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June 30, 2023

Mr. Denis Saumure
Commission Registrar, Commission Registry
Canadian Nuclear Safety Commission
PO Box 1046 Station B, 280 Slater Street
Ottawa, ON K1P 5S9

Rook I Project – Final Submission of Documents to Support a Licence Application to Prepare Site and Construct a Uranium Mine and Mill

Dear Mr. Saumure:

On behalf of NexGen Energy Ltd. (NexGen), it is my pleasure to provide you with this letter and the enclosed documents in support of the formal application for a licence to prepare site and construct the Rook I Project (Project), a proposed uranium mine and mill located in northwestern Saskatchewan.

The intent of this correspondence is to provide confirmation of the final submission of complete documents that, together with previous documents submitted to Canadian Nuclear Safety Commission (CNSC) staff, form the final licence application package required to support a licensing decision for the Project by the CNSC Commission and to trigger formal review in accordance with Section 8.1 of the *Uranium Mines and Mills Regulations*.

This correspondence follows previous formal submissions to the CNSC, including:

- from NexGen to the CNSC on February 14, 2019 (*L. Curyer* to *M. Langdon*) requesting the initiation of the licensing process for the Project;
- from the CNSC to NexGen on May 21, 2019 (*R. Snider to L. Curyer*) providing confirmation of such licensing process being formally initiated;
- from NexGen to the CNSC on December 17, 2021 (*L. Moger to R. Snider*) representing the first submission of complete documents that form part of the final licence application package; and
- from NexGen to the CNSC on December 23, 2022 (*L. Moger* to *D. Pandolfi*) representing the second submission of complete documents that form part of the final licence application package.

The scope of the licence application, as reflected in this correspondence, includes site preparation, construction, and commissioning of all underground and surface structures, systems, and components to support future operations and the production of up to 31 million pounds (14 million kilograms) of U_3O_8 per annum.

NexGen has implemented an integrated approach to the environmental assessment (EA) and licensing processes for the Project whereby information to support the licence application has been submitted to the CNSC in a staged manner to ensure alignment between the EA and licensing documentation. This approach has enabled early alignment with CNSC staff on information requirements and provided process certainty for NexGen. The commitment from CNSC staff to actively engage in the licensing review process and technical workshops in support of both the EA and licence application is appreciated, as are the regular update meetings on the licence application with CNSC staff.

NexGen is optimizing the advancement of the Project while protecting people and the environment, and meaningfully engaging with local Indigenous Nations and communities in which it operates. NexGen is entirely dedicated to this philosophy.

NexGen has signed Benefit Agreements covering all phases of the Project with each of the:

- Clearwater River Dene Nation (CRDN);
- Métis Nation – Saskatchewan Northern Region 2 (MN-S NR2);
- Birch Narrows Dene Nation (BNDN); and
- Buffalo River Dene Nation (BRDN).

The Benefit Agreements have been developed to define the environmental, cultural, economic, training, employment, business opportunities, and other benefits to be provided to the Indigenous Nations by NexGen and to confirm the consent and support of those Indigenous Nations for the Project. These four Nations (i.e., the CRDN, MN-S NR2, BNDN, and BRDN) collectively represent the First Nation and Métis communities for which the Saskatchewan Ministry of Environment assigned procedural aspects of the Duty to Consult for the Project to NexGen, and which have been identified by NexGen as the primary Indigenous Nations for consultation in consideration of the federal requirements of the CNSC.

This submission includes complete management system program documents, the Rook I Mining and Milling Facility Description Manual, the Rook I Preliminary Decommissioning and Reclamation Plan, and supporting information that demonstrate concordance to the applicable topic-specific legislated requirements, the associated safety and control areas, and the draft *Site Preparation and Construction Licence Application for Uranium Mines and Mills: Guidelines* provided to NexGen by the CNSC on April 29, 2022 (*D. Pandolfi* to *L. Moger* and *J. Henderson*).

This submission is the final licence application documentation planned to be provided to the CNSC.

Rook I Project Licence Application Overview

The Project licence application structure reflects the primary documentation required to satisfy the licence application requirements of the *Nuclear Safety and Control Act*, *General Nuclear Safety and Control Regulations*, *Uranium Mines and Mills Regulations*, and associated CNSC regulatory documents and standards. As shown in Figure 1, the licence application consists of the Rook I Integrated Management System (i.e., Policy, Manual and 13 programs), Rook I Mining and Milling Facility Description Manual, and Rook I Preliminary Decommissioning and Reclamation Plan. The Rook I Environmental Impact Statement is also included in Figure 1 in recognition of it forming a foundational part of the licensing basis for the Project, and the requirement for a positive decision on the EA prior to a licensing decision being made by the CNSC Commission.

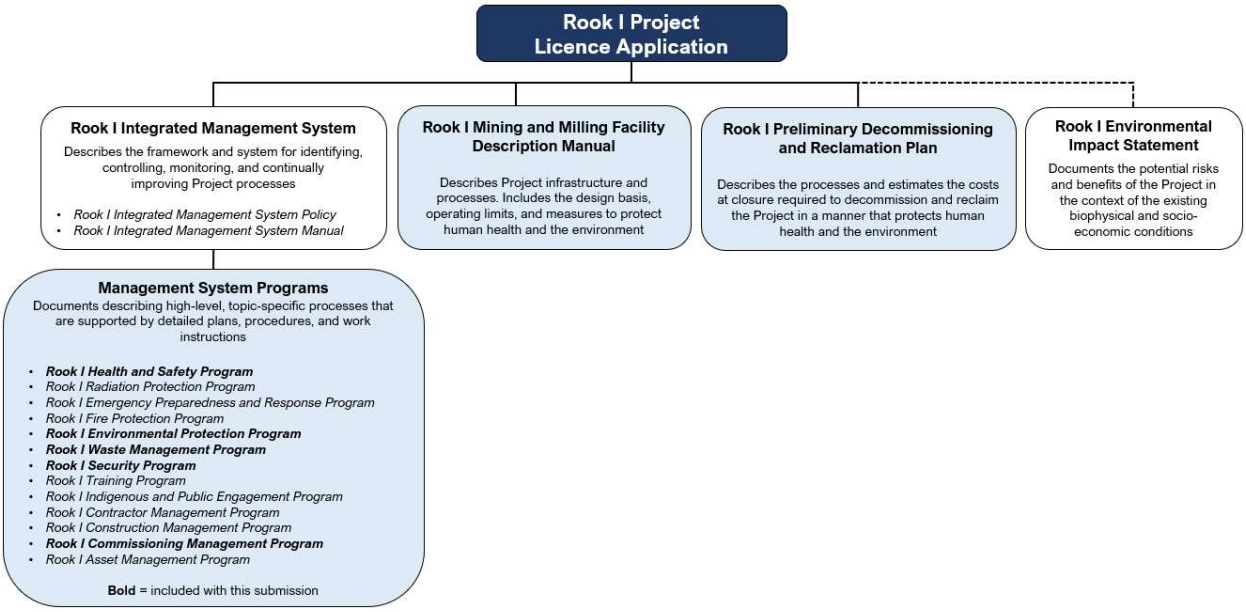

Figure 1: Rook I Project Licence Application Structure

June 2023 Submission

Documents being submitted under this correspondence include:

- five complete program documents;
- the Rook I Mining and Milling Facility Description Manual and supporting design criteria, drawings, hazard analyses, and technical studies and reports;
- the Rook I Preliminary Decommissioning and Reclamation Plan;
- eight working draft supporting documents;
- updated transitory procedure supporting documents;
- tables of concordance that clearly outline how and where applicable CNSC requirements have been addressed; and
- comment disposition tables and document update summary files reflecting NexGen responses to CNSC comments on previously submitted documents.

Further description of submitted documents is provided below, and submission summary tables are provided in Attachment B and Attachment C.

The *Rook I Security Program* and supporting submission documents are considered prescribed information and, consistent with CNSC submission protocol, are being sent via encrypted email Protected Class B documents to mitigate unauthorized access.

The *Rook I Mining and Milling Facility Description Manual* is considered confidential due to the technical detail included (e.g., design criteria, drawings, hazard analyses, technical studies and reports) and incorporated into the body of the document which, if released, could compromise NexGen's economic advantage. The *Rook I Preliminary Decommissioning and Reclamation Cost Estimate* is also considered confidential as it relies on and incorporates information from financial models developed for the Project (e.g., those serving as the basis for unit costs) which are not in the public domain and could similarly compromise NexGen's economic advantage. It is understood that members of the public may be interested in certain information or descriptions provided within both of these documents. NexGen is actively evaluating alternative ways to make this information available to the public, as appropriate and in a form that does not compromise NexGen's economic advantage or public disclosure requirements.

Between November 2019 and May 2021, NexGen submitted working draft versions of the Rook I Integrated Management System Manual and the 13 program-level management system documents to the CNSC for early review and feedback. Comments from CNSC staff on the working drafts were considered and incorporated, as appropriate, into the complete versions of the programs that were provided in 2021 and 2022. A similar process has been followed between 2021 and 2023 for other information supporting the licence application for the Project, including complete, working draft, and transitory documentation.

Previously submitted documents that have been formally accepted by the CNSC as having met all applicable requirements necessary to support the licence application are summarized in Attachment A. These documents are not resubmitted as part of this submission package. It is understood that complete documents submitted and accepted by the CNSC as licensing documents are subject to CNSC approval prior to revision or change.

It is noted that some working draft supporting documents (i.e., procedures) related to complete programs are being submitted as transitory documents; unlike complete documents, transitory documents are not licensed documents and do not require CNSC approval prior to revision or change.

To aid in the CNSC's review of the documentation included in this June 2023 submission, updates made to previously submitted versions have been noted in standalone, document-specific tracking files included with this submission, which are included in Attachment C.

Closure

We look forward to continuing to work with the CNSC on the safe advancement of the Rook I Project and appreciate the opportunity to provide this formal update and associated documentation to conclude the staged provision of information that has been conducted for the licence application process.

We trust the detail provided in the accompanying documents satisfies the legislative requirements as further outlined within the documents. NexGen will be in contact following this submission to discuss the next steps in relation to the licence application for the Project, including scheduling of a public Commission hearing date for the Rook I Project. Should you have any questions or require further information, please feel free to contact me at [redacted] or by phone at [redacted].

Sincerely,

[redacted]

Luke Moger
Vice President, Environment, Permitting, and Licensing
NexGen Energy Ltd.

LM:lm

NexGen:	L. Curyer, K. Small, K. Oakes, A. Engdahl, J. Cooper, R. Paine, W. Anderson, N. Espenberg, B. Martel, A. Lieu, P. Barnes, J. Henderson, Regulatory
CNSC:	K. Murthy, P. Burton, D. Pandolfi, B. Duhaime, K. Gorzkowski, H. Tadros, N. Kwamena, N. Frigault

Attachment A: Documents Previously Accepted by the CNSC

Document Number	Document Type	Document Title	Acceptance
ROOK-IMS-POL-00001	Policy	Integrated Management System Policy	Email - February 18, 2022 (R. Snider to J. Henderson)
ROOK-IMS-MAN-00003	Manual	Integrated Management System Manual	Email - January 24, 2022 (R. Snider to J. Henderson)
ROOK-RAD-PGM-00001	Program	Radiation Protection Program	Email - February 6, 2023 (D. Pandolfi to J. Henderson) Meeting – April 26, 2023 (D. Pandolfi, B. Duhaime, K. Gorzkowski, J. Henderson)
ROOK-EMG-PGM-00001	Program	Emergency Preparedness and Response Program	Email - February 16, 2023 Email - March 15, 2023 (D. Pandolfi to J. Henderson) Meeting – March 29, 2023 (D. Pandolfi, L. Nicolai, W. Anderson, J. Henderson)
ROOK-FIR-PGM-00001	Program	Fire Protection Program	Email - February 16, 2023 (D. Pandolfi to J. Henderson)
ROOK-TRN-PGM-00001	Program	Training Program	Email - March 8, 2023 (D. Pandolfi to J. Henderson)
ROOK-IPE-PGM-00001	Program	Indigenous and Public Engagement Program	Meeting - March 17, 2023 (J. Henderson, D. Pandolfi, A. Corcoran, B. Duhaime, K. Gorzkowski) Email - September 29, 2022 (D. Pandolfi to J. Henderson)
ROOK-CON-PGM-00001	Program	Contractor Management Program	Email - February 3, 2022 (R. Snider to J. Henderson)
ROOK-CST-PGM-00001	Program	Construction Management Program	Email - February 15, 2023 (D. Pandolfi to J. Henderson)
ROOK-AST-PGM-00001	Program	Asset Management Program	Email – March 29, 2023 (D. Pandolfi to J. Henderson) Meeting – April 26, 2023 (D. Pandolfi, B. Duhaime, K. Gorzkowski, J. Henderson)
ROOK-ENG-REF-00001	Reference	Human Factors Engineering Program Plan	Email – March 8, 2023 (D. Pandolfi to J. Henderson)

Attachment B: Document Submission Summary

Complete Documents

Document Number	Document Type	Document Title
ROOK-HSF-PGM-00001	Program	Health and Safety Program
ROOK-ENV-PGM-00001	Program	Environmental Protection Program
ROOK-WST-PGM-00001	Program	Waste Management Program
ROOK-SEC-PGM-00001*	Program	Security Program*
ROOK-COM-PGM-00001	Program	Commissioning Management Program
ROOK-ENG-MAN-00001	Manual	Mining and Milling Facility Description Manual
ROOK-DEC-PLN-00001	Plan	Preliminary Decommissioning and Reclamation Plan

*Sent via encrypted email

Rook I Mining and Milling Facility Description Manual Supporting Documentation (Appendix A - Design Criteria)

Title	Document Number
Civil Design Criteria	H366614-0000-220-210-0001
Electrical Design Criteria	H366614-0000-260-210-0001
Fire Protection Design Basis	H366614-0000-250-210-0005
Fire Protection Design Criteria	H366614-0000-250-210-0004
Ground Support Standard Specification	H366614-1300-282-080-0001
HVAC Design Criteria	H366614-0000-247-210-0001
Mechanical Design Criteria	H366614-0000-240-210-0001
Mine Design Criteria	H366614-1300-282-210-0001
Mine Ventilation and Heating Design Basis	H366614-1530-280-210-0001
Paste System Design Criteria	H366614-5200-280-210-0001
Shafts and Hoisting Plants Design Criteria	H366614-1100-280-210-0002
Structural Design Criteria	H366614-0000-230-210-0001
Surface Process Design Criteria	H366614-0000-210-210-0001

Title	Document Number
Civil - Borrow Pit General Layout	H366614-0000-220-260-0102
Civil - General Details - Runoff	H366614-2000-220-260-0030
Civil - General Details - Typical Road and Pad Sections	H366614-2000-220-260-0025
Civil - General Details Monitoring Ponds	H366614-2000-220-260-0031
Civil - Signage, Ditching and Culverts - Typical Details	H366614-2240-220-260-0017
Civil - Typical Ditches/Trench Details	H366614-2000-220-260-0026
GA - Area 5110 Power Plant and LNG Storage	H366614-5110-240-292-0001
GA - LLRW Incinerator General Arrangement	ECO-10TN-2PVS-GA
GA - Mine Ventilation and Heating Airlock Doors	H366614-1530-240-270-0002
GA - Mine Ventilation and Heating Aux Fan	H366614-1530-240-270-0004
GA - Mine Ventilation and Heating Bulkhead	H366614-1530-240-270-0001
GA - Mine Ventilation and Heating Fresh Air Raise	H366614-1530-240-270-0006
GA - Mine Ventilation and Heating Material Handling	H366614-1530-240-270-0005
GA - Mine Ventilation and Heating Production Level	H366614-1530-240-270-0003
GA - Non-LLRW Incinerator General Arrangement	ECO-5TN-2PV-00
GA - Paste Backfill Plant Mechanical General Arrangement	H366614-5200-280-270-0001
GA - Paste Backfill Plant Mechanical Section B	H366614-5200-280-270-0005
GA - Paste Backfill Plant Mechanical Section C	H366614-5200-280-270-0006
GA - Paste Backfill Plant Mechanical Section D	H366614-5200-280-270-0007
GA - Paste Backfill Plant Mechanical South Elevation	H366614-5200-280-270-0002
GA - Paste Backfill Plant Mechanical West Elevation	H366614-5200-280-270-0003
GA - Rook I Project Surface Infrastructure and Overall Site Layout	ROOK-ENG-GA-00001
Mechanical - Mine Ventilation and Heating - Offshaft Development - Long Section	1530-DE10-CSD-0001
PFD - Acid Plant	H366614-3970-210-282-0001
PFD - Acid Plant Steam Distribution	H366614-3970-210-282-0002
PFD - Barren Strip Filtration	H366614-3600-210-282-0005
PFD - Bulk Fuel Storage & Distribution Bulk Diesel and Gasoline Storage	H366614-5600-210-282-0001
PFD - CCD and PIN Bed Clarifier Reagents	H366614-3400-210-282-0005

Title	Document Number
PFD - CCD Thickener Tank 1 and 2	H366614-3400-210-282-0001
PFD - CCD Thickener Tank 3 and 4	H366614-3400-210-282-0002
PFD - CCD Thickener Tank 5 and 6	H366614-3400-210-282-0003
PFD - Compressed Air Systems and Instrumentation	H366614-3930-210-282-0001
PFD - Demineralized Water Makeup and Distribution	H366614-3923-210-282-0001
PFD – Feed/Effluent Monitoring Ponds	H366614-2530-210-282-0001
PFD - Gland and Seal Water	H366614-3922-210-282-0001
PFD - Grinding	H366614-3200-210-282-0001
PFD - Gypsum Precipitation	H366614-3600-210-282-0001
PFD - Gypsum Washing	H366614-3600-210-282-0002
PFD - HVAC Glycol Supply and Distribution	H366614-3940-210-282-0001
PFD - Leach Residue Storage and Dewatering	H366614-3700-210-282-0001
PFD - Leaching	H366614-3300-210-282-0001
PFD - LLRW Incinerator with APC System	ECO-10TN-2PVS
PFD - Material Handling Underground Ore and Waste	H366614-1580-280-282-0001
PFD - Mill Reagents 1 of 2	H366614-3980-210-282-0001
PFD - Mill Reagents 2 of 2	H366614-3980-210-282-0002
PFD - Mine Dewatering 1 of 4	H366614-1570-280-282-0001
PFD - Mine Dewatering 2 of 4	H366614-1570-280-282-0002
PFD - Mine Dewatering 3 of 4	H366614-1570-280-282-0003
PFD - Mine Dewatering 4 of 4	H366614-1570-280-282-0004
PFD - Mine Terrace Fresh Water Intake and PAG Runoff	H366614-2000-220-260-0013
PFD - Mine Ventilation & Heating - Life of Mine	H366614-1530-280-282-0004
PFD - Ore Sorting, Storage, Blending and Grinding	H366614-3100-210-282-0001
PFD - Paste Backfill Plant Binder System	H366614-5200-210-282-0003
PFD - Paste Backfill Plant Conveyors	H366614-5200-210-282-0001
PFD - Paste Backfill Plant Paste Distribution Pumps	H366614-5200-210-282-0004
PFD - Paste Backfill Plant Paste Mixers	H366614-5200-210-282-0002
PFD - Paste Backfill Plant Services Area	H366614-5200-210-282-0005

