that is set out in Schedule 2

- (b) a change that may be caused to the environment that would occur
  - (i) on federal lands
  - (ii) in a province other than the one in which the act or thing is done or where the physical activity, the designated project or the project is being carried out
  - (iii) outside Canada
- (c) with respect to Aboriginal peoples, an effect occurring in Canada of any change that may be caused to the environment on
  - (i) health and socio-economic conditions
  - (ii) physical and cultural heritage
  - (iii) the current use of lands and resources for traditional purposes
  - (iv) any structure, site or thing that is of historical, archaeological paleontological or architectural significance

5. (2) However, if the carrying out of the physical activity, the designated project or the project requires a federal authority to exercise a power or perform a duty or function conferred on it under any Act of Parliament other than this Act, the following environmental effects are also to be taken into account:

- (a) a change, other than those referred to in paragraphs (1)(a) and (b), that may be caused to the environment and that is directly linked or necessarily incidental to a federal authority's exercise of a power or performance of a duty or function that would permit the carrying out, in whole or in part, of the physical activity, the designated project or the project
- (b) an effect, other than those referred to in paragraph (1)(c), of any change referred to in paragraph (a) on
  - (i)health and socio-economic conditions
  - (ii) physical and cultural heritage

- (iii) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance

The Canadian Nuclear Safety Commission (CNSC) uses the proponent's EIS and other information received during the environmental assessment (EA) process to prepare an EA report that will inform the issuance of a decision statement by the Commission. Therefore, the EIS must include a full description of the changes the project will cause to the environment that may result in potential effects on areas of federal jurisdiction (i.e., section 5 of the CEAA 2012), including changes that are directly linked or necessarily incidental to any federal decisions that would permit the project to be carried out. The EIS should also include a list of key mitigation measures that the proponent proposes to undertake in order to avoid or minimize any adverse environmental effects of the project. It is the proponent's responsibility to provide sufficient data and analyses of potential changes to the environment.

Top of page

2. Guiding principles

2.1 Government of Canada's interim measures

On January 27, 2016, the Minister of Environment and Climate Change Canada and the Minister of Natural Resources Canada announced an interim approach that includes principles and plans for major projects. These principles are the first part of a broader strategy to review and restore confidence in Canada's EA processes.

In particular, the Government of Canada has introduced a principle under which direct and upstream greenhouse gas emissions linked to the projects under review will be assessed. The proponent is expected to take the necessary steps to provide sufficient information and evidence, in accordance with this principle. For more information on assessing greenhouse gas emissions, refer to section 5.1 (Part 2).

2.2 Environmental assessment as a planning tool

An environment assessment (EA) is a planning tool used to ensure that projects are considered in a careful and precautionary manner in order to avoid or mitigate possible environmental effects and to encourage decision makers to take actions that promote sustainable development.

2.3 Public participation

One of the purposes of the EA identified in the CEAA 2012 is to ensure opportunities for meaningful public participation during an EA. The CNSC ensures that the public is provided with opportunities to participate in the EA. Meaningful public participation is best achieved when all parties have a clear understanding of the proposed project as early as possible in the review process. The proponent is required to provide current information about the project to the public and especially to the communities likely to be most affected by the project.

2.4 Engagement with Indigenous groups

A key objective of the CEAA 2012 is to promote communication and cooperation with Indigenous peoples, which include the First Nations, Inuit and Métis. The proponent is expected to engage with Indigenous groups that may be affected by the project as early as possible in the project planning process. The proponent will provide Indigenous groups with opportunities to learn about the project and its potential effects, communicate their concerns about the project's potential effects and discuss measures to mitigate those effects. The proponent is strongly encouraged to work with Indigenous groups to establish an engagement approach that is reasonable to both parties. The proponent will make reasonable efforts to consider traditional Indigenous knowledge in the assessment of environmental impacts. For more information on considering Indigenous traditional knowledge, refer to section 3.3.2 (Part 1).

Information gathered through the EA process and associated engagement by the proponent with Indigenous groups will be used to inform decisions under the CEAA 2012. In providing information to the CNSC, the proponent will ensure that any confidential information shared with them by Indigenous groups is treated in the appropriate manner. This information will also contribute to the Crown's understanding of any potential adverse impacts of the project on potential or established Indigenous or treaty rights and the effectiveness of measures proposed to avoid or minimize those impacts, and will assist the Crown in meeting its duty-to-consult obligations.

The proponent is encouraged to consult the following resources:

- REGDOC-3.2.2, *Indigenous Engagement* (CNSC)
- Aboriginal and Treaty Rights Information System (Indigenous and Northern Affairs Canada)

2.5 Application of the precautionary approach

In documenting the analyses included in the EIS, the proponent will demonstrate that all aspects of the project have been examined and planned in a careful and precautionary manner in order to avoid significant adverse environmental effects.

A document by Canada's Privy Council Office, *A Framework for the Application of Precaution in Science-based Decision Making About Risk,* sets out guiding principles for the application of precaution to science-based decision making.

Top of page

3. Preparation and presentation of the EIS

3.1 Guidance

The proponent is encouraged to consult the CNSC's REGDOC-2.9.1, *Environmental Protection: Environmental Policy, Assessments and Protection Measures* for additional guidance on the preparation of the EIS. The proponent may also consider consulting the relevant EA policy and guidance documents provided on the Impact Assessment Agency of Canada's website.

The proponent is further encouraged to consult with the CNSC and, if applicable, other federal authorities, during the planning and development of the EIS and supporting documentation.

3.2 Study strategy and methodology

The proponent is expected to respect the intent of these guidelines and to consider the effects that are likely to arise from the project (including situations not explicitly identified in these guidelines), the technically and economically feasible mitigation measures that will be applied, and the significance of any residual effects. Except where specified by the CNSC, the proponent has the discretion to select the most appropriate methods to compile and present data, information and analysis in the EIS, as long as the methods are transparent, justifiable and replicable.

These guidelines may include matters that the proponent does not deem relevant or significant to the project. If such matters are omitted from the EIS, the proponent will clearly indicate this and provide a justification so that the CNSC, federal authorities, Indigenous groups, the public and any other interested party have an opportunity to comment on this decision. If the CNSC disagrees with the proponent's decision, the proponent will be required to provide the specified information.

The proponent must explain and justify the methods used to predict the impacts the project will have on each valued component (VC). VCs include biophysical and socioeconomic components, the interactions among them and their relationships within the environment. The information presented must be substantiated; in particular, the proponent must describe how the VCs were identified and what methods were used to predict and assess the project’s potential adverse environmental effects on these components. The value of a component not only relates to its role in the ecosystem, but also to the value that humans place on it. The culture and way of life of the people using the area affected by the project may be considered VCs themselves. The EIS will also explain and justify methods used to identify mitigation measures and follow-up program elements.

The EIS will document how scientific, engineering, traditional and local knowledge were used to reach conclusions. Assumptions will be clearly identified and justified. All data, models and studies will be documented such that the analyses are transparent and reproducible. All data collection methods will be specified. The uncertainty, reliability and sensitivity of models used to reach conclusions must be indicated. The sections in the EIS regarding the existing environment and the potential adverse environmental effects predictions and assessment must be prepared, using best available information and methods, to the highest standards in the relevant subject area. All conclusions must be substantiated.

The EIS will identify all significant gaps in knowledge and understanding related to key conclusions, and the steps to be taken by the proponent to address these gaps. Where the conclusions drawn from scientific, engineering and technical knowledge are inconsistent with the conclusions drawn from traditional and local knowledge, the EIS will contain a balanced presentation of the issues and a statement of the proponent's conclusions.

3.3 Use of information

3.3.1 Federal coordination of information or knowledge

Section 20 of the CEAA 2012 requires that every federal authority with specialist or expert information, or knowledge with respect to a project subject to an EA, make that information or knowledge available to the CNSC. The CNSC will coordinate the involvement of federal departments and other jurisdictions with expert and specialist knowledge specific to the EA and notify the proponent.

3.3.2 Community knowledge and Indigenous traditional knowledge

Subsection 19(3) of the CEAA 2012 states, “the environmental assessment of a designated project may take into account community knowledge and Aboriginal traditional knowledge”.

The proponent will consider the community and Indigenous traditional knowledge to which it has access or that is acquired through Indigenous and public engagement activities, in keeping with appropriate ethical standards and obligations of confidentiality. Agreement should be obtained from Indigenous groups regarding the use, management and protection of their existing traditional knowledge during and after the EA.

Where community and Indigenous traditional knowledge has been considered by the proponent, the EIS will document the following:

- the traditional knowledge gathered
- how the traditional knowledge was gathered (e.g., interviews with key community leaders and elders, collaborative field research, Indigenous traditional knowledge studies, etc.)
- the source of the traditional knowledge
- how the proponent considered the traditional knowledge gathered in the assessment, including both methodology (e.g., identifying VCs, establishing spatial and temporal boundaries, defining significance criteria) and analysis (e.g., baseline characterization, effects prediction, development of mitigation measures)

3.3.3 Existing information

In preparing the EIS, the proponent is encouraged to make use of existing information relevant to the project. When relying on existing information to meet the requirements of the EIS guidelines, the proponent will either include the information directly in the EIS or clearly direct readers to it (i.e., by cross-referencing). When relying on existing information, the proponent will also comment on how the data was applied to the project, separate factual lines of evidence from inference and state any limitations on the inferences or conclusions that can be drawn from the existing information.

3.3.4 Confidential information

In implementing the CEAA 2012, the CNSC is committed to promoting public participation in the EAs of projects and providing access to the information on which EAs are based. All documents prepared or submitted by the proponent or any other stakeholder in relation to the EA are posted or referenced on the Canadian Impact Assessment Registry (formerly the

Canadian Environmental Assessment Registry) and/or the CNSC's website and made available to the public upon request. For this reason, the EIS should not contain information that:

- is sensitive or confidential (i.e., financial, commercial, scientific, technical, personal, cultural) under the *Privacy Act* and the *Access to Information Act*, is treated consistently as confidential, and the person affected has not consented to the disclosure
- may cause harm to a person or harm to the environment through its disclosure

If the EIS contains information that should be treated as confidential or protected under the *Privacy Act* and the *Access to Information Act*, the proponent should identify that information and request that the CNSC treat it accordingly.

Part 2 – Content of the Environmental Impact Statement

Part 2 of this document provides specific instructions for the content of each section in the EIS. The EIS as a whole must reflect the guiding principles in Part 1 of this document.

Top of page

1. Presentation and Organization

To help identify the documents submitted, the title page of the EIS and related documents contains the following information:

- project name and location
- title of the document, including the term "environmental impact statement"

- subtitle of the document
- proponent name and contact information
- date

The EIS will be written in clear, precise language. A glossary of technical terms and a list of acronyms and abbreviations will be included. It will include charts, diagrams, tables, maps and photographs where appropriate to clarify the text. Perspective drawings that clearly convey the various components of the project will also be provided. Wherever possible, maps will be presented in common scales and datum to allow for comparison and overlay of mapped features.

For brevity and to avoid repetition, cross-referencing within the EIS is preferred. The EIS may make reference to information that has already been presented in other sections of the document, rather than repeating it.

Detailed studies (including all relevant and supporting data and methodologies) will be provided in separate appendices and will be referenced by appendix, section and page in the text of the main document. The EIS will explain how information is organized in the document. This will include a list of all tables, figures and photographs referenced in the text. A complete list of supporting literature and references will also be provided. A table of concordance which cross-references the information presented in the EIS with the information requirements set out in the EIS guidelines will be provided. The proponent will provide copies of the EIS and its summary for distribution, as directed by the CNSC, including paper and electronic versions in unlocked, searchable PDF format.

Top of page

2. Executive Summary

For efficiency, the proponent may consider preparing a summary of the EIS in both official languages (English and French) to be provided to the CNSC at the same time as the EIS. The proponent is also encouraged to consider making the executive summary available in the language(s) spoken by Indigenous communities in close proximity to the project (e.g., Cree, Dene).

The summary, provided as a separate document, will include:

- a concise description of all key project components and related activities
- a summary of the consultation held with Indigenous groups, the public and government agencies, including a summary of the issues raised and the proponent's responses
- an overview of the key environmental effects of the project and proposed technically- and economically-feasible mitigation measures
- the proponent's conclusions on the residual environmental effects of the project after taking mitigation measures into account and the significance of those effects
- sufficient details for the reader to learn about and understand the project, its potential environmental effects, mitigation measures, the significance of the residual effects and the follow-up program

Top of page

3. Introduction and Overview

3.1 About the proponent

In the EIS, the proponent will:

- provide contact information (e.g., name, address, phone, fax, email)

- identify itself and provide the name of the legal entity or entities that would develop, manage and operate the project
- describe corporate and management structures
- identify key personnel, contractors and/or sub-contractors responsible for preparing the EIS

3.2 Project overview

The EIS will describe the project, key project components and associated activities, scheduling details, the timing of each phase of the project and other key features. If the project is part of a larger sequence of projects, the EIS will outline the larger context.

The overview identifies the key project components rather than providing a detailed description which is presented in a different section of the EIS.

3.3 Project location

The EIS will contain a description of the geographical setting in which the project will take place. This description should include those aspects of the project and its setting that are key to understanding the project's potential adverse environmental effects, including:

- geographical maps of the project location (at an appropriate scale) that includes project components, boundaries of the proposed project site with Universal Transverse Mercator (UTM) coordinates, the lease boundary, site study area, local study area, regional study area, the major existing infrastructure, adjacent land uses and any important environmental features
- current land use in the area
- the distance of the project facilities and components to any federal lands

- the environmental significance and value of the geographical setting in which the project will take place and the surrounding area
- environmentally sensitive areas, such as national, provincial and regional parks, ecological reserves, wetlands, estuaries and habitats of federally (Schedule 1 of *Species at Risk Act* (SARA)) or provincially listed species at risk and other sensitive areas
- a description of local and Indigenous communities
- traditional Indigenous territories, treaty lands, and Indian reserve lands and Métis harvesting regions and/or settlements

3.4 Regulatory framework and the role of government

The EIS should identify:

- the environmental and other regulatory approvals and legislation, including the CEAA 2012, that are applicable to the project at the federal, provincial, regional and municipal levels
- government policies, resource management plans, planning or study initiatives pertinent to the project and/or EA and their implications
- any treaty or self-government agreements with Indigenous groups that are pertinent to the project and/or EA
- any relevant land use plans, land zoning or community plans
- regional, provincial and/or national objectives, standards or guidelines that have been used by the proponent to assist in the evaluation of any predicted environmental effects

Top of page

4. Project description

4.1 Purpose of the project

The EIS will describe the purpose of the project by providing the rationale for the project. It explains the background, the problems or opportunities that the project is intended to satisfy and the stated objectives from the proponent's perspective. If the objectives of the project are related to broader private or public sector policies, plans or programs, this information should also be included.

4.2 Alternative means of carrying out the project

The EIS shall identify and describe alternative means to carry out the project that are, from the perspective of the applicant, technically and economically feasible. The alternative means identified by the proponent include options for locations, development and implementation methods, routes, designs, technologies and mitigation measures. Alternative means may also be related to the construction, operation, expansion, decommissioning and abandonment of a physical work.

The approach and level of effort applied to addressing alternative means is established on a project-by-project basis, taking into consideration:

- the characteristics of the project
- the environmental effects associated with the potential alternative means
- the health or status of VCs that may be impacted by the alternative means
- the potential for mitigation and the extent to which mitigation measures may address potential environmental effects
- the level of concern expressed by the public and Indigenous groups

The EIS should also describe the environmental effects of each of the alternative means. It should list the criteria used to identify an alternative means as unacceptable and explain how these criteria are applied, as should the criteria used to examine the environmental effects of each remaining alternative means to identify the preferred alternative.

The proponent will complete the following procedural steps for addressing alternative means:

- Identify and describe in sufficient detail the alternative means to carry out the project:
    - develop criteria to determine the technical and economic feasibility of the alternative means
    - identify those alternative means that are technically and economically feasible
- Identify the effects of each technically and economically feasible alternative means:
    - identify those elements of each alternative means that could produce effects in sufficient detail to allow a comparison with the effects of the project
    - the effects referred to above include both environmental effects and potential adverse impacts on potential or established Indigenous and treaty rights and related interests
- Describe the methodology used for the analysis of alternative means and the conclusion reached (i.e., preferred means)

For further information regarding “purpose of” and “alternative means”, please consult the Impact Assessment Agency’s operational policy statement, *Addressing “Purpose of” and “Alternative Means” under the CEAA 2012* (see bibliography).

The CNSC recognizes that projects may be in the early planning stages when the EIS is being prepared. Proponents are strongly encouraged to conduct an environmental effects analysis where they have not made final decisions about the placement of project infrastructure or the technologies to be used, or if several options exist for various project components.

4.3 Scope of project

The scope of the project for the purpose of the EA includes all the phases, components, activities and federal decisions proposed by the proponent as described in the project description that has been determined to meet the requirements of the *Prescribed Information for the Description of a Designated Project Regulations*. The CNSC's Commission may also determine that other components and/or activities in relation to the project are to be included in the project scope.

The proponent will consider all phases, components, activities and federal decisions identified in the scope of project as part of the effects assessment.

4.3.1 Project components

The EIS will describe the project by presenting the project components, associated and ancillary works, and other characteristics that will assist in understanding the environmental effects.

4.3.2 Project activities

The EIS will include descriptions of each phase associated with the proposed project.

This will include descriptions of the activities to be carried out during each phase, the location of each activity, expected outputs and an indication of the activity's magnitude and scale.

Although a complete list of project activities should be provided, the emphasis will be on activities with the greatest potential to have environmental effects. Sufficient information will be included to predict environmental effects and address concerns identified by the public and

Indigenous groups. Highlight activities that involve periods of increased environmental disturbance or the release of materials into the environment.

The EIS will include a summary of the changes that have been made to the project since originally proposed, including the benefits of these changes to the environment, Indigenous peoples, and the public.

The EIS will include a schedule including time of year, frequency, and duration for all project activities.

Top of page

5. Scope of the environmental assessment

5.1 Factors to be considered

Scoping establishes the EA's parameters and focuses the assessment on relevant issues and concerns. The EA of the designated project must take into account the following factors, as listed in subsection 19(1) of the CEAA 2012:

a. the section 5 environmental effects of the designated project (such as changes to fish and fish habitat, aquatic species, migratory birds), including the environmental effects of malfunctions or accidents that may occur in connection with the designated project, and any cumulative environmental effects likely to result from the designated project in combination with other physical activities that have been or will be carried out
b. the significance of those environmental effects
c. comments from the public that are received in accordance with the CEAA 2012

d. mitigation measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the designated project
e. the requirements of the follow-up program in respect of the designated project
f. the purpose of the designated project
g. alternative means of carrying out the designated project that are technically and economically feasible and the environmental effects of any such alternative means
h. any changes to the designated project that may be caused by the environment
i. the results of any relevant study conducted by a committee established under section 73 or 74 of the CEAA 2012
j. any other matter relevant to the EA that the CNSC requires to be taken into account, in accordance with the *Nuclear Safety and Control Act*

Pursuant to subsection 19(2) of the CEAA 2012, the scope of the factors to be taken into account under paragraphs 19(1)(a), (b), (d), (e), (g), (h) and (j) is determined by the CNSC, as the responsible authority.

In conjunction with subsections 4.1 and 4.4 of REGDOC-2.9.1, *Environmental Protection: Environmental Policy, Assessments and Protection Measures*, the CNSC requires an environmental risk assessment (ERA) and a human health risk assessment (HHRA) as part of the EIS. An ERA is a systematic process that identifies, quantifies and characterizes the risk posed by nuclear or hazardous substances and physical stressors in the environment. The ERA:

- identifies facility- or activity-specific characteristics and site-specific environmental characteristics
- identifies interactions between those characteristics
- assesses the likelihood and significance of these interactions and the resulting potential effects on the environment and the public

An HHRA is completed as a sub-element of an ERA for both nuclear and hazardous substances.

To implement the Government of Canada's interim measure with respect to upstream greenhouse gas emissions, the CNSC may require consideration of these types of emissions in the scope of the EA. On March 19, 2016, a definition of upstream greenhouse gas (GHG) emissions was published by Environment Canada and Climate Change in the *Canada Gazette*. The proposed definition of upstream includes "all industrial activities from the point of resource extraction to the project under review." The processes to be considered as upstream activities will vary by type of resource and nature of the project being assessed. In general, upstream activities include extraction, processing, handling and transportation.

Where a reliable and feasible methodology exists for calculating upstream GHG emissions linked to the project, the proponent will be required to provide sufficient information to estimate these types of emissions. This information should be presented by individual pollutant and summarized in carbon dioxide equivalent units per year. If upstream GHG emissions are not considered in the assessment, the proponent will provide a rationale in the EIS.

5.2 Scope of factors

5.2.1 Valued components to be examined

Valued components (VCs) refer to environmental biophysical or human features that may be impacted by a project. The value of a component relates not only to its role in the ecosystem, but also to the value people place on it. For example, it may have scientific, social, cultural, economic, historical, archaeological or aesthetic importance.

The EIS identifies the VCs linked to section 5 of the CEAA 2012, including those identified in section 9.2 (Part 2), that may be affected by changes in the environment, as well as species at risk and their critical habitat as per the requirement outlined in section 79 of the SARA.

Under section 73 of the SARA, the Minister of Environment and Climate Change Canada may grant permits authorizing an activity affecting a listed wildlife species or any part of its residence or critical habitat that would otherwise be prohibited. Where the proponent determines that a listed wildlife species or any part of its residence or critical habitat would be affected by the project activities, it should consult directly with the Canadian Wildlife Service as early as possible in the process.

The final list of VCs to be presented in the EIS will be completed according to the evolution and design of the project and reflect the knowledge about the environment acquired through public consultation and Indigenous engagement. The EIS will describe the methods used to predict and assess the potential adverse environmental effects the project would have on these components.

The VCs will be described in sufficient detail to allow the reviewer to understand their importance and to assess the potential for environmental effects arising from the project activities. The EIS will provide a rationale for selecting specific VCs and for excluding any VCs or information specified in these guidelines. Challenges with particular exclusions may arise, so it is important to document the information and criteria used to make each determination. Examples of justification include primary data collection, computer modelling, literature references, public consultation, expert input or professional judgement. The EIS will identify those VCs, processes and interactions that were raised as concerns during any workshop or meeting held by the proponent, or that the proponent considers will likely be affected by the project. In doing so, the EIS will indicate to whom these concerns are important and why, including environmental, Indigenous, social, economic, recreational and aesthetic considerations. If comments are received on a component that has not been included as a VC, the comments will be summarized, and the rationale for excluding the VC will be provided.

5.2.2 Spatial and temporal boundaries

The spatial and temporal boundaries used in the EA may vary depending on the VC and will be considered separately for each one. The proponent is encouraged to consult with the CNSC, federal and provincial government departments and agencies, local government and Indigenous groups. It is also encouraged to take into account public comments when defining the spatial boundaries used in the EIS.

The EIS will describe the spatial boundaries, including local and regional study areas, for each VC to be used to assess the potential adverse environmental effects of the project and provide a rationale for each boundary. Spatial boundaries are defined by taking into account the following criteria. This list is not exhaustive:

a. the physical extent of the proposed project, including any off-site facilities or activities
b. the extent of aquatic and terrestrial ecosystems potentially affected by the project
c. the extent of potential effects arising from noise, light and atmospheric emissions
d. the extent to which traditional land use or treaty rights could potentially be affected by the project
e. current land and resource use for residential, commercial, industrial, recreational, cultural and aesthetic purposes by communities whose areas include the physical extent of the project

f. the size, nature and location of past, present and reasonably foreseeable projects and activities which could interact with items (b), (c), (d) and (e)
g. community and Indigenous traditional knowledge, and ecological and technical considerations

The following geographic study areas should serve as the basis for developing project- and effect-specific study areas:

Site study area: The site study area is the project’s footprint. In other words, it is where project activities would be undertaken, and it includes the project’s proposed facilities, buildings and infrastructure.

Local study area: The local study area is defined as the area that exists outside the site study area boundary, where measurable changes to the environment may be anticipated as a result of the proposed activities at any phase of the project, either through normal activities or from possible accidents or malfunctions. The boundaries must change if appropriate following an assessment of the spatial extent of potential effects. The geographic boundary depends on the factor being considered (e.g., a local study area defined for the aquatic environment will differ from that defined for the atmospheric environment).

Regional study area: The regional study area is defined as the area within which the potential effects of this project may interact with the effects of other projects, resulting in potentially cumulative effects. The geographic boundary for the regional study areas is also specific to the factor being considered.

Within these study areas, the boundary of concern will extend to a depth that will include the full extent of the surface water and groundwater.

The EA's temporal boundaries will span all phases of the project determined to be within the scope of the project, as specified in section 4.3. If impacts are predicted after project decommissioning, this should be taken into consideration when defining boundaries. At a minimum, the assessment is expected to include the period of time during which the maximum impact is predicted to occur. Community and Indigenous traditional knowledge should factor into decisions about temporal boundaries. If the temporal boundaries do not span all phases of the project, the EIS will identify the boundaries used and provide a rationale.

Top of page

6. Public and stakeholder consultation

In accordance with CNSC's REGDOC-3.2.1, *Public Information and Disclosure*, the EIS will describe the ongoing and proposed participation activities that the proponent will undertake or that it has already undertaken on the project. It will describe the efforts made to distribute project information, and describe the information and materials that were distributed during the public consultation process. The EIS will indicate the methods used, where the consultation was held, the persons and organizations consulted, the concerns voiced and the extent to which this information was incorporated into the project design and EIS. The EIS will provide a summary of the key project issues raised and their potential environmental effects, as well as describe any outstanding issues and ways to address them.

Top of page

7. Indigenous engagement

In accordance with the CNSC's REGDOC-3.2.2, *Indigenous Engagement*, the EIS will describe the proponent's engagement activities with potentially affected Indigenous groups.

The EIS will include, and the proponent should consider engaging with potentially affected Indigenous groups to obtain their views on the following, to be included in the EIS:

- the objectives of Indigenous engagement activities and the methods used
- each Indigenous group's potential or established rights, including geographical extent, nature, frequency, timing, maps and data sets (e.g., fish catch numbers), when this information is provided by a group to the proponent or available through public records
- comments, specific issues and concerns raised by Indigenous groups and how the key concerns were addressed
- the potential adverse impacts of the project on potential or established Indigenous or treaty rights
- the effects of changes to the environment on Indigenous peoples (health and socio-economic conditions; physical and cultural heritage, including any structure, site or thing that is of historical, archaeological, paleontological or architectural significance; and current use of lands and resources for traditional purposes), pursuant to paragraph 5(1)(c) of the CEAA 2012
- VCs suggested by Indigenous groups for inclusion in the EIS, whether they were included and the rationale for any exclusions
- measures identified to mitigate or accommodate potential adverse impacts of the project on the potential or established Indigenous or treaty rights and effects of changes to the environment for Indigenous peoples, including suggestions made by Indigenous groups

One suggested format for providing this information is a table to track the key issues raised by each Indigenous group, including concerns raised about the project, proposed mitigation options and where appropriate, a reference to the proponent's analysis in the EIS.

Top of page

8. Description of the environment

8.1 Baseline environment

The EIS will include a description of the environment, including the components of the existing environment and environmental processes, their interrelations and interactions, and the variability in these components, processes and interactions over time scales appropriate to the EIS. In characterizing the environmental effects of the project, the proponent will consider the current baseline environment and environmental trends within the project area. The description of the existing baseline and environmental trends should consider past projects and activities carried out by the proponent and/or others in the project area.

Based on the scope of the project, the EIS will present sufficiently detailed baseline information to determine the effects the project could have on the VCs and analyze those effects. If other VCs are identified while conducting the EA, the baseline condition for these components will also be described in the EIS. The baseline description should include results from studies done prior to any physical disruption of the environment due to initial project activities (e.g., site preparation). To determine the appropriate spatial boundaries to describe the baseline information, refer to section 5.2.2 (Part 2) of these guidelines. As a minimum, the EIS will include a description of the following biophysical and human (health/socio-economic) environmental components.

8.2 Atmospheric environment

The atmospheric environment includes the climate conditions at the site and in the local and regional study areas. It includes the seasonal variations in weather conditions in the study areas to allow the assessment of effects on the facility or activity.

The applicant or licensee should provide a description of the existing ambient air quality in the study areas, with emphasis on characterizing radiological and non-radiological analytes.

The description should include meteorological information, such as air temperature, relative humidity, precipitation, wind speed and direction, atmospheric pressure and solar radiation. It should also include the occurrence of weather phenomena (e.g., lightning, temperature inversions, fog). Special consideration should be given to analyzing extreme and rare meteorological phenomena (e.g., tornadoes). Uncertainties should be described and taken into account when discussing the reliability of the information presented.

The description should also include current ambient daytime and nighttime noise levels at the site and local study areas, and include information about its source(s), geographic extent and temporal variations. The description should provide ambient noise levels for other areas that could be affected by the facility or activity. Some examples are:

- increased traffic along transportation corridors to and from the site during construction

- receptors at residences and sensitive sites (such as hospitals, schools, daycare facilities, seniors' residences and places of worship)

The applicant or licensee should describe the influence of regional topography or other features that could affect weather conditions in the study areas.

The baseline information should be sufficient to support the use of an atmospheric dispersion model to conduct a site-specific ERA and to support an assessment of environmental effects on the project (e.g., tornadoes).

8.3 Surface water environment

The surface water environment includes all surface water features and hydrology that affect surface water at the site or in the local and regional study areas. The applicant or licensee should include delineation of drainage basins at appropriate scales.

When documenting the water quality of all surface water, the applicant or licensee should demonstrate the use of appropriate sampling and analytical protocols for the range of analytical parameters that could potentially be influenced by the facility or activity. This information should be presented using tables, maps and figures to provide an understanding of surface water characteristics and conditions at the site and in the local and regional study areas.

The applicant or licensee should describe hydrological regimes within the drainage basin, including seasonal fluctuations and the year-to-year variability of all surface waters. The applicant or licensee should assess the normal flow, flooding and drought properties of water bodies, as well as the interactions between surface water and groundwater flow systems. The applicant or licensee should describe all water sources used for drinking water in the area, including source water intakes for drinking water treatment facilities.

The baseline information should be sufficient to support the use of an aquatic dispersion model to conduct a site-specific ERA and to support an assessment of the effects (e.g., flooding) of the environment for the facility or activity.

The applicant or licensee should document the sediment quality of all water bodies to be affected by the facility or activity and demonstrate the use of appropriate sampling and analytical protocols for the range of analytical parameters with the potential to be influenced by the facility or activity. This information should provide an appropriate understanding of sediment characteristics and conditions on the site and in the local and regional study areas.

The study design should be fully described, including the allocation of samples in space and time, measurement methods and results.

The applicant or licensee should include an assessment of any limitations or gaps in the quality and extent of baseline data and methods, as well as the method(s) by which they have been addressed.

8.4 Aquatic environment

The aquatic environment includes the aquatic and wetland species at the site and within the local and regional study areas, including the flora and fauna and their habitats.

The applicant or licensee should seek information from relevant authorities (e.g., Environment and Climate Change Canada, Fisheries and Oceans Canada and provincial or territorial authorities) on aquatic and wetland species and habitat for the local and regional study areas. The applicant or licensee should also undertake independent studies to gather the necessary information.

The applicant or licensee should include a description of the food chain and food web dynamics as a habitat component, as this relates to fish populations, and the potential effects (e.g., impingement and entrainment) the facility or activity will have.

The applicant or licensee should provide detailed habitat mapping that demonstrates habitat usage by fish within the study areas. This information should include depth profiles, substrate mapping, water temperature profiles and a description of known and potential habitat usage (e.g., spawning, nursery, rearing, feeding and migration) by fish in the study areas.

The applicant or licensee should identify any biological species that have natural conservation status – in other words, that are deemed rare, vulnerable, endangered, threatened or uncommon at a federal, provincial or municipal level – and their critical habitats, if any are identified.

The applicant or licensee should provide baseline characterization of radionuclide and hazardous substance levels in aquatic biota to support human and ecological risk assessments.

The applicant or licensee should fully describe the study design, including the allocation of samples in space and time, measurement methods and results.

The applicant or licensee should include an assessment of any limitations or gaps in the quality and extent of baseline dates and methods, as well as the method(s) by which they have been addressed.

8.5 Geological and hydrogeological environment

The geological and hydrogeological environment includes the bedrock and overburden geology at both the local and regional scales.

8.5.1 Geology

The applicant or licensee should characterize the geomorphology, topography, quaternary geology and soil characteristics, structural geology, petrology, geochemistry, economic geology and hydrogeology. The applicant or licensee should also describe the geomechanical properties that apply to the region and at the site that will be disturbed.

The applicant or licensee should provide the geotechnical properties of the overburden, including shear strength and liquefaction potential, to allow for the assessment of slope stability and the bearing capacity of foundations under both static and dynamic conditions.

The description of the structural geology should include regional, local and site-specific documentation of fractures and faults. It should include a description of primary geological features and deformation fabrics, both at the site and in the local and regional study areas.

If applicable, the applicant or licensee should describe the coastal geomorphology and include the characteristics of any lakefront, ocean bluff or shoreline, and both near-shore and offshore zones.

The baseline characterization should be sufficient to assess the effects of the environment on the facility or activity (e.g., seismic effects).

The applicant or licensee should present a geological model that incorporates all overburden and bedrock information. If extrapolation is required to derive the stratigraphy, the applicant or licensee should explicitly discuss the uncertainties and the need for additional field investigations to reduce those uncertainties.

The applicant or licensee should describe the geotechnical and geophysical hazards, including consideration of subsidence, uplift, seismicity (and active faulting), and it should consider the potential for movement at the ground surface (including co-seismic rupture) and earthquake ground motions. A seismic hazard assessment should be provided. Where appropriate, narrative descriptions should be supplemented by geological maps, figures, cross-sections, borehole logs and photographs (with specific location information).

8.5.2 Hydrogeology

The applicant or licensee should describe the hydrogeology at the site and in the local and regional study areas. The description should characterize the physical and geochemical properties of all overburden and bedrock hydrogeological units (from the ground surface to the uppermost basement unit, which is site dependent).

Units may be characterized as aquifers or aquitards, and unit descriptions should include their geochemical characteristics, vertical and lateral permeabilities, transport mechanism (diffusion versus advection) and the directions of groundwater flow.

The applicant or licensee should identify the groundwater recharge and discharge areas, and describe in detail groundwater interactions with surface waters.

The applicant or licensee should present a conceptual and numerical hydrogeological model that discusses the hydrostratigraphy and groundwater flow systems.

The applicant or licensee should provide a description of baseline groundwater quality at the site and in the local study area. The applicant or licensee should also describe local and regional potable groundwater supplies, including their current use and potential for future use.

8.6 Terrestrial environment

The terrestrial environment includes flora and fauna, their habitats, any wildlife corridors and the soil.

The applicant or licensee should describe the terrestrial species at the site and within the local and regional study areas, including flora, fauna and their habitat. The applicant or licensee should identify all biological species at risk (i.e., endangered, threatened, special concern, extirpated at a federal, provincial or municipal level) known to occur in the area or where the site is within range of the species.

The applicant or licensee should describe the presence and importance of wildlife habitat within the study areas, including critical habitats for any listed species. The applicant or licensee should also describe any wildlife corridors and physical barriers to movement.

The applicant or licensee should identify all protected and conservation areas established by federal, provincial and municipal jurisdictions (e.g., wilderness areas, parks, sites of historical or ecological significance, nature reserves, federal migratory bird sanctuaries and wildlife management areas).

The applicant or licensee should describe the existing soil quality (including hazardous and radiological substance concentrations) for all study areas, as well as any additional soil quality parameters potentially relevant for modelling purposes (such as the transport and bioavailability of contaminants of potential concern).

The applicant or licensee should provide baseline a characterization of radionuclide and hazardous substance levels in vegetation and other non-human biota to support human and ecological risk assessments. The characterization should also take into consideration the baseline conditions of other applicable environmental components (e.g., the atmospheric environment).

The applicant or licensee should undertake independent studies to gather the necessary information, as appropriate. The applicant or licensee should describe field studies in terms of representativeness of the target populations where possible. The applicant or licensee should fully describe the design of the study, including the allocation of samples in space and time, measurement methods and results.

The applicant or licensee should include an assessment of any limitations or gaps in the quality and extent of baseline data and methods, and the method(s) by which they were addressed.

8.7 Ambient radioactivity

Ambient radioactivity arises from sources, their activity levels and their origin, for all applicable environmental media (including air, soil, food, water, aquatic sediments and plant or animal tissue).

The applicant or licensee should describe the ambient radiological conditions at the site and in the local and regional study areas. The applicant or licensee should include information about the existing conditions, including an inventory of sources, their activity levels and their origin (natural or anthropogenic), for all applicable environmental media.

The applicant or licensee should fully describe the design of the study, including the allocation of samples in space and time, measurement methods and results.

The description should include an assessment of any limitations or gaps in the quality and extent of the baseline data and methods, as well as the method(s) by which they have been addressed.

8.8 Human health

The potential effects of the facility or activity on human health include both radiological sources and non-radiological contaminants.

The applicant or licensee should describe the current health profiles of the communities likely to be affected by the facility or activity, including information on the population health of the communities in the local and regional study areas.

The applicant or licensee should provide, to the extent available, information about the current consumption of locally grown harvests and country foods, and the quality by food type, amounts consumed and parts consumed (whole body or specific organs).

The applicant should characterize the socio-economic environment, including:

- the rural and urban settings likely to be affected by the project
- any federal lands and lands located outside the province or Canada that may be affected by the project
- the current use of land in the study area, with a description of hunting, recreational and commercial fishing, trapping, gathering, outdoor recreation, use of seasonal cabins, outfitters
- current use of all waterways and water bodies that will be directly affected by the project, including recreational uses, where available
- location of and proximity to any permanent, seasonal or temporary residences or camps
- health [1] and socio-economic conditions, covering the functioning and health of the socio-economic environment and encompassing a broad range of matters that affect communities in the study area in a way that recognizes interrelationships, system functions and vulnerabilities

- physical and cultural heritage, including structures, sites or things of historical, archaeological, paleontological or architectural significance

8.9 Indigenous land and resource use

Indigenous land and resource use includes lands, waters and resources of specific value, traditional activities and lifestyle, and traditional dietary habits.

Traditional land use may include areas where traditional activities are being carried out, such as establishing seasonal camps, camping, travel on traditional routes, gathering of country foods and medicines (hunting, fishing, trapping, planting and harvesting). Traditional land use also includes spiritual sites of significance to Indigenous people.

The applicant or licensee should identify the lands, water and resources of specific social, economic, archaeological, cultural or spiritual value to Indigenous people, including established and asserted Indigenous or treaty rights, that may be affected by the facility or activity.

The applicant or licensee should describe Indigenous land and resource use at the site and in the local and regional study areas. The applicant or licensee should identify traditional activities, including activities for food, social, ceremonial and other cultural purposes, in relation to such lands, waters and resources with a focus on the current use of lands, waters and resources for traditional purposes.

The applicant or licensee should describe the traditional dietary habits and dependence on country foods and harvesting for other purposes, including harvesting of plants for medicinal purposes. The analysis should focus on identifying the potential adverse effects of the facility or activity that impact the ability of future generations of Indigenous people to pursue traditional activities or lifestyle.

Top of page

9. Effects assessment

9.1 Predicted changes to the physical environment

The assessment will include a consideration of the predicted changes to the environment that result from the project being carried out or from of any powers, duties or functions to be exercised by the federal government in relation to the project. These predicted changes to the environment are to be considered in relation to each phase of the project (i.e., construction, operation, decommissioning) and are to be described in terms of magnitude, geographic extent, duration and frequency, and whether the environmental changes are reversible or irreversible.

As changes to various parts of the physical environment may be inter-related in an ecosystem, the EIS will explain and describe the connections between the changes described.

9.2 Predicted effects on valued components

Based on the predicted changes to the environment identified in section 9.1 (Part 2), the proponent is to assess the environmental effects of the project on the VCs identified as per section 5.2.1 (Part 2).

Based on the predicted changes to the environment identified in section 9.1 (Part 2), additional VCs are to be selected based on the following:

- If there is potential for the project to result in environmental changes on federal lands, in another province or in another country, VCs of importance not already identified are to be listed in this section.
- If federal decisions about the project will lead to environmental changes, these environmental changes are to be considered stand-

alone VCs.

All interconnections between VCs and between changes to multiple VCs will be described.

The proponent will use the information in appendix C of the CNSC's REGDOC-2.9.1, *Environmental Protection: Environmental Policy, Assessments and Protection Measures* and CEAA 2012 guidance documents listed on the Impact Assessment Agency's website for guidance on assessing the environmental effects of the project (refer to the bibliography for titles and web pages).

9.3 Mitigation measures

Every EA conducted under the CEAA 2012 will consider measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project. Measures that are technically and economically feasible include application of best industry practices, pollution prevention principles such as best available technology and techniques economically achievable, and radiation protection principles, such as keeping radiation exposure and doses as low as reasonably achievable (ALARA). Under the CEAA 2012, mitigation includes measures to eliminate, reduce or control the adverse environmental effects of a project, as well as restitution for damages to the environment through replacement, restoration, compensation or other means.

Each measure will be specific, achievable, measurable and verifiable, and described in a manner that avoids ambiguity in intent, interpretation and implementation. Mitigation measures may be considered for inclusion as conditions in the EA decision statement and/or in other compliance and enforcement mechanisms provided by other authorities' permitting or licensing processes.

As a first step, the proponent is encouraged to use an approach based on the avoidance and reduction of the effect(s) at the source. Such an approach may include the modification of the design of the project or relocation of project components.

The EIS will describe the standard mitigation practices, policies and commitments that constitute technically and economically feasible mitigation measures and that will be applied as part of standard practice regardless of location (including the measures directed at mitigating adverse socio-economic effects). The EIS will then describe the project's environmental protection plan and its environmental management system, through which the proponent will deliver this plan. The plan will provide an overall perspective on how potentially adverse effects would be minimized and managed over time. The EIS will further discuss the mechanisms the proponent would use to require its contractors and sub-contractors to comply with these commitments and policies and with auditing and enforcement programs.

The EIS will then describe mitigation measures that are specific to each environmental effect identified. Measures will be written as specific commitments that clearly describe how the proponent intends to implement them and the environmental outcome the mitigation is designed to address. The EIS will describe mitigation measures in relation to species and/or critical habitat listed under the SARA. These mitigation measures will be consistent with any SARA permit, applicable recovery strategy and/or action plan.

The EIS will specify the actions, works, minimal disturbance footprint techniques, best available technology, corrective measures or additions planned during the project's various phases to eliminate or reduce the significance of potential adverse effects. The impact statement will also present an assessment of the effectiveness of the proposed technically and economically feasible mitigation measures. The basis used to determine whether the mitigation measure reduces the significance of a potential adverse effect will be made explicit. The proponent is also encouraged to identify mitigation measures for effects that are adverse although not significant.

The EIS will indicate what other technically and economically feasible mitigation measures were considered, and explain why they were rejected. Trade-offs between cost savings and effectiveness of the various forms of mitigation will be justified. The EIS will identify who is responsible for the implementation of these measures and the system of accountability.

For proposed mitigation measures for which there is little experience or that have questionable effectiveness, the potential environmental risks and effects – should those measures not be effective –will be clearly and concisely described. In addition, the EIS will identify the extent to which technological innovations will help mitigate environmental effects. Where possible, it will provide detailed information on the nature of these measures, their implementation and management, and how they are integrated into the follow-up program.

The EIS will document specific suggestions raised by Indigenous groups for mitigating the effects of changes to the environment on Indigenous peoples (section 5(1)(c) of CEAA 2012). For the mitigation measures intended to address the effects of changes to the environment for Indigenous peoples, the proponent must discuss the residual effects with the Indigenous groups prior to submitting the EIS.

Adaptive management is not considered a mitigation measure, but if the follow-up program indicates that corrective action is required, the proposed approach for managing the action should be identified.

9.4 Other effects to consider

9.4.1 Accidents and malfunctions

The applicant should provide an assessment of potential health and environmental effects resulting from postulated radiological and conventional malfunctions or accidents. The EIS should also include any mitigation measures, such as monitoring, contingency, clean-up or restoration work in the surrounding environment that would be required during or immediately following the postulated malfunction and accident scenarios.

The EIS should provide a description of postulated malfunction and accident sequences leading to a radiological or non-radiological release considering, as appropriate, internal events, external events and human-induced events, including their frequency, an explanation of how these events were identified and any modeling that was performed.

The applicant can use a bounding approach or use facility- or activity-specific information (e.g., design, operation, projected environmental releases) in the assessment of radiological accidents and malfunctions. If a bounding approach is used, the applicant should provide a detailed rationale for the selection of each bounding scenario.

The EIS should include the source, quantity, mechanism, pathway, rate, form and characteristics of contaminants and other materials (physical and chemical) likely to be released to the surrounding environment during the postulated malfunctions and accidents.

Note: Malfunctions and accidents are reviewed in depth under the NSCA for licensing purposes (for example, under REGDOC-2.4.1, *Deterministic Safety Analysis*; REGDOC-2.4.2, *Probabilistic Safety Assessments for Nuclear Power Plants* and REGDOC-1.1.1, *Site Evaluation and Site Preparation for New Reactor Facilities*. These scenarios should be taken into consideration by the applicant when designing environmental protection measures.

If applicable, the applicant should use operating experience (OPEX) to identify any past abnormal operations, accidents and spills to the extent that they are relevant to the current assessment for the purposes of identifying malfunction and accident scenarios to be assessed.

9.4.2 Effects of the environment on the project

The EIS shall take into account how the environment could adversely affect the project and how this in turn could result in effects on the project (e.g., extreme environmental conditions resulting in malfunctions and accidental events). These events will be considered in different probability patterns (e.g., 5-year flood vs. 100-year flood).

Examples include local conditions, natural hazards (e.g., severe and/or extreme weather conditions), external events (e.g., flooding, drought, ice jams, landslides, avalanches, erosion, subsidence, fire, outflow conditions, geotechnical hazards, seismic events) and biophysical hazards (e.g., algae).

The applicant shall also take into account any potential effects of climate change on the project, including an assessment of whether the project might be sensitive to changes in climate conditions during its lifecycle.

The EIS will provide details of planning, design and construction strategies intended to minimize the potential environmental effects of the environment on the project.

9.4.3 Cumulative effects

The applicant shall assess any residual adverse environmental effects of the project in combination with other past, present or reasonably foreseeable projects and/or activities within the study area.

The applicant should explain the approach and methods used to identify and assess cumulative effects. The approach and methods should be consistent with *Assessing Cumulative Environmental Effects under the*

Canadian Environmental Assessment Act, 2012 (see Bibliography).

Top of page

10. Conclusion on significance of residual effects

The applicant shall assess the significance of any residual effects that persist, taking into consideration the proposed mitigation measures. These residual effects are identified during the ERA or a characterization of the environmental effects.

In the EIS, the applicant should include a detailed analysis of the significance of each residual effect. The applicant should clearly explain the method and definitions used to describe the level of the residual adverse effect (e.g., low, medium, high) for each of the criteria assessed. The applicant should also describe any cumulative environmental effects that are likely to result from the designated project in combination with other physical activities that have been or will be carried on. It should also describe how these levels were combined to reach an overall conclusion on the significance of the adverse effects for each VC.

Some specific criteria to be assessed are:

- magnitude of the effect
- spatial extent of the effect
- duration and frequency of the effect
- degree to which the effect can be reversed or mitigated
- ecological importance

The method used to describe the level of the adverse effect should be transparent and reproducible.

The EIS should identify additional criteria used to assign significance ratings to any predicted adverse effects. It should contain clear and sufficient information to enable the CNSC and the public to understand and review the applicant's judgment of the significance of effects. The applicant should define the terms used to describe the level of significance. In assessing significance against the criteria, the EIS should, where possible, employ relevant existing regulatory documents, environmental standards, guidelines or objectives such as prescribed maximum levels of emissions or discharges of specific hazardous substances into the environment or maximum acceptable levels of specific hazardous substances in the environment.

Top of page

11. Follow-up program

The EIS shall include a framework or preliminary program upon which EA follow-up actions will be managed throughout the life of the project.

The applicant should design the follow-up program to verify the accuracy of the EA predictions and to determine the effectiveness of the measures implemented to mitigate the potential adverse environmental effects of the project. The applicant should also design the follow-up program to incorporate pre-project information that would provide the baseline data; compliance data, such as established environmental quality criteria; regulatory documents, standards or guidelines; and real-time data consisting of observed data gathered in the field. The applicant should describe the compliance reporting methods to be used, including reporting frequency, methods and format.

Where applicable, the proponent will describe how the follow-up program relates to the project's environmental protection plan and environmental management system.

Environmental assessment effects predictions, assumptions and mitigation actions that are to be tested in the follow-up program must be converted into field-testable monitoring objectives. The monitoring design must include a statistical evaluation of the adequacy of existing baseline data to provide a benchmark for testing project effects, and the need for any additional pre-construction or pre-operational monitoring to establish a firmer project baseline.

The proponent will propose a schedule for the follow-up program. The schedule should indicate the timing, frequency and duration of effect monitoring. This schedule would be developed after the statistical evaluation of the length of time needed to detect effects given estimated baseline variability, probable environmental effect size and desired level of statistical confidence in the results (type 1 and type 2 errors).

The description of the follow-up program must include any contingency procedures or plans or other adaptive management provisions as a means of addressing unforeseen effects or correcting exceedances, as required, to comply with benchmarks, regulatory standards or guidelines.

The follow-up program will describe roles and responsibilities for the program and its review process, by both peers and the public.

The EIS should provide discussion on the follow-up program's requirements, and include:

- objectives and structure of the follow-up program and the VCs targeted by the program
- tabular summary and explanatory text of the main components of the program including:

    - a description of each monitoring activity under that component
    - which of the two generic program objectives the activity is relevant to (e.g., verify EA predictions, determine effectiveness of mitigation measures)
    - the specific statement from the EA that goes along with that generic objective and will be the focus for that activity (e.g., program objective: verify predicted effects; environmental assessment effect: no potential adverse effects)
    - the specific monitoring objective for that activity
    - planned schedule
- roles and responsibilities to be played by the proponent, regulatory agencies, Indigenous people, local and regional organizations and others in the design, implementation and evaluation of the program results
- possible involvement of independent researchers
- program funding sources
- information management and reporting (reporting frequency, methods and format)
- possible opportunities for the proponent to include the participation of the public and Indigenous groups, during the development and implementation of the program

The follow-up program plan should be sufficiently described in the EIS to allow independent judgment as to the likelihood that it will deliver the type, quantity and quality of information required to reliably verify predicted effects (or absence of them) and confirm the effectiveness of mitigation measures.

Acronyms

Acronym	Term
ALARA	As Low As Reasonably Achievable
BATEA	As best available technology and techniques economically achievable
CEAA 2012	*Canadian Environmental Assessment Act, 2012*
CNSC	Canadian Nuclear Safety Commission
EA	environmental assessment
EIS	environmental impact statement
ERA	ERA environmental risk assessment
GHG	greenhouse gas
HHRA	human health risk assessment
OPEX	Operating Experience
SARA	*Species at Risk Act*
UTM	Universal Transverse Mercator
VC	valued component

Top of page

Bibliography

Canadian Nuclear Safety Commission. REGDOC-2.9.1, *Environmental Protection: Environmental Policy, Assessments and Protection Measures,* December 2016, http://nuclearsafety.gc.ca/eng/acts-and-regulations/regulatory-documents/published/html/regdoc2-9-1-new/index

Canadian Nuclear Safety Commission. REGDOC-3.2.1, *Public Information and Disclosure,* May 2018, http://www.nuclearsafety.gc.ca/eng/acts-and-regulations/regulatory-documents/published/html/regdoc3-2-1/index

Canadian Nuclear Safety Commission. REGDOC-3.2.2, *Indigenous Engagement*, February 2016, /pubs_catalogue/uploads/REGDOC-3-2-2-Aboriginal-Engagement-version-1.1-eng.pdf

Canada Privy Council Office. *A Framework for the Application of Precaution in Science-based Decision Making about Risk*. ISBN 0-662-67486-3
Cat.no. CP22-70/2003.

Impact Assessment Agency of Canada (formerly Canadian Environmental Assessment Agency). Various guidance documents.

Operational policy statements:

- Assessing cumulative environmental effects under CEAA 2012
- Addressing "purpose of" and "alternative means" under CEAA 2012
- Determining whether a designated project is Likely to cause significant adverse environmental effects under CEAA 2012

Technical guidance:

- Assessing cumulative environmental effects under CEAA 2012
- Determining whether a designated project is likely to cause significant adverse environmental effects under CEAA 2012

- Guide to preparing a description of a designated project under CEAA 2012
- Technical guidance for assessing physical and cultural heritage or any structure, site or thing that is of historical, archeological, paleontological or architectural significance under CEAA 2012
- Technical guidance for assessing the current use of lands and resources for traditional purposes under CEAA 2012

Indigenous and Northern Affairs Canada. Aboriginal and Treaty Rights Information System, https://sidait-atris.aadnc-aandc.gc.ca/atris_online/home-accueil.aspx

---

1 The proponent should refer to Health Canada's guidance documents in order to include the appropriate baseline information relevant to human health.

Date modified:

2021-06-08

Record of Decision

DEC 19-H112

In the Matter of

Project Proponent	NexGen Energy Ltd.
Subject	Decision on the scope of an environmental assessment for the proposed Rook I Project
Date of Decision	February 20, 2020

RECORD OF DECISION – DEC 19-H112

Project Proponent:	NexGen Energy Ltd.
Address/Location:	3150 - 1021 West Hastings Street, Vancouver, BC V6E 0C3
Purpose:	Decision on the scope of an environmental assessment for the proposed Rook I Project
Project description received:	February 14, 2019
Date of decision:	February 20, 2020
Location:	Canadian Nuclear Safety Commission 280 Slater St., Ottawa, Ontario
Panel of Commission:	R. Velshi, President

Decision on the Scoping of an Environmental Assessment under the *Canadian Environmental Assessment Act, 2012*

eDocs 6101243 (Word)
eDocs 6239439 (PDF)

Table of Contents

1.0 INTRODUCTION

1. NexGen Energy Ltd. (NexGen) submitted a description of its Rook I Project to the Canadian Nuclear Safety Commission[1] (CNSC) on February 14, 2019. NexGen has proposed to construct and operate a new uranium mine and mill on the Patterson Lake peninsula in northern Saskatchewan, approximately 155 km north of La Loche and 80 km south of the decommissioned Cluff Lake mine site. The proposed project would include underground and surface facilities to support the extraction and processing of uranium ore from the Arrow deposit, with an annual production of up to 14 million kg of triuranium octoxide (U_3O_8) over an operating period of 24 years.

2. Pursuant to section 15 of the *Canadian Environmental Assessment Act, 2012*[2] (CEAA 2012), which was in effect at the time the project description was submitted, the CNSC, as the Responsible Authority (RA) for the proposed project, was obliged to consider the application of CEAA 2012 in respect of the project.

3. The Rook I Project meets the definition of a "designated project" that is included in the "Physical Activities" list, as defined in section 31 of the *Regulations Designating Physical Activities*[3] made under CEAA 2012, requiring that an EA be carried out for the project. CNSC staff posted a Notice of Commencement of an EA (NOC) on the Canadian Impact Assessment Registry on May 2, 2019, as per section 17 of CEAA 2012, thus commencing the EA.

4. The *Impact Assessment Act*[4] (IAA) came into force on August 28, 2019. However, its transitional provision stipulates that any EA of a designated project by the CNSC commenced under CEAA 2012 in respect of which no decision statement had been issued before the IAA came into force, is to be continued under the CEAA 2012. In accordance with the transitional provision, this EA shall continue under CEAA 2012. On August 29, 2019, the CNSC issued a letter to advise NexGen of this fact, and the letter was posted on the Canadian Impact Assessment Registry.[5]

5. Prior to the EA being carried out, the Commission must determine the scope of the factors to be considered in the EA, under the applicable provisions of CEAA 2012.

[1] The *Canadian Nuclear Safety Commission* is referred to as the "CNSC" when referring to the organization and its staff in general, and as the "Commission" when referring to the tribunal component.
[2] S.C. 2012, c. 19, s. 52.
[3] SOR/2012-147
[4] S.C. 2019, c. 28, s. 1
[5] *Notice of Commencement of an Environmental Assessment – Rook I Project*, https://www.ceaa-acee.gc.ca/050/evaluations/document/129513?culture=en-CA& (accessed January 1 2020), Impact Assessment Agency, issued on May 2, 2019.

Panel

6. Pursuant to section 22 of the NSCA, the President established herself to preside as a Panel of the Commission to consider this matter. The Commission considered written submissions from CNSC staff (CMD 19-H112 and CMD 19-H112.A).

2.0 DECISION

7. Based on its consideration of the matter, as described in more detail in the following sections of this *Record of Decision*, the Commission,

> pursuant to section 19 of the *Canadian Environmental Assessment Act, 2012*, determines the scope of the factors for the environmental assessment of the Rook I Project proposed by NexGen Energy Ltd. to include the factors mandated in paragraphs 19(1)(a) to (h) of the *Canadian Environmental Assessment Act, 2012*, with no additional factors.

8. The Commission accepts CNSC staff's submission that, in accordance with subsection 19(3) of CEAA 2012, Indigenous traditional knowledge and community knowledge shall inform the EA for the Rook I Project.

9. The Commission understands that NexGen will prepare an environmental impact statement (EIS) for the proposed project, as provided for by the CNSC's *Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012*[6] (the EIS Guidelines).

10. The Commission directs CNSC staff to report to the Commission on any issues arising during the conduct of the EA that could warrant the Commission to reconsider the above scoping decision.

3.0 ISSUES AND COMMISSION FINDINGS

11. In consideration of this matter, the Commission examined the completeness and adequacy of the information submitted by CNSC as presented in CMD 19-H112 and CMD 19-H112.A. The Commission notes that CNSC staff included in its submission a detailed revised description of the Rook I Project that was submitted by NexGen in April 2019, a disposition table of the questions and comments resulting from the Indigenous and public consultation on the project description, and the CEAA 2012 process map.

[6] *Generic Guidelines for the Preparation of an Environmental Impact Statement Pursuant to the Canadian Environmental Assessment Act*, CNSC, May 2016.

3.1 Application of *Environmental Assessment Act, 2012*

12. The Commission notes that NexGen submitted its revised description for the Rook I Project to the CNSC in April 2019, at which time CEAA 2012 and its regulations provided the requirements for EA for nuclear projects. The IAA came into force on August 28, 2019. As this project had commenced under CEAA 2012 following the submission of the project description in February 2019, in accordance with the transitional provision provided for by section 182 of the IAA, this project is to continue under CEAA 2012.

13. The Commission notes that the CNSC's EIS Guidelines apply to all "designated projects" under CEAA 2012 and, therefore, apply to this project. The Commission recognizes that the EIS Guidelines provide proponents with the information required for the preparation of their technical studies related to the proposed project.

14. In its written submission, CNSC staff reported that, pursuant to section 20 of CEAA 2012, the relevant federal authorities were informed about the proposed project in order to confirm their future participation in the EA process. CNSC staff submitted that the following five federal authorities have confirmed their participation in and would provide the expertise relevant to the proposed project:

- Environment and Climate Change Canada
- Health Canada
- Natural Resources Canada
- Parks Canada
- Transport Canada

15. The Commission notes that the project is also subject to the EA requirements of the Government of Saskatchewan under *The Environmental Assessment Act* (EAA).[7] CNSC staff submitted that NexGen's project description had been written to meet the requirements of both the federal project description under CEAA 2012 and the provincial technical proposal under the EAA. CNSC staff also submitted that both the federal and provincial EAs will be coordinated to the extent possible, noting that the provincial EA process involves key steps that are similar to those of the CEAA 2012 process, and that NexGen would submit a single EIS to meet the requirements of both the federal and provincial EA processes.

3.2 Consultation on the Scope of the EA

3.2.1 Indigenous Consultation and Engagement

16. The Commission recognizes that the common law duty to consult with Indigenous peoples applies when the Crown contemplates actions that may adversely affect potential

[7] Statutes of Saskatchewan (S.S.), c. E-10.1

or established Indigenous and/or treaty rights, and that cooperation with Canada's Indigenous peoples with respect to EA is one of the purposes of the CEAA 2012. The CNSC ensures that all of its EA and licensing decisions uphold the honour of the Crown and consider Indigenous peoples' potential or established Indigenous and/or treaty rights pursuant to section 35 of the *Constitution Act, 1982*.[8]

17. CNSC staff submitted that it had identified ten Indigenous groups and organizations with potential interest in the Rook I Project, had provided each identified group with the NOC and had solicited comments on NexGen's project description as part of the 30-day comment period. CNSC staff reported that the identified Indigenous groups and organizations with potential interest in the project include:

- Clearwater River Dene Nation (Treaty 8)
- Athabasca Chipewyan First Nation (Treaty 8)
- English River First Nation (Treaty 10)
- Black Lake Denesuline First Nation (Treaty 8)
- Fond-du-Lac Denesuline First Nation (Treaty 8)
- Métis Nation – Saskatchewan
- Buffalo River Dene Nation (Treaty 10)
- Birch Narrows Dene Nation (Treaty 10)
- Ya'thi Néné Lands and Resource Office (representing the Athabasca Basin communities including Black Lake Denesuline First Nation and Fond-du-Lac Denesuline First Nation)
- Meadow Lake Tribal Council

18. The Commission notes that CNSC staff's *Preliminary Indigenous Consultation Report: Rook I Project; Patterson Lake, Saskatchewan*[9] details Indigenous and treaty rights in relation to the proposed project. The Commission's consideration of the comments received on NexGen's project description by way of the 30-day review period is in the next section of this *Record of Decision*.

19. CNSC staff submitted that CNSC staff and NexGen had offered to meet with Indigenous groups and other organizations that had expressed an interest in the proposed project. CNSC staff provided details of meetings that were carried out in September and October of 2019 in Prince Albert, Saskatchewan in order to discuss CNSC-regulated uranium mines and mills, to discuss the EA and licensing processes and to build relationships with the Indigenous groups. CNSC staff further submitted that, throughout the project, it would continue to build relationships with Indigenous groups and communities through meetings and the provision of timely information and project updates, to ensure that the Crown's duty to consult with Indigenous peoples is fulfilled.

[8] *Constitution Act, 1982*, Schedule B to the *Canada Act 1982*, 1982, c. 11 (U.K.)
[9] *Preliminary Indigenous Consultation Report: Rook I Project; Patterson Lake, Saskatchewan*, CNSC, July 2019.

20. The Commission considered the Indigenous engagement activities that had been conducted to date by NexGen. CNSC staff submitted that it was satisfied with the preliminary Indigenous engagement activities carried out by NexGen and that, in accordance with REGDOC-3.2.2, *Indigenous Engagement*,[10] NexGen had submitted its preliminary Indigenous Engagement Report on February 14, 2019. CNSC staff further submitted that this report outlined the Indigenous groups with which NexGen planned to engage during the proposed project, NexGen's planned Indigenous engagement activities and the concerns that had been raised to date by the identified Indigenous groups.

21. CNSC staff submitted that NexGen had organized site visits and meetings with the identified Indigenous groups and organizations in order to introduce the Rook I Project and to discuss any potential impacts on Indigenous or treaty rights, land use or other concerns about the project. CNSC staff noted that, during those meetings, NexGen also provided clarification regarding the project and solicited early feedback on the project engineering and design.

22. CNSC staff reported that, throughout the EA process for the Rook I Project, it would verify NexGen's compliance with REGDOC-3.2.2 and CEAA 2012, including the gathering of any relevant Indigenous knowledge and traditional land use information from identified Indigenous groups to inform the EA.

23. The Commission is satisfied with the efforts made by CNSC staff to date in respect of Indigenous consultation. The Commission expects that CNSC staff will continue to provide the identified Indigenous groups with timely project updates, information and an opportunity to discuss any concerns at key points during the EA process, including the review of NexGen's EIS, CNSC staff's EA Report, and other project-related documentation.

24. The Commission is satisfied with the preliminary Indigenous engagement activities carried out by NexGen for this project. The Commission expects NexGen to continue to provide updates on the progress of its Indigenous engagement plan in future iterations of the Indigenous Engagement Report for the project, as detailed in the information submitted for this hearing. The Commission directs CNSC staff to continue to monitor NexGen's progress throughout the regulatory review process to ensure compliance with REGDOC-3.2.2 and CEAA 2012 requirements.

3.2.2 Indigenous and Public Participation, and Participant Funding

25. The Commission recognizes that section 24 of CEAA 2012 requires that the public be provided with an opportunity to participate in an EA. CNSC staff submitted that the first public and Indigenous participation opportunity that the CNSC offered was a 30-day review of the Rook I Project description and that, in response, submissions had been received from four Indigenous groups including the Ya'thi Néné Land and Resource Office (Ya'thi Néné), the Clear Water Dene Nation, the Métis Nation – Saskatchewan,

[10] CNSC Regulatory Document, REGDOC-3.2.2, *Indigenous Engagement*, version 1.1, 2019.

and the Athabasca Chipewyan First Nation. No submissions were received from members of the public.

26. The Commission notes that Table 3 of CMD 19-H112 includes CNSC staff responses to key themes found in the four submissions received during the comment period and that Appendix C of CMD 19-H112 includes a detailed disposition table of these submissions, as well as CNSC staff's responses. CNSC staff reported that the submissions from Indigenous groups encompassed questions and comments regarding the importance of: the protection of ecological systems; environmental monitoring; traditional land use; engagement plans; environmental and human health impact; protection of Indigenous and/or treaty rights; flexible, varied and continued engagement by NexGen; the EA taking into consideration the cumulative effects; and the EA process. CNSC staff further reported that the disposition table had been shared with all of the Indigenous groups that submitted comments, and that it is posted on the Canadian Impact Assessment Registry.[11]

27. Pursuant to section 58 of CEAA 2012, an RA must establish a participant funding program (PFP). Pursuant to paragraph 21(1)(b) of the NSCA, the CNSC has the authority to provide participant funding through its own PFP in order to enhance Indigenous and public participation in the regulatory review of a project, and to bring value-added information to the Commission. In respect of the Rook I Project, this would include the EA process itself. Participant funding through the CNSC's PFP is awarded based on recommendations from an independent funding review committee.

28. CNSC staff reported that the CNSC planned to award participant funding in respect of the proposed Rook I Project and proposed that the funding be offered in two phases, consisting of $150,000 for each phase. CNSC staff submitted that the planned first phase of funding would be for the review of the draft EIS, while the second phase would be for the remainder of the Rook I Project regulatory process, including a public hearing to consider the regulatory approval of the EA.

29. CNSC staff submitted that it had sought input from Indigenous groups and the public on how they would like to be engaged during the EA process. Indigenous groups provided comments on the importance of early ongoing engagement by NexGen with the communities and participation in the EA process including funding. CNSC staff submitted that it will provide regular updates directly to Indigenous groups throughout the regulatory process and that CNSC staff is committed to ongoing consultation and engagement with Indigenous groups and the public.

30. The Commission is satisfied with the efforts made by CNSC staff in regard to the comment period for the project description. The Commission recognizes that future Indigenous and public participation opportunities for this project will include a public comment period on NexGen's draft EIS, on CNSC staff's EA Report and the CNSC's public hearing process in respect of the EA decision. The Commission notes that the availability of participant funding for this project will be announced by the CNSC

---

[11] Canadian Impact Assessment Registry – Rook I Project, https://iaac-aeic.gc.ca/050/evaluations/proj/80171 (accessed 13 December 2019).

following this decision.

3.3 Scope of the Environmental Assessment

31. As the RA for the proposed project and pursuant to paragraph 19(2)(a) of CEAA 2012, the CNSC is required to determine the scope of factors to be considered in an EA through its analysis of proponent submissions and in response to comments from Indigenous groups and the public. The Commission notes that NexGen had identified the scope of the project in its submitted project description and that the scope includes direct activities related to the mining and processing of uranium ore, as well as ancillary activities that support the project. CNSC staff submitted a detailed description of the primary project components and that it was satisfied that the project components and activities that NexGen listed in its project description were appropriate.

32. CEAA 2012 mandates that the factors in paragraphs 19(1)(a) to (h) be considered in all EAs. CNSC staff submitted that the Rook I Project EA will consider community knowledge and Indigenous knowledge, where available and accessible, taking into account that the project is within Treaty 8 territory and Métis Nation-Saskatchewan Northern Region 2, as well as the traditional territories of many Indigenous groups, in accordance with subsection 19(3) of CEAA 2012.

33. CEAA 2012, paragraph 19(1)(i) provides that EAs must take into account "*the results of any relevant study conducted by a committee established under section 73 or 74* (of CEAA 2012)." CNSC staff submitted that paragraph 19(1)(i) does not apply to the Rook I Project EA as there are no relevant regional studies conducted by a committee established by the Minister to consider.

34. CEAA 2012, paragraph 19(1)(j) provides that EAs must take into account "*any other matter relevant to the environmental assessment that the responsible authority, or — if the environmental assessment is referred to a review panel — the Minister, requires to be taken into account*." CNSC staff reported that, based on its review of the proposed EA scope and on the comments about the project submitted by the Ya'thi Néné, the Clear Water Dene Nation, the Métis Nation – Saskatchewan, and the Athabasca Chipewyan First Nation, the relevant EA factors are those set out in paragraphs 19(1)(a) to (h) of CEAA 2012. As such, CNSC staff was of the view that no additional factors needed to be included in the scope of factors for this EA.

35. CNSC staff submitted that, following the Commission's decision in respect of the scope of factors to be considered for the Rook I Project EA, the Commission's *Record of Decision* and the description of the factors to be taken into account in the EA would be posted on the Canadian Impact Assessment Registry, in accordance with paragraph 79(2)(b) of CEAA 2012. CNSC staff also submitted that the Commission's decision in this matter would be provided to the ten identified Indigenous groups and the EA project distribution list.

36. CNSC staff reported that, following the Commission's decision in this matter, NexGen would prepare an EIS for the Rook I Project in accordance with the determined scope and the EIS Guidelines.

37. The Commission is satisfied with the information provided by CNSC staff in regard to the scope of the factors to be considered for the Rook I Project EA.

4.0 CONCLUSION

38. The Commission has considered the information submitted by CNSC staff as presented on the record.

39. The Commission, pursuant to section 19 of CEAA 2012, determines the scope of the factors for the EA for the Rook I Project proposed by NexGen to include the factors mandated by paragraphs 19(1)(a) to (h) of the CEAA 2012, with no additional factors.

40. The Commission understands that, pursuant to subsection 19(3) of CEAA 2012 and taking into account that the proposed project is located within Treaty 8 territory and Métis Nation-Saskatchewan Northern Region 2, as well as the traditional territories of many Indigenous groups, the EA for the Rook I Project shall consider Indigenous traditional knowledge and community knowledge.

41. The Commission notes that NexGen shall prepare an EIS for the proposed project in accordance with the EIS Guidelines, with the estimated timeline for NexGen's submission of a draft EIS for the proposed project to be late fall of 2020.

42. The Commission directs CNSC staff to report to the Commission on any issues arising during the conduct of this EA that could warrant the Commission to reconsider the above scoping decision.

R Velshi FEB 2 0 2020

Rumina Velshi
President,
Canadian Nuclear Safety Commission

Date

Annex 1 – Information Requirements for the Rook I Project draft Environmental Impact Statement

Table 1 – Federal Indigenous Review Team – Technical Review Comments of NexGen draft Environmental Impact Statement for the proposed Rook I project

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
1.	CNSC	IMPACT Model	General	The model inputs used to construct the IMPACT model scenario(s) used in the ERA were not summarized in the Appendix to facilitate a comprehensive review.	Provide detailed information on the IMPACT model inputs used in the ERA. Alternatively provide the model scenario file(s).	
2.	MN-S	Environmental Stewardship	Section 1.1.7 Section 17.2.9 Section 18.2.1	Section 1.1.7 of the EIS states: "… working with local Indigenous Groups to implement independent environmental monitoring." Status of independent environmental monitoring as of the draft EIS review period was unclear to MN-S. As a rights holder, MN-S should have the opportunity to contribute to the scoping, development, and implementation of all monitoring programs, not just the independent Indigenous Monitoring programs. While it is acknowledged that an independent Indigenous Monitoring program would be scoped and developed to meet the needs of the Indigenous Nation, NexGen should also be prepared to listen, learn, and apply the learnings of the independent Indigenous Monitoring program into operational practices and adaptive management approach.	NexGen to ensure that MN-S has the opportunity to contribute to the scoping, development, and implementation of all monitoring programs, not just the independent Indigenous Monitoring programs.	
3.	MN-S	Local indigenous Groups	Section 1.2.3	Section 1.2.3 of the EIS states: "The NexGen process to determine primary or other engagement requirements for Local Indigenous Groups included consideration of CNSC (2019) ..." NexGen centering its own perspective on "determining" engagement requirements with Indigenous Nations does not align with the spirit of the United Nations Declaration on the Rights of Indigenous People (UNDRIP), which is a part of the ongoing national conversation on Indigenous rights. NexGen deciding who it believes is interested in the Project does not align with current good practice on the recognition of Indigenous rights.	MN-S is requesting that NexGen amend the text on p. 1-24, to provide specifics on how Indigenous Nations expressed their interest in participating in the Impact Assessment process, rather than focusing on NexGen's process to determine Nations that it considered within scope.	
4.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 1.2.6	The Proponent proposes storing tailings underground as a cemented backfill material. ECCC agrees that storing cemented tailings as backfill material is an environmental design feature. However, it is not clear whether there has been an assessment to determine if there are fractures, faults or other discontinuities underground that may become conduits for seepage or contaminants from the cemented tailings backfill underground to Patterson Lake. It is also not clear what distance separates the reaches of the underground mine and Patterson Lake. This information will help to determine its proximity to Patterson Lake, which will indicate whether contaminants have a possibility of reaching Patterson Lake.	Regarding stored tailings used as cemented backfill material: 1. Confirm whether there has been an assessment for the presence of fractures, faults and other discontinuities underground that could become conduits for seepage and/or contaminant flow to Patterson Lake. 2. Provide information on the distance between the reaches of the underground mine location and Patterson Lake. 3. Demonstrate that no contaminants will migrate or seep into Patterson Lake from the cemented backfill material.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
5.	ECCC	Wildlife and Wildlife Habitat	Section 2 Section 3 Section 14 Section 16 Section 20 Section 23 Section 24 Table 20.3-1 Table 23A-5	The Proponent has committed to developing a Caribou Monitoring and Offsetting Plan due to residual effects to caribou. This plan should consider ECCC's Biodiversity Offsetting Approach that is described in the Operational Framework for Use of Conservation Allowances (ECCC, 2012)[1]. ECCC is available to assist the Proponent in the determination of appropriate offsets that would balance against Project effects.	Provide the Caribou Monitoring and Offsetting Plan for review and clearly explain efforts to minimize, avoid, mitigate and offset impacts to caribou. **Suggestions for mitigation and follow-up measures** In the Caribou Monitoring and Offsetting plan, provide details on how severity of disturbance and vulnerability of the caribou population were considered in coming up with offsetting amounts relative to area disturbed. Important factors including time lag (the amount of time from restoration work to when the habitat would be considered caribou habitat) would need to be considered.	
6.	CNSC	Current use of lands and resources for traditional purposes	Table 2.4-4	**Context:** Under the rationale for Athabasca Chipewyan First Nation (ACFN) being included as an Indigenous group identified for information sharing, the EIS states "Potential overlap with traditional territory but no access link or known residency/land use". It is not clear how this was determined. ACFN provided comments on the Project Description for the Rook-1 Project and identified that they use the land in the vicinity of the project for hunting, fishing and trapping. It is not clear if NexGen has discussed this with ACFN to better understand their land use in the vicinity of the Project or how ACFN's comments on the Project Description were considered when making this determination. **Rationale:** Additional information regarding engagement with ACFN and the projects potential impacts on ACFNs Indigenous and/ or Treaty rights and interest is required.	Provide any additional information about any engagement NexGen has done with ACFN to understand their land use in the vicinity of the Project. Please provide additional information available related to ACFN's Lands and Resource use in Section 16.3.3 of the EIS and in the Indigenous Engagement Report (IER).	
7.	CRDN	Indigenous Peoples' health / Socio-economic conditions	Section 2.5.1	Section 2.5.1 General Communication Methods indicates NexGen exploring ways to further develop its use of social media for the Project and does not have a dedicated social media platform for communication in the Local Priority Area (LPA). Social media as mentioned in the EA is the most common form of communication among our entire demographic and this is especially true for Indigenous northern communities.	**Suggestions for mitigation and follow-up measures** CRDN recommends that NexGen hire a social media representative within the community and work with them to create an Instagram, Tik Tok and Facebook account to educate communities and ensure any workshops, presentations, interview selection, and all forms of communications and opportunities are not missed. Creating these social media accounts will help close the gap in sharing and providing important and valuable information in real time, capturing all LPAs.	
8.	MN-S	VC Scoping and Input	Section 2.5.2.1 Section 2.6.3.1.1	The EIS states: "Assist in the identification of valued components (VCs) …" "The VC Survey requested input on identifying the VCs to be evaluated for the Project and ideas about how to avoid or lessen potential Project effects on VCs.	The MN-S input into VCs cannot be considered thorough and meaningful under these circumstances. VC scoping should consider the reviews of this draft	

[1] https://www.canada.ca/en/environment-climate-change/services/sustainable-development/publications/operational-framework-use-conservation-allowances.html

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				Results from these surveys helped to inform future engagement, as well as the selection of VCs for the EIS." The Joint Working Group for MN-S did not have western science advice or individuals with impact assessment experience involved when NexGen approached the group to discuss VCs. MN-S, on several occasions, repeated a request for this conversation to be re-opened with the support of western science advice, beginning with a Joint Working Group meeting in late 2020.	EIS by western science advisors, as per MN-S' request.	
9.	MN-S	Indigenous Group Engagement Method Summary	Section 2.5.2.2, Table 2.5-1	As outlined in Table 2.5-1 of the EIS - Summary of Primary Indigenous Group Engagement Methods – the Table indicates that Joint Working Group meetings, Joint Working Group breakout sessions, and information presentations were used to capture "Indigenous Knowledge" Indigenous Knowledge is subject to the First Nations Principles of ownership, control, access, and possession (OCAP®) and Nations' consent. It is unclear from Joint Working Group meeting minutes when NexGen believes there was a discussion of which information sources should be considered Indigenous Knowledge, and how they should be used. Also, "capture" is a verb that leaves open the possibility as to whether "Indigenous Knowledge" was respectfully and accurately documented with Nations' knowledge and consent.	It is unclear from Joint Working Group meeting minutes and other documents when NexGen believes that it validated specific information that it understood to be "Indigenous Knowledge" to be documented in the draft EIS. Please provide additional context in the Joint Working Group meeting minutes to clarify NexGen's validation process.	
10.	CRDN	Indigenous Peoples' health / Socio-economic conditions	Section 2.5.4	Under section 2.5.4 Public Engagement Methods there are no Indigenous methodologies being used to access and gain Indigenous insight. For example, when providing the project information packages (under table 2.5-1: Summary of Primary Indigenous Group Engagement Methods)	**Suggestions for mitigation and follow-up measures** CRDN recommends that NexGen consider hiring a community member to contextualize and provide NexGen methodologies for all engagement opportunities including social media -e.g. photovoice, short creative videos, etc. Partnering to provide information updates on the Project, identify opportunities to engage with the Project. E.g., maps and models can be co-created and co-designed to what is culturally appropriate and understood. Providing context for fluent first nation speaking communities/nations. The models, maps and distribution of materials need to be accessible and transmitted in ways that meet the needs of try community engagement through a more inclusive messaging. There are proactive alternatives to cartography (digital technologies by decolonial Indigenous artists, Indigenous indicators of cumulative impacts, etc.) "A better map is one that I am part of, not as an object, but as a subject of my own future" – Alais Ole-Morindat. There are participatory continuums and collaboration quality to be considered.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
11.	MN-S	Incorporation of Indigenous and Local Knowledge	Section 2.5.5	As stated in the EIS: "Incorporation of Indigenous and Local Knowledge…" "Incorporation" is a term typically not preferred, because it implies a secondary position afforded to Indigenous Knowledge within the draft EIS document. Indigenous Knowledge is a unique, but equal, way of knowing. As a rights holder, MN-S qualitative communication of impacts regarding the quality of resources and/or contamination levels should be acknowledged. Text, at a minimum, should reflect "real or perceived" impacts. The exclusive use of "perceived" implies that this Knowledge is not supported or equal in importance to scientific data collection.	Please revise text in the EIS to ensure MN-S qualitative communication of impacts regarding the quality of resources and/or contamination levels is acknowledged.	
12.	MN-S	Incorporation of Indigenous and Local Knowledge	Section 2.5.5	As stated in Section 2.5.5 of the EIS: "… as the Project has developed and provided additional opportunities to incorporate Indigenous and Local Knowledge throughout all phases of the EA." The TLUS is a key element of the Indigenous Knowledge related to the Project.	It is unclear from the draft EIS how specific contents of the TLUS were used in the EA process. It is unclear from Joint Working Group meeting minutes when NexGen believes it may have engaged with MN-S on the contents of the completed TLUS and how they would be used in the EIS. Please provide additional context to clarify.	
13.	CNSC	Human Health with respect to radiation exposure	Section 2.6	**Context:** NextGen mentions in various areas of section 2.0 "Indigenous, Regulatory and Public Engagement" that it recognizes the importance of feedback from different target audiences including the general public in the LPA communities for the design and development of the proposed Project, the EA process including the selection of VCs. There is information as to how the feedback from Indigenous Groups, stakeholder groups such as JWT, Trappers Associations to name a few, was incorporated where applicable and feasible. There is however no information as to how feedback from the general public was factored in development of the proposed Project, the EA process including the selection of VCs. **Rationale:** The regulatory document REGDOC-3.2.1, *Public Information and Disclosure* and Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012 mention the proponent will indicate how the feedback from target audiences and concerns voiced will be incorporated in the design of the project as well as in the EIS, to the extent possible. There is an expectation that the views of the public are likely to influence the proponent's communications tools and information to deliver an effective public information and engagement program .	Provide information as to how feedback from the general public gathered from various engagement activities was factored in the development of the proposed Project, the EA process including the selection of VCs.	
14.	MN-S CNSC	Reasonably Foreseeable Development Case	Section 2.6.1.2, Section 6.5.3, p. 6-21	As stated in section 2.6.1.2 of the EIS: "Communities noted that the consideration of effects and effects studies completed at other project sites in the area is important in the assessment of the Project. Information about other project activities in the surrounding area was noted as important for better understanding potential cumulative effects that might occur. It was noted that cumulative effects from other industrial activities such as mining, forestry, and hydro-electric power generation and transmission projects should be taken into consideration. Indigenous Groups also noted concerns regarding increased access restrictions to traditional lands due to increasing project developments in the	It is clear that the Fission Patterson Lake South Project was designated for the RFD Case, however the section then says "*Additional RFDs were identified and included in the assessment of cumulative effects* for applicable VCs (e.g., woodland caribou)". It would be helpful to clearly list in this section what RFDs were identified and included, potentially through a table. Please provide rationale as to why the list of RFDs	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				area." The list of Reasonably Foreseeable Developments (RFDs) included in NexGen's draft EIS includes only Fission's proposed Patterson Lake project, and does not include other industrial activities, such as NexGen's own exploration activities. It is also not clear from Joint Working Group meeting minutes when NexGen believes it may have engaged with MN-S	does not include other activities. Please provide additional information on when NexGen believes it may have engaged with MN-S on this.	
15.	CNSC	Current use of lands and resources for traditional purposes	Section 2.6.1.2.2 Other Indigenous Groups	**Context**: The EIS states "To date, no issues or concerns have been identified by ACFN or ERFN". ACFN submitted comments on the Project Description, which included concerns such as potential impact on their rights to hunt, trap and fish, the continuation of their culture and cumulative effects. **Rationale:** Concerns raised by ACFN, including those raised during their review of the Project Description, should to be included in the EIS and IER Summary tables.	Include a summary of issues table for ACFN with information about issues or concerns raised during the review of the Project Description and any issues or concerns ACFN has raised since then. Include information about how the issues have been responded to ACFN and any updates with regards to engagement on the Project with ACFN use of lands and resources for traditional purposes.	
16.	CNSC	Current use of lands and resources for traditional purposes	Section 2.6.1.3 and Appendix 2B	**Context:** The summary of issues tables does not appear to include all key issues identified by the Indigenous Nations and communities For example, some of Indigenous Nations and communities have shared concerns with respect to reduced access to cabins and cultural sites, lack of trust in the process and the road safety of highway #955 that were not captured in the issues and concerns and summary tables in Appendix 2B. The final EIS and IER supporting documentation should include further details on the validation of issues and concerns directly raised by Indigenous Nations and communities, and how NexGen is addressing them as per REGDOC-3.2.2 and CNSC's Generic EIS Guidelines. Particularly, those concerns related to impacts on any potential or established Indigenous and/or treaty rights. **Rationale**: Additional detail is required to understand the status of validation for each issue raised and the response provided.	Update the summary of issues and concerns tables to include all issues and concerns raised by each of the Indigenous Nations and communities to date, including concerns raised in the Traditional Knowledge studies, on the Project Description, and during engagement activities. Demonstrate that each Indigenous Nation and community has reviewed and validated their summary of issues and concerns table and/or a path forward to complete the validation throughout the EIS and the update in the IER. **Suggestions for mitigation and follow-up measures** It is recommended that NexGen creates a commitment tracking table, or adds a column to their issues table, that clearly articulates the specific mitigations that they have committed to for each Indigenous Nations and community to address the issues and concerns they have raised. Validation must be complete by the time the technical review of the EIS is complete, prior to submission of a final EIS. Should the proponent not be able to fully address issues, concerns or feedback raised by any Indigenous Nation or community, this must be clearly documented, and a rationale provided.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
17.	MN-S	Summary of Trappers Workshop		As stated in the EIS "The N-19 Trappers Association expressed an interest in reviewing the baseline studies and EA results when available." NexGen does not describe what actions it did or did not take to facilitate this review. The EIS' efforts to characterize trappers' activities as commercial are at odds with trapping as a harvesting practice as protected under s. 35 of the Constitution Act (1982).	NexGen should include a detailed response of the actions they took to facilitate trappers' access to baseline studies and EA results, particularly on the understanding that MN-S citizens are among the association's members, and harvest is a constitutionally protected right under s.35 of the Constitution Act.	
18.	MN-S	Summary of indigenous Group Engagement Activities	Table 2A-2	Table 2A-2 Métis Nation – Saskatchewan 5 May 2021 meeting and subsequent email exchanges dated 5 May 2021 and 7 May 2021 regarding MN-S' expectations for engagement. The characterization of the exchange of MN-S' documented expectations for engagement with a formal response from NexGen as answering "many of" MN-S requests regarding engagement is not a faithful summary of the exchange of views. Among the key aspects of engagement that MN-S documented was a discussion of effects and mitigation measures before submission of the EIS. MN-S' expectations documented on May 5, 2021, included community meetings where effects and mitigation measures would be discussed with community members. This expectation is foundational to having a clear understanding of the Project and its potential to affect Métis rights and interests, but its omission gets erased through NexGen's characterization "many of" MN-S' expectations having been met. Not all expectations are equal, nor could NexGen cherry pick the expectations that suit it and call this "collaboration". Understanding that NexGen's timelines for EIS submission were rapidly approaching, MN-S and its consultants instead asked for courtesy copies of the EIS to be sent to MN-S in parallel with submission to regulators. NexGen refused this as well. These are not examples of a collaborative form of engagement but meet a minimum regulatory threshold. This summary also omits the Joint Working Group subcommittee meetings in which MN-S and its consultants gave extensive guidance to NexGen on the nature, pace, and sequence of Joint Working Group meetings. NexGen was able to "suggest" to MN-S certain topics because subcommittee meetings were the vehicle for doing so. 19 August 2021, Video conference communication The summary of this meeting omits the fact that the key barrier to collaboration through the Joint Working Group process was building trust, and that this was a primary topic of conversation on this date. The current summary describes the meeting as discussing the procedural aspects of the Joint Working Group process, which is only a partial description of the conversation.	MN-S is requesting that NexGen re-word the 19 August 2021 meeting summary to include trust-building, and introduction of more culturally appropriate ways of sharing such as cultural values and Métis history shares, including the fact that these were introduced at MN-S' request. MN-S also requests that NexGen describe the "remaining 2021 and 2022 funding" accurately in the Table 2A-2 record of engagement.	
19.	MN-S	Public Engagement Materials	2F, all	This appendix and its contents use globalizing language such as "Joint Working Group summary" to imply that any or all of the Joint Working Groups may have advanced through a collaborative conversation on the content described in the	The content of Appendix 2F should be renamed and repackaged to indicate which Nations engaged on which topics at which times. The globalizing nature	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				summary documents compiled in Appendix 2F. As Appendix 2A notes, each Joint Working Group progressed at different paces on different topics. Appendix 2F provides a misleading picture of the content shared through Joint Working Groups and the dates on which it was shared and with whom.	of these summaries erases Nation-by-Nation specificity, which is important in establishing an understanding of engagement.	
20.	MN-S	Gathering Indigenous and Local Knowledge	Section 3.6.2.1	As stated in the EIS :"…Between April and June 2021, NexGen presented information and requested feedback and input from Indigenous Groups on the topics of traffic accidents and malfunctions, EA methods (i.e., pathway analysis, residual effects classification, determination of significance, prediction confidence and uncertainty, and monitoring and follow-up programs). Mail-out documentation on these topics was presented in documents entitled "Joint Working Group Summary" that are included as appendices for Section 2 of the draft EIS but meetings on these topics over this timeframe did not take place with MN-S, based on review of Joint Working Group meeting minutes. Again, the global nature of wording such as "Indigenous Groups" allows NexGen to give the impression that the same approach was followed for all Nations, which as NexGen notes in 2.0 Indigenous, Regulatory, and Public Engagement, is not the case. It is also misleading to indicate that summary documents mailed out, to which MN-S did not provide a detailed response, constitutes "incorporation of Indigenous Knowledge".	MN-S requests that NexGen change the text of Section 3.6.2.1 to indicate what is local knowledge versus Indigenous Knowledge. Indigenous and local knowledge should be described separately. Also, the draft EIS should describe OCAP® processes related to KP interviews.	
21.	CNSC **MN-S**	Current use of lands and resources for traditional purposes	Section 3.6.2.2	**Context:** The EIS indicates that sources of Indigenous knowledge were shared with each EA discipline specialist for review and incorporation into their respective assessments and that a coordinator reviewed for accuracy and consistency. It is not clear whether NexGen has validated the inclusion of Indigenous knowledge in the EIS with the Indigenous Nations and Communities. **Rationale**: Additional detail is required to determine if Indigenous Nations and communities have validated their inclusion of Indigenous Knowledge in the EIS.	Provide detail to demonstrate how NexGen has validated the inclusion of Indigenous Knowledge in the EIS with the Indigenous Nations and communities.	
22.	CRDN	Indigenous Peoples' health / Socio-economic conditions	Section 4.1	Under section 4.1 Indigenous Engagement table 4.1-1: Summary of Primary Indigenous Group Key Engagement Activities, how is CRDN defined? Is the correspondence, meetings, joint working group, site tours data coming directly through engagement with Chief and Council members only? Or does this include CRDN leadership and community members? If community members are included, at what level? Treaty members? Local members? Community members that are considered hunters, trappers, gatherers and/or environmental advocates? On page 78, the job descriptions are identified within community, but they are not categorized with attached numbers/data. I recognize the summary sections of 2.6.3.1.3, 2.6.3.1.4 and 2.6.3.1.5. but believe the data collected under section 4.1 could be categorized into special groups, to show the number of trappers, hunters, gatherers, knowledge keepers, Elders, environmental community advocates, educators, local business owners, local cabin owners, etc. were all considered to provide information in all community engagement aspects/participate in the survey collection, interviews, and workshops. For example: key person interviews conducted with community members to cover health, education, economic development, social services, and community well-being: x amount of trappers participated, x amount of hunters	Please provide additional information on how CRDN is defined in section 4.1. Please revise section 4.1 so that data collected is categorized, including the identification of demographic, educational background, way of living etc. in order to identify any information gaps.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				participated, x amount of gatherers participated, x amount of local educators participated. It would be helpful to identify what demographic, educational background, and way of living the data is being generated from and for. This could help identify real gaps in all types and methods of data collection and land use studies. There may not be enough participants identified and/or considered for both Indigenous and local trappers, hunters, gatherers, etc. that carry Indigenous-local land intelligence no one else can claim (as these are intrinsic, inherent, and diverse ways of knowing) and this would be considered a massive loss and missed opportunity of vital local-traditional knowledge and deep understandings of the geography and biodiversity.		
23.	CRDN	Indigenous and Local Knowledge	Section 4.4	Indigenous knowledge has been defined by "input from Indigenous Groups, and relevant literature". This is very vague and there are no sources being cited/referenced to the relevant literature. In 2021, CRDN Elders, language workers, trappers, hunters, gatherers, and community care advocates developed a definition of what Indigenous Traditional Knowledge (ITK) means "a network of knowledges, beliefs, and traditions intended to preserve, communicate, and contextualize Indigenous relationships with culture and landscape over time. Indigenous epistemologies (how knowledge can be known), pedagogies (how knowledge can be taught), and ontologies (our wans of life in the world) include the holistic, empirical data and knowledge in historical, geographical, cultural, spiritual, social economic, environmental, and experiential studies of the natural world. Our diverse knowledges are portable, in that they call for reliance upon local resources and careful observations of the interactions between living beings and natural processes within an ecosystem (any ecosystem) to ensure human survival."	CRDN recommend that NexGen include clear definitions of Indigenous and local knowledge. CRDN recommend NexGen use the definition of what ITK means as developed in 2021 by CRDN Elders, language workers, trappers, hunters, gatherers, and community care advocates.	
24.	CNSC	Alternative Assessment	Section 4.4.2.1	As outlined in Section 4.2 of the *Generic Guidelines for the preparation of an Environmental Impact Statement pursuant to the CEAA 2012*, the alternative means assessment should take into consideration " the level of concern expressed by the public and Indigenous groups". Section 4.4.2.1 states that the alternative assessment did take into account input from Indigenous nations and communities and members of the public, however this section is lacking details on areas of concern, levels of concern and how this information was used in the alternative means assessment.	Please revise Section 4.4.2.1 to include details on the feedback that was heard from Indigenous nations and communities and members of the public, and how the alternative means assessment took this feedback into consideration when moving forward with preferred project design/options.	
25.	CNSC	Alternative Assessment	Section 4.5.4 Process Stripping Method	**Context:** After screening-level assessment, the proponent states that the more preferred alternative for process stripping was strong acid stripping as it would provide better environmental performance for the process plant and reduce health and safety concerns for the Project. A strong acid will be used as the stripping agent in the process plant solvent extraction circuit to extract Uranium and will be transported to the project site. However, the proponent does not provide information on the strong acid, e.g., type and quantity, to be used. **Rationale:** As the strong acid will be transported to the project site, different acid may pose different impacts on the environment and human health and safety when an	Provide information on the strong acid to be used for process stripping.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				accident occurs in association with the transportation and/or storage of such an acid.		
26.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 4.5.6	The Proponent indicates that "One specific underground location, U-4 was carried forward for screening for technology; U-4 is located outside of known major geologic structure and potential areas of mineralization." Looking at figure 4.5.4, ECCC notes that the U-4 location is quite close to, and some portions of it overlap with, parts of Patterson Lake. It is unclear what the actual distance between the U-4 underground storage and Patterson Lake will be upon construction, and the probability that contaminants from the U-4 underground location will seep into Patterson Lake is not stated.	1. Provide the distance from the U-4 underground storage location to Patterson Lake. 2. Demonstrate that no contaminants will migrate or seep into Patterson Lake from the U-4 underground storage location.	
27.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 4.5.6.4 Section 4.5.6.4.1	The Proponent selected the option of segregated, non-potential acid generating (NPAG) unlined, potentially acid generating (PAG) engineered source control. The Proponent states that "Source control layers are layers of lower permeability material to control air and water flow through a waste rock pile and reduce potential for material acidification." The Proponent stated that PAG material contains less than 0.03% U_3O_8 (triuranium octaoxide) and greater than or equal to 0.1% sulphur and NPAG is clean material with less than 0.03% U_3O_8 and less than 0.1% sulphur. Besides these criteria, the Proponent did not explain the rationale or the method for how the criteria cutoff was determined. The neutralization potential that was used to determine the segregation of PAG and NPAG was not described by the Proponent, although it is stated that the dominant waste rock units contain limited buffering capacity as they are deficient in carbonate materials. Acid rock drainage (ARD) and metal leaching (ML) may still occur at low sulphur content when there is no buffering material available.	Provide details on how the waste rock was characterized to determine PAG and NPAG classifications and provide information on how the U_3O_8 and sulphur cutoff criteria were determined.	
28.	CNSC	Alternatives Assessment Surface Water Quality	Section 4.5.6.4 TSD XVIII-SWWBM Report-section 5.2.2.4	**Context:** Under section 5.2.2.4-*Sensitivity to Design Alternatives* of TSD XVII, only one design alternative was assessed as part of the sensitivity case to assess how concentrations in the final points of control and treated effluent ponds change when an alternate design option is carried forward for the project. The scenario assessed included an unlined WRSA facility, which showed increased exceedances of environmental release targets compared to the chosen alternative which includes a liner for PAG waste rock. One could expect this would be the case, and it is not clear if there are other alternative assessment scenarios in which the water quality would be improved by choosing different alternatives (for example assessing a dual liner system for PAG waste rock). It is not clear why only this one design option was assessed and why the focus was on WRSA alternatives, and not on any other section of the alternatives assessment (e.g., tailings, gypsum, effluent treatment, waste disposal). **Rationale:** NexGen should justify the choice to only assess the predicted final points of control and treated effluent ponds water quality for one WRSA design alternative, or justify why this one alternative is sufficient to capture the sensitivity of design alternatives for impacts on water quality. NexGen should highlight which design	Provide justification for only assessing one design alternative as part of the "Sensitivity to Design Alternatives" section to assess how concentrations in the final points of control and treated effluent ponds change when an alternate design option is carried forward for the project. Justify the chosen alternative assessed and assess additional alternatives if there are others with potential to impact run off and effluent quality.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				choices throughout the entire alternatives assessment could have the largest potential to impact run off and effluent water quality and include these assessments under section 5.2.2.4.		
29.	CNSC	Alternative Assessment	Section 4.5.6.4 Waste Rock	**Context:** Pre-screening for general location was conducted for five general locations: underground, in-pit, surface (on site), off-site, and in-lake. Underground, in-pit, off-site, and in-lake general locations were eliminated during pre-screening. The storage of waste rock underground and in-pit were not considered feasible due to volume incompatibility. The only general location, surface (on site) was carried forward for specific location screening and further multiple accounts analysis (MAA). The waste rocks to be stored include potentially acid generating (PAG) waste rock, non-potentially acid generating (NPAG) waste rock, and a smaller quantity of special waste rock that would be processed prior to closure. The PAG waste rock would pose higher risks to the environment and human health due to its potential acid generation. It appears that screening out general location of underground and in-pit by considering the volume of the PAG and NPAG waste rock together is not well justified. The volume of the PAG and the NPAG waste rock is also associated with waste rock segregation criteria (i.e. concentrations of U3O8 and sulphur) that appears to have not been rationalized. CNSC staff is of the opinion that pre-screening of general location for waste rock management could separate the PAG waste rock from the NPAG waste rock, and only consider the PAG waste rock to be backfilled. **Rationale:** The PAG waste rock is considered as mineralized/special waste rock [1] and could significantly harm human health or the environment. Therefore, the PAG waste rock should be segregated properly and managed adequately in both short term and long term. CNSC RegDoc 2.11.1 vol 2 requires that the design of mineralized waste rock and tailings management systems shall minimize the reliance on active institutional controls post decommissioning. Management of the PAG waste rock on surface, comparing with underground and in pit, would need more active institutional controls post decommissioning. Section 6.2.5.1.1 of TSD XXI-ERA states that “For arsenic and uranium, the estimated non-radiological dose was highest during Operations, whereas for cobalt and copper, the estimated non-radiological dose was highest during the far-future projection. That is due to the additional load of cobalt and copper from groundwater flows (infiltration and seepage), primarily from the waste rock storage area and secondarily from the UGTMF in the far-future projection.” It appears that the waste rock stockpiles are the primary sources of contaminants cobalt and copper that would pose negative impacts on surface water quality in long term. For the waste rock management, it is also not clear what is the opinion of Indigenous Groups and the public. In Section 3.7.2, page 3-31, members of JWGs	1. Consider the PAG and NPAG waste rock separately for pre-screening of general location for waste rock management; 2.Conduct alternative means assessment of managing the PAG waste rock underground and in pit with justification of the criteria for waste rock segregation; 3.Provide summary information on the public and Indigenous consultation outcomes for waste rock management.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				stated that "….[NexGen] mentioned some will go into the shaft and other places. Any opportunity, even during operations, to store waste rock in mined-out areas should be maximized. (BNDN-JWG 2021)" It appears that Indigenous Groups and the public prefer to manage the waste rock in the mined-out areas. Reference: 1. RegDoc-3.6, Glossary of CNSC Terminology. May 2022.		
30.	ECCC	Alternatives Assessment	Section 4.5.7	**Context:** The electricity demand for the Project is estimated to be 24.1 MW. However, there is no information provided on the power ratings for equipment and there is no context around whether the estimate reflects a maximum demand. **Rationale:** Emission effects associated with power generation depend on power demand. The electrical load information will enable independent estimation of the Project's power and energy demand. The information is needed in order to verify the overall power demand information presented in the EIS, and to understand the impacts of the Project on air quality, particularly NOx, and GHG. Including information based on maximum demand will ensure that all impacts are encompassed.	Provide quantitative details of power consumption by equipment operating at the site. Ensure that all equipment is included, and that power consumption at maximum demand is expressed.	
31.	CNSC	Alternative Assessment	Table 4.5-8	**Context:** Table 4.5-8 contains categories, sub-categories, and set of criteria for four alternatives for tailings storage. For the construction risk and complexity Sub-category of Technical category, the criteria include geotechnical stability considering foundation conditions and waste placement. For the underground tailings storage using the UGTMF, there are concerns of geotechnical stability of the UGTMF caverns as the UGTMF caverns have large dimensions. **Rationale:** Any failures of UGTMF caverns during construction could pose significant risks to workers' safety and might also cause significant underground water inflow and should be considered in the alternative means assessment for underground tailings storage.	Include geotechnical stability of the UGTMF caverns in criteria for construction risk and complexity sub-category and provide supportive information on geotechnical conditions of the UGTMF.	
32.	CNSC	Alternative Assessment	Section 4.5.9 Camp Location	**Context:** The Rook I project is to be developed as an on-site camp-based operation with the workforce typically working 12-hour shifts on a rotational basis. Three on-site locations were selected for a screening-level assessment for camp location by considering environmental, technical, economic, and social categories. After evaluation of the relative advantages and disadvantages of the range of feasible alternatives, the preferred alternative for camp location for the Project was the west location. The west location is located west of, and adjacent to, mine buildings for the Project, and would be integrated into the general mine and mill terrace areas. The camp location alternative assessment appears to have not considered the workers safety, in particular, the impact of accidents on the workers safety. **Rationale:**	Provide further justification and assessment on camp location by considering workers' health and safety during all phases of the project taking into account accidents and malfunctions.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				In the assessment of accidents and malfunctions, bounding scenario 6-acid plant tail gas scrubber failure, the modeling results show that distance to (Acute Exposure Guideline Level) AEGL-3 is 261 m and to AEGL-2 is 2500 m under worst-case weather conditions, while distance to AEGL-3 is 122 m and to AEGL-2 is 849 m under typical weather conditions. AEGL-3 means that the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals could experience life-threatening health effects or death while AEGL-2 means that the airborne concentrations of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape. Given the close proximity of the camp location to the mine process plant, the likely accident from the mine process plant could pose significant risks to workers' health and safety.		
33.	CNSC	Alternatives Assessment Surface Water Quality	Section 4.5.12	**Context:** NexGen has proposed four different effluent treatment technology options in the EIS. NexGen states that all four technologies can meet environmental protection requirements. It is not clear from the EIS the difference in effluent quality the different treatment options were expected to produce. The EIS reads "All treatment alternatives considered in this assessment could meet environmental protection requirements in terms of water quality and discharges to the receiving environment (i.e., Patterson Lake). As such, the overall rankings between the alternatives were driven by relative differences in capital cost, and long-term operational, management, and surveillance costs, as well as factors associated with operational risk/complexity." However, with the proposed two-stage precipitation with lime option, some COPCs are predicted to be above water quality guidelines at the edge of the mixing zone (e.g., chloride, sulphate). **Rationale:** NexGen does acknowledge in this section that CNSC draft REGDOC 2.9.2, *Controlling Releases to the Environment*, was released during the preparation of the Draft EIS, and that the multiple accounts assessment (MAA) is considered preliminary and likely to be refined as part of a forthcoming licensing submission that will meet the requirements of the final REGDOC-2.9.2, when released. However, it is not clear to what degree each effluent treatment technology considered in the assessment could treat each COPC relative to one another. It is also not clear why NexGen has not considered more advanced effluent treatment technologies as part of the alternatives assessment if not all COPCs can meet environmental protection targets, as there are other more advanced treatment options that could have been considered.	1.Describe the expected effluent quality in all options assessed in the alternative assessment for effluent treatment technology. 2.Consider other more advanced effluent treatment technologies options in the alternatives assessment that would be considered industry best practices. Describe the expected effluent quality for the more advanced options.	
34.	CNSC	Change to an environmental component due	Section 4.5.12	**Context:** Toxicity testing is a requirement under the *Metal and Diamond Mine Effluent Regulations* and CNSC REGDOC-2.9.1.	NexGen must implement measures and programs to ensure that the treated discharged effluent is not acutely lethal to rainbow trout and to *Daphnia Magna*	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
		to hazardous contaminants		**Rationale:** The following is an excerpt from REGDOC-2.9.1. The applicant or licensee shall assess for acute lethality any effluents that are released to water frequented by fish and that contain hazardous substances that could be considered deleterious under the Fisheries Act. Meeting existing federal or provincial requirements for toxicity testing shall be considered as satisfying this requirement. The EIS does not appear to show how NexGen plans to demonstrate that the treated discharged effluent is not acutely lethal to rainbow trout and to *Daphnia Magna*.	NexGen must demonstrate that the treated discharged effluent is not acutely lethal to rainbow trout and to *Daphnia Magna*.	
35.	CNSC	Human health with with respect to hazardous contaminants	Section 4.5.13	**Context:** One of the potential risks of a uranium mine or mill facility is the leakage in the pipes that will be transporting the untreated influent and the treated effluent. **Rationale:** The EIS does not appear to document preventative measures that will in place to prevent a potential spill from the pipes that will be transporting the untreated influent and the treated effluent.	Identify any preventive measures that will be implemented to prevent a potential spill from the pipes that will be transporting the untreated influent and the treated effluent. **Suggestions for mitigation and follow-up measures** NexGen should ensure that the pipes with treated effluent are heat traced to prevent freezing. NexGen should ensure there are programs in place to prevent a potential spill from the pipes that will be transporting the untreated influent and the treated effluent.	
36.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 4.5.16 Section 11.4.2	**Context:** Section 4.5.16 provides an alternatives assessment of sewage treatment technologies and provides the rationale for the selected treatment technology. However, there is no assessment of alternatives or discussion of any treated sewage discharge options. Within Section 11.4.2 the treated sewage discharge location is discussed, but there is no alternatives assessment for potential options such as a combined treated effluent and sewage discharge location and how that may affect the chosen sewage/effluent treatment technologies. **Rationale:** An evaluation of treated sewage discharge that goes beyond location siting and considers potential options, such as combined treated effluent and sewage discharge location, should be completed. This assessment should provide information on how this may affect the chosen effluent and sewage treatment technologies and how this may reduce impacts to surface water quality and fish and fish habitat.	1. Provide an alternatives assessment for treated sewage discharge options, which includes options that investigate a combined treated sewage and effluent discharge. 2. Provide an assessment of how combining treated sewage and effluent may affect the chosen treatment technology and water quality in the receiving environment. 3. Update the surface water quality modelling, effluent and sewage dispersion modelling, environmental risk assessment and aquatic health assessment as needed to reflect any changes that may arise if a combined discharge is selected.	
37.	CNSC	Alternatives Assessment Mine Waste	Section 4.5.17.3.1	**Context:** NexGen is proposing on-site incineration as the primary industrial waste disposal method for industrial waste. While assessed as a neutral alternative in the MAA due to the relative requirement for on-site infrastructure (i.e., surface disturbance) and emissions potential, this option was selected as the availability of preferred	Provide additional justification to why on-site incineration is the best option for industrial waste disposal.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				option (off-site facilities) to accept certain waste types or volumes could not be confirmed at the time of the assessment. Both on-site incineration and underground disposal alternatives were considered neutral in the assessment, and it is not clear in the EIS why on-site incineration was chosen as the preferred option over underground disposal. **Rationale:** In the assessment, underground disposal ranked most preferred in the categories change in land use, population at risk, community effect, air quality, and ecological integrity, which are all important topics to stakeholders. NexGen should provide additional justification to why on-site incineration is the preferred option for disposing of industrial waste.		
38.	ECCC	Wildlife and Wildlife Habitat	Section 5 Section 10 Section 14.4.2 Appendix 23A Table 5.4-4 Table 23A-5	**Context and Rationale:** The draft EIS states there will be water management ponds, an effluent treatment plant and a sewage treatment plant on site. The potential toxicity of these waters was not discussed in the context of SAR and aquatic migratory birds. The Proponent states that deterrents will be used to prevent migratory birds from contacting stored water and states wildlife patrols will occur during nesting season (late April to mid-August) to monitor effectiveness of deterrents and apply adaptive management as necessary. Migratory birds may use these stored water ponds outside of the nesting season (i.e., during migration) and it is unclear what mitigation measures will be used to deter migratory birds during other times of year (i.e., outside of the nesting period).	1. Identify the potential toxicity of water management ponds to aquatic migratory birds and SAR. 2. Describe what measures will be taken if the waters are found to be toxic to migratory birds and SAR. 3. Explain how the proposed timing of use of deterrents will reduce risk of migratory birds making contact with treatment waters outside of the nesting season (i.e., during migration and stop over use). D. Explain which deterrents will be used, which deterrents were considered, and what alternative, adaptive measures will be considered if deterrents are unsuccessful.	
39.	NRCan	Geology	5.2.6 8.3.1.1 5.1.3.2	**Context:** Current interpretations of geology **Rationale:** NRCan recommends the use of Athabasca Supergroup (versus Group versus group) as this is based on current interpretations (Bosman and Ramaekers, 2015) and published in recent journal articles of the regional geology (e.g., Card, 2021; Johnstone et al., 2021; Tschirhart et al., 2021). This is inconsistent within the text (Supergroup vs Group vs group). NRCan also recommends using the modern age constraints on the Athabasca Basin (ca. 1.85 Ga to ca. 1.54 Ga) from Bosman and Ramaekers, (2015). References: Bosman, S.A. and Ramaekers, P. (2015): Athabasca Group + Martin Group = Athabasca Supergroup? Athabasca Basin multiparameter drill log compilation and interpretation, with updated geological map; *in* Summary of Investigations 2015, Volume 2, Saskatchewan Geological Survey, Saskatchewan Ministry of the Economy, Miscellaneous Report 2015-4.2, Paper A-5, 13p.	There is no specific question/or information to ask. **Suggestions for mitigation and follow-up measures** NRCan recommends referencing recent publications for nomenclature and age constraints.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				https://pubsaskdev.blob.core.windows.net/pubsask-prod/92005/92005-A-5_Bosman_and_Ramaekers.pdf Johnstone, D.D., Bethune, K.M., Card, C.D. and Tschirhart, V., 2021. Structural evolution and related implications for uranium mineralization in the Patterson Lake corridor, southwestern Athabasca Basin, Saskatchewan, Canada. *Geochemistry: Exploration, Environment, Analysis*, *21*(1). https://doi.org/10.1144/geochem2020-030 Tschirhart, V., Pehrsson, S., Card, C., Potter, E.G., Powell, J. and Pană, D., 2021. Interpretation of buried basement in the southwestern Athabasca Basin, Canada, from integrated geophysical and geological datasets. *Geochemistry: Exploration, Environment, Analysis*, *21*(1). https://doi.org/10.1144/geochem2019-061 Card, C.D., 2021. The Patterson Lake corridor of Saskatchewan, Canada: defining crystalline rocks in a deep-seated structure that hosts a giant, high-grade Proterozoic unconformity uranium system. *Geochemistry: Exploration, Environment, Analysis*, *21*(1). https://doi.org/10.1144/geochem2020-007		
40.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 5.3.3.5	**Context and Rationale:** The Proponent states, "Based on results from ongoing kinetic (i.e., longer-term tests over many weeks) testing on representative waste rock samples, material with greater than 0.1% sulphur content has been defined as PAG, and material with less than 0.1% sulphur content has been defined as NPAG. Further, a delay to onset of acidic conditions is expected in PAG material with low sulphide content (i.e., below approximately 1% sulphide). Geochemical depletion calculations indicate that acidic conditions are not expected to develop for decades in PAG material with low sulphide content; the low-sulphide PAG material is expected to have near neutral pH during Operations, with acidic conditions forming after Closure." ECCC notes that acidity can occur if there is not enough neutralization potential. As indicated earlier by the Proponent, there is little neutralization potential available (pdf page 651). Therefore, the classification of rocks with less than 0.1 % sulphur content as NPAG appears to be based only on kinetic testing, without any other verification testing. Based on MEND, 2009[2], both kinetic and static tests are the industry norm.	Provide details on how the cutoff criteria were established for sulphur and if they were based on test results or some other information. If tests were used, provide details on what tests were conducted and the test results.	
41.	CNSC	EIS Geochemical conditions	Section 5.3.3.5 Geochemical conditions, waste rock	**Context:** It is indicated in the EIS that kinetic testing on representative waste rock samples is still ongoing. Delay to onset of acid leaching is expected for the long-term disposal in post-closure stage. **Rationale:** Leachate chemistry analyses, including all significant dissolved cations and anions and parameters like pH, are fundamental model inputs to run geochemical simulations of speciation and mineral saturation. For the geochemical condition of waste rocks, the current EIS and corresponding TSD lack the necessary completeness for type of elements, length of test duration, and description of testing procedures and QA/QC procedures.	Provide further information on static and kinetic leaching testing results (including all significant dissolved cations and anions and parameters like pH). The industrial best practice such as MEND 2009 should be followed. MEND (Mine Environment Neutral Drainage). 2009. Prediction Manual for Drainage Chemistry from Sulphidic Geological Materials. MEND Report. Canada.	

[2] MEND. 2009. Prediction Manual for Drainage Chemistry from Sulphidic Geologic Material. Mend Report. 1.20.1. 2009.

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
42.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 5.4.3	**Context:** Approximately 13.7 Mm^3 of waste rock is predicted to be produced over the proposed Project lifespan, which will be processed in the paste plant and then deposited underground within the Underground Tailings Management Facility (UGTMF). The Proponent states that "Three empty chambers would be required when the process plant begins to produce tailings; from this point, chambers would be progressively mined and backfilled." It is not clear where the tailings will be stockpiled or how they will be managed before space has been created for backfilling. It is also unclear if there is any storage capacity built into the tailings management system to contain tailings from processing if there are any delays in the mining of chambers within the UGTMF. **Rationale:** It is important to have tailings management system contingency planning in place in the event that there are any issues with the UGTMF or paste delivery system for backfilling the UGTMF. Contingency planning should be considered in the event that there are any delays in the mining of chambers, or issues with the paste tailings delivery system/paste plant.	1. Provide clarification on where tailings will be stockpiled before the mined-out underground spaces are ready to receive backfill, and clarify how tailings will be managed to prevent movement of contaminants 2. Provide clarification regarding how tailings will be managed or stored if there are any issues with the UGTMF, paste delivery system or paste plant (such as delays in mining chambers or maintenance required for the paste delivery system/paste plant). 3. Confirm if processing will need to be halted if tailings cannot be deposited into the UGTMF. 4. Confirm if an additional storage contingency system or management plan will be devised in the event there are any issues with depositing tailings into the UGTMF.	
43.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 5.4.4	**Context:** This section discusses the ore storage stockpile, the special waste rock stockpile, and the waste rock storage areas. The waste rock storage areas are divided into potentially acid generating (PAG) and non-potentially acid generating (NPAG). There is not enough detail provided in this section to assess the management of contact and non-contact water, flood risk, drainage and leak-detection. Within the main EIS there is no information on how water is intended to flow between the storage stockpiles, where monitoring wells for leak detection will be located, how contact water will be pumped from within storage areas to monitoring ponds/collection areas, or the estimated volume for maximum water capacity within each storage area. A flow diagram is provided in TSD XVIII (Section 3.4 Figure 5 pg. 24) however, this is very difficult to interpret and no reference is made to it in the EIS. There is no information on how the liner system and leak detection systems will be designed. **Rationale:** More information would enable the assessment of the sufficiency of the mine rock management in order to understand site water management, containment of contact water, potential for leaks from stockpiles and flood risk potential.	1. Provide and describe a simplified diagram of the flow of contact and non-contact water from mine rock stockpiles to the monitoring ponds/collection areas and how this system will be designed. 2. Describe how water management within lined stockpiles will be conducted including the volume of water that can be held within each stockpile area, how they will be drained and how the liner systems and leak detection systems will be designed. 3. Describe how monitoring for the leak detection system will be designed. Include details for how monitoring of the leak detection system will be conducted, including how contaminants will be monitored. **Suggestions for mitigation and follow-up measures** Include details for how monitoring of the leak detection system will be conducted, including how contaminants will be monitored.	
44.	ECCC	Fish and fish habitat Change to an environmental component due	Table 5.4-4	The Proponent states "The west bermed runoff collection area would be located on the west side of the Project site. This collection area would receive runoff from the local contributing area as well as overflow from contact water pond #2, if required. This bermed area would prevent suspended solids entrained in runoff water from entering Patterson Lake by natural filtration through an unlined berm".	Confirm that all effluent, as defined in the MDMER, will be discharged through a FDP.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
		to hazardous contaminants		The Proponent is reminded that as required by the *Metal and Diamond Mining Effluent Regulations* (MDMER) all effluent and seepage from the mine site that contains deleterious substances needs to be discharged through a final discharge point (FDP). From the description of the west bermed runoff collection area, it is not clear whether runoff that filters through the unlined berm will be discharged through the FDP or go directly to Patterson Lake without being discharged through the FDP.		
45.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 5.4.4.3 Section 5.5.3.1 Table 11.4-1	The Proponent states that "The top of the finished PAG and NPAG WRSAs would be tied into the hill to the south of the mill terrace, and the overall height would not exceed the highest nearby topography. At closure, an engineered cover system (e.g., growth medium) would overlay the final PAG WRSA and NPAG WRSA landforms." It is unclear how the PAG and NPAG WRSAs would be impacted by wind or water erosion due to their height or elevation. In Section 5.4.4.3 it is stated that "At Closure, an engineered cover system (e.g., growth medium) would overlay the final PAG WRSA and NPAG WRSA landforms." Table 11.4-1 indicates that an "engineered cover of compacted clean material and growth medium layer" will be installed over the PAG WRSA. A growth medium cover will be installed over the NPAG WRSA. It is unclear whether "compacted clean material" may include NPAG waste rock. If NPAG waste rock or other materials are used as cover for the PAG rock, information should be provided on the thickness of the cover so as to ensure that the PAG material is contained within the frozen layer, below the active layer, thereby minimizing ARD. It is also not indicated whether the ditches and the seepage and runoff collection system will be functional or present post-closure.	1. Provide information on how the PAG and NPAG WRSAs will be impacted by wind and water erosion as a function of their height or elevation. 2. Provide clarification on what other types of cover systems have been considered for the PAG rock cover, including whether NPAG may be used as cover. 3. Provide details on what the thickness of the cover system will be to ensure that the PAG rock will be contained in the frozen layer below the active layer. 4. Provide details on how the seepage from the PAG and NPAG WRSA will be managed post-closure if the ditches and runoff collection system are decommissioned.	
46.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 5.4.5.2 TSD XVIII, Section 3.4	**Context:** There is not enough information provided within the EIS and site water infrastructure designs to determine if the design will sufficiently contain mine site contact and non-contact water runoff to be protective of the environment. It is stated that contact water ponds and collection areas can contain specified Probable Maximum Precipitation (PMP) events for select ponds/areas, however the actual volume and dimensions of these ponds/areas are not provided. There are no estimates on the total volume of water that may be drained from the overall site infrastructure (i.e. the mine terrace, the camp area etc.) during a 24-hr PMP event and if contact water ponds can contain that drainage. On pg. 1567 a list of potential Project activities that would have the potential to affect surface water quality and sediment quality during the Project lifespan is provided, however runoff from the site airstrip and roads is not included in this list. Runoff from both of these Project activities can have impacts on surface water quality and sediment quality and should be considered as potential effect pathways.	1. Provide the dimensions and maximum volume capacity of each pond and collection area for all site water management infrastructure. 2. Provide a map marking the locations of proposed surface drainage structures including collection ditches, culverts, diversion ditches, perimeter berms and swales. 3. Provide estimated volumes of water to be drained from overall site infrastructure (such as the mine terrace, airstrip, camp area etc.), during a 24-hr PMP event and an analysis of the capacity of the water infrastructure to contain and treat this water.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				The site layout and locations of surface drainage structures including collection ditches, culverts and diversion ditches are not provided on a map. Figure 5 pg. 24 of TSD XVIII was reviewed, however the locations of infrastructure in this flow diagram do not necessarily correspond to geographic locations. Drainage of the site airstrip is not described as part of the infrastructure in the EIS. For lined ponds and collection areas, there is no description of how leak detection monitoring will be completed. For the potentially acid generating (PAG) runoff collection area, it is stated that "The contained water will be tested before release to the environment based on regulatory requirements; water that does not meet the release specifications would report to the ETP for treatment". There are no details provided on how often this water would be tested or how it would be released to the environment (i.e. straight to the Effluent Treatment Plant (ETP) discharge). For contact water pond two, no water volume capacity is provided, and there is no information on frequency of monitoring to determine if water will require treatment or be released to the west bermed runoff collection area. There is also no information regarding water quality monitoring of the west bermed runoff collection area and its capacity. Additionally, the west bermed runoff collection area is described as being unlined to allow natural filtration of collected non-contact water to the environment. However the *Metal and Diamond Mining Effluent Regulations* (MDMER) pursuant to the *Fisheries Act* requires all mine effluent and seepage from the mine site that contains deleterious substances be discharged through a final discharge point. **Rationale:** In order to be able to understand site water management and flood risk potential, more information needs to be provided regarding the site water infrastructure designs. More information on the volume of water expected to be captured within the site water management infrastructure during PMP events, and the probability that site infrastructure can contain that water would help ECCC to understand how contact and non-contact water will be conveyed throughout the site. Further information on proposed monitoring locations would assist in the assessment of adverse effects to the receiving environment. Runoff from roads and the site airstrip will contain contaminants from vehicles, heavy machinery, aircrafts and de-icing practices. Additional information on the runoff collection systems for the site airstrip and roads would aid in understanding if the collection of runoff from this site infrastructure is properly managed.	4. Provide information on how runoff water from the site airstrip will be managed and how monitoring for contaminants within this runoff (ex. hydrocarbons, etc.) will be conducted. 5. Describe how leak detection monitoring from lined ponds and collection areas will be conducted. 6. Provide additional information on the frequency of water quality monitoring and which contaminants will be tested for in the PAG runoff collection area, contact water pond two and the west bermed runoff collection area. 7. Provide further information on how water will be released into the receiving environment from the PAG runoff collection area and west bermed runoff collection area with consideration of MDMER requirements.	
47.	ECCC	Fish and fish habitat	Section 5.4.5.2 Section 22.6.3	**Context:** The Proponent states in Section 5.4.5.2 that the 24-hour 100-year event will result in 89.4 mm accumulation of precipitation. However, in Section 22.6.3 Major Precipitation Events the value quoted is 75.8 mm, which represents a 15% difference. In Section 5.4.5.2 the Probable Maximum Precipitation (PMP) is quoted as 489.2 mm in 24 hours. In Section 22.6.3 Major Precipitation Events, the PMP value quoted is 490 mm in 24 hours. It is unclear if the PMP values correspond to the 24-hour 2000-year return period.	1. Provide details on the dataset used to generate the accumulation of precipitation values (89.4 mm and 75.8 mm), which generated value is used in each of the assessments (hydrology and climate change), and which elements of Project design were informed by these assessments and why. 2. Confirm if the PMP quoted in the draft EIS (489.2mm and 490 mm in 24-hours) correspond to the 24-hour 2000-year return period and clearly show the datasets from which this value was generated.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				Rationale: Based on the discrepancies noted in the values presented for the accumulation of precipitation and for the PMP, it is unclear which datasets were used to generate these values, which values were used in the hydrology and climate change assessments or in which elements of Project design. While the discrepancies may be small, over the long term this could result in much larger differences for predicted effects.		
48.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 5.4.5.3	**Context:** This section describes the amount of water expected to be produced within the underground dewatering facilities and sent to the surface for treatment. However, it is unclear if the water from the underground dewatering facilities will go straight to the Effluent Treatment Plant (ETP) for treatment or if it will be held in a contact water pond or settling pond to await treatment. **Rationale:** Understanding how the water from the underground dewatering facilities will be managed will aid ECCC in understanding if the proposed site water management infrastructure can contain this water during a flood risk event and in assessing effects on the receiving environment.	1. Describe if water from the underground dewatering facilities will be sent straight to the ETP or if it will need to be held within a contact water pond or settling pond prior to treatment. 2. Confirm if there is the potential for water from the underground dewatering facilities to be temporarily stored underground if the site water infrastructure or ETP cannot immediately contain/treat that water.	
49.	ECCC	Fish and fish habitat Change to an environmental component due to radiological contaminants	Section 5.4.5.4	**Context:** There is currently not enough information provided about the Effluent Treatment Plant (ETP) design to determine if the design is sufficient for treating mine effluent. ECCC notes the following information gaps provided within this section: no schematic for the treatment process within the ETP facility; no information on the two-stage treatment process; and no flow rates, capacity details, effluent characterization information, proposed effluent discharge targets; no Final Discharge Point (FDP) location information. The Proponent plans to install a pipeline to discharge effluent, but it is unclear where the final discharge point (FDP) will be located. Note that the *Metal and Diamond Mining Effluent Regulations* (MDMER) define the FDP as "in respect of an effluent, means an identifiable discharge point of a mine beyond which the operator of the mine no longer exercises control over the quality of the effluent." **Rationale:** Further information about the proposed ETP will assist ECCC in determining if the design will be sufficient to treat mine effluent and that the capacity of the ETP will be sufficient for the site. Effluent characterization information and proposed discharge targets will enable ECCC to assess adverse effects to water quality and aquatic biota.	1. Provide a schematic demonstrating flow through the ETP including flow rates, capacity of system tanks and clarifiers, locations and average and maximum treatment capacity of the ETP. 2. Provide a more in-depth overview of the treatment processes within the proposed ETP and how the ETP is designed to remove the chemical and radiological constituents from effluent, including the expected efficiency of treatment. 3. Provide the expected effluent characterization and final effluent discharge targets, as well as effluent discharge flow rates and estimated volume per batch release to the environment. 4. Describe how waste generated from the effluent treatment process (ex. solids and sludge) that is not discharged as treated effluent be managed? 5. Include the effluent monitoring plan details in Section 5.4.5.4 including contaminants that will be monitored for. 6. Provide the specific location of the FDP.	
50.	ECCC	Air Quality	Section 5.4.7.5	In the EIS the Proponent references the *Off-Road Compression-Ignition Engine Emission Regulations* (previous Regulations). These regulations have been	1. Indicate if the Project site is considered "remote" based on the definition in the *Off-Road Compression-*	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
			Appendix 7A3.2.10.2	repealed, and replaced by the *Off-road Compression-Ignition (Mobile and Stationary) and Large Spark-Ignition Engine Emission Regulations.* ECCC encourages the Proponent to use engines that meet the most stringent emission standard, which is Tier 4 for compression-ignition engines (mobile and stationary), during all phases of the Project. The Regulations require that all stationary compression-ignition engines in Canada that were manufactured after June 4, 2021 must meet US EPA Tier 4 emission standards, with the exception of backup or emergency engines, and engines used in remote locations[3]. In these cases engines may be Tier 3, or Tier 2 under specific conditions. The Proponent must provide information on whether or not the Project site meets the definition of "remote location". The Proponent provided the model number of the Jenbacher J620 gas engine, but ECCC has been unable to determine the emission rating of this engine. The mine fleet has a combination of Tier 2, 3 and 4 off-road engines. The Proponent stated that they would use Tier 4 diesel mobile equipment for underground operations whenever practical. The Proponent should provide justification for use of any engine that is lower than Tier 4. The requested information will enable ECCC to better assess project emissions and potential impacts to the environment.	*Ignition (Mobile and Stationary) and Large Spark Ignition Engine Emission Regulations.* 2. Provide the emission ratings (e.g. Tier 3 or 4) and the air pollutant emission estimates, which includes NOx emissions, of the stationary Jenbacher J620 engine, and any other off-road engines to be used during each phase of the project. 3. Provide justification for the selection of lower-Tier stationary and mobile engines that meet the emission standards of a lower stringency over higher-Tier, cleaner, commercially-available engines.	
51.	ECCC	Wildlife and Wildlife Habitat	Section 5.4.7.7	The Proponent states that a communication tower will be erected at the Project site but does not include any details about height of the tower, the support system, or lights. There is no discussion of potential effects of the tower on migratory birds and SAR or the proposed mitigation measures to minimize these effects.	Provide details regarding how the communication tower will be designed, the potential effects to migratory birds and SAR including bats and the mitigation measures that will be used to reduce these effects.	
52.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 5.5	The Proponent indicated that "clean waste rock" will be permanently stored on the surface and where possible will be used as a source of aggregate material for construction activities. It is not clear what is meant by "clean waste rock." The segregation criterion indicate that even non-potentially acid generating (NPAG) waste rock may contain some amount of sulphide mineral and/or U_3O_8 (triuranium octaoxide). Clean waste rock could be mistaken to be waste rock devoid of any contaminants, which could lead to potential effects on the environment..	Provide a clear and concise definition of "clean waste rock", including the segregation criteria.	
53.	ECCC	Fish and fish habitat Change to an environmental component due	Section 5.5.1.5	The Proponent stated that "All mine rock would be analyzed by gamma radiometric scanners, which would measure the radioactivity of the material, and depending on the scan results, the material would be defined as ore, special waste, or waste rock (Table 5.4.2)".	1. Provide clarification as to whether there are any mitigation measures in place to ensure that the remaining U_3O_8 content in the PAG and NPAG WRSAs poses no danger to the environment.	

[3] Remote location means a geographic area that is serviced neither by
(a) an electrical distribution network that is under the jurisdiction of the North American Electric Reliability Corporation or the main Newfoundland and Labrador electrical distribution networks; nor
(b) a natural gas distribution network.

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
		to radiological contaminants		As described in table 5.4.2, both potentially acid generating (PAG) and non-potentially acid generating (NPAG) rock contain some amount of U_3O_8 (triuranium octaoxide). It is unclear whether there are any mitigation measures to ensure that the remaining U_3O_8 content in both PAG and NPAG waste rock material poses no danger to the environment, or if the classification of NPAG means that the remaining amount of U_3O_8 does not pose any danger or risk to the environment.	2. Confirm if the classification of NPAG means that the remaining amount of U_3O_8 poses no risk to the environment.	
54.	MN-S	Incorporation of Indigenous Knowledge	Section 6.2	As stated in the EIS: "Indigenous and Local Knowledge was integrated into the development of the Project, including EA process. Indigenous and Local Knowledge was incorporated into the EIS by integrating the results from Indigenous Knowledge and Traditional Land Use (IKTLU) Studies and from engagement with local priority area (LPA) community members."	Please provide an explanation for how knowledge gained during "engagement" was verified as being suitable for use and "integrating" Indigenous and Local Knowledge (Indigenous Knowledge) Please provide an explanation on how Indigenous Knowledge was used in the development of the Project. What was the methodology? Did Métis confirm accuracy? Is there a summary of how Indigenous Knowledge influenced Project design or mitigation in the document. Has it been recorded as part in discrete section? If yes, please include this information.	
55.	ECCC	Fish and fish habitat Change to an environmental component due to radiological contaminants	Section 6.2.3 Section 11.4.2 Section 11.5.1.2 TSD XXI ERA	**Context**: The Proponent followed CSA N288.6-12 for the assessment of risk to aquatic biota from radionuclide and non-radionuclide Constituents of Potential Concern (COPCs). This is the 2012 version, and a more recent 2022 version was publicly released. **Rationale**: The Proponent should review the most up-to-date version of the standard to ensure no changes to the methodology of the COPC exposure assessment are required.	Update the COPC exposure assessment methodology with the most recent CSAN288.6-22.	
56.	MN-S	Valued Components-methodology	Section 6.3.1	There is no indication if it was general practice to ask Indigenous groups for their concepts of VCs Good practice would include a step of verifying VCs together with Indigenous Nations. Minutes of Joint Working Group meetings indicate that NexGen presented a draft list of VCs to the Joint Working Group members for comment, but there is no record of an occasion on which NexGen asked open-ended VC questions or validated the VC identification together with MN-S based on engagement and Indigenous Knowledge.	This section should include a description of engagement related to VCs with Métis, as well as a description of Métis concepts of VCs having been confirmed. This will be relevant to the pathways analysis. Text under section 6.3.1, p. 6-9 should be revised to reflect the outcomes of more fulsome engagement between NexGen and MN-S on Valued Components (VCs) and Indigenous Knowledge.	
57.	MN-S	Assessment Endpoints and Measurement indicators	Section 6.3.2	It needs to be confirmed the extent to which Indigenous Knowledge was considered in defining these measures and how (or if) Indigenous Nations were part of the definition development. Table 6.3-1 implies that Indigenous Knowledge was not a consideration for indicators and endpoints or separated out as in "changes in availability and quality of fish, plants, ...". This then calls into question the nature of the Indigenous Knowledge integration.	Text under section 6.3.2, p. 6-10 to 6-13 should be revised to reflect the outcomes of more fulsome engagement between NexGen and MN-S on endpoints and indicators.	
58.	CNSC MN-S	Current use of lands and resources for	Section 6.4.1, Section 14	**Context:** It is not clear whether Indigenous Nations and communities were engaged on the spatial boundaries for all VCs of interest. Indigenous and/or traditional	Provide further detail to demonstrate whether NexGen discussed the spatial boundaries for all valued components of interest (such as Wildlife	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
		traditional purposes		knowledge is not listed as one of the criteria for defining spatial boundaries in Section 6.4.1 of the EIS. Some sections of the EIS (such as Fish and Fish Habitat, Indigenous land and resource use) indicate that Indigenous and/or local knowledge was considered when defining the spatial boundaries. However, this is not included in other sections, such as Wildlife and Wildlife Habitat. It is not clear whether Indigenous Nations and communities did not have any comments on the spatial boundaries of these other sections or if they were not engaged on the topic including the wildlife section **Rationale:** CNSC's Generic EIS Guidelines require that spatial boundaries be defined by considering, but not limited to, the following criteria: Community and Indigenous traditional knowledge, ecological and technical considerations.	Section 14) with the Indigenous Nations and communities. Provide detail about how any comments or concerns raised were considered in defining the spatial boundaries with Indigenous Nations and communities.	
59.	CNSC	Fish and fish habitat Aquatic species Migratory birds	Section 6.3.2, Table 6.3-1, page 6-12 Section 6.4, page 6-18	In section 6.4 states: "**Although additional spatial scales are possible for individual VCs and intermediate components**, spatial scales typically include a minimum of a site study area, a local study area (LSA), and a regional study area (RSA; CNSC 2021)."	It would be helpful to include spatial scales in table 6.3-1, either as it's own column or in relation to specific items. For example, it is unclear from reading the table at what spatial scale habitat and ecosystem availability is considered at.	
60.	CNSC	Indigenous Peoples' health / Socio-economic conditions	Section 6.3.2, Table 6.3-1, page 6-12	Table 6.3-1 includes a "Subsistence harvester" as a VC, which is linked to the rationale for selection including "potential exposure to changes in air quality, soil, surface water, plants, fish and wildlife from Project activities". Furthermore, "traditional and/or current food source security" and "socio-economic/cultural importance" were also included as rationales for selection of this VC. The measurement indicators for this VC included "Hazard quotients, lifetime cancer risk, and radiation dose".	Did NexGen collect information on the current subsistence habits, and traditional foods and wildlife consumption of communities that harvest in areas affected by of the Rook 1 project as baseline information? If so, some information on this topic in this section would be helpful and should link to the appropriate section where it is discussed in more detail. This information could then be used to compare current vs. future habits and consumption once the project is operational to see how the project impacts traditional practices. With the expected psycho-social effects of fear and avoidance of the project, a useful measurement indicator could be current vs. future harvesting and consumption practices.	
61.	CNSC	Other Potential Emission Sources	Figure 7.1-3, 7.2-4, 7.2-22	There are other potential source of contaminant emissions to air that should be considered and discussed in the EIS (e.g., Sewage Treatment Lagoon, airplanes arriving/departing on airstrip).	Include discussion of other potential releases from the site, or rationale for their exclusion from further assessment.	
62.	HC	Human health with with respect to hazardous contaminants	Section 7.2.3, page 7-30	**Context:** The proponent describes a baseline field and desktop study to characterize air quality within the LSA and RSA. Passive sampling was used to collect data on nitrogen dioxide (NO_2) and sulphur dioxide (SO_2). Two years (2019 and 2020) of	To increase the accuracy of any risk assessment, measured baseline data including the exceedances of 1-hour NO_2 CAAQS, as well as 24-hour SAAQS (Saskatchewan Ambient Air Quality Standards) for PM_{10} and TSP at the location of certain receptors	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				sampling from a single monitoring station in Buffalo Narrows were used to establish background conditions. Annex I (Atmospheric Baseline Report) also included 24-hour $PM_{2.5}$ monitoring results at the Buffalo Narrows station, one of the two stations (along with Fort Chipewyan) used to describe air quality at the regional level. The proponent has indicated its intention in Section 7.2.8 of the EIS to continue air quality monitoring for NO2, SO2, Total Suspended Particles (TSP), and fine particulate matter (PM2.5) through all phases of the Project. **Rationale:** Table 7.2-7 of the EIS identifies a24-hour $PM_{2.5}$ maximum daily concentration of 28.5 micrograms per metre cubed (µg/m^3) as background pre-project levels of $PM_{2.5}$ measured at the on-site (Rook I) station in July 2019. The evaluation of COPCs should include project-related emissions and the baseline/background concentrations established in the baseline field study, in order to be more representative of the total expected exposure by nearby human receptors. High baseline conditions should be discussed in order to understand potential exceedances at the monitoring locations.	should be collected and input into predictive models to evaluate future potential health risks. Monitoring during project operations can then be used to validate model predictions and monitor/evaluate changes to avoid increasing health risks. If increased health risks are identified, additional mitigation would then be necessary. **Suggestions for mitigation and follow-up measures** Provide a discussion of the potential impacts of exceedances on human health or a description of the mitigation measures to be employed to address any exceedances or near-exceedances of guidelines based on cumulative effects from the Project combined with baseline exceedances.	
63.	HC	Human health with with respect to hazardous contaminants	Section 7.2.4, page 7-37	**Context:** Onsite material handling and transportation is not listed as a project activity, with the potential to affect ambient air quality by generating fugitive dust and other air pollutant emissions, such as from diesel combustion,, during the Project lifespan. **Rationale:** Health Canada notes that expectations of 100% efficiency in dust suppression on haul roads are not realistic. Health Canada considers PM_{10} and $PM_{2.5}$ to be non-threshold substances, meaning that health effects may occur at any level of exposure. The International Agency on Cancer Research (IARC) has recently classified particulate matter as being carcinogenic to humans (Group 1). Health Canada considers that the risk associated with fine particles, particularly $PM_{2.5}$, is higher than the health risks associated with coarse PM or total suspended particulates (TSP) which includes liquid and solid particles, without particle size differentiation.	Health Canada recommends assessing the human health risks due to changes in exposure to project-related dust associated with on-site material handling and transportation. In addition to the health effects of exposure to $PM_{2.5}$ and PM_{10}, dust can have soiling effects that may be of concern to communities and may contribute to deposition of contaminants onto soil and country-foods that can be ingested by nearby receptors. **Suggestions for mitigation and follow-up measures** 1.Health Canada recommends monitoring of $PM_{2.5}$/PM_{10} levels at sensitive receptor locations, and implementing additional mitigation measures if the levels are elevated in comparison with applicable guidelines (e.g. CAAQS, SAAQS). Additional mitigation measures should also be implemented if $PM_{2.5}$/PM_{10} are predicted or measured to be elevated compared to baseline levels, as there is no threshold under which there are no health effects for these air contaminants. 2.According to Table 7.2-10 (p.7-39), the proponent plans to use Tier 4 engines in the underground hauling operations to limit the effects of the project on air quality in the underground workings. Health Canada suggests expanding the use of Tier 4 engines to surface operations as an effective measure for	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
					reducing particulate matter associated with diesel emissions.	
64.	HC	Human health with with respect to hazardous contaminants	Section 7.2.5, page 7-41	**Context:** Concentrations of NO_2, TSP and PM_{10} are predicted to be greater than the short-term (1-hour) SAAQS within a few hundred metres of the maximum disturbance area for the Project, where traditional land users may be present. The human health risks associated with these exceedances are not discussed in the HHERA. The proponent states: *"As discussed in Section 7.2.2.8.2, Comparison to Canadian Ambient Air Quality Standards, the comparison to CAAQS is provided for information only and does not represent a compliance metric or environmental risk."* **Rationale:** NO_2 and PM_{10} are non-threshold pollutants (meaning that any increment in concentrations presents an increased risk for health effects). Health Canada recommends the use of the CAAQS for project-associated air quality assessments, as they are the appropriate comparison targets for measured, modeled or estimated ambient air concentrations. The CAAQS are some of the most stringent air quality criteria, especially for long-term project emissions after 2025. It is recommended that the proponent take into consideration that NO_2 and $PM_{2.5}$ are non-threshold pollutants. The Canadian Air Quality Management System (AQMS) explicitly recognizes that health effects occur below the CAAQS values, and proposes additional management levels in recognition of the health and environmental benefits that can be realized by taking actions to decrease or maintain background levels of air pollution.	Discuss the impacts of these short-term air quality exceedances (NO_2, TSP and PM_{10}) on human health.	
65.	HC	Current use of lands and resources for traditional purposes	**Reference to EIS:** Section 7.3.2.5, page 7-99, pdf page 119	**Context:** The Fission Patterson Lake South Property is listed as a Reasonably Foreseeable Development Case. For the assessment, it was assumed that the duration of active decommissioning for the Fission Patterson Lake South Property would be similar to the Active Closure Stage for the Project (i.e., five years). **Rationale:** Health Canada has participated in the Designation Request for Fission Patterson and noted that the Indigenous Groups in the area are concerned about cumulative effects, in particular, acoustic impacts. A nearby project of similar scope could potentially lead to increased noise issues for the public.	Provide evidence that the cumulative noise effects have been considered with regard to nearby Indigenous communities. **Suggestions for mitigation and follow-up measures** Health Canada recommends that the proponent have a community engagement plan in place that includes consulting with the public prior to any particularly noisy activities, understanding work/life schedules and working around those schedules to the extent possible. When the community receives information about expected changes in sound levels through a consultation process, and feels that concerns with respect to noise will be addressed, the incidence of noise-related complaints is frequently reduced (Health Canada, 2017).	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
					The proactive community engagement is intended to minimize public complaints and provide an open and transparent means to communicate regularly with potentially impacted receptors.	
66.	HC	Change to an environmental component due to hazardous contaminants	Section 7.3.2.8, page 7-106 pdf page 126	**Context:** The proponent did not include the Project airstrip and the Fission Patterson Lake South Property airstrip when analyzing noise effects. While Transport Canada is responsible for regulating airport operations, the noise assessment should include all noise sources, including aircraft noise, as per Health Canada guidance (2017). **Rationale:** Health Canada (2017) provides guidance specific to aircraft noise when evaluating impacts on sleep disturbance, calculating %HA and applying adjustment factors.	1.Evaluate the effects of airplane noise (take-offs and landings) as infrequent but impulsive noise sources at nearby human receptor locations. 2.Discuss the timing of any aircraft noise, particularly if it may impact sleep or result in increased annoyance at receptor locations. The proponent may find the following Transport Canada resources specific to noise from airport operations useful: https://www.tc.gc.ca/en/services/aviation/operating-airports-aerodromes/managing-noise/exposure-forecast.html **Suggestions for mitigation and follow-up measures** Health Canada recommends providing aircraft arrival and departure times in advance of their occurrence to any potentially impacted receptors in order to reduce the likelihood of complaints regarding aircraft noise.	
67.	ECCC	Air Quality, Noise, and Climate Change	Section 7.4.5	**Context:** In Section 7.4.5 the Proponent states that the land use change emissions include the annual loss of carbon sinks. It is anticipated that there will be 897.8 ha of new disturbance added to the Project area. **Rationale:** While ECCC recognizes that this Project falls under CEAA 2012, the principles of the SACC and Draft Technical Guide should be followed by the Proponent in order to support Canada's ability to meet its environmental obligations and commitments in respect of climate change. There is a distinction between direct GHG emissions from land use change and the effects on carbon sinks. The GHG emissions from land use change should be evaluated, however the effects on carbon sinks should be considered separately. An effect to a carbon sink implies the interruption of the land's natural process that results in the net absorption of carbon from the atmosphere. The Proponent should refer to the Strategic Assessment of Climate Change (SACC) section 5.1.2 and the associated Draft Technical Guide section 4 for guidance on how to perform an assessment of the impact on carbon sinks. This assessment should be qualitative and quantitative.	Provide separate assessments for GHG emissions due to land use change and for GHG emissions due to the effects on carbon sinks. **Suggestions for mitigation and follow-up measures** The Proponent should consider mitigation measures for the disturbance of carbon sinks. The Proponent can refer to the Draft Technical Guide section 3.5.3 for additional guidance.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
68.	ECCC	Air Quality, Noise, and Climate Change	Appendix 7A3.1	**Context:** Section 7A3.1.3.2 includes Table 7A-88, which is titled "AERMET Derived Temperature Summary (2012 to 2016)", however the accompanying text indicates the comparison is only for 2016. There are significant differences in the monthly averages of the temperatures; for example, the average February daily minimum temperature is -19.2C for the site but -24.6C and -27.6C for the AERMET data sets. In Section 7A3.1.1.1 the Project-specific AERMET dataset was extracted from the Weather Research and Forecast (WRF) model at the grid 12 km west of the Project location while there are WRF grids with 4 km resolution available. **Rationale:** Given the inconsistency between the title of Table 7A-88 and the accompanying text, it is possible that model averages are in fact for the 2012-2016 period, as average February temperatures for the 2012-2016 period are about 3C colder than normal for just 2016 at Buffalo Narrows and Fort McMurray according to climate.weather.gc.ca. It is more appropriate to compare the average values for 2016 rather than the five-year average for the model. Wintertime minimum temperatures may vary significantly between locations a few km apart due to cold air pooling depending on local terrain. Surface temperature values relative to temperatures aloft influence vertical stability, which in turn affects dispersion and concentrations of surface-based Project emissions.	**Specific Question/ Request for Information:** 1. Clarify which dataset (i.e., 2012-2016 five-year average or average values for 2016) were used for comparison with the model. If the five-year average was used provide the actual 2016 average values. 2. Provide rationale for why the Project-specific AERMET dataset was not extracted from the WRF model for a location closer to the Project location.	
69.	HC	Human health with with respect to hazardous contaminants	Section 7A3.2.13.3 Table 7A-114, Page 116	**Context:** Several tables, such as Table 7A-114 (Page 116), show the predicted concentrations of some metals for the operations phase; however, the toxicological reference values (TRVs) used to determine the risk quotient in the HHRA section do not appear in these tables. **Rationale:** To assess health risk, HHRAs compare predicted chemical exposures TRVs defined by regulatory agencies such as Health Canada or US Environmental Protection Agency. TRVs represent the amount of a substance below which adverse effects are not expected to be observed in a population. These are not regulatory limits, but are thresholds meant to be used as a decision aid.	1.Where toxicological reference values are available or could be derived, identify these chemicals as COPCs and carry them into the modelling predictions. 2.Revise the table to include TRVs which are applicable to the general public, including sensitive receptors or provide rationale as to how the selected TRVs provide an adequate level of health protection for the general public including sensitive receptors.	
70.	CNSC	Geology	Section 8.3.1	**Context:** Section 8.3.1 provides a brief description of Bedrock Geology with a statement that "Additional details on the bedrock geology can be found in the Geology Baseline Report (NexGen 2021a)." However, the Geology Baseline Report was not provided. **Rationale:** Information about the geological environment is not sufficiently documented in the EIS especially for a new mine proposal that also proposes to develop an underground TMF. REGDOC 2.9.1 appendices describe the expected geological information to be assessed - B.4.1 baseline geological information; and C.4.1 on the description of any changes to the geology as a result of the project.	Provide NexGen 2021a Geology Baseline Report. Assess the geology as a valued component or justify its exclusion as a valued component.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				In addition, the EIS does not assess the geology as a valued component for the Project with no justification for its exclusion.		
71.	ECCC	Fish and fish habitat	Section 9.2.3 Section 9.2.6 Section 9.3.2 Appendix 9A	**Context**: In Section 9.2.3 Spatial Boundaries of the EIS it is stated "There are five larger lakes in the Local Study Area (LSA) including Broach, Patterson, Forrest, Beet and Naomi lakes, as well as several smaller waterbodies including Lake G, Lake H, and wetlands." It is clearly stated that there are wetlands present within the LSA, and at least two wetlands can be seen within the Project footprint in Section 9.1 Figure 9.1-4 pg. 1337 of the EIS. The location of these wetlands within the Project footprint, as well as the other wetlands existing within the LSA can be confirmed from Annex V11.2: Vegetation Baseline Report 2 (Inventory, Rare Plants and Wetlands), including the wetland classifications. However, beyond the above statement from Section 9.2.3, there is no consideration of wetlands or potential effects to wetland hydrology throughout the remainder of the hydrological assessment and hydrological modelling. Potential effects to flow rates, water levels or sediment transport to wetlands within the LSA are not considered. **Rationale:** There is currently not enough information provided for ECCC to provide advice on the potential risks of the proposed Project to wetland hydrology within the LSA. This pathway of effects is important to assess in terms of potential effects to wetland habitat availability due to changes in flow rates, water levels and sediment transport, and potential effects to terrestrial and aquatic receptors. It is necessary to evaluate if draw down from mine dewatering or changes in surface water runoff flows and routing will affect water levels and habitat availability within wetlands.	Provide baseline information regarding wetland characterization within the LSA, including: locations, wetland type, size, water surface elevation, depth, water flow pathways, and the presence of wildlife receptors including presence of fish/fish habitat within the main body of the EIS. Provide further information on mitigation measures and monitoring that would be applied for the protection of wetlands. If this information is available in annexes or technical supporting documents, summarize it within the main body of the EIS with references to respective documents for review.	
72.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 9.3.2.2 TSD VIII, Section 6.2 Section 7.4 Annex IV.3 Figure 13 Figure C4 Annex IV.2, Table 9	**Context:** In Section 6.2 of the Accidents and Malfunctions report, the width of the Clearwater River at the crossing is 6 m with an average depth of 30 cm and an assumed water velocity of 1 m/s for a flow rate of 1.8 m^3/s. These dimensions and rates do not match the channel widths of the Clearwater River presented in Annex IV.3 Geomorphology Characterization Report. According to Figure 13, Transect #4 is right at the bridge crossing, and field measurements at Transect #4 are presented in Figure C4. The stream width was ~12 m and the average depth ~40 cm in late September/early October 2018. According to measurements reported in table 9 of Annex IV.2 Hydrometric Monitoring Characterization Report, discharge at hydrometric station CR-WC-MS-03, adjacent to Transect #4, on 29 September 2018 was 0.983 m^3/s, which is low for open water at this station. In Section 7.4, potential effects of a diesel spill from the bridge over the Clearwater River are discussed with calculations using the river width, depth and flow ~1.5 km downstream from the spill site, between Forrest and Beet Lakes. In this case a channel width of 100-400 m, a depth of less than 2 m, water velocity of 1 cm/s and flow rate of 2.3 m^3/s are used. These dimensions are close to those found in Section 9.3.2.2 of the Environmental Impact Statement, where the Clearwater River between Forrest and Beet lakes is described as being more like a water body with width ranging from 100 m to 600 m.	Provide rationale for the accident scenario stream dimensions that differ from the field measurements, or revise the calculations with dimensions reported in the Geomorphology Characterization Report and update the assessment of potential effects.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				Rationale: Of the six bounding scenarios considered in the Accidents and Malfunctions, two are traffic accidents at the bridge over the Clearwater River on the Project access road, with release of contaminants in the river (uranium concentrate and diesel). The parameters of the river are not the same in both scenarios even though the spill location is the same. Since the stream width is a parameter used in calculating the uranium dissolution rate and long term release rates, doubling its width to match the measured value would increase the potential effects. For the diesel spill scenario, since the stream is narrower and has higher water velocity at the spill location than what was used for calculations, the potential area of impact could be underestimated.		
73.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 9.5 Section 9.5.1 Section 11.4.1	**Context:** The Project effect pathway H-06 Culverts have been designated as a no-effect pathway after implementation of environmental design features and mitigation Table 9.5-2 pg. 1401. In Section 9.5.1 further information is provided about the maintenance of culverts throughout the different life stages of the proposed Project. In Section 11.4.1 the potential effects of drainage infrastructure to fish and fish habitat are discussed, and it is stated that there are 23 locations along the existing access road where culverts may need to be constructed, replaced or extended. Additionally, culverts are to be sized for a 1:100 year 24-hour storm event, but no further details are provided on how this was determined. There currently is not enough information provided to confirm the assessment of no effects. **Rationale:** ECCC requests further information regarding the number, location, design, flow ratings and habitat considerations in order to assess flood risk and potential effects to water quality. There is currently not enough information provided about water flow pathways and conveyance of contact water and run-off water from site infrastructure to make an evaluation of risk to surface waters from potential Constituents of Potential Concern (COPCs) and flooding.	1. Provide a map demonstrating the number and locations of all proposed culverts for the Project. 2. Provide further information on the design, flow ratings, capacity and habitat considerations for the construction and maintenance of culverts throughout the different phases of the proposed Project.	
74.	ECCC	Fish and fish habitat	Section 9.5	**Context:** In Table 9.5-2 pg. 1401 H-06 for culverts, the Proponent states that the design cross drainage maximum flow was considered for a 24-hour 100-year event. No rationale was provide for the selection of the maximum instantons flow used for culvert design. **Rationale:** Culverts function primarily as hydraulic conduits but serve the dual purposes of functioning as hydraulic structures as well as acting as load bearing structures. As a result, the amount of precipitation becomes secondary to the intensity of precipitation. Considering the lifetime of the Project, a 100-year return period is not considered conservative. A risk analysis for a shorter event duration and longer return period should be considered for precipitation intensities.	Provide rationale for the selection of the 24-hour 100-year maximum flow used for culvert design considering both the lifetime (i.e., 43 years) of the Project and the likelihood of an extreme precipitation event occurring.	
75.	ECCC	Fish and fish habitat	Section 9.6 Section 9.7	**Context:**	1.Explain why the rating curve formulae for stations CR-WC-MS-02 and CR-WC-MS-06 do not match the	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
			Annex IV.2, Section 5.3.1	Rating curves represent an approximation of the stream discharge at a location based on the water levels. This allows the estimation of streamflow from continuous water levels that are relatively easy to measure. Inconsistencies with best practices (WSC, 2016) used in developing the rating curves, as well as some general inconsistencies, led ECCC to question their accuracy (Section 5.3.1 of Annex IV.2 Hydrometric Monitoring Characterization Report). Specifically: 1. The open water rating curves for hydrometric stations CR-WC-MS-02 and CR-WC-MS-06, plotted in Figures 15 and 27 respectively, do not correspond to the equations printed in the same figures. 2. Different methodologies were used to develop rating curves for different stations without justification. An open water rating curve developed through a HEC-RAS model (as described in Appendix 9B Hydraulic and Sediment Transport Modelling Summary Report) was used for station CR-WC-MS-03. 3. Eight of the ten rating curves developed are preliminary since a subset of two to five data points with the lowest water elevations for discharges were used when WSC (2016) recommends at least six data points for curves with a single segment; 4. Rating curve stage shifts due to aquatic plant growth in the streambed might be expected to follow an increasing pattern through the summer, and to be similar at the same period of different years. Neither of these signals is present in the stage shifts for the hydrometric stations, rather the shifts jump without following a pattern; 5. Rating curve stage shift above the base curve are expected due to backwater, however shifts below the base curve would need to be well documented as these might be caused by scour in the control section. Figure 18 shows three measurements (15-May-19, 18-May-19 and Jun-19) below the base curve at station CR-WC-MS-03 with no explanation offered. The text states that no levelling or discharge error or physical cause was identified for May 2020 and June 2020 readings below the base curve, but they are not plotted below the curve. 6. Rating curve equations are power relationships between the effective depth and discharge with a multiplier and an exponent. The exponent depends on geometry of the control section and is typically between 1.3 and 3 (WSC, 2016), with similar values for control sections with similar shapes. The open water rating curve for CR-WC-MC-04 has an exponent of 4.5, well above the typical range and no explanation has been provided for this unusual value. **Rationale:** The rating curves are used within the hydrologic model to create stream discharge time series. In turn, the model is used to determine baseline conditions and Project effects on water levels and flow. Using more data points to fit the open water rating curve (see point 3), would likely result in lower estimates of baseline flows. If the baseline flows were lower, the proportional increase in flows due to the Project discharging mine water to the surface would be greater, changing the results in tables 9.6-5 to 9.6-7, 9.6-14 to 9.6-16 and 9.6-23 to 9.6-25 of the EIS and potentially the residual effects classification in Section 9.7. The stream width is an important factor when considering the river's navigability and wetted area contributes to describing fish habitat. Changes to both these stream channel parameters are discussed in Sections 9.4.3, 9.6.1.3, 9.6.2.3 and	plotted lines, specify where this data was used further, and if applicable, discuss effects of correcting the formulae. 2. Provide justification for the use of different methods for determining rating curves at different sites, detailing how they are comparable. 3. Clarify if the comment in the text regarding measurements below the open water rating curve in May and June 2020 at station CR-WC-MS-03 refer to those plotted as May and June 2019 in Figure 18 and provide supporting arguments for keeping the station location since there are indications of channel instability. 4. Provide rationale for the inconsistencies with best practices identified in points 3, 4 and 6 in the context and rationale column. Discuss any effects to the confidence in the rating curve. 5. Discuss how backwater effects are integrated into model predictions including lake levels, discharge estimates and wetted stream areas. 6. Discuss how uncertainty from the rating curves propagates in the hydrologic and subsequent models, and influences the confidence in the conclusions on effects. **Suggestions for mitigation and follow-up measures** The hydrometric monitoring program could be made more robust by including: • hydrometric stations to measure lake levels, particularly in Patterson Lake; • a regular schedule of field visits to monitor rating curve applicability and backwater; and under-ice flow measurements where possible, since discharge from the Project occurs year round and currently under ice flows are only estimated. **Discussion Required:** Yes Measurements of water level and discharge will rarely allow a perfectly fitted rating curve, particularly in low gradient streams. However, the noted inconsistencies with best practices (WSC, 2016)	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				9.6.3.3 for various scenarios in the EIS. There is no mention of variability of channel parameters due to backwater, so it is not clear if the percent change in wetted area of Tables 9.6-8, 9.6-17 and 9.6-26 account for these effects. The inconsistencies with best practices (WSC, 2016) contribute to larger than expected uncertainty in the rating curves, in subsequent studies that use that information, and ultimately the description of baseline conditions. The effect of this uncertainty on the Project residual effects is unclear. **Reference:** WSC - Water Survey of Canada, 2016, Hydrometric Manual – Data Computations, Stage-Discharge Model Development and Maintenance	contribute to larger than expected uncertainty in the rating curves. The rating curves are at the base of a very complicated model and the impact to overall results is very difficult to ascertain.	
76.	ECCC	Fish and fish habitat	Appendix 9A3.6.4 Current Climate Total precipitation data – model input	**Context:** Clarification on some of the climate input data and methods used in the hydrological assessment would help in understanding the Proponent's predictions for the Project, particularly into the far future. The hydrology assessment describes existing conditions and predicts Project effects on the hydrological regime. A hydrological model, which uses various inputs (e.g., historical climate data, hydrometric data, , precipitation etc.) was used to characterize the existing conditions and make predictions on future effects in order to inform the assessment of Project effects. Appendix 9A describes the methods used to conduct the hydrology assessment including hydrological modelling. . The following areas is describe where additional information will assist ECCC in assessing the model: -Medium-Range Weather Forecasts (ECMWF) Reanalysis database provides synthetic hourly climate data. The European Reanalysis Interim (ERA1) database consists of data spanning from January 1979 to July 2018 on a 50km spacing grid. The European Reanalysis 5 (ERA5) database consists of data spanning 1950 to present on a 30 km spacing grid. It is unclear which datasets were used, if a combination of the datasets were used or how the datasets were compiled. There was no detail provided on how longer timeframes (e.g., 24-hour) were inferred from the hourly data. -The synthetic data was verified by comparison with a locally collected data set spanning only 2 years but no rationale for the use of this methods was provided. Verification of the synthetic data using available observed data sets in combination with a weighted average algorithm for the Project location will yield more accurate data. -An assembly of climate time series data was also used in the hydrological model. It is not clear if the probability distribution of the sequential times series is the same, if the probability distribution was verified or how the time series distribution errors were considered. Understanding how probability distribution for the times series was verified helps to understand how the bias, which is directly related to time series and probability distribution was addressed. By forcing the modelled future data to maintain the past synthetic data, time series PD statistical errors of the past	1. Confirm if the ERA1, the ERA5 database or a combination of the databases was used for climate data. If both databases were used provide details on how the databases were compiled and where the complied dataset was used throughout the draft EIS. 2. Describe the procedure by which longer timeframes were obtained from ECMWF Re-analysis data. Provide this information for 12 and 24-hour periods. 3. Provide rationale as to why a data set spanning two years was used for verification of the synthetic data rather than using available observed datasets in combination with a weighted average algorithm for the Project location. 4. Confirm that the sequential time series have the same probability distribution. Confirm if the time series sequences were verified for best fit probability distribution or if they were assumed to have the same probability distribution. 5. Clarify if the potential size of time series probability distribution errors was estimated due to statistical assumptions. 6. Describe where time series analysis versus climate data points were used in the hydrology and climate change assessments. **Discussion Required:** Yes. The hydrology assessment is based on a complicate hydrological model that has a number of inputs	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				time series are propagated into the future generated data set model. Without an understanding of the limitations of the past data (which in itself was modeled), it is not possible to understand the limitations in the future modeled data. The same applies for value-biased corrections. -In several areas of the draft EIS both climate points (average over 30 years) and time series analysis were referenced. It is unclear where climate points and where time series analysis were used in the assessments. **Rationale:** The draft EIS does not provide enough detail surrounding the current climate data used in the hydrology assessment for ECCC to assess the predicted effects of the Project particularly into the far future.	sources. Further discussion would help ECCC to assess the potential effects of the Project.	
77.	ECCC	Fish and fish habitat	Section 9A3.6.4.5 Historical Climate – model input	**Context and Rationale:** The Proponent states that precipitation is the main input in the watershed and Figure 9A8 shows precipitation variations of 20% (i.e., more 10% in the mean). Based on this, ECCC would expect to see a corresponding variation in surface water elevations, however, Table 9.4-2 shows minimal water surface elevation variations. **Rationale:** A clear understanding of the current hydrological regime would assist ECCC in understanding how predicted changes in precipitation will affect surface water elevations and how the projected climate change will affect hydrology.	Explain the discrepancies between Figure 9A8 and Table 9.4-2. Describe if the discrepancies can be interpreted as a flooding of the natural shoreline.	
78.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 10.2.6 Section 10.4.2 Section 10 Appendix 10A	**Context:** Baseline surface water and sediment quality throughout the Local Study Area (LSA) and Regional Study Area (RSA) are discussed within this section and sampling locations are presented in Figure 10.2-4 pg. 1601 of the EIS. However, no baseline information is provided about wetlands within the LSA and Project footprint. The location of wetlands within the Project footprint, as well as the other wetlands existing within the LSA can be confirmed from Annex V11.2: Vegetation Baseline Report 2 (Inventory, Rare Plants and Wetlands), including the wetland classifications. There is no consideration of wetlands or potential effects to wetland surface water or sediment quality throughout the surface water and sediment quality assessments and surface water quality modelling report in Appendix 10A. **Rationale:** There is currently not enough information provided for ECCC to provide advice on the potential risks of the proposed Project to wetland surface water and sediment quality within the LSA. This pathway of effects is important to assess in terms of potential impacts to wetland habitat availability and effects to terrestrial and aquatic receptors. Potential effects from Constituents of Potential Concern (COPCs) and radionuclides to surface water and sediment, or potential effects to ecological receptors within wetlands have not evaluated.	1. Provide baseline information on wetland surface water and sediment quality characterization for wetlands within the Project footprint, including physiochemical parameters and particle size for sediment. 2. Provide an assessment of potential effects to surface water and sediment quality for wetlands within the LSA and potential effects to ecological receptors during all phases of the proposed Project.	
79.	ECCC	Fish and fish habitat	Section 10.2.8.2.1	**Context:** This section discusses the elimination of chemical constituents from further analysis in water quality modelling for the Project. ECCC acknowledges the rationale provided by the Proponent for eliminating thallium and Dissolved Organic	Assess un-ionized ammonia, thallium and DOC in the pathways analysis and surface water quality modelling for the surface water quality assessment.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
		Change to an environmental component due to radiological contaminants		Carbon (DOC) as Constituents of Potential Concern (COPCs) for further assessment in the pathways analysis. Total ammonia is included for assessment, but un-ionized ammonia is not. Despite the provided rationale, due to requirements under the *Metal and Diamond Mining Effluent Regulations* (MDMER) for effluent testing and receiving environment monitoring, it is recommended that thallium, DOC, and un-ionized ammonia be carried forward for a complete assessment of all required monitoring parameters under the MDMER. **Rationale:** ECCC recommends that thallium, DOC and un-ionized ammonia be screened in as COPCs for further assessment in the pathways analysis and water quality modelling due to requirements under the MDMER Schedule 4 and Schedule 5 Sections 4(1), 7(1) and 12(1)(ii) for environmental effects monitoring. ECCC recommends that these parameters, as well as hydrocarbons, be included in the larger set of constituents that surface water quality monitoring would be conducted for.	**Suggestions for mitigation and follow-up measures** Un-ionized ammonia, thallium, DOC and hydrocarbons should be included in follow-up surface water quality monitoring.	
80.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 10.2.8.2.1 Section 10.3.1.2 Section 10.5.1.1.3, Section 10.5.1.1.1	**Context:** In Section 10.2.8.2.1 the Proponent provides the list of Constituents of Potential Concern (COPCs) carried forward for further assessment in the pathways analysis and water quality modelling. Both mercury and sulphate are included as COPCs. In Section 10.3.1.2 pg. 1633 the Proponent states that sulphate is one of the dominant ion concentrations in the Local Study Area (LSA) and Regional Study Area (RSA) for existing conditions. Table 10.3-4 pgs. 1635-1637 provides data on existing water quality conditions for the LSA and RSA, including values for sulphate and mercury. There is no baseline data on methylmercury provided in this table. Due to the existing conditions and expected inputs of both sulphate and mercury to the receiving environment from the proposed Project via liquid and air emissions. Table 10.5-3 pg. 1659-1660 displays the predicted concentrations of metals at the edge of the proposed Effluent Treatment Plant (ETP) Regional Mixing Zone (RMZ) at the beginning and end of operations for the Project Application Case. Table 10.5-3 suggests that mercury concentrations are expected to increase by a degree of magnitude throughout Project operations due to effluent and atmospheric deposition, and Table 10.5-1 pg. 1657 suggests an increase in sulphate concentrations in the receiving environment, which could potentially lead to an increase in mercury methylation rates. **Rationale:** Increased sulphate availability can lead to increased methylation rates of mercury and methylmercury in sediment and surface water. Methylmercury is a toxin that can bioaccumulate within the food chain and present risks to aquatic biota and wildlife consuming aquatic biota. Potential changes to methylmercury concentrations in water quality, sediment and fish tissues should be assessed due to the proposed sulphate and mercury loadings in effluent.	1. Provide baseline data on the concentrations of methylmercury in surface water, sediment and fish tissues (i.e. large-bodied sports fish and small-bodied forage fish) in the LSA and RSA receiving environment to establish a baseline prior to potential Project impacts. 2. Provide an assessment of risk from methylmercury to ecological receptors due to changes in sulphate and mercury concentrations in the receiving environment related to Project discharges.	
81.	ECCC	Fish and fish habitat	Section 10.2.8.2.2 Section 10.3.2	**Context**: The Proponent has provided a list of total metals and radionuclides that were carried forward for the quantitative sediment quality assessment and modelling in the Environmental Risk Assessment (ERA). The Proponent states that these were	1. Include TOC in further assessments in the ERA and sediment quality modelling for the sediment quality assessment.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
		Change to an environmental component due to hazardous contaminants		determined based on the corresponding water quality constituents having the potential to exceed baseline values and availability of guidelines. Due to requirements for environmental effects monitoring under the *Metal and Diamond Mining Effluent Regulations* (MDMER) total Organic Carbon (TOC) must be screened for further assessment and modelling. Additionally, based on baseline condition data provided in Section 10.3.2 for sediment quality, barium, iron, manganese and vanadium should be screened in for further assessment as these metals had the highest concentrations in sediment within Patterson Lake and Naomi Lake. **Rationale**: Due to requirements under the MDMER Schedule 5 Sections 12(1)(ii) for environmental effects monitoring of benthic invertebrate communities, TOC must be screened in for further assessment and modelling . Due to elevated concentrations of barium, iron, manganese and vanadium in sediment concentrations within Patterson Lake and Naomi Lake, it is recommended that these metals be included for further sediment quality assessment and modelling.	2. Include barium, iron, manganese and vanadium in further sediment quality assessment and modelling.	
82.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 10.2.8.3.1 Section 10.3.1.2 Appendix 10A-2	**Context**: Table 10.2-5 pg. 1620-1622 demonstrates Constituents of Potential Concern (COPCs), their respective water quality guidelines from applicable sources, and proposed Project thresholds that have been selected based upon the most stringent guidelines. General parameters such as temperature, pH, conductivity, etc. that would require Project thresholds and monitoring under the *Metal and Diamond Mining Effluent Regulations* (MDMER) have not been provided in this table. Phosphorous and its respective guidelines and Project threshold is missing from this table. All COPCs that require calculations based on other parameters such as hardness, pH, or temperature to derive guidelines (i.e. ammonia, cobalt, zinc, etc.) should be calculated and added to the table, with a note specifying the parameter values used in the calculation. For nitrate (as N) the Canadian Council of Ministers of the Environment (CCME) chronic guideline provided in the table is 3.0 mg/L however, the correct value is 13 mg/L. For molybdenum, the most stringent water quality guideline is the CCME guideline of 0.073 mg/L, not the provincial guideline of 31 mg/L. For vanadium it appears the federal water quality guideline was suggested, however the correct value is 120 ug/L or 0.120 mg/L, not 0.00012 mg/L. In Appendix 10A-2 pg. 1946 modelled surface water concentrations of molybdenum for the application and upper bound modelling scenarios at all downstream lakes are displayed. There is a significant increase in surface water concentrations in the far future, and it is difficult to discern if there are any exceedances of the 0.073 mg/L CCME chronic guideline. There has been no discussion of these increases within the results of the EIS. Table 10.3-3 pg. 1634-1636 displays the existing baseline water quality conditions for all the areas within the LSA and RSA. General parameters (ex. temperature, pH, conductivity, etc.) and nutrients (ex. total and un-ionized ammonia, nitrate, phosphorus etc.) that would require Project thresholds and monitoring under the	1. Update Table 10.2-5 to include all general parameters required for environmental effects monitoring: pH, temperature, hardness, alkalinity, and conductivity. 2. Update Table 10.2-5 to include phosphorous and its respective guidelines and Project threshold. 3. Verify that all COPCs that require calculations based upon other parameters such as hardness, pH, temperature, etc. are calculated and input as values into the table with notes specifying the parameter values used in the calculations. 4. Update Project nitrate and vanadium guidelines and thresholds to the correct values, update molybdenum assessments and consider applying the most stringent molybdenum water quality guidelines as the Project threshold. 5. Provide additional information to justify the use of selected water quality guidelines on any water quality guideline exceedances for molybdenum for all Project phases including post-closure. 6. Update Table 10.3-3 to include the baseline data for general water quality parameters and nutrients that would require monitoring under the MDMER.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				Metal and Diamond Mining Effluent Regulations (MDMER) have not been provided in this table. **Rationale**: The recommended changes for Table 10.2-5 are based upon providing all the information needed for reviewers to assess the characterization of effects Proposed changes incorporate the usage of correct, up-to-date and the most stringent chronic water quality guidelines. It is difficult to discern if there is an exceedance of the water quality threshold for molybdenum, which should be discussed more in-depth in the results of the EIS. The recommended changes for Table 10.3-3 are based on providing baseline conditions in order for comparisons to determine if there are Project related effects that could cause changes to these parameters over the course of the Project's lifespan.	7. Update assessments as necessary according to changes in thresholds applied as described in ECCC-SW-13.	
83.	CNSC	Radiological Threshold Selection for water quality	Section 10.2.8.3.1	**Context:** The EIS states that thresholds for radionuclides in surface water for risk to aquatic life were calculated from a biota dose benchmark, following the USDOE document: A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota. **Rationale:** Typically, dose is cumulatively assessed from all sources of radiation by applying a recommended dose benchmark (100 µGy/hr for terrestrial biota and 400 µGy/hr for aquatic biota). It is unclear from the text if the selected concentrations for the radiological COPCs is reflective of the concentration of each individual radionuclide required to reach the threshold, or if the cumulative dose from all the radiological COPCs was considered in the calculation when deriving the concentration threshold in water.	1.Provide clarification of which dose benchmarks were considered when deriving the radiological concentration threshold in surface water. 2.Provide clarification on whether the thresholds derived only considered dose from the individual radionuclide or were they derived considering cumulative dose from all radiological COPCs? 3.Provide an example calculation on how these thresholds were derived to understand the process undertaken	
	CNSC	Selected surface water threshold for some COPCs	Section 10.2.8.3.1, 10.2.8.3.2	**Context:** The text in section 10.2.8.3.1 states that the most stringent chronic thresholds were selected for each COPC in the surface water, however it looks like the selected threshold for Molybdenum was the provincial objective of 31 mg/L, instead of the CCME objective of 0.073 mg/L (table 10.2-5). Similarly, table 10.2-7 shows less stringent Health Canada drinking water thresholds were selected for cadmium, selenium, lead-210, and radium-226 when there were lower World Health Organization thresholds available. **Rationale:** There is a disconnect between the stated process for selecting threshold values in section 10.2.8.3.1 and the selected thresholds for some COPCs. The proponent should provide an explanation for the inconsistencies between the process for threshold selection in the EIS and the selected thresholds.	Please explain why the less stringent surface/drinking water quality threshold was selected for molybdenum, cadmium, selenium, lead-210, and radium-226 when more stringent thresholds were referenced.	
84.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 10.2.8.3.4	**Context**: The residual effects analysis measures the effects of the Project on surface water and sediment quality against existing conditions and thresholds. Thresholds were set to identify if projected surface water and sediment quality over the lifespan of the project and the far-future projection had the potential to adversely affect aquatic life and waterbody productivity health. In Table 10.2-9 pg. 1626 it is unclear why several parameters for sediment quality do not have a Project threshold identified despite there being potential sediment quality guidelines available (ex.	Update Table 10.2-9 to incorporate the selection of the most stringent sediment quality guidelines for all parameters with available sediment quality guidelines. If this cannot be done, provide rationale as to why.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				cadmium, lead, nickel, selenium, vanadium and zinc). It is also unclear why Project thresholds that have been identified for some parameters (ex. arsenic, copper, and molybdenum) are not based upon the most stringent guidelines available with no rationale provided. **Rationale**: The recommended changes for Table 10.2-9 are based upon incorporating the use of the most stringent chronic sediment quality guidelines for the protection of the receiving environment. Use of the most stringent guidelines will allow for the most protective assessment to analyze risks to the receiving environment.		
85.	CNSC	Selected sediment thresholds for some COPCs	Section 10.2.8.3.4	**Context:** The text in section 10.2.8.3.4 states that thresholds from Burnett-Seidal and Liber 2013 were prioritized when selecting thresholds for sediment, as they are reflective of data from Canadian uranium mines. However, there are some COPCs with no threshold selected for the project, even when there is data available (cadmium, lead, nickel, selenium, vanadium). Furthermore, the LEL from Thompson et al. 2005 was selected for copper, when values from Burnett-Seidal and Liber 2013 exist, which is inconsistent with the stated process **Rationale:** Selection of sediment thresholds is inconsistent with the process outlined in the EIS, the proponent should provide an explanation for the exceptions pointed out in the context.	1.Please explain why some sediment COPCs have no project threshold associated with them, even when there is data available. 2.Please explain why the LEL was the preferred threshold for copper instead of the REF value 3.Please explain why the REF value for arsenic is highlighted	
86.	CNSC	Indigenous groups noting decreased water quality from exploratory work	Section 10.3.1	**Context:** It is stated that Indigenous groups noted a decrease in water quality coinciding with exploratory work in the area prior to 2013. **Rationale:** It is possible that exploratory work for the project altered the baseline of Patterson Lake, it is important to know when baseline data was collected to ensure exploratory work did not alter the undisturbed baseline	Please explain when baseline data for water and sediment quality was collected for the project, when compared to other activities carried out on the site. Provide rationale as to how baseline data was uncompromised by other activities or disturbances which have occurred in the project area.	
87.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 10.4.2	**Context:** In Table 10.4-2 pg. 1651-1652 for Pathway SWQ-11 (Treated effluent and treated sewage affecting sediment quality), predicted sediment quality concentrations in the Patterson Lake North Arm West Basin are provided for the different modelling scenario cases for the Project in order to compare predicted sediment concentration exceedances of Constituents of Potential Concern (COPCs) to environmental guidelines and Project thresholds established in Section 10.2.8.3.4 Table 10.2-9 pg. 1626. However, the guidelines and Project thresholds have not been included in Table 10.4-2, making it difficult for reviewers to compare the exceedances to guidelines. Additionally, the assessment of exceedances and risk to receptors has not been made against the most stringent sediment quality guidelines for arsenic and molybdenum (see Comment ECCC-SW-14). Arsenic and cobalt were evaluated further within the Environmental Risk Assessment (ERA) but the results are not discussed within this section of the EIS, and molybdenum was not evaluated further.	1. Incorporate IR from comment ECCC-SW-12 to consider Total Organic Carbon, barium, iron, manganese and vanadium for further assessment in the ERA and sediment quality modelling for the sediment quality assessment. 2. Incorporate IR from comment ECCC-SW-14 to update Table 10.2-9 to incorporate the selection of the most stringent sediment quality guidelines for all parameters with available sediment quality guidelines. 3. Update the risk assessment of molybdenum in the ERA for sediment quality.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				Rationale: Arsenic has CCME Interim Sediment Quality Guideline (ISQG) of 5.9 ug/kg dw and a Probable Effect Level (PEL) of 17 ug/kg dw. However, the less stringent Saskatchewan Reference Values for Uranium Operations Reference (REF) value of 20.8 ug/kg dw and No-Effect (NE2) value of 522 ug/kg dw were used as Project thresholds. Molybdenum has a 'Uranium Mining and Milling in Canada guideline' for Lowest Effect Level (LEL) of 13.8 ug/kg dw and Severe Effect Level (SEL) of 1239 ug/kg dw. However, the less stringent 'Saskatchewan Reference Values for Uranium Operations' REF value of 22.6 ug/kg dw and NE2 value of 245 ug/kg dw. The most stringent guidelines, including molybdenum as a parameter for further evaluation in the ERA, and including the results from the sediment quality risk assessment in the ERA should be used in the assessment of potential effects to aquatic biota and wildlife. Use of the most stringent guidelines will allow for the most protective assessment to analyze risks to the receiving environment.	4. Include the ERA results for the quantitative risk assessment for sediment quality in the EIS for review.	
88.	CNSC	Screening out of the sediment pathway in the EIS	Section 10.4.2 and general throughout section 10	**Context:** Interactions between the project and sediment were classified as a secondary pathway and therefore not carried forward in the assessment. The only area looked at in depth in the EIS was therefore the surface water pathway **Rationale:** Screening out the sediment pathway as a means of contamination discounts the inherent interconnectedness of the entire aquatic ecosystem and removes an important aspect of it from analysis. There are several reasons the sediment pathway should not have been screened out of the analysis after pathways screening: -That discharge to surface water is considered a primary pathway, this should automatically qualify the sediment pathway as requiring additional analysis that was conducted for the surface water environment, given their interconnectedness. -Cobalt and copper are expected to exceed surface water thresholds into the future, mostly from a groundwater pathway, this groundwater must travel through sediment to reach the surface water environment, sediments in the path of the groundwater will most likely increase as well. A groundwater pathway to sediment should be considered. -Several COPCs are expected to increase throughout the life cycle of the project, with some predicted to potentially exceed surface water thresholds into the far-future. It is well established in other uranium mines that as surface water concentrations of COPCs increase in surface water, it will also increase in the sediments due to settling or uptake of plankton which also settle to the sediment after death or are preyed upon by benthic invertebrates. COPCs in sediment can represent a major source of trophic bioaccumulation in aquatic biota. Screening out the sediment pathway discounts the influence COPC concentrations in surface water could have on sediment quality. -Several sources indicate that thresholds in the sediment will be exceeded:	The proponent must apply the precautionary approach, and provide additional analysis of the sediment pathway, commensurate with that conducted for the surface water pathway, or provide strong justification for screening out sediment pathways from the additional analysis like that conducted for surface water. The changes to sediment concentrations from the project also qualify it to be analysed for a residual effects analysis.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				- Table 10.4-2 of the EIS indicates molybdenum, lead-210 and polonium-210 will exceed thresholds in sediment, showing a possible effect to sediment from the project - The ERA indicated copper exceeded relevant hazard quotients for zooplankton, benthic invertebrates, and lake whitefish While these may not inherently indicate effects to aquatic biota, the precautionary approach must be applied and additional analysis of the sediment pathway must be considered.		
89.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 10.5.1.1.1	**Context**: Table 10.5-1 pg. 1657 depicts the chloride and sulphate concentrations in surface water at the edge of the proposed mixing zone for the Application Case. The water quality threshold for Aquatic and Terrestrial Life for sulphate is predicted to change from 128 mg/L at the beginning of operations to 429 mg/L near the end of operations due to changes in hardness levels in Patterson Lake surface water. It is unclear why hardness levels are expected to change over the lifespan of the Project and if this is a Project-related effect. **Rationale**: If Constituents of Potential Concern (COPC) water quality thresholds are dependent on other water quality parameters, such as hardness, and are predicted to change over the course of the Project lifespan, an explanation of why these changes occur must be provided with clarification whether it is a Project-related effect.	1. Clarify if changes to hardness in surface water quality of Patterson Lake is an expected effect of the proposed Project. 2. Confirm if changes to hardness levels will affect any other COPC thresholds such as cobalt over the course of the Project. 3. Confirm if there are any other general water quality parameters that are expected to change over the course of the Project lifespan that may change COPC thresholds? 4. Include, in the potential COPC exceedances, an evaluation against thresholds that are calculated using baseline condition data during assessments of risk if threshold changes are caused by Project effects.	
90.	CNSC	Increase in sulphate thresholds throughout life of project	Section 10.5.1.1.1	**Context:** Table 10.5-1 indicates that the sulphate increases ~3.3 times from start of operation to end of operation. Sulphate concentrations at the end of operation will also increase above what the threshold would be under baseline conditions. **Rationale:** The sulphate threshold is hardness driven, which is expected to increase throughout the life of the project from effluent, this in turn allows a larger release of sulphate without exceeding thresholds. The modification of hardness represents an effect on the surface water environment, as it is changing it in such a way that more sulphate is allowed into the system than would be sustainable under baseline conditions. This appears to be in contradiction with the pollution prevention principle, which does not seem to have been considered for the control of sulphate.	Please provide information on how the principle of pollution prevention and the application of BATEA has been considered in the control of sulphate. Please provide additional justification, to demonstrate application of the precautionary approach as to why it is appropriate to release an amount of sulphate into the environment that could potentially cause adverse effects under natural conditions. **Suggestions for mitigation and follow-up measures** Principles of pollution prevention and the precautionary approach should be applied for the control of sulphate, with the application of BATEA for wastewater treatment in order to keep environmental concentrations of COPCs ALARA.	
91.	CNSC	Exceedances of Copper and Cobalt predicted in the far-future	Section 10.5.1.2.3 and throughout section 10	**Context:** The EIS predicts cobalt will exceed aquatic protection and drinking water quality threshold into the far-future in and downstream from Patterson Lake (potentially into the RSA). Copper will also exceed the aquatic protection threshold in Patterson	Propose additional mitigation measures the ensure the potential irreversible contamination of Patterson Lake and downstream does not occur. The EIS currently indicates this will be a source of monitoring,	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				Lake. The suspected source of this ongoing contamination is from leeching of surface and subterranean waste-rock piles. **Rationale:** The prediction that Patterson Lake and downstream aquatic environments could be impacted for as long as models predict, represents an unacceptable compromise of the environment and violation of the CNSC mandate of protection people and the environment. Every measure should be taken to prevent this outcome and a concrete plan needs to be in place to ensure the environment is able to be returned to baseline conditions after the end of the project. The site must be passively safe after decommissioning, and a permanent leaching of select COPCs into the receiving environment, resulting in long-term exceedances of thresholds, and potential long-term and irreversible impacts to the receiving environment, does not demonstrate a passively safe site.	follow-up, and adaptive management activities; however, these conditions are not expected to occur until after decommissioning of the project which could be too late to prevent this from occurring. **Suggestions for mitigation and follow-up measures** Installation of impermeable and long term effective membranes/barriers on waste rock piles or consideration of other waste rock management approaches to control cobalt and copper migration.	
92.	CNSC	Potential shift of Patterson Lake North Arm from Oligorophic to Mesotrophic	Section 10.5.1.2.6	**Context:** The sensitivity analysis indicated that the trophic state of the North Arm of Patterson Lake could temporarily shift from oligotrophic to mesotrophic during the operations phase of the project **Rationale:** Measures should be taken to ensure a trophic shift does not occur in the lake. This was a specific issue raised with local Indigenous groups, who indicated the clear waters of Patterson Lake and surrounding waterbodies was of significant importance to them, as well as noting algae would indicate compromise of water quality.	Provide additional justification and commitments that lake eutrophication will be monitored and prevented during the operation of the project. **Suggestions for mitigation and follow-up measures** Installation of BATEA for the wastewater treatment in order to keep environmental concentrations of COPCs ALARA.	
93.	CNSC	Aquatic environment	Section 10.5.2.1.3 TSD XXI- ERA-section 6.3.1.1	**Context:** The EIS states that in the far future, the average monthly cobalt concentrations are predicted to consistently exceed the threshold value in Patterson Lake North Arm – West Basin and Patterson Lake South Arm, peaking at 0.0015 mg/L (1.5 ug/L) and 0.0011 mg/L (1.1 ug/L), respectively. The threshold for cobalt used is 0.465 ug/L (as can be seen in table 4-2 of the ERA), and is based on the FEQG for cobalt which takes hardness into account. Patterson Lake is considered to have soft hardness (e.g., often less than 25 mg/L $CaCO_3$). Although the EIS predicts exceedances of the cobalt threshold, the ERA does not predict any effects from cobalt on aquatic or terrestrial populations as a result of releases from the project (i.e., all HQ values are below 1). The ERA uses TRVs for cobalt from Stubblefield et al., 2020 that are adjusted to an EC_{20}. It is not clear if these TRVs take the study area's low hardness into account. **Rationale:** The TRVs for cobalt from Stubblefield et al., 2020 presented in table 6-15 of the ERA do not appear to be adjusted to take low hardness into account. For example, table 6 of Stubblefield et al., 2020 indicates that the hardness in the chronic toxicity test results ranges from 27.4 to 250.3 mg/L. Since the project area is known to have low hardness, this would mean that cobalt could be more toxic at lower concentrations, therefore making the TRVs presented in the ERA less conservative. For example, the lowest TRV for cobalt in the ERA is 9.8 ug/L for aquatic plants	Please provide additional information/justification on the cobalt TRVs chosen for use in the ERA, and ensure the TRVs used to predict effects are conservative and take the soft hardness of the project area into account.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				(based on conversion to EC_{20}) . The SSD curve derived from Stubblefield et al., 2020, calculated a value of 1.8 ug/L for cobalt for 5% of species effected. The FEQG for cobalt (based on a hardness of 52) is 0.78 ug/L, and would be even lower for the project area due to softer waters. Based on the information presented it is not clear if the TRVs for cobalt used in ERA are adequately conservative.		
94.	CNSC	Aquatic Environment	Section 10.5 TSD XXI- ERA- section 4.2.2	**Context:** It is not clear if the pathway for groundwater to sediment was considered in the EIS/ERA for the far future modelling when exceedances for cobalt and copper are predicted in surface water (caused in large part by WRSA and tailing management seepage and infiltration). The Federal Environmental Quality Guidelines (FEQG) for cobalt states that cobalt binds strongly with sediments and suspended particulate matter and that high sediment-water partition coefficients suggest that cobalt will remain for the most part in bottom sediments after entering this compartment. **Rationale:** It is difficult to follow the methodology used in the EIS/ERA related to the sediment pathway, particularly if sedimentation for copper and cobalt present in surface water (caused by WRSA/tailing management GW seepage/infiltration) was considered for the far future.	Please clarify if the sediment pathway was considered from groundwater in the far future (caused by seepage and infiltration from WRSA and tailing management) for copper and cobalt.	
95.	CNSC	Surface Water quality Cumulative effects	Section 10A6.3.2.2	**Context:** The EIS determined potential cumulative effects on water quality by estimating the combined impacts of the project activities under the Application Case and the activities related to the Fission Patterson Lake South Property. The EIS states that "*as the Fission Patterson Lake South Property has not been approved and expected quality of the discharges is not within the public domain, the treated sewage quality was set equal to the treated sewage discharge quality from the Project. Additionally, the treated mine effluent discharge quality during the assumed three-year construction period and six-year operating period of the Fission Patterson Lake South Property was assumed to be equal to the median treated effluent quality predicted for the Project during the corresponding mine life phases. The quality assigned to site surface runoff from the Fission Patterson Lake South Property above-ground tailings management facility and covered waste rock storage facility in the far future was set to equal to the median treated effluent quality predicted for the Project during Operations.*" The EIS also states that the cumulative effects from the Project and the Fission Patterson Lake South Property on surface water quality in general would include an increase of COPC concentrations in the South Arm of Patterson Lake compared to the Application Case, however COPCs would remain below water quality thresholds. It is not clear how conservative these assumptions on water quality from the Fission Patterson Lake South Property project are to support this conclusion. **Rationale:** It is not clear from the EIS if the surface runoff from the Fission Patterson Lake South Property above-ground tailings management facility and covered waste rock storage facility will be collected, treated, and released as effluent, or if it is a separate source-term that is not being collected/treated and is being released directly into Patterson Lake, and this distinction will impact what assumptions for	For the cumulative effects assessment, please apply the precautionary approach, and consider treated mine effluent and surface runoff quality estimates conservatively based on existing operating mines OR include information on how using the assumptions under section 10A6.3.2.2 of the EIS is conservative to determine cumulative effects on water quality, and how it respects the precautionary approach. Please clarify if Fission Patterson Lake South Property surface water runoff will be treated as effluent and provide rationale that the median treated effluent quality predicted for the NexGen Project is appropriate for estimating effluent and run-off from a facility with above-ground tailings management.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				predicted water quality should be used. Furthermore, the quality assigned to the treated mine effluent discharge and site surface runoff from the Fission Patterson Lake South Property above-ground tailings management facility and covered waste rock storage facility was set to equal to the median treated effluent quality predicted for the Project during Operations, however the NexGen Project is proposing underground tailings management, and therefore the NexGen effluent quality may not be representative of Fission's effluent or surface water runoff. It is unclear how similar the effluent from the NexGen Project would be to a project that includes an above-ground tailings management facility. In this case, the precautionary approach should be applied, whereby effluent and surface water runoff quality estimates from other operational above-ground tailings management facilities would be more conservative, and hence more appropriate for predicting cumulative effects than using the median treated effluent quality predicted for the NexGen Project.		
96.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section Appendix 10A7.4.1	**Context**: It is incorrectly stated that only chloride concentrations exceed water quality thresholds at the edge of the mixing zone from the Effluent Treatment Plant (ETP). Table 10A-34 pg. 1777 demonstrates that both sulphate and chloride exceed water quality thresholds at the edge of the mixing zone. Additionally, this table should be updated to include all parameters of interest from the *Metal and Diamond Mining Effluent Regulations* (MDMER) and their respective water quality thresholds. **Rationale**: ECCC advice is to include the general water quality parameters that influence water quality thresholds in this table and parameters in Schedule 4 of the MDMER, so that any changes over the lifespan of the Project can be reviewed.	1. Include all general water quality parameters (ex. pH, temperature, hardness, total suspended solids, etc.) and un-ionized ammonia in Table 10A-34. 2. Include all water quality thresholds for each parameter in Table 10A-34. 3. Update the conclusions on water quality threshold exceedances at the edge of the mixing zone in this section to address sulphate exceedances and any other changes to general water quality parameters over the Project lifespan.	
97.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Appendix 10A7.4.2	**Context**: This section states that the Total Suspended Solids (TSS) concentration for the Effluent Treatment Plant (ETP) and Sewage Treatment Plant (STP) were set to 25 mg/L for the modelling of the near-field area. The maximum allowable discharge limit under the *Metal and Diamond Mining Effluent Regulations* (MDMER) Schedule 4 is 15 mg/L monthly mean concentration from any final discharge point. **Rationale**: It remains the Proponent's responsibility to adhere to the MDMER to ensure that effluent at the end-of-pipe from the final discharge points meets the requirements of Section 4 and Schedule 4 of the regulations.	1. Update modelling to reflect changes to TSS concentration limits to adhere to MDMER discharge limits. 2. Update conclusions in this section to reflect any changes in results.	
98.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Appendix 10A7.5.1	**Context**: Modelling results should be provided for all Constituents of Potential Concern (COPCs) and water quality parameters required under the *Metal and Diamond Mining Effluent Regulations* (MDMER) and any parameters expected to have elevated concentrations in effluent or that have elevated baseline concentrations. There is no information provided in this section on effluent concentration inputs used for the modelling. A water quality threshold of 429 mg/L for sulphate has been applied but in Section 10.2.8.3.1 Table 10.2-5 pg. 1620-1622 the proposed threshold for the Project is 128 mg/L.	1. Provide modelling results for all COPCs and water quality parameters required under the MDMER and any parameters expected to have elevated concentrations in effluent or elevated baseline concentrations. 2. Provide the expected effluent discharge concentrations for all parameters used as inputs for the modelling.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				Rationale: A review all modelling results of all COPCs under the MDMER will assist ECCC in understanding the potential risks to the receiving environment. Additionally, ECCC advises that all Project thresholds and water quality guidelines are adhered to throughout the lifespan of the Project, with reasoning provided for any changes to those thresholds.	3. Provide an explanation for the discrepancy in the sulphate water quality threshold.	
99.	DFO	Fish and fish habitat	Sections 11 & 13	**Context:** No mention in Section 11 (Fish and Fish Habitat) or Section 13 (Vegetation) of whether wetlands are providing fish habitat. It could be that the types of wetlands present do not have sufficient standing water or connectivity to waterbodies to provide fish habitat; however, this should be stated explicitly. **Rationale:** Wetlands can provide valuable habitat for fish; therefore, if the wetlands predicted to be impacted have the potential of providing fish habitat, they must be evaluated for presence of fish and be appropriately included in the quantification of impacts to fish and fish habitat.	Describe whether there is standing water in any of the wetlands that could be providing fish habitat. If there is the potential for wetlands in the study area to support fish, further investigation into fish presence/absence is required. If the wetlands do not have sufficient water to support fish life processes, explicitly state this in the report. **Suggestions for mitigation and follow-up measures** If there are found to be fish in wetlands that will be impacted by the project, the proponent will be required to develop an offsetting plan to counterbalance the loss.	
100.	ECCC	Fish and fish habitat	Section 11.2.2.1 Section 11.5.2.4.1	**Context**: Table 11.2-1 pg. 1997 of the EIS provides the chosen fish species as Valued Components (VC) for further assessment. Lake Whitefish were chosen as a VC and representative species for forage fish species. However, Lake Whitefish are a large-bodied, cold, deep-water, transitory benthivorous fish species that does not share similar life history traits with many small-bodied forage fish species. Lake Whitefish should not be used as the representative species for forage fish. **Rationale**: EEM monitoring recommends using a large-bodied and small-bodied fish species to capture potential effects across different trophic levels within the exposure area. Large-bodied fish species are often very transitory and may not exist within the exposure area for long enough periods of time for effects to be accurately measured (i.e. may not be in exposure area during sampling, may only use exposure area during spawning, etc.), whereas small-bodied forage fish are more likely to be located in large numbers within the exposure area consistently and during monitoring. The additional a small-bodied forage fish species that is well studied as a VC would ensure potential effects across different trophic levels within the exposure area are captured in the assessment.	Include a small-bodied forage fish species as a VC for the risk assessment in the ERA.	
101.	CNSC	Assessment and Measurement Endpoints	Section 11.2.2.3 and 11.2.2.2	Assessment endpoints (e.g., 7.4.2.2.3, 11.2.2.3) should be discussed in the section preceding measurement indicators (e.g., 7.4.2.2.2, 11.2.2.2), since measurement indicators are used to predict overall effects on assessment endpoints.	Reorganize the sections so that assessment endpoints precedes measurement indicators section.	
102.	CNSC	Habitat Productivity	Section 11.2.6 (pg 11-29)	**Context and Rationale:**	Consider addition of available fish habitat productive capacity metrics in their assessment or provide rationale for exclusion.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				There are metrics available to measure productive capacity of fish habitat (e.g., Habitat Productivity Index, Index of Biotic Integrity), but during review, only qualitative ranges in the NexGen EIS could be identified. For example: Comparison of a Habitat Productivity Index (HPI) and an Index of Biotic Integrity (IBI) for Measuring the Productive Capacity of Fish Habitat in Nearshore Areas of the Great Lakes - ScienceDirect (Free)		
103.	CNSC	Lower trophic community sampling	Section 11.2.6.4 (pg 11-36)	**Context and Rationale:** There is currently no discussion identifying species that are resilient and those that are sensitive to chemical or physical stressors. As this information could provide early indicators of potential changes to aquatic community, it should be captured in the EIS.	Consider addition of discussion of resilient and sensitive lower trophic community species and their use as an early indicator of potential changes to aquatic community or provide rationale for exclusion.	
104.	DFO	Fish and fish habitat	Section 11.4.1 Pg. 92	**Context:** The EIS states that 'All applicable DFO-recommended measures to avoid causing harm to fish from the use of explosives would be followed for the proposed Project (DFO 2019b). The DFO guidelines for the use of explosives in or near fish-bearing waters (Wright and Hopky 1998) provide a maximum allowable limit for overpressure (i.e., peak pressure level; 100 kilopascals) and peak particle velocity (i.e., 13 mm/s).' **Rationale:** These guidelines are not currently accepted as a code of practice by DFO, and more recent research suggests the 100 kPa threshold may not be appropriate to ensure that fish are not harmed. DFO's previous Western and Arctic Region has recommended a maximum overpressure threshold of 50kPa (Cott and Hannah 2005). More recent research suggests this value is protective of fish including sensitive life stages (Koden and Aimone 2013). Cott P., and B. Hanna. 2005. "Monitoring explosive-based winter seismic exploration in waterbodies, NWT 2000–2002." In *Offshore Oil and Gas Environmental Effects Monitoring: Approaches and Technologies*, edited by S.L. Armsworthy, P.J. Cranford, and K. Lee, 473-490. Columbus: Batelle Press. http://dx.doi.org/10.13140/2.1.2312.7688. Kolden, K. D., and C. Aimone-Martin. 2013. "Blasting Effects on Salmonids." *Alaska Department of Fish & Game*. https://www.adfg.alaska.gov/static/home/library/pdfs/habitat/blasting_report.pdf.	The blasting assessment should be updated using the 50 kPa threshold. If the threshold is exceeded, mitigation measures should be proposed to reduce harmful effects. If measures to reduce impacts are predicted to be ineffective due to project design or site limitations, the potential impacts should be quantified and accounted for in the offsetting plan. A monitoring plan to confirm predictions and adaptively manage effects from blasting should be developed.	
105.	ECCC	Wildlife and Wildlife Habitat	Table 11.4-1 Table 23A-4	The draft EIS states that water crossing structures will be designed to limit the area disturbed and in a manner that protects the banks from erosion (Table 11.4-1 path ID F-10), particularly when moving equipment across the river using cranes. There was no discussion of the potential effects of these activities to SAR, migratory birds or wetland function.	Describe the methods that will be used to minimize erosion of stream banks and how success of these measures will be evaluated. Explain any risks to migratory birds, SAR and wetland function as a result of these crossings.	
106.	ECCC	Fish and fish habitat Change to an environmental	Section 11.4.2	**Context**: The movement of heavy equipment and infrastructure across the Clearwater River below Patterson Lake at the existing bridge crossing is discussed in this section. The Proponent proposed two options, (1) the use of a crane to maneuver equipment across the river, and (2) upgrading the existing bridge to provide additional	1. Provide further information on the existing conditions and bridge crossing including dimensions, capacity, footprint and information about the Clearwater River at that specific location (i.e., flows, depth, width, etc.).	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
		component due to hazardous contaminants		capacity. The Proponent's preferred approach is the use of a crane but the bridge will be upgraded in the event that it is deemed necessary. The Proponent concludes that upgrading the bridge will have negligible changes to fish habitat availability and thus is not further assessed., More information on the current bridge crossing would assist in the assessment of the amount of risk to the receiving environment from both options. **Rationale**: Currently there is no information provided on the current bridge crossing for dimensions, capacity and river flows. There is also no information provided regarding the amount of equipment expected to be brought across the river, and which best management practices would be used. Further information on proposed spill management and monitoring would assist in analyzing the options presented.	2. Provide more information on the number and types of equipment that would need to be lifted over the river and the footprint for both options. 3. Provide further information on which best management practices will be applied for spills management and monitoring.	
107.	CNSC	Summary of key information sources considered in the fish and fish habitat residual effects assessment	Figure 11.5-1 (pg 11-117)	For Key Findings it mentions that both cobalt and copper concentrations in Patterson Lake are predicted to exceed surface water quality thresholds for the protection of aquatic life, but in boxes that follow there is no mention of cobalt, only copper.	Revise Figure 11.5-1 to indicate if/how cobalt was removed from further consideration in second step (EcoRA) (Cobalt HQ<1).	
108.	CNSC	Surface water quality guidelines	Section 11.5.1.1 (pg 11-118), Table 115-1	Report mentions that surface water quality predictions were compared to CCME guidelines (2021) and SK provincial WQ objectives (WSA 2015), but not upper limit of background.	Provide reference to where in EIS and how the upper limit of background was calculated and taken into consideration.	
109.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 11.7	**Context**: There is the potential for a low level of risk to aquatic biota in the far future due to elevated copper concentrations in surface water due groundwater inputs from the Potentially Acid Generation Waste Rock Storage Area (PAG WRSA). Forage fish, benthic invertebrates and planktonic species are predicted to be at higher risk than predatory fish species. The Proponent states that they are "developing an adaptive management plan to reduce uncertainty and manage risks related to this pathway". **Rationale**: Further information on this topic would assist ECCC in assessing the risk to aquatic receptors.	Provide the adaptive management plan, and include details on the monitoring and management of copper loadings to Patterson Lake for all Project stages including post-closure from the PAG WRSA.	
110.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 11A2.3	**Context**: Table 11A-2 pg. 2155 provides the input values for the Biotic Ligand Model (BLM) and Multiple Linear Regression (MLR) models for the assessment of copper. Hardness values were predicted based upon predicted calcium and magnesium concentrations rather than baseline values. **Rationale**:	Provide additional information on the parameter inputs used for the BLM and MLR models and if concentrations are related to Project effluent inputs to Patterson Lake.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				As per comment ECCC-SW-16, clarity is would assist in understanding if changes in concentrations of hardness and other parameters are a Project-related effect.		
111.	ECCC	Wildlife and Wildlife Habitat	Section 12 Table 14.4-1	The draft EIS states that erosion control techniques will be utilized but does not provide details on what these techniques are or how these techniques will prevent sediment from entering waters frequented by migratory birds or SAR.	Provide details on what methods will be used for erosion control and how they will prevent sediment from entering waters frequented by migratory birds and/or SAR. Explain what actions will be taken if the erosion control measures are not successful. **Suggestions for mitigation and follow-up measures** In development of the Environmental Protection Plan, ensure that clearing and grubbing activities are not conducted during the breeding bird season.	
112.	ECCC	Wildlife and Wildlife Habitat/Wetland Function	Section 13 Section 14 Table 23A-5	The draft EIS states that the Project will avoid wetlands as much as practical, but there will be a permanent "loss of availability of approximately 28 ha of wetland ecosystems". The mitigation measures propose adherence to the Federal Policy on Wetland Conservation to have no net loss of wetlands, however the draft EIS also states in multiple places that reclamation rarely works or restores original function. The draft EIS also states that offsets may be required to meet the requirements of the Federal Policy on Wetland Conservation, but does not provide clear explanation of how offsets will be applied. It is unclear how the Proponent will ensure no net loss of wetlands with this Project.	Provide a wetland mitigation and offset plan that will describe how no net loss of wetland function will be achieved.	
113.	MN-S	Assessment Endpoints	Section 13.2.2.3 Table 13.2-1 Valued Components, Rationale, Measurement Indicators, and Assessment Endpoints	Please explain why "ecosystem condition" was not used as a measurement indicator for the traditional use plant species VC. As defined in Section 13.2.2.24, ecosystem condition is "primarily affected by changes in the amount of moisture and sunlight, competition with invasive species, and dust deposition".	Please explain how traditional use plant species and their associated ecosystems are not expected to be affected by these changes.	
114.	CNSC	Baseline assessment of rare plant species	Sections 13.2.3.1 and 13.2.3.2	**Context:** The spatial boundaries for the vegetation baseline assessment do not cover the extent of the environmental assessment (EA) spatial boundaries, i.e., the baseline study areas are smaller than the EA regional study area (RSA) of 107,491 ha, as depicted in Figure 13.2-1. As a result, it is unclear whether all plant species in the RSA were adequately captured in baseline surveys, in particular with respect to	1.Provide further rationale for the selection of an ecosystem-based approach for rare plant species. 2.Discuss uncertainties related to an ecosystem-based approach for rare plant species.	

