Denison Mines Corp.

Wheeler River Operation

Facility Licensing Manual

Document # 1

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Approval for Use

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Abbreviations, Acronyms and Units

Abbreviation / Acronym	Definition
ALARA	As Low As Reasonably Achievable
CNSC	Canadian Nuclear Safety Commission
DCS	Distributed control system
Denison	Denison Mines Corp.
EA	Environmental Assessment
EIS	Environmental Impact Statement
FFT	Feasibility Field Test
FLM	Facility Licensing Manual
ISR	In situ recovery
IWWTP	Industrial Wastewater Treatment Plant
JCU	JCU (Canada) Exploration Company Ltd.
MSM	Management System Manual
O/F	Overflow
OIS	Operator interface stations
Operation	Wheeler River Operation
ORP	Oxygen reduction potential
PDP	Preliminary Decommissioning Plan
Property	Wheeler River Property
SCA	Safety and Control Area
SK MOE	Saskatchewan Ministry of Environment
U/F	Underflow
U_3O_8	Triuranium octoxide
UBS	Uranium bearing solution
WSA	Water Security Agency

Unit	Definition
%	percent
°C	degrees Celsius
ha	hectare
km	kilometre
m	metre
m^2	square metre
m^3	cubic metre
Mlbs	million pounds

Glossary

Term	Definition
Basement rock	The foundation of thick, ancient rocks (e.g., metamorphic and igneous), which form the crust of continents. For the Wheeler River Operation, it involves rock of low permeability located under the uranium ore deposit.
Brine solution	A solution of calcium chloride that will be circulated through the freeze holes to remove heat from the ground to create the freeze wall.
Clean waste rock	Waste rock generated as sandstone cuttings and core from drilling activities associated with well and freeze hole development that does not have uranium containing materials.
Diamond drilling	A form of core drilling that uses a rotary drill with a diamond drill bit attached in order to create precisely measured holes and obtain cores of rock samples.
Environmental Assessment	An assessment of the potential environmental consequences of a project. An environmental assessment considers the existing environment where a project is to be located (including, but not limited to, Indigenous and Local Knowledge), predicts potential effects on valued components of the environment, identifies mitigation measures used to limit the effects of the project on the local environment, classifies residual effects remaining after mitigation, and describes monitoring and follow-up programs.
Environmental Impact Statement	A document that contains the environmental assessment for a project, and may also include details on the project description, engagement, mitigation measures, residual and cumulative effects, accidents and malfunctions, and effects of the environment on the project.
Freeze hole	Bore hole in ground outfitted with sealed freeze pipe or temperature sensors.
Freeze wall	A wall of frozen ground extending from the surface down to basement rock. The freeze wall is used to limit groundwater movement into the vertical area in and above the mining area and, in conjunction with well design and hydraulic containment from pumping, contain solutions (mining solution and uranium bearing solution) within the mining area.
Geomembrane liner	A synthetic material with low permeability used to control or prevent the migration of a liquid or gas.
Geosynthetic clay liner	A liner made of geotextiles and bentonite to prevent the migration of a liquid or gas.
Industrial Wastewater Treatment Plant	The wastewater facility for the treatment of industrial wastewater, including wastewaters produced in the processing plant during uranium extraction and from other various sources (e.g., wash bay sump water, leachate from the industrial landfill, wellfield runoff pond).
Injection well	The well that delivers mining solution to the uranium ore deposit.
In situ recovery	A mining method that uses a water-based solution, fortified with mining reagents, to dissolve naturally occurring uranium from within a host rock, while the host rock remains in place (in situ) below the surface.

Term	Definition
Mining solution	An acidic solution prepared on site by adding reagents (e.g., sulphuric acid, hydrogen peroxide, and ferric sulphate) to water.
Mining area	Underground area where in situ recovery mining occurs and within which mining solutions are contained. The maximum extent of the mining area is roughly 90 m wide x 750 m long x 50 m high. This is the approximate wellfield width and length, with consideration for the maximum vertical migration of mining fluids above the ore zone.
Mud rotary drilling	A drilling technique that uses a rotating drill bit to grind rock as the drill bit advances and then uses drilling mud to transport the drill cuttings up to the ground surface.
Ore zone	Location of the economic portion of the deposit that is being mined.
Processing plant	The processing plant will house the tanks and equipment to process the uranium bearing solution recovered from the in situ recovery wellfield into yellowcake.
Pumphouse	A pumphouse is a small building or container on the surface where pipes from injection and recovery wells in the wellfield are operated and mining solution flows are monitored.
Recovery well	The well that brings the uranium bearing solution from the mining area up to surface.
Special waste	Includes mineralized core and cuttings from well development that have uranium containing materials.
Uranium bearing solution	Mining solution containing uranium that is extracted from the uranium ore deposit by way of the recovery wells and is then processed into yellowcake in the processing plant.
Well	Casing and screen constructed in a bore hole that is open to the natural ground formation in the screened interval.
Wellfield	A group of injection and recovery wells, installed and completed in the ore zone for in situ recovery mining.
Wheeler River Operation	The name of the proposed uranium mine and mill, and all related components. All components included in The Wheeler River Operation have been addressed as part of the Wheeler River Project Environmental Assessment.
Yellowcake	Dried uranium ore concentrate or U_3O_8 (triuranium octoxide).

1 Introduction

1.1 Purpose

Pursuant to the *Nuclear Safety and Control Act* and the *Uranium Mines and Mills Regulations*, Denison Mines Corp. (Denison) is seeking a licence to prepare a site and construct a uranium mine and mill. The purpose of this Facility Licensing Manual (FLM) is to guide the licensing process for the Wheeler River Operation (the Operation) and provide context for the activities required during preparation of the site and construction of the Operation.

1.2 Introduction

Denison proposes an in situ recovery (ISR) uranium mine and processing plant for the Phoenix deposit at the Wheeler River Property (the Property) in the Athabasca Basin region of northern Saskatchewan, Canada. The deposit is high grade (average grade 19% uranium ore concentrate [i.e., triuranium octoxide or U_3O_8]), with approximately 70.2 Mlbs of U_3O_8.

Denison is applying a blend of existing and proven technologies to the Operation, from the mining and oil and gas industries, to engineer field conditions for an innovative application of the ISR method. The utilization of an ISR method involves leaving the ore where it is in the ground and recovering the minerals by dissolving them and then pumping the uranium bearing solution (UBS) to the surface, where the minerals can be recovered. Consequently, there is little surface disturbance, and no conventional tailings are generated.

Once the UBS reaches the surface, the uranium is recovered similar to other uranium mills using a precipitation, thickening, and drying process. The Operation's processing plant is designed to produce an annual average production of 9 Mlbs of uranium concentrate, with an estimated peak production of 12 Mlbs over a 15-year operating period.

1.3 Proponent

Denison is a publicly traded uranium development and exploration company with interests focused in the Athabasca Basin region of northern Saskatchewan. The company trades on the Toronto Stock Exchange and NYSE American Exchange, and is headquartered in Toronto, Ontario, with offices in Saskatoon, Saskatchewan and Elliot Lake, Ontario.

Denison (and its predecessor companies) has over 50 years of uranium mining experience in Ontario, Saskatchewan, and the United States. Today, the company is part owner (22.5%) of the McClean Lake Joint Venture, which includes the McClean Lake Operation in northern Saskatchewan. In addition, Denison provides expert mine decommissioning and care and maintenance services through its Closed Mines Group, which is responsible for Denison's closed uranium mining operations in the Elliot Lake region of northern Ontario.

The Operation is a joint venture between Denison (90%) and JCU (Canada) Exploration Company Ltd. (JCU) (10 %). Denison is also a 50% owner of JCU, which means that Denison has an effective 95% ownership interest in the Operation. Denison is the operator and, as such, is the proponent in all regulatory matters.

1.3.1 Mailing Address

The Denison office in Toronto acts as the corporate headquarters of the company, where most of the executive leadership team is located.

The business address of the Toronto headquarters is:

1100 – 40 University Avenue

Toronto, ON, Canada, M5J 1T1

The Denison office in Saskatoon supports the operation of the Operation. The office is located approximately 600 km south of the Operation.

The business address of the applicant is:

Denison Mines Corp.

345 4th Avenue South

Saskatoon, SK, Canada, S7K 1N3

1.3.2 Contact Authority

The following members of Denison are authorized to interact with the Canadian Nuclear Safety Commission (CNSC) in dealings with the application for the Operation:

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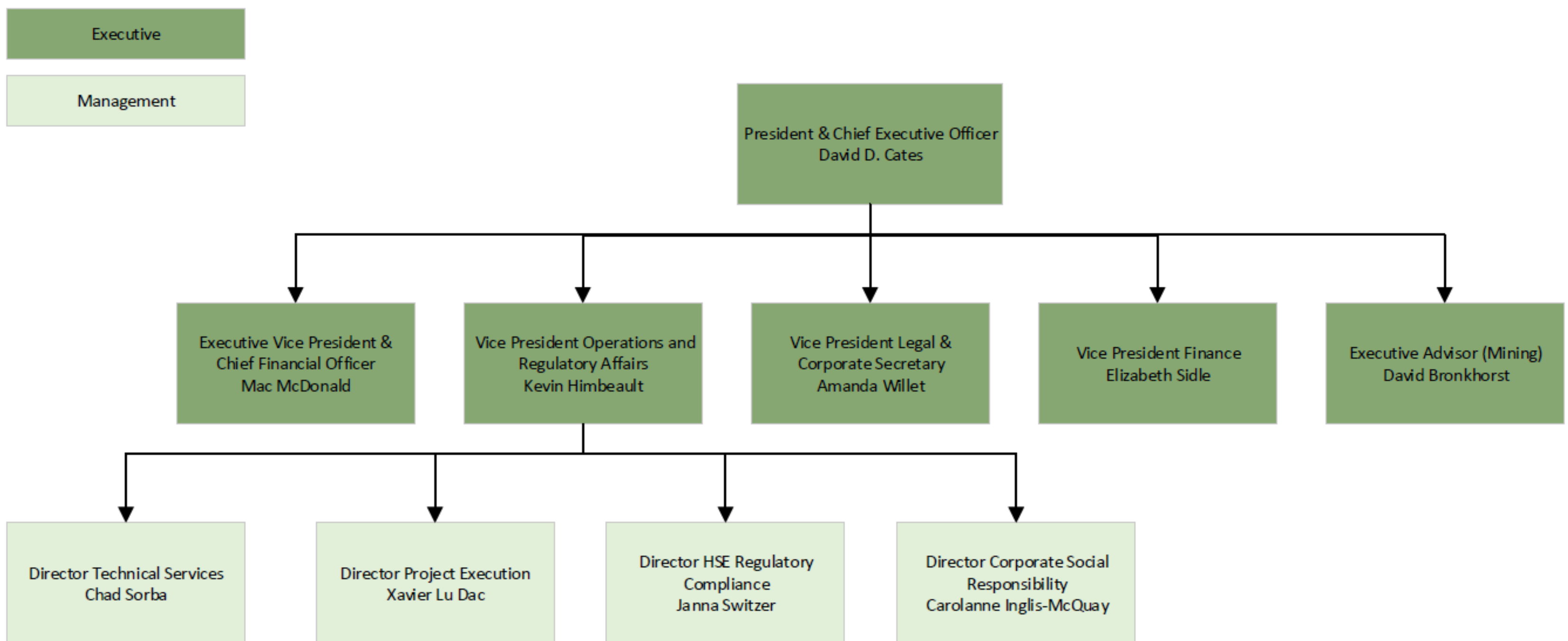
1.4 Organizational Management Structure

Denison's current management structure is comprised of an executive team and a management team, illustrated in the following organizational chart (Figure 1). The executive team provides overall direction on projects and expenditures to meet operational objectives. The management team executes operational directives set by the executive team. Those in site positions execute operational directives given from the management team. Ultimately, the collective team is governed by Denison's Board of Directors.

Figure 1 **Denison Organizational Chart**



1.4.1 Positions and Responsibilities

<u>Executive Team Positions:</u>

President and Chief Executive Officer (CEO)

Responsible for general oversight of the business and affairs of Denison, including leadership, strategy, and Board reporting.

Executive Vice President and Chief Financial Officer

Responsible for assisting the CEO with general oversight of Denison and Denison's financial matters, including tax, treasury, insurance, financial reporting and the establishment, monitoring, and improvement of Denison financial procedures, processes, and internal controls.

Vice President Legal and Corporate Secretary

Responsible for legal oversight and compliance matters for Denison.

Vice President Finance

Supports the oversight of Denison's financial matters, including tax, treasury, financial reporting and financial procedures, processes, and internal controls.

Vice President Operations and Regulatory Affairs

Responsible for operational oversight of Denison's evaluation projects, including the Operation design, construction and operation, engineering support and metallurgical expertise, and oversight of health, safety, and environment matters, regulatory relations, and project licensing for the Operation.

<u>Management Team Positions:</u>

Director, HSE Regulatory Compliance

Responsible for the oversight of environmental assessments, licensing and permit applications, health and safety program development, and environmental monitoring and reporting associated with operational activities.

Director, Corporate Social Responsibility

Responsible for the oversight of Indigenous and non-Indigenous Community engagement activities and implementation of the Public and Indigenous Information Program and provides guidance and support to the creation of social and economic initiatives in the areas in which Denison operates.

Director, Technical Services

Responsible for the execution of technical programs including the evaluation of mining and processing technologies, well field and plant design requirements and on-going evaluation of processes and monitoring systems to ensure ongoing safe operations.

Director, Project Execution

Responsible for the engineering, construction and commissioning of the project including managing preparation of site and construction activities in accordance with Denison's policies, principles, and applicable regulatory requirements.

1.5 Licensing Documentation

This subsection outlines existing licensing and the forthcoming licensing and approval processes required by various regulatory agencies for the Operation.

An overview of the documents within Denison's Management Framework, which will in turn be submitted to the CNSC for licensing purposes, can be found in Section 5.1 of this FLM.

1.5.1 Existing Licensing

Denison-led activities at the Property have been conducted under several permits and agreements issued by the Saskatchewan Ministry of Environment's (SK MOE) Environmental Assessment and Stewardship Branch and Lands Branch, as well as the Water Security Agency (WSA).

Denison holds a Nuclear Substance and Radiation Device Licence (Licence Number: 60677-1-23.0) from the CNSC and a permit to Operate a Pollutant Control Facility with the Province of Saskatchewan (Approval No. PO22-100), both of which were issued for the completion of feasibility field testing at the Operation through 2022 and 2023.

1.5.2 Pre-Construction Licensing and Approval Processes

Denison will be seeking other key approvals from the Government of Canada and the Province of Saskatchewan in addition to the CNSC license to prepare the site and construct infrastructure. Key approvals include, but are not limited to, those described in the following subsections.

1.5.2.1 Environmental Assessment

In 2019, Denison submitted a *Technical Proposal and Federal Project Description* (Denison 2020) to the SK MOE and CNSC, as required under provincial and federal environmental legislation, to initiate the regulatory process for the Operation.

The *Technical Proposal and Federal Project Description* was submitted and accepted by the SK MOE and the CNSC in 2019, with the determination that the Operation required an Environmental Assessment (EA) under the Saskatchewan *Environmental Assessment Act* and *Canadian Environmental Assessment Act, 2012*. The joint provincial and federal EA process allowed Denison to file one Environmental Impact Statement (EIS) that meets the requirements of both the SK MOE and CNSC.

On November 29, 2022, the CNSC completed its conformity review of the draft EIS submitted for the Operation and determined that it met the requirements for the advancement of the EA process. As of June 2023, the technical review of the EIS is ongoing.

A decision regarding the approval of the EIS from the provincial and federal governments must be obtained if the Operation is to proceed.

1.5.2.2 Mineral Surface Lease Agreement

Before constructing any permanent surface facilities, Denison must obtain a mineral surface lease agreement. A mineral surface lease agreement is the legal authorization for a mining company to occupy Crown land. Surface leases are coordinated through the Saskatchewan Ministry of Government Relations, Northern Engagement Branch and the SK MOE, Lands Branch, with input from other ministries or branches as required. Issuance of a surface lease agreement is tied to the successful outcome of the provincial EA process.

1.5.2.3 Provincial Permitting

Denison must obtain an approval to construct a pollutant control facility from the SK MOE, and a permit to construct a facility to handle hazardous substances or waste dangerous goods from the SK MOE.

2 Background

This section provides background information on the Operation, including project history, operation location, operation schedule, and activities for which Denison is seeking authorization.

2.1 History

The Property was staked on July 6, 1977. Excluding the years 1990 to 1994, exploration activities, such as airborne and ground geophysical surveys, geochemical surveys, prospecting, and diamond drilling, have been carried out on the Property from 1978 to present. Denison became the operator of the Property in November 2004 and carried out property-wide airborne geophysical surveys in 2005. The Phoenix deposit was discovered by diamond drilling in 2008, with subsequent delineation completed over the next six years from 2008 to 2014.

Since the discovery and delineation of the Phoenix deposit, Denison has achieved several project milestones, including:

- 2016 – completion of a Preliminary Economic Assessment (Denison 2016);
- 2018 – completion of a Prefeasibility Study (Denison 2018);
- 2019 – initiation of the provincial and federal EA processes;
- 2021 – initiation of a Feasibility Study; and
- 2022 – initiation of a Feasibility Field Test (FFT).

Since 2019, Denison has proceeded with the evaluation of the Operation under the EA process. The EA process summarized several years of baseline environmental data collection, outlined potential effects associated with the Operation, and considered applicable mitigation measures. The EA process also included detailed third-party technical assessments and extensive engagement and consultation with Indigenous and non-Indigenous Interested Parties. See Section 1.5.2.1 for more detail regarding the EA for the Operation.

The advanced exploration FFT was conducted to determine the effectiveness of using the ISR method at the Property. The FFT involved circulating and recovering an acidic mining solution over a small spatial area to obtain data on the ISR process under site-specific geochemical and hydrogeological conditions. In the fall of 2022, Denison successfully completed the leaching and neutralization phases of the FFT. As of June 2023, Denison is completing the recovered solutions management phase, which will be followed by surface infrastructure decommissioning.