Title	Document Number
PFD - Power Plant Liquid Natural Gas Storage	H366614-5110-210-282-0001
PFD - Power Plant Power Plant Generators	H366614-5110-210-282-0003
PFD - Power Plant Power Plant Regasifiers	H366614-5110-210-282-0002
PFD - Pregnant Solution Clarification and Storage	H366614-3400-210-282-0004
PFD - Process Plant Overall Process Flow Diagram	H366614-3000-210-282-0001
PFD - Process Water Makeup and Distribution	H366614-3921-210-282-0001
PFD - Residue Dewatering and Reagents	H366614-3700-210-282-0004
PFD - SX Acid Wash and Regeneration	H366614-3500-210-282-0003
PFD - SX Extraction and Scrubbing	H366614-3500-210-282-0001
PFD - SX Regeneration Reagents	H366614-3500-210-282-0005
PFD - SX Scrubbing and Stripping	H366614-3500-210-282-0004
PFD - SX Stripping	H366614-3500-210-282-0002
PFD - Tailings Dewatering	H366614-3700-210-282-0003
PFD - Tailings Storage Mixing	H366614-3700-210-282-0002
PFD - YC Calcining	H366614-3800-210-282-0002
PFD - YC Drying	H366614-3800-210-282-0001
PFD - YC Filtration	H366614-3600-210-282-0004
PFD - YC Off-Gas Handling	H366614-3800-210-282-0005
PFD - YC Precipitation and Washing	H366614-3600-210-282-0003
PFD - YC Product Sizing	H366614-3800-210-282-0003
PFD - YC Storage and Packaging	H366614-3800-210-282-0004

Rook I Mining and Milling Facility Description Manual Supporting Documents (Annex A – Hazard Analysis)

Title	Author	Date
Hazard Analysis Report	Hatch	20-Dec-2022
NexGen Rook I Project Baseline Gamma Radiation Survey	Canada North Environmental Services	01-Dec-2022
Rook I Project - Evaluation of Low-level Radioactive Waste Incinerator Radiological Exposures	Arcadis	01-Jun-2023

Title	Author	Date
Rook I Project - Evaluation of Process Plant and Paste Tailings Workplace Radiological Exposures	Arcadis	01-Jun-2023
Rook I Project - Evaluation of Underground Workplace Radiological Exposures	Arcadis	01-Jun-2023
Rook I Project - Evaluation of Uranium Kidney Burden	Arcadis	01-Jun-2023
Rook I Project - Evaluation of Worker Exposure to Crystalline Silica and Diesel Engine Emissions	Arcadis	01-Jun-2023
Rook I Project - Radiological Exposure Assessment of Occupational Accidents and Malfunctions	Arcadis	01-Jun-2023
Rook I Project Fire Hazard Assessment Drum Storage Building	Hatch	16-Jan-2023
Rook I Project Fire Hazard Assessment ERT Admin Mill Dry Building	Hatch	16-Jan-2023
Rook I Project Fire Hazard Assessment Mine Dry Building	Hatch	16-Jan-2023
Rook I Project Fire Hazard Assessment Process Plant Building	Hatch	16-Jan-2023
Rook I Project Fire Hazard Assessment Production Headframe	Hatch	16-Jan-2023
Rook I Project Fire Hazard Assessment Production Hoist House	Hatch	16-Jan-2023
Rook I Project Fire Hazard Assessment Solvent Extraction Building	Hatch	16-Jan-2023
Rook I Project Human Factors Engineering Program Plan	NexGen	01-Nov-2022

Rook I Mining and Milling Facility Description Manual Supporting Documents (Annex B – Mining)

Title	Author	Date
Geotechnical Design Report for the Exhaust Shaft	Hatch	22-Jul-2022
Geotechnical Design Report for the Production Shaft	Hatch	22-Jul-2022
Ground Freezing FEED Report	Newmans Geotechnique	28-Aug-2022
Rook I Project - Mining Geotechnical Assessment	North Rock Mining Solutions	24-Apr-2023

Rook I Mining and Milling Facility Description Manual Supporting Documents (Annex C – Process Plant)

Title	Author	Date
Filtration Laboratory Test Report - Horizontal Vacuum Belt Filter (Hasler 2019)	Hasler Group	01-Jul-2019
Final Report - Arrow Uranium Ore Metallurgical and Environmental Bench Testing (Phase I)	SRC	01-Mar-2018
Final Report - Arrow Uranium Ore Metallurgical and Environmental Pilot Testing (Phase II)	SRC	01-Jul-2018

Rook I Mining and Milling Facility Description Manual Supporting Documents (Annex D – Waste Management)

Title	Author	Date
Rook I Project – Geochemical Characterization of Waste Rock	SRK	01-Jan-2023
Rook I Project - Paste Feasibility Study Backfill Test Work Summary Report	Paterson & Cooke	10-Jan-2020

Rook I Mining and Milling Facility Description Manual Supporting Documents (Annex E – Water Management)

Title	Author	Date
Hydrogeology Baseline Report for the Rook I Project	Golder Associates	01-Apr-2022
Solute Transport Modelling Report Technical Support Document for the Rook I Project	Golder Associates	01-Oct-2021

Supporting Documentation (Working Draft)

Related Program-Level Document (Document Number)	Document Number	Document Title
Emergency Preparedness and Response Program (ROOK-EMG-PGM-00001)	ROOK-EMG-PLN-00001	Emergency Response Plan
Environmental Protection Program (ROOK-ENV-PGM-00001)	ROOK-ENV-PLN-00001	Environmental Monitoring Plan
	ROOK-ENV-PLN-00002	Effluent and Emissions Plan
Waste Management Program (ROOK-WST-PGM-00001)	ROOK-WST-PLN-00001	Mine Waste Management Plan
	ROOK-WST-PLN-00002	Site Water Management Plan
	ROOK-WST-PLN-00003	Conventional Waste Management Plan
Security Program* (ROOK-SEC-PGM-00001)	ROOK-SEC-PLN-00001	Security Plan*
Preliminary Decommissioning and Reclamation Plan (ROOK-DEC-PLN-00001)	ROOK-DEC-PLN-00002	Preliminary Decommissioning and Reclamation Cost Estimate

*Sent via encrypted email

Supporting Documentation (Transitory Procedures)

Related Program-Level Document (Document Number)	Procedure Number	Procedure Title
Health and Safety Program (ROOK-HSF-PGM-00001)	ROOK-HSF-PRO-00004	Personal Protective Equipment
	ROOK-HSF- PRO-00005	Respiratory Protection
	ROOK-HSF-PRO-00006	Hearing Loss Prevention
Construction Management Program (ROOK-CST-PGM-00001)	ROOK-CST-PRO-00001	Constructability Reviews
	ROOK-CST-PRO-00002	Construction Change
	ROOK-CST-PRO-00003	Construction Deficiencies
	ROOK-CST-PRO-00004	Construction Handover to Pre-Operational Testing
	ROOK-CST-PRO-00005	Construction Quality Control
	ROOK-CST-PRO-00006	Construction Work Packages
	ROOK-CST-PRO-00007	Field Mark-ups
	ROOK-CST-PRO-00008	First Fills and Lubrications
	ROOK-CST-PRO-00009	Inspection and Test Plan Management
	ROOK-CST-PRO-00010	Site Instructions
	ROOK-CST-PRO-00011	Site Request for Information
	ROOK-CST-GDE-00001	Temporary Works
	ROOK-CST-GDE-00002	Construction Work Schedule Development and Management Guide
Commissioning Management Program (ROOK-COM-PGM-00001)	ROOK-COM-PRO-00001	Commissioning Execution Plan Requirements
	ROOK-COM-PRO-00002	Handover from Pre-operational Testing to Process Commissioning
	ROOK-COM-PRO-00003	Handover from Process Commissioning to Operations
	ROOK-COM-PRO-00004	Commissioning Punch List

Attachment C: Concordance, Comment Disposition, and Program Update Document Submission Summary

Tables of Concordance

Related Program-Level Document (Document Number)	Document Type	Document Title
All	Table of Concordance	Table of Concordance – Safety and Control Area Equivalency List
Health and Safety Program (ROOK-HSF-PGM-00001)	Table of Concordance	Table of Concordance – Rook I Health and Safety Program
Environmental Protection Program (ROOK-ENV-PGM-00001)	Table of Concordance	Table of Concordance – Rook I Environmental Protection Program
Waste Management Program (ROOK-WST-PGM-00001)	Table of Concordance	Table of Concordance – Rook I Waste Management Program
Security Program* (ROOK-SEC-PGM-00001)	Table of Concordance	Table of Concordance – Rook I Security Program*
Commissioning Management Program (ROOK-COM-PGM-00001)	Table of Concordance	Table of Concordance – Rook I Commissioning Management Program
ROOK-ENG-MAN-00001 (Mining and Milling Facility Description Manual)	Table of Concordance	Table of Concordance – Rook I Mining and Milling Facility Description Manual
ROOK-DEC-PLN-00001 (Preliminary Decommissioning and Reclamation Plan)	Table of Concordance	Table of Concordance – Rook I Preliminary Decommissioning and Reclamation Plan
ROOK-DEC-PLN-00002 (Preliminary Decommissioning and Reclamation Cost Estimate)	Table of Concordance	Table of Concordance – Rook I Preliminary Decommissioning and Reclamation Cost Estimate

*Sent via encrypted email

Comment Disposition Tables

Related Document (Document Number)	Document Type	Document Title
Health and Safety Program (ROOK-HSF-PGM-00001)	Comment Disposition	Comment Disposition – Rook I Health and Safety Program (June 2023)
Environmental Protection Program (ROOK-ENV-PGM-00001)	Comment Disposition	Comment Disposition – Rook I Environmental Protection Program (June 2023)
Waste Management Program (ROOK-WST-PGM-00001)	Comment Disposition	Comment Disposition – Rook I Waste Management Program (June 2023)
Security Program* (ROOK-SEC-PGM-00001)	Comment Disposition	Comment Disposition – Rook I Security Program*
Construction Management Program (ROOK-CST-PGM-00001)	Comment Disposition	Comment Disposition – Rook I Construction Management Procedures (June 2023)
Commissioning Management Program (ROOK-COM-PGM-00001)	Comment Disposition	Comment Disposition – Rook I Commissioning Management Program (June 2023)
Emergency Preparedness and Response Program (ROOK-EMG-PGM-00001)	Comment Disposition	Comment Disposition – Rook I Emergency Response Plan (June 2023)
Preliminary Decommissioning and Reclamation Plan (ROOK-DEC-PLN-00001)	Comment Disposition	Comment Disposition – Rook I Preliminary Decommissioning and Reclamation Plan (June 2023)

*Sent via encrypted email

Program Update Summary Files

Related Program-Level Document (Document Number)	Document Type	Document Title
Health and Safety Program (ROOK-HSF-PGM-00001)	Tracking File	Tracking File – Rook I Health and Safety Program
Environmental Protection Program (ROOK-ENV-PGM-00001)	Tracking File	Tracking File – Rook I Environmental Protection Program
Waste Management Program (ROOK-WST-PGM-00001)	Tracking File	Tracking File – Rook I Waste Management Program
Security Program* (ROOK-SEC-PGM-00001)	Tracking File	Tracking File – Rook I Security Program*
Commissioning Management Program (ROOK-COM-PGM-00001)	Tracking File	Tracking File – Rook I Commissioning Management Program

*Sent via encrypted email

ROOK I PROJECT

Initial Licence Application to
Prepare Site and Construct

Submitted to:

Canadian Nuclear Safety Commission (CNSC)

Uranium Mines and Mills Division
101 - 22nd Street East, Suite 520
Saskatoon, SK S7K 0E1
Attention: Mark Langdon

Submitted by:

NexGen Energy Ltd.

Operations Headquarters
Suite 200, 475 – 2nd Ave S
Saskatoon, SK S7K 1P4

February 2019

Executive Summary

The Rook I Project (Project) is a proposed new uranium mining and milling operation that is 100% owned by NexGen Energy Ltd. (NexGen), a Canadian uranium development company. The Project is located adjacent to Patterson Lake in the southern Athabasca Basin in northern Saskatchewan, approximately 155 km north of the town of La Loche, 80 km south of the former Cluff Lake mine site, and 640 km north west of Saskatoon.

In February 2014, NexGen discovered the Arrow uranium deposit, a land-based, basement hosted high grade uranium deposit located at Rook I. Results of a recently completed pre-feasibility study indicate that Arrow has exceptional potential to support development of a uranium mine and mill. NexGen is currently advancing the technical studies and analysis necessary to refine facility design and to support the preparation of applications required for the provincial and federal regulatory approvals to authorize mine and mill development.

Accordingly, this document constitutes the initial licence application to prepare site and construct a uranium mine and mill as required under the *Nuclear Safety and Control Act*, the *General Nuclear Safety and Control Regulations*, and the *Uranium Mines and Mills Regulations*. It is intended to initiate the associated Canadian Nuclear Safety Commission (CNSC) licensing process as described in *REGDOC-3.5.1 Licensing Process for Class I Nuclear Facilities and Uranium Mines and Mills*.

The scope of this application covers the activities commencing with the preparation of the site and physical construction of surface and underground infrastructure through to commissioning of all structures, systems, and components with ore to support future operations which includes the production of up to 31 million pounds (14 million kilograms) of U_3O_8 per annum.

NexGen understands that a licensing decision regarding the construction of new a uranium mine and mill cannot be made by the CNSC until the environmental and socio-economic effects of the proposed activities have been evaluated through an environmental assessment (EA) conducted in accordance with the federal and provincial regulatory requirements. Work to support the EA is in progress, including early engagement with the public and local Indigenous communities as well as the concurrent submission of a Project Description and Indigenous Engagement Report. With the submission of the Project Description, the Indigenous Engagement Report, and this licence application, NexGen intends to pursue an integrated and harmonized EA approval and licensing process for the Project as described in *REGDOC-2.9.1, Environmental Protection: Environmental Principles, Assessments and Protection Measures*.

As the Project is subject to further study, assessment and subsequent phases of design, NexGen proposes to develop and provide all necessary supporting technical information required to fulfill CNSC licensing obligations in stages during the licensing process as outlined herein. This staged approach to the submission of licensing documentation completed in parallel with the EA process is intended to allow alignment of the EA, detailed facility design, and licensed program development to ensure the necessary level of detail is available to adequately inform the development of each of the licensed programs required by the CNSC prior to issuing a licence to prepare site and construct for the Rook I Project.

DESCRIPTION OF PROJECT

The Project includes underground and surface facilities to support the mining and processing of uranium ore from the Arrow deposit. The main components include:

- underground workings and two vertical shafts;
- a uranium mill and paste processing circuit;
- a purpose-built underground tailings management facility (UGTMF);

- a wastewater treatment plant;
- an ore storage pad;
- a special waste rock storage pad;
- a clean waste rock stockpile; and
- the associated ancillary surface infrastructure to support operation of a uranium mine and mill facility.

The underground mine will require the excavation of mine workings and the installation of the associated underground and surface infrastructure to support development and mining. The current planned average capacity of the mine is 1,400 tonnes per day, subject to refinement as part of the EA and subsequent phases of design.

Transverse and longitudinal retreat mining methods are currently planned to extract ore from the Arrow mine. Following ore extraction, cemented paste generated from mill waste streams (tailings) will be used to backfill stopes. The deposit will be accessed from surface via two vertical shafts located in the footwall and lateral drifts developed in waste rock. Shaft 1 and 2 will extend to approximately 650 m and 530 m below surface, respectively. Within the mine, ramps will be developed to provide equipment access and material transfer between production levels. The workings will be bolted, screened, and sprayed with shotcrete (as required) to ensure stability and will be equipped with necessary utilities, ventilation, and infrastructure to collect and manage groundwater seepage and water from underground applications.

To facilitate the exclusive storage of mining and milling process wastes (i.e. tailings) underground, mine development during construction will also include excavation of an underground tailings management facility (UGTMF). The UGTMF will be a purpose-built, underground facility constructed approximately 250 m below the unconformity (approximately 385 m below surface) in competent basement rock beyond the extent of mineralization. It will consist of specially designed chambers approximately 25 m wide by 25 m long by 60 m high. The excavations will be dedicated to the storage of mining waste, paste backfill and radiologically contaminated waste. Three cavities are planned for development during the construction and commissioning phase to ensure adequate storage capacity is available during commissioning and the initial transition to operations.

The mill is currently designed for a production capacity of up to 31 million pounds (14 million kilograms) of U_3O_8 per year and is based on conventional uranium milling methods. It will consist of the following circuits:

- acid plant;
- grinding;
- leaching;
- liquid-solid separation;
- solution clarification;
- solvent extraction;
- gypsum precipitation and washing;
- yellowcake precipitation and washing;
- drying/calcining;
- packaging; and

- paste processing.

The majority of the mill circuits and infrastructure will be housed within an enclosed mill facility. The design includes the features and functionality necessary to protect the health and safety of workers and the environment throughout all Project phases including, but not limited to, single-pass ventilation, fire suppression systems, radiation shielding and monitoring systems, and secondary containment.

Ventilation systems for both the mine and the mill will be described in the *Ventilation Code of Practice* and will be designed to consistently meet regulatory requirements while minimizing potential exposures of personnel to radon and other airborne contaminants. Similarly, radiation protection measures during construction and commissioning will be described in detail as part of the *Radiation Protection Program* and *Radiation Code of Practice* and will include a combination of administrative, management, and engineered controls.

The conceptual Project design accounts for solid waste streams from the milling process (tailings) to be diverted to a paste backfill circuit where they will be processed prior to transfer and disposal underground. Two types of processed waste streams will be generated by the paste backfill circuit; cemented paste backfill and uncemented paste backfill. Cemented paste backfill will be engineered to meet strength criteria required for cemented paste backfill product in the mined stopes whereas the processed waste placed in the UGTMF will not be subject to the same level of strength criteria. Further studies and assessment specific to paste design characteristics (e.g. radiological properties), delivery, and stability are underway. The technical requirements, operational implications, and health, safety, radiological, and environmental protection measures will also be identified and reflected in the respective licensed programs.

