Final Closure Report

Beaverlodge Properties

URA 7, URA 1, BOLGER 1,
Tailings Management Area Properties

Prepared for

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NOVEMBER 2023

This report is dedicated to the memory of Don Hovdebo who passed away unexpectedly before this report was finalized. Don was instrumental in the development of the Province of Saskatchewan's Institutional Control Program and played key role in supporting the management of the decommissioned Beaverlodge Site. His passion for northern Saskatchewan and its people was evident in everything he did. Don's in-depth experience and knowledge was invaluable and greatly contributed to the strength of this report. Don was a great mentor and will be dearly missed by all who knew him.

Table of Contents

Glossary **1**

1 Introduction **4**
1.1 Background 4
1.2 Purpose 5
1.3 Schedule 8

2 Submitting Organization **9**

3 Beaverlodge Site History **10**
3.1 Eldorado Mining and Refining Limited 10
3.2 Cameco Corporation 12
3.3 Local Environment 13

4 Development of the Beaverlodge Performance Objectives **14**
4.1 Beaverlodge Management Framework 14
4.2 Beaverlodge Path Forward Report 15
4.2.1 Performance Objectives and Indicators 16

5 Institutional Control **18**
5.1 Saskatchewan Institutional Control Registry and Funds 18
5.2 Maximum Potential Failure Event 19
5.3 Institutional Control Boundaries 19

6 Site Wide Conditions **22**
6.1 Site Inspections 22
6.2 Assessments 24

7 Assessing Remaining Site Aspects Requiring Future Monitoring or Maintenance **30**

8 Property/Area Summaries **32**
8.1 Tailings Management Area 32
8.1.1 Description 32
8.2 Fookes Reservoir Area 34
8.2.1 Recent Decommissioning Activities and Beaverlodge Performance Indicators 40
8.2.2 Decommissioning and Reclamation Documentation 48
8.2.3 Evaluation of Fookes Reservoir Properties 49
8.2.4 Institutional Control Considerations and Requirements 49
8.3 Marie Reservoir Area 52
8.3.1 Initial Decommissioning Activities 53
8.3.2 Recent Decommissioning Activities and Performance Indicators 56
8.3.3 Decommissioning and Reclamation Documentation 65
8.3.4 Evaluation of Marie Reservoir Properties 66
8.3.5 Institutional Control Considerations and Requirements 66
8.4 Minewater Reservoir Area 69
8.4.1 Initial Decommissioning Activities 70

8.4.2 Recent Decommissioning Activities and Beaverlodge Performance Indicators....71
8.4.3 Decommissioning and Reclamation Documentation....81
8.4.4 Evaluation of Minewater Reservoir Properties....82
8.4.5 Institutional Control Considerations and Requirements....82
8.5 URA 1 [MSL 10]....85
8.5.1 Description....85
8.5.2 Initial Decommissioning Activities....86
8.5.3 Recent Decommissioning Activities and Beaverlodge Performance Indicators....86
8.5.4 Decommissioning and Reclamation Documentation....96
8.5.5 Evaluation of URA 1....97
8.5.6 Institutional Control Considerations and Requirements....97
8.6 URA 7 [MSL 15]....101
8.6.1 Description....101
8.6.2 Initial Decommissioning Activities....103
8.6.3 Recent Decommissioning Activities and Beaverlodge Performance Indicators....104
8.6.4 Decommissioning and Reclamation Documentation....111
8.6.5 Evaluation of URA 7....112
8.6.6 Institutional Control Considerations and Requirements....112
8.7 BOLGER 1 [MSL 10]....116
8.7.1 Description....116
8.7.2 Initial Decommissioning Activities....117
8.7.3 Recent Decommissioning Activities and Beaverlodge Performance Indicators....117
8.7.4 Decommissioning and Reclamation Documentation....126
8.7.5 Evaluation of BOLGER 1....127
8.7.6 Institutional Control Considerations and Requirements....127

9 Summary....131

10 Community Engagement....133

11 Community Related Monitoring....135
11.1 Country Foods Assessment....135
11.2 Eastern Athabasca Regional Monitoring Program....135
11.3 Community Based Environmental Monitoring Program....136

12 Road Closure....137

13 Signage and Restrictions....137

14 Monitoring Plan for the IC Program....138
14.1 Long-term Monitoring Program....140
14.2 Institutional Control Inspection Field Guide....141

15 Conclusion....143

16 References....144

List of Tables

Table 1: Description and Acceptable Criteria - Beaverlodge Performance Indicators 17
Table 2: Coordinates of Institutional Control Boundaries 21
Table 3: Potential of a hazard being released 30
Table 4: Severity/consequence terminology 31
Table 5: Beaverlodge Risk Matrix (BRM) 31
Table 6: Fookes Reservoir Area Properties 35
Table 7: Documentation Log – Fookes Reservoir properties 48
Table 8: Evaluation of Fookes Reservoir Properties 49
Table 9: Remaining Site Aspects – Fookes Reservoir Properties 50
Table 10: Marie Reservoir Area Property Coordinates 52
Table 11: Documentation Log – Marie Reservoir properties 65
Table 12: Evaluation of Marie Reservoir Properties 66
Table 13: Remaining Site Aspects – Marie Reservoir Properties 67
Table 14: Minewater Reservoir Property Coordinates 70
Table 15: Minewater Reservoir Property Boreholes 73
Table 16: Documentation Log – Minewater Reservoir properties 81
Table 17: Evaluation of Minewater Reservoir Properties 82
Table 18: Remaining Site Aspects – Minewater Reservoir Properties 83
Table 19: URA 1 Property Coordinates 85
Table 20: URA 1 Property Borehole Coordinates 89
Table 21: Documentation Log – URA 1 96
Table 22: Evaluation of URA 1 97
Table 23: Remaining Site Aspects – URA 1 Property 98
Table 24: URA 7 Property Coordinates 101
Table 25: URA 7 Property Borehole Coordinates 106
Table 26: URA 7 Property Openings 107
Table 27: Documentation Log – URA 7 111
Table 28: Evaluation of URA 7 112
Table 29: Remaining Site Aspects – URA 7 Property 113
Table 30: BOLGER 1 Property Coordinates 116
Table 31: BOLGER 1 Property Boreholes 119
Table 32: Documentation Log – BOLGER 1 126
Table 33: Evaluation of BOLGER 1 127
Table 34: Remaining Site Aspects – BOLGER 1 Property 128
Table 35: Summary of Properties 132

List of Figures

Figure 1: Outline of Remaining Beaverlodge Property Boundaries and Proposed IC boundaries 7
Figure 2: Beaverlodge Site Area 10
Figure 3: Stages – Beaverlodge Management Framework 14
Figure 4: Performance Objectives and Underlying Indicators 17
Figure 5: Beaverlodge Water Quality – Sampling Stations related to the current properties 28
Figure 6. Beaverlodge Water Quality - Regional Sampling Stations 29
Figure 7. Tailings Management Area Properties and Site Features 34
Figure 8. Incremental Gamma Radiation 1 Hectare Averages: Fookes Reservoir Properties 41
Figure 9: Ra-226 Performance Indicator at TL-3 44
Figure 10: U Performance Indicator at TL-3 45
Figure 11: Se Performance Indicator at TL-3 46
Figure 12: Fookes Reservoir Properties – Inspection Track 47
Figure 13: Incremental Gamma Radiation 1 Hectare Averages: Marie Reservoir Properties 57
Figure 14: Ra-226 Performance Indicator at TL-4 60
Figure 15: U Performance Indicator at TL-4 61
Figure 16: Se Performance Indicator at TL-4 62
Figure 17: Marie Reservoir Properties – Inspection Track 64
Figure 18: Incremental Gamma Radiation 1 Hectare Averages: Minewater Reservoir Properties 72
Figure 19: Ra-226 Performance Indicator at TL-7 76
Figure 20: U Performance Indicator at TL-7 77
Figure 21: Se Performance Indicator at TL-7 78
Figure 22: Minewater Reservoir Properties – Inspection Track 80
Figure 23: URA 1 (MSL 10) Property (Source: Beaverlodge Surface Lease Map) 85
Figure 24: Incremental Gamma Radiation 1 Hectare Averages: URA 1 Property 88
Figure 25: Ra-226 Performance Indicator at AC-14 92
Figure 26: U Performance Indicator at AC-14 93
Figure 27: Se Performance Indicator at AC-14 93
Figure 28: URA 1 – Inspection Track 95
Figure 29: URA 1 – Site Features 100
Figure 30: Mill Facility (Source: Beaverlodge Surface Lease Map) 101
Figure 31: Beaverlodge Mill Source: Plan View Before Decommissioning 1983, Eldorado Nuclear Ltd.) 102
Figure 32: Incremental Gamma Radiation 1 Hectare Averages: URA 7 Property 105
Figure 33: URA 7 – Inspection Track 110
Figure 34: URA 7 - Site Features 115
Figure 35: Bolger 1 (MSL 132) Property (Source: Beaverlodge Surface Lease Map) 116
Figure 36: Incremental Gamma Radiation 1 Hectare Averages: Bolger 1 Property 118
Figure 37: Ra-226 Performance Indicator at AC-6A 122
Figure 38: U Performance Indicator at AC-6A 123
Figure 39: Se Performance Indicator at AC-6A 123
Figure 40: Bolger 1 – Inspection Track 125
Figure 41: Bolger 1 - Site Features 130
Figure 42. Ra-226 Expected Natural Recovery at BL-5 139
Figure 43. U Expected Natural Recovery at BL-5 139
Figure 44. Se Expected Natural Recovery at BL-5 140

Glossary

Definitions of the terms used in this report are as follows:

Term	Definition
Adit (Decline, Portal)	A horizontal or nearly horizontal entrance to an underground mine usually driven into the side of a hill or rock outcrop where local topography allows.
Administrative Controls	Administrative controls are a type of hazard control used to improve safety by putting in place policies, rules and/or restrictions decided to reduce the risk to the public via actions such limiting access and/or allowable activities.
ARD (Acid Rock Drainage)	Base metal, precious metal and uranium mines contain sulphide minerals, either in the ore or the surrounding waste rock. When these sulphide minerals, particularly pyrite and pyrrhotite, are exposed to oxygen and water, a process of conversion of sulphide to sulphate takes place. Water in contact with these oxidizing minerals is made acidic, and in the absence of calcareous materials, such as calcite, the acidic water carries with it toxic metals and elevated levels of dissolved salts. As the reactions proceed, temperature and acidity increase, resulting in an increased rate of reaction. Rainfall and snowmelt flush the toxic solutions from the waste sites into the downstream environment. If acidic drainage is left uncollected and untreated, the drainage can contaminate groundwater and local water courses, damaging the health of plants, wildlife, and fish (MEND, 1992).
Catastrophic Failure	A sudden failure without warning (E.g. crown pillar collapse, dam failure, large scale slope slip [slide], etc.), as opposed to a degradation failure
Closed Site	A site at which all decommissioning, remediation and reclamation measures and transition phase monitoring have been completed to the satisfaction of an institution willing to accept custodial responsibility.
COPC	Constituents of potential concern or contaminants of potential concern.
Crown Pillar	A rock mass of variable geometry that is situated above the uppermost underground workings of a mine and that serves to ensure permanently or temporarily the stability of surface elements and underground workings.
Decommissioning	The activity of disassembling, dismantling, disposal, removal or otherwise addressing all infrastructures associated with a project or site.
Degradation Failure	The failure of an aspect over time due to such things as the effects of time, metal fatigue, incremental erosion, etc. Degradation failures, if left unaddressed, can increase the potential of catastrophic failure.
Disturbed Land	Land that has been disturbed by human activities to the extent that there is a material difference in the physical, chemical or biological characteristics of the disturbed land. Disturbances can either improve or impair future land use options. Cleared land, re-graded land, waste rock piles, land affected by a surface or groundwater contaminant plume, etc. are examples of disturbed lands.
Dorrclone	Facility where the coarse material in mill tailings was separated by cyclones for underground backfill and the finer material pumped to the tailing's disposal area. In the actual operation, the tailings slurry from the mill was pumped to a bank of six hydrocyclone separators. The overflow fines flowed by gravity at approximately 10% solids to Fookes tailings area and the coarse bottom fraction was re-slurried and pumped to a second bank of six hydrocyclone separators. The underflow from the second bank of separators was stored in a backfill tank for later use in the mine.
Engineered Structure	A constructed facility or structure (i.e., building, dyke, overflow channel, shaft cap, etc.) or remnants of such.

Term	Definition
Formerly Regulated Lands	Areas of the Beaverlodge site which formerly hosted activities regulated by the *Atomic Energy Control Act* (and subsequently, *the Nuclear Safety and Control Act*) and therefore require inclusion in the Saskatchewan Institutional Control Registry.
Flowing Artesian	Refers to groundwater that is upwelling above the ground surface due to piezometric levels that exceed the surface elevation of the delta
Guidelines	Recommended, non-mandatory controls that serve as a reference when no applicable standards are in place.
Hazard	A source of potential harm, or a situation with a potential for causing harm, in terms of human injury, damage to health, property, the environment and other things of value; or some combination of these. (Source: Risk Management: Guideline for Decision Makers, CAN/CSA-Q850-97 (Reaffirmed 2009), Canadian Standards Association, 2009)
Institutional Controls	Actions, mechanisms and arrangements implemented to maintain control or knowledge of a closed site after custodial transfer. This control may be active (e.g. by means of monitoring, surveillance, remedial work, fences, etc.) or passive (e.g. land use restrictions, markers, records, etc.). Activities undertaken by the post-transfer custodian can range from the simple act of permanently recording the location of a remediated site; to conducting regular inspections that may or may not include active measurements and the collection of samples for analysis; all the way to maintenance of certain aspects of the property.
Impacted Lands	Areas of the Beaverlodge site identified by the Saskatchewan Ministry of Environment as "formerly impacted lands requiring administrative controls or scheduled inspection of specific aspects" and therefore require inclusion in the Saskatchewan Institutional Control Registry.
Long-term	100 years or more.
Mine Site	A previously active mining area, including all land used in or resulting from the work of extracting minerals from their natural deposits or the secondary recovery of ore from refuse or other storage piles, wastes, or mill tailings by any means or method and all works engines, machinery, plant, buildings, residual material (i.e. mill tailings, spent heap leach material, etc.), waste rock and waste management facilities associated with that activity.
Objectives	Non-statutory limits used to guide decisions. (Example: Environment Canada – "Water quality objectives specify the concentrations of substances permissible for all intended water uses at a *specific location* on a lake, river, or estuary. The objectives are based on the water quality guidelines for the uses at that location, as well as on public input and socio-economic considerations.")
Raise	A vertical or inclined excavation in an underground mine that leads from one level, or drift, to another or from one drift or level to surface (i.e. vent raise).
Reclamation	Actions intended to return the land surface to an equivalent undisturbed condition. Reclaimed land has achieved the desired condition.
Remediation	Action taken to remove/reduce a hazard and improve safety or to remove, isolate or reduce pollution or contaminants from environmental media such as soil, groundwater, sediment, or surface water.
Risk	The chance of injury or loss as defined as a measure of the probability and severity of an adverse effect to health, property, the environment or other things of value. (Source: Risk Management: Guideline for Decision Makers, CAN/CSA-Q850-97 (Reaffirmed 2009), Canadian Standards Association, 2009)
Shaft	A vertical excavation adjacent to an ore body equipped with a hoist. A shaft is generally used when ground conditions, ground water, ventilation or other worker safety conditions warrant or when haulage to surface via truck is not economical.

Term	Definition
Slumping (Sloughing)	Slope (rock) movement that occurs when a coherent mass of loosely consolidated materials or rock layers moves a short distance down a slope typically as a mass and under the force of gravity.
Stakeholder	Any individual, community, group or organisation with an interest in the state of the site or outcome of a remediation programme, either as a result of being affected by it positively or negatively, or by being able to influence the activity in a positive or negative way.
Tailings	Uneconomical materials remaining after passing mined ore through a mill or processing facility for the purpose of extraction of the valuable fraction.
Transition Phase Monitoring	Monitoring conducted once all decommissioning, remediation and reclamation activities are completed to demonstrate that all areas are performing as predicted and to demonstrate that the site is physically and chemically stable.

1 Introduction

1.1 Background

Following the implementation of the Province of Saskatchewan's Institutional Control Program (IC Program), the Beaverlodge Management Framework (the Framework) was developed to provide a clear scope for the management of the decommissioned Beaverlodge properties. The Framework outlines a systematic process for assessing site-specific risks to facilitate the transfer of Beaverlodge properties to the IC Program or, in the absence of historical mining/milling activities, for the properties to be free-released. The Framework was developed cooperatively in 2009 by Cameco Corporation (Cameco) and the Joint Regulatory Group (JRG) consisting of the Canadian Nuclear Safety Commission (CNSC), the Saskatchewan Ministry of Environment (SkMOE), Department of Fisheries and Oceans (DFO) and Environment and Climate Change Canada (ECCC). The Framework was presented to the CNSC Commission members during 2009 re-licensing activities, was accepted by the Commission and is referenced in the Licence Condition Handbook (LCH). In addition to collaboration with the JRG, the Framework has been reviewed with public stakeholders, including the Northern Saskatchewan Environmental Quality Committee, as well as residents and leaders of the Northern Settlement of Uranium City.

In following the Framework, Cameco developed the Beaverlodge Path Forward Report (Path Forward) to establish an agreed upon remediation plan paired with evaluation criteria and the expected timeline for transferring properties into the IC program. The Path Forward confirmed that natural recovery paired with additional site-specific remedial options was the best long-term management scenario for the properties. The remedial options that were selected were considered to be based on good engineering practices, contribute to long-term safety and security and expected to result in localized improvements in water quality. The Path Forward was presented to the CNSC Commission members during 2013 relicensing. The Path Forward was accepted by the Commission and Cameco was issued Cameco a 10-year licence to implement the remedial work and prepare the properties for transfer to the IC program.

The Path Forward included criteria to establish that potential risks have been managed and that the properties would be eligible for transfer to the IC Program. The criteria consisted of the overall performance objectives of "safe, secure and stable/ improving." The CNSC Staff presented further information on the performance objectives and associated performance indicators and regulatory acceptance criteria to the Commission in 2014. To facilitate the release from CNSC licensing and transfer to the IC program, Cameco proposed advancing properties in a staged approach.

In 2009, Cameco successfully transferred 5 properties to the provincial IC Program, following release from decommissioning and reclamation by SkMOE, release from CNSC licensing and acceptance by the Saskatchewan Ministry of Energy and Resources (SkMER). During 2016, discussions were held with the SkMOE and the Ministry of Economy (now SkMER) to establish the expected Beaverlodge IC boundaries. The boundaries developed during those discussions reflect the

expected IC boundaries once all the properties are ready for transfer to IC and are based on areas of historic mining/milling activities requiring long term monitoring or administrative controls to ensure future land use restrictions are maintained, if required. Most recently, in 2019 and 2020, Cameco successfully transferred 19 properties to the provincial IC Program, following release from decommissioning and reclamation by SkMOE, release from CNSC licensing and acceptance by the SkMER. One property and portions of some properties were free-released due to the absence of historical mining/milling activities and lack of any safety or environmental risk and therefore have not required any long-term monitoring or ongoing administrative controls. In 2022, an additional 18 properties were released from CNSC licensing and in 2023 the properties were granted a release from decommissioning and reclamation requirements from SkMOE. It is anticipated that these 18 properties, or portions there of, will be transferred to the IC Program, in Q4 of 2023. This report follows a similar format to the report applications successfully submitted for the previous 43 Beaverlodge properties, which initiated the regulatory review process for Cameco to receive a release from decommissioning and reclamation by SkMOE, release from CNSC licensing and acceptance of the properties to the IC Program or free-release.

1.2 Purpose

In accordance with the Path Forward, following a similar process from previous, successful applications, Cameco is hereby submitting this application for the remaining 27 decommissioned Beaverlodge properties to initiate their transfer to the IC program or to have portions free-released where applicable. These properties include; URA 7, URA 1, BOLGER 1, the Fookes Reservoir Area (GC 3, EXC GC 3, GC 5, GC 1, GORE 1, NW 2, NW 1, LEE 4, GORE 2, LEE 3, EXC LEE 3, LEE 2), the Marie Reservoir Area (EXC ACE 18, EXC ACE 17, ACE 17, ACE 15, EXC ACE 14, GORE, EXC GC 2, GC 4, EXC GC 4) Minewater Reservoir Area (EXC URA 6, ACE 19, URA 6) (**Figure 1**). Cameco understands the CNSC, SkMOE and SkMER, must all agree that the Properties have met all the requirements to be considered for transfer.

Cameco requests that the SkMOE consider this submission as a formal request for "Release from Decommissioning and Reclamation" pursuant to Section 22 of *The Mineral Industry Environmental Protection Regulations (MIEPR), 1996*.

Cameco is also providing this report to SkMER for review, in support of an application for custodial transfer of the properties into the IC Program in accordance with *The Reclaimed Industrial Sites Act*. The report contains an assessment of the properties, which will help to inform a proposed schedule and cost estimate of IC inspections prior to the properties being transferred into the IC Program.

The process for entry to the IC Program that has been followed to date requires a Partial Surrender of Surface Lease (Beaverlodge Surface Lease Agreement, 2006) from the Ministry of Environment - Lands Branch, before SkMER will accept the Properties into the IC Program. The properties subject to this report are the last decommissioned Beaverlodge properties to be proposed for the IC Program. Therefore, once all of the decommissioned Beaverlodge properties are released from CNSC licensing, termination of the Surface Lease will be requested from the Ministry of Environment - Lands Branch.

If a specific property is licensed pursuant to the federal NSCA, the CNSC must agree, in writing, to grant an exemption or release from the obligation to hold a licence under the NSCA in order for an individual property to be accepted into the provincial IC Program. Activities on the Beaverlodge site are currently managed under a CNSC Waste Facility Operating License (WFOL-W5-2120.0/2025) issued pursuant to the NSCA which expires on May 31, 2025. By way of this submission, Cameco is providing the information required to support a decision by the CNSC to release the properties from CNSC licensing.

This report addresses the applicable aspects of CNSC REGDOC-2.11.2, *Decommissioning,* and provides a brief discussion of the historical use the properties, a discussion of past decommissioning and reclamation activities and a description of the current condition of the properties. The document also assesses the properties against the performance objectives and associated performance indicators, provides a summary of remaining (if any) hazards/liabilities associated with each and identifies the anticipated institutional control requirements. For ease of discussion, the Tailings Management Area (TMA) properties are discussed herein as three distinct areas rather than individual properties.

The report also provides a document log for each individual property or area.

