NexGen Rook I Uranium Mine – Environmental Impact Statement

Technical Review

October 12, 2022

Submitted by:

Birch Narrows Dene Nation

Contents

1.0 Introduction

NexGen Energy Ltd (NexGen; the Proponent) has proposed a new uranium mining and milling operation called the Rook 1 Project (the Project). The Project is located next to Patterson Lake, about 137 km as the crow flies north of Turnor Lake, and about 80 km south of the former Cluff Lake mine (Figure 1). The Project is located within the Traditional Territory of Birch Narrows Dene Nation (BNDN).

The Project is currently undergoing a joint Federal and Provincial environmental assessment under the *Canadian Environmental Assessment Act* 2012 (CEAA 2012) legislation. Through the CEAA 2012 process, NexGen must prepare an Environmental Impact Statement (EIS) which documents the expected environmental, social and cultural impacts of the Project. BNDN has been provided funding by the Canadian Nuclear Safety Commission (CNSC) to review the draft EIS to assess the potential impacts of the Project on BNDN Treaty and Aboriginal rights and interests. The BNDN review team evaluated the Project to identify deficiencies, concerns, and risks on behalf of BNDN. This included reviewing the Project from a general perspective but also with a specific focus on some topics including:

- cultural heritage, Indigenous Knowledge, and land use
- economy and community wellbeing
- water resources
- aquatic resources
- wildlife and terrestrial ecology
- human and ecological risk assessment
- air quality and emissions
- mine infrastructure and engineering.

In this report, BNDN has prepared comments on the draft EIS. Each comment includes recommendations to the CNSC and NexGen on how to avoid, mitigate, accommodate or compensate for potential adverse impacts to BNDN Treaty and Aboriginal rights and interests.

1.1 Birch Narrows Dene Nation

BNDN is a Denesųłiné First Nation band within the meaning of the Indian Act (Canada) and an Aboriginal people within the meaning of Section 35(1) of the Constitution Act, 1982 (Canada). BNDN members have occupied the lands of Dene Nene or “Land of the People” in northern Saskatchewan since time immemorial according to our own laws and system of government. Today, BNDN is a diverse and vibrant community of Dene, Cree and Métis citizens with 812 registered members. BNDN has 3 reserves, one at Turnor Lake (IR 193B) adjoins the village of Turnor Lake Saskatchewan and is the main reserve for BNDN. Churchill Lake (IR 193A) is at the junction of Churchill Lake and Frobisher Lake, and Turnor Lake (IR 194) is on Peter Pond Lake east of Dillon, SK. BNDN’s vision is a healthy, self-reliant, educated, and united

community. BNDN mission is to provide good governance and create opportunities for the wellbeing of all members.

As a signatory of Treaty 10, BNDN asserts that Treaty 10 was not an agreement to surrender lands and resources. As such BNDN laws, customs and jurisdiction still apply to our Traditional Territory. There are cultural sites and artifacts left throughout the region that are significant for our members. Our community members continue to hunt, fish, gather and trap on the lands throughout our Traditional Territory. Any direct or cumulative impacts from development could negatively affect our ability to exercise Aboriginal and Treaty rights, including the livelihoods of those who live off the land. The lands, waters and resources throughout our Territory are essential to the well-being and survival of our First Nation.

The BNDN Traditional Use Study Specific to NexGen's Proposed Rook 1 Project (Firelight Research Inc., 2019) reports the following BNDN historical context:

> *Chief Raphael Bedshidekkge signed Treaty 10 on behalf of the Clear Lake Band on August 28, 1906. Treaty 10 was based on other numbered treaties, and included the following standard hunting, trapping, and fishing rights clause:*
>
> > *And His Majesty the King hereby agrees with the said Indians that they shall have the right to pursue their usual vocations of hunting, trapping and fishing throughout the territory surrendered as heretofore described, subject to such regulations as may from time to time be made by the government of the country acting under the authority of His Majesty and saving and excepting such tracts as may be required or as may be taken up from time to time for settlement, mining, lumbering, trading or other purposes.* (Indian Claims Commission 1995, p.56)
>
> *The Clear Lake Band later came to be known as the Peter Pond Band. This Band was separated in 1972 into the Buffalo River Band and Turnor Lake Band; today, they are known as the Buffalo River Dene Nation and the Birch Narrows Dene Nation* (Indian Claims Commission 1995).

BNDN members continue to exercise our Treaty and Aboriginal rights including hunting, trapping, fishing, plant gathering and cultural/spiritual practices in the immediate area of the Rook 1 Project and throughout our Traditional Territory. BNDN members have observed decreasing furbearer and caribou populations throughout our Traditional Territory which the members expect to be further impacted by the proposed Rook 1 Project.

BNDN has constitutionally protected Treaty rights, inherent Aboriginal rights, Aboriginal title and interests in and to Dene Nene. BNDN must be consulted and accommodated by the Crown with respect to potential impacts on our rights.

BNDN has ratified a Consultation Protocol which serves as a guide for the Crown and project proponents for how to engage in meaningful consultation with BNDN. This Protocol applies to all projects,

undertakings, decisions, and other activities that necessitate consultation on BNDN Treaty lands and Traditional Territory. BNDN's Consultation Protocol can be used to guide all consultations and reinforce our nation-to-nation relationship with the Crown. It can also help provide confidence to all parties that all the requirements of Canadian, International and BNDN laws are satisfied. The implementation of BNDN's Consultation Protocol is overseen by BNDN's Nuh Nene Department. The Consultation Protocol is attached to the end of this document as Appendix A.

2.0 NexGen Rook I Project

NexGen plans for the Rook 1 Project to be an underground mine processing about 1,400 tonnes of ore per day over 24 years of operations. Including the construction and closure of the mine, NexGen expects the Project to run for 42 years. Similar to other uranium mines in the Athabasca Basin, the Project has very high concentrations of uranium in the rock. NexGen plans to process the uranium ore using the same methods as at other uranium mines in the Athabasca Basin, which involves using acids to dissolve the uranium and then other chemicals to turn the uranium into a solid yellowcake (the final uranium product) that they will transport to market in sealed barrels. NexGen plans to store all of the mine tailings (the crushed rock that is left over as waste after the uranium is removed) underground in the mined-out areas and in a specially created underground tailings management facility (UGTMF). The waste rock (rock that they have to remove but does not have uranium in it) will be stored in a waste rock pile above ground (Figure 2).

NexGen will need to build two water treatment plants that will remove contaminants from the water before it is released to Patterson Lake. The sewage treatment plant (STP) will clean wastewater that is used in the camp, similar to the sewage treatment plant of any city or town. The effluent treatment plant (ETP) will treat all of the water that has been contaminated by the mining operations. This includes water that is used to process the uranium ore and water that becomes contaminated from the waste rock stockpile. The ETP will be required to meet water quality objectives so that it does not contaminate Patterson Lake and the Clearwater River system.

NexGen is required to complete both a Provincial and Federal environmental assessment to be allowed to build the mine. The Federal and Provincial environmental assessments are being conducted cooperatively between the CNSC who are the lead agency for the Federal assessment, and the Saskatchewan Ministry of Environment, who are the lead agency for the Provincial assessment. The Environmental Assessment is following the CEAA 2012 requirements for new uranium mines in Canada.

NexGen has completed baseline studies around the Project to assess the current conditions of the natural environment around the Project. They have used their baseline data along with their predictions for how the Project will impact the environment to assess the level of impact that the Project will have on the environment and on BNDN's Treaty and Aboriginal rights and interests.

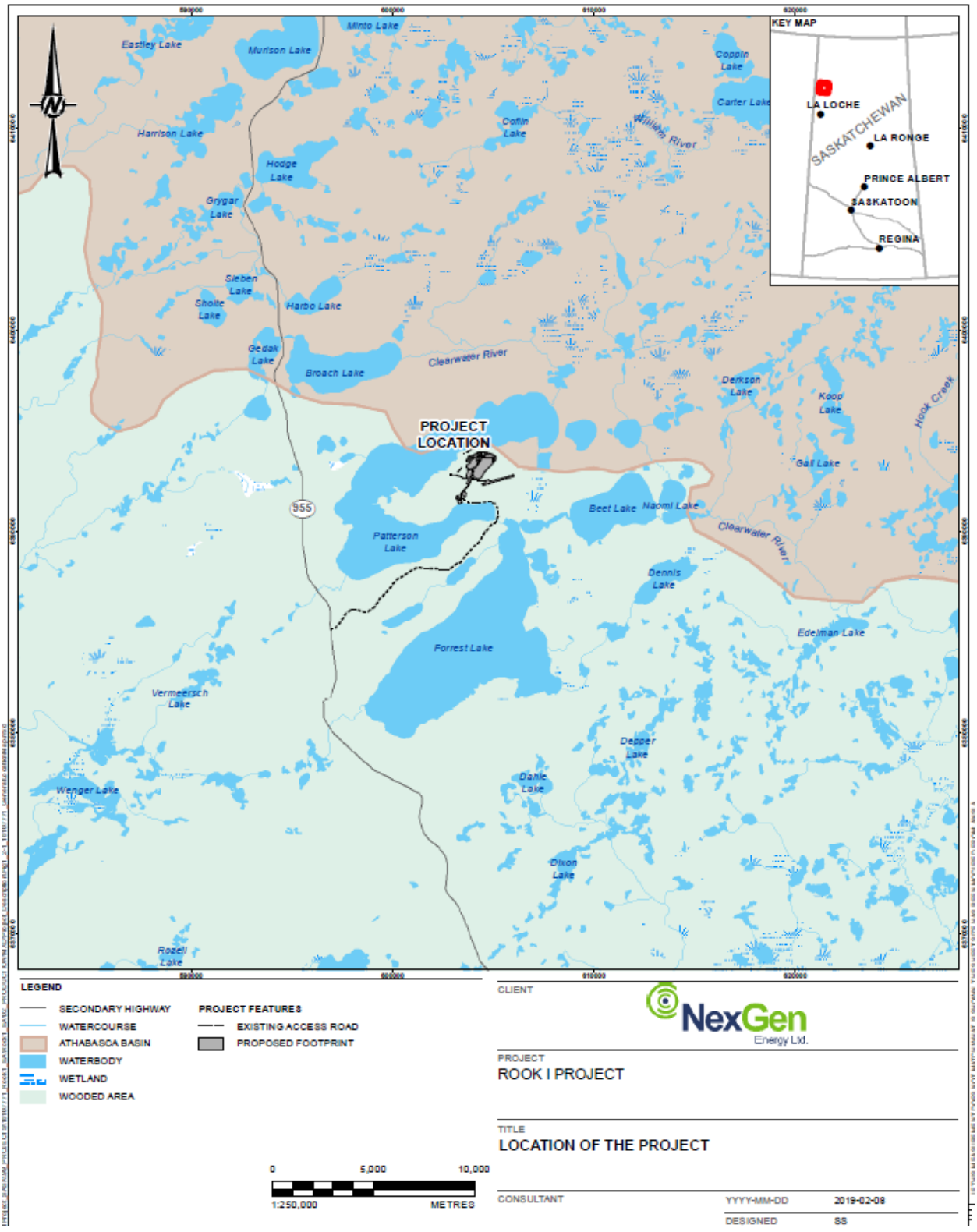


Figure 1: Location of the Rook 1 Project, from EIS Figure 1.2-1 (NexGen, 2022)