The Project's water management and handling system will be designed with sufficient storage, conveyance, and treatment capacity to prevent the uncontrolled release of untreated water to the environment under both routine and non-routine scenarios, including underground in-flows, extreme precipitation events (e.g. probable maximum precipitation events), and upset operating conditions. A wastewater treatment plant (WWTP) consisting of two-stage chemical treatment will handle and treat contaminated or potentially contaminated wastewater generated during all Project phases. It will be designed to effectively remove elements of potential concern to achieve water quality suitable for batch release to the environment. The construction and commissioning of the WWTP will be sequenced early in the construction phase, prior to the generation of, or contact with, potentially contaminated wastewater.

Waste rock management during the construction and commissioning phase of the Project will consist of characterizing, segregating, and storing the material in a manner that ensures adequate protection of the environment. Although most material generated during shaft sinking and underground development is expected to be characterized as overburden and clean waste rock, adequate provisions will be in place to account for special waste rock or ore encountered during construction and commissioning phase.

The Project will also account for the processes and infrastructure necessary to ensure the safe and responsible characterization, handling, storage, processing, reuse, recycling and disposal of domestic, industrial, hazardous, and radiologically contaminated wastes generated during all Project phases. The management strategies for these waste streams are being finalized but are currently anticipated to include a combination of on-site and off-site disposal methods.

Where possible, the Project has been designed with closure in mind and opportunities for progressive reclamation and decommissioning will be explored and implemented throughout the Project lifecycle. A description of the proposed decommissioning and reclamation objectives, strategies, methodologies, assumptions and associated costs will be provided as part of the *Preliminary Decommissioning Plan* and *Preliminary Decommissioning Cost Estimate* (PDP/PDCE) submitted to the Saskatchewan Ministry of Environment (SMOE) and CNSC for review and approval in accordance with the tentative timeline presented herein. The PDP/PDCE will be developed in accordance with provincial and federal regulatory

requirements and available guidance and will form the basis for the financial assurance for the construction and commissioning phase of the Project.

PROJECT EXECUTION

NexGen benefits from having a project development team and supporting staff with direct experience working at licensed uranium mine and mill operations in northern Saskatchewan during construction, commissioning, and operating phases. This experience and expertise provide a sound foundation from which the organization can develop the Rook I Project and provides the necessary capacity to incorporate the level of control required to ensure the health and safety of workers, the public, and the appropriate protection of the environment.

In addition to the future growth of the organization, it is recognized that safely and effectively transitioning towards the construction and eventual operation of a uranium mine and mill will require the evolution of the management systems currently in place and NexGen is committed to implementing robust management systems aligned with international standards and CNSC requirements.

As part of the transition to project development, NexGen will develop and implement specific licensed programs that are linked to each of the CNSC's 14 Safety and Control Areas (SCA). The licensed programs will articulate roles, responsibilities, processes, and control measures that will be used to support site preparation and construction and will form an important part of the licensing basis for the Project. To ensure the outcomes from the EA and subsequent phases of design are appropriately reflected in these licensed programs, NexGen is proposing a staged approach to program submission for CNSC review and approval according to the tentative timelines presented herein. In addition to reflecting necessary alignment with the EA and subsequent phases of design, this staged approach is also intended to encourage transparency of process, enable efficient review, allow for timely revision, and avoid delays in timing of Project execution.

As the Project advances through the licensing process, NexGen will work closely with the CNSC to ensure that staffing levels and personnel qualifications are adequate at each stage, and to ensure that the programs and associated processes are sufficiently robust to continually preserve the health and safety of workers and the public and to adequate protection of the environment.

List of Acronyms

Acronym	Term
ALARA	As low as reasonably achievable
CANMET	Canada Centre for Mineral and Energy Technology
CNSC	Canadian Nuclear Safety Commission
CSA	Canadian Standards Association
EA	Environmental Assessment
EIS	Environmental Impact Statement
GNSCR	General Nuclear Safety and Control Regulations
HAZOP	hazard and operability study
MCC	motor control center
MIEPR	Mineral Industry Environmental Protection Regulations
NexGen	NexGen Energy Ltd.
NSCA	Nuclear Safety Control Act
OSLD	optically stimulated luminescence dosimeter
PAG	potentially acid generating
PDP	Preliminary decommissioning plan
PDCE	Preliminary decommissioning cost estimate
PEA	Preliminary economic assessment
PFS	Pre-feasibility study
PMP	Probable Maximum Precipitation
SCA	Safety and Control Area
SMOE	Saskatchewan Ministry of Environment
SO_2	Sulphur dioxide
SO_3	Sulphur trioxide
the Project	Rook I Project
TMZ	Talston Magmatic Zone
U_3O_8	Triuranium octoxide
UGTMF	underground tailings management facility
UMMR	Uranium Mines and Mills Regulations
VOD	Ventilation on Demand
WWTP	wastewater treatment plant

List of Units

Unit	Term
km	kilometres
kg	kilograms
m^3	cubic metres
Mlbs	million pounds

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Table of Concordance

1.0 GENERAL INFORMATION

1.1 Introduction

NexGen Energy Ltd. (NexGen) is a Canadian uranium development company with substantial land holdings in the southwestern Athabasca Basin of Saskatchewan. Since 2013, exploration activity has been principally focused on NexGen's 100% owned Rook I site, located approximately 155 km north of the town of La Loche and 640 km northwest of Saskatoon by air (768 km by road).

In February 2014, NexGen discovered the Arrow uranium deposit at Rook I, which is currently the largest undeveloped uranium deposit in Saskatchewan. The Arrow deposit is hosted below land within competent crystalline basement rock and is a structurally controlled, sub-vertical high-grade uranium deposit. The Indicated Mineral Resources total 2.89 million tonnes at an average grade of 4.03% triuranium octoxide (U_3O_8), for a total of 256.6 million pounds (Mlbs) U_3O_8. The Inferred Mineral Resource estimate is 91.7 Mlbs U_3O_8 in 4.84 million tonnes at an average grading of 0.86% U_3O_8. The Probable Mineral Reserve estimate is 234.1 Mlbs U_3O_8 contained in 3.43 million tonnes at an average grading of 3.09% U_3O_8.

Results of a recently completed pre-feasibility study (PFS) titled *Technical Report on Pre-feasibility Study, Arrow Deposit, Rook I Property, Saskatchewan* (Wood Canada Limited 2018) indicate that Arrow has exceptional potential to support development of a uranium mine and mill. NexGen fully recognizes this potential and continues to advance the work necessary to demonstrate its feasibility and to support the preparation of applications required for the provincial and federal regulatory approvals necessary to authorize mine and mill development. This includes technical studies and analysis related to mining, milling, and waste management as well as early Indigenous and public engagement, and the characterization of local and regional socio-economic and environmental conditions.

As discussed below, the information provided herein is intended to initiate the Canadian Nuclear Safety Commission (CNSC) licensing process for a new uranium mine and mill as described in *REGDOC-3.5.1 Licensing Process for Class I Nuclear Facilities and Uranium Mines and Mills*. This application is submitted concurrently with the *Indigenous Engagement Report* (NexGen, 2019a) and the *Rook I: Project Description* (NexGen 2019b). With these submissions, NexGen intends to initiate the Environmental Assessment and licensing processes in support of the advancement of the Rook I Project.

1.2 Purpose of Application

As required under the *Nuclear Safety and Control Act* (NSCA), the *General Nuclear Safety and Control Regulations* (GNSCR), and the *Uranium Mines and Mills Regulations* (UMMR), this document constitutes the initial application by NexGen for a licence to prepare site and construct a uranium mine and mill to support the development of the Arrow deposit, referenced herein as the Rook I Project (Project). This initial application has been prepared in reference to the legislated requirements noted below and with consideration of relevant guidance, including *REGDOC-3.5.1 Licensing Process for Class I Nuclear Facilities and Uranium Mines and Mills*.

For ease of reference, a table of concordance has been provided (Appendix A) which identifies where the information required under the following federal legislation is provided within this application:

- General Nuclear Safety and Control Regulations;
- Uranium Mines and Mills Regulations;
- Radiation Protection Regulations;
- Nuclear Security Regulations; and
- Packaging and Transport of Nuclear Substances Regulations, 2015.

NexGen understands that a licensing decision regarding the construction of new a uranium mine and mill cannot be made by the CNSC until the environmental and socio-economic effects of the proposed activities have been evaluated through an environmental assessment (EA) conducted in accordance with the requirements of the federal *Nuclear Safety and Control Act*, the *Canadian Environmental Assessment Act, 2012* and *The Environmental Assessment Act* under the jurisdiction of the Province of Saskatchewan.

Work to support the EA is in progress including the concurrent submission of a Project Description developed in fulfillment of the CNSC and the Saskatchewan Ministry of Environment (SMOE) requirements as described in *the Prescribed Information for a Description of a Designated Project Regulations* and the *Technical Proposal Guidelines* (Government of Saskatchewan 2014), respectively.

With the submission of the Project Description and this initial licence application, NexGen intends to pursue an integrated, harmonized EA approval and licensing process for the Project. This approach will allow for the EA and licensing technical submissions and regulatory reviews to be conducted concurrently and the facilitation of a single EA and licensing decision by the Commission. This integrated EA and licensing process, as described in *REGDOC-2.9.1, Environmental Protection: Environmental Principles, Assessments and Protection Measures* is outlined in Figure 1.

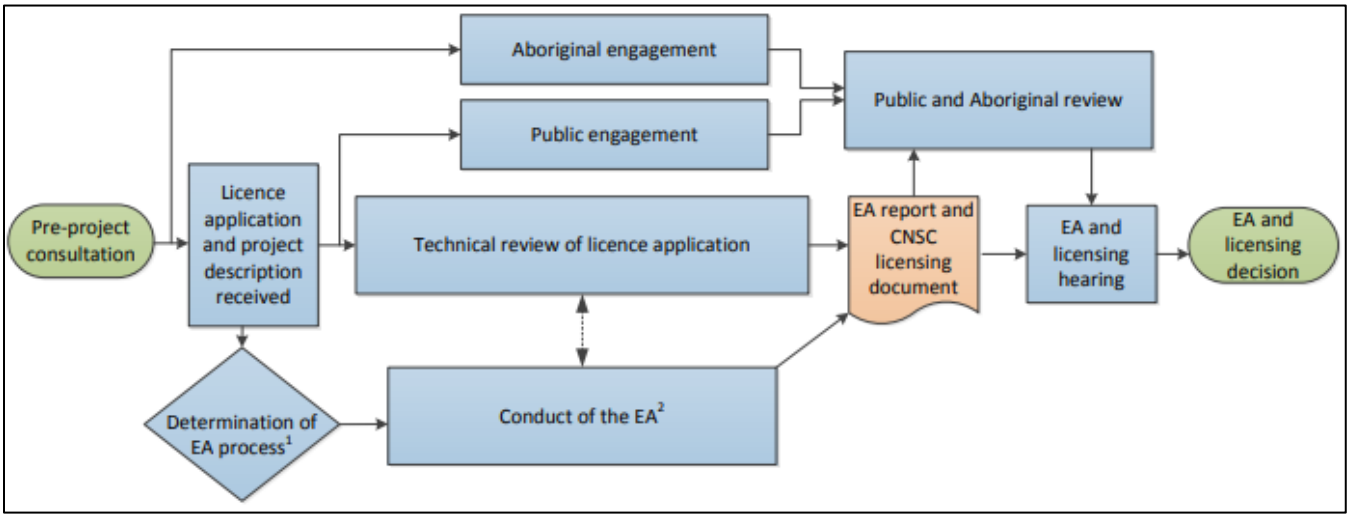


Figure 1: Integrated EA and Licensing Process (CNSC, 2017)

This application includes an overview of the Project as currently envisioned as well as NexGen's understanding of the regulatory requirements, the timelines for future technical submissions to fulfill these requirements, and the guiding principles with which management programs will be developed for each associated and applicable SCA.

As the Project is subject to further study and subsequent phases of design, the supporting technical documentation required to fulfill CNSC licensing obligations are not provided with this initial application, but will be developed and submitted in stages during the licensing process as outlined in Section 5.2. This staged approach to the submission of licensing documentation completed in parallel with the EA process is intended to allow for alignment of the EA, detailed facility design, and licensed program development to achieve harmonization between these elements and to ensure regulatory, Indigenous, and public expectations are met in accordance with established federal and provincial standards and guidance. This approach is expected to ensure that the necessary level of detail is available to adequately inform the design and development of each of the programs whereby the controls applied are appropriate and risk-informed.

1.3 Scope of Application

This application applies to the preparation of the site, construction, and commissioning of an underground uranium mine, surface mill, and associated infrastructure as part of the Rook I Project. The construction and commissioning will support future operations, including the mining and processing of uranium ore from the Arrow deposit and the production of up to 31 million pounds per annum of U_3O_8 (Section 3.0). The application is intended to cover the activities commencing with the preparation of the site, physical construction of surface and underground infrastructure, through the commissioning of all structures, systems, and components with ore. Anticipated development timelines, based on current design detail, are outlined in further detail in Section 1.6.

The Project is located in the southern Athabasca Basin in the northwestern corner of Saskatchewan, approximately 155 km north of the town of La Loche, 80 km south of the decommissioned Cluff Lake uranium mine and mill, and 640 km northwest of Saskatoon (Figure 2). It is accessible by road via the all-weather gravel Highway 955 which travels north-south approximately eight kilometers west of the Project site. The site can also be accessed by helicopter and fixed wing floatplane.

Activity in support of further delineating and characterizing the Arrow deposit as well as exploring the surrounding geology is ongoing. As per guidance provided by the CNSC on October 25, 2018 (*P. Fundarek* to *L. Curyer*), any activities related explicitly to mineral exploration are considered outside the scope of this licensing application and are not detailed herein. All site activity considered beyond the scope of this licensing application and the NSCA will be carried out in accordance with NexGen's expressed commitment to protecting human health, preserving the environment, continual improvement, and compliance with all applicable federal and provincial legislation, approvals, and permits.

1.4 Applicant Information

The Project is 100% owned by NexGen Energy Ltd. and NexGen will operate and manage the Project. NexGen is a Canadian company, publicly traded on both the Toronto and New York stock exchanges. NexGen has two offices, a corporate office in Vancouver, British Columbia and a project execution and operations office in Saskatoon, Saskatchewan.

The corporate business address is as follows:

NexGen Energy Ltd.
3150-1021 W Hastings St
Vancouver, BC
V6E 0C3

The principle contacts for the application are provided in Table 1.

Table 1: Principle Contacts for the License Application

Official Title	Name	Address	Phone/Email
President & Chief Executive Officer	Leigh Curyer	3150-1021 W Hastings St Vancouver, BC V6E 0C3	(604) 428-4112 lcuryer@nxe-energy.ca
Chief Financial Officer	Bruce Sprague		(604) 428-4112 bsprague@nxe-energy.ca
Senior Manager, Permitting, Environment, and Regulatory Affairs	Shawn Harriman	Suite 200, 475 2nd Ave South Saskatoon, SK S7K 1P4	(306) 978-6870 sharriman@nxe-energy.ca

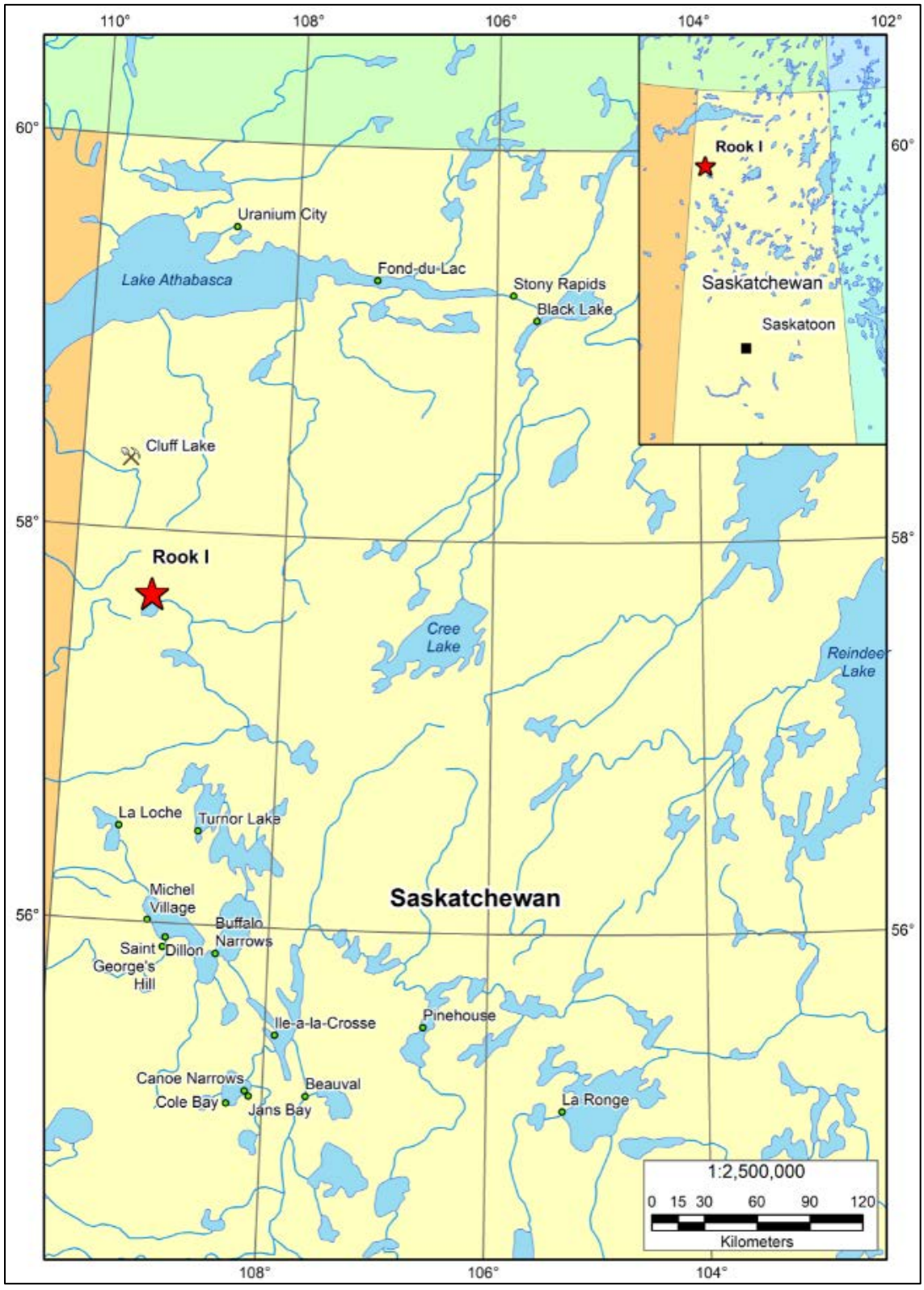


Figure 2*:* **Project Location**

1.5 Description of Licensed Activity

The activity to be licensed is the site preparation, construction, and commissioning of an underground uranium mine, surface mill and associated infrastructure, consisting of the following:

- underground workings and two vertical shafts;
- a uranium mill and paste processing circuit;
- a purpose-built underground tailings management facility (UGTMF);
- a wastewater treatment plant (WWTP);
- an ore storage pad;
- a special waste rock storage pad;
- a clean waste rock stockpile; and
- the associated ancillary surface infrastructure to support operation of a uranium mine and mill facility.