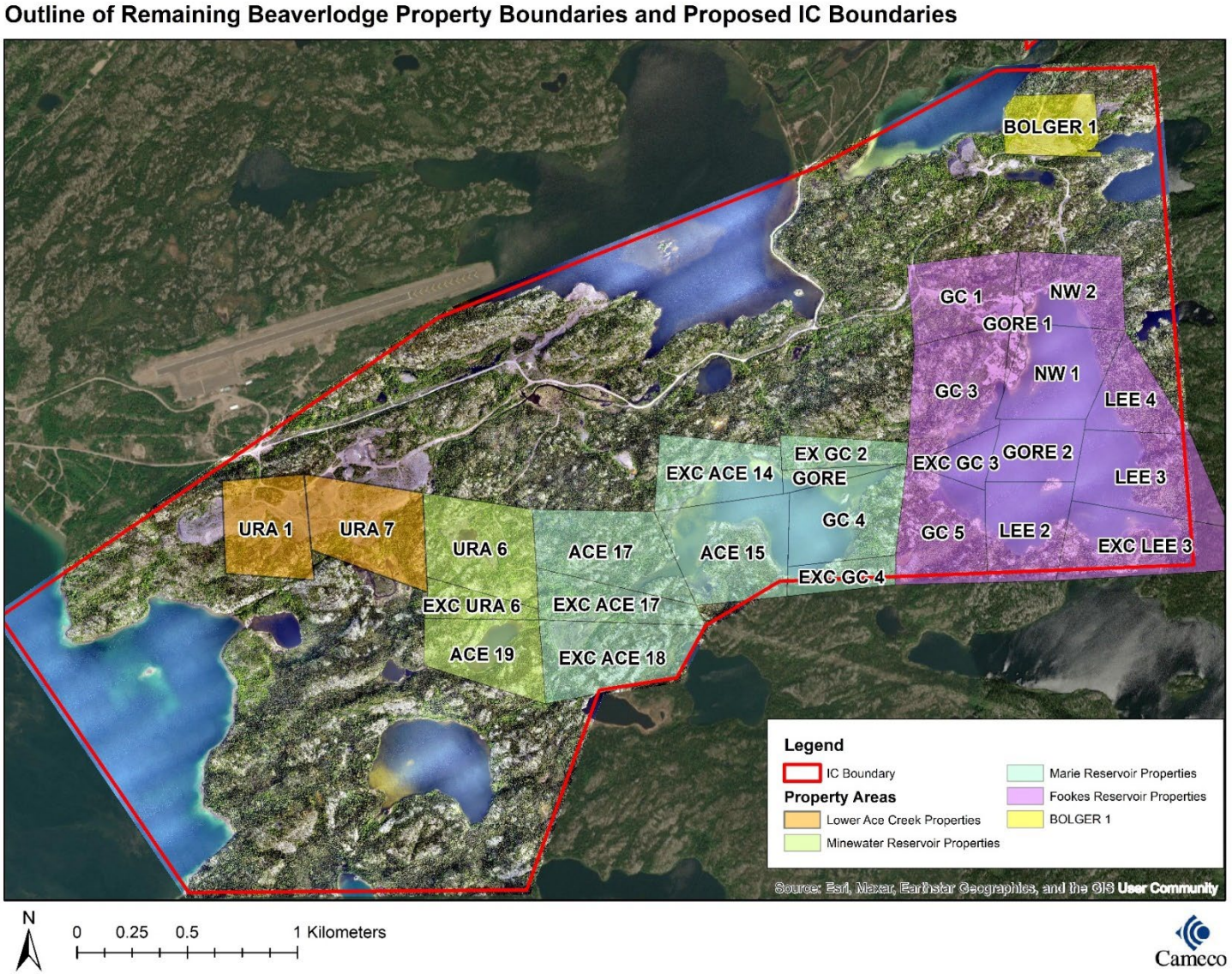

Figure 1: Outline of Remaining Beaverlodge Property Boundaries and Proposed IC boundaries

1.3 Schedule

All physical work to prepare the properties for transfer to the IC Program has been completed. The current WFOL-W5-2120.0/2025 is set to expire in May 2025 and the Beaverlodge Surface Lease Agreement expires in December 2026. The decommissioned Beaverlodge Properties have met the established criteria to facilitate a release from CNSC licensing; Release from Decommissioning and Reclamation from SkMOE; and transfer to the ICP, managed by SkMER. The plan is to complete all document preparation, public engagement, and regulatory processes to support the final release of the decommissioned Beaverlodge properties prior to May 2025,to facilitate transfer to the IC program.

2 Submitting Organization

This document is submitted by:

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Officers of Cameco Corporation are as follows:

President & Chief Executive Officer	- T. S. Gitzel
Senior Vice-President & Chief Financial Officer	- G. Isaac
Senior Vice-President & Chief Operating Officer	- B. Reilly
Senior Vice-President & Chief Corporate Officer	- A. Wong
Senior Vice-President, Chief Legal Officer & Corporate Secretary	- S. Quinn

The Board of Directors of Cameco Corporation as of October 31, 2023 is as follows:

C. Gignac	L. van Leeuwen-Atkins
D. Camus	D. Kayne
T. Gitzel	K. Jackson
J. Gowans	D. Minière
T. Cook-Searson	D. Deranger

Management (monitoring and maintenance) of the decommissioned Beaverlodge properties is the responsibility of Cameco, while the Government of Canada, through Canada Eldor Inc. (CEI) retains responsibility for the financial liabilities associated with the properties. Including the provision of funds to finance the long-term monitoring program to be implemented under the IC Program.

3 Beaverlodge Site History

3.1 Eldorado Mining and Refining Limited

Uranium bearing mineralization was first discovered in the Beaverlodge area of northern Saskatchewan in 1934 (**Figure 2**). Since there was little demand for uranium at that time, further prospecting and development in the region was delayed for almost ten years until 1944 when Eldorado Mining and Refining Ltd. (Eldorado), a crown corporation owned by the Government of Canada, commenced detailed exploration in the area of Fishhook Bay on the north shore of Lake Athabasca. Between 1944 and 1948 Eldorado continued to explore the area around Beaverlodge Lake, discovering the Martin Lake and Ace Zones in 1946. In 1947, a prospecting incline shaft was developed to explore the Ace ore body and the Dubyna claims were staked.

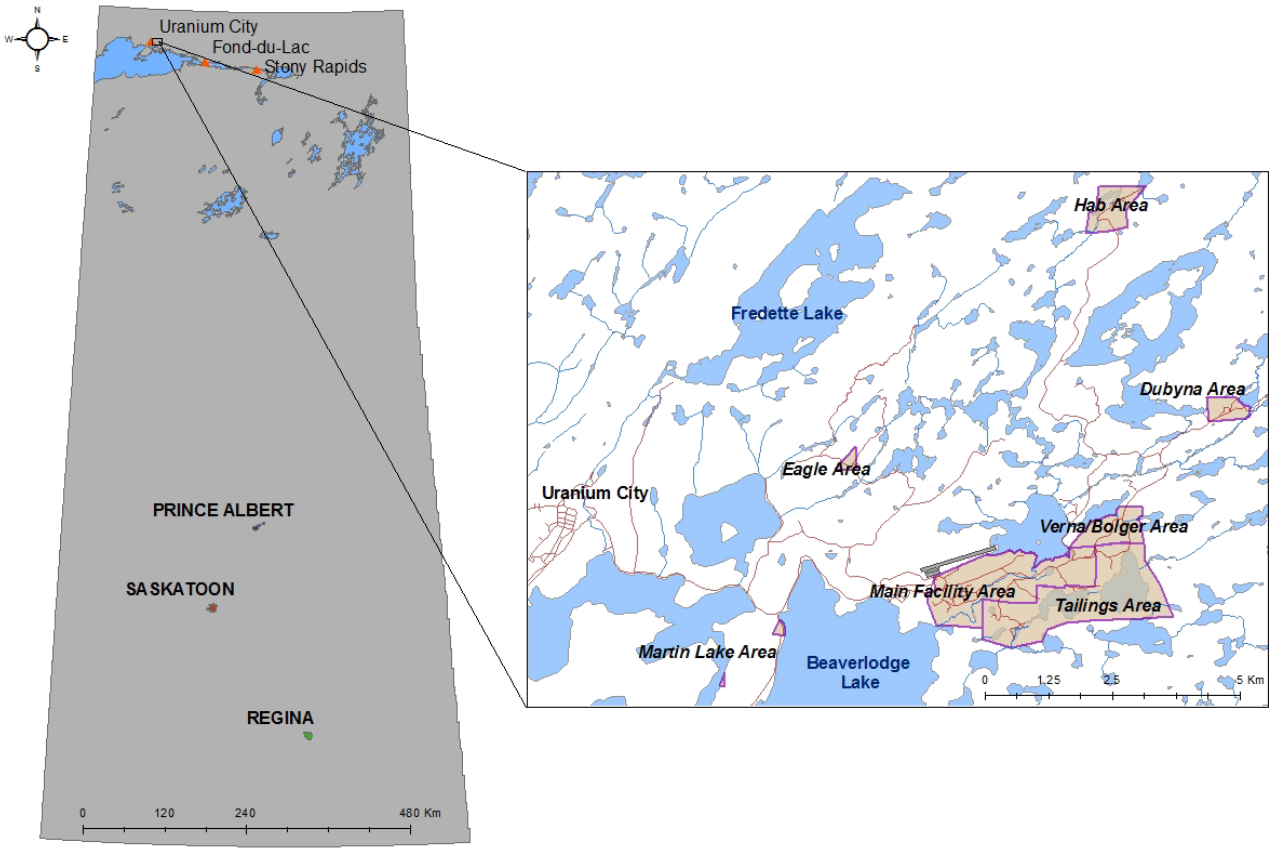


Figure 2: Beaverlodge Site Area

Exploration and initial development of a number of separate ore bodies continued until 1951 when Eldorado Mining and Refining Ltd. developed the Fay shaft and headframe, and the following year laid the foundations for a 450 tonnes/day (t/day) carbonate leach mill. Carbonate leach was selected over an acid leach process due to the high carbonate content of the ore. The mill started production in 1953 and expanded to 680 t/day in 1954, to 1800 t/day in 1956 and operated until 1982. Over its

operating history, Eldorado Mining and Refining Limited was also known as Eldorado Nuclear Limited and Eldorado Resources Limited.

During the years of mining activity at the Beaverlodge site, the primary focus was on an area north and east of Beaverlodge Lake where the Ace, Fay and Verna shafts were sunk with production from these areas continuing until 1982. Over the entire 30-year production period (1952 – 1982) the majority of the ore used to feed the mill came from these areas, however a number of satellite mines, primarily in the Ace Creek watershed and the Melville Lake/Beaverlodge Lake watershed were also developed and operated for shorter periods of time. Placement of mill tailings during the mill operating period was underground (40%) and into small waterbodies (60%) within the Fulton Creek watershed.

Although the Atomic Energy Control Board (the predecessor to the current CNSC) licensed the Beaverlodge activities, environmental protection legislation and regulation did not exist either federally or provincially and therefore was not a consideration during the early operating period. It was not until the mid-1970's that effluent treatment processes were initiated at the Beaverlodge site in response to discussions with provincial and federal regulatory authorities.

At the request of the Atomic Energy Control Board (AECB) a conceptual decommissioning plan was submitted in June 1981. On December 3, 1981, Eldorado Nuclear Limited (formerly Eldorado Mining and Refining Ltd.) announced that its operation at Beaverlodge would be shutdown.

Mining operations at the Beaverlodge site ceased on June 25, 1982 and the mill discontinued processing ores in mid-August 1982. At that time, Eldorado initiated site decommissioning, following a formally approved plan. The decommissioning and reclamation work was completed in 1985 and transition phase monitoring was initiated at that time. The transition phase monitoring continues today.

The original decommissioning and reclamation documents were presented in six documents to the regulatory agencies (consisting of the AECB, Environment Canada, Labour Canada, Environment Saskatchewan and Labour Saskatchewan) between June 1982 and February 1987. These are:

1. *Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site*, June 1982, Eldorado Nuclear Limited

2. *Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site, Report No. 2 Operating History and Environmental Conditions*, February 1983, Eldorado Resources Limited

3. *Beaverlodge Tailings and Sludges Close-Out Engineering Feasibility Studies*, February 1983, Eldorado Resources Limited

4. *Radiological and Environmental Assessment of Close-out Options*, April 1983, Eldorado Resources Limited

5. *Plan for Close-out of the Beaverlodge Site, Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site*, August 1983, Eldorado Nuclear Limited

6. *Departure with Dignity, Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site,* February 1987, Eldorado

The Beaverlodge operation was the first uranium mining and milling operation in Canada to be subject to a formal decommissioning and reclamation strategy. As such, each phase of the shutdown, decommissioning and reclamation was subject to detailed discussion between Eldorado and the regulatory agencies. At the time of decommissioning the regulatory agencies formed the Joint Review Committee (JRC) (consisting of the AECB, Environment Canada, Labour Canada, Environment Saskatchewan and Labour Saskatchewan) and throughout the decommissioning and reclamation project, regular progress meetings were held and chaired by the AECB as the lead agency (Eldorado 1987). The JRC established close-out criteria, were kept informed of all activities and conducted regular on-site inspection and monitoring to ensure that the decommissioning and reclamation activities were undertaken according to the plan and in a safe manner. Joint approvals were issued on behalf of the inter-agency committee with the primary documents being:

- *Eldorado Nuclear Ltd., Eldorado, Saskatchewan, Decommissioning and Close-Out Approval AECB-DCOA-130-0*.

- *AECB AECB-DA-142-0, Eldorado Resources Limited Decommissioning Approval*, Atomic Energy Control Board, November 1983

3.2 Cameco Corporation

On February 22, 1988, the Government of Canada and the Province of Saskatchewan publicly announced their intention to establish an integrated uranium company as the initial step in privatizing their respective uranium investments.

On October 5, 1988, Cameco Corporation - a Canadian Mining and Energy Corporation was created from the merger of the assets of the Saskatchewan Mining Development Corporation (a crown corporation owned by the Province of Saskatchewan) and Eldorado Resources Limited (the federal crown corporation). Following the merger, management (monitoring and maintenance) of the decommissioned Beaverlodge properties became the responsibility of Cameco Corporation - a Canadian Mining and Energy Corporation, while the Government of Canada, CEI retained responsibility for the financial liabilities associated with the properties. Cameco - a Canadian Mining and Energy Corporation was issued *AECB-MFDL-340-0 Cameco, Beaverlodge/Dubyna Saskatchewan Decommissioning License* by the Atomic Energy Control Board in October 1988.

In 1990, Cameco Corporation - a Canadian Mining and Energy Corporation’s name was changed to simply Cameco Corporation (Cameco) and currently shares of Cameco are traded on both the Toronto and New York stock exchanges.

The management of the Beaverlodge monitoring program and any special projects associated with the properties is the responsibility of the Compliance & Licensing – Safety, Health, Environment and Quality (SHEQ) Department, Cameco.

3.3 Local Environment

The Beaverlodge site is located within the Taiga Shield ecoregion which is the northernmost ecozone of the province. The area is underlain by the crystalline rocks of the Precambrian shield, with poor soil development, covered in areas by glacial drift. The poor drainage and rolling post-glacial topography result in numerous lakes. The area's cold winters and low precipitation limit the vegetation to lichen woodlands on higher elevations, and bogs in the lowlands which contribute to a low number of animal species—the lowest of any ecozone in the province (U of Regina 2015).

Chapter 2 of *Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site, Report No. 2 Operating History and Environmental Conditions* (Eldorado 1983) provides a more detailed discussion of the local terrestrial and aquatic environments in the Beaverlodge area.

While Beaverlodge Lake is the receiving environment for water exiting the Beaverlodge decommissioned sites, it is also the receiving environment for discharges from the former Lorado Uranium Mining Ltd. mill site and tailings area, and nine other non-Eldorado abandoned uranium mine sites within the Beaverlodge Lake watershed.

4 Development of the Beaverlodge Performance Objectives

4.1 Beaverlodge Management Framework

In response to the implementation of the IC Program, the Beaverlodge Management Framework (Cameco 2009) was developed cooperatively between Cameco and the JRG. The Framework provides a clear scope for the management of the decommissioned Beaverlodge properties and a systematic process for assessing potential residual site-specific risks to allow decisions to be made regarding the transfer of Beaverlodge properties to the IC Program. The accepted Framework has been reviewed by public stakeholders, including the Northern Saskatchewan Environmental Quality Committee, as well as residents and leaders of the Uranium City community. Five general stages (**Figure 3**) are applied to each property using the Framework and include the following:

- Establish a comprehensive foundation of information upon which residual risks can be assessed.
- Assess the residual risk posed by the properties.
- If necessary, develop and assess reasonable remedial options that could mitigate residual risk on or immediately downstream the properties.
- Implement selected remedial option(s) and monitor results.
- If implemented options are successful in achieving the expected benefit or if it is determined that nothing more could reasonably be done to mitigate the residual risk(s) beyond natural recovery, then an application will be made to transfer the property to the IC Program for long-term monitoring.

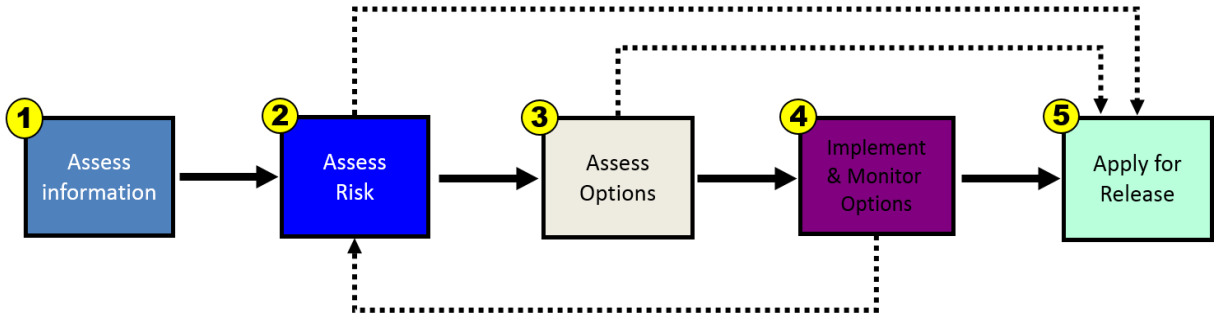


Figure 3: Stages – Beaverlodge Management Framework

In progressing through the Framework, Cameco has gathered extensive information regarding environmental conditions and human activities on the decommissioned properties through a combination of routine monitoring and special investigative studies. An example of a special investigative study conducted is the Country Food Study initiated in May 2010. This was a two-year study with a primary objective of determining whether there were any potential human health risks

associated with the consumption of country foods gathered in the Uranium City area by local residents. The study involved interviewing community members as well as analyzing samples of wildlife and vegetation voluntarily provided by members of the community (CanNorth and SENES 2012). The study concluded that traditional harvesting of country foods does not present health risks to residents of Uranium City. Results from routine monitoring and special investigative studies like the Country Food Study, combined with historical information, was used to develop the Beaverlodge Quantitative Site Model (QSM; SENES 2012a; 2012b).

The QSM was a tool that allowed for assessment of ecological and human health risk from a baseline water and sediment quality perspective, which was established based on information gathered in the first phase of the Framework. In addition, the QSM was developed with a feature that allowed simulation of potential remedial activities and comparison of simulated results to the baseline option.

Once the QSM was developed, a Remedial Options Workshop was conducted in 2012, which included participants from Uranium City, including elders, youth and local leadership, as well as representatives of the Northern Saskatchewan Environmental Quality Committee (Athabasca Sub-committee) representing six Athabasca communities. Also, in attendance at this workshop were representatives from the JRG, Cameco, and a variety of third-party experts. This workshop presented various remedial options, their implementation costs, as well as their expected environmental benefits as evaluated in the QSM. Workshop results informed the assessment of potential remedial options and were instrumental in development of the Beaverlodge Path Forward Report (Cameco 2012).

4.2 Beaverlodge Path Forward Report

Following the development of the Framework and informed by the Beaverlodge remedial options workshop and the Path Forward Report was developed. The Path Forward Report provides a checklist and schedule of additional remedial activities to be implemented on the decommissioned Beaverlodge properties over the current 10-year licence period to address residual risk on the properties and prepare them for release from CNSC licensing and transfer to the IC program. In addition, the Path Forward Report also describes the performance objectives by which to assess the effectiveness of the implemented remedial activities. During the development of the Path Forward Report, all stakeholder feedback received during the remedial options workshop was considered.

Once the remedial activities have been implemented, and the properties are shown to meet the site performance objectives set out in the Path Forward Report, an application can then be made for a Release from Decommissioning and Reclamation from SkMOE, release from CNSC licensing and, where applicable, transfer to the Province of Saskatchewan’s IC Program for long-term monitoring and stewardship.

The Framework and the Path Forward Report were presented to the CNSC during the Beaverlodge re-licensing hearing in 2013 and help form the licensing basis of the 10-year licence granted by the Commission.

4.2.1 Performance Objectives and Indicators

Criteria to determine the eligibility for release from decommissioning and reclamation, release from CNSC licensing and transfer to IC were presented to the CNSC Commission and SkMOE with the intent that each of the properties associated with the decommissioned Beaverlodge properties will be assessed through the Framework. The performance objectives for the decommissioned Beaverlodge site have been defined as "safe, secure, and stable/improving".

> Safe – The site is safe for unrestricted public access. This objective is to ensure that the long-term safety is maintained.
>
> Secure – There must be confidence that long term risks to public health and safety have been assessed by qualified person and are acceptable.
>
> Stable/Improving – Environmental conditions (e.g. water quality) on and downstream of the decommissioned properties are stable and continue to naturally recover as predicted.

To determine if a property is meeting the performance objectives, site specific performance indicators were established (**Figure 4**). **Table 1** provides an overview of the performance indicators as presented to the Commission by CNSC Staff in 2014 meeting (CNSC 2014). The applicable indicators vary depending on the nature of the property, but generally include ensuring that: risks associated with residual gamma radiation and crown pillars are acceptable; mine openings to surface are closed and secure; boreholes (if present) are plugged; and, the site is free from historical mining debris. The stable/improving objective is also related to these performance indicators but is more relevant to monitoring water quality and comparing to predicted recovery. In order to verify that conditions on and downstream of the properties are stable/improving, Cameco has continued to monitor the progress of natural recovery and the expected localized improvements from the additional remedial measures implemented at the properties. Meeting the performance objectives will ensure that residual human health and ecological risks are managed to acceptable levels to allow for a release from licensing.

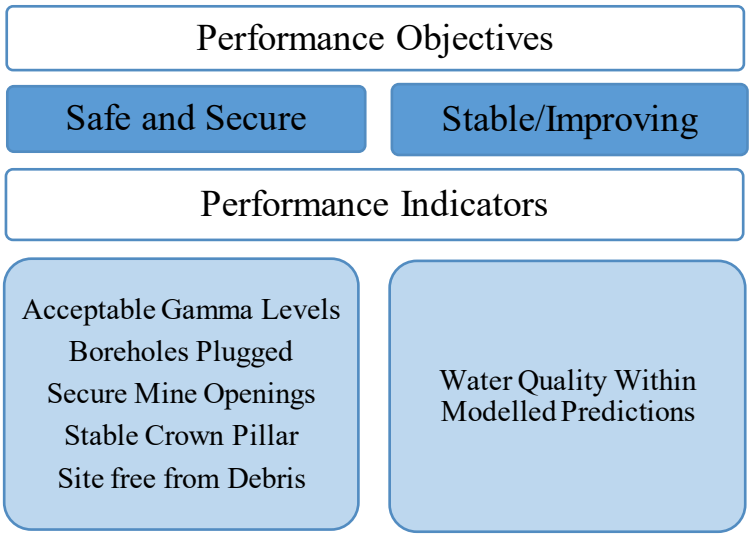


Figure 4: Performance Objectives and Underlying Indicators

Table 1: Description and Acceptable Criteria - Beaverlodge Performance Indicators

Performance Indicators	Description	Acceptance Criteria
Acceptable Gamma Levels	Cameco will complete a site-wide gamma survey that will indicate where additional material may need to be applied to cover existing waste rock or tailings. Following the application of the cover material, a final survey will be completed of the remediated areas verifying that the cover was adequate.	Reasonable use scenario demonstrating gamma levels at the site are acceptable.
Boreholes Plugged	Cameco will plug all identified boreholes on the site to prevent groundwater outflow to the surface.	All boreholes have been sealed.
Stable Mine Openings*	The current concrete caps on the vertical mine openings will be replaced with new engineered caps with established designs to improve the long-term safety of the site, where applicable.	Mine openings have been secured and signed off by a qualified person, where applicable*
Stable Crown Pillar	Based on the surface subsidence in the Lower Ace Creek area, a crown pillar assessment will be completed for the four areas that have mine workings close to surface, specifically Hab, Dubyna, Bolger/Verna, and Lower Ace Creek.	Crown pillar assessed, remediated (if required), and signed off by a qualified person.
Site Free From Debris	Inspection and removal of any residual debris will be completed prior to exempting the properties from CNSC licensing and accepting them into the provincial IC Program.	Site free of former mining debris at the time of transfer to IC Program.
Water Quality Within Modelled Predictions	Trends established from past and future water monitoring will be compared to modelled predictions to verify: 1. That remedial options expected to result in localized improvements are having the desired effects; and 2. That natural recovery on and downstream of the decommissioned properties is continuing as predicted.	Water quality data is stable/improving.

*Note: The performance indicator identified above as “Stable Mine Openings” was originally labelled as “Stable Caps on Vertical Mine Openings”. The scope and acceptable criteria for this performance indicator was expanded to include all mine openings.

5 Institutional Control

5.1 Saskatchewan Institutional Control Registry and Funds

A site cannot be accepted into the Saskatchewan IC Program until remediation activities have taken place and regulatory authorities have issued a release. In Saskatchewan, the responsible custodian under the IC Program is the ministry or ministries assigned responsibility for implementing and managing the program. The legislative authority to implement and enforce the IC Program is the *Reclaimed Industrial Sites Act* and the *Reclaimed Industrial Sites Regulations*. To date, SkMER is the provincial ministry that has been assigned the responsibility for managing the IC Program.

The program consists of two primary components, the Institutional Control Registry and the Institutional Control Funds. The registry maintains a formal list of the transferred properties and manages the funds provided for any required monitoring and maintenance work. The funds, which are provided at the time of transfer by the applicant pay for long term monitoring and maintenance of individual properties (if required) as well as any unforeseen events. Once accepted to the IC Program monitoring and maintenance will continue at an agreed upon frequency to ensure they continue to meet the performance objectives of safe, secure and stable/improving. Copies of the inspection reports will be available to interested members of the public.