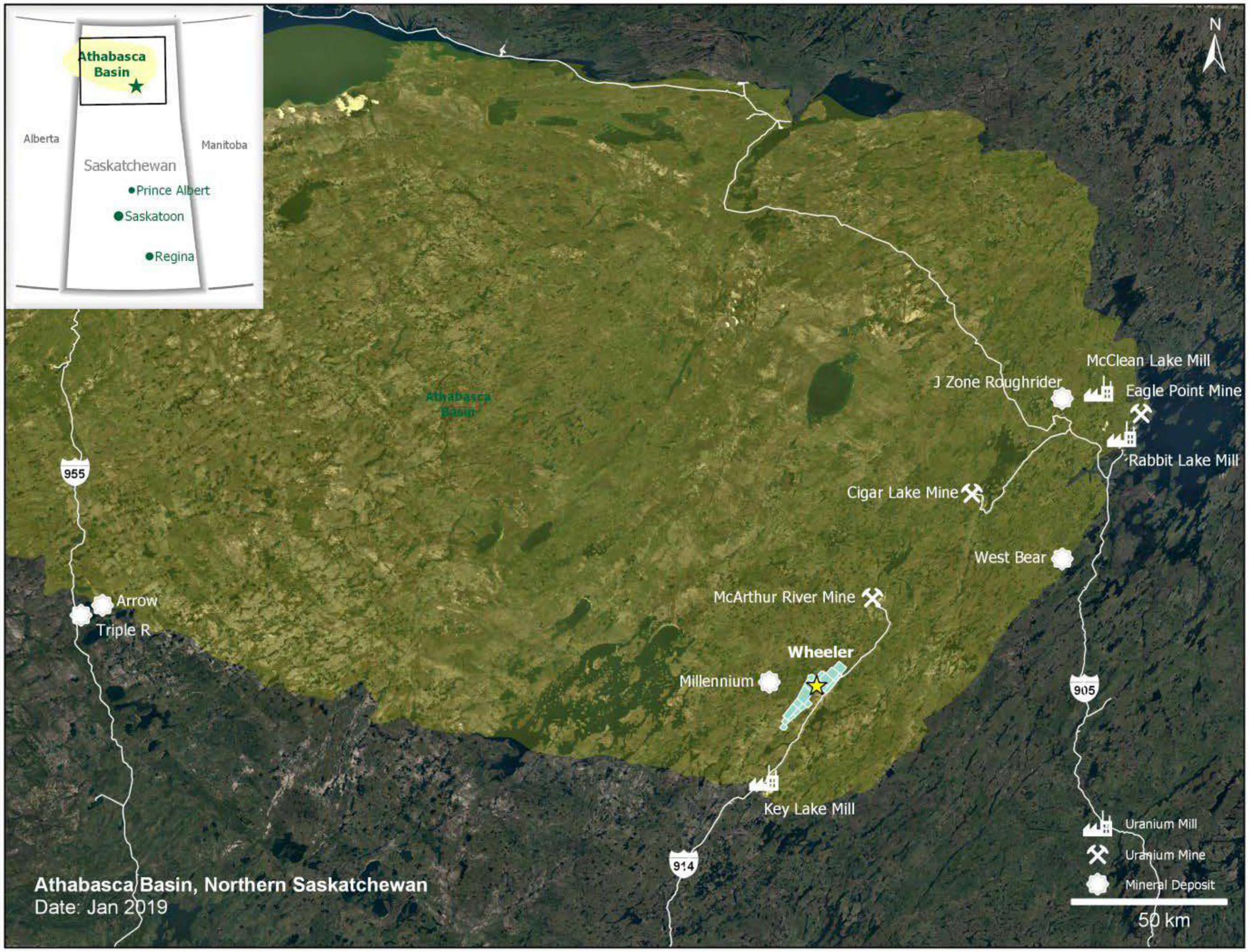
Through careful planning, focused technical studies, and discussions with local land users, Indigenous communities, and other Interested Parties, Denison has evaluated the development of the Operation as an ISR mine and processing plant.

2.2 Location

The Operation is located along the eastern edge of the Athabasca Basin region of Northern Saskatchewan within the Northern Administration District. The Operation is located approximately 600 km north of Saskatoon and is situated mid-way between Cameco Corporation's Key Lake Operation and McArthur River Operation, approximately 4 km west of Highway 914 (Figure 2). The Property consists of 19 mineral claims totaling 11,720 ha.

The Operation is located within the boundaries of Treaty 10, in the Nuhtsiye-kwi Benéne (Ancestral Lands) of the English River First Nation, the traditional territory of the Kineepik Métis Local #9, the homeland of the Métis, and the Nuhenéné.

Figure 2 Wheeler River Operation Location in the Athabasca Basin



2.2.1 Description of Site

The Operation is accessible by all-weather roads and the provincial power grid. Vehicle access to the Property is by Highway 914 of the provincial highway system to the Key Lake Mill, then by the ore haul road between the Key Lake and McArthur River operations to the eastern part of the Property.

The Operation is located in the Boreal Shield Ecozone, which is characterized by subdued topography compared to elsewhere in the Canadian Shield due to flat-lying sandstone and almost continuous cover of sandy glacial deposits. The surrounding climate is typical of continental sub-Arctic regions of Canada and is characterized by extremely cold, dry winters and short summers. Daily mean temperatures are typically below freezing from January to April and October to December. Temperature extremes in a year can range from -50°C to +35°C. The area is relatively dry with most of the annual precipitation falling in June, July, and August. During winter, the snowpack is typically less than 1 m.

The Operation is anticipated to have a total footprint of 75 ha. By applying a buffer around Operation components, the maximum footprint of the Operation was estimated to be 170 ha. See Appendix A for a map of the Operation footprint.

2.3 Schedule

The total duration of the proposed Operation is estimated to be approximately 37 years, which includes two years for Construction, 15 years for Operation, five years for Decommissioning, and 15 years for Post-Decommissioning.

2.3.1 Site Preparation

Clearing and leveling of the surface facilities will be contracted out to a suitable contractor. Topsoil and brush will be stockpiled on site for future use during reclamation. The location of the topsoil stockpiles will be determined closer to Construction.

Construction of foundations and general earthworks will be required for various Operation components. Construction of roads, foundations, pads, ponds, and the airstrip will be initiated during site preparation. Suitable construction fill material will be sourced from a proposed borrow area and any suitable clean sandstone generated during freeze wall and well drilling. It is estimated that 11,000 m^3 of subgrade fill will be needed.

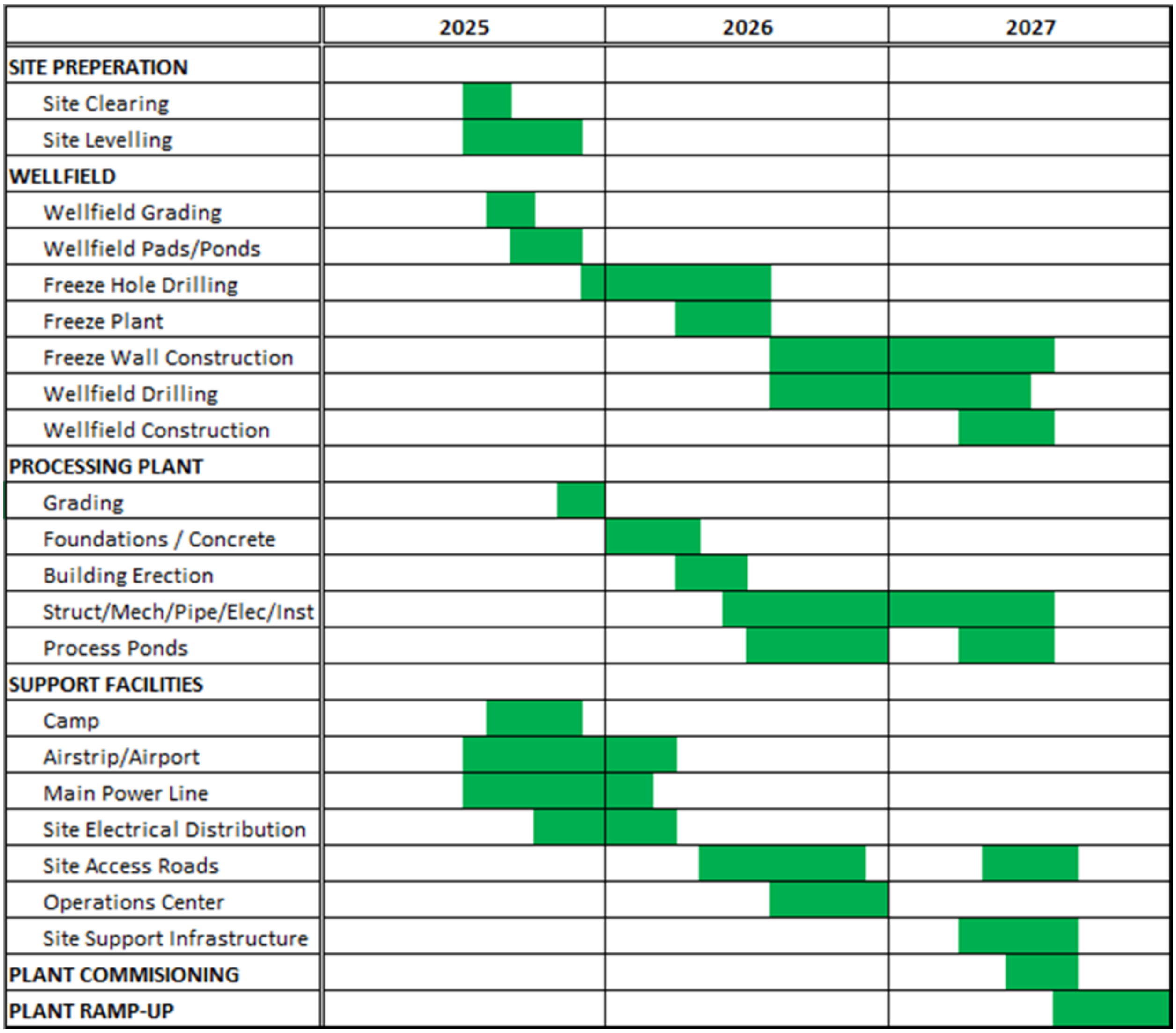
Activities are expected to be completed without the use of explosives for blasting. Works that involve vegetation and/or soil disturbance will be conducted outside of the nesting season, whenever practicable.

2.3.2 Construction

Construction activities will follow industry best management practices to minimize effects of the Operation on the environment and keep risks to workers as low as reasonably achievable.

The sequence for Construction activities will occur in a logical manner based on Operation execution plans. The current proposed preparation of site and construction schedule assumes a mid-2025 start. Table 1 shows a high-level breakdown of the preparation of site and construction schedule for the Operation.

Table 1 Preparation of Site and Construction Schedule



The Operation will employ a full stage commissioning process using a systematic approach. The process will consist of four stages: construction verification against design specification and drawings, individual subsystem testing, integrated system testing, and process commissioning. These commissioning activities will be further defined in the Operation Commissioning Plan. Commissioning is planned to take place post-construction, prior to commercial production and receipt of operating licenses and permits.

2.4 Activities Authorized

Denison is seeking authorization for the following activities to be conducted under a licence to prepare a site and construct a uranium mine and mill:

- Prepare site and construct a facility for the mining of uranium ore and the production of uranium concentrate at the Wheeler River Operation.
- Construction, commissioning, and operation of a freeze wall and freeze plant, including all necessary components.