Further detail on the proposed activities is provided in Section 3.0.

At this time, no opportunities for external sources of uranium ore other than the Arrow deposit are being contemplated and local or regional milling is not considered in this licensing application. However, it is recognized that the location, configuration, capacity, and design of the proposed facility could also support processing of uranium ore from other local and regional mines in the future. Such considerations are outside the scope of this application.

1.6 Development Schedule

The schedule for the construction and commissioning phase of the Arrow project is presented in Table 2. This tentative schedule outlines projected timelines based on available design detail and direct experience with projects of similar scale and complexity carried out in similar remote locations. The timelines presented assume that work would be executed year-round with crews working 11-hour shifts. In some roles, coverage would be provided 24-hours per day

The start of construction is contingent on receipt of a variety of regulatory approvals including, but not limited to:

- the CNSC and the SMOE EA approval;
- a CNSC decision to issue a license to prepare site and construct; and
- an Approval to Construct a Pollutant Control Facility issued by the SMOE.

While the schedule presented assumes that all necessary regulatory approvals will be secured, it does not account for the timelines required to receive them. As these timelines are outside of the direct control of NexGen, they have not been estimated though it is assumed that they will reflect those outlined under legislation, regulatory guidance, or existing service standards.

It is recognized that the project development schedule may be subject to unplanned or unforeseen factors or events beyond NexGen or regulatory control that could result in adjustment relative to what is presented. Therefore, specific dates have not been provided.

Table 2: Project Development Schedule

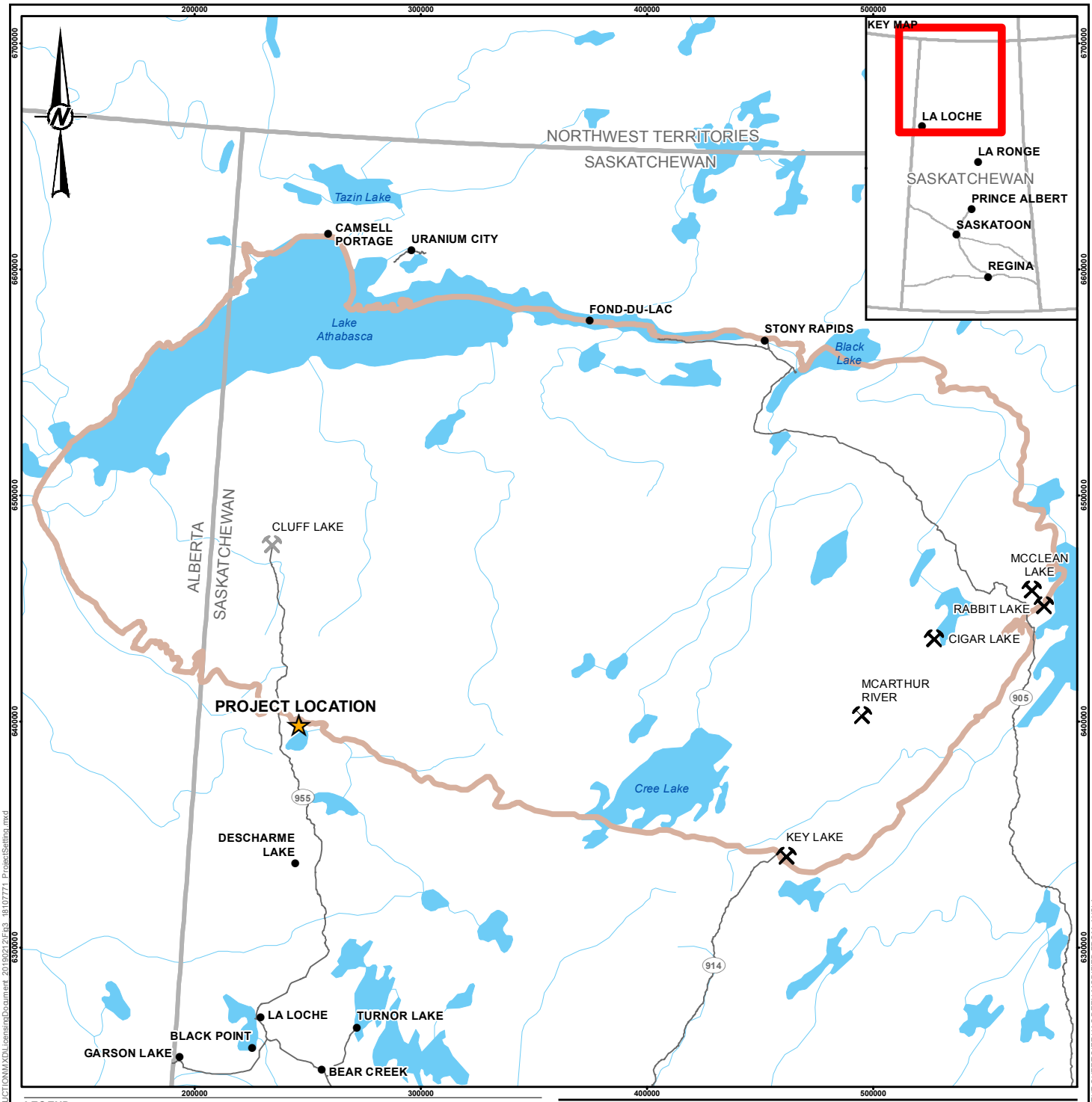
Phase	Description	Post-Approval Timeline (Year)	Duration (years)
Site Preparation, Construction & Commissioning	Site preparation, mine, mill, and site infrastructure development, commissioning all structures, systems and components with ore.	0 – 3	3
Operation	Mining and milling of ore, production of uranium concentrate and supporting activities.	4 – 27	24
Active Decommissioning	Backfilling mine workings, removal of physical infrastructure, recontouring and revegetating disturbed areas, and any other activities required to achieve decommissioning objectives and to return the site to safe and stable condition.	23 – 32	5
Post-active Decommissioning Monitoring	The transition to Institutional Control, including monitoring of environmental media to verify decommissioning criteria have been achieved.	33 – 42	10
Closure (i.e., Institutional Control)	Transfer back to the province under the Institutional Control Program once decommissioning criteria has been fully demonstrated	42	0

2.0 PROJECT SETTING

2.1 Project Location

The Rook I Project is located in the southwestern Athabasca Basin, within the Boreal Plain Ecozone of the Mid-Boreal Uplands Ecoregion of Saskatchewan (Figure 3). The Project is located on a peninsula adjacent to Patterson Lake which is part of the Clearwater River watershed and forms the headwaters of the Clearwater River. Wildlife species known to occur in the region include moose, woodland caribou, deer, black bear, wolf, and all other mammals commonly found in Boreal forest ecosystems. Fish species include walleye, lake trout, northern pike, whitefish, burbot and perch. Continual monitoring and evaluation is ongoing. Temperatures range from greater than 30°C in the summer to colder than –40°C during the winter with mean monthly temperatures of below freezing from October to April. Annual precipitation is approximately 0.45 m with 70% of this occurring as rain during the warmer months and the remainder as snow during the winter.

A more fulsome site description of the local and regional Project area based on the comprehensive baseline site characterization work completed as part of the EA for the Project will be provided in the Environmental Impact Statement (EIS).



LEGEND

- POPULATED PLACE
- URANIUM MINING FACILITY (ACTIVE)
- URANIUM MINING FACILITY (DECOMMISSIONED)
- SECONDARY HIGHWAY
- WATERCOURSE
- WATERBODY
- PROJECT LOCATION
- ATHABASCA BASIN BOUNDARY

0 50 100

1:2,500,000 KILOMETRES

REFERENCE(S)

1. BASE DATA MAY BE OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED, GEOLOGICAL ATLAS OF SASKATCHEWAN VIEWER © 2018, GOVERNMENT OF SASKATCHEWAN, ALBERTA GEOLOGICAL SURVEY. OR IHS MARKIT CANADA LIMITED.

PROJECTION: UTM ZONE 12 DATUM: NAD 83

CLIENT

NexGen Energy Ltd.

PROJECT

ROOK I PROJECT

TITLE

PROJECT SETTING

CONSULTANT

GOLDER

YYYY-MM-DD	2019-02-12
DESIGNED	SS
PREPARED	LMS
REVIEWED	SS
APPROVED	AL

PROJECT NO.	PHASE	REV.	FIGURE
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Since drilling began in 2013, exploration activity has been principally based out of the Rook I camp consisting of tent accommodations and recreational facilities for workers, a kitchen, washroom facilities, administration offices, electrical generators and a medical facility. A core storage area, facilities for processing drill core, fueling facilities and a small shop for equipment maintenance are located nearby, extending to the north and west of the camp. The camp currently accommodates up to 100 personnel in accordance with provincial permit conditions. The layout of the camp and associated infrastructure is shown in Figure 4.

Figure 4: Rook I Camp - August 2018

2.2 Site Geology and Minerology

2.3 Regional

The Athabasca Basin is a Paleoproterozoic, intracontinental, sedimentary basin covering a large portion of northwestern Saskatchewan and a smaller portion of northeastern Alberta. This basin is comprised of the Athabasca Group, composed primarily of sandstones with local conglomeratic beds. The basin is oval-shaped with approximate dimensions of 450 km by 200 km and has a thickness of approximately 1,500 km approaching its center (Jefferson et al., 2007). The Athabasca Basin and the underlying rocks are host to the highest-grade uranium deposits in the world.

The Athabasca Group unconformably overlies Archean to Paleoproterozoic crystalline basement rocks of the Hearne and Rae Provinces, with a portion of the basin to the southwest overlying the rocks of the Taltson Magmatic Zone (TMZ). The Rae and Hearne Provinces and are separated by the Snowbird Tectonic Zone, a large crustal-scale feature, with the Rae Province to the west and the Hearne Province to the east (Card et al., 2007). The TMZ is a basement complex intruded by continental magmatic arc granitoids and peraluminous granitoid rocks (Grover et al. 1997).

2.3.1 Local

The Project site is covered by 30 to 100 m of glaciofluvial till that was deposited over Cretaceous mudstones. The glaciofluvial till comprises primarily sand and also gravels, cobbles, and boulders. The glacial deposits have formed topographic features in the area such as drumlins, outwashes, and hummocky terrain.

Flat-lying Cretaceous mudstones, siltstones, and sandstones form the top of the bedrock sequence and commonly contain thin coal seams. Aside from a frequently intersected, thin, impermeable, and competent layers, the Cretaceous rocks are generally weak and are most often geotechnically treated as soil.

Below the Cretaceous rocks and overlying the rocks of the Athabasca Group, Devonian sandstones are often present. Situated along the southwestern margin of the Athabasca Basin, the rocks of the Athabasca Group are not always intersected; however, where they exist, the Athabasca Group sandstones unconformably overly the basement rocks and have a maximum thickness of approximately 70 m.

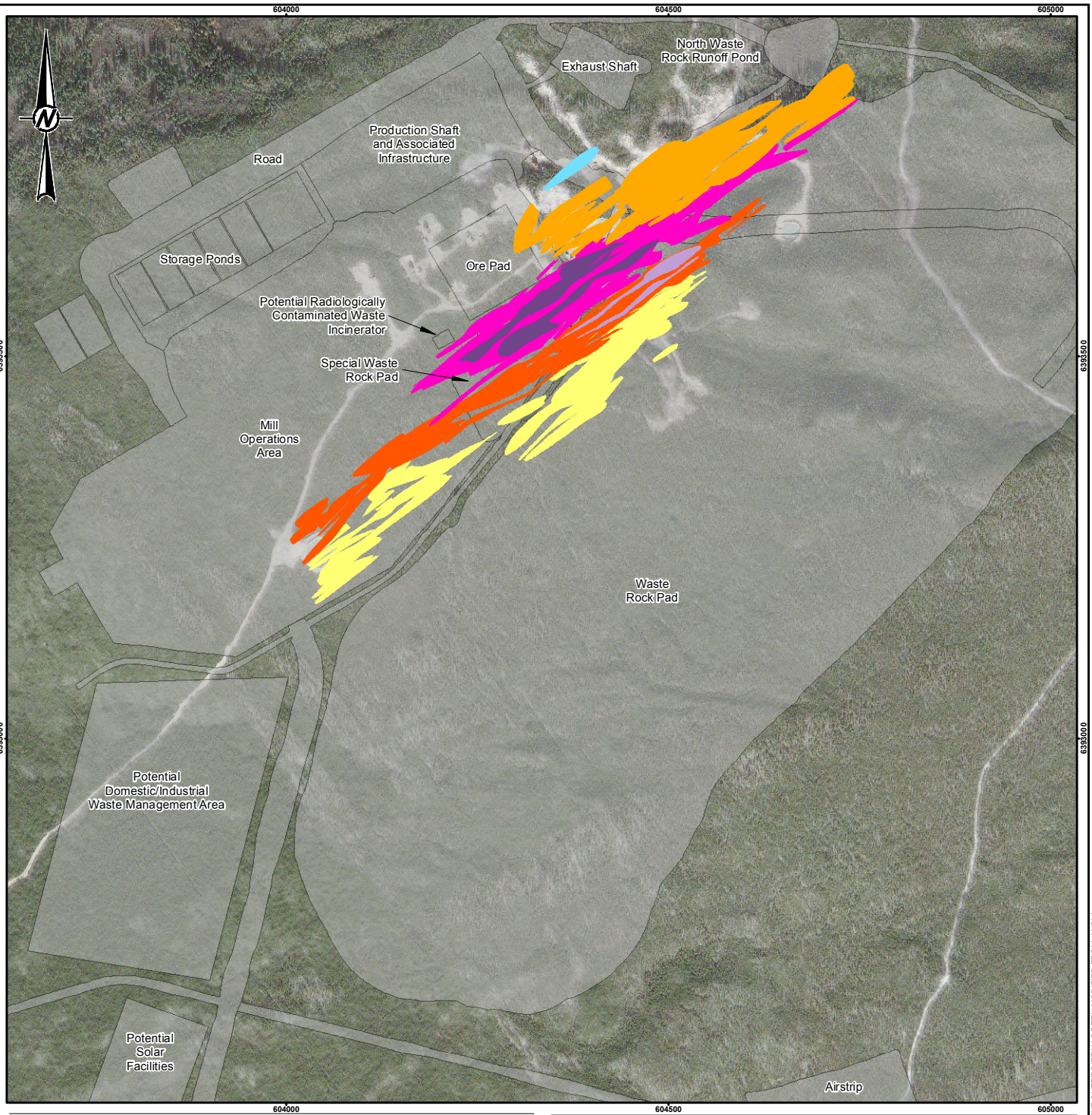
The TMZ orthogneisses are the main lithological package intersected by drilling. Basement rocks surrounding the Arrow Deposit are competent and comprise north-northeast trending and steeply dipping quartz-rich gneisses that host mineralization and include thin, mafic, mylonitic, sub-vertical shear zones.

Geotechnical and hydrogeological characterization of the rock mass to the northwest of the Arrow Deposit has been conducted to understand wall-rock conditions for underground development, including proposed underground tailings management. Preliminary results indicate that the competent footwall rock mass is relatively unaltered with generally low hydraulic conductivities. Local, relatively thin, sub vertical brittle structures are present in the footwall and are oriented parallel to the deposit, no significant cross-cutting structural features have been observed. Discrete, discontinuous trace to low-grade mineralization is locally observed in the rock mass surrounding the Arrow Deposit in factures and gouges.

2.3.2 Arrow Deposit

The Arrow Deposit is located entirely on land and hosted within the crystalline basement rocks, interpreted as gneisses of the TMZ now dominated by quartz as well as garnet porphyroblast pseudomorphs. The pseudomorphs are now almost exclusively chlorite, hematite, illite, or sudoite. Other minor mineral phases present include plagioclase, potassium feldspar, biotite, muscovite, and amphibole, in varying concentrations. The geology of the immediate area of the Arrow Deposit is also marked by the presence of a large sill-like intrusive body containing granitic to gabbroic gneisses that are locally cross-cut by minor veins of uranium mineralization.

Uranium mineralization at the Arrow Deposit is closely associated with narrow, strongly graphitic, discrete shear zones (Figure 5). High grade uranium zones often occur immediately adjacent to strongly sheared graphitic zones, but never within them. The main foliation in the vicinity of the Arrow Deposit is northeast-trending and dips sub-vertically to vertically. Currently, mineralization occurs within five discrete, parallel shear panels referred to as the A1 though A5 shears. Each shear panel is approximately 50 m wide and contains a number of narrow graphitic shear zones that are oriented sub-parallel to foliation striking and dipping vertically to sub-vertically. These graphitic shear zones have undergone brittle reactivation and are host to the uranium mineralized lenses and pods which are also oriented parallel and sub-parallel to the regional foliation. Slickenstriae observed on fault surfaces within the graphitic shear zones close to high grade uranium mineralization show two general orientations, an older dip-slip orientation and a younger overprinting strike-slip to oblique-slip orientation. Mineralization closely follows the plunge of these slickenstriae, supporting the strong structural control of the deposit.



LEGEND

- PROPOSED FOOTPRINT

MINERALIZATION SHEAR LENSES

- A0
- A1
- A2
- A2 HIGH GRADE
- A3
- A3 HIGH GRADE
- A4

0 150 300

1:7,500 METRES

REFERENCE(S)

1. SHEAR LENS DATA OBTAINED FROM RPA AND NEXGEN ENERGY LTD, 2018.
2. IMAGERY OBTAINED FROM NEXGEN ENERGY LTD., DATED 2015.
PROJECTION: UTM ZONE 12 DATUM: NAD 83

CLIENT

NexGen Energy Ltd.