The Saskatchewan IC Program addresses all aspects of conventional closed mines as well as the uranium-specific issues of radioactive waste management, including those defined in the articles of the International Atomic Energy Agency's (IAEA) Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, all applicable provincial acts and regulations, and the NSCA. The program includes a formal, publicly accessible registry and document repository.

The Province of Saskatchewan's *The Reclaimed Industrial Sites Act* and its Regulations require provision of a fund sufficient to pay for the long-term monitoring and maintenance of the site. In addition, depending on whether any engineered structures or tailings remain on the site, an additional contribution of between 10 - 20% of the monitoring and maintenance amount is made to an Unforeseen Events Fund. The IC program also requires that a financial assurance in the amount of the maximum potential failure event be carried until such time as the Unforeseen Events Fund builds to a level that the Province of Saskatchewan is comfortable that there is sufficient money in the fund to cover any future unforeseen event.

As properties are transferred to the IC Program, Canada Eldor Inc. (CEI) provides the required funds to the Province of Saskatchewan to meet the Monitoring and Maintenance requirements as well as the Unforeseen Events Fund.

5.2 Maximum Potential Failure Event

The IC Program requires that a site holder post a financial assurance in the amount sufficient to cover the cost of the remediation of the maximum potential failure event. A financial assurance for the maximum potential failure event has not been required for Beaverlodge properties transferred to the IC Program as the financial liabilities associated with the management of the Beaverlodge properties are held by the Government of Canada. The financial liabilities are managed by Canada Eldor Inc. (CEI), a wholly owned subsidiary of the Canada Development Investment Corporation (CDEV) that reports to the federal Minister of Finance.

As such, the Ministry of Finance prepared the following statement, which states that no detailed maximum potential failure event calculations are required for the Beaverlodge properties,

> *"Canada Eldor Inc. is an agent of the Crown in right of Canada for all purposes. It follows that any undischarged obligations and liabilities of Canada Eldor Inc. are the obligations and liabilities of the Crown in right of Canada. That will include Canada Eldor Inc.'s obligations and liabilities to decommission the Beaverlodge Site and the expenses associated with possession, management and control of nuclear substances at that site.*
>
> *As the obligations and liabilities associated with this site have been accepted by the Crown, there is no need to maintain a financial assurance for the maximum potential failure event for these properties to cover any future unforeseen event"* (Cameco 2005).

5.3 Institutional Control Boundaries

During the operation of the former Eldorado Beaverlodge mines and milling facilities, the company retained formal tenure on 70 separate properties. To date, 43 of the properties have received a *Release from Decommissioning and Reclamation* from the SkMOE and been exempted/released from CNSC licensing. Of the 43 properties, 24 properties (or portions of them) have been transferred to the Saskatchewan IC Registry, while one property has been free-released in its entirety, while the other 18 properties are expected to be transferred in Q4 of 2023.

During 2016, discussions were held with the SkMOE and the Ministry of Economy (now SkMER) to establish the expected Beaverlodge Institutional Control boundaries. The boundaries developed during those discussions reflect the expected IC boundaries once all the properties are ready for transfer to IC and are based on areas of historic mining/milling activities requiring long term monitoring or administrative controls to ensure future land use restrictions are maintained. These areas have been outlined in red in Figure 1.

During active operations many of the Beaverlodge properties within these boundaries were retained to host the physical activities associated with mining, milling and waste management, many others were retained to secure access to individual sites, to host transmission and communications corridors, or to secure surface tenure over areas of underground mining. As a result, the post-closure condition of individual properties varies, as does the need for long term institutional controls.

The following provides a definition of the post-closure land status classifications for the former Eldorado Beaverlodge properties.

- *Disturbed Lands Within Current Surface Lease Boundary* - Areas which formerly hosted activities regulated by the Atomic Energy Control Act (and subsequently, the Nuclear Safety Control Act (NSCA) and located within the current surface lease boundaries, and therefore require inclusion in the Saskatchewan IC Registry. As these locations hosted licenced activities on or below surface, they have been determined to require either inspections or ongoing administrative controls to manage future development.

- *Disturbed Lands Outside of Surface Lease Boundary* - Areas identified by the SkMOE as off the current surface lease that will require administrative controls or scheduled inspection of specific aspects and therefore require inclusion in the Saskatchewan IC Registry. These areas include an approximately 50m buffer beyond the surface projected extent of the underground workings, as well as the area of Greer Lake downstream of the Tailings Management Area (TMA).

- *Free Release* - The Province of Saskatchewan identified some areas of the properties where management under the IC Program is unwarranted. These portions of Beaverlodge site are typically undisturbed land, or between mining areas, and did not host any licensed activities. As such there is no residual risk to be managed, nor any site features that will require long term monitoring, maintenance or ongoing administrative controls to manage future development. These areas are identified on Figure 1 as the areas that were within the original surface lease boundaries but lie outside the IC Boundary, outlined in red.

Table 2 provides the coordinates of the proposed IC boundaries as applicable to the current request (also see **Figure 1**).

Table 2: Coordinates of Institutional Control Boundaries

Area	UTM WGS84 Zone 12	
	X Coordinate (East)	**Y Coordinate (North)**
Main Site	646274	6606475
	646455	6604217
	644575	6604142
	644238	6603941
	644108	6603705
	643756	6603648
	643426	6602741
	641891	6602729
	641035	6603981
	643027	6605340
	644751	6606024
	645562	6606460

6 Site Wide Conditions

As discussed previously, Cameco, in cooperation with community members and the JRG, developed the Beaverlodge Management Framework to facilitate assessment of the Beaverlodge properties following a clear and transparent methodology to establish that the properties are safe, secure and stable/ improving.

6.1 Site Inspections

Several targeted and routine inspections have been completed on the decommissioned properties in preparation for their transfer to IC:

Geotechnical Inspections:

Regular geotechnical inspections are conducted at the Fookes Reservoir Delta; the two outlet spillways at Fookes and Marie Reservoirs; the Marie Reservoir Delta; Ace Creek Catchment Area III; the Ace Stope Area; the Hab crown pillar area; the Dubyna crown pillar area; and the Bolger Pit area, including the Bolger Flow Path from the Zora Creek Channel to the Verna Lake Inlet, in order to assess their condition and to confirm that each is performing as expected.

Third party inspections of the Fookes Reservoir Delta and the outlet spillways at the Fookes and Marie Reservoirs were undertaken by SRK Consulting (Canada) Inc. (SRK) in June 2004 (SRK 2005a), August 2007 (SRK 2008), May 2010 (SRK 2010a), June 2015 (SRK 2015a), and September 2020 (SRK 2021). SRK previously undertook an inspection of the Marie Reservoir Delta and the catchment areas around Ace Creek in 2004 (SRK 2005b), June 2015 (SRK 2015a) as well as September 2020 (SRK 2021). Third party inspections of the crown pillars also occurred in 2015 (SRK 2016) and September 2020 (SRK 2021) and the Bolger Pit area was inspected by SRK in each of the two years following construction of the Flow Path (SRK 2018, SRK 2019) as well as in September 2020 (SRK 2021). In the 2020 Geotechnical Report SRK concluded that these sites are stable and expected to remain so in the future, and conditions are appropriate for final closure and transfer to IC.

In addition to third party inspections, Cameco has conducted annual inspections of Fookes Reservoir Delta, the two outlet spillways at Fookes and Marie Reservoirs, the crown pillar areas, and the Bolger Pit area since 2016. These inspections have been guided by a Geotechnical Inspection Checklist developed by Cameco and SRK and are appended to annual reports. All geotechnical inspections conducted have been submitted and accepted by regulators.

***Exploration Borehole Surveys*:** From 2009 to 2011, several borehole investigations were conducted on the Beaverlodge properties. The intent of the investigations was to record the

location and condition of boreholes on and near the Beaverlodge properties and identify all holes with the potential to exhibit artesian conditions in which groundwater associated with flooded underground workings is reporting to the surface.

As part of the investigations, a review of existing historical exploration drill records was performed followed by detailed ground surveys to locate and provide coordinates for all flowing and non-flowing drill holes and all surface seeps within the study area. Drill holes were characterized in terms of location, condition, and presence/absence of surface discharges.

Following the original search for boreholes, additional boreholes have been discovered during numerous ground inspections of the properties including a 2014 surficial gamma survey, a 2015 to 2017 debris clean-up campaign as well as multiple JRG inspections. All boreholes located have been sealed according to accepted methods (Cameco 2017), with the location and condition recorded in a borehole log appended to each Beaverlodge annual report.

***Surficial Gamma Survey*:** In 2014, SENES Consultants and Cameco developed the Beaverlodge gamma radiation survey plan in consultation with the CNSC and SkMOE. The main purpose of the gamma radiation survey was to gather sufficient data to complete a risk assessment on properties that did not meet the criteria described in the Guidelines for Northern Mine Decommissioning and Reclamation The survey included accessible areas disturbed by mining and milling infrastructure, accessible areas of known tailings spills, access roads as well as appropriate background reference areas.

The study was conducted using both walking surveys and all-terrain vehicle surveys depending on terrain and vegetation cover. As part of the survey, photos of remnant debris were also taken whenever encountered. These photos were used to help inform the final site inspections and debris cleanup process. The surficial gamma survey was submitted and accepted by regulators.

Following the completion of the gamma survey in 2014, if an area was subsequently disturbed for any reason (additional cover material added, excavation related to exposure of mine openings, etc), the area was re-scanned to confirm the original readings and the new gamma data was incorporated into the final gamma assessment provided in this document.

***Site Visual Surveys*:** From 2015 through 2017, Kingsmere Resources Services Inc. was retained to conduct visual inspections of each of the decommissioned Beaverlodge properties, including those which are the subject of this report. The inspections were conducted by walking transects over the entire property unless safety considerations, surface features, lack of previous land use or significant vegetation prohibited access to a specific area. All inspections were tracked using individual handheld Garmin Model GPSmap 62S or 64S.

During the inspections, debris was cached for later retrieval and transport off the property for disposal. If debris was too large or heavy to be safely removed by two people, it was "marked" (Waypoint) on the hand-held GPS and flagging tape secured in a visually prominent position to allow easy location of the material during the clean-up activities.

Members of the JRG have conducted follow-up inspections of each of the properties to confirm the property meets the relevant performance indicators. During these final inspections the location of any additional debris identified is recorded as a waypoint and collected for disposal.

***Regulatory Inspections*:** The performance of the remediated areas of the Beaverlodge site is assessed through routine inspections conducted by Cameco personnel, third party consultants and/or the JRG) The JRG is currently comprised of representatives from SkMOE and the CNSC.

The Saskatchewan Ministry of Labour Relations and Workplace Safety (LRWS) Mines Unit, Fisheries and Oceans Canada and Environment and Climate Change Canada each provide expert technical support to the JRG lead agencies as required. The JRG inspections are conducted to ensure that conditions on the properties do not impact the health and safety of people, the continued protection of the environment, and that the requirements of the license and Surface Lease Agreement continue to be met. The SkMOE also participates in regulatory inspections. As the agency responsible for management of the IC program, their participation is vital in ensuring the properties meet the requirements for acceptance to the IC program and there is an understanding of the existing condition of the properties and the future monitoring requirements.

The objective of the most recent inspections has been to conduct a general assessment of the Beaverlodge site, while focusing on the properties scheduled for transfer to the IC Program and identifying any remaining issues prior to transferring the selected properties. In addition, the inspection was completed to verify compliance with Cameco's approved licensing documentation, the NSCA and associated Regulations; while ensuring the properties remained safe, secure and stable/improving.

6.2 Assessments

In order to demonstrate that the decommissioned properties that are the subject of this request are eligible for a *Release from Decommissioning and Reclamation*, release from CNSC licensing and transfer to the IC Program, Cameco undertook several studies to assess the properties relative to the performance indicators. These assessments consist of:

***Waste Rock Stability Assessment*:** In 2010, SRK was retained by Cameco to conduct a third-party assessment of waste rock slope stability at the Beaverlodge properties. The assessment included the waste rock piles at the Hab, Verna and Lower Ace Creek areas and concluded

that the slopes were stable with little risk of failure (SRK 2010b). This report has been submitted and accepted by regulators.

Pit Wall Slope Stability Assessment: In 2010, SRK was retained by Cameco to conduct a third-party assessment of the pit wall stability at the Beaverlodge properties. The assessment included the pit wall slopes associated with the Hab, Dubyna and Bolger open pits. The main conclusions arising from this evaluation are that slope instability at the Hab, Dubyna and Bolger pits is not expected, and the risk of rockfall at each of these pits is limited (SRK 2010c). This report has been submitted and accepted by regulators.

Utility Corridor Assessment: In 2015 during the visual site surveys, utility corridors that contained historic power line infrastructure were located on the ACE 5 property. Additional investigations revealed that historic infrastructure was located on and between several of the properties. In response, Cameco commissioned Kingsmere Resource Services Inc. to complete an assessment of the extent of the infrastructure remaining as well as to provide an assessment of potential remediation options. Subsequently, power poles were cut into smaller sections and laid on the ground to facilitate natural breakdown. All remaining electrical and communication infrastructure were removed and disposed of in the Lower Fay Pit as approved by SkMOE.

***Country Foods Assessment*:** The main objective of this study was to collect information regarding locally harvested foods typically consumed by Uranium City residents and assess the potential associated risk. Information from the lab analysis of the collected plant and animal specimens was used to conduct a human health risk evaluation for the Beaverlodge area. The final conclusion of the study was d that traditional harvesting and consumption of country foods does not present health risks to the residents of Uranium City, provided the posted healthy fish consumption advisories are followed where applicable (CanNorth and SENES 2012). This report has been submitted and accepted by regulators.

***Quantitative Site Model*:** The QSM was developed for Cameco by SENES Consultants as a tool to predict changes in water and sediment quality and assess the potential ecological and human health risks associated with the decommissioned Beaverlodge properties. An important feature of the QSM was the model's ability to simulate potential remedial options and predict the expected benefit of their implementation. In general, the QSM confirmed natural recovery, and provided model predictions for comparison to future monitoring results to verify that the associated lakes continue to have a stable/improving trend in the long term (SENES 2012a; 2012b). This report has been submitted and accepted by regulators.

Land Use Assessment: In December 2014, a door-to-door survey was conducted in Uranium City to gather information from the residents of the community regarding their use of the areas around Uranium City in order to determine a reasonable approximation of the time each person spent on the former Beaverlodge properties. The focus of the interviews was on land use in the past 5 years and expected land use in the foreseeable future (SENES and Kingsmere 2015).

The survey included the interview of representatives from 21 of the 34 reportedly active Uranium City residences. The remaining 13 residences were not interviewed because the residents either declined to participate (4) or were out of town during the survey period and were unreachable (9).

As outlined in the report, the assessment was based on familiarity with the residents of Uranium City and interviews conducted covered the key people and groups who use the land in the region. This report has been submitted and accepted by regulators.

***Gamma Assessment*:** A risk assessment regarding residual gamma radiation was completed for all disturbed areas on the Beaverlodge properties that were above the 1 µSv/h reference gamma value in the provincial *Guidelines for Northern Mine Decommissioning and Reclamation* (SkMOE 2008). The gamma risk assessment utilized the data collected in 2014 Site-Wide Gamma Survey and the findings from the Land-Use Assessment to estimate the potential risks from radiation exposure at the Beaverlodge properties based on spatial considerations, use of the properties and measured gamma radiation levels while also taking into consideration the consumption of country foods and exposure to other pathways. Overall, the evaluation found that from a risk perspective, the gamma radiation levels on the Beaverlodge properties are acceptable and as such, no further remedial actions were recommended at these sites to reduce gamma exposure levels (ARCADIS 2015). This report has been submitted and accepted by regulators.

***Site Wide Crown Pillar Assessment*:** To ensure properties remain safe, stable and secure, Cameco initiated a third-party investigation of crown pillars on all Beaverlodge properties in 2014. A report assessing the crown pillars and related risks on all properties was submitted in 2015 for regulatory review. The properties associated with this closure report did not have any areas that required remediation or detailed monitoring of Crown Pillars. Based on the assessment of the available mining data, it was determined that the Ace Stope Area required additional remediation to address potential risk, and visual monitoring was recommended for the Hab and Dubyna areas (SRK 2015b). Those areas have been previously released from CNSC licensing and are not the subject of this report. The report regarding the Crown Pillar Assessment has been submitted and accepted by regulators.

2020 Beaverlodge ERA: In this update of the decommissioned Beaverlodge QSM, the water dispersion modelling was updated along with an examination of the potential risks to human and ecological receptors that use the area. The model assumptions were revisited based on the current understanding of the environmental conditions informed by almost 40 years of monitoring results. The environmental performance indicators related to water quality at various monitoring stations were also updated accordingly. CNSC Staff have concluded the updated performance indicators are appropriate. See **Figure 5 and 6** for the Beaverlodge Environmental Monitoring Program water quality monitoring stations.

The 2020 ERA complies with applicable components of the Canadian Standards Agency (CSA) N288.6-12 standard for Environmental Risk Assessments at Class I Nuclear Facilities

and Uranium Mines and Mills. Consistent with previously accepted assessments, the 2020 ERA concluded that the immediate and downstream environments will continue to naturally recover over time. As shown previously, based on reported use of the land, there are not expected to be risks to humans residing near, or consuming food from areas surrounding the Decommissioned Beaverlodge Mine Site. Therefore, living a traditional lifestyle and consuming country foods from the area, while respecting the water and fish advisories, can continue to be done safely (CanNorth 2020a). A summary of the ERA is made publicly available on the Beaverlodge website.

The above noted studies have established that the decommissioned Beaverlodge properties meet the performance objectives set out in the Path Forward; and that human health remains protected and ecological risk has been sufficiently managed to allow the properties to be considered for transfer to the provincial IC Program for long term management. As such, the properties will support traditional activities, such as hunting/gathering of country foods and collection of firewood.

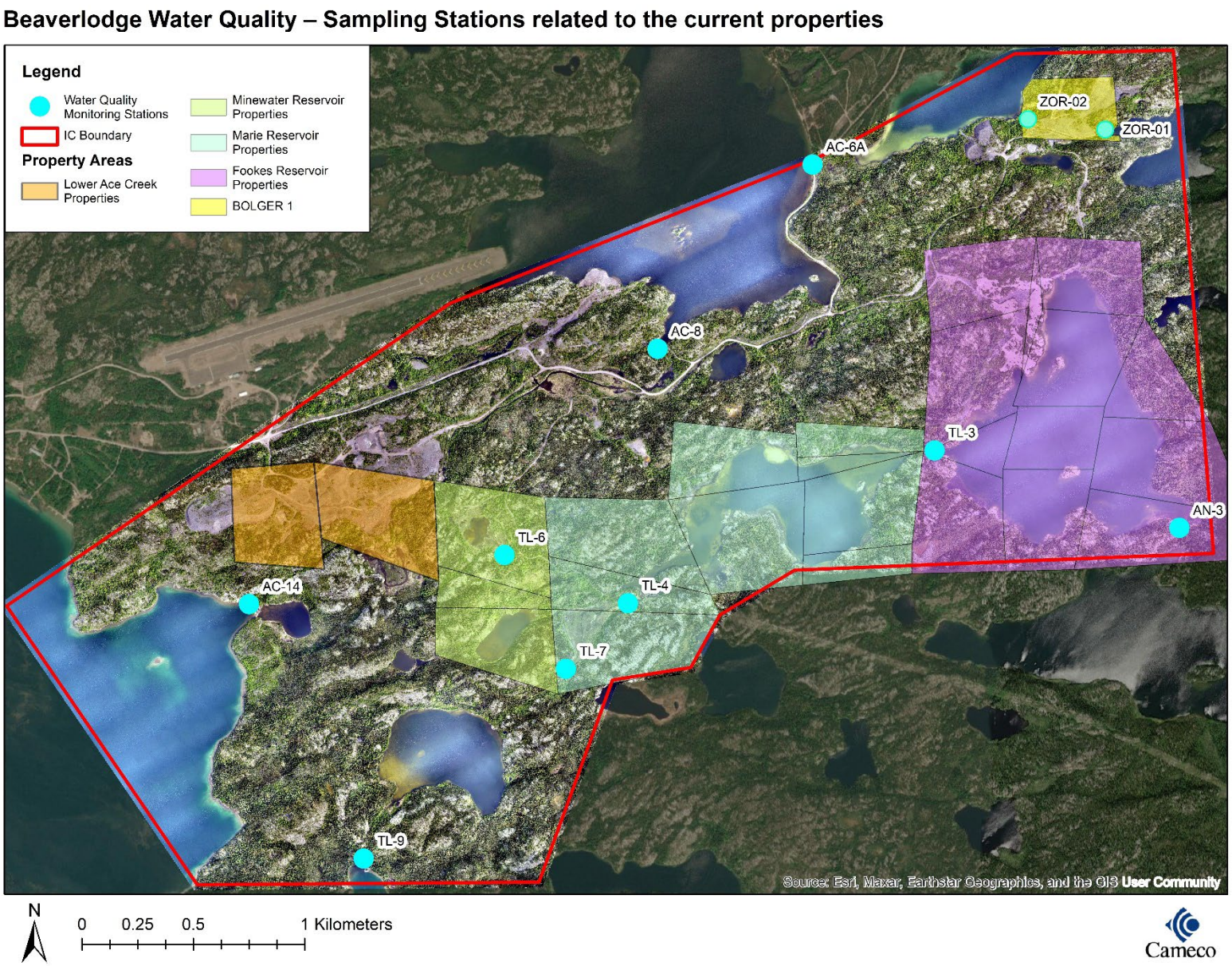


Figure 5: Beaverlodge Water Quality – Sampling Stations related to the current properties.

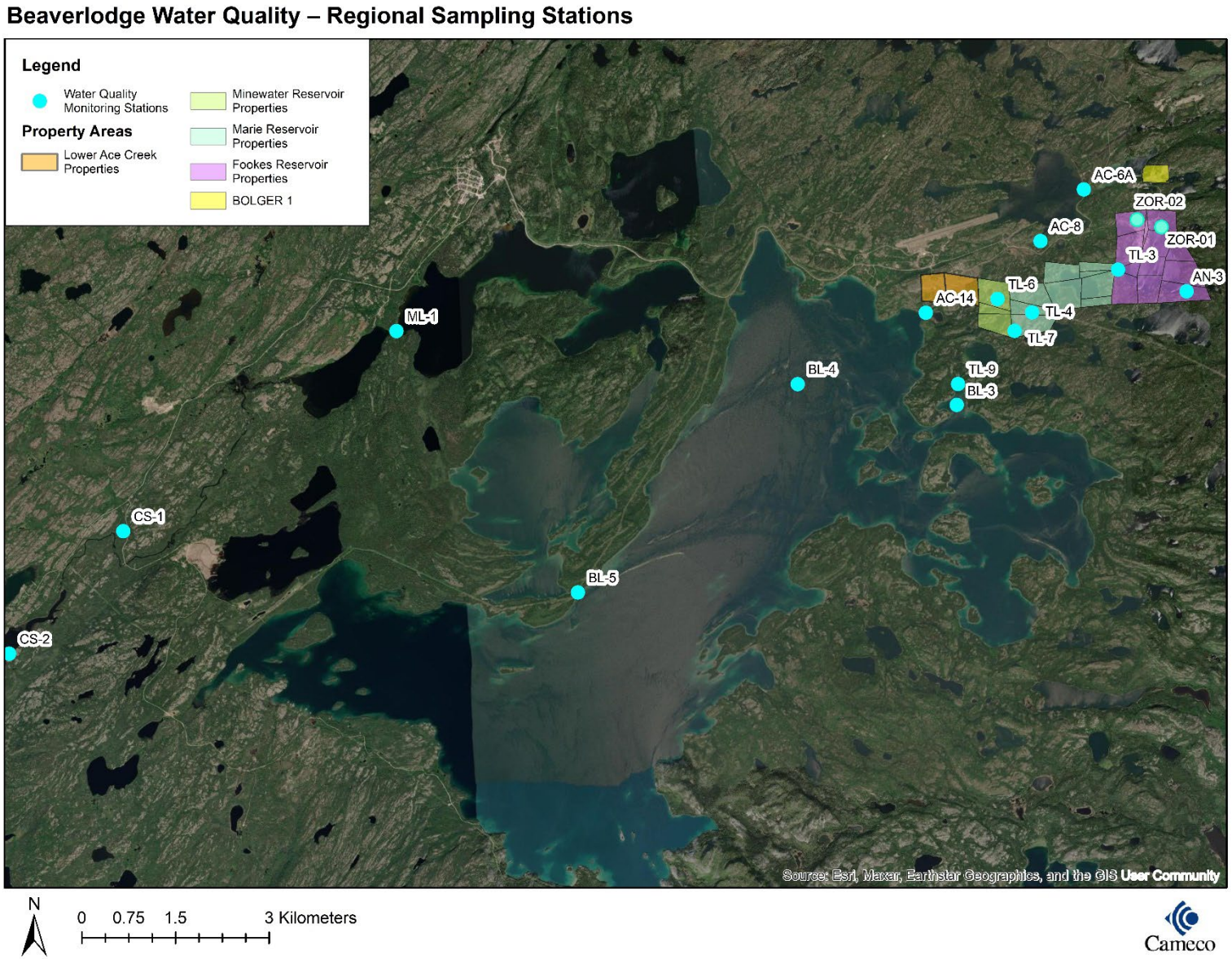


Figure 6. Beaverlodge Water Quality - Regional Sampling Stations

7 Assessing Remaining Site Aspects Requiring Future Monitoring or Maintenance

In order to assess any residual risks resulting from historical mineral exploration, mine/mill operations or decommissioning on each property, it is necessary to:

1. Identify the potential hazards/liabilities (if any) that exist on each property.
2. Assess the likelihood of the hazard being realized.
3. Assess the potential severity/consequence posed by the hazard/liability.
4. Evaluate the residual risk based on the potential severity/consequence of an event occurring and the likelihood of the event occurring.