- Commissioning activities of necessary components prior to commencement of commercial operation.
- Storage of clean waste rock and storage and transport of special waste to a licensed processing facility.
- Handling and storage of hazardous material and disposal of hazardous wastes.
- Import, possess, use, store, and transfer of nuclear substances and radiation devices that are required for or associated with laboratory studies, field studies, fixed gauge usage, and borehole logging devices.

3 Proposed Facilities

This section outlines the proposed facilities broken down into components that make up the design for the Operation. Information regarding the proposed facilities is presented in this document at a high level. See Appendix A for an Operation layout diagram. More details and further reference to design documentation can be found in Denison's Facility Description Manual.

3.1 Operation Components

The Operation can be broken down into the following components:

- Mining – includes all wellfield infrastructure, including surface and subsurface components, injection wells, recovery wells, monitoring wells, and freeze wells.
- Processing – includes the circuits that move UBS from the wellfield to the processing plant, to allow transformation of UBS into uranium concentrate.
- Reagents and Plant Support Facilities – includes, but is not limited to, processing reagents, laboratories, fire protection systems, compressed air, and distributed control systems.
- Radiation Protection and Ventilation – includes all physical and administrative radiological controls such as radiological control zones, designated areas, shielding, ventilation, and separation and containment.
- Waste Management – includes water treatment and other waste facilities related to processing.
- Site Infrastructure – includes remaining non-CNSC licensed facilities such as the airport, access road, domestic landfill, construction landfill, camp, and related camp infrastructure.

3.1.1 Mining

The ISR method proposed for the Operation will require the establishment of a number of wells. Two types of drilling have been successfully tested for the Operation as part of project development and exploration work: mud rotary drilling and diamond drilling. These will be the two main drilling techniques used for the ISR wellfield, groundwater monitoring well, and freeze hole drilling required for the Operation.

During well drilling activities, material will be recovered in the form of cuttings (i.e., small pieces of rock and debris). This material is defined as waste and will be classified into two categories: clean waste and special waste. It is expected that cuttings generated from drilling 0 to 300 m in depth will be clean waste, and cuttings generated from drilling 300 to 400 m will be special waste.

3.1.1.1 Freeze Wall

Denison will install a freeze wall to support a defense in depth containment strategy for mining solutions, and to prevent the regional groundwater system from entering the mining zone. Once freeze holes are constructed, the freezing process will be started, which allows for a 12-month development of the freeze wall before operations begin.

The freeze wall will be established by drilling vertical or steeply dipping holes from surface to the competent basement rock (over 410 m below surface). The freeze holes will be spaced 6 m apart. The ground will be frozen from surface down to the competent basement rock to create a continuous freeze wall around the mining area, isolating it from the surrounding regional area. The freeze wall will be a nominal 10 m thick and installed approximately 25 m away from the uranium deposit.

A chilled brine solution (e.g., calcium chloride brine) will be circulated through the cased holes to remove heat from the ground. A freeze plant will be constructed on the surface near the deposit where the freeze holes are collared. The freeze plant will be modular for ease of installation and operation as more chiller units will be added as ground freezing needs increase. Each chiller unit produces refrigeration and contains an ammonia compound compressor. A total of six chiller units are expected to be required at peak load later in the mine life. The brine distribution system is handled by a mixing tank that can move brine to freeze holes at the required capacity.

Temperature monitoring holes will be installed in close vicinity to the freeze holes to monitor the thickness of the freeze wall and confirm that containment parameters are achieved.

3.1.1.2 Mining Wellfield

Three types of wells will be installed:

- injection wells for introducing solutions into the uranium mineralization;
- recovery wells for UBS; and
- monitoring wells for assessing ongoing operations and containment.

The well patterns are developed for a specific site, and installation for a given wellfield is based on the subsurface geometry of the ore deposit. Various pattern shapes are used, although a five-spot pattern will be the primary design layout. This arrangement includes one recovery well in the centre, surrounded by four injection wells. The spacing is anticipated to be approximately 5 to 10 m. Ore body size and geometry will also influence the number of wells in a wellfield. The total wellfield will cover an area measuring 90 m wide by 750 m long. The wellfield will be constructed in a phased approach to match the freeze wall mining phases.

The final details of the wellfield design will be developed as engineering advances through the final engineering design stages.

Pump tests will be completed in the wellfield as part of wellfield commissioning to confirm the hydraulic connectivity in the mining area.

3.1.1.3 Pumphouses

Two different types of pumphouses will be required for the Operation: injection solution pumphouses and recovered solution pumphouses. A pumphouse is a small building located on the surface where pipes from injection and recovery wells are operated and mining solution flows are monitored.

Pumphouses will distribute the mining solution to the injection wells and collect the UBS from the recovery wells. Pumphouses will be connected to production pipelines. One of the pipelines will be used for receiving mining solution from the processing plant and another will be used for returning UBS back to the processing plant.

Injection solution pumphouses will consist of an injection transfer tank, pumps, flow meters, control valves, piping, and mixing systems, which will allow for mining solution to be delivered through the pipeline to the required injection wells at the appropriate reagent concentrations. The mining solution composed of hydrogen peroxide, ferric sulfate, sulphuric acid, and water will then enter the mining area and dissolve uranium in place. All injected solutions containing reagents will be controlled by metering pumps, inline mixers, or control valves to allow for the appropriate chemical composition needed to meet process objectives. Each injection well will have its own dedicated injection pump and reagent concentration monitoring system.

3.1.2 Processing

The processing plant is relatively simple when compared to other full-service uranium mills, as there are a limited number of vessels and minimal piping. The Operation uses precipitation, thickening, and drying to recover a uranium product from the UBS. The recovery of uranium from the UBS obtained in the wellfield will be undertaken in a two-stage precipitation process. The two-stage process creates a low-grade uranium precipitate and a concentrated uranium product known as uranium concentrate.

Most of the equipment and materials inside the processing plant are small in size, enabling the shipment of tanks and other vessels pre-assembled. Construction of the processing plant will begin immediately following earthworks at the site. After foundations are completed, building construction will begin.

3.1.2.1 Radon Purge Tank

The ore zone is saturated with radon, which will naturally degas when exposed to atmospheric pressures at the surface. To keep worker doses 'As Low As Reasonably Achievable' (ALARA), a radon purge tank will be used to remove this initial volume of radon before the solution enters the processing plant. This will be done by sparging air provided by a compressor and ventilation fans, which pull air from the top of the tanks.

As part of the well development phase, and periodically during the wellfield lifetime, it is expected that solids may be brought to surface. The radon purge tank has been designed to handle such occurrences.

3.1.2.2 Uranium Bearing Solution Holding Area

In situ mining and subsequent processing of uranium will not always occur at the same rates. Additionally, there will be times when parts of the processing plant are down for routine maintenance. For these reasons, a UBS holding area will be incorporated into the design of the plant.

Recovered high-grade UBS is delivered from the Recovered Solution tanks and mixed with water. The solution is heated by a glycol heat exchanger. A ventilation fan pulls air, and thus radon, off the top of the tank.

3.1.2.3 Stage One Precipitation

Stage One Precipitation removes contaminants from the UBS. Stage One Precipitation reagents such as hydrogen peroxide, barium chloride, and lime are added and the pH will be increased through agitator tanks to precipitate iron-hydroxides, associated metals, radium-226, and thorium-230.

The system is comprised of a series of four gravity-fed tanks. Each tank is equipped with an agitator and instrumentation for monitoring and control of pH and oxidation reduction potential (ORP). Uranium bearing solution is mixed with recycled thickener underflow (U/F) in reaction tank 1. Lime slurry is added to each tank to control pH. Hydrogen peroxide is added to control ORP. Barium chloride is added to tank(s) 3 and/or 4 to promote the precipitation of radium.

The discharge from tank 4 feeds the Stage One Thickener by gravity. A ventilation fan pulls air off the top of the Stage One Precipitation reaction tanks and discharges the air outside of the processing plant.

3.1.2.4 Stage One Thickener

The Stage One Thickener receives gravity feed from the Stage One Precipitation tank 4. The feed to the Stage One Thickener is mixed with flocculant to promote settling of solids, and with the backwash from the sand filters, which contains particulates. The Stage One Thickener overflow (O/F) is pumped through a set of sand filters for fines removal, and then onto the Stage Two Precipitation Circuit. The Stage One Thickener has a rake mechanism that promotes settled solids (thickened slurry) to migrate to the bottom of the cone where two U/F pumps are connected. One U/F pump recycles slurry back to the first reaction tank, and the other pump feeds a filter for washing and dewatering precipitated solids. Dilute sulphuric acid is used to wash the solids of solution containing uranium.

Ventilation fans pull air from the Thickener O/F tank and purified leach surge tank. This air is discharged outside of the processing plant.

3.1.2.5 Stage One Filtering System

Slurry from the Stage One Thickener feeds the Stage One Filtering System. The Stage One Filtering System removes liquid from the Stage One Thickener U/F. A vacuum pump promotes filtration through a filter cloth. The precipitates are then moved into the process precipitates hopper, and the filtrate is recycled back into the Stage One Thickener. A screw feeder moves the precipitates into a tote for storage and future transport.

3.1.2.6 Stage Two Precipitation

Stage Two Precipitation occurs via a series of four gravity-fed tanks equipped with agitators. Purified leach solution is heated by a glycol heat exchanger. The solution is then fed to the Stage Two Precipitation reaction tank 1. Hydrogen peroxide is added to the reaction tanks to promote precipitation of uranium as uranyl peroxide, commonly referred to as ‘yellowcake’. Magnesia is added to maintain pH setpoints throughout the tanks as the precipitation of yellowcake generates acidic conditions. The flow passes through tanks 2, 3, and 4 by gravity before it enters the subsequent Yellowcake Thickener. The precipitated uranium is mixed with a flocculant prior to feeding into the Yellowcake Thickener where it is allowed to settle and dewater (thicken).