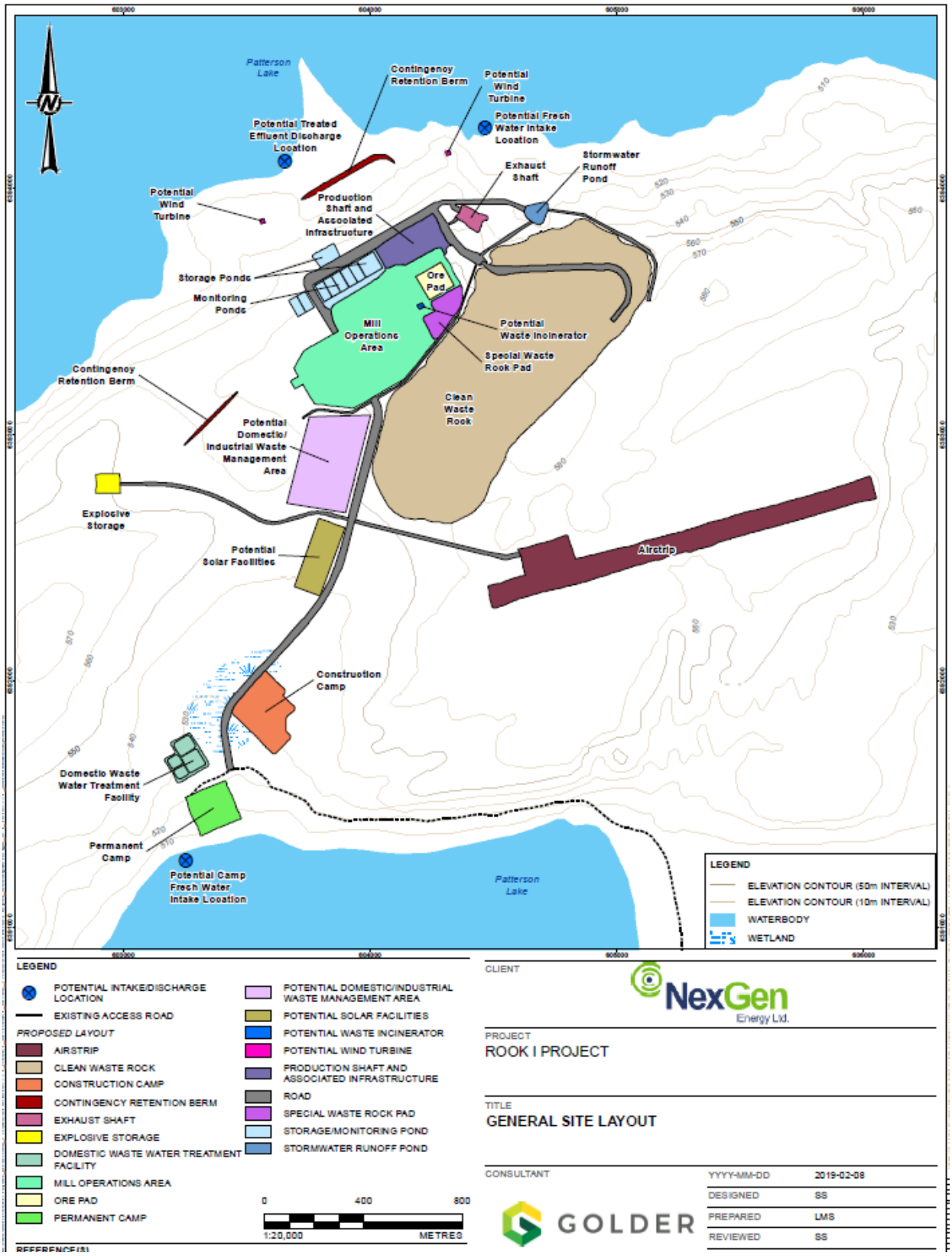


Figure 2: Site Layout of the Rook 1 Project, from EIS Figure 2.3-1 (NexGen, 2022)

3.0 Community Input

BNDN has a signed Mutual Benefits Agreement (MBA) with NexGen for the Rook 1 Project. Through the MBA, BNDN has provided consent for the Project and NexGen is legally bound to provide benefits to BNDN from the Project. The MBA includes a range of environmental and socio-economic benefits to BNDN. The MBA provides funding for BNDN to hire several staff that will work at the mine and will be employed by BNDN, including an environmental monitor and a coordinator to implement the MBA. BNDN also completed an Indigenous Knowledge and Traditional Land Use (IKTLU) study for the Project in 2019 (Firelight Research Inc., 2019). The IKTLU study found extensive hunting and fishing use by BNDN members in and around Patterson Lake. The study also documented several cultural sites immediately around Patterson Lake. BNDN members rely on a variety of fish species including lake trout, whitefish, northern pike, walleye, and suckers.

NexGen has done some community engagement with BNDN, though participation has often been limited due to restrictions related to the COVID-19 pandemic. Most recently BNDN members attended a community meeting where BNDN's consultants from Tamarack Environmental Associates presented on the Project and gathered input from the community. BNDN and NexGen are coordinating a community meeting to discuss the findings from the EIS review for November 2022.

Some of the comments on the Project from community members at the September 20, 2022, community meeting on the Project included:

- I'm very concerned with uranium and am very concerned with the potential impacts to the environment and our way of life from uranium mining
- I'm very concerned that this will make it impossible for us to practice our way of life and use the land
- The mining method and their plans to refill the mined-out areas with concrete is concerning and we need more information on how they are going to protect groundwater and the environment with this mining method
- We also need more information on what the chemical and physical composition of the tailings/concrete mix will be to know that it is safe
- Where else has underground tailings management been done and is it safe?
- Where will contamination from the underground tailings enter the environment, how will water move and how much will it contaminate the environment?
- How will contaminants from the tailings and waste rock be managed?
- There will be major changes to water quality downstream from the mining of the rock, including far into the future from the effects on groundwater.
- The changes to the earth from the mining will cause permanent changes to our way of life and to the land itself which affects us as people.
- Other mines in the area have left a mess and we need to be confident that NexGen will not do the same

- Radon gas sounds dangerous and concerning, we need more information on mine ventilation, how will air get in and out to prevent health concerns for miners underground and for people above ground too
- In the early days on site the drillers did not know that they were drilling through high grade uranium and the drilling water and cuttings were not properly disposed of, some even went into Patterson Lake. NexGen eventually fixed this once they found out they had hit uranium. How will NexGen mitigate or accommodate the impacts from that contamination?
- NexGen should undertake a baseline study of Turnor Lake
- NexGen should give more presentations to the community, including to students.
- BNDN needs to have an organized approach to dealing with NexGen, and Nuh Nene could work well for this.
- The environmental assessment should be a community led process, not a company or government led process.

4.0 Review of Rook I

BNDN has undertaken a technical review of the draft EIS for the Project, including the baseline documents and technical appendices. This technical review is divided by discipline in Sections 4.1 through 4.8 and is focused on information gaps, deficiencies in data, underrepresentation of potential effects, inadequate monitoring, and lack of involvement of BNDN. All of these priorities for BNDN comments are discussed through the lens of potential impacts of the Project on BNDN Treaty and Aboriginal rights, interests and claims.

4.1 Cultural Heritage, Indigenous Knowledge and Land Use

NexGen provided primary impacted Indigenous Groups, including BNDN with funding to complete IKTLU Studies related to the Project. In total, five IKTLU Studies were conducted for the proposed Project. Each Study was developed, self-directed, owned and controlled by the respective participating community. Within the EA, NexGen considered both Indigenous Knowledge and Local Knowledge. According to NexGen, “Indigenous Knowledge” is defined as “information sanctioned (i.e., authoritative permission or approval given) by an Indigenous Group as an official statement, document or position,” while “Local Knowledge” is defined as “information from a local citizen or community representative, but without Indigenous Group or Elder sanction” (NexGen, 2022: 78).

Indigenous Knowledge was shared through the IKTLU Studies, Joint Working Group (JWG) sessions and community engagement sessions and has informed the Project design and EA. NexGen evaluated the impact of the Project on Indigenous land and resource use based on access and available land for land use; availability and quality of fish, plants and wildlife for harvesting; and quality of land use experience. Impacted communities use the land throughout the study areas; BNDN uses the land both throughout the RSA and LSA of the Project. Every phase of the Project, excluding far-future scenario was deemed to have the potential to impact Indigenous land and resource use.

Some of the ways in which the results of the IKTLU Studies informed the Project, include the design of the "underground storage of tailings, minimization of the Project footprint, and reduction of surface infrastructure, which are all consistent with the expressed preferences heard through engagement with local Indigenous Groups and communities" (NexGen, 2022: 80). Within the EA, IKTLU information informed VCs and intermediate components, assessment methods, existing conditions, scoping and pathways analysis, mitigation measures, monitoring, follow-up and adaptive management. Some of the measures identified to help mitigate and accommodate against residual impacts include:

- Impact Benefit Agreements;
- Environmental Committees with full-time independent Indigenous monitors;
- Environmental Management processes;
- Designing facilities and infrastructure to minimize sensory disturbance;
- Implementing progressive and final reclamation; and
- Developing a Decommissioning and Reclamation Plan, Security Program, and Indigenous and Public Engagement Program.

NexGen notes that the consideration of Indigenous Knowledge is of ongoing importance throughout the lifecycle of the Project, including through the Indigenous and Public Engagement Program and the independent Indigenous monitoring program and Environmental Committees.