PROJECT

ROOK I PROJECT

TITLE

ARROW DEPOSIT

CONSULTANT

GOLDER

YYYY-MM-DD	2019-02-12
DESIGNED	SS
PREPARED	LMS
REVIEWED	SS
APPROVED	AL

PROJECT NO.	PHASE	REV.	FIGURE
18107771	3000	0	**5**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

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PATH: G:\Clients\NexGen\Rook1\Project SASK\09 PROJECTS\18107771 Rook1 EA\Rook1 EA\02 PRODUCTION\MXD\LicensingDocument 20190212\Fig5 18107771 ArrowDeposit.mxd

2.4 Site Evaluation, Investigation and Preparatory Work

Through a combination of field, desk-top, and laboratory study, NexGen has advanced site characterization and technical, radiological, environmental, and socio-economic evaluations to the degree of detail necessary to support the preliminary economic assessment (PEA) (RPA 2017) and the recently completed PFS (Wood Canada Limited 2018). This information has been used to support the preparation of the Project Description required to initiate the federal and provincial EA process. There are no historical mining-related site activities that will have an impact on mine or mill development.

A high-level summary of the type of work completed to-date and the associated documents where more supporting information can be found is provided in Table 3. All work has been completed by a combination of qualified and competent NexGen staff and consultants with qualifications and expertise in their respective fields of study.

As part of the integrated approach to executing the EA, licensing, and detailed design, the Project, its components, and the associated socio-economic and environmental impacts will be subject to more comprehensive evaluation as the Project progresses through the subsequent phases. Where relevant to the licensing process, results of the technical work will be submitted or made available for review.

As discussed in Section 2.1, the Rook I site and camp has been developed to support exploration and further delineation and characterization of the Arrow deposit. As exploration continues, incremental infrastructure upgrades and expansions may be implemented to support these activities. As with the work to date, any changes to the current Rook I camp and site will be planned and executed in accordance with applicable regulatory requirements.

Table 3: Investigations, Evaluations, and Preparatory Work Completed at the Project

Category	Description	Evaluation Type	Status	Reference
Geology	Ground gravity surveys	Exploration	Complete	PFS
	Ground DC resistivity and induced polarization surveys	Exploration	Complete	PFS
	Airborne magnetic-radiometric-very low frequency (VLF) survey	Exploration	Complete	PFS
	Airborne Versatile Time-Domain electromagnetic (VTEM) survey	Exploration	Complete	PFS
	Airborne Z-Axis Tipper electromagnetic (ZTEM) survey	Exploration	Complete	PFS
	Airborne gravity survey	Exploration	Complete	PFS
	Radon-in-water geochemical survey	Exploration	Complete	PFS
	Ground radiometric and boulder prospecting program	Exploration	Complete	PFS
	Diamond directional drilling	Exploration	Ongoing	PEA, PFS
Radiation	Dose Assessment	Initial assessment of exposures from mining and milling scenarios	Ongoing	PFS
Environment	Air	Baseline characterization	Ongoing	Project Description
	Acoustic	Baseline characterization	Ongoing	Project Description
	Light	Baseline characterization	Ongoing	Project Description
	Soils and Terrain	Baseline characterization	Ongoing	Project Description
	Hydrology	Baseline characterization	Ongoing	Project Description
	Surface Water Quality	Baseline characterization	Ongoing	Project Description
	Aquatic Resources	Baseline characterization	Ongoing	Project Description
	Vegetation	Baseline characterization	Ongoing	Project Description
	Wildlife	Baseline characterization	Ongoing	Project Description
Technical	Geochemistry	Tailings source term characterization	Ongoing	PFS
	Geotechnical	Deposit characterization	Ongoing	PFS
	Hydrogeology	Baseline characterization	Ongoing	PFS
	Geological Modelling	Resource estimation	Ongoing	PFS
	Metallurgical	Pilot-scale mill testing	Ongoing	PFS
	Paste backfill	Pilot-scale study	Ongoing	PFS
Economic	Uranium Marketing	Current & projected market conditions	Complete	PFS

3.0 DESCRIPTION OF PROJECT

A description of the Project including underground mining and surface infrastructure, the predicted operating capacities of relevant systems, and strategies for managing waste is provided in the following sub-sections. A surface plan showing tentative site boundaries, existing and planned structures, excavations, and underground developments is also provided in Figure 6.

As the Project advances through the EA and subsequent phases of design, further refinement of the information outlined in the preceding sections is expected. It is also possible for changes to be made to certain aspects of the Project (e.g., configuration, preferred technology) based on the outcomes of the EA and detailed design.

As described in Section 1.2, NexGen has adopted an integrated, parallel approach to project planning and regulatory applications. This approach will allow for the final facility design to incorporate relevant feedback received through regulatory, public, and Indigenous engagement in conjunction with the incorporation of revisions required as a result of supporting studies, modelling predictions, and through the completion of a human health and environmental risk assessment of the Project, where appropriate. As shown in Table 9, it is NexGen's intention to include a more detailed description of infrastructure and operating capacities as part of the *Mining and Milling Facility Description Manual* as detailed design information is completed.

Information provided in this section outlines Project related activities both during the site preparation and construction phase and the operating phase to provide clear linkage of the purpose for construction activities.

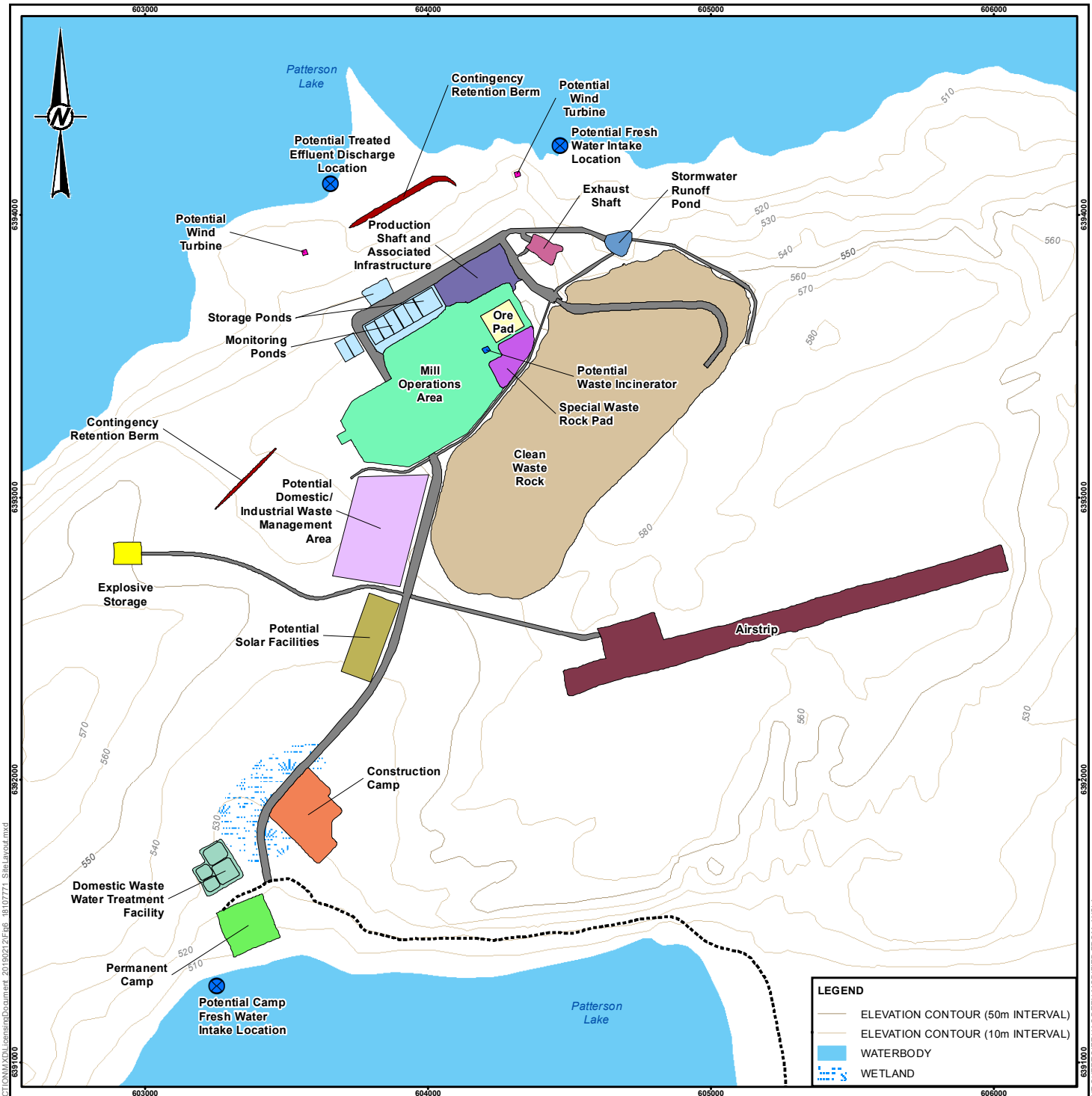
3.1 Mining

The Arrow deposit will be developed as an underground mine requiring the excavation of underground mine workings and the installation of the associated underground and surface infrastructure to support development and mining. The current planned average capacity of the mine is nominally 1,400 tonnes per day, subject to refinement as part of the EA and subsequent phases of design.

Two longhole mining methods are planned to extract ore from the Arrow mine:

- transverse stope mining will be used in areas of higher grade and wider stopes; and
- longitudinal retreat stope mining will be used in areas of lower grade and thinner stope widths.

Both longhole mining methods will use cemented paste to backfill stopes following removal of ore. This combination of longhole stoping and paste backfill is well established in the mining industry and will provide proven safety performance, good productivity, high extraction rates, and stable ground support for continued mining. Details specific to the use of processed mill waste (tailings) to generate a cemented paste backfill product are provided in Section 3.3.1. The Project has also considered other variations of longhole stope mining for lower grade areas such as cut and fill mining, sub-level shrinkage, other bulk tonnage mining methods such as Alimak raise slashing for narrow vein areas, and raisebore mining where potentially beneficial.



LEGEND

- POTENTIAL INTAKE/DISCHARGE LOCATION
- EXISTING ACCESS ROAD

PROPOSED LAYOUT

- AIRSTRIP
- CLEAN WASTE ROCK
- CONSTRUCTION CAMP
- CONTINGENCY RETENTION BERM
- EXHAUST SHAFT
- EXPLOSIVE STORAGE
- DOMESTIC WASTE WATER TREATMENT FACILITY
- MILL OPERATIONS AREA
- ORE PAD
- PERMANENT CAMP
- POTENTIAL DOMESTIC/INDUSTRIAL WASTE MANAGEMENT AREA
- POTENTIAL SOLAR FACILITIES
- POTENTIAL WASTE INCINERATOR
- POTENTIAL WIND TURBINE
- PRODUCTION SHAFT AND ASSOCIATED INFRASTRUCTURE
- ROAD
- SPECIAL WASTE ROCK PAD
- STORAGE/MONITORING POND
- STORMWATER RUNOFF POND

0 400 800

1:20,000 METRES

REFERENCE(S)

1. PROJECT FEATURES OBTAINED FROM NEXGEN, NOVEMBER 2018.
2. BASE DATA MAY BE OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED OR IHS MARKIT CANADA LIMITED.

PROJECTION: UTM ZONE 12 DATUM: NAD 83

CLIENT

NexGen Energy Ltd.

PROJECT

ROOK I PROJECT

TITLE

SITE LAYOUT

CONSULTANT

GOLDER

YYYY-MM-DD	2019-02-12
DESIGNED	SS
PREPARED	LMS
REVIEWED	SS
APPROVED	AL

PROJECT NO.	PHASE	REV.	FIGURE
18107771	3000	0	**6**

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PATH: G:\Clients\NexGen\Rook1\Project SASK\09 PROJECTS\18107771 Rook1 EA\Rook1 EA\02 PRODUCTION\MXD\LicensingDocument 20190212\Fig6 18107771 SiteLayout.mxd

The deposit will be accessed from surface via two vertical shafts located in the footwall and lateral drifts developed in waste rock. Shaft 1 and 2 will extend to approximately 650 m and 530 m below surface, respectively.

Shaft 1 will be used to transport personnel and materials, to deliver ore and waste rock from the workings to surface, and to provide fresh air from surface with a separate compartment and ventilation circuit for hoisting ore. Shaft 2 will be used as an exhaust ventilation shaft with secondary emergency egress. Each shaft will be hydrostatically lined through the overburden and keyed into bedrock to a depth of approximately 150 m followed by a conventional, non-hydrostatic concrete lining installed to shaft bottom. To accommodate shaft sinking during construction, a temporary freeze plant will be required to freeze the overburden at each shaft location to manage groundwater inflow from the overburden during shaft excavation. The freeze plant infrastructure will be removed once it has been verified that ground freezing objectives have been met.

Lateral development will support mining of the deposit by providing access from outside of the ore body. Lateral development will occur in waste rock from both shafts following completion of shaft sinking. Several lateral drifts (levels) will be developed having vertical spacing of approximately 30 m with the uppermost level located approximately 380 m below surface. Within the mine, ramps will be developed to provide equipment access and material transfer between production levels and to allow multiple mining locations.

Lateral developments will be sized to accommodate mining equipment and will have arched roofs which will provide optimal stability. Waste development will be located to avoid intersection with major known fault structures or areas of potentially adverse ground conditions. The workings will be bolted, screened, and sprayed with shotcrete (as required) to ensure stability and will be equipped with all necessary electrical utilities, ventilation, and water handling infrastructure for the collection of groundwater seepage and water used in underground applications.

To facilitate the exclusive storage of mining and milling process wastes (i.e., tailings) underground, mine development during construction will also include excavation of an UGTMF (Section 3.3.1). The UGTMF will be a purpose-built, underground facility constructed approximately 250 m below the unconformity (approximately 385 m below surface) in competent basement rock beyond the extent of mineralization. It will consist of specially designed diamond-shaped chambers approximately 25 m wide by 25 m long by 60 m high. The excavations will be arranged in a regular pattern and will be dedicated to the storage of mining waste and paste backfill. Three cavities are planned for development during the construction and commissioning phase to ensure adequate storage capacity is available for commissioning and the transition to mining and milling uranium ore (operations). Waste rock removed during development of the UGTMF will be transferred to surface for storage as clean waste rock.

During the construction phase, additional underground development occurring in waste rock will include lateral excavation of cavities for refuge stations, underground maintenance shops, electrical substations, offices, a wash bay, and underground sumps. At the bottom of the mine workings, an underground ore crushing system will be constructed to reduce the size of ore prior to transfer to surface during operations. Vertical development will also include ore and waste passes connecting various mine workings levels and boreholes to surface to accommodate pipelines for the conveyance of paste backfill.

A preliminary schematic depicting the conceptual mine workings as currently envisioned in the final year of construction and commissioning is provided in Figure 7.

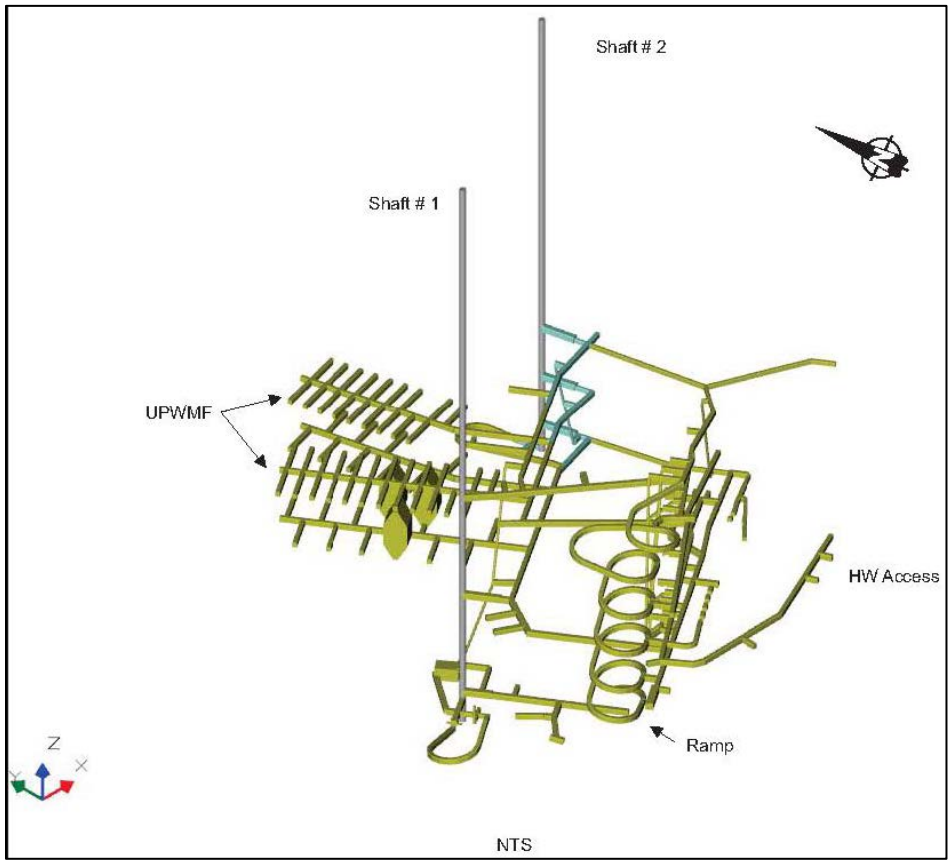

Figure 7: Underground Mine Development at the End of Construction and Commissioning

Ventilation will be designed as a predominantly negative (pull) system that will consistently meet regulatory requirements and provide adequate air quality to minimize potential exposure of personnel to radon and other airborne contaminants during the construction phase. Measures to manage the performance of the ventilation system during construction and commissioning will be described in the *Ventilation Code of Practice* (Table 9).

3.1.1 Radiation Protection Measures

Radiation protection measures for the underground mine during construction and commissioning will be based on keeping exposures as low as reasonably achievable (ALARA) and will be described in detail as part of the *Radiation Protection Program* and *Radiation Code of Practice* (Table 9). Strategies and controls currently identified to protect underground workers from exposure to potential radiological hazards during construction and commissioning are well established within the industry and include but are not limited to:

- designing transverse stopes to limit the length required for accessing and extracting areas with higher grade ore;
- applying shotcrete to provide shielding;
- use of remotely or autonomously operated mining equipment for work in areas of elevated radiation;
- personal protective equipment (e.g., respiratory protection) for non-routine work;
- personal dosimetry monitoring (e.g., dust pumps, direct reading dosimeters, optically stimulated luminescence dosimeter [OSLD] badges);

- area radon monitoring (e.g., prisms) and radiological monitoring performed by trained radiation protection practitioners;
- zone control to prevent the incidental spread of contamination from contaminated work areas to offices, control rooms, and lunch rooms;
- primary and secondary ventilation systems;
- dust suppression measures;
- equipment cleaning facilities; and
- clean/dirty dry facilities to avoid spread of contamination outside of the workplace.