A ventilation fan pull air from the top of all Stage Two Precipitation reaction tanks and discharges the air outside of the processing plant.

3.1.2.7 Yellowcake Thickener

The Yellowcake Thickener receives gravity feed from the Stage Two Precipitation reaction tank 4, as well as backwash from the sand filters and filtrate from the Yellowcake Filtering System. The Yellowcake Thickener has a rake mechanism that migrates settled solids (thickened slurry) to the bottom of the cone where two U/F pumps are connected. One U/F pump recycles slurry back to the first reaction tank, and the other pump feeds a filtering system for washing and dewatering precipitated solids. Water is used to wash the solids primarily of solution containing sulfates, and a vacuum pump is used to promote filtering of solution out of the solids. The dewatered yellowcake is then transferred to the Yellowcake Drying Circuit and the filtrate is recycled back to the Yellowcake Thickener feed. The Yellowcake Thickener O/F gravity drains into an O/F tank where it is pumped through a set of sand filters, and then to the Industrial Wastewater Treatment Plant (IWWTP).

3.1.2.8 Yellowcake Filtering System

Slurry from the Yellowcake Thickener feeds the Yellowcake Filtering System. The Yellowcake Filtering System removes liquid from the Yellowcake Thickener U/F. A vacuum pump performs the filtration. Yellowcake is moved into the filtered yellowcake hopper and the filtrate is recycled back into the Yellowcake Thickener. The dryer feed screw conveyor delivers yellowcake to the Yellowcake Dryer. The recycling of filtrate back to the Yellowcake Thickener occurs to recover any yellowcake particulates that were filtered through the filter cloth.

The Yellowcake Filtering System has a continuous counter-current wash solution feed. The wash solution is prepared in the yellowcake filter wash solution mix tank by mixing drum wash sump water, dryer scrubber water, and packaging scrubber water. Additional water required comes from the plant water charge pump.

3.1.2.9 Yellowcake Drying

The filtered yellowcake solids are transferred through an enclosed conveyor to the dryer where any remaining moisture will be evaporated using an indirect dryer that dries the yellowcake at high temperatures (i.e., approximately 125°C). Off-gas from the dryer will go to the dryer venturi scrubber, where water sprays are used to capture any particulates from the dryer ventilation. This solution is then recycled to the Yellowcake Thickener and the scrubbed off-gas is discharged to the atmosphere via a stack. Once the moisture is sufficiently removed from the yellowcake product, the dried yellowcake is fed into a product storage bin awaiting packaging.

3.1.2.10 Yellowcake Packaging

The purpose of the Yellowcake Packaging Circuit is to package uranium concentrate into steel drums. The drying and packaging areas will be outfitted with hygiene systems to capture any radioactive dust that may be generated during handling of the product. The Yellowcake Packaging Circuit will require minimal manual worker intervention to keep radiation and worker doses ALARA. All equipment will be selected to provide minimal dust generation and outfitted with dust collection systems.

Drums are placed onto a rolling conveyor into the packaging enclosure, and then filled with uranium concentrate from the product surge bin and filled to a predetermined level. The drum filling system places a clean drum under the screw feeder and fills the drum to a pre-determined level, which corresponds with an acceptable drum weight for shipping. The drum is forwarded to a lidding station that places a lid on the drum and secures it with a ring, bolt, and nut. The drum is then forwarded to a weigh scale where the weight of the drum is recorded and a label printed, which includes the Lot#, Drum#, net weight, tare weight, and gross weight of the drum. Three labels with this corresponding information are printed and affixed to the drum. The drum is then forwarded to the drum storage area to await radiation scanning and preparation for shipping.

3.1.3 Reagents and Plant Support Facilities

The Reagents and Plant Support Facilities include several key components that are integral to supporting the mining components, processing components, and overall operation and safety of the site.

3.1.3.1 Reagents

The Operation will require different reagents to operate facility components. Certain reagents will be required by the freeze plant to establish the freeze wall during early construction phases, while other reagents will be required later during commissioning activities. Table 2 lists these reagents and the ISR or processing plant circuit they will be used in.

Table 2 Operation Reagents and Associated Components

Reagent	ISR or Processing Plant Circuit
Calcium Chloride Brine	Freeze Plant
Ammonia	Freeze Plant
Hydrogen Peroxide	Injection Leach Solution, Stage 1 and 2 Precipitation
Barium Chloride	Stage 1 Precipitation, Industrial Wastewater Treatment Plant (IWWTP)
Calcium Hydroxide	Stage 1 Precipitation, IWWTP
Flocculant	Thickener, IWWTP
Sulphuric Acid	Injection Leach Solution, Filtering System, IWWTP
Magnesium Hydroxide	Stage 2 Precipitation
Sodium Hydroxide	IWWTP
Iron Sulphate	Injection Leach Solution, IWWTP

3.1.3.2 Compressed Air

A rotary air compressor and associated equipment will be installed in the processing plant. The air compressor will be installed indoors and will operate on a continuous basis, with the exception of preventative maintenance.

3.1.3.3 Fire Protection System

The fire protection system in the processing plant will be installed as per National Fire Protection Association standards. A fire pump complete with an electric motor, a fire water pump with diesel engine, a diesel fuel tank, a fire water jockey pump, and an enclosure holding all pumps and diesel complete with heat, ventilation, and a sprinkler system is included as parts of the fire protection system.

3.1.3.4 Laboratory

There will be two main laboratory facilities on site: a metallurgy laboratory and a chemistry (assay) laboratory. These laboratories are required for sample preparation, test work, and analysis to verify continual improvement of wellfield and processing plant performance. Both laboratories will be appropriately designed to store necessary reagents, standards, and samples long term based on the needs of the Operation.

The metallurgy laboratory will be an area for conducting test work generally focused on ISR, the processing plant, and effluent treatment performance, as well as sample preparation for the chemistry laboratory when required. The chemistry laboratory will be designated as a basic level laboratory (i.e., an area for analyzing liquids and solids used or created on site).

3.1.3.5 Distributed Control System

The plant control system consists of a distributed control system (DCS) with personal computer-based operator interface stations (OIS) located in a control room. In conjunction with the OIS, the DCS will perform all equipment and process control monitoring, optimization, dashboards, reporting, sequencing, unlocking, alarm management, safety interlocks, data storage, retrieval, and reporting.

All areas of the facility will be operated from the OIS in the control room. The freeze plant will have a local, standalone control but will be monitored using the DCS. The DCS will also monitor the fire detection and suppression systems.

3.1.4 Radiation Protection and Ventilation

Radiation protection features were incorporated into the design of the wellfield and processing plant. These features, together with administrative controls, are intended to keep worker doses ALARA. Under these principles, employees will be protected from radiation exposures to the greatest extent possible.

3.1.4.1 Radiation Protection

Areas within the Operation are designated according to potential radiological hazards and contamination control requirements. The movement and accumulation of all forms of radioactive contamination will be monitored via dosimetry and area monitoring. Contamination control measures will be in place to minimize the spread of radioactive materials into unintended locations. The primary shielding features incorporated into building designs are based on worker dose assessment calculations.

3.1.4.2 Ventilation Features

The processing plant will be ventilated at a minimum of one air change per hour. The maximum rate will be six times per hour for areas of concern with high airborne radioactive contaminants. Positive pressurization of buildings and spaces shall be maintained via introduction of outside air.

Air conditioning systems will be provided where required to maintain conditions of air temperature, dew point, air changes, and air quality suitable for occupancy spaces such as offices, lunchrooms and locker rooms, motor control centers, and electrical rooms.

Secondary ventilation air is airflow taken from process tanks and exhausted directly to the atmosphere outside of the Processing Plant building. Secondary ventilation rates will be 6 air changes per hour, based on the normal tank level.

3.1.5 Waste Management

This subsection describes the waste management facility components that would be licensed by the CNSC for the Operation. Waste generated during Construction will be recycled off site to the extent possible. Any remaining wastes will be temporarily piled or stored in laydown areas and placed in the appropriate landfill once construction of the landfills is complete.

3.1.5.1 Industrial Wastewater Treatment Plant

The IWWTP receives overflow solution from the Yellowcake Thickener and other sources of contaminated solution on site and removes dissolved metals and suspended solids to produce an effluent that passes environmental quality requirements. The IWWTP will consist of three treatment stages: Effluent Treatment Stage One, Effluent Treatment Stage Two, and Effluent Treatment Stage Three.

3.1.5.2 Release Ponds

The release ponds consist of three effluent monitoring and release ponds. The ponds will receive water from the IWWTP. There will be an option to recycle water from the ponds back to the processing plant via the process water pond. The three ponds will each have a capacity of 3,300 m^3 of water and a composite liner system.

3.1.5.3 Treated Effluent

The treated effluent discharge line will run from the effluent monitoring and release ponds into Whitefish Lake. The discharge line will be located in an area of the lake bottom so as not to disrupt fish habitat. A diffuser will be placed at the end of the line for effluent mixing within the lake.

3.1.5.4 Emissions Control Systems

Two scrubber stacks will be constructed for emission control in the Yellowcake Drying and Yellowcake Packaging areas. Ventilation from the Yellowcake Drying and Packaging Circuits goes to the appropriate venturi scrubber for cleaning before being discharged into the atmosphere. The scrubber fans draw air through the system to collect particulate matter, where it is misted using water to capture the particulates. The water used in the scrubber is flow controlled. Water from both scrubbers is recycled back to the Yellowcake Filtering System wash solution mix tank.

3.1.5.5 Industrial Waste Landfill

Industrial waste is defined as waste with chemical or radiological contamination. Waste stored in the industrial waste landfill will originate from the operation of the site. The landfill will consist of a double-liner design. This includes a primary high-density polyethylene geomembrane liner over a geosynthetic clay liner and a secondary high-density polyethylene geomembrane liner over another geosynthetic clay liner.