It is unclear within the EIS how some of BNDN's specific concerns were considered, and what communities' involvement was in the incorporation of their results into the EA. Within BNDN's Traditional Knowledge Study, BNDN notes that community members use the Study Area for activities including but not limited to:

- Hunting and trapping;
- Fishing;
- Cultural continuity;
- Ceremonial, cultural or spiritual activities;
- Gathering;
- Access trails;
- Water usage; and
- Other activities.

This Project will cause irreparable damage and loss to BNDN's cultural identity and ability to use the lands and waters for traditional purposes; community members raised concern related to the Project's impacts on hunting and trapping, fishing and ongoing cultural continuity. It is integral that BNDN work

closely with NexGen for the life of the Project to ensure BNDN's social and environmental concerns and identified impacts are mitigated and accommodated for.

Summary of Cultural Heritage

NexGen retained Canada North Environmental Services to conduct a Heritage Resources Impact Assessment (HRIA) of the proposed Project footprint, representing the area of direct disturbance. Any land clearing or disturbance activities have the potential to impact heritage resources. The property was assessed using both pedestrian surveys and the excavation of 239 test pits. No heritage resources were identified and no further archaeological investigation was recommended following the completion of the study. The Heritage Conservation Branch (HCB) of Saskatchewan accepted the assessment and its conclusions in the fall of 2018.

Following the 2018 HRIA, NexGen revised the orientation of a proposed airstrip and site roads; Saskatchewan's HCB considered the revised location but determined that given the airstrip's distance from the lake (further than 250 m, which is a marker for where most heritage sites are located), no further assessment of this area was required.

In addition, following further proposed changes to the Project design in 2021, resulting in potential additional impact to areas not previously assessed, Saskatchewan's HCB again reviewed the project changes to determine if additional heritage assessment work would be required. The HCB once again concluded that no additional assessments were required, noting that the proposed construction would occur in areas previously assessed for heritage or in areas regarded as having low heritage potential.

NexGen is proposing to implement a chance find procedure during land clearing activities in the event that any unanticipated heritage resources are found. NexGen has concluded that the effects of the Project on heritage resources are therefore not significant.

Several gaps exist within the archaeological assessment for the Project, including related to the methodology, how Indigenous Knowledge was considered, and some management measures.

Table 1. Comments and recommendations for the Rook I Project related to cultural heritage, Indigenous knowledge and land use

#	Document Reference	Comment	Request/Recommendation
1.	N/A	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.

2.	N/A	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.
3.	N/A	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.
4.	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	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.

		considered in the Project's assessment.	
5.	N/A	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.
6.	N/A	The chance find procedure for unanticipated heritage resources is not present or easily found in the material to review.	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
7.	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	BNDN requests that NexGen provide a description how Indigenous Knowledge informed the assessment of heritage resources, including: I. the location of areas assessed;

		archaeological site database and prior assessments were consulted as part of the background research for the assessment.	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.
8.	Annex IX: Heritage Resources Impact Assessment and Cover Letter	N/A	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.
9.	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 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.
10.	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.
11.	Annex IX: Heritage Resources Impact	N/A	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

	Assessment and Cover Letter: 4.1		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.
12.	Annex IX: Heritage Resources Impact Assessment and Cover Letter: 3.2	N/A	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 is recent and should have been assessed prior to being disturbed.

4.2 Economy and Community Wellbeing

This section provides the outcome of a review completed in collaboration with BNDN pertaining to NexGen's assessment of the Project's impacts on the Economy (Section 18) and Community Well-Being (Section 19) in the EIS. A summary of EIS content and key issues follows, with comments and recommendations set out in more detail in Table 2 below.

Despite these sections being separate in the EIS, it is appropriate that they have been considered together in this review given the interconnectedness of their impacts and their interconnectedness in BNDN's objectives related to the Project. Given the impacts and risks BNDN will experience during the life of the Project, it is necessary in the context of the Duty to Consult and Accommodate that corresponding economic benefits are also experienced, including financial compensation, the provision of jobs for BNDN members, contracts for BNDN businesses, and training and capacity building to support BNDN's participation in all aspects of the Project. However, it is also essential that these benefits are realized in a culturally appropriate way, and in a way that holistically upholds community well-being, by protecting traditional land use and cultural practices and preventing potential negative impacts such as exacerbating mental health and substance abuse issues, or the issues associated with a transient workforce. The area described as the "Local Study Area" and "Regional Study Area" in the EIS is BNDN's home, and BNDN will remain living here long after the Project's life cycle is complete. It is therefore of utmost importance that the long-term well-being and way of life of the community is considered together in a holistic way with the Project's potential economic benefits.

A significant assumption of the Project that NexGen has used to assess the effects of the Project on the local economy and on community well-being is an "aspirational target" of 75% for hiring workers from LSA communities. Employment projections for onsite workers set out in the EIS for each phase of the Project include:

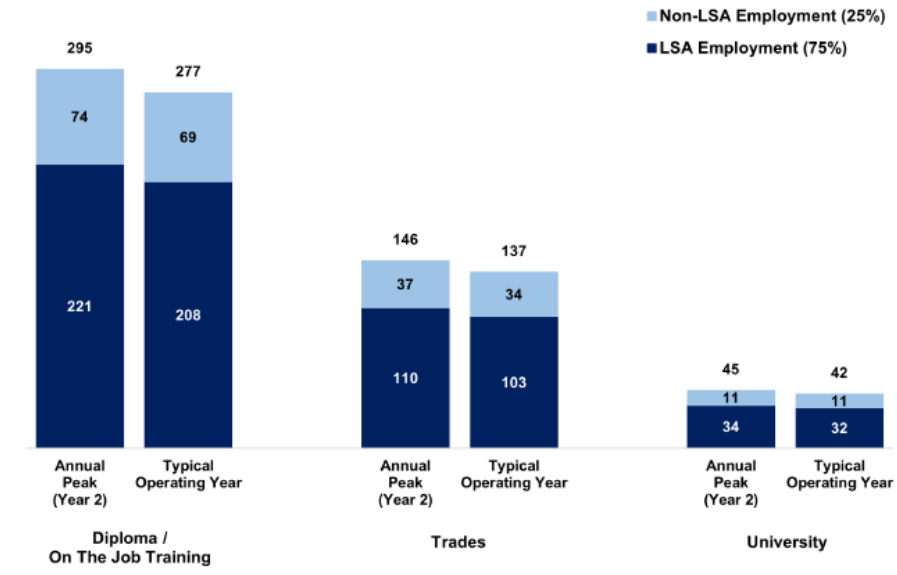
- Construction
    - Year -4: 216 annual peak
    - Year -3: 243 annual peak
    - Year -2: 348 annual peak
    - Year -1: 248 annual peak
- Operations:
    - 486 positions on payroll, with 260 on site at any one time *at peak employment* (see Table 18.4-2 below)
    - 425 direct jobs *during a typical year of operations* (see Figure 18.4-4 below for distribution of jobs by education level)

Table 18.4-2: Peak Positions (On Site and Payroll) During Operations

Labour Category	On-Site Positions	Payroll Positions
Mine labour	167	332
Process plant / paste plant labour	64	125
General and administration labour	29	29
Total	260	486

Source: NexGen 2021c.

Figure 18.4-4: Operations Peak (Year 2) and Estimated Typical Operations Labour Requirements 75% Local Study Area Employment Scenario



Source: Number of positions is based on the data provided by NexGen Energy Ltd. Rook I Project Feasibility Study Workbook (Oakes 2021). Labour positions in payroll allocated into three groups and average operations peak calculated by InterGroup Consultants Ltd.
Note: Typical operations phase estimated based on Statistics Canada I/O modelling. Education requirement for typical operations phase calculated based on the proportion from the Year 2 annual peak allocation.
LSA = local study area; I/O = input/output.

However, NexGen concedes that meeting targets of 75% of these employment projections during construction and operation may not actually be realistic given the demographics and current qualifications of the available workforce in the LSA, and the possibility of projects like the Fission Patterson Project proceeding simultaneously with the Rook 1 Project, which would create an unknown additional demand on the workforce. Recommendations have been provided that require these targets be substantiated with research and clear commitments and the verification of Indigenous groups in the LSA that these commitments have corresponding terms in Benefit Agreements, or that these targets are modified if they are not realistic so that the true benefits and impacts of the Project can be understood.

In parallel to the issue above, another primary characteristic of the Project that NexGen has used to assess the effects of the Project on the local economy and community well-being include aspirational targets for external spending awarded to LSA and RSA business of 30%. NexGen's projections of total expenditures include:

- an estimated capital expenditure of $1.3 billion over the four years of construction
- typical annual operating spending of $167 million

However, NexGen also concedes in this section in the EIS that meeting these targets might not be realistic given the lack of established Indigenous businesses in the LSA. Similar recommendations to the above have been provided that require these targets be substantiated with research and clear commitments to how they will be realized, co-developed with the verification of Indigenous groups in the LSA. If the targets cannot be met, they should be modified so that the true benefits and impacts of the Project can be understood, and alternative offsetting benefits should be identified.

In addition to the participation of LSA communities in the wage and market economy, this review has also considered the importance of BNDN's traditional land use and resource harvesting related to potential socio-economic impacts and impacts to Community Well-Being. While NexGen does acknowledge the estimates of Indigenous groups like BNDN that at least 80% of members participate in some kind of traditional economic activity (e.g. hunting, trapping, fishing, etc.), NexGen's assessment of economic effects doesn't sufficiently address any of the negative economic impacts of the Project related to the decrease of BNDN's ability to participate in the traditional economy caused by environmental impacts and limited access to harvesting areas, or the adverse economic effects on traditional land use to BNDN members who are hired to work in the mining sector. This is a key issue in this section of the EIS, and recommendations have been set out to ensure these effects are assessed and characterized properly so the impacts on this aspect of the Project's economic activities can be understood by BNDN and regulators.

Another significant issue in NexGen's assessment of the impacts of the Project to Community Well-Being is that the indicators NexGen has used to characterize and evaluate impacts to Community Well-Being do not incorporate Indigenous indicators of well-being, despite estimates that 95.2% of the population in the LSA are Indigenous. It's been recommended that NexGen develop more holistic indicators of Community Well-Being that reflect an Indigenous worldview in collaboration with Indigenous groups in the LSA and revise their assessment accordingly.