This section of the document identifies the methodology employed to identify potential hazards/liabilities (aspects) requiring ongoing monitoring or maintenance once the property has been transferred to the IC Program. The risk rankings provided in this document are based on the methodology described in Beaverlodge Project Screening Level Risk Assessment (Cameco 2010) and are consistent with those applied to the 43 Beaverlodge properties previously released from CNSC licensing.

The aspects list of potential hazards and liabilities was developed by a committee of knowledgeable persons that included Cameco employees (past and present) and key third-party consultants.

The frequencies identified in **Table 3** below are used to define the "likelihood" of a potential hazard being realized:

Table 3: Potential of a hazard being released

Likelihood	Frequency
Very Likely	The aspect will contribute to a negative change in current condition one or more times a year.
Quite Likely	The aspect will likely contribute to a negative change in current condition once in ten years.
Somewhat Likely	The aspect will likely contribute to a negative change in current condition once in 50 years.
Unlikely	It is not expected that the aspect will contribute to a negative change in current condition once in 100 years.
Very Unlikely	It is not expected that the aspect will contribute to a negative change in current condition once in 1000 years.

"Consequence" is defined as the outcome of an event or change in circumstances affecting the achievement of Beaverlodge performance objectives. Following the Cameco Corporate Risk

Management Standard, a severity/consequence index was developed to rank the potential severity/consequence of potential hazards for related site aspects based on two different endpoints (Environment and Health & Safety). The severity/consequence terminology utilized in this assessment has been defined in **Table 4**.

Table 4: Severity/consequence terminology

	Severity/Consequence				
	Insignificant	**Minor**	**Moderate**	**Major**	**Catastrophic**
Environment	Localized condition/ event and no effects.	Short term condition/event or minor disturbance to existing conditions	Visible, measurable, or detectable plume or release with short term physical and/or chemical changes to the existing environment. Chronic occurrence of low or negligible incident	Localized upset to existing conditions, mortality within some species, reversible with effort	Regional/ Extensive damage to existing environment
Public Health & Safety	First aid injury. Negligible health impacts.	Medical aid injury. Radiation exceeds target levels	Injury requiring medi-vac to major centre. Radiation exposure exceeds regulatory dose limit for public	Related fatality or permanent disability stemming from an incident related to the current condition of the property.	Several related fatalities or permanent disability for several individuals stemming from incidents related to the current condition of the property

Once the likelihood and consequence of a hazard being realized have been selected, they are assessed together using a consequence versus likelihood matrix method to evaluate the level of risk associated with the existing conditions of the Beaverlodge properties.

The risk matrix follows a 5 X 5 format that considers the consequence and likelihood of the effect occurring resulting in five possible risk ratings for a specific site element ranging from Low to High. Rankings of risk were assigned based on the consequence and likelihood that a risk would result in a negative change to the current condition of the endpoint being assessed, as opposed to the risk of impact to a greenfield site. The assessment of residual risk for this report is based on the Beaverlodge Risk Matrix (BRM) (Cameco 2010). The BRM consequence-likelihood matrix is used to establish rankings of risk. The categories developed for the risk ratings assigned for the Beaverlodge properties are shown in **Table 5**.

Table 5: Beaverlodge Risk Matrix (BRM)

		Consequence				
		Insignificant	**Minor**	**Moderate**	**Major**	**Catastrophic**
Likelihood	**Very Likely**	Medium - Low	Medium - Low	Medium-High	High	High
	Quite Likely	Medium - Low	Medium - Low	Medium	High	High
	Somewhat Likely	Low	Medium - Low	Medium - Low	Medium-High	High
	Unlikely	Low	Low	Medium - Low	Medium	Medium-High
	Very Unlikely	Low	Low	Low	Medium-Low	Medium-Low

8 Property/Area Summaries

8.1 Tailings Management Area

8.1.1 Description

Table 3.4 of *Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site, Report No. 2, Operating History and Environmental Conditions, MacLaren Plansearch* (Eldorado 1983) indicates that a total 10,109,605 tonnes of tailings were produced over the lifetime of the Beaverlodge mill (1953 until August 1982).

Of that total, 4,299,156 tonnes were deposited in the underground mine as backfill and the remainder was placed on surface within the Tailings Management Area (TMA). The TMA consists of a number of water bodies in the Fulton Creek Watershed, as is shown is Figure 5. The main water bodies are Fookes Reservoir, Marie Reservoir, Minewater Reservoir and Greer Lake. Fulton Lake is upstream of the TMA and has not been impacted by past mining activity. Fresh water flows into Fookes Reservoir from Fulton Lake while water exiting Fookes Reservoir flows into Marie Reservoir and then through a meadow (known as Meadow Fen) to Greer Lake. In addition, the small catchment which hosts Minewater Reservoir flows through the Meadow Fen into Greer Lake. Water exiting Greer Lake flows into Fulton Bay of Beaverlodge Lake. It should be noted that Greer Lake is not located within a licensed property and is approximately 0.22 km south of the ACE 19 property. Greer Lake and surrounding area will be included within the IC boundaries to ensure that future activities and naturally recovering environmental conditions are monitored in the future.

Residual tailings from spills that occurred during operations along the pipelines running from the mill and the Dorrclone separator to the tailings management area were assessed and remediated in accordance with the approved decommissioning plan (Eldorado 1987). Accessible tailings were either relocated to the underground mine workings or covered with 0.6 m of waste rock. Locations with residual tailings that were inaccessible, either due to topography or naturally established vegetative cover, were assessed on an individual basis, with the participation of regulatory personnel, to determine whether they should be left as is or remediated. If a decision was made to leave the residual tailings in situ, it was because the disturbance associated with removal or covering the of the tailings would have resulted in greater environmental damage.

The Beaverlodge TMA consists of:

- Fookes Reservoir (1957 – 1982) and Marie Reservoir (1954 – 1957), which received tailings via pipeline from the mill;
- An artificial pond was created with the installation of a dam at the outlet of the Meadow Fen in 1976 (creating the Meadow Settling Pond) and was used for the settlement of radium sludges following barium chloride addition at the Marie Reservoir treatment plant; and,
- Minewater Reservoir was used for tailings deposition during the initial milling period (1953 – 1954). Originally discharged was towards Ace Creek and but it was re-directed to flow into the Fulton watershed in 1971 when it was used as a settling pond for treated minewater from the Fay shaft.

At the start of milling operations in 1953, tailings were deposited in Minewater Reservoir. In 1954, the tailings line was moved to Marie Reservoir, likely to make use of its greater volume (Eldorado 1983). The settling of tailings solids in Marie Reservoir was poor, resulting in tailings migration downstream to Greer Lake. As a result, the tailings discharge point was moved to Fookes Reservoir in 1957. Subsequent to this, dams were constructed at the outlets of Fookes and Marie reservoirs in 1969 and 1971 respectively, to maintain water levels. In 1976 a water treatment plant was constructed at the outlet of Marie Reservoir, and the Meadow Settling Pond was created by the construction of the Meadow Basin dam (TL-7) in 1977 (Eldorado 1983). The decommissioning of the TMA was carried out between the winter of 1983 and the summer of 1985.

Water sampling stations were established at various locations within the TMA to monitor recovery of the various water bodies affected by past mill operation. Fulton Lake outlet (AN-3) is collected to measure background water quality for the watershed. Water quality samples are collected at the following locations within the TMA (shown in Figure 5): Fookes Reservoir outlet (TL-3), Marie Reservoir outlet (TL-4), Minewater Reservoir outlet (TL-6), Meadow Fen outlet (TL-7) and Greer Lake outflow (TL-9). Monitoring at these locations was initiated during operation of the mill and was monitored through decommissioning and continues today. As stated in the 2020 ERA the SEQGs do not account for the historic deposition of tailings during mine operation, water quality in waterbodies within the TMA are not expected to meet SEQGs in the near, or long-term, and comparison to SEQGs is therefore not relevant. As a result, long-term recovery of the TMA is compared to model predictions in the sections that follow.

The TMA properties are listed in Appendix A of the Eldorado Resources Limited Decommissioning Approval AECB-DA-142-0 (November 1983) as “N-294 Tailing’s storage and treatment system”. The properties are included on the *2006 Beaverlodge Surface Lease Agreement* map as N-294 and in the *Property Description Manual* referenced in the LCH, which is referenced in the CNSC issued Waste Facility Operating License WFOL-W5-2120.0/2025.

For ease of discussion, the decommissioned TMA properties are discussed herein as three distinct areas as identified in Figure 7. These are, starting at the upstream end of the historic tailings storage and treatment system:

- *Fookes Reservoir* Area - which consists of 12 properties surrounding and under the former Fookes basin, the Fookes tailings delta, and the Fookes outlet. The properties discussed in association with Fookes Reservoir cover and area of approximately 180.4 hectares.

- *Marie Reservoir Area* - which consists of 9 properties surrounding and under the former Marie basin, the Marie tailings delta, the Marie outlet and the Meadow basin, and includes the decommissioned dam built at the outflow of the Meadow basin (TL-7). The properties discussed in association with Marie Reservoir cover an area of approximately 133.5 hectares.

- *Minewater Reservoir Area* - which consists of 3 properties surrounding and downstream of the former Minewater basin. The properties discussed in association with the Minewater Reservoir cover an area of approximately 42.5 hectares.

Tailings Management Area Properties and Site Features

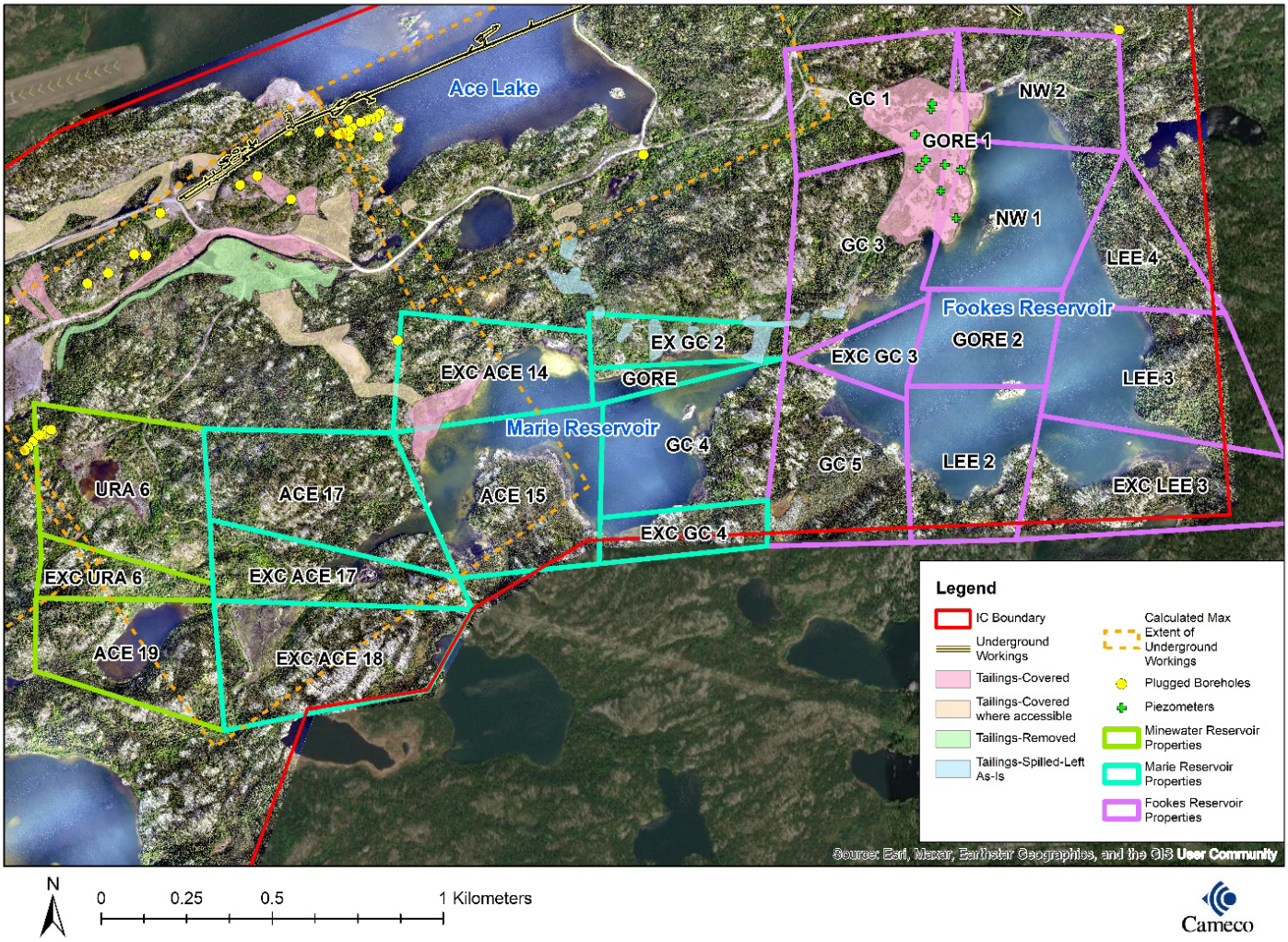


Figure 7. Tailings Management Area Properties and Site Features

8.2 Fookes Reservoir Area

Table 2.I of *Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site, Report No. 3, Beaverlodge Tailings and Sludges Close-out Engineering Feasibility Studies, Stefan Robertson & Kirsten* (Eldorado 1983b) indicates that more than 5 million tonnes of mill tailings were placed within the Fookes basin between 1957 and the cessation of milling in 1982. Tailings were originally discharged at the north-west corner of the reservoir and solids settled over the entire bottom of the reservoir. A tailings delta was formed in the northwest corner of the reservoir, which

covered approximately 7% of the original reservoir surface area at shutdown. The Fookes Reservoir Area consists of the following properties shown in **Table 6**.

Table 6: Fookes Reservoir Area Properties

AECB License Number	Cameco Number	Area (hectares)	Coordinates (UTM WGS 84, 12N)	
			Easting	Northing
N-294	GC 3	21	644587	6604647
			645629	6605320
			645188	6605209
			645592	6604994
			645556	6604880
			645578	6604878
			645574	6604852
			645160	6604774
			645154	6604677
	EXC GC 3	5.3	645511	6604554
			645574	6604852
			645169	6604674
			645511	6604595
	GC 5	19.2	645102	6604126
			645154	6604677
			645169	6604674
			645511	6604554
			645511	6604388
			645104	6604260
			645524	6604137
	GC 1	16.4	645188	6605209
			646131	6605618
			644653	6605545
			645629	6605320
	GORE 1	2.1	644653	6605545
			645592	6604994
			645691	6605316
			646131	6605618
	NW 2	15.3	646146	6605280
			645661	6605640
			646131	6605618
			645691	6605316
	NW 1	18.5	645968	6604878
			645592	6604994
			645691	6605316
			646146	6605280
			645556	6604880
			645578	6604878
	LEE 4	11.3	646443	6604809
			645691	6605316
			646146	6605280
			645968	6604878
			645961	6604831
	GORE 2	11.3	645918	6604593

			645578	6604878
			645968	6604878
			645574	6604852
			645961	6604831
			645511	6604595
	LEE 3	21.8	646443	6604809
			646618	6604388
			645902	6604509
			645918	6604593
			645961	6604831
	EXC LEE 3	21.9	645831	6604145
			642048	6604476
			646618	6604388
			646697	6604197
	LEE 2	16.3	645524	6604137
			645511	6604595
			645918	6604593
			645511	6604554
			645902	6604509
			645511	6604388
			645511	6604145

Initial Decommissioning Activities

Departure with Dignity, Decommissioning of the Beaverlodge Mine/Mill, Operations and Reclamation of the Site, MacLaren Plansearch, Eldorado Resources Limited (Eldorado 1987) states that dismantling of the tailings line was carried out at various times between April 1983 and May 1985. During that activity, the 250 mm diameter Sclairpipe tailings line was salvaged and sent to Rabbit Lake in 1983. The wood stave tailings pipelines were burned at various times during 1983, 1984 and 1985.

Fookes Delta

The reclamation of the Fookes Reservoir Area involved removal of artificial structures to return the water level in the basin to within 1 m of its natural outlet level as well as covering of the exposed tailings delta to reduce gamma radiation and the potential for erosion and dispersion.

The initial lowering of Fookes Reservoir began in January 1983 and was complete by early April 1983. This was accomplished by incrementally removing stop-logs from the dam to maintain a treatable flow at the Meadow basin treatment plant. In November 1983, the logs were replaced in the dam to minimize the volume of water entering Marie Reservoir so that the reclamation of the Marie Reservoir Area could also proceed. During the spring and summer of 1984, the outflow from Fookes was still dammed off to maintain the lowest possible water level in Marie while reclamation work was underway in that area. The stop-logs were removed during November and early December 1984 to once again lower the Fookes Reservoir water level and was allowed to drain until flow ceased in early January 1985, at which point the cribwork at the dam was removed. The outflow channel was re-built at the end of May 1985, and the area landscaped to final contours.

The tailings delta (i.e., Fookes Delta) at the northwest corner of Fookes Reservoir had formed through the direct discharge of tailings and covered approximately 9.2 ha at shutdown. The Fookes Delta is located on properties; GC 1; GC 3; GORE 1; NW 1 and NW 2. Lowering of the reservoir level exposed an additional 1.3 ha of tailings. In total, 88,540 m^3 of waste rock were used to create a 600 mm cover on Fookes Delta in 1983 and 1984. The objectives of the cover were to control gamma radiation, to provide protection against direct contact with the tailings, and to reduce the potential for erosion and dispersion.

To ensure tailings on the Fookes Delta would remain covered, waste rock was placed on the ice, along the edge of the delta extending into Fookes Reservoir. When the ice melted the waste rock settled along the edge of the tailings delta. In addition, the Fookes outflow channel was reconstructed, raising the water level in Fookes Reservoir by 1m.

Following the initial completion of the waste rock cover, some of the tailings began working their way upward through the waste rock, forming small mounds, or “boils”, of exposed tailings on the surface of the cover. This was attributable to seasonally high piezometric pressures within the tailings related to the geometry and stratigraphy of the delta (SRK, 1995), which resulted in localized flowing artesian conditions.

Nine pneumatic piezometers (P93-1 through P93-9) were installed in the tailings delta in 1993 to study the piezometric levels on the delta. These piezometers were monitored regularly (although P93-7 was abandoned in 2005 due to instrument malfunction) and provided an indication of piezometric levels at select locations over the delta for a period of approximately 10 years. Piezometric data indicated that, generally, no artesian levels were observed at any time in some locations, i.e. well back from the Fookes Reservoir shoreline. However, close to the Fookes Reservoir shoreline, artesian levels were observed either seasonally or, at some locations, most of the year.

As a result, remediation work was initiated in 1997, and consisted of covering the exposed tailings boils with two layers of sand: 0.3 m of fine-grained filter sand, overlain by 0.3 m of sand and gravel (“general fill”). Strict grain size distribution requirements were set for the lower filter sand layer to ensure that the sand was fine enough to prevent tailings particles from migrating upwards through the void spaces in the sand, while at the same time allowing groundwater to flow upwards through the filter sand without pore pressure build-up. The upper sand and gravel layer serve only to weigh down the filter sand layer (to reduce the potential for “blow-out” due to high upward seepage gradients) and to protect the filter sand layer from erosion. Stockpiles of additional filter sand and general fill were placed on the delta for future maintenance work. Other work completed in 1997 included the provision of a surface drainage channel at the northeast end of the delta, and placement of erosion protection on the roadway at the northwest end of the delta. A detailed description of the work completed in 1997 is provided in an SRK report entitled "Beaverlodge Decommissioning, Fookes Lake Tailings Delta Remediation, 1997 Construction" (October 1997).

In addition to piezometer monitoring, the surface of the delta was inspected by a geotechnical engineer every three years, starting in 1998. The expectation was that, when the inspections no

longer detected any signs of renewed boil activity over a three-year period, it would be reasonable to assume that conditions on the delta are sufficiently stabilized for final site close out. At that point, subject to regulatory approval, the inspections would be discontinued.

In 2004, at the request of Cameco, SRK completed a six-year review of the cover at the Fookes Delta. As a result of that assessment, SRK recommended that incremental cover material be placed over the tailings delta in accordance with, or as a variant of, one of the following two options:

- Place a strategic cover that corresponds to areas of exposed tailings observed during the inspections of 2001 and/or 2004; or
- Place a full cover over those areas of the delta believed to be prone to forming tailings boils.

Following discussions between Cameco, SRK and others, Cameco decided to proceed with the both options, with installation proceeding in two-stages. During the first stage, the strategic cover would be placed using borrow materials which were stockpiled on the delta in 1997. Concurrent with the borrow placement, additional investigations would be undertaken to identify the design and limits of the full cover and to identify sufficient quantities of borrow materials to complete its installation the following year. During the second stage, the borrow areas developed during the first stage would be used to complete the installation of the full cover.

The strategic cover, consisting of 0.3m of filter sand and 0.3m of general fill, was placed on identified tailings boil areas, and supporting investigations were completed in 2005 for the optimized full cover planned for 2006. The installation of the optimized full cover in 2006 using material hauled from local borrow areas was postponed until 2007 for budgetary reasons. The optimized full cover consisted of 0.15m – 0.3m of filter sand covered with a 0.3m layer of general fill. As-built reports describing the placement of the strategic cover in 2005 and the full cover in 2007 were prepared by SRK in 2006 and 2008, respectively.

The 2007 geotechnical inspection of the cover occurred while the second stage of cover installation was under way. SRK geotechnical engineers completed a formal inspection of the cover in 2010 and 2015, and an informal inspection in 2014. Consistent with SRK's recommendations in 2010, Cameco undertook annual inspections of the cover in June of 2011, 2012 and 2013 and July of 2014, as well as in 2016, 2017, 2018 and 2019, The timing of the 2020 inspection was consistent with the schedule defined in 2015 (SRK, 2015).

Between 1997 and 2010, piezometers installed on the delta were monitored and levels were quite consistent in terms of annual and seasonal trends. In addition, no boils (new or old) were observed during the tailings surface inspection completed by SRK in 2010. SRK (2010a) concluded there was no technical reason for continuing the collection of piezometer data and, following regulatory approval, the collection of incremental piezometric data was discontinued. The eight operational piezometers and single non-operational piezometer were decommissioned in 2022 to prepare the associated Beaverlodge properties for the IC Program.

In 2020, Cameco commissioned SRK Consulting (Canada) Inc.to conduct a detailed geotechnical assessment of the decommissioned Beaverlodge Mine/Mill site which included the Fookes Delta.

This report concluded that no new boils or significant erosion features were observed during the 2020 inspection, which is consistent with the annual Cameco inspection reports completed between 2016 and 2019, inclusive and the conditions on the delta have stabilized sufficiently to support the transfer of properties associated with the Fookes Reservoir delta to the Institutional Control (IC) Program (SRK 2021).

Fookes Outlet Structure

The Fookes Outlet structure is located at the intersection of 3 properties associated with the Fookes Reservoir area: GC 3; EXC GC 3; and GC 5. Stabilization measures at the outlet of the Fookes Reservoir were undertaken in 1985 in an effort to maintain minimum water levels at the outlet 1 m above the highest level of uncovered tailings.