[4] EIS, Section 13, p. 13-14.

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				rare species (e.g., federal and provincial species at risk) that may be located in potentially affected downstream waterbodies, wetlands, and riparian areas. Moreover, there appears to be inconsistency between the rare plant species maps in the EIS and the Annex VII.2 (Vegetation Baseline Report 2: Inventory, Rare Plants, and Wetlands). For example, see Figure 13.5-5 in the EIS *versus* Figure 3.3-1 in Annex VII.2. Lastly, the baseline survey was conducted only in 2018 which may underestimate the presence of certain rare plant species (e.g., annuals). **Rationale:** The VC selection is in part based on observations of plant species in the baseline studies. The limited amount of rare vascular plant observations during the baseline field surveys is used as a rationale to use an ecosystem-based approach to the assessment of rare plants. However, since the surveyed areas for observations do not extend to the RSA boundaries, there is a possibility that not all rare species occurring in the RSA were captured in baseline surveys. Further rationale should be provided to conclude that an ecosystem-based approach is appropriate and conservative for rare plant species. Moreover, in the baseline study presented in Annex VII.2, it is stated that the survey likely underestimates the number of rare species present since only a portion of available habitat was surveyed, and due to plants' variable emergence between years. For example, certain rare annual species have a seed bank and emerge only during specific moisture regimes which may not be available every year.	3.Discuss uncertainties related to limitations of the baseline inventory survey for rare plants. 4.Explain discrepancies between rare plant species mapping in the EIS and Annex VII.2. **Suggestions for mitigation and follow-up measures** Identify any monitoring of rare plants that would be required by other authorities.	
115.	CNSC	Regional environmental assessment boundaries	Section 13.2.3.2	**Context:** The regional study area (RSA) for the EA was selected to provide a watershed-based context for interpreting the local effects of the Project. The RSA includes the local study area (LSA), Forrest Lake, Beet Lake, Naomi Lake, and the watershed east and north of the confluence of the Clearwater and Mirror rivers. The Project is located on the western "edge" of the RSA, as depicted in Figure 13.2-1. Since the complete RSA is used to evaluate the availability (e.g., change in area) and distribution of vegetation VCs (i.e., upland, wetland, and riparian ecosystems), the selection of the size and spatial boundaries of the RSA affects the calculated proportions of lost VC areas, which in turn is used for the predicted effects assessment. The conclusion of the magnitude of the effects is in part based on the physical loss (%) compared to the RSA, and the conclusion of e.g. "low magnitude" (e.g., Table 13.5-6) is therefore influenced by the size of the RSA. **Rationale:** Given that the predicted direct loss of upland, wetland, and riparian ecosystems is concentrated nearby the Project area (LSA), the determination of magnitude based on the comparably large RSA may not adequately reflect the potential effects on availability and distribution of vegetation habitat near the Project. For example, for wetland ecosystems, the Project is predicted to contribute to a loss of 26.0 ha (i.e., 21.2% in the LSA) of undisturbed wetland ecosystems (page 13-118), however, the significance rating is "low magnitude" based on the RSA scale.	1.Provide further rationale for the appropriateness of selecting the size and spatial boundaries of the RSA, and for using a watershed-based approach, for the vegetation VCs. 2.Discuss the conservativeness of using the comparison to the RSA for the determination of effect magnitude. 3.Present effect magnitude based on the LSA for vegetation VCs.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				As another example, the uncommon upland ELC Black spruce/Labrador tea/feathermoss (BP14) availability would decrease from 19.1 ha to 7.6 ha in the LSA, which equals a decrease of approx. 60%.		
116.	MN-S	Traditional Plant Use Plant Species	Section 13.2.6.2	It is not clear how total availability calculations for traditional use plant species considered ELC units with low field sampling effort. Were vegetation field plots comparable between studies (i.e., CanNorth vs. Omnia)? How has accessibility and practicality for harvest (i.e., available at high density) been considered?	Please include additional information how total availability calculations for traditional use plant species considered ELC units with low field sampling effort. Please provide additional information clarifying if vegetation field plots were comparable between studies (i.e., CanNorth vs. Omnia as well as how accessibility and practicality for harvest (i.e., available at high density) has been considered.	
117.	CNSC	Change to an environmental component due to hazardous contaminants	Section 13.4.2	**Context:** The categorizing of “V-04: Fugitive dust and constituent emissions” as a secondary effects pathway is based on the assumption that the spatial extent for the deposition of fugitive dust emissions is concentrated within 500 m of the Project footprint. However, the study of Chen et al. 2017 is cited which concluded that dust generated from a haul road was found to decrease lichen cover up to 1 km. This indicates that lichen is a sensitive species to dust deposition. The Environmental Risk Assessment (ERA) supporting document does not evaluate the air/dust deposition pathway for lichen. The exposure pathway is not included in the ecological conceptual site model (page 6.24 of Technical Support Document (TSD) XXI: Environmental Risk Assessment). **Rationale:** In the ERA (TSD XXI), it was concluded that constituents relevant to fugitive dust and particulates (i.e., total suspended particulates (TSP), particulate matter PM_{10} and $PM_{2.5}$) exceeded screening values, but these were not carried forward in the ERA. Please provide an analysis of predicted effects from dust and particulate matter on lichen.	Evaluate predicted effects on lichen species from atmospheric contact with TSP, PM_{10} and $PM_{2.5}$. **Suggestions for mitigation and follow-up measures** CNSC staff suggest to measure dust deposition at different spatial intervals from the Project site in order to evaluate whether fugitive dust emissions are concentrated within 500 m of the Project footprint, as assumed in the EIS.	
118.	CNSC	Aquatic species	Section 13.4.2	**Context:** The section on the effects pathway “V-08: Surface water flow changes” includes a discussion on how changes in surface water levels, flows, and drainage areas can affect wetland ecosystems, however, it is not acknowledged that seemingly “isolated” wetlands can also be connected hydrologically through groundwater. There is no assessment of potential “downstream” effects to hydrological connectivity of wetlands across the RSA. **Rationale:** Changes in hydrological regimes due to the Project could potentially affect wetland hydrological connectivity, and thereby wetland water levels and indirectly the availability, distribution, and condition of vegetation VCs. In particular, information on wetland connectivity would be relevant regarding the wetlands in close proximity to the Project infrastructure, i.e., the extensive organic wetland (i.e., BP19, BP19[BU], and BP20) to the east of the existing bridge crossing	Evaluate predicted effects on wetland hydrological connectivity, including with respect to groundwater, in the context of vegetation VCs.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				on the existing access road, as well as the wetland west of the proposed airstrip (as described in section 13.5.2.1.2).		
119.	CNSC	Upland ecosystem loss	Sections 13.5.1.1.1 and 13.5.1.3.1	**Context:** In the significance determination for upland ecosystem availability, it is stated that effects are permanent and irreversible for upland ELC units that are covered by permanent facilities (e.g., waste rock storage areas, WRSAs). **Rationale:** Certain upland ELC units are uncommon in the LSA and may be affected. For example, within the LSA, the uncommon Black spruce/Labrador tea/feathermoss (BP14) availability is predicted to decrease from 19.1 ha to 7.6 ha. It is unclear if this ELC is present in areas that are proposed to be used for permanent facilities, and therefore cannot be reclaimed (i.e., permanent and irreversible effect).	1.Provide information on which ELCs are located in areas that are planned to be covered by permanent facilities. 2.Assess the magnitude of effect on the ELCs that cannot be reclaimed. **Suggestions for mitigation and follow-up measures** Consider placement of permanent facilities in areas with upland ELC units that remain common within the LSA.	
120.	CNSC	Traditional use plant species	Section 13.5.4.3.2	**Context:** In the context of the significance determination, it is stated that the effects of previous and existing developments and activities in the Base Case have negatively altered habitat availability and habitat distribution of traditional use plant species. Based on this, it is concluded that in the Application Case, the Project contributes to adverse changes of low magnitude. However, the magnitude compared to a "baseline natural state" of the habitat (i.e., before any disturbance) is unclear. Furthermore, it is predicted that traditional use plant species continue to be self-sustaining and ecologically effective, however, it is unclear what the "tipping point" is at which these species are not self-sustaining and ecologically effective anymore, given that they are assessed on an ELC basis. **Rationale:** Indigenous Groups have expressed concerns related to Project activities and potential effects on traditional use plants, their health and availability for gathering (e.g., section 13.5.4.1.1). Concerns were also expressed about the ability to access habitats in the vicinity of the Project site for collecting medicinal plants or berries and how the ability to harvest traditional use plant species is reduced by the cumulative effects of existing disturbances and the Project. Given these concerns, it would be relevant to assess the magnitude of effects with consideration of the already cumulative effects of existing disturbances.	1.Evaluate magnitude of predicted effects on traditional use plant species availability and distribution with respect to a "baseline undisturbed" state, as well as taking into account the cumulative magnitude of existing and proposed disturbances. 2.Define the specific indicators at which traditional use plant species are considered not self-sustaining and ecologically effective.	
121.	ECCC	Wildlife and Wildlife Habitat	Section 14	As per the CNSC Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012: "The EIS will then describe mitigation measures that are specific to each environmental effect identified. Measures will be written as specific commitments that clearly describe how the proponent intends to implement them and the environmental outcome the mitigation is designed to address. The EIS will describe mitigation measures in relation to species and/or critical habitat listed under the Species at Risk Act (SARA). These mitigation measures will be consistent with any SARA permit, applicable recovery strategy and/or action plan." The draft EIS does not list all SAR, or the adverse effects to all SARA-listed species,	1. Identify all SAR and their critical habitat and describe how they may be adversely affected by the Project. 2. Describe what measures will be taken to avoid or lessen the effects of each Project activity and phase, and how these effects will be monitored to ensure they are minimized or avoided.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				and does not outline the measures that will be taken to avoid or mitigate these effects.		
122.	ECCC	Wildlife and Wildlife Habitat	Section 14	ECCC has identified that four SAR arthropods (yellow banded bumble bee, gypsy cuckoo bumble bee, transverse lady beetle, and nine-spotted lady beetle) have ranges overlapping the Project area and these were not mentioned in the draft EIS.	1. Include the four arthropod SAR in the assessment. 2. Explain what mitigation measures will be used to minimize effects to SAR arthropods that could occur in the study area.	
123.	ECCC	Wildlife and Wildlife Habitat	Section 14 Table 14.4-1 Table 23A-3	Light pollution and effects to migratory birds and SAR such as bats and caribou are identified in the draft EIS. Mitigation is described as 'limit light pollution to the extent practical…' but more detail will help ECCC to determine how light pollution will be limited and what mitigation measures will be utilized.	Explain how light pollution will be managed and what specific mitigation measures will be used to minimize effects to migratory birds and SAR birds and mammals.	
124.	ECCC	Wildlife and Wildlife Habitat	Section 14.2 Table 14.2-1	The Proponent has selected VCs to represent multiple Species at Risk (SAR), without providing sufficient detail on overlap of habitat requirements. Olive-sided flycatcher is considered representative of bank swallow, barn swallow and common nighthawk despite these species having very different nesting habitat requirements. Rusty blackbird is considered representative of horned grebe and yellow rail, although these species have different nesting and feeding habitat requirements. The information for rusty blackbird in table 14.2-1 lists that this species is a "representative species for effects on bank swallow, barn swallow, and common nighthawk, which are all aerial insectivores". This is the same rationale used for olive-sided flycatcher being representative for the same species.	1. Provide an explanation to support the use of olive-sided flycatcher as a representative species for bank swallow, barn swallow and common nighthawk or individually assess each species. 2. Provide an explanation to support use of rusty blackbird as a representative species for horned grebe and yellow rail or individually assess each species.	
125.	CNSC	Physical stressors (noise and vibration) on wildlife	Table 14.4-1; Appendix 14A	**Context:** During all project phases, sensory disturbances such as but not limited to noise have been identified as stressors for wildlife in the project area. However, this appears to have been assessed for most part from an anthropocentric perspective, such as dispersal of game animals resulting in loss of hunting opportunities for local hunters. While this is valid, there is virtually no consideration of the biology of wildlife species which can be disrupted by sensory disturbances. **Rationale:** Noise has been demonstrated to adversely affect reproductive behaviour (e.g., calling behaviour, mating success, calving, to name a few) in many wildlife species. This is particularly important for protected species (SARA-listed species, migratory species) where successful breeding is inextricably linked to species survival, in addition to other factors such as the availability of critical habitat. Also, there is no consideration of project-related vibrations as a sensory disturbance. Sensitive terrestrial species (specifically, herpetofauna, amphibians, and invertebrates) can be impacted by vibrations emanating from the operation of heavy machinery and blasting activities at the project site.	1.Provide a discussion of impacts of physical stressors (specifically noise and vibrations) on wildlife in the project area. Discussion should focus on protected species (i.e., migratory birds, SARA-listed species) and, if appropriate, mitigation measures and/or monitoring should be considered. 2.Provide project-related vibrations as a sensory disturbance in this assessment.	
126.	ECCC	Wildlife and Wildlife Habitat	Section 14.4.2 Table 14.4-1 Table 23A-1 Table 23A-5	The Proponent states that vegetation will be cleared during the construction phase to widen the access road and prepare the mine site, however the timing of vegetation clearing windows was mentioned only within the text of the EIS and should be included in the mitigation table and summaries. The Proponent also states that if sensitive periods for nesting migratory birds cannot be avoided, pre-	Provide an Environmental Protection Program that includes: • details on how vegetation clearing related to site preparation and road widening/development will	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				clearance surveys will be conducted and buffers applied. ECCC does not recommend the use of nest searches or pre-clearing surveys for active bird nests during the breeding season as a mitigation, given the difficulty associated with finding nests reliably and the high likelihood of disturbing nesting birds when searching. Instead, ECCC recommends that clearing and grubbing activities not be conducted during the breeding bird season. The draft EIS states that activity restrictions for sensitive species, including nesting migratory birds, will be applied but provides no details on what these restrictions are or when they will be applied. The Proponent commits to including this information in an Environmental Protection Program.	be conducted to minimize risk to migratory birds and SAR. • the timing window that will be used for vegetation removal to reduce risk to migratory birds and SAR and • details on what activity restrictions will be implemented for the protection of migratory birds and SAR and when they will be applied.	
	MN-S	Summary of Significance Determination - Caribou	Section 14.5.1.3.2 Section 14.7	The EIS states "… *even the incremental effects due to the small amount of habitat loss from the Project in SK2 West are predicted to result in a significant adverse effect on caribou in the Application Case. …* Cumulative effects from the Project, Fission Patterson Lake Property, and forest harvest activities are similarly predicted to result in a significant adverse effect on caribou in the RFD Case, …". MN-S has not had the opportunity to evaluate the Caribou Mitigation and Offsetting Plan to date.	Please explain how significant effects, including cumulative effects, on a listed species can be mitigated with the development of a Caribou Mitigation and Offsetting Plan (i.e., no details provided or evidence that such a plan will be effective) for the Project. Please ensure MN-S has the opportunity to evaluate the Caribou Mitigation and Offsetting Plan.	
127.	ECCC	Wildlife and Wildlife Habitat	Appendix 14A Table 20.3-1 Annex VIII.2, Sections 8, 10 Annex VIII.3, Section 3	Myotis species were detected throughout the Site Survey Area (SSA) but there were no descriptions of locations of important habitat such as maternal roosts or hibernacula provided despite identifying that minor hibernacula could exist in the Regional Study Area (RSA).	1. Describe and map locations of suitable myotis hibernacula and/or maternal roost habitat within the LSA and RSA and explain how these habitats may be affected by Project activities. 2. Describe what mitigation measures will be taken to avoid the breeding period for bats.	
128.	CNSC	Human Health with respect to radiation exposure	Human Health Accidents and Malfunction	**Context:** Camp workers at the proposed Project were assessed for both radiological and non-radiological exposures in the Environmental Impact Statement (EIS) for the Rook I Project. However, the potential radiological and non-radiological impacts of the project on the health and safety of all other persons that would be on-site (for example, nuclear energy workers (NEWs) and persons not considered as NEWs (i.e., non-NEWs)), during normal operations and during accidents and malfunctions, were excluded from the EIS. The rationale provided by the proponent is in reference to CSA N288.6-12, as NEWs are not considered in the Standard. The exclusion of NEWs and non-NEWs who may be occupationally exposed to ionizing radiation and non-radiological hazards is contrary to the Project Description for the Rook I Project, which does identify in Section 4.2.5, Human and Ecological Health, the following:	The proponent is requested to assess the potential radiological and non-radiological impacts of the project on the health and safety of all persons on-site, during normal operations and during accidents and malfunctions (persons on-site in this context are NEWs and persons who are not NEWs who may incur occupational exposures). The proponent should identify all associated hazards and screen them as to potential risks for bounding scenarios. All bounding scenarios should be further assessed in detail with adequate consequence criteria for their specific impacts/risks on the environment, human health, and workers' safety.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				Human and ecological health considerations will be evaluated through all phases of the Project and will consider the various potential impacts that the Project could have to various receptors. For example, specific to the direct operation of the Project, select occupations and personnel on-site could be exposed to radiation sources as part of their daily activities. These would include underground miners, ore and waste rock truck drivers and mill operators. The proponent is reminded that the scope of the environmental assessment, as outlined in the Project Description for the Rook I Project, which was subsequently accepted by the Commission in its Record of Decision, provides the overarching framework for the EIS. Further, in the Record of Decision, it is stated that … "*CNSC staff submitted a detailed description of the primary project components and that it was satisfied that the project components and activities that NexGen listed in its project description were appropriate.*" This would include the receptors identified in Section 4.2.5 as outlined above (i.e., *specific to the direct operation of the Project, select occupations and personnel on-site could be exposed to radiation sources as part of their daily activities. These would include underground miners, ore and waste rock truck drivers and mill operators*). **Rationale:** NexGen identified the scope of the Rook I Project in its submitted project description. Section 4.2.5, Human and Ecological Health, includes consideration of various potential impacts that the Project could have to various receptors, with examples given including select occupations and personnel on-site that could be exposed to radiation sources and non-radiological hazards as part of their daily activities (*paraphrased by CNSC staff*). CNSC staff note that the CSA standard N288.6-12 addresses environmental risk assessments for Class I nuclear facilities and uranium mines and mills. It is agreed that the standard does state the following in 1.6 (Receptors): *NEWs are covered under the radiation protection program and health and safety program in place at the facility and therefore not considered in the Standard.* However, there is currently no radiation protection program or health and safety program in place; noting that the Rook I Project is currently undergoing the EIS review process. Therefore, there is no information contained in the EIS on the extent of potential radiological and non-radiological impacts the project may have on all persons on-site (NEWs and persons who are not NEWs), including during accidents and malfunctions (also noting that the camp workers included in the HHRA were not advanced to the accidents and malfunctions analyses).		

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
129.	MN-S	Exposure Pathways	Section 15.1, Figure 15.1-3	The linkage diagram is useful; however, it does not include all relevant information. Potentially operative exposure pathways removed through controls, mitigation, or treatment should also be discussed. Any exposure pathways which are assumed to be incomplete will require confirmation with monitoring and should not restrict Traditional Land Uses of MN-S, and the reasoning for excluding exposure pathways should be obvious and transparent.	Please include a conceptual site model or linkage diagram that shows all operational as well as incomplete exposure pathways, as well as justification for exposure pathways being rendered incomplete and not considered further in the assessment.	
130.	MN-S	Existing Conditions	Section 15.2.6	Some traditional peoples eat burbot—including the liver. There may be the potential for bioaccumulation of COPCs in burbot livers, especially if burbot are ingesting other predator species of fish, as well as benthic organisms. Burbot would be a good species to gather baseline COPC information from because they are distributed throughout the study area; being captured in all but two (2) waterbodies and watercourses (Clearwater River above Beet Lake, and Clearwater River below Beet Lake). One of the reasons that burbot would be a good species to gather baseline COPC information from is because burbot are distributed throughout the study area, being captured in all but 2 waterbodies and watercourses (all except Clearwater River above Beet Lake, and Clearwater River below Beet Lake).	MN-S requests that the site (LSA) information for existing data regarding toxins (metals, and other toxins) include testing burbot (tissue, bile, livers) as a baseline from which to look at cumulative effects.	
131.	MN-S	Removal of Exposure Pathways	Section 15.2.7	Removal of exposure pathways through mitigation is only acceptable if mitigative measures are applied at the design stage or if their continued operation are conditions of project approval. If active management, exposure control, or other risk mitigations measures need to be maintained or actively applied/enforced, than the pathway should be considered operative. Any exposure pathway mitigated through this approach will require additional monitoring and validation to ensure that the mitigation is effective. Any mitigation which requires restrictions on Traditional Land Use by MN-S will require additional consultation.	**Suggestions for mitigation and follow-up measures** Please provide confirmation that NexGen will consult with MN-S on any mitigation which requires restrictions on Traditional Land Use by MN-S.	
	MN-S	Subsistence Harvester	Section 15.2.8.1	The EIS states that: "… about 50% of the Traditional Foods for subsistence harvesters were assumed to be sourced from either Patterson Lake South Arm, Beet Lake in the LAS, or Lloyd Lake, and the other 50% from a reference location." The identity of this reference location and potential for additional exposure through country foods (whether naturally occurring or not) is not clear.	Please clarify whether/how COPC exposure from the reference location was incorporated. Please include additional detail on the nature of the "reference location" of the Traditional Food Study and the level of COPC exposure expected through Traditional Resources from there.	
132.	CNSC	Receptor Selection and Characterization	Section 15,2.8.1	**Context:** In the selection of receptors for the Human Health Risk Assessment, "infants" and "toddlers" were grouped together with one-year-olds and assumed to have similar exposures (and effects) to the COPCs in the project area. There are, however, significant differences between these groups with respect to their food intakes, body weights, feeding behaviour, and sensitivities to COPCs, to name a few. An infant's intake of liquids (infant formula reconstituted with water taken from the Patterson Lake, for example) is much greater than a toddler and a one-year-old receptor. A toddler would have much higher hand-to-mouth activity (therefore, higher intake of soil) than an older child. Similarly, the sensitivity of these groups to COPCs will differ significantly given that the immune system and detoxification	Include, as receptors, an infant and a toddler in the HHRA for the project.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				mechanisms are still developing in the younger age groups. **Rational:** Clause 6.2.3.1 of the CSA Standard N288.6-12 (Environmental risk assessments at Class 1 nuclear facilities and uranium mines and mills) outlines receptor groups divided into age classes to include infants, toddlers, children, teens, and adults. Given the foregoing, it is inappropriate to group infants and toddlers with one-year-olds in this HHRA.		
133.	MN-S	Carcinogens - harvester	Section 15.5.1.2	This Section compares the subsistence harvester exposed to Project-related arsenic to a reference subsistence harvester for context. However, the reference harvester is only exposed through foodstuffs and not through other exposure pathways, such as baseline concentrations in soil, air, or water.	To ensure a valid comparison between a subsistence harvester exposed to Project-related arsenic and a reference subsistence harvester, please include total exposure for the reference harvester case.	
134.	CNSC	Human Health with respect to radiation exposure	Section 15.5.1.3	**Context:** The factor of 60 Bq/m^3 should not be used as a screening level for radon in ambient air. It was not designed for this purpose. **Rationale:** The value of 60 Bq/m^3 is a reference level for environmental radon concentrations based on a calculated effective dose to members of the public. This value was derived from table 5 of section 4.2.1 in ICRP-65. This section of ICRP-65 provides the basis for an action level for intervention in indoor dwellings. The recommendation of the ICRP is that the annual effective dose be in the range of 3 to 10 mSv/year for a member of the public. The corresponding radon concentration would range from 200 to 600 Bq/m^3, assuming an annual occupancy of 7,000 hours and an equilibrium factor of 0.4. The occupancy time of 7,000 hours represents 80% of the outdoor occupancy. UNSCEAR suggests that a value of 60% may be appropriate for the outdoor environment; therefore, the occupancy used in this derivation is conservative for outdoor exposures. The value of 60 Bq/m^3 is based on dividing the ICRP recommended action level of 600 Bq/m3, which corresponds approximately to an annual dose of 10 mSv/year, by a factor of 10 to arrive at a radon concentration of 60 Bq/m^3 corresponding to an annual effective dose of 1 mSv/year.	Identify the local or regional radon background concentrations. **Suggestions for mitigation and follow-up measures:** NexGen should compare the monitored environmental radon concentrations to local or regional background concentrations.	
135.	MN-S	Carcinogens – harvesters	Section 15.5.2.2, Table 15.5-6	The discussion and table do not acknowledge predicted ILCRs exceed acceptable levels for three receptor groups, and are over 10x the acceptable level of risk for subsistence harvesters at Patterson Lake South Arm.	Please provide additional context in the EIS regarding predicted ILCRs.	
136.	CNSC	Current use of lands and resources for traditional purposes	Sections 15.6, 16.6, 17.6, 19.6,	**Context**: It is not clear if NexGen sought input from Indigenous Nations and communities on the potential adverse effects pathway, reasonably foreseeable development (RFD) case, conclusions and significance determination related to potential adverse impacts of the project on the potential or established Indigenous and/or treaty rights and effects of changes to the environment on Indigenous peoples, pursuant to paragraph 5(1)(c) of the CEAA 2012	Please provide additional information to demonstrate whether Indigenous Nations and communities were engaged directly with regarding the effects pathways, RFD case, conclusions and significance determination related to potential adverse impacts of the project on the potential or established Indigenous and/or treaty	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				Rationale: More information is required to understand whether Indigenous Nations and communities have provided input or have been engaged on the effects pathways, RFD case, conclusions, and significance determination.	rights and effects of changes to the environment on Indigenous peoples, pursuant to paragraph 5(1)(c) of the CEAA 2012. Provide a rationale if this engagement has not been completed.	
137.	CNSC	Indigenous Peoples' health / Socio-economic conditions	Sections 15.8 TSD XXI: ERA Section 8.3 Monitoring and follow-up	**Context:** The EIS states "NexGen would be working with local Indigenous Groups in an effort to complete a targeted traditional foods study to help validate or modify the dietary assumptions made in the HHRA." It is not clear when or how this activity will occur. The level of detail in TSD XXI: ERA section 8.3- Monitoring and Follow-up appears to be insufficient. **Rationale:** Additional information is required to understand the timelines and approach to conducting this engagement activity and study. As outlined in TSD XXI: ERA Section 8.3 , with respect to Far Future Project Effects, ''NexGen would implement an adaptive management throughout the operations.'' There is no explanation how this would be implemented.	Provide further detail in both Section 15.8 of the EIS as well as in Section 8.3 of the TSD XXI: ERA on the status of the targeted traditional food study. Include information about when the Traditional Foods Study would be completed, how Indigenous Nations and communities have and/or will be engaged on this study, how it will be used to help validate the consumption of traditional foods used in the HHRA, and how adaptive management would be implemented for the far future project effects.	
138.	MN-S	Executive Summary Section Purpose Section Introductions Incorporation of Indigenous Knowledge	Throughout EIS	The EIS states that : "*The cultural and heritage resources and Indigenous land and resource use assessment used widely accepted scientific practices and incorporated Indigenous and Local Knowledge from a variety of sources, including Joint Working Group meetings and Indigenous Knowledge and Traditional Land Use (IKTLU) Studies completed by First Nations and Métis Groups (collectively referred to Indigenous Groups) for the Project.*" Terminology such as Métis Group (rather than Indigenous Nation) does not align with, or reflect an understanding of, MN-S as a rights holder. The use of "incorporated" does not reflect current best practices that acknowledge Indigenous Knowledge as an equal but different way of knowing (than western science). This terminology implies that Indigenous Knowledge can be absorbed into a scientific approach. Terminology such as "First Nations" and "Indigenous groups" does not reflect current best practices or acknowledge the Rights, Title and Jurisdiction of MN-S. Each Indigenous Nation should be discussed and acknowledged independently.	Please revise EIS terminology accordingly.	
139.	CRDN	Heritage Resources	Section 16?	No heritage resources identified.	NexGen should provide details on the protocol for change finds. CRDN community monitor should be present monitoring during all phases of project development.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
140.	CNSC	Current use of lands and resources for traditional purposes	Section 16, 17, 23 and 24	**Context:** It is not clear from this section(s) of the EIS and the Indigenous Engagement Report, whether NexGen provided Indigenous Nations and communities with the opportunity to participate in the development, implementation and review of monitoring and mitigation measures, as per the guidance of REGDOC-3.2.2 and CNSC's Generic EIS Guidelines. This engagement should include: presenting information regarding effects to Indigenous land and resource use and mitigation measures, seeking specific feedback, responding to any feedback and validating this with identified. If needed, NexGen should provide a rationale where information could not be obtained. **Rationale:** More information is required to determine what measures were identified to mitigate or accommodate potential adverse impacts of the project on the potential or established Indigenous and/or treaty rights and effects of changes to the environment on Indigenous peoples, including suggestions raised by Indigenous groups pursuant to paragraph 5(1)(c) of the CEAA 2012.	Provide details about how NexGen engaged with Indigenous Nations and communities on the development, implementation and review and validation of the mitigation measures proposed. **Suggestions for mitigation and follow-up measures** It is recommended that NexGen creates a commitments table, or adds a column to their issues table, that clearly articulates the specific mitigations that they have committed to for each Indigenous Nations and community to address the issues and concerns they have raised.	
141.	CNSC	Any structure, site or thing of historical, archaeological, paleontological or architectural significance	Section 16 and 16.4.2	**Context:** It is not clear whether Indigenous Nations and communities were engaged on the results and findings of the Heritage Resources Impact Assessments (HHRIA). **Rationale:** More information is required to understand whether Indigenous Nations and communities have been engaged on; physical and cultural heritage, including any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.	Provide detail to demonstrate whether NexGen engaged with any Indigenous Nations on these surveys and findings on preserving, and managing the archaeological resources identified in the future HHIAs for the site. **Suggestions for mitigation and follow-up measures** The Final EIS submission should include an update on any engagement activities that have taken place with regards to any of the HHRIAs for the Project, or any site or thing that is of historical, archaeological, paleontological or architectural significance.	
142.	CNSC	Indigenous physical and cultural heritage	Section 16 and 16.5.1.3.6	**Context:** The EIS states "The spatial extent of indirect or perceived effects from the Project and potential avoidance or reduced traditional land and resource use surrounding the Project was assumed to be 5 km from the maximum disturbance area, which represents an area where individuals may perceive contamination to exist." It is not clear if NexGen engaged directly with the Indigenous Nations and communities regarding the spatial extent of perceived effects on water, fish, plant, and wildlife resource quality. **Rationale:** More information is required to understand whether Indigenous Nations and communities have provided input or been engaged on the conclusion's regarding the extent of the perceived effects on the lands and resources use and therefore significance determination.	Please provide additional information on how Indigenous Nations and communities were engaged on the 5 km perceived spatial extent selected for the perceived effects on the lands and resources use. It is not clear if NexGen plans to carry out a perception baseline study for the project and area in collaboration with impacted Indigenous Nations and communities? If so, it is recommended that the spatial boundaries of perceived risk of the project by Indigenous Nations and communities be taken into consideration in the measurement indicators and assessment endpoints in the potential impact on cultural and heritage resources and Indigenous land and resource use. **Suggestions for mitigation and follow-up measures**	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
					It is recommended that NexGen engage directly with the Indigenous Nations and communities on the spatial extent of perceived effects for their traditional activities including hunting, trapping, and potential impacts on cultural and heritage resources and Indigenous land and resource use.	
143.	MN-S	Introduction	Section 16.1	The EIS states: "Changes in access to land and traffic patterns could alter Indigenous land user safety." Changes to access have wider ranging impacts to Indigenous land users than just safety concerns. Changes in access may also impact the ability to access Culturally significant locales and/or resources for cultural practices and/or sustenance. This text does not acknowledge MN-S connection to the homeland and the importance and impact of land access to the MN-S culture and practices.	Please revise text to include acknowledgement of MN-S' connection to the homeland and the importance and impact of land access to the MN-S culture and practices.	
144.	MN-S	Assessment Endpoints	Section 16.2.2.3, Table 16.2-1	The EIS states: "Continued ability to participate in Indigenous land and resource use activities." The ability to participate in an activity is not equivalent to the ability to continue to practice an activity with the same frequency or success as was present prior to Project disturbance. As rights holders, at a minimum, the ability for MN-S to continue Indigenous land and resource use practices, as they currently occur, should be the assessment endpoint.	Please revise assessment endpoints to include the ability for MN-S to continue Indigenous land and resource use practices, as they currently occur.	
145.	MN-S	Assessment Cases	Section 16.2.5, Figure 16.2-2	Figure 16.2-2 states: "The Fission Patterson Lake South Property, which is planned by Fission Uranium Corp. … was included in the RFD Case (Figure 16.2-2). …The CRDN and MN-S specifically mentioned the potential for cumulative effects from the Project and the nearby proposed Fission Patterson Lake South Property …" The figure does not appear to show the location of the Fission Patterson Lake South Property, which is identified as included within the RFD case and has also been specifically identified for consideration of cumulative effects by MN-S.	Please revise Figure 16.2-2 to include the location of the Fission Patterson Lake South Property.	
146.	MN-S	Existing Conditions	Section 16.2.6	The EIS states: "Data were validated and supplemented through several means, including discussion during Joint Working Group meetings and review of Joint Working Group records." It is unclear who completed the validation process for existing conditions for Indigenous Land and Resource Use VC. Third party review of meeting records and notes is not equivalent to data validation by potentially affected parties. Data verification should involve collaboration with MN-S, as rights holders, and Indigenous land and resource users. This includes the opportunity to review, revise and contribute to the characterization of existing land and resource conditions with the MN-S Homeland.	Please update the language regarding data verification to reflect that MN-S requested and was not provided the opportunity to review (and verify) the EIS prior to regulatory submissions.	
147.	MN-S	Project Interactions and Mitigations	Section 16.2.7	The EIS states: "A screening-level assessment was applied using Indigenous and Local Knowledge, scientific knowledge, logic, experience with similar developments, and an understanding of the effectiveness of mitigation (i.e., level of certainty that mitigation would work) to assign each pathway to one of the following categories …"	Please revise this section of the EIS to include consideration of changes to the human environment, including impacts to the ability to continue Indigenous land and resource use.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				While the description of screening includes consideration of Indigenous Knowledge, the definitions for both a secondary and primary pathway only references environmental changes (which is assumed to reference the physical and biophysical environment) as the thresholds for the assessment. The determination of pathways should also consider changes to the human environment, including impacts to the ability to continue Indigenous land and resource use.		
148.	MN-S	Residual Effects Classification and Determination of Significance	Section 16.2.9	The EIS states: "This assessment endpoint is qualitatively defined by the continued ability of Indigenous Groups to participate in land-based activities based on similar availability of resources for harvesting, maintenance of access to traditional land use areas, and maintenance of quality of Indigenous land use experience, while acknowledging that traditional activities are dependent on individual preferences and experience. The classification of residual effects criteria provides the foundation for determining if the threshold for significance is exceeded." Indigenous Land and Resource use is intrinsically tied to the land and the specific locale; similar availability of resources does not necessarily reflect the ability to maintain MN-S cultural practices. The ability to participate in an activity is not equivalent to the ability to continue to practice an activity with the same frequency or success as was present prior to Project disturbance. As rights holders, at a minimum, the ability for MN-S to continue Indigenous land and resource use practices, as they currently occur, should be the assessment endpoint.	Please revise to include as an assessment endpoint the ability for MN-S to continue Indigenous land and resource use practices, as they currently occur.	
149.	MN-S	Monitoring, Follow-Up and Adaptive Management	Section 16.2.11	The EIS states: "The implementation of robust, long-term environmental testing and monitoring has also been requested by Indigenous Groups to verify protection of the environment, including community-led monitoring during Construction and Operations of the proposed Project." In addition to supporting implementation of community-led monitoring, as a rights holder MN-S should be involved in the scoping and development of environmental testing and monitoring programs.	Please revise text to clarify that MN-S will be involved in the scoping and development of environmental testing and monitoring programs.	
150.	CNSC	Current use of lands and resources for traditional purposes	Sections 16.3.2	**Context:** Section 16.3.2 of the EIS provides an overview of CRDN, MN-S, BNDN and BRDN. Publicly available information should be included regarding ACFN and YNLR as well as any relevant information provided during engagement with ACFN/ YNLR to date. **Rationale:** More information is required to understand ACFN and YNLR's history and traditional land use in the vicinity of the project.	Provide an overview for ACFN and YNLR in Section 16.3.2 of the EIS.	
151.	MN-S	Gathering	Section 16.3.3.2.3	The EIS states: "A general use area was mapped around the east shore of Forrest Lake and Beet Lake, and Forrest Lake, which overlap the maximum disturbance area ..." MN-S Indigenous land and resource use (gathering) overlaps with the maximum disturbance area; this must be considered and discussed within the assessment.	Please revise the EIS to include details regarding MN-S Indigenous land and resource use (gathering) as it overlaps with the maximum disturbance area.	
152.	MN-S	Hunting	Section 16.3.3.2.4	The EIS states: "Métis Nation – Saskatchewan citizens hunt throughout the LSA and RSA.... Some MN-S citizens reported that moose have moved farther away	Please revise the wildlife assessment to include consideration on MN-S qualitative observations on	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				because of too much activity in the area of the proposed Project." MN-S Indigenous land and resource use (hunting) overlaps with both the LSA and RSA; this must be considered and discussed within the assessment. The wildlife assessment should include consideration on MN-S qualitative observations on Moose movements. The EIS also states: "Specific hunting areas located in the LSA identified by the MN-S include in the areas of Gedak Lake; Dennis Lake; Derkson, Koops and Gall lakes; and Patterson Lake including within the maximum disturbance area …." MN-S Indigenous land and resource use (hunting) overlaps with the maximum disturbance area; this must be considered and discussed within the assessment.	Moose movements. Please revise the EIS to include details regarding MN-S Indigenous land and resource use (hunting) as it overlaps with the maximum disturbance area.	
153.	MN-S	Trapping	Section 16.3.3.2.5	The EIS states: "Métis Nation – Saskatchewan citizens trap in the LSA and RSA. In the RSA, MN-S has identified one trapline … In the LSA, the MN-S has identified one trapline that extends from north of Patterson Lake, including within the maximum disturbance area …" MN-S Indigenous land and resource use (trapping) overlaps with the maximum disturbance area; this must be considered and discussed within the assessment.	Please revise the EIS to include details regarding MN-S Indigenous land and resource use (trapping) as it overlaps with the maximum disturbance area.	
154.	MN-S	Culturally Important Sites and Areas	Section 16.3.3.2.6	The EIS states: "Métis Nation – Saskatchewan citizens value the LSA and consider it culturally important to their continued use of the land. They consider the area important not only for harvesting but also for its role in the larger landscape." MN-S Indigenous land and resource use (harvesting and holistically) must be considered and discussed within the assessment.	Please revise the EIS to include consideration of MN-S Indigenous land and resource use (harvesting and holistically) within the assessment.	
155.	MN-S	Culturally Important Sites and Areas	Section 16.3.3.2.6	The EIS states: "There were no cultural sites and areas identified by the MN-S in the LSA, but several were reported in the RSA, including at lakes directly north of the LSA ..." MN-S identification of cultural sites does not align with the outcomes of the HRIA which identified no heritage resources. Given the pathways analysis determined that "all potential adverse pathways from the Project could be removed from the assessment (page iv)", it is assumed that potential impacts to the heritage resources identified by MN-S have not been assessed or mitigated.	Please revise the EIS to include the Indigenous Knowledge (including the identification of heritage resources) that has been shared with the proponent by MN-S, for the purposes of this study. This information should be considered and applied to the assessment. Given the identification of an MN-S cultural site directly north of the LSA, the rationale for the cultural and heritage resources VC should be evaluated to consider its appropriateness to capture resources potentially impacted by the Project.	
156.	CNSC	Current use of lands and resources for traditional purposes	Section 16.3.3.6	**Context:** The EIS states "The EIS states Athabasca Denesųłiné did not identify any specific traditional activities overlapping with the LSA. **Rationale:** More information is required to better understand YNLR's current and traditional land use near the proposed project site.	Please provide additional information about any additional engagement activities that NexGen completed directly with YNLR related to better understanding their current and traditional land use and potential interests near the proposed project site.	
157.	MN-S	Existing Conditions	Section 16.3	Section 16.3 of the EIS states: "Indigenous land and resource use in the LSA is actively pursued by the CRDN, MN-S, and BNDN, and, to a lesser extent, the BRDN."	Please provide more context that will provide assurance to MN-S to ensure MN-S is given the opportunity to participate in field programs to support identification of cultural and heritage	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				While active Indigenous land and resource use in the LSA by MN-S is acknowledged, best practices that align with an understanding of MN-S as a rights holder would include the opportunity to participate in field programs to support identification of cultural and heritage resources as well as the opportunity to provide review and contribution to the assessment prior to finalization and submission to regulators.	resources as well as given the opportunity to provide review and contribution to the assessment prior to finalization and submission to regulators	
158.	MN-S	Potential Effects and Proposed Mitigation	Section 16.4	Section 16.4 of the EIS states: "Project activities that would have the potential to affect Indigenous land and resource use during the Project lifespan include:" [bullet list] The Project would also impact and change the ability of MN-S to access the homeland due to active mining activities and access restrictions the land.	Please revise bullet list to include "The Project would also impact and change the ability of MN-S to access the homeland due to active mining activities and access restrictions the land."	
159.	MN-S	Potential Effects and Proposed Mitigation	Section 16.4	Section 16.4 of the EIS states: "Project environmental design features such as the underground tailings management facility and a limited Project footprint were designed to minimize the Project's effects on cultural and heritage resources and Indigenous land and resource use." While underground tailings management would minimize the Project footprint, this benefit must be considered in the context of other environmental concerns such as groundwater quality. This text does not accurately reflect holistic consideration of design changes.	Please provide additional context that includes and reflects holistic consideration of design changes.	
160.	MN-S	Potential Effects and Proposed Mitigation	Section 16.4	Section 16.4 of the EIS states: "With respect to cultural and heritage resources, as spatial overlap between the Project and the Fission Patterson Lake South Property would not exist, pathways between the projects would also not overlap; therefore, only the potential effects of the Project were considered in the subsequent steps of the assessment process."	Please revise the EIS to include the consideration of cumulative impact of the loss of access to these lands and resources and the resulting impact to MN-S cultural practices and Indigenous Land and Resource Use. Text should reference how this is considered within the assessment.	
161.	MN-S	Project Interactions and mitigations	Section 16.4, Table 16.4-1	Table 16.4-1 : ILU-04 Environmental Design Features and Mitigation: "Install a gate at the site entrance (i.e., gatehouse) to control public access." It is unclear how installation of a gatehouse would mitigate changes to the availability of fish, plants, and wildlife for harvesting from increased access and competition for resources. It is expected that the installation of a gatehouse, would be in place to ensure that the Indigenous land and resource users do not accidently enter active mining areas as a safety measure. In practice, restricted access is likely to exacerbate changes to the availability of fish, plants, and wildlife for harvesting as it would further decrease access to support MN-S Indigenous land and resource use.	Please provide further information in the EIS on how the installation of a gatehouse would mitigate changes to the availability of fish, plants, and wildlife for harvesting from increased access and competition for resources.	
162.	MN-S	Project Interactions and mitigations	Section 16.4, Table 16.4-1	Table 16.4-1 "ILU-05: Changes to air or water quality The following Project interactions were predicted to result in no pathway to Indigenous land and resource use and were not carried forward in this assessment." The discussion about the assessment of intermediate components and the environmental risk assessment lacks acknowledgement of any real or perceived impacts on fish, plants or wildlife due to air or water quality contamination that have been shared by Indigenous nations.	Please revise the EIS to include the acknowledgement, discussion and consideration of MN-S qualitative communication of impacts regarding the quality of resources or contamination levels.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				Indigenous Knowledge is a unique, but equal way of knowing. As a rights holder, MN-S qualitative communication of impacts regarding the quality of resources or contamination levels should be acknowledged, discussed, and considered.		
163.	MN-S	Secondary Pathways: Disturbance of heritage Resources	Section 16.4.2	HR-01: Disturbance of heritage resources The EIS states: "Therefore, a chance find procedure would be implemented during clearing activities. Management options for any unanticipated archaeological materials or features discovered by chance during any land clearly activities for all Project phases would be developed in consultation with the Heritage Conservation Branch." As a rights holder, MN-S should be involved in the scoping, development, and implementation of a Chance Find Procedure and management options for any unanticipated archaeological materials or features, or cultural or heritage resources discovered throughout the Project life cycle.	Please revise the EIS to include MN-S involvement in the scoping, development, and implementation of a Chance Find Procedure and management options for any unanticipated archaeological materials or features, or cultural or heritage resources discovered throughout the Project life cycle.	
164.	MN-S	Residual Effects Analysis	Section 16.5	Section 16.5 of the EIS states: "Nonetheless, the majority of the LSA and RSA would remain intact with similar resources (i.e., water, fish, plants, and wildlife) as the Patterson Lake area …" Indigenous Land and Resource Use is intrinsically tied to the land and the specific locale; similar resources do not necessarily reflect the ability to maintain MN-S cultural practices.	Please provide additional context in the EIS to show how this statement takes into consideration Indigenous land and resource use and the ability for MN-S to maintain cultural practices.	
165.	MN-S	Access to and Area available for Indigenous Land and Resource use	Section 16.5.1.1	The EIS states: "Access to parts of Patterson Lake may be temporarily restricted during construction of in-lake infrastructure, but unrestricted access to the lake is expected during Operations and Closure." This text does not acknowledge that in-lake infrastructure may affect the ability of MN-S to continue cultural practices and Indigenous land and resource use.	Please revise text to acknowledge that in-lake infrastructure may affect the ability of MN-S to continue cultural practices and Indigenous land and resource use.	
166.	MN-S	Access to and Area available for Indigenous Land and Resource use	Section 16.5.1.2.2	The EIS states: "There were no culturally important sites and areas identified by Indigenous Groups that overlap with the maximum disturbance area." This text does not acknowledge that culturally important sites were identified by Indigenous Groups (including MN-S) within the Regional Study Area and therefore does not accurately represent the presence of culturally important sites within the assessment areas.	Please revise text to acknowledge that culturally important sites were identified by Indigenous Groups (including MN-S) within the Regional Study Area and therefore does not accurately represent the presence of culturally important sites within the assessment areas.	
167.	MN-S	Gathering	Section 16.5.1.2.2	The EIS states: "The loss of most traditional use plants would be continuous until reclamation has re-established vegetation; however, the loss of traditional use plants in wetland habitat (e.g., pitcher plant) is considered permanent and irreversible. While the availability of traditional use plants would be reduced in the maximum disturbance area of the Project, traditional use plant habitat is predicted to remain abundant across the vegetation RSA, and incremental effects of the Project are expected to remain within the resilience and adaptability limits of traditional use plant species. This would result in a low magnitude change in availability of traditional plants int he Indigenous land and resource use LSA." "However, while the loss of traditional use plants in the Project footprint would range from long-term to permanent depending on the habitat, traditional use plants would remain widespread in the Indigenous land and resource use LSA, and opportunities for traditional gathering could continue."	Please provide additional information to confirm that the permanent and irreversible loss of wetland habitat and traditional use plants will be mitigated and compensated.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				The permanent and irreversible loss of wetland habitat and traditional use plants must be mitigated and compensated. Indigenous Land and Resource use is intrinsically tied to the land and the specific locale; similar availability of resources in adjacent areas does not necessarily reflect the ability to maintain MN-S cultural practices. As such it is not appropriate to assume that abundance in the RSA and LSA is equivalent to the losses incurred due to the Project.		
168.	MN-S	Noise	Section 16.5.1.3.1	The EIS states: "However, it is recognized that noise can have an effect on the aesthetics of individual resources users using the LSA, and that individuals may perceive and experience noise differently. Sensitivity to noise may be higher for some individuals, especially when they expect a quiet experience on the land. Tolerance levels may be very different among individual Indigenous land users and are difficult to measure quantitatively. However, it is reasonable to expect that some of the Indigenous land users may be affected negatively and choose not to conduct harvesting activities in the LSA at some locations potentially affect by noise increases."	MN-S requests the opportunity to be engaged in and collaborate on the scoping, development, implementation and analysis of mitigation and monitoring programs associated with Project noise impacts; particularly as it relates to Indigenous land and resource use.	
169.	MN-S	Light	Section 16.5.1.3.2	The EIS states: "The only times when light trespass would be visible is when an Indigenous land user has a direct line of sight on a light source … During Construction and Operations, Project-related illumination would result in skies brighter than the E1 threshold in localized areas for either of the 16 receptors considered in the light analysis ... Sky glow is expected to obscure faint stars for Indigenous land users on clear nights. The change in sky glow may affect the nighttime aesthetics and experience for Indigenous land users spending the night on the land or at a cabin ... Overall, the change of nighttime aesthetics resulting from skyglow would be relatively minor, and changes to the star visibility are expected to be localized." While aesthetics is discussed (16.5.1.3.4) it does not appear that an assessment of visual effects, or predictive modelling of visual effects, has been undertaken to understand the likelihood or frequency that visual effects, including light trespass and sky glow, would impact Indigenous land and resource use. An assessment of visual effects including predictive modelling should be undertaken, and informed by Indigenous land and resource users, including MN-S, to identify appropriate viewing points and determine potential visual impacts (including light trespass and sky glow) associated with the Project.	An assessment of visual effects including predictive modelling should be undertaken, and informed by Indigenous land and resource users, including MN-S, to identify appropriate viewing points and determine potential visual impacts (including light trespass and sky glow) associated with the Project.	
170.	MN-S	Perceptions of Water, Fish, Plant and Wildlife Resource Quality	Section 16.5.1.3.6	The EIS states: "A spatial analysis was completed to provide an indication of the extent of perceived effects on land resources. The spatial extent of indirect or perceived effects from the Project and potential avoidance or reduced traditional land and resource use surrounding the Project was assumed to be 5km from the maximum disturbance area, which represents an area where individuals may perceive contamination to exist. ... Five kilometres was also selected because it represents a distance that can easily by travelled by foot, out and back, through the bush to carry out traditional activities (e.g., hunting) in a day ... A 5km distance from the Project encompasses Patterson Lake where Indigenous Groups indicated the most concern during Joint Working Group."	Please provide additional details regarding the verification with Indigenous Nations that 5 km from the maximum disturbance area represents the area where individuals may perceive contamination to exist. As rights holders and Indigenous land and resource users, data verification should involve collaboration with MN-S, including the opportunity to review, revise and contribute to the characterization of existing land and resource conditions with the MN-S Homeland.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				MN-S was not provided the opportunity to review, discuss or collaborate on an appropriate spatial boundary to represent the area where individuals may perceive contamination to exist. MN-S notes that neither a review of primary sources of Indigenous Knowledge nor Joint Working Group references to an area of importance constitute verification of Indigenous land users' area of perceived impact. Without verification, it is also not appropriate to assume that perceived impacts of quality are directly comparable to the distance an individual can travel on foot.	MN-S request that the language regarding data verification is updated to reflect that MN-S requested and was not provided the opportunity to review (and verify) the EIS prior to regulatory submissions.	
171.	MN-S	Significance Determination	Section 16.6	Section 16.6 of the EIS states: "Indigenous land and resource use is expected to change around Patterson Lake, but overall Indigenous land and resource use in other areas of the LSA and RSA is anticipated to continue. The residual effects on the Indigenous Land and Resource Use VC in the Application Case and the RFD Case are predicted to be not significant."	Please revise this section to take into consideration the following: Indigenous Land and Resource use is intrinsically tied to the land and the specific locale; despite access to other areas, a change in access and cultural practices around Patterson Lake has the potential to affect the ability of MN-S to continue cultural practices associated with the Patterson Lake area.	
172.	MN-S	Prediction Confidence and Uncertainty	Section 16.7	The EIS states: "The primary factors affecting confidence in the predictions made in the assessment for Indigenous land and resource use include: - level of understanding of Indigenous perceptions is based on IKTLU Studies, comments during Joint Working Group meetings, and other perception studies, all of which may not capture the full breadth of individuals' perceptions …" Determining the significance of impacts to Indigenous land and resource use should be verified by Indigenous land and resource users, and not just be informed by Indigenous Knowledge. MN-S was not provided the opportunity to contribute to the significance determination. MN-S further notes that a neither a review of primary sources of Indigenous Knowledge nor incidental sharing during a Joint Working Group meeting constitute verification of Indigenous land users' perceptions.	MN-S is requesting to be given the opportunity to verify the significance of impacts and to contribute to the significance determination.	
173.	MN-S	Indigenous Land and Resource Use	Section 17 Section 17.1 Section 17.2	It is unclear why Indigenous land uses associated with commercial or recreational activities has not been considered within the assessment of the Indigenous Land and Resource Use VC. In general, all uses of the land by Indigenous Peoples should be considered Indigenous land and resource use. Section 35(2) of the Constitution Act (1982) outlines Aboriginal rights and Treaty rights and does not distinguish between commercial, recreational, and other uses of the land. As such, assessment of Indigenous land and resource use should be considered holistically. It is not appropriate to separate Indigenous land and resource uses for assessment under two different VCs.	MN-S is requesting that an assessment of Indigenous land and resource use be considered holistically in the EIS.	
174.	MN-S	Spatial Boundaries	Section 17.2.3	"The Other Land and Resource Use LSA (Figure 17.2-1) incorporates: …" Given the inclusion of Indigenous land and resource users within this VC the list of areas considered within the LSA should also consider the LSA for the cultural and heritage and Indigenous land and resource use LSA.	Please revise the EIS to include the list of areas considered within the LSA for the cultural and heritage and Indigenous land and resource use LSA.	
175.	MN-S	Existing Conditions	Section 17.2.6	It is unclear from this statement if Indigenous commercial and recreational use was considered through the KP interview process. It is also unclear who determined that key persons were in possession of adequate knowledge and experience.	Please provide additional information to clarify the validation process.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				It is unclear who completed the validation process for existing conditions for Other Land and Resource Use VC. Third party review of meeting records and notes is not equivalent to data validation by potentially affected parties. As rights holders and Indigenous land and resource users, data verification should involve collaboration with MN-S, including the opportunity to review, revise and contribute to the characterization of existing land and resource conditions with the MN-S Homeland.		
176.	MN-S	Residual Effects Classification and Determination of Significance	Section 17.2.9	The activities described include recreational (non-Indigenous) hunting, fishing, commercial trapping, commercial fishing, lodge and outfitting services and ecotourism, cabins, parks and protected area, forestry and wildlife, and mining and exploration. It is unclear from this text how Indigenous land and resource users are considered within this VC and/or the existing conditions content. Section 17.2.1 (See comment 17-009) states "this section focuses more narrowly on uses for commercial or recreational purposes and extends to both Indigenous and non-Indigenous users." This contradicts the text included in Section 17.3.	Please revise the EIS to provide clarity on how Indigenous land and resource users are considered within this VC and/or the existing conditions content. Please revise sections 17.2.1 in relation to section 17.3.	
177.	MN-S	No Pathway	Section 17.4.1	Participants of the 2021 trapper's workshop and LPA community members comments on the potential Project effects on water quality, fish and wildlife in the area of the Project…. No significant adverse effect on any human receptors as a result of releases from the Project is likely during Operations for the Application Case and RFD Case. Therefore, this pathway was determined to have no measurable effects on the health of resource users and was not carried forward in the assessment. While quotes that demonstrate Indigenous Knowledge are included throughout this chapter, with the exception of noting concerns were raised through the 2021 trappers' workshop, based on the text provided, Indigenous Knowledge does not appear to have been applied and considered in the determination of Project interactions.	Please provide clarity on how Indigenous Knowledge has been applied and considered in the determination of Project interactions.	
178.	MN-S	Access to, and Area Available for, Land and Resource use	Section 17.6.2	The EIS states: "Regional initiatives to mitigate access could include promotion of continued use close to the Project to, such initiatives would help maintain the areas as an active landscape for resource users, particularly for trappers from local Indigenous communities." It is unclear what mitigations are being proposed to help maintain the area as an active landscape. Proponent promotion for continued use cannot be assumed to be an effective mitigation measure as it is highly dependent on the level of trust that has been established with local users.	Please provide clarity regarding what mitigations are being proposed to help maintain the area as an active landscape.	
179.	MN-S	Access Restrictions and Avoidance	Section 19.5.1.1	The EIS states: "Related to cultural continuity, after mitigation, it is anticipated that access restrictions and avoidance of areas near the Project would have an adverse effect on the well-being of some land users. Access would be restricted only within the maximum disturbance footprint past the gatehouse, thought perceptions of the Project effects could extend across a broader area. ... The effect on cultural continuity would be limited to site-specific knowledge that may not be shared among generations and the loss of which may not be replaced." It is unclear how the effect of access restrictions and avoidance of areas near the Project on cultural continuity can be limited to the maximum disturbance of the	MN-S request that NexGen updates this content, and provide additional detail in the EIS to better reflect how avoidance of areas near the Project has been considered. When considering avoidance of areas for Traditional practices, additional information (and verification by Indigenous Groups) is required to support the statement that the maximum disturbance footprint	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				footprint. While this reflects the access restriction, it is not necessarily reflective of avoidance areas due to the perception of Project effects.	(i.e., physical Project exclusion) is the only area where the ability to practice cultural continuity would be impacted and further the described outcome that the impact to cultural continuity is reversible.	
180.	CNSC	Human health with with respect to hazardous contaminants	Section 21	**Context:** One of the potential risks of a uranium mill is an uncontrolled release from a scrubber. **Rationale:** In the EIS, it doesn't appear that the scenario of an uncontrolled release from a scrubber has been considered. This could be a likely event in a uranium mill given the frequency of handling uranium concentrate. Uranium mills have stacks that are equipped with scrubbers to reduce dust and emissions resulting from the operation. A failure of a scrubber can result in an uncontrolled release of total particulate matter and other contaminants to the environment. This bounding scenario does not appear to be considered in the EIS.	NexGen should consider a bounding scenario of a failure of a scrubber stack in the mill.	
181.	CNSC	Human health with with respect to hazardous contaminants	Section 21	**Context:** One of the potential risks of a uranium mill is a spill of uranium concentrate. **Rationale:** In the EIS, it doesn't appear that the scenario of a spill of uranium concentrate has been considered. This could be a likely event in a uranium mill given the frequency of handling uranium concentrate. This could have impacts since there could be radiation exposure during this malfunction.	NexGen should consider a bounding scenario of a spill of uranium concentrate in the mill.	
182.	CNSC	Accidents and Malfunctions	Section 21.2.2 TSD IX, Section 1.3	**Context:** The spatial extent of the assessment includes two sections of highway, one along Highway 955 and the second along Highway 155. The spatial extent along Highway 955 spans from the intersection of the Project access road and Highway 955 to the intersection of Highway 955 and Highway 155 at La Loche. The spatial extent along Highway 155 spans from the intersection of Highway 955 and Highway 155 to the intersection of Highway 155 and Highway 55 at Green Lake. The proponent states that the spatial extent was informed by evaluation of the existing traffic volumes, identification of incremental increases in traffic associated with the proposed Project, and understanding of transportation emergency response times. The proponent further states that traffic volumes on Highway 155 and Highway 955 are as much as 2 to 20 times less than those on Highway 55, and much lower compared to other provincial highways of comparable size. As such, the incremental increase in traffic volume on these highways due to project-related traffic would be larger than those for other such highways. In addition, the distance of these two highways from major population centres such as Regina or Saskatoon results in slower emergency response to transportation accidents. The emergency response capabilities that can be deployed to the traffic accidents on other major highways is more timely, due to closer proximity to larger population centres.	Provide further rationale or justification on the spatial extent of not extending the transportation risk assessment beyond the Highway 155 and Highway 55 junction at Green Lake. **Technical Discussion Required**: Yes	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				Rationale: TSD IX Sections 8.1.1 and 8.1.2 show that the truck accident rate in Saskatchewan between 2007 and 2014 is from 0.81 to 0.98 per million-vehicle-kilometer [MVkm]distance travelled, while the truck accident rate on Highway 955 and Highway 155 (SGI 2018) is from 0.8 to 1.16 accidents per MVkm, which is similar to or slightly higher than the provincial truck accident rate. When a traffic accident involves radioactive materials or Uranium, the emergency response that can be deployed may come only from the project emergency response team. If such an accident occurs south of Green Lake, the response time for deploying response team from the project site would take longer time to arrive at the accidental site and the highway with such an accident would need to be blocked for a longer time. Therefore, a traffic accident occurs south of Green Lake may pose higher risks to human health and the environment. It appears the determination of the spatial extent not extending beyond Green Lake is not well justified.		
183.	MN-S	Accidents and Malfunctions	Section 21.5.1	"Based on a review of Project-related information, the following key Project components and activities were identified that form the basis of consideration for the identification of potential hazard scenarios: [bullet list] …" While the list of Project components includes "process plant buildings" there does not appear to be any consideration of in-lake infrastructure and associated discharges, such as the treated effluent and pipe diffuser and the treated sewage pipe and outfall. Given the importance of Patterson Lake and the importance of water and influence of water on Indigenous culture (as discussed in Section 21.4, p. 21-12) these factors should be a consideration in the hazard identification process.	MN-S requests that NexGen consider potential accidents or malfunctions related to in-lake infrastructure through the Hazard Identification process. MN-S also requests that these options are specifically discussed in the EIS; if they are not identified as bounding scenarios, rationale should be provided given the level of importance that Patterson Lake and the associated wildlife and habitat provide to MN-S Culture and practices.	
184.	CNSC	Accidents and Malfunctions	Section 21.5.1	**Context:** The proponent states that the assessment of accidents and malfunctions began with the initial identification of hazard scenarios. Hazard scenarios were identified using a systematic approach that considered the existence of sources of hazards and initiating events for the Project. The hazard identification was conducted to identify a comprehensive list of potential project-related accident and malfunction scenarios associated with the key project components and activities with further details provided in the technical supporting document (TSD) VIII. **Rationale:** In addition to traffic accidents on the Project access road, experience from similar mine operation suggests the incidence of traffic accidents damaging chemical storage tanks on the mill site, which could result in the release of chemicals from the ruptured storage tank and cause risks to human health and safety, and the environment. However, this hazard scenario appears to have not been assessed.	Assess the hazard of potential traffic accidents that could damage the chemical storage tanks on the mill site.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
185.	CNSC	Accidents and Malfunctions	Section 21.5.1	**Context:** The proponent states that the assessment of accidents and malfunctions began with the initial identification of hazard scenarios. Hazard scenarios were identified using a systematic approach that considered the existence of sources of hazards and initiating events for the Project. After identifying potential hazard scenarios, a subset (i.e., bounding scenarios) was selected as the focus of the detailed risk analysis. The hazard identification was conducted to identify a comprehensive list of potential project-related accident and malfunction scenarios associated with the key project components and activities with further details provided in the technical supporting document (TSD) VIII. **Rationale:** CNSC staff noted that explosives and detonator storage stations, and strong acid storage facility were not included in the list of key project facilities and the hazards associated with the storage and transportation of explosives, detonators, and strong acid were not identified and their risks to the environment, human health, and workers safety were not evaluated.	1.Include the facilities for storing explosives, detonators, and strong acid in the list of key project facilities; 2.Identify the hazards related to the storage and transportation of explosives, detonators, and strong acid; 3.Assess their potential effects on the environment, human heath, and workers safety from a potential accident/malfunction associated with explosives, detonators, and strong acid.	
186.	MN-S	Accidents and Malfunctions	Section 21.6	The EIS states: "Six hazard scenarios were selected as bounding scenarios for more detailed risk analysis." Given the high importance of Patterson Lake to Indigenous and local Communities, the use of the lake for fishing and sustenance, and the presence of in-lake infrastructure, an accidental release into Patterson Lake has the potential to impacts several VCs and linked VCs.	MN-S requests that NexGen considers an aquatic release to Patterson Lake as a bounding scenario for the assessment of effects of accidents and malfunctions.	
187.	CNSC	Accident and Malfunction	Section 21.6 TSD VIII	**Context:** In Table 21.6-1, the accident or malfunction for project component NPAG WRSA, it states that "…uncontrolled leachate/seepage release through lining failure." It is understood that the NPAG WRSA has no liner, so the lining failure is an incorrect statement. In Table 21.6-3, the release characterization of Bounding Scenario 2 states that hydrogen peroxide = 11,350 L to 18,900 t. 18,900 t is incorrect and should be 18,000 L. Table 3-1 to Table 3-20 in Appendix A of TSD VIII, -consequences for the hazards ID# 1.1, 1.3, 1.8 2.1, 5.2, 17.2, and 20.1 include occupational major injuries. However, the severity (S) is denoted as number 2 that appears to be inconsistent with consequence rating number in Table 3-2 of TSD VIII. -hazard ID# 4.3 has a likelihood (L)=1 and S=5 and its risk ranking (RR) is Low, but not moderate as defined in hazard risk matrix. -Consequences for hazard ID# 5.5 and 5.7 include fatality, but their S=4, not 5. -Hazard ID# 9.3 has L=1 and S=5, RR is high, not moderate as defined in hazard risk matrix.	Clarify or correct all inconsistent and/or inaccurate/incorrect information in section 21.6 and in Tables 3-1 to 3-20 in Appendix A of TSD VIII.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				-Hazard ID#11.4 states uncontrolled leachate/seepage release through lining failure for NPAG waste rock pile. It is understood that NPAG waste rock pile has no liner. -Hazard ID# 12.1 states that dual lined pad with leak detection system, which is not the case for PAG waste rock stockpile. -Hazard ID# 14.3, L=2 for pond lining failure and leakage is not justifiable based on the operation experience at other similar projects in the area. -Hazard ID# 16.1, L=2 for a very common accident/malfunction is not justifiable. **Rationale:** Inconsistent or inaccurate/incorrect information was included in Chapter 21 Accidents and Malfunctions and its supporting TSD.		
188.	CNSC	Accidents and Malfunctions	Section 21.6.3.1 TSD VIII, Section 6.2 TSD IX, Section 9	**Context:** The proponent states that based on drum deformations performed in a previous analysis (McSweeney et al. 2004), if a drum experienced a crush force of 100,000 lbs, then the deformation of the drum would cause the lid to detach from the drum. Using this drum failure mechanism, and assuming the drums weigh 450 kg and are arranged four across in the truck, at a speed of 48 km/h (<60 km/h in TSD IX), the front 25% of the drums would fail, at 60 km/h to 97 km/h 55% would fail, at 145 km/h 75% would fail, and at ≥193 km/h all would fail. Given that the speed of the truck would be less than 40 km/h, it was concluded that less than 25% of the drums would fail upon a traffic accident scenario. There are assumed to be 50 drums per shipment, so some stacking or rows of drums should be expected in this scenario. The drums stacked above could be at greater risk of deformation in a traffic accident. It is not clear whether drums stacking was considered in the previous study cited by the proponent and whether 25% fail is still an adequate percentage of drum failures in such traffic accident scenarios. **Rationale:** Drum failure percentage will impact on the release quantity of uranium in such an accident scenario and then impact on the consequence assessment. Therefore, the drum failure should be adequately assessed and supported with sufficient information and justification.	Clarify the speed limit for 25% drum fail; Provide information and/or rationale as to whether drum stacking would impact drum failure at different speeds and confirm whether 25% drum fail for such an accident is still valid. **Requires Technical Discussion**: Yes	
189.	CNSC	Accidents and Malfunctions	Section 21.6.4 TSD VIII, Section 7	**Context:** EIS states that Bounding Scenario 2 consists of the release of fuel and hazardous chemicals into the Clearwater River under the bridge along the project access road due to traffic accidents. Among the chemicals considered for this scenario, the effects of the release of gasoline and solvents are bounded by the effects associated with the release of diesel fuel. **Rationale:** It is understood strong acid will be used as the stripping agent in the process plant solvent extraction circuit to extract Uranium and will be transported to the site. The strong acid is not considered in this scenario. Explosives will be used for the	Provide information whether Bounding Scenario 2 would bound the potential effects of an aquatic release of strong acid and explosives from a traffic accident and conduct assessment, if not bounded, of the aquatic release of strong acid and explosives from a traffic accident.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				project construction and operation and will be transported to the site as well. It is not clear whether bounding scenario 2 could bound the potential effects of a traffic accident for aquatic release of strong acid and explosives.		
190.	CNSC	Accidents and Malfunctions	21.6.4 TAD VIII, Section 7	**Context:** Bounding Scenario 2 is for traffic accident release of fuel and hazardous chemicals into the Clearwater River under the bridge along the Project access road. Based on the release characterization, the release of diesel fuel would bound other releases. The scenario of release of diesel fuel considered that 45% of the fuel released will be lost due to evaporation and dissolution. While the aquatic release of the fuel was further assessed in the effect assessment, emissions to air from the spills was not discussed/assessed in the EIS. **Rationale:** Emissions to air through evaporation of the fuel releases/spills would impact on the air quality and should be discussed in the EIS.	Strengthen discussion on emissions to air from the accidental release of this scenario.	
191.	CNSC	Accidents and Malfunctions	Section 21.6.5 TSD VIII, Section 8	**Context:** Bounding Scenario 3 involves damage to equipment and vessels containing uranium-bearing solutions in the solvent extraction building, resulting in fire and release of uranium to the environment. The effects of this scenario were evaluated with the Areal Locations of Hazardous Atmospheres (ALOHA) model. The details of the assessment are provided in TSD VIII. In TSD VIII, the airborne source term for this scenario is estimated with equation developed by the United States Department of Energy (USDOE) where the respirable faction is assumed to only include particles of 10 μm and smaller. **Rationale:** No rational was provided to support the consideration of only 10 μm and smaller particles. For material at risk, the total volume of the uranium-rich solvent of 100 m3 was used without explanation. It is also not clear where is the maximum uranium concentration of 8 g/L in the loaded solvent from. The calculation of leak path factor involves several factors either calculated or assumed (i.e. the volume of air of 210 m^3, 14 air changes, maximum air flow of 27 m^3, burning rate of 2.6 L/s), which are not clearly stated. As the airborne source term is an important factor for the effect assessment and should be calculated with transparent and justified information/data.	Provide rationale for why only 10 μm and smaller particles were considered for respirable fraction and explanation for the values of factors used for leak path factor calculation. **Requires Technical Discussion**: Yes	
192.	MN-S	Accidents and Malfunctions	Section 21.7	The EIS states: "After the detailed risk analysis was complete, the resultant risk level rating was assessed to be Low for all scenarios except for the transportation accident scenario involving a vehicle-pedestrian collision, which was deemed to be a Moderate risk. The Moderate risk scenario was deemed to represent a tolerable level of risk in consideration of proposed safeguards that reduce the risk level to ALARP."	MN-S requests additional detail about verification undertaken regarding the MN-S outcomes. If no verification was undertaken, MN-S requests additional text to acknowledge verification was not undertaken and to further acknowledge the limitations of the assessment in this regard.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				It is unclear if NexGen has verified the outcomes of this assessment with potentially affected Peoples (i.e., land users who may be pedestrians along the transportation routes), who may not support this outcome.		
193.	CNSC	Accidents and Malfunctions	Section 21.7 TSD IX	**Context:** The analysis of the potential transportation accident involving hazardous materials requires information regarding the type, quantity, transportation method, and characteristics of the hazardous materials transported from/to the site. The following hazardous materials were selected for the assessment: uranium concentrate, hydrogen peroxide, diesel fuel, liquidized natural gas (LNG), and molten sulphur. **Rationale:** The project will need significant amount of strong acid and explosives that will be transported to the site. The strong acid and explosives are considered as either hazardous or dangerous materials. However, they were not considered in the transportation risk assessment.	Include strong acid and explosives in the transportation risk assessment.	
194.	CNSC	Accidents and Malfunctions	Section 21.7 TSD IX	**Context:** While the EIS states that six transportation hazard scenarios were selected as the focus of the transportation risk assessment, only five scenarios were included in Tables 21.7.1 and 21.7.3. In TSD IX, while five scenarios were stated in Section 6: Transportation Accident Scenarios, six accident scenarios were presented in summary Table 11-1. **Rationale:** Inconsistent information on the transportation hazard scenarios was provided in the EIS.	Clarify the hazard scenarios for transportation risk assessment and provide consistent information in the EIS.	
195.	CNSC	Accidents and Malfunctions	Section 21.7.2.1	**Context:** For the aquatic release scenario, of the 33 water features that are crossed by or occur in the direct vicinity of the project's transportation route, 4 were selected as the focus of the scenario for transportation risk assessment. **Rationale:** Stakeholders need to understand why only four features were selected for this scenario assessment as this might impact on the overall transportation-related risk assessment.	Provide rationale or criteria for selecting only 4 water features for transportation risk assessment of the aquatic release scenario. **Requires Technical Discussion**: Yes	
196.	CNSC	Accidents and Malfunctions	Section 21.7.2.2 TSD IX, Section 9.1	**Context:** It states in Section 21.7.2.2 that "Based on these analyses, the hypothetical maximum concentrations of uranium in water and sediment ranged between 121 μg/L (i.e. downstream of Churchill Lake) and 516 μg/L (i.e. Clear River), and 2,760 μg/g (i.e. Clearwater River) and 3,760 μg/g (i.e., Canoe River), respectively." However, in Section 9.1 of TSD IX, maximum concentrations of uranium in sediment for the Clearwater River release is 2.76x104 μg/g (dry wet) or 27,600 μg/g (dry wet) in Table 9-1; maximum concentrations of uranium in sediment for	Clarify maximum concentrations of uranium in sediment for aquatic release scenario.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				the Canoe River release is 3.76×10^4 µg/g (dry wet) or 37,600 µg/g (dry wet) in Table 9-3. It appears that 37,600 µg/g is not the maximum concentrations of uranium in sediment for the aquatic release of uranium as maximum concentrations of uranium in sediment for the Beaver River Crossing release appears to be 4.11×10^4 µg/g (dry wet) (also refer to CNSC AM-17). **Rationale:** Inconsistent/incorrect information on maximum concentrations of uranium in sediment under aquatic release scenario is provided in the EIS.		
197.	MN-S	Incorporation of Indigenous Knowledge	Section 22.3	The EIS states: "The leadership of each Indigenous Group selected their Joint Working Group participants with consideration of group diversity; where possible, members included Elders, youth, different genders, a range of ages, and land users around Patterson Lake." It is unclear how MN-S's input was considered in section 22.	Please revise the EIS to provide additional context as to how MN-S' input was considered in this section.	
198.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 22.6	**Context:** In Section 22.6, the Proponent provides risk level determinations for various natural hazards based on their likelihood of occurrence and potential consequences. This relies on the climate information and projections detailed in Appendix 22A wherein the potential for future increases in the frequency/magnitude of short-duration precipitation events and Probable Maximum precipitation (PMP) are noted. This potential is also noted in section 22.6.3. – Major Precipitation Events. **Rationale:** In Section 22.6 under "Water Management Infrastructure" (p.22), the Proponent notes "*Self-containment for runoff from mineralized materials has been sized to contain PMP events*". It is not clear if that PMP considers potential climate change.	Describe how future climate change has been factored into the consideration of the risk levels related to extreme precipitation, including possible increases in frequency and magnitude, for all of the Hazard Scenarios identified in Table 22.6.3. **Suggestions for mitigation and follow-up measures** Monitor all pumps and availability of contingency pumps. Redundant pumps may be necessary when the failure threatens the environment.	
199.	ECCC	Fish and fish habitat Migratory birds Current use of lands and resources for traditional purposes	Section 22.6 Appendix 22A	**Context:** In Section 22.6, the Proponent indicates that they have considered the median in an ensemble of climate change projections for a number of climate parameters in their hazard scenario assessment. **Rationale:** Best practice for addressing the inherent uncertainty in future climate projections is to consider the range of projected changes in an ensemble of projections from a range of future emission scenarios and models. Evaluating the risk level based only on the median does not address the inherent uncertainty. A probability of occurrence has not been ascribed to the different future emission scenarios and they diverge increasingly beyond ~2040. The median projected change from the ensemble may not be the most likely to occur, which would result in unreliable predictions and the subsequent assessment of effects of the Project.	Describe how the overall risk levels (based on likelihood and consequence) for the various hazard scenarios that relate to climate outlined in the various tables in Section 22.6 would differ if more extreme projected future changes were considered (i.e., not just the median).	
200.	CNSC	Assessment of Effects of the Environment on the Project	Section 22.6.2 Drought	**Context:** Drought conditions affecting revegetation was assessed in this section. The proponent claims that drought conditions may still affect the successful establishment of some vegetation used in reclamation of the site, particularly if the	Provide further information to demonstrate the negligible consequence for unsuccessful revegetation with clear reclamation objectives and criteria for certifying the reclamation objectives are met.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				drought corresponds to an immature standing crop although native, drought-resistant vegetation species would be used for reclamation. The proponent indicates that the probability of drought conditions affecting reclamation efforts is assessed as unlikely, as adaptive management would be applied to certify reclamation objectives are met, and closure would be managed for several years after mining ceases. However, it is not clear what are the reclamation objectives and what are the criteria to be used to certify such reclamation objectives are met. The proponent further states that the consequence for unsuccessful revegetation is assessed as negligible as there would be no stoppage in Project activity and revegetation of disturbed areas would be repeated. However, there is no further information to support the negligible consequence. **Rationale:** It is understood that waste rock stockpiles will be managed and reclaimed on surface. Lack of a vegetation cover on the waste rock stockpiles will increase the erosion potential of the waste rock stockpiles and the net infiltration into the waste rock stockpiles, and then enhance the contaminant migration, which may pose more significant impacts on the surrounding environment. It is not clear whether vegetation cover is relied on for waste rock stockpile reclamations.		
201.	CNSC	Assessment of Effects of the Environment on the Project	Section 22.6.6 Extreme Temperatures	**Context:** The EIS states that "The NPAG and PAG WRSA cover systems would be designed to withstand cold climates and increasing temperatures. They would follow design and construction recommendations in guidance manuals such as MEND Report 2.21.4A Design, Construction, and Performance Monitoring of Cover Systems for Waste Rock and Tailings (O'Kane 2004)." **Rationale:** MEND report 2.21.4A discusses such issues as freeze/thaw cycling and snowpack measurements, but the majority of the design and monitoring methodologies are based on experiences in more temperate climate, while the guidance manual - MEND report 1.16.5c (2012) [2] is based on more experiences in cold climates and should be followed for cover system design. Reference: MEND Report 1.16.5c, 2012. Cold Regions Cover System Design Technical Guidance Document.	Follow more adequate guidance, such as MEND Report 1.16.5c (2012), for the NPAG and PAG WRSA landform and cover system designs.	
202.	CNSC	Assessment of Effects of the Environment on the Project	Section 22.6.7 Seismic events	**Context:** The EIS states that "The estimated peak ground acceleration (PGA) with a return period of 4,975 years is less than 0.036g at a probability of 2% over 50 years (Golder 2020)." **Rationale:** An event with a probability of 2% over 50 years would have a return period of 2,500 years, but not 4,975 years.	Correct the inconsistent information on probability and return period for the seismic event considered for the Project.	
203.	NRCan	Seismic hazards	Section 22.6.7.1	**Context:** The National Building Code (NBC) (including seismic provisions) has been updated as of 2020.	Please clarify as to which National Building Code may be used?	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				Rationale: Natural Resources Canada (NRCan) points out that the 2015 NBC has been updated (including seismic provisions) and the 2020 National Building Code is most current.	**Suggestions for mitigation and follow-up measures** NRCan suggests using the 2020 NBC for mitigation purposes.	
204.	NRCan	Seismic Hazards	22.6.7.1	**Context:** Seismic events due to mining have been evaluated and are considered highly unlikely. **Rationale:** Section 22.6.7.1 of the draft EIS states that seismic events are unlikely due to mining activities.	Please provide additional information or references on how the proponent came to this conclusion.	
205.	ECCC	Fish and fish habitat Migratory birds Current use of lands and resources for traditional purposes	Section 22.7 TSD XXII	**Context:** In Section 22.7 - the conclusions to the Assessment of the Environment on the Project chapter – the Proponent indicates that: *"The potential risks associated with natural hazards and future climate change would continue to be considered in engineering design on an ongoing basis as a part of the continual improvement process and through implementation of the Climate Adaptation Framework (TSD XXII)."* The quote above indicates that the Climate Adaptation Framework will be implemented. The Climate Adaptation Framework document does not include sufficient detail. It reads more as a Proposed framework in development than a concrete plan. There are a series of suggested measures and approaches and the verb "could" rather than "will" is used throughout **Rationale:** .Providing additional detail in the Climate Adaptation Framework will allow ECCC to assess the Proponent's conclusions on the potential risks associated with natural hazards and future climate change.	Provide an updated version of the Climate Adaptation Framework for review, if available.	
206.	ECCC	Fish and fish habitat	Appendix 22A Appendix 22A2.2 Appendix 22A4.1.1	**Context:** The Climate Change Assessment describes the current climate and provides projections of how climate is likely to change under future climate conditions. Climate variables including temperature and precipitation are input to a multi-model ensemble (multiple models and scenarios) and the output is used to describe how current climate conditions may change in the future. Appendix 22A describes the methods used to conduct the climate assessment, however, clarification on some of the datasets and methods used in the assessment would assist ECCC in understanding future climate projections. It is unclear which climate datasets were used throughout the EIS to determine the Annual Maximum Series described in Appendix 22A and if a Model Output Statistics model was used to generate the data. To establish existing climate conditions for the Project area, reanalysis data from Modern-Era Retrospective analysis for Research and Application Version 2 (MERRA-	1. Describe how all the Annual Maximum Series used in Appendix 22A were generated. 2. Provide the percentage of climate data that comes from satellite observations, the percentage of data from ground-based observations and if there are data gaps in the datasets. 3. Describe how the 2050 and 2080 scenarios used to project climate change were included in the assessment (i.e., as climate points or time series analysis).	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				2) were used. However, it is not clear how missing satellite observations due to cloud cover were addressed. It is also unclear if projected changes under future climate conditions provided for the 2 scenarios, 2050 and 2080 were treated as climate points or a time series analysis. **Rationale:** The climate change assessment is used to assess the effects of the environment on the Project that may occur due to future climate change. A clear understanding of the climate variable datasets and methods used in the climate assessment will enable a better understanding how projected future changes in climate may affect the Project over its lifespan.		
207.	ECCC	Wildlife and Wildlife Habitat	Section 23	The Proponent states they are committed to developing the following plans: Environmental Monitoring Plan Environmental Protection Program Biodiversity Action Plan Effluent Monitoring Plan Decommissioning and Reclamation Plan	Provide the Environmental Monitoring Plan, Environmental Protection Program, Biodiversity Action Plan, Effluent Monitoring Plan, and Decommissioning and Reclamation Plan for review and provide detail on how these plans and programs will ensure the protection of SAR and migratory birds and their nests and wetland function, including how any residual effects will be mitigated.	
208.	CNSC	Follow-Up Monitoring Program	Section 23.5.1	Section 23.5.1 of the EIS includes a very high level summary of what will be included in the Environmental Assessment Follow-Up Monitoring Program (EAFMP) and refers the reader to Sections 7-19 for details that would be implemented as part of the EAFMP. This makes it difficult to see the overall picture of the proposed EAFMP as a whole and it would be best to summarize all of this information in this section so that the reader can get a better idea of what the EAFMP will entail as a whole. It would also be helpful to include a summary of how Indigenous and Local knowledge helped form the basis of the preliminary EAFMP to date. The updated information should also clarify the roles and responsibilities of the different participants in the EAFMP.	1. Please revise Section 23.5.1 to include a table that summarizes the details (as outlined in Sections 7-19 of the EIS) of the proposed preliminary EAFMP for all phases of the Project. Also please include a summary explaining how indigenous nations and communities were involved and how Indigenous and local Knowledge helped influence the development of the preliminary EAFMP. 2. As outlined in Section 11 of the *Generic Guidelines for the preparation of an Environmental Impact Statement pursuant to the CEAA 2012*, please include roles and responsibilities to be played by the proponent, regulatory agencies, Indigenous people, local and regional organizations and others in the design, implementation and evaluation of the EAFMP program results.	
209.	ECCC	Wildlife and Wildlife Habitat	Appendix 23A Table 23A-4 Table 23A-5 Table 23B-1	The use of a liner for the PAG (potentially acid generating) waste rock storage area to "limit seepage from the special waste storage area with double liner and leak detection system" is new technology used to reduce risk of contamination of water run-off and seepage. However, it is unclear how the liner efficacy will be monitored, what will occur if a leak is detected and how migratory birds and SAR will be protected during this process. The Proponent has committed to describing surface water/contact water monitoring in the Environmental Protection Program.	1. Provide details on how the liner's effectiveness will be monitored. 2. Describe what measures will be taken if a leak is detected and how the actions will protect migratory birds, SAR and their habitat from effects of a spill or leak.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
210.	ECCC	Wildlife and Wildlife Habitat	Table 23A-4	The draft EIS states that discharge waters "meets discharge quality criteria prior to release into the environment" but this is not discussed in the context of potential effects to migratory birds, SAR and wetland function.	Describe what the discharge quality criteria are and provide context on how these criteria will reduce effects to migratory birds and SAR.	
211.	ECCC	Wildlife and Wildlife Habitat	Table 23A-5	The Proponent states they will implement best management practices (BMPs) and mitigation such as spill prevention.	1. Explain in more detail what BMPs and mitigation will be utilized for spill prevention. 2. Explain what risks exist for migratory birds, SAR, and wetland function if a release occurs and what actions will be taken if a spill occurs.	
212.	CNSC	Terrestrial environment	Section 23-Appendix 23B	**Context:** Appendix 23B summaries the environmental assessment monitoring and follow-up programs proposed for the project. There is no mention of doing follow up monitoring to confirm soil quality is not impacted by project activities such as air deposition of COPCs to soil, or contact water contamination of soil pathways. **Rationale:** Although there is a plan to monitor air quality, there is no follow up monitoring planned to confirm there are no impacts on soil quality around the site from project activities. This monitoring is required to confirm the EA predictions that soil quality impacts from project activities will not exceed any soil quality guidelines.	Please include a soil quality monitoring plan in the EA follow up monitoring for any contaminants that may impact soil quality through project activities (air deposition, water contact, etc). **Suggestions for mitigation and follow-up measures** Soil quality environmental monitoring	
213.	ECCC	Wildlife and Wildlife Habitat	Table 23B-1	The draft EIS states that noise monitoring will be conducted to verify models but it is unclear what measures will be taken if noise levels are higher than anticipated or exceed thresholds.	Explain what measures will be taken if noise levels exceed thresholds.	
214.	MN-S	Joint Working Group	Section 4.2.1.1	“Traditional Foods study” A traditional food study had not been completed at the time the EIS was submitted, as this EIS states. MN-S submitted a food study budget to NexGen on May 26, 2022. NexGen approved the traditional food study budget by email on August 8, 2022, almost two months after the EIS was submitted. Therefore, reference to the traditional food study as being completed is not accurate.	Please correct this inaccuracy and revise the EIS.	
215.	MN-S	Primary Indigenous Groups	Section 6.1.1	Combining all topics of interest in a global fashion and ascribing them to all Indigenous Nations does not facilitate review for understanding of how an individual Nation's interests may or may not have been addressed in the assessment.	Please rewrite Section 6.1.1 on a Nation-by-Nation basis. Verbiage such as "communities said" is unhelpful to understand how NexGen may have understood and addressed issues that affect individual Nations’ rights and interests.	
216.	CNSC	Alternative Assessment	TSD VII, Section 3.5 Multiple Accounts Analysis and Table B-7	**Context:** Multiple accounts analysis (MAA) was performed to quantitatively evaluate alternatives carried out forward from screening by following the ECCC guidelines for the assessment of alternatives for mine waste disposal (ECCC 2016). The preferred alternative was selected with the highest score ranking of the alternatives assessed with the MAA. One of the steps for the MAA is scoring and weighting in which scoring scales were developed for each indicator with values ranging from 1 to 6 following ECCC (2016) guidelines. When scoring alternatives, a value of 1 always assigned to indicate the	1.Provide an explanation for why reverse number of indicator values were used for the indicator “Potential for impact to plant, fish, and other wildlife population and habitat during construction and, operation, and closure” and correct them as necessary and evaluate whether the correction will impact on the alternative ranking for tailings management;	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				least favorable alternative while a value of 6 was always assigned to indicate the most favorable alternative. **Rationale:** In Table B-7, for the indicator "Potential for impact to plant, fish, and other wildlife population and habitat during construction, operation, and closure" in which indicator measurement is "Distance" that states "Measurement as distance from tailings facility centroid to Patterson Lake, with the longest distance preferred for lowest potential impact." Based on the ECCC guidelines, Underground Location U-4 Paste has a shortest distance of 0.2 km to Paterson Lake, which should be least preferred for this indicator and a lowest value of 1 should be assigned, while a highest value of 6 should be assigned to Surface Location S-1 Paste. However, in Table B-7, reverse number of indicator values were assigned to different alternatives. In addition, a non-integral value was used for some alternatives with no explanation, e.g. in Table B-7, Surface Location S-3 Paste and In Pit Location P-3 Slurry have same distance to Patterson Lake, but 1.9 indicator value was assigned to Surface Location S-3 Paste while 1.6 was assigned to In Pit Location P-3 Slurry.	2.Provide an explanation of how non-integral number of indicator values were used for different alternatives.	
217.	CNSC	Accidents and Malfunctions	TSD VIII	**Context:** In the assessment of some accident scenarios, the terms "very unlikely" and "extremely unlikely" were used for probability, which are different from the terms used in Table 3-1. Similarly, the terms "very severe" and "low" were used for consequences, which are different from the terms used in Table 3-2. The terms and linkage between these terms and the associated tables needs to be clarified. **Rationale:** Inconsistent terms were used for the probability and consequences of the bounding scenario assessment.	Clarify the linkage between the terms mentioned in Context and the terms in Tables 3-1 and 3-2.	
218.	CNSC	Accidents and Malfunctions	TSD VIII, Section 6.2	**Context:** When assessing the release characterization of Bounding Scenario 1, the proponent assumed that 95% of the released uranium concentrate can be recovered from the release location without sufficient justification, and that different water column depths, i.e. 10 cm, 30 cm, 5 cm at the release location were assumed without explanation. **Rationale:** As the release characterization of the uranium concentrate would impact on the assessment of its potential effects, CNSC staff, the public, and Indigenous Groups need to understand the adequacy of the release characterization of this bounding scenario.	Provide further rationale for assuming 95% recovery rate and for using different water column depths for uranium concentrate release characterization.	
219.	ECCC	Fish and fish habitat	TSD VIII, Section 7.2	**Context:**	1. Provide the tanker truck capacity that will be used to transport corrosive liquids.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
		Change to an environmental component due to hazardous contaminants		A hydrogen peroxide spill at the site-access bridge over the Clearwater River was not analyzed further based on the Proponent's release characterization. The Proponent indicated that most species of fish tolerated hydrogen peroxide at greater than a 1000 ppm concentration with no adverse effects. The Proponent then further explained that the concentration of 1000 ppm requires a dilution of 1 to 1000 which means that 18 m^3 should be diluted to 18 000 m^3. Ultimately, it was concluded that this would occur in a stretch of less than 200 m of the Clearwater River and therefore will not affect a large fish population. **Rationale:** Corrosive liquids are typically transported in TC412 tanker trucks, which have a capacity of 40 m^3. If TC412 tanker trucks will be utilized, the distance any spilled contaminants will travel downstream in the Clearwater River will increase resulting in an underestimation of the risk to the receiving environment. It is not clear why the Proponent is considering 18 m^3 as a possible spill volume of hydrogen peroxide. Clarification would assist ECCC in understanding the potential effects on the receiving environment.	2. If trucks of greater than 18 m^3 will be utilized, update the risk evaluation. 3. Provide details on the measures that will be used to reduce the risk from this hazard.	
220.	CNSC	Human Health with respect to radiation exposure	TSD VIII – Accidents and Malfunctions Report, Section 8.0	**Context:** Bounding scenario 3 (Solvent extraction fire or explosion): Results of air concentration predictions for uranium and U_3O_8 are compared to the Emergency Response Planning Guides (ERPG), which are based on chemical toxicity only. Radiological exposure was not considered in this accident scenario. **Rationale:** An estimate of the annual effective dose is required to determine whether the expected doses meet the dose limits set out in the *Radiation Protection Regulations*.	Provide an estimate of the radiological dose to workers and to members of the public resulting from bounding scenario 3.	
221.	CNSC	Human Health with respect to radiation exposure	TSD VIII – Accidents and Malfunctions Report, Section 9.0	**Context:** Bounding scenario 4 (Tailings transfer pipe of pump failure): Occupational exposure from this accident scenario could occur, however, these have not been considered in this TSD. The potential for radiological doses off site has not been addressed. **Rationale:** An estimate of the annual effective dose is required to determine whether the expected doses meet the dose limits set out in the *Radiation Protection Regulations*.	Provide an estimate of the potential radiological dose on-site and off-site resulting from bounding scenario 4.	
222.	CNSC	Human Health with respect to radiation exposure	TSD IX – Transportation Risk Assessment Report	**Context:** Radiological dose to human receptors from transport accidents and the annual dose to the truck driver from the uranium concentrate being transported have not been assessed. **Rationale:** An estimate of the annual effective dose is required to determine whether the expected doses meet the dose limits set out in the *Radiation Protection Regulations*.	Provide an estimate of the annual radiological dose to a truck driver while transporting uranium concentrate from the Rook I site (upon accessing route 955 from the site access road) to the final destination of the uranium concentrate, due to external gamma exposure from the load for the duration of the trip. The number of such trips a driver would typically be expected to complete in one year should be factored into the calculation of the annual dose. In addition, the radiological dose due to accident scenarios should be addressed in the TSD.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
223.	CNSC	Accidents and Malfunctions	TSD IX, Section 1.3	**Context:** Section 1.3 states that "The transportation risk assessment, which is a part of the assessment of accidents and malfunctions, is intended to provide a clear identification of potential transportation-associated hazards that fall outside the range of "typical" day-to-day events." **Rationale:** Highway 955, known locally as the Semchuk Trail, is an all-season highway that is almost entirely unpaved, except for an approximately 4.5 km section of paved highway from La Loche to the turn off to the CRDN reserve. Highway 955 is designated as a secondary highway with the narrowest portion of 7m in width, shoulder to shoulder. When engaging with Joint Working Groups, Joint Working Groups expressed concerns of the poor conditions of the highway north of Green Lake. The poor conditions of Highway 955 could result in a higher accidental rate when traffic rate is increased. While the reviewers understood that TSD IX deals only with the transportation risk related to Accidents and Malfunctions, the transportation risks/hazards due to the increased traffic rate (e.g., vehicle-vehicle accidents and vehicle-individual accidents), during day-to-day operations should also be assessed.	Provide information whether/where the transportation risk/hazard during day-to-day operation is assessed.	
224.	CNSC	Accidents and Malfunctions	TSD IX, Section 5.2	**Context:** It states that "The traffic Impact Study Report prepared by Stantec (2019) calculated the trip generation divided into expendables, labor, and construction equipment or materials categories. Stantec 2019, Appendix B, contains a detailed list of category inclusions and breaks down trips per item. These trip generation data are summarized in Table 5-5, Table 5-6, Table 5-7, below, for all Project phases." **Rationale:** Traffic generation for different project phases is one of the bases for transportation risk assessment. However, the Stantec 2019 report was not submitted and no explanation of the values in Tables 5-5 to 5-7 was provided. Reviewers can not understand the numbers in the tables without the supporting report and additional explanation (e.g. why Trips/Day is more than Trips/Week?)	Provide the Stantec report (2019) or additional explanation on traffic generation for different project phases.	
225.	CNSC	Accidents and Malfunctions	TSD IX, Section 9.1.1	**Context:** On page 9.2 of TSD IX, it states that "If the remediation criteria is set at no-effect uranium concentration of 2,296 µg/g, the residual uranium content in the 5 cm of sediments in an area of 15 m by 15 m is about 26 kg." The proponent claimed that this is a very small fraction of the total amount released, which was used to demonstrate that 95% recovery is a reasonable assumption. However, it is unknown how the 26 kg release amount is calculated. **Rationale:**	Provide calculations or information to support the 26 kg of residual uranium concentrate in the sediment for aquatic uranium release scenario.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				Since 95% recovery rate was used to support the assessment of aquatic uranium release scenario, it is important that this assumption is supported with correct residual release amount of 26 kg uranium concentrate.		
226.	CNSC	Accidents and Malfunctions	TSD IX, Section 9.1.6.2	**Context:** It states on page 9.15 that "Sediment quality results are shown in Table 9-5 for post-remediation conditions. The results presented in the table are a summary of the three flow conditions for the predicted concentrations in Beaver River sediments. In general, using the results of the assessment, the minimum predicted uranium concentrate concentrations in the river sediments occurred under high flow conditions, where the smaller particles (less than 5 μm) are deposited over a larger area." **Rationale:** In Table 9-5, the minimum predicted uranium concentrate concentration in the river sediments did not occur under high flow conditions, rather under average flow condition. It appears that in Table 9-5, the values for average concentration in sediment and average concentration in pore water are switched between the average flow condition and the maximum flow condition.	Clarify the values in Table 9-5 under average and maximum flow conditions.	
227.	CNSC	Accidents and Malfunctions	TSD IX, Section 9.1.7	**Context:** The transportation route of highway 155 crosses the Kisis Channel at the Village of Buffalo Narrows. However, the location where a hypothetical truck accident may occur is assumed at a small bay in the southern part of the lake next to Buffalo Narrows. The bridge crosses the Kisis Channel was not considered for a hypothetical truck accident. **Rationale:** The bridge crossing the Kisis Channel is the bottleneck for highway 155 transportation through the Village of Buffalo Narrows and could have a higher potential for truck accidents.	Provide rationale or information for not selecting the bridge crossing the Kisis Channel for a hypothetical truck accident for the assessment of release to Church Lake.	
228.	CNSC	Accidents and Malfunctions	TSD IX, Section 9.2.2	**Context:** On page 9.24, it states that based on the above discussion on water penetration rate, a conservative penetration time for 15 min was made. No further information was provided why 15 min penetration time is conservative. **Rationale:** It is understood that the response time to a transportation accident could be much longer depending on the accident location and the occurrence time. The accidentally spilled liquid could have much longer time to penetrate soil for a terrestrial release.	Clarify why 15 min was considered as a conservative penetration time for terrestrial release scenario.	
229.	CNSC	Accidents and Malfunctions	TSD IX, Section 10.3	**Context:** Section 10.3 states that "The assessment results shown in Section 9.3, Atmospheric Release Scenarios, indicated that the AEGL-2 or ERPG-2 concentrations would be exceeded within a 238 m distance from the release location for uranium	Clarify the distance values stated in section 9.3 and section 10.3.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				concentrate particle and within 124 m for carbon monoxide in the downgradient wind direction." And "…Under these conditions, the AEGL-2 or ERPG-2 concentrations would be exceeded within a 367 m distance from the release location for uranium concentrate particle, and within 510 m for carbon monoxide in the downgradient wind direction." **Rationale:** The distance value used in 10.3 appears to be inconsistent with the distance values in section 9.3 (i.e. in Tables 9-10 and 9-11), where, for example, 238 m distance is for carbon monoxide, but not for uranium concentrate, and there are no values of 124 m and 367 m.		
230.	ECCC	Climate Change	TSD XII	**Context:** The Proponent provided a net-zero framework document, which was "developed based on the guidance provided in the *Draft Technical Guide Related to the Strategic Assessment of Climate Change*" (SACC). This net-zero framework indicates technologies and practices that could be implemented to reduce GHG emissions from the Project, including information on technical feasibility and GHG reduction potential, which constitutes steps 1-3 of the SACC's 6-step BAT/BEP Determination process. The net-zero framework is incomplete, in that it does not provide information on the complete BAT/BEP Determination, and does not demonstrate how the Project's net GHG emissions will equal 0 t CO2 eq by 2050 and thereafter for the remainder of the Project lifetime. Furthermore, the Proponent states "emissions associated with land use change, stationary combustion, waste incineration, industrial processes, and explosives have a relatively small combined contribution of 12.6% of annual emissions, and therefore have not been evaluated in the net-zero framework at this early stage". The final row in Table 5 (electrification) of the net-zero framework, the Proponent lists several projects where electrification of on-site mobile equipment is being planned or implemented. The upcoming Jansen underground potash mine, which has placed an order for electric vehicles[5] was not included in the table. **Rationale:** While ECCC recognizes that this Project falls under CEAA 2012, the principles of the SACC and Draft Technical Guide should be followed by the Proponent in order to support Canada's ability to meet its environmental obligations and commitments in respect of climate change. The requested information will assist the Proponent in selecting appropriate mitigation measures to reduce GHG emissions from the Project.	1. Update the net-zero framework to align with the principles of sections 3.1 and 3.5.1 of the Draft Technical Guide, by including the following: • The information requirements outlined in section 3.5.2 of the Draft Technical Guide, including completion of the full 6-step BAT/BEP Determination process; • Consideration of all main emission sources defined in the Draft Technical Guide as those that are anticipated to contribute to 1% or more of total Project GHG emissions. 2. Include the upcoming Jansen underground potash mine in the preliminary alternative technologies and practices assessment, which is summarized in Table 5.	
231.	CNSC	Groundwater flow modeling	TSD XIV, Section 2.3	**Context and Rationale:** Section 2.3.1 states that "the model was constructed based on a rectangular mesh ……, with the northwest portion of the model domain situated along a topographic	1.Provide clarification as to why the northwest and southeast portions are topographic high and low,	

[5] https://im-mining.com/2022/06/20/sandvik-secures-major-bev-loader-order-for-bhps-jansen-potash-mine/

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				high and the southeast portion of the model situated along a topographic low (i.e., with drainage to the Clearwater River)". It is not clear how the topographic high/low was determined, considering that the rectangular mesh is not coincident with the surface water watershed (as shown in Figure A-2). Section 2.3.2 indicates that fixed head boundary nodes were specified along the southeast lateral boundary on slices 6 to 39. It is not clear why the southeast boundary was specified as fixed head boundary while all the other three boundary conditions were assumed as no-flow boundary. Additionally, it is not clear why the fixed head was assigned to slice 6 to 39, and what the stratigraphic units of slice 6 to 39 are. Section 2.3.1 described the discretization of the model domain. A figure showing the model mesh would help understand the model domain discretization along the horizontal and vertical direction, and the discretization of each hydro-stratigraphic unit.	since they are not coincident with the surface water watershed. 2.Provide a justification of the boundary conditions (i.e., why the southeast portion was specified as fixed head while all the rest were assigned as no-flow boundary conditions?). 3.Show the model domain discretization along the horizontal and vertical directions along with the hydro-stratigraphic units on the same figure to illustrate the discretization of each hydro-stratigraphic unit.	
232.	CNSC	Solute transport modeling	TSD XIV, Section 3.3.1	Equation (2) is Fick's Second Law, but it is not equal to the diffusive flux. Diffusive flux is represented by Fick's First Law.	Please correct Equation (2).	
233.	CNSC	Infiltration rate on the waste rock storage areas	TSD XIV, Section 3.3.1	Section 3.3.1 (page 13) indicates that, for the post-closure, infiltration was reduced relative to operation conditions due to the cover-in-place. However, no further information is provided about the reduced infiltration (e.g., the extent that infiltration was reduced due to the cover-in-place).	Please provide additional information on the reduced infiltration, including the infiltration rate assumed due to the cover-in-place, or provide reference (such as other TSD) for the reduced infiltration.	
234.	CNSC	Groundwater inflow	TSD XIV, Section 4.1	This section presents the predicted groundwater inflow for the base case, as well as other two scenarios. In one scenario, the hydraulic conductivity of the fault zone was increased by a factor of 5, while in another scenario, the hydraulic conductivity of the basement rock was increased by a factor of 2. It is not clear if the predicted flow rate for the scenario with increased hydraulic conductivity for the fault zone represents the potential maximum inflow rate under non-routine conditions (e.g., flow rate induced by ground collapse along high-conductive features). It is a good practice to estimate the potential maximum inflow rate under non-routine conditions, and provide mitigation measures.	Please estimate the potential maximum inflow rate under non-routine conditions. **Suggestions for mitigation and follow-up measures** Mitigation measures should be developed to minimize the likelihood for non-routine conditions to occur.	
235.	CNSC	Tailings source term derivation	TSD XV, Section 3.3.1.2 Base case and upper case source term calculations	**Context:** The representative materials for CPB and CPT were proportioned to develop a base case and an upper case. Table 3-2 illustrates the methods used for development of both cases. However, no future justification was given with respect to why such methods were adopted. **Rationale:** The upper case seems to demonstrate the worst scenario as maximum leachate concentrations were chosen for each constituent. However, for the upper case scenarios the EIS used the highest pH for source term calculations. Higher pH can enhance dissolution of certain minerals, but will reversely precipitate other	Provide further justification of the methodology for determination of the geochemical assumptions for the base and upper cases.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				elements that are major COPCs. Therefore, it is controversial to simply choose the highest pH as a conservative assumption.		
236.	CNSC	Tailings source term derivation	TSD XV, Section 3.4.1 Evaluation of secondary mineral controls	**Context:** Temperature sensitivity was not evaluated, and solutions were assumed to be at 25°C in order to be consistent with thermodynamic data for geochemical simulations. **Rationale:** Most geochemical reactions and sorption/desorption processes are dependent on temperature. The test data obtained under laboratory conditions may not represent the in-situ condition if temperature varies. For ground surface storage or disposal of waste rock, a scaling factor is usually applied for derivation of source term by considering various factors including temperature. The current EIS lacks information about geothermal condition of the underground tailings repository.	Provide geothermal profile of the site, or at least the geothermal condition of the underground tailings management facility, and adjust the source term derivation as necessary.	
237.	CNSC	Tailings source term derivation	TSD XV, Section 3.4.1 Evaluation of secondary mineral controls	**Context:** A range of oxidation-reduction potential values (-250 mV ~ 500 mV) were reported to be investigated as representative of the oxidized nature of the CPB and CPT and anticipated groundwater conditions at depth. However, no further data or information is available in the EIS or its corresponding TSD. **Rationale:** As clearly stated in Section 3.1.1.1 (Key Chemical Reactions), changes in redox can lead minerals to precipitate or dissolve, and elements to sorb or desorb. A wide range of redox potential will affect the leaching behaviour of major COPCs (e.g. U and As), and will thus introduce uncertainty to the derived source terms. Given its importance in understanding the uncertainty in source term, and how this uncertainty has been managed in the EIS, the geochemical simulation results used to determine the oxidation-reduction potential values should be provided to support the EIS review.	Provide geochemical simulation results about the effect of varying redox potentials, and discuss the potential influences on source terms.	
238.	CNSC	Conceptual geochemical models for waste rock	TSD XVII WR and UG Source Term Report Section 2.2 Geochemical weathering concepts	**Context:** Geochemical weathering is conceptualized as oxidation of pyrite and dissolution of calcite. Release mechanisms of COPCs from waste rock were also discussed briefly. **Rationale:** Uranium and radionuclide release is assumed to result primarily from dissolution. Therefore, source terms for uranium and radionuclides are derived differently from other species. However, it is unclear how such a special treatment was implemented. Uraninite dissolves under oxidative conditions in the presence of carbonate by formation of carbonate complexes. From the current form of the TSD, it is unclear how these dissolution mechanisms are taken into consideration. Therefore, the exact release mechanism for uranium should be given.	Provide detailed information on the considered release mechanisms of uranium from waste rock.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
239.	CNSC	Waste rock and underground wall rock source term prediction	TSD XVII, Section 3.2.2	**Context:** It is stated that "Samples with an NPR greater than 3 were classified as NPAG, and samples with an NPR less than 1 classified as PAG. Samples with NPR between 1 and 3 were classified as uncertain (UC). Further details on the ARD classification will be provided in a baseline geochemistry report currently in draft." Based on this statement, it is still unknown how the waste rock with samples that have NPR between 1 and 3 is classified. **Rationale:** As the waste rock classification will impact on the quantity of both PAG and NPAG waste rocks and their management in both short-term and long-term. This might also impact on their potential effects on the environment.	Provide further details on ARD classification to support the EIS.	
240.	CNSC	Waste rock and underground wall rock source term prediction	TSD XVII, Section 3.2.2, Table 3-4	**Context:** Table 3-4 provides a summary of the infiltration rates, surface area and annual flows rates for each source term. However, no further details how they are obtained, in particular, the net infiltration rate. **Rationale:** Net infiltration will impact on the contaminant leaching and migration and then the loading to the surrounding environment and should be well justified.	Provide further details how net infiltration rates for different source terms are determined. **Suggestions for mitigation and follow-up measures** Monitor the net infiltration rate during operation and reclamation of waste rock stockpiles	
241.	CNSC	Waste rock and underground wall rock source term prediction	TSD XVII, Section 3.2.2, Table 3-9 and Table 3-10	**Context:** Tables 3-9 and 3-10 contain model input loading rates for various parameters for operations and closure by Lithological Grouping. It is noted that during operations, for Segregated PAG Source Term 3&5, parameter SO4 in INT-Mine and SPGN-Mine is greater than that in INT-UGTMF and SPGN-UGTMF. However, during closure, it is reverse, i.e., parameter SO4 in INT-Mine and SPGN-Mine is smaller than that in INT-UGTMF and SPGN-UGTMF. No further information is provided why this is the case. **Rationale:** The input loading rate will impact on the output loading rate and would then impact on the source loadings to the surrounding environment and should be determined adequately.	Provide further information why model input loading rates for parameter SO4 and others as appropriate by Lithological Grouping are reverse in values for operations and closure for Segregated PAG Source Term 3&5.	
242.	CNSC	Source term model inputs and assumptions	TSD XVII WR and UG Source Term Report Section 3.2.2 Table 4.1, 4.3	**Context:** The source terms for waste rock and underground wall rock were predicted from the kinetic leaching test results (HCT) of corresponding samples. Model input has been provided in table format. However, neither reference document nor evidence of kinetic leaching test results was provided in the report. In addition, several elements were observed to be identical in values for different study scenarios in the predicted WRSA concentrations (Tables 4-1, 4-3). For instance, Uranium concentration in the predicted leachate is found to be identical in different scenarios. However, no explanation was provided.	Provide a separate geochemical characterization report for representative waste rock, which should include total elemental analyses of waste rock typical of the geological formations for future development. Provide complete dataset of HCT leaching test results to support the source term predictions. This will provide a comprehensive dataset about the baseline characteristics of the waste rocks as result of the operation, and will facilitate developing corresponding geochemical models for derivation of	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				Rationale: NexGen's current methodology to predict source term relies on leachate concentration of major elements from HCT tests. Since no test results were available for review, it is hard to justify whether the adopted model input is representative of the rocks to be encountered in the operation. Variability of geochemical properties is not fully addressed in the current form. As the HCT test condition could be designed to represent the field condition, uncertainty in variables could affect the leaching behaviour. Information is missing with regards to proportion of chemicals leaching from solid phase. This is partly because of lack of information on total concentration/quantity of chemicals in waste rock samples. In order to achieve this, a detailed quantification of wholerock elemental analyses for waste rock is required. With an in-depth understanding of the total elemental composition, it will enable a better reactive geochemical speciation and transportation modelling for source term predictions.	source terms for both short-term operation and long-term disposals. **Suggestions for mitigation and follow-up measures** Assess the comparative proportion of the leachable elements in the solid phase.	
243.	CNSC	Conceptual geochemical models for waste rock	TSD XVII WR and UG Source Term Report Section 3.2.2 Model inputs & assumptions, Oxygen transport modelling	**Context:** Oxygen transport modelling was completed by Okane to assess oxygen availability for sulfide oxidation in the waste rock stockpile. The Okane (2020) report was heavily relied upon for the development of source terms under different scenarios, in particular, the designs with engineered layers. **Rationale:** The current EIS and TSD XVII have limited to no information on how the engineered layers in the PAG waste rock stockpile are designed. The methodology and simulation results of oxygen transport in waste rock stockpiles are unavailable in the current report.	Provide the referenced Okane (2020) reports: Okane (2020a). Rook I WRSA Options Analysis. Memorandum provided to NexGen Energy Ltd. Okane (2020b). Rook I WRSA – 1-Dimensional Numerical Modelling of WRSA End-Members, Internal Memorandum provided to NexGen Energy Ltd., March 24, 2020.	
244.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	TSD XVIII, Section 4.1.2	**Context**: Seepage from site water ponds is described as a model input based on whether ponds are lined or unlined. **Rationale**: In accordance with comment ECCC-SW-04, ECCC reminds the Proponent that the *Metal and Diamond Mining Effluent Regulations* (MDMER) requires all mine effluent and seepage from the mine site that contains deleterious substances be discharged through a final discharge point.	Provide additional information on how water will be released into the receiving environment from the west bermed runoff collection area with consideration of MDMER requirements and update modelling as necessary.	
245.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	TSD XVIII, Section 5.1.1	**Context**: Flow rate values for the west and east surface runoff appear abnormally high in Figure 9 pg. 46. **Rationale**: Values approach 1000 m^3/day during the transitional monitoring period for runoff, which seems very high considering it is runoff and not an active discharge.	Verify the values/units for east and west surface runoff and provide a rationale if the values currently stated are correct.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
246.	ECCC	Fish and fish habitat	TSD XVIII, Section 5.1.2.3 Section 7	**Context:** The Site-Wide Water Balance Report (SWWBR) describes in Section 5.1.2.3 the vulnerability of the water management system to the extended failure of any one of the various pumps on-site in an average year (1993 in the historical data). The Proponent states in Section 5.1.2.3 that in a 7-day failure, overflow may occur in the settling pond and effluent treatment. **Rationale:** Freshwater supply to the processing plant and groundwater sumps in the mine may also be affected in an extended pump failure, but these do not lead to effects on the environment. The evaluation of pump failure in an 'average year' may mask the potential for pump failures at inopportune times, such as above average precipitation or storm conditions. Additional information would assist ECCC in assessing the potential effects of the Project to the receiving environment.	1. Explain whether or not an analysis of pump failure in storm conditions (e.g. 24-hour 100-year rainfall) would identify the same vulnerable areas. If new vulnerable areas are identified, discuss the mitigation measures that would be used to address this. 2. Discuss whether pump failures at certain nodes may be more important in terms of valued components.	
247.	CNSC	Human health with with respect to hazardous contaminants	TSD XVIII, Appendix H	**Context:** The CNSC has a draft REGDOC-2.9.2 about controlling releases to the environment from nuclear facilities. REGDOC-2.9.2 clarifies the CNSC's requirements and provides guidance for controlling releases to the environment, through: • applying the concept of best available technology and techniques, economically achievable (BATEA) • establishing and implementing licensed release limits and action levels for releases to the environment • commissioning of new treatment systems and confirming their performance • implementing adaptive management where required NexGen has been hosting workshops with CNSC staff. NexGen also acknowledged in their EIS that they will have to be in compliance with REGDOC-2.9.2. **Rationale:** As stated in the draft REGDOC-2.9.2, environmental release targets are used as criteria to inform the design of wastewater treatment systems to constrain the quantity and concentration of contaminants and physical stressors released into the environment. Environmental release targets are established using an exposure-based approach and a technology-based approach. In the EIS, it is unclear how the environmental release targets were used to identify the water treatment plant technology and design.	CNSC's expectation is that NexGen demonstrate to the CNSC that the requirements in draft REGDOC-2.9.2 are met, including: • BATEA assessment • Establishing and implementing licensed release limits and action levels for releases to the environment • Commissioning plan NexGen must clearly demonstrate how the Rook I Project meets the requirements in draft REGDOC-2.9.2.* NexGen must use the environmental release targets to inform the selection of the treatment technology. *Note that although REGDOC-2.9.2 is still in draft form, CNSC staff expects proponents to follow this document in conjunction with REGDOC-2.9.1	
248.	CNSC	Human health with with respect to hazardous contaminants	TSD XVIII, Appendix H	**Context:** The CNSC has a draft REGDOC-2.9.2 about releases to the environment from nuclear facilities. REGDOC-2.9.2 clarifies the CNSC's requirements and provides guidance for controlling releases to the environment, through:	NexGen should harmonize the proposed Effluent Release Targets with the technology-based performance standards that exist in the *Metal and Diamond Mining Effluent Regulations* where applicable.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				• applying the concept of best available technology and techniques, economically achievable (BATEA) • establishing and implementing licensed release limits and action levels for releases to the environment • commissioning of new treatment systems and confirming their performance • implementing adaptive management where required It is acknowledged that NexGen has been having frequent workshops with CNSC staff about draft REGDOC-2.9.2. It is also acknowledged that NexGen stated in the EIS that the final release targets will be proposed to the CNSC as part of the licence application submission to the CNSC. **Rationale:** It is not clear in the submission whether NexGen has considered whether any applicable technology-based performance standards exist in Canada or internationally, and would be relevant as effluent discharge targets, in order to ensure principles of pollution prevention are applied. Consideration of this would help ensure that the proposed effluent discharge targets harmonize with existing federal, provincial/territorial, and/or municipal requirements. For example, there are release limits for radium-226, TSS, and pH outlined in the federal *Metal and Diamond Mining Effluent Regulations*, which have been demonstrated to be achievable in the uranium mine and mill industry.		
249.	CNSC	Human Health with respect to radiation exposure	TSD XVIII, Appendix H	**Context:** As per REGDOC-2.9.1, effluent release targets are an important part of the design of the water treatment plant. Therefore, the development of the effluent release targets must be conservative, consider all possible exposure pathways, and protective of human health and aquatic biota. **Rationale:** It is noted that the proposed effluent release targets for radionuclides are derived based on the thresholds provided by Ecometrix (2021). The basis behind these thresholds don't appear to be provided in Appendix H of TSD XVIII. In addition, it is not clear how the proposed effluent release targets for radionuclides correspond to a dose to a member of the public or to biota. It is also not clear how exposure pathways (such as immersion and ingestion of water) were considered in the development of the proposed effluent release targets for radionuclides.	NexGen should provide more information on how the thresholds for radionuclides are derived. NexGen should clarify how the proposed effluent release targets for radionuclides correspond to a dose to a member of the public or to biota. NexGen should clarify how the proposed effluent release targets for radionuclides considered potential exposure pathways.	
250.	CNSC	Human health with with respect to	TSD XVIII, Appendix H	**Context:** In the EIS, NexGen states that the development of water quality used in the proposed effluent release targets does not include the September 2020 data from Patterson Lake.	Provide justification that the addition of the September 2020 water quality data will not significantly impact the proposed effluent release targets	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
		hazardous contaminants		**Rationale:** It is not clear in the EIS whether including the September 2020 water quality data from Patterson Lake would significantly impact the development of the proposed effluent release targets.		
251.	CNSC	Wildlife, wildlife habitat	TSD XXI- ERA- section 2.3.3.2	**Context:** The ERA defines the occupancy factors for both fish and wildlife species spent in various media. These factors are used in the IMPACT model to calculate risk. Table 2-5 of TSD XXI contains the occupancy factors used in the IMPACT model for the ERA. **Rationale:** How these factors were decided is unclear from reading the ERA. For instance, muskrat, beaver, American mink, mallard and common loon are assigned a factor of 1 for occupancy in air, and 0.5 for occupancy in soil/sediment surface. Riparian mammals and birds also spend time in water, but this is not captured in the occupancy factor table or calculations.	Please explain the choice of occupancy factors for riparian mammals and birds in the ERA, and how it is conservative for the exposure and risk assessments.	
252.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	TSD XXI, Section 4.2.3.1	**Context**: Table 4-1 pg. 43 provides water quality objectives used for the Environmental Risk Assessment (ERA). There are discrepancies between the selected guidelines in this table and the selected Project thresholds used in the main EIS for cadmium and manganese. Additionally, the most stringent molybdenum guideline should be applied. **Rationale**: The Proponent should ensure the most stringent environmental water quality objectives are used and that consistency is maintained across different assessments in the EIS. Use of the most stringent guidelines will allow for the most protective assessment to analyze risks to the receiving environment.	1. Update the ERA using the water quality objectives for cadmium and manganese that were used in the main EIS. 2. Update the ERA applying the most stringent molybdenum water quality guidelines.	
253.	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	TSD XXI, Section 4.2.3.2	**Context**: Un-ionized ammonia and Total Suspended Solids (TSS) have not been included in Table 4-2 pg. 46, which makes it unclear if risk from un-ionized ammonia and TSS have been assessed. **Rationale**: Un-ionized ammonia and TSS are prescribed deleterious substances under Schedule 4 of the *Metal and Diamond Mining Effluent Regulations* (MDMER) and therefore should be put forward for assessment.	Provide an assessment of TSS and un-ionized ammonia.	
254.	ECCC	Fish and fish habitat Change to an environmental component due	TSD XXI, Section 4.2.3.3	**Context:** It is unclear from this section and Table 4-3 pg. 50 that the selection of sediment Constituents of Potential Concern (COPCs) has taken into consideration elevated baseline concentrations of arsenic, barium, iron, lead, manganese, zinc, lead-210, polonium-210 and radium-226 that were found during baseline monitoring. Inconsistencies between the sediment quality thresholds applied and the thresholds chosen within the EIS are noted.	Provide further information regarding if elevated baseline sampling concentrations for sediment COPCs were considered as part of the screening process. Update the results of the assessments if required.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
		to radiological contaminants		**Rationale**: The Proponent should ensure the most stringent environmental sediment quality objectives available are used and consistently maintained across different assessments for the EIS. Use of the most stringent guidelines will allow for the most protective assessment to analyze risks to the receiving environment.		
255.	CNSC	Human Health with respect to radiation exposure	TSD XXI – Environmental Risk Assessment/ Section 5.1.3.2.1 (page 5.11)	**Context:** No rationale has been given why the seasonal resident and lodge operator's diet reflects an average annual food consumption rate, while the other receptors are assigned higher consumption rates. **Rationale:** Clarification is requested so that CNSC staff may determine whether the dose estimate for the offsite receptors is adequate.	Clarification for the choice of the receptor diets should be provided, specifically why the seasonal resident and lodge operator's diet reflects an average food consumption rate, while the other receptors are assigned higher consumption rates.	
256.	CNSC	Human Health with respect to radiation exposure	TSD XXI – Environmental Risk Assessment/ Section 5.3.2 (page 5.77)	**Context:** Exposures to radon progeny have been assessed separately from exposures due to other radionuclides. On page 5.77 the TSD states that "The limit established by the CNSC for radon above background for sites licensed by the CNSC is 60 Bq/m^3 (*Radiation Protection Regulations* SOR/2000-203). For this project, the incremental radon concentration of 60 Bq/m^3 was adopted". The *Radiation Protection Regulations* do not stipulate a limit for radon above background for sites licensed by the CNSC. The effective dose limits for NEWs and persons that are not NEWs are listed in section 13 of these regulations, and in subsection 1(3) for the general public. The annual effective dose from all sources combined must be compared to the applicable effective dose limit. For members of the public this limit is 1 mSv per year. In addition, since the total dose is about 0.6 mSv (including radon progeny, ingestion, inhalation, and external exposures), i.e., 60% of the public effective dose limit, the conservatism built into the dose assessment should be discussed further in particular in relation to the radon dose assessment. **Rationale:** The reason of the requested changes is to ensure consistency with the *Radiation Protection Regulations*. Additional information on conservatism would help put the total dose in context in the Environmental Assessment Report and provide insight on whether the annual dose could approach the dose limit.	The TSD should be aligned with the *Radiation Protection Regulations* by: 1. Removing the reference to a 60 Bq/m^3 limit. 2. Reporting the assessment results as the total dose, from all radionuclides combined including radon progeny, and by comparing this annual effective dose to the effective dose limit. Also provide a summary of the conservative assumptions that have been included in the dose calculations.	
257.	ECCC	Fish and fish habitat	TSD XXI, Section 6.1.1	**Context:** Table 6 pg. 186 provides information on the selected ecological receptors for the Environmental Risk Assessment (ERA). However, no information has been provided on which species (found within the Project local or regional study areas) that these selected receptors are representing. **Rationale:**	**Specific Question/ Request for Information:** 1. Update Table 6 to include a list of each species that each selected ecological receptor is representing.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
				A list of which species the selected ecological receptors are representing should be provided within this table.		
258.	CNSC	COPC concentrations in macrophytes	TSD XXI: ERA, Table 6-1	**Context:** In Table 6-1 of the ERA supporting document, it is stated that for aquatic vegetation, shoot, root, and sediment samples were collected at Lloyd Lake for metal and radionuclide analysis. The macrophyte data does not appear to be discussed beyond a comparison of modelled and measured concentrations (Figure 3-4 in Appendix A of TSD XXI: ERA). Information appears to be missing on the sampling campaign. In particular, it would be of relevance to include which species were sampled as COPC uptake is species-specific, as well as where and when sampling was performed. **Rationale:** Aquatic vegetation can accumulate COPC in their shoot and root tissues, and therefore it is relevant to discuss this data in the EIS. Moreover, in the ERA supporting document, it is unclear how this data were used in the ecological risk assessment. CSA N288.6-12 states that measured concentrations of COPCs should be used, where possible, in the exposure assessment (clause 7.3.6), and that bioaccumulation factors (BAFs) should only be used if measured tissue concentrations are not available (clause 7.3.4.3.1). Please clarify how measured COPC data from macrophytes were used in the ERA.	1.Present information on the macrophyte sampling campaign. 2.Present a summary of measured COPC data in macrophyte shoots and roots. 3.Clarify how measured COPC data from macrophytes were used in the ERA, and consequently considered in the EIS.	
259.	CNSC	Aquatic Environment	TSD XXI- ERA- section 6.3.1.1	**Context:** The ERA defines water concentration-based TRVs for aquatic biota from chronic effects from long term COPCs exposures. In the ERA, TRVs were selected that were 20% ECs (EC_{20} values). As chronic EC_{20} values are not always available, the ERA uses a protocol described in Table 6-14 to derive EC_{20} values from available data. **Rationale:** Although the protocol described in Table 6-14 may be adequate, there is no reference provided to support its use.	Please provide a reference or justification for the calculations used to derive EC_{20} values showing it is a conservative method.	
260.	CNSC	Wildlife, wildlife habitat and SAR	TSD XXI- ERA- section 6.4.1.1.1	**Context:** In accordance with Clause 7.2.4.3 of CSA N288.6-12, species at risk (SAR) should be assessed at the individual level as effects on a few individuals are not considered acceptable, and not assessed at a population level. It is unclear how SAR were assessed in the ERA. **Rationale:** It appears lowest-observed-adverse-effect levels (LOAEL) were used for benchmarks for SAR. The assessment appears to compare SAR doses to LOAELs and if there were no HQ values above 1, then SAR were considered protected. SAR are often assessed using no observable adverse effect level (NOAEL), and not LOAEL, to ensure there are no effects on individual species at risk.	Please justify the method used to assess SAR within the EIS and ERA, ensuring that SAR were assessed at the individual level.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
261.	CNSC	Level of details (QA/QC,)	TSD XXI: ERA Section 7.1- QA/QC	**Context:** Overall, the information in the HHRA is straightforward and clearly presented. However, the level of details in section 7.1- QA/QC appears to be insufficient/unclear to allow a comprehensive evaluation of compliance with CSA N288.6 and associated/interlinked documents. **Rationale:** As per CSA N288.6 (Clause 10) Appropriate QA/QC requirements shall exist for all aspects of the ERA and should be specified prior to conducting the ERA. If these requirements already exist as part of a facility's overall QA program, that program may be applied to the ERA process. In section 7.1 of the ERA report, it is stated that the planning, preparation, and work was performed under the ECOMETRIX ISO-9001-2015 certified quality management system. CSA N286-12 clause 9.5.7, Verification of Services, states that Purchased services shall be verified in accordance with the planned verification. This clause is applicable with other clauses of CSA N286-12. For example, clause 4.8 on work management. Clause 4.8 addresses planning the work including the verification and using controlled documents. CSA N286-12 clause 9.5.5 specifies that "the selected supplier's technical documents that are required to be submitted shall be reviewed and accepted". Additionally, CSA N288.4-19, Clause 10.1.2 (note 1): "The QA program should be commensurate with the management system principle set out in N286, CSA-ISO-9001, or other recognized quality standards." It is not clear how the current information provided satisfies these requirements Providing this information will improve understanding how the QA/QC program fits within the organizations management system and meeting these requirements will ensure that the proponent has control of the purchased services as a future licence applicant.	Provide clarifications if the proponent has reviewed and accepted the TSD XXI-ERA report, and how the ECOMETRIX QA/QC satisfy the proponent quality standard requirements.	
262.	CNSC	Level of details (Sensitivity analysis)	TSD XXI: ERA Section 7.2- Sensitivity analysis	**Context:** The level of detail in section 7.2- Sensitivity Analysis appears to be insufficient to allow a comprehensive review. **Rationale:** Section 7.2 presents the sensitivity analysis of the key model parameters used for annual weather patterns, deposition of COPCs, food consumptions and climate change. The level of details is insufficient to illustrate how the calculations of sensitivity analysis are performed for the different parameters. Providing a sample calculation would illustrate how the sensitivity analysis was calculated for the different parameters.	Provide sample calculations to illustrate how the sensitivity analysis are performed for the different parameters.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
263.	CNSC	Level of details (conceptual model)	TSD XXI: ERA Figure 5.5- Conceptual model	**Context:** The level of detail in Figure 5.5 Conceptual Model appears to be insufficient. **Rationale:** CSA N288.6, clause 6.2.7.3 Site-specific conceptual models should include representations of: (a) the identified COPCs and physical stressors, and (f) relevant transport pathways/modes (e.g., dispersion and deposition) and transformations (e.g., photo-degradation and biodegradation), as applicable. Figure 5.5 shows most of relevant information, but missing representations of the identified COPCs, and transport pathways. Considering this information, the conceptual model will provide valuable representations of the exposure settings considered in the site-specific model for this assessment.	Provide the identified COPCs and the associated pathways into the conceptual model illustrated in Figure 5.5.	
264.	CNSC	Calculation of bedrock hydraulic conductivity through Packer test analysis	Annex III, Section 5.2.2.2, Appendix G	**Context:** Section 5.2.2.2 indicates that hydraulic conductivities were calculated using the Thiem equation. However, Appendix G shows that some tests were analyzed using the Lugeon unit, some were analyzed using the Theis recovery curve analysis, and some were based on the Thiem equation. For the Thiem equation, radius of influence were assumed instead of measured. It is stated in Section 5.2.2.2 that "These assumptions were: R0=1 m; where Q≤0.1 L/min R0=10 m; where 1.0 L/min≤Q≤0.1 L/min R0=1 m; where Q≤0.1 L/min" **Rationale:** There are apparent typos in these assumptions, and they impact the understanding of the content. Additionally, justification (i.e., references) should be provided for these assumptions.	Provide all the theories used in the packer test analysis (i.e., Lugeon test analysis, Theim recovery curve analysis, etc.), and ensure text in Section 5.2.2.2 is consistent with Appendix G. Please clarify the assumptions related to the radius of influence, and provide justification for the assumptions.	
265.	CNSC	Groundwater flow modeling	Annex III, section 6.1	It is stated in Section 6.1 that "Within the bedrock, measured hydraulic gradients indicate that under existing conditions the primary groundwater flow direction is upwards and to the north-northwest (i.e., towards Patterson Lake). In the glacial drift deposits, the groundwater flow direction is downwards and to the north-northwest (i.e., towards Patterson Lake)." It is not clear if this is applicable to the whole modeling domain, or just to the local area around the mine site. A comparison of Figure 19 with Figure 35 indicates that the measured hydraulic heads show an upward gradient within the bedrock, while the simulated hydraulic heads do not. It is not clear what the impact of this inconsistency on the accuracy of the modelled results	Please clarify if this statement in Section 6.1 is applicable for the whole modeling domain. Please provide a discussion on the implication of the inconsistency between the measured and simulated gradients in the bedrock.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
266.	CNSC	Fault zone distribution	Annex III, Section 6.3.3	Section 6.3.3 describes the fault zone and shear zone derived based on the geological model and geophysical survey data. Figures 28, 20 and 30 illustrate the cross sections of the fault zone. But it is not clear how the fault zone extends in the horizontal direction.	Please illustrate the plan view of the fault zone and shear zone in a figure.	
267.	CNSC	Groundwater flow model calibration	Annex III, Section 6.4, Section 6.5 TSD XIV	1.Figure 31 (Annex III) shows the calibration statistics, but there is no information about the water balance. The model should demonstrate an accurate water balance. The water balance error is the difference between total predicted inflow and total predicted outflow. 2.Section 6.5 (paragraph 4 on page 68) (Annex III) cited (Golder 2022b, Regional Meteorological and Hydrological Characterization Report for the Rook I Project) as the source of the estimates of baseflow. Section 2.4 (in TSD XIV) referenced Annex IV.2, Hydrometric Monitoring Characterization Report. It is not clear which one is the correct source. 3.Section 6.5 (paragraph 4 on page 68) (Annex III) states that "Using the catchment areas for Patterson Lake, this baseflow corresponds to an equivalent recharge rate of approximately 110 mm/yr (3.5 L/s/km^2)". It is not clear where this estimate comes from (i.e., appropriate reference is not clear). If this is a calculation in this modeling exercise (i.e., Annex III), an explanation of how this is calculated should be provided. 4.(Annex III) Paragraph 2 on page 68 references Figure 32 and Figure 35. However, they should be Figure 31.	1.Provide the water balance as a model performance measure. 2.Clarify which reference is the correct reference to obtain the baseflow. 3Explain how to determine the equivalent recharge rate corresponding to the baseflow. 4.Please correct the references to Figure 31.	
268.	ECCC	Wildlife and Wildlife Habitat	Annex VIII.2, Section 3 Section 8 Section 10	Given the potential impact of the Project on caribou, the baseline caribou data is insufficient to understand Project effects to this species. Presence/absence detection was provided by camera traps, incidental observations, winter track and pellet survey. There are no dates associated with the locations of caribou observations from incidental or camera trap surveys, and no explanation of seasonal use of the Project area by caribou. Indigenous knowledge of caribou use in the area is referenced in Section 3 Indigenous and Local Knowledge, but should be summarized in Section 14 and used to determine potential Project effects on caribou.	1. Provide more details on the baseline caribou data including: • dates of all observations; and • a summary of seasonal use of LSA, RSA and caribou home range. 2. Explain how caribou use of the area could be affected by the Project throughout all seasons and life stages (e.g., calving, breeding, travel). 3. Provide a summary of Indigenous knowledge of caribou use of the Project area, including seasonal use.	
269.	ECCC	Wildlife and Wildlife Habitat	Annex VIII.2, Section 8 Section 10	There is potential for some SAR (e.g., myotis species, barn or bank swallows, common nighthawk) to be attracted to and use mine infrastructure (buildings, roads etc.) for nesting, roosting, or foraging. This carries an increased collision risk.	For all Project phases, describe the mitigation measures and responses to prevent and minimize effects on SAR that may utilize mine infrastructure.	
270.	ECCC	Wildlife and Wildlife Habitat	Annex VIII.2, Section 10	Surveys confirm common nighthawk occupies the SSA and the LSA. Aerial foraging and road-roosting behavior make this species susceptible to collision.	Provide a mitigation plan to address potential mortality risk to common nighthawk.	

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response
271.	ECCC	Wildlife and Wildlife Habitat	Annex VIII.2, Section 10	Surveys confirm that barn swallows and myotis species were detected in association with bridge crossings (e.g., Patterson Creek Bridge). The Wildlife Baseline Report 2 states (with respect to myotis species) that "This infrastructure could serve to provide habitat for both maternal colonies and/or mixed sex groups that often congregate at night when cool temperatures persist" and that barn swallow "breeding habitat within the area of the Project was likely limited to areas with existing infrastructure...".	1. Develop a mitigation plan to reduce risk to myotis species and barn swallows utilizing any bridges or existing infrastructure as a maternal roost and/or roost site or as breeding habitat (nest site), including avoidance of collisions and disturbance. Demonstrate how the planned mitigation activities will result in no residual effects. 2. Explain what mitigation will be used to ensure no damage occurs to barn swallow nests if any bridge or existing infrastructure maintenance or upgrades are required.	

Rook I Project

Public Notice

PDF Version (Portable Document Format) 6.5 MB (Megabyte)

Document reference number: 3

Rook I Project – Comments Invited on NexGen Energy Ltd.'s Project Description

The Canadian Nuclear Safety Commission (CNSC) is seeking comments from the public and Indigenous groups on the project description for the proposed Rook I Project. The project involves the construction of a new uranium mining and milling operation located on the Patterson Lake peninsula in the southwestern Athabasca Basin in northern Saskatchewan, approximately 155 km north of the town of La Loche, SK.

The CNSC reviewed the project description and determined that it was written in accordance with the *Prescribed Information for the Description of a Designated Project Regulations* (CEAA 2012). Detailed information about the project will be available in the Environmental Impact Statement which will be submitted by NexGen Energy Ltd. at a later stage of the environmental assessment (EA) process.

Comments on the project description should be based on local, regional or traditional knowledge of the site or surrounding environment, or should provide any other relevant information that may help with the conduct of the EA. All comments received will be considered public.

Written comments must be submitted by **June 1, 2019** to:

Nicole Frigault, Environmental Assessment Specialist
Canadian Nuclear Safety Commission
P.O. Box 1046 Station B
280 Slater Street
Ottawa ON K1P 5S9
Telephone: 613-995-7948 or 1-800-668-5284
Fax: 613-995-5086
Email: cnsc.ea-ee.ccsn@canada.ca

Following receipt of comments on the project description, CNSC staff will consider all submissions received and make recommendations to inform the Commission's decision on the scope of the factors to be considered in the EA. In addition, CNSC staff will respond to all comments received from members of the public and Indigenous groups. The comments and responses will be populated in a table and publically posted to the Canadian Environmental Assessment Registry. Effort will be made to collate common issues together.

Following the Commission's decision on the scope of the EA, the proponent, NexGen Energy Ltd., will then be required to provide to the CNSC an environmental impact statement (EIS) for review. An EIS is a report written by a proponent that presents the technical studies and findings of an EA. The CNSC's *Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012* (PDF, 733Kb) provide general instructions on the preparation and information requirements that must be included in the EIS in order to comply with CEAA 2012 requirements.

Participation Opportunities

We'd also like to seek your views on the EA participation opportunities for this project.

As part of the EA process, Indigenous groups and members of the public will have the opportunity, through formal comment periods, to review and comment on the following documents:

- the project description
- the draft Environmental Impact Statement

Indigenous groups and members of the public will also be given the opportunity to submit comments to the Commission for an eventual EA/Licensing hearing as a Commission Member Document (written intervention and/or oral presentation).

In addition, throughout the EA process, CNSC staff will engage with members of the public through more informal engagement opportunities such as open houses, town halls, workshops, webinars, and providing status updates to our project distribution list. As part of standard practice, CNSC staff will focus its efforts in key communities within the regional project area that would provide the greatest opportunity for access by a large number of participants and where possible, capitalize on existing events/festivals in the communities to further extend our reach.

We would like to hear your views and suggestions on in-person engagement opportunities that would be meaningful for you. The feedback received will inform the planning of future activities.

Anyone interested in receiving regular project updates is invited to sign up for the project update e-mail list by sending a request to cnsc.ea-ee.ccsn@canada.ca.

Date modified: 2019-08-14

Participant funding to review the draft Environmental Impact Statement for NexGen Energy Ltd.'s Rook I project

Participant funding for NexGen Energy Ltd.’s Rook I project will be open from **May 25 to August 28, 2020.**

Participant funding notice

The CNSC is offering participant funding to assist Indigenous peoples, members of the public, and stakeholders in the review of the draft Environmental Impact Statement (EIS) for the Rook I project by NexGen Energy Ltd. (NexGen).

NexGen is proposing to develop an underground uranium mine on the Patterson Lake peninsula in the southwestern Athabasca Basin in northern Saskatchewan, approximately 155 km north of the village of La Loche, Saskatchewan. The proposed project includes underground and surface facilities to support the mining and processing of uranium ore. The main components include:

- Underground mine development
- An onsite mill to process an average of 1,400 tonnes of ore per day

- Surface facilities to support the short- and long-term storage of waste rock and ore
- An underground tailings management facility
- Water-handling infrastructure and an effluent treatment circuit
- Additional infrastructure to support mining activities

CNSC authorization in the form of a licence issued under subsection 24(2) of the *Nuclear Safety and Control Act* is required in order for the project to proceed. Before the Commission can make a decision regarding NexGen's proposal, an environmental assessment (EA) conducted under the *Canadian Environmental Assessment Act, 2012*, is required.

For further details on NexGen's proposal and the EA process, please see Canadian Impact Assessment Registry project #80171. The dates and location of public Commission hearings will be announced at a later date in a notice of public hearing.

Up to **$150,000** in participant funding will be disbursed among all eligible applicants for the provision of new, distinctive and valuable information on NexGen's upcoming draft EIS and related documentation. The first phase of funding is intended to assist in the review of the draft EIS, which is anticipated to be submitted in late 2020 or early 2021. A second phase of funding to assist with participation in the remainder of the regulatory process, including the review of the EA report and related Commission Member Documents, will be announced at a later date.

To apply, submit a participant funding application form. Certain terms and conditions apply. An application form can be submitted by:

- Email: pfp@cnsc-ccsn.gc.ca
- Mail: Canadian Nuclear Safety Commission
  c/o Participant Funding Program Administrator
  P.O. Box 1046, Station B

280 Slater Street
Ottawa, ON, Canada K1P 5S9
- Fax: 613-995-5086

Deadline for submitting a participant funding application: August 28, 2020.

A funding review committee independent of the CNSC will consider all applications for funding and make recommendations on the allocation of funds.

For questions about this specific funding opportunity, contact:

Adam Zenobi
Participant Funding Program Administrator
613-992-8469
pfp@cnsc-ccsn.gc.ca

Related links

- Participant Funding Program
- Rook I project

Date modified:

2020-05-25

e-Doc: 6915418

November 16, 2022

Mr. Luke Moger
VP Environment, Permitting & Licensing
NexGen Energy Ltd.
lmoger@nxe-energy.ca

Subject: **Results of the Federal-Indigenous-Review-Team technical review of the June 13, 2022 Draft Environmental Impact Statement Submission for the proposed Rook I Project**

Dear Mr. Moger,

On June 13, 2022, NexGen Energy Ltd. (NexGen) submitted a draft Environmental Impact Statement (EIS), a Master Executive Summary, as well as Technical Support Documents for the proposed Rook I Project (the submission) [1]. On July 12, 2022, CNSC staff found the submission [1] to contain the required information to proceed with the Federal-Indigenous-Review-Team (FIRT) technical review of the draft EIS [2].

Outcome of the FIRT technical review of the draft EIS

The FIRT has completed the technical review of the submission and has found that the information provided does not fully address the regulatory requirements for the environmental assessment (EA). The technical review resulted in 271 information requests (IRs), found in Annex 1 attached, as well as 40 Advice to Proponent comments, found in Annex 2, also attached. Comments in the Advice to Proponent Table contain additional guidance and advice that NexGen should take into consideration when responding to IRs and when revising the draft EIS.

Expectations and next steps for NexGen

CNSC staff expects NexGen to submit complete responses to all IRs and Advice to Proponent comments and to re-submit a revised EIS. It is expected that NexGen clearly indicate how the revised EIS incorporated changes that take into account the responses to the IRs.

CNSC staff as well as members of the FIRT are available and willing to meet with NexGen to discuss the path forward and to clarify expectations for the IR responses.

Commitments Report

At this time, CNSC staff are also formally requesting that NexGen submit, as part of its revised EIS documentation, a Commitments Report in order to capture all the mitigation measures, follow-up program measures and commitments that have been referenced in the EA documentation in a single location for completeness and traceability. This report should include a listing of all commitments made by NexGen based on all of the documentation submitted to date including:

- the EIS
- correspondence with the public and Indigenous Nations and communities
- responses to IRs
- additional commitments NexGen has made in any documentation to members of the public and Indigenous Nations and communities and to whom these commitments apply

These commitments should be triaged based on whether they are within the scope of regulatory requirements or beyond (e.g., good governance, social responsibility), and indicate how each of these commitments will be tracked into NexGen programs, for example, environmental monitoring programs.

It would be helpful if NexGen could organize this information in tabular format providing the following information:

- details of the commitment
- which phase(s) of the project will the commitment be carried out (e.g., all phases)
- where the commitment is referenced (which document, table, etc. and where it can be found)
- how this commitment will be tracked (project EA follow-up program, site-wide programs, etc.)
- whether it is a site-wide commitment versus a project-specific commitment

This report would remain an evergreen document that would continue to be updated, during the remainder of the regulatory review process, as well as if the project is approved, after the public hearings and Commission decisions, to capture any additional commitments made by NexGen staff during public hearings and any actions directed by the Commission to NexGen.

Should you have any questions, please do not hesitate to contact me directly by phone at 343-542-7657 or by email at nicole.frigault@cnsc-ccsn.gc.ca

Sincerely,

-original signed by-

Nicole Frigault
Environmental Assessment Specialist
Environmental Assessment Division

Attachments:
Annex 1 – Information Requirements for the Rook I Project draft Environmental Impact Statement

Annex 2 – Advice to the Proponent
c.c.:
CNSC: N. Kwamena, P. Burton, D. Pandolfi
NexGen: L. Curyer, T. George, K. Oakes, A. Engdahl

References:

[1] Letter, L. Curyer and L. Moger (NexGen) to N. Frigault (CNSC), Rook I Project - Submission of Draft Environmental Impact Statement, June 13, 2022 (e-doc 6832174)

[2] Letter, N. Frigault (CNSC) to L. Moger (NexGen), Outcome of CNSC Staff's Conformity Review of the June 13, 2022 Draft Environmental Impact Statement Submission for the proposed Rook I Project, July 12, 2022 (e-doc 6833127)

Consolidated Comments from Indigenous Nations and Communities and the Public on the NexGen Rook 1 Project Draft EIS

For CNSC Response

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	CNSC Response
1.	Clearwater River Dene Nation (CRDN) (November 11, 2022)		Quantifying Stress Traditional environmental assessments (EA) failed to effectively consider these health concerns, "new assessment is needed attending to linked issues of equity, sustainability and Indigenous food sovereignty" (Jonasson, 2019). In particular, First Nation communities are becoming more concerned about the impacts and risk of industrial development and incidents on Indigenous health and wellness and current EA guidelines have ineffectively considered these impacts (Shandro J. J., 2018). In 2021, new guidelines were published to support impact assessment professionals and indigenous communities to help address these gaps during conventional assessments (Salerno, 2021). Impact assessment (IA) "practitioners have therefore tended to ignore mental health impacts to focus on more easily observable or readily quantifiable impacts, such as sensory disturbance. However, the often-intangible nature of mental health does not make the impacts of project development on mental health any less real" (Salerno, 2021). "Health Impact Assessment (HIA) is a voluntary and unstandardized process … has navigated the limitations of current EAs in which there is a tendency to focus on regulatory thresholds and quantitative measurements of risk" (Jones, 2015).	
2.	CRDN (November 11, 2022)		Perception of Risk Being a subjective mix of both social and psychological factors, risk perception influences how harmful and chemical or exposure is perceived (Keller A, 2012). This report indicates that levels of stress and perception of stress affect health independently and were shown to increase the likelihood of worse health and mental health outcomes (Keller A, 2012). Without clear federal or provincial guidelines on the acceptable level of risk during project development, it raises the question; what is an acceptable level of risk, or perception of risk, that is acceptable for the CRDN to tolerate for what seems an interminable future during the largest development-stage	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on [Canadian Impact Assessment Registry reference: 80171](#))	CNSC Response
			uranium project in Canada? • CRDN needs to develop it's own standards/thresholds in order to understand the risks they are bearing.	
3.	CRDN (November 11, 2022)	Section 23.5, Summary p. 192	There is a need for government to create a regional monitoring body to manage impacts of this mine and other proposed mines in order to manage cumulative effects, conduct monitoring and recommend adaptive management techniques as concerns raised. This body must be codeveloped with First Nations and provide for formal advisory and monitoring functions for First Nations. Comment: • Who determines the changes or 'adaptations' during the project • Create body to provide CRDN advise to government • CRDN should be involved in co-development of management plans	
4.	Birch Narrows Dene Nation (BNDN) (October 12, 2022)	Section 18.4 Project Interactions, Mitigations and Benefit Enhancements Section 19.4 Project Interactions and Mitigation	Throughout Section 18.4 and in Section 19.4, NexGen identifies that a key project characteristic that will contribute to potential effects on the economy includes an aspirational long-term target of 75% of the Project's workforce being composed of LSA residents. However, as the section goes on, the EIS makes the following statements that call into question if this "aspirational" target is in fact realistic: • "NextGen would make best efforts to recruit LSA residents, however, due to the specialized nature of some of the construction work and the associated technical employment qualification requirements, *a substantial portion of the Construction workforce is anticipated to be sourced from outside the LSA*" (18-73) • "It is likely that the long-term target of 75% of the workforce being residents of the LSA *would not be achieved in the early stages of Project Operations*" (18-76) • "The opportunity to employ residents of the LSA on the Project *may be reduced in the event the Fission Patterson Lake South Property proceeded* due to competition for workers and the limited number of qualified personnel from which to draw on" (18-30)	

e-Doc 6939666

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	CNSC Response
			Additionally, NexGen concludes, based on Figure 18.4-3 which provides an illustration of the potential typical operations year labour requirements, that filling 75% of the illustrative leverage peak operating jobs in each education category “may require hiring 38% of the 2016 LSA population over the age of 15 with a high school, college, or university certificate who were unemployed or not in the labor force in 2016 and 45% of the LSA population over the age of 15 with an apprenticeship or trades certificate or diploma who were unemployed or not in the labor force in 2016” (18-76). However, BNDN notes that no research or engagement has been completed to date to verify if hiring this proportion of the population for jobs in the mining sector is possible or desirable to members of the LSA’s workforce a) To justify these targets being cited in Section 18.4 and used to characterize the potential benefits of the Project in the EIS’s analysis of the effects of the Project on the Economy in Section 18.8, much more substantiated evidence is required in the EIS to support the feasibility of these targets and much more specific commitments are required than the generalized measures currently set out on p. 18-81. b) It must also be a condition of the EIS’s approval that the mutually agreed upon terms of an LSA workforce recruitment and retention strategy are established prior to EA approval, and Indigenous groups in the LSA provide confirmation that appropriate features of Benefit Agreements have been established to meet these targets prior to final EA approval or the commencement of construction. c) If substantial evidence cannot be provided to meet this “aspirational” target, NexGen must also provide a more realistic and concrete target based on the evidence that is available so that the effects of the Project on the Economy and Community Well-Being can be accurately assessed and understood by regulators and Indigenous groups. Commitments must also be set out in the EIS for measures that will be taken if NexGen’s targets for employment are not met.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	CNSC Response
5.	BNDN (October 12, 2022)	Section 18.7 Monitoring, Follow-Up and Adaptive Management	BNDN notes that no specific management or monitoring plan has been included in the EIS documentation related to the verification of residual socio-economic impacts, both positive and negative, for the local economy. a) NexGen must develop a Socio-Economic Monitoring Plan for the life of the Project to verify the effects assessment included in the EIS and to be included in the Project's approach to adaptive management. This Plan would include an approach, co-developed with Indigenous groups in the LSA, to monitoring the realization of the benefits and impacts of the Project (e.g., employment and procurement targets, training and capacity building, community investments, etc.) as mitigation and enhancement measures are implemented. Monitoring and subsequent regular evaluation would allow for the real-time adjustment of targets and/or an approach to adjusting enhancement measures or identifying offsetting benefits where targets are not met. b) The Crown must include the development of a Socio-Economic Monitoring Plan as a condition of approval for the Project	
6.	BNDN (October 12, 2022)	General Comment	General Comment. In our review of the surface water and groundwater components of the EIS we found many of the assumptions, interpretations and conclusions to be inadequate. Amongst other concerns, we found that: i. Waste rock permanently stored on surface is far more likely to be acid generating than NexGen previously indicated to BNDN ii. Patterson Lake itself has limited buffering capacity and is very sensitive to acid rock drainage from the project iii. Sulphur dioxide emissions from the Alberta oil sands will continue to cause acidic precipitation at the Rook 1 project site. This is a cumulative effect that has not been considered in the EIS iii. NexGen water quality modelling assumptions overlook a number of important considerations that result in an overly optimistic assessment of Project impacts to surface water quality Despite these inadequacies in the current assessment, NexGen still expects water quality to be permanently and irreversibly impaired in Patterson	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	CNSC Response
			Lake. In light of these factors, we believe that NexGen has significantly understated the potential impacts of the Project on the environment and on BNDN Treaty and Aboriginal rights and interests. If the Crown intends to approve this Project, the Crown must work with BNDN to ensure that the identified potential impacts are avoided, mitigated and/or accommodated. a) BNDN requests that CNSC and SOME establish regular meetings with our Nation to discuss these concerns and the findings of regulators and other Indigenous groups in detail. These meetings will be used to identify meaningful measures that the Crown can take to avoid, mitigate, accommodate or compensate for the significant adverse impacts to our constitutionally protected Treaty and Aboriginal rights and interests. b) BNDN requests that NexGen work collaboratively with our Nation to resolve the concerns raised prior to submission of the Final EIS.	
7.	BNDN (October 12, 2022)	EIS Table 10.5-8 and EIS Table 8.5-3	In Table 10.5-8 (Classification of Residual Effects on Surface Water Quality Indicators for the Application Case and Reasonably Foreseeable Development Case in the Far Future; p. 10-119), NexGen provides their assessment that water quality in Patterson Lake will be negatively impacted by the project for hundreds of years from waste rock seepage and for thousands of years from groundwater (effectively permanently) through the continued loading of elevated concentrations of copper and cobalt to Patterson Lake. BNDN is very concerned with this impact of the Project, which will result in permanent, continuous adverse impacts to our ability to exercise our Treaty and Aboriginal rights. As documented in our IKTLU study, our members frequently fish in Patterson Lake, Forrest Lake and in the Clearwater River system. The Clearwater River system is an extremely important waterway to BNDN that our members have traveled since time immemorial. The fact that Patterson Lake will be permanently impaired is a serious impact on our	

e-Doc 6939666

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	CNSC Response
			members who may never be able to trust the water quality and fish health in Patterson Lake for many generations into the future (long after NexGen has left our Territory). The fact that our members will need to rely on fish and water testing and analyses in perpetuity to have confidence (from a western science perspective) that we can consume fish from Patterson Lake is a significant adverse impact to our Treaty and Aboriginal rights. In the EIS, the Proponent has provided very vague and general measures to monitor these serious permanent impacts to Patterson Lake and the downstream environment which are wholly inadequate to address the magnitude of impact on BNDN. If the Crown intends to approve of the project as described, the Crown and NexGen must avoid, mitigate and/or accommodate this impact to BNDN Treaty and Aboriginal rights. a) BNDN requests that NexGen undertake an assessment of alternatives to address the long-term loading of cobalt and copper into Patterson Lake from the Project. This assessment must be done collaboratively with BNDN, or preferably led by BNDN with capacity support provided by NexGen. b) BNDN requests that NexGen and the Crown work with BNDN to develop a mitigation or accommodation measure that effectively addresses this impact to BNDN Aboriginal and Treaty rights. c) BNDN requests that NexGen commit to developing a trust fund with the purpose of covering the costs of ongoing monitoring of water and fish quality in Patterson Lake in perpetuity. d) BNDN requests that the Proponent obtain consent from BNDN for the surface water quality monitoring programs at the Project for all phases of the Project, including post closure. e) BNDN requests that the Crown require NexGen to obtain BNDN approval and written consent for the surface water and groundwater quality monitoring plans as a condition of approval for the Project.	
8.	BNDN (October 12, 2022)	TSD XVII: Waste Rock and Underground	In the Waste Rock subsection of EIS Section 5.3.3.5 (Geochemical Conditions), the Proponent notes that mine waste rock that will be stored on the surface of the mine site will have both non-acid generating (NAG) and	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	CNSC Response
		Wall Rock Source Term Predictions Figures 3-1 and 3-2	potentially acid generating (PAG) rock. The Proponent has provided limited information on the expected relative proportions of NAG to PAG, the magnitude of acid generation potential from the PAG rock and the buffering capacity of the NAG rock. Figures 3-1 and 3-2 of TSD XVII display analytical results of the acid generation potential of waste rock from the underground tailings management facility (UGTMF) and mine workings. Both Figure 3-1 and 3-2 indicate that that a relatively high proportion of mine workings and UGTMF samples analyzed are PAG rock, a significant proportion of which has a very low neutralization potential ratio indicating a very high potential for acid generation. While very limited baseline information is provided in the EIS and in the supporting documents, Table 3-3 of TSD XVII shows that approximately 40% of waste rock expected to be permanently stored on surface is expected to be PAG. This is quite a high proportion and indicates a very significant risk of acid generation from the waste rock, especially considering that the NAG waste rock generally has low buffering capacity to neutralize acid rock drainage from the PAG waste rock. Considering the obvious potential for acid generation from the limited information provided by NexGen upon which their assumptions and interpretations are based, BNDN is very concerned that NexGen is significantly underestimating the risk of acid rock drainage from the waste rock. BNDN notes that the available information indicates that the waste rock at Rook 1 has a relatively high likelihood of generating acid rock drainage. It is not acceptable for BNDN to have to take NexGen's modelled interpretations of their data on faith. By constructing the Project, NexGen is permanently altering BNDN's Traditional Territory and is asking BNDN to assume the risks to our Treaty and Aboriginal rights associated with this permanent change. The generation of acid in the waste rock would dramatically increase the loading of metals to Patterson Lake and the Clearwater River system and would be a truly disastrous outcome. BNDN must have an exceptional level of confidence that the waste rock will not generate acid rock drainage in the short term or in the far future, and both the Proponent and the Crown must develop conditions and commitments during	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	CNSC Response
			the EA phase of the Project to give BNDN certainty that this outcome will be avoided. a) BNDN requests that NexGen make all of their baseline geochemical data publicly available to facilitate BNDN review. b) The Crown must not make a decision on the Project prior to a thorough and rigorous review and analysis of the geochemical baseline data and the modeling results developed from the geochemical baseline data c) Given the high and permanent risk to the environment, the Crown must work with BNDN to develop conditions of approval for the Project that give BNDN confidence that NexGen will be held to stringent environmental protection measures. This must at a minimum include a requirement for NexGen to obtain explicit consent from BNDN for their relevant management and monitoring plans. d) The Crown must work with BNDN to develop measures to mitigate and accommodate impacts to BNDN Treaty and Aboriginal rights from the permanent, irreversible risk that our Nation is assuming by the waste rock stockpile being built. e) NexGen must commit to developing and funding an independent third-party waste rock management review board (similar in format and conception to an independent tailings review board) for the life of mine. BNDN recommends that this independent third-party waste rock management review board be a Crown condition of approval for the Project.	
9.	BNDN (October 12, 2022)	EIS Section 10 Appendix 10A Table 6 (Summary Parameters for Sampled Lakes)	In EIS Section 10 Appendix 10A Table 6 (Summary Parameters for Sampled Lakes), NexGen reports the pH range of many of the lakes within the Project LSA and RSA, including Patterson Lake. While the lakes are generally circumneutral, NexGen has occasionally measured pH values as low as 5.8, including in Patterson Lake. These relatively low pH measurements are often gathered at the same sampling events where elevated metal concentrations (such as arsenic and nickel) have been observed. These occasional low pH	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	CNSC Response
			measurements and coincident elevated metals concentrations reflect the fact that Lakes in and around the Project area have a low buffering capacity against acid generation (Cathcart, Aherne, Jefferies, & Scott, December 2016). In fact, according to modelling by Cathcart et al (2016), the Project is within an area of Saskatchewan where lakes are particularly sensitive to acidity and Patterson Lake may already be above its critical load of acidity. The Cathcart study was written in the context of the potential for emissions from the oil sands operations in Alberta causing acidic deposition from sulphur dioxide deposition through rainfall and snowfall. Impacts of the estimated 116,000 kT annual sulphur dioxide emissions from the oil sands are expected to most acutely impact lakes within 100 km east and north of the oil sands operations. The Rook 1 Project is less than 110 km as the crow flies east-northeast of the Kearns oil sands operations. The ongoing emissions from the oil sands operations are likely already contributing acidity to the Rook 1 Project area. This, coupled with the very limited natural buffering capacity of Patterson Lake, must be considered cumulatively along with the potential contribution of acidity to Patterson Lake from the Rook 1 Project. NexGen and the Crown have not considered the potential cumulative impacts from sulphur dioxide emissions in the oil sands region on Patterson Lake and on the Rook 1 Project in general. Considering the proposed expansions to existing oil sands operations, it is conceivable that this further negatively impacts the already limited buffering capacity of the waste rock in the Rook 1 Project area and accelerates the onset of acid generation from the waste rock stockpiles. a) NexGen must include the impacts of sulphur dioxide emissions from the Alberta oil sands operations in their cumulative effects assessment for the project. b) NexGen must revise their waste rock seepage and overall water quality model to consider the potential contribution of acidity from rainfall and snowfall in the region. c) NexGen must undertake an assessment of the buffering capacity of lakes and rivers impacted by the Project. The study design must be	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	CNSC Response
			approved by BNDN and must be completed in collaboration with BNDN. d) Based on the findings of the assessment of buffering capacity in lakes and rivers impacted by the Project and the impacts of acidic precipitation, NexGen must revise their surface water assessments of impacts of the project. e) NexGen must develop mitigation and monitoring measures to prevent acidification of Patterson Lake, and the Crown must add a condition of approval to the project that includes protecting lakes impacted by the Project from acidification by the project	
10.	BNDN (October 12, 2022)	EIS TSD XVII Waste Rock and Underground Wall Rock Source Term Predictions Section 3.2.1 (Method Overview)	In the equilibration modelling subsection of EIS TSD XVII Waste Rock and Underground Wall Rock Source Term Predictions Section 3.2.1, NexGen reports that geochemical speciation and mass transfer was modelled using PHREEQC, and that water quality was equilibrated using the MinteqV4 thermodynamic database file (TDF). Lu et al (2022) reported that the TDF that is selected for equilibration modelling can have very significant effects on the outcomes of the model (Lu, Zhang, Apps, & Zhu, February 2022). While MinteqV4 is a frequently used TDF for modelling in the mining industry, the Proponent has provided no rationale for why this database was selected, and what results would be obtained by substituting different TDF files. While the selection of TDF is an important primary consideration of the water quality modeling, other assumptions in the equilibration modelling can also have a dramatic effect on the modelled outcomes, such as oxidation reduction potential (ORP) and pH. NexGen has interpreted their water quality model results with static pH and ORP values that they have somewhat arbitrarily selected and have not modeled their results in a way in which the pH and ORP evolve with the seepage chemistry over time. The Proponent also has provided limited information on the types of calculations that they utilized to calculate their modeled results. Highly differing outcomes can be reasonably expected depending on whether	

e-Doc 6939666

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	CNSC Response
			NexGen utilized an initial speciation calculation or one of the more complex batch-reaction calculations. Considering the limited buffering capacity available in the waste rock, opting for pH to remain fixed for the modelling is a questionable assumption that may have very serious implications in that they dramatically underestimate the potential for acid rock generation from the waste rock stockpiles. As previously mentioned, NexGen has not provided their baseline geochemical data upon which their modelling assumptions were based. BNDN is being asked to take many modeled assumptions for granted without any rationale to justify the assumptions. NexGen has also not provided any alternative reasonably conceivable modelled results based on different real-world assumptions (pH or ORP) or different modelling input variables (TDF or modelling calculations). It is entirely conceivable that NexGen is dramatically understating the potential for acid rock generation and metal leaching from the project, and thus understating the potential impacts from the Project in general. This has major implications for the potential impacts to BNDN Treaty and Aboriginal rights and interests which will already be adversely impacted within NexGen's assumptions. Acid rock drainage is widely understood to be self-perpetuating once initiated, and it is very difficult and costly to remediate. BNDN expects that both the Proponent and the Crown will take appropriate risk management and avoidance measures to prevent acid rock drainage. BNDN also expects that the CNSC will require the project closure bonding to include the costs associated with potential acid rock drainage and the consequent downstream consequences to the already very sensitive receiving environment. a) BNDN requests that NexGen provide a rationale for their chosen TDF and re-run their modelling results with at least 3 other TDFs. The Proponent must provide the modeled results from all 4 TDFs and provide a rationale for the TDF upon which their surface water quality impact assessment for the project is based upon.	

e-Doc 6939666

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	CNSC Response
			b) BNDN requests that NexGen clarify the types and sequences of calculations used in PHREEQC to simulate modeled outcomes c) BNDN requests that NexGen re-run their 4 TDF modelled results through at least 3 different types and sequences of calculations. NexGen must provide a rationale and assumptions within the selected sequences. Note that these assumptions must consider the possibilities discussed in previous comments that precipitation at the project site often has elevated acidity due to sulphur dioxide emissions from oil sands operations in Alberta. d) The Crown must require the closure bonding for the project to include the costs to remediate acid rock drainage from the project. BNDN must be collaboratively involved in determining the assumptions used to inform the closure bonding estimates	
11.	BNDN (October 12, 2022)	IS Section 5.4.3.3 (Underground Tailings Storage)	In Section 5.4.3.3 of the EIS (Underground Tailings Storage), NexGen describes the storage of tailings underground at the Rook 1 Project. While BNDN generally prefers this method of tailings disposal to the alternatives, there are some questions related to project sequencing and temporary tailings storage that raise the risks and potential environmental liabilities from the Project. Specifically, BNDN is unclear on the maximum volume of tailings that will be stored on surface on an interim basis at any given time, and how it will be stored. The sequencing of the project may have significant implications on the volume of tailings stored on surface at any given time, which may vary widely throughout the life of mine. BNDN requires a detailed understanding of how tailings will be managed on surface to minimize risk to the environment. BNDN also recognizes the possibility that the Project could temporarily cease operations throughout the life of mine, and that this could potentially leave some tailings materials on surface with inadequate storage capacity underground and no appropriate facility for storage on the surface. If project sequencing resulted in excess tailings on surface requiring disposal when the mine owner declares bankruptcy, it is possible that it could be prohibitively	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	CNSC Response
			expensive to dispose of tailings on site within the funds available in the closure bonding for the Project. a) The CNSC must require NexGen to provide sufficient closure bonding to properly dispose of tailings stored on surface with inadequate storage. The calculation must be based on the moment of the mine life when there is expected to be the most unfavourable ratio of tailings disposed of on the surface and storage capacity for tailings underground. b) BNDN requests that NexGen clarify the maximum volume of tailings that could be stored on surface on an interim basis, and how it will be handled and stored to ensure that it does not negatively impact the environment, including during a temporary shutdown of the mine	
12.	BNDN (October 12, 2022)	EIS Section 8.2.1	In Section 8.2.1 of the EIS (Incorporation of Indigenous and Local Knowledge - Hydrogeology) the Proponent discusses the importance of groundwater to Indigenous Nations and references the importance of groundwater to BNDN in particular. BNDN wishes to note that the Project will change groundwater quality and surface water quality permanently. While some of these changes may not be considered harmful from a western science perspective, the permanent changes to the environment (especially the water) affects our Nation's relationship to the land. Considering the significant permanent change to the earth where the mine workings will be and the consequent permanent changes to groundwater, our relationship with the land will forever be altered. BNDN wishes to remind NexGen and the Crown that our Aboriginal rights are defined by BNDN alone. These changes, regardless of the extent to which they are assessed in the EIS as adverse from an environmental perspective, will have adverse impacts on our rights and interests that must be accommodated by the Crown and avoided and mitigated by the Proponent to the maximum extent possible.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	CNSC Response
			a) BNDN requests that the Proponent provide a presentation to the community on how groundwater will change from baseline conditions from a western science perspective. At the meeting, the Proponent must work with the community to better understand BNDN's experience of the impacts of the Project on our Nation, especially as it pertains to groundwater and surface water. b) BNDN requests that the Crown work with BNDN to accommodate the impacts on our rights imposed by the permanent changes to surface water and groundwater induced by the mine.	
13.	BNDN (October 12, 2022)	TSD XIX Table 7 and TSD XVIII Appendix H Table 7	Table 7 of EIS TSD XIX (Treated Effluent Source Term Data of Rook 1) and Appendix H Table 7 of EIS TSD XVIII (preliminary Effluent Discharge Concentration Limits Calculation Results) shows NexGen's anticipated effluent quality to be discharged to Patterson Lake. While the numbers differ somewhat between the two tables, both tables show that NexGen expects the final effluent to exceed water quality objectives for a number of parameters and thus will require a mixing zone to achieve water quality objectives. BNDN notes that a number of metals expected to be elevated in the final effluent may be discharged at the threshold for acute toxicity, including uranium and zinc. Furthermore, many of the final effluent objectives that NexGen has proposed are lower than what has been found to be achievable and cost effective elsewhere in Canada. BNDN has a number of concerns with NexGen's proposed effluent treatment objectives, including: • *Acute toxicity of some elements presenting a risk to fish and aquatic life in the immediate presence of the effluent discharge point* • *The potentially synergistic effects between the numerous metals elevated in final effluent* • *The fact that the proposed effluent guidelines are not as stringent as found to be achievable elsewhere in Canada*	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	CNSC Response
			Given that BNDN members frequently harvest fish in Patterson Lake, the relatively relaxed standards and unnecessary risks created through the proposed effluent quality objectives is a serious impact to the exercise of our Treaty and Aboriginal rights. The proposed water quality objectives fall short of what is reasonably achievable and would constitute minimizing adverse impacts to BNDN Treaty and Aboriginal rights. To minimize risk to the receiving environment, BNDN would strongly prefer that all contaminants achieve water quality objectives at the point of discharge with no mixing zone required, especially for mercury, cadmium, cobalt, uranium selenium, copper and arsenic. Note that achieving water quality objectives at the point of discharge is much less stringent than achieving background conditions at the point of discharge, which would be BNDN's preference. a) BNDN requests that the Crown impose a condition of approval on the Project that NexGen must obtain explicit written consent from BNDN for the final permitted effluent quality objectives for the Project b) BNDN requests that the Proponent undertake a study of water quality objectives at other mining operations in Canada to assess what is both economically and technically achievable at this time c) BNDN requests that NexGen commit to revising their effluent quality objectives on a regular basis (for example every 5 years) to assess any improvements in water treatment technology that could improve effluent quality at the project. d) BNDN requests that effluent discharge permits issued for the Project by the Federal Government and Saskatchewan expire in 5 years to require NexGen to reassess their effluent quality objectives	
14.	BNDN (October 12, 2022)	EIS Figure 10.5-18 and 10.5-19	As BNDN has previously noted, NexGen expects water quality in Patterson Lake to be adversely impacted by the Project irreversibly and in perpetuity. While BNDN has raised a number of concerns in our review that indicate that many more elements are likely to be a concern and to a much greater extent than modeled by NexGen, NexGen has acknowledged that copper and cobalt	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on [Canadian Impact Assessment Registry reference: 80171])	CNSC Response
			will be elevated in Patterson Lake in perpetuity and likely will exceed CCME water quality objectives. BNDN notes that the Project will have adverse impacts to Patterson Lake and that the EIS is inadequate in addressing how water quality in Patterson Lake will be protected during the operations, closure and post closure phases of the mine. BNDN wishes to remind NexGen that our land users will be permanently impacted by this Project, long after NexGen has closed the mine and left our Territory. Our Nation needs confidence that both the Proponent and regulatory agencies will take the long-term impacts to Patterson Lake and the Clearwater Lake seriously by committing to stringent but appropriate avoidance, mitigation and accommodation measures to protect Patterson Lake, especially into the far future. a) BNDN requests that NexGen develop a trust fund that will fund the treatment of contaminated seepage from the project in perpetuity. b) BNDN requests that the Crown include a condition of approval for the Project that NexGen's will not be released from their license to operate the Project without explicit written consent from BNDN c) BNDN requests that NexGen, the Crown and BNDN work together to develop a condition of approval for the Project that will ensure that effluent and seepage from the Project will minimize long-term adverse effects to Patterson Lake from the Project.	
15.	BNDN (October 12, 2022)	EIS TSD XVIII Section 5.1.1	In Section 5.1.1 of EIS TSD XVII Application Case for Effects Assessment), NexGen has noted that they will withdraw 4,300,000 L/day from Patterson Lake on average during the operations phase of the mine. While NexGen does not anticipate that the water level in Patterson Lake will change significantly, any substantial project induced increases or decreases to water levels in Patterson Lake are likely to have significant impacts to aquatic life in the downstream environment and consequently to BNDN Aboriginal and Treaty rights, which must be avoided.	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	CNSC Response
			BNDN requests that the Crown include a condition of approval for the project that NexGen does not significantly change water levels in Patterson Lake or in the Clearwater River system. The Crown must develop the details of the condition in collaboration with BNDN.	
16.	Canadian Environmental Law Association (CELA) (October 12, 2022)		The 4-Step process identified by the CEA Agency for considering the alternative means for this project should be used in the EIS.	
17.	CELA (October 12, 2022)		The EA process for this Project should be paused until a more accurate cumulative effects assessment is conducted for the vegetation VC, following the revised baseline study within the vegetation RSA.	
18.	CELA (October 12, 2022)		The EIS document should be uploaded into multiple PDFs, broken down by section (in addition to uploading the EIS as one whole document).	
19.	CELA (October 12, 2022)		Upload a “Master Index” so that interested parties can have an overview of where certain topics are covered throughout the EIS.	
20.	CELA (October 12, 2022)		Upload a document that provides hyperlinks to the various Technical Study Documents referenced throughout the EIS. This simplifies the process of locating these documents in the EA registry for the Rook I Project.	
21.	CELA (October 12, 2022)		PDFs uploaded by the proponent should not be “locked,” prohibiting the copying and pasting of text.	
22.	CELA (October 12, 2022)		The CNSC must refrain from delaying the assessment of issues to the postregulatory phase; the fundamental scoping and planning processes must be carefully considered before making an EA decision on this project.	
23.	CELA (October 12, 2022)		The CNSC must carefully consider the critiques and recommendations within this submission to ensure the Draft EIS and its future iteration accurately reflect the necessary factors that must be assessed to protect the environment and human health from significant adverse environmental effects that may arise from the proposed Rook I Project.	
24.	SES (October 12, 2022)		SES recommends that NexGen be required to incorporate, into the cumulative effects component of the final EIS, the implications of its ongoing and planned additional efforts to expand and extend uranium exploitation activity beyond the Arrow Deposit.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	CNSC Response
25.	SES (October 12, 2022)		Which body of the federal government will be reviewing the cumulative GHG emission effects of historical, existing, and future projects?	
26.	SES (October 12, 2022)		How will that review be included the current EA process for the Rook 1 Project?	
27.	SES (October 12, 2022)		SES recommends that Canada now focus on achieving its 2030 GHG emission reduction target, recognising that new, more ambitious reductions will be required after that date.	
28.	Ya'thi Néné Lands and Resources (YNLR) (October 2022)	Section 1.2.3 Section 2.4	The Athabasca Denesųłiné have a well-established relationship with the CNSC. We have been developing a relationship with NexGen since 2019. Both should be aware of our Treaty and Traditional Territory	
29.	YNLR (October 2022)	Section 1.2.3	YNLR is a not-for-profit organization established by the Black Lake Denesųłiné First Nation, Fond du Lac Denesųłiné First Nation, and Hatchet Lake Denesųłiné First Nation (collectively known as Athabasca Denesųłiné) and the municipalities of Camsell Portage, Uranium City, Stony Rapids and Wollaston Lake. YNLR has the authority to represent the communities in this EIS regulatory process. The three First Nations are also members of the Prince Albert Grand Council. It is unknown what specific guidance was provided by provincial and federal regulatory agencies to NexGen with regards to identifying primary Indigenous Groups, but a comparison situation with the stated identification criteria clearly shows that we should be considered a primary Indigenous group. The key Athabasca Denesųłiné considerations should have been well known by both NexGen and CNSC given materials provided and discussions undertaken.	
30.	YNLR (October 2022)	Section 1.3.2	The Athabasca Denesųłiné remind all parties that the consideration of the impacts of the NexGen project on our rights and interests is incomplete.	
31.	YNLR (October 2022)	Section 2.5.2	Mistakenly, the Athabasca Denesųłiné were categorized as "other" Indigenous Group rather than a "primary" Indigenous Group due to the engagement process followed and 26 were thus relegated to an "inform" designation along the spectrum of engagement. Following the provision of detailed information in our 2020 report and in discussions with NexGen and the CNSC, it was expected that our participation would evolve to reflect our situation, rights, and interests and be moved into the primary Indigenous	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on [Canadian Impact Assessment Registry reference: 80171](#))	CNSC Response
			Group category and to move further along the spectrum of engagement. Unfortunately, any increased consultation and engagement efforts and consideration were limited.	
32.	YNLR (October 2022)	Section 2.6.1.2.2	We are pleased that there is some reference to the Athabasca Denesųłiné, but we believe the summary is incomplete. The 2020 Report - Provision of Athabasca Denesųłiné Traditional Knowledge, Land Use and Occupancy Information for the NexGen Rook 1 Project Environmental Assessment – provided an overview of Athabasca Denesųłiné (AD) culture, history, Treaties, way of life, and Nuhenéné (AD traditional territory).Further, it provided information on traditional (including contemporary) land use and knowledge, provided thematic maps of cultural and land use activities including big game harvesting, small game and fur bearers harvesting, fish and bird harvesting, overnight sites and travel routes, traditional plants, special areas, and Dene names. The report also identified primary concerns of the Athabasca Denesųłiné, and potential impacts related to the NexGen Rook 1 Project and industrial development in general that include: 1.wildlife harvest and habitat 2.water resources, 3.the continued ability to exercise Treaty and Aboriginal Rights and the protection of Athabasca Denesųłiné rights. Any reference to economic activities in the ADKLUO report was indirect, though important. To be clear, there was no reference to the wider Athabasca Basin. Further Athabasca Denesųłiné Treaty and Aboriginal Rights and their protection seemed to be excluded from the NexGen summary. These issues and concerns along with others were raised during meetings between AD and NexGen and/or the CNSC. Again, we note that more meetings and engagement mean more detail. While fewer meetings and engagement mean less detail. Clearly more engagement with primary Indigenous groups lead to a greater elaboration and understanding of their issues. Less engagement with the YNLR lead to less	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	CNSC Response
			elaboration and less understanding and appreciation of Athabasca Denesųłiné issues.	
33.	YNLR (October 2022)	Section 6	YNLR will be interested to see how indigenous knowledge is incorporated into this standard EA approach, together with how it is integrated with knowledge derived from more conventional scientific methods	
34.	YNLR (October 2022)	Section 6	Given the binary, and therefore somewhat subjective application of significance, YNLR wonders whether the precautionary principle was applied in this exercise? Furthermore, why only binary? Why not additional degrees of significance?	
35.	YNLR (October 2022)	Section 6	YNLR questions the statement that a single project seldom causes an environmentally significant effect on its own. Surely this is a scale dependent question, depending on the extent of the spatial and temporal boundaries selected?	
36.	YNLR (October 2022)	Section 18.4	The estimated annual payments by the mine to the Provincial and Federal Governments are $288.5M and $103.9M respectively. The economic output also noted that individual Benefit Agreements would include payments to Indigenous Groups although the terms of the agreements will be confidential. There is increased opportunity for the two levels of Government to increase community programs in the local area as part of receiving the increased income tax/royalty revenue.	
37.	Métis Nation – Saskatchewan (MN-S) (October 19, 2022)	10107, p.1-14	Disciplined Planning "Identification, presentation, and due consideration of local Indigenous Groups' input through early and ongoing engagement processes has validated, informed, and influenced aspects of Project design." This statement seems to be an accurate reflection of NexGen's approach, and potentially meets the standard of CEAA 2012. However, CEAA 2012 is 10 years out of date and well behind the national conversation on Indigenous rights, which has since expanded to include UNDRIP and the TRC Calls to Action, among other things. Terms such as "consideration of input" and "Indigenous Groups" (rather than "Indigenous Nations") does not align with an understanding of MN-S as a rights holder, nor with current good practice related to Projects that drives toward not just collaboration but consent	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	CNSC Response
38.	MN-S (October 19, 2022)	4.4.2, p. 4-10 Assessment Criteria	"The comparison between alternative options was presented in relative terms and is not intended as a definitive statement of Treaty or Aboriginal rights as they pertain to the proposed Project. Such an evaluation is the responsibility of the Crown in consultation with the potentially affected Indigenous Groups."	
39.	ACFN (October 28, 2022)	Section 3.2.1	ACFN is highly active in the project area and practices our treaty rights within the territory and will be affected by the proposed Project. Though the above-mentioned regulatory bodies (CNSC, Government of Saskatchewan) have not identified ACFN as a primary Indigenous group it still does not excuse the lack of adequate consultation. Please provide further references to the selection of priority Indigenous Groups	

Consolidated Comments from Indigenous Nations and Communities and the Public on the NexGen Rook 1 Project Draft EIS

For *NexGen Response

*Note: Text in Blue highlight will also be responded to by CNSC in the CNSC Response Table