With specific regard to the underground ventilation system, the details will be described as part of the *Ventilation Code of Practice* (Table 9), but the system as described in the PFS applies the following principles:

- Airflow in mineralization or in contact with any other radiation source will be single pass air. During waste development and construction periods, where multiple headings are being developed simultaneously, some recovery of air between development headings and construction areas is allowable provided the CANMET engine rating requirements are met, and radiological limits are not exceeded.
- General airflow throughout the mine will be from areas with a lower contamination potential to areas with a higher contamination potential.
- Any leakage and short-circuiting that may occur within the ventilation systems and between systems should be from the airflow with the lower contamination potential to the airflow with the higher contamination potential.
- Backup or safety redundant systems will be established on critical system components where the failure of such component could compromise worker health and safety.
- Ventilation on Demand (VOD) capacity in order to enable the focus additional ventilation where required on a temporary basis.
- All ventilation procedures and designs to be based on conventional ventilation technology using proven, commercially-available equipment.
- Air quality will be monitored to ensure contaminant levels do not exceed regulatory limits or levels as established in the *Radiation Code of Practice*.

3.2 Milling

The following overview of the mill design and milling methods is conceptual in nature and may be subject to modification during subsequent design phases. The current design is based on conventional uranium milling methodologies, relevant literature, and the results of the PFS metallurgical test program (Wood Canada Limited, 2018). The final mill process is described to provide adequate context in relation to site preparation, construction and commissioning activities.

The proposed mill design is based on a production capacity of up to 31 million pounds of U_3O_8 per year with an estimated total net uranium recovery of 97.6% based on the results of the PFS metallurgical test program.

The general overview of the mill and process design, as presented in the PFS, is provided below and is further outlined in Figure 8.

- **Grinding**: ore crushed to required grain size specifications to enable the extraction of uranium and water injected to obtain the target liquid/solids composition.
- **Leaching**: Sulphuric acid and hydrogen peroxide added to the tanks to help dissolve the uranium from the ore.
- **Liquid-Solid Separation**: concentrated uranium solution (pregnant solution) separated from the solids using counter current decantation. The uranium rich (pregnant) solution sent to the solvent extraction circuit and the solids (leach residue) neutralized and routed to the paste processing circuit for processing prior to transfer underground.
- **Solution Clarification**: suspended solids removed from the concentrated uranium solution and pumped back to the liquid-solid separation circuit for further processing.
- **Solvent Extraction**: uranium rich solution mixed with organics to strip the uranium from the solution, washed with acidic water to remove impurities, and then mixed with sulphuric acid to recover uranium.
- **Gypsum precipitation and washing**: uranium concentrated acid solution mixed with lime to gradually increase the pH creating a concentrated uranium solution and precipitated gypsum. The precipitated gypsum can either be disposed on surface, sent off-site as a by-product, or processed and disposal in the UGTMF. The concentrated uranium solution reports to the yellowcake precipitation circuit.
- **Yellowcake precipitation and washing**: uranium solids precipitated from solution using hydrogen peroxide, washed to limit contamination during the drying process, and conveyed to the calciner. The liquid solution and wash water report to the wastewater treatment plant for treatment (see Section 3.3.2).
- **Drying/calcining**: precipitated uranium dried and calcined to produce the final mill uranium concentrate (U_3O_8) product.
- **Packaging**: loading of the final uranium concentrate product into standard 205 L steel drums for shipping.
- **Acid plant**: molten sulphur is fed to acid plant where it is burned to produce a sulphur dioxide (SO_2) gas stream which is cooled and converted into SO_3 gas. The SO_3 gas is then absorbed into sulphuric acid which is diluted with water and stored for use in the mill process.
- **Paste Processing Circuit**. leach residues, precipitated gypsum, and wastewater treatment precipitates (collectively referred to as tailings) processed prior to transfer underground (see Section 3.3.1). Two product streams will be output from the paste processing circuit:
- **Cemented paste backfill:** tailings mixed with binders to meet stope backfill criteria (strength, pumpability, and stability) and transferred underground to backfill mined-out stopes
- **Uncemented paste backfill:** tailings mixed with water and binders and transferred to the UGTMF.

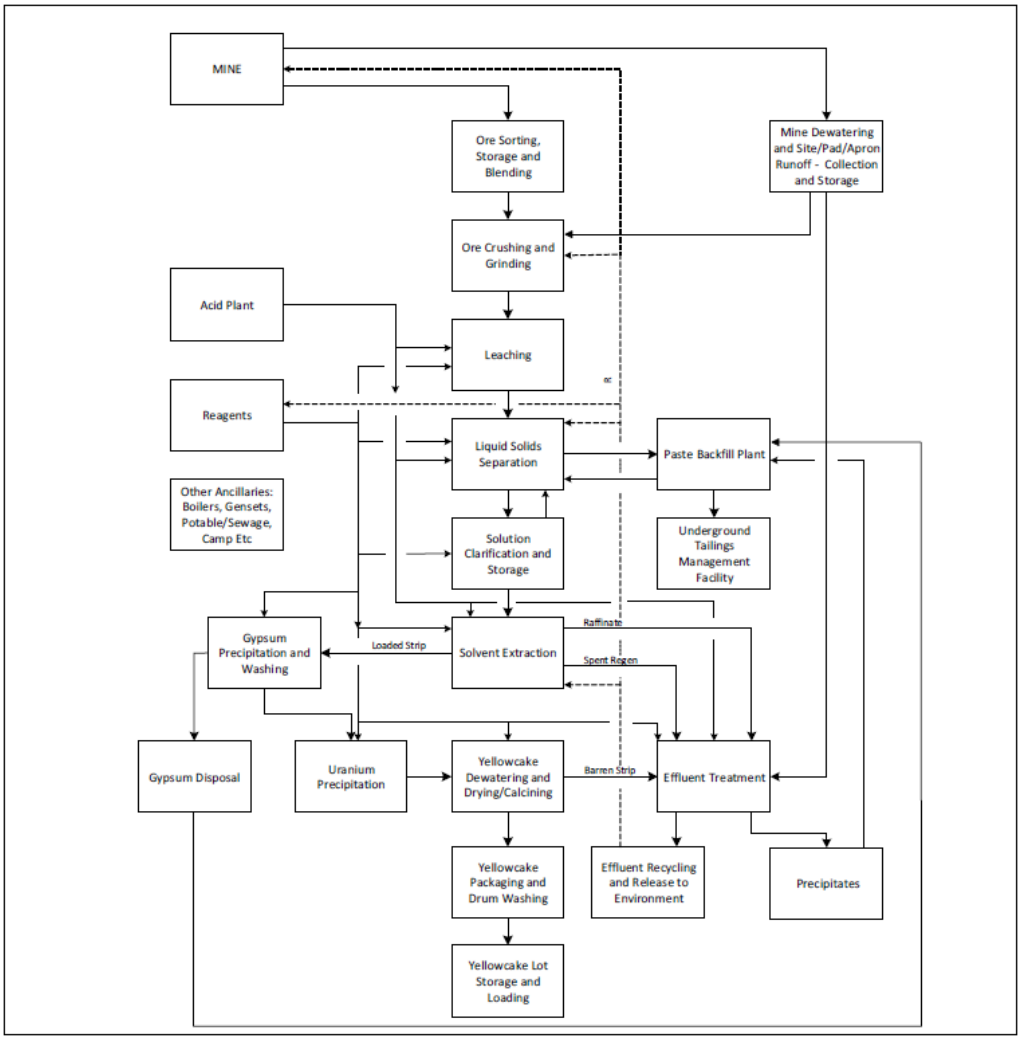

Figure 8: Mill Process Flowchart (Wood Canada Limited 2018)

With the exception of some liquid-solid separation process vessels and reagent storage tanks that will be situated outside within appropriately designed secondary containment areas, it is currently envisioned that the majority of the mill circuits and infrastructure will be housed within an enclosed mill facility. The design includes the features and functionality necessary to protect the health safety of workers and the environment throughout all Project phases including, but not limited to: single-pass ventilation; fire suppression systems; radiation shielding and monitoring systems; and secondary containment. These features will be described in the respective programs submitted in accordance with the preliminary timelines presented in Table 9.

3.2.1 Radiation Protection Measures

Radiation protection measures for the mill during construction and commissioning will be developed as part of subsequent design phases and described in detail as part of the *Radiation Protection Program* and *Radiation Code of Practice* (Table 9). Strategies currently envisioned to protect workers from exposure to radiological hazards include:

- minimization of dust through wetting of work areas and dust collection processes;

- single-pass ventilation with a combination of both positive and negative pressure (depending on the work location and exposure potential);
- exhaust stacks equipped with scrubbers to capture radioactive or contaminant particles where appropriate;
- shielding of work areas, equipment and process vessels as required;
- personal protective equipment (e.g., respiratory protection);
- personal dosimetry monitoring (e.g., dust pumps, OSLD badges);
- area radiological monitoring (e.g., prisms);
- zone control to prevent the incidental spread of contamination from contaminated work contaminated to offices, control rooms, and lunch rooms;
- contained equipment cleaning facilities; and
- clean/dirty dry facilities to avoid spread of contamination from the workplace.

3.3 Waste Management

An overview of the strategies currently envisioned for managing tailings, water, waste rock, and domestic, industrial, and radiologically contaminated waste are outlined below. A *Waste Management Program* will be developed in accordance with the schedule presented in Table 9 and will provide further detail based on the EA and outcomes from subsequent phases of design.

3.3.1 Tailings Management

As discussed in Section 3.2, during operation there will be three solid mill process waste streams generated as a by-product of the milling process:

- leach residues (tailings);
- precipitated gypsum; and
- wastewater treatment precipitates.

The conceptual Project design accounts for these waste streams to be diverted to a paste backfill circuit where they would be processed prior to transfer and disposal underground. Two types of processed waste streams would be generated by the paste backfill circuit: cemented paste backfill comprised of leach residue and binder which would be used as a product for backfilling mined stopes; and uncemented paste backfill comprised of a mix of all three waste streams and binder that would be placed directly in the UGTMF. Cemented paste backfill will be engineered to meet strength criteria required for cemented paste backfill product in the mined stopes whereas the processed waste placed in the UGTMF will not be subject to the same strength requirements.

During construction, wastewater treatment precipitates will be generated as part of the mine dewatering and treatment process as shaft sinking and mine development are advanced. These precipitates will be managed through temporary surface storage within dual lined containment. In preparation for mill commissioning and initial operation, three UGTMF cells will be readied for receipt of the small volume of solid mill process waste streams necessarily generated during commissioning. Wastewater treatment precipitates will be diverted for placement in the UGTMF during this period and contained precipitates will be collected and transferred to the UGTMF.

Paste backfill is a well-established and proven technique that has been successfully adopted in underground mining industries across the globe (Belem, 2004). As part of the PFS, project-specific, pilot-scale testing was completed with favourable results indicating viability of this approach to waste management. Further study and assessment regarding paste design characteristics, delivery, stability, and radiological characteristics is underway. The technical requirements, operational implications, and health, safety, radiological, and environmental protection measures will also be identified and the necessary controls will be reflected in the respective licensing programs developed in accordance with the tentative schedule presented in Table 9.

Opportunity exists to potentially clean precipitated gypsum of impurities and divert this waste stream as a marketable by-product or for surface disposal as a clean waste material. These options may be further explored in subsequent design phases and considered as part of the EA.

3.3.2 Water Management

The Project's water management and handling system will be designed with sufficient storage, conveyance, and treatment capacity to prevent the uncontrolled release of untreated water to the environment under both routine and non-routine scenarios, including underground in-flows, extreme precipitation events, and upset operating conditions.

The water management process is based on PFS level design and is subject to refinement through subsequent EA, design and planning phases which will be reflected in the programs developed. The Project water management system design criteria applied during the PFS phase are summarized as follows:

- collect and treat contaminated or potentially contaminated wastewater generated by construction, commissioning and operating activities;
- collect and treat surface run-off from the mine and mill surface disturbance footprint;
- maximize the diversion of fresh water (precipitation and runoff) away from facilities and infrastructure including, but not limited to, mine infrastructure, processing areas, waste management areas, waste rock piles and ore stockpiles;
- minimize fresh water intake through water reuse and recycling wherever possible; and
- treat water to ensure that effluent quality and performance is consistently below both regulated and established discharge criteria

For the purpose of water retention and handling capacity, ponds and pads for the storage of contaminated or potentially contaminated materials will be designed to accommodate a 24-hour Probable Maximum Precipitation (PMP) event. All other ponds and pads will be designed to accommodate a 24 hour, 1:100 year storm event with contingency infrastructure in place for larger events.

Mine Water

During operation, the mine dewatering system will be capable of collecting and removing all seepage from the shafts, workings, and UGTMF as well as process water from equipment and routine operational activities such as washing equipment, dust suppression, and drilling. Mine water will be routed to underground central collection sumps located at the lower levels of the mine and either subject to primary treatment for reuse underground (where appropriate) or pumped directly to the surface settling pond. Dewatering infrastructure will be established during shaft sinking to collect water generated through the excavation and development process.

Surface Water Management

Surface storage ponds will be designed and situated to capture surface runoff, mine water, and for the storage and monitoring of treated effluent prior to batch discharge during the operating period. A list of the surface water management ponds and design capacity are listed in Table 4. During the construction phase, the availability of water management infrastructure will be staged to ensure sufficient storage and conveyance capacity is available.

Table 4: Surface Water Management Ponds

Pond Name	Capacity (m^3)	Number
Settling Pond	16,000	1
Contingency Pond	5,000	1
Monitoring Ponds	5,000	4

Wastewater Treatment Circuit

A wastewater treatment plant (WWTP) consisting of two-stage chemical treatment will be designed to handle and treat contaminated or potentially contaminated wastewater generated during all project phases. It will be designed to effectively remove elements of potential concern to achieve water quality suitable for batch release to the environment.

During operation, treated effluent from the WWTP will either be recycled for surface or underground industrial use or sent to one of four monitoring ponds where it will be held pending the results of water quality analysis and verification against established effluent quality criteria.

Treated effluent meeting effluent quality criteria will be batch released from a single discharge line to Patterson Lake. A diffuser will be incorporated and discharge rates will be managed to minimize potential physical disturbance in the receiving environment. The conceptual discharge location is located immediately to the north of the mill. The discharge flow rate and the precise location of the treated effluent discharge line and are subject to further assessment.

The construction and commissioning of the WWTP will be sequenced early in the construction phase, prior to the generation of or contact with potentially contaminated wastewater. A detailed construction schedule will be developed as part of subsequent design phases and it will reflect the need to ensure sufficient wastewater storage and treatment capacity is available as required.

3.3.3 Waste Rock Management

The management of waste rock during the construction and commissioning phase of the Project will consist of characterizing, segregating, and storing the material in a manner that meets established criteria and ensures adequate protection of the environment. Although most material generated during shaft sinking and underground development is predicted to be characterized as overburden and clean waste rock, measures will be in place to account for special waste rock or ore encountered. For reference, the material classifications considered are as follows:

- **Ore**: material extracted from mining and available for milling which has a uranium content above established grade cut-off criteria
- **Special waste rock:** waste rock considered mineralized (uranium content below grade cut-off but above 0.03% U_3O_8); potentially acid generating, and/or that has concentrations of any potentially deleterious elements above established criteria.

- **Clean waste rock**: material with uranium concentrations below 0.03% U_3O_8, little or no acid generating potential, and has concentrations of potentially deleterious elements below established criteria.

All material will undergo testing to determine classification. Ore and special waste rock will be managed on dual lined pads equipped with leak detection. Clean waste rock will be managed directly on surface and may be used as an aggregate source for construction and site maintenance purposes. The location and potential extent of these facilities at the end of operations (i.e., maximum footprint) based on information from the PFS is shown on Figure 6. During the mine construction and commissioning phase it is currently estimated that approximately 865,000 m^3 of clean waste rock will be generated which represents less than 10% of the area shown in Figure 6.

The waste rock management practices, including further details on characterization criteria and methods, segregation practices, and storage facilities will be provided in the *Waste Management Program*.

3.3.4 Solid Waste Management

The Project will account for the processes and infrastructure necessary to ensure the safe and responsible handling, storage, processing, reuse, recycling and disposal of domestic, industrial, hazardous, and radiologically contaminated wastes generated during all Project phases. To ensure proper management and control on these various waste streams, the *Waste Management Program* will include waste characterization criteria (i.e., domestic, recyclable, radiological, and hazardous non-radiological), waste segregation strategies, waste packaging and transfer requirements, and plans for storing, processing, and disposing of wastes in a manner that complies with applicable regulatory requirements, and protects workers, the public, and the environment.

The Project as currently designed includes both on- and off-site disposal of identified waste streams. Current predictions of the types and total quantities of waste generated during construction and commissioning are presented in Table 5 along with current planned methods for managing them. The approximate location and extent of on-site waste storage and processing facilities is shown in Figure 6. Waste management practices will be further defined based on the outcomes from the EA and subsequent phases of design.

Table 5: Waste Predictions during Construction and Commissioning

Type	Volume (m^3)	Handling Method
Domestic/Industrial	2,700	Off-site recycle
	30,000	On-site landfill
	8,500	On-site incineration
Radiologically Contaminated	1,000	On-site underground disposal
	1,000	On-site incineration
Hazardous	500	Off-site recycle
	100	On-site landfarming

3.4 Ancillary Infrastructure

Both industrial and non-industrial structures and infrastructure will be constructed to support mining and milling activities (Table 6). Industrial buildings are structures constructed for processing, transportation and storing materials used in the production process or resulting from the production process. Non-industrial structures will be constructed for non-processing activities. Supporting infrastructure includes facilities of main occupancy and other site services needed to support the Project.

Table 6: Surface supporting infrastructure

Industrial Buildings	Non-industrial Buildings	Supporting Infrastructure
■ Mineral processing facilities ■ Hoist building and shaft collar-house ■ Ventilation exhaust and emergency egress ■ Product and storage structures ■ Conveyor and pipe galleries ■ Wastewater treatment plant ■ Acid plant ■ Freshwater pumphouse ■ Power generation plant ■ Freeze plant (temporary, removed after shaft sinking)	■ Electrical buildings (housing dry type transformers, load centers, and MCC cabinets) ■ Administrative buildings & workers dry ■ Maintenance shops, wash bays & storage warehouses ■ Sewage treatment facilities ■ Construction camp & permanent camp ■ Fuel storage & power generation plant	■ Administrative offices ■ Electrical rooms ■ Site security/ Guard houses ■ Airstrip ■ Emergency Response Centre

The design service life of the structures of the Project will be for all phases including construction, commissioning, operation, and decommissioning. All facilities will be designed in accordance with provincial and federal legislation, industry standards and best practices, and relevant guidance where available and applicable. In advance of the construction of permanent surface facilities a surface lease agreement will be required from the provincial government.