Finally, while NexGen has considered some of the effects of population changes and increased income caused by the Project and its transient workforce, such as an increased demand for services and housing, the full range of impacts associated with these dynamics of a remote mining Project on Community Well-Being have not been considered and proposed mitigation measures are also not sufficient. It's been recommended that the EIS be revised to include an assessment of all potential effects of a transient workforce and changes to population dynamics, including those disproportionately experienced by women and other segments of the population, and that NexGen make commitments to investments in social services and wellness programs located in, led and implemented by each of the Indigenous groups in the LSA.

Table 2. Comments and recommendations for the Rook I Project related to socioeconomics, employment, and contracting

#	Document Reference	Comment	Request/Recommendation
13.	Section 18.3 Existing Conditions Section 18.4 Project Interactions, Mitigations and Benefit Enhancements Socio-Economic Baseline Report	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 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	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.

		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 participation 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.	
14.	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	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.

		purchase equipment and supplies, combined with employment policies that facilitate participation in the traditional economy is expected to result in a positive 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.	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
15.	Section 18.4 Project Interactions, Mitigations and Benefit Enhancements	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	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

	Section 19.4 Project Interactions and Mitigation	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). 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 average peak operating jobs in each	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.

		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.	
16.	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

			● 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.
17.	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.
18.	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	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.

		LSA 95.2% are Indigenous" (Executive Summary, iii).	
19.	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.
20.	Section 19.4 Project Interactions and Mitigations	While Section 19.4.3 does consider the effects of population changes related to the Project on social adaptability, demand for services and housing, it doesn't address the full range of potential impacts associated with a transient workforce.	Section 19.4 must include an assessment of all potential effects of a transient workforce and changes to population dynamics, including those disproportionately experienced by women and other segments of the population. This must incorporate findings of research like the 2017 study completed by Lake Babine Nation and Nak'azdli Whut'en (Indigenous Communities and Industrial Camps), and/or related research in the context of the LSA.
21.	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.

4.3 Water Resources

Like all mining operations, the construction, operation and closure of the Rook 1 Project will require careful management of surface water and groundwater to prevent negative impacts to the surrounding and downstream natural environment. The Rook 1 project has the potential to have negative impacts on both the quality and the quantity of surface water resources in the Project area. In the EIS, NexGen has provided their predictions of the impacts that the Project will have on surface water and groundwater quality and quantity. NexGen developed their predictions using the baseline data that they have collected to create computer models that predict how water quality and quantity will be impacted by the project.

Groundwater Quantity

As an underground mining operation, NexGen will need to pump groundwater out of the mine workings to keep the mine dry. By pumping out the groundwater, the groundwater levels around the mine will be lower. This has the potential to reduce the amount of water flowing into nearby lakes and rivers, as they get some of their flow from groundwater. Overall, NexGen argues that the drawdown of groundwater will have very little impact on groundwater during operations of the mine and in the long term. Once the mine closes, the underground mine workings will refill with water and the groundwater levels will return to what they were prior to mining.

Groundwater Quality

In general, natural groundwater has higher concentrations of minerals and other elements in it than clean surface water. This is the case at the Rook 1 Project, where NexGen will need to sample and treat the groundwater that they pump out of the mine before it is released to Patterson Lake. NexGen has also modelled groundwater quality in the mine post-closure, when then mine has been backfilled with paste tailings and waste rock. The groundwater quality in the closed mine is expected to have higher concentrations of some contaminants such as cobalt, copper, and uranium. NexGen plans to address this by sealing the mine so that the groundwater in the mine has very limited interaction with surface water. NexGen expects the time for contaminated groundwater in the mine to reach Patterson Lake to be about 1000 years. NexGen expects negative impacts to Patterson Lake water quality to be permanent from the long-term loading of cobalt and copper from mine waste seepage and the stored tailings groundwater migration into Patterson Lake.

Surface Water Quantity

Activities at the Rook 1 Project will take water from Patterson Lake for use on the mine site and discharge treated water to Patterson Lake. NexGen will take water from Patterson Lake to use in their processing facility as well as for other uses on site such as in the camp. NexGen will also capture and store water on site, as water which interacts with the mine site could become contaminated and NexGen needs to make sure that contaminated water does not enter Patterson Lake. The capture and storage of water through a system of ditches and storage ponds is intended to prevent contaminated

water from flowing into Patterson Lake. NexGen has completed calculations of the total water they expect to remove from and add to Patterson Lake to develop a water balance model for the Clearwater River system. Based on NexGen's water balance model, they expect the mine to slightly increase the total amount of water in Patterson Lake on average during mining, though they expect the effects to be so small that they would be less than the natural variation from year to year. In their environmental impact statement, they have argued that the impacts to surface water will be quite minor overall, and that the changes will not be permanent, meaning that water levels in Patterson Lake and the Clearwater River system will revert back to natural conditions not long after closure of the mine.

Surface Water Quality

All groundwater and surface water that comes into contact with any of the infrastructure on the mine may become contaminated. To manage this, NexGen must capture and store all water on site to prevent potentially contaminated water from entering Patterson Lake. The stockpiled waste rock from the mine and the mine tailings has the highest risk of causing contamination if water that contacts them is not prevented from entering Patterson Lake. Several metals could contaminate the environment from the tailings and waste rock such as arsenic, cadmium, cobalt, mercury, antimony, selenium and uranium. Camp wastewater will have high concentrations of phosphorous and other nutrients that could impact Patterson Lake as well.

To prevent contamination of Patterson Lake from mine contact water and camp wastewater, NexGen plans to capture and treat all water to acceptable standards before it is released to Patterson Lake. NexGen will regularly sample water before and after treatment to ensure that it is meeting Provincial and Federal requirements. NexGen plans to discharge water from both the Effluent Treatment Plant (ETP) and Sewage Treatment Plant (STP) into the North Arm West Basin of Patterson Lake.

NexGen does expect water from the mine to have moderate levels of contamination during operations, closure and post closure of the mine. In the EIS they predict that cobalt and copper are the most likely to be elevated above water quality objectives long term. NexGen has presented these changes to the environment as a significant impact of the Project to the environment.

Primary concerns identified in the review

- NexGen expects cobalt and copper to remain elevated above water quality guidelines for many hundreds or perhaps thousands of years. NexGen and the Crown must demonstrate that this significant impact will be minimized to the maximum extent and properly accommodated
- Available data indicates that waste rock from the Project is much more likely to cause acid rock drainage and metal leaching than what BNDN previously understood.
- NexGen has underestimated how sensitive Patterson Lake is to the addition of metals and acidity from the Project, and has not considered how acid rain caused by oil sands emissions may cause cumulative effects on Patterson Lake that may negatively affect water quality far downstream

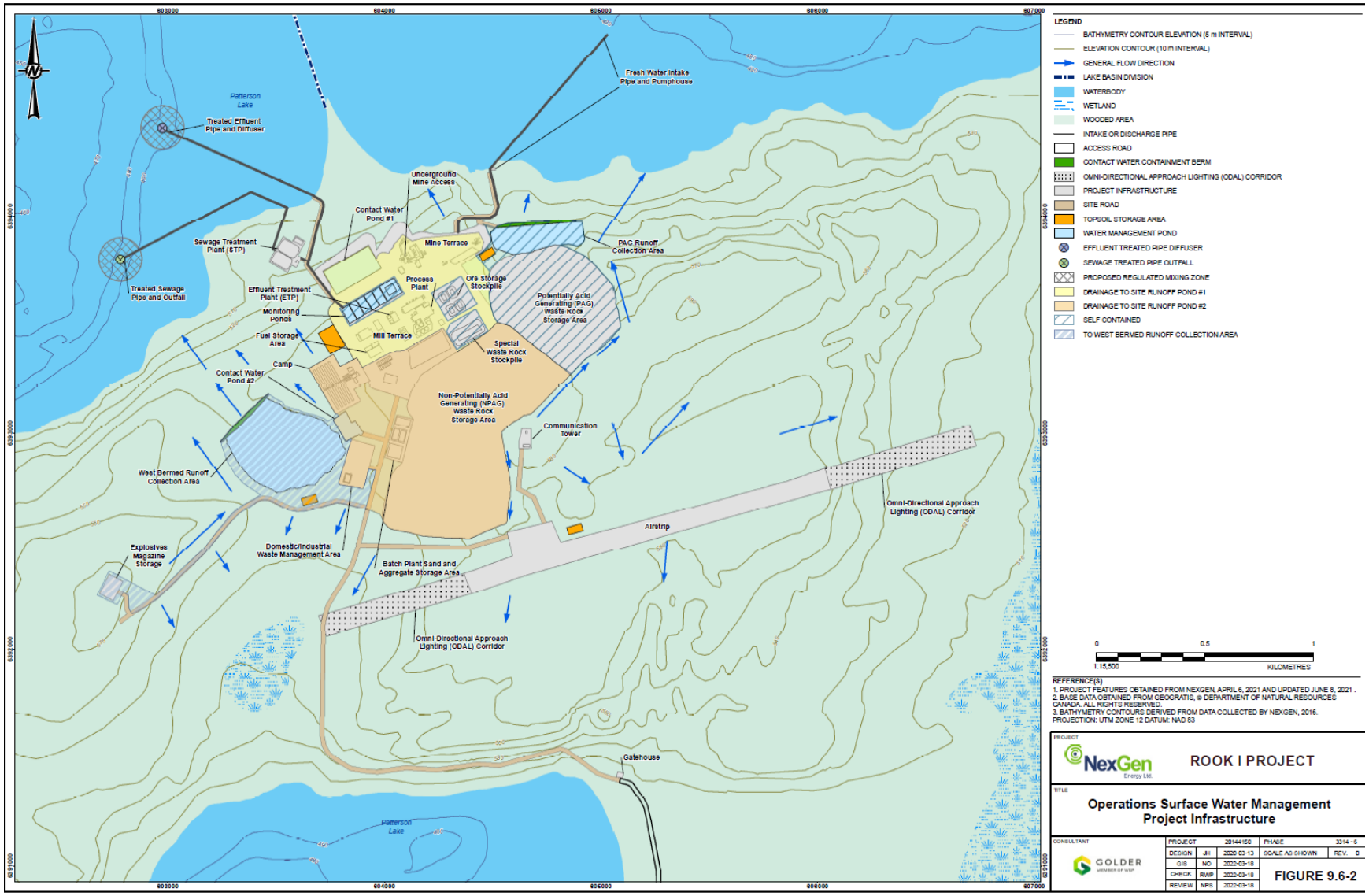


Figure 3: Map of site infrastructure, surface water flows around the mine (solid blue lines) and location of water intake from and effluent discharge into Patterson Lake (NexGen, 2022)