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
1.	Clearwater River Dene Nation (CRDN) (November 11, 2022)	General	Being a subjective mix of both social and psychological factors, risk perception influences how harmful and chemical or exposure is perceived. Levels of stress and perception of stress affect health independently and are shown to increase the likelihood of worse health and mental health outcomes. Without clear federal or provincial guidelines on the acceptable level of risk during project development, it raises the question, what is an acceptable level of risk, or perception of risk, that is acceptable for the CRDN to tolerate for what seems an interminable future during the largest development-stage uranium project in Canada? NexGen should work with CRDN to develop it's own standards/thresholds in order to understand the risks they are bearing. How will this project support perceived risks amongst the community members in order to increase the trust of the community members and therefore increase the reliance of their traditional lands, including harvesting traditional foods?	
2.	CRDN (November 11, 2022)	Sections 5.2, 5.2.2, 5.2.3, 5.3.2, 5.3.3, 5.3.4, 5.4, 5.4.3	Under Environmental Assessment, section 5.2 Atmosphere key findings, use language "remain low", 5.2.2 Noise key findings, "low magnitude", 5.2.3 Climate Change key findings, "no meaningful affect", and "low GHG emissions", 5.3.2 Hydrology key findings, "changes would likely be undetectable", 5.3.3 Surface Water Quality and Sediment Quality key findings, "not result in any threshold exceedances", "result in minor", 5.3.4 Fish and Fish Habitat key findings, "unlikely to be measurable", "not significant", 5.4 Land-5.4.3 Wildlife and Wildlife Habitat key findings, "restored to the extent possible", and "not significant". The key findings for incremental lifetime cancer risk are "negligible to very low", and the incremental and cumulative effects on human health are predicted to be "not	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			significant" (pages 161-162). • What are the definitions of this language, more specifically, how exactly are the potential risks calculated? At what concentration levels? What are the measurements being used to indicate and determine the "remain low", "no meaningful affect", etc. conclusions?	
3.	CRDN (November 11, 2022)	Section 5.2, p. 155	On page 155, in Section 5.2 there is mention of disturbance from lights and noise due to construction and operation of the project but no mention and focus to light pollution, which can affect bird migration routes and other wildlife, including the quality of the night sky which affects navigation by wildlife and humans/people. • How will light pollution be measured over the duration of project and what is the design to "minimize sensory disturbances"? • How will the work and the buildings affect acoustical performance in the ecosystem? (i.e., mating calls, other communications - i.e., loons calling each other to prepare for migration, winds, and other ethological indicators)? More Information regarding sampling frequency to indicate the time of year all samples were collected for all studies. • No mention in this study of any specific lake stressors, such as cyanotoxins. Why no mention? • What types of predictive models were applied to all environmental studies that have been conducted to date, to determine their potential direct and indirect environmental human-social-economic impacts? What were these models based on?	
4.	CRDN (November 11, 2022)	Section 2.3.2 Project Components and Activities, Monitoring ponds	• What will be monitored here? • How is waste rock different from tailings? • If tailings are stored underground, what is waste rock and why is it stored at surface? • West bermed runoff collection area – where does runoff come from and what are the potential hazards of this runoff? How are these hazards assessed?	
5.	CRDN (November 11, 2022)	Section 1.2.6 General Schematic	• Are COPCs in groundwater and interstitial air tracked? Is this in permafrost and has projected permafrost thaw been accounted for? This was an issue at Giant Mine – they stored arsenic trioxide dust in underground stopes and now the permafrost is thawing, resulting in increased hydraulic conductivity in the ground, increased mobility of groundwaters, etc.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
6.	CRDN (November 11, 2022)	Section 1.2.7 Decommissioning and Reclamation	• Are there financial guarantees or reclamation bonds being required to ensure NexGen is responsible for all costs to restore the site to its original state? • Please share the invasive species management plan. • Will the future of buildings and landscapes be co-designed with the aesthetics of the community and landscape in mind? Recommend hiring community members as Indigenous architects, engineers, and community members to co-design plans. • Draft and share a socioeconomic report and socioeconomic management plan. • How will the site contribute to neighbourhood quality improvement? Will the land owned, managed, and stewarded by CRDN maintain or increase in value? • Is there consideration of thermal comfort? How much heat will be released over time? • What current studies show the effects of increased heat on local biomes and human settlements?	
7.	CRDN (November 11, 2022)	Section 5 Infrastructure and Design	• Are infrastructure and material conservation in place? • Will the camp, maintenance shop, warehouse building, airstrip and associated facilities, power supply and distribution facilities, fuel storage facilities, information technology and communications facilities, site roads and access facilities, etc. going to be recyclable and reclaimable or will those supporting infrastructures end up in the dump or buried somewhere? If so, are the locations to recycle, reclaim, dump, or bury determined?	
8.	CRDN (November 11, 2022)	Section 19 Community well-being	• What community protections for the site and for the local communities be put in place? What trauma-informed and restorative justice-based policing or protective services will be implemented? • Need clear guidelines on what services are provided • Recommend community members being hired for these positions for emotional support? • What are the timelines for “periodic” surveys and criteria for determining an increased need for support. The 'indicators' used for social and cultural impacts and wellbeing are limited. • The Canadian Index of Wellbeing covers 8 domains and at least half a dozen indicators for each (University of Waterloo). Some key missing indicators are	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			life expectancy, mental health, functional health, public health (i.e., workers bringing in viruses or transmissible diseases, especially worrisome in the case of women in the proximity of work camps and sexually transmitted diseases), income and wealth volatility and distribution, time use, social relationships, community safety, diversity of leadership, quality of community politics (democratic or familial/tribal governance mechanisms). • Recommend reviewing all indicators of the social-cultural impacts and wellbeing to be included and analyzed	
9.	CRDN (November 11, 2022)		When considering that mental health risks are 'new' to the assessment process during project development: • CRDN needs new and continued assessments completed to ensure thorough consideration of the mental well-being of their community members, especially regarding mental stress.	
10.	CRDN (November 11, 2022)		Actual or perceived contamination – discouraging traditional land use. Previous Uranium projects have resulted in increased negative opinions regarding the perceived risks to their traditional land, resulting in notable decreases in land-use amongst community members • How will this Project support perceived risks amongst the community members in order to increase the trust of the community members and therefore increase the reliance of their traditional lands, including harvesting traditional foods?	
11.	CRDN (November 11, 2022)	Section 5.5.3 Figure 5-6, Summary – page 166	Does not account for the impact of stress on the indigenous community Comment: • Perceived risks need to be accessed and the impacts of long-term stress on the mental and emotional well-being of the community members	
12.	CRDN (November 11, 2022)	Section 2.2.2, Summary Document p. 21 and p. 5-6	Draft a Site Employment Management Plan • Clear guidelines on how the site will be accessible for all workers. For which equity deserving group categories (for example: sex, age, ethnicity, disability, economic status, gender, gender expression, pregnancy status, family status, neurodiversity, caste, nationality, race, sexual orientation, religion, language group, and creed)? • Understanding the demographic of the CRDN and the commitment of the Project to hire community members– Recommend hosting Employment Workshops – hosting hiring fairs within the community makes employment opportunities accessible, achievable and supports trust the Project builds with	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			community members. Commit to more than only funding to support indigenous monitors throughout the project; historically the community has already voiced they want to encourage training opportuning for higher ranges of employment opportunities.	
13.	CRDN (November 11, 2022)		CRDN recommends that NexGen works with CRDN to develop community-specific monitoring program that involves: (i) design of monitoring and (ii) conduct of monitoring – with the goal to produce a long-term data set and track record of monitoring to restore community trust in area (or, to identify issues that are undermining community trust in terms of monitoring results).	
14.	CRDN (November 11, 2022)		CRDN requests that NexGen co- develop programs with CRDN to facilitate CRDN confidence in industry and land use safety.	
15.	CRDN (November 11, 2022)		CRDN requires all collected data from NexGen within a reasonable and mutually agreeable timeframe.	
16.	CRDN (November 11, 2022)		CRDN recommends that a Health Impact Assessment (HIA) be completed, that includes a perceived stress assessment and determine the level of acceptable stress the community can manage.	
17.	CRDN (November 11, 2022)		CRDN recommends that notification and communication protocols be developed between NexGen and CRDN so that CRDN to be notified and included in any investigations into causes of any discrepancy in environmental sampling.	
18.	CRDN (November 11, 2022)		CRDN recommends that NexGen engages with CRDN prior to any changes to sampling frequency during adaptive management.	
19.	CRDN (November 11, 2022)		CRDN recommends that CRDN community members to be present during each site visit.	
20.	CRDN (November 11, 2022)		CRDN requires funding support for environmental monitor training, survey and collection techniques, data management, etc. CRDN to develop and manage all aspects of training.	
21.	CRDN (November 11, 2022)		CRDN recommends that NexGen work with CRDN to expand monitoring program to align with all phases of the project: development, operations, and reclamation. CRDN will monitor environmental, geotechnical, perception of risk, land use, etc.	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
22.	CRDN (November 11, 2022)		CRDN recommends that NexGen develop broader regional Land Use Plan to manage new phase of uranium development and ensure CRDN lands remain healthy and viable for generations to come.	
23.	Birch Narrows Dene Nation (BNDN) (October 12, 2022)		The Project will cause permanent irreparable loss of access and use of the land for BNDN. This includes impacts to cultural identity and Aboriginal and Treaty rights-protected activities and sites. NexGen must negotiate mitigation and accommodation measures with BNDN that are commensurate with the impacts to land use and cultural sites.	
24.	BNDN (October 12, 2022)		BNDN members utilize the Study Area for traditional land use activities. BNDN members mapped and described using the local study area for hunting and trapping, fishing, cultural continuity purposes, access trails, ceremonial/cultural/spiritual activities, gathering, water usage, and other activities. Participants also described concerns related to impacts to hunting and trapping, fishing, and cultural continuity. Once the Project commences this area will no longer be accessible to members who rely on this area for harvesting wild foods, proper nutrition and food cost savings. Members will be forced to travel further to carry out the same activities, spend more on food and lose the nutrition provided by wild foods. NexGen must provide details on how local harvesters who rely on the Project Study Area for traditional land and resource use, food cost savings and nutrition will be compensated. Programs to offset this loss must be developed so that BNDN members can continue to exercise the rights and have access to wild foods.	
25.	BNDN (October 12, 2022)		BNDN members described how the Project will disrupt a sense of cultural continuity, including loss of access to cabins/campsites/travel routes, disruption of a sense of place, disruption to BNDN beliefs and disruption to the transmission of culture to future generations. a) NexGen must develop specific accommodation measures to compensate BNDN for the loss of cultural continuity. b) NexGen must consider providing funding to support traditional educational activities for youth.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
26.	BNDN (October 12, 2022)	EIS Master Executive Summary, section 5.5	It is unclear whether the study areas communities used for the IKTLU Studies matched that of NexGen's LSA and RSA, or whether NexGen imposed its study area on the results of the IKTLU Studies. Defining a study area is at times political; it is important that the potentially unique study areas defined by Indigenous communities in their respective IKTLU Studies be considered in the Project's assessment. BNDN requests that NexGen clarify how they considered the study areas defined by the communities in their IKTLU studies, if they differed from those proposed by NexGen.	
27.	BNDN (October 12, 2022)		It is unclear whether Indigenous communities were given the opportunity to participate in the incorporation of IKTLU results into the EA, including in the development of management and mitigation measures for potentially impacted sites identified in the IKTLU Studies. The co-development of mitigation and management measures was a direct request from BNDN's IKTLU study. a) BNDN requests that NexGen specify the process used to incorporate the IKTLU study results into the EA. b) BNDN requests that NexGen indicate the opportunities Indigenous communities were given to incorporate and review how IKTLU results informed the Project. c) BNDN requests that NexGen work with BNDN to incorporate BNDN IKTLU into the final EIS. This method to incorporate BNDN input is to be determined but could be in the form of a community meeting or workshop with BNDN members or a meeting with BNDN staff and must include a round of revisions by BNDN to the final EIS prior to submission to the CNSC. d) BNDN requests that NexGen describe the process used to determine appropriate management and mitigation measures for potentially impacted sites identified in the IKTLU Studies.	
28.	BNDN (October 12, 2022)		The chance find procedure for unanticipated heritage resources is not present or easily found in the material to review.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			a) BNDN requests that NexGen provide the chance find procedure for review. b) BNDN requests that the chance find procedure includes the required and timely notification of BNDN upon the discovery of any unanticipated heritage resources	
29.	BNDN (October 12, 2022)	Annex IX: Heritage Resources Impact Assessment and Cover Letter	It is unclear how Indigenous Knowledge was considered in the assessment of heritage resources. Indeed, the HRIA indicates that in addition to fieldwork undertaken for the study, only the HCB's archaeological site database and prior assessments were consulted as part of the background research for the assessment. BNDN requests that NexGen provide a description how Indigenous Knowledge informed the assessment of heritage resources, including: I. the location of areas assessed; II. whether members of the communities participated in fieldwork; and III. how community mapped values were considered. Should BNDN be aware of any additional heritage resources in the study area or locations that may contain them, these areas must be further assessed archaeologically.	
30.	BNDN (October 12, 2022)	Annex IX: Heritage Resources Impact Assessment and Cover Letter	Should any additional archaeological fieldwork be required for this Project, monitors from BNDN must be invited to participate. NexGen must commit to providing capacity funding to facilitate BNDN monitor participation.	
31.	BNDN (October 12, 2022)	EIS Master Executive Summary, section 5.5.2	There is no recommendation that a training course be required for workers to: a) Identify unanticipated heritage resources, including common artifacts, ecofacts and features of the region; and b) understand cultural sensitivity around such resources while	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			conducting work NexGen must implement a training course for workers regarding possible heritage resources in the area to be aware of. The training course must also contain a cultural sensitivity component. BNDN monitors must be invited to attend this course and capacity funding must be provided.	
32.	BNDN (October 12, 2022)	Annex IX: Heritage Resources Impact Assessment and Cover Letter: 1.1	Although presence of historic strandlines is an indicator for archaeological potential in northern Saskatchewan, it is unclear whether strandlines exist in the Project area and whether these were assessed effectively. NexGen must provide a description of the presence of strandlines in the Project area and a description of how they were assessed.	
33.	BNDN (October 12, 2022)	Annex IX: Heritage Resources Impact Assessment and Cover Letter: 4.1	As per the description of bias in archaeological investigation based on accessibility, were some areas in the Project area deemed to retain high potential not assessed because they were inaccessible? Please describe. Should BNDN regard these unassessed areas as retaining potential based off of knowledge of the area, these areas must be further assessed.	
34.	BNDN (October 12, 2022)	Annex IX: Heritage Resources Impact Assessment and Cover Letter: 3.2	In general, post-impact assessments are not considered an appropriate form of archaeological assessment by BNDN –archaeological assessments should always occur *prior* to any ground-disturbing activities. While it is understood that the requirement of archaeological assessments is relatively new within legislation, the post assessment of work completed at the Project area in the 2010s should have been assessed prior to being disturbed.	
35.	BNDN (October 12, 2022)	Section 18.3 Existing Conditions Section 18.4 Project Interactions, Mitigations and Benefit Enhancements	Despite acknowledging in Section 18.3.6 and in the Socio-Economic Baseline Report that income within the LSA and RSA come from both the wage or market economy and the traditional economy, and that the traditional economy forms an important part of the LSA and RSA economies that isn't captured in Statistics Canada labour force and income statistics, NexGen's pathways analysis and subsequent effects assessment in Section 18.4 does not include the impacts of the Project to BNDN's participation in the traditional economy as a primary or secondary pathway. What is lacking is an analysis and assessment of how impacts to income and participation in the traditional	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
		Socio-Economic Baseline Report	economy will be experienced by BNDN as a result of effects of the Project on BNDN's exercise of rights and pursuit of traditional land and resource use activities. This is significant issue to BNDN given estimates, cited in the Socio-Economic Baseline Report, that "80% or more of the people in the community participate in some form of traditional economic activity" (6.5.2.3). BNDN does not agree with NexGen's assessment in Table 18.4-1 that a general commitment to "support and promote Indigenous community participation and employment in the traditional economy" warrants only considering the beneficial impacts of the Project on BNDN's articipation and employment in the traditional economy. Further, while NexGen acknowledges that "participation in the traditional economy often occurs sequentially and simultaneously with activities related to Other Land and Resource Use (Section 17) and Cultural and Heritage Resources and Indigenous Land and Resource Use (Section 16)" and that the effects related to those components are addressed in those sections of the EIS (p. 18-85), it is BNDN's position that the implications of the impacts of the Project to those components must be assessed as they relate to income and BNDN's participation in the traditional economy in order for this section of the EIS to be considered complete. Section 18.4 and Section 19.4 must include an assessment of the impacts of the Project on BNDN's income as it relates to participation in the traditional economy as a primary pathway, resulting from the adverse impacts of the Project on BNDN's traditional land and resource use. This assessment must include consideration of the cumulative effects of industrial development on participation in the traditional economy.	
36.	BNDN (October 12, 2022)	Section 18.4 Project Interactions, Mitigations and Benefit Enhancements	In the EIS's characterization of the Project's interactions with Indigenous group's participation in the traditional economy, NexGen states that "while wage employment may reduce activity in the traditional economy for some participants, the effects of increased wage income on the ability to purchase equipment and supplies, combined with employment policies that facilitate participation in the traditional economy is expected to result in a positive	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			benefit to the ability to participate in the traditional economy" (p. 18-85). However, BNDN notes that while this considers those who may be employed by the mine and experience increased wage income, this does not account for impacts to participation in the traditional economy by those not employed by the mine whose experience of the impacts of the Project are not offset by an increase to wage income. In addition, as the "employment policies" cited by NexGen have not been developed or included in the EIS documentation, there is no way to verify that these policies will fulfill this stated purpose. Further, no contextualized evidence or verification of Indigenous groups in the LSA is provided to support that the 2005 study cited to support the sentiment that participation in a fly in/fly-out commuter rotation system would enhance the ability of Indigenous people in the LSA to spend more time on the land, or that this applies to all Indigenous groups in the LSA. a) Section 18.4 must consider the impacts of the Project to participation in the traditional economy by members of Indigenous groups not employed by the Project, in addition to those employed by the Project b) Further, to support the conclusions of Section 18.4 of the EIS that being employed by the Project will not adversely impact participation in the traditional economy: ● *Further commitments and clarity to the process for the development of employment policies and their contents must be included in the EIS* The Proponent must provide more contextualized research and/or the verification of Indigenous groups in the LSA must be provided to support NexGen's assessment of the negligible effects of participating in a fly-in/fly-out commuter system	
37.	BNDN (October 12, 2022)	Section 18.4 Project Interactions, Mitigations and	Throughout Section 18.4 and in Section 19.4, NexGen identifies that a key project characteristic that will contribute to potential effects on the economy includes an aspirational long-term target of 75% of the Project's workforce being composed of LSA residents. However, as the section goes on, the EIS makes the following statements that call into question if this "aspirational"	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
		Benefit Enhancements Section 19.4 Project Interactions and Mitigation	target is in fact realistic: • "NextGen would make best efforts to recruit LSA residents, however, due to the specialized nature of some of the construction work and the associated technical employment qualification requirements, *a substantial portion of the Construction workforce is anticipated to be sourced from outside the LSA*" (18-73) • "It is likely that the long-term target of 75% of the workforce being residents of the LSA *would not be achieved in the early stages of Project Operations*" (18-76) • "The opportunity to employ residents of the LSA on the Project *may be reduced in the event the Fission Patterson Lake South Property proceeded* due to competition for workers and the limited number of qualified personnel from which to draw on" (18-30) Additionally, NexGen concludes, based on Figure 18.4-3 which provides an illustration of the potential typical operations year labour requirements, that filling 75% of the illustrative leverage peak operating jobs in each education category "may require hiring 38% of the 2016 LSA population over the age of 15 with a high school, college, or university certificate who were unemployed or not in the labor force in 2016 and 45% of the LSA population over the age of 15 with an apprenticeship or trades certificate or diploma who were unemployed or not in the labor force in 2016" (18-76). However, BNDN notes that no research or engagement has been completed to date to verify if hiring this proportion of the population for jobs in the mining sector is possible or desirable to members of the LSA's workforce a) To justify these targets being cited in Section 18.4 and used to characterize the potential benefits of the Project in the EIS's analysis of the effects of the Project on the Economy in Section 18.8, much more substantiated evidence is required in the EIS to support the feasibility of these targets and much more specific commitments are required than the generalized measures currently set out on p. 18-81. b) It must also be a condition of the EIS's approval that the mutually agreed upon terms of an LSA workforce recruitment and retention	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			strategy are established prior to EA approval, and Indigenous groups in the LSA provide confirmation that appropriate features of Benefit Agreements have been established to meet these targets prior to final EA approval or the commencement of construction. c) If substantial evidence cannot be provided to meet this "aspirational" target, NexGen must also provide a more realistic and concrete target based on the evidence that is available so that the effects of the Project on the Economy and Community Well-Being can be accurately assessed and understood by regulators and Indigenous groups. Commitments must also be set out in the EIS for measures that will be taken if NexGen's targets for employment are not met.	
38.	BNDN (October 12, 2022)	Section 18.4 Project Interactions, Mitigations and Benefit Enhancements Section 19.4 Project Interactions and Mitigations	Throughout Section 18.4 and in Section 19.4, NexGen identifies that a key project characteristic that will contribute to potential effects on the economy and community well-being includes an aspirational long-term target of 30% of the Project's external spend being awarded to LSA and RSA businesses. However, given that "local study area residents have noted that there are a limited number of locally owned businesses" (p. 18-84) it is not clear that the measures NexGen proposes in this section of the EIS (e.g. maintaining a local business registry, providing advance notice of business opportunities, pre-qualifying Indigenous businesses, etc.) will be sufficient to meet this aspirational target. a) To justify these targets being cited in Section 18.4 and 19.4 and used to characterize the potential benefits of the Project in the EIS's analysis of the effects of the Project on the Economy and Community Well-Being, much more substantiated evidence is required to confirm how these aspirational targets will be met, including: • Commitments to funding and supporting the establishment of Indigenous businesses, Limited Partnerships and Development Corporations to facilitate access to procurement opportunities • Clear and specific commitments to criteria and processes for RFP tendering that will give preference to Indigenous businesses	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			• Offsetting benefits that will be provided if targets of 30% are not met b) It must be a condition of the EIS's approval that Indigenous groups in the LSA provide confirmation that commitments in the EIS and measures established in Benefit Agreements are appropriate to meet procurement targets cited in the EIS. Commitments must also be set out in the EIS for measures that will be taken if NexGen's targets for procurement are not met. c) If substantial evidence cannot be provided to meet this "aspirational" target, NexGen must also provide a more realistic and concrete target based on the evidence that is available so that the effects of the Project on the Economy and Community Well-Being can be accurately assessed and understood by regulators and Indigenous groups	
39.	BNDN (October 12, 2022)	Section 18.7 Monitoring, Follow-Up and Adaptive Management	BNDN notes that no specific management or monitoring plan has been included in the EIS documentation related to the verification of residual socio-economic impacts, both positive and negative, for the local economy. a) NexGen must develop a Socio-Economic Monitoring Plan for the life of the Project to verify the effects assessment included in the EIS and to be included in the Project's approach to adaptive management. This Plan would include an approach, co-developed with Indigenous groups in the LSA, to monitoring the realization of the benefits and impacts of the Project (e.g., employment and procurement targets, training and capacity building, community investments, etc.) as mitigation and enhancement measures are implemented. Monitoring and subsequent regular evaluation would allow for the real-time adjustment of targets and/or an approach to adjusting enhancement measures or identifying offsetting benefits where targets are not met. b) The Crown must include the development of a Socio-Economic Monitoring Plan as a condition of approval for the Project	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
40.	BNDN (October 12, 2022)	Section 19.2.2 Valued Components, Measurement Indicators, and Assessment Endpoints Socio-Economic Baseline Report	Section 19.2.2.2 sets out the measurement indicators used by NexGen in the assessment of effects on Community Well-Being, including: • Societal and Cultural Well Being • Economic Well-Being • Educational Well-Being • Neighborhood and Physical Environment Well-Being • Health Well-Being However, BNDN notes that these measurement indicators and the subsequent supporting indicators and factors considered set out in Table 19.2-1 do not adequately consider Indigenous indicators of well-being, such as spiritual well-being, connection to the land, intergenerational connectedness, well-being of future generations, etc. This is significant given that the Socio Economic Baseline Report acknowledges that "the RSA is predominantly Indigenous, with 87.4% identifying as such" and "within the LSA 95.2% are Indigenous" (Executive Summary, iii) NexGen must co-develop the measurement indicators and supporting indicators must be co-developed with Indigenous communities in the LSA including BNDN to include a greater focus on Indigenous indicators of well-being. BNDN expects that this will result in corresponding changes to Section 19.4 in the final EIS.	
41.	BNDN (October 12, 2022)	Section 19.4 Project Interactions and Mitigations	In Section 19.4.3, a secondary pathway considered by NexGen is how involvement in Project-related employment may reduce opportunities for resource harvesting. However, BNDN notes that the impacts of the Project on traditional land use and resource harvesting and subsequent effects on community well-being have not otherwise been considered as a primary pathway. Section 19.4 must include an assessment of the impacts of the Project on BNDN's community well-being as it relates to traditional land use and resource harvesting as a primary pathway, resulting from the adverse impacts of the Project on BNDN's traditional land and resource use. This assessment must include a consideration of the cumulative effects of industrial development.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
42.	BNDN (October 12, 2022)	Section 19.4 Project Interactions and Mitigations	While Section 19.4 of the EIS does consider the effects of increased income on existing community issues such as substance abuse, domestic violence, as a corresponding mitigation measure, NexGen has only committed to establishing on site health and wellness programming on site as a proposed mitigation measure which is not sufficient to address this potential impact and should not be considered sufficient to prevent residual impacts. Section 19.4 must also set out NexGen's commitments to support the establishment and improvement of social services and wellness programs located in, led and implemented by each of the Indigenous communities in the LSA through the provision of funding and other resources. NexGen must make formal commitments to supporting such investments for the benefit of the Project and the benefit of Indigenous communities in the LSA .	
43.	BNDN (October 12, 2022)	General Comment	General Comment. In our review of the surface water and groundwater components of the EIS we found many of the assumptions, interpretations and conclusions to be inadequate. Amongst other concerns, we found that: i. Waste rock permanently stored on surface is far more likely to be acid generating than NexGen previously indicated to BNDN ii. Patterson Lake itself has limited buffering capacity and is very sensitive to acid rock drainage from the project iii. Sulphur dioxide emissions from the Alberta oil sands will continue to cause acidic precipitation at the Rook 1 project site. This is a cumulative effect that has not been considered in the EIS iv. NexGen water quality modelling assumptions overlook a number of important considerations that result in an overly optimistic assessment of Project impacts to surface water quality Despite these inadequacies in the current assessment, NexGen still expects water quality to be permanently and irreversibly impaired in Patterson Lake. In light of these factors, we believe that NexGen has significantly understated the potential impacts of the Project on the environment and on BNDN Treaty and Aboriginal rights and interests. If the Crown intends to approve this	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			Project, the Crown must work with BNDN to ensure that the identified potential impacts are avoided, mitigated and/or accommodated. a) BNDN requests that CNSC and SOME establish regular meetings with our Nation to discuss these concerns and the findings of regulators and other Indigenous groups in detail. These meetings will be used to identify meaningful measures that the Crown can take to avoid, mitigate, accommodate or compensate for the significant adverse impacts to our constitutionally protected Treaty and Aboriginal rights and interests. b) BNDN requests that NexGen work collaboratively with our Nation to resolve the concerns raised prior to submission of the Final EIS.	
44.	BNDN (October 12, 2022)	EIS Table 10.5-8 and EIS Table 8.5-3	In Table 10.5-8 (Classification of Residual Effects on Surface Water Quality Indicators for the Application Case and Reasonably Foreseeable Development Case in the Far Future; p. 10-119), NexGen provides their assessment that water quality in Patterson Lake will be negatively impacted by the project for hundreds of years from waste rock seepage and for thousands of years from groundwater (effectively permanently) through the continued loading of elevated concentrations of copper and cobalt to Patterson Lake. BNDN is very concerned with this impact of the Project, which will result in permanent, continuous adverse impacts to our ability to exercise our Treaty and Aboriginal rights. As documented in our IKTLU study, our members frequently fish in Patterson Lake, Forrest Lake and in the Clearwater River system. The Clearwater River system is an extremely important waterway to BNDN that our members have traveled since time immemorial. The fact that Patterson Lake will be permanently impaired is a serious impact on our members who may never be able to trust the water quality and fish health in Patterson Lake for many generations into the future (long after NexGen has left our Territory). The fact that our members will need to rely on fish and water testing and analyses in perpetuity to have confidence (from a western science perspective) that we can consume fish from Patterson Lake is a	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			significant adverse impact to our Treaty and Aboriginal rights. In the EIS, the Proponent has provided very vague and general measures to monitor these serious permanent impacts to Patterson Lake and the downstream environment which are wholly inadequate to address the magnitude of impact on BNDN. If the Crown intends to approve of the project as described, the Crown and NexGen must avoid, mitigate and/or accommodate this impact to BNDN Treaty and Aboriginal rights. a) BNDN requests that NexGen undertake an assessment of alternatives to address the long-term loading of cobalt and copper into Patterson Lake from the Project. This assessment must be done collaboratively with BNDN, or preferably led by BNDN with capacity support provided by NexGen. b) BNDN requests that NexGen and the Crown work with BNDN to develop a mitigation or accommodation measure that effectively addresses this impact to BNDN Aboriginal and Treaty rights. c) BNDN requests that NexGen commit to developing a trust fund with the purpose of covering the costs of ongoing monitoring of water and fish quality in Patterson Lake in perpetuity. d) BNDN requests that the Proponent obtain consent from BNDN for the surface water quality monitoring programs at the Project for all phases of the Project, including post closure. e) BNDN requests that the Crown require NexGen to obtain BNDN approval and written consent for the surface water and groundwater quality monitoring plans as a condition of approval for the Project.	
45.	BNDN (October 12, 2022)	TSD XVII: Waste Rock and Underground Wall Rock Source Term Predictions Figures 3-1 and 3-2	In the Waste Rock subsection of EIS Section 5.3.3.5 (Geochemical Conditions), the Proponent notes that mine waste rock that will be stored on the surface of the mine site will have both non-acid generating (NAG) and potentially acid generating (PAG) rock. The Proponent has provided limited information on the expected relative proportions of NAG to PAG, the magnitude of acid generation potential from the PAG rock and the buffering capacity of the NAG rock. Figures 3-1 and 3-2 of TSD XVII display analytical results of the acid generation potential of waste rock from the underground tailings management facility (UGTMF) and mine workings.	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on [Canadian Impact Assessment Registry reference: 80171](#))	NexGen Response
			Both Figure 3-1 and 3-2 indicate that that a relatively high proportion of mine workings and UGTMF samples analyzed are PAG rock, a significant proportion of which has a very low neutralization potential ratio indicating a very high potential for acid generation. While very limited baseline information is provided in the EIS and in the supporting documents, Table 3-3 of TSD XVII shows that approximately 40% of waste rock expected to be permanently stored on surface is expected to be PAG. This is quite a high proportion and indicates a very significant risk of acid generation from the waste rock, especially considering that the NAG waste rock generally has low buffering capacity to neutralize acid rock drainage from the PAG waste rock. Considering the obvious potential for acid generation from the limited information provided by NexGen upon which their assumptions and interpretations are based, BNDN is very concerned that NexGen is significantly underestimating the risk of acid rock drainage from the waste rock. BNDN notes that the available information indicates that the waste rock at Rook 1 has a relatively high likelihood of generating acid rock drainage. It is not acceptable for BNDN to have to take NexGen's modelled interpretations of their data on faith. By constructing the Project, NexGen is permanently altering BNDN's Traditional Territory and is asking BNDN to assume the risks to our Treaty and Aboriginal rights associated with this permanent change. The generation of acid in the waste rock would dramatically increase the loading of metals to Patterson Lake and the Clearwater River system and would be a truly disastrous outcome. BNDN must have an exceptional level of confidence that the waste rock will not generate acid rock drainage in the short term or in the far future, and both the Proponent and the Crown must develop conditions and commitments during the EA phase of the Project to give BNDN certainty that this outcome will be avoided. a) BNDN requests that NexGen make all of their baseline geochemical data publicly available to facilitate BNDN review. b) The Crown must not make a decision on the Project prior to a thorough and rigorous review and analysis of the geochemical	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			baseline data and the modeling results developed from the geochemical baseline data c) Given the high and permanent risk to the environment, the Crown must work with BNDN to develop conditions of approval for the Project that give BNDN confidence that NexGen will be held to stringent environmental protection measures. This must at a minimum include a requirement for NexGen to obtain explicit consent from BNDN for their relevant management and monitoring plans. d) The Crown must work with BNDN to develop measures to mitigate and accommodate impacts to BNDN Treaty and Aboriginal rights from the permanent, irreversible risk that our Nation is assuming by the waste rock stockpile being built. e) NexGen must commit to developing and funding an independent third-party waste rock management review board (similar in format and conception to an independent tailings review board) for the life of mine. BNDN recommends that this independent third-party waste rock management review board be a Crown condition of approval for the Project.	
46.	BNDN (October 12, 2022)	EIS Section 10 Appendix 10A Table 6 (Summary Parameters for Sampled Lakes)	In EIS Section 10 Appendix 10A Table 6 (Summary Parameters for Sampled Lakes), NexGen reports the pH range of many of the lakes within the Project LSA and RSA, including Patterson Lake. While the lakes are generally circumneutral, NexGen has occasionally measured pH values as low as 5.8, including in Patterson Lake. These relatively low pH measurements are often gathered at the same sampling events where elevated metal concentrations (such as arsenic and nickel) have been observed. These occasional low pH measurements and coincident elevated metals concentrations reflect the fact that Lakes in and around the Project area have a low buffering capacity against acid generation (Cathcart, Aherne, Jefferies, & Scott, December 2016). In fact, according to modelling by Cathcart et al (2016), the Project is within an area of Saskatchewan where lakes are particularly sensitive to acidity and Patterson Lake may already be above its critical load of acidity. The Cathcart study was written in the context of the potential for emissions from the oil sands operations in Alberta causing acidic deposition from	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			sulphur dioxide deposition through rainfall and snowfall. Impacts of the estimated 116,000 kT annual sulphur dioxide emissions from the oil sands are expected to most acutely impact lakes within 100 km east and north of the oil sands operations. The Rook 1 Project is less than 110 km as the crow flies east-northeast of the Kearns oil sands operations. The ongoing emissions from the oil sands operations are likely already contributing acidity to the Rook 1 Project area. This, coupled with the very limited natural buffering capacity of Patterson Lake, must be considered cumulatively along with the potential contribution of acidity to Patterson Lake from the Rook 1 Project. NexGen and the Crown have not considered the potential cumulative impacts from sulphur dioxide emissions in the oil sands region on Patterson Lake and on the Rook 1 Project in general. Considering the proposed expansions to existing oil sands operations, it is conceivable that this further negatively impacts the already limited buffering capacity of the waste rock in the Rook 1 Project area and accelerates the onset of acid generation from the waste rock stockpiles. a) NexGen must include the impacts of sulphur dioxide emissions from the Alberta oil sands operations in their cumulative effects assessment for the project. b) NexGen must revise their waste rock seepage and overall water quality model to consider the potential contribution of acidity from rainfall and snowfall in the region. c) NexGen must undertake an assessment of the buffering capacity of lakes and rivers impacted by the Project. The study design must be approved by BNDN and must be completed in collaboration with BNDN. d) Based on the findings of the assessment of buffering capacity in lakes and rivers impacted by the Project and the impacts of acidic precipitation, NexGen must revise their surface water assessments of impacts of the project. e) NexGen must develop mitigation and monitoring measures to prevent acidification of Patterson Lake, and the Crown must add a condition of approval to the project that includes protecting lakes	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			impacted by the Project from acidification by the project	
47.	BNDN (October 12, 2022)	EIS TSD XVII Waste Rock and Underground Wall Rock Source Term Predictions Section 3.2.1 (Method Overview)	In the equilibration modelling subsection of EIS TSD XVII Waste Rock and Underground Wall Rock Source Term Predictions Section 3.2.1, NexGen reports that geochemical speciation and mass transfer was modelled using PHREEQC, and that water quality was equilibrated using the MinteqV4 thermodynamic database file (TDF). Lu et al (2022) reported that the TDF that is selected for equilibration modelling can have very significant effects on the outcomes of the model (Lu, Zhang, Apps, & Zhu, February 2022). While MinteqV4 is a frequently used TDF for modelling in the mining industry, the Proponent has provided no rationale for why this database was selected, and what results would be obtained by substituting different TDF files. While the selection of TDF is an important primary consideration of the water quality modeling, other assumptions in the equilibration modelling can also have a dramatic effect on the modelled outcomes, such as oxidation reduction potential (ORP) and pH. NexGen has interpreted their water quality model results with static pH and ORP values that they have somewhat arbitrarily selected and have not modeled their results in a way in which the pH and ORP evolve with the seepage chemistry over time. The Proponent also has provided limited information on the types of calculations that they utilized to calculate their modeled results. Highly differing outcomes can be reasonably expected depending on whether NexGen utilized an initial speciation calculation or one of the more complex batch-reaction calculations. Considering the limited buffering capacity available in the waste rock, opting for pH to remain fixed for the modelling is a questionable assumption that may have very serious implications in that they dramatically underestimate the potential for acid rock generation from the waste rock stockpiles. As previously mentioned, NexGen has not provided their baseline geochemical data upon which their modelling assumptions were based. BNDN is being asked to take many modeled assumptions for granted without	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			any rationale to justify the assumptions. NexGen has also not provided any alternative reasonably conceivable modelled results based on different real-world assumptions (pH or ORP) or different modelling input variables (TDF or modelling calculations). It is entirely conceivable that NexGen is dramatically understating the potential for acid rock generation and metal leaching from the project, and thus understating the potential impacts from the Project in general. This has major implications for the potential impacts to BNDN Treaty and Aboriginal rights and interests which will already be adversely impacted within NexGen's assumptions. Acid rock drainage is widely understood to be self-perpetuating once initiated, and it is very difficult and costly to remediate. BNDN expects that both the Proponent and the Crown will take appropriate risk management and avoidance measures to prevent acid rock drainage. BNDN also expects that the CNSC will require the project closure bonding to include the costs associated with potential acid rock drainage and the consequent downstream consequences to the already very sensitive receiving environment. a) BNDN requests that NexGen provide a rationale for their chosen TDF and re-run their modelling results with at least 3 other TDFs. The Proponent must provide the modeled results from all 4 TDFs and provide a rationale for the TDF upon which their surface water quality impact assessment for the project is based upon. b) BNDN requests that NexGen clarify the types and sequences of calculations used in PHREEQC to simulate modeled outcomes c) BNDN requests that NexGen re-run their 4 TDF modelled results through at least 3 different types and sequences of calculations. NexGen must provide a rationale and assumptions within the selected sequences. Note that these assumptions must consider the possibilities discussed in previous comments that precipitation at the project site often has elevated acidity due to sulphur dioxide emissions from oil sands operations in Alberta. d) The Crown must require the closure bonding for the project to include the costs to remediate acid rock drainage from the project.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			BNDN must be collaboratively involved in determining the assumptions used to inform the closure bonding estimates	
48.	BNDN (October 12, 2022)	EIS Table 10.5-7	BNDN members have noted an increased frequency of algae blooms and diseased fish in lakes in BNDN Traditional Territory. At this time the reason for the increased frequency of algae blooms is poorly understood. Increased phosphorous and nutrient loading to Patterson Lake from Project effluent discharge has the potential to exacerbate the existing increased frequency of algae blooms in the region. NexGen has selected effluent discharge criteria for phosphorous and other nutrients that are in line with standards in other jurisdictions in Canada. In Table 10.5-7 NexGen has suggested that the discharge of effluent with elevated phosphorous to Patterson will result in no change to Patterson Lake. Given the fact that changes to lakes in the region have occurred with no anthropogenic inputs of nutrients and the lakes in the region are understood to already be sensitive ecological environments, the continual addition of nutrients over a number of decades may increase the likelihood of toxic algae blooms to a greater extent than assumed using National standards. The degree to which effluent discharge into Patterson Lake may increase that likelihood is not adequately assessed in the EIS and would benefit from meaningful incorporation of BNDN IKTLU to inform a more comprehensive assessment. a) BNDN requests that NexGen undertake a literature review on algae blooms, diseased fish and eutrophication in and around the Project area to inform their assessment of potential impacts on productivity status from the Project b) NexGen must work with BNDN to more fully understand the reasons for increased algae blooms in and around the Project area. This could be best discussed at the BNDN – NexGen environmental monitoring committee (EMC). BNDN requests that NexGen discuss providing capacity to BNDN for pursuing a study which is scoped at the EMC to better understand eutrophication in the region. c) BNDN requests that during future community consultation with BNDN, NexGen discusses algae blooms in the region with membership to better understand from BNDN members where they	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			are occurring, and to better inform NexGen's assessment of potential impacts in the final EIS. d) BNDN requests that NexGen commits to revising the assessment of potential impacts of the Project on productivity status in Patterson Lake depending on the findings from meetings with community members and any studies undertaken to understand algae blooms and eutrophication in the region.	
49.	BNDN (October 12, 2022)	IS Section 5.4.3.3 (Underground Tailings Storage)	In Section 5.4.3.3 of the EIS (Underground Tailings Storage), NexGen describes the storage of tailings underground at the Rook 1 Project. While BNDN generally prefers this method of tailings disposal to the alternatives, there are some questions related to project sequencing and temporary tailings storage that raise the risks and potential environmental liabilities from the Project. Specifically, BNDN is unclear on the maximum volume of tailings that will be stored on surface on an interim basis at any given time, and how it will be stored. The sequencing of the project may have significant implications on the volume of tailings stored on surface at any given time, which may vary widely throughout the life of mine. BNDN requires a detailed understanding of how tailings will be managed on surface to minimize risk to the environment. BNDN also recognizes the possibility that the Project could temporarily cease operations throughout the life of mine, and that this could potentially leave some tailings materials on surface with inadequate storage capacity underground and no appropriate facility for storage on the surface. If project sequencing resulted in excess tailings on surface requiring disposal when the mine owner declares bankruptcy, it is possible that it could be prohibitively expensive to dispose of tailings on site within the funds available in the closure bonding for the Project. a) The CNSC must require NexGen to provide sufficient closure bonding to properly dispose of tailings stored on surface with inadequate storage. The calculation must be based on the moment of the mine life when there is expected to be the most unfavourable ratio of tailings disposed of on the surface and storage capacity for tailings underground. b) BNDN requests that NexGen clarify the maximum volume of tailings that could be stored on surface on an interim basis, and how	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			it will be handled and stored to ensure that it does not negatively impact the environment, including during a temporary shutdown of the mine	
50.	BNDN (October 12, 2022)	EIS Section 5.4.3 (Tailings Management	BNDN members have expressed concern with the suitability of utilizing cemented paste backfill and cemented paste tailings in the underground operations. In particular, members have expressed concerns about the safety and structural stability of the backfill for miners working underground, and the potential long term implications for surface water and groundwater quality. BNDN expects that some of our members will be working underground at the mine. The safety of our members in the underground will be essential for our members maintaining support and positive engagement in the Project long-term. a) BNDN requests that NexGen provide further information on the structural stability of utilizing cemented paste backfill during operations, and the potential safety implications for our members working underground. While we request that NexGen provide a written response, this concern is best suited to be addressed at a future community meeting with our members. b) BNDN requests that NexGen provide a written and in person community presentation on the risks to groundwater and surface water quality from the proposed cemented paste backfill and cemented paste tailings. A presentation to BNDN members on recommendations a and b must include examples from other operations that have used the same mining and backfill methods. The examples from other projects must describe what has worked well about the proposed methods and any potential risks from NexGen's mining and backfill plans.	
51.	BNDN (October 12, 2022)	EIS Section 8.2.1	In Section 8.2.1 of the EIS (Incorporation of Indigenous and Local Knowledge - Hydrogeology) the Proponent discusses the importance of groundwater to Indigenous Nations and references the importance of groundwater to BNDN in particular. BNDN wishes to note that the Project will change groundwater quality and surface water quality permanently. While some of these changes may not be considered harmful from a western	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			science perspective, the permanent changes to the environment (especially the water) affects our Nation's relationship to the land. Considering the significant permanent change to the earth where the mine workings will be and the consequent permanent changes to groundwater, our relationship with the land will forever be altered. BNDN wishes to remind NexGen and the Crown that our Aboriginal rights are defined by BNDN alone. These changes, regardless of the extent to which they are assessed in the EIS as adverse from an environmental perspective, will have adverse impacts on our rights and interests that must be accommodated by the Crown and avoided and mitigated by the Proponent to the maximum extent possible. a) BNDN requests that the Proponent provide a presentation to the community on how groundwater will change from baseline conditions from a western science perspective. At the meeting, the Proponent must work with the community to better understand BNDN's experience of the impacts of the Project on our Nation, especially as it pertains to groundwater and surface water. b) BNDN requests that the Crown work with BNDN to accommodate the impacts on our rights imposed by the permanent changes to surface water and groundwater induced by the mine.	
52.	BNDN (October 12, 2022)	EIS Section 10.2.8.3.1	In Section 10.2.8.3.1 of the EIS (Water Quality Thresholds), NexGen discusses their Project-specific thresholds for contaminants of potential concern for water quality. In most cases, NexGen selected the most conservative available water quality guideline available with the exception of molybdenum. The Canadian Council for Ministers of the Environment (CCME) chronic guideline for molybdenum is 0.073 mg/L, but NexGen has opted to use the Saskatchewan Water Security Agency (WSA) guideline of 31 mg/L. BNDN notes that the WSA guideline is 424 times greater than the CCME guideline. The selection of a guideline that is so much less stringent concerns BNDN, given the very limited rationale for the determination that NexGen has provided. The selection of the less stringent requirement implies that NexGen assumes that they cannot achieve the more stringent guideline and thus are avoiding assessing the impacts of increased molybdenum	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			concentrations in Patterson Lake. Academic literature indicates that some animals are very sensitive to molybdenum toxicity, notably cattle and sheep (Novotny & Peterson, May 2018). While limited research has been conducted on caribou to assess their sensitivity to molybdenum toxicity, BNDN expects the Proponent to exercise reasonable caution to protect highly sensitive and culturally important species to BNDN. BNDN is very concerned with the fact that NexGen has opted for a more relaxed molybdenum water quality objective. BNDN notes that Table 8 in TSD XIX indicates that NexGen expects to achieve the CCME guideline within the regulated effluent mixing zone, so the reason for selecting the less stringent requirement is unclear. a) BNDN notes that our Nation strongly prefers that NexGen utilize the more stringent CCME guideline for all parameters, including molybdenum. b) BNDN requests that the Proponent provides a detailed rationale for their choice of the WSA guideline for molybdenum as opposed to the CCME guideline. c) BNDN requests that the Proponent revise their assessment of impacts based on the revised water quality objective for molybdenum to provide context to our Nation on the degree to which the selected guideline changes the assessment of impacts. d) BNDN requests that the reassessment of molybdenum loading to the environment from the Project considers the proposed revisions to water quality modelling from the Project proposed in comments above	
53.	BNDN (October 12, 2022)	TSD XIX Table 7 and TSD XVIII Appendix H Table 7	Table 7 of EIS TSD XIX (Treated Effluent Source Term Data of Rook 1) and Appendix H Table 7 of EIS TSD XVIII (preliminary Effluent Discharge Concentration Limits Calculation Results) shows NexGen's anticipated effluent quality to be discharged to Patterson Lake. While the numbers differ somewhat between the two tables, both tables show that NexGen expects the final effluent to exceed water quality objectives for a number of parameters and thus will require a mixing zone to achieve water quality objectives.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			BNDN notes that a number of metals expected to be elevated in the final effluent may be discharged at the threshold for acute toxicity, including uranium and zinc. Furthermore, many of the final effluent objectives that NexGen has proposed are lower than what has been found to be achievable and cost effective elsewhere in Canada. BNDN has a number of concerns with NexGen's proposed effluent treatment objectives, including: • Acute toxicity of some elements presenting a risk to fish and aquatic life in the immediate presence of the effluent discharge point • The potentially synergistic effects between the numerous metals elevated in final effluent • The fact that the proposed effluent guidelines are not as stringent as found to be achievable elsewhere in Canada Given that BNDN members frequently harvest fish in Patterson Lake, the relatively relaxed standards and unnecessary risks created through the proposed effluent quality objectives is a serious impact to the exercise of our Treaty and Aboriginal rights. The proposed water quality objectives fall short of what is reasonably achievable and would constitute minimizing adverse impacts to BNDN Treaty and Aboriginal rights. To minimize risk to the receiving environment, BNDN would strongly prefer that all contaminants achieve water quality objectives at the point of discharge with no mixing zone required, especially for mercury, cadmium, cobalt, uranium selenium, copper and arsenic. Note that achieving water quality objectives at the point of discharge is much less stringent than achieving background conditions at the point of discharge, which would be BNDN's preference. a) BNDN requests that the Crown impose a condition of approval on the Project that NexGen must obtain explicit written consent from BNDN for the final permitted effluent quality objectives for the Project	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			b) BNDN requests that the Proponent undertake a study of water quality objectives at other mining operations in Canada to assess what is both economically and technically achievable at this time c) BNDN requests that NexGen commit to revising their effluent quality objectives on a regular basis (for example every 5 years) to assess any improvements in water treatment technology that could improve effluent quality at the project. d) BNDN requests that effluent discharge permits issued for the Project by the Federal Government and Saskatchewan expire in 5 years to require NexGen to reassess their effluent quality objectives	
54.	BNDN (October 12, 2022)	EIS Figure 10.5-18 and 10.5-19	As BNDN has previously noted, NexGen expects water quality in Patterson Lake to be adversely impacted by the Project irreversibly and in perpetuity. While BNDN has raised a number of concerns in our review that indicate that many more elements are likely to be a concern and to a much greater extent than modeled by NexGen, NexGen has acknowledged that copper and cobalt will be elevated in Patterson Lake in perpetuity and likely will exceed CCME water quality objectives. BNDN notes that the Project will have adverse impacts to Patterson Lake and that the EIS is inadequate in addressing how water quality in Patterson Lake will be protected during the operations, closure and post closure phases of the mine. BNDN wishes to remind NexGen that our land users will be permanently impacted by this Project, long after NexGen has closed the mine and left our Territory. Our Nation needs confidence that both the Proponent and regulatory agencies will take the long-term impacts to Patterson Lake and the Clearwater Lake seriously by committing to stringent but appropriate avoidance, mitigation and accommodation measures to protect Patterson Lake, especially into the far future. a) BNDN requests that NexGen develop a trust fund that will fund the treatment of contaminated seepage from the project in perpetuity. b) BNDN requests that the Crown include a condition of approval for the Project that NexGen's will not be released from their license to operate the Project without explicit written consent from BNDN	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			c) BNDN requests that NexGen, the Crown and BNDN work together to develop a condition of approval for the Project that will ensure that effluent and seepage from the Project will minimize long-term adverse effects to Patterson Lake from the Project.	
55.	BNDN (October 12, 2022)	EIS TSD XVIII Section 5.1.1	In Section 5.1.1 of EIS TSD XVII Application Case for Effects Assessment), NexGen has noted that they will withdraw 4,300,000 L/day from Patterson Lake on average during the operations phase of the mine. While NexGen does not anticipate that the water level in Patterson Lake will change significantly, any substantial project induced increases or decreases to water levels in Patterson Lake are likely to have significant impacts to aquatic life in the downstream environment and consequently to BNDN Aboriginal and Treaty rights, which must be avoided. BNDN requests that the Crown include a condition of approval for the project that NexGen does not significantly change water levels in Patterson Lake or in the Clearwater River system. The Crown must develop the details of the condition in collaboration with BNDN.	
56.	BNDN (October 12, 2022)	EIS, Section 11.2.2.1 Valued Components	The use of the four fish species as VCs (walleye, pike, lake whitefish, and lake trout) was done because they are important culturally, they occur throughout the study area in relative abundance, and they represent different ecological roles for large bodied species. Unfortunately, limiting the assessment to large-bodied species may result in an oversight with regards to potential effects. Based on table 11.2-1 it appears that no small bodied fishes were even considered for selection as VCs. Small-bodied fish are often more susceptible to the effects of mining projects due to their feeding and movement behaviours. Because they inhabit smaller home ranges and often spend more time in association with the benthic environment, they are more likely to be negatively affected by discrete areas with elevated contamination (such as would occur in Patterson Lake North Arm – West Basin). To account for the different behaviours and exposures of small bodied fishes, the Proponent must include a small-bodied fish species as one of the VCs	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			assessed for Fish and Fish Habitat. Troutperch or spot tail shiner would both be good candidates for this assessment. BNDN recommends that the assessment of Fish and Fish Habitat be updated with an additional VC of a small-bodied fish to account for their unique ecological niche and role in supporting energy transfer through the ecosystem. Table 11.2-1 must also be updated with the inclusion of small-bodied fish species and the rational for their exclusion for use as VCs.	
57.	BNDN (October 12, 2022)	Fish and Fish Habitat: Figure 11.2-3	The section of Clearwater River between Broach Lake and Patterson Lake (including Jed Lake) was not sampled during baseline studies (Figure 11.2-3). This area is important as it provides a connection between Patterson Lake and upstream areas and is likely used for spawning runs for species including walleye and northern pike. Moreover, it is expected that this stretch of river may be quite productive, similar to the section of Clearwater River above Patterson Lake where the electrofishing CPUE of 22.11 fish/minute was recorded (Section 11.3.4.2). It is not clear why the Proponent chose not to include this area in baseline surveys. BNDN requests that baseline surveys be completed on the section of Clearwater River between Broach Lake and Forest Lake to evaluate • Benthic invertebrates • Sediment quality and characteristics • Water quality • Hydrological characteristics • Fish habitat • Fish community • River morphology • Barriers to fish passage	
58.	BNDN (October 12, 2022)	EIS, Section 11 Fish and Fish Habitat: Table 11.2-4	Water quality was not collected in Patterson Lake adjacent to Project or in Patterson Creek during baseline studies (Table 11.2-4). These are important areas that may be impacted by effluent discharge and must have adequate baseline information. It is BNDN's perspective that these locations are the	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			most important areas for this type of sampling because these are the areas where effluent discharge is proposed. BNDN requests that multi-season and multi year water quality sampling be conducted in Patterson Lake North Arm – West Basin, adjacent to the Project area so that baseline conditions can be better understood.	
59.	BNDN (October 12, 2022)	EIS, Section 11.4 Project Interactions and Mitigations	Patterson Lake North Arm – West Basin is the deepest part of the lake with high oxygen levels throughout the year. This represents important habitat, including a large volume of overwintering habitat, which is likely limiting for many species in the region. This is also the area where effluent discharge and wastewater discharge are planned. The nutrients from these discharges may contribute to algal growth and subsequent bacterial decay that may deplete oxygen and/or reduce the available overwintering habitat in this area. This is particularly concerning for lake trout which have a relatively narrow range of suitable thermal and oxygen conditions (Blanchfield et al., 2009; Guzzo and Blanchfield, 2017). The Proponent has not adequately described how effluent discharge of treated mine water from the ETP or treated sewage from the STP may alter or diminish the availability of well-oxygenated water in overwintering habitat (i.e., above 9.5 mg/L of DO) BNDN requests information on how the Proponent has assessed changes in dissolved oxygen may affect overwintering populations of fish. This must include quantitative information on the overall volume of overwintering habitat available in Patterson Lake North Arm – West Basin and an assessment of whether the proposed discharge may shrink this habitat, by reducing the area of water that is sufficiently oxygenated. Furthermore, BNDN requests information on whether/how changes of DO were modelled spatially and temporally in Patterson Lake North Arm – West Basin as a result of effluent discharge from the ETP and STP	
60.	BNDN (October 12, 2022)	EIS Section 11, F-08 Loss or alteration of fish habitat	The Proponent undertook water quality testing to assess the DO profiles of lakes within the study area. However, no attempt was undertaken to quantify the volume of overwintering habitat available and the potential change of overwintering habitat caused by the Project. Given the importance of	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			overwintering habitat as a limiting factor for species within this area, this is an important analysis that should be included in the assessment. BNDN requests that the Proponent make an analysis to quantify the volume of overwintering habitat available in Patterson Lake and assess the potential changes in total habitat caused by the Project throughout the life of the mine. This can be done for each of the fish species selected as VCs.	
61.	BNDN (October 12, 2022)	EIS Section 11.5.3.1 Summary of Predicted Changes to Surface Water Quality	Predictive modelling of water quality indicates that the Project is expected to result in elevated levels of copper and cobalt in the downstream environment. Copper is anticipated to exceed water quality thresholds (0.0020 mg/L) in the North Arm – West Basin of Patterson Lake, while cobalt is anticipated to exceed guidelines (hardness dependent but typical 0.0006) as far downstream as Beet Lake. In both cases, these exceedances are expected to persist long into the future, such that they are functionally permanent (Figure 11.5-4). These exceedances will be a result of runoff from WRSA and groundwater migration from the UGTMF during post-closure. NexGen has concluded that due to the low level of these concentrations and the local scale at which they occur, there will not be any significant effect on fish populations or biodiversity, and therefore no long-term mitigation or treatment is planned by NexGen. Water quality within Patterson Lake is a major concern of BNDN regarding the Project. It is BNDN's perspective that the Project should not result in any long-term impacts on the environment. Furthermore, as a food source for BNDN, it is imperative that concentrations of copper and cobalt in fish tissue be kept as low as possible. a) Given the timeframe during which the impacts of elevated concentrations of copper and cobalt are expected to occur, it is very difficult to ensure adequate planning, monitoring and mitigation occurs. However, the permanent increases in concentrations of these contaminants are unacceptable and treatment or other mitigation measures must occur. For this reason, BNDN requests that NexGen include funding for the permanent monitoring (i.e., into the far-future) of water quality within Patterson Lake. If at any point in the future, water quality exceedances of any kind occur, there must be	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			sufficient funding in place to allow collection and treatment of water or other alternative mitigation measures. b) Fish tissue monitoring as part of follow-up and compliance monitoring (e.g., MDMER Environmental Effects Monitoring) is expected to occur during operations of the Project but will not continue into closure, post-closure, or the far future. BNDN request information on how the Proponent plans to monitor and mitigate contamination of fish tissues in the far future.	
62.	BNDN (October 12, 2022)	EIS Section 11.5.2.2 Summary of Ecological Risk Assessment Results	Cobalt was not included in the Aquatic Health Assessment because the Ecological Risk Assessment showed the Project Hazard Quotient (HQ) was below the threshold of 1. This is despite the large geographic area over which the cobalt threshold exceedance occurs (from Patterson Lake, Forrest Lake, to Beet Lake). Cobalt is a known toxin that can negatively affect fish health at long levels and accumulate in fish tissues (Stubblefield et al., 2020). For this reason, it must be included as part of the Aquatic Health Assessment conducted for this Project. Due to the importance of fish as a food source for BNDN community members and the use of the lakes in this area for fishing, BNDN requests that the Aquatic Health Assessment include cobalt. This information must be included in an updated version of the EIS.	
63.	BNDN (October 12, 2022)	EIS, Table 10.2-5	NexGen has developed Project Specific Water Quality thresholds based on CCME, Saskatchewan provincial standards, and other publicly available guidelines (Table 10.2-5). However, there is no commitment to meet these standards as part of mitigation measures. Instead, the Proponent has indicated that they will develop a site-specific ETP to treat contaminants of concern to "*appropriate release limits in accordance with provincial standards and license/permit conditions*" (EIS, table 10.4-1). Given the importance of maintaining a healthy aquatic ecosystem and reducing contamination in effluent, it is necessary at this stage of planning for the Proponent to commit to meeting maximum concentrations of contaminants in effluent. BNDN requests that the Proponent commit to meeting the proposed water quality thresholds throughout all phases of the Project. Furthermore, BNDN	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			requests greater clarity around the expected concentrations of contaminants at the point of discharge for both the ETP and the STP (i.e., end-of-pipe).	
64.	BNDN (October 12, 2022)	EIS, Section 11.4.2 Secondary Pathways: F-14 Nutrient changes from Project activities	The Proponent expects an increase of approximately 0.005 mg/L of Total Phosphorous (TP) concentration in downstream water bodies due to discharge of nutrients from the STP and ETP. The peak concentrations in Patterson Lake North Arm – West Basin are predicted to be 0.009 mg/L. These calculations show that the trophic status of Patterson Lake will remain unchanged. However, this change in nutrients would be very near to the 0.01 mg/L TP threshold between oligotrophic and mesotrophic that is commonly applied under the Canadian Environmental Quality Guidelines (CCME, 2004). However, even though the official nutrient classification has not changed, it does not preclude any ecological changes occurring within the lake. Furthermore, should there be any errors in the calculation, unforeseen inputs of phosphorus, or other ecological/chemical processes that contribute to increased phosphorus, it is possible that a shift in the trophic structure of the lake may be observed. BNDN requests that nutrient monitoring and assessment of lake trophic status be included as part of the Environmental Monitoring Plan. BNDN requests that NexGen provide regular opportunities to review this plan and ensure adaptive management is in place, in the event that changes to nutrient status and/or trophic structure are observed in Patterson Lake.	
65.	BNDN (October 12, 2022)	EIS, Section 11.4	The Proponent plans to cross the Clearwater River using the existing bridge on the access road off Highway 955 (the Clearwater River bridge). This bridge is rated for “light duty” and will be sufficient for most currently planned activities. However, for some heavy equipment and large loads, it is anticipated that a crane will be required. At this time, information on the expected design specifications and operation schedule of the crane is not provided. The partial reliance of the Project on construction and operation of a crane for crossing the Clearwater River is of questionable merit. It adds a layer of complexity and risk to operations. This will require active coordination to	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			ensure that the crane is readily available for all large loads to prevent delays/disruptions. Furthermore, it may incentivize inappropriate use of the bridge by employees and contractors who are motivated to deliver large loads during periods when the crane is not available. There are many scenarios during which this may occur, such as if the crane is damaged, an operator is not available, or if weather conditions prevent its use (e.g., high winds). The end result is that the bridge may be compromised, potentially resulting in damage to the fish habitat, spills, or other problems. It is also possible that through the course of operations, the Proponent may change their plans or expand operations, such that a bridge becomes necessary. For these reasons, it seems that the most practical and protective course of action is to construct an adequately sized bridge during the construction phase of the Project. BNDN recommends that an upgraded clear span bridge be constructed to cross the Clearwater River. This would simplify the logistics of construction, operation, and closure. Furthermore, it would remove the risks associated with inappropriate crossings on the existing undersized bridge. Plans and mitigation measures for construction of the bridge must be shared with BNDN for review and comment.	
66.	BNDN (October 12, 2022)	EIS, Section 11.4.2, Figure 11.4-1	NexGen has indicated that installation of effluent discharge pipes from the STP and ETP will occur above ground which may result in minor and localized sediment release. To reduce the area of effect, it may be preferable to construct both pipelines so that they have an overlapping footprint onshore, at the lake edge, and in the nearshore, then diverging to their separate discharge locations. Secondly, there does not appear to be any discussion of how pipes will be protected from freezing and shifting ice (i.e., ice shove) which may cause damage or impairment to the operation of these pipelines a) BNDN suggests that the Proponent consider burying the pipelines prior to reaching the lake. The pipelines could emerge directly from the lake bottom below the maximum ice depth. This may result in increased impacts from sedimentation but would reduce the risk of pipeline damage and/or failure. To be clear, BNDN isn't advocating	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			that this approach is preferred but rather that it must be considered as an alternative. b) To minimize disturbed areas on-shore and within Patterson Lake, it is recommended that the pipelines for treated effluent and treated sewage be constructed along the same route for the sections on-shore, lake-edge, and near shore. The route could then diverge in the lake and the proposed in-lake discharge locations can be maintained.	
67.	BNDN (October 12, 2022)	EIS Section 14 Pg 14-53 to 55	The EIS uses a 500 m buffer around existing and proposed anthropogenic disturbances to define effective habitat loss from sensory disturbance. However, the EIS acknowledges that BNDN knowledge and scientific research expects up to 5 km (or greater) of caribou avoidance around mining projects, and that related semi-permeable barriers, such as roads, likely exacerbate this effective habitat loss. Furthermore, the EIS acknowledges uncertainty concerning local woodland caribou response to the proposed project. Without considering a larger avoidance buffer (as demonstrated in various research) around proposed anthropogenic disturbances, we believe that the EIS underestimates the potential extent of caribou habitat loss. BNDN requests that NexGen present the extent of caribou habitat loss from the proposed project (including effective and indirect) within a range of uncertainty using the BNDN knowledge and research presented in the EIS. Specifically, the percent loss of high, medium, and low suitability habitats, for the LSA, RSA and Caribou SA must be presented using a 500 m (low end) up to a 5,000 m (high end) buffer. We believe this analysis will provide a more accurate range of outcomes with respect to potential project impacts to caribou. This analysis must be considered in the context of each of the SK2 and SK1 ecozones, and in the context of the RFD case.	
68.	BNDN (October 12, 2022)	EIS Figure 14.2-4 Section 14.5	The Project EIS acknowledges that for SK2, Base Case conditions create disturbance levels that result in “not likely to be self-sustaining” woodland caribou populations. The EIS also states that a loss of “less than 1%” habitat within SK2 is expected for woodland caribou under the RFD case (i.e., when Fission	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			Uranium Corp's Patterson Lake project is considered). ~1% represents a significant loss of habitat (~1/35 of available disturbance within SK2). The positioning of these two projects, combined with extensive – and potentially overlapping, effective habitat loss (from sensory disturbances), may remove woodland caribou from the entire southern and western sections of Patterson Lake. BNDN requests that NexGen more clearly acknowledges the proposed project's specific percent of direct and effective caribou habitat removal within SK2 (i.e., clarifies the statement: "less than 1%"). One percent of SK2 constitutes a very significant loss of available habitat.	
69.	BNDN (October 12, 2022)	Wildlife Baseline 1 Section 13.3	We disagree with the Wildlife Baseline 1 statement (section 13.3) that the Boreal Plain (SK2) areas of the Caribou SA and RSA could be treated as Boreal Shield (SK1). These Study Areas overlap two distinct, albeit adjacent, Ecozones. All official description of these Ecozones (as well as all figures in the EIS) define the border between Plain and Shield to the east of the Project and Patterson Lake. BNDN requests that NexGen remove all descriptions and references to redesignation of Ecozones, or the lumping of associated policy requirements from all EIS, Baseline and all other reports.	
70.	BNDN (October 12, 2022)	EIS Section 14.5	The EIS states that there are currently relatively low densities of white-tailed deer, moose and wolves in the RSA and SK1 Ecozone. With the habitat losses and alterations expected from the proposed project, relative ungulate and predator densities may be affected (through alterations to vegetation communities, and increased access along improved linear corridors). These shifts in ungulate and predator densities may exacerbate disturbance mediated apparent competition, which is known to negatively impact caribou survival. We request that the EIS describes a commitment to monitoring ungulate and predator densities within the RSA generally, as well as associated mitigations and adaptive management responses as required to minimize impacts to caribou.	
71.	BNDN	EIS Table 14.4-1	Increased Predator Access: We agree with the mitigations proposed in response to the potential for increased predator access. In addition to those	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
	(October 12, 2022)		listed, we would like to see a commitment to long-term monitoring of predator movement along linear features in the vicinity of the proposed project. We request that monitoring of potential increased predator access due to site activities and linear feature enhancement. Furthermore, it is important that specific thresholds are defined, through consultation with BNDN during development of the caribou mitigation and offsetting plan.	
72.	BNDN (October 12, 2022)	EIS Table 14.4-1 & W-09	Increased Public Access: The EIS states that despite BNDN concerns, the Project "would not increase" public access, recreational access to non-Indigenous users or decrease opportunities for indigenous harvesters. We believe that this claim ("would not increase") is not sufficiently justified or explained in the text. We recognize the mitigations described in 14.4-1 but would also like to see follow-up monitoring of these access levels. We request a commitment to long-term monitoring of public access through the study area to ensure the scenarios of concern (described in section 14 W-09) are not occurring. This monitoring must be completed through ongoing consultation with BNDN and must be associated with management responses up to and including limiting certain types of road use.	
73.	BNDN (October 12, 2022)	EIS Table 14.4-1 W-03	We acknowledge the preliminary list of potential sensory disturbance and effective habitat loss mitigations escribed in section W-03. However, we believe that more robust mitigations are required to protect caribou from the extensive effective habitat loss that is expected. We request that the sensory disturbance mitigations include a commitment to modifying operations as required up to, and including, complete suspension of all construction, operations or decommissioning activities. A full work stoppage and site shutdown must be required in the event caribou proximity during specific, sensitive contexts (e.g. calving, post-calving). The details of this mitigation must be developed in consultation with BNDN.	
74.	BNDN (October 12, 2022)	EIS Table 14.4-1	Table 14.4-1 presents a wide array of general wildlife impact mitigations, which generally demonstrate thorough consideration for industry best-practices. All the proposed mitigations to wildlife impacts are only described at a very generalized and high level in the EIS. It is not possible to comment	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			about whether these proposed mitigations will meaningfully diminish impacts without BNDN's ongoing and direct involvement in the refinement of all mitigation planning. BNDN must be meaningfully involved in the development of mitigation and offsetting plans to ensure that proposed impacts are sufficiently reduced. BNDN must also be directly involved in carrying out the proposed project's wildlife monitoring and mitigations. Numerous specific mitigations may be required to achieve this, such as, but not limited to: i. work stoppages in specific contexts such as the proximity of caribou in calving, post-calving or other sensitive periods; ii. establishment of a standardized Breeding Bird Survey route along the site access road, which must be surveyed prior to, throughout and after all construction, operations and decommissioning; iii. wildlife crossings, culverts, and fencing to prevent road mortality of Canadian toad iv. wildlife mortality monitoring and deterrents on powerlines, windows, vehicles, buildings, etc.; v. installation of compensation habitat structures from tree removals, such as properly designed and installed bat maternity roost boxes; vi. annual waterfowl density monitoring; vii. SAR bird targeted annual monitoring	
75.	BNDN (October 12, 2022)	TSD, pg. iv.	It is stated that monitoring would be implemented to verify risk assessment model predictions and to update (and improve) model predictions when the Project begins. This would reduce uncertainty in risk assessment predictions and support an adaptive management framework. It is important to ensure that BNDN members are actively involved in the monitoring program, and should unacceptable risks be found to occur with updated environmental data and modelling, the Nation must be notified in a timely manner through the Joint Working Group, Indigenous Environmental Committee, Leadership and Indigenous Monitors.	
76.	BNDN (October 12, 2022)	TSD Section 4.2.1, page 4.3	Mine-affected groundwater is assumed to reach Patterson Lake North Arm – West Basin, from the upper horizon, in 1000 years. Groundwater originating beneath the waste rock area is predicted to reach Patterson Lake in 43 years	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			(north) and 77 years (south). Will groundwater monitoring be carried out to assess whether these timeframes are accurate? Should groundwater reach Patterson Lake earlier than expected, this must be accounted for in the exposure and risk calculations.	
77.	BNDN (October 12, 2022)	TSD Section 4.2.3.1, page 4.4	For molybdenum, concentrations were screened using the Saskatchewan Water Security Agency guideline of 31 mg/L rather than the CCME guideline of 0.073 mg/L. There is a significant difference between the two values (i.e., orders of magnitude), with the less conservative value used in the screening process. Additional discussion is warranted on the difference in scientific basis between both guideline values. Rationale for choosing a less conservative value is required. What impact, if any, is there on the risk assessment assumptions and conclusions?	
78.	BNDN (October 12, 2022)	TSD Section 4.2.3.1, page 4.4	Phosphorous was not considered a COPC in the risk assessment. The rationale provided for this in the report is that it is a nutrient rather than a toxicant. Given the use of surrounding waters by Indigenous community members, elevated phosphorous concentrations could impact nuisance algae growth and disturb the overall healthy functioning of the aquatic system. Further discussion of phosphorous impacts to the aquatic system is warranted.	
79.	BNDN (October 12, 2022)	TSD Section 4.2.3.1, page 4.5 and EIS Section 15.2.8.2, p. 15-30	In the selection of COPCs to further consider in the risk assessment, it is stated that if upper bound concentrations of COPCs in runoff exceeded guidelines but did not exceed in the treated effluent, they were not considered COPCs in the risk assessment. This was true for cadmium, iron and manganese. However, Section 15.4.3, page 15-48 states that runoff from the Project footprint may cause changes to surface water and sediment quality and adversely affect human health. Chemical concentrations exceeding guidelines in runoff alone must still be considered as COPCs in the risk assessment. The human health risk assessment process is designed to be conservative in nature and capture all potential risks to human health.	
80.	BNDN	TSD, Table 4.2	Arsenic was carried forward in the risk assessment as the concentration at the edge of the mixing zone was found to be only *marginally* below the guideline.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
	(October 12, 2022)		It is unclear why this same rationale was not used to carry forward mercury in the risk assessment. This is especially important given that sulphate was also carried forward for further assessment Mercury must be carried forward as a COPC in the risk assessment given it is only marginally below the screening value. Mercury concentrations, coupled with input of sulphate, could result in the production of methylmercury, which is of major concern to human health. Methylmercury can bioaccumulate in aquatic biota including fish and affect the health of those consuming impacted fish as part of their diet	
81.	BNDN (October 12, 2022)	TSD Figure 5-5 and Figure 15.2-5, p. 15-35	Dermal contact with surface water is missing from the Human Health Conceptual Model. In addition, groundwater should be added in given discharge to surface water and subsequent exposure to humans is a complete pathway. The CSM must be revised to include all applicable exposure pathways in the HHRA.	
82.	BNDN (October 12, 2022)	TSD, Section 5.2.3.1, p. 5.22	It is stated that the N288.1-20 Human Diet was selected over the Health Canada diet for humans, resulting in an assumed diet of 706 kg/yr versus 808 kg/yr. A rationale for using the less conservative value is required. How will this impact the conclusions of the HHRA?	
83.	BNDN (October 12, 2022)	TSD, Table 5-6	It is stated that Northern pike was used as a Representative Ecological Receptor for predator fish species. Please provide additional rationale for using Northern Pike over Walleye. Would this be considered more conservative given differences in their feeding behavior and activity patterns?	
84.	BNDN (October 12, 2022)	TSD Tables 5-7, 5-9 and 5-10	Dose calculations for sediment pathways do not appear to have been calculated. Incidental ingestion and dermal contact with sediment were identified as complete exposure pathways in the HHRA (i.e., Section 15.8.2.1 states that contact with sediment could occur). Sediment pathways are also listed in Table 15.2-5, p. 15-34.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			Exposures and associated health risks should be quantified for all complete human health exposure pathways, including sediment.	
85.	BNDN (October 12, 2022)	TSD – Section 5.4.1.1.1, page 5.81	The molybdenum hazard quotient (HQ) for the base case exceeded the hazard acceptability benchmark of 0.2 for terrestrial animal ingestion for the one-year-old subsistence harvester (Patterson Lake South Arm and Beet Lake Lloyd Lake) and one year old seasonal resident (Paterson Lake South Arm, Lloyd Lake). Although the Project is stated as not significantly changing the existing base case hazard estimate and therefore only contributing minimally to existing risk from consuming traditional foods impacted with molybdenum, further discussion around health hazards associated with molybdenum are warranted. In addition, further discussion is warranted around the uranium HQs calculated for this same receptor given concern expressed by Indigenous community members. The uranium HQ for terrestrial animal consumption was only marginally below the hazard acceptability benchmark (i.e., 0.17 vs. 0.2). The total uranium HQ for all pathways considered is 0.256, which is driven by two pathways, namely ingestion of terrestrial plants and animals. Calculated HQs for both molybdenum and uranium warrant further discussion in the HHRA. Even though the Project may not contribute significantly to the health hazards for these chemicals (over existing conditions), the health impacts for both chemicals must be fully discussed. Consumption of traditional foods is of importance to many community members.	
86.	BNDN (October 12, 2022)	EIS Section 5.4.1, Page 5.79	It is stated that, to be protective, a benchmark HQ of 0.2 per medium (e.g., water, soil, food and air) would be acceptable. It is unclear what the total HQ (sum of pathways) was compared to? Was the total HQ calculated also compared to a benchmark of 0.2? This requires further discussion in the risk assessment (especially for uranium).	
87.	BNDN (October 12, 2022)	TSD Table 5-18 and EIS Section 15.5.1.1	Table 15.5-1 indicates that molybdenum exposure for the one year-old subsistence harvester at the Patterson Lake South Arm and the one-year-old seasonal resident at Patterson Lake Southern Arm were above the hazard acceptability benchmark of 0.2 for the terrestrial animal exposure pathway (base case). However, Section 15.5.1.1 only discusses uranium HQs as being of concern. Both uranium and molybdenum HQs must be discussed.	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on [Canadian Impact Assessment Registry reference: 80171])	NexGen Response
88.	BNDN (October 12, 2022)	TSD – Section 5.4.1.1.2	The incremental lifetime cancer risk from arsenic exposure for the subsistence harvester at Patterson Lake South Arm was predicted to be 4/100,000 in both the Application Case and the reasonable upper bound sensitivity scenario. The risk acceptability benchmark is 1/100,000. The baseline cancer risk from arsenic for this same receptor was predicted to be 69/100,000. Although the additional risk associated with the Project might seem small in comparison to the baseline case, an increase of 4 per 100,000 is still 4 times the acceptability benchmark and warrants further consideration in the assessment. Discounting the Project-associated risk based on the current risk level is concerning for those who consume traditional foods in the area. Additionally, it is stated that the assumed ingestion rates of moose and moose organs were likely conservative and were based on the rates provided in the FNFNES study. Was the assumed ingestion rate discussed with members of the JWG to determine if that value is indeed conservative or is it actually representative of those community members who rely on moose as a food source in the area? Further details and context are required around the calculated risk associated with exposure to arsenic in the HHRA. More specifically, discussion around what the factor of four exceedance of the risk acceptability benchmark means for those consuming country foods is required. Additional rationale for why the assumed ingestion rate for moose and moose organs is considered conservative is also warranted. How was this determined?	
89.	BNDN (October 12, 2022)	EIS Section 15, Appendix A, Section 3.3, p. 316	It is stated that concentrations in sediment were modelled based on concentrations in water. No baseline sediment data was collected. It is unclear why sediment data were not collected as part of the baseline assessment given assumed discharge to the aquatic environment will occur as part of the Project. Not having sediment data adds a level of uncertainty to the risk assessment.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
90.	BNDN (October 12, 2022)	EIS Section 15.5.1.2, page 15-58	Information is provided on various risk acceptability benchmarks and what each is interpreted to mean (low risk, very low risk, range of medical procedures etc.). It is also important to note, here, that the risk acceptability level of 1 in 100,000 prescribed by Health Canada could be considered less conservative than those used in other jurisdictions (i.e., it is 1 in 1 million in Ontario). Therefore, exceeding the benchmark put forward by Health Canada (i.e., 4 per 100,000) does indicate that potentially unacceptable risks are predicted. This should not be dismissed in the risk assessment. Even though it is stated that risks from arsenic from the Project are small in comparison to the baseline risks, addition of arsenic to the system will increase risks to human health. The HHRA report must be updated to clearly state what an exceedance of the risk acceptability benchmark means for those exposed to arsenic.	
91.	BNDN (October 12, 2022)	EIS Section 15.8, page 15-76.	The proposed Country foods monitoring program could include a voluntary program whereby hunters submit samples of moose (including organs) to help verify model assumptions and predictions. This should be developed with communities, and the JWG, and implemented by Indigenous Environmental Committees and Indigenous Monitors (to be established). Fish sampling should include walleye to determine if Northern Pike is a representative surrogate species in the risk assessment calculations. The Indigenous-led Country Foods Monitoring Program must consider sample submission from hunters (moose and moose organs) and fishers (Northern pike and walleye).	
92.	BNDN (October 12, 2022)	EIS Section 7.0	Project-related particulate emissions for PM10 and TSP are predicted to exceed SAAQS and CAAQS during construction based on NexGen air dispersion modeling. Baseline data shows previously observed exceedances of PM2.5, PM10 and TSP during wildfire events. Particulate exceedances have negative impacts on human health (especially for elderly people or those with respiratory conditions) and increase particulate deposition on vegetation and waterbodies. The potential for significant exceedances exists if construction particulate emissions are combined with wildfire related particulates.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on [Canadian Impact Assessment Registry reference: 80171](https://iaac-aeic.gc.ca/050/evaluations/proj/80171))	NexGen Response
			Project construction or operations must be halted or modified during exceedance conditions for PM2.5, PM10, and TSP During wildfire events which cause particulate exceedances, NexGen must halt or modify construction/operations to reduce cumulative particulate emissions in the region.	
93.	BNDN (October 12, 2022)	EIS Section 7.0	Diesel power generators contribute to the majority of construction related air emissions including the majority of NO2, CO, PM 2.5 and GHGs. Diesel combustion has a significant contribution to the Project's overall carbon footprint and local air quality that could be easily avoided using better technology. NexGen must abandon plans to utilize diesel for power generation during construction. Diesel power generators are not considered Best Available Technology Economically Achievable (BATEA) for power generation. The GHG emissions and air pollutant emissions would be drastically decreased if alternative technology was implemented. The use of LNG or renewables during construction must be explored further and implemented into the final Project design.	
94.	BNDN (October 12, 2022)	EIS Section 7.0	Diesel emissions associated with mining equipment, pickup trucks and other equipment are a major source of Project-related NO2, CO, PM 2.5 and GHGs. Diesel combustion has a significant contribution to the Project's overall carbon footprint and local air quality that could be easily avoided using better technology. NexGen must look to decrease the Project's reliance on diesel fuel and utilize Best Available Technology Economically Achievable (BATEA) for mining equipment and other infrastructure. The GHG emissions and air pollutant emissions would be drastically decreased if alternative technology was implemented. The use of LNG or electric mining equipment must be further explored and implemented into the final Project design.	
95.	BNDN (October 12, 2022)	EIS Section 7.0	NexGen's residual effects assessment for air quality does not include Dioxins and Furans compound (D&F) emissions despite acknowledging waste incineration and other activities will produce D&F emissions. There is no commentary on the results of air dispersion modeling for D&F or the potential effects on air quality/human health.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			Dioxins and Furans compound (D&F) emissions must be included in the residual effects assessment for air quality. The results of air dispersion modeling for D&F emissions must be discussed in the EA and compared against relevant or equivalent regulatory standards. This will allow BNDN to better assess the fulsome Project-related air quality effects.	
96.	BNDN (October 12, 2022)	EIS Section 7.0	NexGen's residual effects assessment for air quality does not include radon or other radionuclides despite the air dispersion model confirming radionuclide emissions. There is no commentary on the results of air dispersion modeling for radon or other radionuclides or the potential effects on air quality/human health. Radon and other radionuclides must be included in the residual effects assessment for air quality. The results of air dispersion modeling for radon and radionuclides must be discussed in the EA and compared against relevant or equivalent regulatory standards. This will allow BNDN to better assess the fulsome Project-related air quality effects.	
97.	BNDN (October 12, 2022)	EIS Section 7.0	NexGen's residual effects assessment for air quality does not include metals, despite acknowledging that Project related dust will include metals. There is no commentary on the results of air dispersion modeling for metals or the potential effects on air quality. Metals contained in Project-related dust must be included in the residual effects assessment for air quality. The results of air dispersion modeling for metals were discussed in the EA and compared against relevant or equivalent regulatory standards. In this case, since the SAAQS do not include standards for metals, the Ontario Ambient Air Quality Criteria (AAQCs) must be used as a substitute for comparison and discussion purposes (similar to the use of the Alberta standard for sulphuric acid in the absence of a SAAQS in Section 7.1). The following metals must be included in the revised residual effects assessment. This will allow BNDN to better assess the fulsome Project-related air quality effects. o Uranium (U)	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			o Vanadium (V) o Zinc (Zn) o Cesium (Cs) o Bismuth (Bi) o Calcium (Ca) o Iron (Fe) o Magnesium (Mg) o Manganese (Mn) o Sodium (Na) o Silver (Ag) o Arsenic (As) o Barium (Ba) o Beryllium (Be) o Cadmium (Cd) o Cobalt (Co) o Chromium (Cr) o Copper (Cu) o Mercury (Hg) o Molybdenum (Mo) o Nickel (Ni) o Lead (Pb) o Antimony (Sb) o Selenium (Se) o Tin (Sn) o Thorium (Th)	
98.	BNDN (October 12, 2022)	EIS Section 7.0	NexGen acknowledges that Project related dust (PM10, PM2.5 and TSP) contains numerous trace metal compounds. However, NexGen does not specify how trace metals will be monitored during the Project. It is important for BNDN members to understand the composition of the Project-related dust they will be inhaling. Further, Project-related dust will also deposit on traditionally important vegetation communities and surface water resources. NexGen must monitor Project-related dust for trace metal concentrations to determine which trace metals are contained in Project related dust and at what	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			concentration. This will help BNDN members to understand potential risks with the inhalation or deposition of Project related dust.	
99.	BNDN (October 12, 2022)	EIS Section 7.0	NexGen acknowledges that Project related waste incineration will produce Dioxins and Furans (D&F) compounds emitted from a domestic waste incinerator and a low-level radioactive waste incinerator compounds. However, NexGen does not specify how D&F will be monitored during the Project. NexGen must monitor Project-related D&F to determine actual concentrations near the Project site. This will help BNDN members to understand potential risks with associated the D&F emissions from the Project.	
100.	BNDN (October 12, 2022)	EIS Section 7.0	NexGen acknowledges that the Project will release radionuclides including radon emissions. However, NexGen does not specify how radionuclides including radon will be monitored during the Project. NexGen must monitor Project-related radionuclides including radon to determine actual concentrations near the Project site and work exposure. This will help BNDN members to understand potential risks associated with the radionuclides and radon emissions from the Project.	
101.	BNDN (October 12, 2022)	EIS Section 7.0	NexGen does not specify how it will monitor air contaminant concentrations during all phases of the Project. Continuous on-site ambient air monitoring for all contaminants of concern (including particulates, metals, D&F and radon) is the only way to truly assess the Project's impact on air quality and compliance with government standards. Without proper on-site monitoring tracking Project-related air contaminant exceedances will be impossible NexGen must conduct continuous on-site monitoring for all contaminants of concern (including particulates, metals, D&F and radon) in order to assure regulatory compliance and verify the accuracy of air dispersion models and EA predictions.	
102.	BNDN (October 12, 2022)	EIS Section 7.0	It is unclear what type of waste will be incinerated in the Low-level radioactive waste incinerator Please specify the type of waste, approximate volumes and radiation levels of the waste that will be incinerated in the Low-level radioactive waste incinerator.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
103.	BNDN (October 12, 2022)	EIS Section 7.0	NexGen acknowledges the Project's contribution to climate change through GHG emissions but does not outline any plan to offset GHG emissions. Another major mine in Canada, the Canadian Malartic Mine in Quebec (joint venture between Yamana Gold Inc. and Agnico Eagle Mines Limited) has a climate change offset plan in which carbon emissions are tracked and offsetting plans are developed (Canadian Malartic, 2014). NexGen must develop a GHG/Carbon offsetting plan in order to mitigate some of the potential impacts of the Project to climate change. NexGen could work with BNDN on initiatives that help to offset the Project's GHG emissions (e.g., tree planting, wetland restoration, carbon offsets). This would demonstrate corporate social responsibility and climate stewardship on NexGen's behalf.	
104.	BNDN (October 12, 2022)	EIS Section 7.0	The GHG emissions model does not include emissions related to fuel hauling or other freight for the Project. NexGen must include the GHG emissions related to fuel hauling and freight in their GHG emissions model.	
105.	BNDN (October 12, 2022)	EIS Section 7.0	The Project is reliant on burning fossil fuels for power generation, mine processing activities and equipment. The GHG intensive nature of the Project's construction and operation phases are a concern for BNDN and not in line with federal or provincial directives to reduce GHGs. Cleaner technology and fuel sources are available to reduce the Project's GHG emissions. For a project that is based around supplying fuel for the energy transition, a more progressive approach that utilizes Best Available Technology is required in order to reduce GHG emissions. Where feasible NexGen must implement the use of low carbon technology and fuels in the final Project design to reduce GHG emissions. Specifically, NexGen should redesign the Project to: • Use renewable energy sources for electricity generation (e.g., wind, solar) as early in the project lifecycle as possibl • Replace all diesel electricity generation with LNG generators (and add in renewables where feasible) for construction phase • Replace all mine equipment and vehicles with electric or LNG models • Use renewable energy to power mine heaters	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
106.	BNDN (October 12, 2022)	EIS Section 7.0	NexGen acknowledges that mining and milling uranium ore releases radionuclides into the environment This occurs through the crushing and grinding of the ore, wind erosion of the tailings, and the release of radon gas. The most persistent radionuclides have the longest half-lives; thus, U in ore dusts, 226Ra and 210Pb in tailings dusts, and 210Pb and 210Po aerosols from radon gas decay are of greatest concern (Thomas & Gates, 1999). The lichen-caribou-human food chain is the most sensitive and effective food chain on earth for concentrating airborne radionuclides (Thomas & Gates, 1999). Lichens are better at accumulating atmospheric radionuclides than other vegetation because they have no roots, a large surface area, and a long-life span (Thomas & Gates, 1999). Lichens are the main food source for woodland caribou, which is a dietary staple for BNDN members and a sacred animal in Dene culture. Airborne radionuclides, particularly cesium- 137 (137Cs), lead-210 (210Pb), and polonium210 (210Po), are transferred efficiently through this simple food chain to people, elevating their radiological dose (Thomas & Gates, 1999). The increased deposition of these radioactive particles on lichens in the mining area could increase radiation doses in both caribou and people who eat the caribou. BNDN members are concerned about the potential health impacts (e.g.,cancers) associated with airborne radionuclides and consuming woodland caribou with elevated radiation doses as a result of consuming lichen that has bioaccumulated radionuclides associated with uranium mining. a) NexGen must develop a wild foods monitoring program to monitor radionuclides levels in culturally significant species such as woodland caribou, moose, blueberries, and other species identified by BNDN and other Indigenous groups. This must be done in collaboration with BNDN and other Indigenous groups. The program must include a component by which harvesters can submit wild food samples for analysis if they have concerns. b) NexGen must also develop a follow-up monitoring program to monitor the deposition of radionuclides in the environment, specifically on lichen and other sensitive vegetation communities.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			c) NexGen must revise the air quality residual effects assessment to include radionuclides.	
107.	BNDN (October 12, 2022)	EIS Executive Summary Section 2.3.1, P36	It is noted that the stockpiles for PAG and NPAG are connected together based on the general layout shown in Figure 2.3-7. The design measures to prevent the contact water flow from the PAG to NPAG through the contact boundary is not clear in the report. Please clarify the design measures to prevent the contact water flow from the PAG to NPAG through the contact boundary between the two stockpiles.	
108.	BNDN (October 12, 2022)	EIS Executive Summary Section 2.3.1, P36	During development of the potentially acid generating WRSA, potentially acid generating rock would be placed in alternating lifts of waste rock and borrow material to provide engineered source control to reduce the advective air flux through the placed material, thereby reducing potential effects to the environment. Due to a large demand quantity of the borrow materials, the source of the potential borrow pits should be described. The potential borrow areas for acid WRSA construction should be described as part of the EA study.	
109.	BNDN (October 12, 2022)	EIS Executive Summary Section 2.3.2, P38-39	The flood design criteria for all Water Management Ponds (WMP) are not described in this Section, which are considered as the critical design parameters. The flood design criteria for all WMPs must be documented in the Master Executive Summary Report. It is noted all ponds and collection areas would be designed to accommodate a PMP 24-hours event of 489.2mm in EIS Report (NexGen 2022).	
110.	BNDN (October 12, 2022)	EIS Executive Summary Section 2.3.2, P44	In Section of Project Design Features for Long-Term Environmental Protection, HDPE geomembrane lined stockpiles (Ore Storage Stockpile, Special Waste Rock Stockpile, Potential Acid Generating WRSA) and WMPs are the important design features for long-term environmental protection, which should be included in this Section. We recommend adding HDPE geomembrane lined stockpiles and WMPs are the one of important design features for long-term environmental protection.	
111.	BNDN (October 12, 2022)	EIS Executive Summary Section 2.3.3, P46	In construction sequence: “Strip topsoil layers, subsoil material and organic materials and stockpile for future reclamation”. The proposed locations for the stockpiles for the striped in-situ materials are not shown in the general layout drawing in Figure 2.3-1 (P26).	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			The proposed locations for the stockpiles for the stripped in-situ materials must be planned in the general layout drawing.	
112.	BNDN (October 12, 2022)	EIS Executive Summary Section 5.3.1, P119	Groundwater elevation: During operation, seepage to the mine would result in a depressurization of the surrounding bedrock, which would be observed as a reduction in ground water elevation (i.e., Drawdown). Based on our prior experience, the dewatering (drawdown) process will cause the ground settlement, which should be assessed prior to dewatering activity at the mine site. Ground settlement for the project site induced by the dewatering during mine operation must be assessed.	
113.	BNDN (October 12, 2022)	EIS Executive Summary Section 7 Reference, P199	Three references which may be related to the dam and tailings/water management facilities, missed, including: • MNR, 2011. Ontario Ministry of Natural Resources (MNR) and Forestry 2011 Lakes and Rivers Improvement Act (LRIA), Dam Safety Guidelines • CDA, 2013. Canadian Dam Association (CDA) Guidelines for Public Safety around Dams MAC, 2011. Mining Association of Canada Developing an Operation, Maintenance and Surveillance Manual for Tailings and Water Management Facilities We recommend adding the three references to the list, which will be followed in the embankment and WMPs design.	
114.	BNDN (October 12, 2022)	EIS Section 5.4.4.1, P5-63	It is noted that the stockpiles for PAG and NPAG are connected together based on Figure 5.4-11. The design measures to prevent the contact water flow from the PAG to NPAG through the contact boundary is not clear in the report. Please clarify the design measures to prevent the contact water flow from PAG to NPAG through the contact boundary between the two stockpiles.	
115.	BNDN (October 12, 2022)	EIS Section 5.4.4, P5-62 to 5-64	Design Criteria for the slope stability (Safety Factor) for the stockpiles under various loading conditions are not described. Design Criteria for the slope stability (Safety Factor) for the stockpiles must be defined in the report.	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
116.	BNDN (October 12, 2022)	EIS Section 5.4.5.2, P5-68	The design criteria (flood and earthquake) for the proposed perimeter embankments for WMPs are not documented in the report. CDA guideline (2013) should be followed to determine the design criteria for the perimeter embankment. Design criteria for the pond perimeter embankments must be defined based on CDA guidelines.	
117.	BNDN (October 12, 2022)	EIS Section 5.5.1, P5-83	Strip topsoil layers, subsoil material and organic materials and stockpile for future reclamation". The proposed locations for the stockpiles for the striped in-situ materials are not shown in the general layout drawing. The proposed location of the stockpiles for strip in-situ soil must be shown in the site layout drawing.	
118.	BNDN (October 12, 2022)	EIS Section 8.5.1.1.1, P8-54	The groundwater elevation will draw down about 5 m and extend approximately 2km to the north, 4 km to the south, and 3.5 km in both east and west directions. Based on our prior experience, the dewatering (drawdown) process will cause ground settlement, which should be assessed prior to dewatering. Ground settlement for the project site induced by the dewatering during mine operation must be assessed.	
119.	Canadian Environmental Law Association (CELA) (October 12, 2022)		The Draft EIS should be updated to include a timeline of various far-future scenarios, which would provide a visual of the potentially adverse environmental effects that future generations would be burdened with should this Project be approved.	
120.	CELA (October 12, 2022)		To ensure the purposes set out in sections 4(1)(b) and 4(2) of CEAA 2012 are upheld, greater attention must be paid to the precautionary principle. This means the far-future scenarios proposed by NexGen need to be re-assessed to align with any further data provided for VCs and boundary scoping	
121.	CELA (October 12, 2022)		In order to fulfill CEAA 2012's purpose promoting sustainable development and upholding international climate commitments, NexGen must incorporate climate change within sustainability, specifically applying a presumption of harm approach towards the projects that would depend on the uranium produced by the proposed Rook I Project.	
122.	CELA (October 12, 2022)		The Purpose of this Project needs to be re-assessed to ensure that the information before the CNSC is grounded in sustainability, and does not contribute to irreversible environmental effects at a local or global scale.	
123.	CELA (October 12, 2022)		The EIS should be updated to include management plans, monitoring and follow-up programs, or decommissioning and reclamation plans to allow the	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			CNSC to consider the sustainability of the project and the measures that would be implemented to protect future generations from environmental harm.	
124.	CELA (October 12, 2022)		NexGen needs to rectify the deficiencies in the cumulative effects assessment by reconducting the scoping phase in accordance with CELA's VC and boundary recommendations.	
125.	CELA (October 12, 2022)		The EIS be updated to clearly identify all the types of cumulative effects that were assessed for each VC.	
126.	CELA (October 12, 2022)		The EIS should include a matrix or table which would present information regarding rationale for including each physical activity identified and the VCs that they may effect.	
127.	CELA (October 12, 2022)		The components identified as "intermediate components" need to be assessed in the same manner as "valued components" and must undergo the full 5-step framework for conducting a cumulative effects assessment.	
128.	CELA (October 12, 2022)		"Avoiding redundancy" is not an acceptable reason for excluding fish species from VC scoping, and when selecting fish VCs, rationale come from a balancing of the recommended lines of reasoning: primary data collection, computer modelling, literature references, public consultation, expert input or professional judgement. As a result, the scoping of fish species VCs needs to be restarted to ensure that the cumulative effects assessment accurately captures the potentially adverse environmental effects that would require mitigation and monitoring.	
129.	CELA (October 12, 2022)		The EIS should provide an updated cumulative effects assessment for fish and fish habitats to reflect proper selection of fish VCs.	
130.	CELA (October 12, 2022)		The proponent should re-evaluate its confidence level of moderate to high in assessing cumulative effects on vegetation VCs, as this determination likely arose from a faulty conclusion based on uncertain climate change assumptions.	
131.	CELA (October 12, 2022)		Any vegetation species disqualified from being included as a VC on the grounds of redundancy should be re-evaluated to ensure the cumulative effects assessment of vegetation accurately captures any potential environmental effects requiring mitigation and monitoring.	
132.	CELA (October 12, 2022)		Any wildlife species disqualified from being included as a VC on the grounds of redundancy should be re-evaluated to ensure the cumulative effects	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			assessment of wildlife and wildlife habitat accurately captures any potential environmental effects requiring mitigation and monitoring.	
133.	CELA (October 12, 2022) – p. 45		Federally listed wildlife species (northern myotis, common nighthawk, and barn swallows) should not be excluded from VCs on the grounds of "appropriate representation" by other species.	
134.	CELA (October 12, 2022) – p. 45		The EIS should be updated with cumulative effects assessment scoping for potential insect VCs	
135.	CELA (October 12, 2022) – p. 45		The Caribou Mitigation and Offsetting Plan needs to accompany the EIS in order to determine mitigation measures will effectively reduce residual effects on woodland caribou.	
136.	CELA (October 12, 2022) – p. 45		The scoping of spatial boundaries for VCs associated with water should encompass the Lake Athabasca Basin	
137.	CELA (October 12, 2022) – p. 45		Certain VCs would benefit from spatial boundaries being refined ecologically (e.g., utilizing watershed boundaries), and the proponent should assess whether certain ecological boundaries need to be utilized to provide a more fulsome scope of potential physical activities that may interact cumulatively with the proposed project.	
138.	CELA (October 12, 2022) – p. 45		The cumulative effects assessment for the EIS should revisit the temporal boundaries of different VCs, and apply more VC-centric or ecosystem-centric modelling for temporal boundaries. The application of an activity-centric temporal boundary arises in too many issues due to the complex timeline of a uranium mine's potential environmental effects which exceed the 43-year operation timeline.	
139.	CELA (October 12, 2022) – p. 45		The 92 mineral dispositions located in close proximity to the Rook I Project site should be considered reasonably foreseeable physical activities (future mines), and should therefore be included in the cumulative effects assessment for the Rook I Project.	
140.	CELA (October 12, 2022) – p. 45		The EIS be updated to provide include source, quantity, mechanism, pathway, rate, form and characteristics of contaminants and other materials (physical and chemical) likely to be released to the surrounding environment during the 93 postulated malfunctions and accidents, pursuant to REGDOC-2.9.1.	
141.	CELA (October 12, 2022)		The sheer volume of hazards identified by NexGen indicate that a bounding scenario approach is not appropriate for assessing the accidents and malfunctions associated with this project. The EIS should not use a bounding	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			approach, and should be revised to use a different approach for assessing accidents and malfunctions to ensure all identified accident/malfunction scenarios are adequately reviewed.	
142.	CELA (October 12, 2022)		The 4-Step process identified by the CEA Agency for considering the alternative means for this project should be used in the EIS.	
143.	CELA (October 12, 2022)		The vague and inconsistent references to VCs within the alternative means assessments fail to develop a sufficient understanding of potential environmental effects of the alternative means under consideration, and therefore the alternative means assessment within the EIS carefully assess potential effects on VCs.	
144.	CELA (October 12, 2022)		A gamma radiation monitoring program should be in place to determine the gamma radiation levels close to the ore and waste rock stockpiles. The monitoring program must specify the frequency of monitoring, how data will be made available to workers, and thresholds which will be put in place to ensure radiation doses remain As Low As Reasonably Achievable. Critical to the health and safety of all workers at the site is radiation protection. This issue is given little attention in the draft EIS and must be remedied.	
145.	CELA (October 12, 2022)		All employees who frequent the area must wear a gamma radiation dosimeter badge. The gamma radiation dosimetry badges worn by employees must be replaced on a quarterly basis. Workers' written consent must be obtained for a position where exposure to radiation above the allowable annual dose to the public may occur.	
146.	CELA (October 12, 2022)		Proper signage should be place in the area indicating that gamma radiation exposure is in effect. This area should be delineated with a barrier such as a fence or berm.	
147.	CELA (October 12, 2022)		A program should be in place for wetting the ore and special waste stockpiles to reduce air born radioactive dust. The special waste rock may contain insufficient grade but still has some uranium content. This is especially necessary as radioactive dust could be blown towards buildings, such as the bunk houses and as a result radon levels could increase within the buildings.	
148.	CELA (October 12, 2022)		A radon progeny and gamma radiation program must be implemented for all underground and surface employees. The gamma radiation dosimetry badges worn by employees must be replaced on a quarterly basis. Radon progeny	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			testing must be completed at all underground workplaces and designated surface locations on a monthly basis.	
149.	CELA (October 12, 2022)		The Working Level results and hours worked at each workplace must be documented to determine the radiation dose for each employee. The accumulated yearly radiation dose from radon progeny should not exceed 4WLM/year (Working Level Month). More information on radiation protection is found in Section 4 of the CNSC Radiation Protection Program. All licensees are required to implement a radiation protection program and this ought to be profiled and detailed in the draft EIS.	
150.	CELA (October 12, 2022)		The Environmental Protection Program, Industrial Air Source Environmental Protection Plan and baseline monitoring program would continue through all phases of the project. Radon gas and dust monitoring from mining activities not clearly defined.	
151.	CELA (October 12, 2022)		An Environmental Surveillance Program should include ambient air monitoring stations for control measures. The types of air monitoring equipment must include dust fall jars, high-volume air sampling units, meteorological stations, and radon detector monitoring stations. Air monitoring stations for radon should installed in buildings on the mine sites. This would include bunk houses and other enclosed areas where radon could accumulate to elevated levels. Radon detectors should be located at the mine exhaust and downstream to determine radon concentrations. Dust fall jars must also be installed downstream of the mine exhaust to determine the distance the mine dust could potentially travel and accumulation of airborne radionuclides.	
152.	CELA (October 12, 2022)		Ground water monitoring boreholes should be installed at several locations around the perimeter of the ore, special waste and acid generating stockpiles. Testing of the ground water on a semi-annual schedule would ensure that the ground water surrounding the stock-plies does not become contaminated and to ensure the integrity of the polyethylene liner has not failed.	
153.	CELA (October 12, 2022)		The contingency pond should be kept full of water as to not allow the polyethylene liner to dry out and crack and to allow frost build-up in the ground under the liner and potentially cracking it.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
154.	CELA (October 12, 2022)		The potentially acid generating stockpile should be dual-lined. Acid generated from this pile could potentially cause deterioration of the liners and contaminate the ground water.	
155.	CELA (October 12, 2022)		There is no mention of which water disinfection treatment would be used for the potable water treatment system. Disinfection kills or removes pathogens from drinking water, reducing health risks. You can disinfect water by adding chemicals, ultraviolet (UV) radiation, filtration, or a combination of these methods.	
156.	CELA (October 12, 2022)		The sludge generated by the operation of the sewage wastewater treatment plant should be disposed in a designated land fill location within the mine area. The location should be signed, fenced, and gated as such.	
157.	CELA (October 12, 2022)		The heavy metal sludge which was generated from the chemical treatment in the treatment plant and settled in the pond must be properly disposed. In the uranium milling process radium is removed by chemical treatment. In most cases barium chloride is added at the treatment plant. This allows the radium to precipitate out into the settling ponds producing a radium sludge. It is important that the radium is removed from the water as to not affect the water quality at the final water sampling location which must meet provincial water quality and CNSC standards. Iron precipitated by lime addition to regulate pH levels from the mine wastewater forms a sludge in the settling ponds and must be removed as to not allow the ponds to fill up with sludge. The more sludge the less retention time for treated mine water to remain in the ponds.	
158.	CELA (October 12, 2022)		Water sampling boreholes should be installed in the West Berm. This is the final overflow of the water collected around the mine site. It is essential that the ground water at this point meet all water quality standards. This would include suspended solids. The berm is designed as a filter, however the sludge accumulating against the berm may affect the ground water as well as overflow water quality.	
159.	CELA (October 12, 2022)		A silica dust monitoring program for underground workers must be implemented. Silica dust particles become trapped in lung tissue causing inflammation and scarring. The particles also reduce the lungs' ability to take in oxygen. When silica dust particles are less than 10 µm, they will stay airborne for up to several hours until gravity and electrostatic forces help them settle onto surfaces. Of greater importance, at this size, they can easily	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			enter the lungs, where they are even more toxic than coal dust. The monitoring program should include monthly testing at all underground workplaces and the dust monitors must be worm by the mine employee.	
160.	CELA (October 12, 2022)		The global and regional importance of this wetland environment ought to be described.	
161.	CELA (October 12, 2022)		Impacts to groundwater must be sufficiently assessed in the Draft EIS report. Overall, methods and processes to protect both surface water and groundwater are not considered nor addressed adequately.	
162.	CELA (October 12, 2022)		Cumulative impacts monitoring and assessment should be detailed and described within Section 3. This could be better addressed by inclusion of a source water protection planning process.	
163.	CELA (October 12, 2022)		Noise and visual impacts should be detailed over the timing of site development and mine site operation. Impacts should be provided for time of day, and time of year. These impacts should be assessed against bird migration patterns and wildlife movement.	
164.	CELA (October 12, 2022)		Groundwater recovery after mine closure ought to be detailed as well as wetland impacts from groundwater depletion	
165.	CELA (October 12, 2022)		Baseline data on local water quality, groundwater recharge rates, and water quantity ought to be described in detail.	
166.	CELA (October 12, 2022)		Patterson Lake forms a partial headwater to downstream waterbodies including rivers, lakes and wetlands. To help address many of the aforementioned concerns around surface and groundwater condition, a source water protection (SWP) planning approach is recommended. The EIS has not taken a proactive, preventative approach to water quality protection. A threats analysis followed by a risk assessment would be a beneficial addition to the EIS.	
167.	CELA (October 12, 2022)		NexGen to provide plans for monitoring and follow-up programs and management plans specific to the various far-future scenarios to be assessed within the context of the EIS.	
168.	CELA (October 12, 2022)		NexGen provide details about the expected lifespan of the PAG WRSA liners, as well as recommended management systems for the far-future generations that would be burdened with the COPC metal concentrations expected to flow from the site.	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
169.	CELA (October 12, 2022)		NexGen should an estimate of the costs required to adequately close, as well as monitor the mine site post-closure, in order to adhere with the polluter-pays principle.	
170.	CELA (October 12, 2022)		NexGen should provide estimates for the GHG emissions associated with flights and off-site transportation, as well as estimates on the number of anticipated flights annually during the project's operations.	
171.	CELA (October 12, 2022)		There should be a re-assessment of potential pathways from the proposed Fission Patterson Lake South Property on the terrain and soils cumulative effects assessment, to ensure the precautionary principle is being adhered to.	
172.	CELA (October 12, 2022)		The EIS should include the habitat requirements for tracked bryophytes—despite the lack of data available.	
173.	CELA (October 12, 2022)		The proponent should conduct studies of bryophyte habitat requirements to assist in filling in the gaps in knowledge.	
174.	CELA (October 12, 2022)		The EIS should re-assess the wildlife VCs and include the following species as VCs: (a) Northern myotis; (b) Common nighthawk; (c) Barn swallow; and (d) River otter. This is not an exhaustive list of species to reconsider as VCs; the EIS should provide an updated assessment for selecting wildlife VCs that aligns with cumulative effects assessment scoping guidelines.	
175.	CELA (October 12, 2022)		NexGen should provide clarification on whether insects were as wildlife VCs, and whether any federally-listed arthropods were located within the RSA.	
176.	CELA (October 12, 2022)		NexGen should provide details about offsetting through a financial mechanism, and how that will protect both existing and far-future woodland caribou from the environmental effects of this proposed uranium mine.	
177.	CELA (October 12, 2022)		Seeking clarification on how NexGen intends to balance the mitigation measures required for different VCs (e.g., woodland caribou sensory disturbance reduction vs. detracting wildlife from contact water ponds via cannons or sonic guns).	
178.	CELA (October 12, 2022)		A revised baseline study for the vegetation VC should be conducted to accurately reflect the established RSA	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
179.	CELA (October 12, 2022)		To gain a better understanding of the on-site hybrid system alternative and the economic considerations set out in the Draft EIS, the following feasibility studies should be made available for the public to review: • SLR Consulting (Canada) Ltd. 2021. Renewable Energy Scoping Study for Mining Operations. Prepared for NexGen Energy, Arrow Development – Rook I Project. • Stantec Consulting Ltd. 2019. Alternative Energy Assessment, Arrow Deposit, Rook I Project. Prepared for NexGen Energy Ltd	
180.	CELA (October 12, 2022)		Where will the fans be located, at the production shaft or at the fresh air intake? The size of fans and volume of air circulated must be specified.	
181.	CELA (October 12, 2022)		The proponent must detail all plans for all wastes, both non-radioactive and radioactive, including but not limited to their storage and handling, environmental monitoring, worker health and safety programs, and their oversight throughout the project's lifecycle.	
182.	CELA (October 12, 2022)		Provide information regarding safe transport of materials offsite, including definitions for low grade or and hazard levels, impacts to road safety and roadway condition due to large trucks, and impacts borne to Indigenous communities.	
183.	CELA (October 12, 2022)		In reference to onsite wastewater (section 5.4.55) the following gaps remain: is this secondary or tertiary wastewater treatment? How will septic tank solids be removed? Where will these solids be disposed of, and how frequently? What constitutes domestic and industrial hazard waste? In what way will it be safely stored on site?	
184.	CELA (October 12, 2022)		What are the identified ecosystems that are valued in this proposed mine site development?	
185.	CELA (October 12, 2022)		What are the noise and visual impacts detailed over the timing of site development and mine site operation? Can a corridor of transit be implemented for wildlife in this area to facilitate access to and between waterbodies?	
186.	CELA (October 12, 2022)		There is no mention of how this project will adapt to the very real impacts of climate change such as increased incidence of drought and wildfire or violent weather creating floods and other sudden weather events. How will resiliency be built into this project in the face of continued regional impacts of climate change?	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
187.	Saskatchewan Environmental Society (SES) (October 12, 2022)		SES recommends that evaluation of the justification for, benefits of, and alternatives to the Project be based on a fully comprehensive description of how it might fit within the transition to a sustainable energy future	
188.	SES (October 12, 2022)		Are there documented examples of deep underground storage of uranium mine tailings? If so, please provide details of their history, including the nature, duration, and results of monitoring.	
189.	SES (October 12, 2022)		What is the expectation for the structural longevity of the concrete/tailings backfill material? (A quick search indicates that concrete generally remains stable for 50 to 100 years, depending on the chemical environment in which it is located.)	
190.	SES (October 12, 2022)		Have studies been done to determine the effect on mobility of the tailings components when the concrete breaks down?	
191.	SES (October 12, 2022)		Why is it not considered advisable to also line the sides of the UGTMF storage cells with cemented paste backfill (CPB)?	
192.	SES (October 12, 2022)		What potentially leachable contaminants are in the CPB itself, given that it contains the leach residue from the mill process?	
193.	SES (October 12, 2022)		If it were to be discovered, say 50 or 100 years after closure, that contaminants were found to be moving into groundwater faster than had been anticipated, what adaptive management options would be available at that point?	
194.	SES (October 12, 2022)		Have the feasibility, effectiveness, and costs of potential groundwater contamination adaptive management options been determined?	
195.	SES (October 12, 2022)		SES recommends that all GHG emissions associated with transport of people and materials to and from the site be included in the Project emissions estimate.	
196.	SES (October 12, 2022)		SES recommends that all greenhouse gas emissions associated with production of cement used in the project be included in calculation of project emissions.	
197.	SES (October 12, 2022)		SES recommends that emissions associated with the production of LNG used in the project as well as its transportation to the site be included in calculation of project GHG emissions.	
198.	SES (October 12, 2022)		Will the final EIS include a plan for use of carbon offset measures as a component of mitigating the Project's GHG emissions?	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
199.	SES (October 12, 2022)		SES recommends that the final version of the EIS take into account the recent, unexpectedly severe, global impacts of climate change as well as estimating the consequences for the project of extended drought and increased wildfire frequency and intensity	
200.	SES (October 12, 2022)		On what basis was the decision made to use the Health Canada guideline for Pb210 and Ra226 water quality thresholds rather than the more conservative WHO figure?	
201.	SES (October 12, 2022)		SES recommends that the final EIS include an alternative site water management design based on no degradation of water quality in Patterson Lake.	
202.	SES (October 12, 2022)		SES recommends that, in the final EIS, NexGen provides a Conventional Waste Management alternative plan that is based on a Zero Waste goal.	
203.	SES (October 12, 2022)		SES recommends that the final EIS include the alternative of having the power plant built and operated as a CHP facility.	
204.	SES (October 12, 2022)		Why was the identification of Valued Components done at the ecosystem level for vegetation, but at the species level for fauna, and limited to such a relatively small selection of terrestrial and aquatic VC species?	
205.	SES (October 12, 2022)		Given their ecological roles, and importance as indicators of ecosystem condition, why were no aquatic or terrestrial invertebrate species identified as VCs?	
206.	SES (October 12, 2022)		Given the importance of their ecological niches, and indicators of ecosystem condition, why were no raptors, fish-eating birds, mustelids, or small rodents selected as VCs?	
207.	SES (October 12, 2022)		SES recommends that the final EIS be required to recognize the Clearwater River Provincial Park and Canadian Heritage River as a Valued Component and include it in monitoring and impact mitigation planning.	
208.	SES (October 12, 2022)		SES suggests a fairer structure for the Environmental Committees would be two local residents, one company representative, and one independent, outside advisor to be selected by the other three. We recommend that such an alternative structure be considered.	
209.	SES (October 12, 2022)		Who will determine how long these Environmental Committees and Monitors will be maintained and funded?	
210.	SES (October 12, 2022)		Will the Committees have funding to conduct independent studies if they feel these are necessary?	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
211.	SES (October 12, 2022)		The Indigenous monitor is to be chosen by each Indigenous organization. Will the Indigenous organizations have the option of naming a non-Indigenous person as their monitor if they prefer?	
212.	Ya'thi Néné Lands and Resources (YNLR) (October 2022)	General	As noted as a critical issue, YNLR and our respective communities need to be fully acknowledged within the EIS. YNLR is interested in establishing a collaborative and mutually beneficial relationship with NexGen.	
213.	YNLR (October 2022)	General	There are a total of 24 VCs plus a number of other 'intermediate components' in the EIS, yet the residual and cumulative effects analyses are 'significant' for only one VC, the woodland caribou. While YNLR understands the important role of mitigation in reducing predicted impacts, we find this overall outcome somewhat questionable. YNLR believes that this overly optimistic conclusion results from a number of sources, ranging from a poor selection of VCs to the largely subjective and qualitative nature of the impact assessment analyses, including the erroneous conclusions drawn for some VCs. For example, the residual and cumulative impacts of the year-round work camps have been largely ignored in the EIS, especially with respect to the additional harvest pressure on fish and wildlife resources, both locally and regionally. This is particularly the case for the lake fish surveys in the EIS, which indicated that their populations were already too low to sustain additional harvest pressure from project workers. YNLR believes that this potential cumulative impact cannot be overlooked, and suspects there may be others.	
214.	YNLR (October 2022)	General	The situation for this important species (Woodland Caribou) in the region is already precarious and the Project will exacerbate this. The concluding sentence highlighted above is therefore overly optimistic and not in line with the actual effects assessment performed in the EIS, which concluded both residual and cumulative effects as 'significant' for woodland caribou. An Offset Plan for caribou has been proposed, which YNLR agrees with. However, YNLR would like to be involved with the development of this plan, and would like to see the plan largely finalized and agreed to before construction begins on the Project.	
215.	YNLR	General	While the physical footprint of the Project may be small, the nature and permanence of a uranium mine development does raise the risk level for	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
	(October 2022)		Indigenous people. YNLR therefore expects to be fully involved with the design, implementation, and reporting of all monitoring programs for the Project, and expects such programs to be statistically robust and transparent to our communities.	
216.	YNLR (October 2022)	Section 1 Section 2 Section 5	Our primary concern is the improper categorization of the YNLR as an "Other Indigenous Group" rather than a "Primary Indigenous Group".	
217.	YNLR (October 2022)	Section 1.2.2 Section 2.4.1	The EIS states that: The NexGen Rook 1 Project is "located entirely on Provincial Crown Land within Treaty 8 territory and the Métis Homeland, and adjacent to Treaty 10 territory" (p 1-18). For reference, there are only three First Nations in Saskatchewan that are signatories to Treaty 8. Two of these are Athabasca Denesųłiné (AD) communities: Black Lake Denesųłiné First Nation, and Fond du Lac Denesųłiné First Nation. Another of the communities represented by YNLR is Hatchet Lake Denesųłiné First Nation who is a signatory to Treaty 10, like many of the other Indigenous communities discussed within the NexGen EIS.	
218.	YNLR (October 2022)	Section 1.2.2 Section 2.4	The EIS states that: "There are currently no land use plans that encompass the Project location". (p 1-19) This statement is questionable. The Athabasca communities approved a regional land use plan in 2008. The multiple use zone of this plan encompasses the NexGen Rook 1 project area. This information has been available to the public since 2008 prior to the beginning of NexGen's Rook 1 project. This plan is referenced on the YNLR website (www.yathinene.ca) and was available on the sites of our predecessor organizations through the Prince Albert Grand Council. This information was contained within the report - Provision of Athabasca Denesųłiné Traditional Knowledge, Land Use and Occupancy Information for the NexGen Rook 1 Project Environmental Assessment - provided to NexGen in December 2020. Lastly, we include a copy of the plan here as Figure 1.	
219.	YNLR (October 2022)	Section 1.2.2	Figures 1.2-1, 1.2-2, and 1.2-3 show the Athabasca Denesųłiné reserves but do not name the First Nations or show community locations. Further, the maps do not show the Athabasca Denesųłiné traditional territory. The maps should show this information. This information has been available to the public since 2008 - prior to the beginning of NexGen's Rook 1 project. Our	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			traditional territory is referenced on the YNLR website (www.yathinene.ca) and was available on the sites of our predecessor organization's through the Prince Albert Grand Council. This information was contained within the report - Provision of Athabasca Denesųłiné Traditional Knowledge, Land Use and Occupancy Information for the NexGen Rook 1 Project Environmental Assessment - provided to NexGen in December 2020. Lastly, we include a map of the Athabasca Denesųłiné traditional territory here as Figure 2.	
220.	YNLR (October 2022)	Section 1 Section 2 Section 3	Unfortunately, NexGen did not seek to involve Athabasca Denesųłiné until May 2019. In 2020, the Report - Provision of Athabasca Denesųłiné Traditional Knowledge, Land Use and Occupancy Information for the NexGen Rook 1 Project Environmental Assessment – was prepared by the Athabasca Denesųłiné with financial support from NexGen. This report provided an overview of the Athabasca Denesųłiné (AD) including culture, history, Treaties, way of life and dependence on the barren-ground caribou herds and other wildlife, and Nuhenéné (AD traditional territory). Further, it provided a thematic analysis and mapping of cultural and land use activities including big game harvesting, small game and fur bearers harvesting, fish and bird harvesting, overnight sites and travel routes, traditional plants, special areas and Dene names. The later sections identify primary concerns of the Athabasca Denesųłiné, and potential impacts related to the NexGen Rook 1 Project and industrial development in general.	
221.	YNLR (October 2022)	Section 1.2.3	The establishment of an LPA (local priority area) that followed on from the identification of the groups "that would most likely be affected by the proposed Project" during early engagement has two flaws. First, it ignores or disregards the information provided by the Athabasca Denesųłiné in 2020 that clearly demonstrates their interests in the vicinity of Rook 1. Second, because the inclusion of communities in the LPA is based on whether or not they had been previously identified in early stages, means that AD's exclusion is likely self- perpetuating, since the Athabasca Denesųłiné were not involved in the early stages NexGen indicates commenced in 2013.	
222.	YNLR (October 2022)	Section 1.2.3 Section 3	The LPA (first shown on a map in Section 3, p 3-2) emphasizes the area to the south of the Project area along the highway, with much less emphasis to the north of the Project location. Road access is not a good surrogate for a	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			community or its people to be 'most likely affected'. The Athabasca Denesųłiné generally access their traditional territory in the vicinity of the Rook 1 Project by means other than road. Figure 3 illustrates that traditional use that occurs in the Athabasca Denesųłiné traditional territory near the Project regardless of roads. Figure 4 enlarges the area adjacent to ROOK 1 to better show ADKLUO. A version of this map was provided to NexGen in our December 2020, ADKLUO study report. Note that the Local Priority Area (LPA) is introduced in EIS Section 1 but first shown on a map in Section 3, Figure 3.1-1 Indigenous Land and Resource Use LSA and RSA shown here are introduced in Section 16 Figure 16.2-1).	
223.	YNLR (October 2022)	Section 1.2.3	The outline of the Métis Nation – Saskatchewan Northern Region 2 is found on each map throughout the EIS titled "Location of the Rook I Project". The Athabasca Denesųłiné Traditional territory overlaps the Métis Nation – Saskatchewan (MN-S) Northern Region 2 area by nearly 60% (Figure 5). The Athabasca Denesųłiné Traditional territory (see previous Figure 1) should also have been included on all reference maps. Its exclusion means that the Athabasca Denesųłiné Traditional territory is given no significance and is therefore not known or properly considered by those involved with the Project.	
224.	YNLR (October 2022)	Section 1.2.3	It appears that the Athabasca Denesųłiné were not considered to be potentially interested or affected. This seems at odds with publicly available information and the project-specific materials provided to NexGen by the Athabasca Denesųłiné since 2019.	
225.	YNLR (October 2022)	Section 1.2.3 Section 2.4	The Athabasca Denesųłiné has a long-established traditional territory and Treaty rights in the project area. Further there is documented Athabasca Denesųłiné knowledge, land use, and occupancy in the project area. It is reasonable to conclude that the Athabasca Denesųłiné could be impacted.	
226.	YNLR (October 2022)	Section 1.2.3 Section 2.4	The Athabasca Denesųłiné has a long-established and documented traditional territory overlapping the area of the regulated facility. Further, our Treaty 8 Communities are 180 km and 260 km from the proposed Project. Generally, the area is not accessed via road. Travel to this part of our traditional territory is cross-country.	
227.	YNLR (October 2022)	Section 1.2.3 Section 2.4	There is no on-going or settled litigation involving the Athabasca Denesųłiné in the project area. We believe that this is a positive condition	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
228.	YNLR (October 2022)	Section 1.2.3	YNLR is a not-for-profit organization established by the Black Lake Denesų̨łiné First Nation, Fond du Lac Denesų̨łiné First Nation, and Hatchet Lake Denesų̨łiné First Nation (collectively known as Athabasca Denesų̨łiné) and the municipalities of Camsell Portage, Uranium City, Stony Rapids and Wollaston Lake. YNLR has the authority to represent the communities in this EIS regulatory process. The three First Nations are also members of the Prince Albert Grand Council. It is unknown what specific guidance was provided by provincial and federal regulatory agencies to NexGen with regards to identifying primary Indigenous Groups, but a comparison situation with the stated identification criteria clearly shows that we should be considered a primary Indigenous group. The key Athabasca Denesų̨łiné considerations should have been well known by both NexGen and CNSC given materials provided and discussions undertaken.	
229.	YNLR (October 2022)	Section 1.2.3	Comparing the information in EIS Table 1.2-2 with the identification criteria, several gaps are immediately evident. The overlap of the Athabasca Denesų̨łiné traditional territory with the project area is missing. The documented traditional use in the vicinity of the project is missing. The proximity of our communities to the project site are downplayed by using a road distance measure rather than the well documented cross- country routes our members generally use to access this portion of our territory. In fact, Fond du Lac is closer to the project site than a number of other groups considered primary.	
230.	YNLR (October 2022)	Section 1.2.3 Section 2 Section 3 Section 5 Section 15 Section 16 Section 18 Section 19 Section 20 Section 24	The Athabasca Denesų̨łiné were not deemed by NexGen to be a primary Indigenous Group and were thus not afforded the opportunity to sign a fulsome Study Agreement that allowed for participation in a joint working group aimed at supporting the inclusion of Indigenous knowledge into the EA through ongoing dialogue, for the identification of valued components, for the discussion of other important issues (e.g., caribou, and traditional routes into the project study area, etc.), for the creation of a community liaison position and for the ultimate development of Benefits Agreement. The inclusion of Athabasca Denesų̨łiné within these activities would have allowed for a much more complete exploration of Athabasca Denesų̨łiné rights and interests and how they might be impacted by the Rook 1 Project and ensured that NexGen	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			was able to better understand and appreciate the uniqueness of the Athabasca Denesųłiné. The exclusion of the Athabasca Denesųłiné from the primary Indigenous group category ensured that they were afforded less attention than other Indigenous peoples. This is prejudicial and self- perpetuating.	
231.	YNLR (October 2022)	Section 1.2.3	We find it ironic that our traditional use of the project area as demonstrated in our ADKLUO study appears to be recognized by the Proponent, but this has not led to a greater and more appropriate consideration with the EA process.	
232.	YNLR (October 2022)	Section 1.3.2	The Athabasca Denesųłiné remind all parties that the consideration of the impacts of the NexGen project on our rights and interests is incomplete.	
233.	YNLR (October 2022)	Section 1.3.2	YNLR identifies with this company philosophy and approach, which mirrors its own for the sustainable development of northern resources that provides long-lasting benefits for its aboriginal people. As such, YNLR expects to be closely engaged by NexGen as the Project unfolds	
234.	YNLR (October 2022)	Section 1.3.2	Following meaningful engagement with YNLR community members, YNLR places the protection and conservation of the natural environment as a very high priority. The local people will still be living in the area long after the uranium ore has been mined out. The quality of their lives, and the lives of their descendants should not be impacted by any social, economic, or environmental damage that could result from the Project	
235.	YNLR (October 2022)	Section 2.1	Given that engagement efforts are directed at local communities, the exclusion of the Athabasca Denesųłiné is prejudicial and ensures that our rights and interests cannot be fully considered. It is the opinion of the Athabasca Denesųłiné that we are a local community	
236.	YNLR (October 2022)	Section 2.1	Figures 2.1-1 shows the Athabasca Denesųłiné reserves but does not name the First Nations or show community location. Further, the map does not show the Athabasca Denesųłiné traditional territory. The maps should show this information. This information has been available to the public since 2008 - prior to the beginning of NexGen's Rook 1 project. Our traditional territory is referenced on the YNLR website (www.yathinene.ca) and was available on the sites of our predecessor organisations through the Prince Albert Grand Council. This information was contained within the report - Provision of Athabasca Denesųłiné Traditional Knowledge, Land Use and Occupancy Information for the NexGen Rook 1 Project Environmental Assessment -	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			provided to NexGen in December 2020. Lastly, we include a map of the Athabasca Denesųłiné traditional territory herein as Figure 2.	
237.	YNLR (October 2022)	Section 2.2.2	Initiatives noted in the EIS include (p 2-7, 2-8): Summer student program (starting 2016), scholarships for local students (since 2017 for students in LPA), School breakfast program (since 2017), Youth sports program (since 2017), Recreational program (since 2018), Other community initiatives (since 2018), Dog adoption program (since 2015). Athabasca Denesųłiné were not included in such programs.	
238.	YNLR (October 2022)	Section 2.3.2.1	The EIS references Technical Support Document (TSD) I, Indigenous Engagement Report that was prepared and submitted with the EIS. This report provides information on Indigenous engagement activities completed up to 28 February 2022 (p 2-13) We don't believe that we have received this report	
239.	YNLR (October 2022)	Section 2.4 Section 3.2.2 Section 5.1.3 Section 18.2.3 Section 19.2.3	NexGen began engaging with communities as early as 2013. Unfortunately, discussions with the Athabasca Denesųłiné did not begin until 2019. Based on the early engagement (e.g., pre-2019) primary communities deemed most likely affected by the proposed Project were identified. Then using these identified communities as a guide, a LPA (local priority area) was established. NexGen engagement activities were focused on primary communities in the LPA. This approach has at least three flaws. First, it ignores or disregards the information provided by the Athabasca Denesųłiné in 2020 that clearly demonstrates their interests in the vicinity of Rook 1. Clearly processes need to respond to the information available. Second, because the inclusion of communities in the LPA (and indeed the geographic extent of the LPA) is based on whether or not they were previously identified means that AD's exclusion is likely self-perpetuating. The Athabasca Denesųłiné were not involved in the early stages so they could not possibly have been considered nor could the LPA area include them. Third, the proximity of our communities to the project site is downplayed in the EIS by using a road distance measure rather than the well documented cross-country routes our members generally use to access the portion of our territory near	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			the Project. In fact, Fond du Lac is closer to the project site than a number of other groups considered primary!	
240.	YNLR (October 2022)	Section 2.5	As the Athabasca Denesųłiné were not included during early engagement activities, nor were we considered a primary Indigenous Group, nor are we included with in the resultant LPA, it would have been difficult for NexGen to develop an understanding of the Athabasca Denesųłiné including our rights and interests and determine preferred engagement process and techniques as well as participate in a fulsome Study Agreement. Unfortunately, the Athabasca Denesųłiné were not engaged until 2019, and then only at the low end of the consultative spectrum, but it appears that the overall EIS process had difficulties incorporating and adjusting to new information. Regrettably, the Athabasca Denesųłiné were not included in these engagements. Assuredly, the Athabasca Denesųłiné communities would have welcomed the opportunity to both learn more about the EA undertakings and to share their knowledge of the land, their traditional territory and their rights and interests.	
241.	YNLR (October 2022)	Section 2.5.2	There were multiple means and methods of communications during Project engagement including Face-to face meetings, Noticeboards, social media, websites, radio/television, newspapers, mail-outs, community events. (p 2-27, 2-28). Most of these methods were targeted at, and specific to communities in the LPA, and therefore the Athabasca Denesųłiné were excluded.	
242.	YNLR (October 2022)	Section 2.5.2	Mistakenly, the Athabasca Denesųłiné were categorized as "other" Indigenous Group rather than a "primary" Indigenous Group due to the engagement process followed and 26 were thus relegated to an "inform" designation along the spectrum of engagement. Following the provision of detailed information in our 2020 report and in discussions with NexGen and the CNSC, it was expected that our participation would evolve to reflect our situation, rights, and interests and be moved into the primary Indigenous Group category and to move further along the spectrum of engagement. Unfortunately, any increased consultation and engagement efforts and consideration were limited.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
243.	YNLR (October 2022)	Section 2.5.2.2 Section 3.3	The Athabasca Denesųłiné were engaged with using far fewer methods and with a much narrower focus than primary Indigenous groups. The greater involvement of Athabasca Denesųłiné within the engagement activities would have allowed for a much more complete exploration of Athabasca Denesųłiné knowledge, land uses, rights and interests and how they might be impacted by the Rook 1 Project and ensured that NexGen was able to better understand and appreciate the uniqueness of the Athabasca Denesųłiné. The exclusion of the Athabasca Denesųłiné from the primary Indigenous group category ensured that they were afforded less attention than other Indigenous peoples. This is prejudicial and self-perpetuating.	
244.	YNLR (October 2022)	Section 2.5.4	LPA communities were engaged by: Project information packages, Newsletters, Emails, Letters, Telephone, in-person and virtual Meetings, Surveys and questionnaires, KP (key person) interviews, Community information sessions, Site tours, Project Liaison Manager. The purpose of these engagements was wideranging. (see Table 2.5-4) (p 2-36, 2-37) Regrettably, the Athabasca Denesųłiné communities were not engaged in this manner. It constituted a lost opportunity for joint learning and sharing between Athabasca Denesųłiné and NexGen.	
245.	YNLR (October 2022)	Section 2.5.5	With the exception of an Athabasca Denesųłiné IKTLU study, which was impacted by the COVID pandemic, the Athabasca Denesųłiné were not included in any of the other noted knowledge sharing processes. The greater involvement of Athabasca Denesųłiné within these engagement activities would have allowed for a much more complete exploration of Athabasca Denesųłiné knowledge, land uses, rights and interests and how they might be impacted by the Rook 1 Project and ensured that NexGen was able to better understand and appreciate the uniqueness of the Athabasca Denesųłiné. The exclusion of the Athabasca Denesųłiné from the majority of these opportunities ensures that they are afforded less attention than other Indigenous peoples. This is prejudicial and self-perpetuating	
246.	YNLR (October 2022)	Section 2.6.1	This means there is an average of over 157 Key Engagement Activities per primary Indigenous Group. For comparison, YNLR had only 29 key engagement activities including 20 emails/letters of correspondence, and 9 meetings (in-person/video). The greater involvement of Athabasca	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			Denesųłiné within these engagement activities would have allowed for a much more complete exploration of Athabasca Denesųłiné knowledge, land uses, rights and interests and how they might be impacted by the Rook 1 Project and ensured that NexGen was able to better understand and appreciate the uniqueness of the Athabasca Denesųłiné. The exclusion of the Athabasca Denesųłiné from the majority of these opportunities ensured that they were afforded less attention than other Indigenous peoples. This is prejudicial and self-perpetuating.	
247.	YNLR (October 2022)	Section 2.6.1.1.1 Section 2.6.1.1.2	Unfortunately, the Athabasca Denesųłiné were not included in the Joint Working Groups. Athabasca Denesųłiné may have had some good information to share and would have appreciated the opportunity to learn from others	
248.	YNLR (October 2022)	Section 2.6.1.2.1	Athabasca Denesųłiné notes that more meetings and engagement result in more detail. While fewer meetings and engagement result in less detail.	
249.	YNLR (October 2022)	Section 2.6.1.2.2	We are pleased that there is some reference to the Athabasca Denesųłiné, but we believe the summary is incomplete. The 2020 Report - Provision of Athabasca Denesųłiné Traditional Knowledge, Land Use and Occupancy Information for the NexGen Rook 1 Project Environmental Assessment – provided an overview of Athabasca Denesųłiné (AD) culture, history, Treaties, way of life, and Nuhenéné (AD traditional territory).Further, it provided information on traditional (including contemporary) land use and knowledge, provided thematic maps of cultural and land use activities including big game harvesting, small game and fur bearers harvesting, fish and bird harvesting, overnight sites and travel routes, traditional plants, special areas, and Dene names. The report also identified primary concerns of the Athabasca Denesųłiné, and potential impacts related to the NexGen Rook 1 Project and industrial development in general that include: 1.wildlife harvest and habitat 2.water resources, 3.the continued ability to exercise Treaty and Aboriginal Rights and the protection of Athabasca Denesųłiné rights. Any reference to economic activities in the ADKLUO report was indirect, though important. To be clear, there was no reference to the wider Athabasca	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			Basin. Further Athabasca Denesųłiné Treaty and Aboriginal Rights and their protection seemed to be excluded from the NexGen summary. These issues and concerns along with others were raised during meetings between AD and NexGen and/or the CNSC. Again, we note that more meetings and engagement mean more detail. While fewer meetings and engagement mean less detail. Clearly more engagement with primary Indigenous groups lead to a greater elaboration and understanding of their issues. Less engagement with the YNLR lead to less elaboration and less understanding and appreciation of Athabasca Denesųłiné issues.	
250.	YNLR (October 2022)	Section 2.6.1.3	The Athabasca Denesųłiné were not included in the validation process and therefore did not have the same opportunity to further discuss their issues and interests	
251.	YNLR (October 2022)	Section 2.6.3.1.1	The Athabasca Denesųłiné were not included in the community information activities and sessions	
252.	YNLR (October 2022)	Section 2.6.3.1.2	The Athabasca Denesųłiné were not included in the KP Research Program.	
253.	YNLR (October 2022)	Section 2.6.3.1.3	The Athabasca Denesųłiné were not included in the Youth or other Workshops	
254.	YNLR (October 2022)	Section 2.7.1	In section 2.7.1 There is no mention of "other Indigenous Groups", Athabasca Denesųłiné, or YNLR in this section. There should be.	
255.	YNLR (October 2022)	Section 3.1	The Athabasca Denesųłiné are pleased with NexGen's commitments but have concerns about NexGen's approach to identifying primary and other Indigenous groups and the local priority area (LPA). The lesser level of involvement afforded to us due to our characterisation as a non-primary Indigenous Group, the modest consideration of our traditional territory, way-of-life, knowledge, land and resource use, and Treaty and Aboriginal rights is problematic. We have elaborated on these concerns in previous sections and will continue to elaborate on them within this section.	
256.	YNLR (October 2022)	Section 3.1	Figure 3.1-1 shows the reserves but does not name the First Nations or show community locations. Further, the maps do not show the Athabasca Denesųłiné traditional territory. The maps should show this information. This	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			information has been available to the public since 2008 - prior to the beginning of NexGen's Rook 1 project. Our traditional territory is referenced on the YNLR website (www.yathinene.ca) and was available on the sites of our predecessor organisations through the Prince Albert Grand Council. This information was contained within the report - Provision of Athabasca Denesųłiné Traditional Knowledge, Land Use and Occupancy Information for the NexGen Rook 1 Project Environmental Assessment - provided to NexGen in December 2020. Lastly, we include a map of the Athabasca Denesųłiné traditional territory here as Figure 2.	
257.	YNLR (October 2022)	Section 3.1.1	The Athabasca Denesųłiné agree that Indigenous Knowledge is incredibly important and a cornerstone of modern EA. That is why we lobbied for greater involvement, prepared our report "Provision of Athabasca Denesųłiné Traditional Knowledge, Land Use and Occupancy Information for the NexGen Rook 1 Project Environmental Assessment", participated in every meeting to which we were invited, and are commenting on the EIS. NexGen began engaging with communities as early as 2013. Unfortunately, discussions with the Athabasca Denesųłiné did not begin until 2019. Our ADKLUO report provided an overview of the Athabasca Denesųłiné (AD) including culture, history, Treaties, and way of life and their dependence on the barren-ground caribou herds and other wildlife, Nuhenéné (AD traditional territory). It further provided a thematic analysis and mapping of cultural and land use activities including big game harvesting, small game and fur bearers harvesting, fish and bird harvesting, overnight sites and travel routes, traditional plants, special areas and Dene names. The later sections identified our primary concerns and potential impacts related to the NexGen Rook 1 Project and industrial development in general.	
258.	YNLR (October 2022)	Section 3.8	The AD would caution that EAs need to be able to respectfully and meaningfully, incorporate Indigenous knowledge (e.g., ways of knowing) and that this is not something easily achieved. Effective incorporation needs to go beyond checks, balances, comparisons, and verifications to move towards a shared understanding. When discussing the balancing or melding of traditional knowledge with northern Canadian resource management boards, White (2020)1 discusses that traditional knowledge is really about a way of	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			life or ways of knowing. While resource management focuses much on the natural environment and human interactions elements of traditional knowledge, they find it difficult to deal with social, philosophical, and spiritual aspects. Key challenges include Language (and the lack of concepts and terms); inadequacy of communications methods; formal, written, and impersonal procedures; and confidentiality concerns. Perhaps the NexGen EA approach was less effective with regards to incorporation and influence of YNLR information since Athabasca Denesųłiné traditional territory and Traditional knowledge seem not to have been incorporated in a fulsome way. AD had limited or non-existant contributions to such issues as "selection of VCs, existing conditions, Project interactions and mitigation measures, residual effects analysis, monitoring programs" (p 3-27), or "VCs and intermediate components; component methods; existing conditions; scoping and pathways analysis; mitigation measures; and monitoring, follow-up, and adaptive management" (3.8 Influence on the Environmental Assessment p 3-34). Further, Athabasca Denesųłiné knowledge was not sought -during the EA process (Joint Working Groups, ongoing engagement, scoping, environmental assessment Figure 3.1-6 p 3-28)	
259.	YNLR (October 2022)	Section 3.8	Unfortunately, the delineation of the spatial boundary for the LSA does not appear to include inputs and information from the Athabasca Denesųłiné.	
260.	YNLR (October 2022)	Section 4	As previously stated, YNLR supports the efforts to reduce the release of GHGs in Saskatchewan and Canada. However, the benefits to indigenous people from such a strategy must also be maximized, notwithstanding their desire to also protect the northern environment that they are dependent on	
261.	YNLR (October 2022)	Section 4	YNLR supports the use of environmental sustainability as a key theme in the Project alternatives assessment. YNLR also notes the use of the terms 'ecological integrity' and 'ecological health' throughout the EIS. However, neither term seems to be defined in the EIS, and seem to be used interchangeably. What does NexGen mean by ecological integrity and ecological health?	
262.	YNLR (October 2022)	Section 4	YNLR has concerns with the resulting increase in traffic between La Loche and the Project. Aside from human safety considerations, there will be additional direct and indirect impacts on wildlife.	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
263.	YNLR (October 2022)	Section 4	This decision for a permanent on-site worker camp seems to be at odds with statements regarding the transportation of workers to the Project (Page 1-32, EIS)	
264.	YNLR (October 2022)	Section 5	YNLR recognizes NexGen's efforts at minimizing the Project's footprint. However, given the 43-year Project window and the additional decades for full vegetation recovery, YNLR feels that any wildlife habitat destroyed should be offset in the same manner as destroyed fish habitat is under federal law. YNLR generally supports the alternatives assessment selection for each of the above facilities as outlined in Section 4 of the EIS. If there are temporary and permanent camps, YNLR expects that the increased pressure on fish and wildlife harvest in the area will be assessed and mitigated for in some fashion.	
265.	YNLR (October 2022)	Section 5	YNLR believes that if NexGen is adopting the precautionary principle as stated in earlier sections of the EIS, it cannot minimize the potential of other mining developments in the area in a cumulative effects analysis. This is especially true given the substantial length of time the Rook Project will be operating over, including the decommissioning and reclamation phases, and the fact that uranium will be in increasing demand.	
266.	YNLR (October 2022)	Section 5	YNLR expects to be involved throughout the lifetime of this project. Perhaps NexGen would be interested in co-signing a 'development agreement' of some sort with YNLR in order to facilitate this collaboration	
267.	YNLR (October 2022)	Section 5	NexGen's development philosophy largely meshes with that of YNLR. However, YNLR expects the interaction between the company and indigenous people to be ongoing throughout the lifetime of the project	
268.	YNLR (October 2022)	Section 5	NexGen's environmental protection philosophy largely meshes with that of YNLR. However, YNLR expects the interaction between the company and indigenous people to be ongoing throughout the life of the project. Indigenous people are not stakeholders; they are rights- holders.	
269.	YNLR (October 2022)	Section 5	YNLR believes that effective follow up and monitoring is one of the key measures of sustainability, whether social, economic, or environmental. As such, YNLR expects to be involved in the design and implementation of monitoring programs over the life of the Project.	
270.	YNLR (October 2022)	Section 5	Other than the direct and indirect surface disturbance generated by the Project, YNLR is highly concerned with the potential for contamination of	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			soils and water from these components, especially in Patterson Lake. This concern also holds for the various Project activities including construction, commissioning, operation, decommissioning, and reclamation of the Project	
271.	YNLR (October 2022)	Section 5	The predicted traffic tables referred to are somewhat confusing to understand and don't reference any baseline conditions, hence it is difficult to assess the impact of increased vehicular traffic created by the Project	
272.	YNLR (October 2022)	Section 5	YNLR is hopeful that this Project will generate the promised significant employment, training, business, and contracting opportunities for local and indigenous people. However, ongoing dialogue is needed.	
273.	YNLR (October 2022)	Section 5	YNLR supports NexGen's design efforts to minimize the environmental impacts of the Project to date. However, ongoing dialogue will be needed.	
274.	YNLR (October 2022)	Section 5	YNLR supports the application of adaptive management throughout the Project's lifespan, but expects such changes to be open, transparent, and collaborative in nature.	
275.	YNLR (October 2022)	Section 6	YNLR understands and supports the use of the Precautionary Principle. However, at what point is it usual to say we have too little, or too much information? Isn't that being somewhat subjective?	
276.	YNLR (October 2022)	Section 6	YNLR is very concerned about the long-term ramifications of cumulative effects, especially when northern Saskatchewan is facing a time of greatly accelerating development. One species, woodland caribou, already seems to have fallen victim to such effects	
277.	YNLR (October 2022)	Section 6	The correct selection of VCs is critical to the successful outcome of an EA. Poorly thought out VC selection can lead to erroneous conclusions from the modeling, resulting in potential harm to people and the environment. YNLR is pleased that the YNLR study and other indigenous knowledge and values were included in the analysis. However, YNLR questions the statement regarding avoidance of VC redundancy – strictly speaking, a species can only indicate itself because every species has its own ecological niche. For example, two songbird species can inhabit the same habitat and serve as indicators for that habitat, but other aspects of their ecological niches (e.g. diet, behaviour) can be entirely different. Arbitrarily dropping one from an impact analysis could therefore lead to erroneous results.	
278.	YNLR (October 2022)	Section 6	This definition of sustainability (Page 6-10 of the EIS) meshes with that of YNLR. However, while YNLR understands that measurement indicators need	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			to be more quantitative than endpoints, it is not clear at this stage (Table 6.3-1 notwithstanding) which measurement indicators could be readily used to calibrate an endpoint like 'cultural integrity' or 'indigenous resource use' in the same way as they are used to calibrate ecological integrity.	
279.	YNLR (October 2022)	Section 6	Notwithstanding the rationale behind VC selection provided in earlier sections, YNLR questions some of the resulting selections in Table 6.3-1. Why are some species and habitats selected but not others? For example, upland and riparian ecosystems are identified but only from amount, distribution, and integrity perspectives. Shouldn't post fire age of upland ecosystems be considered here, especially from the perspective of woodland caribou or other species dependent on older forest seral stages? The same applies to the mammal species selected as VCs. Why only one species of furbearer? Why was the wolverine omitted? Canada Lynx etc? For birds, why are species like olive-sided flycatcher and rusty blackbird selected, but not a variety of other forest songbirds that are considered at risk, such as the bank swallow, barn swallow, and Canada warbler. No aerial feeders are included, such as common nighthawk, also a species at risk. Two species of ducks are selected as VCs, but not the horned grebe, again an at risk species. What about the validity of the leopard frog as a VC? On the human side, YNLR questions how the VC of Indigenous Land and Resource Use is effectively measured from the following somewhat vague and subjective measurement indicators (Table 6.3-1): • Changes to access to and area available for Indigenous land and resource use • Changes to the availability and quality of fish, plants, and wildlife for harvesting • Changes to the quality of the Indigenous land use The same is true for the VCs such as 'Other Land and Resource Use' and 'Community Well- Being. Their measurement indicators are again somewhat vague and subjective.	
280.	YNLR (October 2022)	Section 6	The maintenance of air and water quality over the long term is a very high priority for YNLR, which expects monitoring programs to be properly	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			designed and implemented with YNLR participation in order to detect significant deviations from baseline conditions.	
281.	YNLR (October 2022)	Section 6	YNLR supports the conservation of all living things as represented by the concept of biodiversity, and supports the application of both fine (species) and coarse (ecosystem) filter management approaches in achieving this. However, YNLR recognizes that the few biological VCs selected for this EIS represent a very small fraction of the many thousands of species that exist in the boreal forest. It is misleading to suggest that a handful of species can represent the many other thousands of species in the boreal forest and its ecological 55 health/integrity. In addition, the likelihood of the EIS effects modeling committing Type 2 statistical errors cannot be dismissed, which is why rigorous follow up and statistically valid monitoring are so critical.	
282.	YNLR (October 2022)	Section 6	YNLR believes a figure for illustration purposes would have been useful here (Page 6-18 of EIS), although the text suggests that more than one LSA and RSA were used for the assessments. Certainly, the RSA(s) for woodland caribou and larger carnivores need to be large enough to reflect the home ranges of the species under consideration. YNLR is very concerned with cumulative effects, and will carefully consider what the EIS decides on what is a ‘reasonably’ foreseeable development and what is not. For example, the area is covered with mineral claims	
283.	YNLR (October 2022)	Section 6	As with spatial boundaries, there appears to be more than one temporal boundary. The presence of the far-future scenario really underscores the need for the Project to be carefully designed and implemented, and for thorough follow up and monitoring. It also reinforces the need for open and transparent involvement with the local and indigenous people.	
284.	YNLR (October 2022)	Section 6	YNLR believes these criteria (Page 6-20 of the EIS) are very restrictive and/or subjective in nature and will preclude many RFDs that might otherwise increase cumulative effects in conjunction with the NexGen Project. Why so narrow an approach? Why not instead model various levels of RFD to generate future potential scenarios of cumulative effects? Furthermore, it appears that a lower number of VCs leads to a lower likelihood of a CEA being triggered, which shouldn’t be the case. The two variables should be independent of one another	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
285.	YNLR (October 2022)	Section 6	YNLR has echoed these indigenous concerns (page 6-21 of EIS) to both Fission and NexGen so is pleased a CEA was triggered in this case. YNLR will pressure Fission to do the same. However, we note that an overlap of 15 years is a minimum and it should be treated as such. In the case of woodland caribou, it is been established for some time now that their populations decline due to the cumulative effects of both human and natural disturbance, so this analysis should be taken seriously.	
286.	YNLR (October 2022)	Section 6	YNLR understands the concept of pathways analysis and the resulting mitigation measures, including offsetting. Earlier in this review, YNLR argued that wildlife habitats functionally lost for several decades should be offset in the same way that fish habitats are under federal law. The above statement referring to temporal losses to the environment would appear to support this	
287.	YNLR (October 2022)	Section 6	YNLR questions why uncertainty and time lag would always preclude offsets. In fact, the longer that habitats are non-functional, the stronger the case for offsetting them. For some reason, fish habitat offsets under federal law are not mentioned in this part of the EIS, which is unfortunate.	
288.	YNLR (October 2022)	Section 6	Given the significant nature of the Project and its impact assessment, YNLR is strongly supportive of well-designed, transparent, and statistically valid monitoring programs and expects YNLR community member involvement with their inception and implementation.	
289.	YNLR (October 2022)	Section 7	YNLR is concerned with how the Project is going to affect both air quality (including dust) and noise, not only from the standpoint of people, but also from the standpoint of wildlife and the general environment. Are roads and the increased associated traffic considered to influence air quality and noise in the EIS?	
290.	YNLR (October 2022)	Section 7	These airshed study areas seem to be reasonable and cover very important aquatic ecosystems. YNLR understands that air quality effects are scale dependent, but doesn't completely follow the logic behind the statement referencing '10% of the air quality criteria'.	
291.	YNLR (October 2022)	Section 7	Airborne dust from local roads will apparently be mitigated, but what about the increased dust from the elevated traffic levels on Highway 955 between La Loche and the Project?	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
292.	YNLR (October 2022)	Section 7	YNLR understands that air quality standards will be somewhat exceeded in the local area of the Project and supports ongoing monitoring. However, shouldn't consideration be given for offsets given the length of time of these impacts? What will be the effect on the water quality of Patterson Lake?	
293.	YNLR (October 2022)	Section 7	What about the increased noise levels coming from the elevated traffic levels locally and on Highway 955?	
294.	YNLR (October 2022)	Section 8	YNLR is very concerned about the potential for groundwater and surface water contamination from the Project.	
295.	YNLR (October 2022)	Section 8	Watershed boundaries are a logical way of delineating the extents of the LSA and RSA for groundwater and hydrology assessments.	
296.	YNLR (October 2022)	Section 8	It is not clear to YNLR why the pathways from both projects lack the potential to overlap? Can groundwater contamination from the Fission LSA reach the NexGen LSA and vice versa?	
297.	YNLR (October 2022)	Section 8	YNLR understands that the impact of the Project on groundwater quantity (distribution) seems to be significant over time and space. The discharge of potentially contaminated water into Patterson Lake from the mine, TMF, and rock storage area is of high concern.	
298.	YNLR (October 2022)	Section 8	The EIS states: "Based on modeling of groundwater quality, the magnitude of the effects was variable and specific to the solute being modeled. Solute-specific effects ranged from negligible effects beyond background values to multiple orders of magnitude above background values. Spatially, these effects were considered to be limited to the groundwater discharge within Patterson Lake. The temporal scale of these effects was long-term, spanning a period from the late stages of Operations to long-term following Closure (i.e., permanent). Changes to groundwater quality that affect surface water quality in the receiving environment were subsequently considered in the surface water and sediment quality assessment (Section 10) (Page iv, Section 8, EIS)." This result is somewhat alarming and raises questions about the long-term ecological health of Patterson Lake, and its connected waters.	
299.	YNLR (October 2022)	Section 8	The EIS States: "Follow-up and monitoring programs would be implemented to monitor for changes in groundwater quantity and quality, including	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			continued monitoring of background wells located upgradient of the Project footprint (Page iv, Section 8, EIS)." YNLR strongly supports this as a result of the groundwater modeling. However, YNLR wonders if a risk assessment and contingency plans should be developed should monitoring eventually reveal larger than expected impacts on the environment.	
300.	YNLR (October 2022)	Section 9	YNLR is very concerned about the potential for streams, rivers, wetlands, and lakes to become contaminated by the Project.	
301.	YNLR (October 2022)	Section 9	The predicted impacts to surface water hydrology appear to be negligible which is reassuring. However, the potential long-term impact of the groundwater disruption (Section 8) on surface waters still requires clarification. Surface water quality is also a question at present (Section 10) The maintenance of surface water quality is a very high priority for YNLR	
302.	YNLR (October 2022)	Section 10	It seems that the potential cumulative effects of the Fission TMF has been dismissed because it is aboveground. However, doesn't it still have the potential to contaminate surface waters irrespective of where it's positioned?	
303.	YNLR (October 2022)	Section 10	YNLR is very concerned with the far-future, cumulative contamination prediction for Patterson Lake.	
304.	YNLR (October 2022)	Section 10	In section 10 of the EIS: "To minimize the potential for effects to the receiving environment (e.g., aquatic habitat), source control measures would be implemented for the PAG WRSA. This mitigation would be expected 72 to result in reductions in the mass loading of cobalt and copper, and other COPCs, to Patterson Lake." This statement does not assuage YNLR's concerns. In addition, the long-term contamination from the NexGen and Fission TMFs seems to be unresolved.	
305.	YNLR (October 2022)	Section 10 Section 23	The EIS states: "The Environmental Protection Program, Environmental Monitoring Plan, Effluent Monitoring Plan, and associated environmental monitoring would be implemented to verify effects predictions and effectiveness of mitigation on protection of the aquatic environment, identify unanticipated effects, and apply adaptive management" (Page iv, Section 10, EIS).	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			YNLR believes this is absolutely critical given the contaminant predictions and expects to be consulted as a result. YNLR also expects the monitoring programs to be open, transparent, and statistically robust.	
306.	YNLR (October 2022)	Section 11	Assessment of the VC's selected (whitefish, lake trout, northern pike and walleye) included biological effects in a number of categories (hydrology, surface water quality, etc.). However, the EIS does not take into account changes in harvest pressure on these species due to increased human activity and access as a result of the Project	
307.	YNLR (October 2022)	Section 11	Effects on biodiversity were based on the completed fish VC assessment and were therefore determined to be negligible. The selected VC's while appropriate for fish use and sustainability may not be at all useful as indicators for overall biodiversity in the affected water bodies.	
308.	YNLR (October 2022)	Section 11	Again, the determination and assumptions leading to the fish species and habitat effects assessment are identified as "not significant". A broader range of factors (such as increased harvest levels) in fish management should be taken into account in developing this conclusion	
309.	YNLR (October 2022)	Section 11	Each discussion with community representatives demonstrated the historical, cultural and importance of fish as food. Note that the YNLR identified suckers as being important to community members. Despite this, these species (longnose and white suckers) were not identified as VCs	
310.	YNLR (October 2022)	Section 11	The EIS suggests that "adaptive management measures may also be proposed to address uncertainties…". The implementation of long-term monitoring being very important and being requested by indigenous groups should also include an adaptive management process.	
311.	YNLR (October 2022)	Section 11	Patterson Lake was identified as being intensively used by community members for fish harvesting. This lake will continue to receive increasing fish harvest pressure with the increased number of individuals associated with the mining activity near the lake coupled with easy road access.	
312.	YNLR (October 2022)	Section 11	Morphology and catch data for walleye based on fishing efforts in the LSA and RSA are presented in Table 11.3-5. A total of 336 walleye were captured during baseline sampling in the LSA or RSA. However, a large majority of the walleye documented were captured in the Clearwater River above Patterson Lake (n = 298; Table 11.3-5). Of the 336 walleye captured, 109	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			were captured in Patterson Lake. In Patterson Lake, walleye ranged in size from 26.6 cm to 66.5 cm for length and 140 g to 2,720 g for weight (Table 11.3-5) (Page 11-69, EIS). There appears to be a discrepancy between Table 11.3-5 (Page 11-70, EIS) which identified Patterson Lake Walleye at N = 10 and identification within the above text of Patterson Lake walleye n=109?	
313.	YNLR (October 2022)	Section 11	Table 11.4 -1 describes in some detail "Environmental Design Features and Mitigation" but it does not mention participation in management and harvest (recreational and commercial), which should be addressed at the onset of the predicted increased human activity in the Patterson Lake area. This will be one of the most important management tools that can be implemented to sustain the local fish populations	
314.	YNLR (October 2022)	Section 11	While the EIS surmises that on site blasting is being carried out at a safe distance from Patterson Lake and therefore "there are no predicted residual effects on the VC's", monitoring should be carried out to confirm that this is indeed accurate considering that there were local concerns identified by YNLR (Page 11-79, EIS).	
315.	YNLR (October 2022)	Section 11	The EIS states that "An increase in TP (total phosphorus) may result in minor changes to primary productivity with virtually no effects on upper-level consumers" (i.e. piscivorous). Adding additional oligotrophic species such as suckers to monitoring programs would therefore be prudent.	
316.	YNLR (October 2022)	Section 11	"…fish habitat lost or altered because of the development would be offset with habitat created, restored or enhanced." Restoring habitat is technically not an offset although it is important as part of the mitigation.	
317.	YNLR (October 2022)	Section 11	NexGen "exploring the possibility of implementing a policy that would prohibit or restrict fishing" while laudable, would have a minimal effect on fish harvest. For example, the company cannot remove indigenous rights to fish. The EIS recognizes that changes to public access and the increased density of people may affect the viability of fish populations. It is therefore important for the company, indigenous representatives, and the Provincial Government to review and alter season and catch limits in the area at the onset of the project	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
318.	YNLR (October 2022)	Section 11	The EIS recognizes that copper concentrations will exceed minimum acceptable levels during the life of the project; however, analysis indicated that there would be minimal effects on aquatic populations and communities. The only mitigation measure to affect this outcome would be to limit the copper concentration levels, if this is possible	
319.	YNLR (October 2022)	Section 11	Overall predicted effects on aquatic biodiversity considered as negligible neglects the cumulative effects of other mine sites such as Fission Uranium even though this factor has been identified in the EIS	
320.	YNLR (October 2022)	Section 11	Analysis of the residual effects on fish, particularly the VC's is concluded to be "not distinguishable from natural background variability" without any in-depth analysis of increased and persistent fish harvest due to the major changes in public access	
321.	YNLR (October 2022)	Section 12	YNLR understood that the waste rock would be put back underground as part of reclamation, so how can the impact on the waste rock storage areas be irreversible?	
322.	YNLR (October 2022)	Section 13	YNLR believes that the use of only three vegetation ecosystem VCs is too coarse an approach that may miss many important finer elements. For example, woodland caribou are dependent on older seral stages of coniferous forest for lichens as food. Were the three ecosystems subdivided any further to enable more refined impact assessments? Isn't it possible to miss potential impacts by not doing so?	
323.	YNLR (October 2022)	Section 13	YNLR is very concerned about the introduction of invasive plant species into the forest ecosystems by the increased level of human disturbance.	
324.	YNLR (October 2022)	Section 13	The EIS States: "Upland ecosystems would be expected to experience the following residual effects Page iii, Section 13, EIS): • The Project is predicted to contribute to a loss in availability of approximately 868 ha of upland ecosystems, which represents 1.2% of upland ecosystems in the RSA (i.e., low magnitude) 82 • The Fission Patterson Lake South Property activities are predicted to contribute an incremental loss of 1,450 ha of upland ecosystems availability in the RSA • In combination, the Project, Fission Patterson Lake South Property, and existing anthropogenic disturbance (e.g., Highway 955, seismic	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			lines) would account for 2,390 ha (3.1%) of disturbance across upland ecosystem types in the RSA (i.e., low magnitude) Despite the loss of upland ecosystems that would occur as a result of the Project and the Fission Patterson Lake South Property, the distribution of most upland ecosystems would remain abundant and well connected across the RSA." If these upland ecosystems are either lost permanently or for several decades, YNLR believes that there should be some sort of no net loss offset applied, as it is for fish habitat under federal law (see before and below).	
325.	YNLR (October 2022)	Section 13	The EIS States: "Wetland ecosystems would be expected to experience the following residual effects Page iv, Section 13, EIS): • The Project is predicted to contribute to a loss in availability of approximately 28 ha of wetland ecosystems (i.e., less than 0.1% of the RSA), which would be limited to the Project's maximum disturbance area (i.e., low magnitude) • Cumulatively, the Project and the Fission Patterson Lake South Property are predicted to contribute to a loss in availability of approximately 56 ha (i.e., 0.1% of the RSA) of wetland ecosystems (i.e., low magnitude) Following Decommissioning and Reclamation (i.e., Closure), it is anticipated that wetland ecosystems would be reclaimed to the extent possible in an attempt to achieve no net loss of wetland functions, consistent with the guideline of the Federal Policy on Wetland Conservation (Government of Canada 1991). Although the establishment of functioning wetland ecosystems following the Active Closure Stage was considered possible, restoration of wetland species composition and ecological function similar to the wetland ecosystems observed under existing conditions would be unlikely. As such, the loss of all wetland ecosystems was conservatively assumed to be permanent." This statement is somewhat confusing. Will lost wetlands be restored or not? If the wetland loss is permanent or long lasting, YNLR believes that a no net loss offset should be applied	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
326.	YNLR (October 2022)	Section 13	What is the distance of the riparian set back? How was it arrived at? Again if riparian loss is permanent or long lasting, YNLR believes that a no net loss offset should be applied	
327.	YNLR (October 2022)	Section 13	Again, YNLR believes that permanent losses in traditional plant use habitats should be offset in some manner.	
328.	YNLR (October 2022)	Section 13	The Environmental Protection Program, Environmental Monitoring Plan, and associated environmental monitoring would be implemented to verify effects predictions and effectiveness of mitigation on vegetation, identify unanticipated effects (i.e., manage the residual uncertainty in the effects prediction), and apply adaptive management, if required. A noxious and nuisance weeds follow-up study would be carried out for weed management to monitor the establishment of designated weed species within the disturbance area and apply appropriate mitigation to avoid the unintended spread of such species. YNLR believes that such monitoring is critical in order to maintain the ecological health of the forest.	
329.	YNLR (October 2022)	Section 14	YNLR has concerns about the breadth and composition of these wildlife VCs, which are essentially indicators of ecological health with respect to the impacts of the Project. Eleven species represent a very tiny proportion of the total number of wildlife species present in the boreal forest, especially if one considers invertebrates to be also 'wildlife'. Can only 11 wildlife species represent this vast and complex ecosystem even at the scale of the Project? For example, 6 of the VCs are mammals out of more than 85 species of boreal forest mammal, and only 4 are birds out of more than 300 boreal forest bird species. Notwithstanding how they were chosen (Appendix 14A), YNLR also questions their individual selection with the omission of many others. For example, only two species of furbearer are selected, despite the importance of trapping to northern indigenous people. Species like Canada lynx, wolverine, fisher, mink and marten are omitted. Why? Only two species of songbird and two waterfowl species are selected. Why? No aerial feeders are included such	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			as common nighthawk, barn swallow and bank swallow. Why? Is NexGen confident that a sufficient number and variety of VCs have been selected?	
330.	YNLR (October 2022)	Section 14	YNLR supports the selection of woodland caribou as a VC, and believes it deserves special consideration for this assessment.	
331.	YNLR (October 2022)	Section 14	Wolf density was mentioned as a potential mitigating factor for moose below. YNLR wonders why there is no mention of wolf density in the baseline woodland caribou description. Human hunting pressure may increase on this species once the Project is underway, due to the presence of camps	
332.	YNLR (October 2022)	Section 14	YNLR supports the selection of moose as a VC and is concerned about the impact that the increased levels of traffic and human disturbance will have on it. Hunting pressure may increase on this species once the Project is underway due to the presence of camps.	
333.	YNLR (October 2022)	Section 14	As an important predator of caribou and moose, YNLR supports [grey wolf's] selection as a VC. Hunting and trapping pressure may increase on this species once the Project is underway due to the presence of camps.	
334.	YNLR (October 2022)	Section 14	YNLR is concerned with an increase in human-bear conflict once the Project in underway. Their attraction to refuse dumps needs to be carefully managed. Hunting pressure may increase on this species once the Project is underway due to the presence of camps.	
335.	YNLR (October 2022)	Section 14	YNLR supports the selection of the beaver as a VC owing to its status as a furbearer and riparian dweller. Trapping pressure on the species is likely to increase once the Project is underway due to the presence of camps	
336.	YNLR (October 2022)	Section 14	Given the fact that white nose disease is likely to have a much greater impact than the Project itself, YNLR questions the selection of the Little Brown Myotis as a VC	
337.	YNLR (October 2022)	Section 14	YNLR is unclear why the olive-sided flycatcher was selected as a VC for the Project assessment	
338.	YNLR (October 2022)	Section 14	Given the apparent lack of suitable habitat and the low number of birds detected, YNLR questions the selection of the Rusty Blackbird as a VC	
339.	YNLR (October 2022)	Section 14	The Common Goldeneye is a good indicator of intact riparian habitat and so useful as a VC in the assessment. Hunting pressure on this species will likely increase due to the presence of camps	
340.	YNLR (October 2022)	Section 14	Hunting pressure on the Mallard will likely increase due to the presence of camps	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
341.	YNLR (October 2022)	Section 14	YNLR agrees the Canadian Toad is a potentially useful indicator and VC. However, were leopard frogs or other amphibians included in the surveys, and thus potentially serve as VCs?	
342.	YNLR (October 2022)	Section 14	The sensory disturbance comes not only from the Project activities, but also from the elevated numbers of people living at the camp. Camp workers will likely be fishing and/or 90 hunting thereby increasing the level of harvest pressure on local and regional wildlife. ATV and snowmobile use may well increase too.	
343.	YNLR (October 2022)	Section 14	YNLR believes that the NexGen and the Fission projects will make a bad situation worse for woodland caribou over the long term. The only mitigating factor might be long-term regional forest recovery in the absence of forest fires, but climate predictions suggest otherwise (Page ix). Given the significance of this assessment, YNLR would like to see a woodland caribou offset plan negotiated before the Project begins.	
344.	YNLR (October 2022)	Section 14	Some of these other VCs are listed as species at risk, therefore any decrease in habitat over long periods could be considered as significant	
345.	YNLR (October 2022)	Section 14	NexGen is committed to reclaiming habitat disturbed by the Project footprint and offsetting the incremental loss of caribou habitat to help achieve self-sustaining and ecologically effective caribou populations. YNLR supports this commitment and expects to be involved in any future decisions regarding woodland caribou conservation.	
346.	YNLR (October 2022)	Section 14	As with other Project monitoring commitments, YNLR will be looking to see that such programs are open, transparent, and statistically robust.	
347.	YNLR (October 2022)	Section 6, 11, 13 and 14	General comment on Sections 6, 11, 13, and 14: The EIS asserts in a number of places that the selected ecological VCs are representative of all boreal forest biodiversity and ecological health/integrity. This is an invalid assumption and oversimplification of the actual situation, which is far more complex	
348.	YNLR (October 2022)	Section 15	YNLR wonders whether data and experience gathered on human health effects at other uranium mining projects would have been included? What are the human health records from other uranium mines?	
349.	YNLR (October 2022)	Section 15	It is likely that many nuclear energy workers will also consume traditional foods (see Page 18-57).	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
350.	YNLR (October 2022)	Section 16 Figure 16.1-1	Figures 16.1-1 shows the Athabasca Denesųłiné reserves but does not name the First Nations or show our community locations. Further, the map does not show the Athabasca Denesųłiné traditional territory. The map should show this information. This information has been available to the public since 2008 - prior to the beginning of NexGen's Rook 1 project. Our traditional territory is referenced on the YNLR website (www.yathinene.ca) and was available on the sites of our predecessor organizations through the Prince Albert Grand Council. This information was contained within the report - Provision of Athabasca Denesųłiné Traditional Knowledge, Land Use and Occupancy Information for the NexGen Rook 1 Project Environmental Assessment - provided to NexGen in December 2020. Lastly, we include a map of the Athabasca Denesųłiné traditional territory herein as Figure 2.	
351.	YNLR (October 2022)	Section 16.1.2	In the purpose and approach to the assessment. The Athabasca Denesųłiné question how Step 2 "characterize existing conditions" can be appropriately met given that the AD were excluded from fulsome consideration as a primary Indigenous group. The limited consideration of the Athabasca Denesųłiné during Step 2 has implications for subsequent steps	
352.	YNLR (October 2022)	Section 16.2.1	The YNLR prepared (with financial support from NexGen) the 2020 Report - Provision of Athabasca Denesųłiné Traditional Knowledge, Land Use and Occupancy Information for the NexGen Rook 1 Project Environmental Assessment – on behalf of the Athabasca Denesųłiné communities including Black Lake Denesųłiné First Nation, Fond du Lac Denesųłiné First Nation, and the Hatchet Lake Denesųłiné First Nation. Lastly, the comment that the level of AD engagement was designated by the CNSC and ENV and accepted by NexGen does not appear to be congruent with the selection criteria that NexGen identified within the EIS to determine primary Indigenous groups (See YNLR comments on EIS Sections 1.2.3 and 2.4.1 as well as comments below). Did NexGen apply the criteria or not? Either way, the Athabasca Denesųłiné have been improperly excluded from the primary Indigenous group category.	
353.	YNLR (October 2022)	Section 16.2.2.1	The Athabasca Denesųłiné were not involved in the community information sessions referenced, nor were they included in JWGs or its discussions, nor did the EA process engage with them as actively and deeply as with those deemed "primary" Indigenous groups. These exclusions are unfortunate as it means AD's core method for providing relevant information was via the 2020	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			Report - Provision of Athabasca Denesųłiné Traditional Knowledge, Land Use and Occupancy Information for the NexGen Rook 1 Project Environmental Assessment – prepared by YNLR on behalf of the Athabasca Denesųłiné communities including Black Lake Denesųłiné First Nation, Fond du Lac Denesųłiné First Nation, and the Hatchet Lake Denesųłiné First Nation without the benefit of continuous and supporting discussion with NexGen.	
354.	YNLR (October 2022)	Section 16.2.2.2	As noted herein, the Athabasca Denesųłiné have had limited input, mainly due to their exclusion from the primary Indigenous group category, into the development of the VCs. This ensures that some elements are overlooked. For example, the Athabasca Denesųłiné generally use to access the portions of their traditional territory near the Project via cross- country routes. A focus on road access or proximity will overlook this fact.	
355.	YNLR (October 2022)	Section 16.2.3	Unfortunately, the omission of the Athabasca Denesųłiné means that their traditional territory, Treaty area, traditional land and resource uses, and their cultural connections to the landscape were missed.	
356.	YNLR (October 2022)	Figure 16.2-1	Figure 3 (in YNLR comments) overlays the Athabasca Denesųłiné traditional territory, Treaty 8 boundary, and traditional land and resources uses with the EIS map of the LSA and the RSA. Figure 4 (in YNLR comments) is an enlargement of same information in the area near the Project. Clearly there is overlap between rights and interests and both the LSA and RSA. In fact, Athabasca Denesųłiné traditional territory covers approximately 86% of the LSA. the This Athabasca Denesųłiné traditional territory information has been publicly available since at least 2008 (before the NexGen Rook 1 Project) and other information was provided directly to NexGen during the EA process. [Note these figures appear in early section comments]	
357.	YNLR (October 2022)	Section 16.2.4	The EIS (p 16-20) notes that the temporal scope for the assessment is 43 years from Construction to Operations to Decommissioning and Reclamation phases. The potential impacts to Athabasca Denesųłiné rights and interests over such a lengthy period of time makes their limited inclusion in the EIS all the more egregious.	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
358.	YNLR (October 2022)	Section 16.2.6	While the Athabasca Denesųłiné were able to provide some information through their IKTLU study and comments on the Project Description, they were not provided the opportunity to provide supporting and supplemental information through JWG meetings, workshops, KP Interviews, baseline study	
359.	YNLR (October 2022)	Section 16.2.8	The Athabasca Denesųłiné see the cultural landscape assessment criteria as limited and not reflective of their broader rights and interests given the incomplete appreciation of their traditional territory and other information provided along with the limited engagement opportunity to ensure NexGen's appreciation.	
360.	YNLR (October 2022)	Section 16.3.2	The Athabasca Denesųłiné have repeatedly raised their issues with their categorization as an "other Indigenous group rather than a "primary" Indigenous group and the resulting lesser level of engagement and consideration in the Project EA	
361.	YNLR (October 2022)	Section 16.3.3	The information from the primary Indigenous groups is very detailed and the result of a long-term, focused engagement process. A process that placed less attention on the AD. The Athabasca Denesųłiné are not questioning the inclusion any of the other Indigenous groups within the EIS. They are merely pointing out inconsistent treatment and highlighting its ramifications. Further, we note within the descriptions of these groups that there are a number of references that support the Athabasca Denesųłiné assertions of traditional territory and land use	
362.	YNLR (October 2022)	Section 16.3.3.4.1	The Athabasca Denesųłiné note that within the descriptions of these groups, their neighbors, that there are a number of references that support the assertions of AD traditional territory, land use, and travel patterns	
363.	YNLR (October 2022)	Section 16.3.3.5	It is incorrect to state that the AD traditional use does not overlap the LSA. The Athabasca Denesųłiné traditional territory and specific land uses do indeed overlap the LSA (and RSA) almost entirely (See Figures 3 and 4 above). Further this statement seems at odds with the information presented in other sections of the EIS	
364.	YNLR (October 2022)	Section 16.3.3.5	It's important to note that the Project is within the range of the caribou herds that define the Athabasca Denesųłiné. Where there are, or have been caribou, there have been Athabasca Denesųłiné. The following map (Figure 6) produced by the BQCMB shows that the Athabasca Denesųłiné Traditional	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			Territory, the NexGen Project's Indigenous Land and Resource Use's LSA both fall almost entirely within the range of the barren-ground caribou	
365.	YNLR (October 2022)	Section 16.3.3.5	The Athabasca Denesųłiné's traditional territory and documented land use includes almost all of the LSA (see Figures 3 and 4 in the YNLR comment).	
366.	YNLR (October 2022)	Section 16.4.3 Section 24	Given their treatment as a non-primary Indigenous group thus far in the EA, the Athabasca Denesųłiné are questioning whether they would be included in the mitigation options identified. Is NexGen considering their inclusion in programs such as caribou measures, Indigenous monitors, implementation committee, Environmental committee, Benefits agreements, and others? The Athabasca Denesųłiné believe that they should be full participants in any such endeavours	
367.	YNLR (October 2022)	Section 16.5.1.2.3. Section 24.4.1.3.3	The Athabasca Denesųłiné believe that they should be full participants in any Caribou Mitigation and Offsetting Plan.	
368.	YNLR (October 2022)	Section 16.7	The statement of limitation also applies to the Athabasca Denesųłiné as noted specifically in their IKTLU study… "This study does not represent all Denesųłiné values in the project study area, and an absence of data does not signify an absence of use or value." The AD were excluded from most of the uncertainty management measures noted in the EIS. The AD should be included in the citation as noted. Further, their exclusion from primary Indigenous group status should be addressed.	
369.	YNLR (October 2022)	Section 16.8	The Athabasca Denesųłiné believe that their status as a non-primary Indigenous group is not justifiable given their traditional territory, Treaty 8 membership, the proximity of their communities to the Project, well documented land and resource use within the LSA and RSA, relationship with NexGen and the CNSC, and potential impacts on their aboriginal and Treaty Rights. Such a mis-categorization may prevent them from being fully involved in the monitoring activities noted in the EIS. The AD should be enabled to fully participate in these activities.	
370.	YNLR (October 2022)	Section 17	Would not the active exclusion of unauthorized people from the Project area also affect other land and resource use?	
371.	YNLR (October 2022)	Section 17	YNLR considers the long-term addition of two work camps in the region to be a potential impact on local fish and wildlife resources, which would potentially reduce the availability of fish and wildlife for harvesting (note that	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			the baseline studies showed that several lakes in the area are showing signs of overharvest)	
372.	YNLR (October 2022)	Section 18.2.6.2	To the best of our knowledge, no Athabasca Denesųłiné members participated in the key person interviews. The Athabasca Denesųłiné believe that their categorization as an "other" Indigenous group is incorrect and that with the attributes of a primary Indigenous group, they should be full participants in engagement activities	
373.	YNLR (October 2022)	Section 18.2.6.3	While the Athabasca Denesųłiné were able to provide some information through their IKTLU study and comments on the Project Description, they were not provided the opportunity to provide supporting and supplemental information through JWG meetings, community meetings, workshops, KP Interviews, baseline study, etc	
374.	YNLR (October 2022)	Section 18.3.6.1	The YNLR prepared (with financial support from NexGen under a limited Study Agreement) the 2020 Report - Provision of Athabasca Denesųłiné Traditional Knowledge, Land Use and Occupancy Information for the NexGen Rook 1 Project Environmental Assessment – on behalf of the Athabasca Denesųłiné communities including Black Lake Denesųłiné First Nation, Fond du Lac Denesųłiné First Nation, and the Hatchet Lake Denesųłiné First Nation. This study clearly shows that our traditional territory, Treaty, and land/resource use overlap with the LSA and the RSA. The YNLR report (page 5) references (and includes) a map prepared by the Beverly and Qamanirjuaq Caribou Management Board that shows the caribou range based on a variety of information sources. It is not intended to be a map of shifting range. In fact, the Board provides an interpretation note on their map that reads "It is important to note that the map is based on telemetry locations for a small number of adult female caribou that have been collared and tracked by satellite for a limited time period. As a result of these limitations, an area mapped without caribou locations does not necessarily indicate a lack of use or low importance to caribou. It could simply be an area where collared animals have not been located and could potentially be an area of high use by non-collared animals". The inaccuracies in the EIS footnote should be corrected.	
375.	YNLR	Section 18.4	The Athabasca Denesųłiné believe that their categorization as an "other" Indigenous group is incorrect (and hence AD are excluded from the LPA) and	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
	(October 2022)		that as they have the attributes of a primary Indigenous group, they should be full participants in engagement activities and programs related to education and training, business and contracting opportunities, mitigation implementation and other benefits.	
376.	YNLR (October 2022)	Section 18.4	The NexGen and Fission mines have a huge opportunity to significantly improve the socio- economic conditions in this region. YNLR welcomes this and is available to assist in any way with these developments, provided the land and waters are protected from long-term damage.	
377.	YNLR (October 2022)	Section 18.4	The key point is the high value of the land as a natural food and medicine resource. While the new mine will provide an excellent opportunity for employment, its employment impact on the total population of the LSR is relatively small, which highlights the actual value of the land to provide sustenance. The natural long–term productivity of the land must therefore be protected	
378.	YNLR (October 2022)	Section 18.4	The EIS notes: An analysis was completed to evaluate Project components and activities and associated effects pathways that could potentially affect economy; this analysis included consideration of both adverse and beneficial effects. The evaluation also considered similar combined effects from the Fission Patterson Lake South Property, the identified RFD for the economy assessment. Project characteristics that have the potential to affect the economy during the Project lifespan include (Page iii, Section 18, EIS): • Estimated capital expenditures of $1.3 billion over the four years of Construction • A peak construction workforce of approximately 350 workers, with actual on-site labour requirements varying throughout Construction • Typical annual operating spending of $167 million • An operations workforce, including a forecasted 486 direct jobs during the operating peak and approximately 425 direct jobs during a typical year of Operations • Spending during Closure • Aspirational targets established by NexGen Energy Ltd. (NexGen) for hiring workers from LSA communities (i.e., 75%) and external spending awarded to LSA and RSA businesses (i.e., 30%)	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			Proposed mitigation and enhancement measures, such as the delivery of certified and accredited training and recruitment programs, development of culturally sensitive employment policies, and increasing involvement of local businesses within the LSA would reduce adverse 119 effects and enhance beneficial effects on the economy. In addition to these mitigation and enhancement measures, NexGen is in the process of negotiating Benefit Agreements with primary Indigenous Groups in the LSA and has signed agreements with three groups. Although details of these agreements are confidential and have not been finalized for all Indigenous Groups, they are premised on commitments including proactively engaging with local communities; supporting the economic participation of affected communities; seeking to provide opportunities resulting in sustainable, lasting benefits to local communities beyond the Project lifespan; and providing clear and timely information to those who have a direct interest in the Project. Implementation of items agreed to in Benefit Agreements is also expected to reduce adverse effects and enhance beneficial effects on the economy. After mitigation measures were considered, the pathways analysis determined that all potentially adverse pathways from the Project to the environment could be removed from the assessment. Therefore, no pathways were carried forward into the residual effects analysis (Page iii)." YNLR supports this initiative and is interested in entering cooperative agreements with both NexGen and Fission	
379.	YNLR (October 2022)	Section 18.4	Income opportunities will provide the ability for individuals and communities to purchase equipment with which to increase lake and forest accessibility, and thereby increase harvest pressure on the area's natural resources.	
380.	YNLR (October 2022)	Section 18.4	The EIS states: "Monitoring and follow-up would be conducted to confirm effects predictions and address potential uncertainty. Monitoring would also be performed to track progress against long-term targets and identify opportunities to further enhance outcomes. Follow-up and monitoring programs would be used to (Page v): 121 • Monitor progress on achieving employment and contracting targets and identify opportunities to improve employment and contracting outcomes	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			• Maintain ongoing communication and dialogue with local communities to identify and resolve issues • Contribute to the overall continual improvement of the Project In Benefit Agreements with Indigenous Groups, NexGen has committed to establishing an Implementation Committee, which would facilitate an effective, ongoing working relationship between NexGen and the Indigenous Group, and verify that all commitments made within the Benefit Agreements are realized. YNLR approves of these arrangements and looks forward to contributing towards the realization of sustainable development in the north	
381.	YNLR (October 2022)	Figure 19.2-3	Figure 19.2-3 Map for Reasonably Foreseeable Development in the Regional Study Area shows but does not highlight the Athabasca Denesųłiné communities also in the Regional Study Area.	
382.	YNLR (October 2022)	Section 20	The residual effects (~ effects remaining after mitigation) summary in Table 20.3-1 has been simplified below. Note that in accordance with the precautionary principle, the highest rankings within Table 20.3-1 have been included: From this, it can be seen that all VCs are predicted to be adversely affected (i.e. a negative direction from assessment endpoints) by the Project. Moderate to high effects are predicted for 5 VCs, including indigenous land use and (notably) four wildlife species. The woodland caribou is predicted to experience a high magnitude of effect. The duration of residual effects is predicted to be permanent to long term for all VCs, with only two (Other Land Use and Community Well-Being) having a high certainty of reversibility. Despite this, other than woodland caribou, all residual effects to VCs are ranked as non-significant, either from the Project or cumulative effects perspectives. To summarize, the majority of VCs will experience adverse residual effects, which are mostly low in magnitude but relatively long lasting with a relatively low certainty of reversal. This seems at odds with the non-significant rankings assigned to most VCs, and points to potential errors	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			associated with multiple tests and the binary nature of their assigned significance. All other things being equal, one would predict some of the significance rankings to be incorrect simply based on chance alone. YNLR also notes that the human impacts associated with two work camps have been largely ignored by the EIS. These workers will place increased harvesting pressure on the fish and wildlife resources in the area, which would elevate residual effects, especially for the fish, which are at abnormally low population levels in all of the lakes surveyed (Section 11). Furthermore, the residual effects summary table (Page 20-5, EIS) states that the effect on residence moose populations is "not significant" with the rationale "moose are highly adaptable, highly mobile, and can accommodate moderate to high levels of anthropogenic disturbance" Without further qualification, this is a naïve statement or just categorically wrong, which brings the ranking of Not Significant into question. In reality, following the development and increased human access to the area will require additional regulatory measures if the local moose population is to remain sustainable. The summary table also lists the change in impact of indigenous use of the area as "not significant". While access to the land on a broad scale does not change dramatically, the availability of wildlife, fish and perhaps traditional use plants will not be sustainable and therefore will be degraded with respect to local resource use. The increase in access due to increased purchasing power for off road equipment will allow for increased access in the general area. For these and other reasons, YNLR believes that the residual analyses are collectively over optimistic, and reinforce the need for open, transparent, and statistically robust monitoring programs and follow up, which includes meaningful dialogue with the indigenous people of the region.	
383.	YNLR (October 2022)	Section 21	YNLR supports the level of consultation with indigenous people on accidents and malfunctions, and expects the dialogue to be ongoing.	
384.	YNLR (October 2022)	Section 21	YNLR believes that a collision with wildlife is not unlikely. Did NexGen investigate any relevant data that SGI might have on this matter?	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
385.	YNLR (October 2022)	Section 23	YNLR is ready to continue working on a long-term, collaborative, and mutually beneficial relationship with NexGen	
386.	YNLR (October 2022)	Section 24	Follow up and monitoring is critical. However, while residual effects on most VCs were deemed not significant individually, their significance in total may be, especially given the multiple tests and binary ranking of significance	
387.	Northern Village of Île-à-la-Crosse (Île-à-la-Crosse) (October 12, 2022)	Section 1.2.3	Île-à-la-Crosse is not satisfied with its exclusion from the LPA. Historically, all communities in northwest Saskatchewan on the Highway 155 corridor have participated in engagement related to uranium mining projects in northwest Saskatchewan, and the EIS does not satisfactorily explain NexGen's rationale for changing and revised the Cut-off Point from the area which has historically been used and applied. This newly established arbitrary Cut-off Point specifically excludes Île-à-la-Crosse without any logical or reasonable rationale In terms of proximity, it should be noted that Île-à-la-Crosse was considered an impact community and was engaged on the Cluff Lake Mine project and that the Rook I Project is approximately 80 km closer to Île-à-la-Crosse as compared to the Cluff Lake Mine Project. Furthermore, Île-à-la-Crosse is only 52 km away from the Cut-off Point and only 64.5 km from the Northern Village of Buffalo Narrows, which has been included in the LPA. With regards to the potential impacts upon the community, the exclusion of Île-à-la-Crosse within the LPA will cause extreme and sever economic and community hardship. There is limited access to training and education and limited employment and business opportunities within or near Île-à-la-Crosse and by including communities as part of the LPA which are so close in proximity and excluding Île-à-la-Crosse, many of the residents will relocate and leave Île-à-la-Crosse in order to fall within the LPA in pursuit of educational and employment opportunities. This mass exit of community members will have both short and long term negative and lasting impacts Additionally, the EIS already identifies the various impacts the Project will have on Highway 155, which includes, increased volume of traffic, congestion, noise, debris, vibrations, pollution as well as the movement of	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			dangerous goods. As Highway 155 is the only access road for Île-à-la-Crosse, clearly all of these factors will have an impact upon Île-à-la-Crosse and its residents. Given the forgoing, we see no logical reason or rational for specifically excluding Île-à-la-Crosse from the LPA and the establishment of the new Cut-off Point, as compared to the historic engagement area. Île-à-la-Crosse requests that it be added and included in the LPA.	
388.	Île-à-la-Crosse (October 12, 2022)	Table 1.2-1	In reviewing Table 1.2-1 we believe that the following Rationales would equally, if not more so, apply to our Métis People: Île-à-la-Crosse in comparison to the include Metis Communities: Proximity to the Project; Potential land use in proximity to the Project; Potential overlap with traditional territory; and increase Project-related traffic. Our historical Métis Community: Île-à-la-Crosse is approximately 320 km from the Project in terms of proximity, making it closer than or equal to two of the other Primary Indigenous Groups, and closer to the Project than <u>all</u> the “other Indigenous Groups” identified in the EIS The EIS already identifies the issues and impacts in terms of potential land use in proximity to the Project, potential overlap with traditional territory in increased Project-related traffic, all of which would equally, if not more so, apply to our historical Métis community: Île-à-la-Crosse. Île-à-la-Crosse is not satisfied with its exclusion from the Local Priority Area in the exclusion of our Métis people as a Primary Indigenous Group identified for full engagement. Île-à-la-Crosse has historically been engaged on mining projects in northwest Saskatchewan, is in close proximity to the Project, and will be impacted by the Project. Île-à-la-Crosse therefore requests that the LPA be expanded to include Île-à-la-Crosse and the Métis people of Île-à-la-Crosse be identified as a Primary Indigenous Group.	
389.	Athabasca Chipewyan First Nation (ACFN)		The EIS hydrology and climate-change components contain data and assessment gaps and methodological deficiencies that likely mean EIS effects assessments are unreliable and may underestimate potential effects.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on [Canadian Impact Assessment Registry reference: 80171](#))	NexGen Response
	(October 28, 2022)		Shortcomings in methods involve model validation, characterization of future climates in effects assessments and temporal scope for change in future climates.	
390.	ACFN (October 28, 2022)	Section 9.2.6.1	Inadequate baseline data, particularly at Project-specific monitoring stations undermines the reliability of outputs from hydrologic simulation modelling, particularly for smaller streams.	
391.	ACFN (October 28, 2022)		A predevelopment baseline is not provided. In the absence of a pre-development baseline, explain how cumulative effects on Traditional-use activities can be fully and appropriately determined.	
392.	ACFN (October 28, 2022)	Section 9.2.6.1	The absence of systematic documentation of Indigenous navigability and its requirements is of concern given the importance of water-based access for carrying out Traditional-use activities.	
393.	ACFN (October 28, 2022)	Section 9.2.6.2.6; Section 9.8; Section 9A5	Confirm whether the hydrologic model was validated at non-regional scales. If it wasn't validated, also explain why it was subsequently applied in the EIS effects assessments at these non-regional scales.	
394.	ACFN (October 28, 2022)	Appendix 22A5.1; Section 9.4	Revise EIS section 9 (hydrology) to include the range of future climates, carrying forward this range through to the end of the effects assessments.	
395.	ACFN (October 28, 2022)	Section 9.2.7; Section 6.10; Appendix 22A	a) Revise the future projected climate to include the full extent of climate change expected during Project lifespan – ie, to 2067 rather than to 2055. b) Revise EIS section 9 (hydrology) to include the full temporal range of projected climates (to 2067) carrying forward this range through to the end of the effects assessments.	
396.	ACFN (October 28, 2022)	Section 6.3.1 (p6-12), Section 6.3.2 (p6-12); Section 9 Executive Summary (pi-iii); Section 9.3.2.1 (p9-39 & 9-40); Section 9.3.2.2 (p9-48 to 9-51); Section 9.3.6 (p9-58); Section 9.6.3 (p9-85 to 9-91); Section 16.2.2.3	Provide an Indigenous navigation effects assessment including a thorough and systematic description of the navigation requirements of Traditional-use activities.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on [Canadian Impact Assessment Registry reference: 80171](#))	NexGen Response
		(p16-15); Section 16.2.7 (p16-26); Section 16-5		
397.	ACFN (October 28, 2022)	Section 9.8; Section 9.2.11	Given the short duration of the Project-specific baseline data, the inappropriate consideration of projected climates within the effects assessments, and the lack of RSA model validation at non-regional scales, explain how the EIS can justify claiming a high confidence for its hydrology predictions.	
398.	ACFN (October 28, 2022)	10.2.8.3.3 Productivity Status Thresholds, p. 10-48 to 10-49 Table 10.2-8 10.3.1.3 Productivity Status Constituent Concentration, p. 10-62 to 10-64 Table 10.3-7	Please revise the total phosphorous water quality Project Threshold to 10 µg/L, from 20 µg/L.	
399.	ACFN (October 28, 2022)	10.2.8.3.4 Sediment Quality Thresholds Table 10.2-9	Please explain why sediment quality Project Thresholds were not selected for constituents with existing guidance thresholds available.	
400.	ACFN (October 28, 2022)	10.3.1.2 Water Quality (Risk to Aquatic Life and Terrestrial Life) and Drinking Water Quality Constituent Concentrations, p. 10-57 10.3.1.3 Productivity Status Constituent	a) Please revise the water and sediment quality data compilations and related analyses, so that censored data points are not substituted at all. Please instead use the above-mentioned newer and more robust approaches for the water and sediment quality data used in this study. b) For any future monitoring, please plan analytical sample analyses accordingly, so that whenever possible detection limits are not near to or above the applicable thresholds. In interpreting data, please note that there is a large degree of uncertainty inherent in values near the detection limit, including when detection limits are below but close to thresholds.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
		Concentration, p. 10-62		
401.	ACFN (October 28, 2022)	10.3.2 Sediment Quality	Please clarify – were sediment concentration data standardized to particle size for the purposes of sediment quality QA/QC and comparisons or summaries between sites and years?	
402.	ACFN (October 28, 2022)	10.3.1.2 Water Quality (Risk to Aquatic Life and Terrestrial Life) and Drinking Water Quality Constituent Concentrations Tables 10.3-3 through 10.3-6, p. 10-58 to 10-61	a) Please justify the pooling of the site data in calculating and presenting base case summary statistics, including as a base case for further impacts assessment steps. b) If this pooling cannot be justified, please recalculate and present summary statistics for each lake, lake basin (in the case of Patterson Lake), and each river sampling site separately.	
403.	ACFN (October 28, 2022)	Section 10: Surface Water Quality and Sediment Quality	Please refrain from refer to existing or base case conditions as "naturally occurring" or "natural" without supporting evidence. It is contrary to the stated assessment approaches and methods and is also invalid.	
404.	ACFN (October 28, 2022)	10.4 Project Interactions and Mitigations Table 10.4-1	Please include in the impact assessment an assessment of the potential for acidification of lakes and rivers as a result of emissions from the Project depositing to surface water systems.	
405.	ACFN (October 28, 2022)	Section 10.2.5, p. 10-20	Please explain the decision to remove consideration of Project effects on sediment quality following the life of the Project. Why would water quality effects continue, but not sediment quality effects?	
406.	ACFN (October 28, 2022)	Table 6A-1, p. 2 10.5.2.1.6 Climate Change Sensitivity Scenario, p. 10-110 to 10-112	a) Please clarify, were climate change-induced effects on surface water temperatures included in climate change scenarios assessed for Project and cumulative effects? b) If the answer is no, please include climate change-induced effects on surface water temperatures in the assessment of impacts to water quality and surface water systems from the Project, other developments and climate change.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on [Canadian Impact Assessment Registry reference: 80171](#))	NexGen Response
407.	ACFN (October 28, 2022)	10.4.2 Secondary Pathways, p. 10-71	Please confirm that snow quality will be monitored in future to confirm that air emissions to land and subsequently to surface water systems is unlikely to result in non-negligible residual effects on surface water and sediment quality.	
408.	ACFN (October 28, 2022)	10.5.1.2.6 Sensitivity Analysis, p. 10-96 Figure 10.5-12	a) Please remove the final sentence in the paragraph proceeding Figure 10.5-12. It is scientifically invalid. b) Please assess the predicted trophic status shift in the Patterson Lake basins for residual effects, without explaining away the likelihood of such a shift. This applies to the Application Case reasonable upper bound and the cumulative (RFD) scenarios. c) Please note that, in light of the above, the following statement in Section 10.5.3.1.1 (p. 10- 114) appears to be incorrect: "The Project effects on the measurement indicators during the lifespan of the Project for the reasonable upper bound sensitivity scenario would be consistent with the effects described for the Application Case, albeit with higher projected COPC concentrations." This statement fails to acknowledge the predicted shift in trophic status under the reasonable upper bound scenario. Please revise it to include this predicted impact.	
409.	ACFN (October 28, 2022)	10.5.3 Residual Effects Classification, p. 10-112 to 10-113	Please clarify, of the mitigations listed in point form in section 10.5.3, where any included in the predictive models, especially the Project site wide model? If any were included in the model and subsequently the model predictions, then would any of these mitigations contribute to a further decrease when determining residual effects?	
410.	ACFN (October 28, 2022)	10.5.3.1.1 Application Case, p. 10-113 to 10-114	a) Please clarify, are predicted changes to each COPC in water under the Application Case ad RFD scenario expected to return to base case concentrations, or reach a pseudo-steady state? If it is the latter, will the pseudo-steady-state establish at a concentration higher than the base case or the Project threshold? A table might help to present the results for each COPC. b) In each case, please clarify, are the effects considered reversible?	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
411.	ACFN (October 28, 2022)	10.6.1.4 Regional Surface Water Quality Model, p. 10-123	In a discussion of the regional surface water quality model, NexGen claims that the prediction of effects from the nearby Fission Project were conservative, in part because effluent concentrations from the Fission project were assumed to be equivalent to the median effluent concentrations from the Project. But, why would an assumption like that, using the median quality from another project, be considered conservative? Please explain, how is the approach discussed above conservative, and not just reasonable?	
412.	ACFN (October 28, 2022)	Section 1.3.4; 15.2.8	a) Please update section 1.3.4 to include available federal human health and ecological risk assessment guidance documents, and b) Confirm that federal health risk assessment guidance was relied on to conduct the HHRA (Section 15) and ERA (TSD XXI), please specify where federal guidance was modified or not adopted to undertake the ERA	
413.	ACFN (October 28, 2022)	Section 15.2.8.2; 4.2.3; 4.3.3	a) It is requested that the proponent re-evaluate the predictive modelling data for air, surface water (end of pipe), sediment and soils in the ERA to first identify bioaccumulative and persistent substances as per CEPA Persistence and Bioaccumulation Regulations (SOR/2000-107) and include these as COPCs, without the application of any additional screening criteria. b) If the proponent chooses to identify COPCs by comparing predicted concentrations of COPCs to screening values, it is requested that additional criteria from the US EPA and WHO be included.	
414.	ACFN (October 28, 2022)	15.2.3 (Table 15.2-2; Figure 15.2-1); 14.2.4	a) It is requested that the proponent provide a summary of ACFN identified issues related to the spatial and temporal boundaries and predicted concentrations of COPCs in air, soil, and water modelling (Sections 6,7,8,9,10,11, 12, 13, and 14). b) Based on the summary of issues, it is requested that the proponent update the ERA (TSD XXI) and the HHRA (Section 15) accordingly and c) Provide a summary of how updates based on ACFN comments affected the predicted risks (i.e. HQs, ILCRs, Radiation Dose) in the HHRA.	
415.	ACFN (October 28, 2022)	Section 15.2.5	It is requested that the proponent provide an additional assessment case “pre development” and results from this additional assessment case are used to develop risk-based adaptive monitoring, management and mitigation plans	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			that address cumulative effects and support collaboration between industrial stakeholders to reclaim the environment to pre disturbance condition.	
416.	ACFN (October 28, 2022)	TSD XXI, Section 15	It is recommended that the proponent adjust the Project life to align with outputs from the predictive modelling which indicate project related contaminants released from the UGTMF and waste rock seepage to groundwater may intercept Patterson Lake and affect surface water quality and risks to human health from contamination of traditional foods from 77 to > 1000 years. At a minimum, the ERA should extend to 77 years when groundwater influences from the waste rock pile are predicted to discharge to the south end of Patterson Lake and would overlap with the predicted future development case.	
417.	ACFN (October 28, 2022)	TSD XXI, Section 15	Please provide a comparison of the predicted risks from exposure to the project only scenario to the scenario which accounts for exposure to baseline conditions and the project related effects by comparing to the hazard quotients (HQ) of 1.0 (for all exposure pathways) to indicate if the adopted methods are a representative measure of the predicted risks to human health.	
418.	ACFN (October 28, 2022)	TSD XXI, Section 15	It is recommended that the screening process to identify COPCs associated with surface water, sediment, air ,and soil be re-evaluated to consider complex mixtures as per Health Canada guidance and identify individual COPCs and mixture based COPC classes that reflect similar target organs/ effects/ mechanism of action and that these new COPCs be reflected in an updated HHRA and EcoRA	
419.	ACFN (October 28, 2022)	TSD XXI, Section 15	a) Please clarify if the screening process identified COPCs which exceeded screening values at each of the identified areas (end of pipe, boundary of mixing zone, runoff) or if a COPC was only identified if predicted concentrations exceeded at each of the areas **b)** If the response indicates that COPCs were identified only if predicted concentrations exceeded screening values at the end of pipe and boundary of the chronic mixing zone, please re-screen the predicted concentrations and identify COPCS as those project related contaminants which exceeded screening values at the end of pipe.	
420.	ACFN (October 28, 2022)	TSD XXI	It is recommended that the air quality guidelines (AQGs) published by the WHO be added to the sources of air quality screening values and considered in the selection of final screening values to identify air related COPCs.	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
421.	ACFN (October 28, 2022)	TSD XXI	a) Please provide rationale describing how the air dispersion modeling study is representative of long-term exposures and supports the assessment of health risks. b) It is recommended that the air dispersion modelling be updated to a 3-year period to allow for comparison to federal air quality standards (CAAQS) and that this comparison be undertaken and results reflected in the EIS	
422.	ACFN (October 28, 2022)	TSD XII	a) It is recommended that the ERA be updated with soil screening values derived using the CCME (2006) guidance for metals associated with air deposition of total suspended particles, b) the derived values be included in the screening process to identify air associated COPCs, and c) the HHRA be updated to reflect any additional COPCs which were identified though this conservative approach	
423.	ACFN (October 28, 2022)	TSD XXI	a) It is recommended that the ERA be updated with all known carcinogenic substances as per Health Canada toxicity reference values (TRV) guidance (2021) b) It is recommended that the HHRA be updated to reflect carcinogenic substances which may act through additive mechanisms.	
424.	ACFN (October 28, 2022)	Section 13	a) Please explain which non-native plant species may be used in reclamation and why that species would be used instead of a native plant species. **b)** For each non-native plant species to be used, explain how that species will be prevented from becoming established within the reclaimed plant community and altering species composition relative to pre-disturbance.	
425.	ACFN (October 28, 2022)	Section 13	Please provide evidence from the scientific literature that the mitigations for fugitive dust and constituent emissions will be successful in preventing dust or other emissions from coating the leaves of plant species in the vicinity of Project construction and operations activities	
426.	ACFN (October 28, 2022)	Section 13	Please provide evidence from the scientific literature that mitigations for fugitive dust and constituent emissions are effective at preventing significant impacts on the nutritional quality, growth, and survivorship of plant species,	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			particularly those that have been shown to be sensitive to dust and other emissions.	
427.	ACFN (October 28, 2022)	Section 13	If site roads and the haul route from the headworks to the waste rock piles are unpaved, please provide justification for why the speed limit of 25 km/hr will not apply in these areas.	
428.	ACFN (October 28, 2022)	Section 13	Will all other mitigations in the Project effects pathway (Table 13-4.1) be applied to site roads and the haul route from the headworks to the waste rock piles to prevent dust, radon, and other emissions from being generated and impacting nearby plant species?	
429.	ACFN (October 28, 2022)	Section 13	Please explain how NexGen will promote propagation and regeneration	
430.	ACFN (October 28, 2022)	Section 13	Please provide evidence from the scientific literature or data from other projects to show the effectiveness of the techniques used to promote propagation and regeneration.	
431.	ACFN (October 28, 2022)	Section 13	Given the prevalence of invasive species in the disturbed areas of the Project, and their prevalence in human-disturbed areas generally, including in reclamation sites, will NexGen consider carrying forward the invasive species pathway in the assessment of Project effects?	
432.	ACFN (October 28, 2022)	Section 13	Given that many of the predominant species (i.e., lichens, mosses) found in the plant communities to be disturbed by the Project footprint, including traditional use plant species, are difficult to re-establish in reclamation, please provide justification for the prediction that the impacts on the availability of upland and riparian ecosystems are reversible.	
433.	ACFN (October 28, 2022)	Section 13.5.5	Please provide evidence from the scientific literature that the plant species that predominate pre-disturbance plant communities (e.g., lichen, feathermosses) can be reestablished within reclamation sites in the boreal forest.	
434.	ACFN (October 28, 2022)	Section 6.5	Please quantitatively assess changes in wildlife habitat from pre-disturbance to existing conditions to understand the degree and rate of change in wildlife habitat quality and quantity. If not, please provide rationale.	
435.	ACFN (October 28, 2022)	Section 14.2.2	Please discuss further how Project Application and RFD impacts on upland and wetland ecosystems are indicative of impacts on grouse and ptarmigan.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
436.	ACFN (October 28, 2022)	Section 14.2.2	Please summarize magnitude of Project and RFD impacts to fisher and marten given the predictions and significance outcomes for caribou, little brown myotis and upland habitats assessments.	
437.	ACFN (October 28, 2022)	Section 14.4	Please provide explanation as to how the effluent treatment plant (ETP) final diffuser design will mitigate changes to ice thickness.	
438.	ACFN (October 28, 2022)	Section 14.2	Please clarify what species were included in the ecological risk assessment.	
439.	ACFN (October 28, 2022)	Section 14.2	Please describe what wildlife species will be monitored and how they will be monitored to verify the predictions in the risk assessment.	
440.	ACFN (October 28, 2022)	Section 14.4	Please discuss whether the PM10 exceedances may pose a risk to wildlife that consume aquatic vegetation.	
441.	ACFN (October 28, 2022)	Section 14.4	Please define what “adverse” effects represents.	
442.	ACFN (October 28, 2022)	Section 14.4	How will NexGen monitor for potential changes in wildlife habitat availability and quality due to these predicted exceedances, particularly for woodland caribou.	
443.	ACFN (October 28, 2022)	Section 14.5	In addition to the discussion of habitat distribution under the Application and RFD cases, please provide further details on size of the suitable habitat patches and distance between these habitat patches from the LSA for each wildlife VC.	
444.	ACFN (October 28, 2022)	Section 14.5	Please provide connectivity analyses as part of the impact assessment. If not, provide ecologically supported rationale for not doing so.	
445.	ACFN (October 28, 2022)	Section 14.4	Please discuss mortality risk for smaller wildlife VCs in the residual effects assessment.	
446.	ACFN (October 28, 2022)	Section 14.4	How will mitigation effectiveness be assessed given that smaller species may be under reported or unknown at the time of collision?	
447.	ACFN (October 28, 2022)	Section 14.2	What other movement corridors were identified in the RSA that would support wildlife movement due to the loss of the narrows, and the area between Patterson Lake and Forrest Lake? Please identify areas on a map	
448.	ACFN (October 28, 2022)	Section 14.2	What feedback was shared from the Indigenous working groups regarding the removal of these areas and its impact to wildlife and member access/movement for traditional activities.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
449.	ACFN (October 28, 2022)	Section 14.2	How did the impact assessment consider Indigenous values and importance of the movement route in the impact significance determination?	
450.	ACFN (October 28, 2022)	Section 14.7	Please discuss how wildlife use of reclaimed habitat will be assessed in follow up programs.	
451.	ACFN (October 28, 2022)	Section 14.7	Provide an outline of what predicted impacts the monitoring program for wildlife will address and methods for studying those impacts.	
452.	ACFN (October 28, 2022)	Appendix 14B	Can the classification of burns be modified to correspond with optimal moose habitat to make the moose HSI more accurate?	
453.	ACFN (October 28, 2022)	Appendix 14B	Is there any forestry activity in the area that needs to be considered in the HSI?	
454.	ACFN (October 28, 2022)	Appendix 14B	Can the HSI model be adjusted to reflect the ecological interaction of recently logged or burned areas (moose forage) with roads (predator access)?	
455.	ACFN (October 28, 2022)	Appendix 14B	Are pools of existing data and scientific consensus regarding moose populations available for the area?	
456.	ACFN (October 28, 2022)	Appendix 14B	Are other moose models available for a similar region that have been developed with validation?	
457.	ACFN (October 28, 2022)	Appendix 14B	Can additional pre-disturbance data be collected for the purpose of model validation?	
458.	ACFN (October 28, 2022)	Appendix 14B	Please provide a brief justification / explanation for the application of the various zone of influence (ZOI) distances for each Valued Component and disturbance type.	
459.	ACFN (October 28, 2022)	Appendix 14B	Please provide information on the overall level of linear disturbance in the RSA.	
460.	ACFN (October 28, 2022)	Appendix 14B	Consider that wolf use of linear features may change depending on the overall amount of linear disturbance in the landscape. Does this change any of the classifications of existing disturbance in the wolf habitat models?	
461.	ACFN (October 28, 2022)	Section 14.5.13	Please quantitatively assess changes in biodiversity including providing metrics on existing biodiversity in the study area compared to similar areas in the region	
462.	ACFN (October 28, 2022)	Section 1.2.3	Section 1.2.3 of the EIS makes a distinction between Local, or Primary, Indigenous Groups, and Other Indigenous Groups. ACFN is identify as an "Other Indigenous Group". The Rationale for this is cited in Table 1.2-2 and	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			includes the following statement/bullet point: "Potential overlap with traditional territory but no access link or known residency/land use." This statement is factually incorrect, as ACFN maintains active use in the area. 1) Please explain what information was used as the basis for the above statement, and provide references, if any to these sources of information 2) Please describe what efforts were undertaken, if any, to confirm the above statement directly with ACFN	
463.	ACFN (October 28, 2022)	Section 1.3.2	Please indicate whether any meetings were held, whether in person or virtual, with ACFN Leadership, Staff, or Community, to enable dialogue regarding the Project and how ACFN could be potentially affected by it.	
464.	ACFN (October 28, 2022)	Section 1.3.2	Section 1.3.2 of the EIS states "NexGen's approach to the EA process has been focused on enabling dialogue with and seeking feedback from Indigenous Groups who could be potentially affected by the proposed Project". On the basis of inaccurate information, NexGen categorized ACFN as an "Other Indigenous Group" and sought only to inform ACFN of the project. Through inclusion of ACFN as an "Other Indigenous Group", NexGen acknowledges that ACFN "could be potentially affected by the proposed Project". However, NexGen did not demonstrate effort or interest in enabling dialogue with ACFN, for the purpose of seeking ACFN's input." Please describe what efforts were undertaken, if any, to confirm the above statement directly with ACFN prior to including it in the EIS.	
465.	ACFN (October 28, 2022)	Section 2.4.1	Please provide further rational for determining ACFN as a group who would not require the same level of consultation as a primary Indigenous group	
466.	ACFN (October 28, 2022)	Section 2.4.1	Please enter into a full Study Agreement with ACFN, which would commence with ACFN undertaking a TLU/IK study to further enhance NexGen's understanding of ACFN's use and ACFN's indigenous knowledge. This information, and subsequent studies as deemed relevant, must then be	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			used to re-evaluate the EIS, including relevant impact predictions and proposed mitigations.	
467.	ACFN (October 28, 2022)	Section 2.4.1	NexGen identified ACFN as having "Weak Claim" on the basis of the statement that there is "no access link or known residency/land use", which is inaccurate and incorrect. Even if this statement was accurate, NexGen has entered into study agreements with other communities who are classified as "Other" Indigenous Groups at an "inform" level. Please enter into a study agreement with ACFN to provide TLU/IK Study, site visits, meetings with ACFN and ACFN leadership.	
468.	ACFN (October 28, 2022)	Section 2.5.2	**1)** Please provide information on the reclamation-related caribou research project. **2)** Please include ACFN in the reclamation-related caribou research project.	
469.	ACFN (October 28, 2022)	Section 2.5.2	The following is stated in the EIS as an example of collaboration and engagement: "NexGen has maintained an open-door policy of informing as a minimum and continues to regularly provide groups with opportunities for enhanced engagement options that range from consult to collaborate participation levels, as appropriate." The above statement is false as ACFN has requested funding for a study in 2019 and was denied funding. Please include ACFN as a full participator in this process	
470.	ACFN (October 28, 2022)	Section 2.5.5	Please explain what efforts NexGen will undertake to engage with ACFN, including providing ACFN with site visits, meetings and other project-information sharing activities, and meetings with ACFN Leadership	
471.	ACFN (October 28, 2022)	Section 2.7.1.1	The following activities NexGen's planned engagement with ACFN: - Joint Working Groups - Joint Working Group Summaries - Joint Working Group Breakout Sessions - Indigenous Group Leadership and Staff - Benefit Agreements	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			ACFN has not been included in any of the above engagement opportunities to date **1)** Please provide an invitation to join the working groups **2)** Please include ACFN on any indigenous collaboration efforts as a priority Indigenous Group	
472.	ACFN (October 28, 2022)	Section 2.5.5, 2.6.1.2.2, 3.1.1	Please include ACFN within the local priority area.	
473.	ACFN (October 28, 2022)	Section 2.5.2 2.5.5, 2.6.1.2.2, 3.1.1,6, 7, 8, 9, 10, 11, 12 ,13, 14, 15, 16, 17, 18, 19	Please enter into a study agreement with ACFN to provide TLU/IK Study, site visits, meetings with ACFN and ACFN leadership.	
474.	ACFN (October 28, 2022)	Section 3.1.1	NexGen states: "The inclusion of Indigenous and Local Knowledge in the EA aligns with the Government of Canada's commitment to advancing reconciliation through a renewed relationship based on the recognition of rights, respect, cooperation and partnership" Please provide instances in which NexGen illustrated reconciliation with ACFN when it comes to rights, respect, cooperation, and partnership.	
475.	ACFN (October 28, 2022)	Section 3.2.1	ACFN is highly active in the project area and practices our treaty rights within the territory and will be affected by the proposed Project. Though the above-mentioned regulatory bodies (CNSC, Government of Saskatchewan) have not identified ACFN as a primary Indigenous group it still does not excuse the lack of adequate consultation. Please provide further references to the selection of priority Indigenous Groups	
476.	ACFN (October 28, 2022)	Section 3.2.1.6	The ACFN's homelands are mapped along the boundary of the Firebag River south of Lake Athabasca and west of the Project.	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			The map referenced is not part ACFN's consultation policy. The map referenced shows ACFN priority protection area's and protecting the Woodland Caribou, barren ground Caribou, and wood bison within the consultation map. The map referenced is not a comprehensive area of ACFN consultation zones. Please provide the rationale for determining ACFN territory without adequate consultation with ACFN	
477.	Métis Nation – Saskatchewan (MN-S) (October 19, 2022)	1.1.1, p. 1-1 to 1-3, Figure 1.1-1	NexGen describes itself as holding a portfolio and shows in Figure 1.1-1 that the locations of the assets are very close to one another. Effects from exploring or developing all of these assets would accumulate. The list of Reasonably Foreseeable Developments (RFDs) included in the draft EIS does not include these other exploration activities. Inclusion of NexGen's exploration activities into the cumulative effects assessment is recommended.	
478.	MN-S (October 19, 2022)	1.1.6, p. 1-12	"Key themes NexGen has heard and addressed include: … • continued, effective, and respectful engagement with the local communities through all phases of the Project, including consideration of valuable feedback; …" In May 2021, MN-S indicated to NexGen their preferred approach to engaging, which included early (pre-submission) sharing of EIS contents. Sharing of courtesy copies of the draft EIS during the conformity period was another request that MN-S made of NexGen. NexGen chose to work primarily within the formal regulatory process for MN-S' comments on the draft EIS contents, rather than sharing early drafts or courtesy copies. This suggests that NexGen's definition of "continued, effective, and respectful engagement" has not always fully considered MN-S' perspectives.	
479.	MN-S (October 19, 2022)	1.2.1, p.1-16	"NexGen will continue to prioritize training, employment, and business opportunities for the communities closest to the Project."	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			This statement is aspirational and does not address the specifics of how such economic benefit would be prioritized. CEAA 2012 does not require a detailed and quantified assessment of positive effects, so this text meets regulatory requirements, but does not provide confidence that 1) NexGen has indeed been successful on prioritization of training, employment, and business opportunities according to communities' definitions and expectations; and 2) NexGen has specific mechanisms in place for prioritizing local economic content.	
480.	MN-S (October 19, 2022)	1.2.1, p.1-17	"In addition to payments to the provincial and federal governments, Benefit Agreements signed with Indigenous Groups include payments based on revenue generated throughout the Project lifespan." As of review of this EIS during August 2022, MN-S had not completed agreements with NexGen. As the Project maps show, the Project is in the heart of the Métis Homeland, and the closest communities to the Project have a majority Métis population.	
481.	MN-S (October 19, 2022)	1.2.2, 1-21	Figure 1.2-2 Regional Area of the Rook I Project Given the figure's title as "regional area," it seems unusual to leave out the boundary of the Clearwater River Provincial Park, whose boundaries appear to overlap with the spatial area shown. Request - Inclusion by NexGen of the boundary of Clearwater Provincial Park in Figure 1.2-2, Regional Area of the Rook I Project	
482.	MN-S (October 19, 2022)	1.2.2-1-23	Figure 1.2-4 Active Mineral Dispositions in the Area of the Rook I Project This map reinforces the concern that NexGen has not included its own exploration activities in the list of Reasonably Foreseeable Developments (RFDs) to be considered as part of the cumulative effects assessment.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			NexGen has an active ongoing exploration program related to other deposits in the area, as MN-S is aware of through provincial permit applications that included items such as camp enhancements and an airstrip.	
483.	MN-S (October 19, 2022)	2.3.1, 2-10	"Target specific engagement to Indigenous Groups where NexGen has been informed of their particular interest in aspects of the Project and level of engagement desired." In mid-2021, MN-S shared a document with NexGen that indicated the sequence of engagement activities and expectations for level of engagement on various topics. Several the expectations outlined at that time were not met, such as early sharing of drafts of EIS chapters for discussion and consideration before submission through the formal regulatory process. NexGen's interest in targeting engagement upon request from Indigenous Nations has been somewhat selective.	
484.	MN-S (October 19, 2022)	2.4.2.2.1, 2-23	"… lesbian, gay, bisexual, transgender, queer or questioning, and two-spirit plus." The word "people" appears to be missing from the end of this sentence. In Joint Working Group meetings between MN-S and NexGen, MN-S representative repeatedly indicated concern for various ways in which the company and the camp would be respectful and inclusive to a variety of people and groups. Small things such as word choice have the potential to affect the impression this draft EIS creates for NexGen's inclusivity and genuine value for diversity. Also note that this text appears misplaced within the document structure. Members of the queer community (as well as Elders, youth, etc. and all the groups indicated in the same bulleted list) are not just members of the public, but members of rights-holding Indigenous Nations. Understanding of intersectional, layered identities should be considered in the understanding of Indigenous Nations.	
485.	MN-S (October 19, 2022)	2.5, 2-25 Figure 2.5-1	The use of the International Association of Public Participation (IAP2) spectrum together with the explanatory text is vague and potentially	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			misleading; particularly in indicating that the proponent used a variety of techniques from inform to empower. According to IAP2, a proponent reaches the level of "collaborate" and "empower" when affected groups can influence project outcomes. Collaborating on the agenda for a meeting is not the same as collaborating on detailed mitigation measures for Project impacts. This text also contradicts the text in 1.0 Introduction, which states that NexGen wishes to "consider input" from Indigenous Nations. "Considering input" is firmly at the level of "consult/involve."	
486.	MN-S (October 19, 2022)	2.5.2.1, 2-31	"NexGen has honoured the MN-S request to conduct engagement through MN-S …" Following the procedures of a rights-bearing Nation's government should not be described as an "honour," nor should MN-S' notification about correct process be viewed as a request. It is simply following MN-S procedure.	
487.	MN-S (October 19, 2022)	2.5.5, 2-37	Incorporation of Indigenous and Local Knowledge "For the purposes of the Project EA, Indigenous Knowledge is specifically defined as information sanctioned (i.e., authoritative permission or approval given) by an Indigenous Group as an official statement, document, or position." This definition does not align with CEAA 2012 guidance on Aboriginal Traditional Knowledge (ATK). Detailed comments on this definition are made in comments on Section 3 Indigenous and Local Knowledge.	
488.	MN-S (October 19, 2022)	2.6.1.1.1, 2-41	"The MN-S paused their participation in Joint Working Groups in December 2020 and reengaged in May 2021 with a restructured Joint Working Group membership that included a combination of new members and existing members from the original Joint Working Group. As part of this restructuring process, the MN-S communicated in early May 2021 that a two-month meeting cadence would be their preference, and provided a list of topics of interest for discussion." The reasons for the hiatus have not been documented. In December 2020, MN-S indicated that it was keen to see more technical participation in the	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			Joint Working Group process. The Joint Working Group was restructured to provide additional technical support to engage with NexGen on the topics of interest. Some of the topics that MN-S noted in May of 2021 were of interest were discussed through the Joint Working Group (e.g., caribou and a revised presentation on the Project Description), as evidenced by the Joint Working Group meeting minutes. Many of MN-S' preferred topics were not discussed through the Joint Working Group. Among the topics not discussed were • early contents of baseline studies, • identified effects, and • mitigation measures. As such, the EIS is the first time that MN-S is understanding in detail the work that NexGen has done to understand and manage its impacts.	
489.	MN-S (October 19, 2022)	2.6.1.1.1, 2-42	Table 2.6-3 Joint Working Group Meeting Topics "Information sent" (regarding 2021 Joint Working Group Meeting Topics) Sending information does not constitute collaborative, two-way engagement, which NexGen elsewhere in the draft EIS says it wishes to conduct. Sending documents that cover a variety of communities, such as a PDF entitled "Joint Working Group summaries", does not indicate that each Nations followed its own sequence of, and approach to, topics covered under the Joint Working Group process.	
490.	MN-S (October 19, 2022)	2.6.1.1.1, 2-43	Table 2.6-3 Joint Working Group Meeting Topics • "Baseline studies, • Terrestrial, • Aquatic, • Environmental interactions (i.e., pathways)	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			• Cumulative effects …" Identified as not applicable ("n/a") for MN-S. It is not apparent from Joint Working Group meeting minutes, when fulsome, science-backed conversations on these topics took place through the Joint Working Group with MN-S. Request: Detailed account of the time and forum through which a two-way conversation on the topics listed in Table 2.6-3 Joint Working Group Meeting Topics took place.	
491.	MN-S (October 19, 2022)	2.6.1.1.1, 2-45 Overall organization of the section	This section is organized from the proponent perspective and describes a summary of all activities. It is not organized to allow one Nation to see whether the narrative of how they were engaged is complete and accurate. Request: Organization of Section 2.6.1.1.1 Summary of Joint Working Group by Nation and description of activities on a Nation-by-Nation basis.	
492.	MN-S (October 19, 2022)	2.6.1.2.1, 2-46	"Communities stated that working together with NexGen towards a harmonious and prosperous future is the desired outcome, and communities appreciate the opportunity to discuss the Project and work with NexGen." It is unclear from existing documentation when NexGen believes MN-S joined with any other Nation to present a joint or collective opinion that it thought reflected "communities". In fact, during early Joint Working Group processes, MN-S specifically indicated an interest in joining with other Nations to share information regarding the Project. This request was not explored in detail. The collective implication of this statement does not appear to be accurate. Request: Rewording of the text in Section 2.6.1.2.1 to reflect perspectives from individual Nations rather than broad wording that gives the impression it reflects all Nations.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
493.	MN-S (October 19, 2022)	2.6.3.1.1, 2-55	"A series of community information sessions were held in 2019. Subsequent community information sessions planned for late 2021 and early 2022 have not been conducted due to Covid-19 and the ability to maintain the health and safety of participants." These community information sessions were conducted well before the studies to inform the draft EIS were complete. Community information sessions documented in the draft EIS did not address Project impacts or mitigation measures. Request: Creation of a documented plan for NexGen to engage on the Project's impacts and mitigation measures while the EIS remains in draft form and before it is finalized. During the time this plan is being developed and implemented, MN-S seeks a parallel process for engagement and forums for MN-S to engage its own citizens and understand their concerns.	
494.	MN-S (October 19, 2022)	2.6.3.1.1, 2-55	"A series of community information sessions were held in 2019. Subsequent community information sessions planned for late 2021 and early 2022 have not been conducted due to Covid-19 and the ability to maintain the health and safety of participants." Given the large number of Métis citizens in the communities engaged in the 2019 sessions, there is an opportunity through such public engagements to share information on the Project with citizens. While this would not constitute engagement with MN-S as a rights-holding government, it would be a method of sharing information that could help citizens understand the Project. NexGen would not yet have had information to share regarding the Project's impacts and mitigation measures as the EIS was under completion during 2019, the only time NexGen has undertaken community-facing engagement. Not engaging with potentially affected communities about impacts and mitigation measures, but only engaging on the project description, is not in line with good practice.	
495.	MN-S (October 19, 2022)	2.6.3.1.3, 2-59	Table 2.6-12 Summary of Youth Workshop Survey Responses	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			"What Would You Still Like to Know About the Project? • How it will affect the land • That communities will be kept updated on progress • What happens once the mine closes • Potential effects on water • If there will be potential pollution" This table describing youth engagement in March 2020 lists several concerns and questions regarding the Project and does not describe how NexGen planned to respond to youth with relevant information that addresses these fears.	
496.	MN-S (October 19, 2022)	2.6.3.1.8, 2-61	"Key newsletter content included a Project overview and key Project components, commitment to protection of people and the environment, community programs, education and training requirements, jobs and opportunities, and next steps in the EA process." This list of topics does not appear to include anticipated Project effects and mitigation measures, as well as other topics that are part of the EIS.	
497.	MN-S (October 19, 2022)	2.6.3.1.8, 2-61	"As the La Loche office has regular business hours, it also allows community members to engage at a time of their convenience." Regular business hours are typically Monday to Friday, 9–5. These hours can be inconvenient for many people, including individuals with regular work commitments and those with ongoing caregiving responsibilities that do not allow them to easily drop into an office during working hours, when other family members who could fill in as caregivers may be working. If NexGen has tried to make itself available on an ongoing basis to working people and those with caregiving responsibilities, this would support NexGen's claims	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			elsewhere in this chapter that it supports engagement with a diversity of people.	
498.	MN-S (October 19, 2022)	2.7.1.1, 2-64 General comment on text under this heading	The content in this section does not indicate topics for engagement, timing, frequency, or approach.	
499.	MN-S (October 19, 2022)	2.7.1.1, 2-64	"Items for discussion will be based on activities in progress, as well as any specific items of discussion requested by Indigenous Groups." This description of the Joint Working Group process does not align with the fact that NexGen has already declined MN-S' request to discuss baseline findings, project effects, and mitigation measures before the EIS was submitted. MN-S has already made requests to discuss certain topics through the Joint Working Group process that have not been met. Additional detail would be needed to add confidence as to how NexGen would engage according to MN-S' requests.	
500.	MN-S (October 19, 2022)	2.7.1.1, p. 2-64	"The Benefit Agreements include commitments to establish processes for regular communication and information exchange between NexGen and each Indigenous Group." Repeat comment that this aligns with the "inform" level on the IAP2 spectrum. Other places on the IAP2 spectrum involve some degree of shared level of control over Project decisions. This use of language is at odds with use of language elsewhere in the Application that indicates NexGen seeks to collaborate. Also repeat comment that MN-S does not have a benefit agreement in place with NexGen, and as such this engagement approach is not applicable to all Nations. Request: Replacement of the generalized Benefit Agreement content in Section 2.7.1.1 with detailed, Nation-by-Nation information on engagement approaches	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on [Canadian Impact Assessment Registry reference: 80171])	NexGen Response
501.	[MN-S] (October 19, 2022)	2.7.1.3, p. 2-65	"Along with the prospect of future youth workshops, NexGen will explore opportunities for future women's and men's workshop to enable more opportunities for community members to engage on the Project." This commitment is vague, aspirational, and does not include specific information about when and how engagement would take place. There is also no indication that community feedback was incorporated into NexGen's comments that it aspired to hold these workshops.	
502.	[MN-S] (October 19, 2022)	2.7.1.3, p. 2-65 Global comment on text under this heading	The list of engagement techniques leans heavily on "inform" level activities according to the IAP2 spectrum, which is not good practice and does not align with NexGen's stated aims to collaborate.	
503.	[MN-S] (October 19, 2022)	2A, p. 14	Table 2A-2 Métis Nation – Saskatchewan "Introductory meeting for the Joint Working Group including … Indigenous Knowledge in the EA" In the October 2019 Joint Working Group meeting, MN-S leaders from NR2 shared their perspectives on what Indigenous Knowledge is. Although NexGen's minutes of this meeting indicate that NexGen was cognizant of these perspectives, NexGen chose to define Indigenous Knowledge as "information sanctioned (i.e., authoritative permission or approval given) by an Indigenous Group as an official statement, document, or position". The study agreement indicates that the purpose of the Joint Working Group was to "support the inclusion of Métis Knowledge" but does not define the Joint Working Group as the place where any knowledge shared or exchanged may be considered Indigenous Knowledge. The study agreement between NexGen and MN-S does not define Indigenous (or traditional or Métis) Knowledge the way NexGen has done in the EIS. The study agreement says of traditional knowledge: "NexGen acknowledges that some of the information shared by the MN-S may be considered as Métis or Traditional Knowledge and may be sensitive or proprietary to the MN-S and NexGen is committed to protecting	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			this information." According to the study agreement, the Joint Working Group was the intended vehicle through which conversations on OCAP® could be held. By unilaterally defining Indigenous Knowledge in the EIS, NexGen has sidestepped OCAP® principles and is not operating in the spirit of the study agreement.	
504.	MN-S (October 19, 2022)	2A, p. 23 Table 2A-2 Métis Nation – Saskatchewan	10 November 2021, multiple methods "NexGen … would be reviewing the Joint Working Group meeting outline document provided by the MN-S in May 2021 in advance of the next meeting to share an update on available presentation materials." This commitment to reviewing MN-S expectations for engagement six months after they were shared, and four months before NexGen was originally planning to submit the EIS, suggests that NexGen was not sufficiently serious about taking on MN-S' feedback about when, how, and on what it expected to be engaged, including on understanding effects and mitigation measures before the EIS was submitted.	
505.	MN-S (October 19, 2022)	2A, p. 23 - Table 2A-2 Métis Nation – Saskatchewan	13 December 2021 "NexGen advised … there was a large amount of funding remaining …." The remaining funding under the technical agreement was specifically earmarked for the TLUS and the traditional food study, both of which were important to MN-S. It was not appropriate to redirect those amounts for general technical support on engagement. MN-S noted as much in subsequent conversations with NexGen, a fact which is not noted in the engagement record and may be considered a gap.	
506.	MN-S (October 19, 2022)	2A, p. 23 to 24 - Table 2A-2 Métis Nation –	Engagements 17 December 2021 through 15 February 2022 Through these various emails, letters, and video conferences, NexGen documents its desire to engage on Project effects (17 December 2021) despite	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
		Saskatchewan	having been told on 1 December 2021 that there was an absence of capacity funding to support engagement. This expression of interest to engage took place after MN-S informed NexGen that a key staff member, who was 50% of the Duty to Consult team and the team's only senior member, was on personal leave until January. This exchange over December through February further supports the conclusion that NexGen was happy to choose moments for dialogue if such moments suited NexGen's intended EIS submission schedule.	
507.	MN-S (October 19, 2022)	2B, all Global comment on structure and content of table.	Table 2B-2: Summary of Issues Identified by Métis Nation – Saskatchewan The columns marked "How Addressed in EIS" and "Summary of Response" effectively say repeatedly, "NexGen studied this topic in the EIS". They are not responses to the issue statements such as concern about effects of dust on vegetation and wildlife. Responses to issues regarding effects should discuss the presence or absence of effects, rather than responding "we studied whether there were effects". MN-S requests that NexGen Revise Table 2B-2 issues table to provide substantive answers to the issues, rather than pointing readers to other locations in the EIS where the issue response is. MN-S also requests that NexGen include internal document hyperlinks to the locations in the EIS where responses are contained, as a courtesy to readers who are investing time in understanding the Project.	
508.	MN-S (October 19, 2022)	2E, all Global comment on community information sessions	Community information sessions well in advance of EIS submissions on the Project and its general philosophy are a good practice, but they are not the only good practice when used as a precursor for engagement on Project effects and mitigation measures, which have not yet taken place.	
509.	MN-S (October 19, 2022)	3.1.1, p. 3-4 Inclusion of Indigenous and Local	References to IAAC 2020a and BC EAO 2020. The *Impact Assessment Act* (2019) and revitalized *BC Environmental*	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
		Knowledge in the Environmental Assessment General Context	*Assessment Act* (2018) provide guidance on the use of Indigenous Knowledge that is fulsome, iterative, and pervasive throughout the EA process and an EIS document. These pieces of legislation are much more robust and up to date than CEAA 2012 and Saskatchewan provincial processes for environmental assessment. NexGen has omitted key concepts of IAA 2019 and EAA 2018 such as consent, consensus-seeking, and Indigenous self-determination, which are the cornerstones of IAA 2019 and EAA 2018. EAA 2018 also indicates that proponents are not able to define Indigenous Knowledge in ways of its choosing, so this is a particularly problematic inclusion.	
510.	MN-S (October 19, 2022)	3.4.1, p. 3-16 Defining Indigenous and Local Knowledge	Defining Indigenous Knowledge (all text) Proponent again refers to IAA 2019 and implies that it will be guided by it, without considering the key aspects of IAA 2019 such as incorporating Indigenous Knowledge throughout the EA process and EIS document. This should be removed, as it implies that NexGen is meeting all, rather than part, of IAA 2019 expectations. Alternatively, NexGen should apply IAA 2019 consistently throughout its EIS and agree to comply with it	
511.	MN-S (October 19, 2022)	3.4.1, p. 3-16 Defining Indigenous Knowledge	"For the purposes of the EA, Indigenous Knowledge is specifically defined as information sanctioned (i.e., authoritative permission or approval given) by an Indigenous Group as an official statement, document, or position." This definition does not align with the CEAA 2012 guidance on Aboriginal Traditional Knowledge. Applying a definition this broad gives NexGen an opportunity to include any information from Nation-approved meeting minutes and label it "Indigenous Knowledge". This would allow NexGen to credibly state that it has included Indigenous Knowledge "throughout the assessment". However, many of the comments made by members of MN-S in Joint Working Group meetings relate to topics such as jobs, the legacy of Cluff Lake, and safety on Project roads. Topics such as these are not Indigenous Knowledge.	
512.	MN-S (October 19, 2022)	3.4.1, p. 3-18 Defining Indigenous	"In summary, Indigenous Knowledge can generally be understood as the	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
		Knowledge	unique and collective knowledge of a group of Indigenous People that is built up through generations of living in close contact with the land and natural environment.…" etc. to end of paragraph. This definition is inconsistent with the definition of Indigenous Knowledge elsewhere in the EIS.	
513.	MN-S (October 19, 2022)	3.6.1, p. 3-22	"Community-based protocols and procedures should be understood, respected, and followed." This is a good practice. It would also be a good practice to engage in dialogue with communities on what these protocols and procedures are. An example of that would be engaging with MN-S through the Joint Working Group on their preferred approaches to how Indigenous Knowledge is reflected in the EIS.	
514.	MN-S (October 19, 2022)	3.6.1, p. 3-23	"Confirm informed consent" This is a good practice. It would also be a good practice to engage in dialogue with communities and confirm informed consent on the ways in which the Traditional Land Use Study (TLUS) was to be used in the assessment, and to confirm that this was understood and acceptable, following OCAP principles.	
515.	MN-S (October 19, 2022)	3.6.2, p. 3-24 Reference to community information sessions	Community information sessions were not Nation-specific. They took place in communities that have a high percentage of Indigenous citizens. By referring to these information sessions together with Joint Working Groups, the first paragraph under Section 3.6.2.1 gives the impression that any feedback given in these information sessions may have constituted Indigenous Knowledge. These may be considered local knowledge only and should be indicated as such.	
516.	MN-S (October 19, 2022)	3.6.2.1, p. 3-24 *Gathering Indigenous and Local Knowledge*	"NexGen presented a preliminary list of VCs …" during joint working group meetings in 2019 and 2020. Based on minutes of these meetings, this is an accurate statement. Based on minutes of a Joint Working Group meeting dated January 2021, presenting VCs without western science advice was not well received by MN-S.	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on [Canadian Impact Assessment Registry reference: 80171](#))	NexGen Response
517.	MN-S (October 19, 2022)	3.6.2.1, p. 3-25 *Gathering Indigenous and Local Knowledge*	"The IKTLU Studies were generally completed and shared with NexGen between December 2019 and December 2020 …. These IKTLU Studies were reviewed for applicable Indigenous Knowledge and to identify and confirm effects pathways for biophysical and socioeconomic intermediate components and VCs." The word "applicable," is vague, subjective, and/or potentially aligned with NexGen's definition of Indigenous Knowledge, which is problematic and unilateral.	
518.	MN-S (October 19, 2022)	3.6.2.1, p. 3-25 *Gathering Indigenous and Local Knowledge*	"A total of 78 KP interviews were conducted with community members, primarily through telephone unless another method was requested. Interviews were completed with business owners, principals and staff of schools, housing clerks, health care directors, band councillors, and the RCMP." Again, mixing the conversation regarding Indigenous Knowledge and local knowledge gives the impression that a data collection opportunity with an RCMP officer may have been Indigenous Knowledge. Indigenous and local knowledge should be described separately. Also, the draft EIS should describe OCAP® processes related to KP interviews so that readers are aware of the ways in which NexGen sought and obtained informed consent for Indigenous Knowledge collection and use, where applicable. Otherwise, it appears that NexGen is attempting to seek extra Indigenous Knowledge credit for doing primary data collection for its socioeconomic work.	
519.	MN-S (October 19, 2022)	3.7.3, p. 3-34 Summary of Influence on Project Design	Table 3.7-1 Indigenous and Local Knowledge Key Influence on Project Design "Inclusion of a dedicated space for Elders on site to be available to support Indigenous employees"	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			This is a good practice and reflects an affirmative response to MN-S interest in and request for such an arrangement. Available space is one part of facilitating workers' access to Elders for their wellbeing. Other aspects of facilitating access to Elders have not been documented here.	
520.	MN-S (October 19, 2022)	3.8, p. 3-36 Influence on the Environmental Assessment	Table 3.8-1 Incorporation of Indigenous and Local Knowledge in the Environmental Assessment Comment on structure and content of table This table combines local and Indigenous Knowledge. This does not allow an understanding for rights-bearing Indigenous Nations as to how their Indigenous Knowledge was specifically placed within the context of the assessment.	
521.	MN-S (October 19, 2022)	3.9, p. 3-40 Use of Indigenous and Local Knowledge through the Project Lifespan	"Initial conversations regarding the Decommissioning and Reclamation Plan were held during Joint Working Group meetings in February 2020 and March 2021" MN-S is missing from the references here.	
522.	MN-S (October 19, 2022)	4.1, p. 4-1	Introduction "The assessment of alternatives has been informed by … (including Indigenous Knowledge) …" This statement is problematic given the misalignment between NexGen's definition of Indigenous Knowledge provided in Section 3 Indigenous and Local Knowledge (3.4.1, p. 3-16), good practice related to Indigenous Knowledge, and MN-S' definitions of Indigenous Knowledge provided through Joint Working Group meetings. The assessment of alternatives can be adequately informed by Indigenous Knowledge when conversations around Indigenous Knowledge include MN-S' views.	
523.	MN-S (October 19, 2022)	4.4.2.1, p. 4-11 to 4-13 *Input from Indigenous Groups and the Public* - All content of this	As mentioned elsewhere in this review, wording that describes engagement with all Indigenous Nations as though it were consistent prevents a Nation-by-Nation understanding of issues and engagement.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
		section		
524.	MN-S (October 19, 2022)	4.4.2.1, p. 4-11 to 4-13 *Input from Indigenous Groups and the Public* - All content of this section	TWC notes that engagement on the criteria documented on p. 4-11 to 4-13, and fulsome, science-based conversation on how the alternatives compare, does not appear to have taken place as a dialogue through the Joint Working Group process, according to the Joint Working Group minutes. The alternatives analysis was an activity that NexGen undertook without involving MN-S, although NexGen on various occasions did discuss the outcomes of key choices such as tailings storage.	
525.	MN-S (October 19, 2022)	5.2.1, p. 5-11 Project Environs	"Approximately 92 active mineral dispositions, issued to twelve companies, exist within the general area of the proposed Project." (Figure 5.2-2) In Section 20, cumulative effects assessment, the only project referenced was Fission's Patterson Lake Project.	
526.	MN-S (October 19, 2022)MN-S	5.3.2, p. 5-30	"… Preliminary Decommissioning and Reclamation Plan …" No indication when this will be done — before or after the EIS is finalized.	
527.	MN-S (October 19, 2022)	5.4.7.1, 5-77 Camp Facilities and Utilities	"The camp would provide semi-private spaces, such as individual rooms for workers that would be shared on a rotating basis, …." This needs to be clarified. Does this mean one room shared between two (2) people, without time overlaps?	
528.	MN-S (October 19, 2022)	5.4.7.4, 5-78 Airstrip and Airstrip Infrastructure	Any special arrangements for animal deterrence from wondering onto runway? What is purpose of airstrip? Given limited passenger capacity (40-50), will it be used to transport workers given the stated intention to use the Buffalo Narrows Airport (5-109). Is the airstrip needed?	
529.	MN-S (October 19, 2022)	5.6.1, p. 5-108, 5-109	"NexGen is currently considering using the Buffalo Narrows Airport as a pick-up point." Drive-in/drive-out staff, assumes airstrip is operational" (Table 5.5-5).	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			Add detail on transport of employees. Busing to site after pickup in Buffalo Narrows. Inconsistent with Table 5.5-5.	
530.	MN-S (October 19, 2022)	5.6.1, p. 5-110	"working with local communities to develop culturally sensitive employment policies …" Does this include cultural sensitivity training during on-boarding, including MN-S participation in developing training materials? "using best efforts to provide qualified local residents …" Will best efforts include support measures to facilitate the ability to work 2 weeks in and 2 weeks out such as family support measures for those at home? Daycare? Special employment considerations for harvesting? Ability to drive back and forth from La Loche daily rather than reside in camp? If so, is this in traffic estimate?	
531.	MN-S (October 19, 2022)	5.6.2, 5-111 Training	Table 5.7-1 Will employment monitoring, tracking, and reporting local employment levels against the 75% objective be added to the table?	
532.	MN-S (October 19, 2022)	6.1, p. 6-1 Regional Area of the Rook I Project	Commenting on missing items in regional map Map Omissions: Athabasca Basin is labelled but the basin to the south is only labelled as wooded area. Regional maps generally feature other activities, developments, etc. in the area for cumulative effects purposes. Map should be updated to align with a complete list of reasonably foreseeably projects, including requested changes to the list of projects included in the cumulative effects assessment	
533.	MN-S (October 19, 2022)	6.2, p. 6-8 Incorporation of Indigenous Knowledge	"General concerns (e.g., Project effects on water) …" This paragraph might be better placed in 6.3 Assessment Scoping.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
534.	MN-S (October 19, 2022)	6.6, p. 6-22 Existing Conditions Characterizations	"Information used to support the description of existing conditions also included available Indigenous and Local Knowledge from engagement and IKTLU Studies, …" This statement implies the bias where Indigenous Knowledge was integrated into western science. This may have introduced an unintentional bias in the characterization as critical information may have been missed since Indigenous Knowledge followed on the characterization by western science. Was a cross-check of the contents of the existing conditions description completed starting with Indigenous Knowledge?	
535.	MN-S (October 19, 2022)	6.8.1, p. 6-27 Project Effects (Application Case)	Other measurement indicators, such as community cohesion … qualitative data … relied upon to complete the analysis. With respect to qualitative data, Joint Working Group Meeting minute notes do not show that engagement was a multi-step process where the qualitative data was collected, interpretation confirmed, and analysis checked with the Métis. This is a gap against good practice.	
536.	MN-S (October 19, 2022)	6.8.2, p. 6-28 Cumulative Effects from Reasonably Foreseeable Developments Case	The section would benefit with the addition of a list of the RFDs and the potential adverse effects being assumed. Please see comments elsewhere in the document	
537.	MN-S (October 19, 2022)	Section 6.9.1 and 6.9.2	The residual effects classification likely will not be easily adaptable for human environment conditions. Are there variations for the human environment? The Significance Determination (6.9.2) section refers to socio-economic context assessment of resilience which would be based on the residual effects classification. NexGen should confirm that the residual effects classification as described under sections 6.9.1 and 6.9.2, p. 6-29 and 6-32, be modified and shown to be appropriate to quantify and qualify residual effects on humans such as	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			economy, traditional economy, etc. Please provide examples that describe how the classification would work in this case. For indirect effects such as those on traditional economy, also provide an example of how the residual effects would be described.	
538.	MN-S (October 19, 2022)	6.11, p. 6-35 Monitoring, Follow-up, and Adaptive Management	The process for determining when, how, and where to use … Integrated Management System Manual. Integrated Management System Manual has not been provided for review.	
539.	MN-S (October 19, 2022)	8.2.5, p. 8-14 Assessment Cases	A combined case considering cumulative groundwater impacts from nearby future developments (i.e., Fission's neighboring property) was not considered since changes to groundwater indicators were not predicted to overlap. The predicted groundwater drawdown area impacted from mining at the Project extends 2 to 4 kilometers (km) from Project site. However, it is not clear how far drawdown from neighboring future development will extend and if the drawdown areas will overlap or cause impacts. It is unknown if this is considered in other EIS sections, or if data is available to evaluate this	
540.	MN-S (October 19, 2022)	*Groundwater Elevations* 8.2.6.3, p. 8-17 *Bedrock* 8.3.3.1, p. 8-26	It is unclear which unit bedrock groundwater elevations were measured in, and if the different hydrostratigraphic units were considered together or separately. The terminology used is unclear, as it appears that bedrock and basement can both be used interchangeably to refer to the meta-gneiss/granitoid "basement" units. Bedrock also appears to be used to refer to all strata below glacial drift, including the basement, Athabasca sandstone units and the Devonian/Cretaceous rock units. The groundwater elevation differences between bedrock units (i.e., basement, sandstone and Devonian/Cretaceous rocks) are not well laid out, and it is unclear what the groundwater flow patterns in and between these units are.	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
541.	MN-S (October 19, 2022)	8.3.4.1, p. 8-41 *Bedrock*	Athabasca sandstone is identified as the main bedrock aquifer, but this is based on relatively few in situ tests compared to the basement rocks. It is also not specified if there are fault or shear zones within the sandstone that may affect groundwater flow. This author is in general agreement that the sandstone is the main bedrock aquifer unit, but the small number of test data may limit the understanding of groundwater flow within this unit. It is also not clear if structure-controlled flow is relevant within the sandstone since there is no mention if the fault and shear zones identified in the basement rocks extend into the sandstone unit.	
542.	MN-S (October 19, 2022)	8.4, p. 8-51 Project Interactions and Mitigations (8.4) 8.5.1.1.2, p. 8-58 Groundwater Flow Patterns and Rates (8.5.1.1.2)	It is unclear if the pathway of seepage from the UGTMF was considered during the construction and operation phase. It appears that only seepage from WRSA was considered during the operation phase. It appears that the UGTMF was excluded because mine dewatering and seepage will be collected and managed during operations which would effectively remove the pathway, but it is unclear if this pathway was even considered in a formal sense.	
543.	MN-S (October 19, 2022)	8.5.1.1.2, p. 8-58 Groundwater Flow Patterns and Rates	The analysis assumes that water collected, treated and discharged from underground mine workings to Patterson Lake balances the change in baseflow in the lake. This assumes a direct hydraulic connection between Patterson Lake and the underground mine workings, which is not clearly supported by data. Water quality from the basement rocks indicated "old" groundwater and is not representative of Patterson Lake water quality. In addition, cross sections presented in Figures 8.3-2[1] and 8.3-3[2], interpret glacial drift sediments to be underlying Patterson Lake.	