3.5 Decommissioning and Reclamation

Where possible, the Project has been designed with closure in mind and opportunities for progressive reclamation and decommissioning will be explored and implemented throughout the Project lifecycle. Currently, examples of this include the ongoing backfilling of processed tailings underground during operations and the progressive contouring of the clean waste rock pile to minimize the amount of pile shaping required once production has ceased.

A description of the proposed decommissioning and reclamation objectives, strategies, methodologies, assumptions and associated costs will be provided as part of the *Preliminary Decommissioning Plan and Preliminary Decommissioning Cost Estimate* (PDP/PDCE) submitted to the SMOE and CNSC for review and approval (Table 9). The PDP/PDCE will be developed in accordance with provincial and federal regulatory requirements and will form the basis for the financial assurance for the construction and commissioning phase of the Project. Once the PDP/PDCE are approved by both the CNSC and the SMOE, a financial assurance in the approved form and amount will be provided to the SMOE prior to the commencement of site preparation and construction.

Although the PDP/PDCE will account for all disturbance and site infrastructure added during Project construction and commissioning, the financial assurance amount will be incrementally increased to reflect the decommissioning requirements based on construction advancement. With reference to the project development schedule presented in Table 2, under this scenario, the full financial assurance amount will be posted at the end of the second year of construction. This staged approach will ensure a conservative and appropriate financial assurance is in place for all phases of site preparation, construction, and commissioning.

The PDP/PDCE will be based on information related to site-specific conditions and will describe the intended approach for decommissioning of all infrastructure, structures, systems and components found on the Project property. It will demonstrate that decommissioning can be completed with available technology in a manner that provides for the protection and safety of workers, members of the general public, and the environment. Although development restrictions will likely be placed on the land following the completion of decommissioning and reclamation, it is envisioned that the site will be free from access restrictions and suitable for recreational and traditional land use.

4.0 PROJECT EXECUTION

4.1 Organizational Structure

NexGen benefits from having a project development team and supporting staff with direct experience working in various aspects of licensed uranium mine and mill operations in northern Saskatchewan during construction, commissioning, and operation phases. This includes designing and operating mines and mills, planning and executing major infrastructure projects, and overseeing the implementation and management of licensed programs while maintaining compliance with provincial and federal legislation, including CNSC license requirements. This experience and expertise provide a sound foundation from which the organization can develop the Project and provide the necessary capacity to incorporate the level of control required to ensure the health and safety of workers, the public, and the appropriate protection of the environment.

Developing and implementing the necessary controls during Project construction and commissioning will require the addition of positions including, but not limited to, hired and contracted laborer's, technicians, operators, tradespeople, management and assorted qualified professionals. As the organization expands, existing positions such as the Chief Executive Officer will maintain accountability for providing the leadership and resources necessary to ensure the organization remains focused on and capable of fulfilling its licensing obligations while preserving human health and protecting the environment.

NexGen is committed to ensuring that staffing levels and the qualifications of personnel are adequate for ensuring appropriate control in accordance with licence and regulatory requirements. A preliminary, high-level overview of position categories, examples of position types, their general scope, and the Safety and Control Areas to which they correspond is provided in Table 7. The exact reporting structure, position titles, and number of positions required for construction and commissioning will be defined as part of the subsequent design, planning, and assessment phases. A final organizational structure will be included as part of the future *Mining and Milling Facility Description Manual* (Section 5.2) which will also provide details on the final mine and mill facility, equipment, and process design.

Qualifications of both NexGen and contracted personnel will be managed as part of the *Human Performance Program* (Table 9). The *Human Performance Program* and relevant training aspects will be developed using a systematic approach to training and will ensure that all workers are competent and qualified to perform the duties of their position.

Table 7: High-Level Construction and Commissioning Organizational Structure

111	Examples of Position types	Scope	Safety and Control Area[1]
Senior Executives	CEO, CFO, COO, Sr VP, VP	Organizational and project-specific direction, leadership and organizational accountability	All
Project Development	Project managers, qualified professionals, trades, laborer's	Construction, contracts, procurement, commissioning	PD, FS, OP, HPM, MS
	Engineers, technicians, qualified professionals	Health, safety, radiation, environment, quality, compliance	RP, CH&S, EP, SA, EM&FP, MS, P&T, S&NP, OP
	Engineers, scientists, technicians, laborer's	Technical services related to mine engineering, geology, metallurgy, chemistry	PD, OP, MS
	Engineers, technicians, trades, operators, laborer's	Utilities, maintenance, services, supply chain, transportation, waste	FS, OP, P&T, MS, WM
	Engineers, technicians, trades, operators, laborer's	Mine, mill, and paste process operational support	FS, PD, OP, MS
	Qualified professionals, trades	Training, security, community relations	HPM, S

[1]Acronyms for the Safety and Control areas are as follows:

MS = Management system
RP = Radiation protection
OP = Operating performance
SA = Safety analysis
PD = Physical design
HPM = Human performance management
CH&S = Conventional health and safety
EP = Environmental protection
EM&FP = Emergency management & fire protection
FS = Fitness for service
WM = Waste management
S = Security
S&NP = Safeguards and non-proliferation
P&T = Packaging and transport

4.2 Compliance

In addition to EA and CNSC licensing requirements, construction and commissioning activities are subject to a number of other provincial and federal regulations. A listing of regulations currently identified are provided in Table 8. NexGen is committed to ensuring regulatory expectations are met throughout all phases of project development which includes:

- applying for and securing the necessary approvals prior to initiating work;
- reflecting regulatory requirements in the content of licensed programs and associated procedural documents, described further in Section 5.2; and
- incorporating regulatory requirements and available guidance into the design and operation of all mining and milling processes, systems, structures, equipment, and components.

It is acknowledged that other legislation may apply and that applicable legislative requirements may be subject to change during the life-cycle of the Project. NexGen will routinely review approval requirements and cooperate with regulating agencies to ensure all appropriate approvals are secured as required and that activities consistently comply with all regulatory requirements and approval conditions.

Internally, responsibilities for managing regulatory applications, external regulatory communication, and monitoring compliance obligations have been assigned. Regular, open communication with representatives from the government agencies responsible for overseeing the project will ensure consistent understanding of the requirements and the timely response to any requests. As discussed in Section 4.3 below, compliance and program conformance will be periodically assessed through an audit program structured to cover all applicable internal and external requirements as they relate to each subject area.

Table 8: Potential Federal and Provincial Acts and Regulations Applicable to the Project

Jurisdiction	Act	Regulations
Federal	Canadian Environmental Assessment Act, 2012*	Regulations Designating Physical Activities*
		Prescribed Information for the Description of a Designated Project Regulations*
		Cost Recovery Regulations*
	Nuclear Safety and Control Act	General Nuclear Safety and Control Regulations
		Uranium Mines and Mills Regulations
		Radiation Protection Regulations
		Nuclear Substance and Radiation Devices Regulations
		Packaging and Transport of Nuclear Substances Regulations
		Nuclear Security Regulations
		Nuclear Non-Proliferation Import and Export Control Regulations
	Fisheries Act*	Metal and Diamond Mining Effluent Regulations
		Deposit Out of The Normal Course of Events Notification Regulations
		Wastewater Systems Effluent Regulations
	Canadian Environmental Protection Act	Environmental Emergencies Regulations
		Federal Halocarbon Regulations
	Pan Canadian Framework on Clean Growth and Climate Change*	Greenhouse Gas Reporting Program*
	Transportation of Dangerous Goods Act	Transportation of Dangerous Goods Regulations
	Aeronautics Act	Canadian Aviation Regulations
	Navigation Protection Act*	No specific regulations related to this act.
	Species at Risk Act	No specific regulations related to this act.
	Canadian Wildlife Act	Wildlife Area Regulations
	Migratory Birds Conservation Act	Migratory Birds Regulations
		Migratory Birds Sanctuary Regulations
	Explosives Act	Explosives Regulations

Table 8: Potential Federal and Provincial Acts and Regulations Applicable to the Project

Jurisdiction	Act	Regulations
Provincial	The Environmental Assessment Act	No specific regulations related to this act.
	The Environmental Management and Protection Act, 2010	The Environmental Management and Protection (General) Regulations
		The Mineral Industry Environmental Protection Regulations, 1996
		The Environmental Management and Protection (Saskatchewan Environmental Code Adoption) Regulations
		Discharge and Discovery Reporting Chapter
		Site Assessment Chapter
		Corrective Action Plan Chapter
		Halocarbon Control Chapter
		Environmental Code of Practice on Halons
		Industrial Source (Air Quality) Chapter
		The Hazardous Substances and Waste Dangerous Goods Regulations
		The Municipal Refuse Management Regulations
		The Waterworks and Sewage Works Regulations
	The Water Security Agency Act	The Water Security Agency Regulations
		The Withdrawal from Allocation Regulations
	The Fisheries Act (Saskatchewan), 1994	The Fisheries Regulations
	The Groundwater Conservation Act	The Groundwater Protection Regulations
	The Wildlife Act, 1998	The Wildlife Regulations
		The Wild Species at Risk Regulations
	The Forest Resources Management Act	The Forest Resources Management Regulations
	The Wildfire Act	The Wildfire Regulations
	The Provincial Lands Act, 2016	Saskatchewan Wetland Conservation Corporation Land Regulations
		Crown Resource Land Regulations
		Provincial Lands Regulations
	The Heritage Property Act	The Heritage Property Regulations
	The Crown Resources Act	The Crown Resource Land Regulations, 2017
	The Mineral Resources Act	The Quarrying Regulations
	The Natural Resources Act	The Resource Protection and Development Service Regulations

Table 8: Potential Federal and Provincial Acts and Regulations Applicable to the Project

Jurisdiction	Act	Regulations
Provincial	The Pest Control Act	The Pests Declaration Regulations
		The Pest Control Products Amendment Regulations, 2012
	The Weed Control Act	The Weed Control Regulations
	The Management and Reduction of Greenhouse Gases Act*	No specific regulations related to this act.
	The Northern Municipalities Act, 2010	The Northern Municipalities Regulations
	The Saskatchewan Employment Act	The Occupational Health and Safety Regulations, 1996
		The Mines Regulations, 2018
	The Radiation Health and Safety Act, 1985	The Radiation Health and Safety Regulations, 2005
	The Boiler and Pressure Vessel Act	The Boiler and Pressure Vessel Regulations
	The Technical Safety Authority of Saskatchewan Act	No specific regulations related to this act.
	The Electrical Inspection Act	The Electrical Inspection Regulations
	The Gas Inspection Act	The Gas Inspection Regulations
	The Public Health Act	The Food Safety Regulations
		The Plumbing and Drainage Regulations
		The Public Sewage Works Regulations
		The Public Accommodations Regulations
	The Passenger and Freight Elevator Act	The Passenger and Freight Elevator Regulations, 2017
	The Reclaimed Industrial Sites Act	The Reclaimed Industrial Sites Regulations
	Treaty Land Entitlement Act	No specific regulations related to this act.

*Denotes legislation that is currently under review or revision and is subject to change during the project lifecycle.

4.3 Management Systems

NexGen acknowledges and understands the role of robust management systems in ensuring compliance, enabling continual improvement, in the ongoing preservation of human health and safety, and in providing for the protection of the environment. To this end, NexGen has incorporated management systems that are appropriate and effective for the nature and scale of the current exploration activities.

It is recognized that safely and effectively transitioning from exploration towards the construction and eventual operation of a uranium mine and mill requires the evolution and expansion of the existing management system to adequately accommodate increasing organizational and operational complexity. As such, NexGen is committed to implementing robust management systems aligned with international standards and CNSC requirements including a quality management system to provide an overarching, unified framework that governs all systems and operational functions.

The quality management system will be described in the *Quality Management Program* and will be based on the plan-do-check-act approach to continual improvement. Consistent with the conditions of the internationally recognized ISO 9001 standard, the Program will articulate a common set of requirements that will define how the organization identifies the needs of its stakeholders, sets objectives and targets, monitors and evaluates performance, manages change, identifies and mitigates risks, and tracks and investigates unplanned events. These requirements will be applicable to each of the licensed programs that are developed to correspond to each SCA and to describe specific organizational functions (Section 5.2). Management designated as responsible for each licensed program will be responsible for conformance to program requirements with support provided by dedicated professionals tasked with guiding, monitoring conformance, and administering the quality systems (e.g., incident tracking, change control, document management).

The approach outlined will ensure consistency in achieving quality across all aspects of the organization and will provide the foundation from which a robust organizational culture committed to safety, environmental excellence, and continual improvement will be established, maintained and reinforced.

As described in Section 5.2, the *Quality Management Program* will be developed with reference to the applicable CNSC and Canadian Standards Association (CSA) guidance documents and will be submitted to the CNSC during the licensing process. The estimated timeline for initial submission is provided in Table 9.

4.4 Risk Management

NexGen supports the use of both qualitative and quantitative analysis to systematically identify and proactively manage, mitigate or eliminate potential risks to worker health and safety, the environment, stakeholder relations, compliance, and the financial position of the company. NexGen favors a defense-in-depth approach to controlling risks through the development and integration of administrative, management, and engineered measures as appropriate. Efforts are also made to eliminate potential risks whenever possible.

As the project advances through the licensing, EA, and integrated detailed design phases, risks will be comprehensively identified and evaluated to ensure they are consistently and adequately managed. This includes, but is not limited to, the completion of a hazard and operability study (HAZOP), accidents and malfunctions assessment, human health and environmental risk assessment as well as the definition of risk management processes as part of the licensed programs as outlined in Section 5.0.

4.5 Indigenous and Public Engagement

NexGen recognizes the importance of working closely with and understanding the concerns of local Indigenous communities and the public and as they relate to Project activities through all phases of project development. NexGen also understands that effective engagement is foundational to the EA and licensing process.

To date, NexGen has undertaken engagement with local community leaders and residents to provide updates on exploration activities and has conducted early engagement specific to project development. Beyond this direct engagement, NexGen has worked extensively to provide employment, training, and mentoring opportunities for individuals from the region and to support local businesses in the procurement of goods and services. NexGen has also been actively involved in community outreach initiatives since 2014 and was recognized for these efforts as the recipient of the Prospectors and Developers Association of Canada's (PDAC) 2019 Environment and Social Responsibility Award. These outreach initiatives have focused on youth and relate to education, health and wellness, and fostering economic capacity.

NexGen commits to building on the work to-date through ongoing, meaningful engagement with the public and Indigenous communities and to consider *REGDOC-3.2.1 Public Information and Disclosure* and *REGDOC-3.2.2 Aboriginal Engagement* in engagement planning. Further information specific to Indigenous engagement has been provided in the *Indigenous Engagement Report* (NexGen, 2019a) while public and Indigenous engagement plans are further outlined in the Project Description (NexGen, 2019b), both of which accompany this application.

Details regarding communication modes and methods, and mechanisms for receiving and responding to feedback will be developed with consideration for the expressed needs of both Indigenous communities and public stakeholders. Details will be provided in the proposed *Indigenous and Public Information Program* as outlined in Table 9.

5.0 LICENSED PROGRAMS

5.1 Policy

NexGen has developed internal policies which, amongst other aspects, outline NexGen's expectations for and commitment to the protection of the environment and the health and safety of employees and contractors. These policies link the corporate vision and provide a set of fundamental principles that inform the conduct and expectations of the organization and all NexGen employees and contractors. As NexGen continues to advance the development of the Project, new policies will be added and existing policies reviewed and updated where required to ensure they meet the evolving needs of the organization and reflect NexGen's commitment to world class performance. These policies will provide a foundation and framework from which the licensed programs will be developed or improved throughout the entire life-cycle of the Project.

5.2 Licensed Program Development

The CNSC has established 14 defined SCA's that provide the framework for licensees to develop programs and processes that ensure compliance of activities and alignment with CNSC expectations. NexGen recognizes that before a license to prepare site and construct can be issued, proponents must prepare and submit licensed programs linked to each SCA for CNSC review and approval and that these programs will form the basis of the license issued. The licensed programs are overarching documents that reflect NexGen's corporate policies and describe the principles, processes, and practices that will be in place to enable safe, reliable, and responsible construction, commissioning, and eventual operation of the proposed uranium mine and mill facility.

As described in Section 4.2, although NexGen has adopted and documented processes appropriate for the current scale and scope of its activities, during the licensing process NexGen will develop the programs necessary to support site preparation and construction. A listing of each of the programs that will be developed to support licensing, their scope, the associated SCA and some of the key documents that will be referenced in their development are provided in Table 9. While not explicitly listed, the development of these programs will also take into account and reflect all legal and other requirements as may applicable to the Project.

NexGen is proposing a sequenced or staged approach to submission of license program documents according to the tentative timelines presented in Table 9. As the development of each program is dependent on inputs from other processes, such as EA and subsequent design phases, development of each program will be completed as the relevant information is available which is reflected in the forecast timelines. This staged approach to licensing of the Project as proposed is intended to encourage transparency of process, enable efficient review, allow for timely revision, and avoid delays in timing of Project execution.

As an extension, program implementation timelines are not currently projected although implementation is expected to occur throughout the licensing process as program elements, such as management systems, processes, and other functional aspects are developed. Full implementation will be completed and verified prior to the commencement of site preparation and construction (as applicable).

NexGen is committed to working with the CNSC and the Project Officer assigned to the Project as the primary point of contact throughout the licensing process, and to developing and implementing well designed programs to provide for the health and safety of workers and the public and adequate protection of the environment.