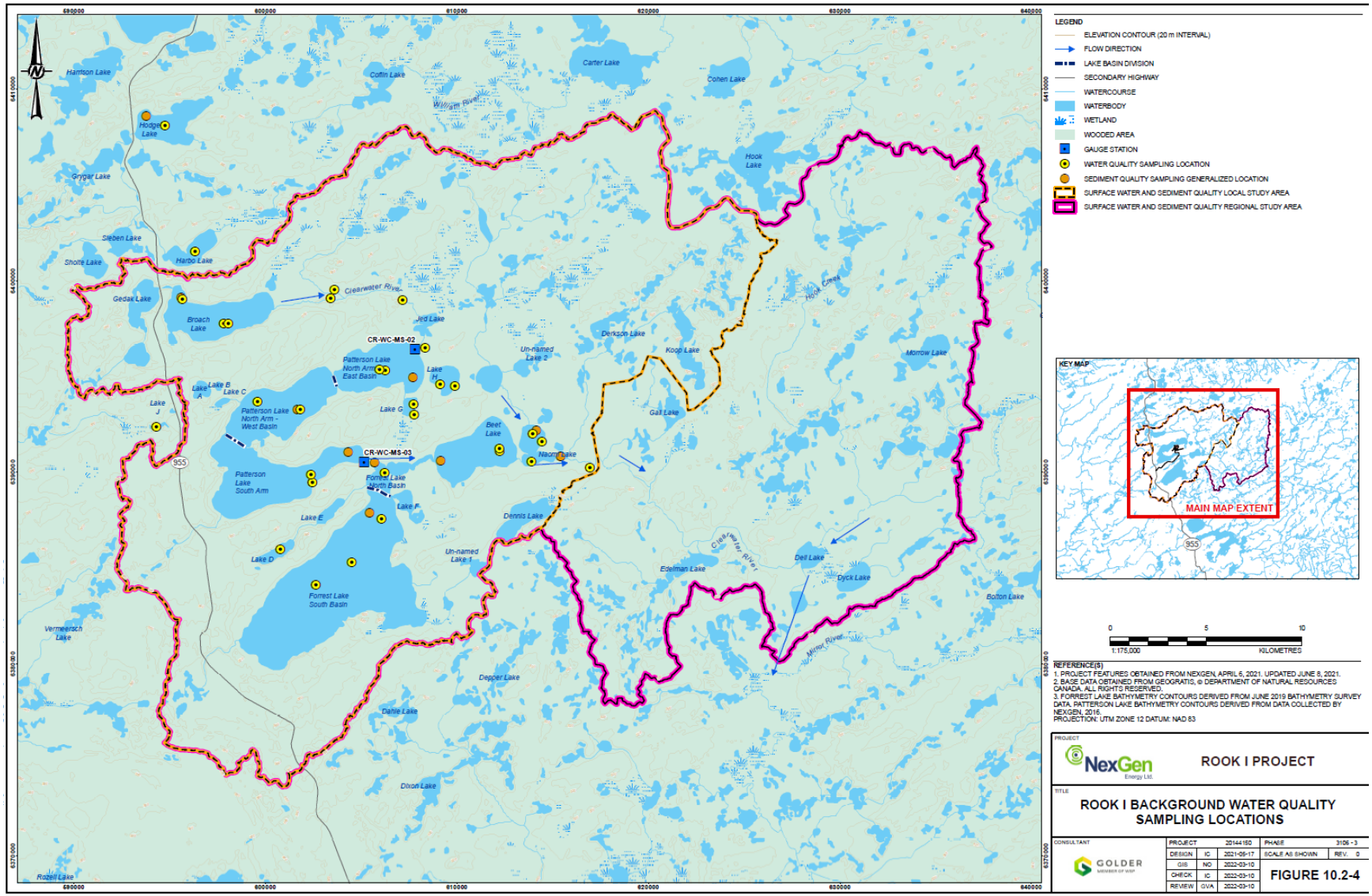


Figure 4: Location of baseline surface water (yellow dot) and sediment (orange dot) sampling, and the local and regional study areas for surface water and sediment quality for the EIS (NexGen, 2022)

Table 3. Comments and recommendations for the Rook I Project related to water resources

#	Document Reference	Comment	Request/Recommendation
22.	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	a) BNDN requests that CNSC and SMOE 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.

		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 Project, the Crown must work with BNDN to ensure that the identified potential impacts are avoided, mitigated and/or accommodated.	
23.	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	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

		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 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.	written consent for the surface water and groundwater quality monitoring plans as a condition of approval for the Project.
24.	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	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.

		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	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.

		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.	
25.	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	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

		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	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.

		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.	
26.	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	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. BNDN must be collaboratively involved in determining

		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 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	the assumptions used to inform the closure bonding estimates.

		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.	
27.	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	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

		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.	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 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.
28.	EIS 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 of 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	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.

		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.	
29.	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	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.

		positive engagement in the Project long-term.	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.
30.	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	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.

		Proponent to the maximum extent possible.	
31.	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 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	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.

		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.	
32.	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:	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.

		• 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.	

33.	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. 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.
34.	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	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

		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.	details of the condition in collaboration with BNDN

4.4 Aquatic Resources

The Project is located along the edge of Patterson Lake within the upper portions of the Clearwater River system. Fish and Fish Habitat was chosen by the Proponent for evaluation of potential effects with the study areas. The Valued Components (VCs) chosen for assessment of this discipline were lake trout (*Salvelinus namaycush*), lake whitefish (*Coregonus clupeaformis*), walleye (*Sander vitreus*), and northern pike (*Esox lucius*).

The Fish and Fish Habitat LSA is 685 km^2 and includes portions of the Clearwater River watershed from its headwaters to the outlet of Naomi Lake (Figure 5). The LSA was selected to evaluate potential direct effects and local indirect effects from the Project. The RSA includes this area and all the areas draining to the Clearwater River through its confluence with the Mirror River (1,076 km^2). The RSA was selected to assess the maximum predicted direct and indirect effects of the Project, along with cumulative effects of other reasonably foreseeable projects. These study areas are the same as those used for hydrology and surface water quality.

Waterbodies in the area are typically large deep lakes with low nutrients (i.e., oligotrophic) that provide good year-round habitat for local species and smaller shallow ponds that freeze to bottom or near-bottom overwinter. Streams and rivers, such as the upper reaches of the Clearwater River are typically wide and low gradient with sandy and organic sediments. Depth and substrate size of watercourses generally both increase in the lower portions of the watershed. Baseline studies found seventeen fish species within the study areas, which are common representatives of the northern Saskatchewan fish community, including lake whitefish, yellow perch, longnose sucker, northern pike, burbot, and lake trout. This includes the capture of Arctic grayling in only one location, in the Clearwater River below Naomi Lake. Small-bodied fish included troutperch, spot tail shiner, and lake chub. Benthic invertebrate and plankton communities were also found to exhibit common characteristics of northern oligotrophic waterbodies.

Three measurement indicators were chosen to evaluate the effects of the Project on self-sustaining and ecologically effective fish populations. The Proponent's assessment of these is summarized as follows:

- **Habitat availability** – Habitat suitability in the Patterson Lake North Arm – West Basin may be altered due to increased copper after closure. The Proponent does not anticipate that the predicted copper levels will result in detectable effects on populations or communities of fish, benthic invertebrates, or plankton.
- **Habitat distribution (i.e., connectivity)** – There are no anticipated changes between habitat distribution/connectivity from the Project. Fish should therefore be able to maintain all life processes, including spawning, migration, rearing, overwintering etc.
- **Survival and reproduction** – Fish survival and reproduction may be affected by elevated levels of copper, however the risk assessment showed that this is not expected. The risk of effects is somewhat more likely for forage fish (e.g., lake whitefish) than for predators due to their reliance on benthic invertebrates, however the Proponent concludes that these effects are not likely measurable.

Based on the results of their analysis, there is only one primary pathway for potential effects (a non-negligible and measurable effect); the potential change in surface water quality from the WRSAs and UGTMF after Closure. All other Project components/activities were considered not to have secondary pathway (minor or negligible effect) or no pathway (effect is avoided or non-detectable) to effects on fish and fish habitat. As a result of their analysis, the Proponent has stated that the effects of the Project on Fish and Fish Habitat were not significant.