[1] EIS, Section 8, p. 8-29.
[2] EIS, Section 8, p. 8-30.

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			This assumption may be further explained in sections presenting the water balance for the Project, but these sections are not referenced; therefore, it is unclear what this assumption is founded on.	
544.	MN-S (October 19, 2022)	8.5.1.2, p. 8-63 Solute Mass Loading Rates to Patterson Lake	Table 8.5-1 Simulated Peak Solute Mass Loading Rates The predicted solute mass loadings to Patterson Lake are presented, but it is unclear over what timeframe these values represent or after what duration negative impacts are predicted to occur. The timeframe for predictions would help understand the effects to Patterson Lake water quality, as it is expected that different constituents of concern will have different timelines based on source concentration and flow path. It is unknown if this is discussed further in other EIS sections.	
545.	MN-S (October 19, 2022)	8.5.1.2.3, p. 8-65 Climate and Natural Disturbance Factors	The climate change analysis is qualitative and high level. Qualitative analysis may be acceptable based on level of data available but the assumption that increased precipitation will be balanced by increased evapotranspiration may be too simplistic, especially when considering the effectiveness of an engineered cover system to reduce solute transport from the WRSA over the long term. Monitoring programs do not appear to consider climate change impacts.	
546.	MN-S (October 19, 2022)	8.5.2.1, p. 8-66 *Groundwater Quantity*	Residual effects were predicted for groundwater flow pathways that were certain and permanent, but the specific effects are unclear. This may be explained further in the hydrology assessment EIS section, but they are not clearly stated in this section. It is hard to evaluate the proposed monitoring programs since the effects are not explicitly stated. Additionally, the residual effects analysis predicted a negative change for groundwater elevation but a neutral change for groundwater flows and directions. Groundwater elevation drives groundwater flow and direction. Again, since effects were not explicitly stated, it is unclear if these statements can be verified.	
547.	MN-S	8.5.2.1, p. 8-66	Key findings state that water from the UGTMF and stope backfill sources	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
	(October 19, 2022)		flow upward through faults and shear zones in the basement and then horizontally through the Athabasca sandstone before discharging into Patterson Lake. It is unclear, however, if Patterson Lake is connected to the sandstone. Cross sections presented in Figures 8.3-2 and 8.3-3 show Patterson Lake underlain by glacial drift sediments.	
548.	MN-S (October 19, 2022)		Several facets of analyses presented in the EIS rely on modelling completed to estimate long term baseline stream discharge at various nodes throughout the Project site. The modelling is calibrated based on a brief period of record from stations that appear to extrapolate beyond the measured ranges of the stage-discharge rating curves. A key question to the proponent is to address the confidence of modelling completed based on extrapolated estimates from measured data. As an example, hydrometric gauging station CR-WC-MS-01 is reported in the baseline monitoring annex as having a maximum measured flow rate of 0.631 m^3/s and a maximum estimated flow rate of 0.800 m^3/s. Stage-discharge rating curves are typically exponential which can lead to large errors when used for extrapolation and any subsequent model calibration using those data would influence the modelled data used for further analyses.	
549.	MN-S (October 19, 2022)		The proponent indicates that some hydrometric gauging stations were backwatered, presumably by downstream influence (ex. Station CR-WC-TI-02). How were the hydrographs adjusted during known periods of backwater (i.e., what decision criteria were incorporated to shift the water levels)? Backwater can also be generated during periods of ice cover. The water level data provided by the proponent appear to not be influenced by ice. Do most hydrometric stations at the site remain ice free throughout the year? If not, were the water levels corrected to remove ice cover influence?	
550.	MN-S (October 19, 2022)		At station CR-WC-TI-01 the stage-discharge curve follows an irregular form. Use of this rating curve may result in substantial errors for future flow rate predictions. Is monitoring on-going to add additional data measurement points?	
551.	MN-S (October 19, 2022)		Were any analyses completed to confirm that Douglas River near Cluff Lake (Station number 07MA003 operated by Water Survey Canada) was a	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			reasonable proxy to represent long term hydrological conditions for the Project?	
552.	MN-S (October 19, 2022)	10.8, 10-127 Key Findings	"Water quality COPC concentrations in the far-future projection indicate that cobalt and copper may exceed the threshold for water quality in the receiving environment downstream of the Project …" This section indicates that the copper and cobalt levels could be resolved through mitigation, but it is not clear what that mitigation might be.	
553.	MN-S (October 19, 2022)	11.2.2.1, p. 11-13 to 11-15, 11-17	Table 11-2.1: Species Considered for Selection as Valued Components Burbot was not one of the four (4) fish species selected as Valued Components (VCs) for assessing the effects of the Project on fish and fish habitat. The EIS states burbot were excluded because they were mentioned infrequently by communities during engagement, and because they occupy niches that overlapped with other VC species chosen; namely, lake trout (pelagic predator) and lake whitefish (bottom dwelling species, and prey species). It is because of this overlap, and other aspects of the burbot—a winter spawner that spends adult life more resident in its preferred habitat than either lake trout or lake whitefish—they occupy a unique niche in the aquatic environment. Larger burbot are a predator species that eat fish while younger burbot tend to eat insects. Smaller burbot can be a prey species for some larger fish species. Adults are a night predator and often move into the littoral zone to feed.[3] Burbot also have a proportionately larger liver than other fish, a physiological difference. Burbot 's unique physiology, use of habitat, and feeding habits have the potential to contribute more fully to baseline information and knowledge gaps for this EIS.	

[3] Tallman, R. F., Tonn, W. M., Howland, K. J., Antoniuk, K., Lapine, D., MacDonald, F., Tourangeau, S., Unka, D., Unka, T. (1996) *Life History Variation of Inconnu (Stenodus leucichthys) and Burbot (lota lota), Lower Slave River, June to December 1994*. (Report number 118). Northern River Basins Study Project. 0-662-24656-X.pdf (barbau.ca), p. 33.

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
554.	MN-S (October 19, 2022)	11.3.4, p. 11-60 Fish Communities	Table 11.3-2 Summary of Fish Species Captured in the Local and Regional Study Areas Burbot were documented to be a common and well distributed fish species in the sampling program, being captured in all but two (2) waterbodies and watercourses (Clearwater River above Beet Lake, and Clearwater River below Beet Lake), so burbot are present in most (if not all) of the aquatic study area.	
555.	MN-S (October 19, 2022)	11.5.2.2, p. 11-125 *Summary of Ecological Risk Assessment*	The Ecological Risk Assessment (EcoRA) predicted elevated copper concentrations to exceed surface water quality in Patterson Lake, North Arm - West Basin. It states that the most sensitive endpoints for chronic copper exposure would include the growth of benthic invertebrates, the reproduction of zooplankton, and growth and reproduction of forage fish—represented by lake whitefish.	
556.	MN-S (October 19, 2022)	11.5.2.4.1, p. 11-128 Effects on Habitat Availability	If there were changes in the lower trophic levels, there could potentially be changes up the food chain to higher trophic levels.	
557.	MN-S (October 19, 2022)	11.5.2.4.3, p. 11-130 to 11-131 Effects on Survival and Reproduction	The EIS states because large-bodied fish (such as lake whitefish) are mobile, it may be unlikely most individual fish would be exposed to maximum copper concentration in sediments for extended periods. It is predicted that limited effects may occur but are not likely for survival and reproduction of fish VCs. Burbot, on the other hand, are more sedentary, moving smaller distances and may spend more time in an area with copper in the sediments. Lake whitefish (*Coregonus clupeaformis*) is an inadequate and inappropriate representation of burbot *(Lota lota*) as a Valued Component (VC) through which to assess the effects of the Project on fish and fish habitat	
558.	MN-S (October 19, 2022)	11.5.4.2, p. 11-138 Significance Determination	Lake whitefish were the forage fish considered in the VC of the EcoRA and effects due to direct exposure to copper in the water column are not expected	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on [Canadian Impact Assessment Registry reference: 80171](https://iaac-aeic.gc.ca/050/evaluations/proj/80171))	NexGen Response
			for predator fish[4] and are considered unlikely for forage fish.[5] Burbot feeding and habitat use show them to be bottom dwelling and both a prey species (when smaller), and predator species. So, it cannot be assumed that burbot occupy the same niche as lake trout or lake whitefish and will potentially retain COPCs (Copper if that is the long-term concern, or other COPCs) in the same manner, concentration, or proportion	
559.	MN-S (October 19, 2022)	11.5.4.2, p. 11-138, 11-140 Significance Determination	The EIS states predicted effects are irreversible before the end of the modelling timeframe and are therefore considered permanent. Maximum copper concentrations are anticipated to occur during limited periods (dry climate years). It is acknowledged that this is a reasonable approach, however a species such as burbot, with different aquatic habitat uses and feeding patterns, could bioaccumulate COPC's differently than the species chosen and even potentially more than other species for some COPCs because of their larger liver. The Albert Northern River Basin Study (NRBS) collected baseline COPC's in burbot tissue and liver. Part of the justification for the inclusion of burbot in the contaminant study was because burbot move less than other fish species.[6] Staying within a given habitat for longer periods increases the likelihood of issues with contaminant build up. Burbot undertake one brief seasonal movement mid-winter for spawning compared to the longer, more complex movement patterns and habitat use of other fish species studied.[7] Including burbot would add value by doing two things: i. It would allow for another layer of contaminant baseline to be documented throughout the study area and may be valuable to the	

[4] Lake trout, northern pike, and walleye were chosen to represent predator fish.
[5] Lake whitefish.
[6] Lockhart, W. L., Metner, D. (1996). *Analysis for Liver Mixed Function Oxygenase in Fish – Peace, Athabasca and Slave River Basins, September to December, 1994* (Report No. 132). Northern River Basins Study Project. 0-662-24709-4.pdf (barbau.ca), p. 47.
[7] Tallman, R. F., Tonn, W. M., Howland, K. J., Antoniuk, K., Lapine, D., MacDonald, F., Tourangeau, S., Unka, D., Unka, T. (1996) *Migration of Inconnu (Stenodus leucichthys) and Burbot (lota lota), Slave River and Great Slave Lake, June, 1994 to July, 1995*. (Report No. 117). Northern River Basins Study Project. 0-662-24656-X.pdf (barbau.ca), p. 1, 26, 34.

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			company to show that future changes are regional and not mine site specific. ii. Burbot may also show changes sooner than other fish species simply because they move less and stay in an area longer which potentially exposes them to contaminant in a different way than lake trout or lake whitefish. Burbot should be considered for testing to get baseline information regarding their existing COPC levels. Also test burbot several years following (project scientist can suggest frequency of revisiting the sampling effort).	
560.	MN-S (October 19, 2022)	11.4.1, p. 11-75, p. 11-80 No Pathways	The temperature of the effluent, when released, is not expected to increase water temperature; less than 1°C increase at edge of regulated mixing zones. However, because a temperature increase is expected: Q1. Will mixing zone/diffuser heat create a thermal refuge and attract fish (thus spending more time in the effluent zone)? Will some fish spend more time in this mixing zone if it has a buffered temperature regime (likely winter use)? Q2. Is the volume of water being released through effluent into the lake enough that it could affect temperature refuge type habitat for lake trout over the lifespan of the mine? Rational for question: lake trout use cold water zones in lakes as thermal refuge, particularly during warmer summer periods. Could warmer water released, over the lifetime of the operation, potentially decrease the volume of the lake's thermal refuge for lake trout? Is there potential for climate change (likely causing lakes to warm in northern regions such as this), in combination with the warmer effluent, to affect lake trout habitat sooner than if climate change was not the only influence on lake temperatures? If effluent temperature has an area of influence that increase lake temperature locally in Patterson Lake, it may i. attract fish into spending more time closer to the effluent mixing	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			area; and ii. decrease the area (volume) of colder, refuge habitat available for Lake Trout to spend summer months.	
561.	MN-S (October 19, 2022)	11.4.2, p. 11-114 to 11-115 Secondary Pathways	The EIS makes no mention of aquatic invasive species (AIS). Mine site activity (construction and operation) will bring construction equipment from down south, and potentially from out of province. There is risk of AIS movement with all equipment, particularly if there is no policy or requirement to clean equipment before moving used equipment to site. With increased access to area (recreational users are a potential source of AIS), how will waters be monitored for AIS during the life of the mine, until the area is decommissioned? NexGen's consideration to implement a policy to prohibit or restrict employees and contractors from fishing on project site and along the existing access road while on rotation or residing in camp is one possible step toward preventing the introduction of AIS to the area. Another step NexGen mentions is bringing workers to site by bus or by air to limit personal vehicles travelling to and being on the site. It would be relatively simple to have a veliger sampling program (assuming zebra mussels would be the species to target) on lakes to which mine development has improved access. Some acknowledgment of the mine development and operation being a vector of increased risk for AIS exposure is reasonable. The potential to introduce presence of aquatic invasive species (AIS) exists, given that equipment and personnel may be sourced from places where AIS exist. (This will become even more of a concern if the Fission project also goes ahead). Improved access to recreational users will also increase the risk of AIS exposure.	
562.	MN-S (October 19, 2022)	13.2.2, p. 13-13	"Habitat requirements for species that are not well known or understood (i.e., tracked bryophytes, such as mosses, and lichens) were excluded as	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			VCs because of the high degree of uncertainty associated with the distribution of these taxa (e.g., species) within the area of the anticipated Project (and generally in Saskatchewan)(DeVries and Wright 2015) and because such organisms often require detailed chemical or taxonomic procedures for their identification (Eldridge et al. 2003)." A high degree of uncertainty and lack of information does not preclude the potential for adverse Project-related effects on tracked and/or listed non-vascular plant and lichen species. Please comment on why this lack of information was not addressed within baseline studies for the Project.	
563.	MN-S (October 19, 2022)	13.2.3.1, p. 13-16 *Baseline Survey Boundaries*	This section states that the spatial boundaries for the baseline field surveys differed from those used in the EA, but that the baseline survey data remain appropriate for the EIS boundaries. What effect or source of error does having different spatial study areas for vegetation VCs—and some surveys that did not include the entire footprint of the Project—have on the appropriateness of the EIS, considering the size of the Assessment RSA shown in Figure 13.2-1, on page 13-18, and the amount of area that was never surveyed?	
564.	MN-S (October 19, 2022)	13.2.6, p. 13-24 Existing Conditions	"Supplemental vegetation inventory and rare plant surveys [were] completed in 2021 to further characterize baseline conditions for vegetation (Dolmage 2021)." Will this information be provided as an Annex to the EIS for review? MN-S has not had an opportunity to evaluate this material to date.	
565.	MN-S (October 19, 2022)	13.2.6.1, p. 13-26 *Ecological Land Classification*	It is noted that a new ELC map was created for the EIS, which is different from the ELC map used in the baseline Annex reports. How closely does the EIS ELC mapping correspond with the mapping products created by CanNorth and Omnia in 2021? Does the revised ELC mapping have any implications for stratified listed/tracked plant surveys completed during baseline work (i.e., have all revised ELC units been appropriately sampled in accordance with SK CDC protocols)?	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
566.	MN-S (October 19, 2022)	13.2.6.1, p. 13-26 *Ecological Land Classification*	What is the scale of the ELC mapping? What was the minimum, maximum, and average polygon size? What proportion of polygons were field verified?	
567.	MN-S (October 19, 2022)	13.2.6.1.2, p. 13-28 Wetland Ecosystem Mapping	Table 13.2-4 Wetland Ecological Land Classification Units within the Local and Regional Study Areas The table does not show any shallow open water wetlands mapped within the LSA or RSA. Please comment on why no shallow open water wetlands were identified to be associated with persistent water <2m deep (as defined by the Canadian Wetland Classification System).	
568.	MN-S (October 19, 2022)	13.2.6.1.3, p. 13-29 Riparian Ecosystem Mapping	"Riparian ecosystems are zones of interaction between aquatic and terrestrial environments within watersheds that function in linking terrestrial ecosystems to watercourses, stabilizing streambanks and floodplains, regulating stream temperatures, and providing a source of large woody debris and organic matter for aquatic ecosystems …". Based on this definition, it is unclear why ecosystems with "riparian potential" were defined as land cover types with moist or wet soil moisture regimes. It seems that ecosystems with other soil moisture regimes (e.g., mesic) within riparian areas could provide similar functions. Please comment on how the definition of "riparian potential" used within the assessment is not underestimating riparian ecosystems within the RSA.	
569.	MN-S (October 19, 2022)	13.2.6.1.3, p. 13-29 to 13-30 Riparian Ecosystem Mapping	"The method used to identify riparian ecosystems likely overestimates the outer edge of active floodplains for many of the smallest watercourses and waterbodies in the RSA and appropriately captures the active floodplains for the largest watercourses in the RSA." Were mapped wetland ELC units also buffered (i.e., waterbodies not captured at the 1:50k CanVec scale)?	
570.	MN-S (October 19, 2022)	13.2.7, p. 13-37 Project Interactions	"Secondary pathway: The pathway could result in a measurable but minor environmental change relative to existing conditions or guideline values, but	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
		and Mitigations	this change would be sufficiently small that it would have a negligible residual effect on vegetation." This approach uses language that implies dismissing "minor" changes that the assessment knows, without doing the assessment, would definitively (i.e., "would have") have a negligible effect – and none of these terms have been defined. As such, the assessment does not appear to assess "all" potential effects on vegetation, but only those residual effects that are judged to be greater than "minor", before the assessment is done? How are the negligible effects considered in the cumulative effects assessment?	
571.	MN-S (October 19, 2022)	13.2.9, p. 13-39 Residual Effects Classification and Determination of Significance	It is noted that magnitude criteria have not been assigned based on VC-specific thresholds. While it is understood that context is required to properly characterize effects, well-supported VC-specific a priori magnitude thresholds provide clear rationale for magnitude determinations.	
572.	MN-S (October 19, 2022)	13.3.1.3, p. 13-51 *Ecosystem Condition*	Please comment on the baseline data collection for Boreal Shield ecosites in Annex VII.1 and its applicability to areas of the Boreal Shield within the RSA. What is the confidence in the age estimates provided, given the low extent of overlap between the Omnia RSA and the EIS RSA?	
573.	MN-S (October 19, 2022)	13.3.2.2, p. 13-56 *Ecosystem Distribution*	Figure 13.3.3: Wetland Ecosystems and Rare Plant Species in the Regional Study Area, Base Case On Figure 13.3.3, wetland ecosystems appear to be more prevalent outside (to the south) of the Omnia RSA at the southwestern extent of the EIS RSA. Please provide comment on the implications of this discrepancy and the relative accuracy of wetland mapping within each of the EIS study areas considering that if wetlands have been disproportionately mapped at the margins of the RSA, the potential effects of the Project may be diluted within the assessment.	
574.	MN-S (October 19, 2022)	13.3.3.1, p. 13-60	"Overall, riparian habitats are uncommon the landscape relative to upland	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
		Ecosystem Availability	and wetland ecosystems …" Please comment on how different mapping scales/products within the LSA and RSA may have influenced this result.	
575.	MN-S (October 19, 2022)	13.4.2, p. 13-86 to 13-97 Secondary Pathways	Secondary pathways identified as: V-03 Public access affecting vegetation V-04 Fugitive dust and constituent emissions V-05 Vegetation changes from particulates and acid emissions V-06 Loss from fibre optic line V-07 Invasive species V-08 Surface water flow changes V-09 surface water quality from runoff V-10 Treated effluent discharge V-11 Surface water quality from WRSAs and UGTMF after Closure, are all addressed by outlining the general mitigation and then concluding with a statement such as "any minor changes are predicted to have a negligible residual effect on vegetation VCs, and the pathway was not carried forward in the assessment". Please address how it is appropriate to not consider all adverse effects on vegetation VCs in the assessment of residual effects, regardless of the magnitude, particularly in the cumulative effects assessment, where several "negligible adverse effects" could result in a measurable change in vegetation? It is noted that no potential indirect effects on vegetation VCs have been	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on [Canadian Impact Assessment Registry reference: 80171])	NexGen Response
			carried forward to the residual and cumulative effects assessments. In addition, negligible is not a defined term in Table 13.2-9[8] Definitions applied to the effects criteria classifications for the assessment of residual effects, for vegetation – yet it is used throughout the chapter to dismiss residual effects?	
576.	[MN-S] (October 19, 2022)	13.4.3, p. 13-98 Primary Pathways	This section addresses two primary pathways: V-01 Direct loss W-02 Terrain alteration, that are taken forward in the assessment. Please comment on the rationale for focusing on only two identified residual effects while dismissing the secondary pathways identified earlier and not considering their influence on vegetation in addition to the primary pathways, particularly as it relates to cumulative effects?	
577.	[MN-S] (October 19, 2022)	13.5.2.1.1, p. 13-118 Ecosystem Availability	"Wetland ecosystems are less common within the LSA … relative to the RSA …". Please comment on how different mapping scales/products within the LSA and RSA may have influenced this result.	
578.	[MN-S] (October 19, 2022)	13.5.5, p. 13-164 Effects on Biodiversity	This section indicates that "effects on biodiversity have been evaluated based on the assessment completed for ecosystems and traditional use plant species". "Effects on biodiversity have been assessed on the effects on ecosystems … and the effects on traditional use plant species …" Please explain how all the minor/negligible effects on vegetation that were not assessed (i.e., only primary pathways taken forward into the assessment and the cumulative effects assessment) increase the uncertainty of the assessment results?	

[8] EIS, p. 13-39

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
579.	MN-S (October 19, 2022)	13.7, p. 13-167 Monitoring, Follow-up and Adaptive Management	The section discusses monitoring, the Environmental Monitoring Plan, the Preliminary Decommissioning and Reclamation Plan, and the plan to establish Environmental Committees. No details, or even a draft Table of Contents, on an Environmental Monitoring Plan for vegetation are provided, only a commitment that one would be implemented. Please provide Environmental Monitoring details for the vegetation component. There is also no discussion on any follow-up programs that would test the predictions made in the EIS under this heading, as it suggests; please address as appropriate?	
580.	MN-S (October 19, 2022)	14.1.2, p. 14-6 Purpose and Approach to the Assessment	"The purpose of Section 14 is to provide a detailed and comprehensive assessment of all potential Project-specific effects and cumulative effects …" How does this approach consider the "minor" effects that are screened out before the assessment is even begun?	
581.	MN-S (October 19, 2022)	14.2.2.2, 14-23 Measurement Indicators	Section states that one of the measurement indicators is "survival and reproduction" which relates to "change in abundance". Measurement indicators suggest that baseline information is such that any changes resulting from the Project can be measured. Does the baseline information support such a comparison to adequately inform the assessment (i.e., environments that can be measured)?	
582.	MN-S (October 19, 2022)	14.2.3, p. 14-23 Spatial Boundaries	Section states that the spatial boundaries for the baseline field surveys differed from those used in the EA, but that the baseline survey data remain appropriate for the EA boundaries. What effect or source of error does having different spatial study areas for some of the wildlife groups, and that some of the surveys did not include the entire footprint of the Project, have on the appropriateness of the EA, considering the size of the Assessment RSA shown in Figure 14.2-1, on page 14-25, and the amount of area that was never surveyed?	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
583.	MN-S (October 19, 2022)	14.2.7, p. 14-43 Project Interactions and Mitigations	"Secondary pathway: the pathway could result in measurable but minor environmental change relative to existing conditions or guideline values, but this change would be sufficiently small that it would have a negligible residual effect on wildlife and wildlife habitat." This approach uses language that implies dismissing "minor" changes that the assessment knows, without doing the assessment, would definitively (i.e., "would have") have a negligible effect – and none of these terms have been defined. As such, the assessment does not appear to assess "all" potential effects on wildlife and wildlife habitat, but only those residual effects that are judged to be greater than "minor" before the assessment is done. How are the negligible effects considered in the cumulative effects assessment?	
584.	MN-S (October 19, 2022)	14.2.8, p. 14-44 Residual Effects Analysis	"Changes in habitat availability and animal use" This appears to link two concepts into a single effect and the linkage is not clear. Please explain.	
585.	MN-S (October 19, 2022)	14.2.8, p. 14-44 Residual Effect Analysis	"Changes in survival and reproduction" Again, appears to link two concepts into a single effect. Without detailed baseline information on the survival rates and reproduction of the wildlife VCs, it is unclear as to how there can be an assessment to determine changes in the measurement indicators. Please expand on this.	
586.	MN-S (October 19, 2022)	14.2.9, p. 14-45 Residual Effects Classification and Determination of Significance	Table 14.2-7 Definitions Applied to Effects Criteria Classifications for the Assessment of Valued Components The table shows that for "Magnitude," the change in the measurable indicator is described by effect size with no characterization criteria (e.g., Low, Moderate, High) to put the effect into context with appropriate threshold values or other ecological indicators. Please discuss how this approach is appropriate in informing the determination of the significance of any of the residual effects for wildlife and wildlife habitat.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
587.	MN-S (October 19, 2022)	14.2.9, p. 14-46 Residual Effects Classification and Determination of Significance	Section states that the significance of the residual effects on the VC were determined at the RSA level, except for caribou, where significance was determined at the scale of the SK2 West Caribou Administration Unit. Please discuss the rationale for this, and dilution of the effect that this approach would introduce to differing spatial boundaries for the assessment and the purpose for different study areas for caribou (i.e., caribou regional study area, caribou home range assessment area, Regional Study Area) to inform the assessment and/or the differing conclusions based on the different spatial areas.	
588.	MN-S (October 19, 2022)	14.3.1 to 14.3, p. 14-49 to	It appears that little of the baseline data collected was used to inform the description of the baseline conditions for the VCs (i.e., no mention of populations or densities estimated), and that the baseline description relied heavily on a literature review – please explain how the baseline data collected to support and inform the EA was incorporated and used?	
589.	MN-S (October 19, 2022)	14.4, p. 14-148 Project Interactions and Mitigations	Table 14.4-1 Potential Effects Pathways for Wildlife and Wildlife Habitat Table indicates that one of the primary mitigation measures is to "Limit the Project Footprint to the extent practical." Does this recognize the area currently disturbed by all the exploration activities that have taken place in the past that has led up to the Project being advanced? No mention a pre-exploration conditions is discussed	
590.	MN-S (October 19, 2022)	14.4.2, p. 14-157 to 14-174 Secondary Pathways	W-04 Fibre optic line direct loss states that the entire line will be ploughed-in. What about watercourse, wetland and bog crossings and related disturbances to wildlife and wildlife habitat? W-05 Injury and mortality from clearing W-06 Invasive plants affecting wildlife habitat W-07 Increased edge habitat W-08 Increased predator access	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			W-09 Increased public access W-10 Air emission effects via inhalation or ingestion W-11 Soil contamination from emissions W-12 Treated effluent discharge W-13 Surface water quality from runoff W-14 Water quality from WRSAs and UGTMF W-15 Surface flow changes W-16 Linear barriers W-17 Power line injury and mortality W-18 Vehicle injury and mortality W-19 Wildlife attractants W-20 Direct harm from contact water All secondary pathways are addressed by outlining the general mitigation and then concluding with a statement such as "any adverse interactions between the Project and wildlife are expected to be infrequent and have a minor influence on regional population relative to existing conditions and are predicted to result in negligible residual effects on VCs – and the pathway was assessed as secondary and not carried forth in the assessment". How it is appropriate to not consider all negative effects on wildlife and wildlife habitat in the assessment of residual effects, regardless of the magnitude, particularly in the cumulative effects assessment, where several "negligible adverse effects" could result in a measurable change in wildlife or wildlife habitat? Explain why "negligible" is not a defined term in Table 14.2-7: Definitions Applied to Effects criteria Classification for the Assessment of Valued Components, for wildlife and wildlife habitat – yet it is used throughout the chapter to dismiss residual effects.	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
591.	MN-S (October 19, 2022)	14.4.3, p. 14-174 Primary Pathways	Three primary pathways: W-01 Habitat loss W-02 Habitat alteration W-03 Sensory disturbance are taken forward in the assessment – please comment on the rationale for focusing on only three identified residual effects while dismissing the secondary pathways identified earlier and not considering their influence on wildlife and wildlife habitat in addition to the primary pathways, particularly as it relates to cumulative effects.	
592.	MN-S (October 19, 2022)	14.5, 14-175 Residual Effects Analysis	It appears that the significance of each of the residual effects was not determined, but that the residual effects (i.e., only those with a primary pathway) were rolled up to predict the significance on each of the wildlife VCs – is this correct?	
593.	MN-S (October 19, 2022)	14.5.13, p. 14-35 3 Effects of Biodiversity	"Effects on biodiversity have been evaluated based on the assessment completed for the wildlife VCs, …". Please explain how all the minor/negligible effects on wildlife and wildlife habitat that were not assessed (i.e., only primary pathways taken forward into the assessment and the cumulative effects assessment) increase the uncertainty of the assessment results, particularly as they relate to listed species.	
594.	MN-S (October 19, 2022)	14.7, p. 14-356 Monitoring, Follow-Up, and Adaptive Management	The section discusses monitoring, the Caribou Mitigation and Offsetting Plan, the Preliminary Decommissioning and Reclamation Plan, and the plan to establish Environmental Committees. No details, or even a draft Table of Contents, on an Environmental Monitoring Plan for Wildlife and Wildlife Habitat are provided, only a commitment that one would be implemented. Please provide Environmental Monitoring details for the Wildlife and Wildlife Component. There is also no discussion on any follow-up programs	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			that would test the predictions made in the EIS under this heading, as it suggests – please address as appropriate.	
595.	MN-S (October 19, 2022)	14.8, p. 14-357 Key Findings	"Section 14 met the main objectives of the Terms of Reference for the Project issued by the ENV and CNSC by providing a detailed and comprehensive assessment of potential Project-specific effects, and cumulative effects from the Project and other developments on wildlife and wildlife habitat." How can the assessment be considered comprehensive, when "minor or negligible effects" are screened out; therefore, not all residual effects were assessed, particularly in the cumulative effects?	
596.	MN-S (October 19, 2022)	14A2, p. 2 Barn Swallow	Indicates that no secondary pathways were assessed for any of the listed species addressed in this section. Was this approach considered appropriate to determine cumulative effects on these listed species?	
597.	MN-S (October 19, 2022)	14A2, p. 3,4 Barn Swallow	To determine significance of the Project residual effects and the cumulative effects for three listed species, the prime consideration in the assessment appears to be that the incremental changes to habitat availability, habitat distribution, and survival and reproduction are expected to remain within the species' resilience and adaptability limits, and therefore, to remain self sustaining and ecologically effective – followed by the prediction of not significant for the residual effects. How can this statement be made in this screening-level assessment when there is no mention of measurement indicators relative to resilience and adaptability?	
598.	MN-S (October 19, 2022)	14B3.7.2, p. 30 Model Validation	This section reports on model verification for rusty blackbirds and concludes with the statement "The model provides an ecologically relevant and confident assessment of the effects of the Project and previous, existing and other future developments on olive-sided flycatcher habitat." Please explain the correlation between rusty blackbird habitat as it relates olive-sided flycatcher habitat, and its relevance in the EA?	
599.	MN-S (October 19, 2022)	15.2.8, p. 15-24	Figure 15.2-2: Human Health Risk Assessment Process	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
		Risk Assessment	The methodology described can be applied to individual COPCs. However, when multiple COPCs are present, risks can occur when exposure to individual COPCs is still below safe levels if multiple COPCs have similar modes of toxicity. Exclusion of COPCs before evaluation of toxicity interactions may underestimate potential risks to human receptors.	
600.	MN-S (October 19, 2022)	15.2.8.1, p. 15-26 *Receptor Selection and Characterization*	Table 15.2-3: Rationale for Selection of Human Health Receptor Groups It is unclear if COPC screening used observed or predicted concentrations	
601.	MN-S (October 19, 2022)	Section 15.2.8.2, Figure 15.2-3	Application of Federal or Provincial Guidelines is not necessarily protective of human health. COPCs concentrations which are increased by project activities, but remaining below guidelines, still contribute to overall exposure. Applied guidelines may also not be protective of Traditional Land Uses, address the potential for bioaccumulation in Traditional Foods, or reflect the most current understanding of COPC toxicity. Please include in the EIS, a detailed review of guidelines adopted from other jurisdictions to ensure the same assumptions regarding toxicity, exposure, and receptor characteristics are applied. Only guidelines which are solely health-based should be considered for COPC screening.	
602.	MN-S (October 19, 2022)	15.2.8.2, p. 15-30 *Aquatic Sources*	Figure 15.2-4: Screening Process for Selection of Constituents of Potential Concern for the Environmental Risk Assessment It is not clear if COPCs that exceeded water quality objectives at end-of-pipe treatment but met WQOs at the boundary of the mixing zone, were excluded from further assessment. This approach is not conservative and makes several assumptions regarding dilution factors for COPCs. If this approach is taken, these assumptions and model results must be validated with a comprehensive monitoring plan, with a plan in place to address any unexpected WQO exceedances. Factoring in dilution in a surface water body is not good practice for ecological risk assessment.	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
603.	MN-S (October 19, 2022)	15.2.8.2, p. 15-32 *Atmospheric Sources*	Screening against Ambient Air Quality Objectives (AAQO) needs to confirm that all applied objectives are entirely health based, and do not represent achievability, objectives being phased in over time, or which include social, technical, or economic factors. Additionally, any COPC, even if there are AAQO, that acts with a non-threshold level of toxicity should be included for further assessment regardless of whether they exceed AAQOs, to indicate potential health effects.	
604.	MN-S (October 19, 2022)	15.2.8.2, p. 15-32 *Atmospheric Sources*	Screening for deposition based on soil quality guidelines may not be protective in some cases. For example, if soil quality guidelines do not consider exposure pathways relevant to all applicable traditional land use (e.g., consumption of Traditional Foods). For example, arsenic and lead are both predicted to be deposited to soil increasing concentrations and exposure, and are present in other media, but not assessed further in soil (Table 4.3.3.4, Page 4.40 and Table 4-10, Page 4.41 of TSDXXI). These are both non-threshold COPCs, so any increase in environmental concentration needs to be incorporated into the overall project exposure calculation.	
605.	MN-S (October 19, 2022)	15.2.8.3, p. 15-35 Exposure Pathways and Conceptual Model	Figure 15.2-5 Human Health Conceptual Site Model[9] Indicates that the only exposure of human receptors to water is through ingestion, this is not consistent with wording throughout Section 15.2.	
606.	MN-S (October 19, 2022)	15.2.9, p. 15-37 Risk Characterization and Determination of Significance	This Section lacks clarity on the usage of age-dependent adjustment factors (ADAFs) for different life stages. ADAFs of 1 are not conservative, and in some cases, Health Canada recommends larger AFAFs: 10 for infants, 5 for toddlers, 3 for children, and 2 for teenagers.[10]	
607.	MN-S (October 19, 2022)	15.2.9, p. 15-37	"Arsenic was evaluated …. as a non-threshold carcinogen … For this assessment, the lifetime average daily dose was estimated for various age	

[9] See also Section 6 TSD XXI: Environmental Risk Assessment, Issue # ERA-002, of this document.
[10] *Federal Contaminated Sites Risk Assessment in Canada: Interim Guidance on Human Health Risk Assessment for Sort-Term Exposure to Carcinogens at Contaminated Sites,* Health Canada, 2013. https://publications.gc.ca/collections/collection_2013/sc-hc/H144-11-2013-eng.pdf

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on [Canadian Impact Assessment Registry reference: 80171](#))	NexGen Response
		Risk Characterization and Determination of Significance	groups … to permit estimation of the lifetime risk to a composite receptor for each of the subsistence harvester, seasonal resident, and permanent resident." Confirm if there was any averaging of doses for less-than-lifetime exposure to non-threshold carcinogens as described. If so, confirm that this averaging followed Health Canada guidance.[11]	
608.	MN-S (October 19, 2022)	15.2.9, p. 15-37 to 15-38 Risk Characterization and Determination of Significance	"post-modelling adjustments were made on the outputs to account for bioavailability of arsenic in certain foodstuffs … and the percent inorganic arsenic present in fish tissue, given that 90% is present in a relatively non-toxic, organic form" Several adjustments were made to arsenic exposure based on assumed bioavailability and ratio of inorganic to organic forms. Arsenic is above risk thresholds and pretty large adjustments were made. Metals have highly variable bioavailability so in this case a good practice would be to confirm that moose meat is safe.	
609.	MN-S (October 19, 2022)	15.3.1, p. 15-40 Baseline Considerations of Constituents in Environmental Media	Based on Indigenous Knowledge evidence, water and air quality is extremely high in the Study Area, except for areas already impacted by other developments. It is not clear if baseline data used in the Environmental Risk Assessment reflect natural high-quality conditions and not those already impacted by existing activity.	
610.	MN-S (October 19, 2022)	15.5.1.2, p. 15-60 *Carcinogens*	Figure 15.5-1: Interpretation of Incremental Cancer Risk for Human Health Receptors – Application Case The Figure is not clear. It appears to indicate that ILCR will decrease because of Project activities, and that ILCR values greater than 1 in 1,000 represent low risk. This is not consistent with Health Canada policy and misrepresents the results of the HHRA.	

[11] Ibid.

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
611.	MN-S (October 19, 2022)	15.6, p. 15-72 to 15-73 Risk Characterization and Significance Determination	Table 15.6-1 Classification of Residual Effects on Human Health Measurement Indicators for the Application Case and Reasonably Foreseeable Development Case For non-carcinogenic COPCs, the magnitude in Table 15.6-1 is indicated as small compared to existing conditions. However, a base case dose estimate or hazard quotient was not provided for comparison. The geographic extent is also not clear, as HQs were not estimated to be below 0.2 at all locations. The assigned probability of occurrence, unlikely, does not reflect rest of the information provided.	
612.	MN-S (October 19, 2022)	15.6, p.15-73 Risk Characterization and Significance Determination	Table 15.6-1 Classification of Residual Effects on Human Health Risks were predicted for arsenic, and these were classified as not significant. As risks were predicted, it would be the expectation of MN-S that these potential impacts were examined in more detail. While several conservative assumptions have been made in the HHRA, this conservativeness is intended to reflect the uncertain nature of risk assessment and be protective of al MN-S members. There are no specifics provided or scientific justification behind the assertion that residual effects will not be significant, and there is opportunity to include additional detail in the assessment that would ensure there are no potential risks to members of MN-S.	
613.	MN-S (October 19, 2022)	15.7, p. 15-75 Prediction Confidence and Uncertainty	Table 15.7-1 How Uncertainties in the Human Health Exposure are Addressed This table indicates that there are no permanent residents currently in the RSA. It is not clear if there are any restrictions on residency in this area, or if there are control measures in place to prevent establishment of residences within the RSA during the Project lifespan. Excluding permanent residents from an understanding of the RSA has the potential to limit the understanding of potential future residents of the RSA, such as workers at possible future developments in the area.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
614.	MN-S (October 19, 2022)	15.8, p. 15-76 Monitoring, Follow-Up, and Adaptive Management	Environmental monitoring as proposed in Section 15.8 should also include verification of assumptions made in the Human Health Risk Assessment (HHRA). Additionally, there should be means to validate that the proposed mitigation measures used to exclude any exposure pathways are in place and working as intended.	
615.	MN-S (October 19, 2022)MN-S	15.8, p. 15-76 Monitoring, Follow-Up, and Adaptive Management	"short-term exceedances … may occur within the Project footprint …" It is not clear why short-term exposures to air quality pollutants were not included in the HHRA, when this section states that short-term exceedances may occur at the Project boundary (Section 15.8, Page 15-76 of EIS15).	
616.	MN-S (October 19, 2022)	16, p. ii *Existing Conditions (Section 16.3)*	"In total, 180 ha were assessed and no heritage resources were identified in the survey area." No information is provided regarding methodology for the Heritage Resource Impact Assessment (HRIA); additional detail regarding survey approach, including length of field program and a definition of heritage resources is required within the introduction. MN-S questions the robustness and methodology of a 180ha field program with no findings in an area acknowledged as actively used for Indigenous land and resource use.	
617.	MN-S (October 19, 2022)	16, p. iv *Potential Effects and Proposed Mitigation (Section 16.4)*	"With respect to Indigenous land and resource use, proposed mitigation measures that would reduce effects include: • implementation of Benefit Agreements with primary Indigenous Groups, which would include funding and human resources to support community-related initiatives and establishing an Implementation Committee …." Currently, no agreement is in place with MN-S for the Project. As such, it is not appropriate to list establishment of an Impact-Benefit Agreement as mitigation to reduce effects to MN-S Cultural and Heritage Resources and Indigenous Land and Resource Use.	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			The terms of the agreement will be subject to a negotiation process with MN-S and the outcomes may vary from those presented and therefore are not an accurate reflection of mitigation that will be applied.	
618.	MN-S (October 19, 2022)	Section 16.5, Section 16.4	Section 16.5 of the EIS states: "Perception that mine activities may adversely affect the quality of water, fish, plants, and wildlife." "Perceptions of contamination at decommissioned facilities and the suitability of the land and resources for practising traditional activities." Indigenous Knowledge is a unique, but equal way of knowing. As a rights holder, MN-S qualitative communication of impacts regarding the quality of resources and/or contamination levels should be acknowledged, discussed and considered. Text should, at a minimum, reflect "real or perceived" impacts. The exclusive use of "perceived" implies that this Knowledge is not supported or equal in importance to scientific data collection. Please revise text so that , at a minimum, it reflects "real or perceived" impacts.	
619.	MN-S (October 19, 2022)	Section 16.8	Section 16.5 of the EIS states: "The effectiveness of mitigations on the Indigenous land and resource use would be evaluated through the following: …" [bullet list] This summary only discusses mitigation measures, however lacks detail and information related to follow-up and adaptive management. Monitoring on its own would identify deficiencies or opportunities to improve the programs but does not imply any action is required to remedy or resolve issues, improve program efficacy, re-evaluate objectives and goals or otherwise adapt the management approach. It is unclear if there was a perception study to document existing perceptions and concerns related to mining to inform current practices. One should have been undertaken to support the assessment of potential effects on Indigenous land and resource use and to support future monitoring, mitigation, and adaptive management.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			Without a "baseline" of the current understanding, a future survey will provide little value in terms of assessing a change in understanding. MN-S requests the opportunity to be engaged and collaborate on the development of all mitigation and monitoring programs related to the cultural and heritage resources and the Indigenous land and resource use assessment. In particular, MN-S requests the opportunity to support the scoping, development, implementations, analysis, and development of mitigation and monitoring programs related to a perception survey related to LPA residents' thoughts and understanding of uranium mining. In addition, the scope of this survey should not be limited to "thoughts and understanding of uranium mining" and instead should focus on the Projects, its potential real or perceived impacts, the implementation of mitigation and monitoring programs and the overall ability of NexGen to meet its commitments. As rights holders, MN-S should have the opportunity to contribute to the development and implementation of all discussions related to monitoring, follow-up and adaptive management associated with Indigenous Land and Resource Use.	
620.	MN-S (October 19, 2022)	16.2.3, p. 16-16 Spatial Boundaries	"The spatial boundary selected for the cultural and heritage resources assessment was defined as the heritage study are and included three main areas of the maximum disturbance area (Annex IX, Figure 3):" The study area figure should be included within the EIS; readers should not be required to consult an alternate document to understand the spatial scope of the assessment. Additional justification is required to understand the selection of these locales for inclusion within the study areas, and more importantly why other areas within the maximum disturbance area were excluded.	
621.	MN-S (October 19, 2022)	16.2.3, p. 16-18 Spatial Boundaries	Table 16.2-2 Spatial Boundaries for the Assessment of Indigenous Land and Resource Use LSA Description:	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			"The terrestrial, aquatic, and human health RSAs where ecosystems and resources can potentially be directly or indirectly affected by the Project and experience some cumulative effects, if applicable." Section 16.2.2.2 states that "the measurement indicators for Indigenous land and resource use are connected to intermediate components in the EA such as air quality, noise, hydrology, and surface water quality."[12] At a minimum, these intermediate components (air quality, noise, hydrology, and surface water quality) should be considered (and discussed within the EIS) when selecting the appropriate spatial boundaries for Indigenous land and resource use.	
622.	MN-S (October 19, 2022)	16.2.6, p. 16-24 Existing Conditions	Table 16.2-3 Linkage between Existing Conditions and Measurement Indicators The cultural and heritage resources VC has only one measurement indicator; a high-level summary of existing conditions for this indicator should be provided. The level of detail and robustness should be comparable to the content provided for the Indigenous land and resource use measurement indicators. Readers should not be required to consult an alternate document to understand the existing conditions.	
623.	MN-S (October 19, 2022)	16.2.7, p. 16-26 Project Interactions and Mitigations	"No Pathway: Analysis reveals that the pathway could be removed (i.e., effect is avoided) by mitigation so that the Project would result in no measurable environmental change relative to existing conditions or guideline values and, therefore, would have no residual effect on cultural and heritage resources and Indigenous land and resource use." No mitigation is guaranteed to avoid an effect; mitigations are intended to minimize potential effects.	

[12] EIS, p. 16-14.

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			TWC recommends that MN-S request the definition for No Pathway is updated throughout the EIS.	
624.	MN-S (October 19, 2022)	16.3.2.2, p. 16-38 Métis Nation-Saskatchewan Northern Region	"However, both communities' Métis populations have declined in recent years. In La Loche, the Métis populations decreased by 600 since 2011 (the largest population decrease among LPA communities), and by 225 in Buffalo Narrows. Buffalo Narrows has the oldest population among LPA communities with a median age of 30.8 years, which is consistent with provincial Indigenous population characteristics where the Métis population is oldest amount Indigenous Groups." The overall MN-S population numbers should be included to understand the impact of a population decrease of 600 since 2011.	
625.	MN-S (October 19, 2022)	16.3.3, p. 16-39 Contemporary Indigenous Land and Resources	"Fishing: Fishing has traditionally been an important activity for Indigenous Groups providing food. Topics discussed include the cultural importance of fishing, the species fished, fishing locations, and the seasonality, where available." Given fishing is acknowledged as an important activity for Indigenous Groups, fishing as is relates to sustenance (and ultimately Human Health) should be a topic of discussion to fishing.	
626.	MN-S (October 19, 2022)	16.3.3.6, p. 16-59 Summary of Contemporary Indigenous Land Use	"The MN-S has stated that the Patterson Lake area has historical and current value and is paramount to its members, and their lifeblood ..." This statement is a clear indication of the value of the Patterson Lake area to MN-S Indigenous land and resource use. Similar resources in the relative area should be not considered equivalent from a Cultural perspective. This text supports MN-S direction that the Indigenous land and resource use assessment endpoint should at a minimum reflect MN-S' ability (as a rights holder) to continue Indigenous land and resource use practices, as they currently occur, should be the assessment endpoint.	
627.	MN-S (October 19, 2022)	16.4, p. 16-60 to 16-62	Table 16.4-1 Potential Adverse Effects Pathways for Indigenous Land and	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on [Canadian Impact Assessment Registry reference: 80171](#))	NexGen Response
		Project Interactions and Mitigations	Resource Use Environmental Design Features and Mitigations column As a rights holder, MN-S should have the opportunity to contribute to the scoping, development and implementation of all mitigation measures related to cultural and heritage resources and Indigenous land and resource use.	
628.	[MN-S](#) (October 19, 2022)	16.4, p. 16-60 to 16-62 Project Interactions and Mitigations	Table 16.4-1 Potential Adverse Effects Pathways for Indigenous Land and Resource Use ILU-01/ILU-02/ILU-03/ILU-05: Environmental Design Features and Mitigation "Implement Benefit Agreements including …" Currently, no agreement is in place with MN-S for the Project. As such, it is not appropriate to list implementation of an Impact-Benefit Agreement as mitigation to reduce effects to MN-S Cultural and Heritage Resources and Indigenous Land and Resource Use. The terms of the agreement will be subject to a negotiation process with MN-S and the outcomes may vary from those presented and therefore are not an accurate reflection of mitigation that will be applied.	
629.	[MN-S](#) (October 19, 2022)	16.4, p. 16-62 Project Interactions and Mitigations	Table 16.4-1 Potential Adverse Effects Pathways for Indigenous Land and Resource Use ILU-05 (Effects Pathway Changes to air or water quality) Environmental Design Features and Mitigation As a rights holder, MN-S should have the opportunity to contribute to the scoping, development, and implementation of all mitigation measures related to cultural and heritage resources and Indigenous land and resource use. Environmental Protection, Management and Monitoring Plans must consider Indigenous Knowledge including consideration of real or perceived impacts communicated by MN-S.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
630.	MN-S (October 19, 2022)	16.5.1.2.2, p. 16-73 *Access to and Area available for Indigenous Land and Resource Use*	"NexGen also commits to supporting intergenerational transfer of knowledge." It is unclear what actions NexGen is committing to; additional information and context is required to support this statement.	
631.	MN-S (October 19, 2022)	16.5.1.2.3, p. 16-78 to 16-79 Hunting and Trapping	"This may result in woodland caribou [Moose, Black Bear] avoiding an existing movement route at the narrows of Patterson Lake identified through Indigenous and Local Knowledge." It is unclear if mitigations or monitoring programs are being proposed to address this change in movement and potential connectivity between habitats.	
632.	MN-S (October 19, 2022)	16.5.1.2.3, p. 16-82 Summary	"However, wildlife habitat is expected to remain well connected for movement throughout the rest of the wildlife RSA. Effects on wildlife availability from changes in habitat availability, habitat connectivity, and sensory disturbances would occur throughout all Project phases and extend beyond the Active Closure Stage (i.e., two generations of Indigenous land users, or 43 years, for harvesting of most species, and approaching three to four generations, or 100 years, for common goldeneye and American marten) until functional habitat is restored and sensory disturbance from traffic in Project activities is no longer expected to influence wildlife movements. ... Overall, the Project is expected to have a small, local effect on Indigenous land and resource use through its effects on the availability of wildlife for harvest." Indigenous Land and Resource use is intrinsically tied to the land and the specific locale; similar availability of resources in adjacent areas does not necessarily reflect the ability to maintain MN-S cultural practices. An impact to wildlife availability that lasts two to four generations (43 to 100 years) is not a small and local effect on Indigenous land and resource use.	
633.	MN-S (October 19, 2022)	16.5.1.3.3, p. 16-86	"Dust could affect the quality of Indigenous land use experience in the LSA	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
		Air Quality	during Construction, Operations, and the Active Closure Stage, and potentially discourage harvesting next to the Project. Dust deposition rates are not expected to exceed guidance values outside of the maximum disturbance area." MN-S requests the opportunity to be engaged in and collaborate on the development of mitigation and monitoring programs associated with Project dust impacts; particularly as it relates to Indigenous land and resource use. MN-S notes that the text in this section highlights MN-S concerns raised regarding dust, including on vegetation and berries, however no mitigation or monitoring to address these concerns is discussed or proposed.	
634.	MN-S (October 19, 2022)	Section 16.5.1.3.4	The EIS states: "While permanent features of the Project (e.g., WRSAs) would be reclaimed, vegetation communities anticipated to establish on these features would likely not be representative of the terrestrial ecosites not influenced by the Project; therefore, effects are conservatively considered permanent and irreversible ... This may result in a loss of aesthetic value after Closure for some Indigenous land and resource users." It is unclear why reclamation would be undertaken such that vegetation ecosystems or forest types would differ from those present before disturbance. Reclamation should, at a minimum, be consistent with existing ecosystems and should be informed by Indigenous land users and their past, current, and future uses of the land. MN-S requests the opportunity to be engaged and collaborate on all aspects of end land use, closure, and reclamation planning. An assessment of visual effects including predictive modelling should be undertaken, and informed by Indigenous land and resource users, including MN-S, to identify appropriate viewing points and determine potential visual impacts (including aesthetics) associated with the Project.	
635.	MN-S (October 19, 2022)	16.5.1.3.4, p. 18-88 Aesthetics	"Reclamation is predicted to reverse effects on disturbed areas and restore natural ecosystems and visual aesthetics of the Project footprint; however, vegetation ecosystems or forest types would most likely differ from those present before disturbance ..."	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			How will the reversal of effects be accomplished and confirmed if the end goal is not consistent with the current conditions? Predictive visual modelling and renderings should be provided to confirm the anticipated outcome and support statements these objectives. What is the time scale to accomplish reclamation goals and 'reverse effects on disturbed areas and restore natural ecosystems and visual aesthetics of the Project footprint?' MN-S requests the opportunity to be engaged and collaborate on all aspects of end land use, closure, and reclamation planning.	
636.	MN-S (October 19, 2022)	Section 16.5.1.3.5.1	The EIS states: "Indigenous land users have documented the use of Patterson Lake, Forrest Lake, Beet Land, Dennis Lake, Derkson Lake, Koop Lake, Gall Lake and Dyck Lake in the LSA … If the access road is used to access these lakes or cabins in these areas, there is potential for safety conflicts. … The Ground Transportation Emergency Response Plan would contain measures to address Indigenous land user traffic safety on the access road and the Security Program would contain measures within the maximum disturbance area …" The proposed mitigation measures include no specific mention of Indigenous land and resource users. MN-S requests the opportunity to be engaged and collaborate on the development of mitigation and monitoring programs related to the access road, including the Ground Transportation and Emergency Response Plan and Security Program as they relate to Indigenous land and resource use goals, objectives, mitigations, and monitoring.	
637.	MN-S (October 19, 2022)	16.5.1.3.5.2, p. 16-88 *Highway 955*	"Highway 955 was documented by Indigenous Groups as a travel route to access traditional use areas or other communities … The Ground Transportation Emergency Response Plan would contain	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			limited measures to address Indigenous land user traffic safety on Highway 955 due to the roadway being under provincial purview ...” MN-S requests additional details related to the ongoing management and maintenance of Highway 955. Including clear delineation of provincial and proponent roles and responsibilities. MN-S requests additional details regarding “limited measures to address Indigenous land user traffic safety”. Safety for all road users, including Indigenous land and resource users and rights holders such as MN-S, should be a priority for NexGen and the Province. MN-S requests the opportunity to be engaged and collaborate on the development of mitigation and monitoring programs related to the access road, including the Ground Transportation and Emergency Response Plan and Security Program as they relate to Indigenous land and resource use goals objectives, mitigations, and monitoring	
638.	MN-S (October 19, 2022)	16.5.1.3.6, p. 16-88 Perceptions of Water, Fish, Plant and Wildlife Resource Quality	Indigenous Knowledge is a unique, but equal way of knowing. As a rights holder, MN-S qualitative communication of impacts regarding the quality of resources or contamination levels should be acknowledged. Text should, at a minimum, reflect “real or perceived” impacts. The exclusive use of “perceived” implies that this Knowledge is not supported or equal in importance to scientific data collection.	
639.	MN-S (October 19, 2022)	16.5.1.3.6, p. 16-90 Perceptions of Water, Fish, Plant and Wildlife Resource Quality	“However, existing perceptions of reduced resource quality are expected to remain for some individuals in the Application Case. To help mitigate these perceptions to the Project's potential for adverse effects on Indigenous land and resource use, NexGen would: ...” The proposed mitigations do not include any collaborative activities to develop a shared understanding, with MN-S, of the perceived impacts to the quality of resources; nor was MN-S provided the opportunity to contributed to the identification of appropriate mitigations. Mitigations to address perceived impacts must be informed by collaboration and contribution of MN-S.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			The effectiveness of the independent Indigenous monitoring program to mitigate potential effects is limited without a commitment from NexGen to collaborate with Indigenous Nations to apply adaptive management approaches to the operations, which are informed by the outcomes of Indigenous monitoring and associated Indigenous Knowledge.	
640.	MN-S (October 19, 2022)	16.5.1.3.6, p. 16-91 Perceptions of Water, Fish, Plant and Wildlife Resource Quality	"Benefit Agreements have been or are being negotiated with each potentially affected primary Indigenous Group. Within each Benefit Agreement, NexGen commits to provide resources, both monetary and human, to support community-related initiatives in areas such as health and wellness, education, and cultural and traditional values." Currently, no agreement is in place with MN-S for the Project. As such, it is not appropriate to list establishment of an Impact-Benefit Agreement as mitigation to reduce effects to MN-S Cultural and Heritage Resources and Indigenous Land and Resource Use. The terms of the agreement will be subject to a negotiation process with MN-S and the outcomes may vary from those presented and therefore are not an accurate reflection of mitigation that will be applied.	
641.	MN-S (October 19, 2022)	16.6, p. 16-108 to 16-109 Residual Effects Classification and Determination of Significance	Table 16.1: Classification of Residual Effects on Indigenous Land and Resource Use Measurement Indicators Direction Row of the Table for ALL measurement indicators The direction of all measurement indicators has been identified as negative. No positive effects have been identified for any indicators related to Indigenous Land and Resource Use under any of the Measurement Indicators. This data does not support an outcome of a "not significant"[13] residual adverse effect on Indigenous land and resource use.	
642.	MN-S (October 19, 2022)	16.6, p. 16-108 to 16-109	Table 16.1: Classification of Residual Effects on Indigenous Land and Resource Use Measurement Indicators	

[13] EIS, Section 16.6.2, p. 16-114.

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
		Residual Effects Classification and Determination of Significance	Duration Row of the Table for ALL measurement indicators The durations listed for the Project range from medium-term (43 years) to long-term (100 years) however all measurement indicators for the RFD duration include short-term (25 year) impacts and links this to the experiential nature of Indigenous Knowledge transfer between generations. It is unclear how the cumulative impacts of the RFD Case would be shorter than the impacts of the Application case. Cumulative impacts will persist beyond the operational periods of both projects. It is also unclear how this timeframe is connected to intergenerational Knowledge Transfer by Indigenous land and resource users. This data does not support an outcome of a "not significant"[14] residual adverse effect on Indigenous land and resource use.	
643.	MN-S (October 19, 2022)	16.6, p. 16-108 to 16-109 Residual Effects Classification and Determination of Significance	Table 16.1: Classification of Residual Effects on Indigenous Land and Resource Use Measurement Indicators Frequency Row of the Table for ALL measurement indicators The frequency of all measurement indicators is listed as continuous. This data does not support an outcome of a "not significant"[15] residual adverse effect on Indigenous land and resource use.	
644.	MN-S (October 19, 2022)	16.8, p. 16-117 Monitoring, Follow-up, and Adaptive Management	"NexGen has committed in the Benefit Agreement with each primary Indigenous Group to establish an Implementation Committee. The Implementation Committee is tasked with the responsibility of facilitating an effective ongoing working relationship between NexGen and the Indigenous Groups to verify that all commitments made with the Benefit Agreements are realized." Currently, no agreement is in place with MN-S for the Project. As such, it is	

[14] Ibid.
[15] Ibid.

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			not appropriate to list establishment of an Impact-Benefit Agreement as mitigation to reduce effects to MN-S Cultural and Heritage Resources and Indigenous Land and Resource Use. The terms of the agreement will be subject to a negotiation process with MN-S and the outcomes may vary from those presented and therefore are not an accurate reflection of mitigation that will be applied.	
645.	MN-S (October 19, 2022)	16.9, p. 16-118 Key Findings	"In summary, residual adverse effects on Indigenous land and resource use were assessed as not significant for both the Application Case and the RFD Case. Small magnitude changes in the availability of resources, access to and area available for Indigenous land and resource use, and moderate magnitude changes in the quality of the Indigenous land use experience, are expected to be centred on the Patterson Lake area. Indigenous land and resource use activities may change or be displaced but are expected to continue with the application of mitigations including the Indigenous and Public Engagement Program and Benefit Agreements." Please see previous comments for additional detail on each of the points summarized below: • As a rights holder, MN-S should be the afforded the opportunity to collaborate and contribute to the identification of mitigation and monitoring programs and the determination of significance for potential impacts to Indigenous land and resource use. • While the magnitude of impacts against measurement indicators may be listed as small and moderate, for all indicators the direction of change is negative, the frequency is continuous, and the time scale ranges from 25 years through 100 years. This data does not support a not-significant outcomes for impacts to Indigenous land and resource use. Further, reclamation and closure are not anticipated to result in a return of the land to the current ecotypes or vegetations. • Indigenous Land and Resource use is intrinsically tied to the land and the specific locale; similar availability of resources in adjacent areas does not necessarily reflect the ability to maintain MN-S cultural	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			practices. As such it is not appropriate to assume that abundance in the LSA or RSA is equivalent to the losses incurred due to the Project. Currently, no agreement is in place with MN-S for the Project. As such, it is not appropriate to list establishment of an Impact-Benefit Agreement as mitigation to reduce effects to MN-S Cultural and Heritage Resources and Indigenous Land and Resource Use. The terms of the agreement will be subject to a negotiation process with MN-S and the outcomes may vary from those presented and therefore are not an accurate reflection of mitigation that will be applied.	
646.	MN-S (October 19, 2022)	17.0, p. i *Section Purpose*	"The Other Land and Resource Use assessment used widely accepted scientific practices and incorporated Indigenous and Local Knowledge." Indigenous Knowledge is a unique, but equal way of knowing. The term 'incorporated' implies that this Knowledge is not equal in importance to scientific data collection and instead can be absorbed within it.	
647.	MN-S (October 19, 2022)	17.0, p. iv *Residual Effects Analysis (Section 17.5)* Access to, and Area Available for, Land and Resource Use	"The Project and the Fission Patterson Lake South Property would not restrict small watercraft from navigation of Patterson Lake." Consistent with text in Chapter 16, it is understood that "access to parts of Patterson Lake may be temporarily restricted during construction of in-lake infrastructure."	
648.	MN-S (October 19, 2022)	17.0, p. iv *Residual Effects Analysis (Section 17.5)* Quality of the Resource Use Experience	"Perceptions that mine activities adversely affect the quality of fish and wildlife for harvest. Perceptions of contamination at decommissioned facilities." Text should, at a minimum, reflect "real or perceived" impacts. The exclusive use of "perceived" implies that the knowledge of the land and resource users (including MN-S land and resource users and their Indigenous	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			Knowledge) is not supported or equal in importance to scientific data collection.	
649.	MN-S (October 19, 2022)	17.0, p. v *Monitoring, Follow-up and Adaptive Management (Section 17.8)*	"Meetings would be held with community members, commercial trappers, outfitters, and other potentially affected land users, as applicable, both independently and as part of the Indigenous and Public Engagement Program." It is unclear if engagement that has been undertaken with these parties to develop a relationship and increase NexGen's understanding of land and resource user perspectives and ultimately inform the assessment.	
650.	MN-S (October 19, 2022)	17.2.1, p. 17-10 Incorporation of Indigenous and Local Knowledge	"Another key source of Indigenous and Local Knowledge was information shared by Indigenous Group representatives during Joint Working Group meetings. The Joint Working Groups represent an agreed-upon primary engagement mechanism as outlined in the Study Agreements signed by each of the primary Indigenous Groups and NexGen." While the Joint Working Group may be agreed upon as an engagement mechanism, it should not be assumed that information shared through the Joint Working Group constitutes Indigenous Knowledge nor that consent for the use of this Indigenous Knowledge has been provided.	
651.	MN-S (October 19, 2022)	17.2.1, p. 17-11 Incorporation of Indigenous and Local Knowledge	"Comments submitted by Indigenous Groups on the Project Description … were also reviewed for applicable Indigenous and Local Knowledge. Indigenous and Local Knowledge related to Other Land and Resource Use was incorporated into the assessment by viewing the information as complimentary and influential alongside scientific information." It is unclear what process NexGen undertook to verify and/or confirm permissions to use information identified by NexGen as Indigenous Knowledge through document and comment review processes.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
652.	MN-S (October 19, 2022)	17.2.2.3, p. 17-13 Assessment Endpoints	"The endpoint used in this assessment is continued level of opportunities for Other Land and Resource Use. The level of opportunity is dynamic as it is subject to factors such as markets, business fluctuations, and government policies; however, the level refers to the amount of access, the availability of resources and the quality of resources and resource use experience." Given the caveats provided on the assessment endpoints, it is unclear how the assessment endpoint will be determined and used to guide the determination of significant effects on Other Land and Resource Use.	
653.	MN-S (October 19, 2022)	17.2.6, p. 17-21 Existing Conditions	"Quantitative recreational hunting harvests and participation levels, commercial trapping production and value, and commercial fishing production by lake and by species were available from ENV databases. The data sources were retrieved by request from government officials and, in the case of fur production, from annual reports ..." It is unclear from this statement if Indigenous commercial and recreational use is represented within this data.	
654.	MN-S (October 19, 2022)	17.2.6, p. 17-22 Existing Conditions	"To validate the data, cabins documented in at least two of the four sources were considered for the assessment. Completing this verification process improved the reliability of the data given that the presence of resource user cabins may now be known to the Wildlife Management Branch depending on whether cabin owners applied for Crown Land leases or not." It is unclear from this text what process was undertaken to validate the data; further the use of 'at least two of the four sources' does not provide any detail or clarity about which of the source were verified.	
655.	MN-S (October 19, 2022)	17.2.6, p. 17-22 Existing Conditions	"The IKTLU Studies supported the integration of Indigenous and Local Knowledge into the assessment."	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			The use of "integration of Indigenous and Local Knowledge" does not reflect current best practices that acknowledge Indigenous Knowledge as an equal but different way of knowing (than western science). This terminology implies that Indigenous Knowledge can be absorbed into a scientific approach.	
656.	MN-S (October 19, 2022)	17.2.7, p. 17-23 Project Interactions and Mitigations	**No Pathway**: Analysis revealed that the pathway could be removed (i.e., effect is avoided) by mitigation so that the Project would result in no measurable environmental change relative to existing conditions or guideline values and, therefore, would have no residual effect on Other Land and Resource Use. No mitigation is guaranteed to avoid an effect; mitigations are intended to minimize potential effects.	
657.	MN-S (October 19, 2022)	17.2.8, p. 17-24 Residual Effects Analysis	A qualitative assessment was conducted on potential changes…changing perceptions concerning the potential quality of country foods for consumption… It is unclear how the Other Land and Resource Use VC measurement indicator for changes in quality of resources and the quality of resource use experience related to perceptions concerning the potential quality of country foods for consumption under the Other Land and Resource Use VC is distinguished and unique from the assessment of Indigenous land and resource use measurement indicator for changes in the quality of resources and the quality of resource use experience.	
658.	MN-S (October 19, 2022)	17.3.2, p. 17-32 Commercial Trapping	This subsection focuses on trapping for commercial purposes, whereas trapping for traditional purposes by Indigenous Peoples is described in Section 16.3, though it is noted that trapping for commercial purposes and for sustenance (i.e., traditional purposes) are performed concurrently. It remains unclear how Section 16 and Section 17 have considered Indigenous land and resource use.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			Section 35(2) of the *Constitution Act* (1982) outlines Aboriginal rights and Treaty rights and does not distinguish between commercial, recreational, and other uses of the land. As such, assessment of Indigenous land and resource use should be considered holistically. It is not appropriate to separate Indigenous land and resource uses for assessment under two different VCs.	
659.	MN-S (October 19, 2022)	17.3.2.1, p. 17-32 History of Commercial Trapping	Indigenous Peoples in northern Saskatchewan have been involved in trapping fur-bearing animals for commercial purposes since the 1700s. This statement directly contradicts the text in 17.3.2 which indicates that Indigenous commercial trapping is not considered within this discussion.	
660.	MN-S (October 19, 2022)	17.3.2.2, p. 17-33 Commercial Trapping in the Regional Study Area	Trapping still provides benefits to trappers and their families, including money from fur sales, meat from certain species and some use of furs for domestic purposes, such as moccasins and gloves. Trapping continues to be a source of supplemental income for many, bringing in between $1.5 million and $6.0 million per annum for 4,500 trappers. The values and benefits discussed here also apply to Indigenous land and resource users.	
661.	MN-S (October 19, 2022)	17.3.5, p. 17-45 Cabins	The status of these cabins, whether historical, current, or planned for the future, was not available, and these locations could not be validated when cross-referenced with three other sources of information. It is unclear what other information sources were used to attempt to verify the location of cabins identified through the trappers' workshop; in particular it is unclear if data validation included field programs or ground-truthing. Indigenous Knowledge is a unique, but equal way of knowing, which cannot necessarily be verified through a data or source review against scientifically collected data.	
662.	MN-S (October 19, 2022)	17.4, p. 17-52 Project Interactions and Mitigations	Note that mitigation measures are intended to address Indigenous and non-Indigenous land users and recognize there is considerable overlap between the two. The intent is to accommodate all, and not exclude any individuals,	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			involved in Other Land and Resource Use. It is acknowledged that many mitigation measures outlined below (e.g., grievance mechanisms) would also overlap with mitigation measures presented in Section 16. This approach is intended to collectively address all land users, both Indigenous and non-Indigenous, across these two sections. It is confusing and unclear to the reader what has been assessed and mitigated with respect to Indigenous land and resource users in Chapter 16 and Chapter 17. Further the separation of the assessment of Indigenous land and resource uses between two chapters dilutes the assessment of potential impacts to Indigenous land and resource users and does not respect Indigenous nations, including MN-S, as rights holders who have distinct rights under Section 35(2) of the *Constitution Act* (1982).	
663.	MN-S (October 19, 2022)	17.4, p. 17-53 to 17-54 Project Interactions and Mitigations	Table 17.4-1 Potential adverse effects pathways for Other Land and Resource Use Environmental Design Features and Mitigation for OLU-01/OLU-02/OLU-03/OLU-04: …Implement Project Benefit Agreements… Currently, no agreement is in place with MN-S for the Project. As such, it is not appropriate to list implementation of an Impact-Benefit Agreement as mitigation to reduce effects to MN-S.	
664.	MN-S (October 19, 2022)	17.5.1.1, p. 17-61 Access to and Area Available for Land and Resource Use	The Project is not predicted to restrict access to or between the lakes in the Other Land and Resource Use LSA. Consistent with text in Chapter 16, it is understood that "access to parts of Patterson Lake may be temporarily restricted during construction of in-lake infrastructure."	
665.	MN-S (October 19, 2022)	17.6.2, p. 17-71 Significance	Due to the Project remote location, resource use for commercial and recreational purposes is nominal (meaning virtually absent but not	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
		Determination	confirmed to be zero), and only two resource user groups were identified as potentially affected: Trappers and lodge and outfitting clientele. The findings of Section 17 identify trappers as potentially effected land and resource users, however Section 16[16] which focuses on Indigenous land and resource use found that 'residual adverse effects on Indigenous land and resource use are anticipated to be not significant.	
666.	MN-S (October 19, 2022)	17.6.2, p. 17-72 Access to, and Area Available for, Land and Resource Use	Should a loss of income occur, there are remedies such as trapping compensation agreements that have been implemented successfully with trappers around five mining operations in northern Saskatchewan. It is unclear if this text is indicating that the Province of Saskatchewan would be responsible for implementing mitigations such as trapping compensation or if the proponent would be responsible for such compensation. It is also unclear if NexGen is proposing trapping compensation as a potential Project mitigation measure for a loss of trapper income.	
667.	MN-S (October 19, 2022)	17.7, p. 17-75 Predication Confidence and Uncertainty	Uncertainty was managed by: … Validation with Indigenous and Local Knowledge where possible;… Additional information regarding the process of validation with Indigenous Knowledge should be provided. Other sections of the EIS note that this validation was undertaken through review of meeting notes and discussions at Joint Working Group. Third party review of meeting records and notes is not equivalent to data validation by potentially affected parties. Data verification should involve collaboration with MN-S as rights holders and Indigenous land and resource users. This data verification with MN-S should include the opportunity to review, revise, and contribute to EIS content.	
668.	MN-S (October 19, 2022)	18.0, p.i	"The selection was also informed by Indigenous and Local Knowledge	

[16] Section 16.6.2, Significance Summary, page 16-114.

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
		Section Purpose	obtained from Indigenous Knowledge and Traditional Land Use Studies and Joint Working Groups, and feedback received during community engagement sessions." The use of "obtained" when referring to Indigenous Knowledge implies that the information shared was "taken" by the proponent. This does not align with best practices and acknowledgement of Indigenous Knowledge as a unique but equal way of knowing. It is also unclear what process NexGen took to verify and confirm that Indigenous Knowledge was applied in a manner that involved, and was acceptable to, the Indigenous nations.	
669.	MN-S (October 19, 2022)	18.0, p. iii *Project Interactions, Mitigations, and Benefit Enhancement (Section 18.4)*	"… NexGen is in the process of negotiating Benefit Agreements with primary Indigenous Groups in the LSA … they are premised on commitments including proactively engaging with local communities; supporting the economic participation of affected communities … Implementation of items agreed to in Benefit Agreements is also expected to reduce adverse effects and enhance beneficial effects on the economy." Currently, there is no agreement in place with MN-S for the Project. As such, it is not appropriate to list implementation of an Impact-Benefit Agreement as mitigation to reduce effects to MN-S economic impacts. Further, proposed mitigations should be clearly outlined. Text such as "supporting the economic participation of affected communities" is ambiguous and open to interpretation. The terms of the agreement will be subject to a negotiation process with MN-S and the outcomes may vary from those presented and therefore are not an accurate reflection of mitigation that will be applied.	
670.	MN-S (October 19, 2022)	18.0, p. iv *Employment*	"Should the aspirational target of 75% local employment be achieved, an estimated 365 positions during Operations would be filled by members of the LSA. Employment would continue during Closure, but at a decreased level compared to Operations." Has NexGen established aspirational targets for hiring of Indigenous Peoples in addition to members of the LSA? Employment targets—as well as	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			Education and Training, and Business and Contracting—should be established to support the Indigenous Economy and considered within the assessment.	
671.	MN-S (October 19, 2022)	18.0, p. v *Monitoring, Follow-up, and Adaptive Management (Section 18.7)*	"In Benefit Agreements with Indigenous Groups, NexGen has committed to establishing an Implementation Committee which would facilitate an effective, ongoing working relationship between NexGen and the Indigenous Group, and verify that all commitments made within the Benefit Agreements are realized." Currently, no agreement is in place with MN-S for the Project. As such, it is not appropriate to list implementation of an Impact-Benefit Agreement as mitigation to reduce effects to MN-S economic impacts. The terms of the agreement will be subject to a negotiation process with MN-S and the outcomes may vary from those presented and therefore are not an accurate reflection of mitigation that will be applied. Further, it is unclear what mechanisms will be available to Indigenous Groups—without a Benefit Agreement in place—to realize the benefits and mitigations identified within the EIS.	
672.	MN-S (October 19, 2022)	18.2.2.2, p. 18-11 *Measurement Indicators*	"Nine measurement indicators were identified for the economy VC (Table 18.2-1): … • Indigenous community participation and employment in the traditional economy; • income: • personal income and household income, and wage income and traditional economy income; …" While text on page 18-10 provides some context on the traditional economy, it is unclear what NexGen is referring to with when referencing "employment in the traditional economy". Participation in traditional practices, and the traditional economy, does not necessarily equate to employment or an	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			affiliation with a business or commercial operation. Further, distinguishing between wage income and traditional income supports the perspective that Indigenous Peoples may participate in the traditional economy, and earn income from these practices, independent of employment, which provides a wage.	
673.	MN-S (October 19, 2022)	18.2.2.3, p. 18-12 *Assessment Endpoints*	Table 18.2-1 Valued Component Rationale, Measurement Indicators, and Assessment Endpoints Assessment Endpoints • Enhancing the participation of local Indigenous and non-Indigenous individuals in employment, income, education and training opportunities. • Enhancing Indigenous and locally owned business and opportunities. … Maintaining opportunities to participate in the traditional economy." While it is recognized that "assessment endpoints are qualitative expressions that represent the key properties of VCs that should be protected", the terminology used to define the assessment endpoints, in particular the term "enhancing" is subjective, not qualitative. It is unclear how NexGen will confirm that the assessment endpoints have been met. In addition, as rights holders, opportunities for Indigenous Nations and Indigenous individuals should be considered independently of non-Indigenous communities. Similarly, it is unclear why only the traditional economy has been identified to be maintained, when all other assessment endpoints are intended to be enhanced. Opportunities to enhance the traditional economy can and should be explored through collaboration with MN-S.	
674.	MN-S (October 19, 2022)	18.2.6, p. 18-18 Existing Conditions	"Joint Working Group discussions, IKTLU Studies, and workshops … assisted in identifying existing economic conditions and related community	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			interests and concerns, as well as supported data triangulation (e.g., cross-referencing) to verify the data was accurate and representative of the communities." This text seems to be missing some content, in particular following "as well as". Verification that Indigenous Knowledge has been used accurately and appropriately, should be completed by the potentially affected Indigenous Nation. NexGen reviewing primary sources of Indigenous Knowledge (i.e., IKTLU Studies) or performing data-triangulation (e.g., cross-referencing) *cannot* be considered verification that data is an accurate representation of the Indigenous community experience. As rights holders, MN-S should have the opportunity to collaborate in data verification, including the opportunity to review, revise, and contribute to the characterization of existing conditions with the MN-S Homeland.	
675.	MN-S (October 19, 2022)	18.2.6.2, p. 18-20 Existing Conditions	*Key Person Interview Program* "A total of 73 interviews were conducted with community members ... Interviews were conducted with the consent of individual interview participants and community leadership. Community coordinators were hired and trained to assist in identifying participants in the KP interview program. Interviews were conducted in La Loche (20 interviews), BNDN / Turnor Lake (9 interviews), BRDN (16 interviews), Buffalo Narrows (24 interviews), other hamlets and villages (3 interviews), and the Meadow Lake Tribal Council (1 interview)." It is unclear from this text how many Key Person (KP) interviews were undertaken with Indigenous Peoples and non-Indigenous Peoples. It is also unclear which Indigenous communities were invited to participate in this process. As a rights holder, MN-S should have the opportunity to participate and be represented in the KP interview program.	
676.	MN-S (October 19, 2022)	18.2.7, p. 18-23 Project Interactions, Mitigations, and	"Project interactions determined as no pathway, secondary pathways, or beneficial pathways were not carried forward for further assessment	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
		Benefit	(Section 6.7.3)." This text appears to be missing some content and should be reviewed and updated.	
677.	MN-S (October 19, 2022)	18.3.7.1.3, p. 18-61 to 18-62 Mining-Specific Training	"The MPTP was a collaborative effort developed by government, industry, and local public and Indigenous communities to maximize training and advancement opportunities in the uranium sector." MN-S request that abbreviations (i.e., MPTP) are spelled out at first use within a section. It is unclear what this abbreviation stands for.	
678.	MN-S (October 19, 2022)	18.3.7.2, p. 18-62 *Educational Attainment*	"The majority of the population in the LSA (i.e., 56.3%) and RSA (i.e., 50.8%) have less than a high school certificate, compared to approximately 20% of the Province of Saskatchewan." Given that students generally graduate high school at the age of 17 or 18, the inclusion of individuals under the age of 17 in this dataset dilutes the accuracy of the results.	
679.	MN-S (October 19, 2022)	18.4, p. 18-70 Project Interactions, Mitigations and Benefit Enhancement	Table 18.4-1: Effects Pathways for Economy E-01, Mitigation and Benefit Enhancement Policies and Actions Column includes: • "Provide dedicated space for Elders to be available to support employees to assist with employee retention. … • Implement provisions of Benefit Agreements related to employment and training." It is unclear how exactly a dedicated space for Elders would function to assist with employee retention. How would Elder's be compensated for their time and Knowledge, what are the expectations associated with this role, and who would be afforded the opportunity to participate? Currently, no agreement is in place with MN-S for the Project. As such, it is not appropriate to list implementation of a Benefit Agreement as mitigation to reduce effects to MN-S.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			The terms of the agreement will be subject to a negotiation process with MN-S and the outcomes may vary from those presented and therefore are not an accurate reflection of mitigation that will be applied.	
680.	MN-S (October 19, 2022)	18.4, p. 18-70 Project Interactions, Mitigations and Benefit Enhancement	Table 18.4-1 Effects Pathways for Economy Mitigation and Benefit Enhancement Policies and Actions column includes: “E-02 … • Develop and maintain a business opportunities workplan that describes the steps NexGen and each primary Indigenous Group would take to achieve the desired outcomes of the respective Benefit Agreement.” Currently, no agreement is in place with MN-S for the Project. As such, it is not appropriate to list implementation of a Benefit Agreement as mitigation to reduce effects to MN-S. The terms of the agreement will be subject to a negotiation process with MN-S and the outcomes may vary from those presented and therefore are not an accurate reflection of mitigation that will be applied.	
681.	MN-S (October 19, 2022)	18.04, p. 18-70 Project Interactions, Mitigations and Benefit Enhancement	Table 18.4-1 Effects Pathways for Economy E-02 Mitigation and Benefit Enhancement Policies and Actions Column - all content The text within the assessment clearly outlines the interest and importance of local business to Indigenous Groups in the LSA. None of the mitigations identified however, include opportunities to support the start-up of local businesses and support Indigenous entrepreneurs.	
682.	MN-S (October 19, 2022)	1.4, p. 18-70 Project Interactions, Mitigations and Benefit Enhancement	Table 18.4-1 Effects Pathways for Economy Effects Pathway column…	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			"E-04 … • Benefit Agreements include payments to Indigenous Groups based on revenue generated throughout the life of the Project." Currently, no agreement is in place with MN-S for the Project. As such, it is not appropriate to list implementation of an Impact-Benefit Agreement as beneficial pathway for MN-S. The terms of the agreement will be subject to a negotiation process with MN-S and the outcomes may vary from those presented and therefore are not an accurate reflection of mitigation that will be applied.	
683.	MN-S (October 19, 2022)	18.4.1, p. 18-72 Beneficial Pathways	"The analysis of beneficial effects on the economy considers that NexGen is in the process of negotiating Benefit Agreements with Indigenous Groups in the LSA and has signed agreements with three groups. Although details of these agreements are confidential and have not been finalized for all Indigenous Groups, they are premised on commitments described in NexGen's Integrated Management System Policy including proactively engaging with local community; supporting the economic participation of affected communities; seeking to provide opportunities resulting in sustainable, lasting benefits to local communities beyond the Project lifespan; and providing clear and timely information to those who have a direct interest in the Project." This comment applies to all text in subsections of 18.4.1 which reference and discuss NexGen's establishment of Benefit Agreements, including text that outlines anticipated commitments within the Agreements. Currently, no agreement is in place with MN-S for the Project. As such, it is not appropriate to list implementation of an Impact-Benefit Agreement as beneficial pathway for MN-S. The terms of the agreement will be subject to a negotiation process with MN-S and the outcomes may vary from those presented and therefore are not an accurate reflection of mitigation that will be applied. In addition, it is not appropriate for NexGen to assess and consider the benefits of a theoretical	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on [Canadian Impact Assessment Registry reference: 80171](#))	NexGen Response
			agreement for Indigenous Groups with no agreement, or certainty about the identified benefits, in place.	
684.	MN-S (October 19, 2022)	18.4.3, p. 18-88 Secondary Pathways	"E-05: Population migration … most, if not all in-migration would be anticipated to be former residents, which would be viewed by most as a positive outcome (i.e., relatives returning home)." Earlier text in this assessment (and further in this passage) indicates that the Project will include several specialized jobs that will require specific skills sets that may not be available within the LSA workforce. While NexGen has identified a willingness to implement mitigation to minimize in-migration, this does not provide data to support the assumption that in-migration will be limited (almost entirely) to former residents.	
685.	MN-S (October 19, 2022)	18.8, p. 18-91 Key Findings	"Sustainable economic opportunities associated with the Project also form part of the signed Benefit Agreements with Indigenous Groups." Currently, no agreement is in place with MN-S for the Project. As such, it is not appropriate to list implementation of an Impact-Benefit Agreement as a source of sustainable economic opportunity for MN-S. The terms of the agreement will be subject to a negotiation process with MN-S and the outcomes may vary from those presented and therefore are not an accurate reflection of mitigation that will be applied. In addition, it is not appropriate for NexGen to assess and consider the benefits of a theoretical agreement for Indigenous Groups with no agreement, or certainty about the identified benefits, in place.	
686.	MN-S (October 19, 2022)	18.8, p. 18-93 Key Findings	"Mitigation, enhancement, and monitoring are proposed to sustainably maximize economic opportunities these include … • Providing a dedicated space for Elders to be available to support Indigenous employees."	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			It is unclear how a dedicated space for Elders would function to assist with Employee Retention. How would Elder's be compensated for their time and Knowledge, what are the expectations associated with this role and who would be afforded the opportunity to participate?	
687.	MN-S (October 19, 2022)	19.0, p. i *Section Purpose*	"The assessment of effects on community well-being was informed by the assessments completed for Indigenous land and resource use, Other Land and Resource Use, and economy. Results from the assessment of community well-being did not provide inputs to other EIS Sections." Human Health and Community well-being are closely linked, as such a robust assessment of community well-being should be informed by the Human Health Effects Assessment. MN-S request the assessment of community well-being is updated to include consideration of the Human Health Effects Assessment.	
688.	MN-S (October 19, 2022)	19.0, p. vi *Project Interactions, Mitigations and Benefit Enhancement (Section 19.4)*	"Proposed mitigation and enhancement measures would reduce adverse effects and enhance beneficial effects on the local communities. Measures would include the development of culturally-sensitive employment policies, provision of dedicated space for Elders ..." It is unclear how a dedicated space for Elders would function to assist with Employee Retention. How would Elder's be compensated for their time and Knowledge, what are the expectations associated with this role and who would be afforded the opportunity to participate? MN-S request additional detail is provided, and included within the EIS, related to dedicated space for Elders as a mitigation to support employee retention.	
689.	MN-S (October 19, 2022)	19.0, p. vi *Project Interactions, Mitigations and Benefit Enhancement (Section 19.4)*	"… NexGen is in the process of negotiating Benefit Agreements with Indigenous Groups in the LSA … [a]lthough details of these agreements are confidential and have not been finalized for all Indigenous Groups, they are premised on commitments including proactively engaging with local communities; supporting the economic participation of affected communities; seeking to provide opportunities resulting in sustainable,	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			lasing benefits to local communities beyond the Project lifespan; and providing clear information to those who have a direct interest in the Project. Implementation of items agreed to in Benefit Agreements is also expected to reduce adverse effects and enhance beneficial effects on community well-being." Currently, no agreement is in place with MN-S for the Project. As such, it is not appropriate to list implementation of an Impact-Benefit Agreement as mitigation to reduce effects to MN-S. The terms of the agreement will be subject to a negotiation process with MN-S and the outcomes may vary from those presented and therefore are not an accurate reflection of mitigation that will be applied. MN-S request the removal of implementation of Benefit Agreements as a mitigation measure, and beneficial pathway, throughout the EIS.	
690.	MN-S (October 19, 2022)	19.0, p. viii Demand for Community Infrastructure and Services	"… it is expected that support in the Benefit Agreements and the Community Vitality Monitoring Partnership Program (CVMPP) would work towards minimizing residual cumulative effects. The CVMPP is a multi-stakeholder group that includes mine operators, health authorities, and the provincial government that completes or commissions research on topics related to quality of life in northern Saskatchewan at a regional scale …" Currently, no agreement is in place with MN-S for the Project; it is therefore not appropriate to list implementation of an Impact-Benefit Agreement as mitigation to reduce effects to MN-S. Similarly based on the description provided the CVMPP does not include representation of Indigenous Groups. As such these mitigations to address the demand for community infrastructure are not applicable to MN-S. MN-S request this text is updated to reflect how Indigenous Groups without a Benefit Agreement in place will realize the mitigations for community infrastructure and services.	
691.	MN-S (October 19, 2022)	19.1, p. 19-4	Figure 19.1-3 Community Well-Being elements	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
		Introduction	*AND* "The assessment of effects on community well-being relies on inputs from Indigenous land and resource use … Other Land and Resource Use … and the economy. Results from the assessment of community well-being do not provide inputs to other EIS sections." Figure 19.1-3 Community Well-being Elements includes: Societal and Cultural, Health, Neighbourhood and Physical Environment, Educational and Economic, however the text does not identify a linkage between the Human Health Assessment and the Community well-being assessment. It is further noted that text in the introduction references mental health but makes no other reference to the influence on health on community well-being. Human Health and Community well-being are closely linked, as such a robust assessment of community well-being should be informed by the Human Health Effects Assessment. MN-S request the assessment of community well-being is updated to include consideration of the Human Health Effects Assessment.	
692.	MN-S (October 19, 2022)	19.2.1, p. 19-10 Incorporation of Indigenous Knowledge	"Comments submitted by Indigenous Groups on the Project Description … were also reviewed for applicable Indigenous and Local Knowledge." The use of Indigenous Knowledge should be subject to the protocols and permissions of the Indigenous Nations who share that Knowledge. In addition, the use of Indigenous Knowledge should be verified by Indigenous land and resource users to ensure that it has been applied appropriately and as intended. MN-S requested the opportunity to review and contribute to the EIS prior to submission, but NexGen did not meet this request. Further, unless explicitly directed otherwise, the provision of comments on a document review is not synonymous with sharing Indigenous Knowledge for the purposes of an impact assessment. MN-S request that NexGen update text to reflect any verification process undertaken to confirm the application of Indigenous Knowledge.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on [Canadian Impact Assessment Registry reference: 80171](#))	NexGen Response
			MN-S request NexGen update text within the EIS to reflect that a verification process was not undertaken to ensure that the application of MN-S Knowledge was appropriately applied within the assessment. This comment is applicable to all content within the EIS and should be updated globally.	
693.	[MN-S](#) (October 19, 2022)	19.2.2.2, p. 19-13 Measurement Indicators	Table 19.2-1 Measurement Indicators, Supporting Indicators, and Factors Considered Health well-being row Holistic consideration of health well-being requires consideration of potential health impacts associated with the Project. As such the outcomes of the human health risk assessment should inform the supporting indicator of overall health. MN-S request the inclusion and consideration of the Human Health Risk Assessment within the Community well-being assessment, particularly as it relates to the health well-being measurement indicator.	
694.	[MN-S](#) (October 19, 2022)	19.2.6, p. 12-20 Existing Conditions	"A Joint Working Group session in 2020 was specifically developed to discuss community definitions of well-being, the factors that both contribute to and detract from well-being, and how participants felt the proposed Project might interact with these factors." It is unclear who participated in this working group and what definitions were provided for well-being and the factors that contribute to and detract from well-being. MN-S requests additional detail is included within the EIS to reflect the participants and Knowledge that was shared and applied to this assessment.	
695.	[MN-S](#) (October 19, 2022)	19.2.6.5, p. 19-25 Existing Conditions *COVID-19 Impacts*	"An LGBTQ2S+ (Lesbian, Gay, Bisexual, Transgender, Queer or Questioning, and Two-Spirit plus) workshop was postponed … and later cancelled based on the change in participants' willingness to participate, which was respected." The use of LGBTQ2S+ without reference to people or community diminishes the identify of those that are members of the LGBTG2S+ community to a	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on [Canadian Impact Assessment Registry reference: 80171])	NexGen Response
			label. It is also unclear if the scope of the workshop was intended to include LGBTQ2S+ allies and family members. MN-S request that this terminology is updated to acknowledge members of the LGBTQ2S+ community as people. For example, the text could be revised to state "a workshop to engage with members of the LGBTQ2S+ community was postponed ...".	
696.	MN-S (October 19, 2022)	19.2.11, p. 19-31 Monitoring. Follow-up and Adaptive Management	"NexGen has demonstrated a commitment to working with LSA Indigenous Groups and communities to realize the potential socio-economic benefits the Project would provide." This statement is ambiguous, and it is unclear what demonstration of commitment is being referenced. MN-S request NexGen revise this text within the EIS to support the statement that NexGen has demonstrated a commitment, and further note that implementation of a yet to be negotiated Benefit Agreement is not a demonstration of NexGen's commitment to working with MN-S.	
697.	MN-S (October 19, 2022)	19.3.1.1.3.2, p. 19-38 *Buffalo Narrows*	"The Buffalo Narrows population is predominantly Métis (i.e., 80.2%) with some First Nations (i.e., 19.8%)." This text is contradictory to the content included on the preceding page (19-37) which states: "La Loche and Buffalo Narrows are described in this subsection because Métis are the majority population of the various groups (i.e., 50.0% in La Loche and 65.8% in Buffalo Narrows)." MN-S request NexGen review and revise this content for accuracy and consistency.	
698.	MN-S (October 19, 2022)	19.3.1.2.2, p. 19-41 Community Context	Métis Nation–Saskatchewan Northern Region 2 It is noted that the content to describe the MN-S community context is informed entirely by engagement in 2020 and does not include any context from NexGen's KP Interview program. While it is acknowledged that the COVID-19 pandemic limited in person engagement, this assessment has	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			identified that remote and digital engagement has been ongoing. MN-S request NexGen review this content and update it to reflect inputs from the KP Interview Program and engagement activities in 2021. If no additional information is available, TWC recommends MN-S request that NexGen provide rationale for the 2021 data gap.	
699.	MN-S (October 19, 2022)	19.4, p. 19-97 to 19-100 Project Interactions and Mitigations	Table 19.4-1 Effects Pathways for Community well-being[17] Environmental Design Features, Mitigation, and Enhancements column: "CWB-01 ... • Provide **dedicated space for Elders** to be available to support employees to assist with employee retention. … • Implement items as agreed to in the **Benefit Agreements** related to culture and traditional values. … • Establish an **Implementation Committee** to provide a forum for regular communication and information exchange between NexGen and communities for effective management of the Benefit Agreement Commitments and for early resolution of issues and/or disputes that may arise. … CWB-03 … • Implement provisions of **Benefit Agreements** related to culture, traditional values, employment, training and economic development, and including: • funding and human resources …" It is unclear how a dedicated space for Elders would function to assist with Employee Retention. How would Elder's be compensated for their time and	

[17] Emphasis in original

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			Knowledge, what are the expectations associated with this role and who would be afforded the opportunity to participate? TWC suggests that MN-S request additional detail is provided, and included within the EIS, related to dedicated space for Elders as a mitigation to support employee retention. Currently, no agreement is in place with MN-S for the Project. As such, it is not appropriate to list implementation of an Impact-Benefit Agreement as mitigation to reduce effects to MN-S. The terms of the agreement will be subject to a negotiation process with MN-S and the outcomes may vary from those presented and therefore are not an accurate reflection of mitigation that will be applied. MN-S request the removal of implementation of Benefit Agreements as a mitigation measure, and beneficial pathway, throughout the EIS.	
700.	MN-S (October 19, 2022)	19.4, p. 19-97 Project Interactions and Mitigations	Table 19.4-1 Effects Pathways for Community well-being[18] Environmental Design Features, Mitigation, and Enhancements column: "CBW-03 …. • Work with local Indigenous Groups and communities to **develop fishing policies** that consider both fisheries protection and traditional use activities." It is unclear in what jurisdiction NexGen must develop, implement, and enforce fishing policies. MN-S requests additional detail is provided, and included in the EIS, regarding this proposed mitigation including what is within the authority of NexGen to implement and enforce with respect to fishing policies.	

[18] Emphasis in original

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on [Canadian Impact Assessment Registry reference: 80171](#))	NexGen Response
701.	MN-S (October 19, 2022)	19.4.1, p. 19-102 Beneficial Pathways	CWB-09: Increased Income "Currently, NexGen is negotiating a Benefit Agreement with the MN-S … [t]he Benefit Agreements stipulate that NexGen and each primary Indigenous Group would, among other things …" Currently, no agreement is in place with MN-S for the Project. As such, it is not appropriate to list implementation of an Impact-Benefit Agreement as mitigation to reduce effects to MN-S. The terms of the agreement will be subject to a negotiation process with MN-S and the outcomes may vary from those presented and therefore are not an accurate reflection of mitigation that will be applied. MN-S request the removal of implementation of Benefit Agreements as a mitigation measure, and beneficial pathway, throughout the EIS.	
702.	MN-S (October 19, 2022)	19.4.1, p. 19-102 Beneficial Pathways	CWB-09: Increased Income "In addition to the commitments under the Benefit Agreements, NexGen is committed to: • providing dedicated space for Elders to be available to support employees and assist with employee retention; …" It is unclear how a dedicated space for Elders would function to assist with Employee Retention. How would Elder's be compensated for their time and Knowledge, what are the expectations associated with this role and who would be afforded the opportunity to participate? MN-S request additional detail is provided, and included within the EIS, related to dedicated space for Elders as a mitigation to support employee retention.	
703.	MN-S (October 19, 2022)	19.4.1, p. 19-104 Beneficial Pathways	CWB-11: Payments to Indigenous Groups "Benefit Agreements include payments to primary Indigenous Groups based on revenue generated throughout the life of the Project."	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			Currently, no agreement is in place with MN-S for the Project. As such, it is not appropriate to list implementation of an Impact-Benefit Agreement as mitigation to reduce effects to MN-S. The terms of the agreement will be subject to a negotiation process with MN-S and the outcomes may vary from those presented and therefore are not an accurate reflection of mitigation that will be applied. MN-S request the removal of implementation of Benefit Agreements as a mitigation measure, and beneficial pathway, throughout the EIS.	
704.	MN-S (October 19, 2022)	19.5.1.1, p. 19-116 Access Restrictions and Avoidance	"If uses in proximity to the Project footprint continue and are encouraged through Construction and Operation, the duration of avoidance may be reduced." It is unclear who will be encouraging continued use of the land in proximity to the Project footprint, or what methods would be employed to build confidence and trust in the safety and ability to continue traditional practices on the land. Encouragement in and of itself is not an effective mitigation measure. MN-S request that this text in the EIS is updated to provide additional detail is provided regarding encouragement as a mitigation measure for avoiding lands in the proximity of the Project. If sufficient detail is not available to support this as a robust mitigation measure, TWC recommends that MN-S request this content is removed from the EIS.	
705.	MN-S (October 19, 2022)	19.5.2.1, p. 19-122 to 19-123 Access Restrictions and Avoidance	"The Benefit Agreement would provide cultural supports that contribute to cultural continuity." This is a broad and vague statement that provides no details regarding the proposed mitigation and should be removed. Further, currently, no agreement is in place with MN-S for the Project. As such, it is not appropriate to list implementation of an Impact-Benefit Agreement as mitigation to reduce effects to MN-S. The terms of the agreement will be subject to a negotiation process with MN-	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			S and the outcomes may vary from those presented and therefore are not an accurate reflection of mitigation that will be applied. MN-S request that this text is removed and that implementation of Benefit Agreements as a mitigation measure, and beneficial pathway, throughout the EIS.	
706.	MN-S (October 19, 2022)	19.6.2, p. 19-128 Application Case	"… while effects on social adaptability from the worker rotation system, and changes in demand for community infrastructure and services are expected to range from periodic to continuous …" This text contradicts the information provided in Table 19.6-1 which identifies the frequency of Social Adaptability and demand for community infrastructure to be continuous for both the Application Case and the RFD case. MN-S request the EIS content is reviewed and updated for consistency and accuracy.	
707.	MN-S (October 19, 2022)	19.6.2, p. 19-127 Application Case	"In the Application Case, residual effects due to access restrictions and avoidance of areas near the Project and the worker rotation system are expected to be negative and negligible to small in magnitude." Table 19.6-1 Direction, duration, frequency and probability rows for all measurement indicator groupings are listed as negative, long-term, continuous and probable or certain. While magnitude is an important consideration, it is unclear what (if any) steps NexGen has taken to confirm or verify the determination that these residual effects are low. MN-S request NexGen undertake engagement to verify these outcomes with Indigenous Groups and potentially affected Peoples and update this content to provide further rationale for the classification of residual effects.	
708.	MN-S (October 19, 2022)	19.8, p. 19-131 Monitoring, Follow-up and Adaptive Management	"… NexGen has committed in the Benefit Agreements with each primary Indigenous Group to establish an Implementation Committee … [that] would be task with the responsibility of facilitating an effective ongoing working relationship and confirming that all commitments made within the Benefit Agreements are realized."	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			Currently, no agreement is in place with MN-S for the Project. As such, it is not appropriate to list implementation of an Impact-Benefit Agreement as mitigation to reduce effects to MN-S. The terms of the agreement will be subject to a negotiation process with MN-S and the outcomes may vary from those presented and therefore are not an accurate reflection of mitigation that will be applied. MN-S request that this text is removed and that implementation of Benefit Agreements as a mitigation measure, and beneficial pathway, throughout the EIS. In addition, NexGen should provide additional detail regarding how Indigenous Groups without a Benefit Agreement in place would realize these benefits and/or mitigations	
709.	MN-S (October 19, 2022)	19.9, p. 19-133 Key Findings	"For both the Application and the RFD Case, the residual effects are predicted to be **not significant** to the community well-being VC. … The Project is anticipated to cause incremental and cumulative effects on community well-being." When all the well-being elements are considered together, the Project is anticipated to result in a beneficial outcome for the LSA, particularly if mitigation and enhancement are implemented effectively. The closing text for this chapter references a beneficial outcome, however all supporting information and facts speak to potential impacts. It is unclear how the following factors (listed in the text) contribute to an overall beneficial outcome: "… incremental and cumulative effects on community well-being … changes to cultural continuity from access restriction, social adaptability from the inclusion of the worker rotation system, and subsequent changes in demand for community infrastructure …" MN-S request this content is updated to provide additional detail regarding a beneficial effect on community well-being and that outcomes, particularly as they relate to Indigenous Rights and Interest (e.g., cultural continuity) are	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			verified with Indigenous Groups. Discussion of the verification process should be included in the EIS.	
710.	MN-S (October 19, 2022)	21, p. ii *Risk Assessment Approach (Section 21.5)*	"The process taken to identify transportation hazard scenarios considered the potential for the release of chemical or radiological constituents to the aquatic, terrestrial, and atmospheric environments." It is also feasible and likely that there may be vehicle malfunctions or accidents that could result in a vehicle fire, which has the potential to impede use of the roadway and/or spread including potential to become a wildfire situation. MN-S request that a hazard scenario related to vehicle fires is considered and included within the EIS.	
711.	MN-S (October 19, 2022)	21.2.2, p. 21-8 Transportation Route	"For the purpose of this assessment, the transportation route for the Project encompasses defined sections of Saskatchewan provincial Highway 955 and Highway 155 …" The destination of the Rook I Project products is unclear. It is also unclear how materials will be transported from the intersection of Highway 955 and Highway 155 at Green Lake to the destination. Finally, no rationale is provided for limiting the potential for accidents or malfunction to this specific area. MN-S request additional detail and rationale be provided in the EIS about the selection of the defined sections of the transportation route considered within this assessment.	
712.	MN-S (October 19, 2022)	2.1.5.5, p. 12-20 Assessment of Bounding Scenarios for Accidents and Malfunctions	"Based on the results of the initial screening process undertaken to identify hazard scenarios …. a subset of the identified scenarios was selected as the focus of the detailed risk analysis. These hazard scenarios represented the bounding scenarios considered in the accidents and malfunctions assessment." Additional detail is required to understand the selection of the bounding scenarios. As written, it is unclear if all hazard scenarios identified as high-	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			risk were selected as bounding scenarios, if a subset of the high-risk scenarios was selected, or if another approach was applied. If any option aside from advancing all high-risk hazard scenarios was applied, rationale for the selection process should be provided.	
713.	MN-S (October 19, 2022)	21.6.2, p. 21-25 Selection of Bounding Scenarios	Table 21.6-2 Bounding Scenarios Considered in the Accidents and Malfunctions Assessment and Associated Mitigations Bounding Scenarios 1, 2, and 3 It is unclear why only aquatic impacts associated with a traffic accident are discussed. The release of uranium concentrates and radioactivity or the release of fuel and hazardous chemicals pose an environmental risk as well as a potential risk of fires or explosion which has both environmental and health risks (as noted for bounding scenario 3).	
714.	MN-S (October 19, 2022)	21.6.3.4, p. 21-30 Risk Measurement and Evaluation	"With implementation of environmental design features and mitigation, and in consideration of the assessed probability for this accident scenario, the likelihood was assessed as highly unlikely." This text directly contradicts the text in Section 21.6.3.2 (p. 21-28) which states that "[r]isks associated with release of uranium concentrate to the surface water environment due to a traffic accident at the Clearwater River bridge crossing location would be managed through design criteria and management controls related to the access road ..."; i.e., no environmental mitigation is proposed. This text provides the reader with the impression that environmental design features are a component of the mitigation for this scenario.	
715.	MN-S (October 19, 2022)	21.6.4.4, p. 21-31 Risk Measurement and Evaluation	"With implementation of environmental design features and mitigation, and in consideration of the assessed probability for this accident scenario, the likelihood was assessed as highly unlikely." This text directly contradicts the text in Section 21.6.4.2 which states that "[r]isks associated with a potential release of fuel or other hazardous chemical	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			to the surface water environment would be managed through design criteria and management controls related to the access road ...”; i.e., no environmental mitigation is proposed. This text provides the reader with the impression that environmental design features are a component of the mitigation for this scenario.	
716.	MN-S (October 19, 2022)	21.6.5.3, p. 21-32 Assessment of Potential Effects	“These weather conditions included a worst-case condition, which assumed peak wind speeds and worst-case conditions for dispersion of released materials, and a typical weather condition, which assumed average wind speeds and average conditions for dispersion of released materials.” The weather scenarios lack the details required to understand the extent of the weather conditions considered and the difference between the two scenarios: “worst-case” and “average.”	
717.	MN-S (October 19, 2022)	21.6.6.3, p. 21-34 Assessment of Potential Effects	“In the event of a maximum release of up to 14.9 m^3, the released tailings would flow north, away from the solvent extraction and process plant.” It is unclear how the maximum release of 14.9m^3 was determined. Further, it is unclear what controls are in place to ensure that the release will not exceed 14.9 m^3.	
718.	MN-S (October 19, 2022)	22.1, p. 22-1 Introduction	"The assessment of potential effects of the environment on the Project includes identification of natural hazards deemed to have reasonably possible consequences for the proposed Project, and the mitigation measures that would be implemented to reduce or eliminate potential risks." The proposed mitigations do not include any collaborative activities to develop a shared understanding with MN-S of the natural hazards; nor was MN-S provided the opportunity to contribute to the identification of appropriate mitigations. Mitigations to address natural hazards must be informed by collaboration and contribution of MN-S. This applies for all mitigations mentioned in section 22.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
719.	MN-S (October 19, 2022)	22.1.2, p. 22-6 Risk Management	"NexGen's objectives of risk management are to reduce all health, safety, and environmental risks to acceptable levels and to keep radiological exposures to workers and the environment as low as reasonably achievable." How does NexGen define "acceptable levels"?	
720.	MN-S (October 19, 2022)	22.1.2, p. 22-6 Risk Management	"NexGen's objectives of risk management are to reduce all health, safety, and environmental risks to acceptable levels and to keep radiological exposures to workers and the environment as low as reasonably achievable." "Keeping radiological exposures as low as reasonably achievable" is vague. TWC recommends that MN-S request clarification of how low the radiological exposure will be targeted to be, what may impede the ability of NexGen to reach those targets and what measures will be taken to reduce the risk further throughout the lifecycle of the facility. TWC also recommends that NexGen provide clarification on the effects of radiological exposure on human health and the environment.	
721.	MN-S (October 19, 2022)	22.1.2, p. 22-7 Risk Management	"Adaptive management may be used to reduce the uncertainty associated with hazards or risks when systems are highly dynamic and when there are gaps in information or understanding, opportunities to learn and gain new information, and opportunities to adjust activities or practices to realize improvements." It is important for MN-S to be involved in adaptive management throughout the lifecycle of the Project as adaptive management may impact the effectiveness of mitigation measures	
722.	MN-S (October 19, 2022)	22.3, p. 22-8 Incorporation of Indigenous Knowledge	Section title The use of "incorporated" does not reflect current best practices that acknowledge Indigenous Knowledge as an equal but different way of knowing (than western science). This terminology implies that Indigenous Knowledge can be absorbed into a scientific approach.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
723.	MN-S (October 19, 2022)	22.3, p. 22-10 Incorporation of Indigenous Knowledge	"Indigenous and Local Knowledge related to effects of the environment on the Project was incorporated into the assessment by viewing the information as complementary and influential alongside scientific information." See comment 22-007. The term 'complementary' implies that Indigenous Knowledge is used to complement scientific information rather than Indigenous Knowledge being an equal but different way of knowing (than western science).	
724.	MN-S (October 19, 2022)	22.3, p. 22-10 Incorporation of Indigenous Knowledge	"Issues, concerns, and comments received during community engagement and Joint Working Group meetings as well as information from Indigenous Knowledge and Traditional Land Use Studies were considered in the design of the Project, and included topics such as potential effects of changing climatic conditions and extreme events (e.g., fire and flooding), as well as potential mitigation options." It is unclear how MN-S's input was considered in section 22.	
725.	MN-S (October 19, 2022)	22.4.1, p. 22-11 Natural Hazard Scenario	"Natural hazards that have the potential to cause adverse effects on the Project include the following: - wildfire; - drought; - major precipitation events; - severe snowstorms; - tornado/severe thunderstorms; - extreme temperatures; and - seismic events."	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			It unclear if MN-S had opportunities to comment on the list of natural hazards.	
726.	MN-S (October 19, 2022)	22.4.3, p. 22-11 Risk Measurement	"Likelihood and consequence were estimated based on industry and operational experience, Project-specific conditions, and the knowledge base of the Project team." It is a good practice for Indigenous Nations to have input into risks and mitigations, as well as residual risks, to assess the potential of effects of the environment on the Project to affect MN-S's Indigenous Rights and Title.	
727.	MN-S (October 19, 2022)	22.5, p. 22-13 Climate Change	"Given that climate change is occurring but there remains uncertainty in the future projections of climate change, NexGen would consider climate risks as a part of the continual improvement process, as outlined in TSD XXII, Climate Adaptation Framework." It is not specified if MN-S will be engaged on the continual improvement process related to the Climate Adaptation Framework.	
728.	MN-S (October 19, 2022)	22.6.1.2, p. 22-18 Risk Measurement and Evaluation	Entire Section. It is unclear if the risk of explosions to the workers is being considered.	
729.	MN-S (October 19, 2022)	22.6.1.2, 22-19	FF-03: Fire Reaching Fuel Storage Tanks or the Surface Explosives Magazine Entire section It is unclear if the risk of explosions to the workers is being considered.	
730.	MN-S (October 19, 2022)	22.6.2.1, p. 22-21 Hazard Scenario Identification	"Water management planning would be undertaken using a risk-based approach considering both routine and non-routine Project conditions and would be periodically re-evaluated throughout the Project lifespan to optimize water usage." It is not specified if MN-S will be engaged on the water management planning throughout the Project lifespan.	
731.	MN-S (October 19, 2022)	22.6.2.1, p. 22-21	"During Construction and Operations, there would be an increase of water	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
		Environmental Design Features	being returned to Patterson Lake (i.e., with more water being released to Patterson Lake than being withdrawn). This increase is on account of collecting and treating groundwater recovered from the underground mine workings." It is unclear how much groundwater will be released into Patterson Lake and the effects of this release on Patterson Lake. The term "being returned" is misleading as the water does not originate from Patterson Lake. TWC recommends that MN-S request more information about the effects of releasing groundwater into Patterson Lake during construction and operations, and that the term "being returned" be replaced with "being released".	
732.	MN-S (October 19, 2022)	22.6.2.1, p. 22-21 Mitigation	"During Construction and Operations, a Preliminary Decommissioning and Reclamation Plan would be developed updated at least every five years to reflect changing site-specific conditions. Prior to transitioning to Closure, a Detailed Decommissioning and Reclamation Plan would be developed to reflect mitigations necessary to avoid and limit the effects of drought on revegetation efforts, as required." Mitigation Plans such as the ones described here do not constitute mitigations in and of themselves. It is important to understand the actual mitigations that are planned to be in place to better understand the effectiveness of proposed mitigation measures. Mitigations must be informed by collaboration and contribution of MN-S.	
733.	MN-S (October 19, 2022)	22.6.2.2, p. 22-22 Risk Measurement and Evaluation	"Native, drought-resistant vegetation species would be used for reclamation; however, drought conditions may still affect the successful establishment of some vegetation used in reclamation of the site, particularly if the drought corresponds to an immature standing crop." It is not clear which vegetation species would be used for reclamation.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
734.	MN-S (October 19, 2022)	22.6.3.1, p. 22-23 Hazard Scenario and Risk Identification	"'The Project would be fully contained the competent crystalline basement rocks." This sentence requires clarification.	
735.	MN-S (October 19, 2022)	22.6.3.2, p. 22-26 Risk Measurement and Evaluation	"The likelihood of a major precipitation event causing a mine inflow is assessed as Unlikely. Combined with the consequence being assessed as Moderate, the risk level was evaluated as Low." The risk to employees is unclear from this risk measurement and evaluation	
736.	MN-S (October 19, 2022)	22.6.5.2, p. 22-33 *Risk Measurement and Evaluation*	TT-01: Tornado Damage It is not clear if the if the risk measurement and evaluation for tornado damage takes climate change into consideration.	
737.	MN-S (October 19, 2022)	22A3, p. 5 Using the Results	"The uncertainty associated with any projections or forecasts is increased with the duration of the projected period and is subject to future developments; therefore, this work should be updated as new climate science is developed and after the release of downscaled climate projections from ClimateData.ca for the area of the Project following the AR6 by the IPCC (2021)." It is not clear as to how NexGen plans on reviewing climate change data throughout the lifecycle of the Project and how NexGen plans on engaging with MN-S on effects of the environment on the Project as a result.	
738.	MN-S (October 19, 2022)	22A4.1.1, p. 8 On-Site and Regional Stations	"With no suitable observations available for the area of the Project, reanalysis data were selected to represent the current climate conditions over the same period as the modelled baseline (1981 to 2019)." It is concerning that the analysis informing the climate change dataset summary and section 22 is based on substantial data gaps.	
739.	MN-S (October 19, 2022)	23.2, p. 23-5 Engagement and	"… with the goal of disclosing information …"	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
		Communication	"... a grievance mechanism …" Engagement and communication go beyond information disclosure and grievance mechanisms. Will the program provide funding for Indigenous participants beyond the one full-time independent Indigenous Monitor (23.5.2)? Will the program allow for input and agreement on follow-up and monitoring measures and changes. "… Integrated Management System (IMS) Manual …" Need to provide review access to this manual. Reference to 23.5.2 is not sufficient.	
740.	MN-S (October 19, 2022)	23.2, p. 23-5 Engagement and Communication	"… Integrated Management System (IMS) Manual …" Need to provide review access to this manual. Reference to 23.5.2 is not sufficient.	
741.	MN-S (October 19, 2022)	23.3.2.2, p. 23-11 *Mitigation Measures*	"The mitigation measure effectiveness is categorized as high, medium, …" This section might be better placed in Methodology. It is useful additional information that fills in gaps of understanding in Section 6 Environmental Assessment Approach and Methods.	
742.	MN-S (October 19, 2022)	23.4.1, p. 23-12 to 23-20 Environmental Management	The entire section discusses the purpose of the Management Plans but does not provide an opportunity to review the actual Plans to confirm if they will sufficiently track the proposed mitigation. It is more like a methodology and approach section on what the monitoring plans are intended to achieve. Statements of intention.	
743.	MN-S (October 19, 2022)	23.4.2, p. 23-17, 23-18 Socio-economic Management	This subsection describes the socio-economic management framework that is being developed for the Project. "NexGen is committed to continue engagement …" This statement and subsequent statements in the section suggests a deficiency or incompleteness in the draft EIS. Commitment to engage is not a management plan.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on [Canadian Impact Assessment Registry reference: 80171](#))	NexGen Response
744.	[MN-S](#) (October 19, 2022)MN-S	23.4.2, p. 23-17, 23-18 Socio-economic Management	"The socio-economic framework will be enhanced through the establishment of formal Benefit Agreements …" It is unclear to what extent "Benefit Agreements" are intended to be a form of socio-economic mitigation especially where the socio-economic management initiatives are integrated into Benefit Agreements. This introduces a lack of transparency to determine sufficiency of mitigation. There is no indication of a timeline for achieving socio-economic capacity and by when the framework will be developed.	
745.	[MN-S](#) (October 19, 2022)	5.2, p. 36 to 43 Métis Nation – Saskatchewan	Table 5 Summary of Key Engagement Activities with the Métis Nation – Saskatchewan All content Comments made on tables in Section 2 Indigenous, Regulatory, and Public Engagement of the draft EIS would also apply to tables in TSD I (and its associated appendices).	
746.	[MN-S](#) (October 19, 2022)	6.2.2, p. 65 Métis Nation – Saskatchewan	Table 12 Summary of Issues Identified by the Métis Nation – Saskatchewan "Proper use of Métis Knowledge while protecting intellectual property rights and confidentiality" Repeat comment regarding NexGen's definition of Indigenous Knowledge. Noting the community interest in proper use of Métis Knowledge, it is particularly concerning that NexGen chose to define Indigenous Knowledge unilaterally.	
747.	[MN-S](#) (October 19, 2022)	TSDIB, p. 12 to 24 Indigenous Engagement Activities	Table B-2 Métis Nation – Saskatchewan All content Table B-2 appears to be a repeat of Table 5. Repeating content such as this does not facilitate review.	
748.	[MN-S](#) (October 19, 2022)	TSDIC, p. 5 to 8 Summary of Issues	Table C-2 Summary of Issues Identified by Métis Nation – Saskatchewan	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
		Identified by Indigenous Groups	All content Comments made on tables in EIS Section 2 Indigenous, Regulatory, and Public Engagement would also apply to tables in this TSD.	
749.	MN-S (October 19, 2022)	9.3.2, p. 115–116 Community and Chemistry Survey	Black spots on fish not explained The Black spots identified during baseline work, on various fish species, at several locations, are not explained, and there are no photos. Black spots are mentioned as skin abnormalities in fish in Beet Channel, Naomi Lake, Clearwater River Near and Clearwater River Mid, but the spots are not specific to species. *See also* Appendix C Table 47, p. 1 which states a total of ninety-three (93) fish with external black spots in Patterson Creek, Beet Channel, Beet Lake, Beet Creek, Naomi Lake, Clearwater Creek, and Clearwater River. Speculation – naturally occurring condition of fish having black spots likely caused by trematodes.[19] The black spot was identified as baseline information to mine development. The presence of black spots on fish could be blamed on the mine site/company in the future.	
750.	MN-S (October 19, 2022)	4.6, p. 8	"Twenty-eight plant species or groups of plant species plant species [*sic*] were identified as traditional plant species used for food, medicinal, ceremonial, or other purposes within the IKTLU Studies, of which 34 species or genera [*sic*] potentially identified traditional use plant species were observed during the baseline surveys." The number of species identified as traditional plant species is less than the number of traditional use plant species observed during baseline surveys. There appears to be a disconnect between the field studies (e.g., inconsistent study areas) and the assessments (e.g., field data use to inform the assessment appears to be minimal). The field programs, or study area, focus on the Project footprint and the immediate vicinity— an area previously disturbed by	

[19] Black Spot in Fishes (alberta.ca)

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			extensive exploration activities. Therefore, the baseline conditions represent a chronically disturbed area.	
751.	MN-S (October 19, 2022)	2.1, p. 10 Study Area Selection	Descriptions of the Local Study Area (LSA) and Regional Study Area (RSA) are provided in terms of effects on wildlife. Comments required on how the LSA, and RSA were designed to consider potential Project effects on vegetation	
752.	MN-S (October 19, 2022)	2.2.2, p. 11 *Landforms*	The landforms within the region are described as having "large areas of bogs and peatlands"; however, small areas of wetland ecosites were identified within the RSA (Table 5.3-1). Report lacks information on this discrepancy and the suitability of the RSA for describing regional vegetation.	
753.	MN-S (October 19, 2022)	2.2.2, p. 11 *Landforms*	"The landforms in these areas are more representative of Boreal Shield landforms than Boreal Plain landforms. Typically, the Boreal Plain usually contains more clay-sized materials and has a more diverse mineralogy". Unknown if soils investigations were completed to describe soil characteristics within the Project Study Areas.	
754.	MN-S (October 19, 2022)	5.2.1, p. 21 *Predictive Ecosite Map*	Lacking information on the data collected at each of the ecosite field sampling/ground truthing sites. What is the difference between a "vegetation/ecosite characterization survey" and "ground control points"? Lacking information on how soil characteristics—including characterization of moisture and nutrient regimes—were incorporated within Project-specific ecosite mapping and field verification.	
755.	MN-S (October 19, 2022)	5.2.2, p. 21 *Interpreted Ecosite Map*	Lacking information on map scaling. At what scale was the interpreted ecosite map completed for the Project? What was the minimum, maximum, and average polygon size? What proportion of polygons were field verified?	
756.	MN-S (October 19, 2022)	5.2.2, p. 22 *Interpreted Ecosite*	"The regenerating land cover types less than 40 years old that did not match any of the ecosites described by McLaughlan et al. (2010) …".	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
		Map	McLaughlan et al. state that young (e.g., <40 years old) or modified sites may still be classified according to the guide, but elements or specific features of these sites may vary from the mature natural condition (2010). Lacking information on how the ecosite evaluation for these sites included supplemental information such as soil moisture and nutrient regimes or other soil attributes in accordance with the recommendations on page 63 of McLaughlan et al. 2010.	
757.	MN-S (October 19, 2022)	5.3.1, p. 24 *Predictive Ecosite Map*	"The accuracy level is due to McLaughlan et al. (2010) not describing forest types under 40 years of age in their ecosite classification system". McLaughlan et al. state that young (e.g., <40 years old) or modified sites may still be classified according to the guide, but elements or specific features of these sites may vary from the mature natural condition (2010). Lacking information on how the ecosite evaluation for these sites included supplemental information such as soil moisture and nutrient regimes or other soil attributes in accordance with the recommendations on page 63 of McLaughlan et al. 2010.	
758.	MN-S (October 19, 2022)MN-S	5.3.2, p. 26 *Interpreted Ecosite Map*	It is noted that regenerating land cover types were divided into three vegetation types—bog, coniferous, and deciduous—and that the "bog" vegetation type is the only lowland (wetland) regenerating land cover type. Unknown if regenerating fens, marshes or other wetland classes were mapped within the RSA.	
759.	MN-S (October 19, 2022)	6.3, p. 72	It is noted that lesser duckweed (*Lemna minor*) was identified as a provincially listed species observed within ecosite BP25. This species was omitted from the EIS.	
760.	MN-S (October 19, 2022)	1.2.2, p. 5 Vegetation Study Area	"The SSA consisted of an area 25 square kilometres (km2) (5 km x 5 km) encompassing the entire proposed Project footprint, whereas the LSA consisted of an area 225 km2 (15 km x 15 km) surrounding and including the SSA (Figure 1.2-1)." Please comment on the rationale for the size and shape of these study areas in relation to potential Project effects on vegetation.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
761.	MN-S (October 19, 2022)	1.2.2, p. 5 Vegetation Study Area	"The SSA area was where effects (i.e., total area subject to vegetation and soil disturbance, which may have direct and indirect effects on vegetation and wildlife) are expected to occur on the terrestrial environment (GS 2014). The LSA included the area surrounding the SSA where there is reasonable potential of direct and/or indirect effects on the terrestrial environment from the Project activities on potential VCs resulting from existing and planned activities (CanNorth 2010; GS 2014; IAAC 2019)." Please comment on why most of the proposed Project access from Hwy 955 is not located the SSA; and the southwestern extent of the Project access road is not located within either the SSA or the LSA.	
762.	MN-S (October 19, 2022)	3.2, p. 15 Methods	Please provide more detail on the method of aquatic vegetation sampling at each survey point. How was aquatic vegetation detected and sampled?	
763.	MN-S (October 19, 2022)	3.2, p. 15 Methods	Surveys for vascular plant Species of Conservation Concern appear to have been completed in June and August of 2018; were surveys for non-vascular plant or lichen Species of Conservation Concern also completed?	
764.	MN-S (October 19, 2022)	4.2, p. 25 Methods	"A legend defining the boreal wetland classifications and their sub-categories is presented in Appendix A, Table 5." This table defines shallow open water wetlands as wetlands with "<25% herbaceous/woody vegetation present (submerged or floating-leaved vegetation may be present); persistent water table well above surface with flooded conditions". However, Table 4.3-1, p. 26 does not show any shallow open water wetlands identified within the LSA. Please comment on why no shallow open water wetlands were identified to be associated with persistent water <2m deep (as defined by the Canadian Wetland Classification System).	
765.	MN-S (October 19, 2022)	2.0, p. 10 Study Objectives	Section indicates that one of the objectives of the wildlife baseline studies was to "inventory wildlife occurrence". Please explain why the objective was not to determine habitat use/availability on a seasonal or year-round basis to support a habitat-based evaluation of changes for wildlife and wildlife habitat to inform the EIS?	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			There is no mention of a "Project Footprint"; does the LSA include all components of the Project, including access, powerline, fibre optic cable and borrow sources? No actual Project components nor existing access are shown on Figure 3.1 on page 11. "Both LSA and RSA boundaries are of an appropriate size and location for the inventory and assessment of both local and regional effects on vegetation and wildlife from existing and planned activities." Yet, a "caribou regional study area (CRSA)" is added, indicating that the RSA was not appropriate? The relationship between the RSA and cumulative effects study area for all wildlife species is not clear – please provide clarification? And it is noted that different study areas were delineated for the assessment.	
766.	MN-S (October 19, 2022)	4.2, p. 14 Methods	The section provides no indication that the winter track count surveys were designed to sample the wildlife use of the available habitat types within the RSA.	
767.	MN-S (October 19, 2022)	4.3, p. 16 Results	Figure 4.3-1 Winter Tracking Survey Transects The figure shows only portions of two triangle surveys were completed in the CRSA, at the border of the RSA.	
768.	MN-S (October 19, 2022)	5.3, p. 28, 29 Results	It is noted that none of the backtracking trails were completed in the CRSA.	
769.	MN-S (October 19, 2022)	6.3.3, p. 37 *Woody Browse and Lichen Availability*	Relative to terrestrial and arboreal lichens, and woody browse, the text uses terms such as "area of the Project" and "Project Area".	
770.	MN-S (October 19, 2022)	7.3.1, p. 43, 44 *Trapping/Inventory and Habitat Characterization*	Figure 7.3-1 Small Mammal Trapping Transects Table 7.3-1 Small Mammal Captures per Transect in the LSA and Reference Sites – September 2018 It appears that not all of the transects identified in Table 7.3-1 are included on Figure 7.3.1; therefore, the context of the text is not clear.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
771.	MN-S (October 19, 2022)	8.3, p. 51 Results	Figure 8.3-1 Semi-aquatic Furbearer Shoreline Survey Locations Table 8.3-1: Semi-Aquatic Furbearer Shoreline Survey Observations– September 2018 Figure 8.3-1 does not number the creeks or lakes identified in Table 8.3-1; therefore, the context of the text is not clear.	
772.	MN-S (October 19, 2022)	9.2, p. 53 Methods	"… areas were surveyed … at the maximum altitude that allowed for identification of avian species …" The section lacks other survey details.	
773.	MN-S (October 19, 2022)	1.2.2, p. 6 Wildlife Study Area	The study areas including birds in this report, are different from the study areas delineated in *Annex VIII.1 Wildlife Baseline Report 1 (Mammals, Waterfowl, and Raptors), Omnia 2018* for the study of waterfowl and raptors	
774.	MN-S (October 19, 2022)	1.2.2, p. 8 Wildlife Study Area	Figure 1.2-1: Overview of the Site Study Area and Local Study Area Sampled for Wildlife Baseline Studies, 2018 It appears that the Site Study Area (SSA) and Local Study Are (LSA) do not include a portion of the access into the site.	
775.	MN-S (October 19, 2022)	2.3, p. 9 Methods	No mention is made of the data collected on species at risk or sensitive species for the Project and presented in Annex VIII.1. For example, there is no mention of osprey or red-throated loon identified by Omnia (2018).	
776.	MN-S (October 19, 2022)	2.3, p. 9 Results	With respect to woodland caribou, it states that "Habitat potential for this species is classified as moderate to high throughout the majority of the SSA and LSA." – Is this consistent with what is reported for caribou habitat in the Omnia (2018) report, and ultimately in the environmental assessment?	
777.	MN-S (October 19, 2022)	2.4, p. 10 Existing Information	Several references to "the area of the Project" are made with no definition to provide context. As no RSA was delineated for this report, please provide a definition that puts it into context with the Project footprint, SSA and LSA.	

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
778.	MN-S (October 19, 2022)	5.3, p. 27 Results	Table 5.3-1 Results of the Common Nighthawk Surveys, June 2018 Indicates the numbers of common nighthawks detected. Clarification on the number of nighthawks reported for the ARUs and whether the numbers represent the number of calls recorded or were individual birds.	
779.	MN-S (October 19, 2022)	8.2, p. 40 Methods	1. "Collection and analysis of recordings was conducted in accordance with … the Wildlife Guidelines for Alberta Wind Energy Projects (GA 2011)." Explanation as to why the more recent and up to date *Wildlife Directive for Alberta Wind Energy Projects, 2018* was not used,	
780.	MN-S (October 19, 2022)	8.2, p. 40 Methods	Indicates that various protocols for Alberta wind farms were followed, and that a raised microphone for a bat detector (BAT 03) was installed at a height of 7 m. The Alberta protocol suggest a paired sampling of a raised microphone at 30 m height with a lower recorder height.	
781.	MN-S (October 19, 2022)	8.2, p. 42 Methods	Figure 8.2-1 Bat Detector Locations, May to October 2018 The Project footprint shown in Figure 8.2-1 is different from the Project footprint shown in other figures, such as Figure 7.4-4?[20]	
782.	MN-S (October 19, 2022)	1.1, p. 4 Study Objectives	"The objective of the 2020 surveys was to supplement baseline data, following recommendations in … the Wildlife Guidelines for Alberta Wind Energy Projects (GA 2011)." Was the *Wildlife Directive for Alberta Wind Energy Projects, 2018* reviewed at this time as well?	
783.	MN-S (October 19, 2022)	2.2, p. 8 Study Area	"Passage migration surveys followed standard guidance and methods for migration surveys for renewable wind energy projects …"	

[20] Canada North Environmental Services (2021). *Annex VIII.3: Wildlife Baseline Report 3 (Bird Migration and Bats).*, p. 39.

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			Section makes no mention of the *Bird Migration Survey Protocol* [21] issued by the Government of Alberta in January 2020, which is cited later. Please comment.	
784.	MN-S (October 19, 2022)	3.2, p. 13, Bat Survey Methods	Figure 3.2-1 Location of Bat Detectors Shows that all detectors are in the same habitat type, and none of the detectors are near water which could attract bats.	
785.	MN-S (October 19, 2022)	1, p. 1, Introduction	"… incorporation of Indigenous Knowledge throughout the Environmental Assessment (EA) process …" The use of "incorporation" does not reflect current best practices that acknowledge Indigenous Knowledge as an equal but different way of knowing (than western science). This terminology implies that Indigenous Knowledge can be absorbed into a scientific approach.	
786.	MN-S (October 19, 2022)	1, p. 1, Introduction	"This report presents a detailed account of the socio-economic environment present in the potentially affected Denesuline (Dene) First Nations and Métis Groups (collectively referred to as Indigenous Groups) and communities." It is unclear from this statement which Indigenous Nations are within the scope of this report. Similarly, this text does not align with the text used within the EIS to identify those Indigenous Nations that have been considered within the assessments informed by this baseline.	
787.	MN-S (October 19, 2022)	4.2, p. 11, Secondary Data Collection	"For some socio-economic conditions, there is no data available for these communities, in which case, the 'other LSA communities' sub-section was omitted." The omission of data makes it challenging for readers to understand if the authors made an error in presenting material, or if insufficient data was available.	

[21] Government of Alberta (2020). *Bird Migration Survey Protocol*. aep-bird-migration-protocol-2020.pdf (alberta.ca)

Number	Source	Reference to EIS, appendix, or TSD	Comment Summary (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
788.	MN-S (October 19, 2022)	4.3, p. 12, Primary Data Collection	"Other sources included community information sessions and workshops with youth and trappers to provide additional information and confirm the accuracy of secondary data (i.e., verification and triangulation)." The confirmation of secondary sources via primary sources is an important component of the verification process. However, it is unclear what steps NexGen took, in alignment with best practices, to verify that Indigenous Knowledge was appropriately applied and used as intended with Indigenous Nations.	
789.	MN-S (October 19, 2022)	4.3.3, p. 14, Joint Working Groups	"Three Joint Working Group sessions … were specifically conducted … to discuss community definitions of well-being, including the factors that both contribute to and detract from well-being, and how participants felt the Project might interact with these factors." Joint Working Group to increase understanding is a valuable and important exercise. However, it is unclear what steps NexGen took, in alignment with best practices, to verify that Indigenous Knowledge was appropriately applied and used as intended with Indigenous Nations.	
790.	MN-S (October 19, 2022)	4.4, p. 18, Quality Assurance / Quality Control	"Quality assurance and quality control measures were employed throughout the data collection, analysis, and reporting process." The QA/QC described supports confidence that the data received is consistent, however this is not equivalent to verifying outcomes with potentially affected Peoples.	
791.	MN-S (October 19, 2022)	5.1.1.4.7, p. 27	Residential Schools -General comment regarding content. This content, dated April 2022, fails to acknowledge the finding of unmarked graves at residential schools across Canada—first discovered in Spring 2021—and the impact of this on Indigenous Peoples across the country. Please provide updates to "Section 5.1.1.4.7 Residential Schools" to reflect the finding of unmarked graves at Canadian Residential Schools.	
792.	MN-S (October 19, 2022)	5.2.2, p. 34	First Nations "The MLTC is the tribal council for nine First Nations, including the CRDN, BNDN, and BRDN." This is the first usage of MLTC in this section of content. Spell out.	

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
793.	MN-S (October 19, 2022)	6.2.1.3, p. 59, Major Capital Projects	"Major proposed projects in the RSA include the following …: Dennison Mines Corp. … the proponent is expected to enter the construction phase in 2022 … *Rabbit Lake Tailings Management Facility Expansion Project* … in February 2022 announced that it would restart operations amid uranium price gains ... *Highway 914 All-Weather Road* ... The project is expected to take approximately three years to complete and will connect Highway 905 and 914 …" The Reasonably Foreseeable Development (RFD) case included in the EIS does not mention any of these proposed Projects within the RSA and instead includes only the Fission Patterson Lake South Property which is located within the RSA. Under CEAA 2012, assessment of cumulative effects includes both projects that are "certain" and those that are "reasonably foreseeable".[22]	
794.	MN-S (October 19, 2022)	6.3.2.10.2.1, p. 93, *Highway 155*	"Updated weight restrictions for specific vehicles travelling on primary or secondary highways can be found by contacting the Saskatchewan Ministry of Highways and Infrastructure ..." It is unclear why the reader is directed to contact the provincial government for additional data. If additional data is relevant to the baseline reporting it should be included; if it is not relevant, then this text is unnecessary.	
795.	MN-S (October 19, 2022)	6.4.1.2.2, p. 98, La Loche	"Participation in the labour force is higher for males (i.e., 36.7%) than females (i.e., 30.4%) … The unemployment rate in the community is higher for males than females with a widening different; 14.0% difference in 2016 compared to 10.8% in 2006."	

[22] Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012 - Canada.ca

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			It is unclear how males can be both higher participants in the workforce and higher in terms of unemployment. Population numbers in La Loche[23] are generally quite similar with a total La Loche population of 2370 (in 2016) with a composition of 47.9% males and 52.1% females.	
796.	MN-S (October 19, 2022)	6.6.1.2.5, p. 120, Buffalo Narrows	"Around 19.1% of the Buffalo Narrows population aged 15 and over has completed high school as their highest level of education, lower than the Indigenous provincial average (i.e., 28.2%) and only slightly lower than the RSA average (i.e., 20.1%)." Given students are generally aged 17 to 18 at the time of graduation, inclusion of individuals under 17 in this dataset dilutes the accuracy of the results. A 15-year-old is unlikely to have had the opportunity to graduate high school, let alone accomplish any post-secondary education. This however does not automatically mean that those individuals will not graduate high school or pursue post-secondary education.	
797.	MN-S (October 19, 2022)	7.0, p. 179 to 180, Education and Training	"Joint Working Group participants indicated that the standards for highs [*sic*] school certificates have been lowered, meaning graduates may not qualify for Grade 12 proficiency ..." This sentence is challenging to understand. Update of the sentence in Section 7 of Annex 10 to provide clarity about the lack of qualification for Grade 12 proficiency.	
798.	MN-S (October 19, 2022)	7.2, p. 181, Closure	"Benefit Agreements have been developed and are being negotiated to define environmental, cultural, economic, training, employment, and business opportunities and other benefits to be provided to the primary Indigenous Groups by NexGen and to confirm the consent and support of those groups for the Project." It is not appropriate to identify a Benefit Agreement as an opportunity to confirm consent and support for the Project. Particularly given that NexGen has consistently identified in the draft EIS documentation that Impact-Benefit	

[23] Golder Associates Ltd., *Annex X: Socio-economic Baseline Report*, p. 42.

Number	Source	Reference to EIS, appendix, or TSD	**Comment Summary** (all original submissions can be found on Canadian Impact Assessment Registry reference: 80171)	NexGen Response
			Agreements have been established or are being negotiated for the Project. As rights holders, Indigenous Nations have the right to self-governance and decision making. Negotiating with a proponent for the purposes of collaboration and mutual benefit does not automatically translate to Project consent. Please remove of all references to “Benefit Agreements” as an opportunity to confirm consent and support of the Project from this baseline report, all baseline reports, and the draft EIS in its entirety.	

e-Doc: 7166063

November 14, 2023

Mr. Luke Moger
VP Environment, Permitting & Licensing
NexGen Energy Ltd.

lmoger@nxe-energy.ca

Subject: Outcome of CNSC Staff Completeness Check of the October 31, 2023, Responses to Federal-Indigenous Review Team (FIRT) Information Requests for the Rook I Project

Dear Mr. Moger,

On October 31, 2023, NexGen Energy Ltd. (NexGen) submitted responses to Information Requests (IRs) and Advice to the Proponent comments for the proposed Rook I Project [1]. CNSC staff have determined that the submission has the required information for the Federal Indigenous Review Team (FIRT) to proceed with the Environmental Impact Statement (EIS) technical review.

The technical review of the complete package of information, including technical supporting documentation, will commence on November 14, 2023, taking up to 90 days to complete and ending no later than February 12, 2024.

Should you have any questions, please do not hesitate to contact me, directly by phone at 343-542-7657 or by email at Nicole.Frigault@cnsc-ccsn.gc.ca.

Sincerely,

Nicole Frigault
Environmental Review Specialist
Environmental Review Division

c.c.: CNSC: N. Kwamena, P. Burton, C. Cattrysse, A. Levine, R. Froess
NexGen: F. Halliday, NexGen Regulatory Mailbox

References:

[1] Letter, L. Moger (NexGen) to N. Frigault (CNSC), *Rook I Project - Draft Environmental Impact Statement Federal Indigenous Review Team Information Responses*, October 30, 2023 (e- Doc 7161958)

e-Doc: 7408522

November 18, 2024

Mr. Luke Moger
VP Environment, Permitting & Licensing
NexGen Energy Ltd.
lmoger@nxe-energy.ca

Subject: Results of the Federal-Indigenous Review Team technical review of NexGen's May 22, 2024, revised draft EIS for the proposed Rook I Project

Dear Mr. Moger,

On May 22, 2024, NexGen Energy Ltd. (NexGen) submitted a revised draft Environmental Impact Statement (EIS) package, including responses to Information Requests (IRs), Advice to the Proponent comments, a revised EIS, Technical Support Documents and Baseline Reports, as well as a Commitments Report for the proposed Rook I Project [1]. On June 20, 2024, CNSC staff found the submission [1] to contain the required information to proceed with the Federal-Indigenous Review Team (FIRT) technical review [2].

Extended Review Period

The FIRT's initial review of NexGen's responses to IRs was intended to conclude by September 20, 2024. As the review progressed, NexGen requested the opportunity to discuss the outcome of the review process and the paths to resolution with the relevant FIRT members where elements of IRs remained unresolved.

NexGen submitted additional information to CNSC staff from May to November 2024 to resolve these IRs [3]. For transparency purposes, these submissions will be posted to the Canadian Impact Assessment Registry (the Registry) in two combined packages.

Outcome of the EIS Technical Review

Following the extended technical review, the FIRT has found that the information provided by NexGen addresses the regulatory requirements for the environmental assessment (EA). All responses to IRs and Advice to the Proponent comments are now deemed as accepted.

A table with the status of the FIRT's review of IRs is provided in Annex 1[4], and a table with the status of the FIRT's review of the Advice to Proponent comments is provided in Annex 2 [5].

Expectations and Next Steps

On November 19, 2024 or shortly thereafter, CNSC staff will post these review results as well as the additional information submitted by NexGen on the Canadian Impact Assessment Registry for the NexGen Rook I Project (Reference number: 80171).

CNSC staff expect NexGen to submit a Final EIS package, including responses to the Consolidated Comments from Indigenous Nations and Communities and the Public on the NexGen Rook I Project, updated technical support documents, as well as an updated Commitments Report and an updated Indigenous Engagement Report (IER). Once received, the submission will undergo a 30-day review by CNSC staff to ensure all documents have been updated accordingly and that all comments from Indigenous Nations and Communities and members of the public have been addressed in an acceptable manner.

If CNSC staff deems the submission as acceptable, staff will notify NexGen that the EIS has been accepted as Final and that CNSC staff will draft the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) EA Report summarizing the results of the technical review and staff's recommendations to the Commission.

Please note, and as previously mentioned, both the Commitments Report and IER are evergreen documents that should continue to be updated over the remainder of the regulatory review process, and, after the public hearings and Commission decisions, if the project is approved.

Should you have any questions, please do not hesitate to contact me, directly by phone at 343-542-7657 or by email at Nicole.Frigault@cnsc-ccsn.gc.ca.

Sincerely,

Nicole Frigault
Environmental Review Specialist
Environmental Review Division

c.c.:
CNSC: D. Beaton, L. Sigouin, N. Kwamena, P. Burton, A. Levine, R. Froess, D. Pandolfi
NexGen: F. Halliday, NexGen Regulatory Mailbox

References:

[1] E-mail, L. Moger (NexGen) to N. Frigault (CNSC), *Results of Federal Indigenous Review Team Technical Review of NexGen's Oct 31, 2023 IR Responses – Rook l Draft EIS*, May 22, 2024 (e-Doc: 7290708)

[2] Letter, N. Frigault (CNSC) to L. Moger (NexGen), *Outcome of CNSC Staff Completeness Check of the May 22, 2024 Responses to Federal Indigenous Review Team Information Requests for the Rook l Project*, June 20, 2024 (e-Doc: 7303364)

[3] NexGen to CNSC, Rook l Project EIS Information Requests - Supplemental Information, Rook l Project EIS Advice to Proponent – Supplemental Information November 14, 2024 (e-Doc: 7408558, e-Doc: 7408555)

[4] Annex 1, Federal and Indigenous Review Team, Rook l Project – Information Requests, November 18, 2024 (e-Doc: 7409331)

[5] Annex 2, Federal and Indigenous Review Team, *Rook l Project – Advice to Proponent*, November 18, 2024 (e-Doc: 7409340)

Canadian Nuclear Safety Commission
Commission canadienne de sûreté nucléaire

e-Doc 7452567

January 28, 2025

Mr. Luke Moger
VP Environment, Permitting & Licensing
NexGen Energy Ltd.
lmoger@nxe-energy.ca

Subject: Rook l Project– Acceptance of the Final EIS and Supporting Documents

Dear Mr. Moger,

On January 28, 2025, CNSC staff completed their review of NexGen's submission of the final Environmental Impact Statement (EIS) for the proposed Rook l Project. CNSC staff have determined that the information provided in NexGen's submission is complete and, as such, the final EIS has been deemed acceptable. CNSC staff will proceed with the preparation of the *Canadian Environmental Assessment Act, 2012* Environmental Assessment Report, which will be made available for review by Indigenous Nations and communities and the public prior to a public Commission hearing.

The Final EIS will soon be posted to the Canadian Impact Assessment Registry. The posting will include this conclusion letter and NexGen's responses to comments from Indigenous Nations and communities and members of the public, the updated Indigenous Engagement Report (IER), and all other supporting documents. CNSC has also provided responses to comments directed to the regulator and will post these responses to the registry, as these are shared with commenters.

With these conclusions, along with the sufficient licence application, CNSC staff will notify CNSC Commission Registrar of this acceptance, who will proceed with scheduling public hearing dates. Further details regarding how to participate will be provided once the Commission Secretariat has announced the hearing dates.

CNSC reminds NexGen that when the next version of the IER is submitted for the Commission Hearing, *Appendix B Indigenous Group Engagement Activities* is expected to be fully updated within two months of the submission date.

Sincerely,

Nicole Frigault
Environmental Review Specialist
Environmental Review Division

c.c.: CNSC: D. Beaton, L. Sigouin, N. Kwamena, N. Frigault, P. Burton, A. Levine, D. Pandolfi, R. Froess
NexGen: F. Halliday, NexGen Regulatory Mailbox

Rook I Project

Environmental Impact Statement

Annex 1 Responses:
Federal Indigenous Review Team Information Request – Round 2

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
4	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 1.2.6	The Proponent proposes storing tailings underground as a cemented backfill material. ECCC agrees that storing cemented tailings as backfill material is an environmental design feature. However, it is not clear whether there has been an assessment to determine if there are fractures, faults or other discontinuities underground that may become conduits for seepage or contaminants from the cemented tailings backfill underground to Patterson Lake. It is also not clear what distance separates the reaches of the underground mine and Patterson Lake. This information will help to determine its proximity to Patterson Lake, which will indicate whether contaminants have a possibility of reaching Patterson Lake.	Regarding stored tailings used as cemented backfill material: 1. Confirm whether there has been an assessment for the presence of fractures, faults and other discontinuities underground that could become conduits for seepage and/or contaminant flow to Patterson Lake. 2. Provide information on the distance between the reaches of the underground mine location and Patterson Lake. 3. Demonstrate that no contaminants will migrate or seep into Patterson Lake from the cemented backfill material.	NexGen notes that Draft EIS Section 1.2 (Rook I Project Overview) is intended to provide information at a summary level. NexGen confirms that information addressing the reviewer's IR is included within the Draft EIS submission. Responses to part 1, part 2, and part 3 of this IR are provided below. 1. NexGen generated a geological model that was used to define the hydrostratigraphic units. Within the crystalline basement rock, the model defined shear and fault zones that were mapped as sub-vertical features as they were encountered during borehole drilling. The primary hydraulic pathway applicable on the scale of the proposed mine development is through the fractures related to fault and shear zones (Draft EIS Annex III [Hydrogeology Baseline Report], Section 5.1.3.1). Groundwater modelling presented in Draft EIS TSD XIV (Groundwater Flow and Solute Transport Modelling Report) included the presence of these fault and shear zones and their ability to enhance flow to Patterson Lake. In addition, sensitivity analysis on the mass loading to Patterson Lake was conducted, wherein the hydraulic conductivity of the fault zone was assumed to be five times higher than the values from the calibrated groundwater model. Model predictions of mass loading to Patterson Lake are presented in Section 4 and Section 5 of Draft EIS TSD XIV. Note that fault zones are illustrated in the figures prepared in NexGen's response to IR 266 (Attachment IR 231/264/266/267-1). 2. Figure 10 of Draft EIS TSD VII (Mine Waste Alternatives Assessment Report) and Figure A-15 of Appendix A of Draft EIS TSD XIV both present a visual of the location of the underground mine relative to Patterson Lake. The underground tailings management facility (UGTMF), as shown in both of these figures, is approximately 350 m below Patterson Lake. Vertical raises are located approximately 315 m from Patterson Lake. 3. Figure A-17 of Appendix A of Draft EIS TSD XIV presents a conceptual breakdown of the advective flux from the various underground components to Patterson Lake. Seepage from the UGTMF, primary backfill, secondary backfill, and reflooded mine workings to Patterson Lake is predicted to occur, as presented in Figure A-17. Mass loadings to Patterson Lake are inputs to the surface water quality analysis and effects assessment for Patterson Lake as documented in Draft EIS Section 10 (Surface Water Quality and Sediment Quality), Draft EIS Section 11 (Fish and Fish Habitat), and Draft EIS Section 15 (Human Health), which concluded no significant adverse effects on valued components.	n/a	**Context:** Parts one and two of the original IR have been met. These parts related to requests for information about the presence of fractures, faults and other discontinuities as well as providing the distance between underground tailings storage and Patterson Lake. This information was provided by the Proponent in their response. Further details are requested for part three of the original IR, as well as parts one and two of IR 26, related to scientific information that is needed to assess the potential for contaminants to migrate from the Underground Tailings Management Facility (UGTMF) and the Reflooded Mine Workings (RMW) area, to Patterson Lake by the groundwater pathway, and details related to the extent and associated timing of potential contamination. The details provided and requested in this IR are in following with the original request to demonstrate that no contaminants will migrate or seep into Patterson Lake from the cemented backfill material. The information requested is intended to provide specificity to the request to support a more structured response. It is also noted that discussion of the RMW as a source of contamination to Patterson Lake by the groundwater pathway was not discussed in Section 10.5.1 of the EIS. It is unclear if the EIS considered the RMW as a contamination source within the term UGTMF (potentially due to the close proximity of the UGTMF and the RMW). The Proponent's response indicated that an advective flux of 0.55 m^3/d from the UGTMF and 2.7 m^3/d from the RMW to Patterson Lake is anticipated, as listed in Figure A-17 of Appendix A of Draft EIS TSD XIV. The advective flux values of 0.55 m^3/d and 2.7 m^3/d are not listed in the EIS or Appendix A of Draft EIS TSD XIV, outside of Figure A-17. White Figure A-17 contains a diffusive flux section, it has not been made clear how these values were considered or utilized. It was therefore difficult to assess the validity of the values in Figure A-17. The timing of when peak mass flux of contaminants from the UGTMF and RMW to Patterson Lake would occur was also not clear. A summary of the mass flux of individual contaminants from the UGTMF and RMW after closure could not be found. A clear understanding of how regional hydrogeology and the Project results in groundwater being transported from the UGTMF and RMW to Patterson Lake is requested to assess this potential pathway for surface water contamination. From Section 3.3.2	4-R1	1. Provide details on how the advective flux of 0.55 m^3/d from the UGTMF and 2.7 m^3/d from the RMW to Patterson Lake were determined (Figure A-17 of Appendix A of Draft EIS TSD XIV). Details related to how mass flux from the UGTMF to Patterson Lake will occur over time should be provided. The requested details should be included within the body of text in Appendix A, with a summary of key parameters and results provided in the body of the EIS. 2. Provide details on how the flooding of the mine during closure will impact regional hydrogeology, specifically related to the migration of contaminants from the UGTMF and RMW to Patterson Lake by the groundwater pathway. 3. Clarify if contamination sourced from the RMW by the groundwater pathway has been included within the term UGTMF in section 10.5.1 of the EIS. If the RMW was not considered as a source of contamination to Patterson Lake by the groundwater pathway in Section 10.5.1 of the EIS, it should be added. 4. Include a table summarizing the predicted mass flux of contaminants from the UGTMF and RMW to Patterson Lake over time. 5. Provide justification for the assumption in the groundwater flow model of an equivalent porous media approach for groundwater transport through the shear and fault zones. The model should give due consideration for fracture dominated transport, either by directly modelling as fracture flow or through a robust justification for how the parameters used in the existing equivalent porous media model are reflective of fracture-dominant transport. 6. Provide additional information on the assumption that dispersity is 10% of the flow pathway for vertical flows from the UGTMF to Patterson Lake. Provide a reference for the validity of this approach that is either peer reviewed or which demonstrates that it is an established method. The supporting documentation for the use of this method to estimate dispersivity should indicate that it is valid for situations that are comparable to the Project site, notably vertical groundwater flows that are likely to be fracture dominated. 7. Provide additional details on why the hydraulic conductivity value of the sandstone unit in the model is two orders of magnitude above the geometric mean. 8. Provide details on the source of the values selected for the hydraulic conductivity of the fault and shear zones. 9. If multiple calibrated model solutions were trialed, provide details, including why the parameters that were selected are considered the most appropriate model solution. If multiple calibrated model solutions were not trialed, provide information to support that the calibrated parameter values represent a unique calibration solution. 10. Where model parameters were obtained from site analogues or literature values, provide additional details that establish why the selected site analogues are valid for the Project site. 11. For fault and shear zone features that extend out of the local area, provide a clear explanation of the method used to determine the location, size, angle, and parameters that were used in the model to describe these zones. Provide the reasoning for the use of different hydraulic conductivity values for the	Please see Attachment IR 04-R1, 26-R1 for NexGen's response to this IR. As described in the attachment, NexGen concurs with the reviewer that additional clarity could be provided within the EIS and will provide additional details in the revised EIS in response to part 1, part 3, and part 4 of IR 4-R1. In summary, the additional information provided is consistent with the information presented in the Draft EIS, for which the assessment concluded that there would be no significant adverse effects to valued components as a result of the underground storage of tailings or reflooded mine workings.	Section 10.5.1; TSD XIV, Section 3.3, Section 4.5, Appendix A

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
								(Groundwater Flow Pathways) of Appendix A of Draft EIS TSD XIV, the advective flux from the UGTMF and RMW to Patterson Lake is stated to occur following flooding of the mine during closure: "Upon completion of mining and placement of underground waste, the mine would be flooded, and groundwater pressures would re-establish to natural hydrostatic conditions, which are anticipated to be similar to those observed in the pre-development period. Upon saturation of the mine backfill and open workings, groundwater would migrate from these source areas, through the geological pathways, discharging to the receiving environment." The groundwater contaminant transport model is the primary tool being used to predict when and to what extent Patterson Lake may be contaminated by the groundwater pathway. It is therefore important that details of how key parameter values in the model were selected are provided and that the best available information is utilized. Parameter values in the groundwater model were selected by a variety of methods, including site analogues, literature values, and through model calibration. The source of hydraulic conductivity values for the fault and shear zones within the local areas was not clear. For vertical dispersivity from the UGTMF and RMW, a value equal to 10% of the flow pathway was used, referencing lecture notes. In addition to the parameters of relevance to contaminant transport in groundwater listed above, the fault zone and shear zone features that extend outside of the local area were included in the model through the following approach outlined in Section 2.3.3 (Groundwater flow Pathways) of Appendix A of Draft EIS TSD XIV: "To account for the presence of these [fault and shear zone locations outside of the local area] features, the bedrock in this area was assigned a horizontal hydraulic conductivity of $1.3x10^{-07}$ m/s with an orientation of 43° from north (i.e., approximating the trend of the fault and shear zones) and $1.0x10^{-08}$ m/s in the perpendicular (i.e., northwest-southeast) direction." The approach to numerical modelling of groundwater flow is also relevant to assessing predictions for the transport of contaminants to Patterson Lake from the UGTMF and RMW by the groundwater pathway. Notably, in		fault and shear zones within the local area vs outside the local area. 12. In the sensitivity analysis, provide a justification for the magnitude of variability considered for each parameter. The justification should include consideration of how the value for each parameter was selected (field data, model calibration, etc.) and the level of uncertainty associated with each parameter. The magnitude of variability used for sensitivity analysis for each parameter should be chosen with respect to the level of confidence in the accuracy of each parameter value.		

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
								Section 2.2 (Numerical Model Approach) of Appendix A of Draft EIS TSD XIV, a general assumption and limitation applied to the numerical modelling approach is: "Groundwater flow in the model, regardless of the presence of bedrock fractures, is represented by an equivalent porous media approach." **Rationale:** Following from the original IR to demonstrate that no contaminants will migrate or seep into Patterson Lake from the cemented backfill material, specific information is being requested related to groundwater as a contamination pathway to Patterson Lake. Expansion of the IR is intended to elucidate outstanding issues and improve specificity. Parameter values with an unclear source and the selection of model assumptions and parameters that are consequential simplifications of known site characteristics result in a high degree of uncertainty in the reliability of predictions from the groundwater model, predictions for contaminant transport from the UGTMF and RMW to Patterson Lake and subsequent impacts to fish and fish habitat cannot be adequately assessed. The groundwater flow and contaminant transport models are critical to predictions of how much and when contaminated groundwater from the UGTMF and RMW will reach Patterson Lake. To adequately assess the validity of the groundwater models, the reasoning behind underlying assumptions should be clearly explained. Specifically, the use of an equivalent porous media approach to model fractured media should be justified as the fracture dominated fault and shear zones are the likely path for water from the UGTMF and RMW to reach Patterson Lake. Using the most accurate values available for key parameters is important to assess the validity of predictions of the contamination pathway from the UGTMF and RMW to Patterson Lake. The parameters that quantify key groundwater characteristics should be based on the best available data, with the reasoning behind selection criteria clearly outlined. Where regional analogues or literature values are used, a justification of why the analogues are reasonable should be provided, based upon similarities between the Project location and the analogue location.				

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
5	ECCC	Wildlife and Wildlife Habitat	Section 2 Section 3 Section 14 Section 16 Section 20 Section 23 Section 24 Table 20.3-1 Table 23A-5	The Proponent has committed to developing a Caribou Monitoring and Offsetting Plan due to residual effects to caribou. This plan should consider ECCC's Biodiversity Offsetting Approach that is described in the Operational Framework for Use of Conservation Allowances (ECCC, 2012)[1]. ECCC is available to assist the Proponent in the determination of appropriate offsets that would balance against Project effects. Note 1: https://www.canada.ca/en/environment-climate-change/services/sustainable-development/publications/operational-framework-use-conservation-allowances.html	Provide the Caribou Monitoring and Offsetting Plan for review and clearly explain efforts to minimize, avoid, mitigate and offset impacts to caribou. **Suggestions for mitigation and follow-up measures** In the Caribou Monitoring and Offsetting plan, provide details on how severity of disturbance and vulnerability of the caribou population were considered in coming up with offsetting amounts relative to area disturbed. Important factors including time lag (the amount of time from restoration work to when the habitat would be considered caribou habitat) would need to be considered.	NexGen notes the Environment and Climate Change Canada's (ECCC's) request for the Caribou Mitigation and Offsetting Plan (CMOP) is outside the scope of the Project Terms of Reference (Draft EIS Appendix 1A [Concordance Tables for the Terms of Reference and Generic Guidelines for Preparation of an Environmental Impact Statement], Table 1A-2). Information on NexGen's approach to minimizing, avoiding, and mitigating effects to woodland caribou is summarized in the Draft EIS. The CMOP cannot be provided within the EA process as this plan is still in the development stage and requires the involvement of multiple parties. NexGen is in the process of developing the CMOP through engagement with the Saskatchewan Ministry of Environment and primary Indigenous Groups to meet provincial requirements and align with Indigenous goals. NexGen confirms that factors such as population status, vulnerability (resilience), and time lags that are identified by the ECCC in its draft *Offsetting Policy for Biodiversity* (ECCC 2020) and associated operational guidance and decision support tools, should they be provided by the ECCC, will be considered in the offsetting methods and calculations. Draft EIS Section 14.5 (Residual Effects Analysis) provides information on NexGen's approach to minimizing, avoiding, and mitigating effects to woodland caribou, and the specific mitigations measures relating to potential effects to woodland caribou are identified in Table 14.4-1 of Draft EIS Section 14.4 (Project Interactions), including Pathway ID W-01 (Habitat loss), Pathway ID W-02 (Habitat alteration), and Pathway ID W-03 (Sensory disturbance). Information on the mitigation hierarchy level for these mitigation measures is included in Draft EIS Appendix 23A (Summary of Project Environmental Design Features and Mitigation Measures). No changes are proposed in the revised EIS to address this IR. __References__ ECCC (Environment and Climate Change Canada). 2020. Draft Offsetting Policy for Biodiversity. [accessed June 2023]. Available at https://www.canada.ca/content/dam/eccc/documents/pdf/offsetting-policy-biodiversity/draft-biodiversity-offsetting-policy.pdf	n/a	**Context:** The Proponent states that the information on their approach to minimizing, avoiding, and mitigating effects to woodland caribou is summarized in the Draft EIS. However, the information provided in the draft EIS is insufficient to adequately assess impacts and plans related to woodland caribou. The mitigations listed in Table 14.4-1 are insufficient to determine if impacts to boreal woodland caribou will be fully addressed, and often the proposed mitigation is the commitment to develop a Caribou Mitigation and Offsetting Plan (CMOP). **Rationale:** The Proponent states that they are in the process of developing the CMOP and are engaging with Saskatchewan and Indigenous groups to meet provincial requirements. ECCC is collaborating with Saskatchewan to support alignment of the CMOP with the federal recovery strategy. ECCC recommends using the Operational Framework for Use of Conservation Allowances to inform offset multipliers. However, the determination of the appropriate offset ratio following the framework is case-specific and is based on an assessment of several factors such as impact type, severity, duration, site characteristics, vulnerability, uncertainties and risk characterization. For caribou, ECCC typically recommends a minimum offset multiplier of 4:1 (offset outcome : residual impact). This is a benchmark ratio applied to a project that is in the lower end of the risk spectrum; for example, for a project with a low severity impact adversely affecting a low vulnerability ecological component. In general, the minimum 4:1 multiplier accounts for time-lags to restoration, uncertainty in outcomes, a precautionary approach, and the adverse impact itself in its specific context. However, offset multipliers are variable and determined by project-specific circumstances and associated risks and uncertainties. Based on ECCC's characterization of risk for this Project a ratio of 4:1 to 20:1 would be consistent with the recovery objectives. Relevant factors in risk characterization include an assessment of population status, habitat replicability, habitat function, connectivity, and sensitivity, magnitude of impact, geographic scope, duration of effect, frequency, timing and irreversibility. When additional information is made available, a more specific range for offsetting can be provided.	5-R1	Provide the draft Caribou Mitigation and Offsetting Plan, including details on how residual effects to Caribou will be offset. If details on mitigation and offsetting cannot be provided at the time of response, present a discussion of the gap in information, related uncertainty with regards to potential effects and mitigation, and any additional mitigation measures and/or monitoring and follow up that will be implemented on a precautionary basis.	NexGen confirms that the Caribou Mitigation and Offsetting Plan (CMOP) remains under development at this time and further confirms that NexGen will both provide a draft of the CMOP to provincial and federal regulators in 2024 and continue to invite Environment and Climate Change Canada (ECCC) and the CNSC to attend Caribou Working Group meetings facilitated by NexGen with primary Indigenous Groups. NexGen notes that Draft EIS Section 14.5.1 (Woodland Caribou) presents a detailed assessment that allows for a fulsome understanding of the potential effects of the Project and the Project combined with reasonably foreseeable developments on woodland caribou. With respect to the reviewer's request for details on mitigation and discussion on gaps in information, related uncertainty with respect to potential effects and mitigations, and the inclusion of additional mitigation measures and/or monitoring and follow-up that would be implemented, NexGen confirms that this information is contained within the Draft EIS: ▪ Draft EIS Section 14.5 (Residual Effects Analysis) provides information on NexGen's approach to avoiding, minimizing, and mitigating effects to woodland caribou. Specific mitigation measures related to potential effects to woodland caribou are identified in Table 14.4-1 of Draft EIS Section 14.4 (Project Interactions and Mitigations), including Pathway ID W-01 (Habitat loss), Pathway ID W-02 (Habitat alteration), and Pathway ID W-03 (Sensory disturbance). Information on the mitigation hierarchy level for these mitigation measures is included in Draft EIS Appendix 23A (Summary of Project Environmental Design Features and Mitigation Measures). ▪ Draft EIS Section 14.6 (Prediction Confidence and Uncertainty) describes primary factors affecting confidence in the predictions made in the wildlife and wildlife habitat assessment and how this uncertainty was managed. ▪ Draft EIS Section 14.7 (Monitoring, Follow-up, and Adaptive Management) describes monitoring programs that would be used to evaluate effectiveness of the environmental protection measures and enhance mitigation measures, as necessary. The assessment concluded that, despite Project-related adverse effects to woodland caribou being anticipated, adverse effects already exceed the provincial management threshold under existing (i.e., baseline) conditions and the woodland caribou herd is not considered self-sustaining in the SK2 Administrative Unit (ECCC 2020). Under this context, and as woodland caribou is designated as a species at risk under the *Species at Risk Act*, NexGen has committed to creating and implementing a Caribou Mitigation and Offsetting Plan (CMOP) that would be developed through engagement with the Saskatchewan Ministry of Environment (ENV) and Indigenous Groups (Draft EIS Section 14.5.1.1.1 (Habitat Availability). NexGen notes that, as a condition of provincial EA approval, the CMOP must be submitted to the ENV for approval prior to NexGen initiating the Project Construction phase (ENV 2023). As additional information to what was provided in the Draft EIS, NexGen confirms that the CMOP continues to be developed with input from Indigenous Groups and based on meetings held with provincial regulators in 2022 and 2023, including a workshop held on 30 October 2023 with representatives of Indigenous Groups and the ENV,	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
											CNSC, and ECCC. The CMOP is being developed to be consistent with the provincial Range Plan for Woodland Caribou in Saskatchewan: Boreal Plain Ecozone – SK2 West Caribou Administrative Unit (range plan) (ENV 2021) and the related federal Amended Recovery Strategy for the Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada (federal recovery strategy) (ECCC 2020a). NexGen notes that the Saskatchewan range plan was developed to support the landscape-level planning requirements of the federal recovery strategy. The range plan is consistent with the federal recovery strategy and applicable to the local conditions of the SK2 West Boreal Plain herd. Specifically, the federal recovery strategy says, "[t]o guide the protection of critical habitat and the recovery of boreal caribou, range plans or other similar documents and/or action plans are being prepared by provincial and territorial jurisdictions" (ECCC 2020a). As stated in the provincial range plan, "Saskatchewan is responsible for managing woodland caribou on provincial and private lands, and as signatory to the Accord for the Protection of Species at Risk in Canada, has a responsibility to prepare a provincial range plan for woodland caribou. Range plans provide a path forward for effective landscape management. They provide the federal government with clear information on the measures, tools and targets for woodland caribou habitat management being deployed, and that they effectively protect woodland caribou habitat" (ENV 2021). The ENV then reports to ECCC on the implementation of the plan every five years. Following the federal-provincial agreement for the conservation of the woodland caribou in Saskatchewan (ECCC 2019), NexGen has assumed that federal and provincial governments are coordinated and aligned on the recovery strategies, action plans, and range plans. The CMOP is also being designed to be consistent with the seven policy statements in the Draft Offsetting Policy for Biodiversity (ECCC 2020b). The CMOP will incorporate Indigenous engagement and components, follow the mitigation hierarchy, account for adverse effects, follow no net loss and net gain, identify limitations, present how the offset design meets the implementation concepts (i.e., equivalency, use of multipliers, additionality, location, timing and duration, monitoring and evaluation, and accountability and governance), and include complementary measures. The mitigation measures for avoidance, minimization, and reclamation in the CMOP will be the same as those presented in Draft EIS Section 14 (Wildlife and Wildlife Habitat). In addition, there are three components currently being proposed in the draft CMOP to offset residual effects. These components are consistent with the Saskatchewan range plan and federal recovery strategy to meet no net loss of functional habitat and include: ▪ restoration of linear features in Tier 2 habitat through the provincially led restoration program; ▪ research and restoration of linear features in Tier 1 habitat adjacent to the Project (building on caribou-focused research already being conducted by NexGen); and ▪ Indigenous-led stewardship. Implementation of the offsetting is expected to begin concurrent with Construction but would be dependent on provincial restoration timelines and Indigenous timelines. The proposed offsetting components are compatible with the federal recovery strategy in that they: ▪ follow provincial landscape-level planning objectives of the range plan;	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
											▪ restore habitat to work toward recovering the 65% undisturbed threshold for sustainable population in the SK2 West; ▪ work to reduce predation mortality by reducing predator use of linear features; and ▪ take a coordinated approach, with inclusion of Indigenous-led stewardship and monitoring. The CMOP is being developed to include calculations to determine offset requirements to meet no net loss objectives while incorporating multipliers to manage uncertainties. The calculations follow methodologies used on many federally accepted caribou offsetting projects throughout Canada. The offsetting plan is also considering and incorporating the Saskatchewan offset calculator requirements as per the assumptions provided by the ENV. NexGen is committed to adaptive management through the execution of the CMOP to ensure success. If ongoing monitoring indicates that any components of the CMOP are not achieving their objectives, revisions would be made to the mitigation and/or offsetting measures, as required. As the potential Project effects to woodland caribou have been appropriately assessed in the Draft EIS and the CMOP would require ENV approval prior to Construction to verify suitable mitigation measures would be implemented, NexGen confirms that an appropriate level of information has been provided for the purposes of EA review. **References** ECCC (Environment and Climate Change Canada). 2019. Woodland caribou (Boreal population) in Saskatchewan: draft conservation agreement. Available at https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/administrative-agreements/agreement-conservation-woodland-caribou-boreal-saskatchewan.html. Accessed December 2023. ECCC. 2020a. Amended Recovery Strategy for the Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada. *Species at Risk Act* Recovery Strategy Series. Environment and Climate Change Canada, Ottawa. xiii + 143pp. ECCC. 2020b. Draft Offsetting Policy for Biodiversity. Available at https://www.canada.ca/en/environment-climate-change/services/biodiversity/offsetting-policy-biodiversity.html. ENV (Saskatchewan Ministry of Environment). 2021. Range Plan for Woodland Caribou in Saskatchewan: Boreal Plain Ecozone - SK2 West Caribou Administration Unit. October 2021. 109 pp. ENV. 2023. Notice of Ministerial Decision Pursuant to Section 15 *The Environmental Assessment Act* NexGen Energy Limited Rook I Project.	
6	CNSC	Current use of lands and resources for traditional purposes	Table 2.4-4	**Context:** Under the rationale for Athabasca Chipewyan First Nation (ACFN) being included as an Indigenous group identified for information sharing, the EIS states "Potential overlap with traditional territory but no access link or known residency/land use". It is not clear how this was determined.	Provide any additional information about any engagement NexGen has done with ACFN to understand their land use in the vicinity of the Project. Please provide additional information available related to ACFN's Lands and Resource use in	NexGen acknowledges the reviewer's comment and provides the following rationale for excluding the Athabasca Chipewyan First Nation (ACFN) within the information presented in Draft EIS Section 16.3.3 (Contemporary Indigenous Land and Resource Use). As discussed in Draft EIS Section 2.4.1 (Identification of Indigenous Groups for Engagement), a detailed evaluation was undertaken for the proposed Project to	Section 2; TSD I	For this IR, NexGen states that they disagree with the reviewer and will not be updating Section 16.3.3 of the EIS or the IER due to the level of information within the documents being appropriate. NexGen should continue to demonstrate that they have been reaching out to meet with ACFN to get their input and remain open to	6-R1		NexGen confirms that appropriate edits will be made in revised EIS Section 2 (Indigenous, Regulatory, and Public Engagement) and revised EIS TSD I (Indigenous Engagement Report) with respect to engagement conducted with the ACFN between Draft EIS submission and revised EIS submission. NexGen also confirms that, as of 31 March 2024, no additional relevant information regarding potential ACFN	Section 2; TSD I

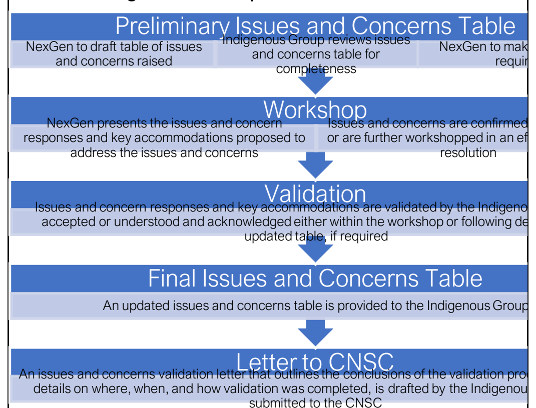
Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				ACFN provided comments on the Project Description for the Rook-1 Project and identified that they use the land in the vicinity of the project for hunting, fishing and trapping. It is not clear if NexGen has discussed this with ACFN to better understand their land use in the vicinity of the Project or how ACFN's comments on the Project Description were considered when making this determination. **Rationale:** Additional information regarding engagement with ACFN and the projects potential impacts on ACFNs Indigenous and/ or Treaty rights and interest is required.	Section 16.3.3 of the EIS and in the Indigenous Engagement Report (IER).	identify the scope of engagement to be completed with Indigenous Groups. This evaluation considered traditional territories; traditional and current land uses; proximity of the Project to Indigenous communities; and potential Project effects on health and safety, the environment, and any potential or established Aboriginal or treaty rights and related interests of Indigenous Groups (REGDOC-3.2.2 Version 1.1 [CNSC 2019]). Through this process, NexGen determined that the ACFN would either not be affected by, or would experience minor effects from, the Project and should be engaged at an information-sharing level (Draft EIS Section 2.4.2 [Identification of Indigenous Groups for Engagement]). NexGen has offered engagement opportunities to, and held meetings with, the ACFN since 2019, including advising the ACFN of the CNSC's public comment period for the Draft EIS and presenting the results of the EA to the ACFN on 13 April 2023. Engagement conducted with the ACFN during the review of the Draft EIS will be updated in the revised EIS. With respect to engagement conducted with the ACFN between Draft EIS submission and revised EIS submission, NexGen will make appropriate edits in revised EIS Section 2 (Indigenous, Regulatory, and Public Engagement) and revised EIS TSD I (Indigenous Engagement Report). NexGen notes that available information, including information provided by the ACFN through Project engagement activities, did not demonstrate that the ACFN have documented traditional land use activities within any of the Project local study areas (LSAs). Map 1 of *Níh boghodi: We are the stewards of our land* (ACFN 2012) shows that the proposed Project location is located outside the ACFN self-declared protection and stewardship zones; the Project location is only within the ACFN self-declared consultation area. This information is consistent with Map 1 of the *Athabasca Chipewyan First Nation Advice to the Government of Alberta Regarding the Lower Athabasca Regional Plan* (ACFN 2010), which shows the proposed Project is located outside of the ACFN Homeland. NexGen acknowledges the ACFN submitted comments on the Project Description that included general concerns related to potential effects on their rights to hunt, trap, and fish; the continuation of their culture; and cumulative effects. However, through engagement activities conducted to date with the ACFN, no specific traditional land uses have been identified within the Project LSA (Draft EIS Appendix 2A [Summary of Indigenous Group Engagement Activities], Table 2A-6; Draft EIS TSD I [Indigenous Engagement Report], Appendix B, Table B-6). Based on the currently known information presented above, NexGen respectfully disagrees with the reviewer's request to provide additional information available related to the ACFN's Lands and Resource use within either revised EIS Section 16.3.3 or the Indigenous Engagement Report (revised EIS TSD I) as the level of information within these documents in the Draft EIS is appropriate. Other than updating engagement records in revised EIS Section 2 and revised EIS TSD I, no changes are proposed in the revised EIS to address this IR. **References**		including any relevant information about ACFN's traditional uses and knowledge that may be relevant to the Rook 1 project if provided. ACFN will be completing their Land Use and Indigenous Knowledge Study in February 2024, there may be additional information available and show land use in the region by ACFN members. NexGen should remain flexible and integrate and summarize any key findings from this study within the EIS including Section 16.3.2 and other relevant sections as applicable. If the study does not reveal any new or additional relevant information on ACFN's land use as it pertains to the Rook 1 project, or it does not get submitted to NexGen and the CNSC within a timely manner (in advance of the EIS being finalized), then this IR would be accepted as long as NexGen continues to document their attempts to engage with ACFN to gather and consider their knowledge, land use and concerns within the EIS and a proposed path forward to continue working with ACFN on addressing any concerns they raise regarding the Rook 1 project, as appropriate.			land use in the area of the Project has been received. Therefore, no further edits are required in revised EIS Section 16.3.3 (Contemporary Indigenous Land and resource Use).	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						ACFN (Athabasca Chipewyan First Nation). 2010. Athabasca Chipewyan First Nation Advice to the Government of Alberta Regarding the Lower Athabasca Regional Plan. November 2010. ACFN. 2012. Níh boghodi: We are the stewards of our land. April 2012. CNSC (Canadian Nuclear Safety Commission). 2019. REGDOC-3.2.2, Indigenous Engagement, Version 1.1. August 2019. ISBN: 978 0 660 04518 4. Available at http://www.nuclearsafety.gc.ca/pubs_catalogue/uploads/REGDOC-3-2-2-Aboriginal-Engagement-version-1.1-eng.pdf						
16	CNSC	Current use of lands and resources for traditional purposes	Section 2.6.1.3 and Appendix 2B	**Context:** The summary of issues tables does not appear to include all key issues identified by the Indigenous Nations and communities For example, some of Indigenous Nations and communities have shared concerns with respect to reduced access to cabins and cultural sites, lack of trust in the process and the road safety of highway #955 that were not captured in the issues and concerns and summary tables in Appendix 2B. The final EIS and IER supporting documentation should include further details on the validation of issues and concerns directly raised by Indigenous Nations and communities, and how NexGen is addressing them as per REGDOC-3.2.2 and CNSC's Generic EIS Guidelines. Particularly, those concerns related to impacts on any potential or established Indigenous and/or treaty rights. **Rationale**: Additional detail is required to understand the status of validation for each issue raised and the response provided.	Update the summary of issues and concerns tables to include all issues and concerns raised by each of the Indigenous Nations and communities to date, including concerns raised in the Traditional Knowledge studies, on the Project Description, and during engagement activities. Demonstrate that each Indigenous Nation and community has reviewed and validated their summary of issues and concerns table and/or a path forward to complete the validation throughout the EIS and the update in the IER. **Suggestions for mitigation and follow-up measures** It is recommended that NexGen creates a commitment tracking table, or adds a column to their issues table, that clearly articulates the specific mitigations that they have committed to for each Indigenous Nations and community to address the issues and concerns they have raised. Validation must be complete by the time the technical review of the EIS is complete, prior to submission of a final EIS. Should the proponent not be able to fully address issues, concerns or feedback raised by any Indigenous Nation or community, this must be clearly documented, and a rationale provided.	NexGen notes that Table 2.6-5 through Table 2.6-8 in Draft EIS Section 2.6.1.2.1 (Primary Indigenous Groups) are intended to present a concise summary of issues and concerns identified by primary Indigenous Groups. Each entry listed in the tables may represent more than one comment received by an Indigenous Group as similar issues and concerns were consolidated. More details regarding issues and concerns raised by Indigenous Groups are presented in Draft EIS Appendix 2B (Summary of Issues Identified by Indigenous Groups), and Appendix C of Draft EIS TSD I (Indigenous Engagement Report). NexGen is confident that Table 2B-1 through Table 2B-5 of Draft EIS Appendix 2A (Summary of Indigenous Group Engagement Activities), and Table C-1 through Table C-5 of Appendix C of Draft EIS TSD I present comprehensive information for the issues and concerns raised by Indigenous Groups noted within the tables (i.e., Clearwater River Dene Nation [CRDN], Métis Nation – Saskatchewan [MN-S], Birch Narrows Dene Nation [BNDN], Buffalo River Dene Nation [BRDN], and Ya'thi Néné Lands and Resources [YNLR]). With respect to the examples raised by the reviewer: ▪ concerns related to reduced access to cabins are contained within Issue IDs CRDN-017, MN-S-001, BNDN-001, BRDN-001, BRDN-005, and YNLR-004; ▪ concerns related to a lack of trust in the EA process are contained within Issue IDs CRDN-001, CRDN-003, and MN-S-011; and ▪ concerns related to road safety are contained within Issue IDs MN-S-009, MN-S-023, BNDN-012, BRDN-007, BRDN-010, BRDN-014, and YNLR-003. For the revised EIS, NexGen will review the engagement record from the Draft EIS, the Indigenous Knowledge and Traditional Land Use Studies, the Project Description, and new engagement records generated since submission of the Draft EIS and include any additional issues and concerns raised in revised EIS Section 2.6.1.2 (Summary of Identified Topics of Interest, Issues, and Concerns), revised EIS Appendix 2B, and Appendix C of revised EIS TSD I. In addition, NexGen will clearly articulate in the revised EIS the key accommodations, including mitigations, proposed to be applied to address issues and concerns raised by the Indigenous Groups.	Section 2.6.1.2; Appendix 2B; TSD I, Appendix C	Although NexGen provided information about the verification process for CRDN with an example chart, CNSC requires NexGen to complete this process with all identified Indigenous Nations and communities and provide updated charts and rational for each within the Final revised EIS in order to accept this IR. The example table of issues and concerns for CRDN is acceptable and will need to be completed for each of the identified Indigenous Nations. CNSC recommends including another line in the table which indicates the status of the concern and justification of the status including how NexGen and the Nation came to consensus on the concern and validated the response and status with the Indigenous Nation. If NexGen was not able to receive a response with regards to addressing and validating the concerns and proposed responses with particular Indigenous Nations, NexGen should continue to document the attempts made to reach out, engage and address the concerns raised by the Indigenous Nation and confirm NexGen's planned path forward to continue to work with the Indigenous Nation and address their concerns, as appropriate.	16-R1		NexGen confirms that revised EIS Section 2.6.1.3 (Validation of Identified Issues) and Section 6.3 of revised EIS TSD I (Indigenous Engagement Report) will be updated to describe the processes used to complete the issues and concerns validation process for Indigenous Groups who raised Project-related issues and concerns and that updates will be provided in a manner that clearly and succinctly describes the processes undertaken. NexGen further confirms that, at the time of writing, issues and concerns validation has been completed with each of the Clearwater River Dene Nation, Métis Nation – Saskatchewan Northern Region 2, Birch Narrows Dene Nation, and Buffalo River Dene Nation and that letters from each of these Indigenous Groups have been sent to the CNSC confirming the resolution of these items and completion of the validation process. Tables documenting the issues and concerns will be included in Appendix 2B of revised EIS Section 2 (Indigenous, Regulatory, and Public Engagement) and Appendix C of revised EIS TSD I. NexGen further confirms that revised EIS Section 2.7.2 (Continuing to Work to Understand Interests and Address Issues) will be updated to reflect how NexGen plans to address any outstanding or future issues and concerns, as applicable.	Section 2, 2.6.1.3, 2.7.2; Appendix 2B TSD I, Section 6.3; Appendix C

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						NexGen also acknowledges the reviewer’s comment regarding validation, which is consistent with the intent of actions described in Draft EIS Section 2.6.1.3 (Validation of Identified Issues) and Draft EIS Section 2.7.2 (Continuing to Work to Understand Interests and Address Issues). The process to validate Indigenous issues and concerns has been discussed with and agreed upon by four Indigenous Groups. At the time of writing, the issues and concerns validation process has been concluded with the CRDN. The general approach to validate Indigenous issues and concerns with the Indigenous Groups is as follows:  To support the response to this IR, NexGen has provided Attachment IR 16-1, which includes the letter from the CRDN to the CNSC validating that CRDN issues and concerns have been addressed, as well as the final CRDN issues and concerns table. NexGen notes that the issues and concerns validation process may be amended, where necessary, should Indigenous Groups and NexGen agree on modified steps that would better facilitate the validation process.						
26	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 4.5.6	The Proponent indicates that “One specific underground location, U-4 was carried forward for screening for technology; U-4 is located outside of known major geologic structure and potential areas of mineralization.” Looking at figure 4.5.4, ECCC notes that the U-4 location is quite close to, and some portions of it overlap with, parts of Patterson Lake. It is unclear what the actual distance between the U-4 underground storage and Patterson Lake will be upon construction, and the probability that contaminants from the U-4 underground location will seep into Patterson Lake is not stated.	1. Provide the distance from the U-4 underground storage location to Patterson Lake. 2. Demonstrate that no contaminants will migrate or seep into Patterson Lake from the U-4 underground storage location.	Responses to part 1 and part 2 of this IR are provided below. 1. Figure 10 in Draft EIS TSD VII (Mine Waste Alternatives Assessment Report) and Figure A-15 in Appendix A of Draft EIS TSD XIV (Groundwater Flow and Solute Transport Modelling Report) both present a visual representation of the location of the underground mine relative to Patterson Lake. The underground tailings management facility (UGTMF), as shown in both of these figures, is approximately 350 m below Patterson Lake. 2. Figure A-17 in Appendix A of Draft EIS TSD XIV presents a conceptual breakdown of the advective flux from the various underground components to Patterson Lake. Seepage from the UGTMF, primary backfill, secondary backfill, and reflooded mine workings to Patterson Lake is predicted to occur, as presented in Figure A-17. Mass loadings to Patterson Lake are inputs to the surface water quality analysis and effects assessment for Patterson Lake as documented in Draft EIS Section 10 (Surface Water Quality and Sediment Quality), Draft EIS Section 11 (Fish and Fish Habitat), and Draft EIS Section 15 (Human Health), which concluded no significant adverse effects on valued components.	n/a	See IR-4	26-R1	See IR-4	Please see NexGen’s response to IR 4-R1 for response to this IR.	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
31	CNSC	Alternative Assessment	Table 4.5-8	**Context:** Table 4.5-8 contains categories, sub-categories, and set of criteria for four alternatives for tailings storage. For the construction risk and complexity Sub- category of Technical category, the criteria include geotechnical stability considering foundation conditions and waste placement. For the underground tailings storage using the UGTMF, there are concerns of geotechnical stability of the UGTMF caverns as the UGTMF caverns have large dimensions. **Rationale:** Any failures of UGTMF caverns during construction could pose significant risks to workers' safety and might also cause significant underground water inflow and should be considered in the alternative means assessment for underground tailings storage.	Include geotechnical stability of the UGTMF caverns in criteria for construction risk and complexity sub- category and provide supportive information on geotechnical conditions of the UGTMF.	NexGen appreciates the CNSC's comment regarding geotechnical stability of the underground tailings management facility (UGTMF) and confirms that, as presented in Table 4.5-8 of Draft EIS Section 4.5.6.2 (Tailings), geotechnical stability of the UGTMF caverns is included under the 'Technical' category and 'Construction risk and complexity' sub-category in the alternatives assessment. A summary of the UGTMF geotechnical conditions includes: ▪ The UGTMF would be located approximately 350 m into the footwall (i.e., north) of the Arrow deposit and a minimum 240 m below the unconformity in predominantly unaltered basement lithologies, including semi-pelitic gneiss and Intrusives. Approximately one-third of the southern chambers would be located within the Intrusives that exhibit relatively better rock mass quality than the semi-pelitic gneiss. ▪ For both of these lithologies, rock mass conditions within the UGTMF zone typically range from 'Good' to 'Very Good' using standard rock mass classification systems, with intact rock strengths generally greater than 100 megapascals (MPa) (i.e., classified as 'Strong' rock). Rock mass conditions associated with major structural features, such as shears or faults, are classified as 'Fair' to 'Good'. ▪ NexGen has assessed the stability of the UGTMF chambers/pillars using empirical, structural (i.e., kinematic or 'wedge analysis'), and three-dimensional numerical stress modelling methods. ▪ Stress modelling results indicate that the extent of probable rock mass yield is minimal at the designed UGTMF chamber and pillar dimensions and for the planned excavation sequence. NexGen confirms that, during initial development of the UGTMF, instrumentation would be used in the chamber back (i.e., roof) and pillars to monitor rock mass response to confirm design assumptions. NexGen has identified proactive mitigation options to apply if rock mass conditions are locally poorer than anticipated, rock structure impacts wall/pillar stability, and/or pillar stresses are higher than anticipated. Mitigations may include one or more of the following: ▪ additional cable bolt support; ▪ decreasing UGTMF chamber plan dimensions; and ▪ increasing pillar thickness. No changes are proposed in the revised EIS to address this IR.	n/a	The reviewer agrees with the response NexGen provided. However, in Table 4.5-8 of Draft EIS Section 4.5.6.2 (Tailings), geotechnical stability of the UGTMF caverns is not included under the 'Technical' category and 'Construction risk and complexity' sub-category.	31-R1	Add geotechnical stability of the UGTMF caverns to Table 4.5-8 under the 'Technical' category and 'Construction risk and complexity' sub-category.	NexGen confirms that "Geotechnical stability considering foundation conditions and waste placement" is included as a criterion under the "Technical" assessment category and "Construction risk and complexity" sub-category in Table 4.5-8 of Draft EIS Section 4.5.6.2 (Tailings). NexGen notes that this description is intended to be generic to the four options being assessed (i.e., underground with paste at location U-4; in-pit with slurry at location P-3; surface with paste at location S-1; and surface with paste at location S-3). In the context of the UGTMF alternative noted by the reviewer (i.e., underground with paste at location U-4), NexGen confirms that this description includes geotechnical stability of the UGTMF caverns. NexGen agrees that additional clarity could be included in the EIS, and will add the following table footnote to Table 4.5-8 in revised EIS Section 4.5.6.2: "Geotechnical stability includes geotechnical stability of the excavated caverns under the underground alternative, the excavated pit walls under the in-pit alternative, and the containment structure under each of the surface alternatives considered in the assessment."	Section 4.5.6.2
32	CNSC	Alternative Assessment	Section 4.5.9 Camp Location	**Context:** The Rook I project is to be developed as an on-site camp-based operation with the workforce typically working 12-hour shifts on a rotational basis. Three on-site locations were selected for a screening-level assessment for camp location by considering environmental, technical, economic, and social categories. After evaluation of the relative advantages and disadvantages of the range of feasible alternatives, the preferred alternative for camp	Provide further justification and assessment on camp location by considering workers' health and safety during all phases of the project taking into account accidents and malfunctions.	NexGen acknowledges the importance of protecting workers staying at the Project camp and confirms that worker health and safety would be protected at the chosen camp location. As described in Draft EIS Section 4.5.9 (Camp Location), the alternatives assessment for the camp location included preliminary screening of both off-site vs. on-site accommodations followed by the comparison of three alternative options to identify the preferred alternative that best met a combined set of criteria or sub-categories within environmental, technical, economic, and social assessment categories. Under the social assessment category, the alternatives assessment considered the potential	n/a	Although the preferred alternative for camp location is the west location after a screening level assessment for camp location with considering environmental, technical, economic, and social factors, the main shortcoming of the alternative assessment is that worker health and safety is not considered, in particular, under potential accidents and malfunctions. The preferred camp location may not be a preferred or safe location for workers if the factor of worker health and safety is taken into account for operation and/or under	32-R1	Provide further justification on the assessment of potential risk level of accidents and malfunctions on the camp workers or an amended camp location assessment as required by the Saskatchewan Ministry of Environment.	Please see Attachment IR 32-R1 for NexGen's response to this IR, which provides additional information that justifies the proposed location of the camp in consideration of accidents and malfunctions. No changes are proposed in the revised EIS to address this IR.	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				location for the Project was the west location. The west location is located west of, and adjacent to, mine buildings for the Project, and would be integrated into the general mine and mill terrace areas. The camp location alternative assessment appears to have not considered the workers safety, in particular, the impact of accidents on the workers safety. **Rationale:** In the assessment of accidents and malfunctions, bounding scenario 6- acid plant tail gas scrubber failure, the modeling results show that distance to (Acute Exposure Guideline Level) AEGL-3 is 261 m and to AEGL-2 is 2500 m under worst- case weather conditions, while distance to AEGL-3 is 122 m and to AEGL-2 is 849 m under typical weather conditions. AEGL-3 means that the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals could experience life-threatening health effects or death while AEGL-2 means that the airborne concentrations of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape. Given the close proximity of the camp location to the mine process plant, the likely accident from the mine process plant could pose significant risks to workers' health and safety.		camp location effects to worker safety and human health, particularly with respect to air and noise emissions. The selected camp location represents the preferred alternative for the environmental, technical, and economic assessment categories, and for 8 of the 10 assessment subcategories. While the chosen camp location was less preferred with respect to the social assessment category, any camp location would be required to meet provincial and federal design standards, regulatory guidance, and applicable building codes that require that worker health and safety are protected. As such, confirming worker health and safety is protected was not a differentiating factor between any of the alternatives. Potential effects to workers' health and safety from a potential accident and malfunction in consideration of the relative proximity of the camp to the process plant was not included but would not change the assessment results presented in Table 4.5-21 of Draft EIS Section 4.5.9. The selected camp location (i.e., west location) was already assessed as less preferred with respect to workers' health and safety and would remain a less preferred alternative in consideration of a potential accident at the proposed process plant. In consideration of the combined assessment rankings, NexGen is currently proposing to locate the camp at the west location. Worker health and safety in the camp was considered as part of the human health and risk assessments. As shown in Table 15.2-5 of Draft EIS Section 15.2.8.3 (Exposure Pathways and Conceptual Model), the potential effects on the camp worker were assessed for inhalation of air; incidental ingestion of soil or sediment; ingestion of water and traditional foods; and dermal contact with soil, sediment, and water for both radiological and non-radiological sources. The assessment showed that potential Project effects associated with non-carcinogens (Draft EIS Section 15.5.1.1 [Non-carcinogens]), carcinogens (Draft EIS Section 15.5.1.2 [Carcinogens]), and radionuclides and radon (Draft EIS Section 15.5.1.3 [Radionuclides and Radon]) would not result in a significant adverse effect on human health (Draft EIS Section 15.6 [Risk Characterization and Significance]). With respect to the results of the assessment of accidents and malfunctions, and the reviewer's reference to the use of Acute Exposure Guideline Levels (AEGLs), NexGen notes the assessment of accidents and malfunctions is predominantly conducted to understand and plan for emergency (i.e., non-routine) events and confirm that the resulting risk is tolerable. This approach includes considering if the Project design has appropriately incorporated design features and controls to minimize the probability of occurrence and minimize the consequence of an accident or malfunction, should an event occur. In addition to evaluating whether these design features and controls have mitigated overall risk to levels that are acceptable or as low as reasonably practicable (ALARP), the results of the accidents and malfunctions assessments are used to inform emergency planning. Section 11 of Draft EIS TSD VIII (Accidents and Malfunctions Report) assessed the overall risk to the public for the acid plant tail gas scrubber failure, which also represents the scenario with the greatest potential risk to workers staying at the camp. The probability of this type of accident or malfunction to		potential accidents and malfunctions in the process plant. In the response, with respect to the results of the assessment of accidents and malfunctions, NexGen stated that *"The probability of this type of accident or malfunction to occur is likely (i.e., less than or equal to 1 occurrence in 10 years and more than 1 occurrence in 100 years) and the consequence associated with this type of accident or malfunction is minor to moderate, for an overall risk rating of low to moderate (i.e., risk -reduction activities would reduce the risk associated with these scenarios to ALARP; risk may be characterized as tolerable)."* The reviewer does not agree with this statement. The west location is about 300~500 m west of the process plant, which is within the zone of (Acute Exposure Guideline Level) AEGL-2 based on the proponent's assessment of bounding scenario 6 – acid plant tail scrubber failure whether or not it is under worst-case weather conditions (i.e., the distance to the process plant from 261 m to 2500 m for AEGL-2, assumed peak wind speeds and worst-case conditions for dispersion of released materials) or under typical weather conditions (i.e., the distance to the process plant from 122 m to 849 m for AEGL-2, assumed average wind speeds and average conditions for dispersion of released materials). The level AEGL-2 means that the airborne concentrations of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape. This consequence can be classified as Major based on the definition of consequence in the EIS (Table 21.5-2). The probability of this accident is 0.1 per year as stated in the EIS (Table 21.6-3), which falls under likelihood of Likely to Very Likely. The risk of this accident to worker health and safety would then be Moderate to High based on Table 21.5-3 in the EIS.				