Table 9: Licensed Program Development Strategy and Submission Timeline

Title	Description	Safety and Control Area	Submission Timeline	Reference Documents
Quality Management Program	Framework to align and integrate management system processes. Includes, but is not limited to, setting objectives and targets, change control, document control, non-conformance, corrective and preventative action, auditing.	Management System	Q1 2020	■ ISO 9001 ■ REGDOC-2.1.1 Management System ■ CSA N286-12 Management system requirements for nuclear facilities
Radiation Protection Program	Framework to address radiation protection and hazard control. Includes, but is not limited to, worker qualifications and competency, controls to maintain exposures to levels considered As Low As Reasonably Achievable (ALARA), dosimetry and contamination monitoring, performance tracking and reporting.	Radiation protection Safety Analysis Safeguards and Non-Proliferation Packaging and Transport	Q2 2020	■ G-129 Keeping Radiation Exposures and Doses ALARA ■ CSA Z94.4-11 Selection, Use and Care of Respirators ■ GD-371 License Application Guide Nuclear Substances and Radiation Devices ■ S-106 Technical and Quality Assurance Requirements for Dosimetry Services in Canada ■ G-91 Ascertaining and Recording Radiation Doses to Individuals ■ G-4 Measuring Airborne Radon Progeny at Uranium Mines and Mills ■ REGDOC-2.5.7 Design, Testing and Performance of Exposure Devices ■ REGDOC-2.14.1 Information Incorporated by Reference in Canada's Packaging and Transport of Nuclear Substances Regulations, 2015 ■ REGDOC-3.1.2 Reporting Requirements, Volume I: Non-Power Reactor Class I Nuclear Facilities and Uranium Mines and Mills
Radiation Protection Code of Practice	Definition of action and administrative levels for radiological exposures and a description of the measures taken when limits are met or exceeded. Listing of approved nuclear substances.	Radiation Protection Operating Performance	Q2 2020	■ G-288 Developing and Using Action Levels ■ G-218 Preparing Codes of Practice to Control Radiation Doses at Uranium Mines and Mills ■ REGDOC-2.12.3 Security of Nuclear Substances: Sealed Sources ■ REGDOC-2.13.1 Safeguards and Nuclear Material Accountancy ■ REGDOC-3.1.2 Reporting Requirements, Volume I: Non-Power Reactor Class I Nuclear Facilities and Uranium Mines and Mills

Table 9: Licensed Program Development Strategy and Submission Timeline

Title	Description	Safety and Control Area	Submission Timeline	Reference Documents
Ventilation Code of Practice	Overview of ventilations systems, controls, and monitoring and the action to respond to inadequate ventilation	Radiation Protection Operating Performance	Q2 2020	■ REGDOC-2.5.4 Design of Uranium Mines and Mills: Ventilation Systems ■ G-221 A Guide to Ventilation Requirements for Uranium Mines and Mills
Health and Safety Program	Framework for the prevention of accidents, injuries, and ill health of workers and the public. Includes, but is not limited to, hazard identification, competency and qualification of workers, operational controls, performance monitoring, inspections, incident tracking, and performance tracking and reporting.	Conventional Health and Safety Safety Analysis	Q4 2019	■ ISO 45001 Occupational Health and Safety ■ REGDOC-2.1.2 Safety Culture ■ REGDOC-3.1.2 Reporting Requirements, Volume I: Non-Power Reactor Class I Nuclear Facilities and Uranium Mines and Mills
Environmental Management Program	Framework for the protection and preservation of the environment. Includes, but is not limited to, description of environmental aspects, risk assessment, release mechanisms (routine and non-routine) to all environmental media, pollution prevention and environmental protection measures, responding to unplanned environmental releases, monitoring of environmental media, inspection and evaluation of critical structures and systems, and performance tracking and reporting.	Environmental Protection Safety Analysis	Q2 2020	■ ISO 14001 Environmental Management Systems ■ P-223 Protection of the Environment ■ REGDOC 2.9.1 Environmental Protection: Environmental Principles, Assessments and Protection Measures (Version 1.1) ■ REGDOC-3.1.2 Reporting Requirements, Volume I: Non-Power Reactor Class I Nuclear Facilities and Uranium Mines and Mills ■ CSA N288.1-14, Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities ■ CSA N288.4-10 Environmental Monitoring Programs at Class I nuclear facilities and uranium mines and mills ■ CSA N288.5-11 Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills ■ CSA N288.6-12 (R2017), Environmental risk assessments at Class I nuclear facilities and uranium mines and mills ■ CSA N288.7-15 Groundwater protection programs at Class I nuclear facilities and uranium mines and mills
Environment Code of Practice	Definition of action and administrative levels for environmental releases and a description of the measures to be taken to correct deviations or necessary steps when limits are met or exceeded.	Environmental Protection Operating Performance	Q2 2020	■ CSA N288.8-17 Establishing and implementing action levels for releases to the environment from nuclear facilities

Table 9: Licensed Program Development Strategy and Submission Timeline

Title	Description	Safety and Control Area	Submission Timeline	Reference Documents
Waste Management Program	Framework for the safe and environmentally responsible management of all waste streams. Includes, but is not limited to, waste minimization, identification, classification, segregation, handling, and disposal.	Waste Management	Q1 2020	■ REGDOC-2.11.1, Waste Management, Volume II: Assessing the Long Term Safety of Radioactive Waste ■ P-290 Managing Radioactive Waste ■ GD-370 Management of Uranium Mine Waste Rock and Mill Tailings ■ N292.3-14, Management of low- and intermediate-level radioactive waste
Contractor Management Program	Framework for ensuring that contractors working at the facility comply with all internal requirements related to health, safety, environment, and security. Includes, but is not limited to, contractor risk evaluation, contractor roles and responsibilities, contractor training, oversight, and performance standards.	Management System	Q1 2020	■ N/A
Security Program	Framework for maintaining security measures to prevent loss of nuclear substances and prevent deliberately destructive acts. Includes, but is not limited to, risk assessment, control measures, access management and performance monitoring.	Security Safeguards and Non-Proliferation	Q1 2020	■ RD-336 Accounting and Reporting of Nuclear Material
Emergency Preparedness, Protection and Response	Framework for the measures to prepare, respond to, and mitigate the effect of emergencies. Includes, but is not limited to, identification of potential emergency situations, planning for emergencies, resources for responses, communication protocols, organization, training, and testing response plans.	Emergency Management and Fire Protection	Q1 2020	■ G-225 Emergency Planning at Class 1 Nuclear Facilities and Uranium Mines and Mills ■ RD-353 Testing the Implementation of Emergency Measures ■ REGDOC-2.10.1 Nuclear Emergency Preparedness and Response

Table 9: Licensed Program Development Strategy and Submission Timeline

Title	Description	Safety and Control Area	Submission Timeline	Reference Documents
Human Performance Program	Framework for ensuring the ongoing qualification of employees and contracted workers through a systematic approach to training. Includes, but is not limited to, training program development (ADDIE), delivery, qualification tracking, and performance monitoring. Will also reflect fitness for duty and performance requirements for workers.	Human Performance Management	Q1 2020	■ REGDOC-2.2.2 Personnel Training (Version 2) ■ REGDOC-2.2.3, I Personnel Certification, Radiation Safety Officers ■ HPD-TPE-01 Objectives and Criteria for Regulatory Evaluation of Nuclear Facility Training Programs, Human Performance Division, Directorate of Assessment and Analysis ■ REGDOC-2.2.4 Fitness for Duty: Managing Worker Fatigue ■ REGDOC-2.2.4 Fitness for Duty, Volume II: Managing Alcohol and Drug Use
Indigenous and Public Information Program	Framework for providing with timely, regular information regarding activities. Includes, but is not limited to, identification of target audiences, communication modes and methods, mechanisms for receiving feedback, and performance tracking and reporting.	N/A	Q3 2019	■ REGDOC-3.2.1, Public Information and Disclosure ■ REGDOC-3.2.2 Aboriginal Engagement
Construction, Commissioning, and Operations Program	Framework for designing, siting, construction, commissioning, and operation. Includes, but is not limited to, design criteria and control, construction practices and processes, installation of equipment, commissioning, operating procedures and activities for routine and non-routine work.	Physical Design Operating Performance	Q2 2020	■ REGDOC-2.3.1, Conduct of Licensed Activities: Construction and Commissioning Programs
Maintenance Program	Framework for ensuring that the function and conditions of systems, components, and structures is sustained. Includes, but is not limited to, preventative maintenance, inspection and testing,	Fitness for Service	Q2 2020	■ N/A
Preliminary Decommissioning Plan & Cost Estimate	Overview of conceptual decommissioning principles, objectives, execution strategy and methodology broken into representative planning envelopes. Costing, justification, and explanation of estimates provided for each planning envelope.	Waste Management	Q2 2020	■ G-219 Regulatory Guide, Decommissioning Planning for Licensed Activities ■ G-206 Regulatory Guide, Financial Guarantees for the Decommissioning of Licensed Activities ■ CSA N294.09 Decommissioning of Facilities Containing Nuclear Substances
Mining and Milling Facility Description Manual	Detailed description of the mining and milling facilities, systems, equipment, and critical components.	N/A	Q2 2020	■ N/A

6.0 SUMMARY

NexGen is a uranium development company with substantial land holdings in the southwestern Athabasca Basin of Saskatchewan. Since 2013, exploration activity has been principally focused on the 100% owned Rook I site, located approximately 155 km north of the town of La Loche and 640 km northwest of Saskatoon. With the discovery of the Arrow uranium deposit in 2014, currently estimated to be the largest undeveloped uranium deposit in Saskatchewan, NexGen is positioned to develop and operate a uranium mine and milling facility to support the development of this important deposit.

In support of future mine and mill development at Rook I, NexGen is in the midst of undertaking the work necessary to advance the Project to the appropriate level of design and to support the regulatory applications necessary to authorize mine and mill development. To this end, the information provided in this application is intended to initiate the CNSC licensing process for a new uranium mine and mill. It is intended to cover the preparation of the site, physical construction and underground access, and the commissioning of all structures, systems, and components with ore. It has been provided with the intention of pursuing an integrated, harmonized EA approval and licensing process for the Project as described in *REGDOC-2.9.1, Environmental Protection: Environmental Principles, Assessments and Protection Measures.*

To fulfill its licensing obligations, NexGen plans to stage the development and submission of the licensed programs that describe the systems that will be in place to enable safe, reliable, and responsible construction, commissioning, and eventual operation of the Project. NexGen recognizes the authority and leadership of the CNSC as Canada's nuclear regulator and is committed to transparency and to working closely with the CNSC through all Project phases. As NexGen proceeds with the concurrent design and EA phases, licensing programs will be developed that reflect the guidance provided by the CNSC in each of the 14 SCAs and these programs will be implemented in a manner that that meets CNSC requirements and achieves the mutual goal of ensuring the health and safety of workers and the public, security of operations, and adequate protection of the environment.

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APPENDIX A

Table of Concordance

Requirement	Section	Notes
General Nuclear Safety and Control Regulations		
(a) the applicant's name and business address;	1.4	
(b) the activity to be licensed and its purpose;	1.3	
(c) the name, maximum quantity and form of any nuclear substance to be encompassed by the licence;	1.1 3.1 3.2	
(d) a description of any nuclear facility, prescribed equipment or prescribed information to be encompassed by the licence;	-	Details to follow (see Table 9)
(e) the proposed measures to ensure compliance with the Radiation Protection Regulations, the Nuclear Security Regulations and the Packaging and Transport of Nuclear Substances Regulations, 2015;	-	Details to follow (see Table 9)
(f) any proposed action level for the purpose of section 6 of the Radiation Protection Regulations;	-	Details to follow (see Table 9)
(g) the proposed measures to control access to the site of the activity to be licensed and the nuclear substance, prescribed equipment or prescribed information;	-	Details to follow (see Table 9)
(h) the proposed measures to prevent loss or illegal use, possession or removal of the nuclear substance, prescribed equipment or prescribed information;	-	Details to follow (see Table 9)
(i) a description and the results of any test, analysis or calculation performed to substantiate the information included in the application;	2.3	
(j) the name, quantity, form, origin and volume of any radioactive waste or hazardous waste that may result from the activity to be licensed, including waste that may be stored, managed, processed or disposed of at the site of the activity to be licensed, and the proposed method for managing and disposing of that waste;	3.3	Details to follow (see Table 9)
(k) the applicant's organizational management structure insofar as it may bear on the applicant's compliance with the Act and the regulations made under the Act, including the internal allocation of functions, responsibilities and authority	4.1	
(l) a description of any proposed financial guarantee relating to the activity to be licensed	3.5	Details to follow (see Table 9)
Uranium Mines and Mills Regulations		
(a) in relation to the plan and description of the mine or mill		
(i) a description of the site evaluation process and of the investigations and preparatory work to be done at the site and in the surrounding area,	2.3	
(ii) a surface plan indicating the boundaries of the mine or mill and the area where the activity to be licensed is proposed to be carried on,	3.0	See Figure 6
(iii) a plan showing the existing and planned structures, excavations and underground development,	3.0	See Figure 6
(iv) a description of the mine or mill, including the installations, their purpose and capacity, and any excavations and underground development,	3.1 3.2	
(v) a description of the site geology and mineralogy,	2.2	

Requirement	Section	Notes
(vi) a description of any activity that may have an impact on the development of the mine or mill, including any mining-related activity that was carried on at the site before the date of submission of the application to the Commission,	2.3	
(vii) a description of the design of and the maintenance program for every eating area,	-	Details to follow (see Table 9)
(viii) the proposed plan for the decommissioning of the mine or mill, and	3.5	
(ix) a description of the proposed emergency power systems and their capacities;	3.4	
(b) in relation to the activity to be licensed		
(i) a description of and the schedule for the planned activity	1.6	
(ii) a description of the proposed methods for carrying on the activity,	4.0	Details to follow (see Table 9)
(iii) a list of the categories of material proposed to be mined and a description of the criteria used to determine those categories	3.3.3	Details to follow (see Table 9)
(iv) the anticipated duration of the activity	1.6	
(v) the proposed management system for the activity, including measures to promote and support safety culture	4.3	Details to follow (see Table 9)
(c) in relation to the environment and waste management		
(i) the program to inform persons living in the vicinity of the mine or mill of the general nature and characteristics of the anticipated effects of the activity to be licensed on the environment and the health and safety of persons	4.5	
(ii) the program to determine the environmental baseline characteristics of the site and the surrounding area	1.1 2.3	
(iii) the effects on the environment that may result from the activity to be licensed, and the measures that will be taken to prevent or mitigate those effects	1.2	Details to follow
(iv) the proposed positions for and qualifications and responsibilities of environmental protection workers		Details to follow (see Table 9)
(v) the proposed environmental protection policies and programs	5.1	Details to follow (see Table 9)
(vi) the proposed effluent and environmental monitoring programs	3.3.2	
(vii) the proposed location, the proposed maximum quantities and concentrations, and the anticipated volume and flow rate of releases of nuclear substances and hazardous substances into the environment, including their physical, chemical and radiological characteristics,	3.3	Details to follow (see Table 9)
(viii) the proposed measures to control releases of nuclear substances and hazardous substances into the environment,	3.3	Details to follow (see Table 9)
(ix) a description of the anticipated liquid and solid waste streams within the mine or mill, including the ingress of fresh water and any diversion or control of the flow of uncontaminated surface and ground water,	3.3	Details to follow (see Table 9)

Requirement	Section	Notes
(x) the proposed measures to prevent or mitigate the effects of accidental releases of nuclear substances and hazardous substances on the environment, the health and safety of persons and the maintenance of security, including measures to	-	Details to follow (see Table 9)
(A) assist off-site authorities in planning and preparing to limit the adverse effects of an accidental release,	-	Details to follow (see Table 9)
(B) notify off-site authorities of an accidental release or the imminence of an accidental release,	-	Details to follow (see Table 9)
(C) report information to off-site authorities during and after an accidental release,	-	Details to follow (see Table 9)
(D) assist off-site authorities in dealing with the adverse effects of an accidental release, and	-	Details to follow (see Table 9)
(E) test the implementation of the measures to control the adverse effects of an accidental release,	-	Details to follow (see Table 9)
(xi) the anticipated quantities, composition and characteristics of backfill, and		Details to follow (see Table 9)
(xii) a description of the proposed waste management system;	3.3	Details to follow (see Table 9)
(d) in relation to health and safety,		
(i) the effects on the health and safety of persons that may result from the activity to be licensed, and the measures that will be taken to prevent or mitigate those effects	4.0 5.0	Details to follow (see Table 9)
(ii) the proposed program for selecting, using and maintaining personal protective equipment	-	Details to follow (see Table 9)
(iii) the proposed worker health and safety policies and programs,	-	Details to follow (see Table 9)
iv) the proposed positions for and qualifications and responsibilities of radiation protection workers,	-	Details to follow (see Table 9)
(v) the proposed training program for workers,	-	Details to follow (see Table 9)
(vi) the proposed measures to control the spread of any radioactive contamination,	-	Details to follow (see Table 9)
(vii) the proposed ventilation and dust control methods and equipment for controlling air quality,	-	Details to follow (see Table 9)
(viii) the proposed level of effectiveness of and inspection schedule for the ventilation and dust control systems; and	-	Details to follow (see Table 9)
(e) in relation to security, the proposed measures to alert the licensee to acts of sabotage or attempted sabotage at the mine or mill	-	Details to follow (see Table 9)
In relation to codes of practice	-	Details to follow (see Table 9)
(a) any action level that the applicant considers appropriate for the purpose of this subsection;	-	Details to follow (see Table 9)

Requirement	Section	Notes
(b) a description of any action that the applicant will take if an action level is reached; and	-	Details to follow (see Table 9)
(c) the reporting procedures that will be followed if an action level is reached.	-	Details to follow (see Table 9)
In relation to a license to prepare site and construct	-	Details to follow (see Table 9)
(a) a description of the proposed design of the mine;	3.1	Details to follow (see Table 9)
(b) the proposed construction program, including its schedule;	-	Details to follow (see Table 9)
(c) a description of the components, systems and equipment proposed to be installed at the mine, including their design operating conditions;	3.1	Details to follow (see Table 9)
(d) the proposed quality assurance program for the design of the mine;	-	Details to follow (see Table 9)
(e) the results of a process-hazard analysis and a description of how those results have been taken into account;	4.4	Details to follow (see Table 9)
(f) a description of the proposed design, construction and operation of the waste management system, including the measures to monitor its construction and operation, the construction schedule, the contingency plans for construction and the measures to control the movement of water in existing waterways;	3.3	Details to follow (see Table 9)
(g) a description of the proposed disposition of the ore;	3.1 3.2 3.3.3	Details to follow (see Table 9)
(h) the anticipated quantities and grade of ore and waste rock that will be removed, their proposed storage location, and the proposed method, program and schedule, for their removal and disposal;	3.1 3.3.3	Details to follow (see Table 9)
(i) the proposed mining methods and programs; and	3.1	Details to follow (see Table 9)
(j) the proposed commissioning plan for the components, systems and equipment to be installed at the mine.	-	Details to follow (see Table 9)
Radiation Protection Regulations		
Various	-	Details to follow (see Table 9)
Nuclear Substances and Radiation Devices Regulations		
Various	-	Details to follow (see Table 9)
Packaging and Transport of Nuclear Substances Regulations		
Various	-	Details to follow (see Table 9)