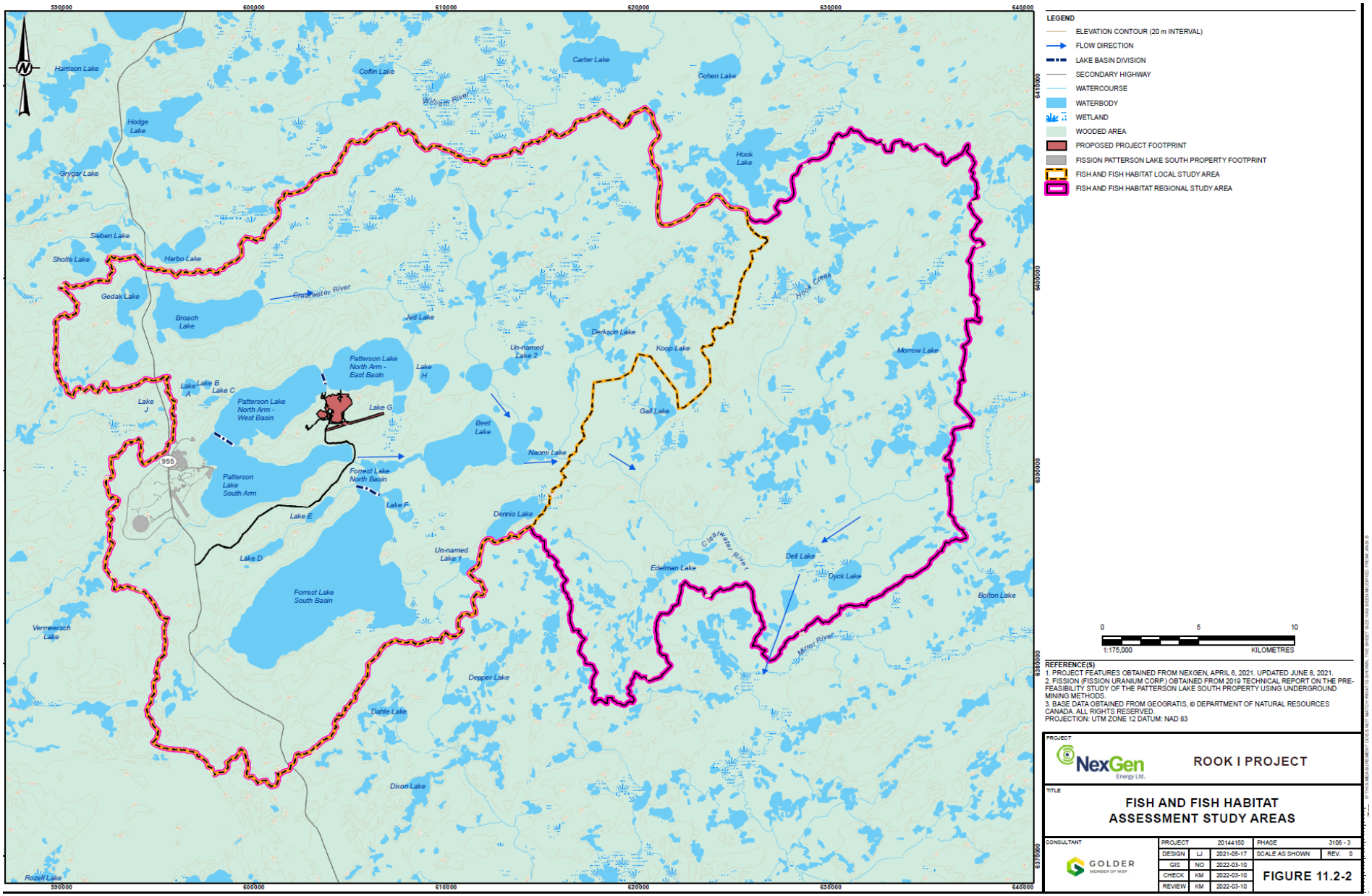


Figure 5. LSA/RSA for fish habitat (NexGen EIS, 2022)

Table 4. Comments and recommendations for the Rook I Project related to aquatic resources

#	Document Reference	Comment	Request/Recommendation
35.	EIS, Section 11 Fish and Fish Habitat	The Proponent made significant effort to incorporate Indigenous Knowledge from BNDN and other Indigenous communities into the Fish and Fish Habitat section. This is demonstrated by the information provided on how data from Indigenous Knowledge Studies were incorporated. These efforts are crucial for conducting a meaningful assessment and should be commended.	NA
36.	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	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.

		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 assessed for Fish and Fish Habitat. Troutperch or spot tail shiner would both be good candidates for this assessment.	
37.	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
38.	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	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.

		locations are the most important areas for this type of sampling because these are the areas where effluent discharge is proposed.	
39.	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.
40.	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	BNDN requests that the Proponenmineake 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

		overwintering habitat available and the potential change of overwintering habitat caused by the Project. Given the importance of overwintering habitat as a limiting factor for species within this area, this is an important analysis that should be included in the assessment.	throughout the life of the mine. This can be done for each of the fish species selected as VCs.
41.	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	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 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

		source for BNDN, it is imperative that concentrations of copper and cobalt in fish tissue be kept as low as possible.	monitor and mitigate contamination of fish tissues in the far future.
42.	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.
43.	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	BNDN requests that the Proponent commit to meeting the proposed water quality thresholds throughout all phases of the Project. Furthermore, BNDN 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).

		maximum concentrations of contaminants in effluent.	
44.	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.
45.	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	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.

		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 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.	Plans and mitigation measures for construction of the bridge must be shared with BNDN for review and comment.
46.	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	a) BNDN suggests that the Proponent consider burying the pipelines prior to reaching the lake. The pipelines could

		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.	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 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.

4.5 Wildlife and Terrestrial Ecology

The Project will require clearing, roads, waste rock piles and a variety of other surface infrastructure that will remove wildlife habitat. Furthermore, many activities on and off-site may negatively impact wildlife by causing avoidance, health effects, and even direct mortality. It is BNDN's perspective that the EIS underestimates the proposed Project's negative impacts to the embattled and federally Threatened woodland caribou (*Rangifer tarandus caribou*). The primary impact pathway of concern is through sensory disturbances and direct/indirect habitat loss.

BNDN knowledge and scientific research presented throughout the EIS describes significant caribou disturbance and avoidance from mining activities and roads. Research cited in the EIS shows this avoidance often occurs at distances of 5 km or greater from industrial sites.

Therefore, the 500 m buffer used in the EIS to define the extent of effective habitat loss is insufficient. We believe that this small (10 times less than observed in various literature) sensory disturbance buffer distance underestimates the total extent of effective habitat loss. The EIS also acknowledges uncertainty concerning caribou response to proposed project activities.

We request that the extent of caribou habitat loss from the proposed project (including effective and indirect) is presented within a range of uncertainty using the avoidance distances described by BNDN and scientific research as referred to 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.

We believe that this extent of sensory disturbance will provide a more appropriate representation of the significant loss of caribou habitat. We also believe that the proposed development may effectively exclude caribou from the entire southern and western shores of Patterson Lake (in the RFD case).

The Wildlife Baseline 1 report claims that the SK2 portion of the RSA and Caribou SA is very similar to the SK1 section and could potentially be treated as per the regulatory requirements of SK1. However, this claim is not justified in the associated report text, contradicts official Ecozone mapping, and is counter to all mapping presented in the EIS. Therefore, all mentions of lumping SK2 regions within the SK1 Ecozone must be removed from all baseline, EIS and all other reports.

Table 14.4-1 presents a wide array of general wildlife impact mitigations, which generally demonstrate thorough consideration for industry best-practices. However, we believe the proposed mitigations relating to sensory disturbances to caribou are insufficient. Pathway W-03 in table 14.4-1 must include a commitment to modifying operations in response to proximity of caribou, up to and including full suspension of all operations as required to minimize impacts during specific contexts (such as proximity of females with calves). All details of the caribou mitigation and offsetting plan must be completed through consultation with BNDN. Furthermore, 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 about whether these proposed mitigations will meaningfully diminish impacts without BNDN's ongoing and direct involvement in the refinement of all mitigation planning.

Increased predator access is of concern within the context of linear features as a factor in disturbance-mediated apparent competition. The EIS states that the project will not increase predator access, as existing roadways will be used. However, the EIS also describes roadway improvements (such as snow-clearance or hard-packing by snowmobile) as potentially related factors for increased use by wolves. We request that the EIS mitigations commit to monitoring for changes in predator access and density. And, that this predator monitoring extends to general densities in the RSA. Adaptive management might be required should increasing ungulate densities (moose and white-tailed) begin to support higher wolf densities and imperil caribou survival.

BNDN members have voiced concerns about increased traffic, increased recreational use by non-Indigenous users and decreased opportunities for indigenous harvesters due to the proposed project. The EIS states (Section 14, W-09) that the project "would not increase access". However, we believe that this is not adequately justified in the text and that additional consideration of these concerns is required. This may involve an enhanced commitment to monitor certain road uses along the improved roadways associated with the project.

Adaptive management to reduce wildlife impacts from the proposed project would require thorough monitoring coupled with clearly defined and robust mitigation response. This is applicable for all VCs including but not limited to: i) work stoppages in specific contexts such as presence 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 should be surveyed prior to, throughout and after all construction, operations and decommissioning; iii) wildlife culverts and fencing to prevent road mortality of Canadian toad; iv) wildlife mortality monitoring and deterrents on powerlines, windows, vehicles, buildings, wind turbines 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; and others.

Table 5. Comments and recommendations for the Rook I Project related to wildlife and terrestrial ecology

#	Document Reference	Comment	Request/Recommendation
47.	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.
48.	EIS Figure 14.2-4	The Project EIS acknowledges that for SK2, Base Case conditions create	BNDN requests that NexGen more clearly acknowledges the proposed project's

	Section 14.5	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 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.	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.
49.	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.
50.	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.	We request that the EIS describes a commitment to monitoring ungulate and predator densities within the RSA generally, as well as associated mitigations and

		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.	adaptive management responses as required to minimize impacts to caribou.
51.	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 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.
52.	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.

53.	EIS Table 14.4-1 W-03	We acknowledge the preliminary list of potential sensory disturbance and effective habitat loss mitigations described 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.
54.	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 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

4.6 Human and Ecological Risk Assessment

An environmental risk assessment (human and ecological health) was completed in support of the EA process for the Project. The non-radiological human health risk assessment (HHRA), which is the focus of this review, followed Health Canada's guidance on Preliminary Quantitative Risk Assessment (PQRA) and included a problem formulation, exposure assessment, toxicity assessment and risk characterization.

Chemicals of Potential Concern (COPCs) were identified by comparing predicted concentrations in air and water due to atmospheric and aqueous releases from the Project. No COPCs in air or soil (from atmospheric deposition) were carried forward for quantitative assessment in the risk assessment. However, several COPCs in water were further considered, namely:

- Arsenic
- Cobalt
- Copper
- Molybdenum
- Uranium
- Sulphate
- Chloride
- Radionuclides (due to public concern)

The risk assessment considered three Project phases: Construction (4 years), Operations (24 years), and Decommissioning and Reclamation (i.e., Closure for 15 years). Additionally, the risk assessment considered the far-future phase, which refers to the period after the closure performance criteria have been fully demonstrated.

Three assessment cases were evaluated, namely:

- Base Case
- Application Case
- Reasonably Foreseeable Development (RFD) Case

Within the HHRA, the following human receptors were considered:

- Camp worker at Patterson Lake camp residence (adult)
- Subsistence harvesters (adult and one-year old)
- Seasonal residents/lodge operators (adult and one-year old)
- Future Permanent Resident (adult and one-year old)

Nuclear energy workers were considered to be outside the scope of the risk assessment as their health risks would be managed under the Radiation Protection Program.

The primary routes of chemical exposure for humans included:

- Ingestion of food such as fish, vegetation, game and store-bought foods (using literature data and information obtained from Joint Working Group (JWG) sessions).
- Incidental ingestion of soil or sediment
- Ingestion of surface water as drinking water
- Dermal contact with surface water and sediment during recreational activities
- Dermal contact with soil while gardening or harvesting
- Inhalation of air (vapour and particulates)
- External exposure to radiation from air, water, soil and sediment.

The risk assessment considered the following three areas when identifying human receptors and calculating exposures:

- Site Study Area (Project footprint) – includes the camp where workers live while at work.
- Local Study Area (LSA) -area where direct changes to the quality of air, sediment, water and soils from the Project would be expected to occur.
- Regional Study Area (RSA) – area where there is potential for spatial overlap or interactions with Project effects and other previous and existing developments, and reasonably foreseeable developments.