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						occur is likely (i.e., less than or equal to 1 occurrence in 10 years and more than 1 occurrence in 100 years) and the consequence associated with this type of accident or malfunction is minor to moderate, for an overall risk rating of low to moderate (i.e., risk -reduction activities would reduce the risk associated with these scenarios to ALARP; risk may be characterized as tolerable). The modelled exceedance would be short in duration. In addition, since the predominant winds at the Project site are northwest and south-southeast (Figure 7A-1 of Draft EIS Appendix 7A [Air Dispersion Modelling Report]), the likelihood of the acid plant tail gas scrubber failing combined with the likelihood that the wind is blowing in the direction of the camp reduces the overall risk of effects to workers at the camp. While the evaluation did not consider the effect indoors, the risk would be lower indoors as a result of the heating, ventilation, and air cooling system in the camp. NexGen confirms that the accident malfunction probability, consequence, and overall risk rating would be similar between workers staying at the camp and the public. With consideration of conditional probabilities of indoor versus outdoor exposure (i.e., shelter-in-place provisions during short-term releases) and wind direction, the probability of exposure is expected to be reduced to unlikely and the overall risk rating would be reduced to low. With the risk at the ALARP level, the residual risk would be managed through emergency response provisions that would protect the safety of camp occupants during a short-term release of sulphur dioxide (SO_2). Overall, worker health and safety would be protected at the proposed camp location. As the Project design proceeds, NexGen will continue to investigate opportunities to further promote health and safety for workers at the camp. NexGen acknowledges that the Saskatchewan Ministry of Environment (ENV) has expressed concerns regarding the proposed camp location for the Project. Should a change in camp location be required as the result of an approval condition issued by the ENV, NexGen notes that, assuming the amended camp location would occur within the Project maximum disturbance area, the potential effects of the associated footprint alteration would fall within the conservative assumptions utilized for the EA and would not require further assessment. No changes are proposed in the revised EIS to address this IR.						
36	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 4.5.16 Section 11.4.2	**Context:** Section 4.5.16 provides an alternatives assessment of sewage treatment technologies and provides the rationale for the selected treatment technology. However, there is no assessment of alternatives or discussion of any treated sewage discharge options. Within Section 11.4.2 the treated sewage discharge location is discussed, but there is no alternatives assessment for potential options such as a combined treated effluent and sewage discharge location and how	1. Provide an alternatives assessment for treated sewage discharge options, which includes options that investigate a combined treated sewage and effluent discharge. 2. Provide an assessment of how combining treated sewage and effluent may affect the chosen treatment technology and water quality in the receiving environment. 3. Update the surface water quality modelling, effluent and sewage dispersion modelling, environmental	NexGen notes the Environment and Climate Change Canada's (ECCC's) recommendation that a sewage treatment alternatives analysis might reduce effects to surface water quality and fish and fish habitat; however, the currently proposed system with two discharge points represents a conservative assessment of Project environmental effects because this assumption considers two separate discharge disturbances. NexGen maintains that the precautionary approach used in the Draft EIS appropriately captures potential effects associated with sewage treatment and discharge. 1. and 2. Despite the approach undertaken to assess potential effects in the EA, NexGen acknowledges	n/a	**Context:** The Proponent has acknowledged that a combined sewage and mine effluent final discharge point could reduce environmental impacts to surface water quality and aquatic receptors and has committed to evaluating options for a combined discharge system for effluent and sewage, though additional information is needed for all parts of the IR. ECCC acknowledges that the Province has requested the Proponent evaluate alternative locations for the mine campsite, and that this design change could influence the design	36-R1	Provide the following items for review and comment if a combined sewage and effluent discharge is selected: ▪ Finalized combined discharge design, ▪ Near-field modelling, ▪ Updated environmental risk assessment predictions	NexGen confirms that a combined effluent and sewage discharge is not currently being proposed for the Project; therefore, the requested information is not required for the EA. Should a combined effluent and sewage discharge be considered at a future date, NexGen confirms that an assessment of the potential environmental effects would be conducted according to the process laid out in REGDOC-2.9.2 (CNSC 2021) as part of licensing. **References** CNSC (Canadian Nuclear Safety Commission). 2021. REGDOC-2.9.2, Environmental Protection, Controlling Releases to the Environment. DRAFT. March 2021. Available at https://www.nuclearsafety.gc.ca/eng/pdfs/regulatory-	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				that may affect the chosen sewage/effluent treatment technologies. **Rationale:** An evaluation of treated sewage discharge that goes beyond location siting and considers potential options, such as combined treated effluent and sewage discharge location, should be completed. This assessment should provide information on how this may affect the chosen effluent and sewage treatment technologies and how this may reduce impacts to surface water quality and fish and fish habitat.	risk assessment and aquatic health assessment as needed to reflect any changes that may arise if a combined discharge is selected.	that potential environmental and economic benefits may be realized if the treated effluent and treated sewage discharges could be combined into a single release point. As a part of advancement of Project design, NexGen will evaluate options for combining treated effluent streams from the sewage treatment plant (STP) and effluent treatment plant (ETP), including the option of routing treated STP effluent through the process plant. This evaluation would be used to support any changes to the configuration for the ETP and STP reflected in the Draft EIS, if proposed, which would be included in the applicable licensing documentation. 3. NexGen notes that, using the conservative approach described above, the treated sewage effluent did not adversely affect the surface water quality assessment (Draft EIS Section 10.5.3.1 [Lifespan of the Project]) nor the fish and fish habitat assessment (Draft EIS Section 11.5.4.2 [Significance Determination]). A revised combined discharge design is expected to be within the bounds of the EA and would not require reassessment. However, if the design is revised, the environmental risk assessment would be updated as part of licensing documentation and in consideration of the requirements of REGDOC 2.9.2 (CNSC 2021), as applicable. No changes are proposed in the revised EIS to address this IR. **References** CNSC (Canadian Nuclear Safety Commission). 2021. Environmental Protection: Controlling Releases to the Environment. DRAFT. March 2021. Available at https://www.nuclearsafety.gc.ca/eng/pdfs/regulatory-documents/regdoc2-9-2/REGDOC-2_9_2_Controlling_Releases_to_the_Environment.pdf		decisions for a combined mine effluent and sewage discharge. It is however noted in the Proponent's IR response that: "…the currently proposed system with two discharge points represents a conservative assessment of Project environmental effects because this assumption considers two separate discharge disturbances." And: "…using the conservative approach described above, the treated sewage effluent did not adversely affect the surface water quality assessment (Draft EIS Section 10.5.3.1 [Lifespan of the Project]) nor the fish and fish habitat assessment (Draft EIS Section 11.5.4.2 [Significance Determination]). A revised combined discharge design is expected to be within the bounds of the EA and would not require reassessment." The current assessment examines the discharges in separate locations and plumes. ECCC acknowledges the Proponent's conclusion that two discharge points represent a greater disturbance and therefore evaluating two discharge points could be considered conservative compared to a single discharge point. However, the bounds of the current evaluation of effects does not consider the additive impacts from elevated concentrations of contaminants such as total suspended solids, chlorides and un-ionized ammonia from the sewage discharge to the mine effluent discharge within the near-field aquatic environment. Therefore, the effects in the receiving environment from the total concentrations of contaminants based on a single combined discharge should still be assessed. **Rationale:** If a combined sewage and effluent discharge is selected, updated information is required to consider potential effects on fish and fish habitat. To adequately capture potential effects to the aquatic environment in the EIS, a review of the finalized combined discharge design, near-field modelling, and updated predictions in the environmental risk assessment are required to confirm modelling predictions for effluent discharged into the receiving environment.			documents/regdoc2-9-2/REGDOC-2_9_2_Controlling_Releases_to_the_Environment.pdf.	
40	ECCC	Fish and fish habitat Change to an environmental component	Section 5.3.3.5	**Context and Rationale:** The Proponent states, "Based on results from ongoing kinetic (i.e., longer-term tests over many weeks) testing on representative waste rock samples, material with greater than	Provide details on how the cutoff criteria were established for sulphur and if they were based on test results or some other information. If tests were used, provide details on	NexGen confirms the rationale described below is with respect to using only total sulphur content less than 0.1% for acid rock drainage (ARD) (potentially acid generating vs. non-potentially acid generating [NPAG]) classification.	n/a	**Context:** In response to the IR, the Proponent provided detailed justification for how the cutoff criteria for sulphur was established. The Proponent also indicated from the bulk mineralogy that	40-R1	Provide additional information to support the statement that "… the rate of sulphide oxidation is lower than the rate of silicate weathering". The information provided should be linked to the classification of PAG and non-PAG rocks.	Please see Attachment IR 40-R1 for NexGen's response to this IR, which includes additional information requested by the reviewer and supports the statement that the rate of sulphide oxidation is slower than the rate of silicate weathering.	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
		due to hazardous contaminants		0.1% sulphur content has been defined as PAG, and material with less than 0.1% sulphur content has been defined as NPAG. Further, a delay to onset of acidic conditions is expected in PAG material with low sulphide content (i.e., below approximately 1% sulphide). Geochemical depletion calculations indicate that acidic conditions are not expected to develop for decades in PAG material with low sulphide content; the low-sulphide PAG material is expected to have near neutral pH during Operations, with acidic conditions forming after Closure." ECCC notes that acidity can occur if there is not enough neutralization potential. As indicated earlier by the Proponent, there is little neutralization potential available (pdf page 651). Therefore, the classification of rocks with less than 0.1 % sulphur content as NPAG appears to be based only on kinetic testing, without any other verification testing. Based on MEND, 2009[2], both kinetic and static tests are the industry norm. Note 2: MEND. 2009. Prediction Manual for Drainage Chemistry from Sulphidic Geologic Material. Mend Report. 1.20.1. 2009.	what tests were conducted and the test results.	Various static geochemical tests, including total metals, acid base accounting, mineralogy, and soluble fractions, have been conducted on waste rock samples, including samples that have less than 1% total sulphur. These results were considered in conjunction with the kinetic test results to support the derivation of the classification criteria. The bulk mineralogy of waste rock samples is consistent with that of the Proterozoic crystalline basement rock, consisting of quartz (39 weight percent [wt%] to 71 wt%), biotite (9.9 wt% to 33 wt%), muscovite (8.8 wt% to 24 wt%), chlorite (up to 12 wt%), anorthosite (up to 8.7 wt%), albite (up to 14 wt%), and clay species (4.5 wt% to 11 wt%). More specifically, only trace carbonate species (i.e., calcite up to 0.028 wt% and siderite up to 0.007 wt%) were identified. The acid potential (AP) of the less than 0.1% total sulphur materials is primarily associated with trace quantities of pyrite. The mineralogical analysis indicates that the bulk of the neutralization potential (NP) of the less than 0.1% total sulphur waste rock is associated with acid-consuming silicate minerals. Because silicate minerals dominate the mineralogy, bulk NP is effectively infinite compared to AP. Therefore, the rate of silicate weathering relative to sulphide oxidation determines the ARD classification of the waste rock materials. Kinetic test results of two waste rock samples containing less than 0.1% total sulphur indicate pH trends suggesting that the rate of sulphide oxidation is lower than the rate of silicate weathering, supporting the use of sulphide content as a management criteria for NPAG material. Based on the details provided above, NexGen is confident the classification of waste rock with less than 0.1% sulphur content as NPAG is appropriate.		although there is very little carbonate mineral in the rock to provide neutralization potential, that the silicate minerals in the rock will provide the neutralization potential (NP) needed to neutralize any sulphide oxidation. These led to the classification of potentially acid generating (PAG) and non-PAG rocks. However, the Proponent stated that "… the rate of sulphide oxidation is lower than the rate of silicate weathering" and it is not clear how the rate of sulphide oxidation could be slower than that the rate of silicate weathering when the opposite is typically true. **Rationale:** Clarity on the rate of sulphide oxidation in comparison to the rate of silicate weathering is needed to assess the NP of silicate minerals and the subsequent impact on the classification of PAG and non-PAG rocks. Any error in the classification of the PAG rock may result in increased ARD/ML and therefore impact the receiving environment including waters frequented by fish.				
44	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Table 5.4-4	The Proponent states "The west bermed runoff collection area would be located on the west side of the Project site. This collection area would receive runoff from the local contributing area as well as overflow from contact water pond #2, if required. This bermed area would prevent suspended solids entrained in runoff water from entering Patterson Lake by natural filtration through an unlined berm". The Proponent is reminded that as required by the *Metal and Diamond Mining Effluent Regulations* (MDMER) all effluent and seepage from the mine site that contains deleterious substances needs to be discharged through a final discharge point (FDP). From the description of the west bermed runoff collection area, it is not clear whether runoff that filters through the unlined berm will be discharged through the FDP or go directly to Patterson Lake without being discharged through the FDP.	Confirm that all effluent, as defined in the MDMER, will be discharged through a FDP.	NexGen notes the reviewer's comments that discharges must be through defined final discharge points as required by the Metal and Diamond Mining Effluent Regulations. NexGen would like to clarify the final discharge details. Contact water from the non-potentially acid generating (NPAG) waste rock storage area (WRSA) would report to site runoff pond #2 (referred to as contact water pond #2 in Figure 5.4-12 of Draft EIS Section 5.4.5 [Site Water Management]), which is sized to the 1:100 year 24-hour precipitation event. Water reporting to site runoff pond #2 is considered the final discharge point (i.e., final point of control) and would be tested to confirm that effluent release criteria are met before water was released to the west bermed runoff collection area, where this water would diffuse passively to Patterson Lake. Water not meeting effluent release criteria would be pumped to the settling pond for treatment in the effluent treatment plant (Draft EIS Section 5.4.5.2 [Surface Water Management]). The treated effluent release criteria would be proposed to the Saskatchewan Ministry of Environment and the CNSC. The outlet of site runoff pond #2 will be proposed as the final point of control.	n/a	**Context:** The Proponent indicated that contact water from the non-potentially acid generating (NPAG) waste rock storage facility would report to the site run off pond 2, which they consider the final discharge point (FDP). In the EIS, the Proponent stated that "The west bermed runoff collection area would be located on the west side of the Project site. This collection area would receive runoff from the local contributing area as well as overflow from contact water pond #2, if required. This bermed area would prevent suspended solids entrained in runoff water from entering Patterson Lake by natural filtration through an unlined berm", but did not mention any control points where the quality of effluent will be monitored. Part one of the Metal and Diamond Mining Effluent Regulations (MDMER) defined effluent to mean: (a) hydrometallurgical facility effluent, milling facility effluent, mine water effluent, tailings impoundment area effluent, treatment pond	44-R1	Demonstrate how all effluent, including any seepage or surface runoff containing deleterious substances that flows over, through or out of the site, will be discharged through an FDP.	NexGen confirms that contact water released to the receiving environment would not contain deleterious substances above Project thresholds. As noted in NexGen's initial response to the original IR, contact water pond #2 (i.e., site runoff pond #2) is considered the final point of control where water would be tested to confirm that effluent release criteria other than total suspended solids (TSS), including requirements under the Metal and Diamond Mining Effluent Regulations, are met prior water being released to the west bermed runoff collection area, where this water would diffuse passively (i.e., to ground; there would be no overland path for water containing TSS to travel to Patterson Lake). In other words, contact water pond #2 represents a final discharge point (i.e., control point) where water would be monitored prior to release to the environment. Should water quality in contact water pond #2 not meet Project thresholds, water would be pumped to the settling pond for treatment in the effluent treatment plant and re-tested to confirm compliance prior to discharge to Patterson Lake (Draft EIS Section 5.4.5.2 [Surface Water Management]). NexGen further notes that the monitoring ponds that receive water from the effluent treatment plant also represent a final discharge point where water would be monitored prior to release to the environment.	Section 5.4.5.2; TSD XVIII

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						Surface water quality modelling completed for the Draft EIS included loadings from the NPAG WRSA contact water input into Patterson Lake. The modelling indicated that this water release would not result in Project thresholds being exceeded in Patterson Lake during Construction, Operations, and Decommissioning and Reclamation (i.e., Closure) (Draft EIS Section 10.5.1 [Application Case]). Monitoring would be in place at site water infrastructure (e.g., monitoring at site runoff pond #2) to confirm that waters are suitable for release, in groundwater to monitor the flow pathway, and within Patterson Lake as the ultimate receptor. This monitoring would be developed and specified in detail as part of the Environmental Protection Program and supporting documentation (e.g., Effluent Monitoring Plan and Environmental Monitoring Plan), which would be submitted as part of the applications for provincial permitting and federal licensing, commensurate with the stage of Project development. **References** Metal and Diamond Mining Effluent Regulations. SOR/2002-222 under the *Fisheries Act*. Last amended June 18, 2020. Available at https://laws-lois.justice.gc.ca/eng/Regulations/SOR-2002-222/index.html		effluent or treatment facility effluent other than effluent from a sewage treatment facility; or (b) any seepage or surface runoff containing any deleterious substance that flows over, through or out of the site of a mine. It also provides a definition for the FDP, "Final discharge point in respect of an effluent, means an identifiable discharge point of a mine beyond which the operator of the mine no longer exercises control over the quality of the effluent." The MDMER requires that any seepage or surface runoff containing deleterious substances that flows over, through or out of the site of a mine is required to go through the final discharge point. **Rationale:** Without any effluent monitoring in place to measure the quality of water leaving the unlined bermed area or without further information regarding whether runoff that filters through the unlined berm will be discharged through the FDP or will bypass the FDP and discharge directly to Patterson Lake, it is unknown if there will be effluent containing deleterious substances discharging from a location that is not the FDP. Confirmation that all effluent will be discharged through an FDP will allow ECCC to assess potential adverse effects to water frequented by fish.			These two final discharge points would represent monitoring locations/points of control for all Project site contact water. NexGen acknowledges that the statement "[t]he west bermed runoff collection area would be located on the west side of the Project site. This collection area would receive runoff from the local contributing area as well as overflow from contact water pond #2, if required" (Draft EIS Section 5.4.5.2, Table 5.4-4) could be interpreted as there being a possibility that water not meeting Project threshold criteria could be discharged into the west bermed runoff collection area. For this reason, Table 5.4-4 in revised EIS Section 5.4.5.2 (Surface Water Management) will be updated to state "[t]he west bermed runoff collection area would be located on the west side of the Project site. This collection area would receive runoff from the local contributing area as well as discharges from contact water pond #2 (i.e., a final point of control), provided Project discharge criteria are met". In addition, NexGen will also update Figure 5 of Section 3.4 of revised EIS TSD XVIII (Site-Wide Water Balance and Water Quality Modelling Report) to show the Project site water process flow more clearly.	
45	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 5.4.4.3 Section 5.5.3.1 Table 11.4-1	The Proponent states that "The top of the finished PAG and NPAG WRSAs would be tied into the hill to the south of the mill terrace, and the overall height would not exceed the highest nearby topography. At closure, an engineered cover system (e.g., growth medium) would overlay the final PAG WRSA and NPAG WRSA landforms." It is unclear how the PAG and NPAG WRSAs would be impacted by wind or water erosion due to their height or elevation. In Section 5.4.4.3 it is stated that "At Closure, an engineered cover system (e.g., growth medium) would overlay the final PAG WRSA and NPAG WRSA landforms." Table 11.4-1 indicates that an "engineered cover of compacted clean material and growth medium layer" will be installed over the PAG WRSA. A growth medium cover will be installed over the NPAG WRSA.	1. Provide information on how the PAG and NPAG WRSAs will be impacted by wind and water erosion as a function of their height or elevation. 2. Provide clarification on what other types of cover systems have been considered for the PAG rock cover, including whether NPAG may be used as cover. 3. Provide details on what the thickness of the cover system will be to ensure that the PAG rock will be contained in the frozen layer below the active layer. 4. Provide details on how the seepage from the PAG and NPAG WRSA will be managed post-closure if the ditches and runoff collection system are decommissioned.	NexGen acknowledges the Environmental and Climate Change Canada's (ECCC's) request for details on the waste rock storage area (WRSA) cover systems and provides the following details in response: 1. It is expected that there would not be significant wind and water erosion of the WRSAs. The potentially acid generating (PAG) WRSA would be constructed at the closure slope landform angle (i.e., nominally 4H:1V, subject to further stages of engineering) and the non-potentially acid generating (NPAG) WRSA would be resloped to the closure landform angle (i.e., nominally 4H:1V, subject to further stages of engineering) prior to or during the Decommissioning and Reclamation (i.e., Closure) Phase. Closure slope angles are expected to reduce water erosion compared to a steeper design. The waste rock material in both WRSAs would be composed of crystalline basement rock after being blasted, mucked, and transported. Material placed in the WRSAs would be composed mostly of coarse rock material that would not be prone to wind and water erosion. Progressive and final revegetation would also reduce erosion. 2. Non-potentially acid generating or borrow material may be used for a compacted layer overlaying the final PAG WRSA surface at Closure. However, throughout Operations, NexGen would progressively reclaim lower slopes of the PAG	n/a	**Context:** Parts one and two are accepted. The Proponent's response indicated that wind and water erosion is not expected given the slope and construction of the waste rock storage area (WRSA). Additionally, the waste rock material is composed of crystalline rock that was blasted large boulders that is not prone to wind erosion. It was also indicated that the final vegetation cover will also help to reduce any potential wind or water erosion. The Proponent indicated that non-PAG rock or borrow materials may be used for compacted layer overlying the PAG rock. Also, a vegetative cover that is suitable for plant growth will be applied over the compacted non-PAG and borrow material. Parts three and four were not fully responded to; although the Proponent indicated that the ARD mitigation associated with the cover system does not rely on the frozen core, they do not provide the thickness of the cover system that will ensure that the active layer is within the non-PAG cover material.	45-R1	1. Provide the thickness of the active layer and demonstrate that the active layer will be contained within the thickness of the cover during the warm months. 2. Provide details on how the seepage from the PAG and NPAG WRSA will be managed post-closure if the ditches and runoff collection system are decommissioned.	1. NexGen notes that based on context provided by the reviewer, the term 'active layer' may be referring to the layer that would be subject to seasonal freeze/thaw cycles, the layer that would be chemically active as a result of diffusive gas transport reaching reactive materials (i.e., potentially acid generating [PAG] waste rock), or both. The following response for part 1 assumes that both definitions may apply. With respect to an active layer representing the area of the PAG waste rock storage area (WRSA) that would be subject to seasonal freeze/thaw cycles, as indicated in NexGen's initial response to the original IR, there are no parts of the PAG WRSA that are expected to remain frozen year-round. In other words, containment of a frozen layer within the cover thickness is not expected. With respect to an active layer representing the layer that would be chemically active as a result of diffusive gas transport reaching reactive materials, the PAG WRSA would be specifically designed to limit potential chemical activity. As part of the PAG WRSA design, engineered source control would be implemented where a 0.5 m lift of fine-grained material is placed between 5 m lifts of waste rock. The fine-grained layer would act to control flow of water and oxygen, which would reduce the advective air flux through the placed material (Draft EIS Section 5.5.2.4 [Mine Rock Management]), thereby placing a control on chemistry through the reduction of diffusive gas transport (Draft EIS TSD VII [Mine Waste Alternatives Assessment], Section 6.3.1). As a result, the	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				It is unclear whether “compacted clean material” may include NPAG waste rock. If NPAG waste rock or other materials are used as cover for the PAG rock, information should be provided on the thickness of the cover so as to ensure that the PAG material is contained within the frozen layer, below the active layer, thereby minimizing ARD. It is also not indicated whether the ditches and the seepage and runoff collection system will be functional or present post-closure.		WRSA. Throughout this phase, NexGen would assess PAG WRSA system performance and refine closure designs based on these results. For the purposes of the EIS, NexGen assumed a cover system, with the primary purpose of supporting vegetation growth, that had the properties of borrow material found extensively at the Project site; the soil properties for borrows would be as described in Section 5.2 of Draft EIS Annex VI (Terrain and Soils Baseline Report). Borrow material has texture more suitable for plant growth than NPAG waste rock. 3. The cover system and associated mitigation against acid rock drainage (ARD) does not rely on a frozen layer. If the core or layers within the WRSAs do freeze, water in WRSA runoff would be equal to, or lower in, constituent concentrations than has been assessed. 4. Seepage from the WRSAs post-closure is expected to be primarily basal seepage to the shallow groundwater. It is assumed in modelling for the EA that the liner underlying the PAG WRSA would not function post-closure. This assumption was carried forward in the post-closure groundwater and solute transport modelling (Draft EIS TSD XIV [Groundwater Flow Solute Transport Modelling Report]), and subsequently into the environmental risk assessment (Draft EIS TSD XXI [Environmental Risk Assessment]). Information regarding post-closure WRSA seepage is provided in Draft EIS TSD XIV.		Additionally, the Proponent referred to post-closure groundwater and solute transport modelling (Draft EIS TSD XIV Groundwater Flow Solute Transport Modelling Report). However, the requested information, such as thickness of the cover and how the seepage from the PAG and non-PAG waste rock storage area (WRSA) would be managed post closure, was not contained in the referenced report. **Rationale:** It is unclear if the active layer will be contained within the non-PAG material during the warm or thaw months, whether or not the frozen core is relied on for containment. The thickness of the active layer is unknown, therefore ECCC cannot verify the Proponent’s conclusions that the cover and vegetated cover layers are thick enough to contain the active layer during the warm months. Additionally, the Proponent has not clarified if the ditches and the runoff collection system will be decommissioned or provided details on how the seepage from the PAG and NPAG WRSA will be managed post-closure if they are decommissioned. This information is needed to assess the adequacy of the collection systems and any impact potential seepage may have on the environment.			active layer thickness for the PAG WRSA would be approximately 3 m of the average 16 m PAG WRSA height (Draft EIS TSD XVII [Waste Rock and Underground Wall Rock Source Term Predictions Report], Section 3.2.2). As noted in NexGen’s initial response to the original IR, the cover system placed on top of these engineered layers is expected to consist of borrow-type materials that would have the primary purpose of supporting vegetation growth rather than contributing to the reduction of PAG WRSA chemical activity. In other words, the cover layer would not be intended to contain the active layer as this purpose would be performed through the engineered source control (i.e., layered construction of the PAG WRSA). In summary, the thickness of the cover layer would not have a bearing on the chemical activity of the PAG WRSA as it is assumed that a frozen layer would not exist and the primary mechanism to minimize PAG WRSA chemical activity would be the engineered source control. 2. NexGen confirms that all water management infrastructure would be removed during the Active Closure Stage. After this time, in line with EA predictions, seepage from the PAG and non-potentially acid generating WRSAs would diffuse to the local ground environment. Further management of this seepage is not expected to be required unless monitoring during Operations and the Active Closure Stage indicates effects to the environment would be worse than predicted. Should potential effects be worse than predicted, water management infrastructure would remain operable until operational control monitoring results determine that the collection and treatment of contact water is no longer required to meet established decommissioning criteria and protect the environment. Final decommissioning criteria would be reflected in the Detailed Decommissioning and Reclamation Plan.	
46	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 5.4.5.2 TSD XVIII, Section 3.4	**Context:** There is not enough information provided within the EIS and site water infrastructure designs to determine if the design will sufficiently contain mine site contact and non-contact water runoff to be protective of the environment. It is stated that contact water ponds and collection areas can contain specified Probable Maximum Precipitation (PMP) events for select ponds/areas, however the actual volume and dimensions of these ponds/areas are not provided. There are no estimates on the total volume of water that may be drained from the overall site infrastructure (i.e. the mine terrace, the camp area etc.) during a 24-hr PMP event and if contact water ponds can contain that drainage. On pg. 1567 a list of potential Project activities that would have the potential to affect surface water quality and sediment quality during the Project lifespan is provided, however runoff from the site airstrip and roads is not included in this list. Runoff from both of these Project activities can have	1. Provide the dimensions and maximum volume capacity of each pond and collection area for all site water management infrastructure. 2. Provide a map marking the locations of proposed surface drainage structures including collection ditches, culverts, diversion ditches, perimeter berms and swales. 3. Provide estimated volumes of water to be drained from overall site infrastructure (such as the mine terrace, airstrip, camp area etc.), during a 24-hr PMP event and an analysis of the capacity of the water infrastructure to contain and treat this water. 4. Provide information on how runoff water from the site airstrip will be managed and how monitoring for contaminants within this runoff (ex. hydrocarbons, etc.) will be conducted.	NexGen acknowledges the reviewer’s requests and notes that many of the requested details are outside the scope of the Project Terms of Reference (Draft EIS Appendix 1A [Concordance Tables for the Terms of Reference and Generic Guidelines for Preparation of an Environmental Impact Statement], Table 1A-2). Specifically, as noted in Section 3 of the Project Terms of Reference regarding the Project Description, “[t]he scope of the description will be conceptual and will incorporate reasonable assumptions, as appropriate. Detailed design information will be provided as part of permitting and licensing stage.” The current site water infrastructure design is considered appropriate for the EIS and for the assessment of potential effects of runoff from the area of the Project on surface water quality and sediment quality. As a global response to this IR, the detailed design information requested will be refined and provided in the applicable federal licensing documentation, commensurate with the stage of Project development. However, NexGen has provided the following information to provide additional context for the reviewer. Responses to part 1 through part 7 of this IR are provided below. 1. The maximum storage capacity of individual Project ponds and collection areas incorporated in the site-	n/a	**Context:** The Proponent has addressed parts one, two, three, and five. However, further information is requested in responses to parts four, six and seven. ECCC notes that non-contact water/non-mineralized contact water runoff from site infrastructure and seepage from the west bermed runoff collection area meets the requirements of the definition of mine effluent under the Metal and Diamond Mining Effluent Regulations (MDMER) as it has the potential to contain deleterious substances. Runoff water from site infrastructure such as the airstrip and roads may be categorized as non-contact water because it does not come into contact with contaminants of potential concern (COPCs) directly from mining operations infrastructure. However, runoff water still has the potential to contain deleterious substances from all site infrastructure including the airstrip, roads, and camp area, and from mine-related activities such as operation of vehicles, including heavy machinery and aircraft, spills,	46-R1	1. Provide an updated site water management plan that includes management of the site infrastructure runoff water (i.e. non-contact water/non-mineralized contact water) from the airstrip and the west bermed runoff collection area. 2. Demonstrate how all Project effluent as defined under the MDMER (i.e. runoff and seepage), will be discharged through an FDP. 3. Demonstrate how the west bermed runoff collection area will prevent seepage of potentially deleterious substances containing non-contact water.	NexGen has provided the information below to address part 1 through part 3 of IR 46-R1. NexGen acknowledges that one figure within the Draft EIS contained a graphical error and that certain information within the Draft EIS could have been more clearly presented. These items will be addressed in the revised EIS as further described below. 1. NexGen confirms that runoff from site infrastructure not associated with mineralized waste or the mill terrace or mine terrace, which includes the Project airstrip and the site road that leads to the explosives magazine storage area, would be managed as non-mineralized contact water. To support the response to part 1 of this IR, a general representation of the local geography and drainage is shown in Figure 1 of Attachment IR 46-R1. <u>Project Airstrip</u> The Project airstrip would be positioned along a general high point in which the topography falls to the east, west, and south. The airstrip would consist of a runway and adjacent apron pad. As described in part 4 of the initial response to the original IR, the non-mineralized contact water from the apron pad would be collected and contained, while non-contact runoff from the remainder of the airstrip would naturally run off into the receiving environment. Potential runoff from the airstrip was represented in the Site-Wide Water Balance Model by two	TSD XVIII

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				impacts on surface water quality and sediment quality and should be considered as potential effect pathways. The site layout and locations of surface drainage structures including collection ditches, culverts and diversion ditches are not provided on a map. Figure 5 pg. 24 of TSD XVIII was reviewed, however the locations of infrastructure in this flow diagram do not necessarily correspond to geographic locations. Drainage of the site airstrip is not described as part of the infrastructure in the EIS. For lined ponds and collection areas, there is no description of how leak detection monitoring will be completed. For the potentially acid generating (PAG) runoff collection area, it is stated that "The contained water will be tested before release to the environment based on regulatory requirements; water that does not meet the release specifications would report to the ETP for treatment". There are no details provided on how often this water would be tested or how it would be released to the environment (i.e. straight to the Effluent Treatment Plant (ETP) discharge). For contact water pond two, no water volume capacity is provided, and there is no information on frequency of monitoring to determine if water will require treatment or be released to the west bermed runoff collection area. There is also no information regarding water quality monitoring of the west bermed runoff collection area and its capacity. Additionally, the west bermed runoff collection area is described as being unlined to allow natural filtration of collected non-contact water to the environment. However the Metal and Diamond Mining Effluent Regulations (MDMER) pursuant to the Fisheries Act requires all mine effluent and seepage from the mine site that contains deleterious substances be discharged through a final discharge point. **Rationale**: In order to be able to understand site water management and flood risk potential, more information needs to be provided regarding the site water infrastructure designs. More information on the volume of water expected to be captured within the site water management infrastructure during PMP events, and the probability that site infrastructure can contain that water	5. Describe how leak detection monitoring from lined ponds and collection areas will be conducted. 6. Provide additional information on the frequency of water quality monitoring and which contaminants will be tested for in the PAG runoff collection area, contact water pond two and the west bermed runoff collection area. 7. Provide further information on how water will be released into the receiving environment from the PAG runoff collection area and west bermed runoff collection area with consideration of MDMER requirements.	wide water balance and water quality model are presented in Table C-6 of Appendix C in Draft EIS TSD XVIII (Site-Wide Water Balance and Water Quality Modelling Report). This table has been updated to provide more detailed information in response to part 1 and part 3 of this IR and is provided as Table 1 in Attachment IR 46-2; the reference values used in Table 1 are unchanged from those in the EIS and are provided in Table C-2 of Appendix C in Draft EIS TSD XVIII. 2. NexGen notes that detailed information on locations for surface drainage structures (e.g., collection ditches, culverts, diversion ditches, perimeter berms, swales) will be submitted to the CNSC as part of the federal licensing process for the Project. To assist the reviewer within the specific context of the IR, a figure developed in support of the Rook I Project Feasibility Study (NexGen 2021) is included as Figure 1 of Attachment IR 46/73-1 and provides the locations of proposed surface drainage structures, including ditches, culverts, and swales. 3. An analysis of the capacity of the water infrastructure to contain and treat runoff during design storms was completed under Scenario 6 (i.e., the sensitivity of the site water management infrastructure to extreme summer rainfall events) as described in Section 5.1.2.2 Draft EIS of TSD XVIII. In this scenario, a summer probable maximum precipitation (PMP) event was simulated during each 15 July of the 43-year simulation to assess the capacity of the water management infrastructure under a variety of antecedent conditions. The model results for this scenario confirm that the site water management infrastructure design is appropriate for this stage of the Project, and that operational refinement for flood storage dewatering would be warranted during later stages of Project planning. NexGen confirms that detailed design information will be provided to the CNSC as part of federal licence application activities, as applicable. 4. NexGen confirms that information on runoff water management and monitoring, including the management and monitoring of runoff water from the Project airstrip, will be included in the Environmental Protection Program and supporting documentation developed for the Project in support of federal licensing. A summary of the proposed monitoring and management for water on and around the airstrip is provided below. Runoff from the airstrip would drain to adjacent ditches where the water would report to ground. Ditches associated with the Project airstrip and airstrip apron are shown on Figure 1 in Attachment IR 46-2. With respect to the airstrip area, NexGen notes that: ▪ Consistent with the site water management approach described in Draft EIS Section 5.4.5 (Site Water Management), water that has not been physically, chemically, or radiologically altered by Project activities (i.e., non-contact water) would be diverted to the extent practicable		fire management practices, and snow removal practices. In their response the Proponent has confirmed that contact water pond #2 is proposed to be the Final Discharge Point (FDP) for monitoring and that the downstream west bermed runoff collection area would discharge into the ground. However, from the figures provided in the Proponent's IR response, it is noted that in addition to potential runoff from the airstrip, the runoff to the west bermed runoff collection area would include runoff from the site access road and runoff from the site road that leads to the Explosives Magazine Storage Area. Site infrastructure runoff water has the potential to contain deleterious substances from Project-related activities, therefore deleterious substances from mine related activities could be introduced to the water within the west bermed runoff collection area after the proposed FDP at the outflow of contact water pond #2. **Rationale:** An updated site water management plan that includes management of the site infrastructure runoff water from the airstrip and the west bermed runoff collection area is necessary to evaluate how deleterious substances could impact the receiving environment. The proposed location of the FDP at the outflow of contact water pond #2 prior to the west bermed runoff collection area may not allow for characterization of all potential deleterious substances. This may lead to the accidental release of contaminants to the receiving aquatic environment, negatively impacting water quality, fish, and fish habitat. The Proponent should demonstrate how the west bermed runoff collection area will prevent seepage of potentially deleterious substances containing non- contact water to confirm the protection of the receiving environment, and confirm that all Project effluent as defined under the MDMER is discharged through an FDP to allow for effluent characterization.			runoff-generating elements: R50 (contained airport runoff [i.e., non-mineralized contact water collected from the apron pad]) and R51 (non-contained airport runoff [i.e., non-contact water from the maneuvering area]) (Draft EIS TSD XVIII [Site-Wide Water Balance and Water Quality Modelling Report], Figure 5). Element R50 would be a lined collection area, and runoff would be directed to an airport fueling pad sump. Water collected in the airport fueling pad sump would be periodically pumped out and trucked to the settling pond for reuse in the mill or for treatment prior to release. Runoff from Element R51 would release to the adjacent landscape, where best management practices for erosion and sediment control would be applied to minimize effects to the local environment. A visual representation of the site water management process for the Project airstrip is shown in Figure 2 of Attachment IR 46-R1. NexGen notes that as some additional context has been provided in Figure 2 that was not presented within the Draft EIS, the appropriate inset within Figure 5 of revised EIS TSD XVIII (Site-Wide Water Balance and Water Quality Modelling Report) will be updated to include this context. <u>Explosives Storage Area</u> With respect to the explosives storage area and associated access road, no deleterious substance sources in runoff would exist; therefore, runoff would be non-mineralized contact water, which would be appropriate for collection in the west bermed runoff collection area. The potential of water quality deleterious substances from the explosives storage area would be limited to those associated with potential spills, which would be mitigated by area-specific management practices for stockpiled materials that will be developed in accordance with applicable regulatory requirements, including the *Explosives Act* and The Mines Regulations, 2018. The potential for spills of explosive materials have been considered in the Project design. As noted in the response to IR 185, the storage of explosives is heavily regulated to minimize risks. Explosives would be managed as per the *Explosives Act*, as well as CAN/BNQ 2910-500/2015 Explosives – Magazines for Industrial Explosives. Potential spills would be contained and managed according to the Rook I Environmental Protection Program to avoid the release of any nitrogen compounds to the environment. The explosives magazine would be designed and constructed with a lined sump capable of storing a 1:100 year, 24-hour precipitation event, and water that has contacted spilled material would be collected and trucked to the settling pond for subsequent treatment and testing prior to discharge through a final discharge point (FDP). In summary, runoff from the explosives magazine or associated access road is not expected to contain deleterious substances, and thus does not require control and management through a FDP. NexGen notes that Figure 5 of Draft EIS TSD XVIII incorrectly shows that Element R52 would contain mineralized contact water rather than non-mineralized contact water; this will be corrected in Figure 5 of revised EIS TSD XVIII. <u>West Bermed Runoff Collection Area</u>	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				would help ECCC to understand how contact and non-contact water will be conveyed throughout the site. Further information on proposed monitoring locations would assist in the assessment of adverse effects to the receiving environment. Runoff from roads and the site airstrip will contain contaminants from vehicles, heavy machinery, aircrafts and de-icing practices. Additional information on the runoff collection systems for the site airstrip and roads would aid in understanding if the collection of runoff from this site infrastructure is properly managed.		and discharged directly to the receiving environment. ▪ Non-mineralized contact water (i.e., water that has been physically or chemically altered by Project activities and not in contact with mineralized and/or radiologically contaminated surfaces) that is not expected to require treatment and meets release criteria would be managed, monitored, and ultimately directed to the west bermed runoff collection area. Aircraft fuel would be stored within double-walled tanks in accordance with The Hazardous Substances and Waste Dangerous Goods Regulations. These tanks would be located within a dedicated area that would be constructed with a sump designed to capture and contain runoff from de-icing and fuelling activities. A collection area within the apron may be constructed as a gravel pad lined with high-density polyethylene (HDPE) or as a concrete pad. Captured water would be trucked to contact water pond #1 for treatment in the effluent treatment plant (ETP). A groundwater monitoring well would be installed between the airstrip fuel storage pad and Patterson Lake to detect potential leakage of aviation fuel and other potential contaminants along the migration pathway. The specific groundwater monitoring well location has not yet been selected but will be included in the Environmental Monitoring Plan submitted to the CNSC prior to the Project airstrip becoming operational. 5. As part 5 of this IR relates to detailed design, NexGen confirms that detailed design information will be provided to the CNSC as part of federal licence application activities, as applicable. Preliminary information is provided below. The monitoring ponds would be double lined with 80 mm thick HDPE lining for primary and secondary containment. Additionally, the containment system would have perforated leak-detection piping for both the primary and secondary liners, including interconnecting buried HDPE piping connected to leak-detection monitoring wells. Details of the leak detection liner system are shown on Figure 2 of Attachment IR 46-2. The ore storage stockpile area would have a high-perimeter berm and a dual HDPE liner system to prevent non-contact water from entering the ore storage stockpile area. The stockpile would be self-contained and capable of accommodating PMP events. Other liner design features would include perforated leak detection piping routed to leak detection monitoring ponds. Monitoring of the leak detection systems would be conducted through routine inspections and groundwater monitoring. Routine inspections will be described in the Environmental Protection Program and supporting documentation developed and submitted in support of federal licensing. Inspections would be completed to verify containment structures, including berms, retaining walls, sumps, sloped floors, and graded or lined surfaces are maintained in functioning condition to provide the required storage capacities, in					NexGen notes that management of runoff from the west bermed runoff collection area is discussed in part 2 and part 3 of the response to this IR and the response to IR 44-R1. 2. NexGen confirms that all site mineralized contact water would be discharged through one of two FDPs: the monitoring ponds and contact water pond #2. Water treated in the effluent treatment plant (ETP) would report to the monitoring ponds. Once this water was confirmed to meet Project licenced release limits (i.e., thresholds), it would then be discharged directly to Patterson Lake via the effluent pipeline and diffuser. Water in contact water pond #2 that meets Project thresholds, other than total suspended solids (TSS), would be discharged to the west bermed runoff collection area. As the west bermed runoff collection area would not have a direct surface water flow pathway to Patterson Lake (i.e., flow would be through shallow groundwater), TSS would be settled out prior to water reporting to Patterson Lake. If water quality in contact water pond #2 did not meet Project thresholds (other than TSS), it would be conveyed to the settling pond for treatment in the ETP. Therefore, no deleterious substances above Project threshold levels would be conveyed to Patterson Lake. 3. As noted in the part 2 response to this IR, NexGen confirms that water in contact water pond #2 that meets Project water quality thresholds, other than TSS, would be discharged to the west bermed runoff collection area. As the west bermed runoff collection area would not have a direct surface water flow pathway to Patterson Lake (i.e., flow would be through shallow groundwater), TSS would be settled out prior to water reporting to Patterson Lake. If water quality in contact water pond #2 did not meet Project thresholds (other than TSS), it would be conveyed to the settling pond for treatment in the ETP. NexGen also confirms that no water sources that could potentially require treatment would report directly to the west bermed runoff collection area. Therefore, no deleterious substances above Project thresholds would be conveyed to the receiving environment from the west bermed runoff collection area. **References** *Explosives Act*. RSC 1985, c E-17. Current to 28 July 2020. Available at https://laws-lois.justice.gc.ca/eng/acts/e-17/. The Mines Regulations, 2018. RRS c S-15.1 Reg 8 under *The Saskatchewan Employment Act*. Effective April 6, 2019. Available at https://www.canlii.org/en/sk/laws/regu/rrs-c-s-15.1-reg-8/latest/rrs-c-s-15.1-reg-8.html. SCC. 2015. CAN/BNQ 2910-510/2015: Explosives – Quantity Distances.	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						accordance with REGDOC 2.9.1, *Environmental Protection: Environmental Principles, Assessments and Protection Measures* CNSC 2020) and The Hazardous Substances and Waste Dangerous Goods Regulations. Groundwater monitoring would include a network of 10 to 15 stations (i.e., wells) situated between Project infrastructure and Patterson Lake to detect the migration of potential contaminants along the flow path. Groundwater quality monitoring is planned to be conducted biannually and would include measurements of pH, temperature, specific conductivity, turbidity, ORP, NH_3 as N, P, alkalinity, HCO_3, CO_3, colour, OH, sum of ions, hardness, TSS, TOC, DOC, Ca, Cl, F, Mg, K, Na, SO_4, TDS, NO_3 + NO_2, NO_3 as N, TKN, dissolved metals (i.e., Al, As, Cd, Cr, Co, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Sr, U, V, Zn), Pb-210, Po-210, Ra-226, and Th-230. 6. Current monitoring plans that are relevant to the potentially acid generating (PAG) runoff collection area, contact water pond #2, and the west bermed runoff collection area are summarized below. Effluent, emissions, and environmental monitoring is a current topic of engagement with the CNSC and Saskatchewan Ministry of Environment: as such, the monitoring may be further refined beyond what is summarized below. Detailed plans will be provided to provincial and federal regulators through future permitting and licensing processes. Current monitoring plans are as follows: ▪ Monitoring runoff quality at the PAG runoff collection area is not proposed for compliance purposes because this water would not be discharged directly to the environment; instead this water would be contained within lined ponds and conveyances and treated prior to discharge, if required. However, purpose-driven monitoring would be conducted during Operations to validate and refine material source terms, reduce uncertainty in future predictions, and adapt the level of mitigation in response to operational information collected. Frequency and parameters monitored would be informed by the regulatory-approved Environmental Risk Assessment required to be conducted during the transition from Construction to Operations. ▪ Contact water pond #2 is the final point of control before non-mineralized waters are discharged to the west bermed collection area. As such, this location would be designated under Metal and Diamond Mining Effluent Regulations (MDMER) as a Final Discharge Point. Water in this pond would be sampled prior to each batch discharge to verify compliance with licensed release limits. Water quality parameters would include pH, temperature, DO, specific conductivity, turbidity, ORP, alkalinity, HCO_3, CO_3, pH, specific conductivity, sum of ions, hardness, TSS, turbidity, TOC, DOC, Ca, Cl, F, Mg, K, Na, SO_4, TDS, NH_3 as N, NH_3 as N (unionized), NO_3 as N, NO_2 as N, NO_3 + NO_2 as N, TP, TN, TKN, Al, Sb, As, Ba, Be, B, Cd, Cr, Co, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Sn, Sr, Th, Ti, U, V, Zn, Pb-210, Po-210, Ra-226, Th-230, U-234, U-238, TPH, BTEX, and F1-F4 hydrocarbon compounds. If water in contact water pond #2 did not meet licensed release limits, this water would be directed to the ETP for treatment, and would be re-sampled as part of the combined ETP treated						

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						effluent in the monitoring ponds to confirm compliance prior to discharge. ▪ Water in contact water pond #2 that is compliant with licensed release limits would be discharged to the west bermed collection area. As this water would have already been verified for compliance with licensed release limits, this water would not be re-sampled in the west bermed collection area. ▪ Relevant to the PAG runoff collection area, contact water pond #2, and the west bermed runoff collection area, groundwater would be monitored between the surface infrastructure and Patterson Lake. Groundwater monitoring would include a network of 10 to 15 stations (i.e., wells) situated between Project infrastructure and Patterson Lake to detect the migration of potential contaminants along the flow path. Groundwater quality monitoring is planned to be conducted biannually and would include measurement of pH, temperature, specific conductivity, turbidity, ORP, NH_3 as N, P, alkalinity, HCO_3, CO_3, colour, OH, sum of ions, hardness, TSS, TOC, DOC, Ca, Cl, F, Mg, K, Na, SO_4, TDS, NO_3 + NO_2, NO_3 as N, TKN, dissolved metals (i.e., Al, As, Cd, Cr, Co, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Sr, U, V, Zn), Pb-210, Po-210, Ra-226, and Th-230. Monitoring details, including information on the frequency of water quality monitoring, will be included in the Environmental Protection Program and supporting documentation submitted to the CNSC for approval with each stage of licensing. NexGen confirms that no contact water would be discharged to the environment from any of the facilities listed unless licensed release limits were met. 7. The PAG runoff collection area would receive runoff from the PAG WRSA and the collected water would be pumped to the settling pond for treatment, if necessary. After treatment in the ETP, this water would be pumped to the monitoring ponds. A final discharge point would be designated for the single point of release from the monitoring ponds that hold treated effluent, where water can be monitored and analyzed to confirm all discharge criteria are met, including MDMER requirements. For the west bermed runoff collection area, a final discharge point would be contact water pond #2. Contact water pond #2 represents a final point of control, and a location where water would be monitored and analyzed to confirm all discharge criteria, including MDMER limits excluding total suspended solids (TSS), are met. As the water in the west bermed runoff collection area would be discharged to ground from contact water pond #2, TSS would be removed from the water before reaching fish habitat. If these remaining limits are not met within contact water pond #2, water from this pond would be pumped to the ETP rather than being discharged to the west bermed runoff collection area. No changes are proposed in the revised EIS to address this IR. **References**						

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						CNSC (Canadian Nuclear Safety Commission). 2020. Environmental Protection: Environmental Principles, Assessments and Protection Measures. REGDOC-2.9.1, version 1.2. September 2020. Available at https://www.nuclearsafety.gc.ca/pubs_catalogue/uploads/REGDOC-2-9-1-Environmental-Principles-Assessments-and-Protection-Measures-Phase-II.pdf Metal and Diamond Mining Effluent Regulations. SOR/2002-222 under the *Fisheries Act*. Last amended June 18, 2020. Available at https://laws-lois.justice.gc.ca/eng/Regulations/SOR-2002-222/index.html NexGen. 2021. Rook I Project Feasibility Study. Feasibility Study Report. Rev 0. Document No. 0000-BA00-RPT-0001. Prepared by Stantec for NexGen Energy Ltd. 28 April 2021. The Hazardous Substances and Waste Dangerous Goods Regulations. RRS c E-10.2 Reg 3 under *The Environmental Management and Protection Act, 2010*. Effective April 1, 1989. Available at https://www.canlii.org/en/sk/laws/regu/rrs-c-e-10.2-reg-3/latest/rrs-c-e-10.2-reg-3.html						
47	ECCC	Fish and fish habitat	Section 5.4.5.2 Section 22.6.3	**Context:** The Proponent states in Section 5.4.5.2 that the 24-hour 100-year event will result in 89.4 mm accumulation of precipitation. However, in Section 22.6.3 Major Precipitation Events the value quoted is 75.8 mm, which represents a 15% difference. In Section 5.4.5.2 the Probable Maximum Precipitation (PMP) is quoted as 489.2 mm in 24 hours. In Section 22.6.3 Major Precipitation Events, the PMP value quoted is 490 mm in 24 hours. It is unclear if the PMP values correspond to the 24-hour 2000-year return period. **Rationale**: Based on the discrepancies noted in the values presented for the accumulation of precipitation and for the PMP, it is unclear which datasets were used to generate these values, which values were used in the hydrology and climate change assessments or in which elements of Project design. While the discrepancies may be small, over the long term this could result in much larger differences for predicted effects.	1. Provide details on the dataset used to generate the accumulation of precipitation values (89.4 mm and 75.8 mm), which generated value is used in each of the assessments (hydrology and climate change), and which elements of Project design were informed by these assessments and why. 2. Confirm if the PMP quoted in the draft EIS (489.2mm and 490 mm in 24-hours) correspond to the 24-hour 2000-year return period and clearly show the datasets from which this value was generated.	Responses to part 1 and part 2 of this IR are provided below. 1. The 24-hour probable maximum precipitation (PMP) event value of 489.2 mm presented in Draft EIS Section 5.4.5.2 (Surface Water Management) represents the short duration rainfall compiled for the purposes of hydrological modelling, which is described in detail in Section 5.1.1 of Draft EIS Annex IV.1 (Regional Meteorological and Hydrological Characterization Report). The 24-hour, 100-year event precipitation value of 89.4 mm presented in Section 5.1.1 of Draft EIS Annex IV.1 was derived based on values published by Environment and Climate Change Canada (ECCC 2019) for nearby climate monitoring stations most representative of the Project site. The 24-hour 100-year precipitation event of 75.8 mm presented in Draft EIS Section 22.6.3 (Major Precipitation Events) was compiled from a different data source (Draft EIS Appendix 22A [Climate Change Assessment]) for the purposes of evaluating potential effects of the environment on the proposed Project and evaluating the effects of climate change. For Draft EIS Appendix 22A, detailed, site-specific future climate projections were developed for the Project through analysis of available projections from a multi-model ensemble. The multi-model ensemble consists of available regional-scale projections from several climate models representing different future climate scenarios (e.g., level of greenhouse gas emissions). Further detail on how the standard and climate change values were incorporated throughout the Draft EIS and considered in Project design is provided Draft EIS Appendix 6A (Climate Change Roadmap).	n/a	**Part 1: Not Accepted** NexGen response indicated that the 24-hour 1:100-year rainfall to be used for design purposes is 89.4mm which appears to be obtained from ECCC IDF data **[A1]** at Cree Lake (Climate Station ID: 4061861). Nevertheless, no attempts were made by NexGen to utilize most up to date extreme rainfall data for estimation of 24-hour 1:100-year rainfall. The estimate at Creek Lake is based on data from 1970-1993 (24 years) thus no recent rainfall data is considered. CNSC staff request NexGen to provide updated 24-hour 1:100-year rainfall data with confidence intervals or provide justification on the validity of the current value despite the estimate is based on old data. **Part 2: Not Accepted** The response from NexGen indicated that the source of PMP estimate is from Hopkinson (1999) study and the value is 498.2mm (~490mm) and to be used design purpose. The 2000-year return period values for rainfall and precipitation are presented in Section 22A4.6 which is pointed out to be unrelated to PMP. CNSC staff accepts that critical structures (self-contained contact water ponds) are to be designed using a PMP however the PMP value of 489.3mm is obtained from 1999 study **[A.2]**, based on historical rainfall data pre-1998, which appears to require an updated PMP value.	47-R1	CNSC staff request NexGen to provide updated 24-hour 1:100-year rainfall data with confidence intervals or provide justification on the validity of the current value despite the estimate is based on old data. CNSC staff requests NexGen to use a PMP value that is estimated using updated historical rainfall data that includes the most up to date meteorological data or provide justification on the validity of the current PMP estimate.	The following information has been organized to speak to part 1 followed by part 2 of the IR. **Part 1** NexGen notes that the approach utilized within the Draft EIS to determine the 24-hour, 1:100-year rainfall data relied on intensity-duration-frequency (IDF) curves published by ECCC (2019). The published data were interpreted to provide a value that was most representative of the geographic location of the Project. The reviewer is correct that the record available for Cree Lake is shorter and consists of older data than other nearby stations. However, NexGen maintains the current value of 89.4 mm for the 24-hour, 1:100-year precipitation event is valid. For short-duration rainfall storm events, data were reviewed from IDF curves published by ECCC (2019) for Buffalo Narrows, Cluff Lake, and Cree Lake in Saskatchewan and for Fort McMurray Airport in Alberta (Draft EIS Annex IV.1 [Regional Meteorological and Hydrological Characterization Report]). Cree Lake was carried forward as the most representative of the anticipated area of the Project based on similar latitude, elevation, European Centre for Medium-Range Weather Forecasting Reanalysis-Interim annual total precipitation data, and similar isolines for a probable maximum precipitation (PMP) event (Hopkinson 1999). Cree Lake has a detailed IDF data record of 24 years. The Fort McMurray, AB and Buffalo Narrows, SK stations have IDF data published based on 43 years of data over the period 1966 to 2017. The IDF values are approximately 5% to 10% higher for Fort McMurrray, AB (95.4 mm per 24 hrs) and Buffalo Narrows, SK (92.9 mm per 24 hours) than at the Project site and Cree Lake based on expected regional geographical variation of extreme rainfall. The expected regional geographic variation in extreme rainfall was based on isolines for extreme rainfall presented by Hopkinson (1999). The relative ratios adopted by Hopkinson (1999) are expected to be less sensitive to change than the magnitude of rainstorms. Using Buffalo	n/a

NexGen Energy Ltd.

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						2. The PMP for the Draft EIS is 489.2 mm in 24 hours, which is rounded to 490 mm in Draft EIS Section 22.6.3. The PMP adopted for the Draft EIS is based on values developed by Hopkinson (1999) using a rational method informed by maximum persistent dew-point temperature rather than a statistical approach. The PMP is an upper bound precipitation event and cannot be assigned a valid return period (e.g., 2,000-year return period). The PMP assessment completed by Hopkinson (1994) was prepared to provide guidance for the safe design of tailings ponds associated with the uranium mining industry in northern Saskatchewan. The data set used by Hopkinson (1994) included hourly dew-point temperatures at 78 stations across western Canada with a focus on the prairie provinces for which sufficient data were available. Statistical approaches to estimating point PMPs in the prairies are usually avoided because of the influence of limited meteorological records on results. In northern Saskatchewan, statistical methods of PMP estimation have been shown (Hopkinson 1994) to yield values much lower than the rational method using persistent dew-point temperature used for the Draft EIS. No changes are proposed in the revised EIS to address this IR. **References** ECCC (Environment and Climate Change Canada). 2019. Environment Canada – Engineering Climate Datasets: Short Duration Rainfall Intensity-Duration-Frequency Data. Accessed November 2019. Available at https://climate.weather.gc.ca/prods_servs/engineering_e.html Hopkinson RF. 1994. Point Probable Maximum Precipitation in Northern Saskatchewan. Environment Canada – Canadian Climate Program. Report No. CSS – R94 – 01. Hopkinson RF. 1999. Point Probable Maximum Precipitation for the Prairie Provinces. Environment Canada Prairie and Northern Region. Report No. AHSD – R99 – 01. 54 p.		Based on the response provided by NexGen it is difficult for CNSC staff to confirm whether the current PMP (489.3m) is conservative or not. Therefore, CNSC staff requests NexGen to use a PMP value that is estimated using updated historical rainfall data that includes the most up to date meteorological data or provide justification on the validity of the current PMP estimate. **Reference:** **[A.1]** ECCC (Environment and Climate Change Canada). 2019. Environment Canada – Engineering Climate Datasets: Short Duration Rainfall Intensity- Duration-Frequency Data. Accessed November 2019. Available at https://climate.weather.gc.ca/prods_servs/engineering_e.html **[A.2]** Hopkinson RF. 1999. Point Probable Maximum Precipitation for the Prairie Provinces. Environment Canada Prairie and Northern Region. Report No. AHSD – R99 – 01. 54 p.			Narrows, SK and Fort McMurray, AB as reference points scaled according to the expected regional variation in the area of the Project, the 43 years of data would yield a 24-hour, 1:100-year rainfall of 85 mm and 91 mm, respectively, or an average of 88 mm, which is slightly less than the value used for Cree Lake (i.e., 89.4 mm). This comparison suggests that reliance on current IDF data from nearby stations with more recent records would have yielded a similar value to that used in the Draft EIS; thus, NexGen confirms that the 24-hour, 1:100-year precipitation event value utilized in the Draft EIS remains valid, and no change is required for the revised EIS. **Part 2** NexGen notes that the probable maximum precipitation (PMP) value (i.e., 489.2 mm) adopted for the Draft EIS was based on a meteorological method derived from persistent dew point temperatures rather than historical rainfall events. As this method does not rely on statistical analysis of historical rainfall events, inclusion of more recent rainfall data will not impact the PMP estimate. This method has been commonly used for determining PMP estimates for uranium mines and mills in Saskatchewan. Therefore, NexGen maintains that the PMP value utilized in the Draft EIS remains valid, and no change is required for the revised EIS. NexGen notes that the design bases and management strategies for site water management infrastructure designed to accommodate a 24-hour PMP event have been included in the licence application for the Project and would be subject to review and revision (as required) throughout the Project lifespan. If the size of the 24-hour PMP were to change as a result of climate change during the Project lifespan, mechanisms within the CNSC licensing process would require revisions to the site water management design bases and associated infrastructure (as required) to ensure adequate containment of mineralized contact water during extreme precipitation events and to maintain protection of the environment. **References** ECCC. 2019. Environment Canada – Engineering Climate Datasets: Short Duration Rainfall Intensity-Duration-Frequency Data. Accessed November 2019. Available at https://climate.weather.gc.ca/prods_servs/engineering_e.html. Hopkinson RF. 1999. Point Probable Maximum Precipitation for the Prairie Provinces. Environment Canada Prairie and Northern Region. Report No. AHSD – R99 – 01. 54 p.	
49	ECCC	Fish and fish habitat Change to an environmental component due to radiological contaminants	Section 5.4.5.4	**Context:** There is currently not enough information provided about the Effluent Treatment Plant (ETP) design to determine if the design is sufficient for treating mine effluent. ECCC notes the following information gaps provided within this section: no schematic for the treatment process within the ETP facility; no information on the two-stage treatment process; and no flow rates, capacity details, effluent characterization information, proposed effluent discharge targets;	1. Provide a schematic demonstrating flow through the ETP including flow rates, capacity of system tanks and clarifiers, locations and average and maximum treatment capacity of the ETP. 2. Provide a more in-depth overview of the treatment processes within the proposed ETP and how the ETP is designed to remove the chemical and radiological constituents from	NexGen notes the reviewer's request for detailed information on the effluent treatment plant (ETP) is outside the scope of the Project Terms of Reference (Draft EIS Appendix 1A [Concordance Tables for the Terms of Reference and Generic Guidelines for Preparation of an Environmental Impact Statement], Table 1A-2) and the CNSC Generic Guidelines for the preparation of an EIS (CNSC 2021a). Sufficient information on the ETP is presented in the Draft EIS to enable the assessment of potential adverse effects to water quality and aquatic biota. The information presented below has been provided to assist in the reviewer's understanding of the Project, though no changes are proposed for the revised EIS.	n/a	**Context:** The Proponent has addressed parts one, two, four and six of the IR. However, further information is requested to resolve parts three and five. Additional information is needed to address effluent characterization concentrations and proposed environmental release targets for total suspended solids (TSS), un- ionized ammonia, and thallium, and to address the predicted exceedance of the MDMER Schedule 4 Maximum	49-R1	1. Provide updated modelling and tables within Appendix G in Draft EIS TSD XVIII to include effluent characterization concentrations and proposed environmental release targets for the following parameters: TSS, un-ionized ammonia, and thallium 2. Address the predicted exceedance of the MDMER Schedule 4 Maximum Authorized Monthly Mean Concentration for radium-226. 3. Identify when it is predicted that effluent discharge flow rates from the mine site would meet the requirements for reporting under the MDMER and when effluent characterization concentrations or proposed environmental release targets for thallium will be provided.	NexGen has provided the information below to address part 1 through part 4 of IR 49-R1. 1. NexGen confirms that information provided within the Draft EIS and responses to round 1 and round 2 FIRT IRs will allow for ECCC and the CNSC to confirm how total suspended solids (TSS), un-ionized ammonia, and thallium will be managed to protect water quality in the receiving environment and to meet Metal and Diamond Mining Effluent Regulations (MDMER) requirements. The following details represent a summary of the available information for these three parameters. **Total Suspended Solids**	TSD XVIII, Appendix H

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				no Final Discharge Point (FDP) location information. The Proponent plans to install a pipeline to discharge effluent, but it is unclear where the final discharge point (FDP) will be located. Note that the *Metal and Diamond Mining Effluent Regulations* (MDMER) define the FDP as "in respect of an effluent, means an identifiable discharge point of a mine beyond which the operator of the mine no longer exercises control over the quality of the effluent." **Rationale:** Further information about the proposed ETP will assist ECCC in determining if the design will be sufficient to treat mine effluent and that the capacity of the ETP will be sufficient for the site. Effluent characterization information and proposed discharge targets will enable ECCC to assess adverse effects to water quality and aquatic biota.	effluent, including the expected efficiency of treatment. 3. Provide the expected effluent characterization and final effluent discharge targets, as well as effluent discharge flow rates and estimated volume per batch release to the environment. 4. Describe how waste generated from the effluent treatment process (ex. Solids and sludge) that is not discharged as treated effluent be managed? 5. Include the effluent monitoring plan details in Section 5.4.5.4 including contaminants that will be monitored for. 6. Provide the specific location of the FDP.	1. and 2. To assist the reviewer within the specific context of the IR, Attachment IR 49-1 has been developed and provides a description of the ETP, which contains the requested information regarding the ETP specifications. 8. Modelled ETP discharge concentrations are presented in Table G-2 of Appendix G in Draft EIS TSD XVIII (Site-Wide Water Balance and Water Quality Modelling Report) for each year of Construction, Operations, and Decommissioning and Reclamation (i.e., Closure). Preliminary environmental release targets are provided in Appendix H of Draft EIS TSD XVIII. As noted in Table 9 of Draft EIS TSD XVIII, the EA assumed that the 5,000 cubic metre (m^3) monitoring ponds would be released at a maximum rate of 5,000 m^3 over a 6-hour period, which equates to 0.23 cubic metre per second (m^3/s). NexGen notes that effluent quality predictions, environmental release targets, licensed release limits, and related information will be further updated and submitted to the CNSC as part of the Application for a Licence to Operate. 9. During the Construction Phase, before the mill is operational, effluent precipitates from the clarifier underflow would be pumped to geotubes for dewatering, which are long tube made of porous weather-resistant geotextile. At the end of the Construction Phase, the geotubes would be cut open, and the solids would either be deposited in the potentially acid generating (PAG) waste rock storage area (WRSA) or transferred to the paste plant for ultimate disposal underground in cemented paste tailings (CPT) or cemented paste backfill. During the Operations Phase, effluent precipitates would be blended with neutralized leach residue, gypsum, and a binder to create CPT. The CPT would be disposed of in the UGTMF as described in Draft EIS Section 5.4.3.1 (Paste Plant). 10. Effluent monitoring is summarized in Draft EIS Appendix 23B (Environmental Assessment Monitoring and Follow-Up Programs Proposed for the Project) and would be refined and updated as part of the Environmental Protection Program and supporting documentation submitted to the CNSC as part of federal licensing, commensurate with the stage of Project development (e.g., Construction, Operations). During Operations, effluent monitoring would be conducted in the monitoring ponds to confirm compliance with licensed release limits (including Metal and Diamond Mining Effluent Regulations [MDMER] limits) prior to each batch release of treated effluent. A composite sample would be drawn from the monitoring pond water and would analyzed for pH, DO, specific conductivity, turbidity, ORP, Cl, SO_4, NH_3 as N, NH_3 as N (unionized), NO_3, TP, Al, As, Cd, Cr, Co, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Sr, U, V, Zn, TSS, Pb-210, Po-210, Ra-226, Th-230, U-234, and U-238. In addition, monthly samples would be collected and analyzed for a larger suite of parameters that includes alkalinity, HCO_3, CO_3, pH, DO, specific conductivity, sum of ions, hardness, TSS, turbidity,		Authorized Monthly Mean Concentration for radium-226. Under the Metal and Diamond Mining Effluent Regulations (MDMER) there are Schedule 4 substances with Maximum Authorized Monthly Mean Concentrations permitted for discharge. Table G-2 of Appendix G in Draft EIS TSD XVIII does not provide effluent characterization concentrations or proposed environmental release targets for the following Schedule 4 substances: un-ionized ammonia and TSS. Additionally, the proposed environmental release target for radium-226 is 0.88 Bq/L which exceeds the Schedule 4 Maximum Authorized Monthly Mean Concentration of 0.37 Bq/L under the MDMER and could result in adverse effects to water quality and aquatic biota. Based on Appendix F Table F-1 Draft EIS TSD XVIII, during the construction phase the predicted effluent discharge rate is 899 m^3/day. At an effluent flow rate of 50 m^3/day, the mine becomes subject to the MDMER. Under the MDMER there are Schedule 5 Section 4(1) substances that have requirements for effluent characterization. Table G-2 does not provide effluent characterization concentrations or proposed environmental release targets for thallium under Schedule 5 which poses uncertainty regarding its effects on the receiving aquatic environment, including effects to fish and fish habitat. **Rationale:** Discharges from the proposed Project will alter water quality in the nearfield receiving environment and could negatively affect aquatic biota. The lack of effluent characterization concentrations and proposed environmental release targets for un-ionized ammonia and TSS cause uncertainty about the effects of the Project's effluent on the receiving environment, and the release target for radium-226 may result in adverse effects to water quality and aquatic biota. Additionally, the Proponent has not provided data to validate their statements that there will not be a significant source term of thallium in Project effluent. Currently not enough information is available regarding missing Schedule 4 and 5 parameters necessary for effluent characterization. This information is required to determine if effluent at the end-of-pipe from all final discharge points is predicted to be acutely lethal to aquatic biota including fish and fish habitat and to verify acute		4. Update the Draft EIS Section 5.4.5.4 to include information on predicted effluent characterization concentrations and environmental release targets for MDMER Schedule 4 and 5 parameters.	Changes to TSS were evaluated in Pathway ID SWQ-10 of Draft EIS Section 10.4.2 (Secondary Pathways). The evaluation concluded that Project controls would minimize potential TSS loadings. Total suspended solids would be treated in the effluent treatment plant (ETP), as necessary, to meet Maximum Authorized Concentrations of Prescribed Deleterious Substances listed in columns 2, 3, and 4 of MDMER Schedule 4. These Maximum Authorized Concentrations will also be incorporated into the effluent release targets (ERTs) that will be provided to the CNSC as part of the REGDOC-2.9.2 process to determine the Best Available Technology and Techniques Economically Available (BATTEA) for effluent treatment as part of licensing for each phase of the Project. The evaluation of effects of discharge of TSS from the ETP and sewage treatment plant (STP) to the receiving environment was completed using a near-field modelling approach focused on the assumed regulated mixing zone (RMZ) boundary, located at 100 m from each of the ETP diffuser and STP outfall (Draft EIS Section 10.2.8.1.2 [Near-Field Water Quality Model]). Specifically, TSS concentrations at the edge of the RMZs were predicted using the equation in Section 10A7.4 of Appendix 10A (Surface Water Quality Modelling Report) and incorporated conservative assumptions (e.g., no settlement to the lakebed following discharge). The modelled results indicated that for the period of operational discharge from the ETP, increases in TSS concentrations at the edge of the regulated mixing zones would be less than 2 mg/L, which would further attenuate through the receiving environment beyond the RMZ (Draft EIS Appendix 10A, Section 10A7.4). As NexGen has confirmed that MDMER Schedule 4 Maximum Authorized Concentrations of Prescribed Deleterious Substances will be met at end-of-pipe for TSS and has provided modelling results that confirm a lack of effects to Patterson Lake with regards to TSS, additional modelling and updates to the EIS are not required. **<u>Un-ionized Ammonia</u>** NexGen confirms that un-ionized ammonia was considered in the surface water quality assessment for the Application Case and Reasonably Foreseeable Development Case as a component of total ammonia (Draft EIS Appendix 10A [Surface Water Quality Modelling Report], Attachment 10A-1a and Attachment 10A-2). In the background surface water quality characterization and near-field and regional surface water quality modelling, total ammonia incorporates the sum of the un-ionized ammonia (NH_3) and ionized ammonia (NH_4^+) species that exist in equilibrium in water. Within the assessment, the un-ionized fraction of the total ammonia was estimated at various instances based on ambient water temperature and pH. Therefore, un-ionized ammonia was considered in the assessment, but total ammonia was reported. NexGen will provide additional clarity regarding ammonia and un-ionized ammonia in the surface water quality assessment in revised EIS Section 10.2.8.2.1 (Surface Water Quality Constituents of Potential Concern) and include both ammonia and un-ionized ammonia in the assessment figures and tables in revised EIS Appendix 10A (Surface Water Quality Modelling Report), where applicable. This update will show that un-ionized ammonia	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						ORP, TOC, DOC, Ca, Cl, F, Mg, K, Na, SO_4, TDS, NH_3 as N, NH_3 as N (unionized), NO_3 as N, NO_2 as N, NO_3 + NO_2 as N, TP, TN, TKN, Al, Sb, As, Ba, Be, B, Cd, Cr, Co, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Sn, Sr, Th, Ti, U, V, Zn, Pb-210, Po-210, Ra-226, Th-230, U-234, U-238, and acute lethality tests for rainbow trout (*Oncorhynchus mykiss*) and water flea (*Daphnia magna*). 11. The location of the final discharge point for the ETP would be at the monitoring ponds as shown in Figure 5.1-3 of Draft EIS Section 5.1.1 (Project Overview). The specific discharge location will be finalized during detailed design and provided to Environment and Climate Change Canada as part of the MDMER registration. Additional details regarding the ETP and discharge characteristics will be provided in the applicable stages of federal licencing and provincial permitting (e.g., Operations). NexGen will provide any updates regarding the requested ETP design details (i.e., part 1 through part 4 of this IR) as part of licensing and in accordance with the requirements of REGDOC 2.9.2, *Environmental Protection, Controlling Releases to the Environment* (CNSC 2021b), recognizing this regulatory guidance remains in draft form at this time. Similarly, additional information on the requested effluent monitoring details (i.e., part 5 of this IR) will be provided in the Environmental Protection Program and supporting documentation that will be submitted to the CNSC in support of the applicable stages of federal licensing, commensurate with the stage of Project development. As this IR is out of the scope of the EA, no changes are proposed in the revised EIS. **References** CNSC (Canadian Nuclear Safety Commission). 2021a. Generic Guidelines for the Preparation of an Environmental Impact Statement – Pursuant to the *Canadian Environmental Assessment Act, 2012*. Available at http://cnsc.gc.ca/eng/resources/environmental-protection/ceaa-2012-generic-eis-guidelines.cfm CNSC. 2021b. REGDOC-2.9.2, Environmental Protection, Controlling Releases to the Environment. DRAFT. March 2021. Available at https://www.nuclearsafety.gc.ca/eng/pdfs/regulatory-documents/regdoc2-9-2/REGDOC-2_9_2_Controlling_Releases_to_the_Environment.pdf Metal and Diamond Mining Effluent Regulations. SOR/2002-222 under the *Fisheries Act*. Last amended June 18, 2020. Available at https://laws-lois.justice.gc.ca/eng/Regulations/SOR-2002-222/index.html		and chronic water quality thresholds. In accordance with the MDMERs, the Proponent will be required to demonstrate that their effluent quality meets the limits in the MDMER.			concentrations will remain below MDMER Schedule 4 Maximum Authorized Concentrations at the end-of-pipe and within Patterson Lake during all phases of the Project. Similar to TSS, the MDMER limits for un-ionized ammonia will be considered in the REGDOC-2.9.2 process for determining the BATTEA for un-ionized ammonia that will be provided to the CNSC for approval as part of each phase of Project licensing. As NexGen has confirmed that the MDMER Schedule 4 Maximum Authorized Concentrations of Prescribed Deleterious Substances will be met for un-ionized ammonia and will make updates to the revised EIS to present modelling results that confirm a lack of effects to Patterson Lake with regards to un-ionized ammonia, additional modelling and updates to the EIS are not required. **Thallium** Per Attachment IR 49-R1, 79-R1, and 82-R1, baseline and source input data gathered for the Draft EIS and more recent data measured from field work conducted from 2021 to 2023 validate the exclusion of thallium as a constituent of potential concern (COPC) for the EA. Reported values for the baseline and source term datasets are generally well below detection limits. While detection limits vary within these datasets, the majority of data points are below the Canadian Council of Ministers of the Environment (CCME) guideline, and in most cases, are orders of magnitude below the CCME guideline. Therefore, there is negligible potential for adverse effects to surface water quality as a result of inputs of thallium to the receiving environment from the Project. Hence, thallium was screened out as a COPC for the Project. Thallium is not expected to be present in quantities that pose a potential environmental risk; therefore, there is no conceptual pathway for thallium to the receiving environment or need to develop ERTs for thallium. In accordance with REGDOC-2.9.2, which would be applied to Project effluents during licensing to guide the development of BATTEA and licensed release limits, thallium would not be defined as a substance that requires control because the data indicate no potential for environmental risk. Therefore, updated modelling of thallium is not required for the revised EIS. 2. NexGen confirms that updates to the Project ERTs for radium-226 will conform to the MDMER Schedule 4 Maximum Authorized Monthly Mean Concentration for radium-226 of 0.37 Bq/L. Table 7 of Appendix H of revised EIS TSD XVIII (Site-wide Water Balance Modelling Report) will be updated to include the MDMER Schedule 4 Maximum Authorized Monthly Mean Concentration of 0.37 Bq/L. 3. Effluent discharge rates for the Project would meet the reporting requirements under MDMER (i.e., when discharged effluent is released to the receiving environment at more than 50 m^3/day) during the first or second year of Construction, depending on the specific start date, and reporting requirements would remain throughout Operations. As shown in Figure 9 of Section 5.1.1 of Draft EIS TSD XVIII, the range of proposed daily discharge rates from the ETP to Patterson Lake North Arm – West Basin during Construction and Operations is 400 m^3/day to 1,400 m^3/day and 5,500 m^3/day to 7,500 m^3/day, respectively. As per REGDOC-2.9.2 requirements, effluent characterization will be updated for each phase of licensing to confirm that the Project	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
											applies BATTEA to meet ERTs. The updated effluent characterization, including quantities and qualities, will be provided to the CNSC for approval for each phase of licensing. Additionally, as per MDMER Section 8(1)(a), within 60 days of exceeding the 50 m^3/day discharge threshold and becoming subject to MDMER, NexGen will submit in writing to the Minister of Environment the information required in MDMER Section 2. With respect to the effluent characterization concentrations or proposed environmental release targets for thallium, these are not required for the reasons outlined in Attachment IR 49-R1, 79-R1, and 82-R1. 4. NexGen notes that Draft EIS Section 5.4.5.4 (Effluent Treatment) is intended to provide a description of Project components and is not the appropriate location for information regarding predicted effluent characterization concentrations and environmental release targets (ERTs). This information has been appropriately included in Appendix G and Appendix H, respectively, of Draft EIS TSD XVIII. NexGen confirms that as part of the surface water quality assessment, not all MDMER Schedule 4 and 5 parameters screened in as COPCs for the Project; therefore, not all of these parameters were characterized for effluent concentrations or had ERTs proposed as part of the surface water quality assessment. However, compliance with the MDMER and implementation of REGDOC-2.9.2 represent key considerations in the development of the Project Effluent and Emissions Plan and Environmental Monitoring Plan that will be applied to Project effluents once approved by the CNSC as part of licensing for each phase of the Project. Parameters listed under Schedule 4 (Table 1) and Schedule 5 (Part 1.4[1]) of the MDMER would be monitored in Project effluent as per the requirements set out in Schedule 4 and Schedule 5 of MDMER, regardless of whether those parameters were identified as COPCs in the EIS. **References** CNSC (Canadian Nuclear Safety Commission). 2021. Environmental Protection: Controlling Releases to the Environment. DRAFT. March 2021. Available at https://www.nuclearsafety.gc.ca/eng/pdfs/regulatory-documents/regdoc2-9-2/REGDOC-2_9_2_Controlling_Releases_to_the_Environment.pdf. Metal and Diamond Mining Effluent Regulations. SOR/2002-222 under the *Fisheries Act*. Last amended June 18, 2020. Available at https://laws-lois.justice.gc.ca/eng/Regulations/SOR-2002-222/index.html.	
64	HC	Human health with with respect to hazardous contaminants	Section 7.2.5, page 7-41	**Context:** Concentrations of NO_2, TSP and PM_{10} are predicted to be greater than the short- term (1-hour) SAAQS within a few hundred metres of the maximum disturbance area for the Project, where traditional land users may be present. The human health risks associated with these exceedances are not discussed in the HHERA.	Discuss the impacts of these short-term air quality exceedances (NO_2, TSP and PM_{10}) on human health.	The short-term air quality exceedances for nitrogen dioxide, total suspended particulates (TSP), and particulate matter less than 10 microns in diameter (PM_{10}) are discussed in Draft EIS TSD XXI (Environmental Risk Assessment). Specifically, Section 4.3.3.3 of Draft EIS TSD XXI discusses air quality constituents that exceed screening values. As stated in Section 4.3.3.3.1 of Draft EIS TSD XXI, "[a]dverse health effects that are attributed to short-term exposures to ambient nitrogen dioxide include	n/a	IR-64 was partially addressed, however, the rationale for not applying the CAAQS in the assessment lacks sufficient justification from a health perspective and further assessment is recommended. 1) The response to HC's IR-64 states that, "The CAAQS are applicable to measured ambient air concentrations over a three-year period and are not	64-R1	HC recommends that the Impact Statement: 1. Compare ambient air concentrations to CAAQS to determine the nature and severity of the project's impacts and need for further mitigation measures; 2. Use modelled results for at least one calendar year when data is unavailable, to indicate frequency of CAAQS exceedances, and provide a discussion as to whether human health impacts are anticipated; and, 3. Implement a monitoring plan for constituents where there are predicted exceedances.	Responses to part 1 through part 3 of IR 64-R1 are provided below. 1. NexGen confirms that a comparison of Project predicted ambient air quality to the Canadian Ambient Air Quality Standards (CAAQS) was made in Table 7.2-12 of Draft EIS Section 7.2.5.1.1.2 (Air Dispersion Modelling Predictions). As noted in Draft EIS Section 7.2.2.8.2 (Comparison to Canadian Ambient Air Quality Standards), achievement determination of the CAAQS is determined by provinces and territories using ambient	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				The proponent states: *"As discussed in Section 7.2.2.8.2, Comparison to Canadian Ambient Air Quality Standards, the comparison to CAAQS is provided for information only and does not represent a compliance metric or environmental risk."* **Rationale:** NO_2 and PM_{10} are non-threshold pollutants (meaning that any increment in concentrations presents an increased risk for health effects). Health Canada recommends the use of the CAAQS for project-associated air quality assessments, as they are the appropriate comparison targets for measured, modeled or estimated ambient air concentrations. The CAAQS are some of the most stringent air quality criteria, especially for long-term project emissions after 2025. It is recommended that the proponent take into consideration that NO_2 and $PM_{2.5}$ are non-threshold pollutants. The Canadian Air Quality Management System (AQMS) explicitly recognizes that health effects occur below the CAAQS values, and proposes additional management levels in recognition of the health and environmental benefits that can be realized by taking actions to decrease or maintain background levels of air pollution.		asthma exacerbations and possibly increased risk of cardiopulmonary effects, and to a lesser extent cardiovascular and respiratory mortality (Health Canada 2016b). Individuals with certain pre-existing diseases such as asthma appear to be sensitive to exposure to ambient nitrogen dioxide. If individuals are present during periods when ambient nitrogen dioxide concentrations exceed the screening value, it is possible that they could experience minor irritation of the respiratory system. These effects would be reversible and would subside after exposure." As stated in Section 4.3.3.3.2 of Draft EIS TSD XXI, "[e]levated TSP concentrations are generally not considered to pose significant health risks because these particles are too large to be inhaled deep into the lungs; therefore, TSP was not considered further in the ERA [Environmental Risk Assessment]." With respect to PM_{10} and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), Section 4.3.3.3.2 of Draft EIS TSD XXI states "[e]xposure to elevated concentrations of both PM_{10} and $PM_{2.5}$ are associated with various respiratory and cardiovascular effects in humans. The finer particles that can be inhaled deeply into the lungs are associated with greater risk because they are more chemically active and have more complex characteristics than larger particles (Health Canada 2016c). If individuals are present during short-term periods of elevated PM_{10} and/or $PM_{2.5}$, they may experience respiratory symptoms such as coughing or difficulty breathing, or asthma symptoms and chronic bronchitis. For most individuals, effects would be reversible and subside after exposure." With respect to the Canadian Ambient Air Quality Standards (CAAQSs), as discussed in Draft EIS Section 7.2.2.8.2 (Comparison to Canadian Ambient Air Quality Standards), the CAAQCs are applicable to measured ambient air concentrations over a three-year period and are not specifically applicable to modelled results from a single facility. As the information requested by the reviewer is already contained within the Draft EIS, no changes are proposed in the revised EIS to address this IR. **References** Health Canada. 2016b. Human Health Risk Assessment for Ambient Nitrogen Dioxide. Healthy Environments and Consumer Safety Branch. Health Canada. 2016c. Human Health Risk Assessment for Coarse Particulate Matter. Healthy Environments and Consumer Safety Branch.		specifically applicable to modelled results from a single facility." The CAAQS are generally calculated for specific multi-year averages and for a particular statistical form so that extreme and unpredictable events do not drive risk management. However, if the data is not available for comparison to a full CAAQS timeframe, HC recommends using modelled results for at least one calendar year to allow for a basic comparison with the CAAQS statistical form. The CAAQS are national air quality standards, but they are not restricted to applications within the context of the Air Quality Management System (AQMS). An evaluation using CAAQS may be considered in determining the nature and severity of the project's impact on air quality levels, and mitigation measures that may be required to maintain good air quality levels or to prevent an exceedance of the CAAQS. Please see *Table 2: Review of the NexGen Responses to Annex 2 – FIRT Advice to the Proponent (HC-1)* for further discussion on the use of CAAQS. 2) The response also indicates that Section 4.3.3.3 of Draft EIS TSD XXI discusses air quality constituents that exceed screening values, including short-term exceedances for nitrogen dioxide, total suspended particulates (TSP), particulate matter ($PM_{2.5}$, PM_{10}), and uranium. Given the potential for these guideline exceedances, it is important to use a robust monitoring system capable of generating sufficient data to determine if any new mitigation measures are required. Health Canada (HC) also notes that, while more conservative than the former National Ambient Air Quality Objectives (NAAQO), the Saskatchewan Ambient Air Quality Standards (SAAQS) and Alberta Ambient Air Quality Objective (AAQO)'s screening values do not reflect the most recent science, which indicates that there is no apparent threshold for NO_2, meaning that health effects may occur at any level of exposure.			concentrations measured in the air zones for a three-year period rather than by comparison of modelled predictions at or beyond a facility boundary (CCME 2012, CCME 2020a,b). NexGen also notes that the CAAQS were not developed as facility-level regulatory standards (CCME 2019). Therefore, the comparisons of modelled values to the CAAQS in Table 7.2-12 of Draft EIS Section 7.2.5.1.1.2 are for information only and are not indicative of compliance or the severity of Project effects. The mitigation measures for the Project are expected to minimize effects to air quality such that no significant adverse effects are expected to the human health (Draft EIS Section 15.6 [Risk Characterization and Significance Determination]) or wildlife (Draft EIS Section 14.5 [Residual Effects Analysis]) valued components; therefore, no changes to revised EIS Section 7.2.4 (Project Interactions and Mitigations) are necessary. 2. NexGen confirms that the number of hours with model-predicted 1-hour NO_2 concentrations exceeding the CAAQS value were computed for each model year (i.e., 2012 through 2016) at each human health receptor. Please see Attachment IR 69-R1 for context regarding potential human health effects from NO_2 emissions. As described in IR 69-R1, the results of the human health risk assessment remain as presented in the Draft EIS (i.e., no significant effects to human health). 3. NexGen confirms that a monitoring program would be implemented to measure ambient air concentrations. As noted in Draft EIS Section 7.2.8 (Monitoring, Follow-Up, and Adaptive Management), monitoring and follow-up programs would be used to: a. Verify the predictions through monitoring of air quality during Construction, Operations, and Closure. The current monitoring program that measures meteorological parameters, NO_2, sulphur dioxide, TSP, and $PM_{2.5}$ would be continued through all phases of the Project, with modification through the licensing and provincial permitting processes, as required. b. Evaluate the effectiveness of mitigation measures and modify or enhance as necessary through monitoring and developing updated mitigation measures, if needed. c. Identify unanticipated negative effects, including possible accidents and malfunctions. NexGen confirms that the Integrated Management System developed for the Project would describe the processes required to monitor and characterize emissions from Project facilities and activities, including those described above. **References** CCME (Canadian Council of Ministers of the Environment). 2012. Guidance Document on Achievement Determination Canadian Ambient Air Quality Standards for Fine Particulate Matter and Ozone. PN 1483. Available at https://ccme.ca/en/res/pn1483_gdad_eng-secured.pdf. CCME. 2019. Guidance Document on Air Zone Management. PN 1593. Available at https://ccme.ca/en/res/guidancedocumentonairzonemanagement_secured.pdf. CCME. 2020a. Guidance Document on Achievement Determination for Canadian Ambient Air Quality Standards for Nitrogen Dioxide. PN 1608. Available at	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
											https://ccme.ca/en/res/gdadforcaaqsfornitrogendioxide_en1.0.pdf. CCME. 2020b. Guidance Document on Achievement Determination for Canadian Ambient Air Quality Standards for Sulphur Dioxide. PN 1610. Available at https://ccme.ca/en/res/gdadforcaaqsforsulphurdioxide_en1.0.pdf.	
67	ECCC	Air Quality, Noise, and Climate Change	Section 7.4.5	**Context:** In Section 7.4.5 the Proponent states that the land use change emissions include the annual loss of carbon sinks. It is anticipated that there will be 897.8 ha of new disturbance added to the Project area. **Rationale:** While ECCC recognizes that this Project falls under CEAA 2012, the principles of the SACC and Draft Technical Guide should be followed by the Proponent in order to support Canada's ability to meet its environmental obligations and commitments in respect of climate change. There is a distinction between direct GHG emissions from land use change and the effects on carbon sinks. The GHG emissions from land use change should be evaluated, however the effects on carbon sinks should be considered separately. An effect to a carbon sink implies the interruption of the land's natural process that results in the net absorption of carbon from the atmosphere. The Proponent should refer to the Strategic Assessment of Climate Change (SACC) section 5.1.2 and the associated Draft Technical Guide section 4 for guidance on how to perform an assessment of the impact on carbon sinks. This assessment should be qualitative and quantitative.	Provide separate assessments for GHG emissions due to land use change and for GHG emissions due to the effects on carbon sinks. **Suggestions for mitigation and follow-up measures** The Proponent should consider mitigation measures for the disturbance of carbon sinks. The Proponent can refer to the Draft Technical Guide section 3.5.3 for additional guidance.	As noted by both NexGen and the reviewer, the request to provide separate assessments for greenhouse gas (GHG) emissions due to land use change and for GHG emissions due to the effects on carbon sinks is outside the scope of both the *Canadian Environmental Assessment Act, 2012* and the CNSC Generic Guidelines for the preparation of an EIS (CNSC 2021). Greenhouse gas (GHG) emissions associated with the land use changes and the resulting loss of carbon sinks are provided in Table 7.4-8 in Draft EIS Section 7.4.5.1.1 (Project Greenhouse Gas Emissions). The total emissions from land use change presented include separate calculations for the GHG emissions associated with the land use change (i.e., the one-time loss of the carbon sink from the land clearing), as well as the annual emissions associated with the loss of carbon sinks. These emissions were calculated using the approach provided in the Intergovernmental Panel on Climate Change (IPCC 2006) guidelines (Draft EIS Appendix 7C [Greenhouse Gas Emissions Estimation Methodology Report], Section 7C5.4) and are aligned with a Tier 1 approach provided in the draft technical guidance supporting the Strategic Assessment of Climate Change (SACC; ECCC 2021). During development of the Draft EIS, the approach for the carbon sink calculations was presented by NexGen as part of proactive engagement between NexGen, the CNSC, and the Saskatchewan Ministry of the Environment on 14 June 2021. No comments were received at the time related to the approach proposed by NexGen for carbon sinks. Outside of the EA process, NexGen's commitments to environmental, social, and corporate governance and sustainability will be used to guide decision-making on reducing GHG emissions. These commitments can be found on NexGen's Sustainability webpage (https://www.nexgenenergy.ca/sustainability/default.aspx) as well as in Draft EIS Section 1 (Introduction). A mitigation for the disturbance of carbon sinks includes removal of merchantable trees and most of the woody debris with soils that are salvaged, where required (i.e., where not planned for use in future reclamation activities), in order to maintain the carbon stocks and avoid release of carbon through decomposition. This mitigation measure is listed in Table 7.4-7 in Draft EIS Section 7.4.4 (Project Interactions and Mitigation). Other mitigation measures to limit disturbance of carbon sinks include the following measures (Draft EIS Appendix 23A [Summary of Project Environmental Design Features and Mitigation Measures]): ▪ designing an efficient infrastructure footprint (i.e., buildings clustered together); ▪ optimizing the use of cleared areas for Project activity; ▪ using existing road infrastructure, including the existing access road and bridge crossing;	n/a	**Context:** The Proponent noted that GHG emissions associated with land use changes and the resulting loss of carbon sinks are provided in Table 7.4-8 in Draft EIS Section 7.4.5.1.1. These values are provided in tonnes of carbon dioxide equivalent (t CO2e), which is reasonable for land use change emissions. However, impacts on carbon sinks should be provided in tonnes of carbon (t C). **Rationale:** There is a distinction between direct GHG emissions from land-use changes and the impacts on carbon sinks. An effect to a carbon sink implies the interruption of the land's natural processes that results in the net absorption of carbon from the atmosphere and should be considered separately from the land-use change evaluation. It is unclear which values presented in the table correspond to carbon sinks, therefore Table 7.4-8 should be updated to clarify the values for carbon sinks and allow for a more accurate assessment of the impact on carbon sinks. ECCC recognizes that this Project falls under CEAA 2012. However, the *Strategic Assessment of Climate Change (SACC) and the Draft Technical Guide Related to the SACC: Guidance on quantification of net GHG emissions, impact on carbon sinks, mitigation measures, net-zero plan and upstream GHG assessment* (Draft Technical Guide) contains the most up-to-date guidance for developing a qualitative and quantitative assessment on impact on carbon sinks. Therefore, ECCC recommends that the principles of the SACC and Draft Technical Guide be followed in order to support an understanding of how the Project impacts Canada's ability to meet its environmental obligations and commitments in respect of climate change.	67-R1	Update Table 7.4-8 in Draft EIS Section 7.4.5.1.1 to display impacts on carbon sinks in tonnes of carbon (t C) using the Strategic Assessment of Climate Change (SACC) section 5.1.2 and the Draft Technical Guide section 4 for the most up to date guidance.	NexGen notes that, as confirmed by the reviewer, the reviewer's request to update the EIS to present Project effects on carbon sinks in terms of tonnes of carbon is outside the scope of the requirements of an EA of a designated project under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012). Also, the Project is not subject to the Strategic Assessment of Climate Change (SACC) guidance (ECCC 2020, 2021). In addition, as noted in Draft EIS Section 4.3.1 (Alternatives to the Project – Energy Type), providing carbon intensity values (i.e., CO_2 produced per unit of electrical energy generated) in CO_2 equivalent (CO_{2e}) units aligns with the measurements used in climate change stabilization scenarios developed by the International Energy Agency in 2017 (i.e., the power sector's carbon intensity must be reduced to 10 to 25 g CO_{2e}/kWh by 2050 and to less than 2 g CO_{2e}/kWh by 2060). For these reasons, the approach to the emissions calculations will not be updated in the revised EIS. However, to support the reviewer's request, NexGen has provided Attachment IR 67-R1, which provides the Project land use change emission values in tonnes of carbon per year. As important context to the reviewer's rationale that this information is required in order to support an understanding of how the Project impacts Canada's ability to meet its environmental obligations and commitments in respect of climate change, NexGen notes that, as described in Draft EIS Section 4.2 (Purpose of the Project), the Project represents a substantial and consistent potential source of uranium for meeting the expected growing global demand for electricity. The Project could contribute to the Government of Canada's ability to meet its environmental obligations and commitments with respect to climate change by displacing high-greenhouse gas (GHG) intensity, fossil fuel (i.e., coal and natural gas) electrical generation in favour of low-GHG emitting, renewable energy options. To achieve decarbonization at the lowest possible cost in Canadian provinces, a diverse set of low carbon technologies, including nuclear, will need to be implemented (Canadian Nuclear Association 2017). In Canada, various climate scenarios for low GHG economy modelling analyses indicate the importance of nuclear energy installation before mid-century to meet the Paris Agreement targets (Draft EIS Section 4.3 [Alternatives to the Project]). As currently proposed, the Project benefits on climate change mitigation significantly outweigh Project effects. For this reason alone, the Project would already align with net-zero initiatives and support Canada's ability to meet its environmental obligations and commitments in respect of climate change. **References** *Canadian Environmental Assessment Act, 2012*. SC 2012, c 19, s 52. Repealed, 2019, c 28, s 9. Available at https://laws-lois.justice.gc.ca/eng/acts/C-15.21/20170622/P1TT3xt3.html. Canadian Nuclear Association. 2017. Vision 2050: Canada's Nuclear Advantage. Available at	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						▪ storing tailings underground; ▪ maximizing water diversion away from site facilities through design and the establishment of berms and grading; and ▪ reclaim and revegetate areas where non-permanent Project facilities have been decommissioned. As the reviewer's request is outside the scope of both the *Canadian Environmental Assessment Act, 2012* and the CNSC Generic Guidelines for the preparation of an EIS (CNSC 2021), no changes are proposed in the revised EIS to address this IR. **References** *Canadian Environmental Assessment Act, 2012*. SC 2012, c 19, s 52. Repealed, 2019, c 28, s 9. Available at https://laws-lois.justice.gc.ca/eng/acts/C-15.21/20170622/P1TT3xt3.html CNSC (Canadian Nuclear Safety Commission). 2021. Generic Guidelines for the Preparation of an Environmental Impact Statement – Pursuant to the *Canadian Environmental Assessment Act, 2012*. Available at http://cnsc.gc.ca/eng/resources/environmental-protection/ceaa-2012-generic-eis-guidelines.cfm ECCC (Environment and Climate Change Canada). 2021. Draft Technical Guide Related to the Strategic Assessment of Climate Change. August 2021. Available at https://www.canada.ca/en/environment-climate-change/corporate/transparency/consultations/draft-technical-guide-strategic-assessment-climate-change.html IPCC (Intergovernmental Panel on Climate Change). 2006. IPCC Guidelines for National Greenhouse Gas Inventories, Prepared by the National Greenhouse Gas Inventories Programme, Eggleston HS, Buendia L, Miwa K, Ngara T, Tanabe K (eds). Published: IGES, Japan. Available at https://www.ipcc-nggip.iges.or.jp/public/2006gl/					www.readkong.com/page/vision-2050-canada-s-nuclear-advantage-using-nuclear-9950301. ECCC (Environment and Climate Change Canada). 2020. Strategic Assessment of Climate Change. October 2020. Available at https://www.strategicassessmentclimatechange.ca/. ECCC. 2021. Draft Technical Guide Related to the Strategic Assessment of Climate Change. August 2021. Available at https://www.canada.ca/en/environment-climate-change/corporate/transparency/consultations/draft-technical-guide-strategic-assessment-climate-change.html.	
69	HC	Human health with respect to hazardous contaminants	Section 7A3.2.13.3 Table 7A-114, Page 116	**Context:** Several tables, such as Table 7A-114 (Page 116), show the predicted concentrations of some metals for the operations phase; however, the toxicological reference values (TRVs) used to determine the risk quotient in the HHRA section do not appear in these tables. **Rationale:** To assess health risk, HHRAs compare predicted chemical exposures TRVs defined by regulatory agencies such as Health Canada or US Environmental Protection Agency. TRVs represent the amount of a substance below which adverse effects are not expected to be observed in a population. These are not regulatory limits, but are thresholds meant to be used as a decision aid.	1.Where toxicological reference values are available or could be derived, identify these chemicals as COPCs and carry them into the modelling predictions. 2.Revise the table to include TRVs which are applicable to the general public, including sensitive receptors or provide rationale as to how the selected TRVs provide an adequate level of health protection for the general public including sensitive receptors.	Responses to part 1 and part 2 of this IR are provided below. 1. The evaluation of air modelling predictions against air quality criteria is presented and discussed in Draft EIS TSD XXI (Environmental Risk Assessment). As discussed in Section 4.3.3 of Draft EIS TSD XXI, the maximum predicted air concentrations at a conservative human and ecological exposure location (i.e., camp location) were compared against air quality criteria to determine constituents of potential concern (COPCs) for further assessment in the environmental risk assessment (ERA). Table 4-6 in Draft EIS TSD XXI identifies the screening values used in the assessment to determine if an air constituent required further quantitative assessment. Section 4.3.4 of Draft EIS TSD XXI concluded that no air COPCs were required for further evaluation in the ERA; however, radionuclides were assessed as part of the total radiological dose. Therefore, the air assessment in the ERA did not progress past a screening phase, and toxicity reference values (TRVs) and	n/a	The response did not address NO_2, particulate matter, and uranium (Chemical Risk), which exceeded the screening criteria. The response to HC's IR-69 indicates that "The TRVs were not presented for air constituents since no air COPCs progressed past the s0creening phase of the ERA"; however, Table 4-9 of the Draft EIS TSD XXI (ERA) indicates that nitrogen dioxide, particulate matter (total suspended particulate (TSP), PM_{10}, $PM_{2.5}$, and TSP deposition), and uranium exceeded their respective air screening criteria. Subsequently, NO_2 and Chemical Risks from Uranium were screened out of further assessment through qualitative evaluations, some of which contain limited, out of date and/or inaccurate information (e.g., referencing values from the NAAQO instead of the current CAAQS). HC's	69-R1	Health Canada recommends that the Impact Statement characterize (i.e., quantify) potential health risks for NO_2, particulate matter, and uranium (Chemical Risk) to support the qualitative assessment in Section 4.3.3.3 of the ERA, considering the following: 1. For NO_2, use the most stringent, Canadian standards (e.g., 1-hour and Annual CAAQS). 2. Consider inhalation risk to off-duty workers who reside at the Project site (i.e., in camp). 3. Consider inhalation risks for receptors at other identified receptor sites where modeled concentration exceed the CAAQS or other health-based standards (e.g., Beet Lake, 19EXP01, and 19EXP02).	NexGen maintains that, as discussed in Section 4.3.3.3 of Draft EIS TSD XXI (Environmental Risk Assessment) further quantitative assessments for nitrogen dioxide (NO_2), particulate matter (PM), and uranium are not required as the screening assessments showed that only minor, short-term, reversible effects to human health could potentially occur. Due to the importance of maintaining human health, NexGen confirms that a monitoring program would be implemented to measure ambient air concentrations. As noted in Draft EIS Section 7.2.8 (Monitoring, Follow-Up, and Adaptive Management), monitoring and follow-up programs would be used to: ▪ Verify the predictions through monitoring of air quality during Construction, Operations, and Closure. The current monitoring program that measures meteorological parameters, NO_2, sulphur dioxide, total suspended particulate, and PM with a diameter of 2.5 microns of less ($PM_{2.5}$) would be continued through all phases of the Project, with modification through the licensing and provincial permitting processes, as required. ▪ Evaluate the effectiveness of mitigation measures and modify or enhance as necessary through monitoring and developing updated mitigation measures, if needed.	TSD XXI, Section 4.3.3

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						subsequent hazard quotients were not calculated for the air pathway. 2. The intent of Draft EIS Section 7.2 (Air Quality) is to present the air modelling results; the interpretation of these results is provided in Draft EIS TSD XXI. Therefore, Table 7A-114 in Draft EIS Appendix 7A (Air Dispersion Modelling Report) presents the predicted metals concentrations during the Operations Phase but does not present the air quality criteria used in the screening assessment in the ERA. These criteria are presented in Table 4-6 in Draft EIS TSD XXI and are health and environment based. The TRVs were not presented for air constituents since no air COPCs progressed passed the screening phase of the ERA; therefore, hazard quotients were not calculated for the air pathway. No changes are proposed in the revised EIS to address this IR.		concerns with this approach are discussed further in *Table 2: Review of NexGen Responses to Annex 2 - FIRT Advice to the Proponent* (HC-1). Uncertainty with the rationale used for screening these substances out for further assessment has the potential to underestimate potential health risks from the project. Providing an up-to-date quantitative risk assessment for the anticipated NO_2, particulate matter, and uranium (Chemical Risk) emissions generated by the project and project activities, which considers site specific receptors, exposure, and appropriate reference values, would characterize potential health risks, reduce uncertainty, and strengthen the assessment. Please see the *Advice to the Proponent (Table 2)* for further discussion on the use of CAAQS, particularly in the context of NO_2 which HC considers a non- threshold contaminant, meaning that health effects may occur at any level of exposure.			▪ Identify unanticipated negative effects, including possible accidents and malfunctions. With respect to NO_2, in addition to the discussion provided in Section 4.3.3.3.1 of Draft EIS TSD XXI, further information in response to the part 1 through part 3 of this IR is included in Attachment IR 69-R1. In summary, while comparison of modelled predictions at or beyond a facility boundary to Canadian Ambient Air Quality Standards (CAAQS) is not appropriate (CCME 2012, CCME 2020a,b), a screening exercise was conducted for information purposes only that shows there would be infrequent exceedances of the 1-hour NO_2 threshold. While there could be potential effects to sensitive human receptors, these effects would be short-term and subside shortly after exposure. Additionally, air quality model predictions are inherently overestimated as several conservative assumptions were made to ensure that effects were not underestimated. In consideration of these factors, significant adverse effects are not predicted to human health and further quantitative assessment of NO_2 is not warranted. NexGen will provide additional context regarding the comparison of predicted Project NO_2 emissions to the CAAQS to Section 4.3.3 of revised EIS TSD XXI (Environmental Risk Assessment) for information purposes; however, no other changes are required. With respect to PM, NexGen notes that Section 4.3.3.3.2 of Draft EIS TSD XXI provides context to support the conclusion that further quantitative assessment is not required. The assessment showed that the 24- hour criteria for PM with a diameter of 10 microns or less (PM_{10}) and $PM_{2.5}$ are exceeded during Construction and Operations at the fence line and camp location; however, frequency of exceedances are low (2.7% and 0.5%, respectively) and the annual criteria are not exceeded. It is acknowledged that some individuals may experience respiratory symptoms, but symptoms would be reversible and subside shortly after exposure (Draft EIS TSD XXI, Section 4.3.3.3.2). Additionally, air quality model predictions are inherently overestimated as several conservative assumptions were made to ensure that effects were not underestimated. In consideration of these factors, significant adverse effects are not predicted to human health and further quantitative assessment of PM is not warranted. With respect to uranium, Section 4.3.3.3.3 of Draft EIS TSD XXI provides context to support the conclusion that further quantitative assessment of uranium was not required. From a radiological perspective, uranium was quantitatively assessed in the multi-pathways assessment in Section 5.2.4 of Draft EIS TSD XXI. From a non-radiological perspective, uranium in PM_{10} marginally exceeded the 24-hour criterion but did not exceed the annual criterion at the fence line or Project camp location during Operations. The 24-hour uranium criterion is converted from the annual Ontario criterion to allow for comparison; the health effects are based on chronic effects to kidneys. Since the predicted maximum concentrations did not exceed the annual screening value, from a non-radiological risk perspective, unacceptable levels of risk for human and ecological health are not expected from the occasional exceedances of the 24-hour value.	
70	CNSC	Geology	Section 8.3.1	**Context:** Section 8.3.1 provides a brief description of Bedrock Geology with a statement that "Additional details on the bedrock geology can be	Provide NexGen 2021a Geology Baseline Report.	NexGen will include the Geology Baseline Report as a new document in the revised EIS (i.e., Annex XI). NexGen maintains that geology should not be considered as a valued component (VC) in the EA. As	Annex XI (new)	CNSC staff request that NexGen include a justification for the exclusion of geology as a valued component within the EIS. As planned, the project will result in the creation of a disposal	70-R1		As noted in the initial response to the original IR, NexGen maintains that geology should not be considered as a valued component (VC) in the EA as, among the other reasons stated, geology does not have an assessment endpoint (Draft EIS Section 6.3.2 [Assessment Endpoints	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				found in the Geology Baseline Report (NexGen 2021a)." However, the Geology Baseline Report was not provided. **Rationale:** Information about the geological environment is not sufficiently documented in the EIS especially for a new mine proposal that also proposes to develop an underground TMF. REGDOC 2.9.1 appendices describe the expected geological information to be assessed - B.4.1 baseline geological information; and C.4.1 on the description of any changes to the geology as a result of the project. In addition, the EIS does not assess the geology as a valued component for the Project with no justification for its exclusion.	Assess the geology as a valued component or justify its exclusion as a valued component.	described in Draft EIS Section 6.3.1 (Valued Components), VCs are aspects of the biophysical, cultural, and socio-economic environments considered to have scientific, social, cultural, economic, historical, archaeological, or aesthetic importance. The selection of appropriate VCs focuses the EA on those aspects of the biophysical, cultural, and socio-economic environments that are of greatest importance to both society and species conservation. Key factors considered when selecting the list of VCs for the proposed Project included: ▪ potential for interaction with the Project and degree of interaction, including presence, abundance, and amount of spatial overlap of a VC with the Project; ▪ sensitivity of a VC to potential Project effects and level of damage or harm that could be realized should an adverse effect occur; ▪ species conservation status or concern (e.g., rarity, sensitivity, uniqueness); ▪ Indigenous and Local Knowledge; and ▪ ecological and socio-economic/cultural value to communities, government agencies, and the public. Selected VCs were primarily aspects or elements of biological and human environments; VCs did not represent physical aspects or disciplines of the biophysical environment (e.g., air quality, groundwater, surface water) except for climate change (i.e., greenhouse gases), which was selected as a VC based on the importance of climate change to federal and provincial governments and Indigenous communities. It is important to note that VCs are associated with assessment endpoints or significance criteria, while physical elements of the environment do not have assessment endpoints (Draft EIS Section 6.3.2 [Assessment Endpoints and Measurement Indicators]; Draft EIS Section 6.3.3 [Intermediate Components]). This note is important because the significance of changes to physical elements, such as geology, can only be evaluated in context of how those changes affect VCs such as fish, vegetation, wildlife, and people, which are the ultimate receptors of concern. For these reasons, geology was not selected as a VC; however, geology is a key aspect of the hydrogeological assessment. The geological model for the Project contributed to defining hydrostratigraphic units (i.e., geological formations characterized by hydraulic properties). The characteristics defining the hydraulics of each hydrostratigraphic unit included hydraulic conductivity (i.e., ability of water to move through rock), porosity of rock types (i.e., ratio of voids to rock volume), degree of weathering through chemical and mechanical degradation of the rock, natural fracture and foliation (i.e., folding) planes, and shear zones (Draft EIS Section 8.2.6.2 [Hydrostratigraphy]). The hydrogeological assessment provided important supporting information to the assessments of aquatic and terrestrial ecosystems (e.g., surface water quality and sediment quality, fish and fish habitat, vegetation, wildlife and wildlife habitat) and the human environment (e.g., Indigenous land and resource use, human health). Besides the inclusion of the Geology Baseline Report, no changes are proposed in the revised EIS to address this IR.		facility (the underground tailings management facility – and the waste rock); geology has been included as a VC in the environmental assessments for other disposal projects as an important aspect of the physical environment (and expected to form a key part of the disposal system description in the documentation of the safety case for disposal); thus staff's request for further explanation.			and Measurement Indicators]; Draft EIS Section 6.3.3 [Intermediate Components]). This aspect is important because the significance of changes to physical elements, such as geology, can only be evaluated in context of how those changes affect VCs such as fish, vegetation, wildlife, and people, which are the ultimate receptors of concern. Although NexGen maintains that it would not be appropriate to include geology as a VC in the EA, NexGen agrees with the reviewer regarding the importance of ensuring that changes in the geological environment as a result or Project activities are properly considered in the context of effects on VCs and confirms that these effects have been appropriately assessed in the Draft EIS. As noted by the reviewer, a key Project activity would include the disposal of cemented paste tailings in an underground tailings management facility (UGTMF). While there are several benefits associated with the storage of tailings in a UGTMF (e.g., smaller surface footprint, reduced potential effects to groundwater, lower surface water management requirements) (Draft EIS Section 4.5.6.2 [Tailings]), adverse effects could still occur through the hydrogeological environment, which could ultimately affect VCs. In addition, waste rock storage on surface in waste rock storage areas (WRSAs) could affect the hydrogeological and surface water environments. NexGen confirms that potential Project effects from the UGTMF and WRSAs on the hydrogeological environment were assessed in Draft EIS Section 8 (Hydrogeology), with outcomes of the assessment further considered in the aquatic and terrestrial ecosystem, human health, Indigenous land and resource use, and other land and resource use assessments (Draft EIS Section 8.1 [Introduction], Figure 8.1 3). Specifically, Pathway HG-04 (Seepage from the UGTMF and backfilled production stopes after Closure), Pathway HG-02 (Seepage from the WRSAs during Construction, Operations and Closure), and Pathway HG-03 (Seepage from the WRSAs after Closure) (Draft EIS Section 8.4.3 [Primary Pathways]) were assessed in Draft EIS Section 8.5.1.2 (Groundwater Quality), which included specific consideration of solute mass loading rates to Patterson Lake. Results from this assessment were then considered in the surface water quality and sediment quality assessment (Draft EIS Section 10), with outputs then being further considered in determining the effects to fish and fish habitat (Draft EIS Section 11), vegetation (Draft EIS Section 13), wildlife and wildlife habitat (Draft EIS Section 14), human health (Draft EIS Section 15), Indigenous land and resource use (Draft EIS Section 16), and other land and resource use (Draft EIS Section 17) VCs. Potential Project effects from the UGTMF and WRSAs on the surface water environment were assessed in Draft EIS Section 10, with outcomes of the assessment further considered in the fish and fish habitat, terrestrial ecosystem, human health, Indigenous land and resource use, and other land and resource use assessments (Draft EIS Section 10.1 [Introduction], Figure 10.1 3). Specifically, Pathway SWQ-05 (Seepage from the WRSAs during Construction and Operations) and Pathway SWQ-06 (Runoff and seepage from the WRSAs and UGTMF following Closure) (Draft EIS Section 10.4.3 [Primary Pathways]) were assessed in Draft EIS Section 10.5.1 (Application Case), which included specific consideration of a far-future scenario where effects were predicted for a period of time long after Project surface water management infrastructure such as water treatment would be removed. Outputs from the surface water quality	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						References NexGen (NexGen Energy Ltd.). 2021. Geology Baseline Report for the Rook I Project. Prepared by NexGen Energy Ltd. June 2021.					assessment, including the far-future scenario, were then further considered in determining the effects to fish and fish habitat (Draft EIS Section 11), vegetation (Draft EIS Section 13), wildlife and wildlife habitat (Draft EIS Section 14), human health (Draft EIS Section 15), Indigenous land and resource use (Draft EIS Section 16), and other land and resource use (Draft EIS Section 17) VCs. In addition to potential adverse chemical effects associated with the UGTMF and WRSAs, the Project has the potential to result in changes to surficial geology and the aboveground and underground geologic environments; both of these topics are discussed in the Draft EIS. Existing surficial and underground geologic conditions are presented in Draft EIS Section 5.3.3.2 (Geotechnical Conditions). Overall, eight subsurface geologic units and three basement geologic units exist in the area of the Project (Draft EIS Section 5.3.3.2, Table 5.3-2 and Table 5.3-3, respectively). In general, geotechnical conditions in the area of the Project are characterized by up to 75 m of dense to very dense sedimentary layers underlain by very competent basement rock extending to below the Arrow deposit. The understanding of surficial and underground geology has allowed NexGen to appropriately design the surface and underground developments and infrastructure. Effects to surficial geology were assessed in Draft EIS Section 12 (Terrain and Soils), with outcomes of the assessment further considered in the aquatic and terrestrial ecosystem, human health, Indigenous land and resource use, and other land and resource use assessments (Draft EIS Section 12.1 [Introduction], Figure 12.1 3). Specifically, Pathway TS-01 (Alteration of soil and terrain conditions) (Draft EIS Section 12.4.3 [Primary Pathways]) was assessed in Draft EIS Section 12.5.1.1 (Quantity and Distribution of Terrain Units), which included specific consideration of the potential permanent changes to terrain. Outputs from the terrain and soils assessment were then further considered in determining the effects to fish and fish habitat (Draft EIS Section 11), vegetation (Draft EIS Section 13), wildlife and wildlife habitat (Draft EIS Section 14), human health (Draft EIS Section 15), Indigenous land and resource use (Draft EIS Section 16), and other land and resource use (Draft EIS Section 17) VCs. Considerations related to the long-term geotechnical conditions of the WRSAs and the underground mine workings (including the UGTMF) were expressed in Draft EIS Section 5 (Project Description) and have formed key aspects of Project design. A goal of Project reclamation is to establish a landscape that is stable under a natural disturbance regime typical for the Project location (Draft EIS Section 5.3.2 [Design Objectives and Guiding Principles]). Both the PAG WRSA and NPAG WRSA would be constructed with side slopes of 4H:1V (Draft EIS Section 5.5.2.4 [Mine Rock Management]), which would facilitate long-term geotechnical stability. Regarding the stability of crown pillars, or the vertical distance between the unconformity and the uppermost production and UGTMF stopes, empirical stability assessments using the scaled span method (Carter, 2008; Carter, 2014) were conducted. The uppermost underground production stope crown pillars are rated as either Class F (0.5% to 1.5% chance of failure; public access allowed) or Class G (<0.5% chance of failure; free public access). Probability of failure of the crown pillars above the production stopes would be further	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
											reduced as the stopes would be backfilled with cemented paste backfill (CPB), which would consist of neutralized leached residue, water, and binder mixed in various ratios to meet appropriate geotechnical strength requirements (Draft EIS Section 5.4.3.1 [Paste Plant]). The UGTMF stopes would be rated as Class G as a result of the existing geotechnical conditions of the surrounding basement rock; these stopes would be backfilled with the CPB and cemented paste tailings, which, as with CPB, would contain a binder to promote structural strength (Draft EIS Section 5.5.2.3 [Tailings Management]). Overall, potential subsidence is not expected due to the combination of low failure probabilities and the backfilling of both underground production and UGTMF stopes, which would facilitate long -term geotechnical stability. As noted by the reviewer, a mine waste safety case is being completed for the Project in accordance with federal licensing requirements. The mine waste safety case will focus on the UGTMF and WRSA disposal systems. The purpose of the mine waste safety case will be to verify that proposed disposal of mine waste from the Project is safe and meets applicable regulatory requirements. Key considerations within the mine waste safety case that are linked to geology will include consideration of constituent of potential concern (COPC) mobility from and long term structural integrity of the UGTMF and WRSAs. As described in the text above, these aspects have been considered in Project design and/or the Draft EIS (i.e., Section 5, Section 8, Section 10, and Section 12), with results of these assessments being forwarded for determination of effects to multiple VCs. In summary, while geology is not considered as a VC within the Draft EIS, the aspects of geology that could potentially result in effects to VCs (i.e., chemical loadings to the environment from the UGTMF and WRSAs, permanent changes to surficial geology, and other aspects of the geologic environment) have been thoroughly assessed. For this reason, no further assessment of geology is necessary and no changes to the revised EIS are required. **References** Carter TG, Cottrell BJ, Carvalho JL, Steed CM. 2008. Logistic regression improvements to the scaled span method for dimensioning surface crown pillars over civil or mining openings. Proceedings from the 42nd US Rock Mechanics Symposium, San Francisco. Carter T. 2014. An update on the scaled span concept for dimensioning surface crown pillars for new or abandoned mine workings. Environmental Science.	
71	ECCC	Fish and fish habitat	Section 9.2.3 Section 9.2.6 Section 9.3.2 Appendix 9A	**Context**: In Section 9.2.3 Spatial Boundaries of the EIS it is stated "There are five larger lakes in the Local Study Area (LSA) including Broach, Patterson, Forrest, Beet and Naomi lakes, as well as several smaller waterbodies including Lake G, Lake H, and wetlands." It is clearly stated that there are wetlands present within the LSA, and at least two wetlands can be seen within the Project footprint in Section 9.1 Figure 9.1-4 pg. 1337 of the EIS. The location of these wetlands within the Project	Provide baseline information regarding wetland characterization within the LSA, including: locations, wetland type, size, water surface elevation, depth, water flow pathways, and the presence of wildlife receptors including presence of fish/fish habitat within the main body of the EIS. Provide further information on mitigation measures and monitoring that would be applied for the protection of wetlands. If this information is available in annexes or technical supporting documents, summarize it	Baseline information regarding wetland ecosystem characterization is provided in Draft EIS Section 13.3.2 (Wetland Ecosystems). Table 13.3-3 in Draft EIS Section 13.3.2.1 (Ecosystem Availability) lists the wetland size and type (defined as wetland Ecological Land Classification [ELC] units) within the local study area (LSA) and regional study area (RSA). Figure 13.3-3 and Figure 13.3-4 in Draft EIS Section 13.3.2.2 (Ecosystem Distribution) show wetland ecosystems and rare plant species in the RSA and LSA, respectively. Additional baseline information is also provided in Section 6.3 of Draft EIS Annex VII.1 (Vegetation Baseline Report 1 [Mapping]).	n/a	**Context:** The Proponent has provided the requested wetland baseline characterization information. However, the Proponent has not incorporated the information into the Draft EIS Section 9 on hydrology, identifying potential hydrological effects to wetlands as a Project pathway, including mitigation measures and monitoring. In Section 9.2.2.2 Measurement Indicators, wetlands are briefly mentioned as being captured under the umbrella term "waterbodies" for the	71-R1	Incorporate specific information regarding the analysis of potential hydrological related effects to wetlands within the LSA and RSA into Section 9 of the Draft EIS. Assess potential impacts of Project-related activities to measurement indicators (i.e. waterbody surface elevation, watercourse flow rates, stream channel parameters, and fluvial sediment transport) for wetlands including updated sediment transport modelling as required to the hydrological assessment of wetlands.	NexGen confirms that the assessment requested by the reviewer is provided in the Draft EIS. NexGen notes that the focus of Draft EIS Section 9 (Hydrology) is to provide a description of Project effects and cumulative effects, including consideration of reasonably foreseeable developments, on the hydrology intermediate component. Information regarding changes to valued components (VCs) due to changes to the hydrological environment has been appropriately considered in the relevant discipline assessments. For the wetland ecosystem VC, the assessment is provided in Draft EIS Section 13 (Vegetation).	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				footprint, as well as the other wetlands existing within the LSA can be confirmed from Annex V11.2: Vegetation Baseline Report 2 (Inventory, Rare Plants and Wetlands), including the wetland classifications. However, beyond the above statement from Section 9.2.3, there is no consideration of wetlands or potential effects to wetland hydrology throughout the remainder of the hydrological assessment and hydrological modelling. Potential effects to flow rates, water levels or sediment transport to wetlands within the LSA are not considered. **Rationale:** There is currently not enough information provided for ECCC to provide advice on the potential risks of the proposed Project to wetland hydrology within the LSA. This pathway of effects is important to assess in terms of potential effects to wetland habitat availability due to changes in flow rates, water levels and sediment transport, and potential effects to terrestrial and aquatic receptors. It is necessary to evaluate if draw down from mine dewatering or changes in surface water runoff flows and routing will affect water levels and habitat availability within wetlands.	within the main body of the EIS with references to respective documents for review.	For riparian wetlands, water surface elevation (WSE) is anticipated to be strongly influenced by the WSE of adjacent waterbodies since the overburden at surface is highly permeable. Consequently, for riparian wetlands adjacent to waterbodies such as Patterson Lake or Lake G, the WSE in the wetland is expected to be primarily controlled by the WSE of the adjacent waterbody. For the purposes of the EA, it is assumed that these wetlands represent fish habitat; however, the Project is not anticipated to result in disturbance to riparian wetlands. While also not currently expected to be disturbed under the existing Project design, there is one isolated wetland perched on a hillslope in ELC unit BP19(BU) – Black spruce treed bog (Burned). This wetland is located adjacent to the existing exploration access road, approximately 30 m in elevation above Patterson Lake, and is the only wetland located in the LSA that is not a riparian wetland. This perched wetland is not expected to be an area of groundwater discharge under current conditions or during the Project lifespan. This perched wetland is also not expected to serve as fish habitat as it is not connected hydrologically to any fish-bearing waterbodies or watercourses and is only expected to hold ponded water for a short period of time each year during spring freshet. Wildlife that may use wetlands in the LSA and RSA are listed in Table 14.2-1 of Draft EIS Section 14.2.2 (Valued Components, Measurements Indicators, and Assessment Endpoints) and include, but are not limited to, muskrat, rusty black bird, mallard, yellow rail, and Canadian toad. Muskrat, rusty blackbird, mallard, and Canadian toad were detected during baseline surveys. Information on mitigation measures that would be applied for the protection of wetlands is included in Draft EIS Section 10.4 (Project Interactions and Mitigations), Draft EIS Section 11.4 (Project Interactions and Mitigations), Draft EIS Section 13.4 (Project Interactions and Mitigations), Draft EIS Section 14.4 (Project Interactions and Mitigations), and Draft EIS Appendix 23A (Summary of Project Environmental Design Features and Mitigation Measures). Monitoring of three LSA wetlands is discussed in Draft EIS Section 13.7 (Monitoring, Follow-Up, and Adaptive Management) and Draft EIS Appendix 23B (Environmental Assessment Monitoring and Follow-Up Programs Proposed for the Project) and this monitoring would be included in the Environmental Monitoring Plan developed as part of federal licensing to confirm the predictions of negligible effects to wetlands. As the requested baseline and mitigation measure information is presented within the Draft EIS, no changes are proposed in the revised EIS to address this IR.		hydrological assessment of waterbody surface elevation. Information on wetlands is not provided for any of the other measurement indicators. In Section 9.2.3 Spatial Boundaries the Regional Study Area (RSA) and Local Study Area (LSA) are defined, however, wetlands are not discussed in this section. The Proponent confirms there are several riparian wetlands adjacent to the lakes in the LSA assumed to be fish habitat, and one isolated non-riparian wetland that is not hydrologically connected to fish-bearing waters These wetlands are located within the LSA and additional information should be provided to allow for an assessment of potential impacts of Project- related activities to aquatic receptors including fish and fish habitat, species at risk, and migratory birds. In Section 9.2.6.1 Baseline Hydrology Monitoring and Studies, no specific baseline information is provided for wetlands. However, in Section 9.2.6.2 Hydrological Modelling of Water Surface Elevation and Flow Rates, some input data and parameterization of hydrological processes for wetlands were incorporated. In the following Section 9.2.6.4 Fluvial Sediment Transport, there is no mention of incorporating wetland data into the sediment transport modelling. In Section 9.3.2 Hydrographic Setting, the lakes in the RSA and LSA are described, but there is no mention of any wetlands connected to these lakes, and none are identified. Throughout the remainder of Section 9 there is no explicit mention of wetland hydrology in the modelling results, evaluation tables of potential adverse effects pathways for hydrology, residual effects analysis or mitigation measures and monitoring. The Proponent states in their response that waterbody surface elevation in wetlands will be strongly influenced by adjacent waterbodies and that the isolated wetland is not likely to be influenced by project activities. However, no information has been provided about the other measurement indicators: watercourse flow rates, stream channel parameters, and fluvial sediment transport. Watercourse flow rates and stream channel parameters may not be as applicable to wetlands; however, wetlands are often depositional areas for sediment and the fluvial sediment transport measurement indicator has not been adequately assessed for impacts to wetlands. For example, the fluvial sediment transport analysis throughout Section 9 focuses on erosion from the Clearwater River below Patterson Lake Upper Reach to the northern end of			The assessment of potential Project effects on wetland ecosystems due to changes to the hydrological environment is discussed in Draft EIS Section 13.4.2 (Secondary Pathways); specifically, in Pathway ID V-08 (Surface water flow changes). Pathway ID V-08 considered changes in: ▪ surface water levels, flows, and drainage areas that can affect soils and the availability, distribution, and condition of wetland ecosystems; and ▪ surface water levels and flows that can alter waterbodies and watercourses and affect the availability, distribution, and condition of wetland ecosystems. Overall, a net discharge of water to Patterson Lake from Project activities is expected to create small changes such as increasing water surface elevation by 5 cm, increasing flows in the Clearwater River downstream of Patterson Lake by less than 5%, and changing stream channel parameters (i.e., wetted area) by less than 1%. Erosional losses in the Clearwater River Upper Reach and subsequent sediment deposition in the lower reach may increase by a non-detectable margin. Therefore, sediment deposition would not result in changes to the physical environment of the Clearwater River below Patterson Lake or the adjacent riparian wetland. Surface water in the receiving environment downstream of the Project would be protected and managed through the Environmental Monitoring Plan, which would include monitoring surface water levels and flows. As a result, the Project could result in minor alterations to the availability, distribution, and condition of wetland ecosystems. However, the changes are predicted to have a negligible residual effect on the wetland ecosystem VC (Draft EIS Section 13.4.2). As noted in NexGen's initial response to the original IR 71, there is one isolated non-riparian wetland perched on a hillslope in ELC unit BP19(BU) – Black spruce treed bog (Burned). This wetland is located adjacent to the existing exploration access road, approximately 30 m in elevation above Patterson Lake, and is the only wetland located in the LSA that is not a riparian wetland. This perched wetland is neither expected to be disturbed by the Project nor to be an area of surface water or groundwater discharge under current conditions or during the Project lifespan. Therefore, Project effects to this wetland are not anticipated. As an analysis of potential hydrological related effects to wetlands is appropriately presented in Draft EIS Section 13, no additional context is required in Draft EIS Section 9.	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
								Forrest Lake. According to Section 13.3.2.2 Wetland Ecosystem Distribution Figure 13.3-3, this area is predominantly riparian wetland. While the predicted changes in sediment transport and deposition are low, there are no references to the wetland habitat in this area throughout the results for hydrology in Section 9 of the EIS. **Rationale:** To assess potential impacts of Project-related activities to measurement indicators (i.e. waterbody surface elevation, watercourse flow rates, stream channel parameters, and fluvial sediment transport) for wetlands and determine potential impacts to aquatic receptors, additional information is needed. Additional details provided should include specific information on wetland hydrology in the modelling results, evaluation tables of potential adverse effects pathways for hydrology, residual effects analysis, mitigation measures and monitoring.				
74	ECCC	Fish and fish habitat	Section 9.5	**Context:** In Table 9.5-2 pg. 1401 H-06 for culverts, the Proponent states that the design cross drainage maximum flow was considered for a 24-hour 100-year event. No rationale was provide for the selection of the maximum instantons flow used for culvert design. **Rationale:** Culverts function primarily as hydraulic conduits but serve the dual purposes of functioning as hydraulic structures as well as acting as load bearing structures. As a result, the amount of precipitation becomes secondary to the intensity of precipitation. Considering the lifetime of the Project, a 100-year return period is not considered conservative. A risk analysis for a shorter event duration and longer return period should be considered for precipitation intensities.	Provide rationale for the selection of the 24-hour 100-year maximum flow used for culvert design considering both the lifetime (i.e., 43 years) of the Project and the likelihood of an extreme precipitation event occurring.	Design flow ratings and capacity for the on-site culverts would meet the Saskatchewan Environment and Resource Management *Construction Guidelines for Pollution Control Facilities at Uranium Mining and Milling Operations* (SERM 2000) requirements for conveyance structures (i.e., ditches and swales), and are planned as follows: ▪ Design capacity: o 1:100-year, 24-hour storm event; or o where overflow would be a reportable spill, culverts would be sized for the 24-hour probable maximum precipitation (PMP) event. ▪ Factor: 1.2 increase multiplier applied in design flow to allow for reduced culvert area from silting. ▪ Culvert material: corrugated steel or high-density polyethylene (HDPE) pipe. ▪ Minimum culvert diameter: 400 mm. ▪ Minimum culvert longitudinal slope: 0.50%. ▪ Erosion protection: rip-rap cobbles, armouring, or equivalent. The design of existing culverts on the access road to a 1:100-year 24-hour storm event meets the design standard for primary access roads in Saskatchewan (MHI 2014). This design standard would be maintained during the Project lifespan. NexGen notes that there is a 35% probability that the 43-year life of the Project will include an event of 100-year return period (TAC 2004). Further rationale for the selection for the design event used for culvert design will be provided to the CNSC and Saskatchewan Ministry of Environment in the Environmental Protection Program and supporting documentation (e.g., water management processes) required as part of permitting and licensing processes for the Project. **<u>References</u>**	n/a	**Context:** In Table 9.5-2 pg. 1401 H-06 for culverts, the Proponent states that the design cross drainage maximum flow was considered for a 24-hour 100-year event. The Proponent's response indicates that this meets a provincial guideline that cannot be located (SERM, 2000). The Proponent also erroneously states that the 100-year 24-hour storm event meets the design standard for a "primary access road" in Saskatchewan Ministry of Highways and Infrastructure (MHI) (2014). MHI (2014) does not use the term "primary access road" but does recommend the use of an instantaneous peak flow for culverts and a 100-year return period in cases where an area would be isolated by a hydraulic failure (PDF page 80 in MHI, 2014). The Proponent also indicates there is a 35% probability that the culverts will encounter a discharge event above their design in the 43 years planned for the Project. A storm above design can lead to failure of the culvert in various ways: road washout, overtopping, erosion, and sediment deposition downstream. The Proponent clarifies that culverts where overflow would be a reportable spill will use the higher 24-hour probable maximum precipitation (PMP). The Proponent does not comment on the choice of a 24-hour storm event, despite the likelihood that the time of concentration of the relatively small upstream areas would be much shorter than 24 hours. The rainfall intensity for shorter duration storms of the same	74-R1	1. Provide a rationale for the selected 24-hour storm duration. 2. Given that a storm event above design will affect all the culverts on site, discuss the potential impacts of a storm above design. Describe how the probability of a storm above design (35% over the life of the project) is incorporated into the description of significance of potential impacts. If there are potential impacts, describe any potential mitigations. 3. Describe how culverts at risk of "reportable spill" will be identified. 4. If the storm duration is reduced in line with the likely time of concentration for the site, provide clarity on if the design values will be adjusted for both the regular culverts (100-year return period) and the "reportable spill" culverts (PMP).	NexGen has provided the information below to address part 1 through part 4 of IR 74-R1. 1. NexGen confirms there are two design capacities listed in the Draft EIS for surface drainage facilities: the maximum flow resulting from the 1:100-year, 24-hour storm event (i.e., 89.4 mm) and the maximum flow resulting from the 24-hour probable maximum precipitation (PMP) storm event (i.e., 489.2 mm). The 1:100-year, 24-hour rainfall event and 24-hour PMP both represent the total precipitation falling over a 24-hour period. The storm classifications established for the design of surface drainage facilities are based on precipitation intensity, duration, and frequency (i.e., return period or annual exceedance probability). The 24-hour duration of design storms was applied because 24 hours allows for representation of both total extreme event volume and peak runoff conditions. Based on other mesoscale convective complex storms observed in the region, the bulk of the 24-hour storm event would be concentrated in an 8-to-12-hour period. Also, SERM (2000) specifically references the 24-hour duration PMP for structures such as ponds that could contain contaminated water. Although SERM (2000) does not provide a duration for the 100-year storm event to be considered for ditches and swales, a consistent approach timeframe of 24 hours was adopted for design criteria development. NexGen maintains that the rainfall intensity during the 24-hour period is appropriate because, when distributed over time for application during Project design, it includes constituent time increments with elevated rainfall intensity. When translating the design storm to a design flood, the design storm is temporally distributed using a storm distribution hyetograph (i.e., a graphical representation of the distribution of rainfall intensity over time) and mass curve (i.e., a graphical representation of the accumulated rainfall over time) to establish the rainfall intensity at the constituent time increments within the 24-hour period. The reviewer is correct that rainfall	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						MHI (Saskatchewan Ministry of Highways and Infrastructure). 2014. Hydraulic Manual. Accessed February 2021. Available at http://www.highways.gov.sk.ca/business SERM (Saskatchewan Environment and Resource Management). 2000. Construction Guidelines for Pollution Control Facilities at Uranium Mining and Milling Operations. In draft. October 2000. TAC (Transportation Association of Canada). 2004. Guide to Bridge Hydraulics 2nd Edition. Pp 181.		return period is higher; the design discharge for a shorter duration storm would be higher as well. **Rationale:** Culverts function primarily as hydraulic conduits but serve the dual purposes of functioning as hydraulic structures as well as acting as load bearing structures. As a result, the amount of precipitation becomes secondary to the intensity of precipitation. Considering the lifetime of the Project and the negative consequences of a culvert failure, a 100-year return period is not considered conservative. A risk analysis should be performed considering different rainfall intensity-duration-frequencies (IDF), including higher intensity, shorter duration rainfall events. **References:** SERM (Saskatchewan Environment and Resource Management). 2000. Construction Guidelines for Pollution Control Facilities at Uranium Mining and Milling Operations. In draft. October 2000. [link unavailable] MHI (Saskatchewan Ministry of Highways and Infrastructure). 2014. Hydraulic Manual. Accessed December 2023. Available at Publications Centre (saskatchewan.ca)			intensities may exceed the return period rainfall rate provided by the published Intensity Duration and Frequency (IDF) curve (i.e., 3.7 mm / hour). The reviewer is also correct that the time of concentration is in many cases less than 24 hours and that a shorter storm duration would be accompanied by higher rainfall intensities that could result in increased flood peaks. NexGen confirms that both of these issues will be addressed during the translation of design storm to design flood during subsequent phases of Project detailed design. Design flow ratings and capacities for the on-site culverts would meet applicable guidelines and codes of practice such as the Environment Canada Environmental Code of Practice for Metal Mines (EC 2009) recommendations for designing surface drainage facilities for extreme weather events and the Saskatchewan Environment and Resource Management Construction Guidelines for Pollution Control Facilities at Uranium Mining and Milling Operations (SERM 2000) guidelines for conveyance structures (i.e., ditches and swales). The EC (2009) recommendation for surface drainage facilities is to handle peak conditions at least equivalent to the once in 100-year flood event. The SERM (2000) guideline includes reference to the 1:100-year storm event as a general Water Management Design Criteria for ditches and swales and other structures; where overflow could have deleterious effects on the downstream environment in the event of overtopping or rupture, other facilities (i.e., ditches, swales, and culverts) should be sized for the 24-hour PMP event (SERM 2000). NexGen notes that the reviewer was unable to access SERM (2000). For this reason, SERM (2000) has been provided as Attachment IR 74-R1. 2. NexGen notes that the potential for a storm above design is not probable for culverts designed for the maximum flow resulting from a 24-hour PMP event; therefore, potential environmental effects associated in this regard are not anticipated. As detailed in part 3 of this IR response, these culverts would include those that could contain potentially deleterious substances or where a breach of design could lead to run-on to critical facilities or external loss of containment. A storm event above the 24-hour, 1:100-year design storm could exceed the design capacity for ditches and culverts designed to the 1:100-year, 24-hour storm event. However, as discussed in part 3 to this IR response, this would only apply to culverts located along ditches that convey water from catchments that intercept non-mineralized water and could not potentially affect surface water management infrastructure that contains potentially deleterious substances. Therefore, adverse effects to the environment are not anticipated. Mitigation measures would include inspection and maintenance of road embankments, ditches, and cross-drainage structures and the implementation for a Project-specific Environmental Protection Program and a Project-specific Environmental Monitoring Plan. NexGen would also explore potential additional mitigation measures during future phases of Project design, if necessary. 3. NexGen confirms that a 24-hour PMP criterion was adopted for culvert design capacity where an overflow could result in a release of deleterious substances such	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
											as mineralized contact water to the downstream environment. As part of ongoing engineering design, culverts where overflow could have deleterious effects and where a 24-hour PMP would be adopted have been identified as follows: a. Culverts located along ditches conveying water from catchments that intercept mineralized contact water. b. Culverts situated near the margins of the site conveying non-mineralized contact water where failure could lead to external loss of containment (i.e., result in off-site environmental effects). c. Culverts located along ditches or swales conveying non-contact water that run adjacent to critical facilities and where failure could affect the integrity of containment (e.g., at the toe of a containment dyke) or where failure would result in run-on to a critical facility. NexGen notes that a 1:100-year, 24-hour storm event criterion was adopted for culverts located along ditches that convey water from catchments that intercept non-mineralized water and would not potentially affect surface water management infrastructure that contains potentially deleterious substances. 4. NexGen notes that for the reasons stated in part 1 of this IR response, the storm duration will not be reduced. The design capacities listed in the Draft EIS are either the 24-hour PMP or the 1:100-year, 24-hour storm event. In each case, the 24-hour 100-year design storm and 24-hour PMP references the total precipitation falling over the 24-hour period. The adoption of a 24-hour period is important to allow for representation of both total extreme event volume and peak runoff conditions. No changes are proposed to the revised EIS with respect to this IR. **References** EC (Environment Canada). 2009. Environmental Code of Practice for Metal Mines. 1/MM/17. ISBN 978-1-100-11901-4. 108 pp. MHI (Saskatchewan Ministry of Highways and Infrastructure). 2014. Hydraulic Manual. Accessed December 2023. Available at https://publications.saskatchewan.ca/#/home. SERM (Saskatchewan Environment and Resource Management). 2000. Construction Guidelines for Pollution Control Facilities at Uranium Mining and Milling Operations. In draft. October 2000.	
75	ECCC	Fish and fish habitat	Section 9.6 Section 9.7 Annex IV.2, Section 5.3.1	**Context:** Rating curves represent an approximation of the stream discharge at a location based on the water levels. This allows the estimation of streamflow from continuous water levels that are relatively easy to measure. Inconsistencies with best practices (WSC, 2016) used in developing the rating curves, as well as some general inconsistencies, led ECCC to question their accuracy (Section 5.3.1 of Annex IV.2 Hydrometric Monitoring Characterization Report). Specifically:	1.Explain why the rating curve formulae for stations CR-WC-MS-02 and CR-WC-MS-06 do not match the plotted lines, specify where this data was used further, and if applicable, discuss effects of correcting the formulae. 2. Provide justification for the use of different methods for determining rating curves at different sites, detailing how they are comparable. 3. Clarify if the comment in the text regarding measurements below the open water rating curve in May and	Responses to each of the numbered parts of this IR are provided below. However, the following information is noted as being relevant to all of these IR parts: ▪ Additional monitoring in the years since 2020 has improved approaches to and understanding of rating curve development at the watercourse hydrometric stations. Through this process, rating curves have been improved and the observed hydrographs updated. ▪ The adjustments to the observed hydrographs are not of a magnitude that would impact model calibration, hydrological model simulation results for baseline conditions, or the hydrological effects assessment. Nor would the adjustments propagate to subsequent models or assessments.	Annex IV.2, Section 5.3.1.3	**Context:** Parts two, three and five of the IR are accepted. The responses to part one, four, and six of the original IR have not been fully answered. The Proponent has continued hydrometric monitoring and plans winter discharge measurements that will help characterize the inter- and intra- seasonal changes to the rating curves. However, the response to part one does not acknowledge that the open water rating curves for hydrometric stations CR-WC-MS-02 and CR-WC- MS-06, plotted in Figures	75-R1	1. Explain why the rating curve formulae for stations CR-WC-MS-02 and CR-WC-MS- 06 do not match the plotted line for the open water rating curve. If corrections are required, detail any other report sections that are affected and ensure that all sections impacted by the error are updated. 2. Provide an explanation for rating curve shifts that are not associated with data. Provide details on the monitoring strategy that will be utilized to deal with the unpredictable backwater effects that have led to frequent rating curve shifts. New data that supports the original rating curves should be presented in figures. If general rules on rating curve shifts have been developed, provide all relevant details. 3. Provide details on where and how data derived from rating curves (i.e. the continuous discharge values	Please see Attachment IR 75-R1 for NexGen's response to this IR.	Annex IV.2, Section 5.3.1.6

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				1. The open water rating curves for hydrometric stations CR-WC-MS-02 and CR-WC- MS-06, plotted in Figures 15 and 27 respectively, do not correspond to the equations printed in the same figures. 2. Different methodologies were used to develop rating curves for different stations without justification. An open water rating curve developed through a HEC-RAS model (as described in Appendix 9B Hydraulic and Sediment Transport Modelling Summary Report) was used for station CR-WC-MS-03. 3. Eight of the ten rating curves developed are preliminary since a subset of two to five data points with the lowest water elevations for discharges were used when WSC (2016) recommends at least six data points for curves with a single segment; 4. Rating curve stage shifts due to aquatic plant growth in the streambed might be expected to follow an increasing pattern through the summer, and to be similar at the same period of different years. Neither of these signals is present in the stage shifts for the hydrometric stations, rather the shifts jump without following a pattern; 5. Rating curve stage shift above the base curve are expected due to backwater, however shifts below the base curve would need to be well documented as these might be caused by scour in the control section. Figure 18 shows three measurements (15-May-19, 18-May-19 and Jun-19) below the base curve at station CR-WC-MS-03 with no explanation offered. The text states that no levelling or discharge error or physical cause was identified for May 2020 and June 2020 readings below the base curve, but they are not plotted below the curve. 6. Rating curve equations are power relationships between the effective depth and discharge with a multiplier and an exponent. The exponent depends on geometry of the control section and is typically between 1.3 and 3 (WSC, 2016), with similar values for control sections with similar shapes. The open water rating curve for CR-WC-MC-04 has an exponent of 4.5, well above the typical range and no explanation has been provided for this unusual value. **Rationale:** The rating curves are used within the hydrologic model to create stream discharge time series. In turn, the model is used to determine	June 2020 at station CR-WC-MS-03 refer to those plotted as May and June 2019 in Figure 18 and provide supporting arguments for keeping the station location since there are indications of channel instability. 4. Provide rationale for the inconsistencies with best practices identified in points 3, 4 and 6 in the context and rationale column. Discuss any effects to the confidence in the rating curve. 5. Discuss how backwater effects are integrated into model predictions including lake levels, discharge estimates and wetted stream areas. 6. Discuss how uncertainty from the rating curves propagates in the hydrologic and subsequent models, and influences the confidence in the conclusions on effects. **Suggestions for mitigation and follow-up measures** The hydrometric monitoring program could be made more robust by including: • hydrometric stations to measure lake levels, particularly in Patterson Lake; • a regular schedule of field visits to monitor rating curve applicability and backwater; and under-ice flow measurements where possible, since discharge from the Project occurs year round and currently under ice flows are only estimated. **Discussion Required:** Yes Measurements of water level and discharge will rarely allow a perfectly fitted rating curve, particularly in low gradient streams. However, the noted inconsistencies with best practices (WSC, 2016) contribute to larger than expected uncertainty in the rating curves. The rating curves are at the base of a very complicated model and the impact to overall results is very difficult to ascertain.	▪ Backwater is a persistent challenge and unavoidable at several stations due to the low gradient between lakes in the Upper Clearwater River, where the Project is located. Additional baseline monitoring from 2020 to 2022 has improved the shifts used to address backwater at these stations. Responses to part 1 through part 6 of this IR are provided below. ***1. Explain why the rating curve formulae for stations CR-WC-MS-02 and CR-WC-MS-06 do not match the plotted lines:*** The rating curve at CR-WC-MS-02 is backwatered under most conditions and is influenced by the water level of Patterson Lake downstream. The reach of the Clearwater River between Jed Lake and Patterson Lake is short and of low gradient with little relief. The rating curve at CR-WC-MS-06 is seasonally backwatered by vegetation growth and water levels in the Clearwater River below the Mirror River Confluence. Rating curve formulae are for the base rating curve. The plotted lines represent rating shifts used to account for backwatered conditions. ***Specify where this data was used further:*** The rating curves presented are for converting continuous measurements of water surface elevation at the hydrometric station to discharge. The rating curves presented in Section 5.3 of Draft EIS Annex IV.2 (Hydrometric Monitoring Characterization Report) were not used in the hydrological model. The hydrological model does not calculate flows from watercourse water level using a rating curve for riverine sections. Rating curves were only used in the model at lake outflows as discussed in Section 9A3.7 of Draft EIS Appendix 9A (Hydrological Modelling Summary Report). Therefore, the rating curve equations for CR-WC-MS-02 and CR-WC-MS-06 were not used in the modelling for the Draft EIS. The observed discharge hydrograph that is presented in Figure 16 of Draft EIS Annex IV.2 for CR-WC-MS-02 was used for the purposes of model calibration at CR-WC-MS-02. The observed discharge hydrograph that is presented in Figure 28 of Draft EIS Annex IV.2 for CR-WC-MS-06 was used for the purposes of model calibration at CR-WC-MS-06. ***Discuss effects of updating the formulae:*** Updating the formulae with more recent measured data for CR-WC-MS-02 and CR-WC-MS-06 is not expected to have any effect on the results presented in the Draft EIS. Improvements to approach were made in 2021 and 2022 for the rating curves at both CR-WC-MS-02 and CR-WC-MS-06. Changes to the rating curve in 2021 and 2022 and adjustments to resultant hydrographs are not of a magnitude that would impact model calibration, hydrological model simulation results for baseline conditions, or hydrological effects assessment, nor propagate to other subsequent models. Therefore, updates are not required to the revised EIS.		15 and 27 respectively, do not correspond to the equations printed in the same figures. For example, using Figure 27, the open water rating curve line for CR-WC-MS-06 passes very near a water surface elevation of 97.4 m and a discharge of 8 m^3/s; however, using a water surface elevation of 97.4 m and a datum of 95.82 with the equation shown in the figure gives a discharge of 12.7 m^3/s (over 50% higher). The response to part one also includes two statements that appear to be in contradiction: “the rating curves […] were not used in the hydrological model” and “the observed discharge hydrograph […] was used for the purpose of model calibration […]”. However, both of those hydrometric stations are listed as calibration nodes in Table 9A-10 of Appendix 9A Hydrological Modeling Summary Report. The continuous discharge points shown in figure 9A-14 of the Hydrological Modelling Summary Report assume to be calculated from water surface elevations and a rating curve. In Appendix B Rating Shift Reports Annex IV.2: Hydrometric Monitoring Characterization Report, there are multiple rating shifts that are not associated with any discharge measurements and are not otherwise justified. For example, Table B-6 Rating Shift Report for CR-WC-MS-06, which happens to be a critical inflow to Patterson Lake, shows that in 2019 there were three rating shifts between July and August despite the only measurements that year being in May and October. These three rating shifts are not accompanied by written justifications such as a site visit or temperature needed for plant growth or senescence. **Rationale:** The rating curve formulae for stations CR-WC-MS-02 and CR-WC-MS-06 do not match the plotted line for the open water rating curve. An error could be propagated to other sections of the EIS. Correction of this error and confirmation that other rating curves have not been affected is required. The data in Annex IV.2 did not present a strong case for the chosen rating curves or the associated shifts. The Proponent’s IR response indicated that they have acquired additional field data that supports the rating curves and shift patterns. However, the data is not presented and therefore cannot be verified. Verification of the rating		for CR-WC-MS-01 to 06) are used in the hydrological model in the draft EIS Appendix 9A. Describe how the seasons with the most variable rating curve shifts (i.e. summer and fall) could be affected by this uncertainty.		

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				baseline conditions and Project effects on water levels and flow. Using more data points to fit the open water rating curve (see point 3), would likely result in lower estimates of baseline flows. If the baseline flows were lower, the proportional increase in flows due to the Project discharging mine water to the surface would be greater, changing the results in tables 9.6-5 to 9.6-7, 9.6-14 to 9.6-16 and 9.6-23 to 9.6-25 of the EIS and potentially the residual effects classification in Section 9.7. The stream width is an important factor when considering the river's navigability and wetted area contributes to describing fish habitat. Changes to both these stream channel parameters are discussed in Sections 9.4.3, 9.6.1.3, 9.6.2.3 and 9.6.3.3 for various scenarios in the EIS. There is no mention of variability of channel parameters due to backwater, so it is not clear if the percent change in wetted area of Tables 9.6-8, 9.6-17 and 9.6-26 account for these effects. The inconsistencies with best practices (WSC, 2016) contribute to larger than expected uncertainty in the rating curves, in subsequent studies that use that information, and ultimately the description of baseline conditions. The effect of this uncertainty on the Project residual effects is unclear. **Reference**: WSC - Water Survey of Canada, 2016, Hydrometric Manual – Data Computations, Stage-Discharge Model Development and Maintenance		***2. Provide justification for the use of different methods for determining rating curves at different sites, detailing how they are comparable.*** Different methods for determining rating curves were used at different sites where the ultimate use of the rating curve in further hydrological analysis differed: ▪ At station CR-WC-MS-03, additional information was available in the form of a 1-D HEC-RAS model. Additional data were collected and the model was developed to evaluate potential changes to river hydraulics and sediment transport and because this location was immediately downstream of the Project activities. ▪ Rating curves were developed for watercourse hydrometric stations as described in Section 4.5 of Draft EIS Annex IV.2 for the purpose of developing observed discharge hydrographs. ▪ Rating curves were developed during regional hydrology model development to calculate lake outflow as a function of lake storage. ***3. Clarify if the comment in the text regarding measurements below the open water rating curve in May and June 2020 at station CR-WC-MS-03 refer to those plotted as May and June 2019 in Figure 18 and provide supporting arguments for keeping the station location since there are indications of channel instability.*** NexGen notes that this text in Draft Section 5.3.1.3 of Draft EIS Annex IV.2 should have referred to 2019 rather than 2020. The revised EIS will be updated to correct this text by changing "May 2020 and June 2020" to "May 2019 and June 2019" in Section 5.3.1.3 of revised EIS Annex IV.2 (Hydrometric Monitoring Characterization Report). Given the high importance of Patterson Lake to the Project hydrological effects assessment, it is important to have a watercourse hydrometric station between Patterson Lake and Forrest Lake. Hydrometric station CR-WC-MS-03 is in a straight reach downstream of the Patterson Lake outlet and upstream of the Clearwater River Bridge. Downstream of the bridge, the reach of the Clearwater River between Patterson Lake and Forrest Lake is sinuous, with few straight reaches with laminar flow developed. The existing location is anticipated to the be the most stable location in the reach. ***4. Provide rationale for the inconsistencies with best practices identified in parts 3, 4 and 6 in the context and rationale column. Discuss any effects to the confidence in the rating curve.*** ***In response to part 3 and the need for more data points:*** NexGen agrees and has continued to collect data annually. The number of hydrometric points available at the time of the Draft EIS was subject to the baseline period and external events. Hydrometric monitoring began in August 2018 and continued in 2019 and 2020 following a seasonal schedule. Monitoring in 2020 was completed during exceptional lockdown conditions due to the COVID-19 pandemic. Further baseline hydrometric monitoring has since extended the number of points available; however, these additional data are		curves chosen and shift patterns is needed to develop a stream discharge time series, which is used to establish baseline conditions and subsequently assess Project effects on water levels and flow. Due to the combined backwater effect of downstream lake levels and weed growth in the channel, there is a need for frequent spot measurements to justify rating curve shifts. It may not be possible to establish a regular pattern at the site due to an insufficient availability of historical data. A commitment by the Proponent to measure discharge year-round would increase confidence in reported discharge values. The inconsistencies with best practices (WSC, 2016) contribute to larger than expected uncertainty in the rating curves. Since rating curves are used to estimate stream flow (discharge) from measured water levels, inaccuracies and uncertainties in the rating curves can lead to under or overestimates of water quantity. This uncertainty is carried into subsequent studies that use the information and ultimately cause uncertainty in the description of baseline conditions and residual effects. As such, accurate rating curves are critical for monitoring water quantity in streams related to water intakes and discharges to the environment. Intakes and discharges have the potential to impact water quality and fish habitat through changes in streamflow and effects on flow velocities, water depths, water temperature, suspended sediment concentrations, erosion, sedimentation, and other related factors. The hydrological model outputs are also used to evaluate the Project's resilience to extreme high and low flow events. Due to the uncertainty in the rating curves, the hydrological model outputs may under or overestimate extreme high and low flow events. As such, the Project's resilience to extreme events may be overstated, leading to accidental contaminant releases into the receiving aquatic environment which can negatively impact water quality, fish, and fish habitat.				

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						not anticipated to result in material changes to the hydrological model simulation results for baseline conditions or hydrological effects assessment, nor propagate to other subsequent models that were presented in the Draft EIS. Therefore, updates are not required to the revised EIS. ***In response to part 4 and seasonal shifts to account for vegetation growth:*** At station CR-WC-MS-04, the rating curve is influenced by the water level in Naomi Lake as well as vegetation effects. General conditions in 2018 and early 2019 were dry with associated low flows and water levels. General conditions in 2020 were wet with associated high flows and water levels. The influence of vegetation during these two years specifically is obscured by the variation in magnitudes of flow over this period. Monitoring since 2020 has improved characterization of the seasonal influence of aquatic plant growth, which does follow an increasing pattern through the summer before senescence in September. However, the additional data are not anticipated to result in material changes in the hydrological model simulation results for baseline conditions or the effects assessment, nor propagate to other subsequent models that were presented in the Draft EIS. Therefore, NexGen is confident in the current rating curve and updates are not required to the revised EIS. ***In response to part 6 and the exponent of the base rating curve being higher than the standard values:*** The reviewer is correct; the calibrated value of the exponent exceeds the general range of the exponent b represented in Table 1 of the *Water Survey of Canada hydrometric manual* (WSC 2016). This exceedance remains the case in subsequent years with additional data. The channel is wide, shallow, and impacted primarily by the difference in water surface elevation in the upstream and downstream lakes. In general, rating shifts have been further developed, and advancement of the hydrometric program has increased confidence in the existing results. Therefore, updates are not required to the revised EIS. ***5. Discuss how backwater effects are integrated into model predictions including lake levels, discharge estimates and wetted stream areas.*** Backwater effects were integrated into model predictions for lake outflow and associated lake level due to winter ice effects. Regional flow observations suggested that backwater from ice effects may cause flows to be overestimated by up to 20%. Ice effects were accounted for by applying a linear reduction in discharge with accumulated cold content based on ambient air temperatures following a degree-day threshold. Wetted stream areas were calculated directly from annual average discharge estimates. Backwater was not considered because stream channel parameters were evaluated on an annual average basis.						

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						6. Discuss how uncertainty from the rating curves propagates in the hydrologic and subsequent models and influences the confidence in the conclusions on effects. The uncertainty from the rating curves is not anticipated to have a meaningful effect on the hydrological model, subsequent models, or influence the confidence in the conclusion on effects. Improvements to the approach were made in 2021 and 2022 for all rating curves. Changes to the rating curves in 2021 and 2022 have not changed the resultant hydrograph enough to imply changes to model calibration. The resulting changes to the observed hydrographs are not of a magnitude that would impact model calibration, hydrological model simulation results for baseline conditions, or hydrological effects assessment, nor propagate to other subsequent models. Therefore, updates are not required to the revised EIS. With respect to the reviewer's suggested mitigation and follow-up measures, please see the below points: ▪ Hydrometric stations exist to measure lake levels at nine waterbodies (i.e., lakes), including Patterson Lake. The reviewer is directed to Section 3.0 of Draft EIS Annex IV.2. ▪ Additional baseline hydrometric monitoring has been completed in 2021 and 2022 since submission of the Draft EIS and is ongoing in 2023. ▪ As part of the ongoing baseline program, visits are conducted on a regular schedule including under ice-covered conditions in March. Additional regularly scheduled visits in winter months (i.e., December, January, February, and March) in the future will improve rating shifts required to characterize seasonally changing ice conditions. Revised EIS Annex IV.2 will be updated to correct the dates referenced in part 3 of this IR. As noted above, the adjustments to the observed hydrographs resulting from ongoing monitoring are not of a magnitude that would impact model calibration, hydrological model simulation results for baseline conditions, or the hydrological effects assessment. Nor would the adjustments propagate to subsequent models or assessments. Therefore, no other changes are proposed in the revised EIS to address this IR. <u>**References**</u> WSC (Water Survey of Canada). 2016. Hydrometric Manual – Data Computations, Stage-Discharge Model Development and Maintenance						
76	ECCC	Fish and fish habitat	Appendix 9A3.6.4 Current Climate Total precipitation data – model input	**Context:** Clarification on some of the climate input data and methods used in the hydrological assessment would help in understanding the Proponent's predictions for the Project, particularly into the far future. The hydrology assessment describes existing conditions and predicts Project effects on the hydrological regime. A hydrological model, which uses various inputs (e.g., historical climate data, hydrometric data, ,	1. Confirm if the ERA1, the ERA5 database or a combination of the databases was used for climate data. If both databases were used provide details on how the databases were compiled and where the complied dataset was used throughout the draft EIS. 2. Describe the procedure by which longer timeframes were obtained from ECMWF Re-analysis data.	NexGen notes that the data used in the hydrological assessment were the best available at the time of model preparation, planning, and execution. Site-specific, long-term historical meteorological data were not available near the proposed Project location. Further, in the regional hydrology model, storage and attenuation in soil and lakes throughout the hydrological system mean that the model response to individual daily events is attenuated. The hydrological system and response are more heavily influenced by precipitation totals at a monthly or seasonal scale.	n/a	**Part 1: Accepted** **Part 2: Accepted** **Part 3: Not Accepted** The comparison of total precipitation and mean temperature for the period from 1979 to 2019 was completed for nearby stations (Cree Lake, Cluff Lake, Key Lake and Fort McMurry). Total precipitation correlation analysis showed good correlation (R2>7)	76-R1		NexGen has provided the information below to address part 3 and part 7 of IR 76-R1. <u>**Part 3**</u> Regarding the daily time step of the hydrological model as it relates to climate input data, the Regional Hydrology Model was developed to support continuous simulations on a daily time step. Precipitation showed good correlation on a monthly scale. Agreement with locally measured temperature and other influential meteorological input variables other than precipitation was strong at a daily timescale. A daily timestep was required to effectively	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				precipitation etc.) was used to characterize the existing conditions and make predictions on future effects in order to inform the assessment of Project effects. Appendix 9A describes the methods used to conduct the hydrology assessment including hydrological modelling. . The following areas is describe where additional information will assist ECCC in assessing the model: -Medium-Range Weather Forecasts (ECMWF) Reanalysis database provides synthetic hourly climate data. The European Reanalysis Interim (ERA1) database consists of data spanning from January 1979 to July 2018 on a 50km spacing grid. The European Reanalysis 5 (ERA5) database consists of data spanning 1950 to present on a 30 km spacing grid. It is unclear which datasets were used, if a combination of the datasets were used or how the datasets were compiled. There was no detail provided on how longer timeframes (e.g., 24-hour) were inferred from the hourly data. -The synthetic data was verified by comparison with a locally collected data set spanning only 2 years but no rationale for the use of this methods was provided. Verification of the synthetic data using available observed data sets in combination with a weighted average algorithm for the Project location will yield more accurate data. -An assembly of climate time series data was also used in the hydrological model. It is not clear if the probability distribution of the sequential times series is the same, if the probability distribution was verified or how the time series distribution errors were considered. Understanding how probability distribution for the times series was verified helps to understand how the bias, which is directly related to time series and probability distribution was addressed. By forcing the modelled future data to maintain the past synthetic data, time series PD statistical errors of the past time series are propagated into the future generated data set model. Without an understanding of the limitations of the past data (which in itself was modeled), it is not possible to understand the limitations in the future modeled data. The same applies for value-biased corrections. -In several areas of the draft EIS both climate points (average over 30	Provide this information for 12 and 24-hour periods. 3. Provide rationale as to why a data set spanning two years was used for verification of the synthetic data rather than using available observed datasets in combination with a weighted average algorithm for the Project location. 4. Confirm that the sequential time series have the same probability distribution. Confirm if the time series sequences were verified for best fit probability distribution or if they were assumed to have the same probability distribution. 5. Clarify if the potential size of time series probability distribution errors was estimated due to statistical assumptions. 6. Describe where time series analysis versus climate data points were used in the hydrology and climate change assessments. **Discussion Required:** Yes. The hydrology assessment is based on a complicate hydrological model that has a number of inputs sources. Further discussion would help ECCC to assess the potential effects of the Project.	Responses to part 1 through part 6 of this IR are provided below. ***1. Confirm if the ERA1, the ERA5 database or a combination of the databases was used for climate data. If both databases were used provide details on how the databases were compiled and where the complied dataset was used throughout the draft EIS.*** The climate record was developed based on a combination of global reanalysis data, including the European Reanalysis Interim (ERAI) and European Reanalysis 5 (ERA5) datasets (i.e., global climate reanalysis datasets produced by the European Centre for Medium-Range Weather Forecasts) and local observations. The use of reanalysis products permitted the extension of the climate record beyond the measurement period for site data (i.e., 3 to 6 years, depending on parameter) to account for a broader range of natural variability over a 41-year period. Total precipitation, rainfall, and snowfall were based on ERAI data for the Project location from 1 January 1979 to 31 July 2018 and observations from the Rook I Meteorological Station for 1 August 2018 to 31 October 2020. Ambient air temperature, dew point temperature, wind speed, and net all-wave radiation were derived from the ERAI database from 1 January 1979 to 31 August 2019 (i.e., when ERAI was replaced by ERA5 data) and then from the ERA5 database from 1 September 2019 to 31 October 2020. Measured data collected on site were given priority if time series records from multiple sources overlapped. However, in some cases, further verification from stream flow records were used to screen and support selection of alternate data sources during periods of overlap. This compiled database was used in Draft EIS TSD XVIII (Site-Wide Water Balance and Water Quality Modelling Report) and the Draft EIS Appendix 9A (Hydrological Modelling Summary Report), with the results then being used for assessing potential effects in Draft EIS Section 10 (Surface Water Quality and Sediment Quality), Draft EIS Section 11 (Fish and Fish Habitat), Draft EIS Section 15 (Human Health), and Draft EIS TSD XXI (Environmental Risk Assessment). ***2. Describe the procedure by which longer timeframes were obtained from ECMWF Re-analysis data. Provide this information for 12 and 24-hour periods.*** Accumulated precipitation data over 12-hour intervals from 1 January 1979 to 31 August 2019 were downloaded from the Medium-Range Weather Forecasts data using the Python program. Data extraction and processing were completed using the MATLAB program. A similar approach was completed for smaller intervals. The procedure of aggregating data for longer time frames (i.e., 24-hour period data) from more frequent time frames was parameter dependent and completed using MATLAB. ***3. Provide rationale as to why a data set spanning two years was used for verification of the synthetic data rather than using available***		between ERA-I and Observed at monthly scale (poor correlation for daily or annual). The daily, monthly and annual temperatures showed strong correlation (R2>9). Nevertheless, the hydrologic model was run at daily time step with daily ERA-I data as input (Section 9A3.2) although the ERA-I data does not accurately represent observed data as this time scale. CNSC staff requests NexGen to provide justification why model was run at daily timestep instead of monthly and how this will not impact the hydrologic model outputs. In addition, it is not clear why ERA-I is preferred over MERRA-2 which was indicated to be better in quality than ERA-I (Section 22A4.1.2) used to characterize baseline climate (1981-2019) in Section 22A4.1 (Appendix 22A Climate Change Assessment). **Part 4: Accepted** **Part 5: Accepted** **Part 6: Accepted** **Part 7: Not Accepted** CNSC staff accepts that critical structures (self-contained contact water ponds) are to be designed using a PMP however the PMP value of 489.3mm is obtained from 1999 study **[A.1]**, based on historical rainfall data pre-1998, which appears to require an updated PMP value. Based on the response provided by NexGen it is difficult for CNSC staff to confirm whether the current PMP (489.3m) is conservative or not. Therefore, CNSC requests NexGen to use a PMP value that is estimated using updated historical rainfall data that includes the most up to date meteorological data or provide sufficient justification on the validity of the current PMP estimate. Reference: [**A.1**] Hopkinson RF. 1999. Point Probable Maximum Precipitation for the Prairie Provinces. Environment Canada Prairie and Northern Region. Report No. AHSD – R99 – 01. 54 p.			represent key physical processes included in the hydrological model such as atmospheric losses, snowmelt, canopy storage, surface / subsurface storage and routing, and lake storage routing. Given the characteristics of hydrological processes dominant in the region (e.g., highly permeable soils, subsurface storage routing lag) and considering the high degree of lake storage routing lag, potential variation on a daily time scale is expected to be minor. The attenuated watershed response to precipitation inputs implies that multi-day, monthly, and seasonal alignment are more important drivers of regional hydrology in continuous model simulations than specific daily values in isolation. Consequently, daily fluctuations in precipitation do not affect the model's ability to predict potential Project effects to waterbody surface elevation, watercourse flow rate, stream channel parameters, and fluvial sediment transport. Therefore, the use of daily rather than monthly flow inputs is not expected to influence results of hydrological modelling or the conclusions of the hydrology assessment. Regarding the use of European Reanalysis 5 (ERA5) data published by the European Centre for Mid-Range Weather Forecasting (ECMWF) over the Modern-Era Retrospective analysis for Research and Applications, Version 2 (MERRA-2) data, NexGen notes that ERA5 is the latest climate reanalysis produced by ECMWF, providing hourly data on many atmospheric, land-surface, and sea-state parameters together with estimates of uncertainty. ERA5 has better temporal coverage over selected climate stations and higher spatial resolution than MERRA-2. In addition, previous experience from WSP working on Canadian sites has shown better rainfall estimates with ERA5 relative to MERRA-2. **Part 7** As presented in the response to IR 47-R1, NexGen notes that the probable maximum precipitation (PMP) value (i.e., 489.2 mm) adopted for the Draft EIS was based on a meteorological method derived from persistent dew point temperatures rather than historical rainfall events. As this method does not rely on statistical analysis of historical rainfall events, inclusion of more recent rainfall data will not impact the PMP estimate. Therefore, NexGen maintains that the approach used to determine the PMP is appropriate and conservative, and no change is required for the revised EIS. NexGen notes that the design bases and management strategies for site water management infrastructure designed to accommodate a 24-hour PMP event have been included in the licence application for the Project and would be subject to review and revision (as required) throughout the Project lifespan. If the size of the 24-hour PMP were to change as a result of climate change during the Project lifespan, mechanisms within the CNSC licensing process would require revisions to the site water management design bases and associated infrastructure (as required) to ensure adequate containment of mineralized contact water during extreme precipitation events and to maintain protection of the environment.	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				years) and time series analysis were referenced. It is unclear where climate points and where time series analysis were used in the assessments. **Rationale:** The draft EIS does not provide enough detail surrounding the current climate data used in the hydrology assessment for ECCC to assess the predicted effects of the Project particularly into the far future.		***observed datasets in combination with a weighted average algorithm for the Project location.*** Long-term historical meteorological data are not available near the proposed Project location. Meteorological monitoring at the Project began in 2015, and the Rook I Meteorological Station was expanded in 2018 to include additional parameters. A long-term meteorological record for the Project was developed for the years 1979 to 2017 using a combination of data from meteorological stations near the Project as well as global reanalysis products including ERAI data sourced from a numerical weather prediction system. Historical meteorological data were compiled from Environment and Climate Change Canada (ECCC) stations within 225 km of the Project, including Fort McMurray, Cree Lake, Key Lake, and Cluff Lake. A weighted average algorithm was not anticipated to account for the main geographic factors influencing climate in the region. Draft EIS Annex IV.1 (Regional Meteorological and Hydrological Characterization Report) provides comparisons of ERAI global reanalysis data to nearby stations. The ERA5 data was published following the initial data compilation for the Project. At the time of initial data compilation, only ERAI data were available. The comparison was not reproduced for ERA5. Differences between ERAI and ERA5 data are not anticipated to result in material changes to the Draft EIS. Therefore, updates are not required in the revised EIS. ***4. Confirm that the sequential time series have the same probability distribution. Confirm if the time series sequences were verified for best fit probability distribution or if they were assumed to have the same probability distribution.*** Where local station data were available, these data were used. The time series sequences were evaluated at the regional station locations based on summary statistics at time scales greater than daily. The sequential time series used for record extension based on global reanalysis data at the geographic location of the site were assumed to have a similar probability distribution. ***5. Clarify if the potential size of time series probability distribution errors was estimated due to statistical assumptions.*** The potential size of time series probability distribution errors due to statistical assumptions was not estimated and was not required for this task. Given the characteristics of hydrological processes dominant in the region (e.g., highly permeable soils, subsurface storage routing lag, lake storage routing lag), potential variation in the probability distribution is expected to be minor and therefore is not expected to influence results of hydrological modelling or effects assessment. ***6. Describe where time series analysis versus climate data points were used in the hydrology and climate change assessments.*** The assessment cases are based on time series analysis rather than climate data points. A combination of time series analysis and event-based data (i.e., climate data points) were used in the site-wide water balance modelling (Draft EIS						