3.1.5.6 Hazardous Substances and Waste Dangerous Goods

Waste oil and hazardous wastes (e.g., paints, solvents, and hydrocarbons) will be collected. The temporary storage pad will have a composite liner and will be 250 m^2 in area. Waste oil will be removed by a licensed carrier and delivered to a licensed receiver for recycling.

3.1.5.7 Electrical Power

The Operation will have electric power supplied from the SaskPower grid. The on-site fenced substation is owned by Denison. The substation includes 138 kV incoming equipment, 138 kV/4160 V transformer(s), and 4160 V switchgear located in an electrical house.

Emergency stand-by, diesel-fired generators will be available for the Operation. The emergency back-up power for the Operation will consist of two 4160 V generators with a total available capacity of approximately 2.6 MW. These will be located near the freeze plant and will electrically tie into the main substation's 4160V switchgear. There will also be a 450 kW and 600 V diesel generator set providing back-up power for the camp and operations center, respectively.

4 Operation Construction and Operating Limits

4.1 Construction of Facilities

The construction of site facilities will be completed using an integrated project delivery model in which the Denison project team members will collaborate with consultants and contractors to complete engineering, procurement, and construction management activities. An Engineering Procurement Construction Management style agreement would be utilized to supplement the Denison project team where the Operation requires. Construction will be completed by contractors. Contractors will be assigned to the various construction work packages depending on their complexity, risk, and value.

A project execution plan will be developed as detailed engineering progresses, which will establish the plans and processes to be used to effectively manage the construction of the Operation. Due to the hybrid project delivery model, this will likely be a joint effort between Denison and the contractors on the project team. The project execution plan will consist of, at a minimum, the following components:

- Project Management Plan;
- Engineering Management Plan;
- Procurement and Contracts Plan;
- Construction Management Plan;
- Commissioning Plan; and
- Environment, Health, Safety, and Security Management Plan.

4.2 Designed Operating Limits

4.2.1 Radiation Action Levels

Radiation action levels are implemented as required by the *General Nuclear Safety and Control Regulations* (paragraph 3(1)(f)), the *Radiation Protection Regulations* (Section 6), and the *Uranium Mines and Mills Regulations* (Section 4). Radiation action levels are based on effective dose and are set at levels to indicate where a potential loss of control of the Radiation Protection Program (see Section 5.1.4.5) may be occurring. These levels are defined in the Radiation Code of Practice, which preceded the Radiation Protection Program, where measures to mitigate the potential for reaching action levels (i.e., administrative levels) are described.

4.2.2 Environmental Action Levels

Environmental action levels are implemented as required by the *Uranium Mines and Mills Regulations*. The regulations define an action level as a specific dose or parameter that, if reached, may indicate a potential loss of control of the environmental protection program. With respect to the Operation, the Environmental Code of Practice is designed to address treated effluent, which is the most significant environmental aspect of the Operation in terms of potential effects on the environment. The Environmental Code of Practice is preceded by the Environmental Management Program.

5 Policies and Programs

Denison has it's 'Environment, Health, Safety and Sustainability Policy' in place. This policy has been adopted by, and its implementation is the responsibility of, the Board of Directors of Denison. The Board of Directors holds all levels of management and all employees responsible for compliance with this policy within their areas of responsibility. The policy states:

Denison is committed to the operation of its facilities in a manner that puts the safety of its workers and, its contractors, its community, the environment, and the principles of sustainable development above all else. Whenever issues of safety conflict with other corporate objectives, safety shall be the first consideration. Accordingly, Denison is committed to the following principles:

- building and operating facilities in compliance with all applicable laws and regulations of the jurisdictions in which it operates;
- adopting and adhering to standards that are protective of both human health and the environment at all of its facilities;
- establishing goals and objectives that would encourage the ongoing development of a sound program of sustainability in the communities that it operates in;
- approaching sustainability and engagement activities with the utmost respect for Indigenous communities, Indigenous Rights, and Indigenous Knowledge; and
- keeping radiation, health and safety hazards, and environmental risks as low as reasonably achievable.

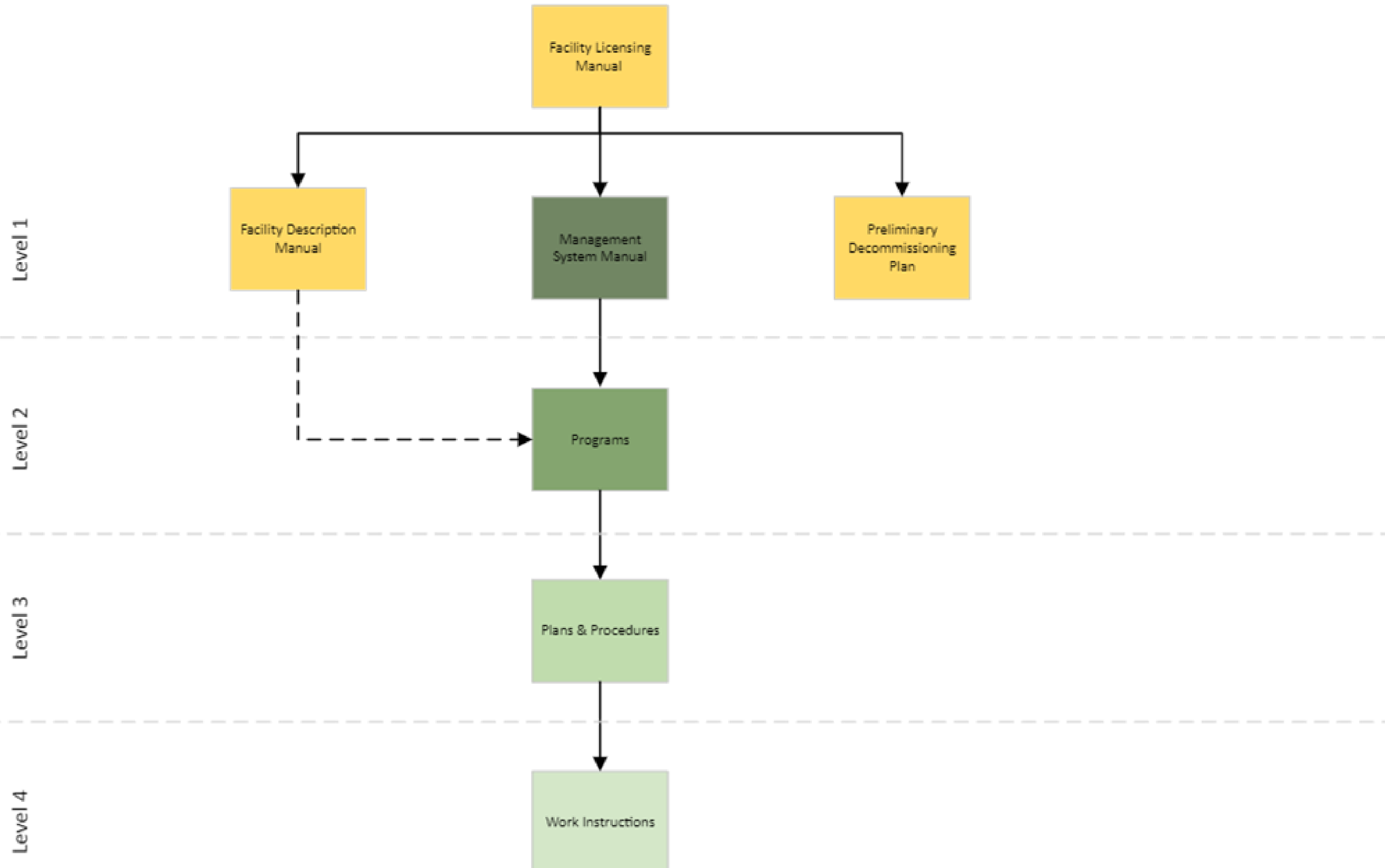
In support of these principles, Denison shall endeavour to:

- establish and maintain clearly defined Environmental Management System to guide its operations in accordance with the foregoing principles;
- provide adequate resources and appropriate staffing to implement its health, safety, environmental, sustainability and engagement programs;
- make sure its employees and contractors are properly trained in the implementation of its Environmental Management Systems and in compliance with applicable laws and regulations;
- institute regular monitoring programs to identify risks to its workers, contractors, Indigenous Rights holders, the public, or the environment, and to confirm compliance with regulatory requirements;
- set objectives and targets in an effort to continually improve its management and performance of health, safety, environmental, sustainability and engagement programs;
- identify and reduce the potential for accidents and emergency situations, and implement emergency response plans that will protect the health and safety of its workers, contractors, the public and the environment;
- conduct regular audits to assess and confirm compliance with this policy;
- develop processes for preventing non-conformance with this policy and adopting corrective actions; and
- require regular reporting to its Board of Directors regarding compliance with this policy.

5.1 Management Framework

Denison is developing a document framework comprised of four 'levels'. The documents within this framework will collectively make up Denison's management system for the Operation. A simplified overview of the framework can be seen in Figure 3. The document framework will also consider future incorporation of a CNSC licence to prepare the site and construct infrastructure, as well as the subsequent creation of a Licence Condition Handbook.

Figure 3 **Wheeler River Operation Document Framework Overview**



This FLM resides in Level 1 of the document framework hierarchy, which also includes the Mine Facility Description Manual, the Management System Manual, and the Preliminary Decommissioning Plan. These documents contain information required for review by the CNSC and provide sufficient information needed to educate external stakeholders about the details of the Operation.

Level 2 consists of nine programs based on Denison's organizational structure and the CNSC's 14 Safety and Control Areas (SCAs). These programs organize areas of the Operation, describe how regulatory requirements are met, provide an initial level of detail required for construction of the Operation, and direct the plans and procedures that follow in the document framework hierarchy. Each of the programs reference corresponding documents in Level 3.