The review focused on impacts to human health from exposures to non-radiological COPCs, which were quantified using Health Canada's guidance on human health preliminary quantitative risk assessment (PQRA). The report states that no unacceptable adverse effects on any of the human receptors considered in the assessment, for any of the Project phases, were found from exposure to non-carcinogenic COPCs (cobalt, copper, molybdenum and uranium). With respect to carcinogenic COPCs (arsenic), the incremental lifetime cancer risk was found to be above the risk acceptability level of 1 in 100,000 for the subsistence harvester at Patterson Lake South Arm just outside the Project footprint.

A detailed review of the health impacts due to exposure to radiological COPCs was not completed as part of this assessment. However, the incremental radiation dose to all receptors considered in the HHRA and for all Project phases were stated to be below the regulatory public dose limit of 1 millisieverts per year. Similarly, exposure to radon reportedly did not result in unacceptable risks at the camp worker location (i.e., below the regulatory limit of 60 becquerels per cubic meter).

The following comments are based on a review of *Chapter 15 – Human Health* of the Environmental Impact Statement and *TSD XXI - Environmental Risk Assessment* (human health components).

Table 6. Comments and recommendations for the Rook I Project related to human health (non-radionuclide and radon)

#	Document Reference	Comment	Request/Recommendation
55.	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.
56.	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 (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.
57.	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),	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?

		with the less conservative value used in the screening process.	
58.	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.
59.	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.
60.	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. 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.

61.	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.
62.	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?
63.	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?
64.	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.	Exposures and associated health risks should be quantified for all complete human health exposure pathways, including sediment.
65.	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	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.

		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.	
66.	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).
67.	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.

68.	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?
69.	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.

70.	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.
71.	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).

4.7 Air Quality and Emissions

Section 7.0 of the Rook 1 Project EIS discusses the impact of the Project on air quality, noise and climate change. It includes a detailed description of baseline conditions, predicted project-related impacts and proposed mitigation measures. A review was completed in collaboration with BNDN to comment, identify potential concerns/deficiencies, and provide recommendations to minimize the impact of the Project on BNDN rights and interests. Comments and recommendations related to noise impacts are included in the wildlife, fish and land use sections.

NexGen incorporated BNDN Indigenous Knowledge into their assessment through:

- Indigenous Knowledge and Land Use Study
- Joint Working Group Meetings
- Community Information Sessions
- Site Tours
- Meetings
- Workshops
- Baseline Date Collection

Air Quality

Air Quality is predominantly assessed using air dispersion models. The Project's predicted air emissions from various sources (diesel generators, process plant emissions, vehicle emissions, etc.) are combined with exiting air quality data (baseline conditions) in a model to understand the change in air emissions caused by the Project. The AERMOD dispersion model was used by NexGen, it was developed by the United States Environmental Protection Agency (USEPA) regulatory modelling programs. AERMOD has been adopted by the Saskatchewan Ministry of the Environmental as the preferred air dispersion model for air quality studies in Saskatchewan.

Air quality is regulated by the Saskatchewan Ministry of Environment through the Saskatchewan Ambient Air Quality Standards (SAAQS). For certain contaminants which do not have provincial regulatory standards, the Canadian Council of Ministers of the Environment (CCME) have agreed to implement a national Air Quality Management System. The framework resulted in the development of the Canadian Ambient Air Quality Standards (CAAQS) for particulate matter less than 2.5 microns (PM2.5), ozone, nitrogen dioxide, and sulphur dioxide.

The baseline air quality in the Study area is considered very high and well below provincial and federal regulations. Concentrations of criteria air contaminants are typical of remote settings with limited industrial activity. The only exceedances of SAAQS or CAAQS that have occurred in the last 5 years were occasional PM 2.5 and PM 10 exceedances caused by wildfire smoke (NexGen, 2022).

Project activities that would have the potential to affect air quality during the Project lifespan include:

- Combustion of fossil fuels in stationary, mobile, and heavy equipment
- Handling and stockpiling of waste rock, special waste rock, and ore
- Gypsum storage in waste rock storage areas
- Underground drilling and blasting
- Waste incineration

NexGen completed a residual effects analysis for seven air contaminants:

- Nitrogen oxides reported as nitrogen dioxide (NO2/NOx)
- Sulphur dioxide (SO2)
- Sulphuric acid
- Carbon monoxide (CO)
- Particulate matter less than 2.5 microns (PM2.5)
- Particulate matter less than 10 microns (PM10)
- Total suspended particulate (TSP)

NexGen included additional compounds that were specific to uranium mining and milling operations, in air dispersion modeling including:

- Radionuclides including Radon: emitted from mining and milling of uranium ores.
- Dioxins and furans (D&F): emitted from a domestic waste incinerator and a low-level radioactive waste (LLRW) incinerator
- Metals: emitted as a fraction of particulate matter from either fugitive sources of mineral dust, or PM associated with combustion emissions including:
    - Uranium (U)
    - Vanadium (V)
    - Zinc (Zn)
    - Cesium (Cs)
    - Bismuth (Bi)
    - Calcium (Ca)
    - Iron (Fe)
    - Magnesium (Mg)
    - Manganese (Mn)
    - Sodium (Na)
    - Silver (Ag)
    - Arsenic (As)
    - Barium (Ba)
    - Beryllium (Be)
    - Cadmium (Cd)
    - Cobalt (Co)
    - Chromium (Cr)
    - Copper (Cu)
    - Mercury (Hg)
    - Molybdenum (Mo)
    - Nickel (Ni)
    - Lead (Pb)
    - Antimony (Sb)
    - Selenium (Se)
    - Tin (Sn)
    - Thorium (Th)

There are two main types of emission sources from the Project:

- Stack emissions: air emissions released through a stack, chimney, vent, or other functionally equivalent opening
- Fugitive emissions: emissions do not pass through a stack, chimney, vent, or other functionally equivalent opening (e.g., road dust, waste rock dust, blasting dust, etc.) (NexGen, 2022)

Air concentrations were calculated, and effects were assessed for the Project (i.e., Application Case) and for the Project in combination with the Reasonably Foreseeable Development (RFD) which includes the Fission Uranium Patterson Lake South Property (i.e., RFD Case).

The following table outlines the main emission sources and activities related to the Rook 1 Project.

Project Phase	**Emission Source**
Construction	Power plant – diesel fired
	Frost fighters
	Aggregate crushing
	General construction emissions (e.g., construction equipment emissions, fugitive dust, blasting)
Construction and Operations	Concrete batch plant
	Dozing (i.e., material placement and contouring) operations at the waste rock storage areas and ore
	Storage stockpile pad
	Grading of roads on the surface and underground
	Material handling (i.e., ore, waste, and aggregate; loading and drops) on the surface and underground
	Drilling and blasting underground
	Waste incinerator for domestic and industrial waste (non-low level radioactive waste)
	Mine fleet exhaust for both surface and underground fleet

	Mine heaters and small heaters
	Road dust from vehicles travelling on surface and underground roads
	Wind erosion of the ore storage pad, waste rock storage areas
	Waste Rock Storage Areas (including potentially acid generating and non-potentially acid generating waste rock storage piles) and Aggregate Storage Pile
Operation Only	Acid plant
	Triuranium octoxide and uranium concentrate handling
	Power plant, fired by liquified natural gas (LNG)
	Low-level radioactive waste incinerator
	Crushing/Grinding in process plant
	Calciner stacks including a natural gas burner stack, a calciner exhaust stack, and the calciner bin baghouse exhaust stack;
	Calciner bin baghouse exhaust stack
	Lime silo baghouse

(NexGen, 2022)

The atmospheric environment acts as a pathway that can impact other valued ecosystem components which impacts BNDN rights, interests, and health, including:

- First Nation land and resource use including but not limited to hunting, fishing, trapping, gathering, cultural sites
- Human health
- Surface water quality and sediment quality
- Fish and fish habitat
- Terrain and soil
- Vegetation including medicinal, spiritual, edible, or culturally significant plants
- Wildlife and wildlife habitat (NexGen, 2022)

NexGen acknowledges that changes in air quality will influence other valued component that will impact BNDN rights and interests.

BNDN and other Indigenous groups expressed concerns related to air pollution from Project activities including impacts to human health, traditional land use activities, wild food safety, climate change, and aquatic and terrestrial environmental health. BNDN raised specific concerns about the effects of dust in general from Project activities on vegetation, including berry patches and wild rice.

NexGen's effects assessment has predicted that air quality will produce detectable changes to the region's existing air quality. However, most of the air contaminant emissions (e.g., nitrogen dioxide, sulphur dioxide, sulphuric acid, carbon monoxide, and PM2.5) are predicted to remain compliant with the SAAQS throughout all phases of the Project. There are some predicted exceedances including hourly Nitrogen Dioxide exceedance of CAAQS during construction with a maximum concentration of 230 $\mu g/m^3$ (CAAQS NO2 Standard = 79.2 $\mu g/m^3$). 24-hour exceedances of SAAQS and CAAQS for PM10 and TSP occur during construction. Short-term concentrations of 24-hour PM10 and 24-hour TSP are predicted to be above the SAAQS but the exceedance frequencies are less than 10 days per year and occur during construction.

BNDN members expressed concern related to radon released to the environment from uranium ore mining and processing and the potential radiation exposure to members who work, live, or use the land near the Project. Potential sources of radon emissions at this project include underground operations through mine shafts, ore storage areas, hazardous waste dumps, and treatment plants. NexGen models show radon level below regulatory compliance limits, with the highest exposure in the mine shaft.

NexGen has committed to monitoring air quality during all phases of the Project to verify EA predictions, evaluate the effectiveness of mitigation actions, and modify or enhance mitigation measures as necessary. NexGen will continue the current baseline monitoring program that measures meteorological parameters, nitrogen dioxide, sulphur dioxide, TSP, and PM2.5 through all Project phases, and the program would consider modifications identified through the licensing, permitting and in consultation with Indigenous groups. NexGen will implement an Environmental Protection Program would be implemented, which would include the Environmental Monitoring Plan, Effluent Monitoring Plan, and Industrial Air Source Environmental Protection Plan (NexGen, 2022).

BNDN has requested the implementation of robust and long-term environmental monitoring to verify protection of the environment, including community-led monitoring during Construction and Operations of the Rook 1 Project. NexGen is working with local Indigenous Groups including BNDN to implement independent environmental monitoring. This includes an Independent Monitor from BNDN (and other Indigenous groups) to verify Project performance, assess mitigation/control effectiveness, suggest changes and report any air quality issues (or other environmental issues) to BNDN Chief and Council and members. The BNDN Monitor would also provide regular reports to the Environmental Committee and work to improve environmental performance and implement adaptive management measures where necessary.