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						XVIII). The time simulation modes used for climate in the site-wide water balance model are explained in Section 3.2.2.2 of Draft EIS TSD XVIII, and described briefly for each scenario in Table 8 of Draft EIS TSD XVIII. All site-wide water balance modelling scenarios that provided data for effects assessment were based on time series analysis. ***7. The length of time used for the Time Series Analysis of the observation data resulted in a shorter Time Series used by the Proponent at all locations. This shorter verification period could lead to inaccurate estimations of probable maximum precipitation (PMP), therefore a longer analysis length should be used. If a longer analysis length isn't available the Proponent should use verified site observations using data from nearby weather stations capable of producing results with a longer time series, provide the methodology used to derive the results, and update the PMP definition to match that of the World Met Org (2009) to reflect the change in the time series.*** NexGen notes that the question stated in part 7 of this IR response was not submitted to NexGen as part of the original IR, though has been created to address comments received from ECCC via email on 12 July 2023. These comments were received following additional discussion conducted with the CNSC and ECCC (as requested in the original IR). The probable maximum precipitation (PMP) adopted for the Draft EIS is based on published values conventionally used for uranium mines in northern Saskatchewan but adjusted for the location of the proposed Project. The PMP was adopted based on the PMP rationale from Hopkinson (1994). The PMP does not strictly follow the PMP estimation method using the World Meteorological Organization (WMO 2009) approach based on time series. There is precedent for use of the PMP from Hopkinson (1994), adjusted for location, at all of the operating uranium mines in northern Saskatchewan. Experience suggests that the PMP rationale and value adopted for the Draft EIS is conservative relative to the values that would be derived using the WMO (2009) method. Additional detail is available in NexGen's response to IR 47. No changes are proposed in the revised EIS to address this IR. **References** Hopkinson RF. 1994. Point Probable Maximum Precipitation in Northern Saskatchewan. Environment Canada – Canadian Climate Program. Report No. CSS – R94 – 01. WMO (World Meteorological Organization). 2009. Manual on Estimation of Probable Maximum Precipitation (PMP). WMO-no. 1045, 291 pp.						
78	ECCC	Fish and fish habitat	Section 10.2.6	**Context:** Baseline surface water and sediment quality throughout the	1. Provide baseline information on wetland surface water and sediment quality characterization for wetlands	Responses to part 1 and part 2 of this IR are provided below.	Appendix 23B	**Context:** The Proponent has addressed both items from the original IR in their	78-R1	1. Update the water quality modelling and environmental risk assessment using baseline data from wetlands adjacent to the Project for water	NexGen acknowledges that information previously provided in response to this IR could have been more clearly stated. Specifically, NexGen confirms that although	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
		Change to an environmental component due to hazardous contaminants	Section 10.4.2 Section 10 Appendix 10A	Local Study Area (LSA) and Regional Study Area (RSA) are discussed within this section and sampling locations are presented in Figure 10.2-4 pg. 1601 of the EIS. However, no baseline information is provided about wetlands within the LSA and Project footprint. The location of wetlands within the Project footprint, as well as the other wetlands existing within the LSA can be confirmed from Annex V11.2: Vegetation Baseline Report 2 (Inventory, Rare Plants and Wetlands), including the wetland classifications. There is no consideration of wetlands or potential effects to wetland surface water or sediment quality throughout the surface water and sediment quality assessments and surface water quality modelling report in Appendix 10A. **Rationale:** There is currently not enough information provided for ECCC to provide advice on the potential risks of the proposed Project to wetland surface water and sediment quality within the LSA. This pathway of effects is important to assess in terms of potential impacts to wetland habitat availability and effects to terrestrial and aquatic receptors. Potential effects from Constituents of Potential Concern (COPCs) and radionuclides to surface water and sediment, or potential effects to ecological receptors within wetlands have not evaluated.	within the Project footprint, including physiochemical parameters and particle size for sediment. 2. Provide an assessment of potential effects to surface water and sediment quality for wetlands within the LSA and potential effects to ecological receptors during all phases of the proposed Project.	1. Water quality and sediment quality baseline information applicable to wetlands within the local area of the Project was not collected for the water quality and sediment quality assessment in the Draft EIS. Within the proposed Project footprint, there are no wetlands that would be physically disturbed; some small wetland areas exist within the southwest portion of the maximum disturbance area; however, NexGen designed the proposed site access road footprint to avoid this wetland area. Therefore, no additional baseline wetland information other than what has been provided in Draft EIS Section 13.3.2 (Wetland Ecosystems) is currently available. 2. The potential for effects on wetland ecosystems in the local study area (LSA) and regional study area (RSA) during all phases of the proposed Project was evaluated in the terrestrial component of the Draft EIS; specifically, Draft EIS Section 13 (Vegetation). Wetlands evaluated in the Draft EIS included those in close proximity to the Project, the largest of which is to the east of the Project and extends from Patterson Lake North Arm – East Basin, through Lake G, across the north end of Forrest Lake, and to the outlet area of Naomi Lake (Figure 13.3-3 of Draft EIS Section 13.3.2.2 [Ecosystem Distribution]). There are additional small wetland areas along the south shore of Patterson Lake North Arm – West Basin that are within the maximum disturbance area. Draft EIS Section 13 assessed the potential for the Project to affect wetland ecosystems in the LSA and RSA through the following pathways: Pathway ID V-01 (Direct loss), Pathway ID V-04 (Fugitive dust and constituent emissions), Pathway ID V-05 (Particulates and acid emissions), Pathway ID V-08 (Surface water flow changes), Pathway ID V-09 (Surface water quality from runoff), Pathway ID V-10 (Treated effluent discharge), and Pathway ID V-13 (Groundwater and soil quality changes from seepage). Direct loss of wetland ecosystems in the RSA was determined as a primary pathway; however, effects on wetland ecosystems from changes in surface water flow and/or changes in the quality of surface flows or groundwater, and changes from Project discharges to Patterson Lake, were determined to be no pathways or secondary pathways. The primary effects assessment of the Project on the direct loss of wetland ecosystems through disturbance, alteration, and fragmentation is presented in detail in Draft EIS Section 13.5.2 (Wetland Ecosystems). The analysis of no pathway and secondary pathways for wetland ecosystems is provided in Draft EIS Section 13.4 (Project Interactions and Mitigations). The secondary pathways that describe and analyze the potential effects on wetlands from changes to water levels, runoff quality, air emissions, and discharge of treated effluent, including seepage, from the Project are Pathway ID V-04, Pathway ID V-05, Pathway ID V-08, Pathway ID V-09, and Pathway ID V-10, which are presented in Draft EIS Section 13.4.2 (Secondary Pathways). Changes in surface flows and water quality in wetlands from Project discharges to Patterson Lake were projected to result in		response; the Proponent has confirmed that no water quality or sediment quality baseline data within wetlands was collected or utilized in the water quality or sediment quality assessments. Additionally, the Proponent has confirmed that potential effects to wetlands within the Local Study Area (LSA) and Regional Study Area (RSA) were only evaluated as pathways for vegetation valued components within the terrestrial component of the draft EIS Section 13. While the potential exposure pathways evaluated may remain the same (i.e. effects from deposition of effluent), the potential effects to fish and fish habitat as a valued component, including to surface water and sediment quality as intermediate components which will affect fish and fish habitat, may differ and must be confirmed. **Rationale:** The Proponent has provided little information regarding baseline surface water and sediment quality for wetlands and has not assessed potential effects to surface water and sediment quality within wetlands. However, the Proponent has agreed to collect water level, water quality and sediment quality sampling data from wetlands adjacent to the project footprint and representative wetlands within the LSA. This data can be utilized to refine predictions of potential effects to wetland surface water and sediment quality, resulting in more accurate predictions of the likelihood of adverse direct effects to aquatic receptors and indirect effects within the pathway of consumption of aquatic receptors in wetlands through to higher trophic level species.		levels, water quality and sediment quality. With consideration of this new data, confirm predictions of negligible effects to the aquatic environment and aquatic receptors. If additional corrections are required, detail any other report sections that are affected and ensure that all sections impacted by the error are updated. 2. Incorporate information regarding the analysis of potential surface and sediment quality within wetlands and potential effects to fish and fish habitat within the LSA and RSA within Section 10 of the EIS.	wetland water quality and sediment quality baseline data were not collected for consideration in the EIS, NexGen has a high degree of confidence that the EA presents conservative results of Project effects to the environment, including potential effects to wetlands, fish and fish habitat, and ecological and human health. The commitment included in the response to IR 78 to conduct water level, water quality, and sediment quality sampling and monitoring of wetlands within and adjacent to the Project footprint and representative wetlands within the LSA, as appropriate, is to help form detailed recommendations for follow up monitoring during the life of the Project, if necessary. No further assessment in the EA is proposed or required. To provide further context on how potential effects have been assessed, the following information has been generated to address both part 1 and part 2 of IR 78-R1. NexGen confirms that riparian wetlands adjacent to Patterson are not anticipated to be disturbed by the Project, and baseline water quality and sediment quality data collected in Patterson Lake are expected to be representative of baseline water quality and sediment quality in the riparian wetlands. However, while not required for the EA, NexGen is planning to collect water quality and sediment quality samples from riparian wetlands, as appropriate, prior to Project Construction NexGen further notes that the focus of Draft EIS Section 10 (Surface Water Quality and Sediment Quality) is to provide a description of Project effects and cumulative effects, including consideration of reasonably foreseeable developments, on the surface water quality and sediment quality intermediate components. Information regarding changes to valued components (VCs) due to changes to the surface water quality and sediment quality environments has been appropriately considered in the relevant discipline assessments. For the wetland ecosystem VC, the assessment is provided in Draft EIS Section 13 (Vegetation), and for the fish and fish habitat VCs, the assessment is provided in Draft EIS Section 11 (Fish and Fish Habitat). NexGen confirms that changes to wetlands as a result of changes to water quality and sediment quality was considered in Draft EIS Section 13.4.2 (Secondary Pathways), including Pathway ID V-04 (Fugitive dust and constituent emissions), Pathway ID V-05 (Particulates and acid emissions), Pathway ID (Surface water quality from runoff), Pathway ID V-10 (Treated effluent discharge), and Pathway ID V-11 (Surface water quality from WRSAs [waste rock storage areas] and UGTMF [underground tailings management facility] after Closure). No modelled water quality constituents or parameters exceeded their respective threshold values during Operations for the nearfield and regional assessments. In the far future, cobalt exceedances were predicted for Patterson Lake North Arm – West Basin and Patterson Lake South Arm, and copper exceedances were predicted for Patterson Lake North Arm – West Basin. As changes to water quality were predicted, an ecological risk assessment was completed to determine the health risks to aquatic plant receptors. The risk assessment considered effects for the far-future and upper-bound scenarios. Results indicated that predicted changes in surface water quality for the upper bound scenario would not cause adverse effects on the health of aquatic plants (i.e., macrophytes, such as sedges and bulrush, and phytoplankton). In the far future, only copper has the potential to exceed the Project hazard quotient threshold of 1, which is limited spatially to the near field in Patterson Lake and limited in magnitude to just	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						measurable minor changes to the condition of wetland ecosystems relative to existing conditions and be limited to the maximum disturbance area. For these pathways, and all other potential secondary effects pathways, the implementation of environmental design features and mitigation measures resulted in a determination of negligible residual effects on wetland ecosystems. Overall, effects to the wetlands ecosystems valued component were predicted to be not significant. To confirm the prediction of negligible effects on wetlands, NexGen will conduct water level, water quality, and sediment quality sampling and monitoring of wetlands within and adjacent to the Project footprint and representative wetlands within the LSA. From the results of these surveys, a detailed recommendation for follow-up monitoring during the life of the Project would be developed, if necessary. This commitment will be added to Table 23B-1 of revised Appendix 23B (Environmental Assessment Monitoring and Follow-Up Programs Proposed for the Project).					above the benchmark for the upper bound sensitivity scenario. However, these exceedances are not predicted to occur for aquatic plants. Therefore, changes to wetland vegetation as a result of changes to water quality or sediment quality are predicted to be negligible. With respect to fish and fish habitat, changes to water quality and sediment quality during the Project lifespan were considered in Draft EIS Section 11.4.2 (Secondary Pathways), Pathway ID F-13 (Project activities affecting water and sediment quality and aquatic health). As noted above, modelled water quality constituents or parameters were predicted to remain below Project specific water quality threshold values in both the Application Case and the reasonable upper bound scenario. The ecological risk assessment concluded that effects during the Project lifespan are not expected to result in adverse effects on the health of fish and lower trophic organisms. Effects to fish and fish habitat in the far future were considered in Draft EIS Section 11.5 (Residual Effects Analysis). The ecological risk assessment concluded that effects to fish and fish habitat VCs and lower trophic organisms as a result of changes to water quality in the far future would be minor for most water quality constituents and parameters. However, the hazard quotient for copper would exceed 1 in Patterson Lake North Arm – West Basin. To assess effects further, an aquatic health assessment was also conducted. The aquatic health assessment concluded that effects on the health of fish due to direct exposure to copper in the water column are not expected for predator fish (e.g., lake trout, walleye, northern pike) and are unlikely for forage fish (e.g., lake whitefish). These changes in habitat quality are considered unlikely to measurably affect the survival and reproduction of fish VCs. Therefore, effects to fish and fish habitat VCs were predicted to be not significant. NexGen confirms that as part of monitoring and follow up, an Environmental Monitoring Plan would be implemented to mitigate Project effects and apply adaptive management, where necessary. The Environmental Monitoring Plan would be developed in accordance with the Metal and Diamond Mining Effluent Regulations (MDMER) for metal and diamond mining environmental effects monitoring (EEM), the federal *Fisheries Act*, the CNSC operating licence, and the ENV operating approval requirements. The key components of the aquatic ecology environmental monitoring program are expected to include water and sediment quality, benthic invertebrates, and fish. With respect to the specific issue of copper loading from the potentially acid generating waste rock storage area to Patterson Lake in the far future, NexGen is developing an adaptive management plan to reduce uncertainty and manage risks related to this pathway (Draft EIS Section 11.7 [Monitoring, Follow-Up, and Adaptive Management). As the technical assessments requested by the reviewer in this IR are presented in the Draft EIS, no changes are required in the revised EIS. **References** Fisheries Act. R.S.C., 1985, c. F 14. Last amended 28 August 2019. Available at https://laws-lois.justice.gc.ca/eng/acts/f-14/. Metal and Diamond Mining Effluent Regulations. SOR/2002-222 under the *Fisheries Act*. Last amended June 18, 2020. Available at https://laws-lois.justice.gc.ca/eng/Regulations/SOR-2002-222/index.html.	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
79	ECCC	Fish and fish habitat Change to an environmental component due to radiological contaminants	Section 10.2.8.2.1	**Context:** This section discusses the elimination of chemical constituents from further analysis in water quality modelling for the Project. ECCC acknowledges the rationale provided by the Proponent for eliminating thallium and Dissolved Organic Carbon (DOC) as Constituents of Potential Concern (COPCs) for further assessment in the pathways analysis. Total ammonia is included for assessment, but un-ionized ammonia is not. Despite the provided rationale, due to requirements under the *Metal and Diamond Mining Effluent Regulations* (MDMER) for effluent testing and receiving environment monitoring, it is recommended that thallium, DOC, and un- ionized ammonia be carried forward for a complete assessment of all required monitoring parameters under the MDMER. **Rationale**: ECCC recommends that thallium, DOC and un-ionized ammonia be screened in as COPCs for further assessment in the pathways analysis and water quality modelling due to requirements under the MDMER Schedule 4 and Schedule 5 Sections 4(1), 7(1) and 12(1)(ii) for environmental effects monitoring. ECCC recommends that these parameters, as well as hydrocarbons, be included in the larger set of constituents that surface water quality monitoring would be conducted for.	Assess un-ionized ammonia, thallium and DOC in the pathways analysis and surface water quality modelling for the surface water quality assessment. **Suggestions for mitigation and follow-up measures** Un-ionized ammonia, thallium, DOC and hydrocarbons should be included in follow-up surface water quality monitoring.	NexGen acknowledges that a number of water quality constituents that are typically measured in general or regulated monitoring programs were not carried forward into the surface water quality assessment (Draft EIS Section 10 [Surface Water Quality and Sediment Quality]). NexGen confirms that not carrying these constituents forward does not mean they were not considered or overlooked; the exclusion specifically identifies these constituents are not anticipated to change in the receiving environment as a result of the Project and are predicted to remain below guidelines during the life of the Project and/or into the far-future scenario. Nevertheless, in addressing each of the listed constituents in this IR (i.e., un-ionized ammonia, thallium, dissolved organic carbon [DOC], and hydrocarbons), NexGen confirms: ▪ Un-ionized ammonia was considered in the surface water quality assessment for the Application Case and Reasonably Foreseeable Development Case as a component of total ammonia (Draft EIS Appendix 10A [Surface Water Quality Modelling Report], Attachment 10A-1a and Attachment 10A-2). In the background surface water quality characterization, and near-field and regional surface water quality modelling, total ammonia incorporates the sum of the un-ionized ammonia (NH_3) and ionized ammonia (NH_4^+) species in the measurable concentration, which exist in equilibrium in water. Within the assessment, the un-ionized fraction of the total ammonia was estimated at various instances based on ambient water temperature and pH and vice versa. Therefore, un-ionized ammonia was considered in the assessment, but total ammonia was reported. NexGen will provide additional clarity regarding ammonia and unionized ammonia in the surface water quality assessment in revised EIS Section 10.2.8.2.1 (Surface Water Quality Constituents of Potential Concern) and include both fractions in the assessment figures and tables in revised EIS Appendix 10A (Surface Water Quality Modelling Report), where appropriate. ▪ Thallium was evaluated as a constituent of potential concern (COPC) but was not carried forward in the surface water quality assessment (Draft EIS Section 10.2.8.2.1) because: o thallium was not identified as a deleterious substance under Metal and Diamond Mining Effluent Regulations (MDMER); o where source term data were available, thallium concentrations were generally non-detectable and below current applicable guidelines; and o where source term data for thallium were not available, it was assumed based on the available source data that any contributions from other sources would similarly be negligible. NexGen maintains that an update to the surface water quality assessment for the inclusion of thallium in the modelling is not required. ▪ Dissolved organic carbon was not carried forward in the assessment because baseline concentrations were low and the Project is not expected to be a notable source of DOC (i.e., organic carbon is not expected to be an additive in the effluent treatment	Section 10.2.8.2.1; Appendix 10A	**Context:** The Proponent has provided additional context regarding excluded parameters from surface water quality modelling and assessment with the exception of thallium. In their IR response the Proponent states that thallium is not expected in significant concentrations in effluent, however, this claim was not confirmed with predicted effluent concentration data and is not currently presented in effluent characterization tables. Because thallium was eliminated from further assessment based on the view that there will be no significant concentrations in effluent, there was no consideration of baseline concentrations of thallium in the receiving surface water and sediment quality. In Section 10.3.1 Water Quality and 10.3.2 Sediment Quality for existing conditions in the receiving environment there is no baseline data on thallium. In Appendix 10A Surface Water Quality Modelling Report Attachment 10A-1 Background Water Quality Characterization there is no baseline water quality data provided for thallium for any of the sampling locations within the Local and Regional Study Area. Regardless of whether thallium could potentially be screened out of later stages of the assessment, baseline concentrations of thallium in the receiving environment are required to validate that there are no baseline exceedances of water quality guidelines (i.e. Elevated background concentrations) of thallium in the existing receiving environment and to establish a baseline for comparison against future monitoring. Effluent characterization data and surface water quality modelling for thallium should be provided for review to confirm that concentrations in effluent will not result in negative effects to the receiving environment and aquatic receptors. **Rationale:** Baseline data on thallium concentrations in water quality in the receiving environment are needed to verify that there are no elevated background concentrations of thallium and are needed for comparison against future monitoring and to inform surface water quality modelling. To confirm predictions that thallium will not result in negative effects to fish and fish habitat, predicted effluent concentrations and surface water quality modelling of thallium concentrations are needed.	79-R1	1. Provide baseline receiving environment surface water quality data for thallium and the predicted effluent concentrations of thallium. 2. Update the surface water quality assessment and modelling as needed to incorporate data on thallium to confirm predictions of no adverse effects to the aquatic receiving environment. If additional corrections are required, detail any other report sections that are affected and ensure that all sections impacted by the omission of thallium data are updated.	The following response has been drafted to address both part 1 and part 2 of the IR. 1. NexGen confirms that baseline surface water quality data for thallium is included in Appendix A of Draft EIS V.1 (Aquatic Environment Baseline Report). In response to the request from the reviewer, information is further summarized in Attachment IR 49-R1, 79-R1, and 82-R1, which includes a discussion regarding the potential sources of thallium in effluent. 2. As described in Attachment IR 49-R1, 79-R1, and 82-R1, NexGen confirms that thallium does not represent a constituent of potential concern for the Project. Based on the measured concentrations of thallium in the baseline aquatic environment and in potential effluent sources, NexGen has confirmed that there is no potential for adverse effects to aquatic receiving environment and receptors with regards to thallium. Therefore, updates to the surface water quality assessment and modelling or any other report sections in the EIS are not required.	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						plant process). Further, DOC is also not a surface water quality constituent that is typically modelled in assessments. NexGen maintains that an update to the surface water quality assessment for the inclusion of DOC is not required. ▪ Hydrocarbons were not included as a COPC given the lack of any background data or likely notable Project source contributions to the receiving environment. NexGen maintains that an update to the surface water quality assessment is not required for hydrocarbons. Despite thallium, DOC, and hydrocarbons not being carried forward as COPCs in the surface water quality assessment (Draft EIS Section 10) and Draft EIS TSD XXI (Environmental Risk Assessment), NexGen confirms that ammonia (both total and un-ionized forms), thallium, DOC, and hydrocarbons would be included in verification and follow-up surface water quality monitoring programs for the Project. Monitoring commitments, such as meeting MDMER requirements, are presented in Draft EIS Section 10.7.2 (Surface Water Receiving Environment Monitoring). As noted above, NexGen will provide additional clarity regarding ammonia and un-ionized ammonia in revised EIS Section 10.2.8.2.1 and in revised EIS Appendix 10A, where appropriate. **References** Metal and Diamond Mining Effluent Regulations. SOR/2002-222 under the *Fisheries Act*. Last amended June 18, 2020. Available at https://laws-lois.justice.gc.ca/eng/Regulations/SOR-2002-222/index.html						
81	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 10.2.8.2.2 Section 10.3.2	**Context**: The Proponent has provided a list of total metals and radionuclides that were carried forward for the quantitative sediment quality assessment and modelling in the Environmental Risk Assessment (ERA). The Proponent states that these were determined based on the corresponding water quality constituents having the potential to exceed baseline values and availability of guidelines. Due to requirements for environmental effects monitoring under the *Metal and Diamond Mining Effluent Regulations* (MDMER) total Organic Carbon (TOC) must be screened for further assessment and modelling. Additionally, based on baseline condition data provided in Section 10.3.2 for sediment quality, barium, iron, manganese and vanadium should be screened in for further assessment as these metals had the highest concentrations in sediment within Patterson Lake and Naomi Lake. **Rationale:** Due to requirements under the MDMER Schedule 5 Sections	1. Include TOC in further assessments in the ERA and sediment quality modelling for the sediment quality assessment. 2. Include barium, iron, manganese and vanadium in further sediment quality assessment and modelling.	NexGen acknowledges the request, and at this time, NexGen maintains that the constituents of potential concern (COPC) screening in the Draft EIS was reasonable and appropriate, and that there is no reason to add total organic carbon (TOC), barium, iron, manganese, or vanadium to a future sediment quality assessment. The screening applied in Draft EIS Section 10.2.8.2 (Constituents of Potential Concern) and in Section 4.2.3 of Draft EIS TSD XXI (Environmental Risk Assessment) indicated negligible risk of the Project to incrementally change the concentration of these sediment constituents in the receiving environment through all phases of the Project to levels that would exceed reference values or guidelines and thus pose a risk to the environment. Specifically, NexGen notes: 1. Total organic carbon was not included in the sediment quality assessment because the Project discharges to Patterson Lake are not expected to be a substantial source of TOC due to the milling and ore processing and water treatment processes on site (i.e., discharges will predominantly be composed of inorganic constituents, and there are minimal organic additives in mine processes/treatment). Therefore, TOC was not identified as having the potential to adversely change sediment quality or surface water quality in the receiving environment, and thus TOC did not screen in as a COPC. Similarly, TOC did not screen in as a COPC for the environmental risk assessment (ERA) (Draft EIS TSD XXI).	n/a	**Context:** The Proponent has responded to both parts of the original IR and has provided rationale for the exclusion of Total Organic Carbon (TOC), barium, manganese and vanadium from further assessment in sediment quality modelling and the Environmental Risk Assessment. However, based on requirements of CSA N288.6-22, iron should be evaluated further due to exceedances of water quality guidelines in baseline surface water quality data and the potential negative effects this may have on the receiving environment. In Section 10.3.1.2, iron was identified as having baseline water quality threshold exceedances in eight waterbodies and watercourses throughout the Local and Regional Study Areas including Patterson Lake. As per CSA N288.6-22 Section 7.2.5.4.2: "If COPCs exceed the screening level for one medium, they should be carried forward into the EcoRA [ecological risk assessment] for all media that are likely to contribute to exposure. For	81-R1	Iron should be included in the exposure assessment portion of the ERA and the sediment quality modelling for the sediment quality assessment.	NexGen concurs with the reviewer that if a constituent of potential concern (COPC) exceeds screening criterion in one medium, it should be assessed for all media that are likely to contribute to exposure points (CSA N288.6-22, Section 7.2.5.4.2 [CSA Group 2022]). NexGen confirms that, for constituents that were identified as COPCs in the Draft EIS (i.e., exposure situations that exceeded a screening criterion), this guidance was followed for the environmental risk assessment (ERA). All COPCs identified in surface water (Draft EIS Section XXI [Environmental Risk Assessment], Section 4.2.3.2) were also assessed in sediment (Draft EIS Section XXI, Section 4.2.3.3), and vice versa, as well as in additional food chain pathways. With respect to iron, it is important to note that an updated Federal Environmental Quality Guideline (FEQG) has been drafted that follows the CCME species sensitivity distribution protocol (ECCC 2019). The updated guideline is dependent on dissolved organic carbon (DOC) and pH. For a pH of 7.0 and using the lower end of the site-specific DOC range from 2.4 mg/L to 13 mg/L (Draft EIS Appendix 10A [Surface Water Quality Modelling Report], Section 10A3.2), the calculated FEQG is 1,588 µg/L for a DOC of 2.4 mg/L. The equation utilized is as follows: FEQG (µg/L) = exp(0.671[ln(DOC)] + 0.171[pH] + 5.586). Under the most recent draft FEQG for iron, there would be no baseline exceedances of iron in the waterbodies in the LSA and RSA, and there would be no need to identify iron as a COPC. NexGen acknowledges that the CCME guideline for iron is 0.3 mg/L; however, this guideline was	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				12(1)(ii) for environmental effects monitoring of benthic invertebrate communities, TOC must be screened in for further assessment and modelling. Due to elevated concentrations of barium, iron, manganese and vanadium in sediment concentrations within Patterson Lake and Naomi Lake, it is recommended that these metals be included for further sediment quality assessment and modelling.		2. Based on the aquatic baseline report (Draft EIS Annex V.1 [Aquatic Environment Baseline Report]), the only constituents that exceeded sediment quality guidelines in the background characterization monitoring were arsenic, cadmium, lead-210, polonium-210, and vanadium, the last of which is limited to Naomi Lake and the Clearwater River (Draft EIS Annex V.1, Appendix C, Table 27). With the exception of vanadium, the constituents that exceeded sediment quality guidelines in baseline were considered further in the screening assessment in Section 4.2.3.3 of Draft EIS TSD XXI. Of these constituents, arsenic, molybdenum, lead-210, and polonium-210 screened in as COPCs for quantitative assessment in the ERA (Draft EIS TSD XXI, Section 6). Vanadium was excluded from the screening assessment in the Draft EIS TSD XXI because the only exceedances of the sediment quality guideline occurred in a downstream waterbody that would not have a direct discharge from the Project (i.e., Naomi Lake and downstream) and because Project inputs via the water pathway did not indicate the potential for background levels to change in the receiving environment. At this time, NexGen maintains that the COPC screening was reasonable and that there is no need to add barium, iron, and manganese to future assessments because the screening applied in Draft EIS Section 10.2.8.2 and in Section 4.2.3 of Draft EIS TSD XXI indicated negligible risk of the Project to incrementally change the sediment quality in the receiving environment to levels that exceed reference values or guidelines. However, if future sediment monitoring, including monitoring associated with the environmental effects monitoring of benthic invertebrate communities per Schedule 5 of Metal and Diamond Mining Effluent Regulations (MDMER), indicates different conditions or the effluent treatment system includes substantial amounts of an organic additive, the COPC list will be re-evaluated. As per the MDMER, sediment quality constituents, which include TOC as well as barium, iron, manganese, and vanadium, will be reported in the First Interpretive Report not later than 36 months after the day on which the mine becomes subject to Section 7 of the MDMER. Monitoring commitments, such as meeting MDMER requirements, are presented in Draft EIS Section 10.7.2 (Surface Water Receiving Environment Monitoring). NexGen notes that, as part of NexGen's broader, proactive approach to Project engagement and planning (i.e., EA monitoring and follow-up activities), NexGen is conducting a baseline environmental effects monitoring program in 2023. Completing an environmental effects monitoring program during the baseline period enables a before-after-control-impact (BACI) design to be used for the Project moving forward. This proactive approach would help to distinguish potential treated effluent effects from natural differences between reference and exposure areas that may have existed before the initiation of treated effluent discharge. Components and methods to complete fish population and benthic invertebrate community surveys for the baseline environmental effects monitoring program, along with the collection of necessary supporting information (i.e., water quality		example, for a given COPC, if a water screening benchmark is exceeded, the same COPC should be carried forward for sediment if its concentration was above the detection limit." **Rationale:** Iron concentrations exceed water quality thresholds in baseline surface water quality throughout the LSA. Due to the exclusion of iron from the sediment quality assessment and ERA, a determination of Project-related impacts to sediment quality and aquatic biota cannot be made.			developed in 1987, and the draft FEQG guideline follows the most recent CCME species sensitivity distribution protocol. Additionally, the FEQG website (GoC 2024) states under the question "[h]ow do FEQGs differ from Canadian Environmental Quality Guidelines" that "[c]urrently, under the Chemicals Management Plan, there is an additional need to develop FEQGs to support federal environmental quality monitoring, risk assessment and risk management activities on substances for which CCME guidelines do not yet exist or are not reasonably expected to be updated in the near future". Therefore, NexGen maintains that the Draft FEQG guideline should be used in preference over the CCME guideline. From a human health perspective, Health Canada has not set a maximum acceptable concentration for iron (the current value represents an aesthetic objective). Iron is an essential element with no evidence for toxic effects unless large quantities of iron are ingested. To show that predicted iron concentrations in sediment in Patterson Lake North Arm – West Basin are below sediment quality guidelines, the following estimation has been performed: $C_{sediment,iron} = C_{water,iron} * K_d$ where: $C_{water,iron}$ = 8.84E-02 mg/L (Patterson Lake North Arm – West Basin, Max Upper Bound [Draft EIS TSD XXI, Table 4-2) K_d = 5000 L/kg (CSA N288.1-20 [CSA Group 2020]) $C_{sediment,iron}$ = 4.42E+02 mg/kg dw There are no federal or provincial guidelines for iron in sediment; therefore, the lowest effect level (LEL) for iron of 2.00E+04 mg/kg from Ontario was utilized (MOEE 1993). The predicted sediment concentration in Patterson Lake North Arm – West Basin is well below the sediment LEL; therefore, no impacts from iron on the aquatic environment are expected. NexGen confirms that the results of the assessment would remain unchanged based on the information in this IR response; therefore, no changes are required in the revised EIS. **References** CSA Group (Canadian Standards Association Group). 2020. CSA N288.1-20: Guidelines for Calculating Derived Release Limits for Radioactive Material in Airborne or Liquid Effluents for Normal Operation of Nuclear Facilities. CSA Group. 2022. CSA N288.6-22: Environmental Risk Assessments at Nuclear Facilities and Uranium Mines and Mills. ECCC (Environment and Climate Change Canada). 2019. Federal environmental quality guidelines – Iron. May. Available at https://www.canada.ca/en/environment-climate-change/services/evaluating-existing-substances/federal-environmental-quality-guidelines-iron.html. GoC (Government of Canada). 2024. Federal Environmental Quality Guidelines (FEQGs). Accessed March 2024. Available at https://www.canada.ca/en/health-canada/services/chemical-substances/fact-sheets/federal-environmental-quality-guidelines.html#a3.	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						and sediment characterization), will follow the metal mining environmental effects monitoring guidance document (Environment Canada 2012). Planning for and initiating this baseline environmental effects monitoring program has also provided an opportunity to engage primary Indigenous Groups on study design; based on Indigenous Group's feedback, non-lethal fish surveys were selected to minimize fish mortality while following the metal mining environmental effects monitoring guidance document (Environment Canada 2012). No changes are proposed in the revised EIS to address this IR. **References** Environment Canada. 2012. Metal Mining Technical Guidance for Environmental Effects Monitoring. Government of Canada, Environment Canada National EEM Office, Science Policy and Environmental Quality Branch, Ottawa, Ontario. Available at https://www.canada.ca/en/environment-climate-change/services/managing-pollution/environmental-effects-monitoring/metal-mining-technical-guidance/metal-mining-technical-guidance-environmental-effects-monitoring.html Metal and Diamond Mining Effluent Regulations. SOR/2002-222 under the *Fisheries Act*. Last amended June 18, 2020. Available at https://laws-lois.justice.gc.ca/eng/Regulations/SOR-2002-222/index.html					MOEE (Ministry of Environment and Energy). 1993. Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario. Ontario Ministry of Environment and Energy.	
82	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 10.2.8.3.1 Section 10.3.1.2 Appendix 10A-2	**Context**: Table 10.2-5 pg. 1620-1622 demonstrates Constituents of Potential Concern (COPCs), their respective water quality guidelines from applicable sources, and proposed Project thresholds that have been selected based upon the most stringent guidelines. General parameters such as temperature, pH, conductivity, etc. that would require Project thresholds and monitoring under the *Metal and Diamond Mining Effluent Regulations* (MDMER) have not been provided in this table. Phosphorous and its respective guidelines and Project threshold is missing from this table. All COPCs that require calculations based on other parameters such as hardness, pH, or temperature to derive guidelines (i.e. ammonia, cobalt, zinc, etc.) should be calculated and added to the table, with a note specifying the parameter values used in the calculation. For nitrate (as N) the Canadian Council of Ministers of the Environment (CCME) chronic guideline provided in the table is 3.0 mg/L however, the correct value is 13 mg/L. For molybdenum, the most stringent water quality guideline is the CCME guideline of 0.073 mg/L, not the provincial guideline of 31 mg/L. For	1. Update Table 10.2-5 to include all general parameters required for environmental effects monitoring: pH, temperature, hardness, alkalinity, and conductivity. 2. Update Table 10.2-5 to include phosphorous and its respective guidelines and Project threshold. 3. Verify that all COPCs that require calculations based upon other parameters such as hardness, pH, temperature, etc. are calculated and input as values into the table with notes specifying the parameter values used in the calculations. 4. Update Project nitrate and vanadium guidelines and thresholds to the correct values, update molybdenum assessments and consider applying the most stringent molybdenum water quality guidelines as the Project threshold. 5. Provide additional information to justify the use of selected water quality guidelines on any water quality guideline exceedances for molybdenum for all Project phases including post-closure. 6. Update Table 10.3-3 to include the baseline data for general water	Responses to part 1 through part 7 of this IR are provided below. 1. NexGen notes that Table 10.2-5 of Draft EIS Section 10.2.8.3.1 (Water Quality Thresholds) is limited to presenting the selected chronic (i.e., long-term) Project thresholds for the constituents of potential concern (COPCs) that apply specifically to the protection of aquatic life. Thus, constituents such as pH, temperature, hardness, alkalinity, and conductivity have not been included in the table because they were not identified as COPCs. Assumptions regarding potential exposure and toxicity modifying factors such as pH, temperature, and hardness, and their influence on guidelines and the selected Project threshold are presented as footnotes to Table 10.2-5 and linked to the relevant constituent to which they apply. These additional constituents have been included in baseline monitoring datasets and tables and would be included in monitoring programs during the life of the Project, including reporting under the Metal and Diamond Mining Effluent Regulations (MDMER). In response to the meeting with the CNSC and Environment and Climate Change Canada (ECCC) on 9 June 2023 to discuss FIRT IRs, NexGen will revise Table 10.2-5 of revised EIS Section 10.2.8.3.1 to broaden the discussion of assumptions regarding pH, temperature, hardness, alkalinity, and specific conductivity, as necessary. 2. Phosphorus is a COPC in the surface water quality assessment but is not listed in Table 10.2-5 of Draft EIS Section 10.2.8.3.1 because it is a COPC that is associated with aquatic productivity limits and not guidelines for the protection of aquatic life. Table	Section 10.2.8.3.1, 10.3.1.2, 10.3.1.3	**Context:** Parts one, two, four and five of the original IR have been addressed by the Proponent. However, additional information is required to address parts three, six and seven. Baseline data has not been provided for thallium in Tables 10.3-3 to Table 10.3-6 or in Attachment 10A-1 of Draft EIS Appendix 10A. The Proponent has stated that thallium was not selected for further assessment because there is no significant source term, however, effluent characterization predictions and data on baseline concentrations of thallium in the receiving environment are required to validate predictions of no risk. Thallium is a required parameter for effluent and water quality monitoring under Schedule 5 of the MDMER. In the Draft EIS Table 10.2-5, the equation for calculating the Project threshold for Cobalt has been provided, rather than a calculated value based on baseline concentrations of hardness in the receiving environment. **Rationale:** Currently there is no available baseline receiving environment surface water quality data or effluent characterization	82-R1	1. Provide the calculations used to determine the calculated value for cobalt in Table 10.2-5. 2. Provide the revised Table 10.2-5 for review. 3. Provide baseline receiving environment surface water quality data and predicted effluent characterization concentrations of thallium. 4. Update the surface water quality assessment and modelling as needed to incorporate data on thallium and confirm predictions of no negative effects to the aquatic receiving environment and receptors.	NexGen has provided the information below to address part 1 through part 4 of IR 82-R1. 1. NexGen confirms that the Project cobalt threshold was calculated according to the equation below from the Federal Environmental Quality Guideline (Environment Canada 2017): FWQG = exp{(0.414[ln(hardness)] – 1.887} where: FWQG = Federal Water Quality Guideline (µg/L) hardness = ambient hardness (mg/L $CaCO_3$) As per Environment Canada (2017), this equation is used to calculate the cobalt guideline for waters with ambient hardness within the range of 52 mg/L to 396 mg/L $CaCO_3$. The equation is not to be extrapolated to calculate the guideline for waters with hardness outside of this range (i.e., this hardness range provides a lower bound and an upper bound for calculating the guideline). The ambient hardnesses for the watercourses and waterbodies local to the Project area (i.e., from Patterson Lake to Naomi Lake) vary from 12 mg/L to 18 mg/L $CaCO_3$. Therefore, as per Environment Canada (2017), to determine the Project threshold for cobalt, the lower bound hardness of 52 mg/L $CaCO_3$ must be used. As a result, the Project cobalt threshold is calculated as follows: FWQG = exp{(0.414[ln(52)] – 1.887} = 0.78 µg/L	Section 10; Section 11; Section 13; Section 14; Section 16; Section 17; TSD XXI

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				vanadium it appears the federal water quality guideline was suggested, however the correct value is 120 ug/L or 0.120 mg/L, not 0.00012 mg/L. In Appendix 10A-2 pg. 1946 modelled surface water concentrations of molybdenum for the application and upper bound modelling scenarios at all downstream lakes are displayed. There is a significant increase in surface water concentrations in the far future, and it is difficult to discern if there are any exceedances of the 0.073 mg/L CCME chronic guideline. There has been no discussion of these increases within the results of the EIS. Table 10.3-3 pg. 1634-1636 displays the existing baseline water quality conditions for all the areas within the LSA and RSA. General parameters (ex. temperature, pH, conductivity, etc.) and nutrients (ex. total and un-ionized ammonia, nitrate, phosphorus etc.) that would require Project thresholds and monitoring under the Metal and Diamond Mining Effluent Regulations (MDMER) have not been provided in this table. **Rationale**: The recommended changes for Table 10.2-5 are based upon providing all the information needed for reviewers to assess the characterization of effects Proposed changes incorporate the usage of correct, up-to-date and the most stringent chronic water quality guidelines. It is difficult to discern if there is an exceedance of the water quality threshold for molybdenum, which should be discussed more in-depth in the results of the EIS. The recommended changes for Table 10.3-3 are based on providing baseline conditions in order for comparisons to determine if there are Project related effects that could cause changes to these parameters over the course of the Project's lifespan.	quality parameters and nutrients that would require monitoring under the MDMER. 7. Update assessments as necessary according to changes in thresholds applied as described in ECCC- SW-13.	10.2-5 lists the COPCs that are associated with chronic (i.e., long-term) Protection of Aquatic Life Project thresholds. The phosphorus Project threshold is shown in Table 10.2-8 of Draft EIS Section 10.2.8.3.3 (Productivity Status Thresholds). The limit used for setting the Project threshold is based on total phosphorus concentrations and associated trophic conditions at the upper bound of the mesotrophic status per the provincial guidelines (MOEE 1994), which is consistent with the trophic categories based on total phosphorus in Canadian lakes and rivers (Environment Canada 2004; CCME 2004). The Project threshold for phosphorus is discussed and presented separately from the protection of aquatic life COPC Project thresholds in Draft EIS Section 10.2.8.3.3 (Productivity Status Thresholds). No changes are proposed in the revised EIS to address part 2 of this IR. 3. NexGen confirms that for COPCs that have exposure and toxicity modifying factors (ETMFs) such as pH, temperature, and hardness in the derivation of their respective Project thresholds, the ETMFs were applied accordingly. NexGen confirms that the various assumptions used in setting respective Project thresholds are provided in the footnotes of Table 10.2-5 of Draft EIS Section 10.2.8.3.1. No changes are proposed in the revised EIS to address part 3 of this IR. 4. With respect to the nitrate, vanadium, and molybdenum guideline changes requested by ECCC, NexGen responds as follows: ▪ For the nitrate (NO_3) Project threshold, NexGen recommends maintaining the nitrate Project threshold as 3 milligrams nitrogen per litre (mg N/L). This threshold is sourced from the British Columbia Ministry of Environment (BC MOE) water quality guidelines (BC MOE 2009), which includes freshwater species sensitivity in its derivation (i.e., the BC MOE recommended freshwater guideline for nitrate was derived by multiplying the 10-day lowest observed effect concentration of 133 mg NO_3/L [Schuytema and Nebeker 1999] by a safety factor of 0.1 and converting to nitrate as nitrogen [N]). This guideline is considered conservative as NexGen notes that nitrate guidelines have been more recently derived that consider the influence of chloride as a modifying factor that can reduce the potential for nitrate toxicity in freshwater ecosystems (e.g., Soucek and Dickenson 2016). NexGen also acknowledges that this threshold is only slightly above the Canadian Council of Ministers of the Environment (CCME) guideline (CCME 2012), so does not consider the selection of the BC MOE guideline as elevating potential for risk to aquatic life in the assessment. ▪ With respect to vanadium, NexGen acknowledges an error in the vanadium guideline stated in Draft EIS Section 10.2.8.3.1 and will adjust the Project threshold for vanadium (i.e., 0.12 mg/L) in Table 10.2-5 of revised EIS Section 10.2.8.3.1 accordingly.		data available for thallium to confirm predictions of no risk to the receiving environment and aquatic receptors. Additionally, due to predicted changes in concentrations of hardness in the receiving environment over the course of the Project life cycle it is necessary that the Proponent confirm the Project threshold for cobalt.			NexGen notes that the calculated Project cobalt threshold in the Draft EIS did not use the lower bound of 52 mg/L $CaCO_3$ but rather used the ambient hardness of Patterson Lake, which generally ranges from 15 mg/L to 17 mg/L $CaCO_3$; this resulted in a Project cobalt threshold of 0.46 µg/L rather than the 0.78 µg/L threshold calculated above. As a result, the assessment results associated with cobalt were overly conservative. In particular, as presented in Draft EIS Section 10.5.1.2.3 (Trace Metals), the predicted far-future cobalt concentration threshold exceedances in Forrest Lake – North Basin (i.e., 0.77 µg/L), Beet Lake (i.e., 0.62 µg/L), and Naomi Lake (i.e., 0.52 µg/L) would no longer exist. However, far-future cobalt concentrations in Patterson Lake North Arm – West Basin and Patterson Lake South Arm would remain above the Project cobalt threshold. As noted in Draft EIS Section 10.7.2 (Surface Water Receiving Environment Monitoring) and Draft EIS Section 23.5.3 (Adaptive Management), NexGen is developing an Adaptive Management Plan for cobalt and copper and will provide the Plan to the CNSC, when available, for review outside the EA process. To address inaccuracies within the Draft EIS related to the 0.46 µg/L Project cobalt threshold, NexGen will make revisions reflective of the updated Project cobalt threshold (i.e., 0.78 µg/L) in revised EIS Section 10 (Surface Water Quality and Sediment Quality), revised EIS Section 11 (Fish and Fish Habitat), revised EIS Section 13 (Vegetation), revised EIS Section 14 (Wildlife and Wildlife Habitat), revised EIS Section 16 (Cultural and Heritage Resources and Indigenous Land and Resource Use), revised EIS Section 17 (Other Land and Resource Use), and revised EIS TSD XXI (Environmental Risk Assessment). 2. NexGen confirms that Table 10.2-5 of revised EIS Section 10.2.8.3.1 (Water Quality Thresholds) will be updated to include the cobalt threshold and molybdenum provincial objective and threshold as well as broaden the discussion of assumptions regarding pH, temperature, hardness, alkalinity, and specific conductivity, as necessary. 3. Measured thallium data for the baseline receiving environment and potential sources of thallium in effluent are provided in Attachment IR 49-R1, 79-R1, and 82-R1. 4. As described in Attachment IR 49-R1, 79-R1, and 82-R1, thallium is confirmed not to be a constituent of potential concern. Based on the measured concentrations of thallium in the baseline aquatic environment and in potential effluent sources, NexGen has confirmed that there is no potential for adverse effects to aquatic receiving environment, including receptors, with regards to thallium. **References** Environment Canada. 2017. *Canadian Environmental Protection Act, 1999*. Federal Environmental Quality Guidelines Cobalt. May 2017. 9pp. Available at https://www.ec.gc.ca/ese-ees/92F47C5D-24F5-4601-AEC0-390514B3ED75/FEQG%20Cobalt%20Final%20EN.pdf.	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						▪ In the Draft EIS, NexGen used the provincial molybdenum guideline (i.e., 31 mg/L; WSA 2017) preferentially over the more conservative federal guideline (i.e., 0.073 mg/L; CCME 2023) because the CCME guideline remains interim and because the provincial guideline has been derived from recent data, following the CCME (2007) protocol. However, based on feedback from Environment and Climate Change Canada (ECCC) on 9 June 2023, NexGen will change the Project threshold from the province-specific guideline for molybdenum (i.e., 31 mg/L; WSA 2017) to the recently updated BC MOE guideline of 7.6 mg/L (BC MOE 2021) in the revised EIS. The regulatory rationale for this change from the Saskatchewan Water Security Agency (WSA) guideline to the BC MOE guideline is because the BC MOE guideline is more conservative than the WSA guideline and is derived from recent data following the CCME (2007) protocol. The revised EIS will be updated to reflect the changes with regard to thresholds for vanadium and molybdenum outlined in part 4 of this IR. NexGen confirms that the corrected Project thresholds for vanadium and molybdenum would not change the findings of the surface water quality assessment for these constituents. 5. NexGen's preference for the BC MOE guideline for molybdenum is based on uncertainty in the CCME guideline, primarily due to the inability of follow-up studies to reproduce the findings of the source on which the CCME guideline was based. Specifically, the CCME guideline was based on multiplying the lowest chronic toxicity value, the 28-day 50% lethal effect concentration (LC_{50}) of 0.73 mg/L for rainbow trout (*Oncorhynchus mykiss*), by a safety factor of 0.1. The original study by Birge (1978) has not been reproducible, either using the original methods or using standard methods (Davies et al. 2005). 6. With respect to the list of constituents presented in Table 10.3-3 to Table 10.3-6 of Draft EIS Section 10.3.1.2 (Water Quality [Risk to Aquatic Life and Terrestrial Life] and Drinking Water Quality Constituent Concentrations) and Table 10.3-7 to Table 10.3-9 of Draft EIS Section 10.3.1.3 (Productivity Status Constituent Concentration), the tables only include background information for the COPCs selected for the surface water quality assessment. Therefore, the background data for constituents that did not screen in as COPCs for the Project are not included in these tables. A more complete surface water quality background baseline dataset, including those constituents listed as MDMER monitoring constituents, is provided in Attachment 10A-1 of Draft EIS Appendix 10A (Surface Water Quality Modelling Report). However, in response to the meeting with the CNSC and ECCC to discuss FIRT IRs on 9 June 2023, NexGen will revise Table 10.3-3 to Table 10.3-9 of revised EIS Section 10.3.1.2 and Section 10.3.1.3, as necessary, to clarify assumptions for constituents flagged as exceeding Project thresholds where the value or concentration of other measured constituents (e.g., pH, temperature, hardness) contributed to the exceedances under background conditions. These						

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						added assumptions will assist the CNSC and ECCC in verifying the identification of the Project thresholds. 7. With respect to the corrected Project thresholds (i.e., vanadium and molybdenum), the surface water quality assessment findings for these constituents would not change. Therefore, no changes are proposed in the revised EIS to address part 7 of this IR. **References** BC MOE (British Columbia Ministry of Environment). 2009. Water Quality Guidelines for Nitrogen (Nitrate, Nitrite, and Ammonia). Addendum to Technical Appendix. Water Stewardship Division, Ministry of Environment Province of British Columbia. BC MOE. 2021. B.C. Ministry of Environment and Climate Change Strategy 2021. Molybdenum Water Quality Guidelines for the Protection of Freshwater Aquatic Life, Livestock, Wildlife and Irrigation. Water Quality Guideline Series, WQG-07. Prov. B.C., Victoria B.C. Birge WJ. 1978. Aquatic Toxicology of Trace Elements of Coal and Fly Ash. Special Collections, USDA National Agricultural Library. Accessed February 2023, https://www.nal.usda.gov/exhibits/speccoll/items/show/5224 CCME (Canadian Council for the Ministers of the Environment). 2004. Canadian Water Quality Guidelines for the Protection of Aquatic Life: Phosphorus: Canadian Guidance Framework for the Management of Freshwater Systems. In: Canadian Environmental Quality Guidelines, 2004. Winnipeg, MB, Canada. CCME. 2007. A protocol for the derivation of water quality guidelines for the protection of aquatic life. CCME. 2012. Canadian Water Quality Guidelines for the Protection of Aquatic Life: Nitrate Ion. Canadian Environmental Quality Guidelines. Available at https://ccme.ca/en/res/nitrate-ion-en-canadian-water-quality-guidelines-for-the-protection-of-aquatic-life.pdf CCME. 2023. Water Quality Guidelines Summary Table. Available at https://ccme.ca/en/summary-table Davies TD, Pickard J, Hall JK. 2005. Acute molybdenum toxicity to rainbow trout and other fish. Journal of Environmental Engineering & Science 4: 481-485. Environment Canada. 2004. Canadian Guidance Framework for the Management of Phosphorus in Freshwater Systems: Science-based Solutions Report No. 1-8. National Guidelines and Standards Office, Water Policy ad Coordination Directorate, Environment Canada. Pp. 114. Metal and Diamond Mining Effluent Regulations. SOR/2002-222 under the *Fisheries Act*. Last amended June 18, 2020. Available at https://laws-						

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						lois.justice.gc.ca/eng/Regulations/SOR-2002-222/index.html MOEE (Ontario Ministry of Environment and Energy). 1994. Water management: policies, guidelines, provincial water quality objectives. Accessed September 2021. Available at https://www.ontario.ca/page/water-management-policies-guidelines-provincial-water-quality-objectives Schuytema GS, Nebeker AV. 1999. Comparative toxicity of ammonium and nitrate compounds to Pacific treefrog and African clawed frog tadpoles. Environmental Toxicology and Chemistry 18:2251-2257. Soucek DJ, Dickinson A. 2016. Influence of chloride on the chronic toxicity of sodium nitrate to *Ceriodaphnia dubia* and *Hyalella azteca*. Ecotoxicology. 2016 Sep;25(7):1406-16. Doi: 10.1007/s10646-016-1691-1. Epub 2016 Jul 7. PMID: 27386878. WSA (Saskatchewan Water Security Agency). 2017. Saskatchewan Water Quality Objective for the Protection of Aquatic Life – Molybdenum. Fact Sheet. Report No. WSA 514.						
83	CNSC	Radiological Threshold Selection for water quality	Section 10.2.8.3.1	**Context:** The EIS states that thresholds for radionuclides in surface water for risk to aquatic life were calculated from a biota dose benchmark, following the USDOE document: A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota. **Rationale:** Typically, dose is cumulatively assessed from all sources of radiation by applying a recommended dose benchmark (100 µGy/hr for terrestrial biota and 400 µGy/hr for aquatic biota). It is unclear from the text if the selected concentrations for the radiological COPCs is reflective of the concentration of each individual radionuclide required to reach the threshold, or if the cumulative dose from all the radiological COPCs was considered in the calculation when deriving the concentration threshold in water.	1.Provide clarification of which dose benchmarks were considered when deriving the radiological concentration threshold in surface water. 2.Provide clarification on whether the thresholds derived only considered dose from the individual radionuclide or were they derived considering cumulative dose from all radiological COPCs? 3.Provide an example calculation on how these thresholds were derived to understand the process undertaken	Responses to part 1, part 2, and part 3 of this IR are provided below. 1. NexGen clarifies that the dose benchmarks for lead-210, polonium-210, and thorium-230 used for the surface water assessment and the ecological risk assessment are the Biota Concentration Guides (BCGs) from the United States Department of Energy (US DOE 2019), as discussed in Draft EIS Section 10.2.8.3.1 (Water Quality Thresholds). The radium-226 benchmark for surface water is from the Saskatchewan Ministry of Environment (Government of Saskatchewan 2017). These BCGs were derived based on a screening dose benchmark of 400 micrograys per hour (µGy/h) for aquatic organisms from US DOE (2019). 2. NexGen clarifies that the BCGs from the US DOE RESRAD-BIOTA tool (ISCORS 2004) are based on individual radionuclides meeting the dose benchmark. The BCGs were used as overall guidelines and were not used to screen and remove any radionuclides from the assessment. If the BCGs were to be used as a screening approach to remove radionuclides, then as recommended by US DOE, a sum of fractions approach would be used to ensure that all radionuclides cumulatively did not result in a dose above the dose benchmark. 3. Appendix G, Biota Concentration Guides (BCGs) in Water, Sediment, and Soil, in US DOE (2019) provides a detailed description of how radionuclides are selected and associated BCGs are derived, and the calculations required to derive the BCGs for each medium. No changes are proposed in the revised EIS to address this IR. **References**	n/a	Based on NexGen's response, CNSC staff understand that the thresholds selected for radiological COPC's in section 10.2.8.3.1 represent the concentration in water that would result in meeting the dose threshold for that individual COPC. CNSC staff would like to emphasize NexGen will need to assess cumulative dose to biota through ongoing environmental risk assessment to ensure the ratios of radiological COPC's released to the environment do not cumulatively exceed the appropriate dose threshold.	83-R1	CNSC staff request NexGen provide the values and sources of the fresh mass aquatic animal to water concentration factor, dose conversion factor, and dose coefficients used to calculate their Biota Concentration Guides (BCGs).	NexGen confirms that all radionuclides in the U-238 decay chain were assessed for cumulative total dose in Section 6.2.5.1.2 and Section 6.2.5.2.2 of Draft EIS TSD XXI (Environmental Risk Assessment), and concurs with the reviewer that this approach will continue to be implemented in future environmental risk assessments (ERAs). NexGen further confirms that the Biota Concentration Guides (BCGs) were not used in any calculations in the ERA or Draft EIS Section 10 (Surface Water Quality and Sediment Quality). The BCGs were used for information purposes only in Draft EIS Section 10 and were not used to screen out radionuclides from further assessment. The following information is provided in response to the reviewer's request. The limiting BCGs used for Pb-210, Po-210, and Th-230 were for aquatic animals. The requested data for fresh mass aquatic animal to water bioaccumulation factor (Biv; [ANL, 2016; US DOE 2019], which is defined as the equilibrium ratio of the contaminant concentration in the fresh weight of biota relative to the contaminant concentration in an environmental medium resulting from the uptake of the contaminant from one or more routes of exposure), and dose coefficients (DCF; external and internal) for aquatic animals are provided in Table 1 of Attachment IR 83-1. NexGen notes that the benchmark for Ra-226 of 0.11 Bq/L was taken from the Saskatchewan Ministry of Environment; therefore, no data for Ra-226 is provided. To illustrate that these BCGs are protective of the environment for the Project, the concentrations at the edge of the regulated mixing zone from Table 10.5-4 of Draft EIS Section 10.5.1.1.4 (Radionuclides) were compared against the screening benchmarks, and a sum of fractions approach was used to determine if these concentrations would be acceptable. As the sum of fractions is less than 1 (Table 2 of Attachment IR 83-1), no adverse effects would be anticipated. The complete ecological dose calculations	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						Government of Saskatchewan. 2017. Radium-226 in Surface Water – Fact Sheet. Saskatchewan Environmental Quality Guidelines. EPB #602. Saskatchewan Ministry of Environment. ISCORS (Interagency Steering Committee on Radiation Standards). 2004. RESRAD-BIOTA: A tool for implementing a Graded Approach to Biota Dose Evaluation. ISCORS Technical Report 2004-02 (U.S. Department of Energy report DOE/EH-0676), Washington, D.C. US DOE (United States Department of Energy). 2019. A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota. DOE-STD-1153-2019.					are presented in Section 6.2.5.1.2, Section 6.2.5.2.2, and Appendix C of Draft EIS XXI. No changes are required to the revised EIS to address this IR. **References** ANL (Argonne National Laboratory). 2016. RESRAD-BIOTA Version 1.8. Available at https://resrad.evs.anl.gov/codes/resrad-biota. US DOE (United States Department of Energy). 2019. A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota. DOE-STD-1153-2019.	
84	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 10.2.8.3.4	**Context**: The residual effects analysis measures the effects of the Project on surface water and sediment quality against existing conditions and thresholds. Thresholds were set to identify if projected surface water and sediment quality over the lifespan of the project and the far-future projection had the potential to adversely affect aquatic life and waterbody productivity health. In Table 10.2-9 pg. 1626 it is unclear why several parameters for sediment quality do not have a Project threshold identified despite there being potential sediment quality guidelines available (ex. cadmium, lead, nickel, selenium, vanadium and zinc). It is also unclear why Project thresholds that have been identified for some parameters (ex. arsenic, copper, and molybdenum) are not based upon the most stringent guidelines available with no rationale provided. **Rationale**: The recommended changes for Table 10.2-9 are based upon incorporating the use of the most stringent chronic sediment quality guidelines for the protection of the receiving environment. Use of the most stringent guidelines will allow for the most protective assessment to analyze risks to the receiving environment.	Update Table 10.2-9 to incorporate the selection of the most stringent sediment quality guidelines for all parameters with available sediment quality guidelines. If this cannot be done, provide rationale as to why.	As indicated in Section 4.2.3.3 of Draft EIS TSD XXI (Environmental Risk Assessment) and in Draft EIS Section 10.2.8.3.4 (Sediment Quality Thresholds), Burnett-Seidel and Liber (2013) Reference (REF) values were selected as the preferred source of the Project thresholds for constituents of potential concern (COPCs) in the sediment quality assessment. This selection was because the reported values in Burnett-Seidel and Liber (2013) are specifically applicable to uranium mining operations in Saskatchewan waterbodies. The REF values from Burnett-Seidel and Liber (2013) were preferentially used even if these values were higher than Canadian Council of Ministers of the Environment sediment quality guidelines (i.e., arsenic), which are generic guidelines that are applicable to all waterbodies in Canada. An exception in the sediment quality assessment in the Draft EIS was copper, where the selected Project threshold was sourced from the lowest effect level (LEL) value in the reference values for uranium mining and milling in Canada (Thompson et al. 2005). The Thompson et al. (2005) values are applicable to uranium ore-bearing regions of northern Saskatchewan and Ontario. However, the use of the LEL value for copper was an oversight, as there is a REF value for copper in Burnett-Seidel and Liber (2013); therefore, the Project threshold for copper for the sediment quality assessment will be updated to the Burnett-Seidel and Liber (2013) REF value in the revised EIS. Despite this change, the maximum predicted sediment copper concentrations in Patterson Lake North Arm – West Basin (Draft EIS TSD XXI) in the Application Case and the far-future projection are below the REF copper value. Table 10.2-9 in revised EIS Section 10.2.8.3.4 and Table 4-3 in Section 4.2.3.3 of revised EIS TSD XXI will be updated to correct the Project copper threshold for sediment quality. No other changes to the tables will be made as the purpose of the tables is to identify the sediment COPC Project thresholds for the sediment quality assessment. The selection of COPCs for Project thresholds for sediment quality was driven by the environmental risk assessment (ERA) screening, based on: ▪ if the maximum predicted sediment concentration of a sediment quality constituent in Patterson Lake North Arm – West Basin during the Application Case, including the maximum upper bound scenario and the far-future projection, was greater	Section 10.2.8.3.4; TSD XXI, Section 4.2.3.3	**Context:** The Proponent has provided rationale for the selection of Burnett-Seidel and Liber (2013) Reference (REF) values as the preferred sources for Project thresholds and the proposed updates to the copper threshold selection. However, there remain inconsistencies in the listed Selected Project Thresholds in Table 10.2-9 Draft EIS Section 10.2.8.3.4 and in Table 4-3 Section 4.2.3.3 of TSD XXI Environmental Risk Assessment that the Proponent has not addressed. In Table 10.2-9 Draft EIS Section 10.2.8.3.4 selected Project threshold have not been listed for cadmium, lead, nickel, selenium, vanadium and zinc, despite thresholds being available for these parameters. With the exception of vanadium, these parameters were all screened in as Contaminants of Potential Concern (COPCs) for the sediment quality assessment. Vanadium was identified as having baseline exceedances of sediment quality guidelines in Naomi Lake. Selected Project thresholds should be clearly identified and listed in this table for each of these COPCs, as they are currently not identified. Furthermore, when Table 10.2-9 Draft EIS Section 10.2.8.3.4 is compared to Table 4-3 Section 4.2.3.3 of TSD XXI Environmental Risk Assessment there remains inconsistencies in the selection of the thresholds. Table 4-3 is part of the sediment quality screening comparing predicted sediment concentrations in Patterson Lake to selected Project thresholds and determines which COPCs proceed to the next tier of assessment. Table 4-3 should use the same screening values as the selected Project thresholds outlined in Table 10.2-9, and both tables should use the most stringent guidelines available, or the preferred Burnett-Seidel and Liber (2013) REF values as justified by the Proponent. However, the Burnett-Seidel and Liber	84-R1	Update the following tables and provide them for review: ▪ Update Table 10.2-9 Draft EIS Section 10.2.8.3.4 to list the missing Selected Project Thresholds for cadmium, lead, nickel, selenium, vanadium and zinc. ▪ Update Table 4-3 Section 4.2.3.3 of TSD XXI Environmental Risk Assessment to utilize the Burnett-Seidel and Liber (2013) REF value of 16.3 ug/kg dw for lead as listed in Table 10.2-9 Draft EIS Section 10.2.8.3.4. ▪ Update Table 4-3 Section 4.2.3.3 of TSD XXI Environmental Risk Assessment to include vanadium and update the sediment quality assessment as needed. If additional corrections are required, detail any other report sections that are affected and ensure that all sections impacted by the error are updated.	NexGen confirms that the following response is specific to IR 84-R1 and does not speak to specific commitments made in NexGen's initial response to the original IR 84. NexGen further confirms that the revised EIS will contain changes committed to in the responses of both IR 84 and IR 84-R1. To clarify the context provided in NexGen's initial response to the original IR, Table 10.2-9 of Draft EIS Section 10.2.8.3.4 (Sediment Quality Thresholds) presents the Project sediment thresholds for constituents of potential concern that were forwarded for quantitative assessment in the environmental risk assessment (ERA). Constituents of potential concern that did not pass the ERA screening process did not have a sediment threshold value assigned; therefore, these values are not presented in Table 10.2-9 of Draft EIS Section 10.2.8.3.4. With this context, and to address the reviewer's request, Table 10.2-9 of revised EIS Section 10.2.8.3.4 will be updated to include Project thresholds for cadmium, lead, nickel, selenium, vanadium, and zinc. NexGen will add the Burnett-Seidel and Liber (2013) REF and NE2 values of 16.3 mg/kg dw and 19.7 mg/kg dw, respectively, for lead into Table 4-3 of Section 4.2.3.3 of revised EIS TSD XXI (Environmental Risk Assessment). NexGen will also add all table information for vanadium, including the Burnett- Seidel and Liber (2013) and Thompson et al. (2015) values for vanadium, in Table 4-3 in Section 4.2.3.3 of revised EIS TSD XXI. NexGen notes that there are no changes to the sediment screening conclusions as a result of these updates; therefore, no further changes within revised EIS TSD XXI are required in this regard. **References** Burnett-Seidel C, Liber K. 2013. Derivation of no-effect and reference-level sediment quality values for application at Saskatchewan uranium operations. Environmental Monitoring and Assessment. 185(11): 9481-9494. Thompson, P.A., Kurias, J., Mihok. S. 2005. Derivation and use of sediment quality guidelines for ecological risk assessment of metals and radionuclides released to the environment from uranium mining and milling activities in Canada. Environ. Monit. Assess. 110, 71-85.	Section 10.2.8.3.4; TSD XXI, Section 4.2.3.3

NexGen Energy Ltd.

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						than a sediment quality guideline (i.e., arsenic, molybdenum, lead-210, and polonium-210); ▪ if the constituent was identified as a COPC in the surface water quality assessment (i.e., cobalt and copper); ▪ if the constituent required an evaluation for toxicity and radiotoxicity (i.e., uranium); or ▪ if the constituent was a Project-focused radionuclide (i.e., uranium-234, uranium-238, thorium-230, and radium-226). Where predicted sediment concentrations did not screen in on the basis of these four conditions, NexGen believes there is a negligible risk of that constituent increasing in the sediment to present a risk to aquatic biota or other users and it was not evaluated further. However, NexGen notes that all of the listed sediment quality constituents in Table 10.2-9 in Draft EIS Section 10.2.8.3.4 not screened in as COPCs, as well as those that did screen in for sediment quality, were carried forward to the ERA for screening as part of the ERA. The footnotes in Table 10.2-9 in revised EIS Section 10.2.8.3.4 will be updated to provide this clarification. Revised EIS Section 10.2.8.3.4 and Table 4-3 in Section 4.2.3.3 of revised EIS TSD XXI will be updated to reflect the changes outlined in this response. **References** Burnett-Seidel C, Liber K. 2013. Derivation of no-effect and reference-level sediment quality values for application at Saskatchewan uranium operations. Environmental Monitoring and Assessment. 185(11): 9481-9494. Thompson PA, Kurias J, Mihok S. 2005. Derivation and use of sediment quality guidelines for ecological risk assessment of metals and radionuclides released to the environment from uranium mining and milling activities in Canada. Environmental Monitoring and Assessment. 110:71-85.		(2013) values for lead are missing from Table 4-3, which as the most stringent value, should be used for the sediment quality assessment in the ERA. Additionally, vanadium is missing from Table 4-3 and should be included as part of the screening assessment for this tier of the ERA due to baseline exceedances of sediment quality guidelines. **Rationale**: Table 10.2-9 of the Draft EIS Section 10.2.8.3.and Table 4-3 Section 4.2.3.3 of TSD XXI Environmental Risk Assessment should be consistent with the COPCs being evaluated and the selected thresholds for those COPCs. The Proponent should remain consistent in the selection and application of thresholds based on their rationale for using Burnett-Seidel and Liber (2013) REF values and/or the selection of the most stringent guidelines and provide both updated tables for review to verify the changes.				
89	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 10.5.1.1.1	**Context**: Table 10.5-1 pg. 1657 depicts the chloride and sulphate concentrations in surface water at the edge of the proposed mixing zone for the Application Case. The water quality threshold for Aquatic and Terrestrial Life for sulphate is predicted to change from 128 mg/L at the beginning of operations to 429 mg/L near the end of operations due to changes in hardness levels in Patterson Lake surface water. It is unclear why hardness levels are expected to change over the lifespan of the Project and if this is a Project-related effect. **Rationale**: If Constituents of Potential Concern (COPC) water quality thresholds are dependent on other water quality parameters, such as hardness, and are predicted to change over the	1. Clarify if changes to hardness in surface water quality of Patterson Lake is an expected effect of the proposed Project. 2. Confirm if changes to hardness levels will affect any other COPC thresholds such as cobalt over the course of the Project. 3. Confirm if there are any other general water quality parameters that are expected to change over the course of the Project lifespan that may change COPC thresholds? 4. Include, in the potential COPC exceedances, an evaluation against thresholds that are calculated using baseline condition data during assessments of risk if threshold changes are caused by Project effects.	Responses to part 1 through part 4 of this IR are provided below. 1. NexGen clarifies that the changes to hardness in Patterson Lake are an expected effect of the proposed Project (i.e., from treated effluent discharge during Operations). As presented to the CNSC during early engagement meetings (e.g., 24 August 2021), the increase in hardness in the receiving environment (i.e., Patterson Lake and farther downstream in the local study area [LSA]) is an expected change because the primary ions that contribute to hardness (i.e., calcium and magnesium) are elevated in the treated effluent discharge as counter ions to chloride and sulphate. The projected changes to the major ions over the life of the Project and in the far-future projection are presented in Attachment 10A-2 of Draft EIS Appendix 10A (Surface Water Quality Modelling Report). The plots for hardness, chloride, and sulphate in this attachment show a corresponding temporal increase in Patterson Lake North Arm – West Basin due to the Project discharges during Operations, which attenuate downstream through	n/a	**Context:** While the Proponent provided information on all parts of the original IR, the information needs to be incorporated into the EIS. Where COPCs and their derived guidelines will be affected by sulphate should be outlined. In their response the Proponent states: "NexGen clarifies that the changes to hardness in Patterson Lake are an expected effect of the proposed Project (i.e., from treated effluent discharge during Operations)." However, this effect is not explicitly outlined within the project pathways within Section 10.4 Project Interactions and Mitigations or within Section 10.5 Residual Effects Analysis. Section 10.5.1.1 Application Case does not describe the increasing hardness due to effluent deposition as a Project	89-R1	1. Incorporate information into the Draft EIS regarding the effects from projected increases in hardness in the receiving environment into the following sections: Section 10.4.3 Primary Effects Pathway for effects for discharge of treated effluent, Section 10.5 Residual Effects Analysis, Section 10.6 Predictions of Confidence and Uncertainty, and Section 10.7 Monitoring, Follow-up and Adaptive Management. 2. Identify any COPCs with hardness-derived thresholds that would exceed their respective guidelines during operations if those guidelines were derived with respect to baseline hardness concentration of the receiving environment.	Responses to part 1 and part 2 of this IR are provided below. 1. NexGen maintains that Project thresholds for constituents of potential concern (COPCs) that possess a hardness-dependent toxicity modifying factor should be calculated using ambient hardness in the receiving environment to appropriately assess COPC changes in the receiving environment resulting from the discharge of treated effluent and to reflect the relevant ambient conditions to which biological receptors would be exposed. The assessment of the potential risk of adverse effects to aquatic life in the Draft EIS used water quality guidelines for the protection of aquatic life from the Canadian Council of Ministers of the Environment (CCME 2023), Environment and Climate Change Canada (Environment Canada 2017, Government of Canada 2021), and British Columbia Ministry of the Environment and Climate Change Strategy (BCMECCS 2019) that incorporated toxicity modifying factors, including hardness, in their derivation. The application of toxicity modifying factors such as hardness in the receiving environment is an appropriate and technically defensible site-specific application of the setting of	Section 10.2.8.3.1; Section 10.5.1.2

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				course of the Project lifespan, an explanation of why these changes occur must be provided with clarification whether it is a Project-related effect.		the rest of Patterson Lake and the downstream lakes in the LSA. These elevated major ion concentrations also diminish in parallel when treated effluent discharge ceases at the end of Operations. 2. As discussed with the CNSC during early engagement (i.e., prior to submission of the Draft EIS), the change in hardness during the life of the Project and the far-future projection was accounted for in all other constituents of potential concern (COPCs) that have hardness-dependent guidelines (e.g., sulphate, cadmium, cobalt, copper, lead, nickel) because hardness is an exposure- and toxicity-modifying factor (ETMF) for these constituents. Based on projected change to hardness in Patterson Lake and the downstream lakes, and the magnitude of change to hardness, specifically in Operations during treated effluent discharge, changes to the Project thresholds for these hardness-dependent COPCs only applied to sulphate and cobalt. These changes are illustrated in the modelled projections presented for sulphate, cadmium, cobalt, copper, lead, and nickel in Attachment 10A-2 of Draft EIS Appendix 10A. 3. The Project thresholds that have ETMFs other than hardness include: ▪ ammonia, where the ETMFs are pH and temperature; and ▪ aluminum, where the ETMFs are pH, dissolved organic carbon (DOC), and calcium. For ammonia, threshold modifications were based on measured monthly water temperature and pH as the Project is not expected to measurably change the water temperature and pH in Patterson Lake or any downstream waterbody. For total aluminum, the threshold was set as the uppermost threshold concentration (i.e., 100 µg/L) due to the background DOC concentration being greater than 2 mg/L (i.e., DOC was not modelled as the Project is not expected to be a material source of DOC [see NexGen's response to IR 79]) and the projected calcium concentrations are greater than 4 mg/L over the duration of the Project and into the far future. The resulting total aluminum threshold was the same as the upper-bound Canadian Council of Ministers of the Environment guideline (i.e., 100 µg/L; CCME 2023). 4. NexGen does not agree that the assessment suggested by ECCC constitutes a science-based evaluation because it does not account for the water quality conditions that would be experienced by biota. As hardness is an ETMF for some metals and ions, which means that the potential for one of these metals or ions to exert a toxicity influence on aquatic life decreases with increasing concentrations of the ETMF, it is reasonable and appropriate to consider hardness in the derivation of thresholds to evaluate the potential for adverse risk to aquatic biota. This approach is further supported by the water quality modelling results that show concurrent increases to each of the metals and ions during Project discharge (i.e., they are each sourced from the Project in the treated effluent discharge to the receiving environment). It is also worth noting that in the far-future projection where the cobalt increases in Patterson Lake are		effect. It also does not explain how the increased hardness was factored in when considering water quality thresholds for other contaminants of potential concern (COPCs) that have guidelines that vary based on the hardness of receiving waters. Section 10.5.1.1 Application Case does not describe the increasing hardness in the receiving aquatic environment due to effluent deposition as a Project effect. Additionally, this section does not describe how the increasing hardness concentrations influence the calculation of water quality thresholds for Contaminants of Potential Concern (COPCs) that have hardness-derived guidelines. **Rationale:** The Proponent indicated that Project discharges to the receiving environment will increase hardness concentrations causing the water quality thresholds for other COPCs to increase, allowing for higher discharge levels of these COPCs. To understand how the thresholds for relevant COPCs will be impacted by increasing hardness concentrations in receiving waters and the potential for related impacts to aquatic receptors such as fish and fish habitat, a dedicated discussion should be provided within the draft EIS. This discussion should outline how hardness derived guidelines for COPCs are influenced throughout the Project lifecycle and how this impacts the concentrations of COPCs within the nearfield receiving environment and aquatic receptors. This information should capture the full scope of potential effects and anticipated changes to the receiving environment and aquatic receptors from the deposition of effluent throughout the lifecycle of the Project.			Project thresholds. Further, CCME (2003) acknowledges the use of exposure and toxicity modifying factors such as hardness in the derivation of Project thresholds to account for site-specific water quality conditions that will maintain the protection of aquatic life in the receiving environment. NexGen agrees with the reviewer that the revised EIS would benefit from additional context regarding increasing hardness from Project effluent and how increases in hardness influences the calculation of water quality thresholds for certain COPCs. To provide these details, the following context will be added in revised EIS Section 10.2.8.3.1 (Water Quality Thresholds): "As noted in Table 10.2-5, sulphate, cadmium, copper, lead, manganese, and nickel have guidelines and Project thresholds that incorporate hardness as a toxicity modifying factor. For these COPCs, aquatic health studies have shown that their toxicity potential is influenced by hardness; specifically, increasing hardness has been identified as the key modifying factor in the water that can reduce the potential for metal uptake and toxicity (Adams and Garman 2023). In addition to COPCs, effluent can contain base cations (e.g., calcium, magnesium) that contribute to a water's hardness. Increases in hardness reduces the toxicity potential for hardness-dependent COPCs to aquatic organisms, so long as the increasing COPC concentrations remain below their hardness-dependent Project threshold. Therefore, applying ambient hardness concentration in the calculation of the Project threshold for these COPCs in the receiving environment provides a standardization in the surface water quality and aquatic health assessment. This standardization accounts for the changes in hardness concentration in the receiving environment during the period of discharge of treated effluent from the Project." In addition, the first paragraph in revised EIS Section 10.5.1.2 (Regional Surface Water Quality Model) will be modified to read as follows: "Regional surface water quality model results from the Application Case indicated that despite COPC concentrations increasing in the receiving environment due to the Project, concentrations remained below their respective thresholds throughout the lifespan of the Project. In addition, water hardness in the receiving environment is expected to increase during the lifespan of the Project, with a return to baseline conditions following Closure. The increase in COPC concentrations and water hardness in the receiving environment is primarily the result of the active ETP and STP discharges to Patterson Lake during Operations." 2. NexGen confirms that sulphate is the only COPC where the modelled concentrations in the receiving environment would potentially be higher than the Project threshold should the Project threshold be derived using baseline hardness concentrations. These higher concentrations would be limited to occur during Project Operations when there would be treated effluent discharged to Patterson Lake. NexGen further notes that, as discussed in part 1 of the response to this IR, the concentrations presented above would not result in adverse effects to the environment as changes in hardness would mitigate these effects.	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						sourced from the groundwater pathway, there is no corresponding hardness increase. Thus, the cobalt projections are evaluated under low hardness conditions, which identifies conditions where the cobalt projections are higher than the Project threshold. No changes are proposed in the revised EIS to address this IR. **References** CCME (Canadian Council of Ministers of the Environment). 2023. Water Quality Guidelines for the Protection of Aquatic Life: Aluminium. Available at http://st-ts.ccme.ca.vsd46.korax.net/en/?lang=en&factsheet=4					**References** Adams WJ and ER Garman. 2023. Recommended updates to the USEPA Framework for Metals Risk Assessment: Aquatic ecosystems. Integrated Environmental Assessment Management. Available at https://setac.onlinelibrary.wiley.com/doi/full/10.1002/ieam.4827. BC MECCS (British Columbia Ministry of the Environment and Climate Change Strategy). 2019. British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture. Summary Report. Ministry of the Environment and Climate Change Strategy: Water Protection & Sustainability Branch. Available at https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/wqg_summary_aquaticlife_wildlife_agri.pdf. CCME (Canadian Council of Ministers of the Environment). 2003. Guidance on the Site-Specific Application of Water Quality Guidelines in Canada: Procedures for Deriving Numerical Water Quality Objectives. https://ccme.ca/en/res/guidance-on-the-site-specific-application-of-water-quality-guidelines-in-canada-en.pdf CCME (Canadian Council of Ministers of the Environment). 2023. Water Quality Guidelines for the Protection of Aquatic Life: Aluminium. Available at http://st-ts.ccme.ca.vsd46.korax.net/en/?lang=en&factsheet=4. Environment Canada. 2017. *Canadian Environmental Protection Act, 1999*. Federal Environmental Quality Guidelines Cobalt. May 2017. 9pp. Available at https://www.ec.gc.ca/ese-ees/92F47C5D-24F5-4601-AEC0-390514B3ED75/FEQG%20Cobalt%20Final%20EN.pdf. Government of Canada. 2021. Federal Environmental Quality Guidelines Summary Table. Available at https://www.canada.ca/en/environment-climate-change/services/evaluating-existing-substances/federal-environmental-quality-guidelines-summary-table.html.	
96	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section Appendix 10A7.4.1	**Context**: It is incorrectly stated that only chloride concentrations exceed water quality thresholds at the edge of the mixing zone from the Effluent Treatment Plant (ETP). Table 10A-34 pg. 1777 demonstrates that both sulphate and chloride exceed water quality thresholds at the edge of the mixing zone. Additionally, this table should be updated to include all parameters of interest from the *Metal and Diamond Mining Effluent Regulations* (MDMER) and their respective water quality thresholds. **Rationale**: ECCC advice is to include the general water quality parameters that influence water quality thresholds in this table and parameters in Schedule 4 of the MDMER, so that any changes over	1. Include all general water quality parameters (ex. pH, temperature, hardness, total suspended solids, etc.) and un-ionized ammonia in Table 10A-34. 2. Include all water quality thresholds for each parameter in Table 10A-34. 3. Update the conclusions on water quality threshold exceedances at the edge of the mixing zone in this section to address sulphate exceedances and any other changes to general water quality parameters over the Project lifespan.	Responses to part 1, part 2, and part 3 of this IR are provided below. 1. and 2. The mixing zone modelling results shown in Table 10A-34 in Section 10A7.4.1 of Draft EIS Appendix 10A (Surface Water Quality Modelling Report) are limited to the constituents that screened in as constituents of potential concern (COPCs) in the assessment. Therefore, general constituents such as pH, temperature, hardness, and total suspended solids are not included in this table as these constituents were not identified as COPCs. However, in response to the meeting with the CNSC and Environment and Climate Change Canada (ECCC) on 9 June 2023, NexGen will update Table 10A-34 in Section 10A7.4.1 of revised EIS Appendix 10A to clarify assumptions for constituents flagged as exceeding Project thresholds where the value or concentration of other measured constituents (e.g., pH, temperature, hardness) contributed to the exceedances. These added assumptions will assist the CNSC and ECCC in verifying the identification	Appendix 10A, Section 10A7.4.1	**Context:** The Proponent has agreed to update Table 10A-34 to include general water quality parameters (ex. pH, temperature, hardness, total suspended solids, etc.) and un-ionized ammonia to address parts one and two of the original IR but has not provided the updated table for review. Additionally, in their response to part three of the original IR, the Proponent confirmed that sulphate concentrations in the nearfield receiving environment are not considered a threshold exceedance because the sulphate water quality threshold will increase from 128 mg/L to 429 mg/L over the course of the Project lifecycle due to increases in hardness concentrations from effluent deposition. However, the Proponent has not fully addressed and updated conclusions regarding	96-R1	1. Provide updated Table 10A-34 for review of proposed changes. 2. Within Appendix 10A Surface Water Quality Modelling Report include a discussion on how changes to receiving aquatic environment hardness concentrations are a Project-related effect. Discuss the implications of this effect to hardness-derived water quality guidelines and calculated concentrations of COPCs for nearfield water quality modelling results.	The following response is provided to address both part 1 and part 2 of the IR. 1. NexGen confirms that, as noted in the initial response to the original IR, NexGen will update Table 10A-34 in Section 10A7.4.1 of revised EIS Appendix 10A (Surface Water Quality Modelling Report) to both clarify assumptions for constituents flagged as exceeding Project thresholds where the value or concentration of other measured constituents (e.g., pH, temperature, hardness) contributed to the exceedances and correct the bolded sulphate concentrations. To also support the reviewer's request in the original IR, NexGen will add the following text in Section 10A7.4.1 in revised EIS Appendix 10A (Surface Water Quality Modelling Report): "Table 10A-34 is limited to presenting the selected COPCs that apply specifically to protection of aquatic life, drinking water quality, and primary productivity. Constituents that are ETMFs to specific COPCs, such as pH, temperature, and hardness, have not been included because they were not identified as COPCs. However, the determination of a threshold exceedance for COPCs	Section 10A.6.4.1.2; Section 10A7.4.1

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				the lifespan of the Project can be reviewed.		of the Project thresholds. NexGen also notes this broader range of constituents would be included in monitoring programs during the life of the Project. 3. With respect to the constituent exceedances identified by ECCC in the near-field mixing model results tables, the identification of sulphate in Table 10A-34 in Section 10A7.4.1 of Draft EIS Appendix 10A for the 'End' period of Operations for the ETP [effluent treatment plant] Reasonable Upper Bound Sensitivity Scenario and the STP [sewage treatment plant] Application Case exceeding its Project threshold at the edge of the mixing zone was an error. During this time, the Project threshold for sulphate would be 429 mg/L in the mixing zone because of the associated higher hardness; the maximum predicted sulphate concentrations at this time for both the ETP Reasonable Upper Bound Sensitivity Scenario and the STP Application Case are below the Project threshold. For this reason, the only predicted exceedance at the edge of the mixing zone is chloride. NexGen notes that the highlighted exceedance of chloride at the edge of the mixing zone is limited to the upper bound modelling scenario, which represents a conservative modelling case. Further, the maximum predicted chloride concentration (i.e., 134 mg/L) is just above the Project threshold (i.e., 120 mg/L), so any aquatic risk associated with exposure to that concentration is considered negligible. This conclusion is additionally supported by recent work by Elphick et al. (2011), which showed hardness is an effective exposure and toxicity modifying factor for chloride, meaning that any possible risk of exposure to the maximum predicted concentration would be mitigated by the corresponding elevated hardness at the edge of the mixing zone at this time. With respect to part 3 of this IR, NexGen will update Table 10A-34 in Section 10A7.4.1 of the revised EIS Appendix 10A to correct the bolded sulphate concentrations. NexGen confirms no other changes to conclusions for general water quality constituents over the Project lifespan are required to address part 3 of this IR. **References** Elphick JRF, Bergh KD, Bailey HC. 2011. Chronic toxicity of chloride to freshwater species: effects of hardness and implications for water quality guidelines. Environmental Toxicology and Chemistry. 30, 239-246.		changes to other water quality parameters over the Project lifespan. **Rationale:** An updated Table 10A-34 should be reviewed to validate the additional information and confirm all the requested information was included. Additionally, as described in IR-89 (CIAR doc #79) changes in hardness of the receiving aquatic environment causes an increase to the water quality thresholds of certain COPCs, which should be discussed as a Project effect within the Draft EIS and relevant appendices.			based on their projection takes into account the associated projection of any ETMF as applicable to a COPC. Where the potential for toxicity by specific COPCs is modified based on additional constituents defined as ETMFs (e.g., pH, temperature), assumptions regarding their influence on the selected Project threshold for those COPCs are provided as footnotes to Table 10A-34." 2. NexGen agrees with the reviewer that the revised EIS would benefit from additional context regarding increasing hardness from Project effluent and how increases in hardness influences the calculation of water quality thresholds for certain COPCs. To provide these details, the following context will be added in Section 10A4.1 of revised EIS Appendix 10A (Surface Water Quality Modelling Report): "As noted in Table 10A-2, sulphate, cadmium, copper, lead, manganese, and nickel have guidelines and Project thresholds that incorporate hardness as a toxicity modifying factor. For these COPCs, aquatic health studies have shown that their toxicity potential is influenced by hardness; specifically, increasing hardness has been identified as the key modifying factor in the water that can reduce the potential for metal uptake and toxicity (Adams and Garman 2023). In addition to COPCs, effluent can contain base cations (e.g., calcium, magnesium) that contribute to a water's hardness. Increases in hardness reduces the toxicity potential for hardness-dependent COPCs to aquatic organisms, so long as the increasing COPC concentrations remain below their hardness-dependent Project threshold. Therefore, applying ambient hardness concentration in the calculation of the Project threshold for these COPCs in the receiving environment provides a standardization in the surface water quality and aquatic health assessment. This standardization accounts for the changes in hardness concentration in the receiving environment during the period of discharge of treated effluent from the Project." In addition, the third paragraph in Section 10A.6.4.1.2 of revised EIS Appendix 10A will be modified to read as follows: "Predicted concentrations of selected constituents are summarized for the Project lifespan and far future in Table 10A-11 and Table 10A-12, respectively, and are illustrated in Attachment 10A-2. An increase from existing conditions for all modelled constituents as well as hardness is predicted in the three basins during Operations (i.e., 2029 to 2052). In general, COPC concentrations and hardness gradually increase throughout the Project lifespan in the three basins with the highest concentrations of COPCs observed in the North Arm – West Basin, which receives the Project discharges, followed by the South Arm and the North Arm – East Basin. Peak COPC concentrations during the Project lifespan are noted in the final years of Operations (i.e., 2051 in the North Arm – East Basin and North Arm – West Basin, and in 2052 in the South Arm), after which they steadily decline as the COPC mass loads are dispersed downstream after Operations discharges cease. Hardness is also expected to return to baseline conditions following Closure. The modelled projections do not show a discernible seasonal effect in the basins, likely due to their large volumes." **References**	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
											Adams WJ and ER Garman. 2023. Recommended updates to the USEPA Framework for Metals Risk Assessment: Aquatic ecosystems. Integrated Environmental Assessment Management. Available at https://setac.onlinelibrary.wiley.com/doi/full/10.1002/ieam.4827.	
105	ECCC	Wildlife and Wildlife Habitat	Table 11.4-1 Table 23A-4	The draft EIS states that water crossing structures will be designed to limit the area disturbed and in a manner that protects the banks from erosion (Table 11.4-1 path ID F-10), particularly when moving equipment across the river using cranes. There was no discussion of the potential effects of these activities to SAR, migratory birds or wetland function.	Describe the methods that will be used to minimize erosion of stream banks and how success of these measures will be evaluated. Explain any risks to migratory birds, SAR and wetland function as a result of these crossings.	NexGen confirms that information regarding methods used to minimize erosion of stream banks is included in the Draft EIS Section 23A (Summary of Project Environmental Design Features and Mitigation Measures). As presented in Table 23A-4 of Draft EIS Appendix 23A, NexGen commits to implementing sediment and erosion control best practices and standard mitigations (e.g., temporary sediment ponds, silt curtains, sediment traps) during all Project phases. Further details on specific erosion control methods and monitoring will be provided during the licensing and permitting processes for the Project, as applicable and commensurate with the stage of Project development. Risks to migratory birds and species at risk (SAR) from Project activities were assessed through the secondary pathway, Pathway ID W-05 (Injury and mortality from clearing), in Draft EIS Section 14.4.2 (Secondary Pathways). The assessment predicted that any adverse interactions between the proposed Project and wildlife, including SAR, are expected to be infrequent and result in negligible residual effects on valued components (VCs). Residual effects to wetlands and associated wetland condition and function from Project construction and infrastructure, such as water crossing structures, were assessed in Draft EIS Section 13.5.2 (Wetland Ecosystems). The assessment predicted that there would be no significant adverse effects to the wetland ecosystem VC. No changes are proposed in the revised EIS to address this IR.	n/a	**Context:** The Proponent provided additional clarification as to how negative effects to migratory birds and species at risk were assessed using pathway W-05, "Injury and mortality from clearing", but did not provide similar information on negative effects to migratory birds and species at risk from moving equipment across the river adjacent to the bridge. **Rationale:** A comprehensive assessment of the pathways of effects to migratory birds and terrestrial species at risk, such as clearing land and equipment movement, is needed to understand potential impacts and mitigation measures. A pathway of effects must be relevant to the receptor, in this case migratory birds and species at risk, to understand how the impacts occur. The pathway used to assess impacts from clearing land does not fully address impacts to migratory birds and species at risk from moving equipment across the river adjacent to a bridge. This information is important since land adjacent to the bridge and/or the bridge itself may provide habitat for species at risk bats and species at risk migratory birds. Information remains outstanding regarding the pathway resulting from moving equipment across the river adjacent to the bridge.	105-R1	Include consideration of how migratory birds (e.g., shoreline or overwater nesting species) and terrestrial species at risk (e.g., little brown bat, barn swallow, yellow rail) may be impacted by moving equipment across the river adjacent to the bridge in the Environmental Protection Plan. Provide details in the EIS, if the EPP cannot be provided for review. If any of the details requested above cannot be provided at the time of response, present a discussion of the gap in information, related uncertainty with regards to potential effects and mitigation, and any additional mitigation measures and/or monitoring and follow up that will be implemented on a precautionary basis.	Through further advancement of Project design, NexGen confirms that use of a crane will not be required to move Project equipment across the river adjacent to the access road bridge crossing at the Clearwater River. As a result, no additional effects or effects pathways from the Project on migratory birds and terrestrial species at risk would exist relative to those currently described in the Draft EIS. Therefore, the assessment undertaken for the Draft EIS is conservative and no changes to the revised EIS are required.	n/a
106	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 11.4.2	**Context**: The movement of heavy equipment and infrastructure across the Clearwater River below Patterson Lake at the existing bridge crossing is discussed in this section. The Proponent proposed two options, (1) the use of a crane to maneuver equipment across the river, and (2) upgrading the existing bridge to provide additional capacity. The Proponent's preferred approach is the use of a crane but the bridge will be upgraded in the event that it is deemed necessary. The Proponent concludes that upgrading the bridge will have negligible changes to fish habitat availability and thus is not further assessed. More information on the current bridge crossing would assist in the assessment of the amount of risk to the receiving environment from both options. **Rationale**:	1. Provide further information on the existing conditions and bridge crossing including dimensions, capacity, footprint and information about the Clearwater River at that specific location (i.e., flows, depth, width, etc.). 2. Provide more information on the number and types of equipment that would need to be lifted over the river and the footprint for both options. 3. Provide further information on which best management practices will be applied for spills management and monitoring.	NexGen acknowledges the reviewer's request for information on the Clearwater River crossing and movement of equipment and has included information on the existing bridge specifications below, noting that information regarding the physical and biological characteristics of the Clearwater River in the immediate vicinity of the bridge crossing location is already contained within the Draft EIS. NexGen further acknowledges that information regarding the equipment to be transported over the Clearwater River bridge crossing and additional details on spill response is outside the requirements of an EA of a designated project under the *Canadian Environmental Assessment Act, 2012*. Responses to part 1, part 2, and part 3 of this IR are provided below. 1. Additional information related to the current bridge size is provided as follows: ▪ dimensions: 27.33 m (long) by 5.53 m (wide); ▪ capacity: 100,000 lbs (45,360 kg); and ▪ footprint: 150 m^2.	Section 11.3.1.2	**Context:** The Proponent has provided some additional information to address part one of the original IR regarding the current bridge crossing of the Clearwater River and hydrological and habitat information regarding the riverine environment at this location. However, no further information has been provided regarding the equipment or infrastructure that would be lifted across the river by crane or the size of the footprint for the work area to address part 2 of the original IR. Insufficient detail has been provided on the proposed approach/methodology for moving equipment/infrastructure by crane across the river, how frequently this should be conducted, or under what conditions upgrading the bridge would be deemed necessary. The magnitude of negative effects to the aquatic environment and receptors from spills or accidents due to the proposed crane approach is unclear. In Section 11.4.2 of the Draft EIS the	106-R1	Further information is required comparing the use of a crane to transport equipment across the river versus upgrading the existing bridge. This information should address the frequency, duration and magnitude of potential effects to fish and fish habitat from Project activities associated with each proposed approach and should include: ▪ An assessment of effects to the aquatic environment from potential accident scenarios related to each proposed approach, ▪ Information on the frequency heavy machinery would need to be transported across the Clearwater River which the existing bridge would not be able to support, and ▪ Specific information on mitigation measures and best practices that should be applied for each approach to be feasible.	Through further advancement of Project design and planning, NexGen confirms that no upgrades to the access road bridge that crosses the Clearwater River are required as part of the Project and that use of a crane will not be required to move Project equipment across the bridge. Therefore, the assessment undertaken for the Draft EIS is conservative and no further assessment of potential effects to the aquatic environment is required in the revised EIS. As an update to information previously provided in response to the original IR 106, NexGen notes that, in support of provincially approved exploration activities (and since the time of submitting the Draft EIS), improvements have been made to the access road bridge crossing at the Clearwater River such that the information provided in response to part 1 of IR 106 has changed as follows: dimensions: 27.43 m (long) by 5.45 m (wide); capacity: 320,465 lbs (145,360 kg); and footprint: 150 m^2. The bridge remains a clear span structure with no permanent footprint below the ordinary high-water mark of the Clearwater River.	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				Currently there is no information provided on the current bridge crossing for dimensions, capacity and river flows. There is also no information provided regarding the amount of equipment expected to be brought across the river, and which best management practices would be used. Further information on proposed spill management and monitoring would assist in analyzing the options presented.		Information about the physical and biological characteristics of the Clearwater River in the immediate vicinity of the bridge crossing location is provided in the Draft EIS Section 9 (Hydrology) and Draft EIS Section 11 (Fish and Fish Habitat), as well as Draft EIS Annex IV.2 (Hydrometric Monitoring Characterization Report) and Draft EIS Annex V.1 (Aquatic Environment Baseline Report). Draft EIS Section 9.4 (Existing Conditions) and Section 5.3 of Draft EIS Annex IV.2 provide information related to water flows, depths, and widths at the Clearwater River bridge crossing location. Baseline hydrometric station CR-WC-MS-03 is located on the Clearwater River immediately upstream of the bridge, and seasonal information on water surface elevation (i.e., water depth), discharge, and stream channel parameters (e.g., channel width) are summarized for this location. Additionally, Draft EIS Section 11.3.1.2 (Clearwater River Mainstem, Clearwater River below Patterson Lake) and Section 9.3.3.1 of Draft EIS Annex V.1 present a description of fish habitat conditions for the 1-km long section of the Clearwater River between Patterson Lake and Forrest Lake, which includes the bridge crossing location. Revised EIS Section 11.3.1.2 will be updated to indicate that the surveyed section of the Clearwater River below Patterson Lake includes the bridge crossing of the site access road. 2. At the current stage of planning for the Project, detailed information is not available on the types of heavy equipment or infrastructure that would need to be lifted over the river and the size of the work area required for staging and site access. The footprint of staging areas would be limited to the extent practicable to minimize the area of disturbance. Additional information will be provided during licensing activities for the Project, as applicable. 3. Standard best management practices and mitigations related to spills would be implemented in accordance with the Project Environmental Protection Program and supporting documentation. Further details on specific spills management and monitoring approaches that would be applied during this Project activity will be provided during Project licensing, as applicable. **References** *Canadian Environmental Assessment Act, 2012*. SC 2012, c 19, s 52. Repealed, 2019, c 28, s 9. Available at https://laws-lois.justice.gc.ca/eng/acts/C-15.21/20170622/P1TT3xt3.html		Proponent concluded that both proposed approaches (i.e. use of crane to transport equipment across the river versus upgrading the existing bridge) would cause negligible changes to fish habitat. Additionally, the Proponent has not specified best management practices and mitigations that would be applied during spills and accident scenarios. **Rationale:** The Proponent has provided some additional information to address the IR. However more information regarding the equipment that would need to be lifted by crane across the Clearwater River is needed to determine the associated effects to the environment, including frequency, duration, and magnitude of effects to fish and fish habitat from project-related activities from this proposed approach. It remains unclear what the likelihood of a negative effect from accidents and spills by using a crane to lift heavy equipment and infrastructure across the Clearwater River would be compared to the alternative approach of upgrading the existing bridge crossing. To adequately evaluate the approach, and resulting effects to the aquatic environment and receptors, the Proponent should provide additional information addressing the frequency, duration and magnitude of potential effects to fish and fish habitat from Project activities associated with each proposed approach.				
109	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 11.7	**Context**: There is the potential for a low level of risk to aquatic biota in the far future due to elevated copper concentrations in surface water due groundwater inputs from the Potentially Acid Generation Waste Rock Storage Area (PAG WRSA). Forage fish, benthic invertebrates and planktonic species are predicted to be at higher risk than predatory fish species. The	Provide the adaptive management plan, and include details on the monitoring and management of copper loadings to Patterson Lake for all Project stages including post-closure from the PAG WRSA.	NexGen notes the Environment and Climate Change Canada's (ECCC's) request is outside the scope the requirements of an EA of a designated project under the *Canadian Environmental Assessment Act, 2012*. For the purposes of the EA, information regarding NexGen's adaptive management process is provided in Draft EIS Section 23.5.3 (Adaptive Management). To assist the ECCC in understanding the risk to aquatic receptors, a draft version of the Adaptive Management Plan (AMP) for copper and cobalt will be provided to the CNSC, as available, noting this plan	n/a	**Context:** The Proponent has identified that copper and cobalt loadings from surface runoff and groundwater seepage from the Waste Rock Storage Areas (WRSAs) and the Underground Tailings Management Facility (UGTMF) will cause exceedances of water quality guidelines for the protection of aquatic biota including fish in the future. This is a potential adverse effect of the Project. The aquatic health	109-R1	Provide the draft Adaptive Management Plan for review to demonstrate how future effects to Patterson Lake will be mitigated. If the draft Adaptive Management Plan is not available at the time of response, present a discussion of the proposed improvements to the effectiveness of Project management and mitigation measures, and provide additional details on how the mitigation strategies will be improved.	As noted in NexGen's initial response to the original IR, NexGen has committed to developing the Adaptive Management Plan (AMP) and providing a draft of the AMP to the CNSC, as available, noting this plan would not form part of the revised EIS. NexGen further notes that, as per the Canadian Environmental Assessment (CEA) *Agency Operational Policy Statement on Adaptive Management Measures under the Canadian Environmental Assessment Act* (n.d.), AMPs are not requirements of an EIS but rather are applied as follow-up programs whereby monitoring is	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				Proponent states that they are "developing an adaptive management plan to reduce uncertainty and manage risks related to this pathway". **Rationale**: Further information on this topic would assist ECCC in assessing the risk to aquatic receptors.		would not form part of the revised EIS. The draft AMP for copper and cobalt would include mitigation details associated with elevated copper concentrations in surface water due to groundwater inputs from the potentially acid generating waste rock storage area. No changes are proposed in the revised EIS associated with this IR. **References** *Canadian Environmental Assessment Act, 2012*. SC 2012, c 19, s 52. Repealed, 2019, c 28, s 9. Available at https://laws-lois.justice.gc.ca/eng/acts/C-15.21/20170622/P1TT3xt3.html		assessment determined that the predicted magnitude of the effect was unlikely to result in adverse effects on populations and communities, but that there could be exceedances of sensitive endpoints for chronic exposure of benthic invertebrates, reproduction of zooplankton and growth and reproduction for fish. **Rationale:** A potential long-term future scenario adverse effect to the aquatic environment from the Project has been identified. The currently proposed mitigation measures of lined waste management areas and the use of an underground tailings facility still allows for seepage of contaminants to groundwater and transport to Patterson Lake. Therefore, the currently proposed mitigation measures and management are inadequate to address the contamination of Patterson Lake by the groundwater pathway. Additional information on proposed mitigation measures is needed to assess the potential adverse effects to aquatic biota in Patterson Lake in the future. The Proponent has committed to providing an Adaptive Management Plan, which is not yet available for review. A determination on the effectiveness of project management and mitigation measures to prevent future effects to the aquatic environment and receptors cannot be made until the proposed Adaptive Management Plan is available for review.			applied and evaluated to mitigated effects that are deemed to be uncertain at the EIS stage. NexGen confirms that the AMP is being designed according to the philosophy and requirements of the CEA Agency (n.d.), including the incorporation of key indicators with action thresholds and testable EA predictions that will be used to trigger additional feasible mitigations that are identified in the plan. The purpose of the AMP is not to prescriptively impose additional mitigations on the Project. A prescriptive approach would not align with the general philosophy of adaptive management, as summarized in Environment Canada (2009). Rather, the AMP provides a "systematic approach for improving environmental management by learning from management outcomes" (Environment Canada 2009). Further, in alignment with Environment Canada (2009), the AMP lays out an approach to "exploring alternative ways to meet management objectives, predicting the outcomes of each alternative based on the current state of knowledge, implementing one or more of these alternatives, monitoring to learn which alternative best meets the management objectives (and testing predictions), and using these results to update knowledge and adjust management actions". With respect to the protection of aquatic resources in Patterson Lake, NexGen disagrees with the reviewer's assertion that the proposed mitigation measures would not be protective of the environment. The EA has shown that the mitigation measures proposed for the Project would be protective of the aquatic environment. In addition to the mitigation measures noted by the reviewer (i.e., lining of waste management areas and use of an underground tailings facility), other mitigation measures that would be applicable to protecting the far-future surface water quality from potential effects from the waste rock storage areas (WRSAs) and underground tailings management facility (UGTMF) after Closure are included in Pathway ID F-01 of Draft EIS Section 11.4 (Project Interactions and Mitigations). These include: ▪ Installing an engineered cover of compacted clean material and growth medium layer on the potentially acid generating (PAG) WRSA and installing a growth medium cover on the non-potentially acid generating (NPAG) WRSA. ▪ Using engineered cemented paste backfill and tailings to control source concentrations. ▪ Applying binder to reduce permeability in backfill and tailings. ▪ Revegetating the NPAG and PAG WRSAs during reclamation to limit total suspended solids in surface runoff. ▪ Developing and implementing a Preliminary Decommissioning and Reclamation Plan. As noted in Draft EIS Appendix 23A (Summary of Project Environmental Design Features and Mitigation Measures), the level of effectiveness associated with these mitigation measures is considered 'high', with the exception of revegetation of the NPAG and PAG WRSAs, which is considered 'medium'. Specific to the assessment of effects, which includes the ecological risk assessment and the aquatic health assessment, Section 11A4 of Draft EIS Appendix 11A (Aquatic Health Assessment of the Potential for Adverse Effects of Predicted Far-Future Copper Concentrations in Patterson Lake]) states "[p]redicted copper concentrations in all scenarios, including the reasonable upper bound scenario, indicated no effects or unlikely effects. Therefore,	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
											there is a high degree of certainty that the potential effects on aquatic biota have not been under-predicted". NexGen further notes that the predictions in the EA have incorporated multiple levels of conservatism to ensure that effects to fish and fish habitat were not underestimated (Draft EIS Section 11.6 [Prediction Confidence and Uncertainty]). Under these conservative assumptions, residual adverse effects to fish and fish habitat VCs were predicted to be not significant (Draft EIS Section 11.5.4.2 [Significance Determination]). It is anticipated that adaptive management measures undertaken would further reduce these residual adverse effects. As described in Draft EIS Section 23.5.1 (Environmental Assessment Follow-Up Monitoring), follow-up monitoring programs would be designed to, among other things, determine the effectiveness of mitigation and/or provide appropriate feedback for modifying or adopting new mitigation designs, policies, and practices (e.g., implementation of adaptive management). Information on preliminary monitoring and follow-up programs for the Project are presented in Draft EIS Appendix 23B (Environmental Assessment Monitoring and Follow-up Programs Proposed for the Project) and include considerations for hydrogeology, surface water quality, sediment quality, fish and fish habitat, terrain and soils, and vegetation. Overall, the Draft EIS provides the level of information required within the scope of the *Canadian Environmental Assessment Act, 2012* and demonstrates that the Project would be protective of the environment. The AMP proposed for the Project is expected to further reduce potential environmental effects, and, once available, will be provided to the CNSC outside of the EA process. **References** *Canadian Environmental Assessment Act, 2012*. SC 2012, c 19, s 52. Repealed, 2019, c 28, s 9. Available at https://laws-lois.justice.gc.ca/eng/acts/C-15.21/20170622/P1TT3xt3.html. CEA Agency (n.d.). Operational Policy Statement on Adaptive Management Measures under the *Canadian Environmental Assessment Act*. Environment Canada. 2009. Environmental Code of Practice for Metal Mines.	
111	ECCC	Wildlife and Wildlife Habitat	Section 12 Table 14.4-1	The draft EIS states that erosion control techniques will be utilized but does not provide details on what these techniques are or how these techniques will prevent sediment from entering waters frequented by migratory birds or SAR.	Provide details on what methods will be used for erosion control and how they will prevent sediment from entering waters frequented by migratory birds and/or SAR. Explain what actions will be taken if the erosion control measures are not successful. **Suggestions for mitigation and follow-up measures** In development of the Environmental Protection Plan, ensure that clearing and grubbing activities are not conducted during the breeding bird season.	NexGen commits to implementing sediment and erosion control best practices and standard mitigations (e.g., temporary sediment ponds, silt curtains, sediment traps) during all Project phases. NexGen confirms that further details on specific erosion control methods and monitoring will be provided during the licensing and permitting activities for the Project, as applicable and commensurate with the stage of Project development. Pathway ID W-03 (Sensory disturbance) and Pathway ID W-05 (Injury and mortality from clearing) in Table 14.4-1 in Draft EIS Section 14.4 (Project Interactions and Mitigations) state that if sensitive species are confirmed in the Project footprint, activity restriction guidelines established by the Government of Saskatchewan (ENV 2017) would be applied for sensitive species; this mitigation is also stated in Table 23A-4 of Draft EIS Appendix 23A (Summary of	n/a	**Context:** The Proponent has committed to utilizing standard mitigations for erosion and sediment control during all phases of the Project and provided relevant examples. The Proponent also states that the details on mitigation methods and monitoring will be provided at a later stage of the Project. These measures, including adaptive management, are to be implemented through their Environmental Protection Plan, once finalized. A fulsome assessment of the mitigation measures to be implemented to address impacts to waters frequented by migratory birds and SAR requires details on methods and monitoring from the Environmental Protection Plan.	111-R1	Provide the Environmental Protection Plan including details on methods and monitoring related to erosion and sediment control measures with respect to how these measures will minimize effects to migratory birds and species at risk. If details on methods and monitoring cannot be provided at the time of response, present a discussion relating to how the mitigation methods and monitoring will be implemented with regards to potential effects and mitigation, and any additional mitigation measures and/or monitoring and follow up that will be implemented on a precautionary basis.	NexGen notes that the level of information provided in the Draft EIS is appropriate for the assessment of Project effects on people and the environment, including effects on species at risk. Specific to proposed mitigation measures, as stated in Draft EIS Section 6.10 (Prediction Confidence and Uncertainty), "[u]ncertainty in the effectiveness of mitigations was also incorporated into the assessment. If uncertainty was high, the analysis applied a precautionary approach and mitigation was not considered sufficient to remove a pathway. For example, if a mitigation was considered new or unproven technology or challenging to implement under certain conditions, then a pathway was conservatively considered to be primary". Therefore, NexGen is confident that the level of effectiveness of mitigation measures has been appropriately captured in the assessment of valued components and intermediate components.	Section 14.4

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						Project Design Features and Mitigation Measures). The intent is to minimize clearing during the nesting period and follow the Environment and Climate Change Canada (ECCC) guidelines (ECCC 2019); however, flexibility is required for activity timing restrictions due to uncertainties in final design logistical details and permitting timelines. If activities occur during the nesting period, NexGen would engage with the ECCC on required authorizations, as applicable. Examples of monitoring activities for terrain and soils are provided in Table 12.7-1 of Draft EIS Section 12.7 (Monitoring, Follow-Up, and Adaptive Management); these monitoring activities would also apply for monitoring erosion potential. As further noted in Draft EIS Section 12.7, results from monitoring conducted through application of the Environmental Protection Program and supporting documentation would be used to determine the effectiveness of mitigation. If required, additional mitigation measures and/or adaptive management would be applied. No changes are proposed in the revised EIS to address this IR. **<u>References</u>** ENV (Saskatchewan Ministry of Environment). 2017. Activity restriction guidelines for sensitive species. Fish, Wildlife and Lands Branch. Regina Saskatchewan. Accessed January 2020. Available at http://publications.gov.sk.ca/documents/66/89554-Saskatchewan%20Activity%20Restriction%20Guidelines%20for%20Sensitive%20Species%20-%20April%202017.pdf ECCC (Environment Canada and Climate Change). 2019. Guidelines to reduce risk to migratory birds. Accessed July 2021. Available at https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/reduce-risk-migratory-birds.html		**Rationale:** Receiving the Environmental Protection Plan will allow ECCC to verify how standard mitigation measures will be implemented to address potential impacts to waters frequented by migratory birds (such as waterfowl and waterbirds) and SAR (such as horned grebe or yellow rail). Without details on methods and monitoring. ECCC is unable to evaluate or provide advice on the efficacy of their methods in relation to minimizing harmful effects to migratory birds and species at risk.			NexGen further notes that the Environment and Climate Change Canada's (ECCC's) request for NexGen to provide the Environmental Protection Program is outside the scope the requirements of an EA of a designated project under the *Canadian Environmental Assessment Act, 2012*. However, to help provide a better understanding for the reviewer, NexGen has provided the information presented below. NexGen confirms that it would implement sediment and erosion control best practices and standard mitigations during all Project phases. In accordance with Section 5.1 (1) of the *Migratory Birds Act*, sediment and erosion control best practices and mitigation would be implemented to prevent sediment from being deposited in waters or an area frequented by migratory birds, or in a place from which sediment may enter such waters or such an area. Sediment and erosion control best practices and mitigation would also be implemented in accordance with Section 33 of the *Species at Risk Act*, where "[n]o person shall damage or destroy the residence of one or more individuals of a wildlife species that is listed as an endangered species or a threatened species…", and Section 58 of the *Species at Risk Act*, where "no person shall destroy any part of the critical habitat of any listed endangered species or of any listed threatened species". NexGen further confirms that it would implement sediment and erosion control best practices and standard mitigations for the protection of migratory birds and species at risk (SAR) including, but not limited to: ▪ To the extent practical, work in sensitive areas (i.e., erosive soils, wetland features, critical species habitat, and fish habitats) would be scheduled to avoid periods that may result in high flow volumes and/or increase erosion and sedimentation (e.g., spring freshet). ▪ Design stream crossing structures to limit the area disturbed and in a manner that protects the banks from erosion and maintains the flows; ▪ Install effective erosion and sediment control measures (e.g., drainage ditches, berms, sediment fencing, straw bales, erosion control cloths) to stabilize erodible and exposed areas. ▪ Keep erosion and sediment control measures in place until all disturbed ground has been stabilized. ▪ Minimize the duration of exposure of disturbed soils by implementing interim revegetation, where practical. ▪ Avoid placing soil stockpiles near waterbodies (i.e., maintaining 150 m buffer from waterbodies and watercourses), and near natural drainage features, unless required for temporary storage. To verify that mitigation measures are achieving their intended goals, sediment and erosion control measures would be monitored through compliance inspections and monitoring such as: ▪ regularly inspecting erosion and sediment control measures to confirm they are functioning as planned and performing any required maintenance, as needed; ▪ inspecting soil stockpile areas after heavy precipitation or high runoff events; and ▪ where sedimentation to waterbodies or watercourses could occur, regularly monitoring for signs of sedimentation and taking corrective action, if required. These sediment and erosion control practices will form part of NexGen's Integrated Management System (e.g., Environmental Protection Program and supporting documents). With respect to other Project activities potentially affecting wildlife SAR, NexGen will have standardized instructions to	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
											avoid, minimize, and document wildlife interactions for the safety of workers, visitors, and wildlife. For example, buffer zones would represent designated protective and avoidance areas around wildlife or wildlife features (e.g., nests, dens) that are meant to minimize disturbance to wildlife from site activities (Draft EIS Section 14.4 [Project Interactions and Mitigations]). Incidental sightings of wildlife SAR would be recorded and reported to the Saskatchewan Conservation and Data Center. A more comprehensive list of mitigation measures for wildlife SAR and migratory birds is provided in Attachment IR 111-R1, 121-R1, 207-R1, and 270-R1. Revised EIS Section 14.4 (Project Interactions and Mitigations) will be updated to include any newly proposed mitigation measures stated in Table 1 of Attachment IR 111-R1, 121-R1, 207-R1, and 270-R1. **References** *Canadian Environmental Assessment Act, 2012.* SC 2012, c 19, s 52. Repealed, 2019, c 28, s 9. Available at https://laws-lois.justice.gc.ca/eng/acts/C-15.21/20170622/P1TT3xt3.html. *Migratory Birds Convention Act, 1994*. SC 1994, c 22. Last amended 12 December 2017. Available at https://laws-lois.justice.gc.ca/eng/acts/m-7.01/. *Species at Risk Act*. SC. 2002, c 29. Last amended 23 April 2021. Available at https://laws-lois.justice.gc.ca/eng/acts/s-15.3/.	
112	ECCC	Wildlife and Wildlife Habitat/Wetland Function	Section 13 Section 14 Table 23A-5	The draft EIS states that the Project will avoid wetlands as much as practical, but there will be a permanent "loss of availability of approximately 28 ha of wetland ecosystems". The mitigation measures propose adherence to the Federal Policy on Wetland Conservation to have no net loss of wetlands, however the draft EIS also states in multiple places that reclamation rarely works or restores original function. The draft EIS also states that offsets may be required to meet the requirements of the Federal Policy on Wetland Conservation, but does not provide clear explanation of how offsets will be applied. It is unclear how the Proponent will ensure no net loss of wetlands with this Project.	Provide a wetland mitigation and offset plan that will describe how no net loss of wetland function will be achieved.	NexGen notes that a wetland offset is not currently required for the proposed Project and would only be developed after detailed design if effects to wetlands could not be avoided. The Project was designed to avoid and minimize effects on wetlands. As described in Draft EIS Section 13.4 (Project Interactions and Mitigations), mitigation during initial Project design included realigning the site access road between the gatehouse and mine terrace to avoid a wetland. NexGen acknowledges that Draft EIS Section 13.5.2.1 (Application Case) identifies that "the combined loss of burned and unburned wetland ELC [Ecological Land Classification] units in the RSA [regional study area] is 27.8 ha"; however, the assessment was conservative in that it defined a maximum disturbance area four times larger than the currently anticipated Project footprint. At this time, the anticipated Project footprint is estimated to affect 0.8 ha of wetlands, with the intention that detailed design would avoid effects to this wetland area, if practicable. Should detailed design show that disturbance to wetlands would be required, a mitigation and offsetting plan describing how no net loss of wetland function would be achieved would be prepared at that time. No changes are proposed in the revised EIS to address this IR.	n/a	**Context:** The Proponent has provided an explanation of wetland loss caused by the Project. They confirmed that after application of avoidance, 0.8 hectare of wetland may be impacted by the Project footprint. The Proponent also states that the yet to be finalized detailed design would avoid effects to this wetland area, if practicable. No Wetland Mitigation and Offsetting Plan that would contain such details currently exists. **Rationale:** Until detailed design features are available for review, there remains uncertainty surrounding Project-related impacts to wetlands, which serve as habitat for fish, migratory birds and species at risk. The Proponent has indicated that there is potential to avoid effects to that wetland area entirely. However, if the detailed design plan does not allow for avoidance, the Proponent has stated in their previous response that a mitigation and offsetting plan describing how no net loss of wetland function would be achieved would be prepared. ECCC will be able to evaluate or provide advice on the efficacy of the methods contained within the Wetland Mitigation and Offsetting Plan if the plan is received. If the details of the plan are unavailable, the Proponent can instead	112-R1	Provide a draft Wetland Mitigation and Offsetting Plan. If the plan is not available at the time of response, present a discussion of the uncertainty which is caused by the lack of a Wetland Mitigation and Offsetting Plan. This discussion should include potential effects, avoidance plans, offsetting ratio, mitigation measures and monitoring that may be implemented. A description of how no net loss of wetlands will be achieved should be included.	NexGen notes that the reviewer's request for a wetland mitigation and offsetting plan is outside the scope of the requirements of an EA of a designated project under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012). To clarify NexGen's initial response to the original IR, NexGen's goal through future design phases will be to avoid the area within the current Project footprint (i.e., 0.8 ha) that exists in wetland ecosystems. For this reason, a wetland mitigation and offsetting plan is not currently anticipated to be required. However, should a design change be implemented that would require the disturbance of wetlands, NexGen would follow applicable regulatory requirements and develop a wetland mitigation and offsetting plan prior to any wetland disturbance. Notwithstanding the information above regarding lack of direct disturbance to wetlands, NexGen maintains that the Draft EIS provides a conservative assessment of Project effects to wetland ecosystems that resulted in a moderate to high degree of certainty in effects predictions (Draft EIS Section 13.6 [Prediction Confidence and Uncertainty]). Specifically, as stated in Draft EIS Section 13.5.2.1.1 (Ecosystem Availability), the use of a maximum disturbance area approximately four times larger than the current Project footprint would result in a loss of 26 ha of wetland habitat. While restoration of this habitat would be attempted during reclamation to achieve wetland species composition and ecological function similar to the current existing conditions, NexGen recognizes that successful reclamation of wetland habitats can be challenging. For this reason, the assessment conservatively assumed that the loss of Project-affected wetland ecosystems would be permanent and irreversible. The conclusions of the assessment on the wetland ecosystem valued component were derived on this basis (Draft EIS Section 13.5.2.3 [Residual Effects Classification and Determination of Significance]).	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
								provide a detailed discussion, as outlined in the follow up IR, for review.			**References** *Canadian Environmental Assessment Act, 2012*. SC 2012, c 19, s 52. Repealed, 2019, c 28, s 9. Available at https://laws-lois.justice.gc.ca/eng/acts/C-15.21/20170622/P1TT3xt3.html.	
121	ECCC	Wildlife and Wildlife Habitat	Section 14	As per the CNSC Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012: "The EIS will then describe mitigation measures that are specific to each environmental effect identified. Measures will be written as specific commitments that clearly describe how the proponent intends to implement them and the environmental outcome the mitigation is designed to address. The EIS will describe mitigation measures in relation to species and/or critical habitat listed under the Species at Risk Act (SARA). These mitigation measures will be consistent with any SARA permit, applicable recovery strategy and/or action plan." The draft EIS does not list all SAR, or the adverse effects to all SARA-listed species, and does not outline the measures that will be taken to avoid or mitigate these effects	1. Identify all SAR and their critical habitat and describe how they may be adversely affected by the Project. 2. Describe what measures will be taken to avoid or lessen the effects of each Project activity and phase, and how these effects will be monitored to ensure they are minimized or avoided.	NexGen confirms that information on species at risk (SAR) potential effects and mitigation measures are presented in the Draft EIS. 1. In Draft EIS Section 14 (Wildlife and Wildlife Habitat), all wildlife SAR that were confirmed to occur in the regional study area were assessed, including identification of critical habitat and mitigation measures. Selected valued components (VCs) assessed included SAR species woodland caribou (Draft EIS Section 14.5.1.1 [Application Case] and Draft EIS Section 14.5.1.2 [Reasonably Foreseeable Development Case]), little brown myotis (Draft EIS Section 14.5.6.1 [Application Case] and Draft EIS Section 14.5.6.2 [Reasonably Foreseeable Development Case]), olive-sided flycatcher (Draft EIS Section 14.5.7.1 [Application Case] and Draft EIS Section 14.5.7.2 [Reasonably Foreseeable Development Case]), and rusty blackbird (Draft EIS Section 14.5.8.1 [Application Case] and Draft EIS Section 14.5.8.2 [Reasonably Foreseeable Development Case]). Legally defined critical habitat is only applicable for woodland caribou, as presented in Draft EIS Section 14.3.1.1 (Habitat Availability). Species at risk not selected as VCs but assessed included northern myotis, common nighthawk, and barn swallow (Draft EIS Section 14.5.12 [Additional Species at Risk Screening Assessments] and Draft EIS Appendix 14A [Species at Risk Screening Assessment]). As presented in Draft EIS Section 13 (Vegetation), there are no vegetation SAR affected by the proposed Project. NexGen notes that yellow banded bumble bee, gypsy cuckoo bumble bee, transverse lady beetle, and nine-spotted lady beetle were not assessed in the Draft EIS but were identified by Environment and Climate Change Canada in IR 122 as potentially overlapping the regional area of the Project. Please refer to the response to IR 122 for context related to these arthropod SAR. 2. NexGen is committed to implementing the mitigation measures presented in Table 14.4-1 of Draft EIS Section 14.4 (Project Interactions and Mitigations) to avoid and minimize effects on SAR and other wildlife. Additional commitments to mitigation are provided in NexGen's responses to IR 38 and IR 127. Follow-up monitoring programs for all SAR and other wildlife will be developed as required as part of the federal licensing and provincial permitting requirements. No changes are proposed in the revised EIS to address this IR.	n/a	**Context:** The Proponent has only partially responded to part one and two of the IR. The CNSC guidelines state: *"the EIS will then describe mitigation measures that are specific to each environmental effect identified. Measures will be written as specific commitments that clearly describe how the proponent intends to implement them and the environmental outcome the mitigation is designed to address. The EIS will describe mitigation measures in relation to species and/or critical habitat listed under the Species at Risk Act (SARA). These mitigation measures will be consistent with any SARA permit, applicable recovery strategy and/or action plan."* The Proponent has provided some of the information required per the EIS guidelines. Table 14.4-1 in the draft EIS outlines some mitigation measures for each pathway. However, these mitigation measures do not provide sufficient detail to understand how these commitments will be implemented as per the EIS guidelines in italics above. Some mitigation measures are missing from the table that are mentioned in the text or are not included for all appropriate pathways. Also, the table does not contain a summary of species-specific mitigation measures, which are required to assess potential impacts to species at risk. **Rationale:** In order to meet the requirements of the EIS Guidelines and to assess potential impacts of the Project on migratory birds and SAR, the Proponent should include a summary table that lists each species at risk, the proposed mitigation measures, and a description of how the Proponent intends to implement them. Details on how the effectiveness of mitigation measures will be assessed should be included in Table 14.4-1 alongside how mitigation commitments will be implemented.	121-R1	1. Provide the following information as detailed in the EIS guidelines: *"the EIS will then describe mitigation measures that are specific to each environmental effect identified. Measures will be written as specific commitments that clearly describe <u>how</u> the proponent intends to implement them and the environmental outcome the mitigation is designed to address. The EIS will describe mitigation measures in relation to species and/or critical habitat listed under the Species at Risk Act (SARA). These mitigation measures will be consistent with any SARA permit, applicable recovery strategy and/or action plan."* 2. Prepare a summary table that lists each species at risk, the proposed mitigation measures, and a description of how the Proponent intends to implement them. This list should include all species at risk known to occur in the Project area, including boreal woodland caribou. 3. Revise Table 14.4-1 to include details on how mitigation commitments will be implemented (see also responses to IRs 123, 126, 270).	Responses to part 1 through part 3 of IR 121-R1 are provided below. 1. NexGen notes that information regarding the effects mitigation measures are intended to address and how mitigation measures would be implemented is provided in Table 14.4-1 of Draft EIS Section 14.4 (Project Interactions and Mitigations). Specifically, mitigation measures described in the "Environmental Design Features and Mitigation Measures" are intended to address the potential effects identified in the "Effects Pathway" column. Each mitigation measure is described in a manner that provides how the mitigation measure would be implemented. As an example, for Pathway ID W-01 (Habitat loss), a mitigation measure described is "reclaim and revegetate areas where non-permanent Project facilities have been decommissioned". For this mitigation measure, reclamation and revegetation would occur after facilities had been decommissioned and would be intended to reduce effects with respect to habitat loss. Mitigation measures intended to reduce effects on species at risk that exist or have the potential to exist in the area of the Project are discussed in either the appropriate species-at-risk valued component subsection in Draft EIS Section 14.5.1 (Residual Effects Analysis) or in Draft EIS Appendix 14A (Species at Risk Screening Assessment). In addition, to support the reviewer's request, NexGen has created Attachment IR 111-R1, 121-R1, 207-R1, and 270-R1, which provides general mitigation measures for both species at risk and migratory birds (Table 1) as well as species-specific mitigation measures for species at risk (Table 2). Any mitigation measures described in Table 1 of Attachment IR 111-R1, 121-R1, 207-R1, and 270-R1 that were not included in the Draft EIS will be added to Table 14.4-1 of revised EIS Section 14 (Project Interactions and Mitigations). Mitigation measures noted in Table 2 of Attachment IR 111-R1, 121-R1, 207-R1, and 270-R1 will be incorporated into the Project Environmental Protection Program and supporting documents. 2. To support the reviewer's request, NexGen has created Attachment IR 111-R1, 121-R1, 207-R1, and 270-R1, which provides general mitigation measures for both species at risk and migratory birds (Table 1) as well as species-specific mitigation measures for species at risk (Table 2). How mitigation measures would be implemented is described within the text for each mitigation measure. Any mitigation measures described in Table 1 of Attachment IR 111-R1, 121-R1, 207-R1, and 270-R1 that were not included in the Draft EIS will be added to Table 14.4-1 of revised EIS Section 14 (Project Interactions and Mitigations). Mitigation measures noted in Table 2 of Attachment IR 111-R1, 121-R1, 207-R1, and 270-R1 will be incorporated into the Project Environmental Protection Program and supporting documents.	Section 14.4, Table 14.4-1

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
											3. As noted in part 1 and part 2 of this IR response, descriptions of how mitigation measures would be implemented are included within the text for each mitigation measure. NexGen confirms that any mitigation measures described in Table 1 of Attachment IR 111-R1, 121-R1, 207-R1, and 270-R1 that were not included in the Draft EIS will be added to Table 14.4-1 of revised EIS Section 14 (Project Interactions and Mitigations).	
123	ECCC	Wildlife and Wildlife Habitat	Section 14 Table 14.4-1 Table 23A-3	Light pollution and effects to migratory birds and SAR such as bats and caribou are identified in the draft EIS. Mitigation is described as 'limit light pollution to the extent practical…' but more detail will help ECCC to determine how light pollution will be limited and what mitigation measures will be utilized.	Explain how light pollution will be managed and what specific mitigation measures will be used to minimize effects to migratory birds and SAR birds and mammals.	NexGen recognizes that additional detail on the light pollution mitigation would result in higher confidence in the effectiveness of mitigations that would reduce effects to migratory birds and other species at risk. However, the proposed Project lighting design has not yet been completed. As stated in Table 14.4-1 of Draft EIS Section 14.4 (Project Interactions and Mitigations), Pathway ID W-03 (Sensory disturbance), NexGen is committed to limiting light pollution to the extent practicable for built (i.e., constructed) infrastructure. Additional details on light mitigation will be developed during detailed design of the Project and reflected in documents provided in support of federal licensing, as applicable. No changes are proposed in the revised EIS to address this IR.	n/a	**Context:** Project lighting has the potential to attract wildlife to structures or other Project components which can result in harm or mortality. The lighting design is in development and not available for review. The Proponent has committed to limiting light pollution to the extent practicable for built infrastructure and that additional details on light mitigation will be developed. However, no details have been provided on what these mitigation measures will be. **Rationale:** Without the ability to review the mitigation measures that will be developed, ECCC cannot advise on the effectiveness of mitigation measures to reduce effects to migratory birds e.g., shoreline or overwater nesting species) and species at risk (e.g., little brown bat, barn swallow, yellow rail) (see IR 121 Context and Rationale). A light pollution mitigation plan for migratory birds and bats should be developed. The plan should include details on how light pollution will be limited, and Table 14.4-1 should be updated to reflect these details and to allow for a fulsome assessment of the mitigation measures for these potential impacts.	123-R1	**1.** Develop a light pollution mitigation plan for migratory birds and bats. **2.** Revise Table 14.4-1 to include details on how light pollution will be limited.	The following response has been drafted to address both part 1 and part 2 of IR 123-R1. In response to the reviewer's request to consider additional mitigation measures with respect to light pollution, NexGen will include the following details regarding light mitigation measures in Table 14.4-1 of revised EIS Section 14.4 (Project Interactions and Mitigations): ▪ Other than where required to comply with regulatory guidelines (e.g., aviation safety) or worker health and safety, the following guidance will be used for Project lighting design when migratory birds may be present: o limit the use of decorative lighting and solid burning or slow pulsing warning lights; o to the extent possible, orient lights downward or use shielded fixtures and limit light use to areas where Project activities are occurring (Dick 2016); o to the extent feasible, use the amber light [spectrum >500 nanometre], limit blue spectral light, and do not use white light, (Dick 2016); and o turn off lights when not in use (e.g., use timers, motion sensors) (Dick 2016). NexGen confirms that detailed lighting design and procurement for the Project has not been completed at this time and likely would not be concluded until greater certainty is achieved regarding Project approvals and development. NexGen notes that the development of a migratory bird and bat light pollution mitigation plan for inclusion in the EIS is outside the scope the requirements of an EA of a designated project under the *Canadian Environmental Assessment Act, 2012*. For these reasons, a detailed light pollution and mitigation plan is neither available, nor required, as part of the Project EA. **References** *Canadian Environmental Assessment Act, 2012*. SC 2012, c 19, s 52. Repealed, 2019, c 28, s 9. Available at https://laws-lois.justice.gc.ca/eng/acts/C-15.21/20170622/P1TT3xt3.html. Dick R. 2016. Royal Astronomical Society of Canada Guidelines for Outdoor Lighting in Dark-sky Preserves (RASC-DSP-GOL). Adopted by the RASC March 2008 Revised Spring 2016. 38 pp. [accessed 26 March 2019].	Section 14.4
128	CNSC	Human Health with respect to radiation exposure	Human Health Accidents and Malfunction	**Context:** Camp workers at the proposed Project were assessed for both radiological and non-radiological exposures in the Environmental Impact Statement (EIS) for the Rook I Project. However, the potential impacts of the project on the health and safety of all other persons that would be on-site (for example,	The proponent is requested to assess the potential radiological and non-radiological impacts of the project on the health and safety of all persons on- site, during normal operations and during accidents and malfunctions (persons on-site in this context are NEWs and persons who are not NEWs who may incur occupational exposures). The proponent should identify all	NexGen appreciates the reviewer's comment and the feedback received from the reviewer during regulatory engagement on this IR. Recognizing that detailed information on this topic will be provided as part of federal licensing, which is being conducted in an integrated manner with the Project EA, NexGen understands the CNSC's request is to provide a summary in the revised EIS (Section 15 [Human Health]) regarding the potential radiological and non-radiological effects of the Project on nuclear energy workers (NEWs) and non-NEWs.	Section 15; Appendix 15A (new)	The Proponent provided Attachment IR 128-1, which includes a summary of radiological and non-radiological effects on the health of nuclear energy workers (NEWs) and non-NEWs during normal operations and through the potential occurrences of accidents and malfunctions. This attachment is intended to be included as revised EIS Appendix 15A. However, the summary focuses on potential radiological effects	128-R1	In order to accept this response, CNSC staff request that the Proponent: 1) include a summary of the assessment of radiological effects of the Project on NEWs and non-NEWs in the context of equivalent doses for the lens of an eye, skin, and hands and feet during normal operations and through the potential occurrences of accidents and malfunctions.	The following response has been drafted to address both part 1 and part 2 of the IR. 1. NexGen notes that the reviewer's request is outside the scope the requirements of an EA of a designated project under the *Canadian Environmental Assessment Act, 2012* and the commitments made within the Project Description (NexGen 2019). For context however, operating experience at other uranium mines and mills indicates that exposure risks to eyes, skin, hands, and feet are low and standard personal protective equipment	Section 15.1.2

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				nuclear energy workers (NEWs) and persons not considered as NEWs (i.e., non-NEWs)), during normal operations and during accidents and malfunctions, were excluded from the EIS. The rationale provided by the proponent is in reference to CSA N288.6-12, as NEWs are not considered in the Standard. The exclusion of NEWs and non-NEWs who may be occupationally exposed to ionizing radiation and non-radiological hazards is contrary to the Project Description for the Rook I Project, which does identify in Section 4.2.5, Human and Ecological Health, the following: *Human and ecological health considerations will be evaluated through all phases of the Project and will consider the various potential impacts that the Project could have to various receptors. For example, specific to the direct operation of the Project, select occupations and personnel on-site could be exposed to radiation sources as part of their daily activities. These would include underground miners, ore and waste rock truck drivers and mill operators.* The proponent is reminded that the scope of the environmental assessment, as outlined in the Project Description for the Rook I Project, which was subsequently accepted by the Commission in its Record of Decision, provides the overarching framework for the EIS. Further, in the Record of Decision, it is stated that … *"CNSC staff submitted a detailed description of the primary project components and that it was satisfied that the project components and activities that NexGen listed in its project description were appropriate."* This would include the receptors identified in Section 4.2.5 as outlined above (i.e., specific to the direct operation of the Project, select occupations and personnel on- site could be exposed to radiation sources as part of their daily activities. These would include underground miners, ore and waste rock truck drivers and mill operators). **Rationale**: NexGen identified the scope of the Rook I Project in its submitted project description. Section 4.2.5,	associated hazards and screen them as to potential risks for bounding scenarios. All bounding scenarios should be further assessed in detail with adequate consequence criteria for their specific impacts/risks on the environment, human health, and workers' safety.	NexGen confirms that detailed information on the topic of this IR will be provided as part of the licensing application submission to the CNSC in support of Project Construction, and will include the deliverables for radiological and non-radiological hazards outlined below. For radiological hazards: ▪ radiological exposure assessment for underground workers; ▪ radiological exposure assessment for the process plant and paste tailings preparation workplace; ▪ radiological exposure assessment for the low-level radioactive waste incinerator; and ▪ radiological exposure assessment for accidents and malfunctions. For non-radiological hazards: ▪ workplace exposure to diesel and crystalline silica dust; ▪ hazard analysis reports; and ▪ human factors engineering documentation. Attachment IR 128-1 includes a summary of radiological and non-radiological effects on the health of NEWs and non-NEWs during normal operations and through the potential occurrences of accidents and malfunctions. This attachment will be included as revised EIS Appendix 15A.		of the Project in the context of effective doses to workers but neglected a discussion on equivalent doses for the lens of an eye, skin, and hands and feet. The Proponent also confirmed that detailed information on the topic of this IR will be provided as part of the licensing application submission to the CNSC in support of Project Construction and will include the deliverables for radiological and non-radiological hazards outlined below. For radiological hazards: ▪ radiological exposure assessment for underground workers; ▪ radiological exposure assessment for the process plant and waste tailings preparation workplace; ▪ radiological exposure assessment for the low-level radioactive waste incinerator; and ▪ radiological exposure assessment for accidents and malfunctions. For non-radiological hazards: ▪ workplace exposure to diesel and crystalline silica dust; ▪ hazard analysis reports; and ▪ human factors engineering documentation. The Proponent's commitments need to be specified in the EIS for completeness.		2) specify in the EIS that worker health, as it relates to normal operations and accidents and malfunctions, will be addressed independently as part of the CNSC licensing process as required.	(e.g., safety glasses, gloves, boots) worn in exposure areas would provide suitable protection for workers. This information was shared with and accepted by the CNSC during a licensing process comment disposition meeting for radiation protection on 16 October 2023.For these reasons, no further assessment is required to satisfy the requirements of the Project EA. 2. NexGen confirms that revised EIS Section 15.1.2 (Purpose and Approach to the Assessment) will include text acknowledging that worker health in respect to both normal operations and potential accidents and malfunctions will be addressed independently as part of the CNSC licensing process, as required. **References** *Canadian Environmental Assessment Act, 2012.* SC 2012, c 19, s 52. Repealed, 2019, c 28, s 9. Available at https://laws-lois.justice.gc.ca/eng/acts/C-15.21/20170622/P1TT3xt3.html. NexGen (NexGen Energy Ltd.). 2019. Project Description for the Rook I Project. Submitted to Saskatchewan Ministry of Environment and Canadian Nuclear Safety Commission. April 2019.	

NexGen Energy Ltd.

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				Human and Ecological Health, includes consideration of various potential impacts that the Project could have to various receptors, with examples given including select occupations and personnel on-site that could be exposed to radiation sources and non-radiological hazards as part of their daily activities (*paraphrased by CNSC staff*). CNSC staff note that the CSA standard N288.6-12 addresses environmental risk assessments for Class I nuclear facilities and uranium mines and mills. It is agreed that the standard does state the following in 1.6 (Receptors): *NEWs are covered under the radiation protection program and health and safety program in place at the facility and therefore not considered in the Standard.* However, there is currently no radiation protection program or health and safety program in place; noting that the Rook I Project is currently undergoing the EIS review process. Therefore, there is no information contained in the EIS on the extent of potential radiological and non-radiological impacts the project may have on all persons on- site (NEWs and persons who are not NEWs), including during accidents and malfunctions (also noting that the camp workers included in the HHRA were not advanced to the accidents and malfunctions analyses).								
191	CNSC	Accidents and Malfunctions	Section 21.6.5 TSD VIII, Section 8	**Context:** Bounding Scenario 3 involves damage to equipment and vessels containing uranium-bearing solutions in the solvent extraction building, resulting in fire and release of uranium to the environment. The effects of this scenario were evaluated with the Areal Locations of Hazardous Atmospheres (ALOHA) model. The details of the assessment are provided in TSD VIII. In TSD VIII, the airborne source term for this scenario is estimated with equation developed by the United States Department of Energy (USDOE) where the respirable faction is assumed to only include particles of 10 µm and smaller. **Rationale:**	Provide rationale for why only 10 µm and smaller particles were considered for respirable fraction and explanation for the values of factors used for leak path factor calculation. **Requires Technical Discussion**: Yes	As noted in Section 8.2 of Draft EIS TSD VIII (Accidents and Malfunctions Report), a 10 µm diameter particle size, or smaller, is a commonly assumed size fraction as an inhalable particle as referenced by various organizations, including the United States Environmental Protection Agency (US EPA 2023). Uranium particles emitted from a solvent fire would be particles or aerosols that are formed during the fire. In most cases, these aerosols are sub-micron in size. In consideration of this typical size, the 10 µm diameter assumption is conservative since it assumes that all the particles are therefore inhalable. Additionally, as noted in Section 8.2 of Draft EIS TSD VIII, the value '1' has been used for the respirable fraction to develop the exposure source term. This value is conservative because it assumes that all the uranium content formed as particles is inhalable. With respect to the calculation of the leak path factor (LPF) for a confined building fire, the basis of the LPF was as follows: ▪ The American Society of Heating, Refrigerating, and Air-Conditioning Engineers Ventilation	n/a	NexGen's response does not include explanation for some values of factors for leak path factor calculation (i.e. the volume of air of 210 m^3, maximum air flow of 27 m^3, burning rate of 2.6 L/s) and the maximum uranium concentration of 8 g/L in the loaded solvent.	191-R1	Provide explanation for the following values of factors, the volume of air of 210 m^3, maximum air flow of 27 m^3, burning rate of 2.6 L/s, and the maximum uranium concentration of 8 g/L in the loaded solvent.	The following explanations are provided to support the values for leak path factor calculations. 1. Volume of air NexGen notes that the volume of air needed to support a burning rate of 20 L/s kerosene that was shown as 21 m^3/s in Section 8.2 of Draft EIS TSD VIII (Accidents and Malfunctions Report) should have been shown as 220 m^3/s. This correction will be made in Section 8.2 of revised EIS TSD VIII (Accidents and Malfunctions Report). The volume of air is based on the following assumptions and calculations: <u>Assumptions</u> ▪ Theoretical burning rate: 20 L/s kerosene (Draft EIS TSD VIII, Section 8.2) ▪ Kerosene density: 0.81 g/cm^3 (US DOL 2004) ▪ Kerosene average molecular weight: 170 g/mole (US DOL 2004) ▪ Molar volume: 22.4 L/mole ▪ Stoichiometric ratio: 37:2 - $2C_{12}H_{26}(l)+37O_2(g)\longrightarrow 24CO_2(g)+26H_2O(g)$ ▪ O_2 to air ratio: 0.21	TSD VIII, Section 8.2

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				No rational was provided to support the consideration of only 10 µm and smaller particles. For material at risk, the total volume of the uranium-rich solvent of 100 m3 was used without explanation. It is also not clear where is the maximum uranium concentration of 8 g/L in the loaded solvent from. The calculation of leak path factor involves several factors either calculated or assumed (i.e. the volume of air of 210 m^3, 14 air changes, maximum air flow of 27 m^3, burning rate of 2.6 L/s), which are not clearly stated. As the airborne source term is an important factor for the effect assessment and should be calculated with transparent and justified information/data.		Standard 62.1 (ASHRE 2022) indicates that air exchange for closed industrial buildings is 4 air changes per hour (ACH). ▪ In case of fire, due to stack effects, the ACH is 3 to 4 times greater, and therefore 3.5 × 4 = 14 ACH was selected. NexGen also notes that the analysis was repeated for an unconfined fire assuming an LPF of 1 in the unconfined fire scenario, which had a similar minor to moderate consequence rating within a relatively short distance from the release as the confined scenario that assumed an LPF of 0.128. No changes are proposed in the revised EIS to address this IR. **References** ASHRE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers). 2022. ANSI/ASHRAE Standard 62.1-2022, Ventilation and Acceptable Indoor Air Quality. Available at https://www.ashrae.org/technical-resources/bookstore/standards-62-1-62-2 US EPA (United States Environmental Protection Agency). 2023. Particulate Matter (PM) Basics. Last updated July 2023. Available at https://www.epa.gov/pm-pollution/particulate-matter-pm-basics					▪ Excess air – open burning: 15% <u>Calculations</u> ▪ Theoretical burning rate: 20 L/s x 1,000 g/L x 0.81 g/cm^3 = 16,200 g/s kerosene ▪ Theoretical burning rate: 16,200 g/s / 170 mole/g = 95.4 mole/s kerosene ▪ Approximate stoichiometric O_2: 95.4 mole/s x 37 / 2 = 1,770 mole/s O_2 ▪ Approximate stoichiometric O_2: 1,770 mole/s x 22.4 L/mole / 1,000 L/m^3 = 40 m^3/s O_2 ▪ Approximate stoichiometric air: 40 m^3/s O_2 / 0.21 O_2/air = 190.5 m^3/s air ▪ Stoichiometric air (incl. excess air): 190.5 m^3/s air x 1.15 = **<u>220 m^3/s air</u>** 2. **<u>Maximum air flow</u>** The maximum air flow was determined based on the following assumptions and calculations. <u>Assumptions</u> ▪ The volume of the solvent extraction building is 7,000 m^3. ▪ A total of 14 air exchanges per hour are assumed (ASHRE 2022). <u>Calculations</u> ▪ Limiting volumetric of air flow: 7,000 m^3 x 14/h = 98,000 m^3/h, and ▪ 98,000 m^3/h / 3,600 sec/h = 27 m^3/s 3. **<u>Burning Rate</u>** Using the methods described in Section 8.2 of Draft EIS TSD VIII and following the calculation shown in part 1 of this response, an air volume of 220 m^3/s would be required for a kerosene burn rate of 20 L/s. However, as shown in part 2 of this response and presented in Section 8.2 of Draft EIS TSD VIII, the maximum air flow for a confined solvent fire within the building would be 27 m^3/s; therefore, the actual burning rate would be 20 L/s / 220 m^3/s x 27 m^3/s = 2.5 L/s. NexGen notes that, due to the updated volume of air provided in part 1, the burning rate value of 2.5 L/s is slightly different than the 2.6 L/s presented in the Draft EIS. NexGen will update Section 8.2 of revised EIS TSD VIII to include the updated value. NexGen confirms that this change does not affect the uranium airborne source term value of 0.0024 kg/s (Draft EIS TSD VIII, Section 8.2); therefore, the assessment results for the solvent extraction fire or explosion bounding scenario would not change. 4. **<u>Maximum Uranium Concentration in Loaded Solvent</u>** NexGen confirms that, based on test work completed for the Project, 8 g/L represents the planned U_3O_8 concentration within clarified pregnant liquor solution reporting from the counter-current decantation circuit to the solvent extraction circuit. Therefore, 8 g/L U_3O_8 for loaded solvent represents the worst-case scenario for effects to the environment should an accident or malfunction occur. **<u>References</u>**	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
											ASHRE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers). 2022. ANSI/ASHRAE Standard 62.1-2022, Ventilation and Acceptable Indoor Air Quality. Available at https://www.ashrae.org/technical-resources/bookstore/standards-62-1-62-2. USDOL (United States Department of Labor). 2004. Occupational Safety & Health Administration. Kerosene Fact Sheet. Available at http://niosh.dnacih.com/nioshdbs/oshameth/2139/2139.html. Accessed February 2024.	
198	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	Section 22.6	**Context:** In Section 22.6, the Proponent provides risk level determinations for various natural hazards based on their likelihood of occurrence and potential consequences. This relies on the climate information and projections detailed in Appendix 22A wherein the potential for future increases in the frequency/magnitude of short-duration precipitation events and Probable Maximum precipitation (PMP) are noted. This potential is also noted in section 22.6.3. – Major Precipitation Events. **Rationale:** In Section 22.6 under "Water Management Infrastructure" (p.22), the Proponent notes "*Self-containment for runoff from mineralized materials has been sized to contain PMP events*". It is not clear if that PMP considers potential climate change.	Describe how future climate change has been factored into the consideration of the risk levels related to extreme precipitation, including possible increases in frequency and magnitude, for all of the Hazard Scenarios identified in Table 22.6.3. **Suggestions for mitigation and follow-up measures** Monitor all pumps and availability of contingency pumps. Redundant pumps may be necessary when the failure threatens the environment.	The following points outline how climate change has been factored into the consideration of the risk levels in Table 22.6-3 of Draft EIS Section 22.6.3.2 (Risk Measurement and Evaluation): ▪ A detailed climate change analysis was completed (Draft EIS Appendix 22A [Climate Change Assessment], Attachment 22A-1) to understand future climate variables. As outlined in Section 22A.5.1.3 of Draft EIS Appendix 22A, climate projections for a range of variables were identified at various percentiles (i.e., 5%, 10%, 50%, 75%, 90%, 95%, and 99%). The climate projections provided across various percentiles have been considered for all climate variables, including extreme weather events such as a probable maximum precipitation (PMP) event. The PMP was projected for climate change scenarios in the 2050s and 2080s (Draft EIS Appendix 22A, Section 22A5.3). ▪ The climate information provided in Draft EIS Appendix 22A has been applied to the Project design through design criteria and management practices (i.e., environmental design features and mitigation). The detailed climate change dataset (Draft EIS Appendix 22A, Attachment 22A-1) was developed for the Project to compare the climate projections with design parameters to evaluate the resiliency of the Project. ▪ The climate information provided in Draft EIS Appendix 22A has also been applied to various disciplines, including hydrology, and has been used throughout the effects assessment. How the disciplines considered climate projections from Draft EIS Appendix 22A in the individual effects assessments are summarized in Table 6A-1 of Draft EIS Appendix 6A (Climate Change Roadmap). ▪ NexGen confirms that Table 22.6-3 of Draft EIS Section 22.6.3.2 considers the detailed climate change analysis (i.e., the Project has been designed to withstand a PMP event, which includes consideration of climate change), as well as the consideration of climate change in the effects assessment by the relevant disciplines (refer to Table 6A-1 of Draft EIS Appendix 6A [Climate Change Roadmap]). ▪ Given that climate change is occurring but there remains uncertainty in the future projections of climate change, NexGen would consider climate risks as a part of the continual improvement process, as outlined in the Climate Adaptation Framework (Draft EIS TSD XXII). With respect to the reviewer's suggested mitigation and follow-up measures, details regarding pump monitoring and the sizing of pumps, requirement for contingency pumps, and considerations for other	n/a	**Context:** The Proponent has clarified that climate change effects on future PMP have been evaluated by examining projections for a range of percentiles. However, it remains unclear what range of the projections was applied in design decisions and evaluation of risk and how these ranges were selected. In the IR response for IR-198 they indicate that: "As outlined in Section 22A.5.1.3 of Draft EIS Appendix 22A, climate projections for a range of variables were identified at various percentiles (i.e., 5%, 10%, 50%, 75%, 90%, 95%, and 99%). The climate projections provided across various percentiles have been considered for all climate variables, including extreme weather events such as a probable maximum precipitation (PMP) event. The PMP was projected for climate change scenarios in the 2050s and 2080s (Draft EIS Appendix 22A, Section 22A5.3)." And that: "The climate information provided in Draft EIS Appendix 22A has also been applied to various disciplines, including hydrology, and has been used throughout the effects assessment. How the disciplines considered climate projections from Draft EIS Appendix 22A in the individual effects assessments are summarized in Table 6A-1 of Draft EIS Appendix 6A (Climate Change Roadmap)" "NexGen confirms that Table 22.6-3 of Draft EIS Section 22.6.3.2 considers the detailed climate change analysis (i.e., the Project has been designed to withstand a PMP event, which includes consideration of climate change), as well as the consideration of climate change in the effects assessment by the relevant disciplines (refer to Table 6A-1 of Draft EIS Appendix 6A [Climate Change Roadmap])." In the Proponent's response to IR-199 they indicate that:	198-R1	Clarify what percentiles of projected changes in extreme precipitation including PMP have been considered and utilized in design of relevant infrastructure and management and evaluation of risks.	NexGen acknowledges the reviewer's comment and, in addition to the information provided in the initial response to the original IR, provides the following information to respond to the reviewer's inquiry regarding how Project design has considered susceptibility to extreme precipitation events, including events associated with future climate change. NexGen confirms that the key infrastructure susceptible to extreme precipitation events would be site water management infrastructure. As presented in Section 5.1.2 of Draft EIS TSD XVIII (Site-Wide Water Balance and Water Quality Modelling Report), sensitivity analyses were conducted to confirm that the current site surface water management system design would be suitable to various precipitation events. With respect to the capacity of the water management system related to precipitation, two scenarios were considered: Scenario 6 and Scenario 8. Scenario 6 considered the susceptibility of surface water management infrastructure to a summer probable maximum precipitation (PMP) event (i.e., 489.2 mm precipitation). The model results confirmed that the site water management infrastructure design is appropriate but that operational refinement for flood storage dewatering is warranted during later stages of Project planning. Scenario 8 considered the susceptibility of surface water management infrastructure to extreme storm events that may occur in the future due to climate change. More specifically, the scenario considered a 12% increase to the PMP event (i.e., 547.9 mm), or the 50th percentile of predicted climate change values for the 2050s (i.e., the end of the Project lifespan) (Draft EIS Appendix 22A [Climate Change Dataset Summary Report], Section 10A5.3, Table 22A-22). The analysis found that containment ponds are projected to maintain sufficient storage containment but may result in loss of freeboard under some antecedent conditions during the Operations phase. However, while site runoff pond #1 is expected to contain the PMP event, there was an increased probability of potential overflow during the Operations phase. As the results of both Scenario 6 and Scenario 8 show that the surface water management infrastructure is predicted to withstand current and future PMP events, the design assumptions for the EA are appropriate. However, NexGen acknowledges that some uncertainty regarding surface water management system performance exists and notes that, while climate change is occurring, there is also uncertainty in the future projections of climate change. Therefore, NexGen would appropriately monitor and consider climate risks on Project surface water management infrastructure as a part of both future design phases and the continual improvement process, as outlined in the Climate Adaptation Framework (Draft EIS TSD XXII). NexGen also notes that the design bases and management strategies for site water management infrastructure designed to accommodate a 24-hour PMP	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						related Project infrastructure will be provided to the CNSC as part of the licence application.		"The likelihood and consequence rankings shown in the various tables in Draft EIS Section 22.6 (Assessment of Effects of Natural Hazards) are accurate because the current Project design criteria and management practices incorporates climate change, which is based on the climate change assessment (Draft EIS Appendix 22A) and considered the range of variables identified at various percentiles as noted above (i.e., not just the median). Consequently, the risk ranking, which is the product of likelihood and consequence ratings assigned for each hazard scenario, is appropriate and would remain unchanged with more extreme projected future climate changes." "The climate information provided in Draft EIS Appendix 22A has also been used by various discipline effects assessments (e.g., hydrology, surface water quality and sediment quality, fish and fish habitat, vegetation, wildlife) as described in Table 6A-1 of Draft EIS Appendix 6A (Climate Change Roadmap). As described in the discipline effects assessments, additional percentiles beyond the median have been considered to better understand climate related effects, especially for extreme events. A summary of the median (i.e., 50th) percentile projections has only been provided for a general context on future climate." Table 6A-1 of the EIS indicates that mean projections rather than a range have been applied in the hydrology and Surface Water sections (Sections 9 and 10). **Rationale:** It is unclear what percentiles of projected changes in extreme precipitation, including PMP, have been considered in the EIS. Clarification on the consideration and utilization of these percentiles in design of relevant infrastructure and the management and evaluation of risks is required to understand effects related to future extreme climate events.			event have been included in the licence application for the Project and would be subject to review and revision (as required) throughout the Project lifespan. If the size of the 24-hour PMP were to change as a result of climate change during the Project lifespan, mechanisms within the CNSC licensing process would require revisions to the site water management design bases and associated infrastructure (as required) to ensure adequate containment of mineralized contact water during extreme precipitation events and to maintain protection of the environment.	
199	ECCC	Fish and fish habitat Migratory birds Current use of lands and resources for traditional purposes	Section 22.6 Appendix 22A	**Context:** In Section 22.6, the Proponent indicates that they have considered the median in an ensemble of climate change projections for a number of climate parameters in their hazard scenario assessment. **Rationale:** Best practice for addressing the inherent uncertainty in future climate projections is to consider the range of projected changes in an	Describe how the overall risk levels (based on likelihood and consequence) for the various hazard scenarios that relate to climate outlined in the various tables in Section 22.6 would differ if more extreme projected future changes were considered (i.e., not just the median).	As outlined in Section 22A.5.1.3 of Draft EIS Appendix 22A (Climate Change Assessment), climate projections for a range of variables were identified at various percentiles (i.e., 5%, 10%, 50%, 75%, 90%, 95%, and 99%). The climate projections provided across various percentiles have been considered for climate variables, including extreme weather events such as probable maximum precipitation and World Meteorological Organization indices. The climate information provided in Draft EIS Appendix 22A has been applied to the Project design through design criteria and management practices	n/a	**Context:** The Proponent has fully responded to the IR. However, in the Proponent's response it is indicated that they "considered the range of variables identified at various percentiles as noted above (i.e., not just the median)". The Proponent also indicates that, "Given that climate change is occurring but there remains uncertainty in the future projections of climate change, NexGen would consider climate risks	199-R1	Clarify how projections for the three RCPs were treated and evaluated.	NexGen confirms that the approach used to develop the multi-model ensemble is aligned with guidance from the Intergovernmental Panel on Climate Change (IPCC 2007; IPCC 2013) to consider all available models and scenarios. As outlined in Attachment 22A-1 of Draft EIS Appendix 22A (Climate Change Dataset Summary Report), all models and scenarios are weighted equally as part of one ensemble. To clarify how the individual representative concentration pathways (RCPs) compare to the multi-model ensemble presented in Draft EIS Appendix 22A, NexGen has included Attachment IR 199-R1 to this response, which includes box and whisker figures that	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				ensemble of projections from a range of future emission scenarios and models. Evaluating the risk level based only on the median does not address the inherent uncertainty. A probability of occurrence has not been ascribed to the different future emission scenarios and they diverge increasingly beyond ~2040. The median projected change from the ensemble may not be the most likely to occur, which would result in unreliable predictions and the subsequent assessment of effects of the Project.		(i.e., environmental design features and mitigations). The detailed climate change dataset (Draft EIS Appendix 22A, Attachment 22A-1 [Detailed Climate Change Methodology]) was developed for the Project to compare the climate projections with design parameters to evaluate the resiliency of the proposed Project. The likelihood and consequence rankings shown in the various tables in Draft EIS Section 22.6 (Assessment of Effects of Natural Hazards) are accurate because the current Project design criteria and management practices incorporates climate change, which is based on the climate change assessment (Draft EIS Appendix 22A) and considered the range of variables identified at various percentiles as noted above (i.e., not just the median). Consequently, the risk ranking, which is the product of likelihood and consequence ratings assigned for each hazard scenario, is appropriate and would remain unchanged with more extreme projected future climate changes. The climate information provided in Draft EIS Appendix 22A has also been used by various discipline effects assessments (e.g., hydrology, surface water quality and sediment quality, fish and fish habitat, vegetation, wildlife) as described in Table 6A-1 of Draft EIS Appendix 6A (Climate Change Roadmap). As described in the discipline effects assessments, additional percentiles beyond the median have been considered to better understand climate related effects, especially for extreme events. A summary of the median (i.e., 50th) percentile projections has only been provided for a general context on future climate. Given that climate change is occurring but there remains uncertainty in the future projections of climate change, NexGen would consider climate risks as a part of the continual improvement process, as outlined in the Climate Adaptation Framework (Draft EIS TSD XXII).		as a part of the continual improvement process, as outlined in the Climate Adaptation Framework (Draft EIS TSD XXII)." **Rationale:** The Proponent indicates in the EIS that they evaluated projections for three Representative Concentration Pathways (RCPs). However, it is not clear how the different emission scenarios were considered. Specifically, it is unclear if the results for the three scenarios have been aggregated together. If this is the case, it is more difficult to separate the causes of uncertainty (e.g. differences between the scenarios) and therefore properly evaluate uncertainty in the projections.			show the range of projections across each RCP, as well as across the multi-model ensemble. **References** IPCC (Intergovernmental Panel on Climate Change). 2007. Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri RK, Reisinger A (eds.)]. IPCC, Geneva, Switzerland, 104 pp. Retrieved from https://www.ipcc.ch/report/ar4/syr/. IPCC. 2013. Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Accessed 2018. Available at http://www.ipcc.ch/report/ar5/wg1/.	
207	ECCC	Wildlife and Wildlife Habitat	Section 23	The Proponent states they are committed to developing the following plans: Environmental Monitoring Plan Environmental Protection Program Biodiversity Action Plan Effluent Monitoring Plan Decommissioning and Reclamation Plan	Provide the Environmental Monitoring Plan, Environmental Protection Program, Biodiversity Action Plan, Effluent Monitoring Plan, and Decommissioning and Reclamation Plan for review and provide detail on how these plans and programs will ensure the protection of SAR and migratory birds and their nests and wetland function, including how any residual effects will be mitigated.	NexGen notes the request for the provision of the Environmental Monitoring Plan, Environmental Protection Program, Biodiversity Action Plan, Effluent Monitoring Plan, and Decommissioning and Reclamation Plan is outside the scope of the requirements of an EA of a designated project under the *Canadian Environmental Assessment Act, 2012*. This request is also outside the scope of the Project Terms of Reference (Draft EIS Appendix 1A [Concordance Tables for the Terms of Reference and Generic Guidelines for Preparation of an Environmental Impact Statement], Table 1A-2), specifically as defined in Section 10. NexGen confirms that the Environmental Protection Program and supporting documentation (e.g., Environmental Monitoring Plan) and processes will outline considerations for the protection of species at risk, migratory birds and their nests, and wetlands. Examples of information that will be included within the Environmental Protection Program and supporting documentation specific to these topics will include: ▪ Minimizing and managing interactions for the safety of wildlife and workers, which will be described in processes (e.g., procedures) and include information on avoiding, minimizing, and	Appendix 5A (new)	**Context:** The Proponent has not provided the following requested plans: ▪ Environmental Monitoring Plan ▪ Environmental Protection Program ▪ Biodiversity Action Plan ▪ Effluent Monitoring Plan ▪ Decommissioning and Reclamation Plan The Proponent stated that this request is out of scope of the EA process. However, the Proponent states that Environmental Protection Program and supporting documentation (e.g., Environmental Monitoring Plan) and processes will outline considerations for the protection of species at risk, migratory birds and their nests, and wetlands. This will include wildlife monitoring, and surface water and groundwater monitoring to evaluate wildlife function. **Rationale:**	207-R1	Provide the following plans and supporting documentation. ▪ Environmental Monitoring Plan ▪ Environmental Protection Program ▪ Biodiversity Action Plan ▪ Effluent Monitoring Plan ▪ Decommissioning and Reclamation Plan Additionally, provide details on the methods of mitigation measures and monitoring plans. If this is not available, provide a discussion of the gaps in information including uncertainty related to potential effects, mitigation measures, and a follow up and monitoring plan. Where information is lacking, a precautionary approach is recommended.	As noted in NexGen's initial response to the original IR, the request for the provision of the Environmental Monitoring Plan, Environmental Protection Program, Biodiversity Action Plan, Effluent Monitoring Plan, and Decommissioning and Reclamation Plan is outside the scope of the requirements of an EA of a designated project under the *Canadian Environmental Assessment Act, 2012*. This request is also outside the scope of the Project Terms of Reference (Draft EIS Appendix 1A [Concordance Tables for the Terms of Reference and Generic Guidelines for Preparation of an Environmental Impact Statement], Table 1A-2), specifically as defined in Section 10. NexGen maintains that the level of information provided in the Draft EIS is appropriate to determine potential effects on the environment, including effects to species at risk, migratory birds, and wetlands. Each discipline assessment section describes the mitigation measures proposed to avoid or minimize effects to the environment (e.g., Draft EIS Section 13.4 [Project Interactions and Mitigations], Draft EIS Section 14.4 [Project Interactions and Mitigations]). With respect to mitigation measure uncertainty, as stated in Draft EIS Section 6.10 (Prediction Confidence and Uncertainty), "[u]ncertainty in the effectiveness of mitigations was also incorporated into the assessment. If uncertainty was high, the analysis applied a	EIS Section 14.4.1, Table 14.4-1

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
						documenting wildlife interactions, as well as requirements for documenting wildlife sightings. ▪ Describing the risk-based set of integrated facilities, processes, and activities utilized to monitor various environmental media as they relate to the Project, including wildlife monitoring to verify compliance with the *Migratory Birds Convention Act, 1994* and *Species at Risk Act*, as well as surface water and groundwater monitoring to evaluate wildlife function. Detailed environmental management and monitoring plans, including the Environmental Monitoring Plan, Environmental Protection Program, Biodiversity Action Plan, Effluent Monitoring Plan, and Decommissioning and Reclamation Plan, will be developed and submitted to the CNSC and other regulatory authorities as part of the licensing and permitting processes for the Project, and reflect information commensurate with the stage of Project development. NexGen notes that a conceptual preliminary decommissioning and reclamation plan for the proposed Project will be included as revised EIS Appendix 5A (Conceptual Preliminary Decommissioning and Reclamation Plan). As this IR is out of the scope of the EA, no changes are proposed in the revised EIS other than the addition of Appendix 5A. **References** *Canadian Environmental Assessment Act, 2012*. SC 2012, c 19, s 52. Repealed, 2019, c 28, s 9. Available at https://laws-lois.justice.gc.ca/eng/acts/C-15.21/20170622/P1TT3xt3.html *Migratory Birds Convention Act, 1994.* SC 1994, c 22. Last amended 12 December 2017. Available at https://laws-lois.justice.gc.ca/eng/acts/m-7.01/ *Species at Risk Act.* SC. 2002, c 29. Last amended 12 August 2021. Available at https://laws-lois.justice.gc.ca/eng/acts/s-15.3/		Without reviewing the requested plans, ECCC is not able to evaluate the efficacy of mitigation methods to protect SAR, migratory birds and wetlands in relation to this Project. If any of the details requested above cannot be provided at the time of response, a discussion of the gap in information should be presented. This discussion should include uncertainty related to potential effects, mitigation measures, and a follow up and monitoring plan.			precautionary approach and mitigation was not considered sufficient to remove a pathway. For example, if a mitigation was considered new or unproven technology or challenging to implement under certain conditions, then a pathway was conservatively considered to be primary". Draft EIS Section 6 (Environmental Assessment Approach and Methods) provides additional context describing how a precautionary approach to assessment was undertaken. In addition to this context, the "Prediction Confidence and Uncertainty" subsections of each discipline assessment section (i.e., Draft EIS Section 7 [Air Quality, Noise, and Climate Change] to Draft EIS Section 19 [Community Well-Being]) describe the specific sources of uncertainty associated with the assessment and how the EA addressed uncertainty to complete a precautionary approach. Additionally, the "Monitoring, Follow-Up, and Adaptive Management" subsections of each discipline assessment section included in the Draft EIS describe the monitoring programs proposed to address the uncertainties associated with the effects predictions and to evaluate the performance of the Project, including the applied mitigation measures. To address the reviewer's request, NexGen has provided Attachment IR 111-R1, 121-R1, 207-R1, and 270-R1, which includes further context regarding general migratory bird and species at risk mitigation measures as well as species-at-risk-specific mitigation measures. Any mitigation measures described in Table 1 of Attachment IR 111-R1, 121-R1, 207-R1, and 270-R1 that were not included in the Draft EIS will be added to Table 14.4 1 of revised EIS Section 14 (Project Interactions and Mitigations). Mitigation measures noted in Table 2 of Attachment IR 111-R1, 121-R1, 207-R1, and 270-R1 reflect mitigations that would be incorporated into the Project Environmental Protection Program and supporting documents. **References** *Canadian Environmental Assessment Act, 2012*. SC 2012, c 19, s 52. Repealed, 2019, c 28, s 9. Available at https://laws-lois.justice.gc.ca/eng/acts/C-15.21/20170622/P1TT3xt3.html.	
226	CNSC	Accidents and Malfunctions	TSD IX, Section 9.1.6.2	**Context:** It states on page 9.15 that "Sediment quality results are shown in Table 9-5 for post-remediation conditions. The results presented in the table are a summary of the three flow conditions for the predicted concentrations in Beaver River sediments. In general, using the results of the assessment, the minimum predicted uranium concentrate concentrations in the river sediments occurred under high flow conditions, where the smaller particles (less than 5 μm) are deposited over a larger area." **Rationale:** In Table 9-5, the minimum predicted uranium concentrate concentration in the river sediments did not occur under high flow conditions, rather	Clarify the values in Table 9-5 under average and maximum flow conditions.	NexGen acknowledges there is an error in the Draft EIS text referenced by the reviewer. For clarity, the values presented in Table 9-5 in Section 9.1.6.2 of Draft EIS TSD IX (Transportation Risk Assessment Report) are correct and the associated text in Section 9.1.6.2 of Draft EIS TSD IX will be updated in the revised EIS to state that the minimum predicted uranium concentrate concentrations in river sediments would occur under average flow conditions. The higher uranium concentrate concentration values in the maximum flow scenario compared to the average flow scenario reflect the fact that the released uranium concentrate would be spread over a wider area in the maximum flow scenario. As a result, remediation efficiency would be lower than for the average flow scenario. Greater remediation efficiency in the average flow scenario would result in lower post-remediation concentrations than for the maximum flow scenario.	TSD IX, Section 9 .1.6.2	The reviewer does not understand why the minimum predicted uranium concentrate concentrations in river sediments would occur under average flow conditions, but not under maximum flow conditions. The reviewer believes that the text in section 9.1.6.2 is correct and the values in Table 9-5 for average concentration in sediment and average concentration in pore water appears to be switched between the average flow condition and the maximum flow condition (please refer to the values in Tables 9-1, 9-3, 9-7 for similar release scenarios).	226-R1	Further clarify the values in Table 9-5 under average and maximum flow conditions.	NexGen confirms that, as noted by the reviewer, the minimum sediment concentration values would occur under the maximum flow conditions. NexGen acknowledges that, upon further review, errors were made in both Table 9-5 of Section 9.1.6.2 of Draft EIS TSD IX (Transportation Risk Assessment) and in NexGen's initial response to the original IR. Specifically, the average flow and maximum flow uranium concentrations in sediment values presented in Table 9-5 of Section 9.1.6.2 of Draft EIS TSD IX were reversed. To address the noted errors, NexGen will make corrections to Table 9-5 and provide the correct context in Section 9.1.6.2 of revised EIS TSD IX (Transportation Risk Assessment). NexGen confirms that these corrections would not change the outcome of the transportation risk assessment as conducted in the Draft EIS.	TSD IX, Section 9.1.6.2

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				under average flow condition. It appears that in Table 9-5, the values for average concentration in sediment and average concentration in pore water are switched between the average flow condition and the maximum flow condition.								
230	ECCC	Climate Change	TSD XII	**Context:** The Proponent provided a net-zero framework document, which was "developed based on the guidance provided in the *Draft Technical Guide Related to the Strategic Assessment of Climate Change*" (SACC). This net-zero framework indicates technologies and practices that could be implemented to reduce GHG emissions from the Project, including information on technical feasibility and GHG reduction potential, which constitutes steps 1-3 of the SACC's 6-step BAT/BEP Determination process. The net-zero framework is incomplete, in that it does not provide information on the complete BAT/BEP Determination, and does not demonstrate how the Project's net GHG emissions will equal 0 t CO2 eq by 2050 and thereafter for the remainder of the Project lifetime. Furthermore, the Proponent states "emissions associated with land use change, stationary combustion, waste incineration, industrial processes, and explosives have a relatively small combined contribution of 12.6% of annual emissions, and therefore have not been evaluated in the net-zero framework at this early stage". The final row in Table 5 (electrification) of the net-zero framework, the Proponent lists several projects where electrification of on-site mobile equipment is being planned or implemented. The upcoming Jansen underground potash mine, which has placed an order for electric vehicles[5] was not included in the table. **Rationale:** While ECCC recognizes that this Project falls under CEAA 2012, the principles of the SACC and Draft Technical Guide should be followed by the Proponent in order to support Canada's ability to meet its environmental obligations and commitments in respect of climate change. The requested information will assist the Proponent in selecting appropriate mitigation measures to reduce GHG emissions from the Project.	1. Update the net-zero framework to align with the principles of sections 3.1 and 3.5.1 of the Draft Technical Guide, by including the following: ▪ The information requirements outlined in section 3.5.2 of the Draft Technical Guide, including completion of the full 6-step BAT/BEP Determination process; ▪ Consideration of all main emission sources defined in the Draft Technical Guide as those that are anticipated to contribute to 1% or more of total Project GHG emissions. 2. Include the upcoming Jansen underground potash mine in the preliminary alternative technologies and practices assessment, which is summarized in Table 5.	NexGen notes the reviewer's comment and acknowledges that guidance is available for completing a net-zero plan according to the requirements of the *Impact Assessment Act*. However, the reviewer's request is outside the scope of the requirements of an EA of a designated project under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012), and the Project is not subject to the Strategic Assessment of Climate Change (SACC) guidance (ECCC 2020, 2021). To show commitment to being net-zero by 2050, NexGen has gone above and beyond the CEAA 2012 requirements by providing additional information related to the options available to move towards a net-zero commitment. The net-zero framework provided in Draft EIS TSD XII (Net-Zero Framework) is appropriate to the early stage of the Project and outlines how the SACC guidance has been used to inform this framework. The net-zero framework is outside of the scope of the climate change effects assessment and would not change the conclusions of Draft EIS Section 7.4 (Climate Change). Outside of the EA process, NexGen's commitments to environmental, social, and corporate governance, and sustainability will be used to guide decision-making related to achieving net-zero by 2050. These commitments are not included in regulatory process for the Project but can be found on NexGen's sustainability webpage (https://www.nexgenenergy.ca/sustainability/default.aspx) as well as in Draft EIS Section 1 (Introduction). NexGen acknowledges that the Jansen underground potash mine is planning on the electrification of its mining fleet. This information will not be included in Table 5 in revised EIS TSD XII as it does not change the conclusions of this framework, and multiple examples of implementation of electrification are already provided. Table 5 in Draft EIS TSD XII is intended to be a preliminary list of technologies and practices and is not meant to provide an exhaustive list of all examples for each technology option. As important context to supporting Canada's ability to meet its environmental obligations and commitments in respect of climate change, as described in Draft EIS Section 4.2 (Purpose of the Project), the Project represents a substantial and consistent potential source of uranium for meeting the expected growing global demand for electricity. The Project could contribute to the Government of Canada's ability to meet its environmental obligations and commitments with respect to climate change by displacing high-greenhouse gas (GHG) intensity, fossil fuel (i.e., coal and natural gas) electrical generation in favour of low-GHG emitting, renewable energy options. No changes are proposed in the revised EIS to address this IR.	n/a	**Context:** The Proponent has not responded to either part of the previous IR. The Proponent has provided a net-zero framework document, which was "developed based on the guidance provided in the *Draft Technical Guide Related to the Strategic Assessment of Climate Change*". This net-zero framework indicates technologies and practices that could be implemented to reduce GHG emissions from the Project, including information on technical feasibility and GHG reduction potential, which constitutes steps 1-3 of the SACC's 6-step BAT/BEP Determination process. However, the Proponent's framework makes no direct commitment to achieve net-zero emissions by 2050. As a result, the net-zero framework is incomplete. It does not provide information on the complete BAT/BEP determination and does not demonstrate how the Project's net GHG emissions will equal 0 t CO2 eq by 2050 and thereafter for the remainder of the Project lifetime. Additionally, the Proponent has not addressed the previous request to consider all main emission sources anticipated to contribute 1% or more of the total project GHG emissions. **Rationale:** A net-zero framework which includes a commitment to achieve net-zero emissions by 2050, information on the complete BAT/BEP determination, and demonstration of how the Project's net GHG emissions will be 0 t CO2 eq by 2050 should be provided to complete the net-zero framework. Alongside a consideration of all main emission sources anticipated to contribute 1% or more of the total project GHG emissions, this complete net-zero framework will assist in estimating the impacts that may occur due to the GHG emissions from the Project. ECCC recognizes that this Project falls under CEAA 2012. However, if the Proponent's goal is to achieve net-zero emissions by 2050, the SACC and Draft Technical Guide will be useful in preparing a Project-specific net-zero plan, as they contain the most up-to-date guidance on this subject. This guidance should be followed by the	230-R1	1. Clarify whether the Project is intending to achieve net-zero emissions by 2050. 2. Update the net zero framework to align with the principles of sections 3.1 and 3.5.1 of the Draft Technical Guide by including the following: ▪ The information requirements outlined in section 3.5.2 of the Draft Technical Guide, including completion of the full 6-step BAT/BEP Determination process, ▪ a consideration of all main emission sources defined in the Draft Technical Guide that are anticipated to contribute to 1% or more of total Project GHG emissions.	Responses to part 1 and part 2 of this IR are provided below. 1. NexGen notes that the Canadian target of achieving net-zero emissions by 2050 does not apply to individual projects; rather this target applies collectively to all emission sources within Canada. Regardless, as currently proposed, the Project would align with net-zero initiatives and support Canada's ability to meet its environmental obligations and commitments in respect of climate change. The Project represents a substantial and consistent potential source of uranium for meeting the expected growing global demand for electricity (Draft EIS Section 4.2 [Purpose of the Project]). The Project could contribute to the Government of Canada's ability to meet its environmental obligations and commitments with respect to climate change by displacing high-greenhouse gas (GHG) intensity, fossil fuel (i.e., coal and natural gas) electrical generation in favour of low-GHG emitting, renewable energy options. To achieve decarbonization at the lowest possible cost in Canadian provinces, a diverse set of low carbon technologies, including nuclear, will need to be implemented (Canadian Nuclear Association 2017). In Canada, various climate scenarios for low GHG economy modelling analyses indicate the importance of nuclear energy installation before mid-century to meet the Paris Agreement targets (Draft EIS Section 4.3 [Alternatives to the Project]). Therefore, the Project benefits on climate change mitigation significantly outweigh Project effects and would align with net-zero initiatives. 2. NexGen confirms that work on the net-zero framework is planned to be advanced in parallel to, and commensurate with, the appropriate stage of Project engineering design and planning and is not complete at this time. The net-zero framework is being advanced in accordance with section 3.5.2 of the Draft Technical Guide Related to the Strategic Assessment of Climate Change (ECCC 2021) and in consideration of all main emission sources that are anticipated to contribute to 1% or more of the total Project GHG emissions, as defined therein. As noted in the initial response to the original IR, and as acknowledged in the reviewer's subsequent rationale, the reviewer's request is outside the scope of the requirements of an EA of a designated project under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012), and the Project is not subject to the Strategic Assessment of Climate Change (SACC) guidance (ECCC 2020, 2021). Therefore, NexGen will not be updating the net-zero framework in the revised EIS. <u>**References**</u> *Canadian Environmental Assessment Act, 2012*. SC 2012, c 19, s 52. Repealed, 2019, c 28, s 9. Available at https://laws-lois.justice.gc.ca/eng/acts/C-15.21/20170622/P1TT3xt3.html. Canadian Nuclear Association. 2017. Vision 2050: Canada's Nuclear Advantage. Available at	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				Note 5: https://im-mining.com/2022/06/20/sandvik-secures-major-bev-loader-order-for-bhps-jansen-potash-mine/		**References** *Canadian Environmental Assessment Act, 2012*. SC 2012, c 19, s 52. Repealed, 2019, c 28, s 9. Available at https://laws-lois.justice.gc.ca/eng/acts/C-15.21/20170622/P1TT3xt3.html ECCC (Environment and Climate Change Canada). 2020. Strategic Assessment of Climate Change. October 2020. Available at https://www.strategicassessmentclimatechange.ca/ ECCC. 2021. Draft Technical Guide Related to the Strategic Assessment of Climate Change. August 2021. Available at https://www.canada.ca/en/environment-climate-change/corporate/transparency/consultations/draft-technical-guide-strategic-assessment-climate-change.html *Impact Assessment Act*. SC 2019, c 28, s1. Last amended 28 August 2019. Available at https://laws-lois.justice.gc.ca/eng/acts/I-2.75/		Proponent to support Canada's ability to meet its environmental obligations and commitments in respect of climate change, including Canada's commitment to achieving net-zero emissions by 2050.			www.readkong.com/page/vision-2050-canada-s-nuclear-advantage-using-nuclear-9950301. ECCC (Environment and Climate Change Canada). 2020. Strategic Assessment of Climate Change. October 2020. Available at https://www.strategicassessmentclimatechange.ca/. ECCC. 2021. Draft Technical Guide Related to the Strategic Assessment of Climate Change. August 2021. Available at https://www.canada.ca/en/environment-climate-change/corporate/transparency/consultations/draft-technical-guide-strategic-assessment-climate-change.html.	
244	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	TSD XVIII, Section 4.1.2	**Context**: Seepage from site water ponds is described as a model input based on whether ponds are lined or unlined. **Rationale**: In accordance with comment ECCC-SW-04, ECCC reminds the Proponent that the *Metal and Diamond Mining Effluent Regulations* (MDMER) requires all mine effluent and seepage from the mine site that contains deleterious substances be discharged through a final discharge point.	Provide additional information on how water will be released into the receiving environment from the west bermed runoff collection area with consideration of MDMER requirements and update modelling as necessary.	NexGen notes that the west bermed runoff collection area would receive runoff from the local contributing area (i.e., non-contact water) as well as water from site runoff pond #2 (referred to as contact water pond #2 in Draft EIS Section 5.4.5 [Site Water Management], Figure 5.4-12) that is suitable release to the environment (i.e., release water) (Draft EIS Section 5.4.5; Draft EIS TSD XVIII [Site-Wide Water Balance and Water Quality Modelling Report], Section 4.4.1.4). NexGen would apply to designate the outflow from contact water pond #2 as a final discharge point. This location represents a final point of control, and a location where water would be monitored and analyzed to confirm all discharge criteria, including Metal and Diamond Mining Effluent Regulations limits excluding total suspended solids (TSS), are met. As the water in the west bermed runoff collection area would be discharged to ground from contact water pond #2, TSS would be removed from the water before reaching fish habitat. If these remaining limits are not met within contact water pond #2, water from this pond would be pumped to the effluent treatment plant rather than being discharged to the west bermed runoff collection area. This added context will be included in Section 10A3.3 of revised EIS Appendix 10A (Surface Water Quality Modelling Report) and in Section 3.4 and Section 4.4.1.4 in revised EIS TSD XVIII (Site-Wide Water Balance and Water Quality Modelling Report). **References** Metal and Diamond Mining Effluent Regulations. SOR/2002-222 under the *Fisheries Act*. Last amended June 18, 2020. Available at https://laws-lois.justice.gc.ca/eng/Regulations/SOR-2002-222/index.html	Appendix 10A, Section 10A3.3; TSD XVIII, Section 3.4, 4.4.1.4	**Context:** The Proponent provided the additional information requested in the response to the IR. However, the provided information raises further questions about seepage from the west bermed runoff collection area. In their response the Proponent states: " NexGen notes that the west bermed runoff collection area would receive runoff from the local contributing area (i.e., non-contact water) as well as water from site runoff pond #2 (referred to as contact water pond #2 in Draft EIS Section 5.4.5 [Site Water Management], Figure 5.4-12) that is suitable release to the environment (i.e., release water) (Draft EIS Section 5.4.5; Draft EIS TSD XVIII [Site-Wide Water Balance and Water Quality Modelling Report], Section 4.4.1.4)." It is noted that the runoff from the local contributing area includes runoff from the site access road and the site road to the Explosives Magazine Storage Area. Site infrastructure runoff water has the potential to contain deleterious substances from Project-related activities (ex. Road salting, spills or leaks from vehicles, etc.) and must be managed. Therefore, potential additions of deleterious substances from mine related activities could be introduced to the water within the west bermed runoff collection area after the proposed Final Discharge Point (FDP) at the outflow of contact water pond #2. Non-contact water runoff from site infrastructure and seepage from the west bermed runoff collection area meets the requirements of the MDMER definition of mine effluent and has the	244-R1	1. Provide an updated site water management plan that includes management of the site infrastructure runoff water (i.e. non-contact water) from the west bermed runoff collection area. 2. Propose a new FDP location downstream of the west bermed runoff collection area outflow that would allow for sampling and monitoring for COPCs required for effluent characterization. 3. Provide design specifications for the west bermed runoff collection area that would prevent seepage of potentially deleterious substance containing non-contact water to confirm the protection of the receiving environment.	Responses to part 1 through part 3 of IR 244-R1 are provided below. 1. NexGen confirms that, with respect to the context provided by the reviewer regarding the explosives storage area and associated access road, no deleterious substance sources in runoff would exist; therefore, runoff would be non-mineralized contact water, which would be appropriate for collection in the west bermed runoff collection area. The potential of water quality deleterious substances from the explosives storage area would be limited to those associated with potential spills, which would be mitigated by area-specific management practices for stockpiled materials that will be developed in accordance with applicable regulatory requirements, including the *Explosives Act* and The Mines Regulations, 2018. The potential for spills of explosive materials have been considered in the Project design. As noted in the response to IR 185, the storage of explosives is heavily regulated to minimize risks. Explosives would be managed as per the *Explosives Act*, as well as CAN/BNQ 2910-500/2015 Explosives – Magazines for Industrial Explosives. Potential spills would be contained and managed according to the Rook I Environmental Protection Program to avoid the release of any nitrogen compounds to the environment. The explosives magazine would be designed and constructed with a lined sump capable of storing a 1:100 year, 24-hour precipitation event, and water that has contacted spilled material would be collected and trucked to the settling pond for subsequent treatment and testing prior to discharge through a final discharge point (FDP). In summary, runoff from the explosives magazine or associated access road is not expected to contain deleterious substances, and thus does not require control and management through a FDP. NexGen notes that Figure 5 of Draft EIS TSD XVIII incorrectly shows that Element R52 would contain mineralized contact water rather than non-mineralized contact water; this will be corrected in Figure 5 of revised EIS TSD XVIII.	Section 5.4.5.2; TSD XVIII

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
								potential to contain deleterious substances. **Rationale:** The additional information provided by the Proponent confirms that seepage from the west bermed runoff collection area is not being managed. Site infrastructure runoff water has not been considered for the management of the west bermed runoff collection area, and the potential for deleterious substances in this runoff water could impact the receiving aquatic environment. The proposed location of the FDP at the outflow of contact water pond #2 prior to the west bermed runoff collection area will not be protective of the receiving aquatic environment.			2. NexGen maintains that an additional FDP downstream of contact water pond #2 (e.g., a FDP downstream of the west bermed runoff area) is not required as, under the currently proposed surface water management system, water released to the receiving environment would not contain deleterious substances above Project thresholds. As noted in NexGen's initial response to the original IR 244, water reporting to contact water pond #2 (i.e., site runoff pond #2) is considered the final point of control and would be tested to confirm that effluent release criteria other than total suspended solids (TSS), including requirements under the Metal and Diamond Mining Effluent Regulations, are met prior water being released to the west bermed runoff collection area, where this water would diffuse passively (i.e., to ground; there would be no overland path for water containing TSS to travel to Patterson Lake). In other words, contact water pond #2 represents FDP (i.e., control point) where water would be monitored prior to release to the environment. Should water quality in contact water pond #2 not meet Project thresholds, water would be pumped to the settling pond for treatment in the effluent treatment plant and re-tested to confirm compliance prior to discharge to Patterson Lake (Draft EIS Section 5.4.5.2 [Surface Water Management]). NexGen further notes that the monitoring ponds that receive water from the effluent treatment plant also represent an FDP where water would be monitored prior to release to the environment. These two FDPs (i.e., contact water pond #2 and the monitoring ponds) would represent monitoring locations/points of control for all Project site contact water. NexGen acknowledges that the statement "[t]he west bermed runoff collection area would be located on the west side of the Project site. This collection area would receive runoff from the local contributing area as well as overflow from contact water pond #2, if required" (Draft EIS Section 5.4.5.2, Table 5.4-4) could be interpreted as there is a possibility that water not meeting Project threshold criteria could be discharged into the west bermed runoff collection area. For this reason, Table 5.4-4 in revised EIS Section 5.4.5.2 (Surface Water Management) will be updated to state "[t]he west bermed runoff collection area would be located on the west side of the Project site. This collection area would receive runoff from the local contributing area as well as discharges from contact water pond #2 (i.e., a final point of control), provided Project discharge criteria are met". In addition, NexGen will also update Figure 5 of Section 3.4 of revised EIS TSD XVIII (Site-Wide Water Balance and Water Quality Modelling Report) to show the Project site water process flow more clearly. 3. As described in part 1 and part 2 of this response, other than TSS, no deleterious substances would be released to the west bermed runoff collection area. With respect to TSS, releases to the west bermed runoff collection area would be directly to ground, with no overland pathway to Patterson Lake. Therefore, TSS would settle out prior to water diffusing to Patterson Lake through the shallow groundwater pathway.	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
											As the west bermed runoff collection area would not receive potentially deleterious substances above Project thresholds other than TSS, the provision of design factors to control the release of deleterious substances is not required. **References** *Explosives Act*. RSC 1985, c E-17. Current to 28 July 2020. Available at https://laws-lois.justice.gc.ca/eng/acts/e-17/. The Mines Regulations, 2018. RRS c S-15.1 Reg 8 under *The Saskatchewan Employment Act*. Effective April 6, 2019. Available at https://www.canlii.org/en/sk/laws/regu/rrs-c-s-15.1-reg-8/latest/rrs-c-s-15.1-reg-8.html. SCC. 2015. CAN/BNQ 2910-510/2015: Explosives – Quantity Distances.	
253	ECCC	Fish and fish habitat Change to an environmental component due to hazardous contaminants	TSD XXI, Section 4.2.3.2	**Context**: Un-ionized ammonia and Total Suspended Solids (TSS) have not been included in Table 4-2 pg. 46, which makes it unclear if risk from un-ionized ammonia and TSS have been assessed. **Rationale**: Un-ionized ammonia and TSS are prescribed deleterious substances under Schedule 4 of the *Metal and Diamond Mining Effluent Regulations* (MDMER) and therefore should be put forward for assessment.	Provide an assessment of TSS and un-ionized ammonia.	NexGen appreciates the reviewer's comment and clarifies that un-ionized ammonia predictions are provided in Table 10A-11 and Table 10A-12 in Draft EIS Appendix 10A (Surface Water Quality Modelling Report) for Patterson Lake during the Project lifespan and in the far future. All predictions of un-ionized ammonia are below the Canadian Council of Ministers of the Environment water quality guideline (CCME 2010) used for the Project (at a pH of 7 and temperature of 15°C). Total suspended solids was not assessed in Draft EIS TSD XXI (Environmental Risk Assessment); however, total suspended solids was assessed in Draft EIS Section 10.5 (Surface Water Quality). No changes are proposed in the revised EIS to address this IR. **References** CCME (Canadian Council of Ministers of the Environment). 2010. Canadian Water Quality Guidelines for the Protection of Aquatic Life: Ammonia. Accessed August 2023. Available at https://ccme.ca/en/res/ammonia-en-canadian-water-quality-guidelines-for-the-protection-of-aquatic-life.pdf	n/a	**Context:** Additional information is needed to satisfy the original IR. The Proponent has not provided an assessment of un-ionized ammonia and total suspended solids (TSS) within the Environmental Risk Assessment (ERA) following standardized methodology. Un-ionized ammonia and TSS are Contaminants of Potential Concern (COPC) identified to be within effluent from both the mining effluent treatment plant and the effluent from the sewage treatment plant. Both were identified for further evaluation in Section 10.2.8.2 of the draft EIS for further assessment in receiving environment surface water quality. From the surface water quality assessment in Section 10.5 and Appendix A of the Draft EIS, predicted changes to receiving environment concentrations of un-ionized ammonia and TSS from effluent discharges were expected to be negligible if there were no predicted exceedances of effluent concentrations or baseline receiving environment concentrations of un-ionized ammonia and TSS, this should have been specified in the Tier 1 screening phase of the ERA. However, as stated in the original IR, un-ionized ammonia and TSS have not been included in Table 4-2 Section 4.2.3.2 of the ERA, which makes it unclear if risk from un-ionized ammonia and TSS have been assessed and deemed negligible or if they have not been assessed. **Rationale:** The Proponent has confirmed that an assessment of un-ionized Ammonia and TSS were not conducted in the ERA. As with the other identified COPCs within effluent in Section 10.2.8.2 of the draft EIS, accurate methodology	253-R1	Update the ERA to follow the correct methodology for the assessment of un-ionized ammonia and TSS. If corrections are required, detail any other report sections that are affected and ensure that all sections impacted by the error are updated.	NexGen appreciates the reviewer's comment and confirms that neither total suspended solids (TSS) nor un-ionized ammonia represent constituents of potential concern (COPCs) that require detailed assessment in the environmental risk assessment (ERA). As noted in Table 10A-36 of Section 10A7.4.2 of Draft EIS Appendix 10A (Surface Water Quality Modelling Report), average baseline measured concentrations of TSS in Patterson Lake are 1 mg/L. In the Application Case, the predicted TSS concentration at the edge of the treated effluent regulated mixing zone is less than 2 mg/L (i.e., the Project is predicted to increase TSS concentrations in Patterson Lake by 1 mg/L or less). Therefore, the predicted TSS concentration at the edge of the regulated mixing zone is well below the Canadian Council of Ministers of the Environment (CCME) guideline for protection of aquatic life of baseline plus 5 mg/L. For this reason, TSS was not considered a COPC for further quantitative evaluation in the ERA. Ammonia was assessed in the ERA as total ammonia-N and compared against the CCME water quality guideline of 5.74 mg/L. As noted in the footnote to Table 4-1 of Section 4.2.3.1 of Draft EIS TSD XXI (Environmental Risk Assessment), the guideline for un-ionized ammonia of 0.019 mg/L was converted to total ammonia-N at a pH of 7 and temperature of 15°C to arrive at this total ammonia threshold. Conversely, predicted total ammonia-N at the edge of the treated effluent regulated mixing zone can be converted to un-ionized ammonia using the equations in CCME (2010) and assuming a pH of 7 and temperature of 15°C as follows: pKa = 0.0901821 + 2729.92/T = 9.5641366 (equation 1) where: pKa = dissociation constant T = 288.15 K (15℃) and $f = 1/[10^{(pKa-pH)}+1] = 0.0027207$ (equation 2) where: f = fraction of total ammonia that is un-ionized	TSD XXI, Section 4.2.3.1 TSD XXI, Section 4.3.2.2

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
								should be followed for the assessment of un- ionized ammonia and TSS in the ERA to confirm that there are no negative effects to the aquatic receiving environment and receptors.			pKa = dissociation constant from equation 1 pH = 7 Using this approach, the predicted total ammonia-N concentration at the edge of the treated effluent regulated mixing zone is 0.498 mg/L, which is well below the CCME water quality guideline of 5.74 mg/L. In terms of un-ionized ammonia, total ammonia-N was converted to total ammonia by dividing by 0.8224 (i.e., the atomic mass of nitrogen divided by the molar mass of ammonia), and then total ammonia was converted to un-ionized ammonia by multiplying by 'f' from equations 1 and 2. Based on this calculation, the estimated un-ionized ammonia concentration at the edge of the regulated mixing zone is 0.00165 mg/L (0.00136 mg/L as N), which is well below the CCME un-ionized ammonia guideline of 0.019 mg/L (0.0156 mg/L as N). Therefore, both total and un-ionized ammonia are predicted to remain below applicable CCME guidelines, and un-ionized ammonia was not considered a COPC for further quantitative evaluation in the ERA. NexGen acknowledges that the information stated above could have been more clearly presented in the Draft EIS. Therefore, the following changes will be made to revised EIS TSD XXI: ▪ Table 4-1 in Section 4.2.3.1 (Screening Value Selection) will be updated to include the CCME (2002, 2010) guidelines as screening criteria for TSS and un-ionized ammonia. ▪ Table 4-2 in Section 4.2.3.2 (Constituents in Surface Water) will be updated to include TSS and un-ionized ammonia as constituents considered for the screening evaluation. A footnote will also be added to Table 4-2 associated with un-ionized ammonia edits that states "a pH of 7 and a temperature of 15°C were assumed to convert total ammonia to un-ionized ammonia". As TSS and un-ionized ammonia were not determined to represent Project COPCs, no further edits are required to the EIS other than the items noted above. **References** CCME. 2002. Canadian Water Quality Guidelines for the Protection of Aquatic Life – Total Particulate Matter. https://ccme.ca/en/res/total-particulate-matter-en-canadian-water-quality-guidelines-for-the-protection-of-aquatic-life.pdf. CCME. 2010. Canadian Water Quality Guidelines for the Protection of Aquatic Life – Ammonia. Available at https://ccme.ca/en/res/ammonia-en-canadian-water-quality-guidelines-for-the-protection-of-aquatic-life.pdf.	
254	ECCC	Fish and fish habitat Change to an environmental component due to radiological contaminants	TSD XXI, Section 4.2.3.3	**Context:** It is unclear from this section and Table 4-3 pg. 50 that the selection of sediment Constituents of Potential Concern (COPCs) has taken into consideration elevated baseline concentrations of arsenic, barium, iron, lead, manganese, zinc, lead-210, polonium-210 and radium-226 that were found during baseline monitoring. Inconsistencies between the sediment quality thresholds applied	Provide further information regarding if elevated baseline sampling concentrations for sediment COPCs were considered as part of the screening process. Update the results of the assessments if required.	NexGen appreciates the reviewer's comment and clarifies that based on Draft EIS Annex V.1 (Aquatic Environment Baseline Report), the only constituents that exceeded sediment quality guidelines in baseline monitoring were arsenic, cadmium, lead-210, polonium-210, and vanadium (in Naomi Lake and Clearwater River only). With the exception of vanadium, the other constituents that exceeded sediment quality guidelines at baseline were considered further in the screening assessment in Section 4.2.3.3 and Table 4-3 of Draft EIS TSD XXI (Environmental Risk Assessment).	n/a	**Context:** In Section 10.3.1.2 Water Quality existing conditions of the draft EIS, baseline water quality concentrations of iron (eight lakes and watercourses), manganese (lakes downstream and in the Regional Study Area), lead (Forest and Beet Lakes), nickel (Patterson Lake – Local Study Area), and arsenic (Patterson Lake) exceeded water quality guidelines for the protection of aquatic life. In Section 10.3.2 Sediment Quality existing condition of the draft EIS, baseline sediment concentrations	254-R1	Assess iron in the ERA and sediment quality modelling (i.e. quantitative risk assessment) for the sediment quality assessment.	NexGen concurs with the reviewer that if a constituent of potential concern (COPC) exceeds screening criterion in one medium, it should be assessed for all media that are likely to contribute to exposure points (CSA N288.6-22, Section 7.2.5.4.2 [CSA Group 2022]). NexGen confirms that, for constituents that were identified as COPCs in the Draft EIS (i.e., exposure situations that exceeded a screening criterion), this guidance was followed for the environmental risk assessment (ERA). All COPCs identified in surface water (Draft EIS Section XXI [Environmental Risk Assessment], Section 4.2.3.2) were also assessed in sediment (Draft EIS Section XXI, Section 4.2.3.3), and vice versa, as well as in additional food chain pathways.	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
				and the thresholds chosen within the EIS are noted. **Rationale**: The Proponent should ensure the most stringent environmental sediment quality objectives available are used and consistently maintained across different assessments for the EIS. Use of the most stringent guidelines will allow for the most protective assessment to analyze risks to the receiving environment.		The results of predicted vanadium concentrations in surface water are shown in Attachment 10A-2 of Draft EIS Appendix 10A (Surface Water Quality Modelling Report). The maximum projected vanadium concentration in Patterson Lake North Arm – West Basin during Project phases is approximately 0.0002 mg/L, which is well below the Project threshold of 0.12 mg/L. With respect to sediment, the predicted sediment concentrations in Table 4-3 in Section 4.2.3.3 of Draft EIS TSD XXI are total concentrations, inclusive of baseline concentrations. Based on the upper-bound concentration of vanadium in treated effluent (i.e., 2.07×10^{-03} mg/L) shown in Table 4-2 in Section 4.2.3.2 of Draft EIS TSD XXI, which represents far-future conditions, the upper-bound water concentration for vanadium in Patterson Lake North Arm – West Basin is predicted to be 1.3×10^{-04} mg/L in the Application Case, which considers existing baseline concentrations and the Project's treated effluent discharge. The predicted maximum sediment concentration of vanadium would be 9.5 mg/kg dry weight (dw), which is well below the sediment quality guideline of 31.8 mg/kg dw from Burnett-Seidel and Liber (2013). As stated in Section 4.2.3.3 of Draft EIS TSD XXI, "Burnett-Seidel and Liber (2013) was selected as the preferred source, as the reported NE2 [no-effect] and REF [reference] values are specifically applicable to Saskatchewan waterbodies." Burnett-Seidel and Liber (2013) guideline values were used even if these values were higher than Canadian Council of Ministers of the Environment guideline values because the former have been developed specifically for assessing the effects of uranium mining in the region. NexGen confirms that the results of the assessment remain unchanged based on this IR; therefore, no changes are proposed in the revised EIS. **References** Burnett- of Seidel C, Liber K. 2013. Derivation of no-effect and reference-level sediment quality values for application at Saskatchewan uranium operations. Environ. Monit. Assess. 185, 9481 – 494.		of arsenic and polonium-210 in Patterson Lake and baseline sediment concentrations of arsenic and vanadium in Naomi Lake exceeded guidelines. As per CSA N288.6-22 Section 7.2.5.4.2, "If COPCs exceed the screening level for one medium, they should be carried forward into the EcoRA [ecological risk assessment] for all media that are likely to contribute to exposure. For example, for a given COPC, if a water screening benchmark is exceeded, the same COPC should be carried forward for sediment if its concentration was above the detection limit." However, in Table 4-3 Section 4.2.3.3 Constituents in Sediment in the Environmental Risk Assessment (ERA), iron and manganese were not assessed. Both parameters were screened out because concentrations in effluent did not exceed guidelines, however baseline concentrations were not adequately considered as per CSA 288.6-22 methodology. While manganese only exceeded water quality guidelines in the RSA and not Patterson Lake, iron was identified as having baseline water quality threshold exceedances in eight waterbodies and watercourses throughout the LSA and RSA including Patterson Lake. **Rationale:** The Proponent has not provided rationale for the exclusion of iron from further assessment in sediment quality modelling and the ERA. Based on the requirements of CSA N288.6-22, iron should be evaluated further due to exceedances of water quality guidelines in baseline surface water quality data. Iron concentrations exceed water quality thresholds in baseline surface water quality throughout the LSA. Due to the exclusion of iron from the sediment quality assessment and ERA, a determination of effects to sediment quality and aquatic biota cannot be made.			With respect to iron, it is important to note that an updated Federal Environmental Quality Guideline (FEQG) has been drafted that follows the CCME species sensitivity distribution protocol (ECCC 2019). The updated guideline is dependent on dissolved organic carbon (DOC) and pH. For a pH of 7.0 and using the lower end of the site-specific DOC range from 2.4 mg/L to 13 mg/L (Draft EIS Appendix 10A [Surface Water Quality Modelling Report], Section 10A3.2), the calculated FEQG is 1,588 µg/L for a DOC of 2.4 mg/L. The equation utilized is as follows: FEQG (µg/L) = exp(0.671[ln(DOC)] + 0.171[pH] + 5.586). Under the most recent draft FEQG for iron, there would be no baseline exceedances of iron in the waterbodies in the LSA and RSA, and there would be no need to identify iron as a COPC. NexGen acknowledges that the CCME guideline for iron is 0.3 mg/L; however, this guideline was developed in 1987, and the draft FEQG guideline follows the most recent CCME species sensitivity distribution protocol. Additionally, the FEQG website (GoC 2024) states under the question "[h]ow do FEQGs differ from Canadian Environmental Quality Guidelines" that "[c]urrently, under the Chemicals Management Plan, there is an additional need to develop FEQGs to support federal environmental quality monitoring, risk assessment and risk management activities on substances for which CCME guidelines do not yet exist or are not reasonably expected to be updated in the near future". Therefore, NexGen maintains that the Draft FEQG guideline should be used in preference over the CCME guideline. From a human health perspective, Health Canada has not set a maximum acceptable concentration for iron (the current value represents an aesthetic objective). Iron is an essential element with no evidence for toxic effects unless large quantities of iron are ingested. To show that predicted iron concentrations in sediment in Patterson Lake North Arm – West Basin are below sediment quality guidelines, the following estimation has been performed: $C_{sediment,iron} = C_{water,iron} * K_d$ where: $C_{water,iron}$ = 8.84E-02 mg/L (Patterson Lake North Arm – West Basin, Max Upper Bound [Draft EIS TSD XXI, Table 4-2) K_d = 5000 L/kg (CSA N288.1-20 [CSA Group 2020]) $C_{sediment,iron}$ = 4.42E+02 mg/kg dw There are no federal or provincial guidelines for iron in sediment; therefore, the lowest effect level (LEL) for iron of 2.00E+04 mg/kg from Ontario was utilized (MOEE 1993). The predicted sediment concentration in Patterson Lake North Arm – West Basin is well below the sediment LEL; therefore, no impacts from iron on the aquatic environment are expected. NexGen confirms that the results of the assessment would remain unchanged based on the information in this IR response; therefore, no changes are required in the revised EIS. **References** CSA Group (Canadian Standards Association Group). 2020. CSA N288.1-20: Guidelines for Calculating Derived	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
											Release Limits for Radioactive Material in Airborne or Liquid Effluents for Normal Operation of Nuclear Facilities. CSA Group. 2022. CSA N288.6-22: Environmental Risk Assessments at Nuclear Facilities and Uranium Mines and Mills. ECCC (Environment and Climate Change Canada). 2019. Federal environmental quality guidelines – Iron. May. Available at https://www.canada.ca/en/environment-climate-change/services/evaluating-existing-substances/federal-environmental-quality-guidelines-iron.html. GoC (Government of Canada). 2024. Federal Environmental Quality Guidelines (FEQGs). Accessed March 2024. Available at https://www.canada.ca/en/health-canada/services/chemical-substances/fact-sheets/federal-environmental-quality-guidelines.html#a3. MOEE (Ministry of Environment and Energy). 1993. Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario. Ontario Ministry of Environment and Energy.	
270	ECCC	Wildlife and Wildlife Habitat	Annex VIII.2, Section 10	Surveys confirm common nighthawk occupies the SSA and the LSA. Aerial foraging and road-roosting behavior make this species susceptible to collision.	Provide a mitigation plan to address potential mortality risk to common nighthawk.	Table 14.4-1 in Draft EIS Section 14.4 (Project Interactions and Mitigations) and discussion in Pathway ID W-18 (Vehicle injury and mortality) in Draft EIS Section 14.4.2 (Secondary Pathways) describe mitigations to reduce potential mortality risk to common nighthawk. Key mitigations that would be included as part of the Project Environmental Protection Program and supporting documentation that will be developed in support of federal licensing include providing awareness training, giving wildlife the right of way, identifying wildlife use areas, reporting observations, and adjusting speed limits. No changes are proposed in the revised EIS to address this IR.	n/a	**Context:** The Proponent commits to developing key mitigations (which are currently not all provided for review) that would be included as part of the Project Environmental Protection Program (EPP). The EPP would also include providing awareness training, giving wildlife the right of way, identifying wildlife use areas, reporting observations, and adjusting speed limits. The key mitigation measures that will be included in the EPP to avoid harm to Common Nighthawk are insufficient. Common Nighthawk is a migratory bird listed as threatened under the *Species at Risk Act* and therefore more prone to adverse effects. **Rationale:** ECCC is not able to evaluate the effects and efficacy of mitigation methods without information regarding mitigation measures that will be employed if a Common Nighthawk nest is found on a roadway, airstrip, or other cleared area with vehicle traffic in order to provide a fulsome assessment of the efficacy of the key mitigation measures. Additionally, Table 14.4-1 in the draft EIS should be revised to include mitigation measures specific to Common Nighthawk, or minimally reference the Saskatchewan setback guidelines which include Common Nighthawk, to avoid vehicle injury or mortality, including nests on Project roadways or infrastructure (pathway W-18) so that the EIS is more inclusive of Common Nighthawk mitigation measures.	270-R1	1. Provide information regarding mitigation measures that will be employed if Common Nighthawk nest is found on a roadway, airstrip, or other cleared area with vehicle traffic. 2. Update Table 14.4-1 in the draft EIS to include Common Nighthawk -specific mitigation (or minimally reference the Saskatchewan setback guidelines which include Common Nighthawk) to avoid vehicle injury or mortality, including nests on Project roadways or infrastructure (pathway W-18).	NexGen confirms that proposed mitigation measures specific to common nighthawk are discussed in Section 14A.3 of Draft EIS Appendix 14A (Species at Risk Screening Assessment) and presented in Table 2 of Attachment IR 111-R1,121-R1, 207-R1, and 270-R1. In addition to these specific measures, mitigation for all wildlife species at risk and all migratory birds (including migratory bird species at risk) are also provided in Table 14.4-1 of Draft EIS Section 14.4 (Project Interactions and Mitigations) and Table 1 of Attachment IR 111-R1, 121-R1, 207-R1, and 270-R1. Mitigation measures specific to common nighthawk include: ▪ Avoid vegetation clearing, where possible, during the migratory bird nesting period (early May to late August). If vegetation clearing occurs during the common nighthawk breeding season (early May to late August), avoid activities within 200 m of active nests (Government of Saskatchewan 2017). If sites cannot be avoided, consult the ENV or ECCC, as applicable. ▪ If active common nighthawk nests are found on mine roads, the airstrip, or mine and mill terrace areas, the nesting area will be identified and avoided to the extent possible. NexGen notes that there are no additional practical mitigations for common nighthawk nesting in active areas such as site access roads or the airstrip. However, it is predicted that the frequency of traffic and level of activity at the Project would likely cause common nighthawk to avoid nesting in these areas. Therefore, the risk of injury/mortality to nesting and foraging common nighthawks is expected to be negligible. NexGen confirms that mitigation measures described in Table 1 of Attachment IR 111-R1, 121-R1, 207-R1, and 270-R1 that were not included in the Draft EIS will be added to Table 14.4-1 of revised EIS Section 14.4 (Project Interactions and Mitigations). Mitigation measures noted in Table 2 of Attachment IR 111-R1, 121-R1, 207-R1, and 270-R1 will be incorporated into the Project Environmental Protection Program and supporting documents.	n/a

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
272 (Link IR-5)	ECCC		Section 5.3.2 Section 5.5.3 Section 13.4					**Context:** The Proponent has committed to the development of a Decommissioning and Reclamation Plan that references revegetation of disturbed areas, as well as conducting progressive reclamation and revegetation of all non-permanent alterations to the Project area. However, no details have been provided related to how these areas will be reclaimed (e.g., what plant species will be used, if they plan to restore to previous habitat type, or what restoration methods will be used), specifically in the context of reclaiming caribou critical habitat. **Rationale:** Caribou critical habitat will be directly impacted within the Project footprint and restoration of these areas back to habitat that will develop the biophysical attributes required by caribou will minimize loss of critical habitat and maintain habitat integrity and connectivity. The SK2 caribou range is above the target disturbance threshold of 35% (Federal Recovery Strategy, 2020), therefore all further disturbance of caribou critical habitat should be restored.	(Link IR-5)	**Information Requirement:** Provide details for the revegetation of non-permanent alterations within the Project footprint with respect to caribou critical habitat. Include details such as what plant species and restoration methods will be used and if the restored areas will resemble the previous habitat type.	NexGen notes that, as woodland caribou is designated as a species at risk under the *Species at Risk Act*, NexGen has committed to developing and implementing a Caribou Mitigation and Offsetting Plan (CMOP) that will be developed through engagement with the ENV and Indigenous Groups (Draft EIS Section 14.5.1.1.1 (Habitat Availability). NexGen further notes that, as a condition of provincial EA approval, the CMOP must be submitted for Ministry of Environment (ENV) approval prior to NexGen initiating the Project Construction phase (ENV 2023). NexGen confirms that the CMOP continues to be developed with input from Indigenous Groups and based on meetings held with provincial regulators in 2022 and 2023, including a workshop held on 30 October 2023 with representatives of Indigenous Groups, the ENV, the CNSC, and ECCC. NexGen will continue to invite the ECCC to attend Caribou Working Group meetings. More information regarding the CMOP is presented in NexGen's response to IR 5-R1. As the Caribou Mitigation and Offsetting Plan is being developed with input from Indigenous Groups and provincial and federal regulatory agencies and would require approval by the ENV prior to Construction to verify suitable mitigation measures would be implemented, adequate information has already been provided for the purposes of EA review. However, consistent with the topic raised by the reviewer, NexGen will provide additional context regarding overall Project decommissioning and reclamation in revised EIS Appendix 5A (Conceptual Preliminary Decommissioning and Reclamation Plan). In summary, reclamation would be focused on returning the landscape to pre-Project ecosystems (to the extent possible), with revegetation activities proceeding as areas become available for reclamation. Target ecosites would be selected using the Field Guide to the Ecosites of Saskatchewan's Provincial Forests (McLaughlan et al. 2010) by matching predicted edaphic (i.e., influenced by soil) conditions of areas to be reclaimed to their respective ecosite. Industry best management practices for revegetation include the following: ▪ monitoring of planting activities by a qualified professional; ▪ establishing a diversity of plant species richness and structural diversity; ▪ minimizing bare ground and subsequent weed invasion; ▪ promoting the use of local seed sources to maintain the genetic integrity of revegetation plant material; and ▪ promoting early recolonization of reclaimed land by wildlife with a focus on species of primary interest for traditional land use. NexGen notes that the information presented in revised EIS Appendix 5A is preliminary in nature, with further versions of the Decommissioning and Reclamation Plan to be developed as the Project progresses through its lifespan, ultimately culminating in a Final Decommissioning and Reclamation Plan. In an effort to facilitate more effective future Project reclamation, NexGen also initiated a reclamation trial in 2023 designed to return a previously disturbed exploration-related borrow area to original conditions. The research area was instrumented with soil sensors (coupled with adjacent meteorological instruments) to gain understanding of site surface water balances. The initial revegetation target for this site is a BP2 jack pine/lichen ecosite and its characteristic tree and shrub species (e.g., jack pine, bearberry, blueberry, lingonberry, prickly rose). Revegetation is expected to take place through three mechanisms:	

Environmental Impact Statement – Federal Indigenous Review Team Information Request Responses – Round 2

No.	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation (if applicable)	Context and Rationale	Information Requirement	NexGen Response	Section in EIS	Justification/Rationale	Follow up IR #	Follow up Information Request	NexGen Response	Section in EIS
											1. Natural regeneration from placed upland surface soils. 2. Direct transplants of surface mats of lichen and associated vascular plants (to test the use of this technique for possible Project application). 3. Planting of container seedlings (planned for spring 2025). In support of this reclamation trial, NexGen and members of the Clearwater River Dene Nation collected seeds of jack pine, green alder, blueberry, and bearberry in October 2023; some of this seed is currently being grown into seedlings. Information gained from the borrow area reclamation trial will feed into the ongoing reclamation research that is part of the Project Decommissioning and Reclamation Plan development. **References** *Species at Risk Act*. SC. 2002, c 29. Last amended 23 April 2021. Available at https://laws-lois.justice.gc.ca/eng/acts/s-15.3/. ENV (Saskatchewan Ministry of the Environment). 2023. Notice of Ministerial Decision Pursuant to Section 15 *The Environmental Assessment Act* NexGen Energy Limited Rook I Project. McLaughlan MS, Wright RA, Jiricka RD. 2010. Field guide to the ecosites of Saskatchewan's provincial forests. Prince Albert, SK: Saskatchewan Ministry of Environment, Forest Service. 338 p.	

n/a = not applicable (i.e., no changes required in the revised EIS).

Rook I Project

Environmental Impact Statement

Annex 1 Responses: Supplemental Information

Attachment IR 4-R1, 26-R1

NexGen Energy Ltd.
Head Office
3150 – 1021 West Hastings Street
Vancouver, BC V6E 0C3

Saskatoon Office
200 – 475 2nd Ave S
Saskatoon, SK S7K 1P4

Attachment IR 4-R1, 26-R1

1 Introduction

NexGen Energy Ltd. (NexGen) is proposing to develop a new uranium mining and milling operation in northwestern Saskatchewan, called the Rook I Project (Project). The proposed Project is subject to both provincial and federal Environmental Assessment (EA) processes, would be licensed as a nuclear facility by the Canadian Nuclear Safety Commission (CNSC), and would be subject to various provincial and federal permits and approvals.

NexGen submitted a Draft Environmental Impact Statement (EIS) to the Saskatchewan Ministry of Environment (ENV) and Canadian Nuclear Safety Commission in 2022. Through the technical review of the Draft EIS, NexGen received information requests (IRs) and advice to proponent comments from the Federal-Indigenous Review Team (FIRT), which is led by the CNSC. Results of the FIRT technical review were provided in two Annexes; Annex 1 was composed of IRs and Annex 2 was composed of advice to proponent comments for NexGen's response. In September 2023, NexGen provided detailed responses to the FIRT IRs and advice to proponent comments.

On 12 February 2024, the CNSC provided the results of their review of NexGen's IR and advice to proponent comment responses. The IRs were categorized by the CNSC as accepted (i.e., requiring no additional response), not accepted with the technical approach deemed acceptable by the CNSC and the IR indicated as being able to be resolved once a revised EIS is provided by NexGen, or not accepted with additional response required by NexGen. For the IRs that were not accepted with additional response required, a second round of follow-up IRs were provided by the CNSC.

Attachment IR 4-R1, 26-R1 provides supporting information for NexGen's response to IR 4-R1 and IR 26-R1. The specific parts of IR 4-R1 and IR 26-R1 are as follows:

1. Provide details on how the advective flux of 0.55 m^3/d from the UGTMF and 2.7 m^3/d from the RMW to Patterson Lake were determined (Figure A-17 of Appendix A of Draft EIS TSD XIV). Details related to how mass flux from the UGTMF to Patterson Lake will occur over time should be provided. The requested details should be included within the body of text in Appendix A, with a summary of key parameters and results provided in the body of the EIS.

2. Provide details on how the flooding of the mine during closure will impact regional hydrogeology, specifically related to the migration of contaminants from the UGTMF and RMW to Patterson Lake by the groundwater pathway.

3. Clarify if contamination sourced from the RMW by the groundwater pathway has been included within the term UGTMF in section 10.5.1 of the EIS. If the RMW was not considered as a source of contamination to Patterson Lake by the groundwater pathway in Section 10.5.1 of the EIS, it should be added.

4. Include a table summarizing the predicted mass flux of contaminants from the UGTMF and RMW to Patterson Lake over time.

5. Provide justification for the assumption in the groundwater flow model of an equivalent porous media approach for groundwater transport through the shear and fault zones. The model should give due consideration for fracture dominated transport, either by directly modelling as fracture flow or through a robust justification for how the parameters used in the existing equivalent porous media model are reflective of fracture-dominant transport.

6. Provide additional information on the assumption that dispersity is 10% of the flow pathway for vertical flows from the UGTMF to Patterson Lake. Provide a reference for the validity of this approach that is either peer reviewed, or which demonstrates that it is an established method. The supporting documentation for the use of this method to estimate dispersivity should indicate that it is valid for situations that are comparable to the Project site, notably vertical groundwater flows that are likely to be fracture dominated.

7. Provide additional details on why the hydraulic conductivity value of the sandstone unit in the model is two orders of magnitude above the geometric mean.

8. Provide details on the source of the values selected for the hydraulic conductivity of the fault and shear zones.

9. If multiple calibrated model solutions were trialed, provide details, including why the parameters that were selected are considered the most appropriate model solution. If multiple calibrated model solutions were not trialed, provide information to support that the calibrated parameter values represent a unique calibration solution.

10. Where model parameters were obtained from site analogues or literature values, provide additional details that establish why the selected site analogues are valid for the Project site.

11. For fault and shear zone features that extend out of the local area, provide a clear explanation of the method used to determine the location, size, angle, and parameters that were used in the model to describe these zones. Provide the reasoning for the use of different hydraulic conductivity values for the fault and shear zones within the local area vs outside the local area.

12. In the sensitivity analysis, provide a justification for the magnitude of variability considered for each parameter. The justification should include consideration of how the value for each parameter was selected (field data, model calibration, etc.) and the level of uncertainty associated with each parameter. The magnitude of variability used for sensitivity analysis for each parameter should be chosen with respect to the level of confidence in the accuracy of each parameter value.

Section 2 and Section 3 provide NexGen's response to directly address the 12 parts of IR 4-R1 and IR 26-R1.

2 Response to Information Request

Part 1 - Provide details on how the advective flux of 0.55 m^3/d from the UGTMF and 2.7 m^3/d from the RMW to Patterson Lake were determined (Figure A-17 of Appendix A of Draft EIS TSD XIV). Details related to how mass flux from the UGTMF to Patterson Lake will occur over time should be provided. The requested details should be included within the body of text in Appendix A, with a summary of key parameters and results provided in the body of the EIS.