Level 3 consists of plans and procedures, which contain sufficient details to execute work. The plans and procedures are organized and referenced by the corresponding program preceding it in the document framework hierarchy. The documentation at this level references corresponding documents in Level 4.

Level 4 contains work instructions or forms that provide detailed instructions for specific tasks.

5.1.1 Facility Description Manual

The Facility Description Manual provides a summary of the processes, facilities, and equipment that will be used to carry out the Operation. The manual contains descriptions of the design and equipment specifications, and it includes the supporting drawings, general arrangement plans, and piping and instrument diagrams that are applicable and available at the current phase of the Operation.

5.1.2 Preliminary Decommissioning Plan

The Preliminary Decommissioning Plan describes the future conceptual plan for the decommissioning activities for the Operation and provides an outline of estimated costs. Further details regarding decommissioning and associated financial guarantees are outlined in Section 6.

5.1.3 Management System Manual

The Management System Manual (MSM) covers the framework that establishes Denison's nine programs and their corresponding plans and procedures. It also makes sure Denison achieves its safety objectives, continuously monitors performance against these objectives, and fosters a healthy safety culture.

The MSM is designed to address the requirements laid out in the CNSC's Management System SCA. The MSM addresses:

- organization information;
- performance assessment, improvement, and management review;
- operating experience, problem identification, and resolution;
- change management;
- safety culture;
- configuration management;
- records management;
- supply and contractor management; and
- business continuity.

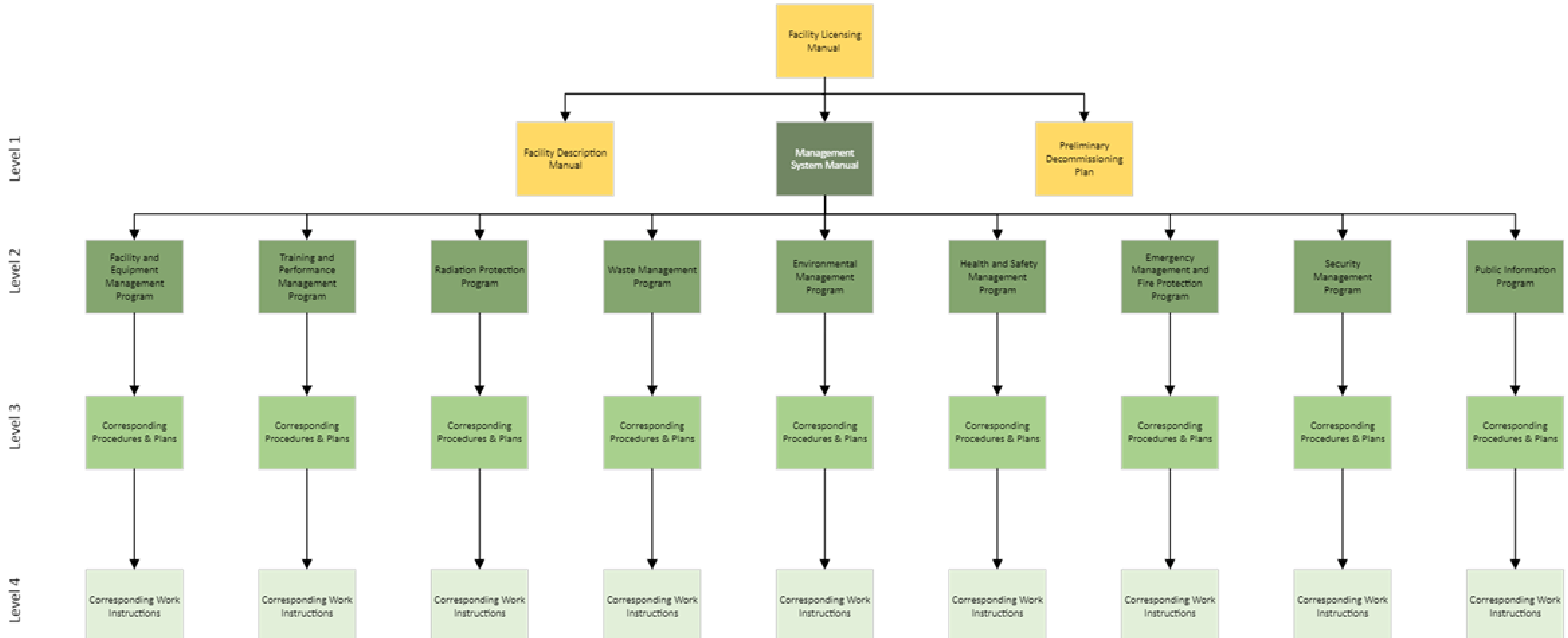
Denison's management system and programs have been developed based on the International Organization of Standardization Plan-Do-Check-Act approach. This approach ensures organizational management will be controlled, monitored, and continually improved for the duration of the Operation.

5.1.4 Overview of Programs

The following subsections outline the nine programs that Denison has developed to align with the CNSC's 14 SCAs and Denison's core principles for the Operation: to protect the health and safety of people and to protect the environment. Figure 4 provides an overview of the document framework, with the program level expanded.

Areas such as corrective action, continual improvement, management review, inspections and audits, change management, and document and record retention will make reference back to the MSM and other internal Denison documents as needed.

Figure 4 **Wheeler River Program Focused Framework Overview**



5.1.4.1 Facilities and Equipment Management Program

The Facilities and Equipment Management Program verifies the ability of the structures, systems, and components to meet and maintain their design basis, remain effective, and perform as intended. This program also makes sure that risk and hazard analyses have been applied to the design. Additionally, the program describes the systematic process for human factor consideration in the design and makes sure that Denison's safety concepts are being fulfilled.

The Facilities and Equipment Management Program introduces and enables the plans and procedures for asset selection and risk management, asset onboarding, maintenance work management, procurement management, inventory management, and asset specific integrity plans. The program is designed to address the requirements laid out in the Physical Design, Fitness for Service, and Safety Analysis SCAs.

5.1.4.2 Training and Performance Management Program

The Training and Performance Management Program is developed to ensure all Operation-related personnel are fully equipped to effectively implement their work functions, in particular consideration of how job function may affect the environment, including worker and public health, within the context of the Environmental Management Program. The program manages contract development, implementation, and administration for maximizing performance and managing risk over the life cycle of a contract. Measurement of performance provides the means for Denison to foster a culture of continuous improvement.

The Training and Performance Management Program implements the Systematic Approach to Training. The program identifies hazards to people, the environment, systems, facilities, and equipment associated with a task or process. The Systematic Approach to Training makes sure that workers are qualified and competent to perform their assigned work safely and effectively in accordance with site expectations and applicable regulatory requirements. The Training and Performance Management Program is designed to address the requirements laid out in the Human Performance Management and Operating Performance SCAs.

5.1.4.3 Environmental Management Program

The Environmental Management Program provides an overarching framework for key environmental monitoring and management plans and a means to demonstrate compliance with applicable environmental regulatory requirements and other environmental objectives and performance targets that Denison has set. The Environmental Management Program identifies environmental aspects associated with Denison's licensed Operation activities and determines their significance. The program also establishes maintenance of operational controls over these aspects.

The Environmental Management Program defines roles and responsibilities that key Denison members have within the program. It establishes the methods used to verify environmental performance and compliance, and introduces the processes used to maintain environmental non-conformances and corrective and preventative action procedures. The program also outlines Denison's management review to confirm the on-going suitability, adequacy, and effectiveness of the program itself.

The Environmental Management Program introduces and enables the plans and procedures in Level 3 of the document framework hierarchy. The program is designed to address the requirements laid out in the Environmental Protection SCA.

5.1.4.4 Waste Management Program

The Waste Management Program provides the framework that confirms Denison's licensed activities involving the processing, storage, and disposal of wastes are performed in a manner that complies with applicable regulatory and licence requirements and protects workers, the public, and the environment.

The Waste Management Program includes identification of waste inventory and the characteristics of the waste (radiological and hazardous non-radiological). The program also includes waste segregation, waste packaging, and transfer requirements, and the plan for storage or disposal of wastes. The Waste Management Program outlines the principles of reduction/reuse/recycle/and recovery (4 Rs) applied at the Operation.

The Waste Management Program introduces and enables the plans and procedures in Level 3 of the document framework hierarchy. The Waste Management Program is designed to address the requirements laid out in the Waste Management SCA as well as the *Transport of Dangerous Good Regulations* and *The Hazardous Substances and Waste Dangerous Goods Regulations*.

5.1.4.5 Radiation Protection Program

The Radiation Protection Program has been designed, and will be implemented, such that Denison complies with, or exceeds, the level of radiation safety that is required by the applicable regulations and Denison's Environment, Health, Safety and Sustainability Policy.

The Radiation Protection Program describes its purpose, scope, and principles through the concept of ALARA. The program outlines the plan for risk management, sets radiation protection objectives and targets, and identifies necessary qualifications and training. The program also refers to the processes for controlling radioactive releases, emergency preparedness and response, and packaging and transport of radioactive materials.

The Radiation Protection Program, and the plans and procedures it enables, outline the need for exposure risk controls, contamination monitoring, bioassay monitoring, equipment purchase/ maintenance controls, contractor management, and deviation and incident reporting.

The Radiation Protection Program is designed to address the requirements laid out in the Radiation Protection and Packaging and Transport SCAs.

5.1.4.6 Health and Safety Management Program

The Health and Safety Management Program is designed to provide for the protection of workers and public health and safety in relation to the Operation. The program promotes employee participation in the implementation of safety and health processes and procedures, which are designed to minimize risk to the health and safety of workers posed by conventional hazards of the workplace.

The Health and Safety Management Program defines processes for managing workplace safety hazards, maintaining health and safety records, investigating and reporting safety related incidents, and training and integrating employees and contractors.

The Health and Safety Management Program is designed to address the requirements laid out in the Conventional Health and Safety SCA as well as the *Canada Labour Code Part II* and all applicable provincial occupational health and safety regulations.