During the 1986 spring-melt, flows through the Marie Reservoir outlet were higher than anticipated (due to glaciation effects in the spillway) and this resulted in substantial erosion of the spillway channel and a 0.15 m drop in the water level. As a consequence, the outlets from both Fookes and Marie reservoirs were upgraded to provide improved long-term stability.

The spillway invert controlling the reservoir level was set at an elevation of 2,824.0 m (based on local datum) at the outlet of Fookes Reservoir. The elevation is approximately 1 m above the elevation down to which the waste rock cover was placed on the tailings delta. This elevation represents an increase of about 2 m in the outlet level of Fookes Reservoir, compared to pre-mine development. The general design objective for the Fookes outlet structure was to:

- Enhance the erosion resistance of the spillway in the long term;
- Raise the embankment to reduce the potential for overtopping; and,
- Prevent erosion of the embankment in the event that glaciations of the spillway results in overtopping of the embankment.

The Fookes outlet structure was upgraded in 1987 in accordance with the objectives noted above.

The Fookes outlet structure consists of a rip-rap lined spillway (with trapezoidal cross section) discharging into a rip-rap lined stilling basin. The rip-rap lining in the spillway channel and the stilling basins was intruded with grout for added erosion protection; however, the rip-rap in the spillway was designed to be stable in the absence of grout intrusion. The Fookes spillway is capable of passing a 500-year flood event with a depth of 0.3 m (680 L/sec) at the entrance of the Fookes outlet structure. In the event of embankment overtopping, the coarse rip-rap will resist erosion of the upper surfaces and downslope embankments (SRK 1986).

Subsequent to the remediation of the Fookes Delta in 1997, inspections of the outlet spillways at the Fookes and Marie reservoirs were undertaken by SRK in September 1998 (SRK, 1998), September 2001 (SRK, 2001), June 2004 (SRK, 2005a), August 2007 (SRK, 2008), May 2010 (SRK, 2010b), June 2015 (SRK, 2015) and September 2020 (SRK 2021). Since 2010, a Cameco representative has

also completed annual inspections of the outlet structures. In 2020, Cameco commissioned SRK Consulting (Canada) Inc. to conduct a detailed geotechnical assessment of the decommissioned Beaverlodge Mine/Mill site which included the Fookes outlet structures. That report concluded that, from a geotechnical perspective, the conditions at the outlet structures have stabilized sufficiently to support the transfer of associated properties to the IC Program (SRK 2021).

8.2.1 Recent Decommissioning Activities and Beaverlodge Performance Indicators

Acceptable Gamma Levels (Performance Indicator has been met)

During 2014, a detailed surficial gamma survey was conducted primarily focusing on the disturbed areas (i.e., Fay area, roads and the former tailings pipeline corridor) and included the Fookes Reservoir Area properties (ARCADIS SENES 2014). The properties were surveyed on a 10 m grid (approximately), as terrain and vegetation allowed considering safety and physical accessibility, with each radiation technician using a Ludlum 2221 ratemeter connected to a 2” x 2” sodium iodide (NaI) crystal scintillation detector (Ludlum 44-10).

The resulting radiation dose rates were then averaged on a 1 ha basis to allow comparison to the 1 µSv/h reference gamma value in the provincial *Guidelines for Northern Mine Decommissioning and Reclamation* (SkMOE 2008).

As shown in **Figure 8**, the surface gamma survey results ranged from <0.1 µSv/h to 1.0 µSv/h above background (ARCADIS SENES 2014), which meets the *Guidelines for Northern Mine Decommissioning and Reclamation* (SkMOE 2008). Therefore, the Fookes Reservoir properties meet the Performance Indicator associated with acceptable gamma levels.

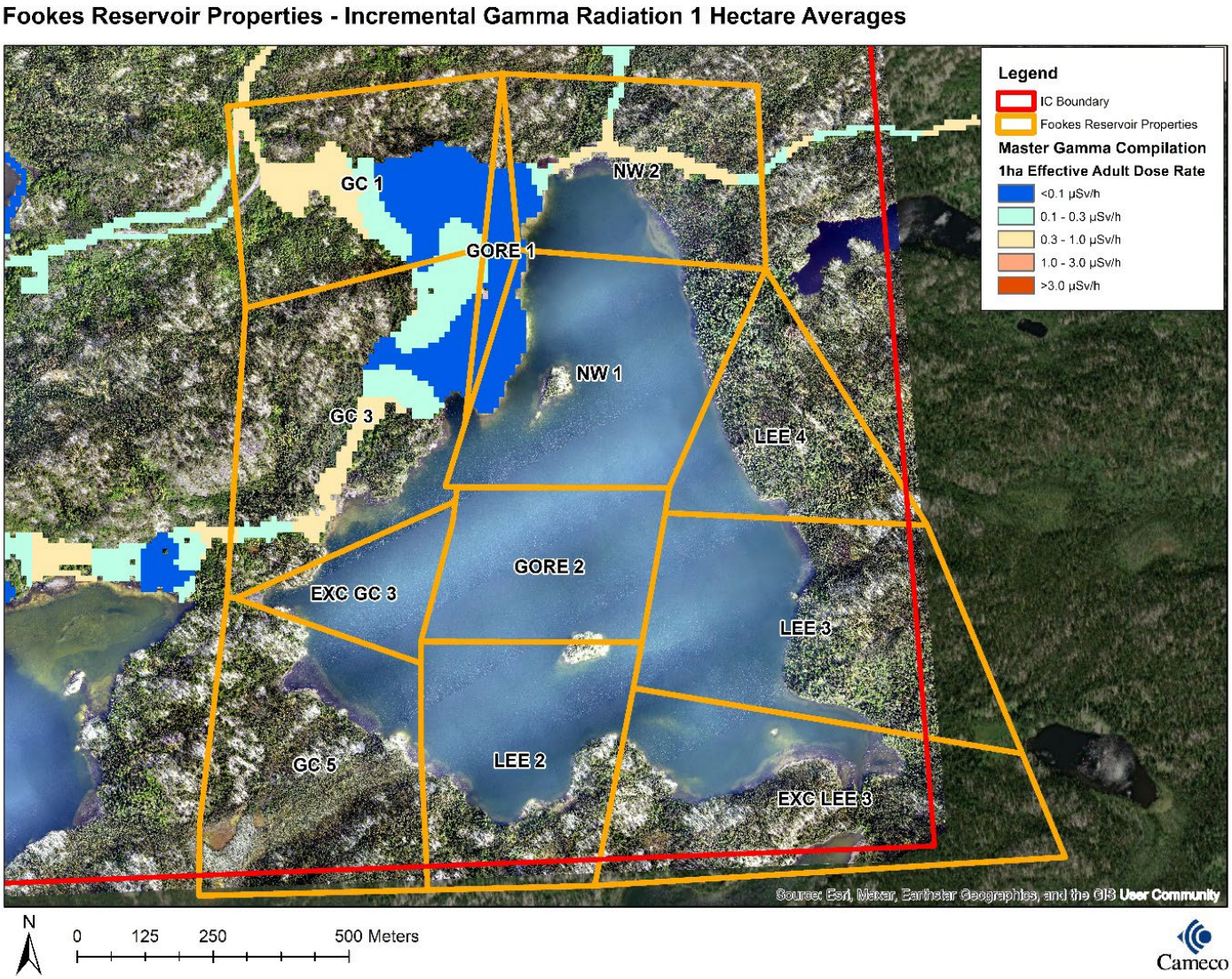


Figure 8. Incremental Gamma Radiation 1 Hectare Averages: Fookes Reservoir Properties

Boreholes Plugged (Performance Indicator is not applicable)

Surface inspections in support of transferring the Fookes Reservoir properties to IC did not identify any exploration drill holes.

Stable Mine Openings (Performance Indicator is not applicable)

The Fookes Reservoir properties do not host any mine openings to surface.

Geotechnical Stability

Crown Pillar (Performance Indicator has been met)

The crown pillar performance indicator is not applicable to the Fookes Reservoir properties as presented to the Commission by CNSC Staff during the 2014 update meeting.

Pit Walls

There are no open pits associated with the Fookes Reservoir properties.

Tailings

No new boils or significant erosion features were observed during the 2021 inspection of the Fookes Delta. The conditions on the delta have stabilized sufficiently to support the transfer of properties associated with the Fookes Reservoir delta to the Institutional Control (IC) Program (SRK 2020)

As shown in **Figure 7**, there are tailings present on one Fookes Reservoir property (GC 3) that were left undisturbed (i.e., left as is). Monitoring has confirmed that surface runoff that comes in contact with tailings are not a significant source of the primary constituents of concern (SENES 2012a; 2012b). All gamma readings measured in the Fookes Reservoir Area meet the *Guidelines for Northern Mine Decommissioning and Reclamation* and no additional remedial actions are justified (ARCADIS 2015).

Waste Rock

Waste rock present on the Fookes Reservoir properties is limited to that used to cover the exposed tailings on the delta and to construct the roads transecting the properties Waste rock samples specific to the Fookes Reservoir area properties have not been collected; however, based on general waste rock samples collected on the Beaverlodge properties, uranium content is typically below the threshold considered to be special/mineralized waste rock at the operating uranium mines in northern Saskatchewan (0.03%). This is reflected in the gamma survey results provided above. Areas where waste rock is located are typically below 1 µSv/hr and below 0.3 µSv/hr on the areas where waste rock is exposed on the Fookes Delta. Further, waste rock sampling has also shown the waste rock is non-acid generating and visual observation for more than 60 years has not identified any impacts that could be attributed to the generation of acidic conditions.

Water Quality within Modelled Predictions (Performance Indicator has been met)

To determine if natural recovery is occurring in the Fookes Reservoir Area as expected, water quality has been monitored at station TL-3 (located at the outflow of Fookes Reservoir) and concentrations have helped inform water quality model predictions. The modelled data helped establish WQ performance indicators, which CNSC Staff have deemed appropriate for evaluating the recovery of Fookes Reservoir. The relevant water quality constituents that are assessed as part of the performance indicator include: radium-226, uranium, and selenium. As shown in Figure 9, 10, and

11 and discussed in greater detail in the 2020 Beaverlodge ERA (CanNorth 2020a) the following observations can be made that demonstrate the Fookes Reservoir water quality data is meeting the water quality performance indicator as defined by regulatory accepted assessment methodologies:

- Radium-226 levels in Fookes Reservoir are within the predicted bounds identified as the performance indicator for this area.
- Uranium and selenium levels in Fookes Reservoir meet the performance indicator for this area and are expected to continually improve over the long-term.

Radium-226 levels are expected to increase slightly before they decline. The chemical processes causing this increase are known and well understood. As detailed in the 2020 ERA, increases are attributed to the release of historically precipitated radium from sediments. Radium-226 precipitates in the Fookes Reservoir are associated with naturally occurring calcium and barium, which may have been introduced in the milling process. After the peak is reached, levels are expected to gradually improve.

The Fookes Reservoir properties therefore meet the “water quality within modelled predictions” performance indicator as defined by the regulatory accepted assessment methodologies.

Figures 9 and 10 are provided to show the rapid decrease in uranium and selenium concentrations that occurred following decommissioning. Due to the rapid improvement of selenium and uranium concentrations following decommissioning, a second graph showing a more suitable scale of current concentrations is also provided.

The water quality of Fookes Reservoir will continue to be monitored as part of the Beaverlodge EMP, until all the Beaverlodge properties are transferred to the provincial IC Registry. A long-term

water monitoring program will then be implemented under the IC Program and water quality will continue to be compared to the predicted recovery from the 2020 ERA (CanNorth 2020).

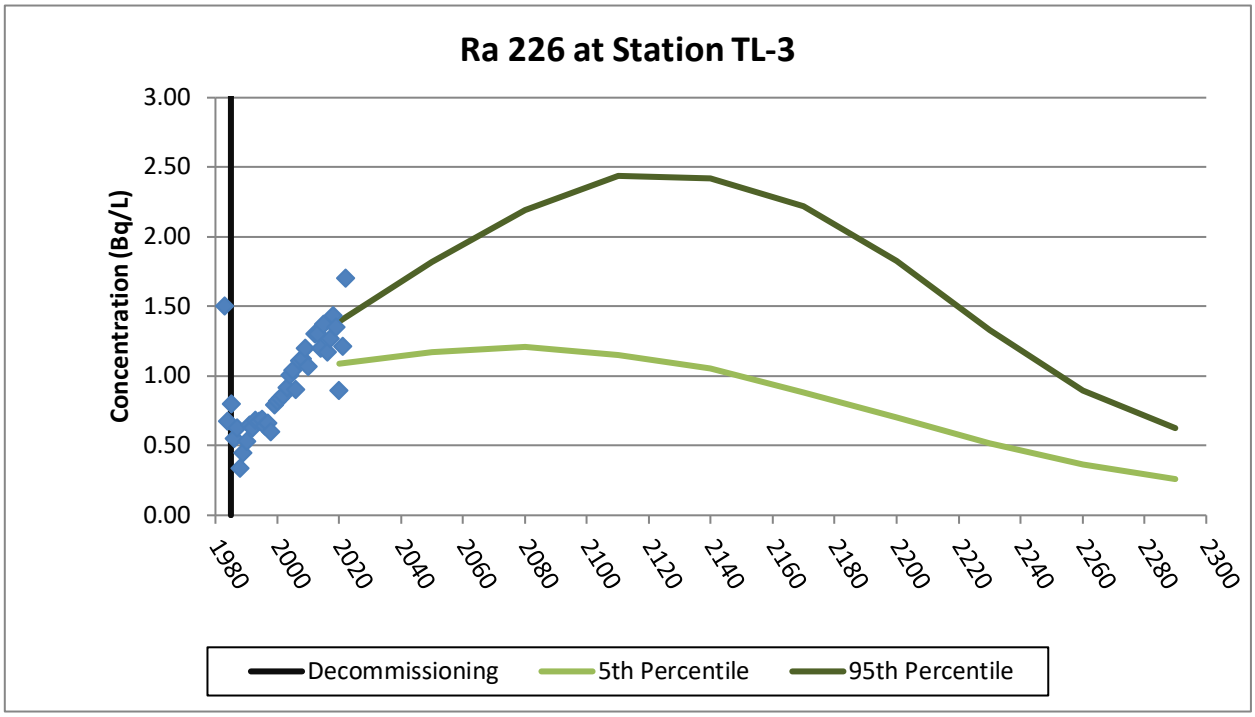
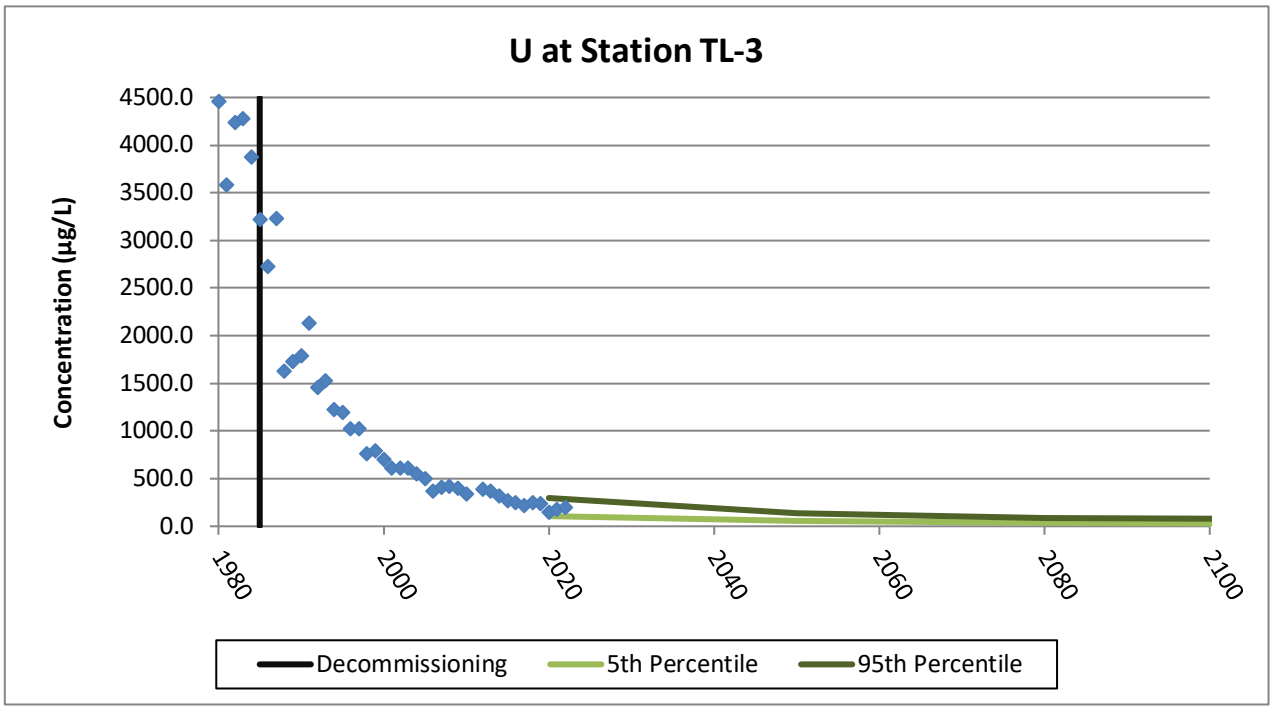


Figure 9: Ra-226 Performance Indicator at TL-3



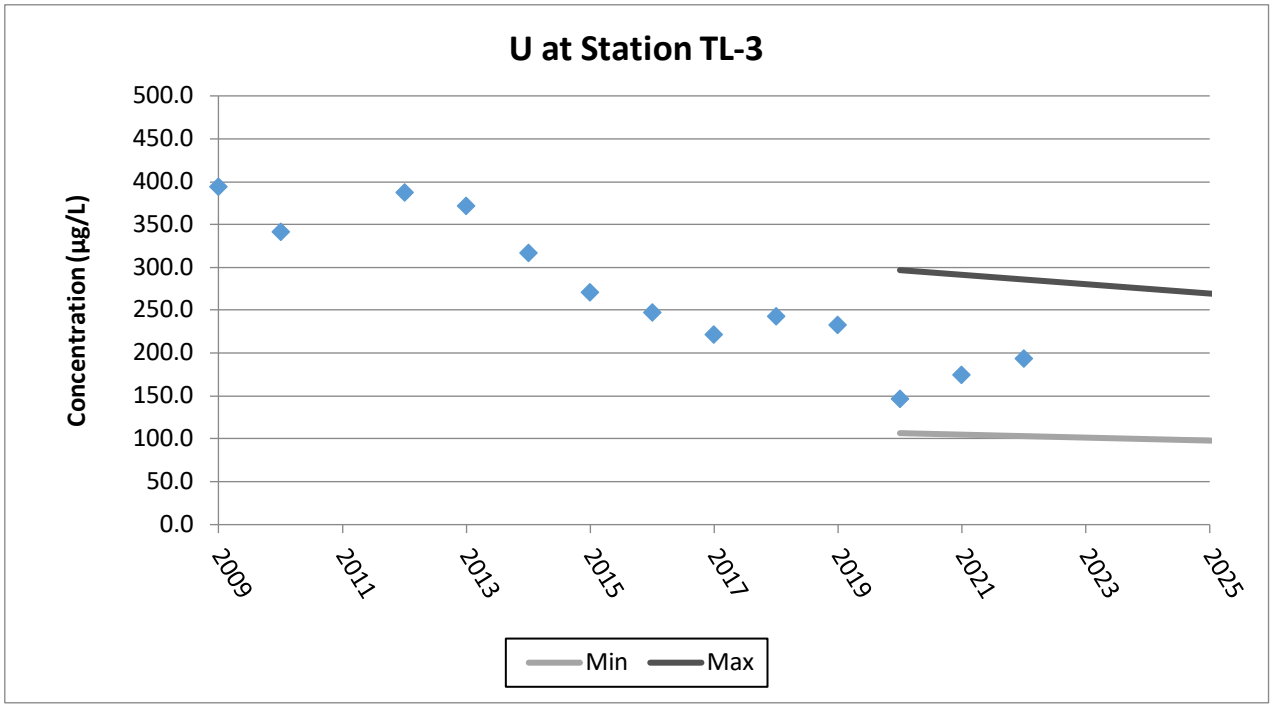


Figure 10: U Performance Indicator at TL-3

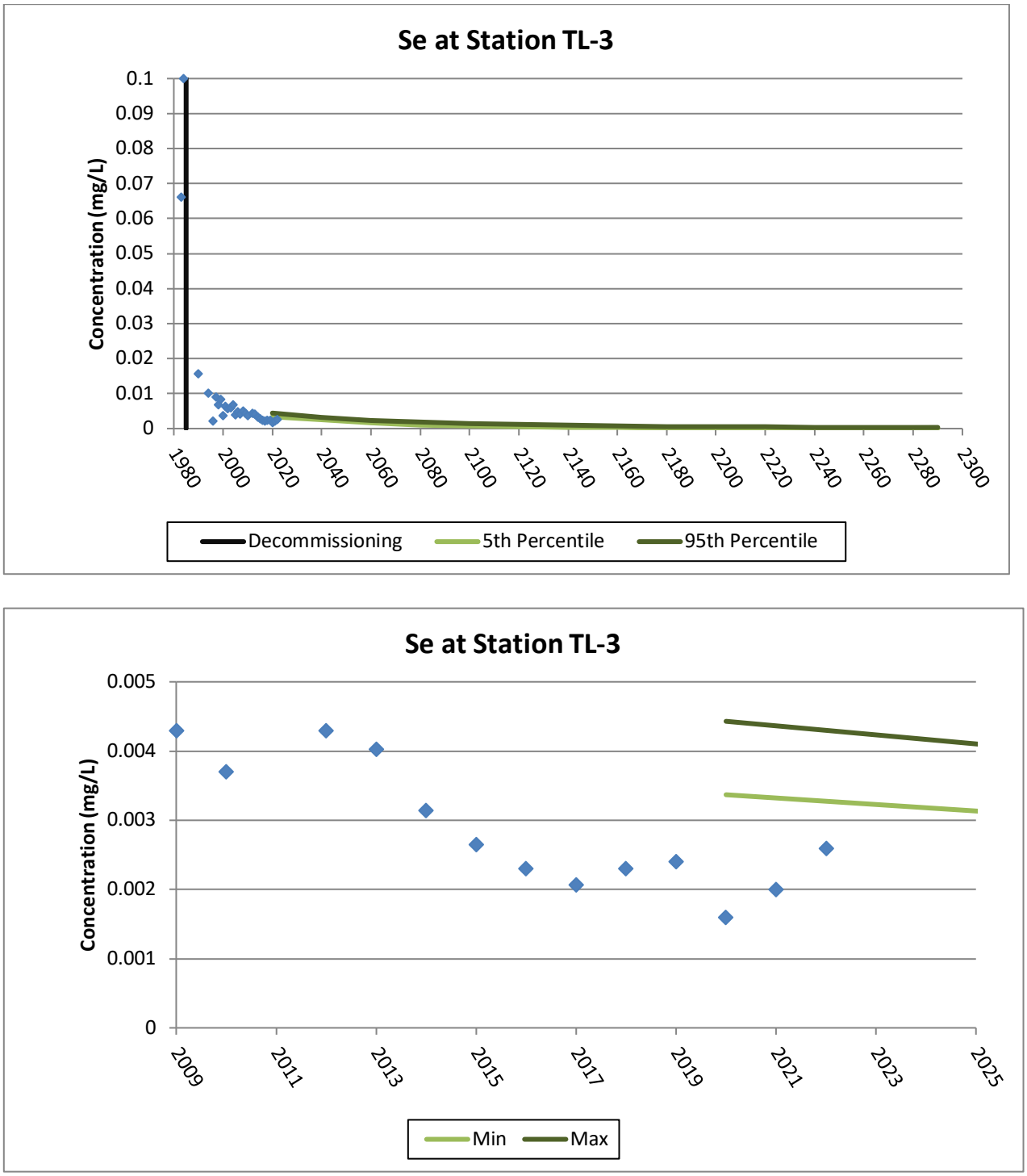


Figure 11: Se Performance Indicator at TL-3

Site Free from Debris (Performance Indicator has been met)

All Beaverlodge related properties were inspected in an effort to locate historic debris not removed during initial decommissioning. During the main clean-up campaign in 2015 and 2017, GPS tracking was utilized to ensure adequate coverage of the properties, including the Fookes Reservoir

properties, unless safety consideration, surface features or significant vegetation prohibited access to a specific area (**Figure 12**).

Following the above noted inspections, various debris found on the property, including the remaining electrical and power infrastructure (pole brackets) and concrete pilons and anchor bolts used to anchor the tailings line were removed and disposed of in the Lower Fay Pit as approved by SkMOE. In addition, as final regulatory inspections of the properties occurred, any additional debris located was disposed of in Lower Fay Pit.