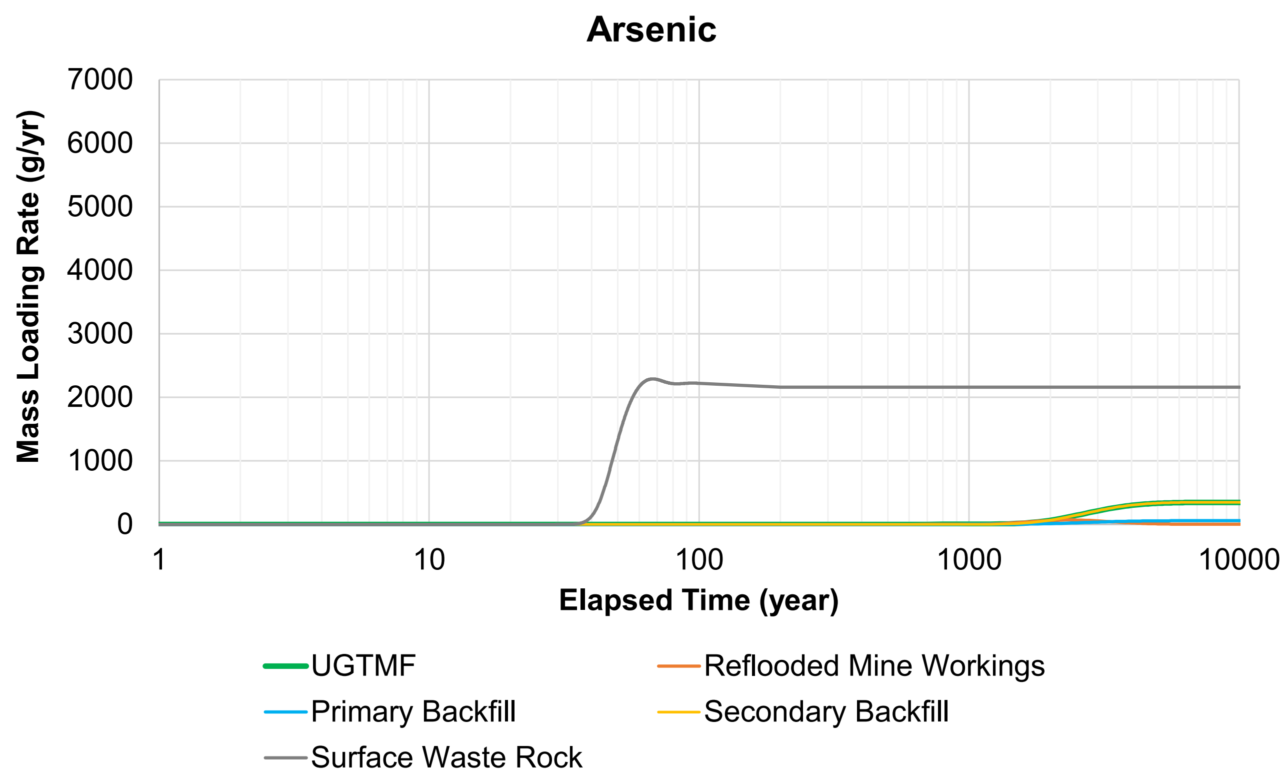
NexGen confirms that the advective fluxes presented schematically in Figure A-17 of Draft EIS TSD XIV (Groundwater Flow and Solute Transport Modelling Report) are the predicted fluxes from the groundwater model following reflooding of the underground. The underground was sub-divided into four areas (i.e., underground tailings management facility [UGTMF], primary backfill, secondary backfill, and reflooded mine workings) and a local water budget was completed for each of those regions to extract the predicted flow for each zone.

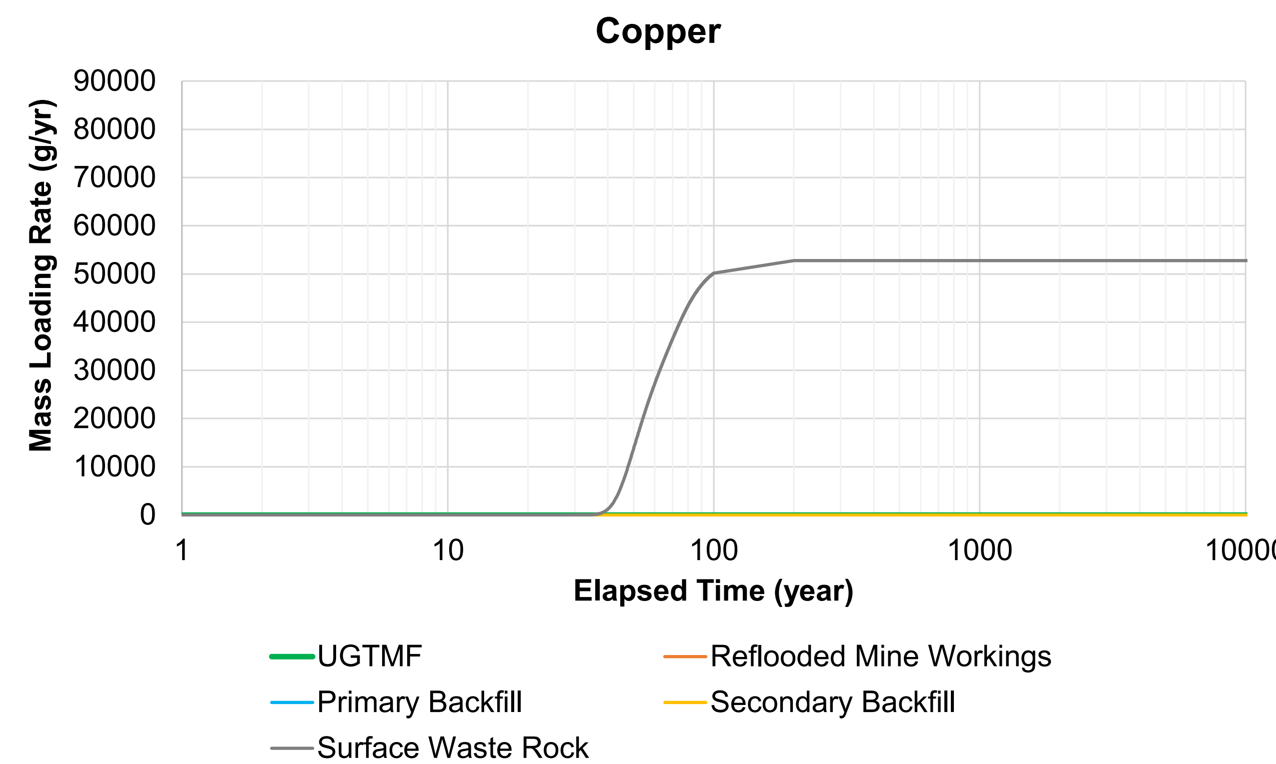
Figure A-21 of TSD XIV presents a summary of the predicted mass loading rates over time to Patterson Lake from the combined sources presented in Figure A-17 (i.e., UGTMF, primary backfill, secondary backfill, reflooded mine workings, background groundwater, and surface waste). Figure 1 of this attachment presents the requested mass flux over time for the UGTMF to Patterson Lake, as well as for the reflooded mine workings, primary backfill, and surface waste rock for arsenic, copper, uranium, and radium.

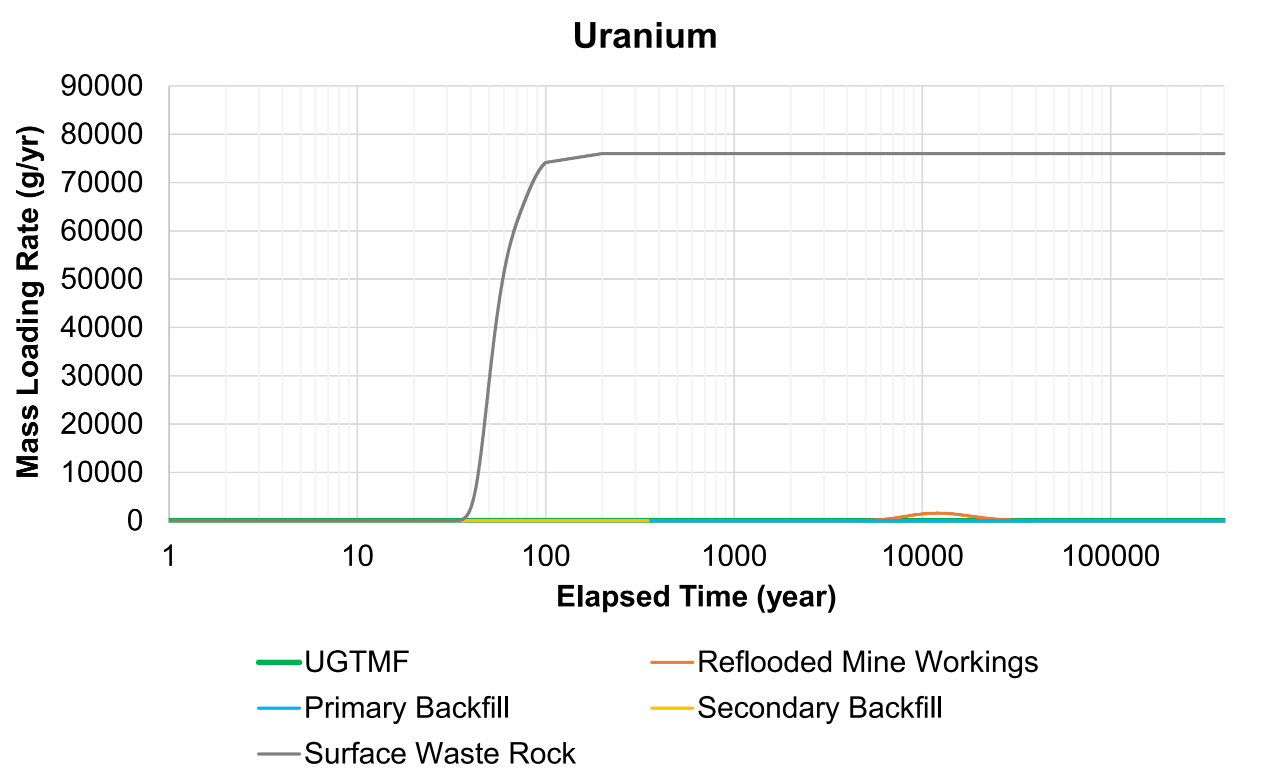
To provide the details requested by the reviewer regarding advective flux, text in Section 3.3 of revised EIS TSD XIV (Groundwater Flow and Solute Transport Modelling Report) will be modified to state the following:

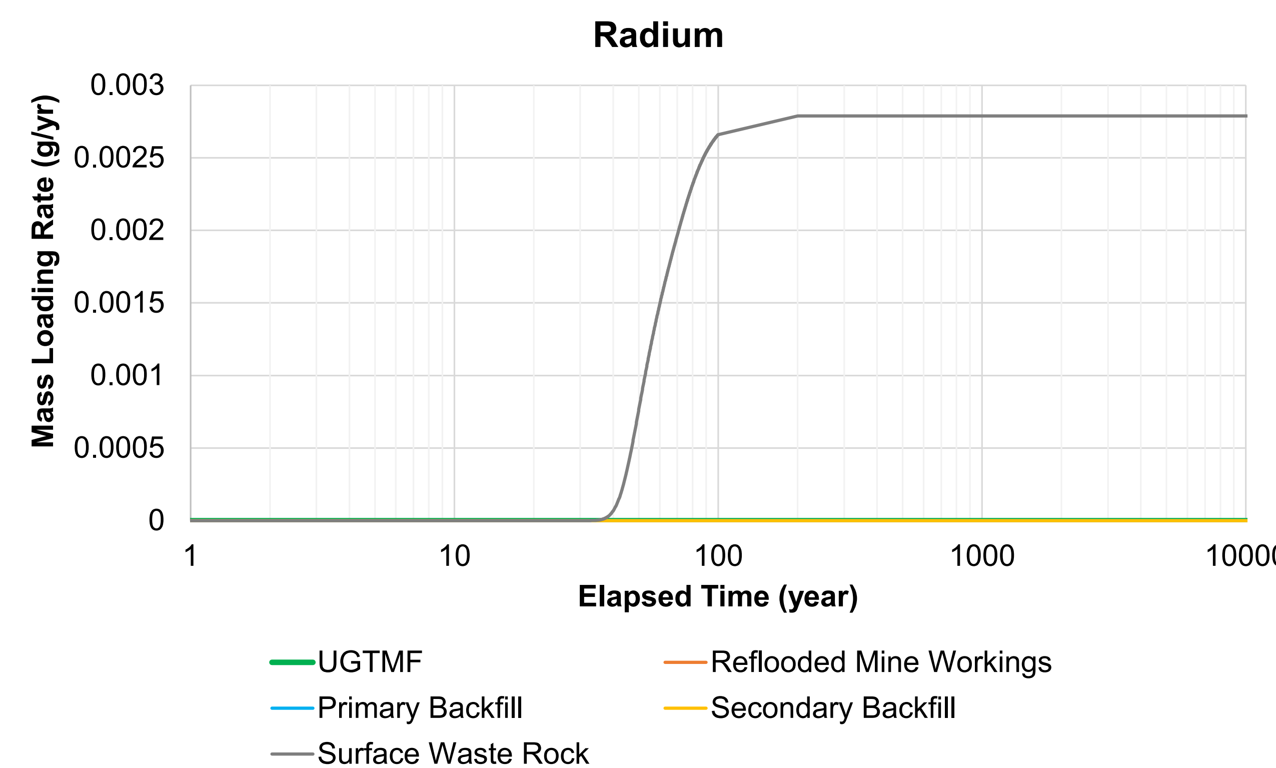
"Figure A-17 provides a schematic illustration of the GoldSim solute transport model identifying the source, pathways, and downstream receptor. Advective fluxes presented in Figure A-17 for the underground (i.e., UGTMF, primary backfill, secondary backfill, and reflooded mine workings) are predicted flow rates from the groundwater model following reflooding of the mine workings. As summarized in Figure A-17, the predicted flux through the UGTMF, primary backfill, secondary backfill, and reflooded mine workings are 0.55 m^3/day, 0.32 m^3/day, 0.15 m^3/day, and 2.7 m^3/day, respectively. Pathways and travel length were derived from the groundwater model through particle tracking analysis as detailed in Section 3.3.2, Groundwater Flow Pathways, and Section 4.4, Pathways Delineation and Travel Times."

To provide the details requested by the reviewer regarding mass flux, Figure 1 of this attachment will be included as Figure A-21b of Appendix A of revised EIS TSD XIV (note: as a result of this edit, Figure A21 of Draft EIS TSD XIV will become Figure A-21a of revised EIS TSD XIV), and the first sentence in Section 4.5 of revised EIS TSD XIV will be modified as follows to reference the new figure: "The simulated peak solute mass loading rates are provided in Table 4, along with the scenarios described in Section 4, Results, and plotted for selected solutes in Figure A-21a and Figure A-21b".









CLIENT NexGen Energy Ltd.		PROJECT NEXGEN ENERGY LTD. ROOK I	
CONSULTANT wsp	YYYY-MM-DD 2024-04-16	TITLE SIMULATED MASS LOADING RATES BY SOURCE TO PATTERSON LAKE – PLOTS FOR SELECT SOLUTES	
	PREPARED RS		
	DESIGN RS		
	REVIEW JL	PROJECT No. 22522691	PHASE 3100.3130
	APPROVED JL	Rev. 0	FIGURE 1

Part 2 - Provide details on how the flooding of the mine during closure will impact regional hydrogeology, specifically related to the migration of contaminants from the UGTMF and RMW to Patterson Lake by the groundwater pathway.

NexGen notes that residual changes to the groundwater system during closure are described in Draft EIS Section 8.5.1 (Application Case).

During Operations, seepage to the underground would result in depressurization of the surrounding bedrock, which would be observed as a reduction in groundwater elevation. The reduction in hydraulic head is primarily limited to the basement rock as the overlying sandstone is several orders of magnitude more transmissive (Section 4.2 and Figure A-8 of Draft EIS TSD XIV). The maximum predicted drawdown in hydraulic head within the sandstone was less than 5 m in the immediate area of the mine workings.

At the end of operations and after active depressurization of the underground, the underground would progressively reflood through passive groundwater inflow. Following reflooding of the underground, groundwater that flows through or past the underground workings is predicted to discharge to Patterson Lake, which surrounds the underground to the north, west, and south. The groundwater migration pathways were predicted using particle tracking analysis in the groundwater model. Overall, groundwater migrates upward primarily through the fault and shear zones, which are more permeable than the surrounding basement rock, then laterally through the sandstone, before discharging to Patterson Lake. Based on the predicted hydraulic gradients, hydraulic conductivity values, pathway dimensions, and effective porosity values applied to the pathways (i.e., porosity of 0.015 for the fault zone and 0.098 for the sandstone), the approximate advective groundwater travel time from the upper horizon of the mine to the discharge location at Patterson Lake is estimated to be approximately 1,000 years.

Part 3 - Clarify if contamination sourced from the RMW by the groundwater pathway has been included within the term UGTMF in section 10.5.1 of the EIS. If the RMW was not considered as a source of contamination to Patterson Lake by the groundwater pathway in Section 10.5.1 of the EIS, it should be added.

Mass loading (contamination) from the reflooded mine workings, primary backfill, secondary backfill, UGTMF and surface waste storage was considered as a source of contamination to Patterson Lake by the groundwater pathway in Draft EIS Section 10.5.1 (Application Case) and further detailed in Section 10A6.3.3 of Draft EIS Appendix 10A (Surface Water Quality Modelling Report). Text in revised EIS Section 10.5.1 (Application Case) will be expanded to list the sources individually rather than solely referencing the UGTMF.

Part 4 - Include a table summarizing the predicted mass flux of contaminants from the UGTMF and RMW to Patterson Lake over time.

Given the number of data points representing the predicted mass flux over time up to 400,000 years, the requested mass flux of contaminants from the UGTMF and reflooded mine workings have been presented graphically in Figure 1 for select parameters rather than in a table (selected parameters are consistent with those presented in Figure A-21 of Draft EIS TSD XIV). Table 4 of Draft EIS TSD XIV presents a summary of combined peak mass loading rates for each solute. Figure 1 of this attachment will be included as Figure A-21b of Appendix A of revised EIS TSD XIV, and the first sentence in Section 4.5 of revised EIS TSD XIV will be modified as follows to reference the new figure: “The simulated peak solute mass loading rates are provided in Table 4, along with the scenarios described in Section 4, Results, and plotted for selected solutes in Figure A-21a and Figure A-

21b". As noted in part 3 of this response, the full dataset of groundwater sources has been carried forward to the surface water quality model.

Part 5 - Provide justification for the assumption in the groundwater flow model of an equivalent porous media approach for groundwater transport through the shear and fault zones. The model should give due consideration for fracture dominated transport, either by directly modelling as fracture flow or through a robust justification for how the parameters used in the existing equivalent porous media model are reflective of fracture-dominant transport.

At the scale of the Project groundwater model, a representative elemental volume (REV) in the bedrock would be on the order of tens to hundreds of metres and within this volume would be multiple local fractures/joints. The bulk properties of this rock would be captured in the scale of packer testing estimates of hydraulic conductivity, which were conducted at a similar scale of tens of metres.

Overall, local joints and structure are considered weaker controls on groundwater flow in comparison to the larger scale shear and fault zones present near the underground, which have been interpreted to act as preferential pathways for groundwater flow. Although each of the shear and faults zones are modelled as an equivalent porous media, the faults and shear zones near the underground were defined explicitly in the model based on mapped extents from borehole data and incorporated individually into the groundwater model as elements of higher hydraulic conductivity. The geometric mean of the 23 packer tests within the fault zones indicate a hydraulic conductivity of 9×10^{-8} m/s, with an overall range of 8×10^{-10} m/s to 7×10^{-6} m/s. The geometric mean of the 40 tests within the shear zone indicate a hydraulic conductivity of 3.1×10^{-8} m/s and overall range of 5×10^{-11} m/s to 6×10^{-6} m/s. This indicates the faults and shear zones may not be as permeable or continuous along their entire length with sections that are more or less transmissive than the calculated average hydraulic conductivity. Although it is recognized that properties may not be uniform along the fault and shear zone lengths, refinement of the variation in transmissivity is not considered to be practical or reasonable. Instead, each of the faults were conservatively assumed to be continuous along their length, which results in stronger hydraulic connection of the underground to Patterson Lake. To account for uncertainty in model input parameters as part of the sensitivity analysis, an alternative scenario was modelled where in each of the faults incorporated in the model, the hydraulic conductivity was assumed to be five times higher than the calibrated value (Draft EIS TSD XIV, Section 5). The model results were found to be less sensitive (i.e., less than 5% difference) for simulations in which adjustments were made to the hydraulic conductivity of the units in comparison to sensitivity runs related to source terms (TSD XIV, Section 5). The influence of uncertainty in the porosity of the shear and fault zones on peak mass flux to Patterson Lake is presented in Part 10 of this IR response.

Part 6 - Provide additional information on the assumption that dispersity is 10% of the flow pathway for vertical flows from the UGTMF to Patterson Lake. Provide a reference for the validity of this approach that is either peer reviewed, or which demonstrates that it is an established method. The supporting documentation for the use of this method to estimate dispersivity should indicate that it is valid for situations that are comparable to the Project site, notably vertical groundwater flows that are likely to be fracture dominated.

The applied dispersivity value (10% of the advective length) is not specific to horizontal or vertical flow and instead represents the dispersivity along the direction of flow (primarily vertical through the fractures, and horizontal through the sandstone). The applied dispersivity of 10% is a general rule of thumb that was used in the absence of site-specific data. NexGen recognizes that this value is highly variable and can vary by several orders of magnitude. The United States Environmental Protection Agency provides an online tool for site assessment calculation of longitudinal dispersivity using each of the following: the 10% rule, data from Gelhar, Welty, and Rehfeldt (1992), and the Xu and Eckstein (1995) formula. Using all three methods, the range of estimated dispersivity spanned over an order of magnitude higher and lower than the assumed value in the modelling assessment.

Dispersive mixing causes some contaminant molecules to move ahead of the average advective velocity along the hydraulic gradient and some molecules to move laterally to the hydraulic gradient. The net effect is to spread (i.e., disperse) the contaminant plume about the average advective front. Changes to the timing of the plume arrival front would not substantially affect the predicted peak concentrations (far future steady state) for the contaminants of concern from the UGTMF, reflooded mine workings, primary backfill, secondary backfill, and surface waste rock sources that would be driving water quality in Patterson Lake. Peak concentrations predicted by the groundwater model for the far future were input to the surface water quality model, including assessments for the best estimate and the sensitivity scenario wherein the upper bound source terms for the UGTMF, primary and secondary backfill, and waste rock were adopted. As described in Section 5 of Draft EIS TSD XIV, because the surface waste rock loadings represent a large portion of the overall mass loadings, the groundwater mass loading results were generally most sensitive to the upper bound waste rock source term.

Part 7 - Provide additional details on why the hydraulic conductivity value of the sandstone unit in the model is two orders of magnitude above the geometric mean.

NexGen confirms that the assigned hydraulic conductivity value is based on the model calibration process.

Data from eight packer tests in the sandstone unit ranged from 2.6×10^{-8} m/s to 9.3×10^{-7} m/s with a geometric mean value of 1.3×10^{-7} m/s. The limited in-situ hydraulic response data are considered to represent the lower end of the permeability for this unit. Data from laboratory permeability testing indicate higher hydraulic conductivity values (to the 10^{-5} m/s range) for the sandstone (NexGen 2019e). Packer test data is documented in Section 5.2.2.2 of Annex III (Hydrogeology Baseline Report).

The hydraulic conductivity of the sandstone was adjusted during model calibration to provide a reasonable match to the measured hydraulic heads in the sandstone unit. Figure A-5 of Draft EIS TSD XIV presents a conceptual cross-section of the hydraulic heads measured in the various hydrostratigraphic units. To represent the relatively flat horizontal gradient observed in the sandstone unit, where hydraulic heads were close to the surface water elevation in Patterson Lake, a relatively high hydraulic conductivity was required that was two orders of magnitude higher than the geometric mean of the packer test estimates and closer to the laboratory permeability testing.

Part 8 - Provide details on the source of the values selected for the hydraulic conductivity of the fault and shear zones.

The final values selected for the hydraulic conductivity of the fault and shear zones were derived from model calibration in consideration of the observed estimates from packer testing.

The geometric mean of the 23 packer tests within the fault zones indicate a hydraulic conductivity of 9×10^{-8} m/s, with an overall range of 8×10^{-10} m/s to 7×10^{-6} m/s. The geometric mean of the 40 tests within the shear zone indicate a hydraulic conductivity of 3.1×10^{-8} m/s and overall range of 5×10^{-11} m/s to 6×10^{-6} m/s. Packer test data is documented in Section 5.2.2.2 of Draft EIS Annex III.

The hydraulic conductivity of the fault and shear zones, along with properties of other hydrostratigraphic units, were adjusted during model calibration to enhance the match between simulated and observed groundwater elevations (statistical calculations and spatial distribution of residuals) and observed groundwater flow patterns (i.e., discharge areas, vertical flow directions, and depths to groundwater). From the automated parameter estimation process completed during calibration, the calibrated values for the basement rock, paleo-weathered basement rock, shear zone, and upper glacial drift units were at or slightly below the geometric mean value from the measured data. For the fault zone, the model value was slightly above the geometric mean value. As discussed in Part 7 of this response, for the sandstone unit, the model value was two orders of magnitude higher than the geometric mean value from the measured data.

Part 9 - If multiple calibrated model solutions were trialed, provide details, including why the parameters that were selected are considered the most appropriate model solution. If multiple calibrated model solutions were not trialed, provide information to support that the calibrated parameter values represent a unique calibration solution.

The groundwater flow model was calibrated using PEST optimization software[1], which iteratively adjusts model parameters (e.g., hydraulic conductivity, recharge) within user-defined constraints until the model error (i.e., the difference between measured and predicted hydraulic head) is minimized. The resultant final values of hydraulic conductivity at the end of the PEST optimization are not considered a unique calibration solution but rather a best estimate based on available data (i.e., reproduction of measured hydraulic heads, flow directions, and hydraulic conductivities). These parameters were selected as they minimized the differences between measured and predicted hydraulic heads while reasonably representing observed groundwater flow directions.

Considering that it is not a unique calibration solution, nine sensitivity runs were considered in the solute transport modelling. The sensitivity scenarios selected parameters that would have the largest potential to alter mass loading rates to Patterson Lake: primarily, bedrock hydraulic conductivity; fault hydraulic conductivity; and source terms for the UGTMF tailings, primary and secondary backfill, and surface waste rock. The sensitivity analysis indicated that peak mass loading is generally most sensitive to the upper bound waste rock source term as the surface waste rock loadings represent a large portion of the total mass loadings through the groundwater pathway. Less than a 5% difference was observed for simulations in which adjustments were made to the hydraulic conductivity of the bedrock, fault zone, backfill, or UGTMF tailings.

Results from the Project groundwater solute transport model were used to represent groundwater discharges to Patterson Lake North Arm – West Basin. Results used included the best estimate from the groundwater model and a reasonable upper bound scenario from the sensitivity analysis (i.e., upper bound source term inputs from UGTMF, primary backfill, secondary backfill, and waste rock). The upper bound scenario was carried forward in surface water quality model sensitivity scenarios, as described in Section 10A1.1 of Draft EIS Appendix 10A.

Part 10 - Where model parameters were obtained from site analogues or literature values, provide additional details that establish why the selected site analogues are valid for the Project site.

The following parameters in the solute transport modelling were obtained from site analogues or literature values: effective porosity, density, adsorption-partition coefficient, and diffusivity.

Porosity and density values were aligned with values adopted for another site in the Athabasca Basin (i.e., Rabbit Lake), which were primarily based on laboratory testing in sandstone, fault zone, and regolith units. Given the

[1] https://pesthomepage.org/

similar lithologic units, this approach was considered reasonable and more applicable than generic literature values.

Where site analogue data was also available from the Rabbit Lake for similar lithologies (i.e., sandstone, fault zone, and regolith), adsorption-partition coefficients and diffusivity values were also based on published values on the analogue site data. As noted in Table 3 of Section 3.4 of Draft EIS TSD XIV, where site analogue data were not available from the Rabbit Lake study, diffusivity and/or adsorption-partition coefficients were assigned based published values in CRC (2004) and the Chemical Data Bases for the Multimedia Environmental Pollutant Assessment Systems (MEPAS) (Stenge and Paterson, 1989).

Uncertainty in the applied effective porosity, adsorption-partition coefficient, and diffusivity would affect the timing and spread of concentrations in the advective front. However, the uncertainty would not substantially affect the predicted peak (far future steady state) concentrations for the contaminants of concern driving water quality in Patterson Lake as the UGTMF, primary backfill, secondary backfill and surface waste rock sources are assumed to be constant sources. Peak concentrations predicted by the groundwater model for the far future were input to the surface water quality model, including estimates for the best estimate and the sensitivity scenario wherein the upper bound source terms for the UGTMF, primary and secondary backfill, and waste rock were adopted. As described in Section 5 of Draft EIS TSD XIV, because the surface waste rock loadings represent a large portion of the overall mass loadings, the groundwater mass loading results were generally most sensitive to the upper bound waste rock source term.

Part 11 - For fault and shear zone features that extend out of the local area, provide a clear explanation of the method used to determine the location, size, angle, and parameters that were used in the model to describe these zones. Provide the reasoning for the use of different hydraulic conductivity values for the fault and shear zones within the local area vs outside the local area.

As described in Section 2.3 of Draft EIS TSD XIV, within the vicinity of the Project, the fault and shear zone units were mapped individually in the three-dimensional geological model and have been incorporated in the groundwater model as independent material property zones.

Outside of the local area and area of mapping, the structures were inferred to extend further based geophysical survey data (Z-tipper axis electromagnetic and airborne magnetic data). The faults and shear zones were extended approximately 700 m to the northeast until they connected to the more permeable sandstone unit beneath Patterson Lake. To the south, the faults were assumed to extend approximately 4 km until they reached Patterson Lake. This is considered a reasonable distance to account for their potential influence on groundwater inflows to and from the underground in Operations and Closure.

To account for the presence of the unmapped faults, an ‘inferred fault zone’ was created with hydraulic conductivities optimized in the PEST calibration process within the bounds of the relative permeabilities of the individual fault and shear zones and the surrounding basement rock. A specific equivalent hydraulic conductivity was not calculated for the inferred fault zone. The zone would have enhanced permeability along the trend of the fault and shear zones and reduced permeability perpendicular to the fault and shear zones. The angle of the principal axis of hydraulic conductivity was rotated 43 degrees east from north to align with the approximate trend of the fault and shear zones.

Part 12 - In the sensitivity analysis, provide a justification for the magnitude of variability considered for each parameter. The justification should include consideration of how the value for each parameter was selected (field data, model calibration, etc.) and the level of uncertainty associated with each parameter. The magnitude of variability used for sensitivity analysis for each parameter should be chosen with respect to the level of confidence in the accuracy of each parameter value.

Uncertainties associated with the derivation of the UGTMF and stopes source terms generally relate to material representativity, system conceptualization and simplification, and numerical derivation of source terms. These uncertainties were identified and documented throughout the derivation process, particularly where assumptions and bounding arguments were made to simplify system behavior. The precautionary principle was consistently applied to ensure that assumptions and bounding arguments were conservative with respect to the source term outcome. Sensitivity analyses were used to identify sensitive parameters and develop an envelope of best-estimate and upper-case source terms where the upper-case source terms represent a conservative outcome that is commensurate with the level of uncertainty associated with the most sensitive parameters. For example, in the case of upper-case source terms, it is conservatively assumed that "first flush" mass release rates (i.e., the highest mass release rates) would be maintained over the modelling period, essentially defining an infinite, constant source term at maximum mass release rates. The envelope of best-estimate and upper-case source terms were applied in the groundwater solute transport model to ensure that propagation of uncertainties was carried forward in the assessment of valued components.

For the mass transport analysis, sensitivity analysis considered the properties most likely to affect mass flux to Patterson Lake (i.e., the hydraulic properties of the hydrostratigraphic units along the flow path through the fault zone and sandstone) as well as the source terms for the UGTMF, primary backfill, secondary backfill, and waste rock.

The calibrated horizontal sandstone hydraulic conductivity is on the upper end of hydraulic conductivity estimates derived from laboratory testing and packer testing (eight tests). A factor-of-five increase is considered outside measured data and therefore above the likely actual bulk properties of the unit. The factor-of-five increase in sandstone hydraulic conductivity is therefore considered reasonable for assessing uncertainty in this parameter. The fault zone horizontal hydraulic conductivity in the calibrated model is just over two times higher than the geometric average from 23 tests (2×10^{-7} m/s in the model versus 9×10^{-8} m/s geometric average). A factor-of-five increase adopted in the sensitivity analysis results in a hydraulic conductivity just over an order magnitude (i.e., 11 times) higher than the geometric average inferred from packer testing. Considering the number of tests (23) and the distribution of hydraulic conductivity estimates from this testing, the adopted hydraulic conductivity in the sensitivity analysis has a probability density function of less than 10% (Figure A-4 of Draft EIS TSD XIV) and is considered reasonable for evaluating uncertainty.

As a test of the sensitivity of the transport predictions, the cross-section area of the faults was assumed to be reduced by a factor of two. Relative to the nine sensitivity scenarios modelled, this scenario generally resulted in the least change in predicted mass flux, and further assessment was not conducted. Overall, it is not practical to measure fracture zone area at such a large scale; therefore, the model incorporates a best estimate based on mapped faults incorporated into the model. In general, the fault zones are conservatively modelled in the sense that they are assumed to extend beyond the limits of the underground to below Patterson Lake, and that over these distances, they are assumed to be continuous and permeable.

3 Additional Context

The groundwater model developed for the Project is based on a comprehensive set of data used to define the conceptual groundwater model and hydrostratigraphic units. Based on this field data and conceptual understanding of groundwater flow conditions, a groundwater model was developed to provide predictions of groundwater changes over the life of the Project and into the far future. Overall, the groundwater model is considered to be well calibrated, with good reproduction of hydraulic heads and flow directions across the study area.

A sensitivity analysis was conducted to assess the uncertainty in model predictions due to uncertainty in model input parameters. The worst case of the sensitivity runs, along with the best estimate from the calibrated model, were used as inputs to the surface water quality model, with the surface water quality model accounting for groundwater seepage loadings from the UGTMF, reflooded mine workings, primary backfill, secondary backfill, and surface waste rock. These two scenarios are considered reasonable for EA planning and mitigation.

The surface water quality modelling extended 357 years after Closure and modelled two time periods in the far future. The first time period was 157 years in duration and included the natural hydrological and hydrogeological processes from the site following Closure such as seepage from the underground and surface waste rock as modelled by the solute transport model for this period of time, and surface runoff from the covered and reclaimed areas of the Project to Patterson Lake North Arm – West Basin. The second modelled time period for the far future extended for 200 years past the first modelled time period and included natural hydrological and hydrogeological processes that account for maximum mass constituent of potential concern loadings associated with solute transport via the groundwater model applied to Patterson Lake North Arm – West Basin over the entire temporal extent of the model (i.e., 357 years). The modelling of the migration of UGTMF-affected groundwater by the groundwater solute transport model demonstrated that the time for this groundwater to reach the surface water occurs over a very large temporal scale (i.e., hundreds of thousands of years; Draft EIS Section 8 [Hydrogeology]), and that the maximum constituent of potential concern loadings generally occurred towards the end of the solute transport modelling period (i.e., up to 400,000 years). However, computational limits precluded the use of a temporal scale consistent with the solute transport model. Therefore, to evaluate the potential for effects on surface water quality, the maximum loadings (i.e., those reached towards the end of the groundwater solute transport model) were applied to the period of 157 to 357 years following Closure (i.e., the far future was effectively fast-tracked to the maximum loadings time period). This approach allows for a much shorter modelling timeframe to project the maximum potential changes to surface water quality in Patterson Lake in the far future and conservatively assumes that the underground groundwater loadings that occur hundreds of thousands of years in the future, including loadings from the UGTMF, overlap with loadings from the WRSAs.

4 References

CRC (Chemical Rubber Company). 2004. CRC Handbook of Chemistry and Physics 84th Edition. CRC Press LLC.

Gelhar, L.W., Welty, C. and Rehfeldt, K.W. 1992. A Critical Review of Data on Field-Scale Dispersion in Aquifers. Water Resource Research, 28, 1955-1974.

NexGen. 2019d. Athabasca Group Sandstone. Presentation provided by NexGen, May 2019.

Stenge DL, Peterson SR. 1989. Chemical Data Bases for the Multimedia Environmental Pollutant Assessment System (MEPAS). Version 1, Battelle Memorial Institute. December 1989.

Xu, M., Eckstein, Y. 1995. Use of Weighted Least-Squares method in Evaluation of the Relationship between Dispersivity and Field Scale. Groundwater. Vol. 33, No. 5., 905-908.

Attachment IR 32-R1

NexGen Energy Ltd.
Head Office
3150 – 1021 West Hastings Street
Vancouver, BC V6E 0C3

Saskatoon Office
200 – 475 2nd Ave S
Saskatoon, SK S7K 1P4

Attachment IR 32-R1

1 Introduction

NexGen Energy Ltd. (NexGen) is proposing to develop a new uranium mining and milling operation in northwestern Saskatchewan, called the Rook I Project (Project). The proposed Project is subject to both provincial and federal Environmental Assessment (EA) processes, would be licensed as a nuclear facility by the Canadian Nuclear Safety Commission (CNSC), and would be subject to various provincial and federal permits and approvals.

NexGen submitted a Draft Environmental Impact Statement (EIS) to the Saskatchewan Ministry of Environment (ENV) and Canadian Nuclear Safety Commission (CNSC) in 2022. Through the technical review of the Draft EIS, NexGen received information requests (IRs) and advice to proponent comments from the Federal-Indigenous Review Team (FIRT), which is led by the CNSC. Results of the FIRT technical review were provided in two Annexes; Annex 1 was composed of IRs and Annex 2 was composed of advice to proponent comments for NexGen's response. In September 2023, NexGen provided detailed responses to the FIRT IRs and advice to proponent comments.

On 12 February 2024, the CNSC provided the results of their review of NexGen's IR and advice to proponent comment responses. The IRs were categorized by the CNSC as accepted (i.e., requiring no additional response), not accepted with the technical approach deemed acceptable by the CNSC and the IR indicated as being able to be resolved once a revised EIS is provided by NexGen, or not accepted with additional response required by NexGen. For the IRs that were not accepted with additional response required, a second round of follow-up IRs were provided by the CNSC.

Attachment IR 32-R1 has been developed to satisfy the request in IR 32-R1 to "provide further justification on the assessment of potential risk level of accidents and malfunctions on the camp workers or to provide an amended camp location assessment as required by the Saskatchewan Ministry of Environment".

2 Response to Information Request

Based on the justification/rationale provided for IR 32-R1, NexGen believes that the reviewer may be conflating the results of two separate analyses (i.e., the screening-level alternatives assessment for a Project worker camp location and the accidents and malfunctions assessment) that were completed in different manners and for different purposes. The screening level alternatives assessment was used to identity a preferred camp location based on various selection criteria, including environmental, technical, economic, and social assessment categories. This process included identification of technically and economically feasible options (i.e., alternative identification), and a prerequisite during the identification of the alternatives was consideration of fatal flaws that would automatically eliminate a potential alternative, such as unreasonable risks to camp resident health. For the selected camp location (or any camp location selected for alternative assessment), no such fatal flaws existed (i.e., camp resident health could be maintained). In contrast, the accidents and malfunctions assessment represents an in-depth evaluation of the risks (based on likelihood and consequence) associated with hazards that are outside the range of 'typical' day-to-day events. The results of the accidents and malfunctions assessment should not be used to inform the selection of preferred camp location alternative. Rather, the accidents and malfunctions assessment was conducted to consider the appropriateness and rigor of design mitigations and to identify risk so that it can be managed through appropriate and comprehensive controls (e.g., emergency response planning).

Although it is not required that the assessment of accidents and malfunctions inform the screening level alternatives assessment for the proposed camp location, NexGen has provided the following information to help respond to the review comments provided in IR 32-R1.

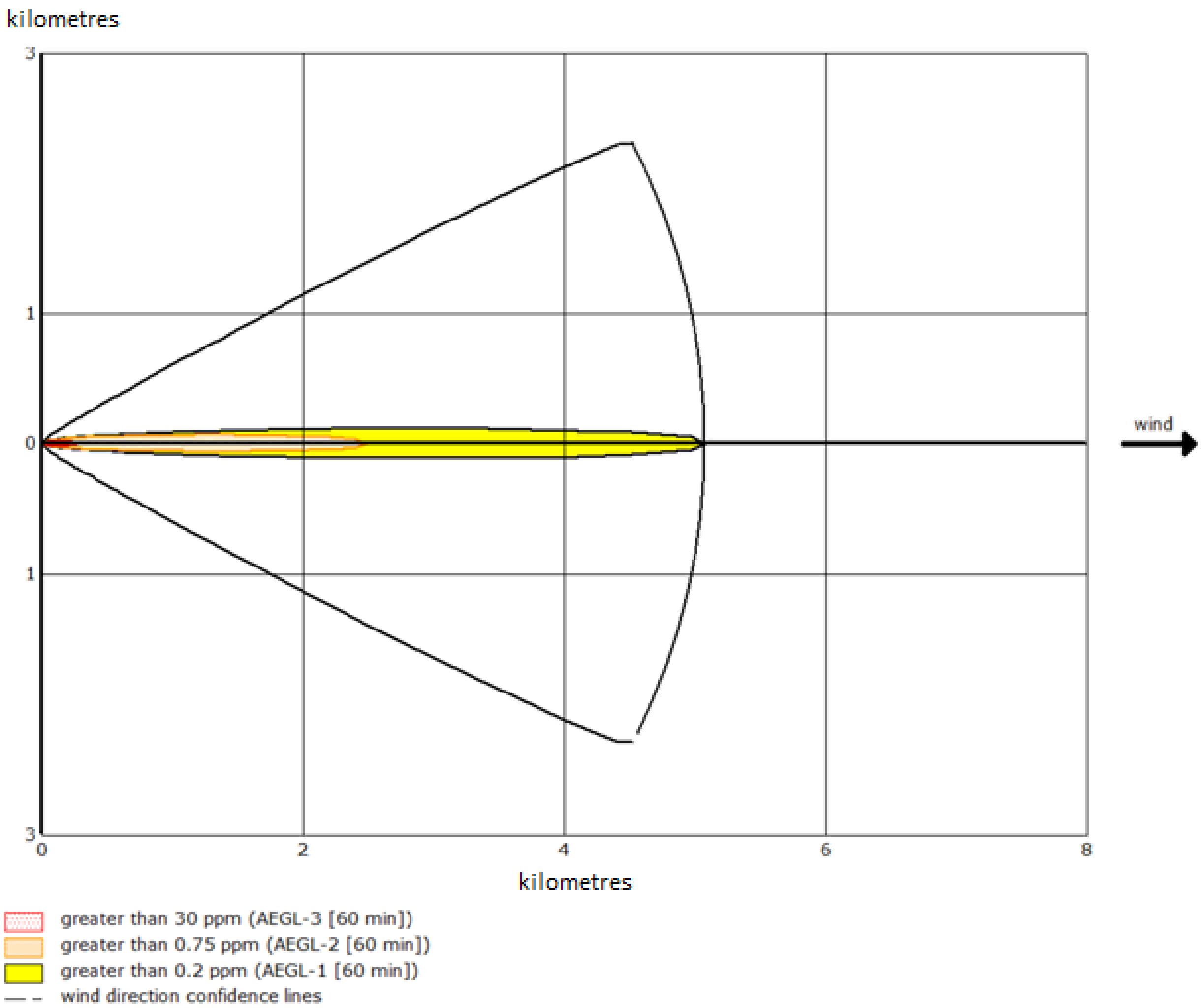
NexGen notes that the reviewer stated that worker health and safety was not considered in determining the preferred worker camp location. Consistent with the original response to IR 32, NexGen re-iterates that the assessment of the camp location included in Draft EIS Section 4.5.9 (Camp Location) considered worker health and safety as part of the worker safety and human health sub-category under the social category. As described in Draft EIS Section 4.4.2 (Selection Criteria), while each sub-category was considered, only differentiating criteria were carried forward for evaluation as part of each alternatives assessment. Further, consistent with what was noted in NexGen's initial response to IR 32 and is described in Draft EIS Section 5.3.1 (Design Standards), all Project infrastructure and facilities (including the camp location) would be developed and operated in accordance with provincial and federal design standards, regulatory guidance, and applicable building codes, which would include those that require that worker health and safety are protected (e.g., Occupational Health and Safety Regulations, 2020). As such, confirming worker health and safety is protected was not a differentiating factor between any of the alternatives and therefore not selected as a criteria in the camp location alternative assessment.

Draft EIS Section 21 (Accidents and Malfunctions) and Draft EIS TSD VIII (Accidents and Malfunctions Report) provided an assessment of potential Project accidents and malfunctions through a hazard identification evaluation process and subsequent quantitative analysis of several bounding scenarios. For the purpose of the accidents and malfunctions assessment, "a bounding scenario is used to represent an event in which its potential effects are considered to represent those associated with other accident and malfunction scenarios; or, alternatively, the potential effects of scenarios that are bounded by another are expected to fit within the envelope of those associated with the bounding scenario" (Draft EIS TSD VIII, Section 3.2.2). As noted by the reviewer, a bounding scenario that has particular relevance to the health and safety of workers is Bounding Scenario 6 (acid plant tail gas scrubber failure).

Section 11 of Draft EIS TSD VIII assessed the overall risk to the public for the acid plant tail gas scrubber failure. With respect to likelihood, the failure of acid scrubber has an annual probability of occurrence of $3x10^{-2}$. This probability is derived from comprehensive statistical analysis conducted over several decades of operational data and is referenced from the Center for Chemical Process Safety (AIChE-CCPS 1989). Further, this probability only considers the probability of the event in a generic sense, and not the specific probability of the conditions of the event whereby the camp workers could be subject to exposure. In this regard, it is important to note that exposure occurs when the wind direction is directed towards the receptors, such as a worker staying in the camp. Accordingly, under prevailing meteorological conditions, and assuming a conditional probability of 0.1 for wind direction towards the camp worker receptor, the annual probability of exposure due to such an event can be estimated to be $3x10^{-3}$, or “unlikely” (≤1 occurrence in 100 years and >1 occurrence in 1,000 years) per the likelihood index shown in Section 3.2 of Draft EIS TSD VIII. The probability can also be characterized for the worst-case meteorological conditions, where the probability is lower again, approximately 20 times less, at $1.5x10^{-4}$, or “highly unlikely” (<1 occurrence in 1,000 years).

With respect to consequence, it is inappropriate to map the dispersion modeling outcomes to the potentially affected areas for the purpose of assessing overall accident or malfunction risk. Although this approach is suitable for routine operations and continuous release scenarios, it fails to account for the probabilistic nature of risks associated with accidents. Specific to the acid plant tail gas scrubber failure scenario, Figure 1 shows the dispersion modeling results corresponding to worst-case weather conditions presented in Table 11-1 in Draft EIS TSD VIII. As this figure demonstrates, the affected area is limited to a narrow band aligned with the wind direction, with the greater effects (and thus, potential consequence) of the overall scenario limited in terms of geographic extent.

Figure 1: Sulphur Dioxide Dispersion for Worst-Case Weather Conditions



AEGL-1 The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic non-sensory effects. However, the effects are not disabling and are transient and reversible on cessation of exposure.

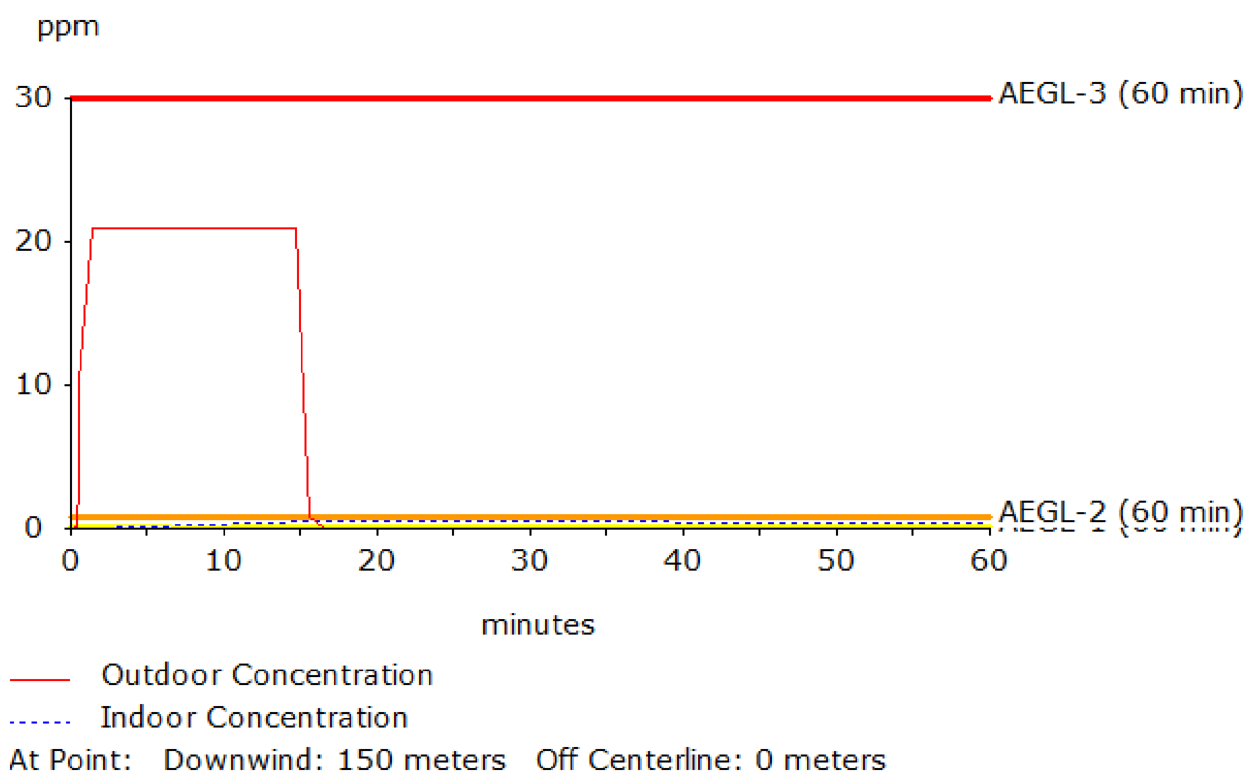
AEGL-2 The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

AEGL-3 The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

ppm = parts per million.

For additional context, Figure 2 illustrates the transient concentrations of outdoor and indoor pollutants at 150 m from the release source (note – the closest point at the proposed camp is located over 250 m from the proposed acid plant). The results indicate that although the outdoor concentration may surpass the AEGL-2 threshold for approximately 15 minutes, the maximum indoor concentration (noting that the camp habitants would be indoors) remains at 0.5 ppm, which is below the AEGL-2 threshold (i.e., would be within AEGL-1, where effects would be reversible and non-disabling). These concentrations would be lower at the camp location, which is farther than the 150 m modelled distance. Concentrations would be further lowered if the wind direction at the time of the postulated acid plant tail gas scrubber failure was not towards the camp.

Figure 2: Concentrations of Outdoor and Indoor Pollutants at 150 m from the Release Source



AEGL-1 The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic non-sensory effects. However, the effects are not disabling and are transient and reversible on cessation of exposure (depicted as the yellow line).

AEGL-2 The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape (depicted as the orange line).

AEGL-3 The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death (depicted as the red line).

ppm = parts per million.

The model simulations described above provide only part of the determination of consequence for an acid plant tail gas scrubber failure. In the instance that such an event occurred, and for any accident or malfunction occurrence, emergency response planning would be implemented to minimize potential consequence to workers on site, including a potential worker staying at the camp. The emergency response planning would adopt a risk-based approach to emergency preparedness and response and would be developed with consideration for a range of potential emergency situations, including those identified within the assessment of accidents and malfunctions. Upon activation of a surface alarm or emergency announcement, non-emergency response workers and visitors, including camp residents and staff, would be required to shut down any equipment they are operating (if safe to do so) and proceed to their designated muster point. Muster points would be identified by posted signage throughout the site. Each muster point would have an alternative location in the event there is danger associated with the designated muster point. Workers or their designate-in-charge of short-term contractors or visitors would accompany short-term contractors or visitors to their designated or alternate muster station. At the camp, workers or their designate-in-charge of short-term contractors or visitors would confirm the presence of the short-term contractors or visitors at the assigned muster point. Head counts would be completed during emergencies and reported to the emergency operations centre. If the emergency requires evacuation, non-emergency response team workers would be evacuated either by ground or air. In advance of Operations, emergency response plans would also be updated to include details on managing emergencies involving sulfuric acid to comply with the Environmental Emergency Regulations (2019). With specific reference to a potential acid plant tail gas scrubber failure, in the event of a prolonged release, which is unlikely due to the limited inventory of SO_2 in the piping system and scrubber, the indoor concentration may gradually rise. Under this scenario, procedures within emergency response plans would trigger the requirement for a potential evacuation of the camp. However, adequate time would be available to implement the emergency response planning procedures, which is expected to minimize the effects (i.e., consequence) and corresponding risk to a worker staying at the camp. Therefore, the determination of consequence also needs to consider the emergency response measures that would be initiated to mitigate the effects from an accident or malfunction associated with the acid plant tail gas scrubber. Considering this holistic approach, the consequence rating of “minor to moderate” that was given in Section 11.4 of Draft EIS TSD VIII is reasonable and justifiable.

Overall, in consideration of the additional information provided above, the risk to a worker staying at the camp associated with an acid plant tail gas accident or malfunction would be as low as reasonably practicable. Therefore, the overall risk rating would be similar for workers staying at the camp as for a member of the public near the Project site (i.e., low to moderate). As described in Draft EIS Section 21.6.9 (Summary of Bounding Scenarios), this was deemed to represent a tolerable level of risk in consideration of proposed safeguards and design features.

3 References

AIChE-CCPS (American Institute of Chemical Engineers, Center for Chemical Process Safety). 1989. Guidelines for Process Equipment Reliability Data, with Data Tables. February 1989. ISBN 978-0-8169-0422-8.

Environmental Emergency Regulations, 2019. SOR/2019-51 under the Canadian Environmental Protection Act. Last amended 24 August 2019. Available at https://laws-lois.justice.gc.ca/eng/regulations/SOR-2019-51/index.html.

The Occupational Health and Safety Regulations, 2020. RRS S-15.1 Reg 10. Effective 17 December 2020. Available at https://pubsaskdev.blob.core.windows.net/pubsask-prod/124952/OC579-2020.pdf.

Attachment IR 40-R1

NexGen Energy Ltd.
Head Office
3150 – 1021 West Hastings Street
Vancouver, BC V6E 0C3

Saskatoon Office
200 – 475 2nd Ave S
Saskatoon, SK S7K 1P4

Attachment IR 40-R1

1 Introduction

NexGen Energy Ltd. (NexGen) is proposing to develop a new uranium mining and milling operation in northwestern Saskatchewan, called the Rook I Project (Project). The proposed Project is subject to both provincial and federal Environmental Assessment (EA) processes, would be licensed as a nuclear facility by the Canadian Nuclear Safety Commission (CNSC), and would be subject to various provincial and federal permits and approvals.

NexGen submitted a Draft Environmental Impact Statement (EIS) to the Saskatchewan Ministry of Environment (ENV) and Canadian Nuclear Safety Commission in 2022. Through the technical review of the Draft EIS, NexGen received information requests (IRs) and advice to proponent comments from the Federal-Indigenous Review Team (FIRT), which is led by the CNSC. Results of the FIRT technical review were provided in two Annexes; Annex 1 was composed of IRs and Annex 2 was composed of advice to proponent comments for NexGen's response. In September 2023, NexGen provided detailed responses to the FIRT IRs and advice to proponent comments.

On 12 February 2024, the CNSC provided the results of their review of NexGen's IR and advice to proponent comment responses. The IRs were categorized by the CNSC as accepted (i.e., requiring no additional response), not accepted with the technical approach deemed acceptable by the CNSC and the IR indicated as being able to be resolved once a revised EIS is provided by NexGen, or not accepted with additional response required by NexGen. For the IRs that were not accepted with additional response required, a second round of follow-up IRs were provided by the CNSC.

Attachment IR 40-R1 represents NexGen's response to IR 40-R1 and includes additional information to support the statement that "… the rate of sulphide oxidation is lower than the rate of silicate weathering" and how this information is linked to the classification of potentially acid generating (PAG) and non—potentially acid generating (NPAG) waste rocks.

2 Information Request Responses

2.1 Context and Objectives

As noted in Draft EIS TSD XVII (Waste Rock and Underground Wall Rock Source Term Predictions Report), the proposed non-potentially acid generating (NPAG) waste rock classification consists of two individual criteria: total sulphur <0.1 wt% and a neutralization potential (NP) over acid potential (AP) ratio of >3. Waste rock must comply with either of the criteria to be classified as NPAG. Related to this classification, information request IR 40 was provided by Environment and Climate Change Canada (ECCC) requesting information related to how the metal-leaching (ML) and acid rock drainage (ARD) cutoff criteria for sulphur that is used to classify waste rock as potentially acid generating (PAG) or NPAG were derived. NexGen responded by confirming that various standard static and kinetic geochemical tests were conducted on a range of samples representing waste rock from the Project and that the results were considered in the derivation of the classification criteria. NexGen also confirmed the following:

- The bulk mineralogy of waste rock samples that classify as NPAG is consistent with that of the Proterozoic crystalline basement rock, consisting predominantly of silicate-based minerals with only trace carbonate species and pyrite.
- Kinetic test results of two waste rock samples containing <0.1 wt % sulphide sulphur show pH trends that suggest the rate of sulphide oxidation is lower than the rate of silicate weathering. This supports the use of sulphur content as a classification criterion for NPAG waste rock.

Following NexGen's response to IR 40, ECCC requested further clarity on the rate of sulphide oxidation in comparison to the rate of silicate weathering to support the ML/ARD classification criteria. More specifically, ECCC requested additional information to support the statement that "… the rate of sulphide oxidation is lower than the rate of silicate weathering" and that the information provided should also be linked to the classification of potentially acid generating (PAG) and NPAG rocks.

The objectives of this attachment are to:

1. Clarify the mechanism through which silicate weathering can buffer acidity produced from sulphide oxidation in waste rock with low sulphur (Section 3.1).
2. Provide additional information on measured kinetic rates for sulphide oxidation and silicate weathering in low sulphur content (i.e., NPAG) waste rock materials (Section 3.2).
3. Clarify how the above mechanism and data support the use of the sulphur criterion in the ML/ARD classification of waste rock from the Project (Section 3.3).

2.2 Silicate Neutralization Potential

2.3 Silicate Minerals and Neutralization Mechanisms

In the absence of carbonate minerals, silicate minerals (e.g., feldspar, mica, olivine, amphibole, pyroxene, chlorite, serpentine) can play a vital role in neutralizing acidity generated by sulphide oxidation in mining environments (Jambor et al. 2002; Price 2009). Silicate minerals can either consume acidity generated by sulphide oxidation through direct acid-consuming reactions or by meteoric weathering reactions with carbon dioxide (e.g., Plumlee 1997; INAP 2014; Day and Kennedy 2015). Neutralization of acidity through acid-consuming reactions typically result in buffering the drainage solutions at highly acidic pH (pH <2.5) levels (INAP 2014).

The chemical reactions involved in meteoric weathering of silicate minerals by carbonic acid (i.e., atmospheric carbon dioxide dissolved in water) in the infiltrating rainwater is shown in Eq. 1 (Penman et al. 2020) and Eq. 2 (Day and Kennedy 2015). These reactions generate bicarbonate that can then interact with dissolved acidity or alkalinity to buffer the pH of the percolating water at near neutral levels (Eq. 3; Day and Kennedy 2015). The weathering reactions between carbonic acid (meteoric waters) and silicate minerals, including aluminosilicate minerals (e.g., Eq. 1 – wollastonite and Eq. 2 - anorthite), can be written as follows:

$$Eq. 1: CaSiO_3 + CO_2 + 3H_20 -> H_4SiO_4 + 2HCO_3^- + Ca^{2+}$$

$$Eq. 2: CaAl_2Si_2O_8 + 2H_2O + 2H_2CO_3 \rightarrow Ca^{2+} + 2Al(OH)_3 + 2SiO_2 + 2HCO_3^-$$

The yielded bicarbonate can in turn be involved in buffering contact water pH through reversible reactions such as:

$$Eq. 3: Ca^{2+} + HCO_3^- \leftrightarrow CaCO_3 + H^+$$

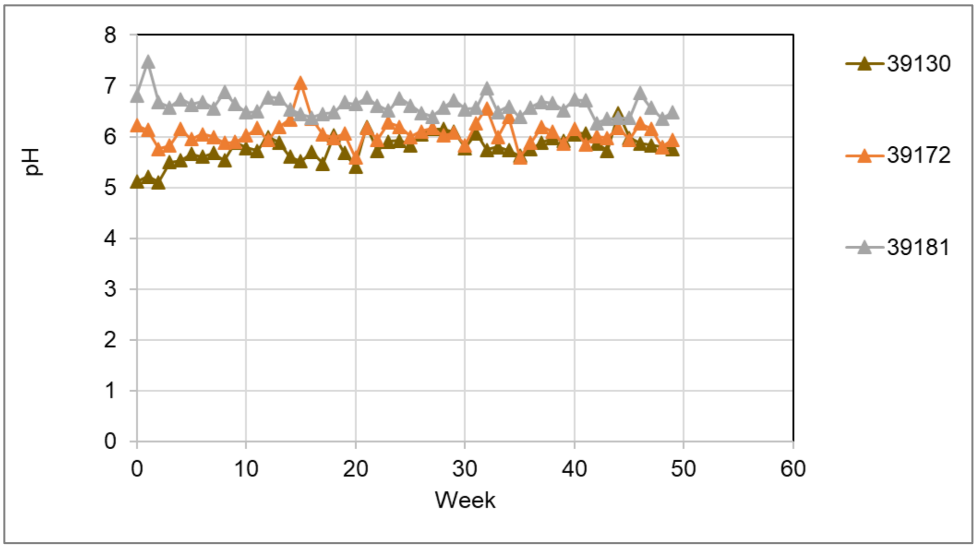
The rates of meteoric weathering of silicate and aluminosilicate minerals (i.e., Eq. 1, Eq. 2, and Eq. 3) in mine wastes are typically several orders of magnitude slower than carbonate dissolution rates (e.g., Jambor 2003; Price 2009). However, for waste rock materials that are characterized by low total sulphur and NP dominated by acid-consuming silicate minerals, the potential exists to generate bicarbonate alkalinity from meteoric weathering of silicate minerals at a sufficient rate to buffer the acidity produced by sulphide oxidation (Jambor 2003; Price 2009; INAP 2014). Furthermore, the silicate mineral reservoir is far greater than the acid that could be generated by sulphide oxidation, resulting in an effectively perpetual source of alkalinity. This buffering was shown to be effective through the work done by Day and Kennedy (2015) at a mine site in northern Minnesota. This study demonstrates that for waste rock materials with low total sulphide content (<1 wt%) and NP dominated by acid-consuming silicate minerals, meteoric weathering of silicate minerals by carbonic acid can deliver sufficient dissolved bicarbonate to offset the acidity generated by the oxidation of the sulphide minerals and buffer the pH of the percolating water to near neutral levels.

2.4 Application to the Non-Potentially Acid Generating Waste Rock Storage Area

The rate of meteoric weathering of silicate minerals (and by extension the rate of bicarbonate alkalinity produced) in a waste rock environment is determined by several factors including the type of silicate minerals, porewater composition and its flux, mineral surface area and texture, climate, and biological activity (White and Brantley 1995, 2003). Similarly, the rate of sulphide oxidation in a waste rock environment is determined by several factors including the type of sulphide minerals, distribution in the rock matrix, mineral texture, reactive surface areas, porewater composition and its flux, oxygen supply, climate, and biological activity (INAP 2014).

Although the bulk material rates under site conditions are not yet known for the NPAG waste rock storage area, kinetic tests conducted on waste rock with low sulphur (sulphide sulphur <0.1 wt%) provide an indication of these rates under laboratory conditions. Kinetic test results for humidity cells 39130, 39172, and 39181 (SRK Consulting 2023) indicate pH trends supporting the rationale that the rate of sulphide oxidation of the waste rock materials in the cells is balanced with alkalinity produced from the weathering of silicate minerals (Figure 1). Since the waste rock material does not contain any detectable carbonate minerals that can neutralize the acidity at the recorded pH levels, pH buffering (pH 5.8 – 6.5) of the leachates is expected to be associated with the weathering of the silicate minerals. For samples in Figure 1, XRD analysis revealed the presence of the following silicate and aluminosilicate minerals: anorthite (up to 4.4 wt%), muscovite (up to 16 wt%), biotite (up to 30 wt%), and chlorite (up to 14 wt%) (SRK Consulting 2023).

Figure 1: pH Time Series for Waste Rock Humidity Cells 39130, 39172, and 39181



2.5 ML/ARD Classification Criteria

In consideration of the information provided in Draft EIS TSD XVII and the additional details included within Attachment IR 40-R1, NexGen has implemented the following ML/ARD criteria to classify waste rock into PAG and NPAG materials:

- PAG if NP/AP or total inorganic carbon (TIC)/AP is ≤1 and sulphide sulphur is ≥0.1 wt%
- Uncertain ARD potential if NP/AP or TIC/AP is >1 and ≤3, and sulphide sulphur ≥0.1 wt%
- NPAG if NP/AP or TIC/AP is >3 or sulphide sulphur <0.1 wt%

Notes:

- Acid potential calculated from sulphur as sulphide where: AP (kg $CaCO_3$/t) = sulphide sulphur (%S) x 31.25.
- The results for both modified NP and TIC are considered.

The low sulphide criterion classifies waste rock, regardless of NP/AP ratio, into two categories: PAG and NPAG (SRK Consulting 2023). As a result, all waste rock materials that are classified as “uncertain ARD potential” based on NP/AP ratio, will be conservatively classified as PAG materials.

The use of both NP/AP ratios (also referred to as net potential ratios [NPR]) and a sulphur criterion is commonly used in the ML/ARD classification of mine waste rock and the proposed NPR values for the PAG/NPAG classification is consistent with industry best practices (INAP 2014; Price 2009).

The use of <0.1 wt% sulphide sulphur for the sulphur cutoff criteria is continuing to be monitored in ongoing kinetic testing of waste rock and will be further verified using field kinetic testing during Project Operations.

3 Conclusions

NexGen is confident that the use of a sulphide-based criterion that is based on the balance between alkalinity produced from the meteoric weathering of silicate minerals under site conditions and the low sulphide oxidation rate in waste rock containing low sulphide sulphur is valid for the ML/ARD classification of waste rock for the Project. The criterion value of 0.1% sulphide sulphur will be verified through ongoing kinetic testing.

In addition, NexGen is confident that the proposed ML/ARD classification system, including the use of both a NP/AP ratio and a sulphur criterion, will result in conservative classification of waste rock into PAG and NPAG materials.

4 References

Day S.J. and Kennedy C.B. (2015): Setting ARD management criteria for mine waste with low sulfide and negligible carbonate content. Paper presented at 10th International Conference on Acid Rock Drainage, April 21 – 24, Santiago, Chile.

Goldich (1938): A Study of rock-weathering. The Journal of Geology, Vol. 48., pp. 17-58.

International Network for Acid Prevention (INAP, 2014): The Global Acid Rock Drainage Guide. http://gardguide.com.

Jambor, J.L. (2003): Mine-Waste Mineralogy and Mineralogical Perspectives of Acid-Base Accounting. In: Environmental Aspects of Mine Wastes (Eds.: Jambor, J.L., D.W. Blowes, and ALM. Ritchie). Short Course Series Volume 31. Mineralogical Association of Canada.

Jambor J.L., Ptacek, C.J., Blowes, D.W., Moncur, M.C. (2005): Acid Drainage from the Oxidation of Iron Sulphides and Sphalerite in Mine Wasters. In Fujisawa T. (ed.) Proceedings of Lead and Zinc ’05 Conference, Kyoto, Japan, Vol. 1.

Penman D.E., Rugenstein J.K., Ibarra D.E., Winnick M.J. (2020): Silicate weathering as a feedback and forcing in Earth's climate and carbon cycle. Earth-Science Reviews, vol. 209. 16 p.

Plumlee, G. S. (1997). Chapter 3: The environmental geology of mineral deposits. 46 p.

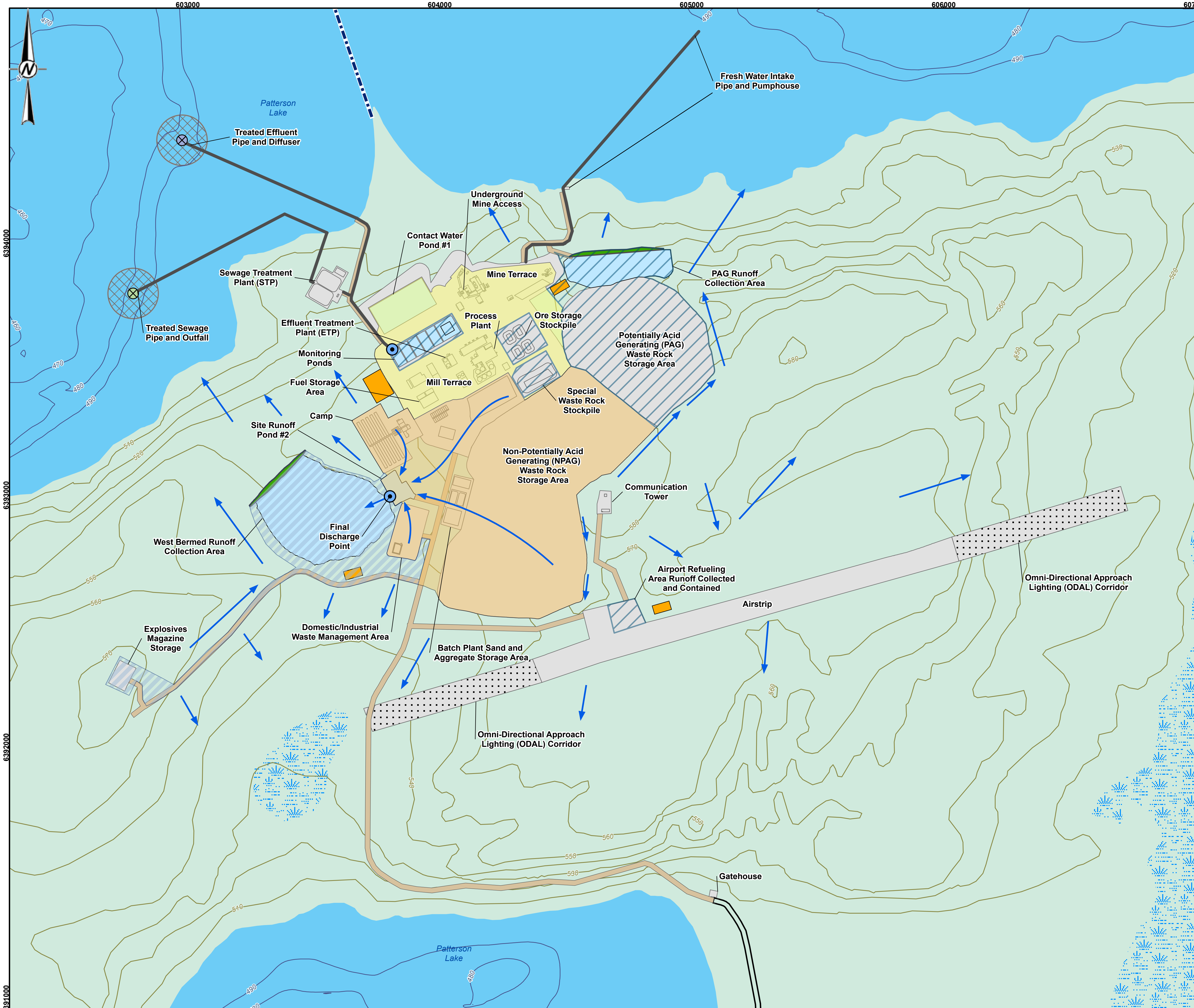
Price W.A. (2009): Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials. MEND Report 1.20.1., 579 p.

SRK Consulting (2023): Rook I Project – Geochemical Characterization of Waste Rock. FINAL. Prepared for NexGen Energy Ltd.: Vancouver, BC. Project number: CAPR001771. Issued January. 351 p.

White A.F. and Brantley S.L. (1995): Chemical weathering rates of silicate minerals: an overview. Chemical weathering rates and silicate minerals, Vol. 31, pp. 1-22.

White A.F. and Brantley S.L. (2003): The effect of time on the weathering of silicate minerals: why do weathering rates differ in the laboratory and the field, Geochemical Geology, Vol. 202, pp. 479-506.

Attachment IR 46-R1



LEGEND

- BATHYMETRY CONTOUR ELEVATION (5 m INTERVAL)
- ELEVATION CONTOUR (10 m INTERVAL)
- GENERAL FLOW DIRECTION
- LAKE BASIN DIVISION
- WATERBODY
- WETLAND
- WOODED AREA
- FINAL DISCHARGE POINT
- INTAKE OR DISCHARGE PIPE
- ACCESS ROAD
- CONTACT WATER CONTAINMENT BERM
- OMNI-DIRECTIONAL APPROACH LIGHTING (ODAL) CORRIDOR
- PROJECT INFRASTRUCTURE
- SITE ROAD
- TOPSOIL STORAGE AREA
- WATER MANAGEMENT POND
- EFFLUENT TREATED PIPE DIFFUSER
- SEWAGE TREATED PIPE OUTFALL
- PROPOSED REGULATED MIXING ZONE
- DRAINAGE TO SITE RUNOFF POND #1
- DRAINAGE TO SITE RUNOFF POND #2
- SELF CONTAINED
- TO WEST BERMED RUNOFF COLLECTION AREA

DRAFT

0 0.5 1

1:15,500 KILOMETRES

REFERENCE(S)
1. PROJECT FEATURES OBTAINED FROM NEXGEN, APRIL 6, 2021 AND UPDATED JUNE 8, 2021 .
2. BASE DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
3. BATHYMETRY CONTOURS DERIVED FROM DATA COLLECTED BY NEXGEN, 2016.
PROJECTION: UTM ZONE 12 DATUM: NAD 83

PROJECT
NexGen Energy Ltd
ROOK I PROJECT

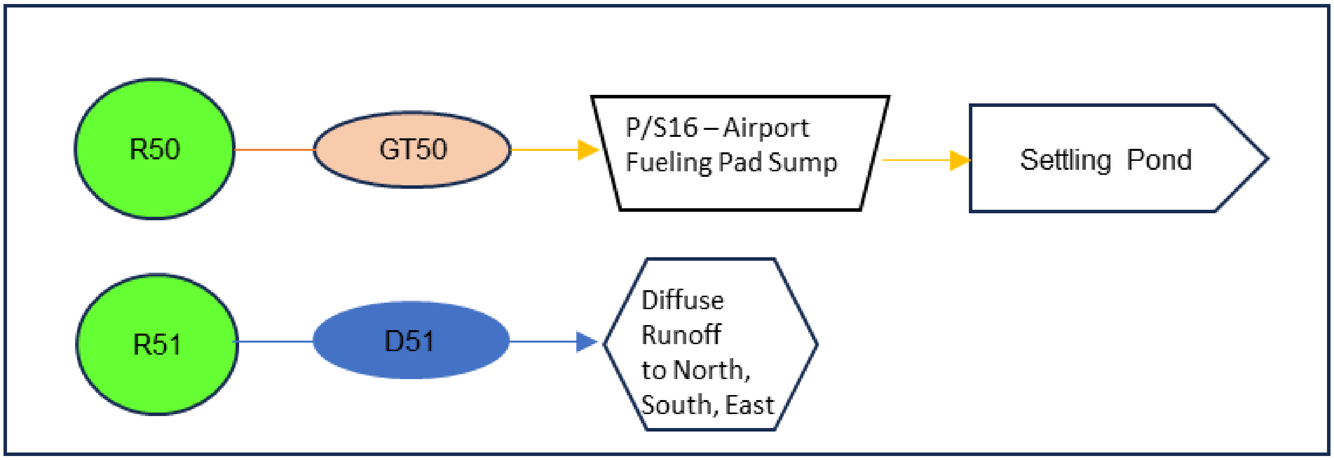
TITLE
GENERAL WATER MANAGEMENT OF PROJECT SITE DURING OPERATIONS

CONSULTANT
wsp

PROJECT		22522691	PHASE	3100.3150
DESIGN	RP	2024-04-09	SCALE AS SHOWN	REV. A
GIS	AA	2024-04-23		
CHECK			FIGURE 4	
REVIEW				

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

Figure 2: Water Management - Airstrip



= non-mineralized contact water = contact water.

Attachment IR 49-R1 79-R1, and 82-R1

NexGen Energy Ltd.
Head Office
3150 – 1021 West Hastings Street
Vancouver, BC V6E 0C3

Saskatoon Office
200 – 475 2nd Ave S
Saskatoon, SK S7K 1P4

Attachment IR 49-R1, 79-R1, and 82-R1

1 Introduction

NexGen Energy Ltd. (NexGen) is proposing to develop a new uranium mining and milling operation in northwestern Saskatchewan, called the Rook I Project (Project). The proposed Project is subject to both provincial and federal Environmental Assessment (EA) processes, would be licensed as a nuclear facility by the Canadian Nuclear Safety Commission (CNSC), and would be subject to various provincial and federal permits and approvals.

NexGen submitted a Draft Environmental Impact Statement (EIS) to the Saskatchewan Ministry of Environment (ENV) and Canadian Nuclear Safety Commission (CNSC) in 2022. Through the technical review of the Draft EIS, NexGen received information requests (IRs) and advice to proponent comments from the Federal-Indigenous Review Team (FIRT), which is led by the CNSC. Results of the FIRT technical review were provided in two Annexes; Annex 1 was composed of IRs and Annex 2 was composed of advice to proponent comments for NexGen's response. In September 2023, NexGen provided detailed responses to the FIRT IRs and advice to proponent comments.

On 12 February 2024, the CNSC provided the results of their review of NexGen's IR and advice to proponent comment responses. The IRs were categorized by the CNSC as accepted (i.e., requiring no additional response), not accepted with the technical approach deemed acceptable by the CNSC and the IR indicated as being able to be resolved once a revised EIS is provided by NexGen, or not accepted with additional response required by NexGen. For the IRs that were not accepted with additional response required, a second round of follow-up IRs were provided by the CNSC.

Attachment IR 49-R1, 79-R1, and 82-R1 provides supporting information for NexGen's response to IR 49-R1, IR 79-R1, and IR 82-R1. In each of these IRs, Environment and Climate Change Canada (ECCC) has requested supporting data and information regarding the assessment of thallium on receiving waters as a result of the release of treated effluent to Patterson Lake.

2 Background

2.1 Thallium in the Environmental Impact Statement

In Draft EIS Section 10 (Surface Water Quality and Sediment Quality), NexGen presented a multi-step process to:

- characterize existing conditions in the environment (Draft EIS Section 10.3 [Existing Conditions]);
- identify potential Project interactions and mitigations (Draft EIS Section 10.4 [Project Interactions and Mitigations]);
- analyze and classify residual effects (Draft EIS Section 10.5 [Residual Effects Analysis);
- describe uncertainty and prediction confidence (Draft EIS Section 10.6 [Prediction Confidence and Uncertainty); and

- based on the previous steps, identify monitoring and follow-up programs (Draft EIS Section 10.7 [Monitoring, Follow-Up, and Adaptive Management]).

The methods applied to complete this multi-step process were outlined in Draft EIS Section 10.2 (Component Methods).

As described in Draft EIS Section 10.2.2.2 (Measurement Indicators), measurement indicators were used to characterize potential changes to surface water quality. Measurement indicators included:

- **Water quality constituent concentrations (i.e., risk to aquatic and terrestrial life):** includes nutrient, major ion, trace metal, and radionuclide concentrations in waterbodies and watercourses, which are compared to water quality thresholds (e.g., guidelines, objectives, standards) that apply to the protection of aquatic life and terrestrial life.
- **Drinking water quality constituent concentrations:** includes major ion, trace metal, and radionuclide concentrations in waterbodies and watercourses, which are compared to Canadian drinking water quality thresholds.
- **Productivity status constituent concentrations:** includes total phosphorus concentrations in waterbodies and watercourses, which are compared to Canadian waterbody trophic status[1] thresholds.

A series of water quality models were applied to predict constituent concentrations at various locations in the environment as described in Draft EIS Section 10.2.8.1 (Water Quality Model Development and Integration). These water quality models incorporated measured baseline data as described in Draft EIS Section 10.2.6 (Existing Conditions) and detailed in the Aquatic Environmental Baseline Report (Draft EIS Annex V.1). Project activities were included in the water quality models to predict potential effects to the receiving environment under different time frames and Project development scenarios.

The full list of constituents considered in the measurement indicators was reduced to a list of constituents of potential concern (COPCs) as described in Draft EIS Section 10.2.8.2 (Constituents of Potential Concern). The COPCs are a focused list of constituents determined through a screening process that potentially pose a risk to aquatic life, terrestrial life, and/or human health. Through this screening process, as illustrated in Figure 10.2-5 (Draft EIS Section 10.2.8.2.1 [Surface Water Quality Constituents of Potential Concern]), thallium was removed as a COPC on the basis that, where source data were available, concentrations were generally non-detectable and below the applicable guideline. Additionally, source terms for thallium were not available for all inputs to the site-wide water balance and water quality model (Draft EIS Technical Support Document [TSD] XVIII).

[1] Trophic status describes and classifies waterbodies and watercourses (e.g., lakes and rivers) based on their ability to support aquatic ecosystems (i.e., primary productivity). The ability of a lake to support aquatic biota, such as plants and algae, is dependent on nutrient concentrations and physical conditions, primarily phosphorus and nitrogen nutrients and water clarity, respectively. In Canadian waters, particularly waterbodies on the Canadian Shield, phosphorus is characterized as the principal limiting factor (i.e., limiting nutrient) for primary productivity (CCME 2004).

2.2 Information Request 79 Round 1 Request and Response

In Round 1, ECCC wrote the following for IR 79:

> Assess un-ionized ammonia, thallium and DOC [dissolved organic carbon] in the pathways analysis and surface water quality modelling for the surface water quality assessment.
>
> **Suggestions for mitigation and follow-up measures**
>
> Un-ionized ammonia, thallium, DOC and hydrocarbons should be included in follow-up surface water quality monitoring.

With regards to thallium, NexGen's response to IR 79 was:

> Thallium was evaluated as a constituent of potential concern (COPC) but was not carried forward in the surface water quality assessment (Draft EIS Section 10.2.8.2.1) because:
>
> - thallium was not identified as a deleterious substance under Metal and Diamond Mining Effluent Regulations (MDMER);
> - where source term data were available, thallium concentrations were generally non-detectable and below current applicable guidelines; and
> - where source term data for thallium were not available, it was assumed based on the available source data that any contributions from other sources would similarly be negligible.
>
> NexGen maintains that an update to the surface water quality assessment for the inclusion of thallium in the modelling is not required.
>
> Despite thallium, DOC [dissolved organic carbon], and hydrocarbons not being carried forward as COPCs in the surface water quality assessment (Draft EIS Section 10) and Draft EIS TSD XXI (Environmental Risk Assessment), NexGen confirms that ammonia (both total and un-ionized forms), thallium, DOC, and hydrocarbons would be included in verification and follow-up surface water quality monitoring programs for the Project. Monitoring commitments, such as meeting MDMER requirements, are presented in Draft EIS Section 10.7.2 (Surface Water Receiving Environment Monitoring).
>
> **References:**
>
> Metal and Diamond Mining Effluent Regulations. SOR/2002-222 under the *Fisheries Act*. Last amended June 18, 2020. Available at https://laws-lois.justice.gc.ca/eng/Regulations/SOR-2002-222/index.html.

2.3 Information Request 49-R1, 79-R1, and 82-R1 Round 2 Requests

In Round 2, ECCC wrote the following for IR 49-R1, IR 79-R1, and IR 89-R1, noting that only the questions relevant to thallium are presented:

IR	Follow Up Information Request
49-R1	1. Provide updated modelling and tables within Appendix G in Draft EIS TSD XVIII to include effluent characterization concentrations and proposed environmental release targets for the following parameters: TSS [total suspected solids], un-ionized ammonia, and thallium. 2. *[not relevant to thallium]* 3. Identify when it is predicted that effluent discharge flow rates from the mine site would meet the requirements for reporting under the MDMER and when effluent characterization concentrations or proposed environmental release targets for thallium will be provided. 4. Update the Draft EIS Section 5.4.5.4 to include information on predicted effluent characterization concentrations and environmental release targets for MDMER Schedule 4 and 5 parameters.
79-R1	1. Provide baseline receiving environment surface water quality data for thallium and the predicted effluent concentrations of thallium. 2. Update the surface water quality assessment and modelling as needed to incorporate data on thallium to confirm predictions of no adverse effects to the aquatic receiving environment. If additional corrections are required, detail any other report sections that are affected and ensure that all sections impacted by the omission of thallium data are updated.
82-R1	1. *[not relevant to thallium]* 2. *[not relevant to thallium]* 3. Provide baseline receiving environment surface water quality data and predicted effluent characterization concentrations of thallium. 4. Update the surface water quality assessment and modelling as needed to incorporate data on thallium and confirm predictions of no negative effects to the aquatic receiving environment and receptors.

3 Information Request Responses

3.1 Screening Thallium as a Constituent of Potential Concern

In response to the Round 2 IRs listed in Section 2.3, further details are provided in Section 3 regarding the original screening of thallium as a COPC. This information supplements the discussion in Draft EIS Section 10.2.8.2 and includes a comparison against more recent baseline and geochemical test work datasets that have been ongoing since the submission of the Draft EIS and validate the original screening.

3.2 Project Thresholds

To understand the potential environmental effects associated with Project activities, the concentrations of water quality, drinking water quality, and productivity status constituents that were predicted by water quality models under development scenarios were compared to environmental thresholds. A set of Project thresholds was derived according to the hierarchy described in Draft EIS Section 10.2.8.3.1 (Water Quality Thresholds). The selected thresholds generally consisted of the most stringent chronic (i.e., long-term) water quality guidelines for the protection of aquatic life sourced from either the Canadian Environmental Quality Guidelines for the protection of aquatic life (Canadian Council of Ministers of the Environment [CCME] 2021) or the Saskatchewan provincial objectives (WSA 2015, 2017). NexGen notes that in some cases, guidelines were not available for a given constituent and other thresholds were adopted; however, this condition is not relevant to thallium.

There is no Saskatchewan surface water quality objective for thallium; therefore, the CCME guideline of 0.8 micrograms per litre (µg/L; CCME 1999) was applied as the Project threshold.

Once derived, Project thresholds were applied in four main ways in the Draft EIS:

- to select COPCs (Draft EIS Section 10.2.8.2);
- to characterize existing conditions (Draft EIS Section 10.3.1 [Water Quality] and Draft EIS Annex V.1);
- to assess residual effects of the Project on surface water quality (Draft EIS Section 10.5); and
- to derive preliminary environmental release targets (Draft EIS TSD XVIII, Appendix H [Environmental Release Target Development], Section 3.0 [Applicable Water Quality Thresholds]).

3.2.1 Metal and Diamond Mining Effluent Regulations Limits

In addition to the Project thresholds, environmental release targets are limited to the lowest value of those derived from Project thresholds and end-of-pipe limits, including limits described in Schedule 4 (Maximum Authorized Concentrations of Prescribed Deleterious Substances) of the MDMER (Government of Canada 2023). The MDMER Schedule 4 limits exist for Prescribed Deleterious Substances listed in Section 3 (Analytical Requirements for Metal or Diamond Mining Effluent) of the MDMER.

Thallium is not a Prescribed Deleterious Substance under Section 3 of the MDMER; thus, the MDMER Schedule 4 does not apply to thallium. However, thallium is listed in Schedule 5 (Environmental Effects Monitoring Studies) of the MDMER as required for effluent monitoring and thus would be applicable to effluent monitoring for the Project, as explained in Section 4 of this memorandum.

3.3 Baseline Concentrations

Baseline concentrations of thallium in rivers and lakes within the Project local study area (LSA) and regional study area (RSA) are provided in Draft EIS Annex V.1. As listed in Table 3.2-2 of Draft EIS Annex V.1, total and dissolved thallium were measured at all aquatic baseline stations in 2018, 2019, and 2020. Detailed water chemistry results are provided in Appendix C of Draft EIS Annex V.1; the results demonstrate that thallium was consistently below the detection limit of 0.2 µg/L (i.e., at least 4 times lower than the CCME guideline) in all rivers and lakes in the area of the Project. The baseline dataset included 415 measured values from 4 watercourses and 11 waterbodies (Draft EIS Annex V.1, Table 3.2-1). Ongoing baseline data collection has validated these measured concentrations, with an additional 480 data points below 0.2 µg/L recorded in 2021, 2022, and 2023.

3.4 Rook I Project Sources to Effluent

As noted in the CCME fact sheet on thallium:

> Thallium is rarely present as large ore deposits, but can be recovered from sulphide ores of lead, copper, and zinc and may also be associated with cadmium, iron, and potassium minerals such as feldspars and micas. Thallium minerals such as crookesite, hutchinsonite, lorandite, and avicennite occur naturally but are rare (CCME 1999).

As these minerals were not detected in the Arrow deposit mineralogy (see Section 5.1.1 and 5.2.1 of the Rook I Project – Geochemical Characterization of Waste Rock [SRK 2023] and the newly included revised EIS Annex XI [Geology Baseline Report]), thallium is not expected to be present in quantities that pose a potential environmental risk. The CCME (1999) fact sheet further states that "*[n]atural inputs of thallium to aquatic environments occur by weathering processes and are not considered toxicologically significant*". As there are no imports of thallium to Project for industrial use, there is no conceptual pathway for thallium enrichment or contamination at the Project site.

The lack of a conceptual pathway for a source of thallium to the environment from Project activities is confirmed by monitoring data from all types of materials that could contribute to effluent during Construction, Operations, Decomissioning and Reclamation (i.e., Closure), and post-closure. Relevant environmental media have been sampled and analyzed for a suite of metals to screen and assess environmental risk, including data presented in the Draft EIS and ongoing characterization work, as presented in Table 1.

Table 1: Summary of Measured Water Concentrations of Thallium in Receiving Environment and Potential Future Sources of Effluent

Environmental Medium	Reported in Draft EIS	Validation Data Measured Since Draft EIS
Baseline data from waterbodies and watercourses in LSA and RSA	415 values from 4 watercourses and 11 waterbodies measured from 2018 to 2020 reported as <0.2 µg/L. **Reference:** Draft EIS Annex V.1, Appendix C.	480 values from 4 watercourses and 14 waterbodies measured from 2021 to 2023 reported as <0.2 µg/L.
Site runoff	-	9 measured values from 3 stations in 2023, all 9 reported as <0.2 µg/L.
Groundwater in glacial drift and bedrock monitoring wells	142 of 147 values measured in 2017 to 2020 below 0.8 µg/L. The five samples above 0.8 µg/L were all from the first sample collected in each well, likely reflecting well development conditions and not local groundwater concentrations. **Reference:** Draft EIS Annex III (Hydrogeology Baseline Report).	130 samples collected in 2021 to 2023, all below <0.2 µg/L, confirming that: (1) thallium is not measurable in groundwater in the LSA; and (2) first samples from each well likely was not representative.
Groundwater in Westbay well GAR-19-035 (i.e., representing mine development area)	1 measurement from each of 10 depth zones in 2020, all reported as <20 µg/L. **Reference**: Draft EIS Annex III.	7 seasonal samples from each of 10 depths (i.e., 70 samples) from 2020 to 2023, all reported as <0.2 µg/L to <20 µg/L, as detection limits improved with time.
Humidity cells of UGTMF and mine development area for waste rock characterization	262 samples measured in leachate from 13 humidity cells over 56 weeks; all values <0.8 µg/L, with most values reported as <0.005 µg/L. **Reference:** Raw data to support Draft EIS TSD XVII (Waste Rock and Underground Wall Rock Source Term Predictions Report); data not presented in TSD XVII.	304 samples measured in leachate from 9 humidity cells over subsequent 179 weeks; all values <0.8 µg/L, with most values <0.005 µg/L.
Overburden and cover materials	Shake flask extraction leachate of four samples of borrow material in 2021; all four were <0.2 µg/L. **Reference:** Okane (2020) that is referenced in TSD XVIII.	20 samples measured from each of 3 humidity cells over 35 weeks. All 60 values are <0.02 µg/L (52/60 are <0.005 µg/L).

µg/L = micrograms per litre; < = less than; LSA = local study area; RSA = regional study area (RSA); TSD = Technical Support Document; UGTMF = underground tailings management facility.

3.5 Conclusions of Constituent of Potential Concern Screening

Data gathered for the Draft EIS and more recent data measured from 2021 to 2023 validate the exclusion of thallium as a COPC for the EIS. Reported values are below detection limits. While detection limits vary, the vast majority of data points are below the CCME guideline and, in many cases, orders of magnitude below the CCME guideline. Therefore, there is negligible potential for adverse effects to surface water quality as a result of inputs of thallium to the receiving environment from the Rook I Project.

By extension, there is no need to develop environmental release targets for thallium. According to REGDOC-2.9.2, *Environmental Protection, Controlling Releases to the Environment* (CNSC 2021), which would be applied to Project effluents during licensing to guide the development of the Best Available Technology and Techniques Economically Available (BATEA) and licensed release limits, thallium would not be defined as a substance that requires control because the data indicate no potential for environmental risk.

4 Follow-Up Monitoring

Schedule 5, Part 1, Section 4(1) of the MDMER requires that thallium concentrations be measured as part of effluent characterization. Additionally, Schedule 3 of the MDMER prescribes analytical precision, accuracy, and detection limits for mine effluents; this schedule applies to thallium. The required detection limit for thallium is 0.4 µg/L, which is 50% of the CCME guideline value.

Compliance with the MDMER is a key consideration in the development of the Project effluent monitoring plan that will be applied to treated effluents, assuming approval by the CNSC, as part of licensing for each phase of the Project. Thallium would be monitored in the Project effluent treatment plant as per the requirements outlined in Schedule 3 and Schedule 5 of the MDMER. If this ongoing monitoring detects increasing trends or values of thallium above the CCME guideline, thallium would be added as a COPC to the next update of the Environmental Risk Assessment, which would occur every five years.

5 References

CCME (Canadian Council of Ministers of the Environment). 1999. Canadian Water Quality Guidelines for the Protection of Aquatic Life: Thallium. https://ccme.ca/en/res/thallium-en-canadian-water-quality-guidelines-for-the-protection-of-aquatic-life.pdf.

CCME. 2021. Canadian Environmental Quality Guidelines summary table. Accessed August 2021. Available at https://ccme.ca/en/summary-table/.

CNSC (Canadian Nuclear Safety Commission). 2021. REGDOC-2.9.2, Environmental Protection, Controlling Releases to the Environment. DRAFT. March 2021. Available at https://api.cnsc-ccsn.gc.ca/dms/digital-medias/REGDOC-2-9-2-controlling-releases-to-the-environment.pdf/object.

Government of Canada. 2023. Metal and Diamond Mining Effluent Regulations. SOR/2023-122.

Okane (Okane Consultants). 2020. Rook I Borrow Material Geochemical Analysis. December 2020.

SRK (SRK Consulting [Canada] Inc). 2023. Final Rook I Project - Geochemical Characterization of Waste Rock. CAPR001771. January 2023. In: NexGen Energy Ltd. Rook I Project Environmental Impact Statement Annex 1 Responses: Federal Indigenous Review Team Information Requests. Attachment IR 27/41/239/242-1. Submitted to Canadian Nuclear Safety Commission. October 2023.

WSA. (Saskatchewan Water Security Agency). 2015. Surface Water Quality Objectives, Interim Edition, EPB 356. Saskatchewan Environmental and Municipal Management Services Division, Water Security Agency. June 2015.

WSA. 2017. Saskatchewan Water Quality Objective for the Protection of Aquatic Life – Molybdenum. Fact Sheet. Report No. WSA 514.

Attachment IR 67-R1

NexGen Energy Ltd.
NexGen Energy Ltd.
Head Office
3150 – 1021 West Hastings Street
Vancouver, BC V6E 0C3

Saskatoon Office
200 – 475 2nd Ave S
Saskatoon, SK S7K 1P4

Attachment IR 67-R1

1 Introduction

NexGen Energy Ltd. (NexGen) is proposing to develop a new uranium mining and milling operation in northwestern Saskatchewan, called the Rook I Project (Project). The proposed Project is subject to both provincial and federal Environmental Assessment (EA) processes, would be licensed as a nuclear facility by the Canadian Nuclear Safety Commission (CNSC), and would be subject to various provincial and federal permits and approvals.

NexGen submitted a Draft Environmental Impact Statement (EIS) to the Saskatchewan Ministry of Environment (ENV) and Canadian Nuclear Safety Commission (CNSC) in 2022. Through the technical review of the Draft EIS, NexGen received information requests (IRs) and advice to proponent comments from the Federal-Indigenous Review Team (FIRT), which is led by the CNSC. Results of the FIRT technical review were provided in two Annexes; Annex 1 was composed of IRs and Annex 2 was composed of advice to proponent comments for NexGen's response. In September 2023, NexGen provided detailed responses to the FIRT IRs and advice to proponent comments.

On 12 February 2024, the CNSC provided the results of their review of NexGen's IR and advice to proponent comment responses. The IRs were categorized by the CNSC as accepted (i.e., requiring no additional response), not accepted with the technical approach deemed acceptable by the CNSC and the IR indicated as being able to be resolved once a revised EIS is provided by NexGen, or not accepted with additional response required by NexGen. For the IRs that were not accepted with additional response required, a second round of follow-up IRs were provided by the CNSC.

Attachment IR 67-R1 has been developed to resolve the question raised in IR 67-R1 and includes a table (Table 1-1) that provides the land use emissions in tonnes of carbon (tonnes C), with the emissions for land use change and one-time loss of carbon sink represented. These calculations are aligned with the guidance included in Section 5.1.2 of the *Strategic Assessment of Climate Change* (Environment and Climate Change Canada [ECCC] 2020) and the Tier 1 approach in Section 4.1 of the Draft *Technical Guide Related to the Strategic Assessment of Climate Change* (Environment and Climate Change Canada 2021).

Table 1-1: Project Land Use Change Emissions

Phase	Year	Annual Land Use Change Emissions		Annual Total Emissions (tonnes C)
		Carbon Sink Loss	Loss of Carbon from Disturbances	
Construction	Year -4	600	31,600	32,200
	Year -3	600	-	600
	Year -2	600	-	600
	Year -1	600	-	600
Operations	Year 1	600	-	600
	Year 2	600	-	600
	Year 3	600	-	600
	Year 4	600	-	600
	Year 5	600	-	600
	Year 6	600	-	600
	Year 7	600	-	600
	Year 8	600	-	600
	Year 9	600	-	600
	Year 10	600	-	600
	Years 11-24 (per year)[(a)]	600	-	600
Decommissioning and Reclamation	Years 25-29 (per year)[(b)]	600	-	600
	Years 30-39 (per year)[(c)]	600	-	600
Project Total Land Use Emissions (tonnes C)		**25,800**	**31,600**	**57,400**

Note: Total does not always equate to the sum of the numbers presented in the table due to rounding. The actual totals are based on calculations performed using a greater number of significant figures than those shown in the table. Refer to Draft EIS Appendix 7C (Greenhouse Gas Emissions Estimation Methodology Report) for a detailed description of the emission calculations.

a) It is assumed that the emissions from Year 10 are reflective of annual emissions for Years 11 to 24.

b) It is assumed that the land use emissions from Year-1 are reflective of annual emissions for Years 25 to 29.

c) The emissions sources during the Transitional Monitoring Stage (Years 30 to 39) include land use change. The annual land-use change emissions for Closure were conservatively estimated to be equal to the annual land-use change emissions from the loss of the carbon sink.

2 References

ECCC (Environment and Climate Change Canada). 2020. Strategic Assessment of Climate Change. October 2020. Available at https://www.strategicassessmentclimatechange.ca/.

ECCC. 2021. Draft Technical Guide Related to the Strategic Assessment of Climate Change. August 2021. Available at https://www.canada.ca/en/environment-climate-change/corporate/transparency/consultations/draft-technical-guide-strategic-assessment-climate-change.html.

Attachment IR 69-R1

NexGen Energy Ltd.
Head Office
3150 – 1021 West Hastings Street
Vancouver, BC V6E 0C3

Saskatoon Office
200 – 475 2nd Ave S
Saskatoon, SK S7K 1P4

Attachment IR 69-R1

1 Introduction

NexGen Energy Ltd. (NexGen) is proposing to develop a new uranium mining and milling operation in northwestern Saskatchewan, called the Rook I Project (Project). The proposed Project is subject to both provincial and federal Environmental Assessment (EA) processes, would be licensed as a nuclear facility by the Canadian Nuclear Safety Commission (CNSC), and would be subject to various provincial and federal permits and approvals.

NexGen submitted a Draft Environmental Impact Statement (EIS) to the Saskatchewan Ministry of Environment (ENV) and CNSC in 2022. Through the technical review of the Draft EIS, NexGen received information requests (IRs) and advice to proponent comments from the Federal-Indigenous Review Team (FIRT), which is led by the CNSC. Results of the FIRT technical review were provided in two Annexes; Annex 1 was composed of IRs and Annex 2 was composed of advice to proponent comments for NexGen's response. In September 2023, NexGen provided detailed responses to the FIRT IRs and advice to proponent comments.

On 12 February 2024, the CNSC provided the results of their review of NexGen's IR and advice to proponent comment responses. The IRs were categorized by the CNSC as accepted (i.e., requiring no additional response), not accepted with the technical approach deemed acceptable by the CNSC and the IR indicated as being able to be resolved once a revised EIS is provided by NexGen, or not accepted with additional response required by NexGen. For the IRs that were not accepted with additional response required, a second round of follow-up IRs were provided by the CNSC.

Attachment IR 69-R1 provides supporting information for NexGen's response to IR 69-R1. Specifically, Attachment IR 69-R1 responds to the reviewer's request that NexGen quantify potential health risks to receptors for nitrogen dioxide (NO_2), utilizing the Canadian Ambient Air Quality Standards for comparison against predicted air concentrations.

2 Response Context

NexGen maintains that the 1-hour and annual Saskatchewan Ambient Air Quality Standards (SAAQS) objectives for NO_2 of 300 µg/m^3 and 45 µg/m^3, respectively, represent appropriate screening values for the environmental risk assessment (ERA). As noted in Section 4.3.3.1 of Draft EIS TSD XXI (Environmental Risk Assessment), the SAAQS represent maximum concentrations in ambient air from all sources as stipulated in The Clean Air Regulations (Government of Saskatchewan 2015). While the 1-hour and annual CAAQS values for NO_2 of 79 µg/m^3 and 23 µg/m^3, respectively, represent more stringent thresholds, as noted in Draft EIS Section 7.2.2.8.2 (Comparison to Canadian Ambient Air Quality Standards), achievement of the CAAQS is determined by provinces and territories using ambient concentrations measured in the air zones for a three-year period, not by comparison of modelled predictions at or beyond a facility boundary (CCME 2012, CCME 2020a,b). NexGen also notes that the CAAQS were not developed as facility-level regulatory standards (CCME 2019). Both of these aspects (i.e., using modelled results to potentially derive regulatory standards) would apply should the CAAQS be used to screen for potential Project effects in the ERA. Overall, the CAAQSs are meant to drive continuous improvement in air quality, be applied for air zone management, and, strictly speaking, only to be applicable once monitoring data are available. For this and the other reasons stated, use of the CAAQS for screening purposes is inappropriate. However, to provide information requested by reviewer, NexGen has conducted a comparison of Project-modelled 1-hour and annual NO_2 values to the CAAQS in Section 3 for discussion purposes. Additional discussions of key findings are provided in Section 4 and next steps in Section 5.

3 Comparison of Modelled Nitrogen Dioxide to the Canadian Ambient Air Quality Standards

The 1-hour and annual NO_2 screening for human and ecological receptor locations is presented in Table 1 for the Application Case (Construction and Operations) and the RFD Case. The data shown represent the 3-year average of the annual 98th percentile of the daily maximum 1-hour predicted concentrations and annual average predicted concentrations to facilitate comparison against the CAAQS (Draft EIS Section 7.2.5.1.1.2 [Application Case Criteria Air Contaminant Prediction Summary], Table 7.2-12).

As shown in Table 1, during Construction, there are predicted exceedances for 1-hour NO_2 CAAQS at seven of the Human Health Risk Assessment (HHRA) receptor locations and no predicted exceedances for annual NO_2 CAAQS. During Operations and for the RFD Case, there are predicted exceedances for 1-hour NO_2 CAAQS at the camp location (HHRA3) and the potential ecological receptor location near Patterson Lake (HHRA5) and no predicted exceedances for annual NO_2 CAAQS. During Construction, exceedances of the 1-hour NO_2 guideline are predicted to occur less than 1% of the time at all receptor locations other than at the Camp location, where exceedances are predicted to occur approximately 7% of the time. During Operations and the RFD Case, there are no predicted exceedances at receptor locations other than at the Camp location (6% of the time) and at the ecological receptor location at Patterson Lake (0.1% of the time). As noted above, there are no exceedances of the annual NO_2 CAAQS of 23 µg/m^3 at any receptor location during any phase of the Project under the Application Case or the RFD Case (maximum values range from 8.55 µg/m^3 to 14.7 µg/m^3 at the Camp location).

Table 1: Summary of 1-hour Nitrogen Dioxide Concentrations at Ecological Risk Assessment Receptor Locations for Construction, Operations, and Reasonably Foreseeable Development Case

Name	Description	Location		NO_2 Annual Concentration			NO_2 1-hour Concentration (3-year Average of the Annual 98th Percentile of the Daily Maximum 1-hour Concentrations)			Frequency of Exceedance of 1-hour limit (Based on Hours with Concentrations Exceeding 79 μg/m³)		
		X (m)	Y (m)	Construction [μg/m³]	Operations [μg/m³]	RFD - Operations [μg/m³]	Construction [μg/m³]	Operations [μg/m³]	RFD - Operations [μg/m³]	Construction [μg/m³]	Operations [μg/m³]	RFD - Operations [μg/m³]
HHRA1	Hodge Lake Reference	593,768	6,407,146	3.89	3.82	3.86	46.9	29.3	31.5	n/a	n/a	n/a
HHRA2	Broach Lake	600,359	6,398,266	4.10	3.91	3.98	**113.2**	48.8	50.2	0.2%	n/a	n/a
HHRA3	Camp	603,778	6,393,226	14.67	8.55	8.63	**244.1**	**148.0**	**148.0**	7%	6%	6%
HHRA4	Patterson Lake Human Health Receptors	598,658	6,387,580	3.95	3.82	4.07	71.7	28.2	76.0	n/a	n/a	n/a
HHRA5	Patterson Lake Ecological Receptors VC	602,320	6,392,289	4.49	4.01	4.10	**129.7**	**84.6**	**84.7**	0.5%	0.1%	0.1%
HHRA6	Forrest Lake	605,446	6,388,744	4.16	3.91	3.97	**121.6**	49.5	54.0	0.3%	n/a	n/a
HHRA7	Forrest Lake North	605,452	6,390,021	4.28	3.99	4.05	**127.9**	67.0	70.4	0.3%	n/a	n/a
HHRA8	Beet Lake	608,931	6,389,997	4.12	3.90	3.95	**114.5**	39.4	44.2	0.2%	n/a	n/a
HHRA9	Naomi Lake	614,179	6,390,462	3.94	3.84	3.87	**82.9**	31.4	33.5	0.1%	n/a	n/a
HHRA10	Clearwater River	626,340	6,380,517	3.87	3.80	3.82	39.6	22.6	24.2	n/a	n/a	n/a
HHRA11	Lloyd Lake	616,793	6,361,563	3.83	3.80	3.81	25.9	22.3	23.2	n/a	n/a	n/a

RFD = Reasonably Foreseeable Development Case; CAAQS = Canadian Ambient Air Quality Standard; NO_2 = nitrogen dioxide; μg/m³ = micrograms per cubic metre; n/a = not applicable.

Bolded and shaded indicate exceedance of 1-hr NO_2 CAAQS of 79 μg/m³ or annual NO_2 CAAQS of 23 μg/m³.

4 Discussion and Key Findings

As noted in Section 3, when compared to Project-modelled results, potential exceedances of the CAAQS are limited to 1-hour NO_2. Therefore, the following discussion is focused on potential short-term health effects.

Based on Health Canada's 2016 review of the health effects of NO_2 as an input to CAAQS development, Health Canada concluded that there is a causal relationship between exposure to short-term NO_2 and respiratory effects and that there is a likely causal relationship between exposure to short-term NO_2 and pre-mature mortality. Epidemiological studies of asthmatic individuals' exposures to short-term ambient NO_2 can result in asthma exacerbations such as decreased lung function, increased airway hyperresponsiveness, and airway inflammation. Adverse effects may include an increased risk of cardiopulmonary effects, and to a lesser extent, cardiovascular and respiratory mortality (Health Canada 2016). As such, individuals with pre-existing conditions such as asthma appear to be sensitive to exposure to short-term ambient NO_2. If individuals are present during periods when ambient NO_2 concentrations exceed the CAAQS, it is possible that some individuals with airway hypersensitivity such as asthma could experience minor irritation of the respiratory system (Draft EIS TSD XXI, Section 4.3.3.1).

However, other studies have shown that certain 1-hour NO_2 values in excess of the CAAQS are generally protective of human health. Hesterberg et al. (2009), as also reported in Health Canada (2016), completed a systematic review of over 50 studies of exposure to short-term NO_2 on healthy and asthmatic individuals. The Hesterberg et al. (2009) findings indicated that there is evidence of no-effect at low concentrations, and a range from 0.2 ppm (376 $\mu g/m^3$) to 0.6 ppm (1,128 $\mu g/m^3$) would be considered protective for short-term exposures. In addition, The World Health Organization (WHO) (2010) and United States Environmental Protection Agency (US EPA) (2008), as also reported in Health Canada (2016), concluded that healthy individuals generally do not experience adverse effects at concentrations up to 1 ppm (1,880 $\mu g/m^3$). NexGen notes that the Draft EIS 1-hour NO_2 screening value of 300 $\mu g/m^3$ is below each of these values.

In addition, NexGen notes that the Project NO_2 predictions are considered conservative and the modelling likely overestimates the exposure concentrations for these potential receptors. The key areas of conservatism in the assumptions for NO_2 emissions and modelling are summarized below (Draft EIS Section 7 [Air Quality, Noise, and Climate Change]).

- The emissions inventory was created for the highest intensity year (i.e., maximum concentrations) of Construction and Operations. Emissions in other years would have lower emission rates for NOx.
    - These maximum predictions would also be representative of the worst-case meteorological conditions, which would rarely occur.
- Conservative assumptions with respect to Project infrastructure and operational aspects were used to estimate the emissions from the Project, including the following:
    - The power plant was assumed to be operating at 90% load hourly throughout the year. The actual operating loads are expected to be lower than these rates most of the time.
    - The Project's mining fleet in the emission inventory considered vehicles equipped with Tier 2 and Tier 3 engines. Tier 4 engines, known for lower NOx emissions, would be procured and utilized to the greatest extent feasible.
    - All mobile equipment was assumed to operate simultaneously; it is not expected that all mobile equipment would be operating at same time.
    - The NOx emissions as a result of the explosives used in blasting were modelled for every hour continuously throughout the year. Actual blasting activities would be expected to occur no more than 5 times per day.

Overall, considering context provided in the discussion above, a quantitative assessment of 1-hour NO_2 in the ERA is not warranted and the overall conclusions of the HHRA remain unchanged (i.e., residual adverse effects to human health would be not significant). The predicted Project emissions for 1-hour NO_2 incorporated multiple conservative assumptions to ensure that effects were not underestimated. NexGen notes that there are occasional predicted exceedances of 1-hour NO_2 CAAQS during Construction and Operations; however, there are no exceedances of annual NO_2 CAAQs indicating no long-term effects would occur. Short-term exceedances would occur infrequently and would be reversible, and should potential effects to sensitive individuals occur, these effects would be expected to subside shortly after exposure. In addition, studies by Hesterberg et al. (2009), the US EPA (2008), and WHO (2010) all show that human health would generally be maintained at 1-hour NO_2 levels above both the CAAQS and predicted Project emissions at HHRA receptors. For these reasons, NexGen maintains that the assessment conducted in the ERA is appropriate. However, NexGen acknowledges that some individuals with pre-existing conditions such as asthma may be sensitive to exposure to short-term ambient NO_2. NexGen would implement both air quality (Draft EIS Section 7.2.8 [Monitoring, Follow-Up, and Adaptive Management]) and human health (including worker health) (Draft EIS Section 15.8 ([Monitoring, Follow-Up, and Adaptive Management]) monitoring programs to detect potential effects to human health and verify that EA predictions are valid.

5 Next Steps

Although further quantitative assessment of Project 1-hour and annual NO_2 emissions in the ERA are not necessary, NexGen will make the following revisions in revised EIS TSD XXI (Environmental Risk Assessment):

- As Health Canada has indicated that they no longer support the national one-hour maximum acceptable level of 400 µg/m^3 for NO_2 in ambient air (Health Canada 2016), text associated with this assertion will be removed from Section 4.3.3.1 (Nitrogen Dioxide).
- Context regarding the comparison of predicted Project NO_2 emissions to the CAAQS will be added to Section 4.3.3 (Screening of Atmospheric Constituents of Potential Concern) for information purposes; however, no other changes to the ERA in this regard (e.g., quantitative assessment of effects associated with 1-hour NO_2) will be completed.

6 References

The Clean Air Regulations. RRS c C-12.1, Reg 1. Repealed by c E-10.22, Reg 2 effective June 1, 2015. Available at https://www.canlii.org/en/sk/laws/regu/rrs-c-c-12.1-reg-1/latest/rrs-c-c-12.1-reg-1.html.

Health Canada. 2016. Human Health Risk Assessment for Ambient Nitrogen Dioxide. Healthy Environments and Consumer Safety Branch.

Hesterberg TW, Bunn WB, McClellan RO, Hamade AK, Long CM, Valberg PA.,2009. “Critical review of the human data on short-term nitrogen dioxide (NO2) exposures: evidence for NO2 no-effect levels.,” *Critical Reviews in Toxicology*, vol. 39, no. 9, pp. 743–81.

US EPA (United States Environmental Protection Agency). 2008. Integrated Science Assessment for Oxides of Nitrogen–Health Criteria. Research Triangle Park, NC: Report No. EPA/600/R08/071. Available: http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=194645#Download.

WHO (World Health Organization). 2010. WHO Guidelines for Indoor Air Quality: Selected Pollutants. World Health Organization, Regional Office for Europe.

Attachment IR 74-R1

Construction Guidelines for Pollution Control Facilities at Uranium Mining and Milling Operations

Saskatchewan Environment
and Resource Management

Shield EcoRegion

October, 2000

EPB 165

1.0 INTRODUCTION

The mining industry in Saskatchewan is regulated by the Operations Division of Saskatchewan Environment and Resource Management, pursuant to the *Environmental Management Protection Act* (*EMPA*) and the *Mineral Industry Environmental Protection Regulations(MIEP)*.

The MIEP Regulations (Section 6) require that a person who desires to construct, install, alter or extend a pollutant control facility shall apply in writing to the minister for approval to do so.

These guidelines were developed by the SERM Shield EcoRegion to guide SERM Project Officers when assessing applications to Construct Pollutant Control Facilities for uranium mining and milling operations, pursuant to the *MIEP Regulations*.

These guidelines are not intended to be prescriptive in nature but rather provide guidance to companies when designing facilities and developing construction applications and to SERM Project Officers when reviewing them.

2.0 GENERAL CONSTRUCTION OF FACILITIES

A definition of what constitutes a pollutant control facility can be found in Section 2(m) of the *MIEP Regulations*. The information to be submitted with an application for approval to construct is detailed in Section 6(2) of the *MIEP Regulations*.

Pollutant Control Facilities are to be constructed in a manner that complies with the following:

- All Environmental Impact Statement commitments made by a company
- All Joint Federal-Provincial Panel on Uranium Mining Developments in Northern Saskatchewan recommendations accepted by the Province
- Any conditions imposed by SERM, on the company, in a Ministerial Approval issued pursuant to *The Environmental Assessment Act*
- All applicable regulations under *EMPA* and *The Clean Air Act*

3.0 CONTAMINATED MATERIAL PIPELINES

Contaminated material pipelines can be defined as pipelines that convey contaminated water (exceeds *MIEP Regulation* discharge limits), ore slurry, tailings, hazardous substances, or other materials that would have a negative impact on the environment if released.

3.1 Secondary Containment

Secondary containment is required for pipelines conveying contaminated material in locations where a pipe rupture would release the material to the environment and be classified as a reportable spill pursuant to *The Environmental Spill Control Regulations* (ex. a tailings pipe rupture within an open pit TMF would not constitute a release to the environment, a minewater pipe rupture adjacent to a road would).

It is possible that minewater at a uranium mine may meet discharge limits prior to treatment (during mine development or during inactive periods) however, secondary containment is recommended as the water would still be considered to be contaminated and any accidental release would be considered a reportable spill by SERM.

Secondary containment should be designed to adequately contain the contaminated material in the event of a pipeline rupture. The minimum permeability guideline for material to qualify for a secondary containment rating is 1 x 10^{-7} cm/second.

Examples of acceptable secondary containment would be:

- High density polyethylene (HDPE) pipe within a pipe arrangement
- Concrete utilidor
- Open ditch lined with material compacted to provide a permeability of 1 x 10^{-7} cm/second

3.2 Basic Construction Criteria for Contaminated Material Pipelines

- HDPE piping
- Designed for maximum anticipated flow
- Above ground (to allow for visual inspections)
- Heat traced, temperature monitored
- Flow detection instrumentation and flow reduction alarms
- Ability to shut down flow immediately upon leak detection
- Secondary containment capable of containing flow and pressure
- Pipe racks only where required, company must give rationale for pipe rack use at a particular location
- Retention ponds or collection sumps with high level alarms at low spots for long pipelines or pipeline sloped to collection pond
- Retention ponds, if used, to have single 80 mil HDPE or equivalent liner and be designed to exceed capacity of pipeline volume that would drain into it
- Designed to account for thermal expansion and contraction
- Flow velocity designed to minimize erosion and to ensure sufficient flow to avoid freezing during winter conditions

4.0 CONTAINMENT STRUCTURES

This section includes guidelines for the construction of structures designed to contain contaminated materials. Such structures would include: ponds for the storage or treatment of water, pads for the storage of uranium ore, waste rock, and yellow cake, and dams, dykes or embankments for the retention of tailings or contaminated water.

4.1 Ponds

4.1.1 Pond Liners

The use of a single 80 mil HDPE liner is recommended for:

- Surface runoff collection ponds
- Treated Effluent Monitoring ponds
- Contingency ponds
- Retention ponds located along minewater pipelines

The use of a double 80 mil HDPE liner system is recommended for:

- Contaminated water collection ponds
- Sludge ponds
- Sedimentation ponds

Drainage collection to be installed between the double liners with inspection piezometers or sumps

4.1.2 Pond Sizing

Ponds are to be designed so that the likelihood of contaminated water being released to the environment due to foreseeable events including, but not limited to, increased mine water inflow, upset water treatment plant operation, extreme storm events, and pipeline breaks are minimized.

Design considerations for Contaminated Water Collection/Sedimentation Ponds include:

- Maximum operating capacity of water treatment plant (WTP)
- Maximum anticipated inflow of minewater
- Retention capacity in event of WTP failure
- Maintain 1 m freeboard during a 24 hr Probable Maximum Precipitation (PMP) event

Design considerations for Surface Runoff Ponds include:

- Retention of 24 hr PMP event over catchment area while maintaining adequate freeboard (1 m)

Other Ponds

- Anticipated volume and retention time of material to be stored
- Designed to retain 24 hr PMP event if overtopping would release contaminated water to the downstream environment

4.2 Stockpiles/Waste Pads

Standard 80 mil HDPE liners are recommended to stockpiles and pads at uranium operations. The use of bentonite liners are discouraged unless used as part of a double liner system involving a HDPE liner.

4.2.1 Criteria for Ore Stockpiles or Sludge Pads

- Double HDPE liner
- Designed to retain runoff/seepage from a 24 hr PMP event
- Adequate base and cover material to protect liner from damage
- Drainage collection to be installed between the double liners with inspection piezometers or sumps to monitor liner integrity

4.2.2 Criteria for Potentially Acid Generating Rock or Special Waste Stockpiles

- Single HDPE liner
- Designed to retain runoff/seepage from a 24 hr PMP event
- Adequate base and cover to protect liner from damage

4.2.3 Criteria for Clean Waste Rock Piles

- No liner required
- Drainage should be diverted to site surface runoff collection pond, where possible, otherwise drainage should be directed to a sedimentation pond to settle out solids prior to the water entering a surface waterbody
- Surface run-off should be diverted around clean waste piles

4.2.4 Criteria for Yellow Cake Storage Pads

- Pad to meet secondary containment criteria of 1×10^{-7} cm/second is recommended as release of yellow cake product outside of approved secondary containment would be a reportable spill

4.3 Dam/Dyke /Embankment Construction

4.3.1 Stability

- Minimum design safety factor of 1.5 against shallow or deep seated failure of dams and embankments.
- Minimum recommended slope for dykes, dams, and other embankments is 2:1
- Maximum reservoir level shall be kept at or below the top of the impervious core for embankment dams.
- Downstream slopes shall be protected where necessary against erosion caused by runoff, seepage flows, traffic, and frost

4.3.2 Seepage and Drainage Control

- Filters shall be placed between materials where significant migration of particles by seepage forces would be possible.
- The flow capacity of filters and drains shall be designed to accommodate the maximum anticipated seepage.

4.3.3 Flood Design

Dams and/or dykes associated with tailings management facilities, contaminated water impoundments or other facilities containing materials which would have deleterious effects on the downstream environment in the event of overtopping or rupture should be designed to withstand a 24 hr PMP event.

4.4 Monitoring Systems

Structures providing containment for contaminated water and materials are required to have a system of groundwater monitoring piezometers in place. Details regarding the location, construction, and sampling practices for groundwater piezometers can be obtained in the following SERM documents:

- Protocols for the Installation and Sampling of Monitor Wells, April 1989
- Environmental Monitoring Guidelines (For Operational Monitoring at Uranium and Gold Mining and Milling Operations in Saskatchewan), March 1989

5.0 WATER MANAGEMENT PRACTICES

Water management practices should be in place during construction and operation phases that minimize the amount of fresh water utilized, thereby reducing the amount of water requiring treatment and the chemical loading to the environment.

Such practices include:

- Diversion of as much water as possible away from the industrial area during construction and operation

- Recycling water as much as reasonably possible to minimize the usage of fresh surface water

- Segregation of contaminated water sources such as minewater and process water from collected surface runoff water and fresh water

Where applicable an estimated site water balance identifying water sources, expected water quality, and water management structures and practices to be employed is to be included in site construction application packages.

5.1 Water Management Design Criteria

- Ditches, swales and other structures to divert runoff from the industrial area should be in place prior to paving/construction.
- Surface runoff ponds to be completed prior to construction of the industrial apron
- Contaminated collection ponds, water treatment plant upgrades, and monitoring ponds to be completed prior to all construction activities which are expected to significantly increase water inflow to the system (ex. second mine shaft construction, open pit dewatering)
- Water storage/treatment capacity to exceed expected inflow at all times
- Ditches/swales to be designed for 1:100 storm event and armored to prevent erosion

6.0 CONTAMINATED WATER TREATMENT

The ALARA (as low as reasonably achievable) principle is to be followed in designing the treatment systems at uranium mine and mill sites.

Basic Design Criteria:

- Plant must be capable of producing effluent that meets the MIEP Wastewater limits
- Plant capacity designed with maximum flow (worst case scenario) criteria
- Site water handling to be designed to minimize the amount of water to be treated thereby reducing the chemical loading on the environment

7.0 HAZARDOUS SUBSTANCE WASTE DANGEROUS GOOD STORAGE

Approval to construct, install, alter, or expand a facility for the storage of hazardous substances or waste dangerous goods is required pursuant to the *The Hazardous Substance Waste Dangerous Goods Regulations*. The requirements of these regulations are to be complied with by companies when designing storage facilities.

8.0 SEWAGE TREATMENT

Refer to the *Water Pollution Control & Waterworks Regulations* and *A Guide to Sewage Works Design, Feb. 1996.*

Basic sewage treatment plant design criteria at uranium operations include:

- All sewage and grey water from the mine and mill dry and other potentially contaminated sources is to diverted to mine water treatment plants
- Design plant capacity for maximum number of people on site (most likely during construction). A contingency (+10%) is recommended.
- Ability to upgrade system if required to meet increased demand
- Choice of sewage treatment system should be a proven technology suitable to northern climates
- Ultra-violet disinfection is encouraged to eliminate chlorine loading to environment
- Meters to gauge flows
- Effluent should meet guidelines for BOD, TSS, Coliform Bacteria
- Proposed effluent monitoring program to be included in construction application package
- Appropriate method of sludge disposal as identified in guidelines/regulations

9.0 POTABLE WATER/FIRE PROTECTION

Refer to the *Water Pollution Control & Waterworks Regulations, A Guide to Water Works Design, and the Saskatchewan Municipal Drinking Water Quality Objectives.*

Basic design criteria for potable water fire protection

- Design for maximum number of people on site (most likely during construction)
- Lake intakes to have appropriately sized fish screens
- Ability to upgrade system if required to meet increased demand
- Potable water treatment must include disinfection
- Treated effluent or contaminated water not to be used for fire protection
- Fire protection water does not need to be treated by potable system
- Must meet all applicable fire code requirements

10.0 SOLID WASTE MANAGEMENT

Companies are to provide a waste management plan for construction and operation phases, that includes a waste minimization (recycling) plan based on the "4R's".

10.1 Domestic and Industrial Waste

Refer to *Municipal Refuse Management Regulations*.

10.2 Contaminated Waste

Radioactive or chemically contaminated wastes generated during construction and operation are to be stored/disposed of separately from other waste materials.

Contaminated waste disposal areas should be located at a specially designed landfill area for contaminated wastes that includes leachate collection or within the confines of areas that have already been impacted, such as:

- Tailings management areas
- PAG or mineralized waste pad

11.0 CONSTRUCTION MONITORING

Construction monitoring to be conducted by company staff or by consultants retained by the company to ensure approved construction specifications are met. This is to include:

- Placement and compaction of materials
- Grading of aggregate, sand etc.
- Liner installations, drain installations between double liners

QA/QC for such activities and installations are to be included in construction packages submitted to SERM for review

All liners to be installed according to manufacturer's specifications for its intended use

Company is to provide monthly construction updates to SERM

Upon completion of the facility, the Company is to provide overall completion report detailing QA/QC conducted, any changes to the originally approved design, and include an as-built drawing.

Attachment IR 75-R1

NexGen Energy Ltd.
Head Office
3150 – 1021 West Hastings Street
Vancouver, BC V6E 0C3

Saskatoon Office
200 – 475 2nd Ave S
Saskatoon, SK S7K 1P4

Attachment IR 75-R1

1 Introduction

NexGen Energy Ltd. (NexGen) is proposing to develop a new uranium mining and milling operation in northwestern Saskatchewan, called the Rook I Project (Project). The proposed Project is subject to both provincial and federal Environmental Assessment (EA) processes, would be licensed as a nuclear facility by the Canadian Nuclear Safety Commission (CNSC), and would be subject to various provincial and federal permits and approvals.

NexGen submitted a Draft Environmental Impact Statement (EIS) to the Saskatchewan Ministry of Environment (ENV) and Canadian Nuclear Safety Commission (CNSC) in 2022. Through the technical review of the Draft EIS, NexGen received information requests (IRs) and advice to proponent comments from the Federal-Indigenous Review Team (FIRT), which is led by the CNSC. Results of the FIRT technical review were provided in two Annexes; Annex 1 was composed of IRs and Annex 2 was composed of advice to proponent comments for NexGen's response. In September 2023, NexGen provided detailed responses to the FIRT IRs and advice to proponent comments.

On 12 February 2024, the CNSC provided the results of their review of NexGen's IR and advice to proponent comment responses. The IRs were categorized by the CNSC as accepted (i.e., requiring no additional response), not accepted with the technical approach deemed acceptable by the CNSC and the IR indicated as being able to be resolved once a revised EIS is provided by NexGen, or not accepted with additional response required by NexGen. For the IRs that were not accepted with additional response required, a second round of follow-up IRs were provided by the CNSC.

Attachment IR 75-R1 provides supporting information for NexGen's response to IR 75-R1. The specific parts of IR 75-R1 are as follows:

1. Explain why the rating curve formulae for stations CR-WC-MS-02 and CR-WC-MS-06 do not match the plotted line for the open water rating curve. If corrections are required, detail any other report sections that are affected and ensure that all sections impacted by the error are updated.

2. Provide an explanation for rating curve shifts that are not associated with data. Provide details on the monitoring strategy that will be utilized to deal with the unpredictable backwater effects that have led to frequent rating curve shifts. New data that supports the original rating curves should be presented in figures. If general rules on rating curve shifts have been developed, provide all relevant details.

3. Provide details on where and how data derived from rating curves (i.e. the continuous discharge values for CR-WC-MS-01 to 06) are used in the hydrological model in the draft EIS Appendix 9A. Describe how the seasons with the most variable rating curve shifts (i.e. summer and fall) could be affected by this uncertainty.

Section 2 through Section 4 directly address each of the three parts of FIRT IR 75-R1.

2 FIRT IR 75-R1 – Part 1

This section provides NexGen's response to IR 75-R1 – part 1.

2.1 Follow up Information Request

"*Explain why the rating curve formulae for stations CR-WC-MS-02 and CR-WC-MS- 06 do not match the plotted line for the open water rating curve. If corrections are required, detail any other report sections that are affected and ensure that all sections impacted by the error are updated.*"

2.2 Analysis and Response

2.2.1 CR-WC-MS-02

The open water rating curve (OWRC) presented as Figure 15 in Draft EIS Annex IV.2 (Hydrometric Monitoring Characterization Report) for Station CR-WC-MS-02 is presented in Figure 1. An analysis was completed to confirm that the base rating curve plotted for CR-WC-MS-02 matches the plotted line for the open water rating curve, as shown in Figure 2. The analysis confirmed that the base rating curve plotted is consistent with the formula provided on the plot of the base open water rating curve (OWRC). No change is required in response to the comment.

Figure 1: Figure 15 from Annex IV.2

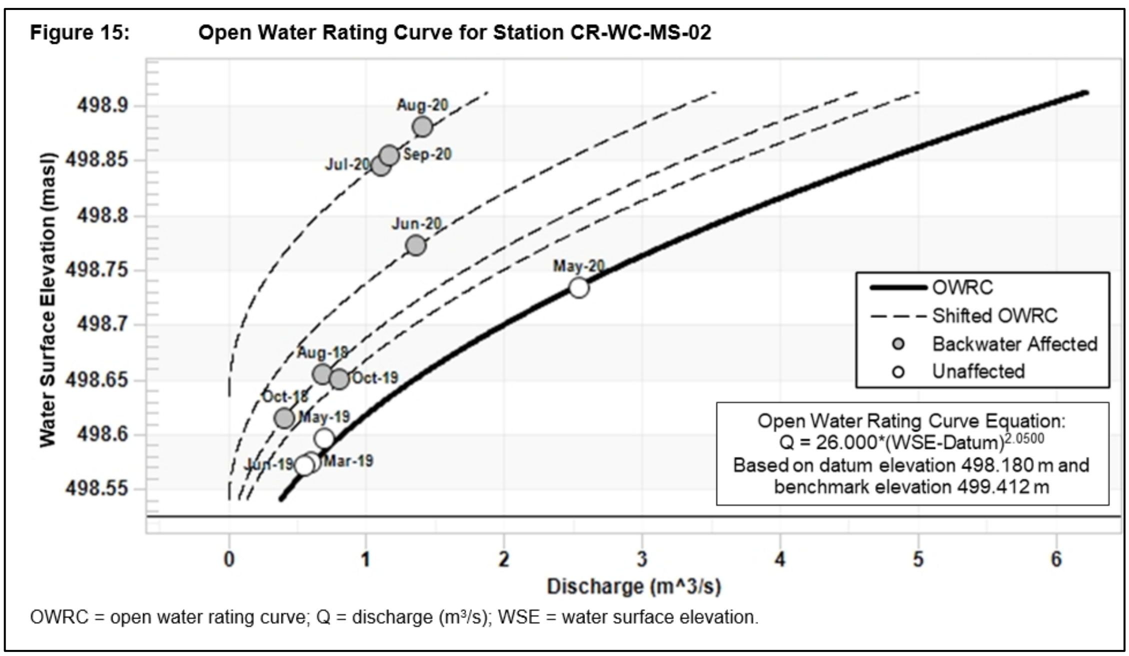
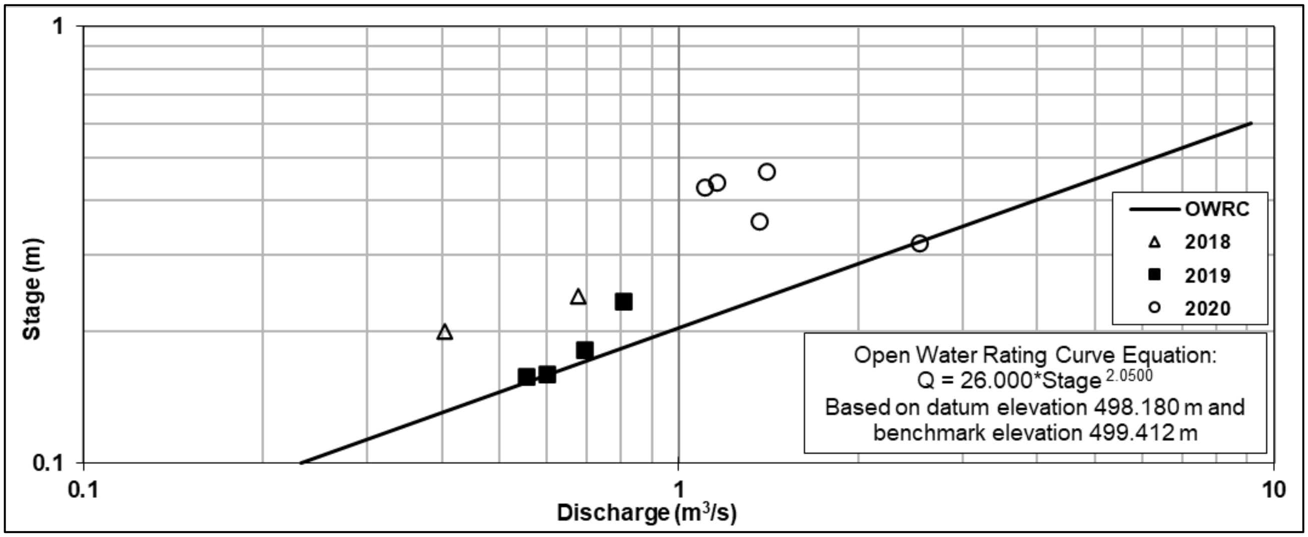


Figure 2: Completed Analysis for CR-WC-MS-06

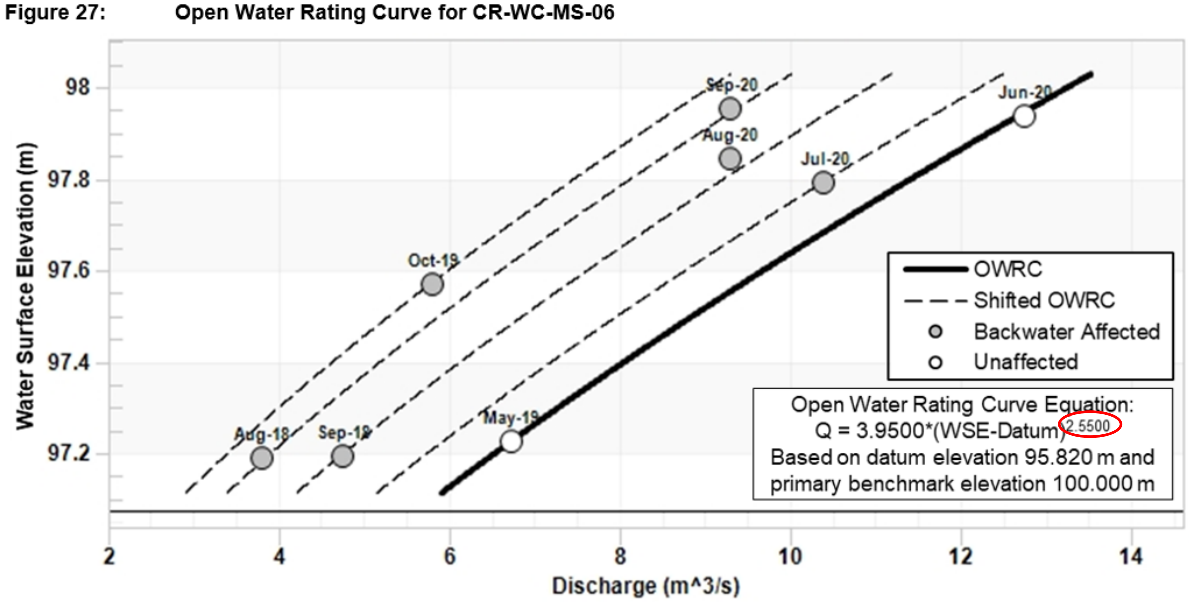


2.2.2 CR-WC-MS-06

The OWRC presented as Figure 27 in Draft EIS Annex IV.2 for Station CR-WC-MS-06 is presented in Figure 3. An analysis was completed to confirm that the base rating curve plotted for CR-WC-MS-06 matches the plotted line for the open water rating curve, as shown in Table 1. During the analysis, it was identified that there was a typographical error in the exponent of the rating curve where the correct exponent of “1.5500” was incorrectly stated as “2.5500” in the legend of Figure 27. The error was isolated to the figure presentation and did not represent the exponent value that was used in the analysis. In the example cited by the reviewer in the context to this IR, using the exponent value of 1.55 yields a discharge rate of 8.03 m^3/s at a water surface elevation of 97.4 m, which matches the discharge value on the figure.

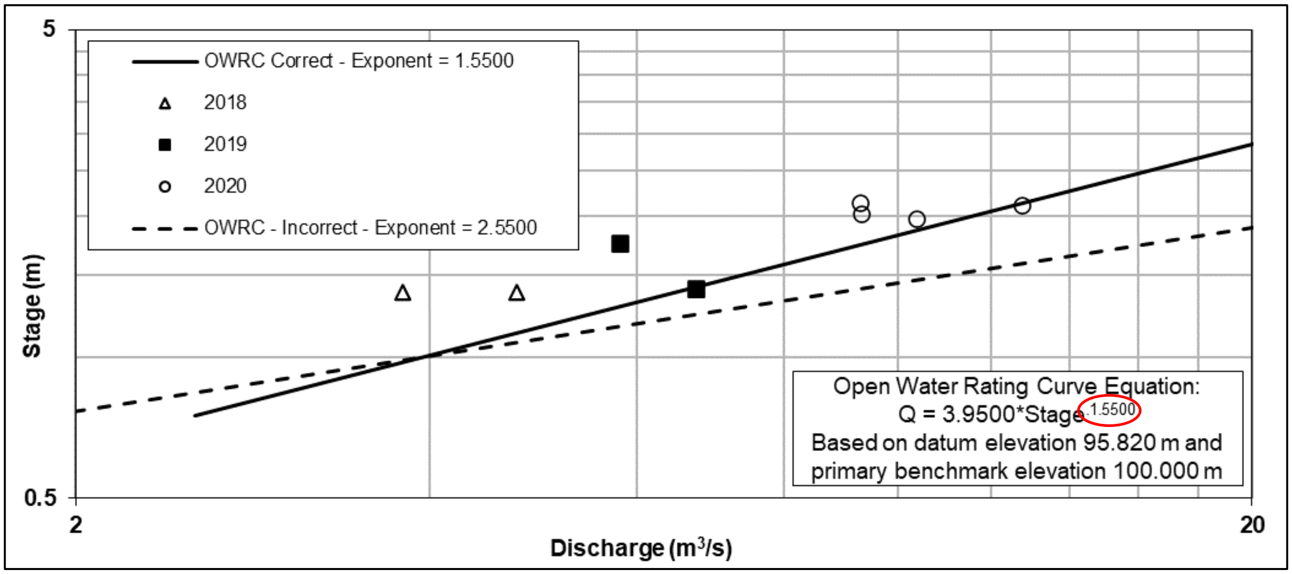
Figure 3: Excerpt from Annex IV.2

Figure 27: **Open Water Rating Curve for CR-WC-MS-06**



OWRC = open water rating curve; Q = discharge (m³/s); WSE = water surface elevation.

Figure 4: Completed Analysis for CR-WC-MS-06



2.3 Conclusion

The rating formulae referenced by the reviewer in part 1 of IR 75-R1 were analyzed, which confirmed the original analysis and presentation of results for CR-WC-MS-02. NexGen notes that the reviewer was correct that the formula did not match the OWRC for CR-WC-MS-06; this was due to an editorial error and did not affect the analysis. NexGen will make the appropriate correction in Figure 27 of Section 5.3.1.6 of revised EIS Annex IV.2 (Hydrometric Monitoring Report). No further changes to the EIS are required with regards to the OWRC applied to CR-WC-MS-02 or CR-WC-MS-06.

3 FIRT IR 75-R1 – Part 2

This section provides NexGen's response to IR 75-R1 – part 2.

3.1 Follow up Information Request

"*Provide an explanation for rating curve shifts that are not associated with data. Provide details on the monitoring strategy that will be utilized to deal with the unpredictable backwater effects that have led to frequent rating curve shifts. New data that supports the original rating curves should be presented in figures. If general rules on rating curve shifts have been developed, provide all relevant details*."

3.2 Key Context

In response to context provided by the reviewer in IR 75-R1, NexGen provides the following points of clarification:

- CR-WC-MS-06 is located on the Clearwater River above the Mirror River Confluence, at the downstream boundary of the Regional Study Area. It is not an inflow to Patterson Lake; rather, station CR-WC-MS-02 is located on the Clearwater River above Patterson Lake and is a critical inflow to Patterson Lake.
- Three paired measurements (i.e., both water surface elevation and discharge measured at the same place and time) were collected in 2019 at CR-WC-MS-02 in May, June, and October and were used to support the rating curve shifts in the EIS.

Water surface elevation values were converted to stage values by subtracting a consistent offset (i.e., stage datum) at each hydrometric station; the stage datum was generally a value slightly below the minimum bed elevation at the watercourse so that stage values were always positive and representative of the maximum water depth across the watercourse. Stage was related to discharge using an empirical equation referred to as the OWRC, developed based on sets of manual stage and discharge measurements at each station.

As described in Section 4.5.2.1 of Draft EIS Annex IV.2, rating curves were developed in Aquarius software and following guidance in WSC (2016). At several stations, stage-shifts were applied to correct the base rating curve to the value of stage-discharge points that were at least 0.003 m above (or less frequently, below) the curve. Several stations experienced seasonal backwater due to aquatic vegetation growth in the channel in the summer months or due to ice in the channel or downstream, and a few stations were occasionally backwatered by downstream waterbodies, particularly when lake water levels increased. Negative shift values indicate backwater conditions when the stage is higher for a given discharge. Stage-shifts were applied for most field visits, though not for the stage-discharge points that defined the base rating curve, which had no shift applied. Stage-shifts were also occasionally applied between field visits at transitions such as before and after spring thaw or when backwater conditions were increasing (e.g., prior to documentation of aquatic vegetation growth or beaver dams downstream of a station, as water levels rose in downstream waterbodies).

3.3 Analysis and Response

3.3.1 Regarding Rating Curve Shifts Not Associated with Data

Shifts are typically timed with field visits or other known events that cause the stage-discharge pair to deviate from the rating curve (e.g., ice formation and ablation). Stage-shifts were occasionally applied between field visits when no specific data point was available at transitions such as before and after spring thaw or when backwater conditions were increasing (e.g., prior to documentation of aquatic vegetation growth or beaver dams downstream of a station, as water levels rose in downstream waterbodies).

Both CR-WC-MS-02 and CR-WC-MS-06 are backwatered by downstream waterbodies, particularly during prolonged wet periods when water levels are increased. CR-WC-MS-06 also experiences complex rating conditions due to seasonal backwater caused by aquatic vegetation and ice. In the case of CR-WC-MS-02, at the inflow to Patterson Lake, stage shifts were informed by paired stage-discharge measurements and continuous water level monitoring in Patterson Lake.

3.3.2 Regarding Monitoring Strategy

The monitoring strategy applied in recent years includes a combination of remote sensing data, automated instrumentation, and field visits to inform rating curve shifts to deal with variable backwater effects. Remote sensing information is used to provide insight into seasonal changes to ice conditions in the reaches of the Clearwater River; automated instrumentation, including hydrometric stations equipped with satellite communications, provide real time data on water temperature and water level; and periodic field visits provide additional paired measurements of stage and discharge at critical times of the year.

The monitoring strategy adopted for baseline data collection and currently ongoing monitoring includes the following field visits:

- **Winter Hydrometric (February):** Mid-winter hydrometric monitoring in February to inform over-winter rating curve shifts for stations that are safely accessible in winter with a focus on the outflow of Patterson Lake. This visit targets collecting paired measurements of stage and discharge in mid-winter.
- **Late Winter Hydrometric Trip (mid-March):** Late winter hydrometric monitoring in March to inform over-winter rating curve shifts for stations that are safely accessible in winter with a focus on the outflow of Patterson Lake. This visit targets collecting paired measurements of stage and discharge in late winter as ice conditions transition on the Clearwater River below Patterson Lake.
- **Open Water Hydrometric Trip #1**: The purpose of this trip is for post-winter maintenance inspection, installation of seasonal instrumentation, and observation of spring freshet conditions. This trip is completed in the second week of June to target all hydrometric stations, activate seasonal hydrometric stations, complete post-winter maintenance inspections, and collect measurements of the receding spring freshet as soon as ice-free conditions are present on Broach Lake, Patterson Lake, Beet Lake, and Naomi Lake.
- **Open Water Hydrometric Trip #2**: This trip is completed in the first week of July to target all hydrometric stations during summer conditions. The purpose of this trip is for maintenance intervention acting on the findings of the spring maintenance inspection and observation of midsummer conditions when vegetation is fully developed.
- **Open Water Hydrometric Trip #3**: This trip is completed in the final week of September to target all hydrometric stations during fall conditions and to remove seasonal stations. The purpose of this trip is for seasonal maintenance and observation of fall conditions when vegetation has senesced.

3.3.3 Regarding Rules on Rating Curve Shifts including all Relevant Details

Backwater can cause discharge to be overestimated for a given stage value. There is more uncertainty in the results at certain streamflow stations that experienced, or were inferred to have had, backwater conditions during the open-water periods. All streamflow stations experience backwater during ice-covered conditions. Stations with noted potential for backwater conditions included:

- Observations of dense aquatic vegetation in the channel at CR-WC-MS-06 and CR-WC-TI-02.
- Observed or inferred conditions during ice-covered periods at all the streamflow stations.
- Due to the low gradients in this area, the location of tributary inflow stations near the confluence with the Clearwater River and/or upstream of its waterbodies causes increased uncertainty for the monitoring periods between field measurements (e.g., CR-WC-MS-02 is located upstream of Patterson Lake and was backwatered as lake levels increased in 2020; CR-WC-MS-06 can be influenced by the Mirror River downstream).

Backwater effects are alleviated using frequent (i.e., seasonally distributed five times per year; Section 3.3.2) field measurements of coincident stage and discharge, which allow the base stage-discharge curves (unaffected by backwater) to be shifted upward to provide a more correct derived discharge. Hydrometric monitoring for this program included frequent measurements at key locations such as along the Clearwater River main stem in the local study area, which improves confidence in the results and reduces uncertainty. Stage-shifts are a method used to improve the discharge data derived from the stage-discharge rating curves. Stage-shifts were used for the stage-discharge paired measurements in which the stage was 5% above or below the rating curves (WSC 2012, 2016). Typically, the magnitude of negative stage-shifts varies based on the degree of vegetation growth, ice effects, and/or downstream water conditions. In general, shifts are used during open water conditions, but on occasion, a shift is required to correct for ice conditions during winter. Positive stage-shifts are required during spring freshet when there are high flow velocities and during other flood conditions and gradually returns to the base curve as velocities return to normal.

3.3.4 Regarding New Data that Supports the Original Rating Curves Should be Presented in Figures

Rating curves have developed over time and the rating curves at the hydrometric stations used for calibration and validation of the Regional Hydrological Model were improved in 2021 and 2022 with the collection of additional baseline data. Section 4 of this memorandum provides detail on comparison of the revised data to the data presented in Draft EIS Annex IV.2.

3.4 Conclusion

The rating conditions at some stations are complex and, in some cases, subject to variable backwater from waterbodies. Additional monitoring and rules on rating curves shifts have improved the fit and basis for continuous discharge records. The implications of new data on rating performance are presented in Section 4.

4 FIRT IR 75-R1 – Part 3

This section provides NexGen's response to IR 75-R1 – part 3.

4.1 Follow up Information Request

"*Provide details on where and how data derived from rating curves (i.e. the continuous discharge values for CR-WC-MS-01 to 06) are used in the hydrological model in the draft EIS Appendix 9A. Describe how the seasons with the most variable rating curve shifts (i.e. summer and fall) could be affected by this uncertainty.*"

4.2 Key Context

The follow-up information request relates to the rating curves developed as part of baseline hydrometric monitoring and specifically whether an update to the rating curves to include additional monitoring in the years since 2020 would lead to changes in regional hydrological modelling and how that might propagate to subsequent models.

The rating curves presented in Draft EIS Annex IV.2 are for converting continuous measurements of water surface elevation at the hydrometric station to discharge. The rating curves presented in Section 5.3 of Draft EIS Annex IV.2 were not used in the Regional Hydrological Model (Draft EIS Appendix 9A [Hydrological Modelling Summary Report]) as the hydrological model does not calculate flows from watercourse water level using a rating curve for riverine sections. Rather, the hydrological model calculated change in lake storage based on a daily net balance of tributary inflows, rainfall and snowmelt inputs, lake evaporation losses, groundwater exchange, and lake outflow. The tributary inflows to each lake were estimated from both the terrestrial landscape and runoff routed from upstream waterbodies, accounting for physical hydrological processes active in the contributing watershed. Rating curves were only used in the model at lake outflows as discussed in Section 9A3.7 of Draft EIS Appendix 9A. Therefore, the rating curve equations presented in Section 5.3 of Draft EIS Annex IV.2 were not directly used in the modelling for the Draft EIS. However, the observed discharge hydrographs presented in Draft EIS Annex IV.2 were used for the purposes of model calibration at CR-WC-MS-06. The assessment of model calibration is provided in Section 9A3.8 of Draft EIS Appendix 9A. Rating curves at the hydrometric stations used for calibration and validation of the Regional Hydrological Model were improved in 2021 and 2022 with the collection of additional data. The updated rating curves allowed for the derivation of updated continuous measured discharge record over the calibration period, which may change the calibration performance.

4.3 Analysis and Response

As referenced in Figure 5, Figure 6, Figure 7, and Figure 8, an assessment was completed to evaluate the changes to the rating curve in 2021 and 2022 and adjustments to resultant hydrographs on the assessment of the calibrated model performance at the model evaluation nodes used in the Draft EIS. The model nodes used in the Draft EIS for evaluation were those with sufficient observed data to support quantitative performance evaluations and the most important to supporting quantitative assessment of Project effects and cumulative effects.

Figure 5: Comparison of Measured Discharge and Continuous Discharge Developed using the Draft EIS Rating Curves and the 2022 Rating Curve at the Clearwater River below Broach Lake (CR-WS-MS-01)

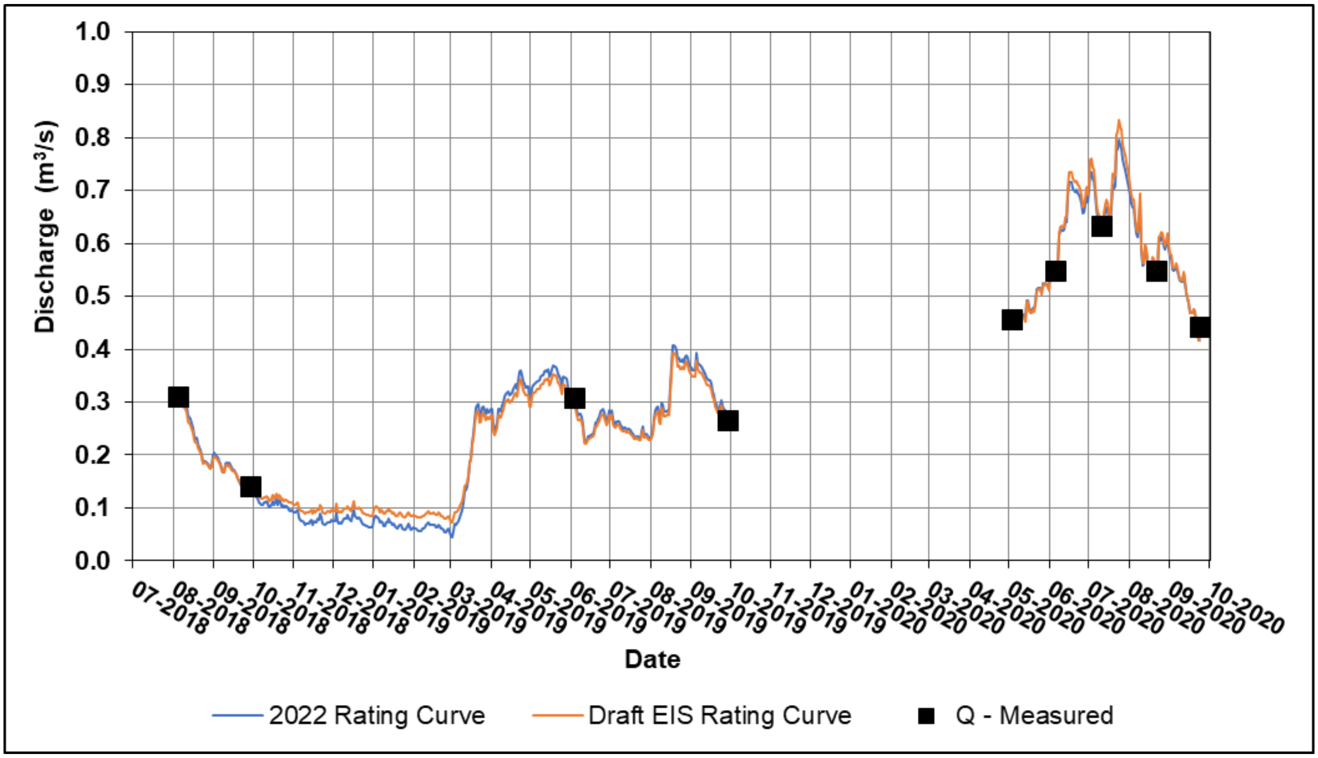


Figure 6: Comparison of Measured Discharge and Continuous Discharge Developed using the Draft EIS Rating Curves and the 2022 Rating Curve at the Clearwater River above Patterson Lake (CR-WS-MS-02)

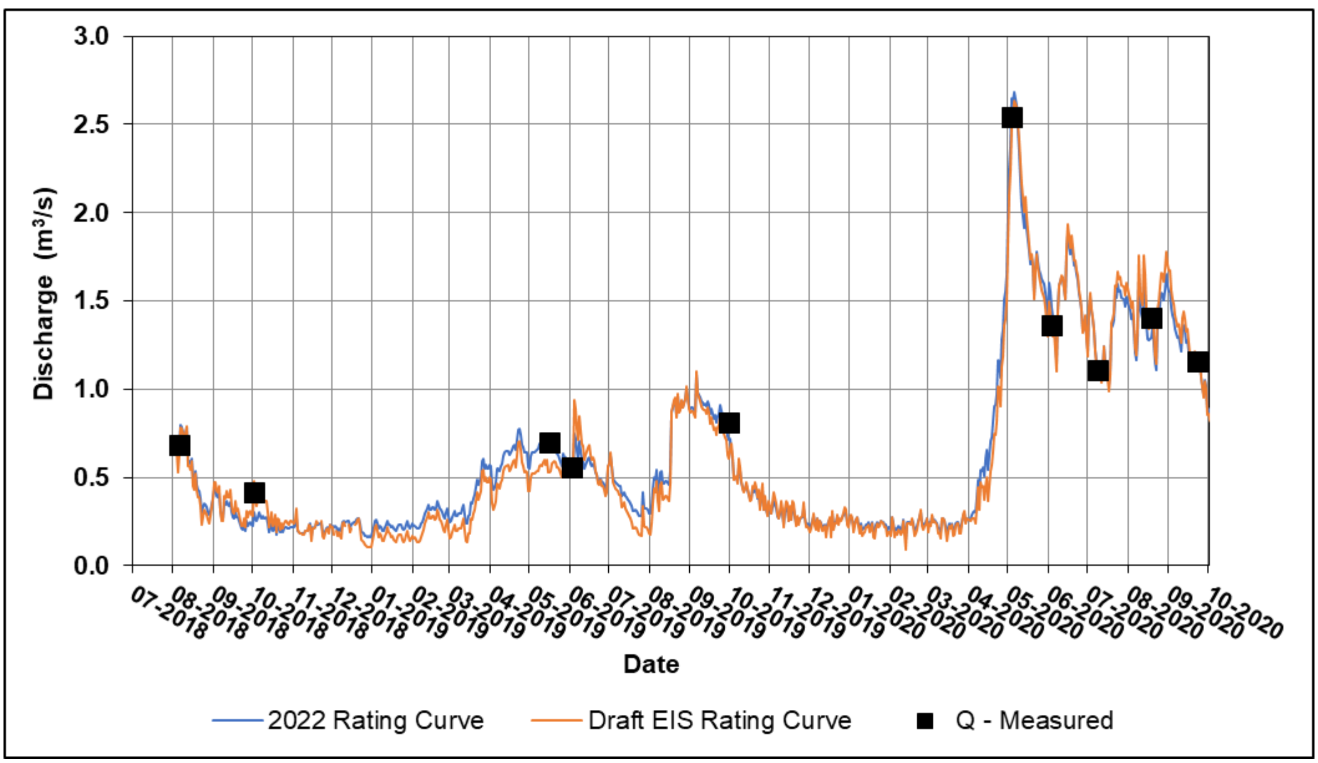


Figure 7: Comparison of Measured Discharge and Continuous Discharge Developed using the Draft EIS Rating Curves and the 2022 Rating Curve at the Clearwater River below Patterson Lake (CR-WS-MS-03)

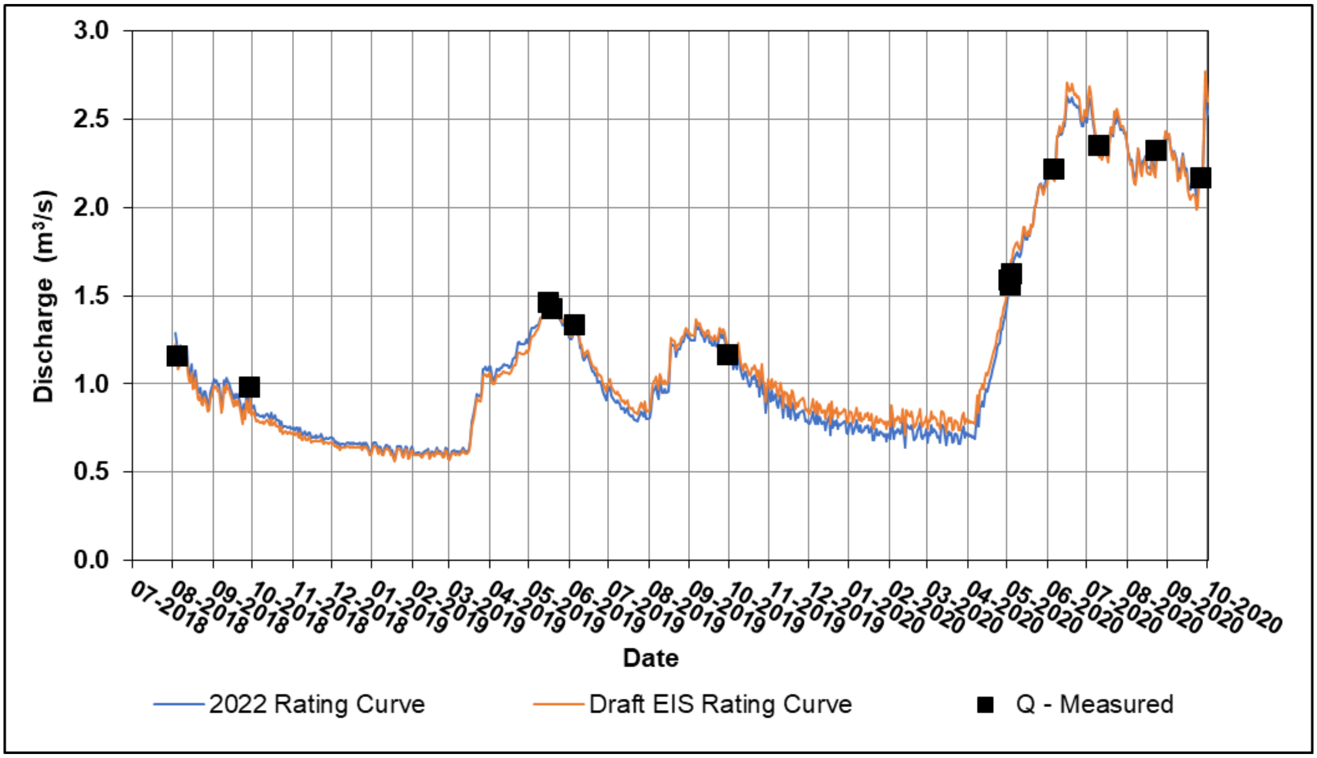
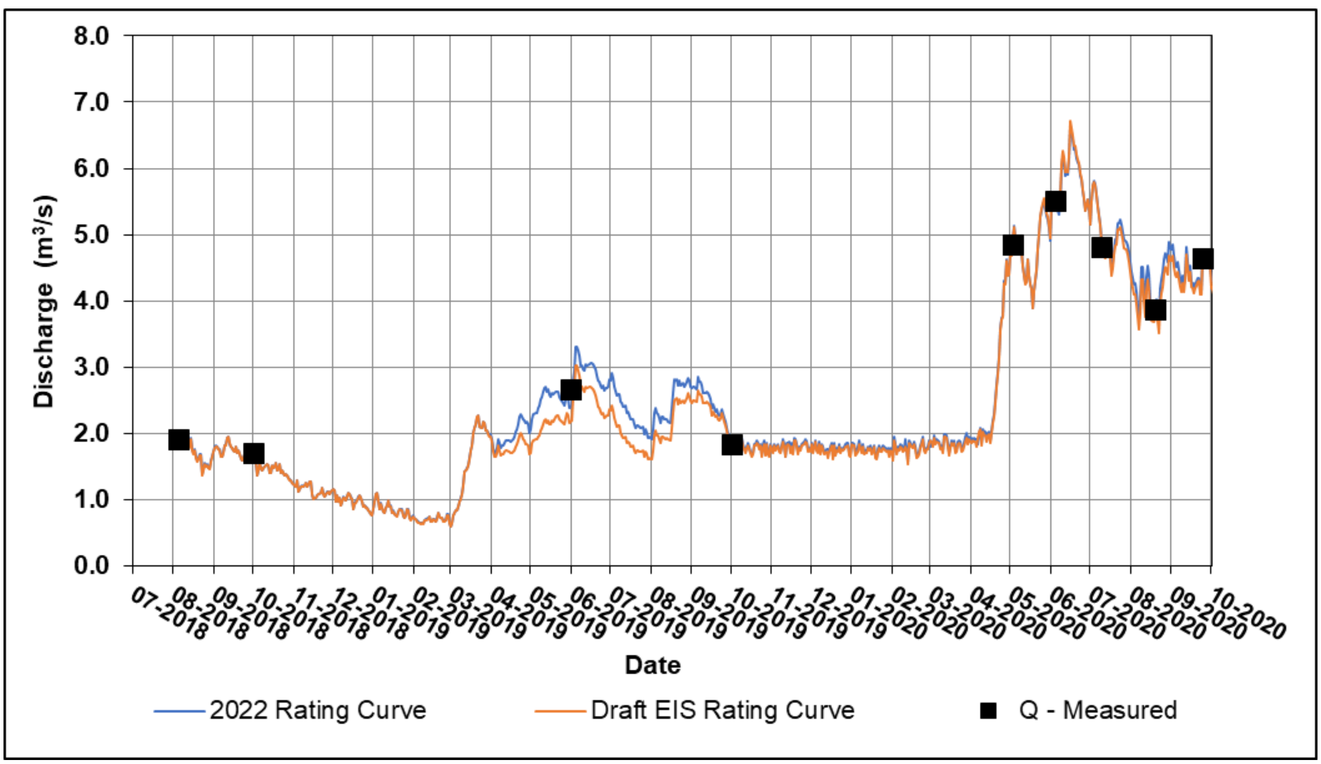


Figure 8: Comparison of Measured Discharge and Continuous Discharge Developed using the Draft EIS Rating Curves and the 2022 Rating Curve at the Clearwater River below Beet Lake (CR-WS-MS-04)



The evaluation of calibration performance of the Draft EIS hydrological model is summarized in Table 1. The model nodes used for evaluation were those with sufficient observed data to support quantitative assessment of the Regional Hydrological Model performance and those stations that were most important for quantitative assessment of Project effects and cumulative effects (i.e., inflows to and outflows from Patterson Lake). The effect of updated rating curves on calibrated model performance was evaluated by comparing calibration results using hydrographs developed using the Draft EIS rating curves and calibration results using hydrographs developed using the updated 2022 rating curves. The comparison adopted the same set of quantitative metrics and calibration period as used in the Draft EIS.

The calibration results presented in Draft EIS Appendix 9A are shown in Table 1 (reproduced from Table 9A-11 of Draft EIS Appendix 9A). The calibration results based on the updated 2022 rating curves are presented in Table 2. An evaluation of change for each performance metric is provided in Table 3. Results indicate a marginal decrease in calibration performance; however, the changes to performance metrics are small or negligible in magnitude and do not impact the overall rating. For the evaluation node CR-WC-MS-03, the decrease of Nash-Sutcliffe efficiency from 0.76 to 0.72 changed the performance rating of “Very Good” to “Good.” For all other evaluation nodes, the performance rating remained unchanged.

The influence of the updated rating curves and hydrographs on the performance of the model-simulated water relative to the observed or estimated water yield from the hydrometric monitoring program varied by station. Annual water yield simulation improved at the Clearwater River above Patterson Lake (CR-WC-MS-03) and remained relatively unchanged at the three other evaluation nodes, leading to a small improvement overall.

Table 1: Quantitative Summary of Calibration Results at the Model Evaluation Nodes – Draft EIS Rating Curves

Station	Δ_{mean} (m^3/s)	NRMSE	R	NSE	Performance Rating
CR-WC-MS-01	0.04	0.26	0.92	0.70	Good
CR-WC-MS-02	0.16	0.46	0.78	0.72	Good
CR-WC-MS-03	0.10	0.13	0.92	0.76	Very good
CR-WC-MS-04	0.46	0.21	0.85	0.63	Satisfactory

Δ_{mean} = mean residual, NRMSE = normalized root mean square error, R = correlation coefficient, NSE = Nash Sutcliffe efficiency.

Note: The performance ratings adapted for evaluating calibration were as follows: an NSE less than 0.50 is considered unsatisfactory, an NSE between 0.50 and 0.65 is considered satisfactory, an NSE between 0.65 and 0.75 is considered good, and an NSE greater than 0.75 is considered very good (Moriasi et al. 2007). An NSE of 1 would correspond to a perfect match of modelled discharge and observed data.

Table 2: Quantitative Summary of Calibration Results at the Model Evaluation Nodes – 2022 Rating Curves

Station	Δ_{mean} (m^3/s)	NRMSE	R	NSE	Performance Rating
CR-WC-MS-01	0.04	0.27	0.89	0.74	Good
CR-WC-MS-02	0.16	0.40	0.77	0.70	Good
CR-WC-MS-03	0.10	0.15	0.86	0.72	Good
CR-WC-MS-04	0.55	0.23	0.82	0.60	Satisfactory

Δ_{mean} = mean residual, NRMSE = normalized root mean square error, R = correlation coefficient, NSE = Nash Sutcliffe efficiency.

Note: The performance ratings adapted for evaluating calibration were as follows: an NSE less than 0.50 is considered unsatisfactory, an NSE between 0.50 and 0.65 is considered satisfactory, an NSE between 0.65 and 0.75 is considered good, and an NSE greater than 0.75 is considered very good (Moriasi et al. 2007). An NSE of 1 would correspond to a perfect match of modelled discharge and observed data.

Table 3: Evaluation of Change due to Updating Rating Curves and Associated Hydrographs

Station	Δ_{mean} (m^3/s)	NRMSE	R	NSE	Performance Rating
CR-WC-MS-01	No Change	Marginal decrease in performance	Small decrease in performance	Marginal increase in performance	Good
CR-WC-MS-02	No Change	Marginal increase in performance	Negligible change in performance	Marginal decrease in performance	Good
CR-WC-MS-03	No Change	Marginal decrease in performance	Small decrease in performance	Marginal decrease in performance	Changes from "Very Good" to "Good"
CR-WC-MS-04	Overall increase to average residual	Marginal decrease in performance	Small decrease in performance	Marginal decrease in performance	No change

Δ_{mean} = mean residual; NRMSE = normalized root mean square error; R = correlation coefficient; NSE = Nash Sutcliffe efficiency.

Note: The performance ratings adapted for evaluating calibration were as follows: an NSE less than 0.50 is considered unsatisfactory, an NSE between 0.50 and 0.65 is considered satisfactory, an NSE between 0.65 and 0.75 is considered good, and an NSE greater than 0.75 is considered very good (Moriasi et al. 2007). An NSE of 1 would correspond to a perfect match of modelled discharge and observed data.

4.4 Conclusion

The purpose of the hydrology assessment for the Draft EIS is to establish effects on hydrology as an intermediate component and provide information to support other valued component (VC) assessments. This assessment has shown that although additional information has been gained in recent years, an update to the baseline hydrometric monitoring station rating curves with new information would not result in a meaningful change to the Regional Hydrology Model used for the Draft EIS nor to the other models that depend on it. Therefore, updates to the Regional Hydrological Model or subsequent models are not required for the revised EIS.

As part of ongoing monitoring, the rating curves used in the Draft EIS have been updated with additional monitoring data collected in 2021 and 2022. The updated rating curves change the daily observed discharge hydrographs used for model calibration and evaluation of calibration performance. However, the updates made to rating curves and hydrographs based on additional data collected in 2021 and 2022 do not result in a material change in performance of the Regional Hydrological Model. The resulting changes to the observed hydrographs are not of a magnitude that impacts model calibration, hydrological model simulation results for baseline conditions, or the hydrological effects assessment, nor do they propagate to other subsequent models. The calibration used in the Draft EIS remains acceptable for describing the hydrological conditions in the spatial domain of the model, even when considering updated hydrometric monitoring data collected to 2022.

Overall, the understanding of regional hydrology will continue to improve over time; however, the baseline data adopted for the Draft EIS to support effects assessment remains an appropriate representation of regional hydrological conditions. Implementation of the Environmental Protection Program and Environmental Monitoring Plan would provide the necessary data to manage potential residual effects on hydrology and verify the effectiveness of Project mitigation measures. Monitoring would also address residual uncertainty by following up on baseline data collected to verify the prediction of minimal changes in water flows and levels during the Project lifespan.

5 References

Moriasi DN, Arnold JG, Van Liew MW, Bingner RL, Harmel RD, Veith TL. 2007. Model Evaluation Guidelines for Systematic Quantification of Accuracy in Watershed Simulations. Transactions of the American Society of Agricultural and Biological Engineers. Vol. 50(3): 885-900.

WSC (Water Survey of Canada) 2012. Hydrometric Manual Data Computations. qSOP-NA037. Water Survey of Canada, Environment Canada. 114p.

WSC. 2016. Hydrometric Manual – Data Computations: Stage-discharge Model Development and Maintenance. qSOP-NA049-01-2016. Water Survey of Canada, Environment Canada. 40p.

Attachment IR 83-R1

Table 1: Radionuclide Bioaccumulation Factors and Dose Coefficients

Radionuclide	Biv (L/kg)	DCF External (Gy/y)/(Bq/kg)	DCF Internal (Gy/y)/(Bq/kg)
Pb-210	3.00E+02	2.15E-06	5.47E-04
Po-210	5.00E+02	4.30E-11	5.40E-04
Th-230	8.00E+01	7.19E-08	4.80E-04

Biv = bioaccumulation factor; DCF = dose conversion factor.

Table 2: Radionuclide Sum of Fractions

Radionuclide	Concentration at Edge of ETP RMZ (Table 10.5-4 of Draft EIS) (Bq/L)	Selected Benchmark (Bq/L)	Source	Sum of Fractions
Pb-210	2.6	2.20E+01	BCG RESRAD-BIOTA	1.18E-01
Po-210	0.044	1.35E+01	BCG RESRAD-BIOTA	3.26E-03
Th-230	0.085	9.51E+01	BCG RESRAD-BIOTA	8.94E-04
Ra-226	0.023	0.11	ENV	2.09E-01
Summed				3.31E-01

ETP = effluent treatment plant; RMZ = regulated mixing zone; EIS = Environmental Impact Statement.

Attachment IR 111-R1, 121-R1, 207-R1, and 270-R1

NexGen Energy Ltd.
Head Office
3150 – 1021 West Hastings Street
Vancouver, BC V6E 0C3

Saskatoon Office
200 – 475 2nd Ave S
Saskatoon, SK S7K 1P4

Attachment IR 111-R1, 121-R1, 207-R1, and 270-R1

1 Introduction

NexGen Energy Ltd. (NexGen) is proposing to develop a new uranium mining and milling operation in northwestern Saskatchewan, called the Rook I Project (Project). The proposed Project is subject to both provincial and federal Environmental Assessment (EA) processes, would be licensed as a nuclear facility by the Canadian Nuclear Safety Commission (CNSC), and would be subject to various provincial and federal permits and approvals.

NexGen submitted a Draft Environmental Impact Statement (EIS) to the Saskatchewan Ministry of Environment (ENV) and CNSC in 2022. Through the technical review of the Draft EIS, NexGen received information requests (IRs) and advice to proponent comments from the Federal-Indigenous Review Team (FIRT), which is led by the CNSC. Results of the FIRT technical review were provided in two Annexes; Annex 1 was composed of IRs and Annex 2 was composed of advice to proponent comments for NexGen's response. In September 2023, NexGen provided detailed responses to the FIRT IRs and advice to proponent comments.

On 12 February 2024, the CNSC provided the results of their review of NexGen's IR and advice to proponent comment responses. The IRs were categorized by the CNSC as accepted (i.e., requiring no additional response), not accepted with the technical approach deemed acceptable by the CNSC and the IR indicated as being able to be resolved once a revised EIS is provided by NexGen, or not accepted with additional response required by NexGen. For the IRs that were not accepted with additional response required, a second round of follow-up IRs were provided by the CNSC.

Attachment IR 111-R1, 121-R1, 207-R1, and 270-R1 provides supporting information for NexGen's responses to IR 111-R1, 121-R1, 207-R1, and IR 270-R1. Table 1 summarizes general mitigation measures for wildlife species at risk (SAR) and migratory birds that would be implemented through the Environmental Protection Program and supporting documents during Construction, Operations, and Closure. The mitigation measures shown in Table 1 may also be found in Table 14.4-1 of revised EIS Section 14.4 (Project Interactions and Mitigations) and revised EIS Appendix 23A (Summary of Project Environmental Design Features and Mitigation Measures). In addition to the general mitigation measures shown in Table 1, Table 2 provides species-specific mitigation measures; these mitigation measures will form part of the Project Environmental Protection Program and supporting documents.

Table 1: Proposed General Mitigation Measures for Wildlife Species at Risk and Migratory Birds

Species	Presence in the RSA Confirmed by Baseline Surveys[(a)]	Provincially Tracked[(b)]	Federally Listed (Schedule 1, SARA)[(c)]	Proposed Mitigation Measure
All wildlife species at risk	n/a	n/a	n/a	General mitigation measures for species at risk include the following: ▪ Limit the Project footprint to the extent practical using practices such as: o optimizing the use of cleared areas for Project activity; o using existing road infrastructure, including the existing access road and bridge crossing; o storing tailings underground; o designing an efficient infrastructure footprint (i.e., buildings clustered together); and o align the fibre optic line right-of-way adjacent to the existing highway and access road. ▪ Reduce sensory disturbance through the following measures: o Where practical, maintain overflight altitudes of >300 m above ground level. o Enclose or dampen equipment in process buildings where the total sound power level is expected to be more than approximately 80 A-weighted decibels, where feasible. o Limit idling of vehicles and equipment to the extent practical. o Limit light pollution to the extent practical for built infrastructure. ▪ Reduce air emission effects via inhalation through the following measures: o Apply water and/or suppressants to site roads, the access road, and airstrip as necessary. Dust suppressants would minimize environmental risk and be government approved for use. o Limit vehicle speed on unpaved roads to reduce fugitive dust during Construction and Operations. ▪ To avoid and limit attraction of wildlife to the Project site: o Implement a Project-specific Conventional Waste Management Plan. o Collect domestic (e.g., food) and industrial (e.g., used oil and lubricants) waste and temporarily store in wildlife-proof containers, incinerate on site, transport off site for recycling, or dispose of at a licensed disposal facility, as appropriate. ▪ Implement sedimentation and erosion control best practices and standard mitigation (e.g., temporary sediment ponds, silt curtains, sediment traps) during all Project phases. ▪ To the extent practical, skirt buildings and stairs to the ground to limit opportunities for use as shelter by wildlife. ▪ Implement progressive reclamation and revegetation of disturbed areas no longer required. ▪ Reclaim and revegetate disturbed areas where non-permanent Project facilities have been decommissioned. ▪ Implement an Environmental Protection Program that includes no harassing, feeding, or approaching wildlife. ▪ Implement a Project-specific Environmental Protection Program, which includes the following mitigation measures to minimize the risk of injury or mortality to people and wildlife: o advising staff, contractors, and visitors to take all reasonable precautions to avoid wildlife collisions; o providing wildlife with the right of way; o identifying wildlife use areas and movement corridors/crossings along the access road and providing appropriate signage in high wildlife use areas (including consideration of Canadian toad); o maintaining gaps in the road berms and snowbanks to facilitate wildlife crossing and escape routes; o stopping and reporting/communicating when wildlife is observed on or adjacent to the road and allow animals to move away before continuing to drive; o reporting any wildlife collisions observed along any road immediately; and

Species	Presence in the RSA Confirmed by Baseline Surveys[(a)]	Provincially Tracked[(b)]	Federally Listed (Schedule 1, SARA)[(c)]	Proposed Mitigation Measure
				o adjusting speed limit in accordance with conditions (e.g., wildlife use of road, road conditions, grade, weather, and loads on vehicle). ▪ Implement an Environmental Protection Program with restricted activity periods to limit effects on denning animals and nesting migratory birds during sensitive time periods (e.g., per Nesting Zone B6 [ECCC 2018] guidelines and the Migratory Birds Convention Act 1994). If sensitive periods cannot be avoided, pre-clearing wildlife sweeps will be completed by qualified professionals and buffers applied, as required. ▪ If sensitive species are confirmed in the Project footprint, apply activity restriction guidelines for sensitive species established by the Government of Saskatchewan (2017) to the Project, as required. ▪ If in specific situations where the setback distance(s) cannot practically be applied, contact the ENV early in the planning stage to minimize effects on sensitive species. Species at risk mitigation measures specific to contact water management ponds include: ▪ lined contact water ponds would either be fenced or fit with animal egress matting or ramps; ▪ implement a Project-specific Environmental Protection Program that would include process for wildlife and bird deterrents around contact water ponds (e.g., cannons, bangers, sonic guns), including prior to and during the nesting periods for Zone B6 (late April to mid August; ECCC 2018) and the northern and southern migration periods; ▪ conduct wildlife patrols regularly during waterbird nesting periods for Zone B6 (late April to mid-August; ECCC 2018) and the northern and southern migration periods to monitor effectiveness of deterrents and apply adaptive management, as necessary; and ▪ regular monitoring would be conducted to evaluate effectiveness of deterrents and water quality, and adaptive management would be applied, as necessary.
Migratory birds (including species at risk)	n/a	n/a	n/a	General mitigation measures that apply to migratory birds include the following: ▪ Design power lines to meet avian-safe standards in compliance with applicable laws, regulations, and permits to prevent electrocutions (e.g., cover jumper wires, conductors, and equipment), discourage perching and prevent collisions (e.g., install markers to enhance the visibility of lines in key movement corridors and staging areas). ▪ To minimize bird and bat collisions with the communication tower: o limit the tower lighting to only what is required for aviation safety (e.g., flashing light on the top of the tower); o minimize guy wires on the communication tower and install markers to enhance the visibility of any guy wires that may be required; and o follow avian-safe standards in compliance with applicable laws, regulations, permits, and best management practices to prevent electrocution (e.g., cover jumper wires, conductors, equipment) and avoid attraction by lights. ▪ Other than were required to comply with regulatory guidelines (e.g., aviation safety) or worker health and safety, the following guidance will be used for Project lighting design when migratory birds may be present: o limit the use of decorative lighting and solid burning or slow pulsing warning lights; o to the extent possible, orient lights downward or use shielded fixtures and limit light use to areas where Project activities are occurring (Dick 2016); o to the extent feasible, use the amber light [spectrum >500 nanometre], limit blue spectral light, and do not use white light, (Dick 2016); and o turn off lights when not in use (e.g., use timers, motion sensors) (Dick 2016). ▪ Do not allow hunting by employees in areas within the Project footprint.

Species	Presence in the RSA Confirmed by Baseline Surveys[(a)]	Provincially Tracked[(b)]	Federally Listed (Schedule 1, SARA)[(c)]	Proposed Mitigation Measure
				▪ Implement an Environmental Protection Program with restricted activity periods to limit effects on denning animals and nesting migratory birds during sensitive time periods (e.g., per Nesting Zone B6 [ECCC 2018] guidelines and the *Migratory Birds Convention Act 1994*). If sensitive periods cannot be avoided, pre-clearing wildlife sweeps will be completed by qualified professionals and buffers applied, as required. ▪ If bats or birds are observed nesting, roosting, or hibernating, do not disturb them, to the extent practicable. Contact the ENV and ECCC to discuss measures for the removal/relocation and to identify further measures that could prevent future access. Damage or danger permits may be obtained, if required. Migratory bird mitigation measures specific to contact water management ponds include: ▪ lined contact water ponds would either be fenced or fit with animal egress matting or ramps; ▪ implement a Project-specific Environmental Protection Program that would include process for wildlife and bird deterrents around contact water ponds (e.g., cannons, bangers, sonic guns), including prior to and during the nesting periods for Zone B6 (late April to mid August; ECCC 2018) and the northern and southern migration periods; and ▪ conduct wildlife patrols regularly during waterbird nesting periods for Zone B6 (late April to mid-August; ECCC 2018) and the northern and southern migration periods to monitor effectiveness of deterrents and apply adaptive management, as necessary.

a) Based on Annex VIII.1 (Wildlife Baseline Report [Mammals, Waterfowl, and Raptors]), Annex V.1 (Aquatic Environment Baseline Report), Annex VIII.2 (Wildlife Baseline Report 2 [Amphibians, Birds, and Bats]), and Annex VIII.3 (Wildlife Baseline Report [Bird Migration and Bats]).

b) Provincial rank definitions (SKCDC 2020; 2021): S1 = Critically Imperilled / extremely rare; S2 = Imperilled / very rare; S3 = Vulnerable / rare to uncommon; S4 = Apparently secure; S5 = Secure / Common; B = for a migratory species, rank applies to the breeding population in the province; M = for a migratory species, rank applies to the transient population in the province; N = for a migratory species, rank applies to the non-breeding population in the province; X = believed to be extinct or extirpated from the province; U = status is uncertain in Saskatchewan because of limited or conflicting information (unrankable); NR = rank is not yet assigned or species has not yet been assessed (not ranked).

c) Government of Canada 2023.

SARA = *Species at Risk Act*; ENV = Saskatchewan Ministry of Environment; ECCC = Environment and Climate Change Canada; n/a = not applicable.

Table 2: Proposed Specific Mitigation Measures for Wildlife Species at Risk

Species	Presence in the RSA Confirmed by Baseline Surveys[a]	Provincially Tracked[b]	Federally Listed (Schedule 1, SARA)[c]	Proposed Mitigation Measure
Woodland caribou (*Rangifer tarandus caribou*)	Confirmed[d]	S3	Threatened	▪ Develop and implement a Caribou Mitigation and Offsetting Plan. ▪ Avoid direct disturbance to wetlands, to the extent possible. ▪ Reduce vehicle-wildlife collisions by maintaining gaps in road berms and snowbanks to facilitate wildlife crossing and escape routes, incorporating road pull-outs at regular intervals when clearing snow, implementing speed limits, and providing appropriate signage in high wildlife use areas. ▪ Design above-ground infrastructure so that the need for wildlife crossing structures is minimized. ▪ Install a gate at the site entrance (i.e., gatehouse) to control public access. ▪ The general mitigation measures for species at risk as described in Table 1 would apply.
Barren-ground caribou (*Rangifer tarandus groenlandicus*)	Potential (winter)	S3N	n/a	▪ Collar data suggest that the winter ranges of barren-ground caribou do not currently overlap with the Patterson Lake area. In addition, much of the LSA has been burned by wildlife fire in the last 40 years and barren-ground caribou would be expected to avoid the Patterson Lake area resulting in little to no interaction with the Project (Draft EIS Section 14.2.2 [Valued Components, Measurement Indicators, and Assessment Endpoints]). If barren-ground caribou return to the Patterson Lake area during the Project lifespan, the mitigation measures implemented for woodland caribou would be expected to also avoid and limit effects to barren-ground caribou. The general mitigation measures for species at risk as described in Table 1 would apply.
Wolverine (*Gulo gulo*)	Potential	S2	Special Concern	▪ If vegetation removal needs to occur during early January to late March, implement pre-clearing wildlife sweeps for wolverine dens. If wolverine dens are detected, avoid clearing activities within 750 m of the dens (as per grizzly bear den setbacks in Government of Alberta 2024) from early October to late April. If sites cannot be avoided, consult the ENV or ECCC, as applicable. ▪ Reduce vehicle-wildlife collisions by maintaining gaps in road berms and snowbanks to facilitate wildlife crossing and escape routes, incorporating road pull-outs at regular intervals when clearing snow, implementing speed limits, and providing appropriate signage in high wildlife use areas. ▪ Design above-ground infrastructure so that the need for wildlife crossing structures is minimized. ▪ Implement a Project-specific Conventional Waste Management Plan to avoid and limit attraction of wolverine to the site. ▪ To the extent practical, skirt buildings and stairs to the ground to limit opportunities for use as shelter by wolverine. ▪ The general mitigation measures for species at risk as described in Table 1 would apply.
Little brown myotis (*Myotis lucifugus*)	Confirmed[d]	S4B, S4N	Endangered	▪ Avoid clearing maternity roost habitat, to the extent possible, during the bat maternity roosting period (early May to late August). If vegetation removal needs to occur during maternity roosting period, implement pre-clearing wildlife sweeps for maternity trees. If maternity roosts are detected, avoid construction activities within 500 m of roosts, year-round (Government of Saskatchewan 2017). If sites cannot be avoided, consult the ENV or ECCC, as applicable. ▪ If bats are observed roosting or hibernating, do not disturb them, to the extent practicable. Contact the ENV and ECCC to discuss measures for the bats' removal/relocation and to identify further measures that could prevent future access. ▪ Minimize the use of guy wires to reduce the risk of bat collisions. ▪ For worker protection and prevention of the spread of rabies and white nose syndrome, contact the ENV and ECCC if any sick, injured, or dead bats are observed. Only trained and rabies-vaccinated staff or contractors would be allowed to handle bats. Submit bat carcasses for testing of rabies and/or white nose syndrome, as appropriate, based on communications with the ENV and ECCC.

Species	Presence in the RSA Confirmed by Baseline Surveys[a]	Provincially Tracked[b]	Federally Listed (Schedule 1, SARA)[c]	Proposed Mitigation Measure
				▪ The general mitigation measures for species at risk as described in Table 1 would apply.
Northern myotis (*Myotis septentrionalis*)	Confirmed[d]	S3	Endangered	▪ Avoid clearing maternity roost habitat, to the extent possible, during the bat maternity roosting period (early May to late August). If vegetation removal needs to occur during maternity roosting period, implement pre-clearing wildlife sweeps for maternity trees. If maternity roosts are detected, avoid construction activities within 500 m of roosts, year-round (Government of Saskatchewan 2017). If sites cannot be avoided, consult the ENV or ECCC, as applicable. ▪ If bats are observed roosting or hibernating, do not disturb them, to the extent practicable. Contact the ENV and ECCC to discuss measures for the bats' removal/relocation and to identify further measures that could prevent future access. ▪ Minimize the use of guy wires to reduce the risk of bat collisions. ▪ For worker protection and prevention of the spread of rabies and white nose syndrome, contact the ENV and ECCC if any sick, injured, or dead bats are observed. Only trained and rabies-vaccinated staff or contractors would be allowed to handle bats. Submit bat carcasses for testing of rabies and/or white nose syndrome, as appropriate, based on communications with the ENV and ECCC. ▪ The general mitigation measures for species at risk as described in Table 1 would apply.
Pileated woodpecker (*Dryocopus pileatus*)	Potential	S3	n/a	▪ Pileated woodpecker nesting cavities must be registered in the Abandoned Nest Registry and be confirmed to not be used by any migratory bird species for 36 months before the tree with the nesting cavity can be removed (ECCC n.d.). If sites cannot be avoided, consult the ENV or ECCC, as applicable. ▪ The general mitigation measures for species at risk as described in Table 1 would apply. Note: Pileated woodpecker was not detected during baseline field surveys. However, surveys for active and inactive pileated woodpecker nests will be completed prior to vegetation removal in the limited areas of the Project footprint that contain habitats that have potential to support pileated woodpecker nests (i.e., deciduous and mixedwood forests with large diameter deciduous trees; approximately 2.1 ha).
Common nighthawk (*Chordeiles minor*)	Confirmed[d]	S4B, S4M	Special Concern	▪ Avoid vegetation clearing, where possible, during the migratory bird nesting period (early May to late August). If vegetation clearing occurs during the common nighthawk breeding season (early May to late August), avoid activities within 200 m of active nests (Government of Saskatchewan 2017). If sites cannot be avoided, consult the ENV or ECCC, as applicable. ▪ If active common nighthawk nests are found on mine roads, the airstrip, or mine and mill terrace areas, the nesting area will be identified and avoided to the extent possible. ▪ The general mitigation measures for species at risk as described in Table 1 would apply.
Olive-sided flycatcher (*Contopus cooperi*)	Confirmed[d]	S4B, S4M	Special Concern	▪ Avoid vegetation clearing, where possible, during the migratory bird nesting period (early May to late August). If vegetation clearing occurs during breeding season, avoid construction activities within 300 m of active nests (Government of Saskatchewan 2017). The applicable nest setback buffer should be confirmed by a qualified avian biologist based on indicators such as alert and flush distances of birds at the nest. If sites cannot be avoided, the ENV or ECCC would be consulted, as applicable. ▪ The general mitigation measures for species at risk as described in Table 1 would apply.
Bank swallow (*Riparia riparia*)	Potential	S4B, S5M	Threatened	▪ Avoid vegetation clearing, where possible, during the migratory bird nesting period (early May to late August). If sites cannot be avoided, the ENV or ECCC would be consulted, as applicable. ▪ To deter bank swallows from nesting, maintain material stockpile slopes at a grade of less than 70 degrees (ECCC 2021).

Species	Presence in the RSA Confirmed by Baseline Surveys[a]	Provincially Tracked[b]	Federally Listed (Schedule 1, SARA)[c]	Proposed Mitigation Measure
				▪ The general mitigation measures for species at risk as described in Table 1 would apply.
Barn swallow (*Hirundo rustica*)	Confirmed[d]	S4B, S4M	Threatened	▪ Avoid vegetation clearing, where possible, during the migratory bird nesting period (early May to late August). If sites cannot be avoided, the ENV or ECCC would be consulted, as applicable. ▪ Minimize habitat creation and human-wildlife interactions for the Project through design; specifically, by evaluating opportunities to include screening on vents and entranceways to rafters/attics, keeping doors closed, tarping/wrapping structures, screening cracks/holes/vents where birds can enter, moving pallets and equipment close to the ground, and keeping heavy equipment free of mud. ▪ The general mitigation measures for species at risk as described in Table 1 would apply.
Rusty blackbird (*Euphagus carolinus*)	Confirmed[d]	S3B, SUN, S3M	Special Concern	▪ Avoid vegetation clearing, where possible, during the migratory bird nesting period (early May to late August). If sites cannot be avoided, the ENV or ECCC would be consulted, as applicable. ▪ Avoid direct disturbance to wetlands, to the extent possible. ▪ The general mitigation measures for species at risk as described in Table 1 would apply.
Common goldeneye (*Bucephala clangula*)	Confirmed[d]	S5B, S3N, S3M	n/a	▪ Avoid vegetation clearing, where possible, during the migratory bird nesting period (early May to late August). If vegetation clearing occurs during the breeding season, avoid construction activities near active nests. Nest setback buffer should be confirmed by a qualified avian biologist based on indicators such as alert and flush distances of birds at the nest. If sites cannot be avoided, the ENV or ECCC would be consulted, as applicable. ▪ Implement the use of bird deterrents (e.g., cannons, bangers, sonic guns) around contact water ponds during the northern and southern migration periods. ▪ Conduct wildlife patrols regularly during waterbird nesting periods (early May to late August) to monitor effectiveness of deterrents and apply adaptive management, as necessary. ▪ The general mitigation measures for species at risk as described in Table 1 would apply.
Red-throated loon (*Gavia stellata*)	Confirmed[d]	S1B, S1M	n/a	▪ Avoid vegetation clearing, where possible, during the migratory bird nesting period (early May to late August). If vegetation clearing occurs during the loon breeding season (mid-May to mid-July), avoid construction activities within at least 200 m of nests (Government of Saskatchewan 2017). If sites cannot be avoided, the ENV or ECCC would be consulted, as applicable. ▪ Implement the use of bird deterrents (e.g., cannons, bangers, sonic guns) around contact water ponds during the northern and southern migration periods. ▪ Conduct wildlife patrols regularly during waterbird nesting periods (early May to late August) to monitor effectiveness of deterrents and apply adaptive management, as necessary. ▪ The general mitigation measures for species at risk as described in Table 1 would apply.
Horned grebe (*Podiceps 7uratus*)	Confirmed[d]	S5B, S5M	Special Concern	▪ Avoid vegetation clearing, where possible, during the migratory bird nesting period (early May to late August). If vegetation clearing occurs during the breeding season, avoid construction activities within at least 200 m of active nests (Government of Saskatchewan 2017). The nest setback buffer should be confirmed by a qualified avian biologist based on indicators such as alert and flush distances of birds at the nest. If sites cannot be avoided, the ENV or ECCC would be consulted, as applicable. ▪ Implement the use of bird deterrents (e.g., cannons, bangers, sonic guns) around contact water ponds during the northern and southern migration periods. ▪ Conduct wildlife patrols regularly during waterbird nesting periods (late April to mid-August) to monitor effectiveness of deterrents and apply adaptive management, as necessary. ▪ The general mitigation measures for species at risk as described in Table 1 would apply.

Species	Presence in the RSA Confirmed by Baseline Surveys[(a)]	Provincially Tracked[(b)]	Federally Listed (Schedule 1, SARA)[(c)]	Proposed Mitigation Measure
Red-necked phalarope (*Phalaropus lobatus*)	Potential (migration)	S4B, S3M	Special Concern	▪ Avoid vegetation clearing, where possible, during the migratory bird nesting period (early May to late August). If sites cannot be avoided, the ENV or ECCC would be consulted, as applicable. ▪ Implement the use of bird deterrents (e.g., cannons, bangers, sonic guns) around contact water ponds during the northern and southern migration periods. ▪ Conduct wildlife patrols regularly during waterbird nesting periods (early May to late August) to monitor effectiveness of deterrents and apply adaptive management, as necessary. ▪ Avoid direct disturbance to wetlands, to the extent possible. ▪ The general mitigation measures for species at risk as described in Table 1 would apply.
Yellow rail (*Coturnicops noveboracensis*)	Potential	S3B, S3M	Special Concern	▪ Avoid vegetation clearing, where possible, during the migratory bird nesting period (early May to late August). If vegetation clearing occurs during the yellow rail breeding season (May 1 to July 15), avoid construction activities within 350 m of active nests (Government of Saskatchewan 2017). If sites cannot be avoided, the ENV or ECCC would be consulted, as applicable. ▪ Avoid direct disturbance to wetlands, to the extent possible. ▪ The general mitigation measures for species at risk as described in Table 1 would apply.
Whooping crane (*Grus americana*)	Potential (migration)	SXB, S1M	Endangered[e]	▪ Avoid vegetation clearing, where possible, during the migratory bird nesting period (early May to late August). If sites cannot be avoided, the ENV or ECCC would be consulted, as applicable. ▪ Implement the use of bird deterrents (e.g., cannons, bangers, sonic guns) around contact water ponds during the northern and southern migration periods. ▪ Avoid direct disturbance to wetlands, to the extent possible. ▪ The general mitigation measures for species at risk as described in Table 1 would apply.
Osprey (*Pandion haliaetus*)	Confirmed[(d)]	S2B, S2M	n/a	▪ Avoid vegetation clearing, where possible, during the migratory bird nesting period (early May to late August). If vegetation clearing occurs during the osprey breeding season (early May to mid-August), avoid construction activities within 1,000 m of active nests (Government of Saskatchewan 2017). If sites cannot be avoided, the ENV or ECCC would be consulted, as applicable. ▪ The general mitigation measures for species at risk as described in Table 1 would apply.
Peregrine falcon (*Falco peregrinus anatum*)	Potential (migration)	S1B, SNRM	Special Concern	▪ No species-specific applicable mitigation measures are proposed for peregrine falcon. The general mitigation measures for species at risk as described in Table 1 would apply. Note: no nesting habitat is available in the LSA.
Short-eared owl (*Asio flammeus*)	Potential	S3B, S2N, S3M	Special Concern	▪ Avoid construction activities within 500 m of short-eared owl nests during the breeding season (late March to early August) (Government of Saskatchewan 2017). If sites cannot be avoided, the ENV or ECCC would be consulted, as applicable. ▪ The general mitigation measures for species at risk as described in Table 1 would apply.
Great grey owl (*Strix nebulosa*)	Confirmed[(d)]	S3	n/a	▪ Avoid construction activities within 400 m of great grey owl nests during the breeding season (late March to early August) (Government of Saskatchewan 2017). If sites cannot be avoided, the ENV or ECCC would be consulted, as applicable. ▪ The general mitigation measures for species at risk as described in Table 1 would apply.
Northern leopard frog	Potential	S3	Special Concern	▪ Avoid construction activities within 500 m of northern leopard frog breeding and overwintering habitat year-round (Government of Saskatchewan 2017). If sites cannot be avoided, the ENV or ECCC would be consulted, as applicable.

Species	Presence in the RSA Confirmed by Baseline Surveys[a]	Provincially Tracked[b]	Federally Listed (Schedule 1, SARA)[c]	Proposed Mitigation Measure
(*Lithobates pipiens*)				▪ Avoid direct disturbance to wetlands, to the extent possible. ▪ The general mitigation measures for species at risk as described in Table 1 would apply.
Ashton cuckoo bumble bee (*Bombus bohemicus*)	Potential	S1	Endangered	▪ No species-specific applicable mitigation measures are proposed for Ashton cuckoo bumble bee. The general mitigation measures for species at risk as described in Table 1 would apply.
Yellow-banded bumble bee (*Bombus terricola*)	Potential	S4	Special Concern	▪ No species-specific applicable mitigation measures are proposed for yellow-banded bumble bee. The general mitigation measures for species at risk as described in Table 1 would apply.
Transverse lady beetle (*Coccinella transversoguttata*)	Potential	S4	Special Concern	▪ No species-specific applicable mitigation measures are proposed for transverse lady beetle. The general mitigation measures for species at risk as described in Table 1 would apply.
Nine-spotted lady beetle (Coccinella novemnotata)	Potential	S4	Endangered	▪ No species-specific applicable mitigation measures are proposed for nine-spotted lady beetle. The general mitigation measures for species at risk as described in Table 1 would apply.

a) Based on Annex VIII.1 (Wildlife Baseline Report [Mammals, Waterfowl, and Raptors]), Annex V.1 (Aquatic Environment Baseline Report), Annex VIII.2 (Wildlife Baseline Report 2 [Amphibians, Birds, and Bats]), and Annex VIII.3 (Wildlife Baseline Report [Bird Migration and Bats]). Confirmed = detected. Potential = not detected.

b) Provincial rank definitions (SKCDC 2020; 2021): S1 = Critically Imperilled / extremely rare; S2 = Imperilled / very rare; S3 = Vulnerable / rare to uncommon; S4 = Apparently secure; S5 = Secure / Common; B = for a migratory species, rank applies to the breeding population in the province; M = for a migratory species, rank applies to the transient population in the province; N = for a migratory species, rank applies to the non-breeding population in the province; X = believed to be extinct or extirpated from the province; U = status is uncertain in Saskatchewan because of limited or conflicting information (unrankable); NR = rank is not yet assigned or species has not yet been assessed (not ranked).

c) Government of Canada 2023.

d) Species confirmed in LSA (Annex VIII.1; Annex V.1; Annex VIII.2; Annex VIII.3).

e) Whooping crane is also listed as endangered under Saskatchewan's *The Wildlife Act.*

SARA = *Species at Risk Act*; ENV = Saskatchewan Ministry of Environment; ECCC = Environment and Climate Change Canada; n/a = not applicable.

References

Dick R. 2016. Royal Astronomical Society of Canada Guidelines for Outdoor Lighting in Dark-sky Preserves (RASC-DSP-GOL). Adopted by the RASC March 2008 Revised Spring 2016. 38 pp. [accessed 26 March 2019]. Available at http://www.rasc.ca/sites/default/files/RASC%20DSP%20GOL%20-%20Spring%202016_0.pdf.

ECCC (Environment and Climate Change Canada). n.d. Damage or Danger Permits for Nest Destruction - Section 70 of the Migratory Birds Regulations (specifically for Pileated Woodpecker nesting cavities). Available at https://www.canada.ca/en/environment-climate-change/services/migratory-bird-permits/faq-migratory-birds-regulations-2022.html.

ECCC. 2018. General Nesting Periods of Migratory Birds. Available at https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods/nesting-periods.html.

ECCC. 2020. Amended Recovery Strategy for the Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada. Species at Risk Act Recovery Strategy Series. Ottawa ON: Environment and Climate Change Canada. xiii + 143 p.

ECCC. 2021. Bank Swallow (Riparia riparia): in sandpits and quarries. [accessed March 2024]. Available at https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/related-information/bank-swallow-sandpits-quarries.html.

Government of Alberta. 2024. Master Schedule of Standards and Conditions. [accessed March 2024]. Available at https://open.alberta.ca/publications/master-schedule-of-standards-and-conditions.

Government of Canada. 1991. The federal policy on wetland conservation. Ottawa ON: Ministry of the Environment, Canadian Wildlife Service. 15 p.

Government of Canada. 2023. Species at risk public registry database. Ottawa ON; [2002-current; last updated 12 December 2023; accessed March 2024]. Available at https://species-registry.canada.ca/index-en.html#/species?sortBy=commonNameSort&sortDirection=asc&pageSize=10.

Government of Saskatchewan. 2017. Saskatchewan Activity Restriction Guidelines for Sensitive Species. [accessed March 2024]. Available at https://publications.saskatchewan.ca/api/v1/products/79241/formats/89554/download. Regina SK: Ministry of Environment, Fish, Wildlife and Lands Branch. 4 p.

Attachment IR 199-R1

NexGen Energy Ltd.
Head Office
3150 – 1021 West Hastings Street
Vancouver, BC V6E 0C3

Saskatoon Office
200 – 475 2nd Ave S
Saskatoon, SK S7K 1P4

Attachment IR 199-R1

1 Introduction

NexGen Energy Ltd. (NexGen) is proposing to develop a new uranium mining and milling operation in northwestern Saskatchewan, called the Rook I Project (Project). The proposed Project is subject to both provincial and federal Environmental Assessment (EA) processes, would be licensed as a nuclear facility by the Canadian Nuclear Safety Commission (CNSC), and would be subject to various provincial and federal permits and approvals.

NexGen submitted a Draft Environmental Impact Statement (EIS) to the Saskatchewan Ministry of Environment (ENV) and CNSC in 2022. Through the technical review of the Draft EIS, NexGen received information requests (IRs) and advice to proponent comments from the Federal-Indigenous Review Team (FIRT), which is led by the CNSC. Results of the FIRT technical review were provided in two Annexes; Annex 1 was composed of IRs and Annex 2 was composed of advice to proponent comments for NexGen's response. In September 2023, NexGen provided detailed responses to the FIRT IRs and advice to proponent comments.

On 12 February 2024, the CNSC provided the results of their review of NexGen's IR and advice to proponent comment responses. The IRs were categorized by the CNSC as accepted (i.e., requiring no additional response), not accepted with the technical approach deemed acceptable by the CNSC and the IR indicated as being able to be resolved once a revised EIS is provided by NexGen, or not accepted with additional response required by NexGen. For the IRs that were not accepted with additional response required, a second round of follow-up IRs were provided by the CNSC.