5.1.4.7 Emergency Management and Fire Protection Program

The Emergency Management and Fire Protection Program identifies how the Operation will prepare for and address emergencies that may affect the health and safety of persons and the environment, and the protection of property. The program describes the framework, principles, and processes used to prevent, plan for, and effectively and safely respond to emergency events and situations.

The Emergency Management and Fire Protection Program is designed to address the requirements laid out in the Emergency Management and Fire Protection SCA. The program incorporates appropriate fire protection management in consideration of fire hazard and risk analyses and demonstration of compliance to applicable fire protection codes and standards.

5.1.4.8 Security Management Program

The Security Management Program outlines a risk-based approach to managing security activities at the Operation, including facilities, equipment, materials, and nuclear substances and radiation devices. The program provides the framework and describes the processes to verify compliance, enable continual improvement, and support effective security management.

The Security Management Program is designed to address the requirements laid out in the Security and Safeguards and Non-proliferation SCAs and the *Nuclear Security in the Uranium Extraction Industry* (IAEA 2016).

5.1.4.9 Public and Indigenous Information Program

The Public and Indigenous Information Program identifies the Indigenous and local communities and general members of the public that will be communicated with and informed on aspects of the Operation. The program summarizes the ways in which Denison will communicate with Northern Saskatchewan's Indigenous and local communities. The Public and Indigenous Information Program also outlines the processes for monitoring and measuring program performance, and for continual improvement.

There is no specific SCA related to public and Indigenous information; however, the Public and Indigenous Information Program is structured to meet CNSC REGDOC 3.2.1 *Public Information and Disclosure* and REGDOC 3.2.2 *Indigenous Engagement*.

6 Decommissioning and Financial Guarantee

6.1 Decommissioning

Current decommissioning details are provided in the Preliminary Decommissioning Plan (PDP). The PDP will be prepared considering provincial and federal documents relevant to decommissioning and reclamation. Key reference documents for the PDP include CNSC's REGDOC-2.11.2 *Decommissioning* (CNSC 2021a) and the SK MOE's *Northern Mine Decommissioning and Reclamation Guideline* (SK MOE 2008).

Denison's decommissioning commitment is to return the land back to the Province of Saskatchewan for unrestricted surface land use post closure. The PDP outlines how radiological, physical, and chemical risks will be managed during decommissioning so no unreasonable risks remain. Denison will prioritize passive versus active controls to reduce long-term risk.

Broadly, the PDP outlines physical decommissioning activities followed by reclamation. Decommissioning is expected to take approximately five years. The three main physical decommissioning activities include:

- mining area remediation;
- asset removal; and
- decontamination, demolition, and disposal.

Physical decommissioning activities will be followed by reclamation. Progressive decommissioning and reclamation will be completed throughout the life of the Operation, whenever feasible, and reported to the regulatory agencies as part of the annual reporting requirements throughout Operation. Progressive decommissioning activities will focus on the decontamination, demolition, and disposal of unused buildings and infrastructure, as well as the removal of unused equipment and machinery. Reclamation of inactive areas will take place when these areas become available.

Closure of the entire Operation will be completed in accordance with provincial and federal regulations and guidance documents with the fundamental considerations being to confirm physical and chemical stability of the site to protect human health and the environment.

6.2 Financial Guarantee

Upon completion, the PDP will include an associated estimate for the decommissioning costs of the Operation. Denison will provide financial assurance to confirm the identified decommissioning activities can be completed as planned. Financial assurance will be provided through letters of credit to the SK MOE, who will then pass on confirmation to the CNSC.

7 Reference List

Canadian Nuclear Safety Commission (CNSC). 1997. *Nuclear Safety and Control Act.*

Canadian Nuclear Safety Commission (CNSC). 2000. *General Nuclear Safety and Control Regulations.*

Canadian Nuclear Safety Commission (CNSC). 2000. *Uranium Mines and Mills Regulations.*

Canadian Nuclear Safety Commission (CNSC). 2000. *Radiation Protection Regulations.*

Canadian Nuclear Safety Commission (CNSC). 2018. *REGDOC-3.2.1, Public Information and Disclosure*.

Canadian Nuclear Safety Commission (CNSC). 2021a. *REGDOC-2.11.2, Decommissioning*. January 2021.

Canadian Nuclear Safety Commission (CNSC). 2022. *REGDOC-3.2.2, Indigenous Engagement,* Version 1.2.

Denison Mines Corp. (Denison). 2016. *Preliminary Economic Assessment for the Wheeler River Uranium Project, Saskatchewan, Canada.* Report Prepared for Denison Mines Corporation. Report prepared by SRK Consulting. March 31, 2016.

Denison Mines Corp. (Denison). 2018. *Prefeasibility Study Report for the Wheeler River Uranium Project Saskatchewan, Canada*. Report Prepared for Denison Mines Corporation. Report prepared by SRK Consulting. October 30, 2018.

Denison Mines Corp. (Denison). 2020. *Wheeler River Project Provincial Technical Proposal and Federal Project Description*. Revised December 2020.

Denison Mines Corp. (Denison). 2023. *Facility Description Manual.*

Government of Canada. 1985. *Canada Labour Code, R.S.C., 1985, c. L-2.*

Government of Canada. 2019. *Canadian Environmental Assessment Act, 2012*. S.C. 2012.

Government of Saskatchewan. 2000. *The Hazardous Substances and Waste Dangerous Goods Regulations. Chapter E-10.2 Reg 3* (effective April 1, 1989).

Government of Saskatchewan. 2018. *The Environmental Assessment Act. Chapter E-10.1* (effective August 25, 1980)

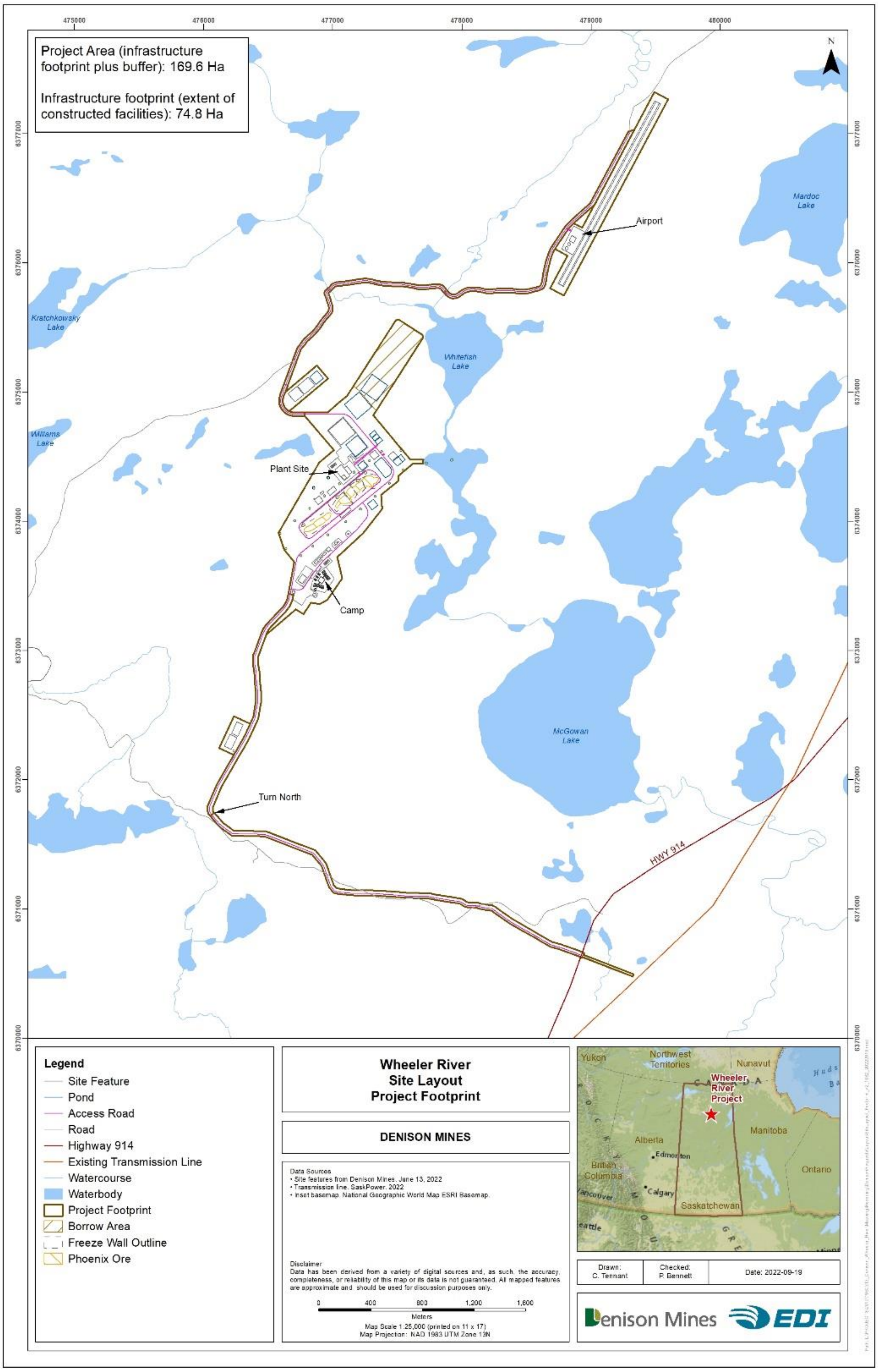
Government of Saskatchewan, Ministry of Environment. 2008. *Northern Mine Decommissioning and Reclamation Guideline*

International Atomic Energy Agency (IAEA). 2016. *Nuclear Security in the Uranium Extraction Industry.*

Transport Canada. 2001. *Transportation of Dangerous Goods Regulations.*

Appendix A Wheeler River Operation Figures

A.1 Wheeler River Operation Footprint



A.2 Wheeler River Operation Layout