As a result of this activity, the Fookes Reservoir properties meets the performance indicator of being free of debris.

Fookes Reservoir Properties - Incremental Gamma Radiation 1 Hectare Averages

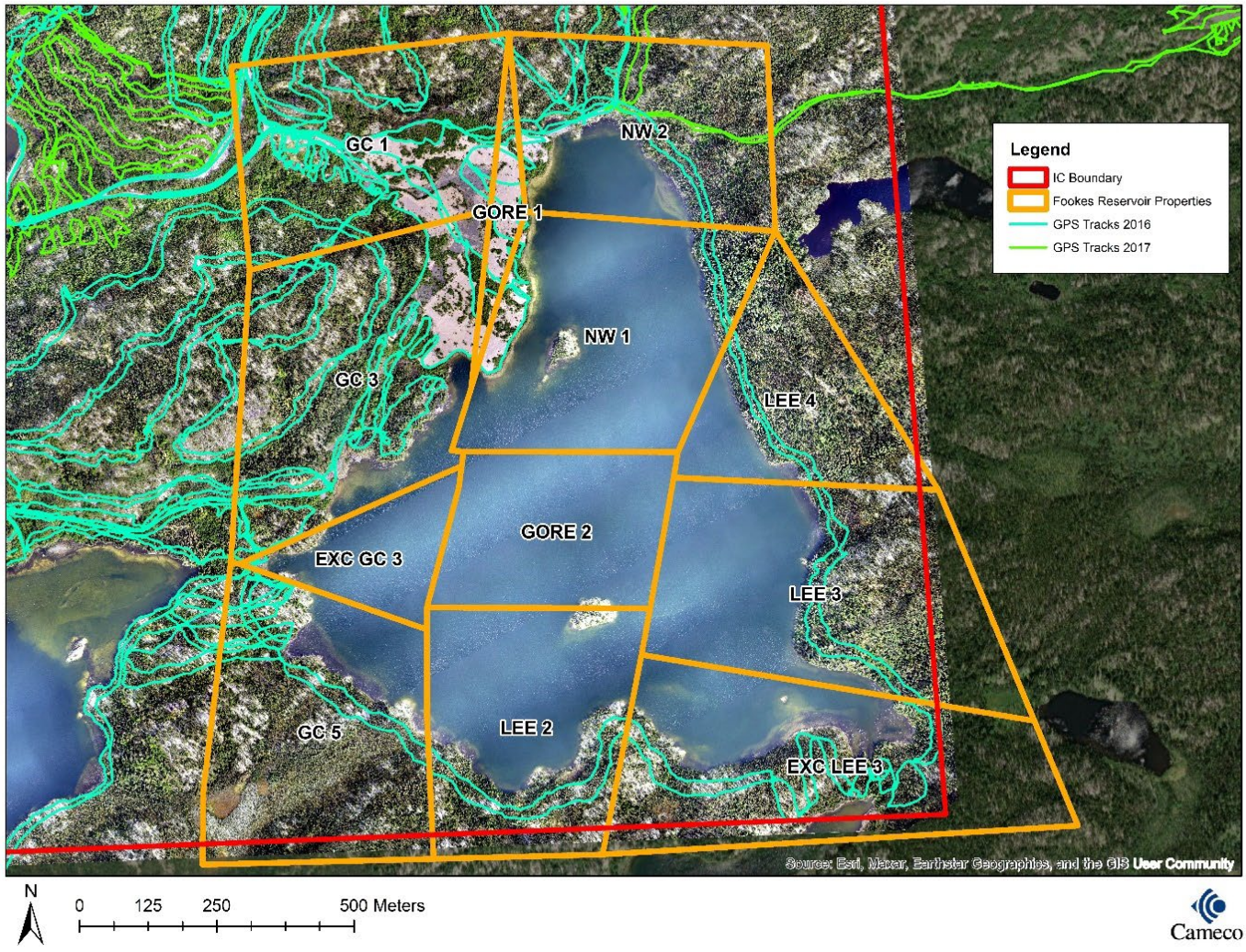


Figure 12: Fookes Reservoir Properties – Inspection Track

8.2.2 Decommissioning and Reclamation Documentation

Table 7 provides a summary of general documents which include refence to the Fay site and by extension the Fookes Reservoir properties.

Table 7: Documentation Log – Fookes Reservoir properties

Document	Date
Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site, Report No. 2, Operating History and Environmental Conditions, MacLaren Plansearch, Eldorado Resources Limited	February 1983
Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site, Report No. 3, Beaverlodge Tailings and Sludges Close-out Engineering Feasibility Studies, Stefan Robertson & Kirsten, Eldorado Resources Limited	February 1983
Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site, Report No. 5 – Plan for the Close Out of the Beaverlodge Site, Eldorado Resources Limited	August 1983
Departure with Dignity, Decommissioning of the Beaverlodge Mine/Mill, Operations and Reclamation of the Site, MacLaren Plansearch, Eldorado Resources Limited	February 1987
Beaverlodge Decommissioning, 2005 Construction Activities at the Fookes Lake Delta, SRK Consulting	February 2006
Surface Lease Renegotiation, Appendix D – Decommissioning and Reclamation Plan, Historical Summary: 1981-2005, Cameco Corporation	November 2006
Beaverlodge Decomissioning 2007 Construction Activities at the Fookes Lake Delta, SRK Consulting	February 2008
Waste Rock Stability Assessments – Former Beaverlodge Sites, SRK Project No. 4CC008.027, SRK Consulting (Canada) Inc	December 2010
Surficial Gamma Radiation Survey of Disturbed Areas at the Former Beaverlodge Mine Site, Final Rev. 1, ARCADIS SENES Canada Inc.	November 2014
2014 Uranium City Consultation on Land Use, SENES Consultants & Kingsmere Resources Services	January 2015
Beaverlodge Site Gamma Radiation Risk Evaluation, ARCADIS Canada Inc.,	June 2015
Beaverlodge Property – Crown Pillar Assessment (2014-2015), SRK Project No. 1CC007.048, SRK Consulting (Canada) Inc.	July 2015
Beaverlodge 2017: Borehole Decommissioning Report, Cameco Corporation (Cameco).	July 2017
Remediation of Utility Corridors & Related Infrastructure, Beaverlodge Properties, Kingsmere Resource Services Inc.	January 2018

Document	Date
Beaverlodge Property Inspection for Institutional Control Transfer Report, Kingsmere Resource Services Inc.	January 2018
2020 Geotechnical Inspection Report Decommissioned Beaverlodge Mine/Mill Site, SRK Consulting (Canada) Inc., 1CC007.067	February 2021

8.2.3 Evaluation of Fookes Reservoir Properties

The properties meet the established performance objectives of safe, secure, stable/improving and have no remaining liabilities (see **Table 8**).

Table 8: Evaluation of Fookes Reservoir Properties

Performance Indicators	Acceptance Criteria	Fookes Reservoir Area
Acceptable Gamma Levels	Reasonable use scenario demonstrating gamma levels at the site are acceptable.	✓
Boreholes Plugged	All boreholes have been plugged at the time of transfer to institutional control.	NA
Stable Mine Openings	Mine openings have been secured and signed off by a qualified person, where applicable.	NA
Stable Crown Pillar	Crown pillar assessed, remediated if required, and signed off by a qualified person.	NA
Site Free from Debris	Site free of former mining debris at the time of transfer to institutional control.	✓
Water Quality Within Modelled Predictions	Water quality data is stable/improving.	✓

Based on the conclusions of the 2020 ERA the human and ecological risks are acceptable, and all relevant performance indicators have been met. As such, the properties associated with Fookes Reservoir should be considered for Release from Decommissioning and Reclamation by the SkMOE, released from CNSC License WFOL-W5-2120.0/2025 and transfer to the provincial Institutional Control Program for long term environmental stewardship.

The following section outlines the expectations for managing Fookes Reservoir properties while under Institutional Control.

8.2.4 Institutional Control Considerations and Requirements

Engineered Structures

The Fookes Reservoir properties hosts the Fookes Delta Cover and Fookes Reservoir Outlet Structure. These structures have been designed as passive structures and Cameco does not anticipate any future maintenance to required. However, Cameco has identified potential sources of cover

material near to Fookes Reservoir and provided funding in the monitoring and maintenance plan to perform minor remediation work if erosion were to occur on the site. The potential sources of cover material are located on the former ACE 3 property and the Highway's Pit, that was used to cover tailings boils as discussed earlier.

Beaverlodge Post Closure Land Status

As previously shown, **Figure 1** outlines the proposed IC border, including the Fookes Reservoir Area. Small portions of the south and southwest properties are outside the IC boundary defined in collaboration with the SkMOE and the Ministry of Economy (now SkMER). These portions will be free-released as they have not been impacted by historical mining/milling activities and the boundaries are based on a simplified (geometrically) IC boundary.

Remaining Site Aspects Requiring Future Monitoring and Maintenance (2020)

To meet the requirements of section 22 of the MIEPR, **Table 9** provides a summary of aspects of the Fookes Reservoir properties in terms of remaining liabilities and an assessment of the significance of the potential hazard posed by each in the unlikely event that it were realized.

Table 9: Remaining Site Aspects – Fookes Reservoir Properties

Site Aspect	Assessment Endpoint	Likelihood	Severity	Overall Residual Risk
Tailings Delta (erosion of cover)	Environment	Very Unlikely	Minor	Low
	Public Health & Safety	Very Unlikely	Minor	Low
Fookes Outlet Structure (erosion of outlet)	Environment	Very Unlikely	Minor	Low
	Public Health & Safety	Very Unlikely	Minor	Low

As noted earlier, the water quality of Fulton Creek watershed will continue to be monitored as part of the Beaverlodge EMP until all the Beaverlodge properties located within the entire watershed are transferred to the provincial IC Registry. A long-term water monitoring program will be implemented under the IC Program and water quality will continue to be compared to the predicted recovery from the 2020 ERA (CanNorth 2020).

Institutional Control Monitoring

Figure 7 outlines the site features associated with Fookes Reservoir properties. Based on the historical activities at the Fookes Reservoir properties, the delta and the outlet structure will require inspection under the Province of Saskatchewan's institutional control management framework. As noted by SRK (2021), involvement by a geotechnical engineer should not be required except in the unlikely event that significant geotechnical concerns arise. Such an inspection should be conducted of all disturbed areas and focus on the following aspects:

- Evidence of recent human visitation,
- Fookes Delta (SRK 2021),
    - Evidence of new tailing boils or tailings exposure due to frost action;
    - Evidence of significant erosion of the cover material:
        - Trench along the northeast edge of the delta (sand flows, erosion of waste rock, slumping, etc.) – maintain photographic and GPS record (identify areas of concern on map).
        - Cover limit along its contact with Fookes Reservoir – maintain photographic and GPS record (identify areas of concern on map) where sand from the delta cover extends into the reservoir.
    - Evidence of erosional features;
    - Ensure erosion-protection devices are performing as expected on former north access road:
        - Waterbars (chevrons);
        - Diversion ditches; and
        - Erosion of cover adjacent to the former access road.
    - Ensure earthen berms are in place to limit access to the delta.
    - Condition of vegetation.
- Fookes Outlet Structure (SRK 2021);
    - Check the condition of the spillway channel, with a view to confirming the grout intruded rip-rap is still in place.
    - Check the condition of the rip-rap embankments on either side of the spillway, with a view to confirming no erosion has occurred due to overtopping associated with an extreme flood event.
    - Document conditions with photographs.
- Water quality.

Institutional Control Maintenance

Although no aspect of the Fookes Reservoir properties is expected to require maintenance under institutional control, funds have been provided to perform remediation on the Fookes Delta if erosional features that need to be addressed are identified.

8.3 Marie Reservoir Area

During operations, more than 170,000 tonnes of mill tailings were placed within the Marie Reservoir between 1954 and 1957. During deposition of tailings a small tailings delta was developed in the northwest end of Marie. The Marie delta is mostly contained to the EXC ACE 14 property; however, a small portion of the delta extends onto the ACE 15 property. This delta was partially submerged by the construction of the Marie Reservoir dam in 1971; and at shutdown, covered approximately 5 to 10% of the reservoir area.

As shown in Figure 7, spilled tailings was identified and left "as-is" along the pipeline right-of-way on properties EXC GC2 and GORE within the Marie Reservoir Area. Residual tailings from spills that occurred during operations along the pipelines running from the Dorrclone separator to the tailings management area were assessed and remediated in accordance with the approved decommissioning plan (Eldorado 1987). Accessible tailings were either relocated to the underground mine workings or covered with 0.6 m of waste rock. Locations with residual tailings that were inaccessible, either due to topography or naturally established vegetative cover, were assessed on an individual basis, with the participation of regulatory personnel, to determine whether they should be left as is or remediated. If a decision was made to leave the residual tailings in situ, it was because the disturbance associated with removal or covering the of the tailings would have resulted in greater environmental damage.

In 1976 a water treatment plant was constructed at the outlet of Marie Reservoir. As a result, the water from Marie was discharged at a controlled rate into the Meadow basin. Sample station TL-4 was established at the outflow of Marie Reservoir, where barium chloride solution and ferric sulphate solution were injected at rates proportional to the discharge flows and the precipitates deposited in the Meadow basin which was created by the construction of a concrete and stop log dam in 1977 (the Meadow dam at sample station TL-7) at the southern end of the Meadow basin on the ACE 19 property. An area approximately 100m to the north and west of the Marie Outlet also appears to have been built up with large angular rip-rap, likely during the construction of the water treatment plant, to prevent water from flowing through an alternate path.

The Meadow basin was used for the settling of barium-radium precipitate resulting from the treatment of water at the Marie dam treatment plant, and for the additional settling of precipitate overflowing from the Minewater basin (see Minewater Reservoir discussion). The Marie Reservoir Area consists of nine properties listed in **Table 10**.

Table 10: Marie Reservoir Area Property Coordinates

AECB License Number	Cameco Number	Area (hectares)	Coordinates (UTM WGS 84, 12N)	
			Easting	Northing
N-294	EXC ACE 18	20.7	643514	6603586
			644110	6603704
			644240	6603942
			643483	6603967
	EXC ACE 17	11.9	644240	6603942

			643472	6604204
			644199	6604033
			643481	6604016
			643483	6603967
	ACE 17	21.2	643472	6604204
			643543	6604470
			644007	6604458
	ACE 15	23.6	643481	6604016
			644622	6604545
			644593	6604539
			644007	6604458
			644611	6604075
	EXC ACE 14	16.1	643481	6604016
			644032	6604811
			644582	6604753
			644587	6604647
			644622	6604545
			644593	6604539
			644611	6604075
	GORE	7.1	644593	6604539
			645154	6604677
			644587	6604647
			644622	6604545
	EXC GC 2	7.4	644587	6604647
			644580	6604808
			645160	6604774
			644582	6604753
			645154	6604677
	GC 4	18.9	645104	6604260
			643946	6605142
			645154	6604677
			644622	6604545
	EXC GC 4	6.6	644611	6604075
			645102	6604126
			645104	6604260
			644614	6604211

8.3.1 Initial Decommissioning Activities

Marie Reservoir Tailings Delta

During the life of mine, tailings were deposited in two general locations within the Marie Reservoir: one near the west end and a second at the east end. Tailings were delivered to the basin using wood stave pipelines that discharged tailings into channels cut into the natural slopes. Given the steepness of these gullies, the vast majority of the tailings flowed into the reservoir as planned, thereby forming each of the two deltas. These channels are heavily vegetated today and only very minor traces of the tailings are evident in the vicinity of these channels.

In 1983 and 1984, as part of the approved mine decommissioning plan, the following activities were undertaken:

- Tailings near the surface of Marie Reservoir were moved to a deeper part of the reservoir; and
- Tailings deltas in Marie Reservoir were covered with waste rock.

Marie Outlet Structure

The Marie Reservoir Outlet structure is located on the EXC ACE 17 property. Close-out activities at the Marie Reservoir in 1985 included measures to remove water treatment infrastructure and to stabilize the outlet of the Marie Reservoir in an effort to maintain minimum water levels at the outlet 1 m above the highest level of uncovered tailings.

During the 1986 spring-melt, flows through the Marie Reservoir outlet were higher than anticipated (due to glaciation effects in the spillway) and this resulted in erosion of the spillway channel and a 0.15 m drop in the water level. As a consequence, the outlets from both Fookes and Marie reservoirs were upgraded to provide improved long-term stability.

The Marie Reservoir spillway was upgraded in 1987 in accordance with the objectives noted below. The spillway invert controlling reservoir level was set at an elevation of 2,815.2 m (based on local datum) at the outlet in Marie Reservoir. The elevation is approximately 1 m above the elevation down to which the waste rock cover was placed on the tailings deltas. This elevation represents an increase of about 1 m in the outlet level of Marie Reservoir, compared to pre-mine development. The general design objective for the outlet structure was to:

- Prevent piping into the coarse embankment fill by constructing an embankment with a low permeability upstream zone;
- Enhance the erosion resistance of the spillway in the long term;
- Raise the embankment to reduce the potential for overtopping; and,
- Prevent erosion of the embankment in the event that glaciations of the spillway results in overtopping of the embankment.

Similar to the Fookes outlet structure, the Marie outlet structure consists of a rip-rap lined open channel (with trapezoidal cross section) discharging into a rip-rap lined stilling basin. The rip-rap lining in the spillway channel and the stilling basins was intruded with grout for added erosion protection; however, the rip-rap in the spillway was designed to be stable in the absence of grout intrusion. The spillway is capable of passing a 500-year flood event with a depth of 0.3 m (680 L/sec) at the entrance of the Marie spillway. In the event of embankment overtopping, the coarse rip-rap will resist erosion of the upper surfaces and downslope embankments (SRK 1986).

Inspections of the outlet spillways at the Fookes and Marie reservoirs were undertaken by SRK in September 1998 (SRK, 1998), September 2001 (SRK, 2001), June 2004 (SRK, 2005a), August 2007 (SRK, 2008), May 2010 (SRK, 2010b), June 2015 (SRK, 2015) and September 2020 (SRK 2021). Since 2010, a Cameco representative has also completed annual inspections of the outlet structures.

In 2020, Cameco commissioned SRK Consulting (Canada) Inc. to conduct a detailed geotechnical assessment of the decommissioned Beaverlodge Mine/Mill site which include Marie outlet structure. That report concluded that, from a geotechnical perspective, the conditions at the outlet structures have stabilized sufficiently to support the transfer of associated properties to the IC Program (SRK 2021).

Meadow Basin

The majority of the Meadow Settling Basin and the outlet of the settling basin is located on the EXC ACE 18 property; however the NE portion, located immediately downstream of the Marie Outlet Structure, is located on EXC ACE 17 property.

After the Marie Reservoir water treatment plant was shutdown the remediation of the Meadow Basin area commenced. Remediation involved the removal of numerous stop-logs from the dam at the south-western outlet (on EXC ACE 18; at monitoring station TL-7) in July 1984, lowering the water level in the basin, exposing the settled precipitate from the Marie Reservoir water treatment plant. The settled precipitate was excavated and disposed of underground. At the time precipitate depths in the Meadow basin varied from 100 mm at the basin inlet to 10 mm at the stoplog dam (TL-7) basin outlet, with the average thickness being 20 mm. The inlet and outlet channels were cleared in September 1984, in preparation for Marie Reservoir overflow to commence in mid-October.

Precipitate was excavated and stockpiled at Meadow during the winter of 1985. Due to equipment limitations, it was necessary to remove a layer approximately 300 mm deep from the total basin floor area. This layer contained primarily muskeg, with a large proportion of ice and snow.

Consequently, the excavated material was stockpiled on the shores of Meadow basin to allow the ice and snow to melt prior to disposal down the Ace Vent Raise.

Precipitate haulage and stockpiling was carried out between January and April 1985 and a total of 6,470 m^3 of material (sludge and muskeg) was hauled and underground disposal was completed during in May and June 1985. Additional remediation of the stoplog dam at TL-7 occurred in 2021 and is discussed further in Section 8.3.2.

During August 2021, the concrete stop log flow control structure (at sample station TL-7) located at the outlet of the Meadow Basin, on property EXC ACE 18, was decommissioned by the removal of the wooden stop logs and steel frame followed by the partial removal of the concrete dam.

The Meadow basin also collects runoff from the Minewater Reservoir area. When runoff from Minewater Reservoir was redirected towards the Meadow basin, in 1971, a culvert was installed in the road along the north side of the Meadow basin to allow drainage into the basin. This culvert was removed in September 2023 and a level crossing was created to allow drainage to continue.

8.3.2 Recent Decommissioning Activities and Performance Indicators

Acceptable Gamma Levels (Performance Indicator has been met)

During 2014, a detailed surficial gamma survey was conducted primarily focusing on the disturbed areas (i.e., Fay area, roads and the former tailings pipeline corridor) and included previously disturbed areas of the Marie Reservoir properties (ARCADIS SENES 2014). The properties were surveyed on a 10 m grid (approximately), as terrain and vegetation allowed considering safety and physical accessibility, with each radiation technician using a Ludlum 2221 ratemeter connected to a 2" x 2" sodium iodide (NaI) crystal scintillation detector (Ludlum 44-10).

The resulting radiation dose rates were then averaged on a 1 ha basis to allow comparison to the 1 µSv/h reference gamma value in the provincial *Guidelines for Northern Mine Decommissioning and Reclamation* (SkMOE 2008). As shown in **Figure 13**, the surface gamma survey results ranged from <0.1 µSv/h to 1.0 µSv/h above background (ARCADIS SENES 2014), which meets the *Guidelines for Northern Mine Decommissioning and Reclamation* (SkMOE 2008). Therefore, the Marie Reservoir properties meet the performance indicator associated with acceptable gamma levels.

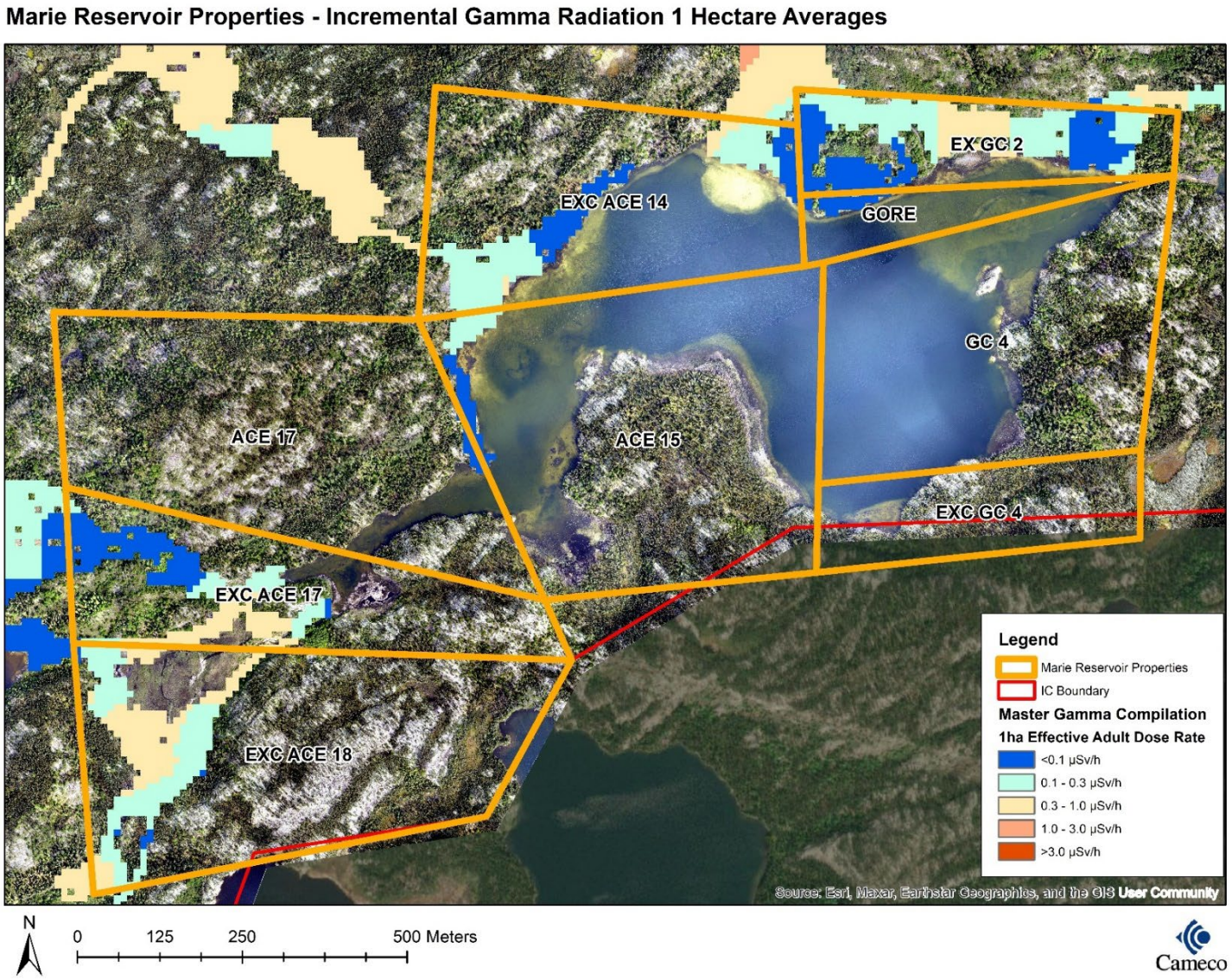


Figure 13: Incremental Gamma Radiation 1 Hectare Averages: Marie Reservoir Properties

Boreholes Plugged (Performance Indicator is not applicable)

Surface inspections in support of transferring the property to IC did not identify any exploration drill holes on the Marie Reservoir properties.