2 Response to Information Request

Attachment IR 199-R1 has been developed to resolve the question raised in IR 199-R1 and includes figures (i.e., Figure 1 to Figure 4) that provide a visual comparison of the ensemble projects and individual representative concentration pathway (RCP) scenarios for mean annual temperature and annual total precipitation for the 2050s and 2080s. In addition, text is provided below to explain how the three RCPs were treated and evaluated as part of the multi-model ensemble.

As explained in Section 22A-1-1.2.2.1 of Attachment 22A-1 of Draft EIS Appendix 22A (Climate Change Dataset Summary Report):

"Since no one model or climate scenario can be viewed as completely accurate, the IPCC (Intergovernmental Panel on Climate Change) recommends that climate change assessments use as many models and climate scenarios as possible, or a "multi-model ensemble". For this reason, the multi-model ensemble approach was used to delineate the probable range of results and better capture the actual outcome (an inherent unknown).

Seventy-two potential members of the multi-model ensemble were reviewed to confirm whether the general temperature and precipitation ranges reasonably matched the observed ranges of climate for the region. Monthly averages were used to capture the known seasonality of the region."

All model projections from all three RCPs considered were treated equally within one ensemble and descriptions of this ensemble and its projections are provided in Draft EIS Appendix 22A. All available projections provided by Environment and Climate Change Canada at the time of the study were considered.

To illustrate how the individual RCPs compare to the multi-model ensemble, the following box and whisker plots present the 5th, 25th, 50th, 75th and 95th percentiles for the model projections from the individual RCPs as well as the ensemble. In addition to the percentiles, the maximum and minimum of the ensemble were also provided in Draft EIS Appendix 22A to capture the full range of projections. As outlined in Draft EIS Appendix 6A (Climate Change Road Map), each discipline incorporated climate projections into their studies according to their impact assessment methods and requirements. In addition, as outlined in Draft EIS Section 22 (Assessment of Effects of the Environment on the Project), Project design will consider how climate may impact design criteria throughout the Project lifespan.

Figure 1: Mean Annual Temperature Ensemble Comparison for the 2050s

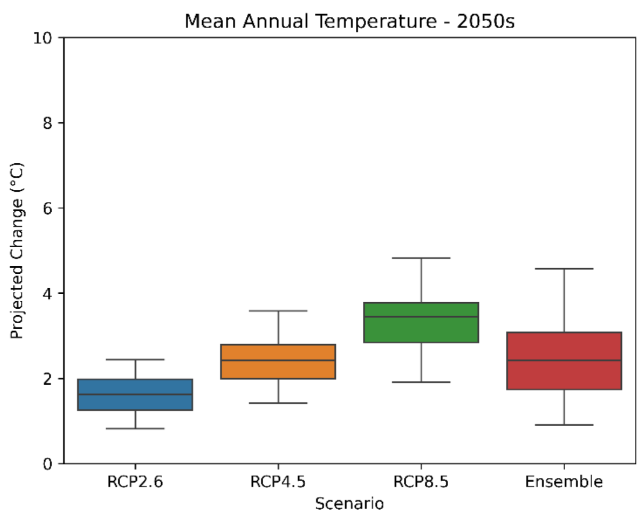


Figure 2: Mean Annual Temperature Ensemble Comparison for the 2080s

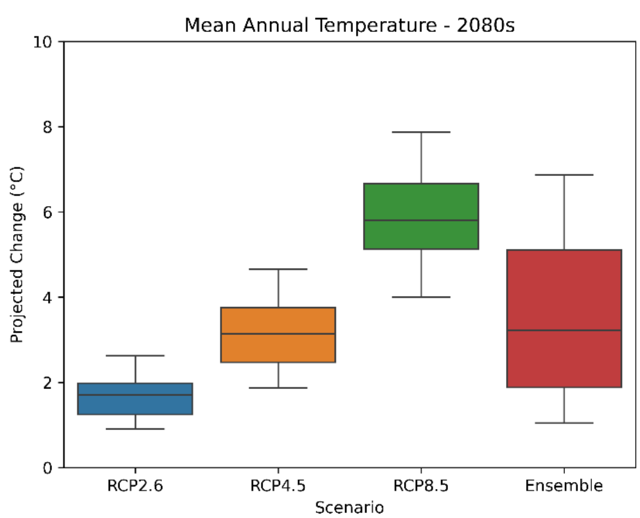


Figure 3: Annual Total Precipitation Ensemble Comparison for the 2050s

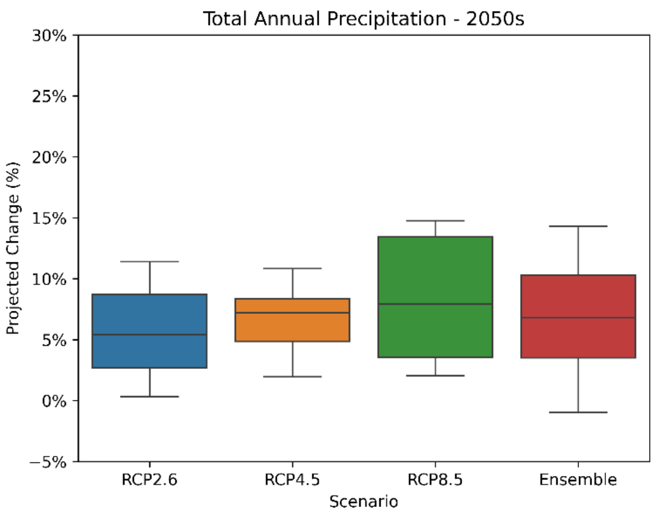
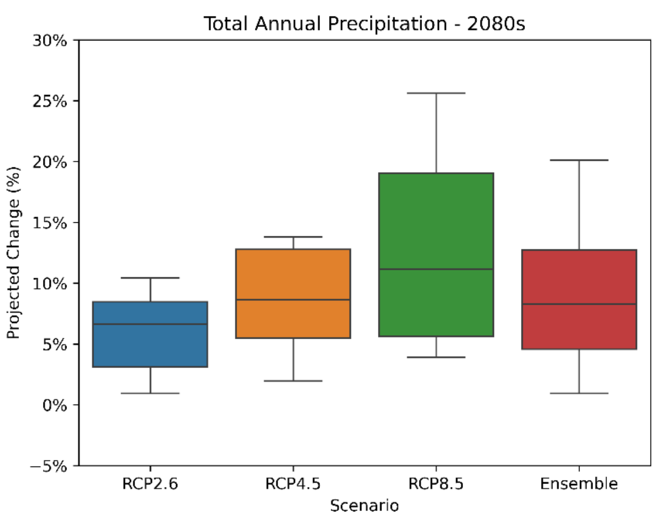


Figure 4: Annual Total Precipitation Ensemble Comparison for the 2080s



Participant Funding for NexGen's Rook 1 Project

Status

This participant funding opportunity is open from March 10 to May 9, 2025.

Participant funding notice

The Canadian Nuclear Safety Commission (CNSC) is offering participant funding to assist Indigenous Nations and communities, members of the public, and interested parties to review the environmental assessment (EA) and licence application for NexGen's Rook 1 Project and in participating in a future Commission hearing process. This is the second opportunity to apply for participant funding for the Rook 1 Project. The Commission has not yet announced the date or location, for a hearing on NexGen's application. For more information on the earlier Rook 1 funding opportunity, please see the previous participant funding notice.

NexGen is proposing to develop an underground uranium mine on the Patterson Lake peninsula located in the southwestern portion of the Athabasca Basin in northern Saskatchewan, approximately 155 km north of the town of La Loche, Saskatchewan. The proposed Rook I mine would produce up to 14 million kg of uranium concentrate (U_3O_8) annually for 24 years. Under the *Nuclear Safety and Control Act*, NexGen's proposal requires CNSC authorization, which must include an EA decision under the *Canadian Environmental Assessment Act, 2012*, affirming that the proposed activities will not cause significant adverse environmental effects, followed by a licensing decision.

For further details on NexGen’s proposal and the EA process, please see the Canadian Impact Assessment Registry. The dates and location of associated CNSC public Commission hearings, as well as the ways in which the public will be invited to participate in them, will be announced at a later date in a notice of public hearing.

Up to **$250,000** in participant funding will be **disbursed among all** successful applicants. Funding will be awarded for:

- the review of documentation, including the EA report and CNSC staff’s and NexGen’s Commission member documents
- participation in associated and yet-to-be-announced public Commission hearings where applicants will be given the opportunity to provide new, distinctive and valuable information through informed and topic-specific interventions to the Commission

Applying for funding

The deadline to submit a participant funding application is May 9, 2025.

A funding review committee will consider all applications for funding and make recommendations on the allocation of funds.

To apply, please submit a participant funding application form. Certain terms and conditions apply. You can submit the form by:

- Email: pfp@cnsc-ccsn.gc.ca

- Mail: Canadian Nuclear Safety Commission
  c/o Participant Funding Program Administrator
  280 Slater St
  PO Box 1046 Stn B
  Ottawa ON K1P 5S9

For information on how to participate, consult the Participate in a public Commission hearing and Participant Funding Program sections of the CNSC website.

Eligibility and funding criteria

For more information on participant funding and how it works, including details on eligibility and funding criteria, please read the PFP guide.

Contact information

Participant Funding Program Administrator
pfp@cnsc-ccsn.gc.ca

Date modified:

2025-03-10

Notice of Public Hearing and Participant Funding

March 11, 2025 Ref. 2025-H-12

CNSC to conduct public hearing on NexGen Energy Ltd.'s licence application to prepare a site for and construct its Rook 1 uranium mine and mill project

The Canadian Nuclear Safety Commission (CNSC) will hold a public hearing to consider an application from NexGen Energy Ltd. (NexGen) for a licence to prepare a site for and construct its proposed Rook 1 mine and mill project. NexGen is proposing to construct and operate a new uranium mine and mill in the southwest Athabasca Basin in northern Saskatchewan, approximately 155 km north of the town of La Loche, 80 km south of the former Cluff Lake mine site, and 640 km northwest of Saskatoon. The proposed project would be located within Treaty 8 territory and Métis Nation-Saskatchewan Northern Region 2. The licence application covers the site preparation for and the construction of all structures, systems and components required to support future operations.

Purpose and scope of hearing

Pursuant to section 24 of the Nuclear Safety and Control Act, a licence issued by the Commission is required for the proposed site preparation for and construction of the project. The proposed project is subject to an environmental assessment (EA) under the Canadian Environmental Assessment Act, 2012 (CEAA 2012). Although the Impact Assessment Act came into force in August 2019, replacing CEAA 2012, it includes provisions to allow ongoing projects with EAs initiated under CEAA 2012 to continue under their existing EA processes. As a prerequisite to the licensing decision, the Commission must also make an EA decision to determine whether the proposed project is likely to cause significant adverse environmental effects.

Hearing details

Date (Part 1):	**November 19, 2025**
Place:	Fully virtual via Zoom
Time:	As set by the agenda to be published prior to the hearing date
Date (Part 2):	**February 9 to 13, 2026**
Place:	To be determined (in person in Saskatoon)
Time:	As set by the agenda to be published prior to the hearing date

The public hearing will be webcast live and available on the CNSC website at cnsc-ccsn.gc.ca. Additional details about the public hearing will be issued at a later date.

During Part 1 of the hearing, the Commission will consider oral and written submissions from NexGen and CNSC staff. During Part 2 of the hearing, the Commission will consider oral and written interventions from Indigenous Nations and communities, members of the public and other interested parties.

NexGen's licence application is available on the CNSC website or on request to the Commission Registry. NexGen's submission and CNSC staff's recommendations to be considered at the hearing will be available on the CNSC website, or on request to the Commission Registry, after October 10, 2025.

Participant funding

In advance of the public hearing, the CNSC is making available up to **$250,000** in funding through its Participant Funding Program. The purpose of this funding is to assist Indigenous Nations and communities, members of the public and interested parties in reviewing CNSC staff's and NexGen's submissions to the Commission, as well as in participating in the hearing process by providing topic-specific interventions to the Commission. Participant funding applications must clearly demonstrate how the proposed submission will provide the Commission with information directly related to NexGen's application. Please note that the $250,000 will be disbursed among all successful applicants. The deadline for submitting a completed participant funding application form is **May 9, 2025**.

Interventions

Pursuant to rule 19 of the Canadian Nuclear Safety Commission Rules of Procedure, persons who have an interest or expertise in this matter or information that may be useful to the Commission in coming to a decision are invited to comment on NexGen's application. Requests to intervene must be filed with the Commission Registry by **January 9, 2026,** using the online request form, email, or the contact information below. **The request to intervene must include the following information:**

- a written submission of the comments to be presented to the Commission
- a statement setting out whether the requester wishes to intervene by way of written submission only, or by way of written submission and oral presentation
- the requester's name, address, telephone number and email address

Oral presenters who wish to use a PowerPoint presentation are asked to submit their slide decks to the Commission Registry by **January 19, 2026**. All submissions will be available for download on the CNSC website or on request to the Commission Registry. Personal information, such as email address and telephone number, is essential for linking the submission to its author. If you wish to ensure the confidentiality of your personal information, please submit it on a separate page.

Individuals who require Indigenous language interpretation for the hearing are asked to contact the Commission Registry by **September 22, 2025**, to request interpretation services. For any request received after this date, the Commission Registry will do its best to provide interpretation services.

Obligation for providing documentary material for the record

Under rule 15 of the Canadian Nuclear Safety Commission Rules of Procedure, any documentary evidence, written submission or other material filed with the Commission shall be open to the participants and the public (subject to any confidentiality measures taken by the Commission, as described below).

In order to provide a clear record of the information that is before the Commission, all participants should submit to the Commission Registry, along with their substantive submissions, any reference materials used to support their position. Reference materials must be directly appended to the submission or filed under separate cover, as appropriate, to be considered on the record. Items cited in and/or hyperlinked from the body of the main submissions but not filed will not be considered as part of the record and will not be taken into account in the Commission's deliberations.

Confidentiality

Under rule 12 of the Canadian Nuclear Safety Commission Rules of Procedure, the Commission can decide to take measures to protect confidential information. Persons considering filing information that may be confidential should contact the Commission Registry, before their submission deadline, for information on how to request that the Commission decide on whether to take measures to protect that information and what those measures should be.

For further information on the Participant Funding Program, contact:

Participant Funding Program Administrator, CNSC
Tel.: 613-415-2814 or 1-800-668-5284
Email: pfp@cnsc-ccsn.gc.ca
Web: Participant Funding Program

For further information on the public Commission hearing process, or on the licensee or the facility being considered in this matter, or to request documents, contact:

Senior Tribunal Officer, Commission Registry
Canadian Nuclear Safety Commission
280 Slater St
PO Box 1046 Stn B
Ottawa ON K1P 5S9

Tel.: 343-542-8587
Fax: 613-995-5086
Email: interventions@cnsc-ccsn.gc.ca
Web: Participate in a public Commission hearing

For inquiries to the applicant, contact:

Canada

NexGen Energy Ltd.
3150 - 1021 West Hastings Street
Vancouver BC V6E 0C3

Tel.: 604-428-4112
Fax: 604-259-0321
Web: NexGen Energy Ltd.

Canada

Revised Notice of Public Hearing and Participant Funding

August 20, 2025

Ref. 2025-H-12
Revision 1

CNSC to conduct public hearing on NexGen Energy Ltd.'s licence application to prepare a site for and construct Rook I uranium mine and mill project

The Canadian Nuclear Safety Commission (CNSC) will hold a public hearing to consider an application from NexGen Energy Ltd. (NexGen) for a licence to prepare a site for and construct its proposed Rook I mine and mill project. NexGen is proposing to construct and operate a new uranium mine and mill in the southwest Athabasca Basin in northern Saskatchewan, approximately 155 km north of the town of La Loche, 80 km south of the former Cluff Lake mine site, and 640 km northwest of Saskatoon. The proposed project would be located within Treaty 8 territory and Métis Nation-Saskatchewan Northern Region 2. The licence application covers the site preparation for and the construction of all structures, systems and components required to support future operations. **This revised notice is to announce the location of Part 1 of the hearing. The hearing will take place in the Outaouais Room, 140 Promenade du Portage, Gatineau, Quebec, and virtually via Zoom.**

Purpose and scope of hearing

Pursuant to section 24 of the Nuclear Safety and Control Act, a licence issued by the Commission is required for the proposed site preparation for and construction of the project. The proposed project is subject to an environmental assessment (EA) under the Canadian Environmental Assessment Act, 2012 (CEAA 2012). Although the Impact Assessment Act came into force in August 2019, replacing CEAA 2012, it includes provisions to allow ongoing projects with EAs initiated under CEAA 2012 to continue under their existing EA processes. As a prerequisite to the licensing decision, the Commission must also make an EA decision to determine whether the proposed project is likely to cause significant adverse environmental effects.

Hearing details

Date (Part 1):	**November 19, 2025**
Place:	**Outaouais Room, 140 Promenade du Portage, Gatineau, Quebec, and virtually via Zoom**
Time:	As set by the agenda to be published prior to the hearing date
Date (Part 2):	**February 9 to 13, 2026**
Place:	To be determined (in person in Saskatoon)
Time:	As set by the agenda to be published prior to the hearing date

The public hearing will be webcast live and available on the CNSC website at cnsc-ccsn.gc.ca. Additional details about the public hearing will be issued at a later date.

During Part 1 of the hearing, the Commission will consider oral and written submissions from NexGen and CNSC staff. During Part 2 of the hearing, the Commission will consider oral and written interventions from Indigenous Nations and communities, members of the public and other interested parties.

NexGen's licence application is available on the CNSC website or on request to the Commission Registry. NexGen's submission and CNSC staff's recommendations to be considered at the hearing will be available on the CNSC website, or on request to the Commission Registry, after October 10, 2025.

Participant funding

In advance of the public hearing, the CNSC made available up to **$250,000** in funding through its Participant Funding Program. The purpose of this funding is to assist Indigenous Nations and communities, members of the public and interested parties in reviewing CNSC staff's and NexGen's submissions to the Commission, as well as in participating in the hearing process by providing topic-specific interventions to the Commission. The deadline for submitting a completed participant funding application form was **May 9, 2025**. A Funding Review Committee, independent of the CNSC, reviewed the funding applications received and made recommendations on the allocation of funds. Based on the recommendations, the CNSC awarded up to $464,979.93 to 8 applicants.

Interventions

Pursuant to rule 19 of the Canadian Nuclear Safety Commission Rules of Procedure, persons who have an interest or expertise in this matter or information that may be useful to the Commission in coming to a decision are invited to comment on NexGen's application. Requests to intervene must be filed with the Commission Registry by **January 9, 2026,** using the online request form, email, or the contact information below.

Document ID: DAMZHJW66V33-166150894-7474

The request to intervene must include the following information:

- a written submission of the comments to be presented to the Commission
- a statement setting out whether the requester wishes to intervene by way of written submission only, or by way of written submission and oral presentation
- the requester's name, address, telephone number and email address

Oral presenters who wish to use a PowerPoint presentation are asked to submit their slide decks to the Commission Registry by **January 19, 2026**. All submissions will be available for download on the CNSC website or on request to the Commission Registry. Personal information, such as email address and telephone number, is essential for linking the submission to its author. If you wish to ensure the confidentiality of your personal information, please submit it on a separate page.

Individuals who require Indigenous language interpretation for the hearing are asked to contact the Commission Registry by **September 22, 2025**, to request interpretation services. For any request received after this date, the Commission Registry will do its best to provide interpretation services.

Obligation for providing documentary material for the record

Under rule 15 of the Canadian Nuclear Safety Commission Rules of Procedure, any documentary evidence, written submission or other material filed with the Commission shall be open to the participants and the public (subject to any confidentiality measures taken by the Commission, as described below).

In order to provide a clear record of the information that is before the Commission, all participants should submit to the Commission Registry, along with their substantive submissions, any reference materials used to support their position. Reference materials must be directly appended to the submission or filed under separate cover, as appropriate, to be considered on the record. Items cited in and/or hyperlinked from the body of the main submissions but not filed will not be considered as part of the record and will not be taken into account in the Commission's deliberations.

Confidentiality

Under rule 12 of the Canadian Nuclear Safety Commission Rules of Procedure, the Commission can decide to take measures to protect confidential information. Persons considering filing information that may be confidential should contact the Commission Registry, before their submission deadline, for information on how to request that the Commission decide on whether to take measures to protect that information and what those measures should be.

Document ID: DAMZHJW66V33-166150894-7474

For further information on the Participant Funding Program, contact:

Participant Funding Program Administrator, CNSC
Tel.: 613-415-2814 or 1-800-668-5284
Email: pfp@cnsc-ccsn.gc.ca
Web: Participant Funding Program

For further information on the public Commission hearing process, or on the licensee or the facility being considered in this matter, or to request documents, contact:

Senior Tribunal Officer, Commission Registry
Canadian Nuclear Safety Commission
280 Slater St
PO Box 1046 Stn B
Ottawa ON K1P 5S9

Tel.: 343-542-8587
Fax: 613-995-5086
Email: interventions@cnsc-ccsn.gc.ca
Web: Participate in a public Commission hearing

For inquiries to the applicant, contact:

NexGen Energy Ltd.
3150-1021 West Hastings Street
Vancouver BC V6E 0C3

Tel.: 604-428-4112
Fax: 604-259-0321
Web: NexGen Energy Ltd.

Document ID: DAMZHJW66V33-166150894-7474

Addressing “Purpose of” and “Alternative Means” under the Canadian Environmental Assessment Act, 2012

This document provides guidance on federal environmental assessments commenced under the former *Canadian Environmental Assessment Act, 2012*. It is retained for the completion of transitional environmental assessments commenced prior to the *Impact Assessment Act*. For more information on transitional environmental assessments, please consult the Legislation and Regulations page.

Updated: March 2015

Document Information

Disclaimer

The Operational Policy Statement: Addressing “Purpose of” and “Alternative Means” under the *Canadian Environmental Assessment Act, 2012* is for information purposes only. It is not a substitute for the *Canadian Environmental Assessment Act, 2012* (CEAA (Canadian Environmental

Assessment Act) 2012) or any of its regulations. In the event of any inconsistency between this guide and CEAA 2012 or regulations, CEAA (Canadian Environmental Assessment Act) 2012 or regulations would prevail.

For the most up-to-date versions of CEAA 2012 and regulations, please consult the Department of Justice website.

Updates

This document may be reviewed and updated periodically. To ensure that you have the most up-to-date version, please consult the Policy and Guidance page of the Canadian Environmental Assessment Agency's website.

Copyright

Catalogue No. (number): En106-77/2014E-PDF
ISBN (International Standard Book Number): 978-1-100-22964-5

Ce document a été publié en français sous le titre : *Énoncé de politique opérationnelle : « Raisons d’être du projet » et « solutions de rechange » en vertu de la Loi Canadienne d’évaluation environnementale, 2012*.

Alternative formats may be requested by contacting: info@ceaa-acee.gc.ca.

This document is also available in Adobe's Portable Document Format [PDF (Adobe Acrobat document) - 716 KB (kilobytes)].

Purpose

The Operational Policy Statement (OPS (Operational Policy Statement)) aims to ensure that the CEAA (Canadian Environmental Assessment Act) 2012 requirements related to the purpose of a designated project and alternative means of carrying out the designated project are met in all environmental assessments (EAs (environmental assessments)) for which the Canadian Environmental Assessment Agency (the Agency) is the responsible authority.

The OPS (Operational Policy Statement) sets out the general requirements and approach to address the purpose of a designated project and alternative means of carrying out the designated project under CEAA (Canadian Environmental Assessment Act) 2012 when the Agency is the responsible authority.

The OPS (Operational Policy Statement) informs the preparation of directives by the responsible authorities, such as the Environmental Impact Statement (EIS (Environmental Impact Statement)) Guidelines. The OPS (Operational Policy Statement) serves as core guidance to project proponents. It provides direction to Agency employees in their interactions with those engaged in federal EA (environmental assessment), such as proponents, federal authorities, other jurisdictions, Aboriginal groups and the public, throughout the EA (environmental assessment) of a designated project.

Application

In the OPS (Operational Policy Statement), "project EA (environmental assessment)" means the EA (environmental assessment) of a designated project under CEAA (Canadian Environmental Assessment Act) 2012. Throughout the OPS (Operational Policy Statement), the term "environmental effects" refers to environmental effects as described in section 5 of CEAA (Canadian Environmental Assessment Act) 2012.

The OPS (Operational Policy Statement) should be used to inform the preparation of the EIS (Environmental Impact Statement) Guidelines and EIS (Environmental Impact Statement) for a designated project. It should be used in conjunction with other Agency policy and guidance instruments.

For application under CEAA (Canadian Environmental Assessment Act) 2012, this OPS (Operational Policy Statement) replaces the Agency's OPS (Operational Policy Statement) entitled, Addressing "Need for", "Purpose of", "Alternatives to" and "Alternative Means" under the *Canadian Environmental Assessment Act*, which had been updated in 2007.

The 2007 OPS will continue to apply for project EAs (environmental assessments) initiated under the *Canadian Environmental Assessment Act* that are being completed pursuant to the transitional provisions of CEAA (Canadian Environmental Assessment Act) 2012.

Relevant Provisions of CEAA (Canadian Environmental Assessment Act) 2012

CEAA (Canadian Environmental Assessment Act) 2012 aims to protect components of the environment that are within federal legislative authority from significant adverse environmental effects caused by a designated project. In addition, CEAA (Canadian Environmental Assessment Act) 2012 ensures that a designated project is considered in a careful and precautionary manner to avoid significant adverse environmental effects, when the exercise of a power or performance of a duty or function by a federal authority under any Act of Parliament is required for the designated project to be carried out.

Section 19 of CEAA (Canadian Environmental Assessment Act) 2012 identifies factors to be considered in the EA (environmental assessment) of a designated project, including:

- the “purpose of” the designated project, as per paragraph 19(1)(f); and
- “alternative means” of carrying out the designated project, as per paragraph 19(1)(g).

With respect to the latter, alternative means considered in a project EA (environmental assessment) must be technically and economically feasible. The project EA (environmental assessment) must address their environmental effects as defined under section 5 of CEAA (Canadian Environmental Assessment Act) 2012 for each of these alternative means.

Section 5 of CEAA (Canadian Environmental Assessment Act) 2012 describes the environmental effects that must be considered in the implementation of the legislation, including changes to the environment and effects of changes to the environment. Paragraph 19(1)(a) clarifies that environmental effects include cumulative environmental effects and environmental effects of accidents and malfunctions.

A project EA (environmental assessment) must address other factors laid out in section 19 of CEAA (Canadian Environmental Assessment Act) 2012. For example, factors related to determining the significance of environmental effects, selecting mitigation measures and implementing a follow-up program are also considered for the one or many alternative means brought forward for decision making. Community knowledge and Aboriginal traditional knowledge may also be taken into account in the project EA (environmental assessment).

Considerations in Addressing the "Purpose of" the Designated Project

The purpose of the designated project is defined as the rationale or reasons for which the designated project would be carried out from the proponent's perspective. It conveys what the proponent intends to achieve by carrying out the designated project. It is often described concisely in terms of:

- the problems that the project is intended to address (for example, resolving a supply gap);
- the opportunities that the project is designed to seize (for example, achieving growth potential);
- the manner in which the project relates or contributes to broader private or public sector policies, plans or programs (for example, contribution to an energy efficiency plan); and/or,
- any other objectives of the proponent in carrying out the project (for example, increasing the productivity of a business line).

The information regarding the purpose of the designated project should be sufficient to provide context for public and technical comment periods during the project EA (environmental assessment), and ultimately to allow the decision maker to understand the purpose of the designated project. Should a Governor in Council decision subsequently be required, it may also help inform whether significant adverse environmental effects would be justified in the circumstances.

Considerations in Addressing "Alternative Means" of the Designated Project

"Alternative means" are the various technically and economically feasible ways under consideration by the proponent that would allow a designated project to be carried out. Identified by the proponent, the alternative means include options for locations, development and/or implementation methods, routes, designs, technologies, mitigation measures, etc. Alternative means may also relate to the construction, operation, expansion, decommissioning and abandonment of a physical work.

The alternative means should be considered by the proponent as early as possible in the planning of a designated project, even before the beginning of the EA (environmental assessment) process by a responsible authority. For projects where the Agency may be the responsible authority, the Agency recognizes that projects may be in the early planning stages when project descriptions are being prepared. In many cases, proponents have not made final decisions concerning the placement of project infrastructure, the technologies to be employed or other options that may exist for various project components. In these situations, project proponents are strongly encouraged to describe the various options available and their associated environmental effects within the project description. This will allow the Agency to set direction in the EIS (Environmental Impact Statement) Guidelines regarding which alternative means should be addressed in the EIS (Environmental Impact Statement), where appropriate, and will avoid unnecessary delays at a later stage of the project EA (environmental assessment). Project proponents should contact the Agency for further guidance in this area prior to the submission of the project description.

Once an EA (environmental assessment) has commenced, the approach and level of effort applied to addressing alternative means is established on a project-by-project basis taking into consideration:

- the characteristics of the project;
- the environmental effects associated with the potential alternative means;
- the health or status of valued components (VCs (valued components)) that may be impacted by the alternative means;
- the potential for mitigation and the extent to which mitigation measures may address potential environmental effects; and,
- the level of concern expressed by Aboriginal groups or the public.

EA (environmental assessment) documentation must clearly explain and justify the methodologies that have been used to address alternative means. At any step during the alternative means analysis, the proponent may consider community knowledge and Aboriginal traditional knowledge.

Considering the alternative means of carrying out the designated project should include the four steps described below:

Step 1: Identify technically and economically feasible alternative means

To identify and describe the technically and economically feasible alternative means to carry out the designated project, the proponent should:

- Develop criteria to determine the technical and economic feasibility of the alternative means.
  Examples of technical criteria could include use of energy, mode of operation, performance, supporting infrastructure, schedule and risks.

Examples of economic criteria could consist of a comparison of cost estimation and forecasted revenues.

- Identify and describe the alternative means from the proponent's perspective.
  The description of the alternative means must be in sufficient detail to establish how to assess them relative to the criteria developed for determining their technical and economic feasibility, as well as to support the analysis described in Steps 2 to 4.
- Establish which of these alternative means are technically and economically feasible.
  A qualitative approach may be used to establish how the alternative means relates to the criteria, based on evidence and professional judgment. Thresholds or other quantitative decision-making tools may also be used, when available and relevant for specific criteria.
- Document the rationale for the alternative means retained for consideration in the project EA (environmental assessment).
  The rationale must provide sufficient detail for an independent reviewer to assess the criteria developed, the nature of the alternative means considered, the approach taken to assess these alternative means against the criteria, and the alternative means retained for further analysis in Step 2.

Step 2: List their potential effects on valued components

Under CEAA (Canadian Environmental Assessment Act) 2012, identification of VCs (valued components) for the project EA (environmental assessment) is made in relation to section 5 of CEAA (Canadian Environmental Assessment Act) 2012 and takes into account direction provided by the responsible authority. Analysis is then undertaken iteratively to examine which of those VCs (valued components) should be considered in addressing alternative means identified in Step 1 as technically and economically feasible.

For Step 2, the proponent should:

- Identify the key VCs (valued components) potentially affected by each alternative means.
  The end result is an understanding of what VCs (valued components) should be retained for analysis given the nature of the alternative means under consideration.
- Examine briefly the potential effects on the VCs (valued components) for each alternative means.
  The intent is to relate the alternative means under consideration with their potential effects on key VCs (valued components). A full assessment of environmental effects is not necessary at this stage.

The intent is to develop a sufficient understanding of potential environmental effects of the alternative means under consideration to inform the selection of an approach in Step 3 and subsequently, to serve in scoping the assessment of environmental effects in Step 4.

Step 3: Select the approach for the analysis of alternative means

Based on information gathered in Step 1 and Step 2, proponents are encouraged to identify a preferred means of carrying out the designated project. The preferred means then becomes the focus of the project EA (environmental assessment), and no further analysis is generally required on other alternative means considered in Step 1 or 2.

In cases where the proponent is not able to identify a preferred means, multiple alternative means can be brought forward in the project EA (environmental assessment). For efficiency, the proponent is then encouraged to identify a scenario that will become the focus of the analysis. The other alternatives would be the object of further analysis only in terms of how they differ from the scenario relative to potential effects on VCs (valued components).

Case A: Identifying a preferred means

To identify a preferred means among the alternative means of carrying out the designated project, the proponent should:

- determine and apply criteria to examine the environmental effects (identified in Step 2) of the technically and economically feasible alternative means (identified in Step 1). Examples of criteria are distance to a watercourse or minimization of loss of wildlife habitat.
- compare the alternative means on the basis of environmental effects, as well as technical and economic feasibility. Thresholds, governmental standards and public concerns may support the criteria used in the comparative analysis; and
- identify the preferred alternative means based on the relative consideration of environmental effects, and of technical and economic feasibility.

If a preferred means is selected, the analysis and the rationale for the choice should be explained from the perspective of the proponent, and be documented in the EIS (Environmental Impact Statement) in sufficient detail to provide context for public and technical comment periods during the project EA (environmental assessment), and ultimately to allow the decision maker to understand the choice.

Case B: Bringing forward multiple alternative means

The proponent can bring forward in the project EA (environmental assessment) multiple alternative means that are technically and economically feasible. The proponent is then encouraged to:

- identify one scenario on which the analysis will focus; and
- describe how the other alternative means retained for further analysis differ from this scenario.

The choice of a scenario should be informed by Steps 1 and 2, as well as the consideration of whether a preferred means can be identified in Step 3. There are many ways in which such scenario can be built.

The scenario can be selected based on practical criteria such as, likelihood that it will be implemented, efficiency in the comparative analysis of alternative means, or ease of presentation in an EIS (Environmental Impact Statement). For instance, selecting a scenario that represents the worst case of potential environmental effects would provide increased confidence that the predictions in the project EA (environmental assessment) are applicable to any of the alternative means.

Step 4: Assess the environmental effects of alternative means

In the case where a preferred means is chosen by the proponent (Step 3-a), the project EA (environmental assessment) should focus the analysis on the environmental effects of the preferred means. A concise summary documenting Steps 1 to 3 in EA (environmental assessment) documents will suffice to inform reviewers and the decision maker of other alternative means considered by the proponent.

In the case where the proponent chose to put forward multiple alternative means to carry out the designated project (Step 3-b) in the project EA (environmental assessment), the following approach is suggested:

- conduct the analysis of the environmental effects of the scenario;
- assess the environmental effects of the other alternative means on the basis of the consequences of their deviation from the scenario;
- after consideration of mitigation measures, provide a rationale for determining the significance of the environmental effects related to the scenario and to each of the other alternatives means.

For either case, the proponent must provide sufficient information to allow the decision maker to decide whether, based on the definition of environmental effects in section 5 of CEAA (Canadian Environmental Assessment Act) 2012, the designated project is likely to cause significant adverse environmental effects after implementing mitigation measures.

The final implementation of a designated project can vary somewhat from the proposal considered during the project EA (environmental assessment). In the case where multiple alternative means are brought forward, the proponent will be expected to carry out the designated project in a way that is consistent with the analysis (e.g., the proponent will implement one of the scenarios that was brought forward or within the bounds of the worst case scenario assessed during the EA (environmental assessment)). Similarly, when a preferred means is identified for analysis, variations during implementation are acceptable provided that they remain within the bounds of the analysis conducted. In both cases, proponents must comply with conditions established in the EA (environmental assessment) decision statement.

Date modified: 2022-03-09

Canadian Environmental Assessment Agency | Agence canadienne d'évaluation environnementale

Technical Guidance for Assessing Cumulative Environmental Effects under the

Canadian Environmental Assessment Act, 2012

Canadian Environmental Assessment Agency

December 2014

DRAFT

Canada

This page has been left intentionally blank

Disclaimer

This technical guidance document is for information purposes only. It is not a substitute for the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) or its regulations. In the event of any inconsistency between this technical guidance and CEAA 2012 or its regulations, CEAA 2012 or its regulations would prevail. This document may be reviewed and updated periodically by the Agency.

Draft Version: Public Comments Invited

Environmental assessment practitioners, the public and Aboriginal groups are invited to provide comments on this draft technical guidance document. Any feedback on this document should be submitted to the Agency at CEAA.guidance-orientation.ACEE@ceaa-acee.gc.ca by **June 30, 2015**. All comments will be reviewed and considered for integration in the document for release in its finalized form. The document will be considered an 'evergreen' resource and will be subject to periodic updates as appropriate.

Publication Information

Catalogue No. En106-116/1-2014E-PDF

ISBN: 978-1-100-25181-3

This document has been issued in French under the title: *Orientation technique pour l'évaluation des effets environnementaux cumulatifs en vertu de la* Loi canadienne sur l'évaluation environnementale (2012).

Table of Contents

Figures

Introduction

Context

The *Canadian Environmental Assessment Act, 2012* (CEAA 2012) aims to protect components of the environment that are within federal legislative authority from significant adverse environmental effects caused by a project, including cumulative environmental effects.

In addition, CEAA 2012 ensures that a project is considered in a careful and precautionary manner to avoid significant adverse environmental effects, when the exercise of a power or performance of a duty or function by a federal authority under any Act of Parliament is required for the project to be carried out.

CEAA 2012 requires that each environmental assessment (EA) of a project take into account any cumulative environmental effects that are likely to result from the project in combination with the environmental effects of other physical activities that have been or will be carried out.

Throughout the guidance, the term “environmental effects” refers to environmental effects as described in section 5 of CEAA 2012 (see description and examples below). In addition, the term “cumulative effects” refers to cumulative environmental effects as mentioned in paragraph 19(1)(a) of CEAA 2012.

Under CEAA 2012, the “environmental effects” to be considered are those in areas of federal jurisdiction as described in section 5, which are:

- effects on fish and fish habitat, shellfish and their habitat, crustaceans and their habitat, marine animals and their habitat, marine plants, and migratory birds;
- effects on federal lands;
- effects that cross provincial or international boundaries;
- effects of any changes to the environment that affect Aboriginal peoples, such as their use of lands and resources for traditional purposes; and
- changes to the environment that might result from the federal decisions as well as any associated effects on health, socio-economic conditions, matters of historical, archaeological, paleontological or architectural interest, or other matters of physical or cultural heritage.

Examples of cumulative effects:

Fish & Fish Habitat: destruction of habitat of the same fish population from three different physical activities.

Aquatic Species: shoreline destruction from multiple physical activities resulting in the removal of several patches of a marine plant.

Socio-Economic Conditions: environmental effects from various operations resulting in the decline of a bivalve population on which an Aboriginal group depends as a source of income.

Current Use of Lands and Resources: impacts on use of traditional fishing grounds owing to decreased fish population which results from multiple physical activities.

Archaeology: continued disturbance of an archaeologically significant site due to construction activities associated with multiple projects.

Purpose

The Operational Policy Statement on Assessing Cumulative Environmental Effects under CEAA 2012 (OPS) clarifies CEAA 2012 requirements related to cumulative effects and provides core guidance to ensure that these requirements are met in all project EAs.

This technical guidance document provides methodological options and considerations to support the implementation of CEAA 2012 and the approach outlined in the OPS in a way that achieves high quality EA.

This document informs the preparation of directives by the Agency, such as the Environmental Impact Statement (EIS) Guidelines, and supports proponents in the development of an EIS. It also provides guidance to Agency employees in their interactions with those engaged in federal EA, such as proponents, federal authorities, other jurisdictions, Aboriginal groups, and the public.

Application

This technical guidance informs the assessment of cumulative effects undertaken as part of the EA of designated projects initiated under CEAA 2012 for which the Agency is the responsible authority. (In this document, the term "project" refers to designated projects initiated under CEAA 2012 for which the Agency is the responsible authority, and "Project EA" refers to the EA of designated projects initiated under CEAA 2012 for which the Agency is the responsible authority.)

For such a Project EA, this technical guidance replaces the 1999 guide entitled "Cumulative Effects Assessment Practitioners Guide". The 1999 guide will continue to apply for EAs initiated under the former *Canadian Environmental Assessment Act* that are still being conducted pursuant to the transitional provisions of CEAA 2012.

This technical guidance **does not** apply to EA processes conducted by other responsible authorities.

This technical guidance should be used in conjunction with other Agency policy and guidance instruments. For an EA by a review panel, additional guidance and direction may be provided in the Terms of Reference or Joint Review Panel Agreement.

General Approach

The practice of EA calls for examining potential environmental effects of a project on valued components (VCs). In the context of CEAA 2012, VCs are selected to enable identification or analysis of environmental effects as described in section 5 of CEAA 2012. This technical guidance therefore proposes a VC-centered approach for the assessment of cumulative effects.

The OPS calls for a five-step approach for cumulative effects assessment (see Figure 1).

> ### OPS Approach
>
> *All cumulative effects assessments should include the five steps described below- scoping, analysis, mitigation, significance, and follow up.*

Figure 1: Generic approach to cumulative effects assessment

Step 1: Scoping

Defining the scope of the assessment is the first step in the assessment of cumulative effects. Scoping helps determine which VCs should be carried forward into the Step 2 analysis. This helps orient and focus the cumulative effects assessment.

Step 2: Analysis

Step 2 considers how the physical activities examined during Step 1 may affect the VCs identified for further analysis in Step 1. Step 2 addresses such VCs within spatial and temporal boundaries set for the assessment of cumulative effects during Step 1.

Step 3: Mitigation

Step 3 aims to identify technically and economically feasible measures that would mitigate adverse cumulative effects. Mitigation may include elimination, reduction or control or, where this is not possible, restitution measures such as replacement, restoration or compensation should be considered.

Step 4: Significance

Step 4 is concerned with determining the significance of any adverse environmental effects that are likely to result from a designated project in combination with other physical activities, taking into account the implementation of mitigation measures.

Step 5: Follow-up

With Step 5, a follow-up program is developed that addresses both project-specific environmental effects and cumulative effects. A follow-up program verifies the accuracy of the EA and determines the effectiveness of any mitigation measures that have been implemented.

The detailed approach to the assessment of cumulative effects is established on a case-by-case basis taking into account:

- the project-specific EIS guidelines or direction provided by the Agency;
- the requirements and core guidance set in the OPS; and
- the technical options and considerations presented in this guidance.

Timing for conducting the cumulative effects assessment

The guidance is consistent with the general practice that calls for first examining the environmental effects of the project in isolation before moving to the consideration of other physical activities. This allows practitioners to first consider mitigation measures for the project and determine if there are residual effects after these mitigation measures have been considered. Identifying such residual effects is one of the ways in which a practitioner can orient and focus the assessment of cumulative effects.

Nonetheless, practitioners may sometimes find it useful to conduct the assessment of cumulative effects at the same time as they are addressing the environmental effects of the project in isolation. As a minimum, information and data requirements for the cumulative effects assessment should be considered from the outset of the EA for planning purposes.

Scoping (Step 1) for the cumulative effects assessment can therefore be started during or after the assessment of potential environmental effects from the project in isolation. In either case, as the EA advances and additional information is gained, it may become clearer which VCs should be carried forward to Analysis (Step 2). Scoping is therefore iterative, and adjustments can be made at different points during the EA process.

Scope and Organization

Most of the guidance in this document relates to the first two steps of the approach presented in the OPS. Section 1 covers scoping and Section 2 covers analysis. To facilitate future updates of this guide, each section is organized into stand-alone guidance sheets (e.g., guidance sheet 1.0, entitled “Overview and Outcomes of Scoping”, is the first guidance sheet dealing with Step 1).

Additional technical background is provided in appendices as follows:

- Appendix 1 provides information on the source-pathway-receptor model that can be used to identify the source of an environmental change, what the source may affect (receptor), and how the source may reach the receptor (pathway).

- Appendix 2 provides examples of types of cumulative effects to support the consideration of cumulative effects on VCs.

- Appendix 3 provides a brief introduction to some of the methods that may be used in conducting Step 1 (scoping) or Step 2 (analysis).

In this technical guidance, a methodology refers to a technical approach and related considerations for use in the conduct of an EA. In addition, a methodology generally frames the implementation of various methods. A “method” is a specific tool, technique, or procedure used as part of implementing the chosen methodology.

1.0 Overview and Outcomes of Scoping

As the first step in a cumulative effects assessment, scoping serves to orient and focus subsequent steps. Its overall outcome is a list of VCs that should be carried forward into the Step 2 analysis, as well as a rationale for VCs considered in scoping that are not carried forward. Scoping documents the scientific evidence and advice, as well as feedback from the public and Aboriginal groups used to determine if further assessment is warranted.

Methodologies

Figure 2 summarizes the recommended generic approach to scoping. The information in the following paragraphs provides an overview of the methodologies that can be used for the scoping step, starting with a description of the generic approach.

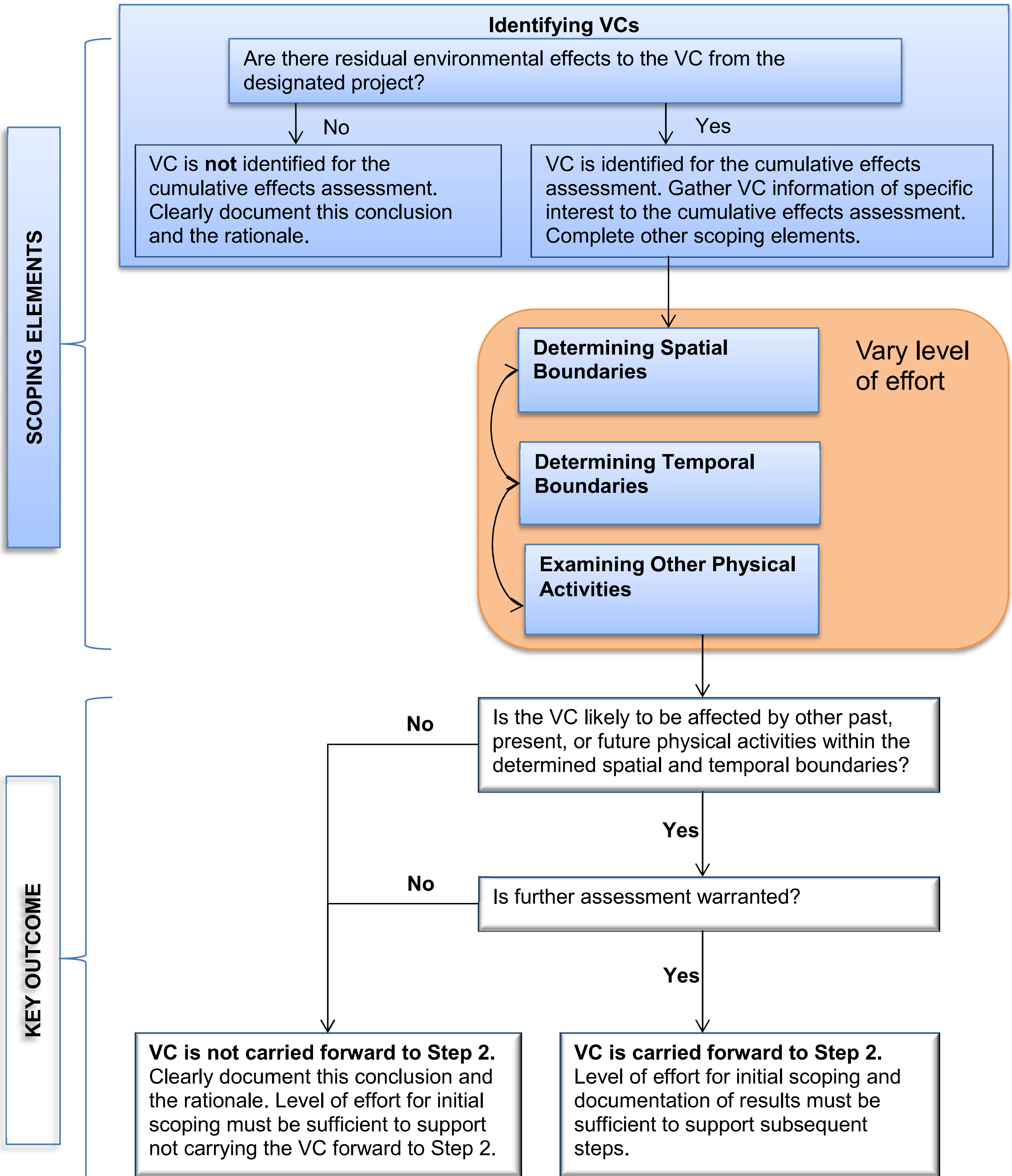
As per Figure 2, a cumulative effects assessment generally starts with addressing VCs for which residual environmental effects are predicted after consideration of mitigation measures recommended for the environmental effects of the project, regardless of whether those residual environmental effects are predicted to be significant. For each of these VCs:

- gather information on the VC of particular interest for the cumulative effects assessment (e.g., comments from the public and Aboriginal groups);
- determine the spatial boundaries within which the potential for cumulative effects will be examined and, if appropriate, analyzed;
- determine the temporal boundaries within which the potential for cumulative effects will be examined and, if appropriate, analyzed;
- identify the other physical activities that will be considered in the cumulative effects assessment; and
- identify the VCs that will be carried forward to Step 2, based on the scoping.

Scoping for the cumulative effects assessment can be started during or after the assessment of potential environmental effects from the project in isolation. With the former approach, project-specific scoping activities inform the selection of VCs by considering, concurrently, how the project and other physical activities may affect VCs. With the latter approach, the determination of which VCs to carry forward for the cumulative effects assessment can also be informed by the results of the detailed analysis of the environmental effects of the project. In either case, as the EA advances and additional information is gained, it may become clearer which VCs should be carried forward to Step 2.

The scoping elements (identifying VCs, determining spatial boundaries, determining temporal boundaries, and examining other physical activities) outlined in Figure 2 are complementary, allowing for considerations in each to inform integrated decision making on which VCs to carry forward to Step 2. VCs that are likely to be affected by other past, present, or future physical activities within set spatial and temporal boundaries should be carried forward, if further assessment is warranted.

Figure 2: Generic approach to scoping for cumulative effects assessment



Considerations

In completing the scoping step, practitioners should take into account the following considerations.

(a) Determining whether further assessment is warranted

If a VC is likely to be affected by other past, present, or future physical activities within the determined spatial and temporal boundaries, practitioners should define well-thought-out criteria that are relevant in the context of the project and apply them to each VC to determine whether further assessment is warranted. Examples of criteria where further assessment of a VC may be warranted include:

- level of concern expressed by the public, Aboriginal groups or government agencies;
- downward trend in the state (health, status or condition) of the VC;
- potential for significant cumulative effects given the understanding of risks to VCs (e.g., vulnerability of the VC, pathways of effects, level of exposure);
- uncertainty in predictions of cumulative effects; and
- potential to require mitigation measures or follow-up.

Any criteria used to determine whether further assessment is warranted should be clearly and appropriately justified.

Beyond examining the direct effects on a species (such as fish under subsection 5(1) or deer under subsection 5(2) where a federal decision affects deer), practitioners need to consider indirect effects as per section 5 of CEAA 2012 (such as Aboriginal use of lands and resources for traditional purposes). In some cases where there are no residual effects on the species, there could nevertheless be indirect effects on individuals that depend on that species in a particular locale.

Example: It may be established that a project does not change the state of a species' population, such as deer. Based on traditional knowledge and the issuance of hunting licenses, it may be well-known that the species is secure. The project may affect only a small proportion of the regional habitat, while leaving ample habitat to support the deer population. In this case, it is reasonable to document the evidence and conclude that the deer will not be carried forward for further analysis (Step 2). At the same time, however, the situation might require that the VC relating to Aboriginal hunting practices be carried forward to Step 2 because the project's effect on the deer changes those practices (e.g., site-specific locations and times of year for hunting).

Practitioners should exercise caution when identifying VCs to carry forward to Step 2. Employing criteria that are too restrictive at this step may result in more effort for practitioners at a later stage in the assessment if it is determined that further analysis is warranted. A reasonable approach should be taken to ensure the cumulative effects assessment is undertaken at an appropriate level of effort that supports defensible conclusions.

(b) Dealing with data limitations and associated uncertainties

VCs should not be omitted from being carried forward to Step 2 based on a lack of readily available data. Where data about a VC are not readily available, practitioners may use one of the following approaches, and document associated uncertainties:

- use surrogate data or model output within comparable environmental conditions;
- carry out new field surveys, if warranted, and/or collect traditional or community knowledge; or
- make inferences based on an appropriate body of knowledge (e.g., scientific and traditional knowledge about how the VC may be affected and to what extent).

Data and information for the cumulative effects assessment will often come from the analysis of environmental effects of the project, leading to identifying those VCs that have residual environmental effects.

Level of Effort for Scoping

In addition to the level-of-effort considerations outlined in the OPS, the following considerations should be taken into account for the scoping step:

- Where a VC is not carried forward to Step 2, the level of effort for scoping including the documentation of results must be sufficient to support not carrying the VC forward.
- Where a VC is carried forward to Step 2, the level of effort for scoping, including the documentation of results, must be sufficient to support subsequent steps of the cumulative effects assessment.

Additional considerations related to level of effort in scoping can be found in Subsections 1.1 to 1.4 of this document.

OPS Approach

The approach and level of effort applied to assessing cumulative environmental effects in a project EA is established on a case-by-case basis taking into consideration: the characteristics of the project; the risks associated with the potential cumulative environmental effects; the state (health, status, or condition) of valued components (VCs) that may be impacted by the cumulative environmental effects; the potential for mitigation and the extent to which mitigation measures may address potential environmental effects; and the level of concern expressed by Aboriginal groups or the public.

Outcome Documentation

Documentation of the scoping step can take the form of two lists of VCs: those that are carried forward to Step 2, and those that are not carried forward, supported by a rationale.

In addition, there should be clear, well-supported documentation of the:

1. criteria used to determine whether a VC should be carried forward to Step 2;
2. rationale for why further analysis was not warranted on any VCs, including why significant adverse environmental effects are not likely to occur; and
3. description or definition of a VC, especially if the identified VC differs from any identified in the project-specific EIS Guidelines or from those considered so far in the EA of the project.

See also other outcome documentation in Subsections 1.1 to 1.4 of this document.

1.1 Identifying Valued Components

Identification of VCs is one of four elements of the scoping step (see Figure 2). The four elements of scoping are complementary, allowing for the considerations in each to inform integrated decision-making.

VCs refer to environmental features that may be affected by a project and that have been identified to be of concern by the proponent, government agencies, Aboriginal peoples, or the public. The value of a component not only relates to its role in the ecosystem, but also to the value people place on it. For example, it may have been identified as having scientific, social, cultural, economic, historical, archaeological, or aesthetic importance.

OPS Approach

Identification of VCs for the project EA is made in relation to section 5 of CEAA 2012 and takes into account direction provided by the Agency. Analysis is then undertaken to identify which of these VCs will be considered for the cumulative environmental effects assessment.

The cumulative environmental effects assessment should consider those VCs for which residual environmental effects are predicted after consideration of mitigation measures, regardless of whether those residual environmental effects are predicted to be significant.

Methodologies

Identification of VCs is based on the assessment of environmental effects of the project. Where residual environmental effects from the project are expected, those VCs are identified for consideration in the cumulative effects assessment.

Considerations

When identifying VCs at any point in the EA, practitioners should take into account the following considerations.

(a) Gathering data and information on VCs of interest

Data and information sources to aid in gathering VC information of specific interest to the cumulative effects assessment include, but are not limited to:

- the Project Description filed by the proponent to initiate the EA;
- scientific and science-based literature;
- legislation;
- completed or in-progress EAs;
- available mapping (e.g., historical air photos, geomorphological data, hydrological data, vegetation mapping, or topographical maps);
- government websites (e.g., for land use plans, development strategies, or open data);
- regional studies conducted under CEAA 2012;
- other regional studies (e.g., conducted by a province);
- monitoring information, status assessments, or management plans from resource management agencies;
- input from the public, Aboriginal groups, and government agencies;
- baseline studies; and

- information on wildlife species listed under the *Species at Risk Act* (e.g., recovery plans, management strategies) or other wildlife of conservation concern.

These sources can be used to understand the current state of knowledge on VCs and related issues, or to identify known regional issues of concern.

(b) Considering input from the public and Aboriginal groups

Consideration of comments from the public and Aboriginal groups, including directly affected individuals, regional and national non-governmental organizations, and public organizations (e.g., universities), may provide information of particular interest to the cumulative effects assessment. Comments may include Aboriginal traditional knowledge (ATK), community knowledge and scientific knowledge, or simply an expression of concern regarding potential cumulative effects to a particular VC. Collection and use of ATK is covered in the reference guide *Considering Aboriginal traditional knowledge in environmental assessments conducted under the* Canadian Environmental Assessment Act, 2012.

Where a cumulative effects assessment gathers information useful to understanding the historical context of past impacts to Aboriginal group's rights, practitioners should keep in mind that, in the context of consultation and accommodation, such information will also help in understanding potential impacts to Aboriginal rights.

> Example: Noise from the project could be identified by an Aboriginal group as an issue of concern relative to wildlife in the context of traditional use of lands. There may be concern that existing noise in the area due to existing physical activities may already be at a level of concern and that the project would result in cumulative effects. This concern would typically result in the "noise" VC being identified for further consideration in scoping.

(c) Characterizing VCs for Cumulative Effects Assessment

A practitioner has flexibility in how to characterize a VC by defining it either broadly or narrowly. If the VC is defined narrowly, consideration should be given to whether the result of the analysis on the narrow VC is relevant to any broader VC. While the EA of the project in isolation may look at a broadly defined VC, it may be necessary in the cumulative effects assessment to focus on a narrowly defined VC such as particular species at risk of losing critical habitats as a result of the project and other physical activities. The final choice may be affected by the available information.

> Example: A VC may be defined broadly, such as "terrestrial vegetation" (e.g. where this VC is relevant under paragraph 5(1)(*c*) or 5(2)(*a*) of CEAA 2012); more narrowly as "on-site forests"; or even more specifically as a species of particular ecological importance due to its rarity, ecological or social value, or vulnerability to the environmental effects of the project.

The state (health, status, or condition) of a species may be monitored because it is seen as a reflection of the state of the environment on a chosen scale (e.g., indicator species in state of the environment reporting). In an EA, it may be used as a surrogate to predict environmental effects on other species or another ecologically justifiable grouping. While such an EA approach is reasonable and often used, one species may have a different degree of sensitivity to disturbances than others; therefore, caution is warranted in use of indicator species.

Example: Grizzly bear, a culturally important species to Aboriginal groups in a project area, might prove to be a good VC to represent other culturally important terrestrial animal species if it is known to be vulnerable to the perturbations of projects and physical activities.

In characterizing the state of the VC, care must be taken in choosing one or more measurable variables that are directly or sufficiently indicative of the health, status, or condition of the VC. Reliance on an inadequate indicator (i.e., a measurable variable chosen to represent the state of a component) may lead to the premature exclusion of a VC from further consideration in the cumulative effects assessment.

Example: A bird, selected as a VC under paragraph 5 (1) (c) of CEAA 2012 due to its use by Aboriginal groups, may be affected by the availability and quality of its habitat. However, the status, health, and condition of the bird may also be affected by other factors. An indicator which reflects **population** abundance may yield a very different level of concern than an indicator defined in terms of **habitat**. Even though the local habitat may not yet be under pressure, a review of population data might show that the species is under pressure due to other factors, such as habitat loss in another country.

(d) Using Benchmarks

Benchmarks help define what would be considered a significant adverse environmental effect on a VC. In some cases, it may be possible to identify established or generally accepted benchmarks. These may be in the form of standards, guidelines, targets, or objectives. Benchmarks are used to:

- aid in understanding where a VC’s state (health, status, or condition) stands in relation to multiple stressors;
- provide information on relevant tangible measurements of environmental consequences for a VC; and
- provide an indication of which VCs are of regional concern (i.e., if a benchmark for a VC has been established at a regional level).

Level of Effort for Identifying VCs

Given that identifying VCs with residual environmental effects is the result of previous phases of the EA, the level of effort for this is the one adopted and justified for previous phases of the EA. Establishing the appropriate level of effort for gathering VC information of specific interest to the cumulative effects assessment should consider the criteria in the OPS (see Section 1.0 of this document for OPS level-of-effort considerations).

Outcome Documentation

The outcome of this scoping element should be clear, well-supported documentation of the:

1. list of VCs with and without residual environmental effects from the project (note that the documentation supporting this list is provided through the documentation of other phases of the EA) ; and
2. information on VCs of specific interest to the cumulative effects assessment.

1.2 Determining spatial boundaries

Determining spatial boundaries is one of four elements of the scoping step (see Figure 2). The four elements of scoping are complementary, allowing for the results of each to inform integrated decision making on scoping.

> **OPS Approach**
>
> *Spatial boundaries should be identified and justified clearly, and be set taking into account direction provided by the Agency.*
>
> *To consider the environmental effects of existing and future physical activities, the spatial boundaries need to encompass the potential environmental effects on the selected VC of the designated project, in combination with other physical activities that have been or will be carried out.*

Methodologies

One of the following methodological options, or a combination of them, should be used to determine spatial boundaries. Spatial boundaries must support the consideration of cumulative effects for each VC identified for the cumulative effects assessment.

1. VC-centered spatial boundaries

Under this approach, spatial boundaries of a cumulative effects assessment are based on setting adequate spatial boundaries for each VC and considering primarily the VC's geographic range and the zone of influence (ZOI) of the project for the VC. For example, spatial boundaries for a migratory species may take into account seasonal migration paths, regardless of jurisdictional boundaries.

This option is generally recommended, as it allows for the most meaningful spatial boundaries to be drawn for the VCs identified for the cumulative effects assessment.

Example: A caribou herd that is hunted by local Aboriginal groups ranges within a 5,000 km^2 area. This full area would be the primary basis for the spatial boundary for the VC. The population is predicted to be directly affected by the residual effect (habitat loss) of the project within a 3 km radius of the project. This would occur in the southern part of the caribou population's range. The caribou herd is also being affected by transport roads and seismic lines that are being cut in the northern part of its range. Effects may include loss of habitat, decreased access to habitat due to caribou avoidance of crossing the seismic lines and increased potential for interaction with predators when crossing seismic lines. As well, in the future the herd could be affected by noise from a proposed new remote airport just outside of the herd's range. Noise from the future airport could limit the use of habitat in proximity to the airport. The spatial boundaries could be designed to allow for consideration of the cumulative effects of all of these physical activities.

In considering the caribou herd in the context of the "current use of lands and resources for traditional purposes" VC, practitioners should take into account whether an Aboriginal group has an option to access hunting opportunities in other parts of the herd's range, or if that other access is in a different group's traditional territory. If so, these factors should be considered in setting the spatial boundaries for the "current use of lands and resources" VC separately from the biophysical caribou VC.

2. Ecosystem-centered spatial boundaries

In some cases, the current understanding of an ecosystem's boundaries and processes allow practitioners to take an ecosystem-centered approach. For example, the geographic extent of the VC may be dependent on ecosystem features such as topography, climate, soils, or geology. Spatial boundaries under this approach are therefore based on knowledge of the ecosystem and where the VC fits in it. For example, ecological boundaries, such as a watershed, may define the geographic range of a VC (e.g., a population of a fish species). This option requires a good understanding of ecosystem boundaries and processes. If a sufficient knowledge base is available, the setting of VC-specific spatial boundaries is done relative to the system in which the VC occurs. For example, an aquatic species could be examined across its distribution in a watershed, thus allowing practitioners to take into account the availability of habitat and the success of recruitment processes across the watershed.

Understanding the ecological setting of a project can inform the setting of spatial boundaries. For example, ecological land classification (e.g., ecoregions) can be very helpful in the identification of spatial boundaries for VCs, particularly for VCs that occur at the landscape level. It can also be useful at a smaller scale for VCs that are an ecotype (i.e., a genetically distinct variety, population, or race of a species adapted to specific environmental conditions). In some circumstances, ecotypes are at great risk due to their rarity or loss of their habitat from other physical activities. In such circumstances, the area of distribution of an ecotype may be the area of key concern for cumulative effects assessment, and it could then be selected as the spatial boundary rather than the larger ecoregion comprising complexes of flora and fauna on which it is nested.

Because of the potential large scale and complexity of ecosystems, an ecosystem-centered approach may be best suited when regional data are available, such as through a regional study, regional EA, or ecosystem-based planning.

3. Activity-centered spatial boundaries

With this approach, spatial boundaries in a cumulative effects assessment are based on the distribution of physical activities in the vicinity of the project (e.g., mining or forest resources harvesting where they might comprise the principal land use). This approach is generally not recommended, because it may fail to encompass all environmental effects acting on the VC and may not fully consider the VC under study (e.g., the type of VC and its geographic range). However, this approach may be useful if the project is in a remote area with few interacting physical activities, and for VCs whose geographic range is limited.

4. Administrative, political, or other human-made spatial boundaries

Under this approach, administrative, political, or other human-made boundaries are established as the spatial boundaries. This may be particularly useful for socio-economic and cultural VCs. For example, spatial boundaries could be based on provincial, municipal, or statistical boundaries (e.g., census tracts), or an Aboriginal group's traditional territory for VCs such as current use of lands and resources, recreational tourism, Aboriginal health, or fisheries.

Administrative spatial boundaries can also apply to biophysical VCs. For example, wildlife information and management often occurs in defined management areas that may be useful spatial boundaries for cumulative effects assessment. Similarly, at times boundaries like ecological reserves, parks, or other protected areas may also be useful if, for example, they reflect biophysical conditions of relevance to the EA.

However, administrative, political, or other human-made boundaries are often sharp and may not take into account the spatial pattern of ecosystems, which typically consist of community gradients where attributes adjust progressively. Additionally, such boundaries may not reflect the spatial distribution of a mobile species.

Where a VC's state (health, status, or condition) is managed within administrative, political, or other human-made boundaries, the collection of data and integrated implementation of mitigation measures may be most effective if considered in the context of these boundaries. Nevertheless, the use of such boundaries must be appropriate in the context and support the assessment of cumulative effects on specific VCs.

5. Any other option

If any other option is selected, it should be fully justified in the context of the project. It must also take into account the OPS, and enable the completion of an EIS that meets the requirements of the project-specific EIS Guidelines and of an EA that meets the requirements of CEAA 2012. Discussion with Agency staff prior to implementing any other option is recommended.

Considerations

Practitioners should take into account the following considerations in determining spatial boundaries.

(a) Considering geographic scale as the EA progresses

The scale of the chosen boundary may lead to over- or under-predicting the importance of the predicted cumulative effects. With this in mind, practitioners must be aware of how cumulative effects are interpreted as the scale of boundaries change:

- Adopting a large spatial area may lead to misinterpreting the incremental cumulative effects of the project as being insignificant *relative to* everything else that is affecting the VC in the region, i.e., a small drop in a large bucket.
- Adopting a small spatial area may result in exaggerating the incremental cumulative effects of a project, i.e., a large drop in a small bucket.

An iterative approach to setting spatial boundaries should be followed. Practitioners should be prepared to adjust the spatial boundaries (for example, by covering a larger or smaller geographic extent for a VC) during the assessment process if new information suggests this is warranted.

(b) Considering the designated project's zone of influence and effects pathways

The ZOI sets a spatial limit beyond which the residual environmental effects of the designated project on a given VC are not detectable. The ZOI should be considered in setting spatial boundaries, for example, when:

- environmental effects generated by the project may be felt over a far reaching area (e.g., long-range transport of pollutants in air sheds or waterways, far-ranging wildlife); or
- exposure to environmental effects from different developments resulting in a mobile VC moving into the ZOI of other physical activities.

Setting the ZOI should be informed by the nature of pathways that result in cause-effect relationships between the project and the selected VCs (e.g., effluent from a project in a river resulting in contamination of fish tissue which is then consumed by humans and wildlife).

Example: In the case of fish that may be affected by a change in water quality, the ZOI of the project may be determined by considering how far downstream the concentration of a particular contaminant can be detected at levels greater than background levels, and what geographic range of fish populations this may affect. Effects pathways would be considered to determine how the water contaminant could affect fish and would also inform whether the ZOI extends to other fish-bearing water bodies by transport of the contaminant through groundwater or other means.

(c) Considering the influence of other physical activities

Effects pathways specify the cause-effect relationship among the project, the selected VCs and other physical activities. The selection of other physical activities to include in the cumulative effects assessment is covered in Section 1.4: *Examining physical activities that have been and will be carried out*.

Physical activities will generally not be the primary factor in establishing spatial boundaries for the cumulative effects assessment. Spatial boundaries may be set solely based on the geographic range of the VC and the ZOI of the project and other physical activities. In doing so, particular care is required for mobile or wide-ranging VCs.

Other physical activities located outside of the spatial boundary may still affect a VC within the spatial boundary. This does not mean that the spatial boundary needs to extend to include a physical activity outside the spatial boundary. The key point is that the environmental effects within the spatial boundary, whether they come from physical activities within or outside of the spatial boundary, should be considered for inclusion.

Example: A caribou herd hunted by local Aboriginal groups ranges within a 5,000 km^2 area. This full area would be the spatial boundary for the VC if the spatial boundary is set solely based on the geographic range of the VC provided that the ZOI of the project falls within the geographic range of the herd. However, the herd could be affected by noise from a proposed new remote airport just outside of the range. Noise from the future airport could limit the use of habitat within the range in proximity to the airport and should therefore be considered in the cumulative effects assessment. While this physical activity and its noise impact would then be included in the cumulative effects assessment, the VC-specific spatial boundaries would not need to be extended.

There are circumstances where the spatial boundaries may be adapted in light of examination of other physical activities, as demonstrated in the following example.

Example: A sessile aquatic species with a patchy distribution within an entire watershed is identified as a VC for the cumulative effects assessment due to the residual release of a particular contaminant by the project. Pathways of effects indicate that the ZOI for release of the contaminant from the project extends to the watershed level. Further scoping using pathways reveals that only one other physical activity would also affect this aquatic species within a small ZOI nested in the watershed. The spatial boundaries could then be adjusted to focus on effects in this small ZOI, rather than cover the entire watershed.

(d) Considering the availability and quality of spatial data

The availability and quality of the spatial data should be clearly described for each VC under study. The quality and quantity of the available spatial data, the level of effort that would be required to augment existing data, and information required to enable final EA decisions will influence whether to collect more data. The decision regarding the collection of additional data should be clearly stated and justified. If no additional data is collected, a valid reason should be given. For example, a geo-database containing detailed species information for the past 20 years would likely be adequate to identify its spatial boundaries.

Practitioners should keep the following considerations in mind:

- The ability to set spatial boundaries may be enhanced for specific VCs in a well-studied watershed, along a well-known migration path, or where relevant remote sensing imagery is available.
- VC-specific field studies can help define the spatial boundaries of some VCs for which limited or inadequate information is available. However, additional detailed studies will not necessarily be required if there is sufficient information to make a decision on whether the VC should be carried forward to Step 2.
- The study of multiple VCs at once may be particularly useful if the spatial distribution of the VCs under investigation is linked through, for example, predator-prey relationships, food webs, or natural barriers (e.g., on an island or in a mountain valley).

Level of Effort for Setting Spatial Boundaries

Spatial and temporal boundaries are set in light of other elements of scoping, including an understanding of how physical activities had, continue to, or will have an environmental effect on VCs.

The environmental effects of a physical activity on a VC must occur within the spatial and temporal boundaries set for the cumulative effects assessment (using the approaches outlined in this guidance) in order for that physical activity and its environmental effects to be considered in the cumulative effects assessment.

In addition to the overall level-of-effort considerations outlined in the OPS (see Section 1.0 of this document for OPS level-of-effort considerations), the level of effort needed to establish spatial boundaries will increase with the uncertainty regarding:

- the geographic extent of residual environmental effects from the project;
- the geographic extent of residual environmental effects of past, present, and future physical activities;
- the geographic range of the VC; and
- the quality of available spatial data.

The level of effort put into setting spatial boundaries must be sufficient to allow for full consideration of the environmental effects acting on a VC from all physical activities, and for the justification of the spatial boundaries in relation to each VC.

Outcome Documentation

The outcome of this scoping element should be clear, well-supported documentation of the:

1. methodology and considerations used in setting spatial boundaries; and
2. spatial boundaries to be used in assessing the potential adverse cumulative effects for each VC and the rationale for their boundaries.

The outcome documentation should be commensurate with the level of effort established. For example, the outcome documentation may be maps with explanatory text which rationalizes the chosen spatial boundary for each identified VC.

Information and data requirements for documenting the spatial boundaries may include maps (geographic information systems), remote sensing or aerial imagery, expert opinions, community and/or ATK, thresholds, indicators, and land-use plans.

1.3 Determining temporal boundaries

Determining temporal boundaries is one of four elements of the scoping step (see Figure 2). The four elements of scoping are complementary, allowing for the results of each to inform integrated decision-making on scoping.

OPS Approach

Temporal boundaries should be identified and justified clearly, and be set taking into account direction provided by the Agency.

Temporal boundaries for assessing a selected VC should take into account past and existing physical activities, as well as future physical activities that are certain and reasonably foreseeable. They should also take into account the degree to which the environmental effects of the physical activities overlap those predicted from the designated project.

Methodologies

Practitioners should endeavour to understand the nature of the perturbation and the persistence of potential cumulative effects in setting temporal boundaries. Time horizons for the project or selected physical activities should include timelines associated with construction, operation, and decommissioning.

One of the following methodological options, or a combination of them, should be used to determine temporal boundaries for the cumulative effects assessment. Temporal boundaries must support the consideration of cumulative effects for each VC identified for the cumulative effects assessment.

1. **VC-centered temporal boundaries**

Determining temporal boundaries according to each selected VC enables an examination of the unique characteristics of environmental effects on VCs and takes into account the VC's natural variation over time. This option can focus temporal boundaries to account for the duration of the residual environmental effects of the project in combination with environmental effects of other physical activities on the same VC. In establishing temporal boundaries, the identification of past, present, and future physical activities is integral to understanding the cumulative effects on the selected VCs over time.

Example: A VC-centered approach could be used for a situation associated with a hydroelectric project where there was an increase in mercury in fish consumed by an Aboriginal group. For the VC “Aboriginal Health”, a practitioner would take into account the mercury contamination associated with effluents from a pulp mill that is no longer operating and future effects from flooding to create a reservoir (which leads to conversion and circulation of mercury already present in plants and soil into the water).

In this case, the temporal boundaries would relate to the environmental effects of increased mercury in fish from the decommissioned pulp mill which may still be affecting fish body burdens. If the mill operated for 50 years and was decommissioned 25 years ago, the past temporal boundary might extend back 75 years.

The future boundary would reflect the likely duration of the presence of increased mercury in the reservoir and fish due to flooding. If mercury levels were expected to decline to levels acceptable for human consumption in some 30 years, and the pulp mill residual environmental effects were predicted to decline in the same period of time, then the future temporal boundary could then be set to 30 years from the time of flooding.

2. Ecosystem-centered temporal boundaries

Using an ecosystem-centered approach, VCs are considered in the context of the current understanding of an ecosystem state and processes. Physical activities are then considered in terms of how they affect ecosystem processes and VCs, and for how long. For example, available information on the evolution of the ecosystem over time may help identify particular events in the history of the VC that could be useful in setting temporal boundaries for the VC. The information might also reveal a trend in the state (health, status, or condition) of the VC that could help predict a suitable point for a future temporal boundary. This option is better suited to circumstances where a reasonable understanding of the ecosystem and its processes is available or can be reasonably obtained.

It may also be useful if key VCs have been strongly influenced by historical drivers or shifts in ecosystem processes – for example, with historical changes in land use (e.g., past forested ecosystems having been converted into agricultural lands).This can help in two ways: providing evidence of the time scale at which change occurs relative to the natural or human drivers, and providing evidence of past shifts in ecosystem processes to assist with predictions of potential effects. Practitioners may also find that the effects of past and existing physical activities are reflected in current ecosystem processes. In some circumstances, it may be important to also understand natural cycles within ecosystems such as predator-prey cycles, and examine the recovery of VCs in relation to the variability of natural cycles of change in ecosystems.

3. Activity-centered temporal boundaries

This option may inform the setting of temporal boundaries, but should not be used in isolation. Focusing purely on physical activities for setting temporal boundaries may create a number of issues:

- Time horizons of physical activities may not align well with consequential environmental effects on VCs (i.e., the lag time it might take a VC to respond to or recover from an environmental effect may extend beyond the phases of projects and physical activities).

- This approach may not reflect natural variation in the VC over time, or its continuing evolution in response to effects from current or past physical activities.
- Temporal boundaries could stretch too far into the past or future, requiring extra effort to support the analysis, or may require information that cannot be obtained, as uncertainty generally increases the farther into the future the temporal boundary is extended.

Nevertheless, some environmental effects will occur in close association with the phases of a project or physical activity (e.g., noise associated with operation).

4. Any other option

If any other option is selected, it should be fully justified in the context of the project. It must also take into account the OPS, and enable the completion of an EIS that meets the requirements of the project-specific EIS Guidelines and of an EA that meets the requirements of CEAA 2012. Discussion with Agency staff prior to carrying forward any other option is recommended.

Considerations

Practitioners should take into account the following considerations in setting temporal boundaries.

(a) Setting a past temporal boundary with a VC-centered approach

Baseline conditions refer to present-day conditions, prior to implementation of the project. These conditions may not be fully representative of the variations in natural conditions, due to natural variability, historical shifts, or effects from other human activity.

Setting a past temporal boundary allows for gathering of past data and information that will provide a more meaningful picture of the VC, allowing the practitioner to credibly state whether the baseline condition is representative or is at a particular point in a cycle.

This can be addressed by ensuring that the description of the baseline condition of each VC includes past information such as the VC's natural variability, drivers of change, and historical shifts. This description of the past can take various forms, such as a narrative of the evolution of the VC from the past point in time to the present, a "pre-industrial case", or a series of "past temporal snapshots" showing the evolution of the VC.

Example: In assessing the environmental effects to the "Aboriginal current use of lands and resources for traditional purposes" VC as per subparagraph 5(1)(c)(iii) of CEAA 2012, Aboriginal traditional land use (TLU) and ATK studies may be undertaken. These studies typically document historical and current Aboriginal land- and resource-use activities that can inform project planning and the development of mitigation strategies. These studies may indicate the lifetimes of study participants as the temporal boundary and/or can include anecdotal information about the cultural history and identity before industrial development took place. This information, along with other information sources (e.g., EIS of another physical activity), could be used to describe the past state of the VC and a narrative of its evolution.

The past temporal boundary would be set to a point in the past where a description of the past state of the VC is useful to understanding cumulative effects or in deciding whether further assessment of a VC is warranted. Possible points in time that could serve as boundaries are:

- when a certain land-use designation was made;
- when environmental effects on the VC first occurred;
- when land use changed (e.g., the commencement of mechanized forest resources harvesting); and
- a point in time when the VC was in a less disturbed condition, especially if the assessment includes determining to what degree past physical activities have affected the VC.

Example: Gathering baseline data reveals that, 50 years ago, a bird (the VC, as it relates to Aboriginal traditional use) habitat covered 10,000 km^2, as opposed to the present 1,000 km^2. The decrease of habitat was due to development in the area. In this case, the past temporal boundary of the VC could conceivably be set to 50 years ago. However, the availability of historical data on the population of migratory birds dating back 50 years may be severely restricted, making this an unreasonable temporal boundary. It may be necessary to rely upon more recent data (e.g., forest management plans and associated migratory bird monitoring that have been in place over the preceding 25 years) and a shorter temporal boundary. Alternatively, practitioners could use surrogate data or modelling to attempt to fill the gap in data.

Questions to consider in determining whether a description of the past state (health, status, or condition) of a VC is appropriate include:

- Does information or data indicate that another physical activity has affected the state of a VC in the past or that the VC is currently under stress?
- Do comments from the public, Aboriginal groups, or expert reviewers indicate an interest in having a description of the past state of a VC?
- Is an understanding of the incremental effects of multiple physical activities in the past necessary to understand or predict cumulative effects?
- Is the understanding of past environmental conditions for specific VCs required to contextualize cumulative effects (e.g., area of habitat lost to date, or limitations to current use of lands and resources for traditional purposes to date)?
- Would information about how past physical activities influenced the state of the VC be valuable in understanding the vulnerability of the VC to future perturbations by the project and other future physical activities?
- Would past information or data on the state of a VC support the identification of mitigation measures or the design of a follow-up program?
- Is the information reasonably attainable, including through ATK and/or surrogate data from other regions with comparable conditions?
- Will the information provide a reasonable level of certainty in predicting the future state of the VC?
- Would the information influence the determination of whether significant adverse cumulative effects would occur?

(b) Setting a future temporal boundary with a VC-centered approach

As a standard practice, boundaries should be extended long enough into the future to take into account when cumulative effects may occur. This means that boundaries should consider the planning horizon and expected life cycle of the project, as well as future certain and reasonably foreseeable physical activities that will be assessed.

Practitioners should consider the temporal dynamics of VCs in response to the environmental effects of the project and other physical activities, which can result in delays in observing environmental effects on VCs in the field. For example, there might be lag time before effects on individuals are observable (e.g., chronic exposure resulting in effects over a long period of time).

It may also take several generations before environmental effects at the population level of a species become fully apparent. A VC may also take generations to stabilize to a new state, or to recover from the perturbations of the project and/or physical activities.

The point at which the project ceases to contribute to cumulative effects may refer to a point in time when the VC is predicted to have recovered to the baseline or another acceptable target, and the state of the VC can now be considered stable relative to environmental conditions and natural variability.

Example: In a highly transformed landscape like agricultural land in the prairies, it may not be reasonable to expect conditions to return to pre-European conditions of native prairie. In such cases, the temporal boundary may be established by a return to current or pre-project or pre-disturbance conditions. For example, a project which includes a right-of-way on agricultural land in an area of former prairie would set a temporal boundary for when the right-of-way is expected to be returned to agricultural production with its inherent pre-disturbance, ecological, and land-use condition, not to pre-European conditions.

Illustrating the temporal overlap among physical activities is recommended to help identify when their environmental effects may overlap. This can be done by creating a diagram that provides the major project phases of the project on a timeline with other physical activities included in the cumulative effects assessment. However, the phases of the project need not overlap with other physical activities for cumulative effects to occur.

Information on the environmental effects of past or existing physical activities may also be of value to setting future temporal boundaries. For example:

- the environmental effects of past or existing physical activities on a specific VC may help predict the environmental effects of a project if the same or similar type of physical activity already had an environmental effect on a VC; or
- future decommissioning of an existing physical activity could affect the future condition of a specific VC.

(c) Setting a temporal boundary using various methodologies

Applying the VC-centered approach to setting temporal boundaries can be supplemented by other approaches, such as methodologies centered on an ecosystem or on physical activities. Understanding the contribution of each approach and adding supplemental information from other approaches can assist in understanding complex system interactions. A way to integrate these methodologies can be to develop scenarios.

It may be helpful to build scenarios reflecting, for example, past conditions, current status, or expected evolution with or without the project. Scenario-building is well-suited when regional data are available, for example, through a regional study, regional EA, or ecosystem-based planning, such as in the following example, in the context of a forest management plan.

Example: Historical logging or mechanized forest resource harvesting may have progressively changed the status of an ecosystem in the past. These changes were then influenced by forest management activities aimed at reversing some of the effects (initiated at T^{FM} in Figure 3).

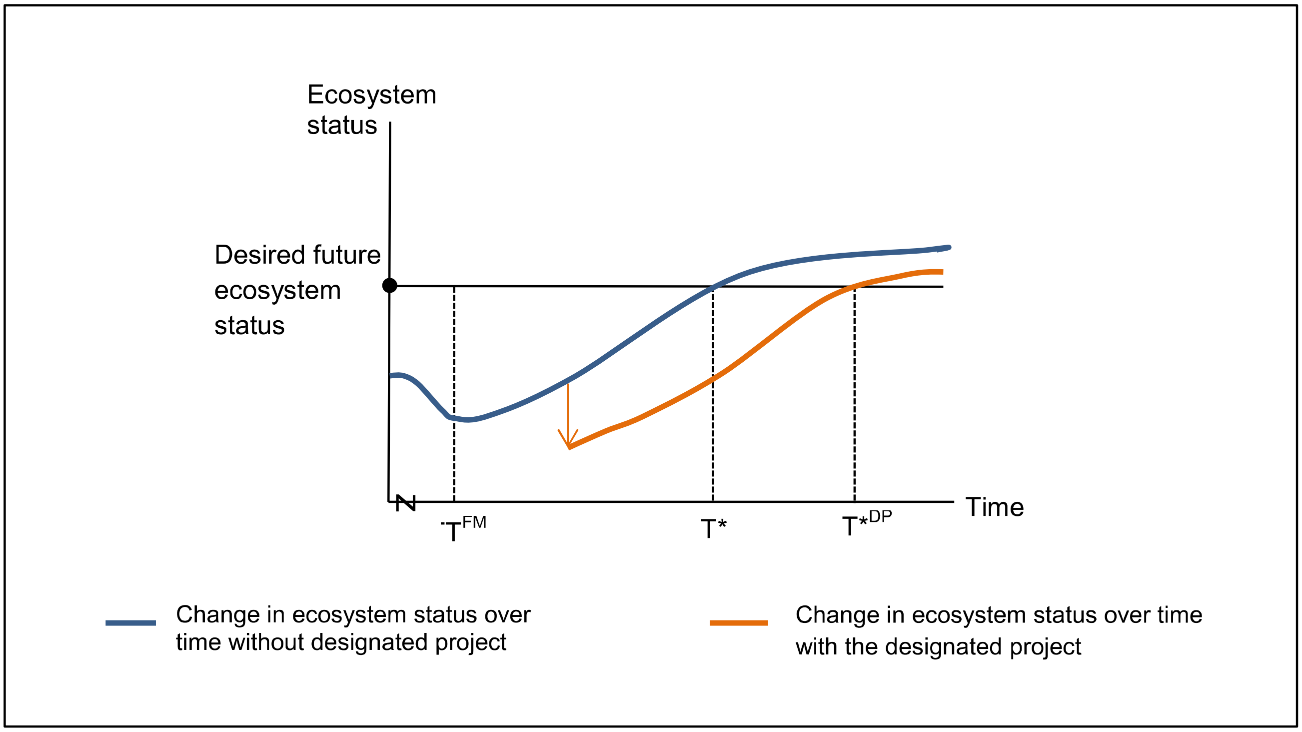
Where a project is proposed in such an area, the future duration of the environmental effects of the project, in combination with those related to forest management, can support the selection of an appropriate future temporal boundary. This boundary would be set as the point in time in the future when the ecosystem can be restored to a certain condition or status.

As shown graphically in a simplified depiction in Figure 3, the desired future ecosystem state would have been reached at T* if the project had not been proposed. However, if the project goes ahead, the adverse environmental effects lead to a delay in when the ecosystem can reach the desired state. This occurs at T^{*DP}, and could serve as the future temporal boundary for VCs within the ecosystem.

Where data are available, the setting of past temporal boundaries can also be informed by knowledge of the ecosystem state at specific points in time.

Monitoring of the state of an ecosystem can be done over time using one or more indices (measured variable). For example, the measured variable can be associated with a key indicator species, such as a bird species known to be representative of the state of that particular forest ecosystem.

Figure 3: Future scenario



Level of Effort for Setting Temporal Boundaries

Spatial and temporal boundaries are set in light of other elements of scoping, including an understanding of how physical activities had, continue to, or will have an environmental effect on VCs.

The environmental effects of a physical activity on a VC must occur within the spatial and temporal boundaries set for the cumulative effects assessment (using the approaches outlined in this guidance) in order for that physical activity and its environmental effects to be considered in the cumulative effects assessment.

In addition to the overall level-of-effort considerations in the OPS (see Section 1.0 of this document for OPS level-of-effort considerations), the level of effort needed to establish temporal boundaries will vary with the:

- nature of the residual environmental effects, in terms of their measurability and scale or magnitude;
- time horizon of residual environmental effects of the project;
- time horizon of residual environmental effects of other past, present, and future physical activities; and
- selected temporal resolution(s) (i.e., years or decades).

Outcome Documentation

The outcome of this scoping step should be clear, well-supported documentation of:

1. the methodologies used in the determination of temporal boundaries, including descriptions and rationale for scenarios if this approach is taken;
2. the chosen past temporal boundary for the consideration of cumulative effects for each VC;
3. the future temporal boundary for the cumulative effects assessment for each VC; and
4. how the chosen temporal boundaries will adequately capture the expected cumulative effects.

The outcome documentation should be commensurate with the level of effort established. The documentation could involve a narrative description of each determined temporal boundary, or a table listing the VC with its chosen temporal boundary, accompanied by explanatory text.

1.4 Examining physical activities that have been and will be carried out

Examining physical activities that have been and will be carried out is done as part of the scoping step (see Figure 2). The four elements of scoping are complementary, allowing for the results of each to inform integrated decision-making.

Physical activities to be considered in a cumulative effects assessment are not restricted to those listed in the *Regulations Designating Physical Activities* and those designated in an order made by the Minister under subsection 14(2) of CEAA 2012.

Examples of physical activities are numerous, and include agricultural development, management of a forested area, dredging a water body, hunting, fishing, remediation of a brownfield site, construction of a pulp mill, or operation and decommissioning of a mine. Practitioners should keep in mind that predicting cumulative effects to a VC will tend to be more accurate when all sources of environmental effects to that VC have been reasonably considered.

OPS Approach

The cumulative environmental effects assessment must consider other physical activities that have been carried out up to the time of the analysis, or will be carried out in the future, provided that these physical activities are likely to have an environmental effect on the same VCs that would be affected by residual environmental effects of the designated project.

Methodologies

1. Identifying Future Physical Activities

The OPS sets the methodology to be used for identifying future physical activities, by indicating that they are to be included in the cumulative effects assessment if they are certain and should generally be included if they are reasonably foreseeable. Some doubt about whether the physical activity will proceed is acceptable. The level of certainty may not be as high as for the project itself.

A future physical activity would be considered certain to proceed, and would be included in a cumulative effects assessment if one or more of the following criteria are met:

- The physical activity has received approval in whole or in part, such as:
    - environmental assessment approval;
    - pre-development approval for early works, permits for exploration, or collection of baseline data; or
    - some other regulatory approval from a province.
- The physical activity is under construction.
- The site preparation is being undertaken.

OPS Approach

A cumulative environmental effects assessment of a designated project must include future physical activities that are certain and should generally include physical activities that are reasonably foreseeable.

A future physical activity would be considered reasonably foreseeable and should generally be included in the cumulative effects assessment if one or more of the following criteria are met:

- The intent to proceed is officially announced by a proponent to regulatory agencies. This information could be found in news media, the proponent's website or via an announcement from the proponent.

- The physical activity is under regulatory review (i.e., the application is in process). This can be known, for example, if information about the review or application is available on a government website, or an EA notice has been made public.

- The submission for regulatory review is imminent. This could be known if the collection of data has already commenced, regulatory authorities have been contacted about information requirements, or through an announcement from the proponent.

- The physical activity is identified in a development plan that is approved or for which approval is imminent (e.g., a wastewater treatment plant in a city's long term development plan).

- The physical activity supports – or is consistent with – the long-term economic or financial assumptions and engineering assumptions made for the project's planning purposes.

- A physical activity is required in order for the project to proceed (e.g., rail or port transportation facilities, or a transmission line).

- The economic feasibility of the project is contingent upon the future development.

- The completion of the project would facilitate or enable the future development.

OPS Approach

The concepts "certain" and "reasonably foreseeable" are defined as follows:

Certain: the physical activity will proceed or there is a high probability that the physical activity will proceed, e.g. the proponent has received the necessary authorizations or is in the process of obtaining those authorizations.

Reasonably Foreseeable: the physical activity is expected to proceed, e.g. the proponent has publicly disclosed its intention to seek the necessary EA or other authorizations to proceed.

The criteria in the last three preceding bullets often relate to what is described as "induced development". If the induced development is *certain* or *reasonably foreseeable*, it should be considered in the cumulative effects assessment. Examples of induced development include housing development that could arise due to the approval of the project.

2. Identifying Past and Existing Physical Activities

The following methodological options, or a combination of them, should be used to determine which past and existing physical activities to include in the cumulative effects assessment.

(a) Using direct evidence relating to past and existing physical activities with VCs

Reasonable effort should be made to identify past and existing physical activities based on direct evidence available from the historical record and other reliable sources, such as reports or ATK.

Data and information on physical activities that occurred in the distant past is often limited. The challenge generally increases as the study extends into the past. In such circumstances, the information is often anecdotal but can still provide some insight into VC response.

> Example: It may be known that early settlers cleared land for agriculture in the 19th century but then gradually abandoned part of the land due to changing lifestyles, or due to other factors such as declining fertility or drought. The abandoned portion of land may have naturally regenerated to its current condition of a forest or prairie. The available information is often anecdotal, but still provides an understanding of the environmental effects of agriculture, and informs the predictions of VC response to removal of the stressors.

Data and information on existing physical activities, or those that occurred in the recent past, are much easier to find. Sources include recent EA reports and land-use planning documents.

> Example: A new coal mine is proposed in a watershed where there is an existing coal mine that releases selenium in the water that could potentially lead to cumulative effects on fish and fish habitat. The environmental effects of the existing mine in relation to fish and fish habitat must be understood in order to assess the cumulative effects of the new mine in the same region. Furthermore, any other past physical activity that has affected the watershed in relation to fish and fish habitat should be included.

In some cases, information on past or existing physical activities may help identify appropriate mitigation measures. Information on existing physical activities should cover their full lifecycle, particularly if decommissioning is certain or reasonably foreseeable.

(b) Using present-day VC conditions to represent past and existing physical activities

This approach is used to address past and existing physical activities when a practitioner has only limited data and information, and needs a reliable means of making inferences about their effects on VCs. For example, it may be well-known that the current environmental conditions in a forested area exist in response to forest resource harvesting dating back to a distant past, but information on how the harvesting occurred and its impact over time may no longer be available.

> **OPS Approach**
>
> *Present-day environmental conditions reflect the cumulative environmental effects of many past and existing physical activities.*

In using this option, the practitioner first needs to consider whether the observed present-day VC conditions are indeed representative of the environmental effects of past and existing physical activities in the study area. Efforts are then focused on describing how past and existing activities may have contributed to the current state of VCs.

The practitioner should also attempt to evaluate whether the current VC condition is stable or whether it is still changing in response to past and existing physical activities. For example, an understanding of recovery stages after clear-cuts in similar environments may be helpful in determining whether the present-day VC condition is likely to remain stable or what its future state might be. This helps establish if present-day VC conditions are adequate surrogates for representing past and existing physical activities.

3. Any other option

If any other option is selected to identify past, existing, or future physical activities, it should be fully justified in the context of the project. It must also take into account the OPS, and enable the completion of an environmental impact statement that meets the requirements of the project-specific EIS Guidelines and of an EA that meets the requirements of CEAA 2012. Discussion with Agency staff prior to carrying forward any other option is recommended.

Considerations

Practitioners should take into account the following considerations in deciding which physical activities to include.

(a) Appropriate information to gather about physical activities

As a general rule, the amount of information that can be obtained for future physical activity is usually proportional to the degree of certainty about it proceeding. For a past activity, there is generally more information available for projects that occurred in the recent past.

Each physical activity that is examined should be described in adequate detail *to allow potential environmental effects to be characterized* for later assessment. Key pieces of information to note about other physical activities may include:

- location, physical size (e.g., area covered, volume of process throughput), and spatial distribution of components (i.e., site specific, randomly dispersed, travel corridors);
- components (e.g., main plant, access roads, waste disposal site) and supporting infrastructure (e.g., waste treatment, power lines);
- the expected life or period of activity (including start date), and phasing involved (e.g., exploration, construction, standard operations, later plans for upgraded or expanded operations, decommissioning, and abandonment);
- variations in seasonal operation (e.g., winter closures);
- frequency of use (for intermittent activities – e.g., helicopter use);
- transportation routes and mode of transport (e.g., roads, railways, shipping lanes);
- processes used (for industrial activity – e.g., open pit mining);
- emissions, discharges, and wastes that are likely to be released, and where;
- approvals received (e.g., permit and license conditions in effect); and
- the duration of any in-place or planned follow-up program.

Where a scenario of future development is being employed, data surrogates for key pieces of information may be established by referencing typical development characteristics.

(b) Information constraints

Information about a physical activity may not be readily available if, for example:

- proprietary technology or confidential production records are involved; or
- the design of the physical activity is too preliminary to provide enough useful information.

Information from similar physical activities at other locations (known as surrogate information) may be useful. It could be used in a case where future physical activities are reasonably foreseeable, but there is little information available.

Example: The development of a future gold mine may be considered reasonably foreseeable, but little information is available. Information on the environmental effects of a surrogate mine could be used. For example, the physical activity would probably include an open pit, mill, tailings storage facility, and water treatment facility. Caution in the use of this surrogate information would be required since the mine in question may have different geology or chemistry, processes, and tailings-management issues.

(c) Pathways and categories of environmental effects

Pathway diagrams may assist in identifying and assessing environmental effects of other physical activities on the VCs identified (see Appendix 1: Source-pathway-receptor model).

The use of broad categories to assess physical activities in a generic way may be appropriate, for example, when little detail is available beyond the type of physical activities (e.g., forest resources harvesting), or when there are too many physical activities (e.g., in an urban area or along a highway) to characterize individually. Categories may be established in recognition of the similar patterns in the environmental effects they may cause. Examples include:

- shape (e.g., linear, aerially dispersed, areal point);
- sector type (e.g., resource extraction, power generation, urban infrastructure);
- industry type (e.g., mining, forest resource harvesting, municipal infrastructure); or
- transportation type (e.g., aircraft, boats, road traffic).

This information will be most helpful when conducting the Step 2 analysis described in this document.

Level of Effort for Examining other Physical Activities

Spatial and temporal boundaries are set in light of other elements of scoping, including an understanding of how physical activities had, continue to, or will have an environmental effect on VCs.

The environmental effects of a physical activity on a VC must occur within the spatial and temporal boundaries set for the cumulative effects assessment (using the approaches outlined in this guidance) in order for that physical activity and its environmental effects to be considered in the cumulative effects assessment.

In addition to the level-of-effort considerations outlined in the OPS (see Section 1.0 of this document for OPS level-of-effort considerations), the level of effort needed to identify past, present, and future physical activities will vary with the:

- number of VCs under consideration;
- spatial boundaries selected;
- temporal boundaries selected;
- number of potential physical activities (past, present and future);
- land-use planning and/or applicable management plan information available;
- sensitivity of VCs to the perturbations of various physical activities;
- status of developments; and
- environmental and regulatory review applications for physical activities.

Outcome Documentation

The outcome of this scoping step should be clear, well-supported documentation of the:

1. methodology used in the selection of physical activities;

2. physical activities considered for inclusion which may include a map depicting the location of the physical activities in relation to the project and the VC under consideration; and

3. physical activities considered for inclusion that will not be carried forward for analyzing cumulative effects.

A table or matrix format may be useful for presenting information regarding the rationale for including each physical activity identified and the VCs that they may affect. It may also be used to categorize physical activities as past, existing, or future (certain or reasonably foreseeable). Where there is evidence that certain or reasonably foreseeable physical activities can be seen as induced development, it should be noted. Where scenarios are used to reflect future or past activities, it should also be noted.

The outcome documentation should be commensurate with the level of effort established.

Figure 4: Example of a matrix structure for outcome documentation

Past, Existing, and Future Physical Activities In a Largely Undeveloped Area	Valued Components				
	1	2	3	4	Description
Physical Activity A	✓	✓			This future physical activity is reasonably foreseeable, since it is currently under regulatory review. It has the potential of affecting VC#1 & VC#2, given the nature of the physical activity and predicted effects pathways within the spatial boundaries established for these VCs. Furthermore, such effects on VC#1 & VC#2 are likely to occur within the same timeframe as the potential effects of the project on the same VCs. The effects of Physical Activity A and those of the project therefore both fall within the established temporal boundaries for VC#1 and VC#2. The environmental effects of Physical Activity A on these two VCs will be considered further in the Step 2 analysis.
Physical Activity B	✓	✓	✓		This is a past activity that will yield useful information about potential future effects on VC#1, VC#2 and VC#3…
Physical Activity C			✓	✓	This is a certain future physical activity with potential effects on VC#3 and VC#4. In the context of the area, it can be considered induced development…
…					
Physical Activity X					This activity is not expected to affect any of the VCs identified for the cumulative effects assessment, therefore it is not included.

2.0 Overview and Outcomes of the Analysis

Step 2 of the framework is analysis of cumulative effects (see Figure 1).

This step builds on the results of scoping (Step 1) and considers how all physical activities identified during the scoping stage may affect the VCs within the spatial and temporal boundaries determined for the assessment of cumulative effects.

Step 2 analysis focuses on understanding the cumulative effects for each VC retained for further analysis.

Methodologies

Assessment of cumulative effects requires an understanding of both the estimated cumulative effects on VCs and the contribution of the project to cumulative effects.

The source-pathway-receptor model (see Appendix 1: Source-pathway-receptor model) can be used to depict the relationship between the project (as one of the sources of an environmental change) and the VC (as the receptor affected by the change).

One of the following options, or a combination of them, can be adopted as a methodological approach to analyze cumulative effects in a way that addresses the total cumulative effects on each VC and the contribution of the project to such effects.

> **OPS Approach**
>
> *The methodologies used to predict cumulative environmental effects must be clearly described. With this information, reviewers of the EIS will be able to examine how the analysis was conducted and what rationale supports the conclusions reached. Any assumptions or conclusions based on professional judgment should be clearly identified and described.*

1. Comparison using reference case(s)

Data from other areas with comparable conditions, or from a reference case, can be used to analyze or understand potential cumulative effects. Comparable conditions can include similar environments, or environments that are experiencing similar environmental effects as a result of similar physical activities. Some past physical activities may be included as a reference because they provide the best source of information for understanding past environmental conditions.

> Example: An open metal mine in an area of boreal forest where there is forest resource harvesting and TLU by Aboriginal groups could be a reference case for an open pit mine in a similar environment in a different part of the country.

The results of monitoring and follow-up of other similar physical activities that have similar receiving environments can be one source of information. This method is useful only when the reference case is comparable. The EA should include a rationale for the use of a reference case and explain its relevance, limitations, and assumptions for assessing the cumulative effects of the project.

2. Comparison using models

Predictive models can generate information that supplements available data or simulates existing and future conditions in those cases where data are limited or difficult to attain. Models can also estimate the response of a VC to cumulative effects.

Models can be qualitative (e.g., a conceptual model, typically less data-intense) or quantitative (e.g., a numerical model, typically more data-intense). The most common use of quantitative models is to predict the state of a physical condition or chemical constituent by using a computer-based application to assess various indicators or parameters such as air and water quality, species condition or response, water volume flows, airborne deposition on soils and vegetation, and habitat condition. Qualitative models can include descriptive narratives or graphic representations that illustrate the conceptual relationships between the environment and human activities.

Example: To model changes to groundwater flow directly linked to a *Navigation Protection Act* authorization under section 5 (2) of CEAA 2012, two types of models may be considered. A conceptual model would illustrate how groundwater flow may be affected by a project and other physical activities. A computer simulation of groundwater flow may predict the potential numerical quantity and quality of groundwater under a range of future conditions (e.g., future phases of the project or different mitigation measures), with or without the project.

Where models are used, it is necessary to provide the rationale for the chosen methodology, the assumptions involved in its use, and the limitations of the predicted data, including uncertainty on data interpretation, and statistical error and confidence.

3. Any other option

If any other option is selected, it should be fully justified in the context of the project. It must also take into account the OPS, and enable the completion of an EIS that meets the requirements of the project-specific EIS Guidelines and of an EA that meets the requirements of CEAA 2012. Discussion with Agency staff prior to carrying forward any other option is recommended.

Considerations

Practitioners should take into account the following considerations in conducting the analysis.

Environmental effects of other physical activities can interact with those of the project in various ways. For example, some effects may be simply additive, while others may result in effects greater than if they had occurred on their own (for more information, see Appendix 2: Types of Cumulative Effects).

Changes in the state of a VC may therefore be attributable to different changes to the environment resulting from the project and other physical activities that are acting together on the VC in various ways. In considering how various physical activities may interact to affect a VC, practitioners may find it helpful to compare the predicted future environmental state of the VC, both with and without the project.

Methodologies outline in broad terms how cumulative effects can be analyzed. For any methodology, a range of methods can be employed. For more information on types of methods that can be employed, see Appendix 3.

Level of Effort for the Analysis

In addition to the overall level-of-effort considerations outlined in the OPS (see Section 1.0 of this document for OPS level-of-effort considerations), the level of effort needed to undertake the analysis of cumulative effects will vary depending on the:

- sensitivity of the VC to the environmental effects of the project;
- likely contribution of the project to cumulative effects;
- complexity of a VC's response to multiple environmental stressors;
- state (health, status, or condition) of a VC with regard to known thresholds, standards or benchmarks;
- past or existing disturbance levels and extent of other physical activities that are or may contribute to cumulative effects on the VC; and
- selected methods used for the assessment.

Outcome Documentation

The outcome of the analysis should be a clear, well-supported documentation of the:

1. methodological approach and methods used and the rationale for their use;
2. estimated cumulative effects on VCs resulting from the project in combination with the environmental effects of other physical activities that have been or will be carried out, including the analysis conducted and rationale supporting the conclusions reached; and
3. contribution of the project to the cumulative effects, considering past, existing, and future physical activities, to facilitate the identification of appropriate mitigation.

The outcome documentation should be commensurate with the level of effort established.

2.1 Analyzing Various Types of Data and Information

Having access to data and information related to other physical activities and traditional and community knowledge is critical for conducting the Step 2 analysis.

To make decisions about which data is to be collected or generated, practitioners should have a clear understanding of how the data and information will be used in the assessment, how to establish a proper scale of analysis, and what methodologies and specific methods will be employed for their analysis.

> **OPS Approach**
>
> *Data collection and/or generation are important components of a cumulative environmental effects assessment. At times, it may be challenging to obtain or generate data to support the analysis.*

Methodologies

The methodological options presented here orient the analysis of various types of data and information frequently used in a cumulative effects assessment.

1. Using information about current and past environmental conditions

The purpose of baseline information is to develop a point of reference – before a project is developed – against which cumulative effects can be predicted and assessed. In order to analyze cumulative effects, it is essential to understand the state of the receiving environment into which a project is entering. This means that, for each selected VC subject to analysis, information should be gathered on its state within the determined spatial and temporal boundaries.

The OPS recognizes that a description of past environmental conditions can at times improve the understanding of cumulative effects for a specific VC. As such, practitioners should make reasonable efforts to understand the extent to which past and present physical activities are responsible for baseline conditions.

> **OPS Approach**
>
> *A description of past environmental conditions can at times improve the understanding of cumulative environmental effects for a specific VC.*

Baseline data can be compared to past conditions to reveal spatial or temporal patterns or trends so that predictions can be made. Information on past environmental conditions may also help establish if present-day VC conditions are likely to be stable. For example, data and information on the response of a forested area to harvesting over time may help establish if the current state has reached equilibrium and/or if the response over time corresponds to the body of knowledge on recovery stages.

Some characteristics of useful baseline information for the purpose of a cumulative effects assessment under CEAA 2012 include:

- detailed data (either qualitative or quantitative) are available for each selected VC within the spatial and temporal boundaries identified for the cumulative effects assessment;

- natural variability, drivers of change, and historical shifts for the VC are identified, if reasonably obtainable;
- trends or spatial patterns in quality, quantity, value, or use of VCs are identified where reasonably obtainable;
- the current status of the existing environment is presented in the context of relevant benchmarks; and
- data or perspectives relevant to baseline conditions include those that are obtained through community and/or ATK, where appropriate.

Models may be used to generate baseline conditions. For more information on conceptual and numerical models, see Appendix 3.

2. Using information on the environmental effects of physical activities

The focus of a cumulative effects assessment is on understanding key environmental effects on specific VCs. In achieving this understanding, it is necessary to gather information on the physical activities identified during scoping.

Pathway diagrams are useful to identify and evaluate potential cumulative effects on VCs by exploring linkages to other physical activities (see Appendix 1 for more information).

However, as a region becomes more heavily disturbed due to many actions, it may become difficult and less relevant to determine which physical activity is contributing to specific environmental effects, and to what degree. While attributing specific environmental effects to individual physical activities may not always be feasible, estimation of the cumulative effects on VCs should still be possible.

It is important to consider if past physical activities that are no longer physically present, operating, or active continue to affect an identified VC (e.g., ongoing environmental effects of an abandoned gravel pit, or a contaminant plume from a brownfield site). In some cases, the source and pathways of environmental effects may no longer be readily observable; however, they may continue to affect the state of the receptor VC.

If the state of the VC is likely to be stable, then the cumulative effects assessment can address how the baseline will be further affected by additional changes in the environment due to future activities. On the other hand, if the VC is still changing as a result of past or existing activities, then the analysis has to address two influences: how past and existing activities are expected to affect the future and how future activities will affect the future.

OPS Approach

Information on the environmental effects of past or existing physical activities may be helpful:

- *if the effects of past or existing physical activities on a specific VC will help predict the environmental effects of a designated project;*
- *if information on past or existing physical activities will assist in the identification of appropriate mitigation measures for the designated project; or*
- *if an existing physical activity will be decommissioned in the future and this decommissioning would affect the future condition of a specific VC.*

With complex interactions, the whole does not necessarily correspond to the sum of the parts. Continuing environmental changes associated with past and existing activities may result in a worsening or improvement of VC conditions. Where there is evidence that effects are not simply additive, it should be noted.

Consideration should also be given to whether an existing physical activity will be decommissioned in the future, and whether this decommissioning might affect the future condition of a specific VC.

> Example: The operation of a generating station releases cooling-water effluent in a lake that results in a change in the fish population due to thermal pollution. The fish population is also affected by fishing and sewage-related pollutants from residential development on the lake's shores. All of these types of environmental effects on the fish should be included in the cumulative effects assessment.

3. Using Aboriginal traditional knowledge and community knowledge

Community knowledge and ATK available to the proponent should be incorporated into the cumulative effects assessment.

Collection and use of ATK is covered in the reference guide *Considering Aboriginal traditional knowledge in environmental assessments conducted under the* Canadian Environmental Assessment Act, 2012.

How community knowledge and ATK available to the proponent are used for the assessment of cumulative effects should be described and be a part of the selected methodological approach, without breaking obligations of confidentiality, if any, while also maintaining appropriate ethical standards. Legislated requirements associated with access to information must be considered.

> **OPS Approach**
>
> *Community knowledge and ATK available to the proponent should be incorporated into the cumulative environmental effects assessment, in keeping with appropriate ethical standards and without breaking obligations of confidentiality, if any.*

Considerations

(a) Establishing the proper scale for analysis

The assessment area for cumulative effects may be larger than required for the assessment of the project-related environmental effects to capture the greater extent of overlapping cumulative effects of other physical activities. The type of data required may change as the scale of the assessment changes.

Where cumulative effects extend over larger areas, the assessment may have to be based on satellite imagery or existing habitat surveys completed at very broad scales.

Example: Maps or photo mosaics at scales ranging from 1:250,000 to 1:50,000 are sometimes used to depict broad-level baseline environmental data for the purposes of a cumulative effects assessment (e.g., to convey available habitat). In some cases, it may be more instructive to include photos of the area (regular or panoramic views) and surrounding areas rather than maps (e.g., to depict changes in viewscape).

In other cases, practitioners may rely on various landscape-level metrics, such as linear feature density, as a predictor of the change in VC health, status, or condition, or to characterize the degree of disturbance or activity. Regardless, practitioners should select appropriate scales and tools to support meaningful evaluation.

In some cases, the scale is small and relies on field surveys.

Example: Species-at-risk studies may be relatively intensive within the proposed footprint of the project and involve on-site mapping.

(b) Selecting the appropriate analytical method

Different methods can be used to analyse the data and information (see Appendix 3). Selecting the method to be used will depend on the nature of the data and information available and generated for the cumulative effects assessment, as well as the nature of the VC and pathways of effects.

Level of Effort for the Analysis

In addition to the overall level-of-effort considerations outlined in previous sections of this document, the level of effort needed to undertake the analysis of cumulative effects will vary depending on the:

- amount of data collection or generation required to predict cumulative effects with an appropriate methodological option;
- quality/quantity of information collected about cumulative effects for each VC during the scoping process;
- quality/quantity of information available about the environmental effects of other physical activities that contribute to cumulative effects;
- amount of existing knowledge on a VC’s sensitivity to environmental effects (natural and anthropogenic); and
- amount of data judged useful for mapping.

Outcome Documentation

EA documentation must clearly explain and justify the methodologies and methods that have been used to assess cumulative effects.

Practitioners should clearly document with the following supporting information:

1. types of data and information that were gathered or generated for each VC, and why they were sought;
2. specific methods that were used to gather or generate this data and information, and why they were selected;
3. specific methods that were used to analyze this data and information, and why they were selected; and
4. the results of the analysis for each VC and how such VC-specific results were used in predicting cumulative effects (as per section 2.0).

The outcome documentation should be commensurate with the level of effort established.

2.2 Addressing Data Limitations and Uncertainty in the Analysis

Collecting and using appropriate data and information is central to the analysis of cumulative effects. A reasonable attempt to collect data and information must be demonstrated. A lack of reliable data and information will tend to make the predictions less certain, and potentially faulty.

Few – if any – cumulative effects predictions are certain. Uncertainties associated with information and methods may occur at many points in the process of analyzing cumulative effects. For example, there may be poor information about other physical activities, or conflicting reports about the effectiveness of mitigation measures. Even where the data are reliable, data interpretation could be challenging. For example, it may not be clear to what extent an effect pathway is likely to result in a change in the environment.

Practitioners must meet the requirement to assess cumulative effects in the face of data limitations and uncertainty. The EIS should present a complete picture of the potential scale of cumulative effects and the data required and used for their assessment. While there are frequent data limitations in cumulative effects assessment that cannot be fully overcome, the uncertainties that result from these limitations should be documented.

Assumptions used in modelling and other analytical methods may limit the analysis. Where possible, it should be noted whether the results are robust (i.e., not sensitive to small changes in assumptions).

OPS Approach

Potential cumulative environmental effects should be considered, as appropriate, in the analysis, even when there is little supporting data or there is predictive uncertainty.

Reviewers of the EIS should be presented with a complete picture of the potential types and scale of cumulative environmental effects. In all cases, uncertainties and assumptions underpinning an analysis should be described and information sources clearly documented.

Methodologies

Various methodologies used to address data limitations and uncertainties in a project EA are also useful in considering cumulative effects.

1. Documenting efforts and limitations

A reasonable attempt to collect information must be demonstrated. A lack of usable information for the analysis can have important implications to the predictive certainty of the cumulative effects assessment.

Where there is little supporting data, or where there is predictive uncertainty, the assessment of cumulative effects should still be conducted.

Limitations imposed by data and other types of uncertainty should be clearly described. This involves outlining how these limitations affected the choice of methodology and assumptions.

2. Using various sources and types of knowledge

A variety of approaches for addressing data limitations are available and have been mentioned in other parts of this technical guidance, including:

- use of ATK and community knowledge to fill data gaps;
- use of surrogate data from similar areas to estimate past environmental conditions;
- use of surrogate data from similar physical activities to predict cumulative effects;
- modelling to assess possible cumulative effects over the range of future conditions; and
- inferences based on an appropriate body of knowledge, using professional judgment.

3. Using scenario building

Scenario building may be useful to account for a range of future conditions for a VC and address uncertainty regarding the future state of a VC.

Scenario building consists of describing a set of possible alternatives that might reasonably take place leading to several possible past or future conditions. They are most helpful for studies of the mid- and long-range future and when several alternative scenarios – each one significantly different from the others – are to be considered.

Scenario building can be difficult and costly. It is often best undertaken as part of a regional approach, such as a regional study or planning exercise.

4. Using adaptive management

Adaptive management may be an appropriate strategy for helping to reduce uncertainty about the environmental effects and the effectiveness of mitigation. Adaptive management provides flexibility to identify and implement new mitigation measures or to modify existing ones during the life of a project.

However, a commitment to implementing adaptive management measures does not eliminate the need for sufficient information regarding the cumulative effects of the project, the significance of those effects, and the appropriate mitigation measures required to eliminate, reduce or control those effects.

For further information on adaptive management, see the Agency's *Operational Policy Statement: Adaptive Management Measures under the* Canadian Environmental Assessment Act, or any future updates to that document.

Considerations

Although aspects of cumulative effects cannot be known with certainty, that does not mean the EA is deficient. The practitioner must simply strive to provide the best information to support decisions about the project.

In determining whether data and information should be obtained or generated, practitioners should consider the ability, cost, and utility of the data to be collected, its intended use, and the limitations to its use in the assessment of cumulative effects.

Caution should be exercised if the degree of uncertainty is unusually large (e.g., effects are expected in the future, but it is not possible to predict whether they will improve or harm a particular VC). In these cases, predictions will be highly sensitive to the assumptions made. Relying on a particular assumption could result in a faulty conclusion. It would therefore be appropriate to present the results as a range, in line with the range of underlying assumptions.

In addition, a Step 5 follow-up program can be established to monitor the VC. This will help determine whether the mitigation measures identified in Step 3 are appropriate in the face of actual environmental effects.

Level of Effort for Uncertainties

The level of effort needed to address uncertainty will depend on:

- what decisions were made in Steps 1 and 2 concerning VCs, methodologies, methods, data collection and level of effort; and
- what is required to clearly state assumptions and data limitations throughout the EA.

Outcome Documentation

In addition to the criteria identified in previous subsections on analysis, the outcome of the analysis should be a clear, well-supported documentation of:

1. model assumptions and data limitations in the assessment of cumulative effects; and
2. the implications of these assumptions and limitations for the predictive certainty of the underpinning a cumulative effects assessment.

The outcome documentation should be commensurate with the level of effort established.

Appendix 1: Source-pathway-receptor model

This reference document provides information on the source-pathway-receptor model as background information. This model (see Figure 5) is used in EAs to identify:

The source of an environmental change (source)

The source is the activity or event that causes environmental stresses. For example, the source might be the project (i.e., a mine) or another physical activity (i.e., agriculture).

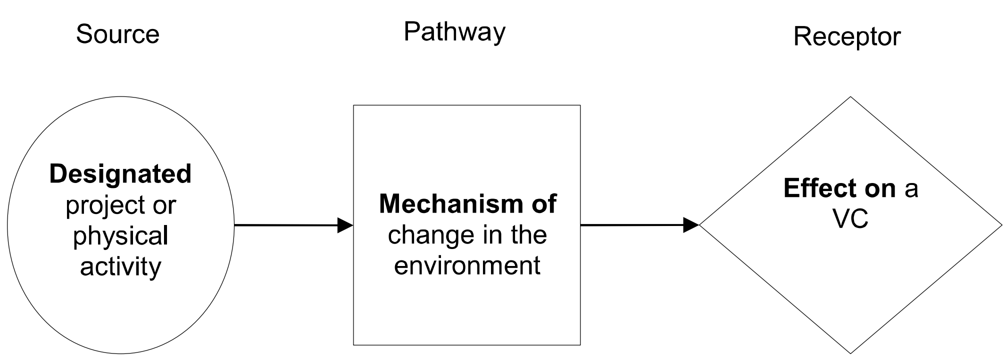
What the source may affect (receptor)

The receptor is the environmental component that is affected by the impacts of a physical activity. Since receptors differ in health and resiliency, each receptor has its own, unique sensitivity to environmental change. These receptors are the focus of the cumulative effects assessment and are typically referred to as VCs.

How the source may reach the receptor (pathway)

The pathway is the route the source takes to reach a VC. Pathways are the mechanisms through which a change in the environment occurs. Pathways can include physical or chemical transport through air, water, soil, animals, food supplies, etc. In order to consider cumulative effects, it is essential to understand these mechanisms and the state of the receiving environment within which a project takes place.

Figure 5: Source-Pathway-Receptor Model



Appendix 2: Types of cumulative effects

This reference document provides information on types of cumulative effects.

It is important to consider how cumulative effects may interact and manifest in practice in order to make sound and justifiable predictions about their significance. Key types of cumulative effects presented in this reference document include:

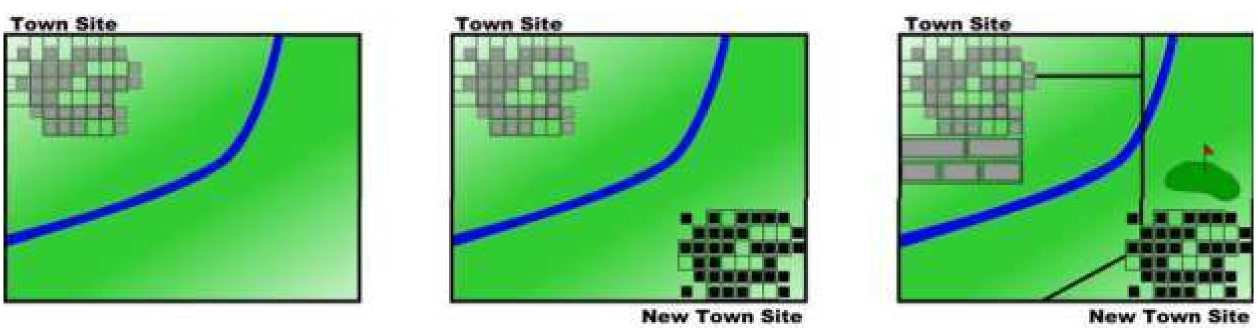
- additive;
- synergistic;
- compensatory; and
- masking.

Determining how cumulative effects occur can be a complex task, and can vary based on the VC being assessed. For example, even if the cumulative effects on habitat are additive, the ultimate effect on a species may be synergistic. Although classifying cumulative effects can be helpful to conceptualize various forms of cumulative effects, the critical point is the need to assess how the cumulative effects are acting on VCs (Duinker & Grieg 2006).

Additive cumulative effects

An additive cumulative effect is the sum of individual effects of two or more physical activities. Figure 6 demonstrates the loss of habitat increases with each new element of development (a new town, followed by new roads and a golf course).

Figure 6: Additive cumulative effects[1]



Synergistic cumulative effects

A synergistic cumulative effect occurs as a result of the interaction between two or more effects, when the resultant combination is greater or different than the simple addition of the effects. Consider the example described in the following text and shown in Figure 7 (adapted from Greig, L.A. et al, 2003).

[1] Source: Gartner Lee Ltd. 2006. *Cumulative Effects Assessment "Tips" Document*

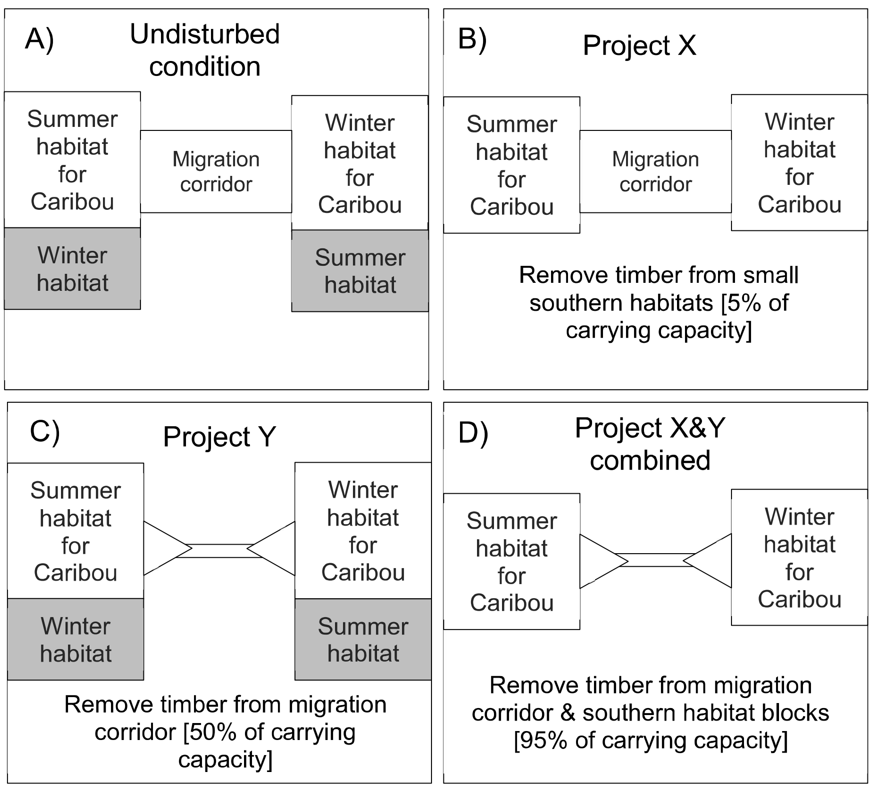
Panel A: Caribou habitat is divided in two large blocks joined by a migration corridor. Each block has contiguous winter and summer habitats, but their proportions are unequal and reversed in the two blocks.

Panel B: Harvest of timber is assumed to remove the small southern areas of winter and summer habitats with relatively little effect on carrying capacity for the migratory caribou herd.

Panel C: Harvest of timber in the migration corridor is assumed to almost completely block migration. Animals stranded in one or the other large habitat block need to find life requisites for the entire year in that block by utilizing the smaller habitat blocks, and the carrying capacity is substantially reduced.

Panel D: The synergistic cumulative effects of both projects combined is expected to reduce the caribou carrying capacity of the total area much more than the sum of the carrying capacity reductions of the two actions when taken independent of each other.

Figure 7: Synergistic cumulative effects[2]



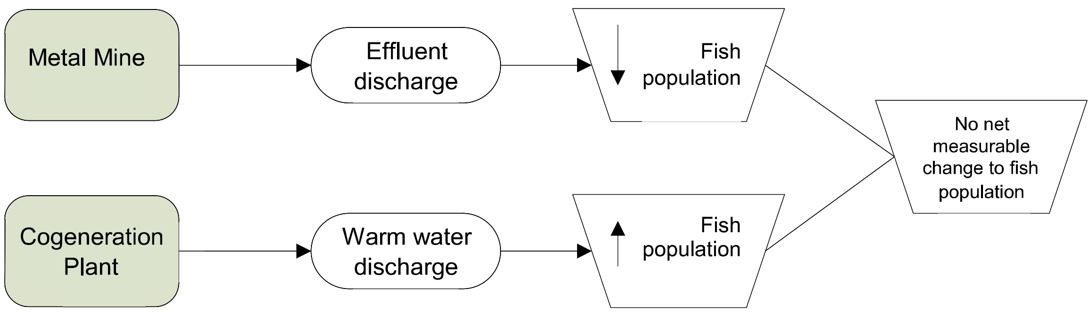
[2] Source: Greig, L.A. et al, 2003

Compensatory cumulative effects

Compensatory cumulative effects are effects from two or more physical activities that "offset" each other.

For example, as illustrated in Figure 8, a metal mine project might cause a decrease in a specific fish population due to effluent discharges, while a cogeneration plant might enable an increase in this same population through its warm water discharges. These effects may offset each other and, accordingly, the cumulative effects on this fish population may not be measureable.

Figure 8: Compensatory cumulative effects[3]



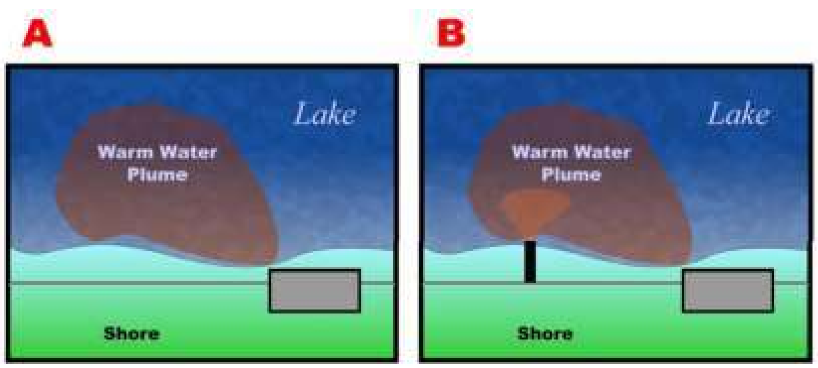
[3] Source: Adapted from Gartner Lee Ltd. 2006. *Cumulative Effects Assessment "Tips" Document*

Masking Cumulative Effects

The effects of one project might mask the effects of another in the field. For example, as illustrated in Figure 9, the warm water plume associated with a generating station (shown under "A" in Figure 9) may be of such magnitude that the effects of a small plume associated with another project (introduced as shown under "B" in Figure 9) would not be detected. If the generating station were to stop its physical activities, then the effect of the other project would become visible.

It is therefore possible that the effects of an earlier project could mask the effects of a new project. In this case, it is reasonable to conclude that the new project is not likely to result in environmental effects. This conclusion is correct as long as the effect of the earlier project continues. Once this earlier project is terminated, the effect from the new project would become evident. If masking of cumulative effects is predicted, a follow-up program may be required to ensure that mitigation measures remain effective in managing cumulative effects when the earlier project is terminated.

Figure 9: Masking Cumulative effects[4]



References

Gartner Lee Ltd. 2006. *Cumulative Effects Assessment "Tips" Document.* Prepared for the Canadian Environmental Assessment Agency.

Greig, L. A., P. N. Duinker, R. R. Everitt, and K. Pawley. (2003). Scoping for cumulative effects assessment. Prepared for Indian and Northern Affairs Canada Environment Directorate, Whitehorse, Yukon Territory. ESSA Technologies Ltd., Richmond Hill, Ontario.

Duinker, P. N., & Greig, L. A. (2006). The impotence of cumulative effects assessment in Canada: ailments and ideas for redeployment. *Environmental Management*, *37*(2), 153-161.

[4] Source: Gartner Lee Ltd. 2006. *Cumulative Effects Assessment "Tips" Document*

Appendix 3: Selecting the methods to be used

This Appendix provides a brief introduction to some of the methods that may be used in the cumulative effects assessment for Step 1 (scoping) or Step 2 (analysis).

Numerous methods are available for conducting a cumulative effects assessment, and often these are simply typical EA tools modified to better consider cumulative effects. The methods discussed in this Appendix include:

- Questionnaires and Interviews;
- Checklists and Matrices;
- Network and Systems Analysis/Diagrams;
- Indicators and Indices;
- Conceptual and Numerical Models;
- Trend Analysis; and
- Spatial Analysis.

Questionnaires and Interviews

Description

Questionnaires and interviews are a means of gathering a broad range of information from knowledgeable or interested individuals.

These methods can be used to collect information about past, present, or planned development projects, baseline data, changes in the socio-economic environment over a period of time, and opinions about where, why, and how cumulative effects may occur.

Applicability to Cumulative Effects Assessment

Interviews and questionnaires can be used to assist in the collection of baseline data and increase understanding of the environmental effects of other physical activities, the VCs affected, and possible mitigation measures. Interviews and questionnaires are most applicable to the scoping of the cumulative effects assessment.

It can be useful to interview experts during scoping and/or analysis to provide a range of expert knowledge during a cumulative effects assessment.

Checklists and Matrices

Description

A checklist is a simple method that can be used to record VCs and potential cumulative effects, but is not typically useful for analysis.

Matrices can be used to summarize and present complex information in a concise manner. Matrices are two-dimensional grids, with information arranged in rows and columns. Practitioners can enter data in the form of descriptive words, symbols, or numbers into the grid to record and organize information. Matrices range from simple interaction matrices, with project physical activities along one axis and VCs along the other, to more complex matrices that describe potential cumulative effects. Matrices can also describe mitigation and follow-up relative to specific cumulative effects.

Applicability to Cumulative Effects Assessment

Checklists are most applicable to the scoping of the cumulative effects assessment to, for example, help highlight common or likely cumulative effects among physical activities and the project under consideration.

Matrices can be used to present and organize information on the cumulative effects of a project and other physical activities on VCs. They are often used to identify the likelihood of cumulative effects on one or more VCs. They can also be used to score or rank cumulative effects. Matrices are often used in EA reports to add information such as mitigation and follow-up recommendations, and even the significance of the cumulative effects and the contribution of the project.

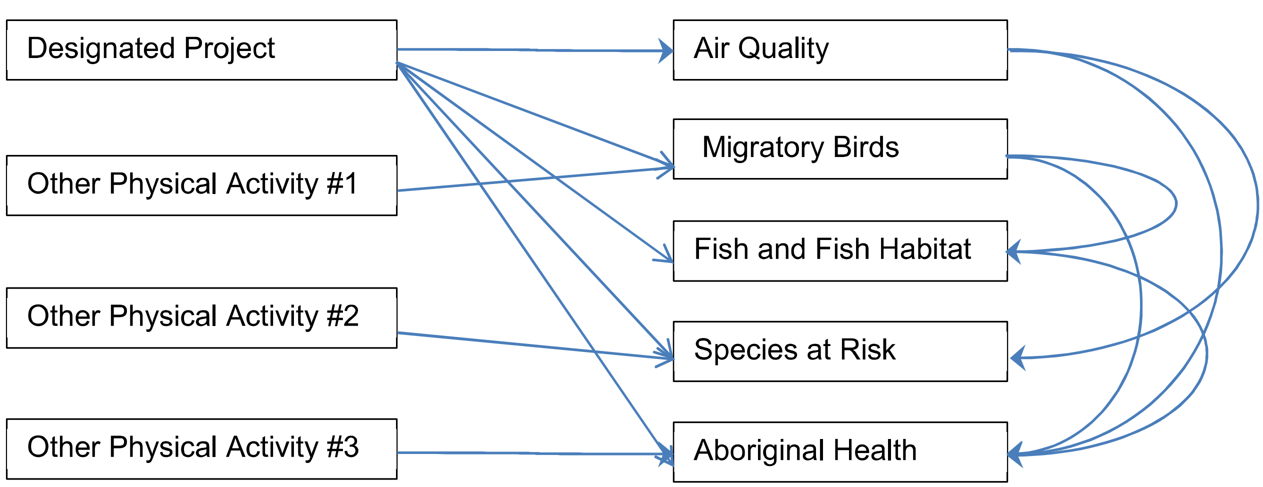
Network and Systems Analysis/Diagrams

Description

Network and systems analysis identifies the pathway of cumulative effects using a series of chains or webs between a proposed action and a VC. This method is based on the concept that there are links and interactions between individual VCs. A VC is affected not only directly by the source activity, but also indirectly through another VC. This method uses a network or system diagram, which is essentially a flow chart with connector lines between a project and/or physical activities and VCs.

An example of a network or system diagram for cumulative effects assessment is provided in Figure 10.

Figure 10: Network or system diagram of cumulative effects



Applicability to Cumulative Effects Assessment

By mapping cause-and-effect relationships among projects, other physical activities, and VCs, possible cumulative effects can be identified. Network and systems analyses are most applicable to the scoping of the cumulative effects assessment, and can be helpful to identify the pathways among a project, multiple other physical activities, and multiple VCs.

Indicators and Indices

Description

In EA, an indicator is a measurable variable and an index is an aggregation of variables. Both can represent the state (health, status, or condition) of a VC. For example, if caribou are selected as a VC, then indicators might include the total size of the herd, the density of animals in a habitat, and rates of mortality and reproduction.

An indicator or index can represent environmental effects on more than one VC. For example, habitat fragmentation can be an indicator of habitat quality for wildlife or vegetation or the use of land for traditional purposes by Aboriginal peoples.

Stress Indicators

Stress indicators are measurements that provide information about the attributes of human-caused disturbances or the surrounding environment, such as the magnitude, intensity, and frequency of physical activities, or natural phenomena that may bring about changes in environmental components. Some examples of stress indicators for which models have been developed and have been correlated to specific VC conditions include kilometres of roads per square kilometre; total cleared area; percent of area disturbed by class of activity; total area burned; and stream crossing density.

Ecological Indices

An ecological index is a numerical or descriptive categorization of a large quantity of ecological data or information involving multiple metrics. It is used to summarize and simplify information, to make it useful to decision-makers and stakeholders. Some examples of ecological indices are core habitat area, habitat patch size, index of biological integrity, and Hilsenhoff biotic index.

Social Indicators

Social indicators provide information on social VCs and facilitate comparisons over time that are well-suited for examining long-term trends in a community. Some examples of social indicators are population size and growth, equity (distribution of benefits), quality of life (self-assessed), locus of control (psychological), and cultural well-being.

Applicability to Cumulative Effects Assessment

Indicators and indices can be used during the scoping, analysis, significance, and follow-up steps of the cumulative effects assessment. For the determination of significance, indicators and indices can form the basis for establishing benchmarks. In cumulative effects assessment, indicators and indices can be useful for:

- summarizing and communicating information on the health, status, or condition of a VC, either in the present or historically;
- increasing the understanding of a VC's response to environmental effects;
- acting as a tool for evaluating VC sustainability over time;
- evaluating the effectiveness of mitigation measures and cumulative effects management strategies; and
- planning follow-up, monitoring, and adaptive management programs.

Conceptual and Numerical Models

Description

Conceptual and numerical models are methods that represent or simulate the environmental interactions among projects, VCs, and other physical activities. Models used in cumulative effects assessment can be qualitative (conceptual models) or quantitative (numerical models).

Conceptual Models

Conceptual models are generalizations of reality that provide an understanding of a more complex process or system. They represent the relationships among receptors (e.g., VCs), stressors (e.g., environmental effects), and sources of stressors (e.g., projects or other physical activities). The outputs from conceptual models are typically qualitative or descriptive narratives, or graphic representations, such as a matrix or a box-and-arrow diagram.

Conceptual models may enhance understanding of the response of VCs to environmental effects resulting from past and existing physical activities. They may also serve as a useful tool to represent the structure, functions, and hierarchical relationships of the terrestrial, aquatic, and atmospheric systems affected by physical activities.

Numerical Models

Numerical models are a set of mathematical equations developed to simulate the behaviour of a system over time. They enable the quantification of cause-and-effect relationships by representing environmental conditions. A model could focus on a particular VC (e.g., water quality), or could represent a complex natural system. Some examples of commonly used numerical models are hydrological and hydrogeological models, air and water dispersion models, and species habitat models. In order to assess changes in the environment, such as air and water quality, water volume flows, and airborne deposition on soils and vegetation, numerical models usually require computers to provide solutions using complex and iterative numerical methods.

Modeling is a powerful technique for quantifying the cause-and-effect relationships leading to cumulative effects. Once the linkages have been quantified, numerical models can be used to make predictions into the future.

Applicability to Cumulative Effects Assessment

In a cumulative effects assessment, models can be used to identify and provide:

- the characteristics and interactions between VCs, the project, and other physical activities;
- the anticipated cumulative effects of multiple physical activities or events within identified study spatial and temporal boundaries;
- linkages of processes and environmental effects across disciplinary boundaries; and
- a scientific basis for the identification of VCs and their associated indicators, the establishment of spatial and temporal boundaries, the identification of other physical activities, and the prediction of cumulative effects.

For example, the Impact Model approach involves testing the validity of a statement, similar to that made in a scientific hypothesis. Such hypotheses provide a clear basis for prediction of cumulative effects by setting out how cumulative effects are likely to arise, and the accompanying rationale for a prediction.

Trends Analysis

Description

Trends analysis assesses the health, condition, or status of VCs over time, and is commonly used to develop projections of past or future conditions. The trend is often described relative to an environmental benchmark. The objective of trends analysis is to identify a pattern – in the form of a mathematical equation – which represents the behaviour of a VC. To support trends analysis, the data can be depicted in various ways, including:

- a simple quantitative indicator of a trend, such as numbers of animals from annual surveys, to reflect changes in population levels over time;
- a series of figures illustrating changes in habitat pattern;
- video simulations from a modelling exercise, showing complex changes in geographic or aesthetic resources; and
- aerial imagery showing time-series information.

Applicability to Cumulative Effects Assessment

Trends can help practitioners identify cumulative effects issues, establish appropriate environmental baselines, or project future cumulative effects.

Spatial Analysis Using Geographic Information Systems

Description

Spatial analysis is a method for identifying the spatial distribution of effects or analyzing geographic information. Spatial analysis can be applied to a range of physical activities and environmental conditions, and is used for identifying physical effects in terms of geographical location. Geographic information systems (GIS) are the most commonly used tool in spatial analysis.

Geographic Information Systems

GIS typically involves the preparation of maps or layers of geographic information that are then superimposed on one another. The layered map can be used to provide a composite picture of the baseline environment.

With GIS it is possible to correlate measures of disturbance to physical activities and relate those disturbances to the occurrence of VCs. This is a tool for creating a model of cause-effect relationships.

Overlay Mapping

Overlays provide a technique for illustrating the geographical extent of different environmental effects. Each overlay can be a layer of information, such as a map of a single impact. When superimposed on one another, the overlaps illustrate areas where there are potential cumulative effects.

With GIS software, overlay mapping is particularly suitable for pinpointing sensitive zones where development should not occur. This can then serve as the basis for land management proposals and other mitigation measures.

Applicability to Cumulative Effects Assessment

Spatial analysis is useful for identifying where cumulative effects may occur as a result of the geographic location of the project in relation to other physical activities.

GIS is also a useful tool in cumulative effects assessment owing to its ability to store, manipulate, and display large sets of complex, geographically referenced data. It is well suited to complex spatial applications, and can be used to display the consequences of multiple actions and to support mitigation proposals for undertaking cumulative effects assessments.

Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under the *Canadian Environmental Assessment Act, 2012*

Interim Technical Guidance

March 2018

Version 1

Canada

This page has been left intentionally blank

Document Information

Disclaimer

Please be advised that this draft guidance piece is an interim document. The Agency is currently reviewing the Environmental Assessment process and as a result of the review, EA practice, policies and procedures may change. This draft guidance document reflects current practice under the Canadian Environmental Assessment Act, 2012 (CEAA 2012).

This Technical Guidance is for information purposes only. It is not a substitute for the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) or its regulations. In the event of an inconsistency between this document and CEAA 2012 or its regulations, CEAA 2012 or its regulations would prevail.

For the most up-to-date versions of CEAA 2012 and regulations, please consult the Department of Justice website.

Agency staff can use this document or portions of it in correspondence and share this document with external partners on an as needed basis by email, using the standard email text provided by Operational Support Directorate. For questions or further information please contact Guidance / Orientation [CEAA/ACEE] CEAA.guidance-orientation.ACEE@ceaa-acee.gc.ca

Updates

This document may be reviewed and updated periodically. To ensure that you have the most up-to-date version, please consult the Policy and Guidance page of the Canadian Environmental Assessment Agency's website.

Copyright

Catalogue Number: En106-154/2016E-PDF

ISBN: 978-0-660-06385-0

Ce document a été publié en français sous le titre : *Déterminer la probabilité qu'un projet désigné entraîne des effets environnementaux négatifs importants en vertu de la* Loi canadienne sur l'évaluation environnementale (2012) – *Orientations techniques intérim*

Alternative formats may be requested by contacting: info@ceaa-acee.gc.ca.

Table of Contents

LIST OF ABBREVIATIONS AND ACRONYMS

Agency	The Canadian Environmental Assessment Agency
CEAA 2012	*Canadian Environmental Assessment Act, 2012*
EA	Environmental Assessment
EIS	Environmental Impact Statement
Minister	Minister of the Environment
OPS	Operational Policy Statement
Project	A designated project under CEAA 2012 for which the Agency is the responsible authority
Project EA	EA of designated projects conducted under CEAA 2012 for which the Agency is the responsible authority
VC	Valued Component

INTRODUCTION

Context

The *Canadian Environmental Assessment Act, 2012* (CEAA 2012) aims to protect components of the environment that are within federal legislative authority from significant adverse environmental effects caused by a project, including cumulative environmental effects.

In addition, CEAA 2012 ensures that a project is considered in a careful and precautionary manner to avoid significant adverse environmental effects, when the exercise of a power or performance of a duty or function by a federal authority under any Act of Parliament is required for the project to be carried out.

Throughout this guidance, the term “environmental effects” refers to environmental effects in areas of federal jurisdiction as described in section 5 of CEAA 2012, which are:

- effects on fish and fish habitat, shellfish and their habitat, crustaceans and their habitat, marine animals and their habitat, marine plants, and migratory birds;
- effects on federal lands;
- effects that cross provincial or international boundaries;
- effects of any changes to the environment that affect Aboriginal peoples, such as their use of lands and resources for traditional purposes; and
- changes to the environment that might result from federal decisions as well as any associated effects on health, socio-economic conditions, matters of historical, archaeological, paleontological or architectural interest, or other matters of physical or cultural heritage.

Please refer to Basics of Environmental Assessment and the Practitioners Glossary for Environmental Assessment of Designated Projects under the *Canadian Environmental Assessment Act, 2012* for additional information on the environmental assessment (EA) process and key terms under CEAA 2012.

Purpose

This technical guidance provides methodological options and considerations to support the implementation of CEAA 2012 and the approach outlined in the *Operational Policy Statement on Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under CEAA 2012* (OPS), in a way that achieves high quality EA.

The OPS provides core guidance on CEAA 2012 requirements related to the determination of significance for a designated project to ensure that these requirements are met in all project EAs.

This document informs the preparation of Canadian Environmental Assessment Agency (the Agency) documents such as the Environmental Impact Statement (EIS) Guidelines and the EA report. It is intended to support proponents of designated projects in the preparation of an EIS, in conjunction with other Agency policy and guidance instruments. It also provides guidance to Agency employees throughout the EA of a designated project in their interactions with those engaged in federal EAs, such as proponents, review panel members, federal authorities, other jurisdictions, Indigenous groups and the public.

This Technical Guidance is based on a collection of examples from past EAs; it is not exhaustive. This document will be reviewed periodically to integrate updated information on the best available approaches to determination of significance.

Application

This technical guidance is intended for use in the EA of a designated project when the Agency is the responsible authority or supports an EA conducted by a review panel. It should be used in conjunction with other Agency policy and guidance instruments. For an EA by a review panel, additional guidance and direction may be provided in the Terms of Reference and/or Joint Review Panel Agreement.

When the National Energy Board is the responsible authority, direction and guidance can be found in their filing manual. Applicants seeking guidance on nuclear projects should refer to the Canadian Nuclear Safety Commission's regulatory framework.

The term "project" refers to designated projects under CEAA 2012 for which the Agency is the responsible authority, and "project EA" refers to the EA of designated projects conducted under CEAA 2012 for which the Agency is the responsible authority. Environmental effects refer to those identified in section 5 of CEAA 2012, including cumulative environmental effects.

This guidance replaces the Agency's 1994 *Reference Guide: Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects* and is for application under CEAA 2012. The 1994 reference guide will continue to apply for project EAs initiated under the former *Canadian Environmental Assessment Act* and are being completed under the transitional provisions of CEAA 2012.

For further guidance on the assessment of cumulative environmental effects, please see the Agency's *Operational Policy Statement Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012* and *Technical Guidance on Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012.*

SUMMARY OF THE CORE GUIDANCE

Determining whether a project is likely to cause significant adverse environmental effects is central to the concept and practice of EA under CEAA 2012. Whatever adverse environmental effects are predicted and whatever methods are used to assess them, the focus of an EA under CEAA 2012 is always whether the project is likely to cause significant adverse environmental effects, after taking into account the implementation of mitigation measures.

The approach for determining significance is nested within the EA framework (see Annex 1 of the OPS).

The OPS provides the following approach for determining whether a project is **likely** to cause **significant adverse** environmental effects:

- Stage 1: Determining whether the environmental effects are adverse
- Stage 2: Determining whether the adverse environmental effects are significant
- Stage 3: Determining whether the significant adverse environmental effects are likely

The OPS provides core guidance on the three stages as well as on information requirements, documentation, and decision-making. Notably, conclusions on the significance and likelihood of environmental effects by the Agency or the review panel are presented in the EA report (or review panel report).

The OPS describes the following key criteria to be used for stage 2: determining if a residual adverse environmental effect is significant:

- Ecological and Social Context,
    - This criterion should be taken into account when considering the key criteria below in relation to a particular valued component (VC), as the context may help better characterize whether adverse effects are significant (see Technical Concepts and Considerations section);
- Magnitude;
- Geographic Extent;
- Timing;
- Frequency;
- Duration; and
- Reversibility.

Example 1: Ecological and Social Context

A proposed project would affect a burial site and a cremation site identified by an Indigenous group. The sites would be buried under mine tailings. The Indigenous group has stated that the site is of great cultural and historical importance to them. The effects are therefore deemed to be of high magnitude and permanent.

TECHNICAL CONCEPTS AND CONSIDERATIONS

The following key concepts inform the determination of significance under CEAA 2012:

- Valued components (VCs) refer to environmental features that may be affected by a project and that have been identified to be of concern by the proponent, government agencies, Indigenous peoples or the public. The value of a component not only relates to its role in the ecosystem, but also to the value people place on it. For example, it may have been identified as having scientific, social, cultural, economic, historical, archaeological or aesthetic importance. For the purposes of CEAA 2012, VCs are selected in relation to section 5 of CEAA 2012 and taking into account direction provided by the responsible authority, or in the case of an EA by review panel, by the Agency or the Minister of the Environment (the Minister).

- Mitigation measures are for the elimination, reduction or control of the adverse environmental effects of a project, and include restitution for any damage to the environment caused by those effects through replacement, restoration, compensation or any other means. Under CEAA 2012, these measures must also be technically and economically feasible.
- A residual environmental effect is an environmental effect of a project that remains, or is predicted to remain, after mitigation measures have been implemented. The determination of whether a project is likely to cause significant adverse environmental effects relates to the residual environmental effects.

Key technical considerations in determining significance include the following:

- Information and documentation;
- Addressing cumulative effects;
- Using benchmarks;
- Addressing likelihood; and
- Addressing uncertainty.

1. Information and Documentation

The Agency issues EIS Guidelines to proponents, which specify the nature, scope and extent of the information required for the preparation of the EIS. Following the review of the EIS, the Agency, the review panel or the Minister may also issue information requests to a proponent seeking additional clarification and information if necessary.

A proponent, the Agency or a review panel may make a determination of significance in the course of a project EA. Such determinations are separate from, but may inform, the decisions made by the Minister under subsection 52(1) of *CEAA 2012.*

Community knowledge and Aboriginal traditional knowledge can contribute to the determination of significance. The public and Indigenous groups can provide new information, offer a different interpretation of the facts or question the conclusions put forward by the proponent or the Agency.

The EIS will identify and define the criteria used to assign significance ratings to any predicted adverse effects and justify the methods selected to determine significance. It will contain clear and sufficient information to enable the Agency, technical and regulatory agencies, Indigenous groups and the public to review the proponent's analysis of the significance of effects. If any deficiencies are identified by the Agency, the proponent will be directed to address them.

The degree of uncertainty in outcomes of the EA should be described in the documents produced throughout the project EA as appropriate. The sources and nature of uncertainty should be clearly described to provide the basis for the stated level of confidence as well as how any identified uncertainty may affect the steps in the methodologies discussed in this document.

Example 2: Information from Indigenous Groups

Construction of a proposed project would eliminate access to sites used by a nearby Indigenous group to gather medicinal plants for traditional purposes. The plants are present at other sites within the Regional Study Area. During the EA, members of the Indigenous group noted that alternative plant sites would not be suitable because the community elders could not easily access them. The original sites were important for maintaining the practice of plant gathering for medicine and for the cultural transmission of knowledge of these sites and plants to younger members of the Indigenous group. Through the EA process, the consideration of significance was greatly informed by engagement with the affected Indigenous group.

2. Addressing cumulative effects

Determinations of significance must be made for both project-specific effects, and for any cumulative environmental effects. Both determinations of significance, documented in the EA report, will be taken into account in the Minister's decisions under subsection 52(1) of CEAA 2012.

The assessment of both project-specific and cumulative environmental effects includes the consideration of the implementation of mitigation measures. This is done prior to determining the significance of the environmental effects. Any uncertainty regarding the predicted effectiveness of proposed mitigation measures should be considered in the assessment.

The cumulative environmental effects assessment should consider all VCs for which residual environmental effects are predicted, regardless of whether those residual environmental effects are predicted to be significant.

3. Using benchmarks

Benchmarks help define what would be considered a significant adverse environmental effect on a VC. In some cases, it may be possible to identify established or generally accepted benchmarks. These may be in the form of standards, guidelines, targets, or objectives. Benchmarks are used to:

- aid in understanding whether and how much a VC's state (health, status, or condition) is affected by specific or multiple activities and stressors (Stage 1);
- provide information on potential effects levels for a VC (i.e. thresholds for negative consequences of a stressor on a VC), which can assist in the application of the criteria set for significance (Stage 2); and
- provide an indication of which VCs are of regional concern (i.e. if a benchmark for a VC has been established at a regional level), which may assist with all stages.

4. Addressing likelihood

Likelihood is defined as the probability that an event or incident, such as a significant adverse environmental effect, will occur as a result of a project. The likelihood of the predicted significant adverse environmental effects should be supported with sufficient detail, using an appropriate quantitative or qualitative approach, to understand and substantiate how conclusions were reached.

Different methodologies, such as professional judgment, reasoned argumentation, collaboration and risk assessment, (see Methodologies section) may be used to determine the likelihood of a predicted significant adverse environmental effect. The selection of the methodology used for assessing likelihood is linked, among other things, to measurability of the effect, which in turn is influenced by the nature of the VC and the nature of the environmental effect.

Where possible, practitioners should use a quantitative assessment to characterize the likelihood of occurrence. Any assumptions and limitations should be described and be transparent.

Where quantitative assessment is not possible, the probability of occurrence is often determined based on a qualitative approach using terms such as “low”, “moderate” and “high” probability or “unlikely”, “probable” and “very likely”.

It is important that qualitative terms be defined (e.g. using a defined percentage), applied in a transparent manner and supported by explanation and discussion to avoid variability in different interpretation by reviewers.

Uncertainty often influences the prediction of the likelihood of a significant adverse environmental effect.

Example 3: Likelihood and Uncertainty

Stage 3: Determining whether the significant adverse environmental effects are likely

A proposed project could affect a herd of woodland caribou. An Indigenous group has stated that this herd is critically important to them as a source of food and for a variety of products such as snowshoe panels (current use of lands and resources for traditional purposes).

Uncertainties exist in the conclusions related to:

- the critical ecological pathways to the effects on current use;
- the effectiveness of proposed mitigation measures; and
- the interaction of various effects.

Given these scientific uncertainties and the importance placed on the availability of woodland caribou by the affected Indigenous group, a conservative approach is used. It is assumed to be 100% likely that the hunting success rate of caribou by the Indigenous groups will be significantly affected. Therefore a significant adverse effect to the current use of lands and resources for traditional purposes by the Indigenous group is likely.

5. Addressing uncertainty

Scientific uncertainty associated with information and methods may be introduced at many points in the EA process, including, for example, in the evaluation of the accuracy and availability of baseline information, accuracy of environmental effects predictions, and the expected level of effectiveness of mitigation measures.

All project EAs involve some level of uncertainty and observed results can be expected to deviate, to some degree, from predictions made in the EA. The confidence limits, confidence interval or the confidence level provides information about the range in which the true value lies within a stated degree of probability. This information can be assessed with a quantitative or qualitative approach by qualified professionals.

When data are generated, the application of statistical methods may allow for quantitative determination of confidence limits. When statistical methods are used, the nature and quality of the data used, the scientific validity of the hypotheses, and “statistical significance”, have to be taken into account. Statistical significance is characterized by a low probability of error and a high confidence level. (Note that statistical significance is a different concept from that of significance of adverse environmental effects under CEAA 2012.)

As an alternate to statistical methods, professional judgment (see Methodologies section) is often applied to characterize the level of confidence of each prediction of significance and likelihood with qualitative terms such as “low”, “medium” and “high”. The criteria for determination of the level of confidence should be defined and documented to enable consistent interpretations by reviewers.

It may be appropriate to perform an additional risk analysis to characterize potential risks, particularly if:

- there is a high level of uncertainty in the prediction of the environmental effect;

- a significant environmental effect is possible among the range of potential effects; or
- specific adaptive management commitments would not adequately mitigate the uncertainty or potential for significant environmental effects.

The risk assessment would allow for the description of the range of likely, plausible, and possible outcomes with respect to both potential significance and likelihood.

Regardless of the approach taken to consider uncertainty (quantitative or qualitative), the sources and nature of uncertainty should be clearly described to provide the basis for the stated level of confidence as well as how any identified uncertainty may affect any of the steps in the methodologies discussed in the document.

Adaptive management may be used to address uncertainty. Adaptive management provides flexibility to identify and implement new mitigation measures or to modify existing ones during the life of a project. However, a commitment to implementing adaptive management measures does not eliminate the need for sufficient information regarding the environmental effects of the project, the significance of those environmental effects and the appropriate mitigation measures required to eliminate, reduce or control those environmental effects. Adaptive management requires appropriate predictions, monitoring and triggers for when action will be taken. For further information on adaptive management, please see the Agency's Operational Policy Statement: Adaptive Management Measures under the *Canadian Environmental Assessment Act* or any future updates of this document.

METHODOLOGIES

Several methodologies that can be used to determine whether an adverse environmental effect is significant are described in this section. A methodology generally frames the implementation of various methods.

The methodologies described below are often interrelated and can be used in combination, as appropriate, to determine whether a project is likely to cause significant adverse environmental effects. For example, professional judgment and reasoned argumentation may be used to adapt broad standards, guidelines and objectives to establish a definition or limit of significance for a specific environmental effect. Collaboration can support and inform a variety of methods.

1. Collaboration

Collaborative interactions among experts and other stakeholders can inform the consideration of significance and the scaling or defining of the key criteria. Collaboration generally involves identification of stakeholder representatives who can participate in forums that may require multiple sessions and an investment of time. These forums are typically distinct from general public participation opportunities provided by the proponent, the Agency or a review panel.

Considerations for applying this methodology include the following:

- the objectives of interactions with stakeholders (e.g., seek advice, achieve consensus) should be clear to all participants;
- the reasoning for the determination of significance must be clear for all participants to enable clear conclusions in the EIS;
- this methodology is conducive to the integration of scientific, Aboriginal and community knowledge, mutual learning, creative interpretations and problem solving; and
- this methodology is highly dependent on effective participation methods.

Consideration should be given to using multiple forms of participation (e.g., public meetings, site tours, focus groups), considering the needs and characteristics of the collaborating parties, making use of specialists with the appropriate background and experience, as well as specialists with facilitation and mediation skills.

Example 4: Collaboration

Stage 2: Determining whether the adverse environmental effects are significant

A proposed project may affect the current use of lands and resources for traditional purposes by an Indigenous group. Due to the importance of Indigenous perspectives in the understanding and interpretation of effects on this VC, a collaborative method is used to inform the consideration of significance.

Traditional knowledge holders and leaders from the potentially affected Indigenous group, as well as the proponent's technical experts in biology and archaeology, participated in a three-day workshop to discuss the evaluation of significance of adverse environmental effects. The objectives of the workshop were clearly defined:

- share and understand the rationale behind the residual adverse environmental effects identified;
- define and discuss the key criteria (i.e., ecological and social context, magnitude, geographic extent, timing and duration, frequency, and reversibility) that are typically used to determine the significance of residual adverse environmental effects; and
- achieve consensus on the key criteria to be considered for this VC and the process that will be used to apply these key criteria.

Concerns raised at the workshop were used to inform the design of the project and application of mitigation measures. Questionnaires and interviews with members of the Indigenous group resulted in additional baseline information and greater understanding of their ranking of issues related to current use of lands and resources for traditional purposes.

2. Risk Assessment

Significance can be determined on the basis of an "acceptable level" of a specified risk, using quantitative or qualitative ecological or human health risk assessment. This methodology considers a combination of likelihood and the consequences of the adverse environmental effect.

Risk assessment may also be used to describe the range of likely, plausible, and possible outcomes with respect to both potential significance and likelihood. This may be a useful aid for addressing uncertainty.

Considerations for applying this methodology include the following:

- quantitative risk assessment is often used to determine the significance of the risks to human or ecological health from, for example, carcinogenic chemicals. Its use is restricted to agents that have predictable dose-response or exposure-effect relationships. The response, effect, or risk is often measured in terms of increased incidence of a particular health outcome per million people exposed. By using the dose-response relationship, it can be determined whether or not the dose or exposure would result in an unacceptable level of risk;
- ecological risk assessments are used to assess risks to ecosystem processes, habitats and biotic resources;
- information on who has set the risk levels and how acceptable risk levels are determined should be presented. The views of Indigenous groups should be considered regarding acceptable risk levels for environmental effects that may affect them; and
- risk assessments may use generally available and tested models, models that have been adapted to better address the circumstances of the project or models developed specifically for the project.

Example 5: Quantitative Risk Assessment

Stage 1: Determining whether the environmental effects are adverse,
Stage 2: Determining whether the adverse environmental effects are significant, and
Stage 3: Determining whether the significant adverse environmental effects are likely

The health of an Indigenous group could be affected by air emissions from a proposed project.

A quantitative risk assessment method is appropriate due to the availability of a risk assessment framework and guidance endorsed by federal regulatory agencies.

Future concentrations of air contaminants are modelled and compared to available site-specific and/or published background levels, as well as health-based environmental guidelines set by regulatory agencies.

The risks to the health of Indigenous peoples are evaluated using professional judgement and by comparison to risk levels that consider both the probability of occurrence and the consequences of an adverse environmental effect.

3. Aggregation

Qualitative or quantitative aggregation methods involve attributing a scale ranking to each key criterion and applying a decision rule to inform the determination of significance. Examples of this methodology include multi-criteria analysis and decision trees.

The influence of the key criteria on a determination of significance will vary between VCs. In most cases, reliance on a standardized ranking system or standardized decision rules across all VCs will not give adequate consideration to VC-specific circumstances. It is important to explain rankings and give a clear rationale for the determination of significance on a VC-specific basis.

Example 6: Qualitative Aggregation

Stage 2: Determining whether the adverse environmental effects are significant

A proposed project may affect air quality on a nearby national park (federal lands) and also across a provincial boundary. A method based on qualitative aggregation and professional judgement is appropriate in this case, because the most relevant key criteria for measuring air quality are magnitude, geographic extent and frequency.

Thresholds for magnitude of air quality effects, available as established standards, are best understood in relation to the geographic extent and frequency criteria. Established air quality criteria are developed to apply in the environment, which means beyond the geographic extent of the project itself. The geographic extent of the effect can be tied to the predicted magnitude. For an effect on air quality on federal lands or in another jurisdiction (i.e. transboundary) to be significant, the predicted air quality would need to exceed the relevant criteria and would need to exceed the criteria more frequently than under baseline conditions.

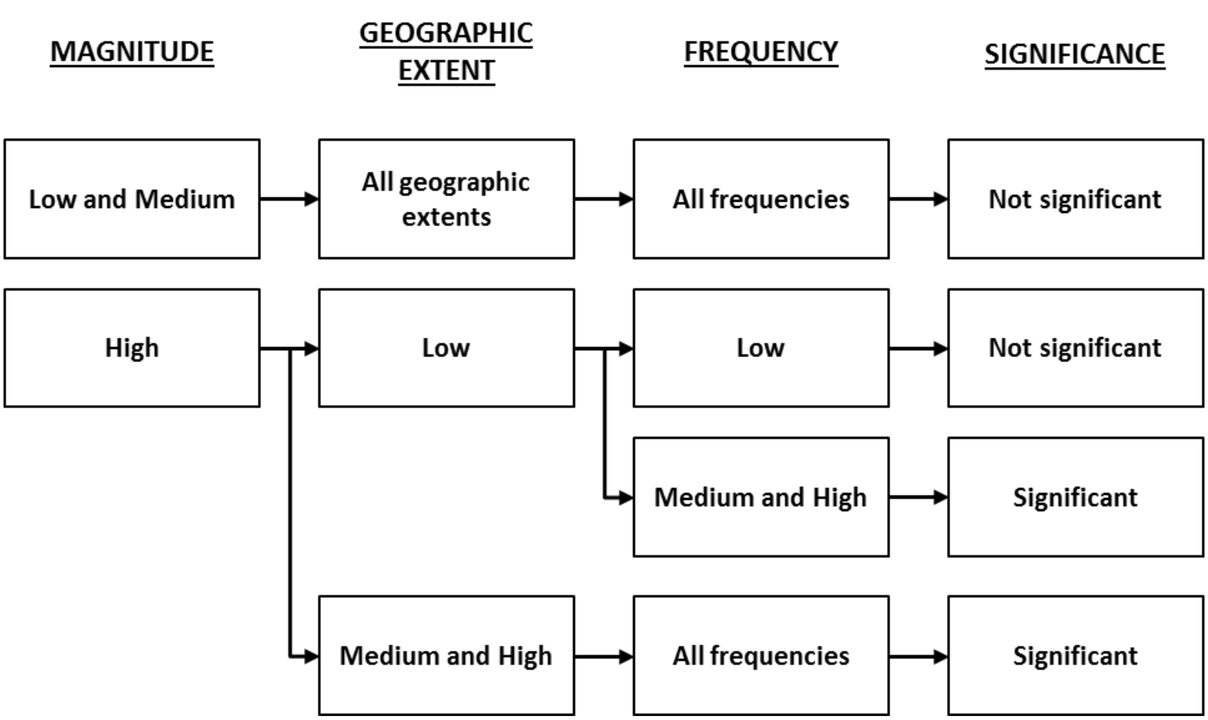
The definitions of the most relevant criteria are as follows:

- Magnitude: degree of the change in concentration of indicator compounds (airborne particulate matter, combustion by-products; and airborne metals) relative to applicable standards
- Geographic extent: the spatial area over which the effect occurs, categorized by comparison to the established study areas for the VC (e.g., Local Study Area, Regional Study Area, beyond the Regional Study Area); and,
- Frequency: how often the residual adverse environmental effect occurs within a given time period.

The decision making process for this example is outlined in Figure 1 below.

Figure 1. Example Decision Tree for Determination of Significance

Note: This diagram provides a decision tree for determination of significance (not significant or significant) based on the sequential interaction between the magnitude, geographic extent, and frequency criteria for effects (defined as low, medium or high).



Example 7: Quantitative Aggregation

Stage 2: Determining whether the adverse environmental effects are significant

A proposed project may affect fish and fish habitat as defined in the *Fisheries Act*. A quantitative aggregation method is appropriate due to the considerable variation in the importance of the key criteria to the determination of significance. Each of the key criteria is assigned effects-level definitions and related scores (see Classification and Score columns in Table 1 below) based on degree of adverse effect, e.g.:

Magnitude and Geographic Extent

- Low (Score 0): Under 20% alteration of important fish habitat in the Local Study Area
- Medium (Score 5): 20% to 40% alteration of important fish habitat in the Local Study Area
- High (Score 10): Greater than 40% alteration of important fish habitat in the Local Study Area

Magnitude and geographic extent, timing and reversibility are given greater weight in the scoring system to reflect their relative importance, i.e. any effects to these criteria could cause fundamental changes to the current state of fish populations.

In Table 1 below, the predicted effects of the project are compared to the significance key criteria using the corresponding scores. The key criteria scores are then aggregated to provide an overall determination of significance as follows:

- Negligible (not significant): 0-5
- Low (not significant): 6-10
- Moderate (not significant): 11-15
- High (significant): 16 or greater

The aggregated score of the effects is 10 corresponding to low, not significant, effects. Therefore, no significant adverse environmental effects on fish and fish habitat are anticipated as a result of the project.

Table 1. Application of Key Criteria

Note: This table illustrates the determination of significance by using quantitative aggregation, based on a comparison among the predicted effect of the project and the corresponding scores for each key criteria.

Key Criteria	Application of Key Criteria	Classification	Score
Ecological and Social Context	Species not identified as commercially or recreationally important or important to Indigenous groups.	Low	0
Magnitude and Geographic Extent	Approximately 25% of important fish habitat is likely to be altered in the Local Study Area.	Medium	5
Timing	The effect extends to sensitive periods (e.g. spawning).	Sensitive	3
Duration	The effect extends from the Construction Phase through the Closure Phase.	Long-term	2
Frequency	Conditions or phenomena causing the effect are anticipated to occur once.	Low	0
Reversibility	The effects are anticipated to be reversible following Project closure.	Reversible	0
Aggregated Score:			**10 (Low)**

4. Reasoned Argumentation

Reasoned argumentation involves presenting a clear, well-reasoned, substantiated and organized argument in support of a conclusion. A reasoned argument allows a wide audience to reasonably draw the same conclusions as the author. The argument should fully utilize relevant information, be based on a comparison of the predicted effect to a benchmark, where appropriate, and consider the most relevant key criteria.

Example 8: Reasoned Argumentation

Stage 2: Determining whether the adverse environmental effects are significant

A proposed project could affect habitat quality and quantity for a migratory bird species on federal lands, and disrupt breeding and nesting periods. Professional judgment and reasoned argumentation are used to identify benchmarks to determine what would be a significant effect for this VC. Scientific literature, species life history traits, predicted changes in measurement indicators and experience from past EAs, monitoring programs and regional studies informed this work.

A significant adverse environmental effect to this VC could be when one or more of the following population outcomes are reached:

- habitat loss or reduced habitat quality causes permanent adverse changes to survival or reproduction at the population level;
- habitat loss and fragmentation that reduces population connectivity to the point that it disrupts demographic rescue between source and sink habitats (or areas); or
- effects on abundance and distribution would be measurable at the population level and likely to decrease resilience and increase the risk to maintaining self-sustaining and ecologically effective populations.

5. Professional Judgment

Professional judgement involves developing interpretations informed by an understanding of project characteristics, predicted environmental effects, and general EA and sustainability principles, to establish a rational basis for a conclusion. The factors and logic leading to the conclusion must be clearly presented. Professional judgment should be applied by individuals that have the appropriate background and experience to make the judgment. Professional judgement is often used in combination with other methodologies (see Aggregation and Reasoned Argumentation sections above).

Considerations for applying professional judgment as the main or single methodology when determining significance include the following:

- a variety of factors should be taken into account, such as the status, size and range of a population unit, broad-scale habitat conditions, established thresholds or standards for closely related species, area-specific policies for land use and species management;
- information from a variety of sources including scientific analysis, community knowledge and Aboriginal traditional knowledge of environmental effects and their significance; and
- comparison to a benchmark should be used, where possible.

Example 9: Professional Judgement

Stage 1: Determining whether the environmental effects are adverse

After the implementation of mitigation measures, it is predicted that a project will result in the direct loss and fragmentation of migratory bird habitat on federal lands due to clearing and grubbing, watercourse alterations, and development of site access roads. Changes in habitat quality from noise, lights, people and vibrations from the project also have the potential to alter the movement and behaviour of individual birds and decrease occupancy of habitat near the project. Since no further mitigation measures are proposed, these effects are deemed residual adverse environmental effects and are advanced for consideration of significance.

Example 10: Professional Judgement

Stage 3: Determining whether the significant adverse environmental effects are likely

The migratory behaviour of marine mammals could be affected by the cumulative effects on habitat quality from a proposed project in combination with the environmental effects of other physical activities that have been or will be carried out. However, the likelihood is considered low given the distances over which the various physical activities are taking place, as well as the localized nature of potential project effects.

Canadian Environmental Assessment Agency
Agence canadienne d'évaluation environnementale

Technical Guidance for Assessing Physical and Cultural Heritage or any Structure, Site or Thing that is of Historical, Archeological, Paleontological or Architectural Significance under the *Canadian Environmental Assessment Act, 2012*

March 2015

Canada

Disclaimer

This technical guidance is for information purposes only. It is not a substitute for the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) or its regulations. In the event of any inconsistency between this technical guidance and CEAA 2012 or its regulations, CEAA 2012 or its regulations, as the case may be, would prevail.

For the most up-to-date versions of CEAA 2012 and regulations, please consult the Department of Justice website at: http://laws.justice.gc.ca/en/.

Updates

This document may be reviewed and updated periodically by the Canadian Environmental Assessment Agency (the Agency). For the most up-to-date version, please consult the Guidance Materials page of the Agency website at: www.ceaa.gc.ca.

Copyright

Catalogue No.: En106-128/2014E-PDF
ISBN: 978-1-100-24141-8

Ce document a été publié en français sous le titre : *Orientations techniques pour l'évaluation du patrimoine naturel et culturel ou d'une construction, d'un emplacement ou d'une chose d'importance sur le plan historique, archéologique, paléontologique ou architectural en vertu de la* Loi Canadienne d'évaluation environnementale, 2012.

Alternative formats may be requested by contacting: info@ceaa-acee.gc.ca.

User Feedback

If you have used or consulted the Technical Guidance for Assessing Physical and Cultural Heritage or any Structure, Site or Thing that is of Historical, Archeological, Paleontological or Architectural Significance under the *Canadian Environmental Assessment Act, 2012*, we would like to hear from you.

Please submit your comments through the User Feedback webpage.

Thank you for taking the time to contribute. Your feedback is appreciated.

Table of Contents

Purpose

This technical guidance document supports the implementation of CEAA 2012 provisions related to the effects of any changes to the environment on physical and cultural heritage or on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance. It provides preliminary guidance on how to conduct the assessment when the Canadian Environmental Assessment Agency (the Agency) is the responsible authority.

The technical guidance informs the preparation of directives by the Agency, such as the Environmental Impact Statement (EIS) Guidelines, and serves as core guidance to project proponents. It also provides direction to Agency employees throughout the environmental assessment (EA) of a designated project in their interactions with those engaged in federal EA, such as proponents, federal authorities, other jurisdictions, review panel members, Aboriginal groups and the public.

In combination with the EIS Guidelines, the technical guidance aims to ensure that CEAA 2012 requirements related to physical and cultural heritage or to any structure, site or thing that is of historical, archaeological, paleontological or architectural significance are met in order to achieve a high quality EA of a designated project.

Application

The technical guidance is intended for use in the EA of a designated project for which the Agency is the responsible authority.

In the technical guidance, "project EA" refers to the EA of a designated project under CEAA 2012.

Throughout the technical guidance, the term "environmental effects" refers to environmental effects as described in section 5 of CEAA 2012. As well, “physical and cultural heritage” is hereafter referred to as heritage, and “any structure, site or thing that is of historical, archaeological, paleontological or architectural significance” is referred to as any structure, site or thing.

The technical guidance should be used to inform the preparation of the EIS Guidelines and the EIS for a designated project. It should be used in conjunction with other Agency policy and guidance instruments. For an EA by a review panel, additional guidance and direction may be provided in the Terms of Reference or Joint Review Panel Agreement.

For application under CEAA 2012, this guidance replaces the Agency’s 1996 guide entitled, *Reference Guide on Physical and Cultural Heritage Resources*. The 1996 guide will continue to be applicable for project EAs initiated under the former *Canadian Environmental Assessment Act* that are still being conducted pursuant to the transitional provisions of CEAA 2012.

Relevant Provisions of CEAA 2012

CEAA 2012 aims to protect components of the environment that are within federal legislative authority from significant adverse environmental effects caused by a designated project, including cumulative environmental effects. In addition, CEAA 2012 ensures that a designated project is considered in a careful and precautionary manner to avoid significant adverse environmental effects, when the exercise of a power or performance of a duty or function by a federal authority under any Act of Parliament is required for the designated project to be carried out. Sections of CEAA 2012 that are most relevant to assessing the effects of any changes to the environment on heritage or any structure, site or thing can be found in Appendix 1.

This technical guidance addresses 5(1)(c)(ii) “physical and cultural heritage” and 5(1)(c)(iv) “any structure, site or thing that is of historical, archeological, paleontological or architectural significance”. It also addresses 5(2)(b)(ii) “physical and cultural heritage” and 5(2)(b)(iii) “any structure, site or thing that is of historical, archeological, paleontological or architectural significance”.

Subsection 19(1) of CEAA 2012 clarifies that environmental effects include cumulative environmental effects and environmental effects of accidents and malfunctions. This subsection also stipulates the factors that are to be taken into account for a project EA. For example, factors related to determining the significance of environmental effects, selecting mitigation measures and implementing a follow-up program also apply. The assessment may also take into account community and Aboriginal traditional knowledge, as per subsection 19(3).

Considerations in Examining Heritage or Any Structure, Site or Thing

Understanding Heritage or Any Structure, Site or Thing

A land or resource (e.g., an artifact, object or place) that is considered as heritage or any structure, site or thing is distinguished from other lands and resources by the value placed on it. The value of heritage or any structure, site or thing originates from its:

- Association with one or more important aspects of human history or culture;
- Historical, archaeological, paleontological or architectural significance; and
- Association with a particular group’s practices, traditions or customs.

Practices, traditions and customs are generally defined as follows:

- Practice: a way of doing something that is common, habitual or expected;
- Tradition: a custom, opinion or belief handed down primarily orally or by practice; and
- Custom: a particular, established way of behaving.

Heritage or any structure, site or thing may be movable (e.g., tools) or immovable (e.g., cultural landscape), above (e.g., historic building) or below ground (e.g., burial ground), and on land (e.g., Quebec City’s walls and fortifications) or in water (e.g., shipwreck). The features of these resources may be natural (e.g., Waterton-Glacier International Peace Park) or fabricated (e.g., pottery), or a combination of both (e.g., culturally modified trees). Additional examples of heritage or any structure, site or thing can be found in Appendix 2.

Heritage is an inclusive term that is associated with important aspects of human history and culture. Contemporary perceptions of heritage tend to be broad and encompass various social, economic, political, environmental, scientific, natural and cultural dimensions. In addition, the concept of cultural landscapes is often used to describe any geographical area that has been modified, influenced, or given special cultural meaning by people (more information on cultural landscapes can be found in Appendix 2).

A specific land or resource that has heritage value will most likely also be considered a structure, site or thing that is of historical, archaeological, paleontological or architectural significance. For Aboriginal groups, lands and resources identified as heritage or any structure, site or thing may also fit under current use of lands and resources for traditional purposes, identified under 5(1)(c)(iii). Spiritual and cultural practices of Aboriginal Groups' are often integrally linked to specific locations and surrounding landscape features, as well as objects of social significance.

Approach to Examining Heritage or Any Structure, Site or Thing in an EA

A project EA first examines any changes to the environment that may be caused by a designated project, and then subsequently considers how these changes to the environment may affect heritage or any structure, site or thing.

A project EA considers the effects of any change to the environment on heritage or any structure, site or thing with respect to Aboriginal peoples. The EA also considers the effects of any changes to the environment on heritage or any structure, site or thing that are directly linked or necessarily incidental to a federal authority's exercise of a power or performance of a duty or function (i.e., a federal decision).

The practice of EA calls for examining potential environmental effects of the designated project on valued components (VCs) and considering mitigation measures. Mitigation measures are taken into account prior to determining the significance of adverse environmental effects for the EA decisions and for the implementation of the follow-up program.

The approach and level of effort applied to assessing effects of any changes to the environment on heritage or any structure, site or thing in a project EA are established on a case-by-case basis taking into consideration:

- The characteristics of the designated project;
- The potential environmental effects;
- The intactness and context of VCs that may be impacted by the environmental effects;
- The potential for mitigation and the extent to which mitigation measures may address potential environmental effects; and
- The level of concern expressed by Aboriginal groups or the public.

Assessment of environmental effects should include the five steps described below. Appendix 3 provides a reference sheet summarizing the five steps.

The steps are iterative; circumstances commonly arise during the course of an assessment that requires these steps to be revisited. EA documentation must clearly explain and justify the methodologies that have been used to assess the effects of any changes to the environment on heritage or any structure, site or thing.

Different types of heritage, structure, site or thing can fall under the authorities of municipal, provincial/territorial or federal governments and sometimes under several of these authorities. Information from other governments may be used to inform federal EAs.

Step 1. Scoping

Scoping is an iterative process. Initial scoping for the project EA is made in relation to section 5 of CEAA 2012 and takes into account direction provided by the Agency (e.g., in the EIS Guidelines). As the project EA advances, information gained, such as evidence on potential or confirmed heritage or any structure, site or thing, may help clarify what needs to be considered and to what extent.

Initial scoping should cover the following aspects: identifying VCs, listing potential effects and determining spatial and temporal boundaries.

Identifying valued components

Identifying VCs involves making an inventory of potential lands and resources and establishing their importance as heritage or as a structure, site or thing. This may be assessed through a combination of consultation, desk-based research and a site survey or inspection, potentially with test excavations. Desk-based research may involve identifying major historical themes and activities through historical research and a review of topographical and historical mapping.

Possible sources of information to assist in identifying places where heritage or any structure site or thing that are valued may be present are:

- lists of national parks, national historic sites, national marine conservation areas, national urban parks and national historic canals;
- Commemorative Integrity Statement (for national historic sites);
- Cultural Resource Value Statement (for national parks, national marine conservation areas and national urban parks);
- federal and provincial registers of archaeological sites;
- Canadian Register of Historic Places;
- Federal Heritage Buildings Review Office;
- Directory of Federal Heritage Designations;
- federal and provincial government departments responsible for heritage issues;
- Aboriginal peoples;
- academic and research institutions;
- professional societies and organizations;
- federal, provincial and municipal archives and libraries;

- museums;
- photographs and maps;
- land use plans;
- local citizens, associations, and municipal government departments involved in the area of heritage conservation and protection; and
- International Council on Monuments and Sites Canada.

Some lands and resources will be easy to identify as heritage or any structure, site or thing for they are already recognized by one or more jurisdictions (e.g., federal, provincial, territorial, municipal or Aboriginal jurisdictions). However, some lands and resources may not be formally recognized or documented. As such, these lands and resources may need to be evaluated first to understand their importance as heritage or as a structure, site or thing.

Stakeholders, professional experts, Aboriginal groups, the public, government and non-government organizations can be important sources of information in identifying and evaluating these lands and resources. In evaluating the importance of potential heritage or any structure, site or thing, considerations may include the following:

- Context: A land or resource may not appear significant on its own. However, considering its historical and physical context, thematic representativeness and information content (such as richness, cultural and ethnic significance) may provide great insight into its value. Relevant background information may include historical events. Key characteristics of the area may also provide insight into the value of the lands and resources.
- Intactness: The degree of intactness of the land or resource is evaluated, including the level to which it has been disturbed or is preserved. Such an evaluation requires data on the previous condition of the land or resource, which may not always be available or documented.
- Evidence: Some types of sites, such as archaeological sites, are not visible. It is therefore important to confirm the presence of these sites in order to assess any impacts on them. For example, the sacred grounds of Aboriginal peoples may have no evidence of physical activity, but may be associated with the creation of legends, ceremonial functions, personal vision quests, puberty rites, etc.
- Places: Aboriginal spiritual and cultural practices are often integrally linked to specific locations and landscape features. Environmental effects resulting from a designated project may impact these places, which may in turn limit the ability of Aboriginal peoples to engage in their spiritual and cultural practices.

Examples of questions that should be considered in identifying VCs include:

- Are there any lands and resources that are recognized to have archaeological, historical, paleontological, architectural, scientific, engineering, natural or cultural value within the study area?
- Has any exploratory work been previously undertaken to identify resources such as archaeological sites or artifacts in the study area?
- What lands and resources are valued by a group or community?

During initial scoping, a VC may be identified at a broad level (e.g., paleontological resources) or at a more specific level (e.g., fossils). The consideration of the effects of the project will generally involve an examination of the specific features of the VC.

Listing potential effects

The term "environmental effect", defined in Section 5 of CEAA 2012, addresses heritage or any structure, site or thing from two perspectives:

- With respect to Aboriginal peoples, an effect occurring in Canada of any change that may be caused to the environment on heritage or any structure, site or thing (e.g., disturbance to rock art); and
- Effects of any changes to the environment on heritage or any structure, site or thing (other than those mentioned in the previous bullet) that are directly linked or necessarily incidental to a federal decision (e.g., disturbance to a designated heritage lighthouse).

The following questions could be considered in listing potential effects on heritage or any structure, site or thing:

- What are the changes to the environment that may be caused by a designated project?
- How will these changes to the environment affect heritage or any structure, site or thing?
- Are there cumulative effects that will affect the identified heritage or any structure, site or thing?
- What are the public concerns associated with the potential effects?

Determining spatial and temporal boundaries

The spatial and temporal boundaries are set to allow for analysis of potential environmental effects, selection of mitigation measures and determination of significance. In the case of heritage or any structure, site or thing, setting these boundaries takes into account the nature of the VC and the changes to the environment that may affect the VC.

In addition, the spatial and temporal boundaries may change when assessing potential cumulative environmental effects. For additional information on establishing boundaries associated with cumulative environmental effects, please refer to the *Operational Policy Statement on Assessing Cumulative Environmental Effects* under CEAA 2012.

Overall, the boundaries of an assessment should be large enough to encompass the potential effects of any changes to the environment on heritage or any structure, site or thing, including cumulative effects. In many cases, it is appropriate to consult with Aboriginal groups and the public in making this determination.

Step 2. Analysis

The objective of the analysis phase is to describe how the potential changes to the environment caused by a designated project may affect heritage or any structure, site or thing. Where a VC is selected for more than one paragraph or subsection of section 5, the analysis is done only once. Building on the information gathered for the initial scoping, this phase of the assessment should include:

- A description of the nature and current condition of the heritage or any structure, site or thing;
- Assessment of the potential effects the project may likely cause to heritage or any structure, site or thing;
- Consideration of potential cumulative effects; and
- An analysis of the results of consultations held with the public and Aboriginal groups.

Important characteristics of these VCs may include the type of construction materials, the location of the land or resource, etc. A VC may already be affected by stressors caused by past and current activities. For example, adverse effects of acid rain may have already led to deterioration of a historic building. The designated project may lead to further changes in the environment or cumulative effects that may result in adverse environmental effects on the VCs. Examples of adverse effects on heritage or any structure, site or thing resulting from a change in the environment could include:

Change in the Environment	Effects on Lands and Resources
Land disturbance and transformation of natural landscapes (e.g., soil compaction, dredging, digging, filling, clearing, etc.)	• Damage, disturbance or destruction in a conservation area. • Damage, disturbance or destruction of archaeological remains or sites, or spiritual sites.
Effects of underground construction	• Deterioration of an architectural or historic building or monument caused by vibration.
Demolition or construction of buildings or other structures	• Destruction of heritage buildings or archaeological sites. • Disturbance of the setting of heritage buildings, structures or sites.

The methodologies used to predict environmental effects must be clearly described. With this information, reviewers will be able to examine the analysis and the rationale supporting the conclusions reached. Any assumptions or conclusions based on professional judgment should be clearly identified and described.

Data collection and/or generation are important components of an analysis of environmental effects. At times, it may be challenging to obtain or generate data to support the analysis. Potential environmental effects should be considered, as appropriate, in the analysis even when there is little supporting data or there is predictive uncertainty. Reviewers of the EIS should be presented with a complete picture of the potential types and scale of environmental effects. In all cases, uncertainties and assumptions underpinning an analysis should be described and information sources clearly documented.

Scientific data and other evidence supporting an assessment of environmental effects can often be supplemented in various ways, including the use of data from other areas with comparable conditions.

Aboriginal traditional knowledge may provide important information on an Aboriginal group's connection to heritage or any structure, site or thing on a given landscape. Community knowledge and Aboriginal traditional knowledge available to the proponent should be incorporated into the assessment, in keeping with appropriate ethical standards and without breaking any applicable obligations of confidentiality.

Step 3. Mitigation

Technically and economically feasible measures must be identified that would mitigate any significant adverse environmental effects. Mitigation of environmental effects can take two forms:

- Elimination, reduction or control of a designated project's environmental effects is preferred.
- Where this is not possible, restitution for any damage to the environment caused by the environmental effect should be considered, e.g., replacement, restoration, compensation.

Both forms of mitigation can be considered in the decisions on whether a designated project is likely to cause significant adverse environmental effects.

A range of measures may be deployed to mitigate the effects of any changes to the environment on heritage or any structure, site or thing, including:

- Re-siting of the project to avoid sensitive areas such as significant sites or areas known to contain cultural artifacts, significant cultural landscapes, etc.;
- Changing the project design or construction techniques and technologies to reduce effects of the project on lands and resources;
- Implementing site protection such as stabilization practices, fences, etc.;
- Conducting professional rescue archaeology, also known as preservation of record, to salvage archaeological resources (in part or entirely) and their contextual information prior to undertaking physical activities associated with the designated project;
- Changing site maintenance practices causing damage to physical structures, e.g. eliminating use of road salt; and
- Cleaning up contaminated heritage buildings.

Effects on heritage or any structure, site or thing can be reversible (temporary) or irreversible (permanent). Given the nature of these VCs, the selection of mitigation measures often needs to address the possibility of irreversible effects (e.g., demolition of artifacts during construction activities).

Step 4. Significance

An EA must consider the significance of any adverse environmental effects that are likely to result from a designated project after taking into account the implementation of any mitigation measures.

Significance predictions in relation to the effects of any changes to the environment on heritage or any structure, site or thing should be clearly presented and rationalized against defined criteria consistent with the Agency's reference guide Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects (November 1994), or any future updates made to this document.

Step 5. Follow-up

Follow-up programs should address project-specific environmental effects and cumulative environmental effects. The objectives of a follow-up program are to verify the accuracy of the EA and determine the effectiveness of any mitigation measures that have been implemented.

To help determine if follow-up is required in relation to heritage or any structure, site or thing, additional guidance is available through the Operational Policy Statement published by the Agency on *Follow up Programs under the Canadian Environmental Assessment Act* (December 2011), or any future updates to this document.

Table of Contents: Appendices	

Appendix 1: *Reference sheet - Relevant Provisions of CEAA 2012*

Environmental Effects

5. *(1) For the purposes of this Act, the environmental effects that are to be taken into account in relation to an act or thing, a physical activity, a designated project or a project are:*

- *a. a change that may be caused to the following components of the environment that are within the legislative authority of Parliament:*
  - *i. fish as defined in section 2 of the [Fisheries Act] and fish habitat as defined in subsection 34(1) of that Act,*
  - *ii. aquatic species as defined in subsection 2(1) of the [Species at Risk Act],*
  - *iii. migratory birds as defined in subsection 2(1) of the [Migratory Birds Convention Act, 1994], and*
  - *iv. any other component of the environment that is set out in Schedule 2;*
- *b. a change that may be caused to the environment that would occur*
  - *i. on federal lands,*
  - *ii. in a province other than the one in which the act or thing is done or where the physical activity, the designated project or the project is being carried out, or*
  - *iii. outside Canada; and*
- *c. with respect to aboriginal peoples, an effect occurring in Canada of any change that may be caused to the environment on*
  - *i. health and socio-economic conditions,*
  - *ii. physical and cultural heritage,*
  - *iii. the current use of lands and resources for traditional purposes, or*
  - *iv. any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.*

Exercise of power or performance of duty or function by federal authority

(2) However, if the carrying out of the physical activity, the designated project or the project requires a federal authority to exercise a power or perform a duty or function conferred on it under any Act of Parliament other than this Act, the following environmental effects are also to be taken into account:

- *a. a change, other than those referred to in paragraphs (1)(a) and (b), that may be caused to the environment and that is directly linked or necessarily incidental to a federal authority's exercise of a power or performance of a duty or function that would permit the carrying out, in whole or in part, of the physical activity, the designated project or the project; and*
- *b. an effect, other than those referred to in paragraph (1)(c), of any change referred to in paragraph (a) on*
  - *i. health and socio-economic conditions,*
  - *ii. physical and cultural heritage, or*
  - *iii. any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.*

Schedule 2

(3) The Governor in Council may, by order, amend Schedule 2 to add or remove a component of the environment.

Factors to be Considered

Factors

19. *(1) The environmental assessment of a designated project must take into account the following factors:*

a. *the environmental effects of the designated project, including the environmental effects of malfunctions or accidents that may occur in connection with the designated project and any cumulative environmental effects that are likely to result from the designated project in combination with other physical activities that have been or will be carried out;*
b. *the significance of the effects referred to in paragraph (a);*
c. *comments from the public — or, with respect to a designated project that requires that a certificate be issued in accordance with an order made under section 54 of the National Energy Board Act, any interested party — that are received in accordance with this Act;*
d. *mitigation measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the designated project;*
e. *the requirements of the follow-up program in respect of the designated project;*
f. *the purpose of the designated project;*
g. *alternative means of carrying out the designated project that are technically and economically feasible and the environmental effects of any such alternative means;*
h. *any change to the designated project that may be caused by the environment;*
i. *the results of any relevant study conducted by a committee established under section 73 or 74; and*
j. *any other matter relevant to the environmental assessment that the responsible authority, or — if the environmental assessment is referred to a review panel — the Minister, requires to be taken into account.*

Scope of factors

(2) The scope of the factors to be taken into account under paragraphs (1)(a), (b), (d), (e), (g), (h) and (j) is determined by

a. *the responsible authority; or*
b. *the Minister, if the environmental assessment is referred to a review panel.*

Community knowledge and Aboriginal traditional knowledge

(3) The environmental assessment of a designated project may take into account community knowledge and Aboriginal traditional knowledge.

Environmental Assessment Decision

Decisions of decision maker

52. *(1) For the purposes of sections 27, 36, 47 and 51, the decision-maker referred to in those sections must decide if, taking into account the implementation of any mitigation measures that the decision-maker considers appropriate, the designated project*

a. *is likely to cause significant adverse environmental effects referred to in subsection 5(1); and*

b. *is likely to cause significant adverse environmental effects referred to in subsection 5(2).*

Referral if significant adverse environmental effects

(2) If the decision maker decides that the designated project is likely to cause significant adverse environmental effects referred to in subsection 5(1) or (2), the decision maker must refer to the Governor in Council the matter of whether those effects are justified in the circumstances.

Referral through Minister

(3) If the decision-maker is a responsible authority referred to in any of paragraphs 15(a) to (c), the referral to the Governor in Council is made through the Minister responsible before Parliament for the responsible authority.

Governor in Council's decision

(4) When a matter has been referred to the Governor in Council, the Governor in Council may decide

a. *that the significant adverse environmental effects that the designated project is likely to cause are justified in the circumstances; or*
b. *that the significant adverse environmental effects that the designated project is likely to cause are not justified in the circumstances.*

Appendix 2: Reference Sheet - Federal Involvement

Key Federal Roles

Jurisdiction over heritage is shared among levels of government. Heritage sites may be specifically designated as protected sites or may be subject to a blanket system of protection either by legislation or by policy at the federal, provincial, territorial or municipal level. In other cases, valuable heritage sites may not yet be known to government authorities (e.g., archaeological sites). Various mandates, objectives and intents of existing legislation and policies found at different levels of government should be considered when assessing heritage.

At the federal level, there are many parties involved in protecting heritage assets, notably:

- Parks Canada (PC) is responsible for managing national parks, national historic sites, national marine conservation areas, national urban parks, United Nations Educational, Scientific and Cultural Organization World Heritage Sites; and other protected heritage areas and heritage protection programs. In addition, Parks Canada also supports the designation work of the Historic Sites and Monuments Board of Canada.
- The Department of Canadian Heritage is responsible for developing policies governing certain aspects of cultural heritage (e.g., video, literature, art, etc.), including policies related to conserving, exporting and importing cultural property. Agencies within the Canadian Heritage portfolio, including national museums and affiliated museums, and Library and Archives Canada, also have specific mandates for the protection of federal heritage.
- The Treasury Board of Canada Secretariat (TBS) provides departments with direction on managing federal moveable heritage assets such as art, archaeological artifacts, and everyday objects that possess heritage value through the *Policy on Management of Material* and its associated *Guide to the Management of Moveable Heritage Assets, 2008.*
- The Federal Heritage Building Review Office (FHBRO) advises custodian departments on their obligations regarding heritage buildings under the TSB *Policy on Management of Real Property*.
- Canada's Historic Places (CHP), a federal, provincial and territorial initiative, maintains the Canadian Register of Historic Places (CRHP), which provides information about all historic places recognized for their heritage value at the local, provincial, territorial and national levels throughout Canada. As well, federal, provincial and territorial collaboration has led to the development of the *Standards and Guidelines for the Conservation of Historic Places in Canada*, 2010, which provides guidance to conserve four types of cultural resources (e.g., cultural landscapes, archaeological sites, buildings and engineering works).
- The Geological Survey of Canada provides expert advice for the identification and analysis of paleontological resources in Canada. As well, national collections of various specimens of vertebrate and plant fossils are maintained in their facilities.

Canada has also acceded and accepted some conventions from the United Nations Educational, Scientific and Cultural Organization (UNESCO). This means that Canada has made a commitment to uphold and implement these conventions. These conventions include:

- *Convention concerning the Protection of World Cultural and Natural Heritage, 1972*

United Nations Educational, Scientific and Cultural Organization (UNESCO*). Convention concerning the Protection of World Cultural and Natural Heritage*. 1972. (Online). Available at: http://whc.unesco.org/en/conventiontext [July 24, 2013].

- *Convention on Wetlands of International Importance, especially Waterfowl Habitat, 1971*

United Nations Educational, Scientific and Cultural Organization (UNESCO*). Convention on Wetlands of International Importance, especially Waterfowl Habitat*. 1971. (Online). Available at: http://www.ramsar.org/cda/en/ramsar-documents-texts-convention-on/main/ramsar/1-31-38%5E20671_4000_0 [September 18, 2013].

Key Federal Definitions and Descriptions

The Office of Auditor General (OAG) of Canada defines heritage as the "evidence of human experience that holds value to a particular group and is also a means of promoting and reinforcing cultural identity" (OAG, 2003). PC defines a cultural resource as "a human work or a place which gives evidence of human activity or has spiritual or cultural meaning, and which has been determined to have historic value" (PC, 2013).

PC defines heritage value as "the aesthetic, historic, scientific, cultural, social or spiritual importance or significance for past, present or future generations" (PC, 2013). This definition is included in the *Standards and Guidelines for the Conservation of Historical Places in Canada*, a document that has been adopted by a number of federal, provincial, territorial and municipal authorities. The term "significance" refers to the value placed on the resource and should not be confused with determining significance of effects in an EA context.

The heritage value of a resource is embodied in tangible and/or intangible character-defining elements. These elements include the materials, forms, location, spatial configurations, uses and cultural associations or meanings that embody the heritage value of a cultural resource, which must be retained to preserve that value (PC, 2013).

Examples of Resources with Heritage Value:
• The Mackenzie King Estate has historical value because it was Prime Minister William Lyon Mackenzie King's residence. • The National Battlefield Park (Plains of Abraham) in Quebec City has historic value as the site of a number of battles between the English and the French for Canada in the eighteenth century. • The Grand Lake in Algonquin Provincial Park has become an important site of national pride because of the famous painting by Tom Thompson, who inspired the formation of the Group of Seven.

The Government of Canada's policies and programs generally divide physical and cultural heritage resources into three types:

- Built heritage resource: CHP provides various categories of built heritage, including cultural landscapes, archaeological sites, buildings, and engineering works (CHP, 2010).
- Moveable heritage resource: TBS defines moveable heritage as objects that have tangible evidence of human experience, such as artifacts, archives, printed material, cultural products, architectural heritage, and archaeology (TBS, 2008).
- Natural heritage resource: The *Convention Concerning the Protection of World Cultural and Natural Heritage, 1972* defines natural heritage as "natural features consisting of physical and biological formations or groups of such formations, which are of outstanding universal value from the aesthetic or scientific point of view; geological and physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of outstanding universal value from the point of view of science or conservation; and natural sites or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty" (UNESCO, 1972).

There may be other types of physical and cultural heritage resources that are not listed above.

Example of Resources by Type	
Built Heritage	• Halifax Citadel in Nova Scotia; • Bethune-Thompson House in Ontario; • Quebec City's walls and fortifications, Quebec; • Parliament Buildings in Ottawa, Ontario; • Archaeological sites along the Chilkoot Trail in British Columbia; • Wanuskewin Heritage Park in Saskatchewan; • Urban cultural landscape of Lunenburg, Nova Scotia; • Shipwreck sites in Red Bay, Labrador; and • Monumental poles (formerly referred to as "Totem poles") in Gwaii Haanas National Park, British Columbia.
Moveable Heritage	• Archaeological objects (e.g., arrow heads, harpoons, tools, agricultural implements, pipes, pottery, etc.); • Religious or sacred objects made or used by Aboriginal groups; • Archival and printed materials; and • Fossils.
Natural Heritage	• Fathom Five National Marine Park of Canada; • Canadian Rocky Mountain Parks; • Waterton Glacier International Peace Park;

	• Gros Morne National Park; and • Percé Rock in Gaspé.

PC defines cultural landscapes as "any geographical area that has been modified, influenced, or given special cultural meaning by people, and that has been formally recognized for its heritage value. Cultural landscapes are often dynamic, living entities that continually change because of natural and human-influenced social, economic and cultural processes" (Canada's Historic Places. 2010). A widely accepted framework used in the *Standards and Guidelines for the Conservation of Historic Places in Canada* places cultural landscapes into three categories: designed; organically evolved (vernacular); and associative:

- *Designed cultural landscapes were intentionally created by human beings;*
- *Organically evolved cultural landscapes developed in response to social, economic, administrative or religious forces interacting with the natural environment. They fall into two sub-categories: Relict landscapes in which an evolutionary process came to an end. Its significant distinguishing features are, however, still visible in material form. Continuing landscapes in which the evolutionary process is still in progress. They exhibit significant material evidence of their evolution over time; and*
- *Associative cultural landscapes are distinguished by the power of their spiritual, artistic or cultural associations, rather than their surviving material evidence*.

Key Federal Policies and Guidance

In addition to CEAA 2012, there are other vehicles to assist in the protection of heritage or any structure, site or thing. These consist of federal, provincial, territorial and municipal policies, guidance and/or legislation. Protection is also supported by international conventions mentioned above.

Some examples of other federal policies and guidance include:

- *Cultural Resource Management Policy, 2013* (PC): The policy sets out the objective to manage cultural resources administered by Parks Canada in accordance with the following principles: Understanding Heritage Value, Sustainable Conservation and Benefits to Canadians.
- *Guidelines for the Management of Archaeological Resources, 2005* (PC): These Guidelines present Parks Canada's approach to archaeological resource management as a component of cultural resource management using the principles and practices of the Cultural Resource Management Policy. Archaeology on federal lands and lands underwater is within the jurisdiction of the Minister responsible for the Parks Canada Agency.
- *Policy on Management of Materiel, 2006* (TBS): The objective of this policy is to ensure that materiel is managed by departments in a sustainable and financially responsible manner that supports the cost-effective and efficient delivery of government programs. It also sets out the requirements for Federal Heritage Buildings.

- *Guide to the Management of Moveable Heritage Assets, 2008* (TBS): The guide provides departments with direction on managing federal moveable heritage assets such as art, archaeological artifacts, and everyday objects that possess heritage value. The guide stipulates that these assets are to be identified, their heritage value is to be assessed, and a record is to be kept that contains accurate information about their nature and condition.
- *Policy on Management of Real Property, 2006* (TBS): The objective of this policy is to ensure real property is managed in a sustainable and financially responsible manner, throughout its life cycle, to support the cost-effective and efficient delivery of government programs.

Detailed information on how to access these instruments follows:

Canada's Historic Places. 2010. *Standards and Guidelines for the Conservation of Historic Places in Canada*. 2nd Ed. (Online). Available: http://www.historicplaces.ca/en/pages/standards-normes.aspx [July 25, 2013].

OAG. 2003. 2003 *November Report of the Auditor General of Canada, Chapter 6 – Protection of Cultural Heritage in the Federal Government*. Ottawa. (Online). Available: http://www.oag-bvg.gc.ca/internet/English/parl_oag_200311_06_e_12929.html [July 24, 2013] Parks Canada (PC). 2013. *Cultural Resource Management Policy. Ottawa*. (Online). Available: http://www.pc.gc.ca/docs/pc/poli/grc-crm/index.aspx [July 24, 2013].

TBS. 2008. *Guide to the Management of Movable Heritage Assets*. Ottawa. (Online). Available: http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=13872&section=text [July 24, 2013].

TBS. 2006. *Policy on Management of Material.* Ottawa. (Online). Available: http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?section=text&id=12062 [September 18, 2013].

TBS. 2006. Policy on Management of Real Property. Ottawa.(Online). Available: http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=12042&section=text [November 12, 2013]

Appendix 3: *Reference Sheet - Generic Framework*

Generic step-wise framework

Step 1: Initial Scoping

- Identification of VCs, including heritage or any structure site or thing; potential environmental effects; and spatial & temporal boundaries.

Step 2: Analysis

- Data collection or generation through means such as surveys, literature reviews, on-site testing, community knowledge and Aboriginal traditional knowledge, and a clear description of methods used to predict environmental effects.

Step 3: Identification of Mitigation Measures

- Identification of technically and economically feasible measures to mitigate any significant adverse effects by reduction, elimination or control or, when these forms of mitigation are not possible, restitution measures such as replacement, restoration or compensation.

Step 4: Determination of Whether a Project is likely to Cause Significant Adverse Effects

- Clearly presented predictions based on defined criteria to support conclusions about whether a project is likely to result in significant adverse effects, taking into account mitigation measures.

Step 5: Follow-up

- Verification of the accuracy of the EA of a designated project and analysis of the effectiveness of mitigation measures.

These steps are iterative rather than linear; circumstances commonly arise during the course of an assessment that may require some steps to be revisited.