Climate Change

The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods (IPCC, 2014). For the purposes of the EA, climate change represents the change in global or regional climate patterns primarily attributed to increased atmospheric concentrations of greenhouse gases (GHGs) (NexGen, 2022).

Climate change was selected as a valued component for the EA based on the following factors:

- Socio-economic and cultural importance of climate change
- Federal and provincial commitments to decrease GHG emissions
- Potential for Project GHG emissions to contribute to climate change

The baseline GHG emissions for Saskatchewan and Canada are provided below in megatons (one million tons) of carbon dioxide equivalent (Mt CO2e). These emissions levels include the cumulative effects of existing projects and activities in Saskatchewan and Canada:

- Saskatchewan (all sectors), 75 Mt CO2e
- Canada (all sectors), 730 Mt CO2e

Canada is a signatory to the UN Paris Agreement, an international agreement signed in 2015 to strengthen the global response to climate change, primarily through GHG emissions reduction. The Paris Agreement established a goal to hold the increase in the global average temperature to below 2°C above pre-industrialized levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrialized levels (United Nations 2015).

NexGen's residual effects analysis considered three measurement indicators, which are the most common GHGs:

- Project emissions of carbon dioxide (CO2)
- Project emissions of methane (CH4)
- Project emissions of nitrous oxide (N2O)

NexGen estimated the GHG emissions for project infrastructure using established emissions inventories that estimate typical emissions for various sources using standard operating conditions. These inputs were modelled to predict the Project-related GHG emissions. The models showed that the Project would result in increased GHG emissions during all phases of the Project.

The project is anticipated to release 2,542,440 tons of carbon dioxide equivalent (CO_2e) over the construction, operations and closure phases. Maximum annual greenhouse gas emissions will occur during Year 1 of the construction phase with 170,800 tons of CO_2e emissions. The operations phase is expected to emit between 78,000 and 81,600 tons of CO_2e annually for 24 years (NexGen, 2022).

The main sources of GHG emissions would occur from Project-related equipment and activities during Construction and Operations, including:

- Electricity generation (natural gas and diesel combustion)
- On-site mobile equipment (diesel and other fuel combustion)
- Heating
- Land use change (due to lost carbon storage from removed vegetation or wetlands)
- Stationary combustion (from industrial furnace in mine processing)
- Waste incineration
- Industrial processes (sulphuric acid production and acid generation in ore/waste rock)
- Explosives

The breakdown of GHG emissions by project activity is included below:

Project Emissions Source	**% Of Project GHG Emissions**
Electricity generation (natural gas and diesel combustion)	59.3
On-site mobile equipment (diesel combustion)	14.7
Heating	13.4
Land use change (due to lost carbon storage from removed vegetation or wetlands)	8.3
Stationary combustion (from industrial furnace in mine processing)	2.4
Waste incineration	1.5
Industrial processes (sulphuric acid production and acid generation in ore/waste rock)	0.3
Explosives	0.1

(NexGen, 2022)

The effects of climate change reflect both ecological and cultural importance for BNDN. Many BNDN land users have experienced the impacts of climate change already and have been adapting to its effects for decades. BNDN expressed concerns related to climate change including:

For example, caribou is considered the lifeblood of the Athabasca Denesųłiné, and they follow the annual migration patterns of the barren-ground caribou throughout their range, which "fluctuates due to natural cycles, and effects due to climate changes, forest fires, development, and other reasons"

- Increased frequency and intensity of wildfires (and subsequent habitat destruction)
- Warmer temperatures changing wildlife and vegetation abundance, availability and natural cycles (e.g., caribou migration patterns, fish spawning locations, wild rice harvesting)
- Warmer temperatures impacting the ability to practice traditional and cultural practices or creating safety issues (e.g., unsafe ice conditions for ice fishing or access to trapping areas)
- BNDN land users have experienced shifts in ecology, weather, and natural cycles which has affected the ability of BNDN members to practice traditional and cultural activities in preferred times and in preferred locations
- Warmer water temperatures impact abundance and availability of fish
- Warmer water temperatures increase algae growth in water bodies

Project GHG emissions were compared to the provincial and federal GHG levels to identify the significance of the Project on the federal and provincial emission reduction targets. NexGen concluded that the Project will not have a significant impact on Canada's or Saskatchewan's ability to meet emissions reduction targets. The Project will contribute approximately 0.5% of the provincial annual total emissions and less than 0.1% of the federal annual total emissions. Regardless, a measurable release of GHGs will occur during all Project phases that will ultimately contribute to climate change (NexGen, 2022).

NexGen will be required to report all GHGs under the federal GHG reporting program as it will emit over the 10 kt threshold. NexGen will also report GHG emissions to Environmental Committees to monitor the emissions of the Project and verify compliance and continuous improvement. BNDN has recommended community-led long-term environmental testing and monitoring during construction and operation of the Project which includes annual GHG reporting.

Mitigation Measures Proposed for Air Quality and Climate

NexGen will utilize the following mitigation measures to avoid or limit the impacts to air quality and climate change:

- Optimize haul routes to reduce fuel consumption and emissions from equipment.
- Recover heat from the LNG power plant exhaust and use it to heat other processes and ancillary buildings, to the extent practical.

- Use pollution control technology on process plant exhaust stacks with preventative maintenance and stack testing, as well as adaptive management, if necessary.
- Use Tier 4 diesel mobile equipment for underground operations, whenever practical, with applicable mine ventilation airflow rates specified by Canada Centre for Mineral and Energy Technology, when available.
- Apply water and/or suppressants to site roads, access road, and airstrip, as necessary. Use dust suppressants that minimize environmental risk and are government-approved for use.
- Limit idling of vehicles and equipment to the extent practical.
- Limit vehicle speed on unpaved site roads to reduce fugitive dust during Construction and Operations.
- Use and maintain emissions control devices on combustion-based equipment.
- Maintain mobile mining equipment and vehicles and operate the equipment within parameters for engine exhaust system design.
- Identify and implement procurement criteria to confirm stationary and mobile engines meet applicable performance standards.
- Implement a Project-specific Environmental Protection Program.
- Implement a Project-specific Environmental Monitoring Plan that includes ambient air monitoring.
- Primarily use LNG, which generates lower emissions per unit of energy produced than diesel, for on-site power generation.
- Implement energy management strategy for measuring and evaluating thermal and electrical energy use.
- Implement GHG management strategy to reduce emissions to the extent practical
- Implement a Project-specific Waste Management Program and a Project-specific Conventional Waste Management Plan.
- Evaluate opportunities to reduce fuel combustion requirements of infrastructure and equipment, to the extent practical, during detailed design.
- Primarily use LNG for power generation
- Recover heat from the LNG powerplant and use it to heat other processes and ancillary buildings, to the extent practical
- Use excess steam generated from the acid plant to heat other process buildings, to the extent practical
- Use energy efficient LED lighting and other similar efficiencies to reduce electrical demand, where practical.

Table 7. Comments and recommendations for the Rook I Project related to air quality and emissions

#	Document Reference	Comment	Request/Recommendation
72.	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.	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.
73.	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.
74.	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	NexGen must look to decrease the Project's reliance on diesel fuel and utilize Best Available Technology Economically Achievable (BATEA) for mining equipment

		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.	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.
75.	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.	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.
76.	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.
77.	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. The following metal compounds should be carried forward to the residual effects assessment: o Uranium (U) o Vanadium (V) o Zinc (Zn)	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

		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)	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) 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)
78.	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	NexGen must monitor Project-related dust for trace metal concentrations to determine which trace metals are contained in Project-related dust and at what concentration. This will help BNDN members to understand potential risks with the inhalation or deposition of Project-related dust.

		important vegetation communities and surface water resources.	
79.	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.
80.	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.
81.	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.
82.	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.
83.	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.
84.	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.
85.	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 possible • 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
86.	EIS Section 7.0	NexGen acknowledges that mining and milling uranium ore releases radionuclides into the environment.	a) NexGen must develop a wild foods monitoring program to monitor

		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	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. c) NexGen must revise the air quality residual effects assessment to include radionuclides.

		consuming lichen that has bioaccumulated radionuclides associated with uranium mining.	

4.8 Mine Infrastructure and Engineering

Table 8. Comments and recommendations for the Rook I Project related to mine infrastructure and engineering

#	Document Reference	Comment	Request/Recommendation
87.	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.
88.	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.
89.	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).

90.	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.
91.	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).	The proposed locations for the stockpiles for the stripped in-situ materials must be planned in the general layout drawing.
92.	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.
93.	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	We recommend adding the three references to the list, which will be followed in the embankment and WMPs design.

		MAC, 2011. Mining Association of Canada Developing an Operation, Maintenance and Surveillance Manual for Tailings and Water Management Facilities	
94.	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.
95.	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.
96.	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 embankments.	Design criteria for the pond perimeter embankments must be defined based on CDA guidelines.
97.	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.
98.	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.
99.	N/A	BNDN members have noted that drill cuttings were released to the environment in an uncontrolled way before NexGen was aware that there was high grade ore in the Arrow deposit. BNDN is unclear if NexGen remediated the high-grade drill	BNDN requests that NexGen clarify what, if anything has been done to remediate the drill cuttings during early exploration. If NexGen has not remediated the sites, NexGen must work with BNDN to identify a suitable mitigation, accommodation and/or

		cuttings that were released to the environment. BNDN wishes to better understand whether NexGen has remediated the impacted sites given the impacts on BNDN Treaty and Aboriginal rights.	remediation measure to address the contamination caused from drilling prior to the discovery of the Arrow deposit.

5.0 Conclusion

Birch Narrows Dene Nation has prepared this report based on a review of the NexGen Rook I EIS and associated documents. It includes 99 specific comments and associated recommendations that are directed to the Proponent and CNSC. These comments have been prepared based on the information and resources available to BNDN at the time of the review. It is anticipated that given additional time and capacity, BNDN would identify additional comments and recommendations and thus these comments should not be considered an exhaustive list of potential BNDN concerns. BNDN expects that NexGen Energy will provide written responses to all of the comments above, including a description of how additional information or specific actions address the concerns described. We expect that identified issues will be resolved through ongoing engagement with the CNSC, SMOE and NexGen throughout the Environmental Assessment for the Project.

6.0 References

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