Stable Mine Openings (Performance Indicator is not applicable)

The Marie Reservoir properties do not host any mine openings to surface.

Geotechnical Stability

Crown Pillar (Performance Indicator has been met)

The crown pillar performance indicator is not applicable to the Marie Reservoir properties as presented to the Commission by CNSC Staff during the 2014 update meeting.

Pit Walls

There are no open pits associated with the Marie Reservoir properties.

Tailings

In 2020, SRK (Canada) Consulting Ltd. Inspected the Marie Reservoir Delta Area and concluded that, consistent with previous assessments (SRK 2005b; 2015), the condition of the cover is generally good despite the observation that tailings have worked their way to surface through the waste rock cover. Visual inspection completed by geotechnical specialist between 2004 and 2020 indicate that no large-scale changes to the extent of exposed tailings have occurred and the exposed tailings have a brown, aged appearance that has remained unchanged since 2004. These observations suggest that the tailings at the Marie Reservoir Delta have been exposed for a long period of time, possibly as far back as 1984 when the rock fill cover was installed (SRK 2021b). From a geotechnical perspective, based on inspections completed over the past 16 years, the conditions on the delta have stabilized sufficiently to support the transfer of properties associated with the Marie delta to the IC Program (SRK 2021).

As shown in Figure 7, there are tailings present on Marie Reservoir properties (EXC GC 2 and GORE) that were left undisturbed (i.e., left as is). Monitoring has confirmed that surface runoff that comes in contact with tailings are not a significant source of the primary constituents of concern. (SENES 2012a; 2012b). Further, the results from the site wide gamma survey meet the *Guidelines for Northern Mine Decommissioning and Reclamation* and no additional remedial actions are justified (ARCADIS 2015).

Waste Rock

Waste rock present on the Marie Reservoir properties was used to cover the exposed tailings on the delta and to construct the roads transecting the properties. In addition, approximately 900m^2 of waste

rock is located approximately 100m NW of the Marie Outlet to prevent water from flowing through an alternate pathway. This waste rock pile was placed during the operating period of the mine/mill and was upgraded in 1987 with additional material, when the upgrades to the Marie Outlet drainage channel were completed.

Waste rock samples specific to the Marie Reservoir area properties have not been collected; however, based on general waste rock samples collected on the Beaverlodge properties, uranium content is typically below the threshold considered to be special/mineralized waste rock at the operating uranium mines in northern Saskatchewan (0.03%). This is reflected in the gamma survey results provided above. Areas where waste rock is located are typically below 0.3 μSv/hr. Further, waste rock sampling has also shown the waste rock is non-acid generating and visual observation for more than 60 years has not identified any impacts that could be attributed to the generation of acidic conditions.

Water Quality within Modelled Predictions (Performance Indicator has been met)

To determine if natural recovery is occurring in the Marie Reservoir Area as expected, water quality has been monitored at station TL-4 (located at the outflow of Marie Reservoir) and concentrations have helped inform modelled predictions. The modelled data helped establish WQ performance indicators, which CNSC Staff have deemed appropriate for evaluating the recovery of Marie Reservoir. The relevant water quality constituents that are assessed as part of the performance indicator include: radium-226, uranium, and selenium. As shown in **Figure 14, 15, and 16** and discussed in greater detail in the 2020 Beaverlodge ERA (CanNorth 2020a), the following observations can be made that demonstrate the Marie Reservoir water quality data is meeting the water quality performance indicator as defined by regulatory accepted assessment methodologies:

- Radium-226 levels in Marie Reservoir are within the predicted bounds identified as the performance indicator for this area.
- Uranium and selenium levels in Marie Reservoir meet the performance indicator for this area and are expected to continually improve over the long-term.

Radium-226 levels are expected to increase slightly before they decline. The chemical processes causing this increase are known and well understood. As detailed in the 2020 ERA, increases are attributed to the release of historically precipitated radium from sediments. Radium-226 precipitates in the Marie Reservoir are associated with naturally occurring calcium and barium, which may have been introduced in the milling process. After the peak is reached, levels are expected to gradually improve.

The Marie Reservoir properties therefore meet the “water quality within modelled predictions” performance indicator.

Figures 14 and 15 are provided to show the rapid decrease in uranium and selenium concentrations that occurred following decommissioning. Due to the rapid improvement of selenium and uranium concentrations following decommissioning a second graph showing a more suitable scale of current concentrations is also provided.

The water quality of Marie Reservoir will continue to be monitored as part of the Beaverlodge EMP until all the Beaverlodge properties are transferred to the provincial IC Registry. A long-term water monitoring program will then be implemented under the IC Program and water quality will continue to be compared to the predicted recovery from the 2020 ERA (CanNorth 2020).

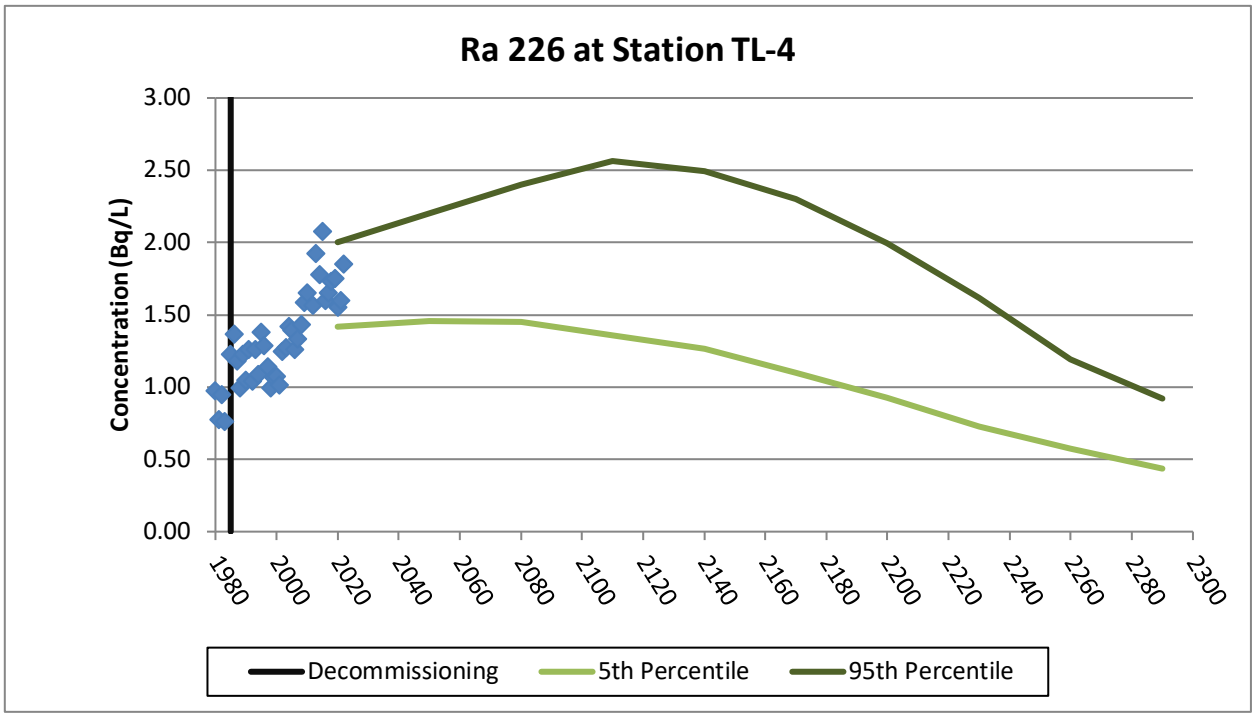
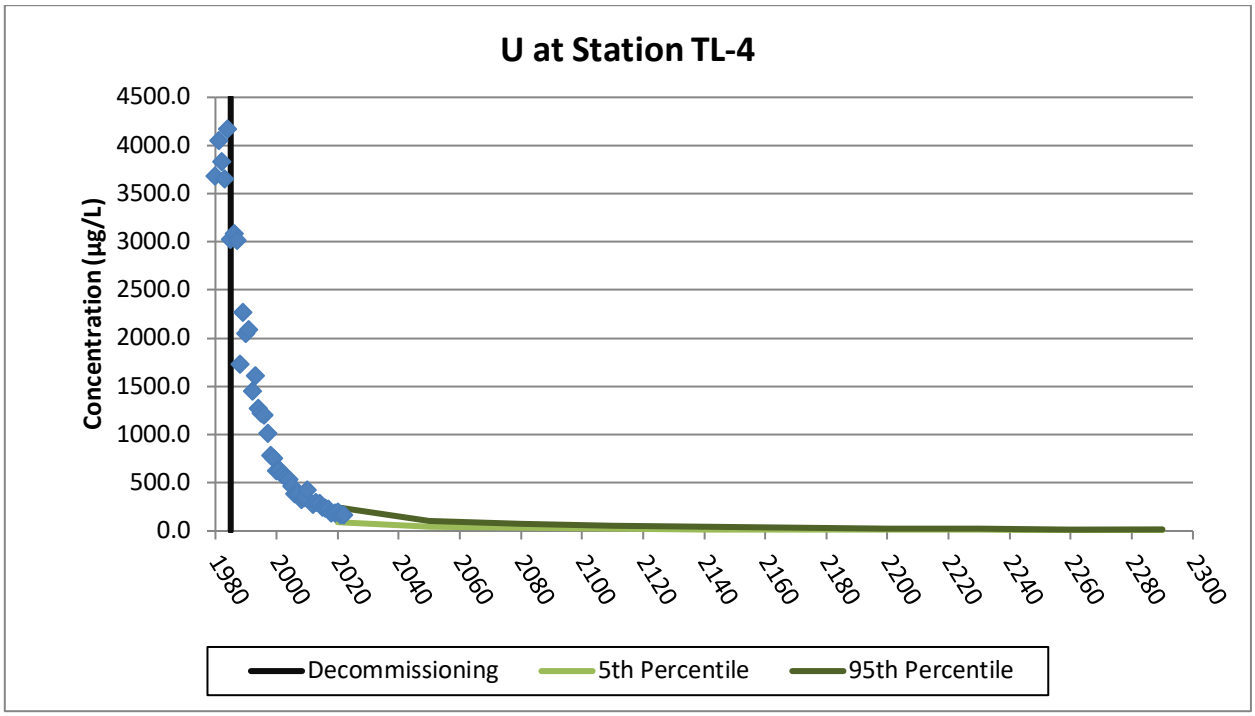


Figure 14: Ra-226 Performance Indicator at TL-4



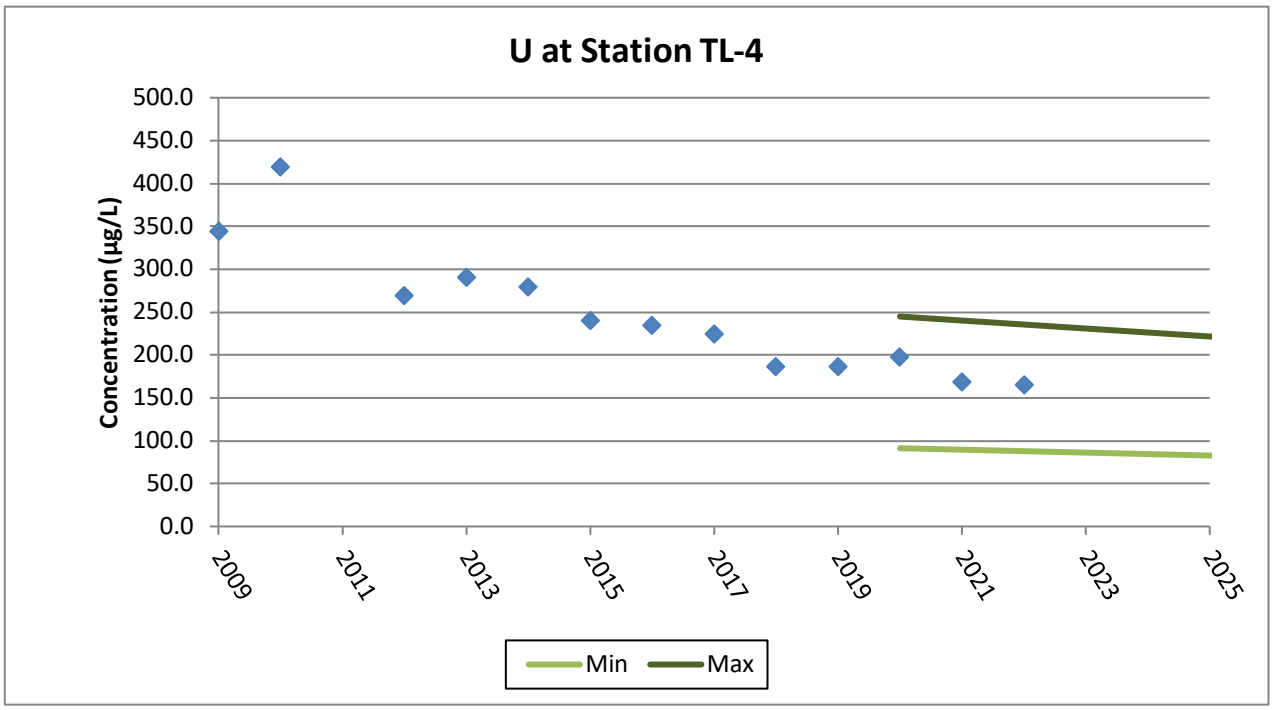


Figure 15: U Performance Indicator at TL-4

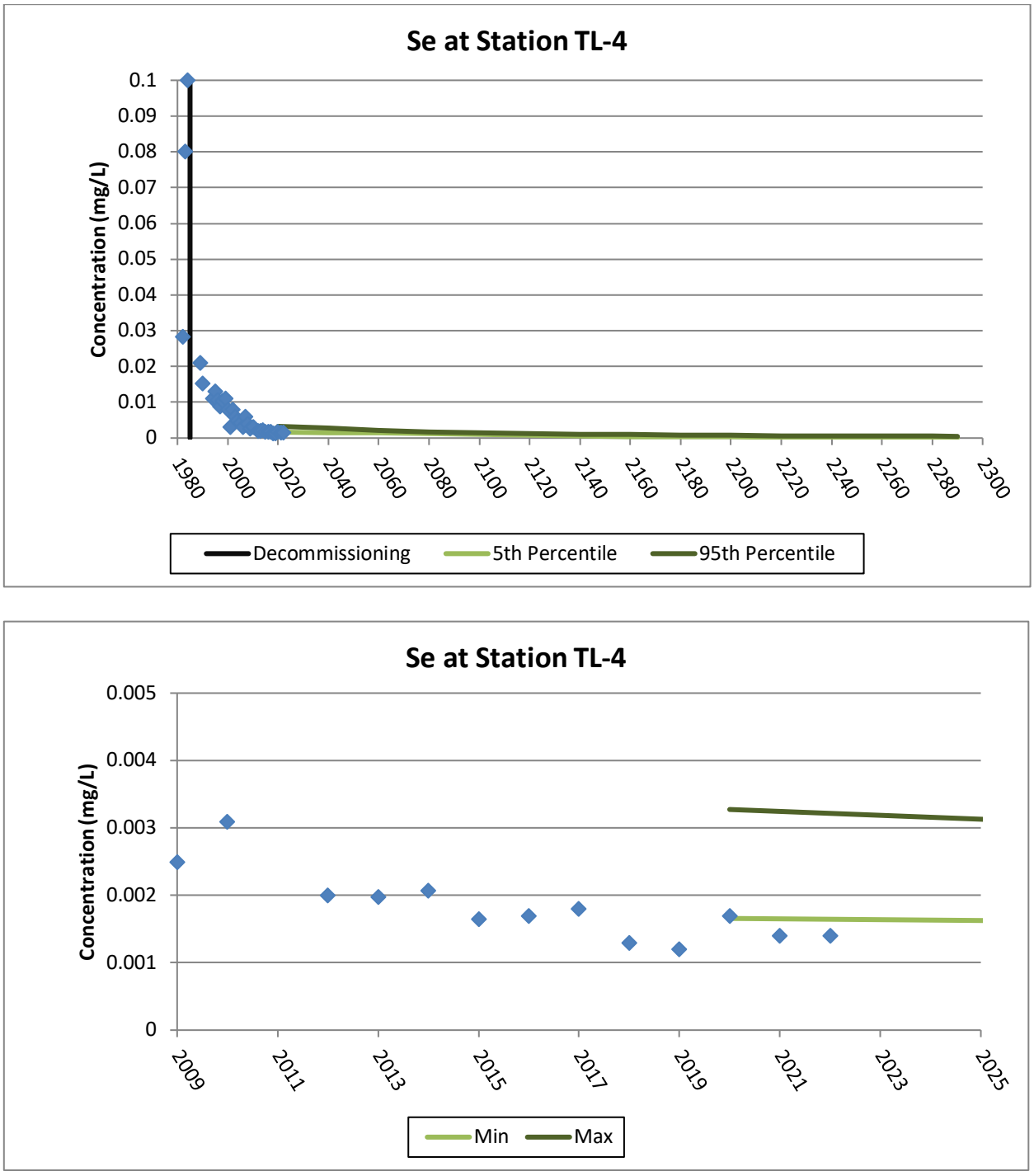


Figure 16: Se Performance Indicator at TL-4

Site Free from Debris (Performance Indicator has been met)

All Beaverlodge related properties were inspected in an effort to locate historic debris not removed during initial decommissioning. During the main clean-up campaign in 2015 and 2017, GPS tracking was utilized to ensure adequate coverage of the properties, including the Marie Reservoir properties, unless safety consideration, surface features or significant vegetation prohibited access to a specific area (**Figure 17**).

Following the above noted inspections, various debris found on the property, including the remaining electrical and power infrastructure (pole brackets) and concrete pilons and anchor bolts used to anchor the tailings line were removed and disposed of in the Lower Fay Pit as approved by SkMOE. In addition, as final regulatory inspections of the properties occurred, any additional debris located was disposed of in Lower Fay Pit.

During August 2021, the concrete stop log flow control structure (at sample station TL-7) located on property EXC ACE 18, was decommissioned by the removal of the wooden stop logs and steel frame followed by the partial removal of the concrete dam. All materials removed (wood, steel and concrete was removed and disposed of in the Lower Fay Pit.

The culvert that was installed under the road along the north side of the Meadow basin to allow drainage from the Minewater Reservoir area was removed in September 2023 and a level crossing was created to allow drainage to continue. The culvert was disposed of in Lower Fay Pit.

As a result of this activity, the Marie Reservoir properties meets the performance indicator of being free of debris.

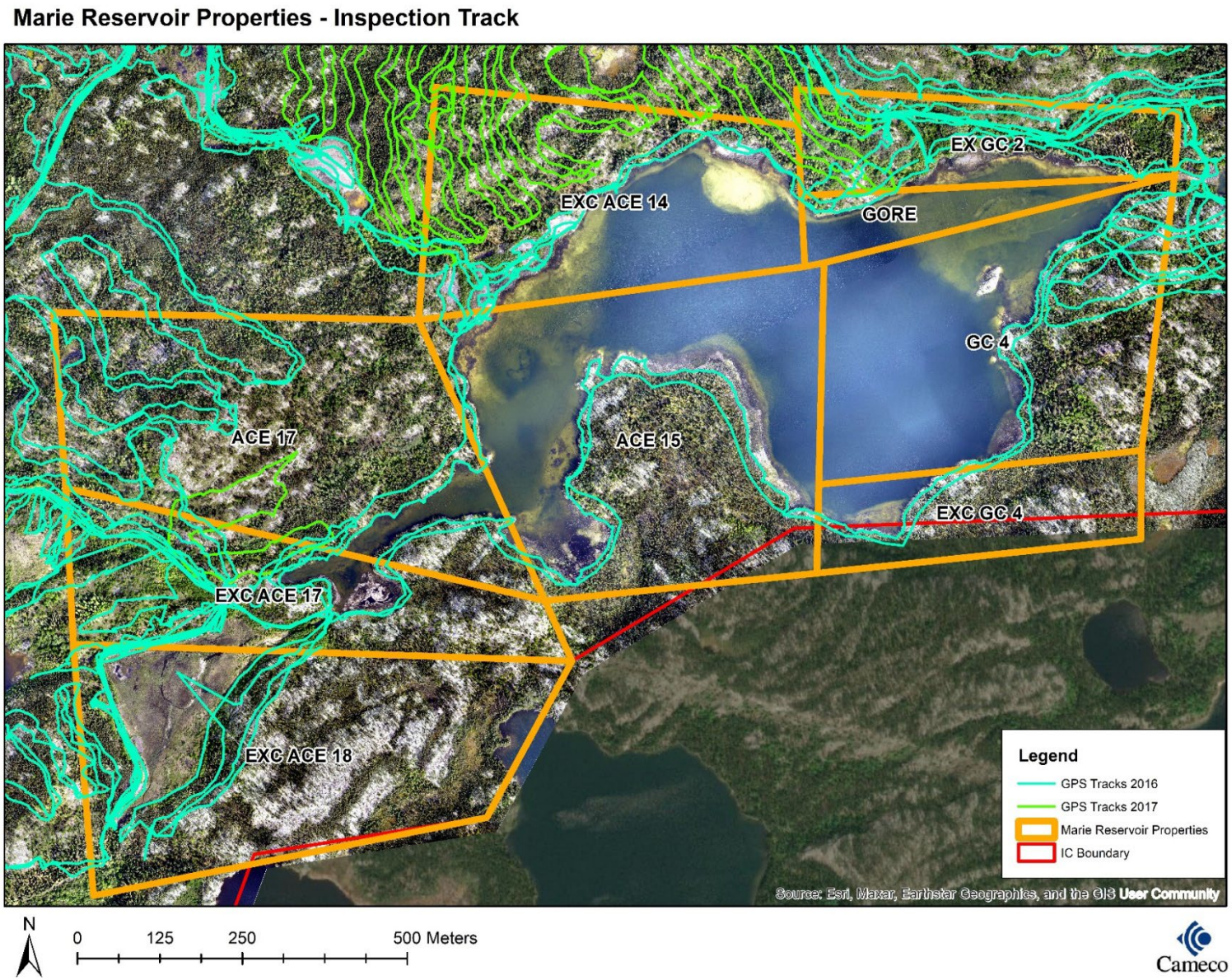


Figure 17: Marie Reservoir Properties – Inspection Track

8.3.3 Decommissioning and Reclamation Documentation

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Surface Lease Renegotiation, Appendix D - Decommissioning and Reclamation Plan, Historical Summary: 1981-2005, Cameco Corporation	November 2006
Waste Rock Stability Assessments – Former Beaverlodge Sites, SRK Project No. 4CC008.027, SRK Consulting (Canada) Inc	December 2010
Surficial Gamma Radiation Survey of Disturbed Areas at the Former Beaverlodge Mine Site, Final Rev. 1, ARCADIS SENES Canada Inc.	November 2014
2014 Uranium City Consultation on Land Use, SENES Consultants & Kingsmere Resources Services	January 2015
Beaverlodge Site Gamma Radiation Risk Evaluation, ARCADIS Canada Inc.,	June 2015
Beaverlodge Property – Crown Pillar Assessment (2014-2015), SRK Project No. 1CC007.048, SRK Consulting (Canada) Inc.	July 2015
Beaverlodge 2017: Borehole Decommissioning Report, Cameco Corporation (Cameco).	July 2017
Remediation of Utility Corridors & Related Infrastructure, Beaverlodge Properties, Kingsmere Resource Services Inc.	January 2018
Beaverlodge Property Inspection for Institutional Control Transfer Report, Kingsmere Resource Services Inc.	January 2018
2020 Geotechnical Inspection Report Decommissioned Beaverlodge Mine/Mill Site, SRK Consulting (Canada) Inc., 1CC007.067	February 2021
Beaverlodge Aquatic Support 2021 - Monitoring Summary / Cameco, Outside Environmental Consulting Ltd.	September 2021

8.3.4 Evaluation of Marie Reservoir Properties

The properties meet the established performance objectives of safe, secure, stable/improving and have no remaining liabilities (see Table 12).

Table 12: Evaluation of Marie Reservoir Properties

Performance Indicators	Acceptance Criteria	**Marie** Reservoir
Acceptable Gamma Levels	Reasonable use scenario demonstrating gamma levels at the site are acceptable.	✓
Boreholes Plugged	All boreholes have been plugged at the time of transfer to institutional control.	NA
Stable Mine Openings	Mine openings have been secured and signed off by a qualified person, where applicable.	NA
Stable Crown Pillar	Crown pillar assessed, remediated if required, and signed off by a qualified person.	NA
Site Free from Debris	Site free of former mining debris at the time of transfer to institutional control.	✓
Water Quality Within Modelled Predictions	Water quality data is stable/improving.	✓

Based on the conclusions of the 2020 ERA the human and ecological risks are acceptable, and all relevant performance indicators have been met. As such, the properties associated with Marie Reservoir should be considered for Release from Decommissioning and Reclamation by the SkMOE, released from CNSC License WFOL-W5-2120.0/2025 and transfer to the provincial Institutional Control Program for long term environmental stewardship.

The following section outlines the expectations for managing Marie Reservoir properties while under Institutional Control.

8.3.5 Institutional Control Considerations and Requirements

Engineered Structures

The Marie Reservoir properties host the Marie Reservoir Outlet Structure; and the remnants of the concrete foundation of the decommissioned control structure at the outlet of Meadow Basin. Neither of these aspects are expected to require maintenance.

Beaverlodge Post Closure Land Status

As previously shown, **Figure 1** outlines the proposed IC border for the Marie Reservoir Area. Small portions of the southern properties are outside the IC boundary defined in collaboration with the SkMOE and the Ministry of Economy (now SkMER). Those portions that will be free-released have not been impacted by historical mining/milling activities and the boundaries are based on a simplified (geometrically) IC boundary.

Remaining Site Aspects Requiring Future Monitoring and Maintenance (2020)

To meet the requirements of section 22 of the MIEPR, **Table 13** provides a summary of aspects of the Marie Reservoir properties in terms of remaining liabilities and an assessment of the significance of the potential hazard posed by each in the unlikely event that it were realized.

Table 13: Remaining Site Aspects – Marie Reservoir Properties

Site Aspect	Assessment Endpoint	Likelihood	Severity	Overall Residual Risk
Tailings Delta (erosion of cover)	Environment	Very Unlikely	Minor	Low
	Public Health & Safety	Very Unlikely	Minor	Low
Marie Outlet Structure (erosion of outlet)	Environment	Very Unlikely	Minor	Low
	Public Health & Safety	Very Unlikely	Minor	Low

As noted earlier, the water quality of Fulton Creek watershed will continue to be monitored as part of the Beaverlodge EMP until all the Beaverlodge properties located within the entire Ace Lake watershed are transferred to the provincial IC Registry. A long-term water monitoring program will then be implemented under the IC Program and water quality will continue to be compared to the predicted recovery from the 2020 ERA (CanNorth 2020).

Institutional Control Monitoring

As previously shown, **Figure 7** outlines the site features associated with Marie Reservoir properties. Based on the historical activities at the Marie Reservoir properties, the tailings delta and the outlet structure will require inspection under the Province of Saskatchewan's institutional control management framework. As noted by SRK (2021), involvement by a geotechnical engineer should not be required except in the unlikely event that significant geotechnical concerns arise. Such an inspection should be conducted of all disturbed areas and focus on the following aspects:

- Evidence of recent human visitation,
- Condition of vegetation,
- Marie Tailings Delta (SRK 2021),
    - Evidence of tailing boils or tailings exposure due to frost action
    - Evidence of significant erosion of the cover material
    - Evidence of erosional features
- Marie Reservoir Outlet (SRK 2021), and
    - Check the condition of the spillway channel, with a view to confirming the grout intruded rip-rap is still in place.
    - Check the condition of the rip-rap embankment on either side of the spillway, with a view to confirming no erosion has occurred due to overtopping associated with an extreme flood event.

  - Check for disturbance along the SaskPower power line right-of-way, with attention to the areas of the Marie spillway channel and the area that was built up with angular rip-rap approximately 100m NW of the Marie spillway.
  - Document conditions with photographs.
- Water quality.

Institutional Control Maintenance

Although no aspect of the Marie Reservoir properties is expected to require maintenance under institutional control, funds have been provided to perform remediation on the Marie Delta if erosional features that need to be addressed are identified.

8.4 Minewater Reservoir Area

During operations, approximately 101,000 tonnes of mill tailings were placed within the Minewater Reservoir between 1953 and 1954. After 1954 and until 1971, the Minewater Reservoir, (sometimes referred to as URA Pond) received mine slimes and sanitary wastes from underground. Between 1971 and 1982, the area was used for settling barium radium precipitate from treated mine water, while continuing to receive sewage, from the Fay underground mine.

The natural drainage direction of the Minewater Reservoir was originally to Ace Creek. A dam was constructed on the west side of Minewater basin in 1971 (saddle dam), to direct drainage from the Minewater Reservoir towards the tailings management area (Meadow Basin). The Minewater dam was constructed to a height of approximately 3 m in 1971 using mine waste rock to prevent the discharge of water from Minewater Reservoir to Ace Creek.

A geotechnical investigation of the saddle dam area was performed in 1981. That investigation indicated that the dam was constructed without a proper (low permeability) core using mine waste rock, which generally consists of sand and gravel sizes and is relatively permeable. No foundation preparations appear to have been made and the saddle dam is underlain by peat and glacial till, over bedrock. Following completion of the above noted investigation (in 1981) a 2 to 5 m blanket of clay/silt till was placed on the upstream face, by end dumping and without compaction.

At decommissioning it was concluded the saddle dam would not be maintained as a permanent structure. Instead, tailings and sludges were removed from Minewater Reservoir, the saddle dam wall was recontoured and a new spillway outlet was blasted into the bedrock on the south part of the reservoir, to permanently alter the drainage of Minewater towards Lost Duck Lake, and then to the Meadow Basin area within the TMA. The crest of the new channel is more than 1 metre below the base of the former saddle dam. Monitoring has confirmed that flows from spring runoff flow freely from the area through the blasted spillway. As a result, the recontoured former saddle dam remains in place, but serves no purpose and does not require future inspection.

Described in DRAWING 53601/15 and Appendix E of *Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site, Report No. 3 – Beaverlodge Tailings and Sludges Close-out Engineering Feasibility Studies,* Steffen Robertson & Kirsten for Eldorado Resources Limited (Eldorado 1983b).

The Minewater Reservoir is located on property URA 6. Flow is from URA 6 through Lost Duck Lake (located on ACE 19) and then into the Meadow Basin on property EXC ACE 18 (located within the Marie Reservoir Area). The Minewater Reservoir Area consist of the following properties shown in **Table 14**.

Table 14: Minewater Reservoir Property Coordinates

AECB License Number	Cameco Number	Area (hectares)	Coordinates (UTM WGS 84, 12N)	
			Easting	Northing
N-294	URA 6	20.7	645524	6604137
			643453	6604470
			643472	6604204
			642975	6604162
	EXC URA 6	6	643483	6603967
			642975	6604162
			642979	6604091
			643481	6604016
			642963	6603974
	ACE 19	15.8	643514	6603586
			642963	6603974
			643483	6603967
			643514	6603586

8.4.1 Initial Decommissioning Activities

Minewater Reservoir

The decommissioning of the Minewater Reservoir on the URA 6 property consisted of the removal of deposited tailings and mine slimes, to the maximum extent possible, with the disposal of the material underground through the Ace vent raise.

The Minewater Reservoir was drained in 1982. Drainage ditches were excavated in the reservoir-bottom muskeg in an attempt to drain the basin in the direction of Meadow; however, the ditch sides continuously slumped and the method of drainage was finally abandoned. A sump was excavated in the tailings by backhoe, and continuous pumping was required during excavation.

During the winter of 1982, test work was conducted on the Minewater materials as part of a preliminary winter program to assess the feasibility of using underground load, haul and dump (LHD) equipment. The results were satisfactory and LHD equipment was used throughout the decommissioning period.

The balance of the tailings and other settled waste were removed from the Minewater basin during 1983 and 1984 and dumped underground through the Ace vent raise. The perimeter of the basin was cleared using a tracked dozer, while the main area of the basin was excavated.

In all, approximately 112,000 m^3 of material was removed and final contouring of the Minewater Reservoir was carried out during a three-week period at the end of August 1984.

8.4.2 Recent Decommissioning Activities and Beaverlodge Performance Indicators

Acceptable Gamma Levels (Performance Indicator has been met)

During 2014, a detailed surficial gamma survey was conducted primarily focusing on the previously disturbed areas (i.e., Fay area, roads and the former tailings pipeline corridor s) and included previously disturbed areas of the Minewater Reservoir properties (ARCADIS SENES 2014). The properties were surveyed on a 10 m grid (approximately), as terrain and vegetation allowed considering safety and physical accessibility, with each radiation technician using a Ludlum 2221 ratemeter connected to a 2" x 2" sodium iodide (NaI) crystal scintillation detector (Ludlum 44-10).

The resulting radiation dose rates were then averaged on a 1 ha basis to allow comparison to the 1 µSv/h reference gamma value in the provincial *Guidelines for Northern Mine Decommissioning and Reclamation* (SkMOE 2008).

As shown in **Figure 18**, the surface gamma survey results for the areas downstream of Minewater Reservoir area typically ranged from <0.1 µSv/h to 1.0 µSv/h above background (ARCADIS SENES 2014), which meets the *Guidelines for Northern Mine Decommissioning and Reclamation* (SkMOE 2008). The area surrounding the Minewater Reservoir itself typically measured between 1.0 and 3.0 µSv/h, with a small area on the east flank of Minewater Reservoir measuring >3.0 µSv/h above background. The area is difficult to access, and the area of the highest measured gamma levels is heavily vegetated. A risk-based approach was applied to evaluate potential radiation exposure risk at the property and concluded incremental dose from the properties based on the measured gamma results and the reported land use are well below the public dose criterion of 1 mSv/yr (ARCADIS 2015) and meet the Performance Indicator associated with acceptable gamma levels.

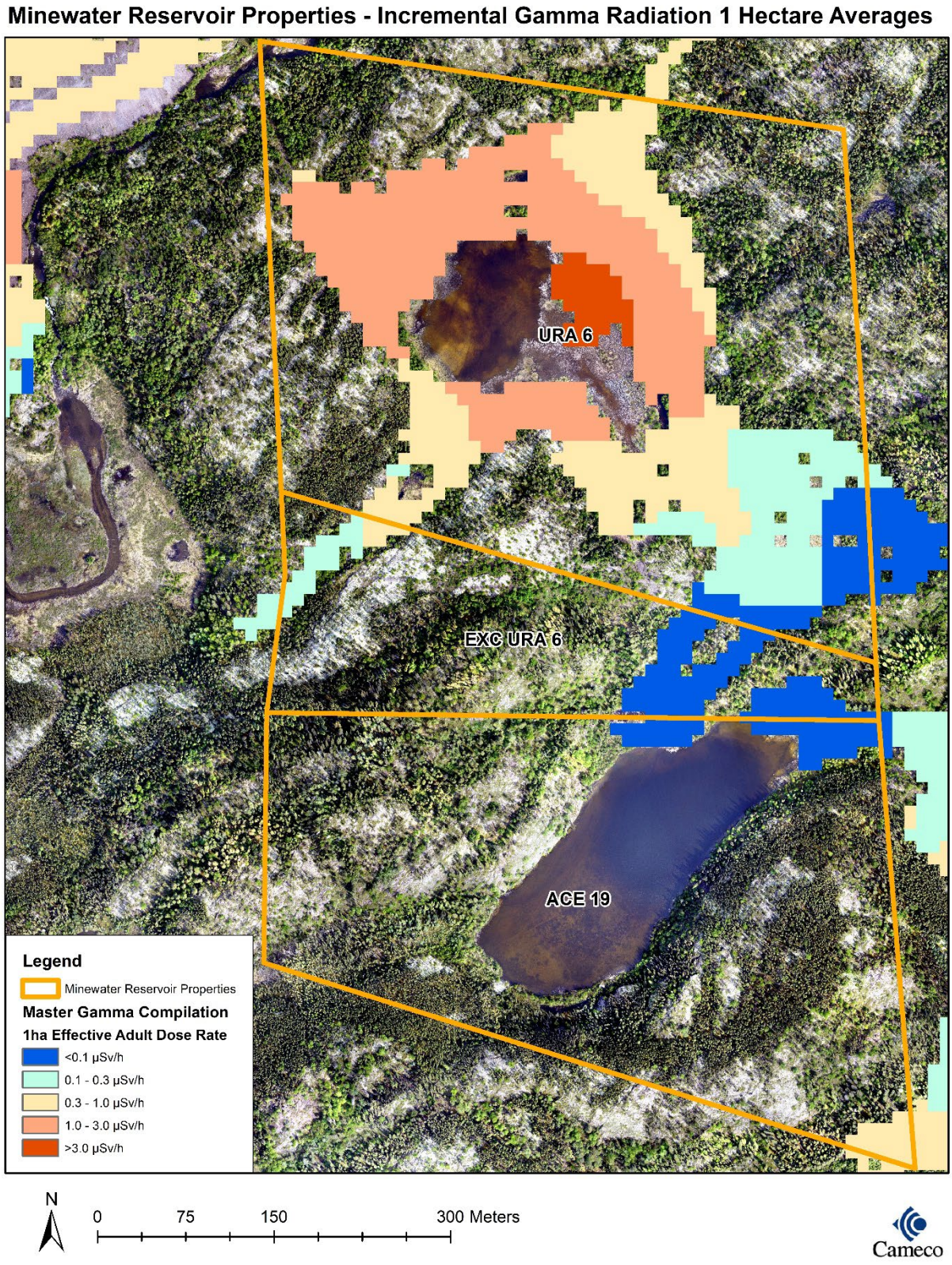


Figure 18: Incremental Gamma Radiation 1 Hectare Averages: Minewater Reservoir Properties

Boreholes Plugged (Performance Indicator has been met)

Activities completed since 1985 have included sealing exploration boreholes according to accepted methods (Cameco 2017). Surface inspections in support of transferring the properties to IC identified eight exploration drill holes on the URA 6 property which forms part of the Minewater Reservoir properties. The following provides the designation and location of each hole:

Table 15: Minewater Reservoir Property Boreholes

Designation	Coordinate System: WGS 84 UTM Zone 12		Year Remediated
	Easting	Northing	
BH-16	643009.193	6604465.019	2017
BH-17	642993.852	6604455.146	2017
BH-18	642995.637	6604466.051	2017
BH-19	642978.88	6604452.098	2017
BH-20	643007.541	6604467.124	2017
BH-26	642972.143	6604451.532	2017
BH-21	642966.862	6604445.757	2017

Each of the holes were found dry with no evidence of past liquid discharge. A review of the locations indicates that there is no potential for a hydraulic head to facilitate a surface discharge from the drill hole in the future. Despite showing no evidence or potential of flow, the drill holes were plugged with a concrete grout to a depth of 30 m or refusal in accordance with regulatory accepted methods.

As a result of the activities conducted since 1985, the Minewater Reservoir properties meet the boreholes plugged performance indicator.

Stable Mine Openings (Performance Indicator is not applicable)

The Minewater Reservoir properties do not host any mine openings to surface.

Geotechnical Stability

Crown Pillar (Performance Indicator has been met)

The crown pillar performance indicator is not applicable to the Minewater Reservoir properties as presented to the Commission by CNSC Staff during the 2014 update meeting.

Pit Walls

There are no open pits associated with the Minewater Reservoir properties.

Waste Rock

Waste rock present on the Minewater Reservoir properties is limited to that used to construct the roads transecting the properties. Waste rock samples specific to the Minewater Reservoir area properties have not been collected; however, based on general waste rock samples collected on the Beaverlodge properties, uranium content is typically below the threshold considered to be special/mineralized waste rock at the operating uranium mines in northern Saskatchewan (0.03%). This is reflected in the gamma survey results provided above showing the roads associated with this area are below 1µSv/hr. Further, waste rock sampling has also shown the waste rock is non-acid generating and visual observation for more than 60 years has not identified any impacts that could be attributed to the generation of acidic conditions.

Tailings

Since initial decommissioning, no additional remedial work related to tailings was required on the Minewater Reservoir properties.

Water Quality within Modelled Predictions (Performance Indicator has been met)

Sample Station TL-6 is located at the discharge of Minewater Reservoir which was used temporarily for tailings deposition in 1953, then as a settling pond for treated mine water during the last 10 years of Beaverlodge operations. The analysis performed as part of the original QSM showed that the contributions of loads from the Minewater Reservoir influencing the downstream Meadow Fen area are quite small, estimated at no more than 10%. As such, 2020 ERA model predictions were not generated for TL-6 (CanNorth 2020a).

To determine if recovery is occurring in the Minewater Reservoir Area as expected, water quality has been monitored at station TL-7 (located at the discharge of Meadow Fen upstream of Greer Lake) and concentrations have helped inform modelled predictions. The modelled data helped establish WQ performance indicators, which CNSC Staff have deemed appropriate for evaluating the recovery of Minewater Reservoir. The relevant water quality constituents that are assessed as part of the performance indicator include: radium-226, uranium, and selenium. As shown in **Figure 19, 20, and 21** and discussed in greater detail in the 2020 Beaverlodge ERA (CanNorth 2020a), the following observations can be made that demonstrate the water quality concentrations measured at TL-7 are within modelled predictions and meeting the water quality performance indicator as defined by regulatory accepted assessment methodologies:

- Radium-226 levels downstream of the Minewater Reservoir area are within the predicted bounds identified as the performance indicator for this area.
- Uranium and selenium levels downstream of the Minewater Reservoir meet the performance indicator for this area and are expected to continually improve over the long-term.

Radium-226 levels are expected to increase slightly before they decline. The chemical processes causing this increase are known and well understood. As detailed in the 2020 ERA, increases are attributed to the release of historically precipitated radium from sediments. Radium-226 precipitates

in the Fookes Reservoir are associated with naturally occurring calcium and barium, which may have been introduced in the milling process. After the peak is reached, levels are expected to gradually improve.

The Minewater Reservoir and downstream area meet the “water quality within modelled predictions” performance indicator.

Figures 19 and 20 are provided to show the rapid decrease in uranium and selenium concentrations that occurred following decommissioning. Due to the rapid improvement of selenium and uranium concentrations following decommissioning a second graph showing a more suitable scale of current concentrations is also provided.

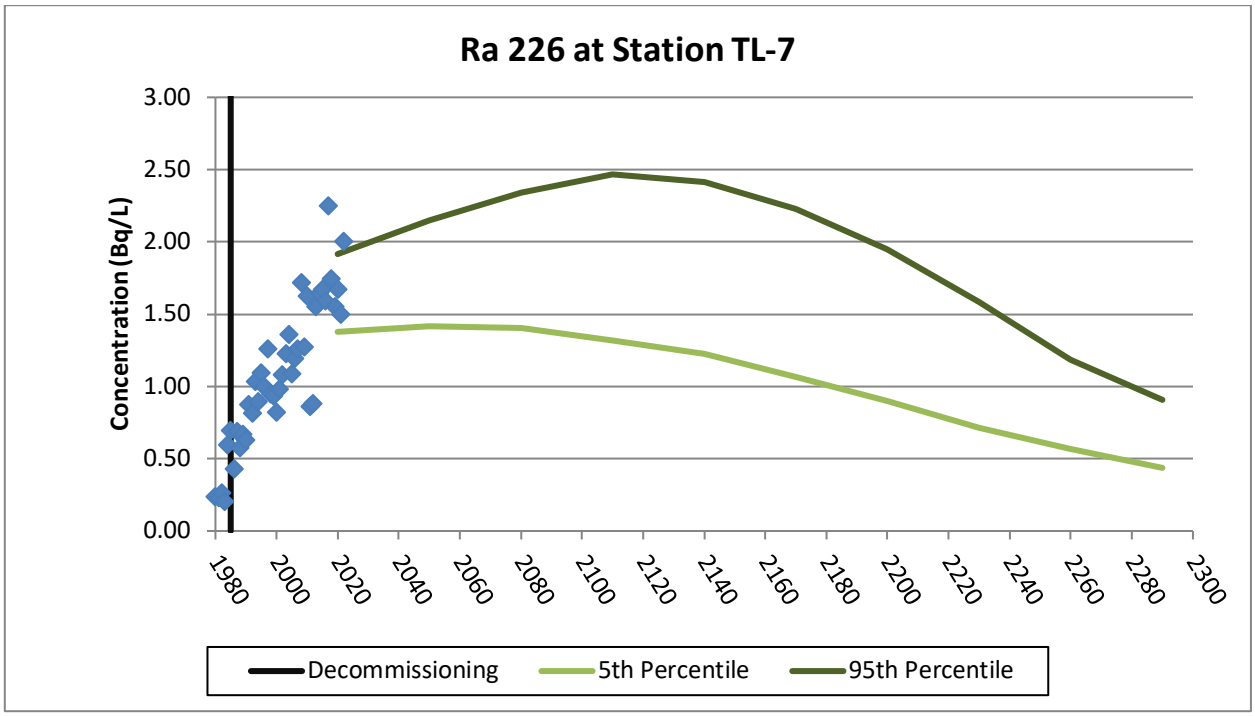
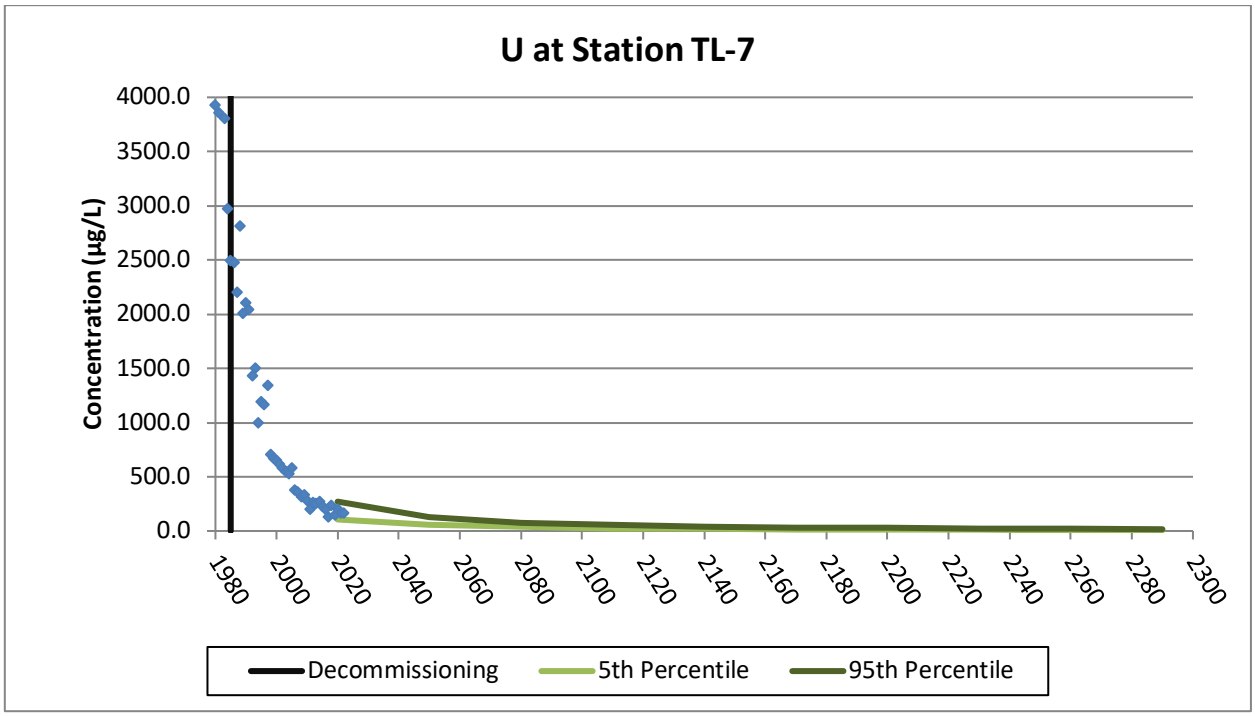


Figure 19: Ra-226 Performance Indicator at TL-7



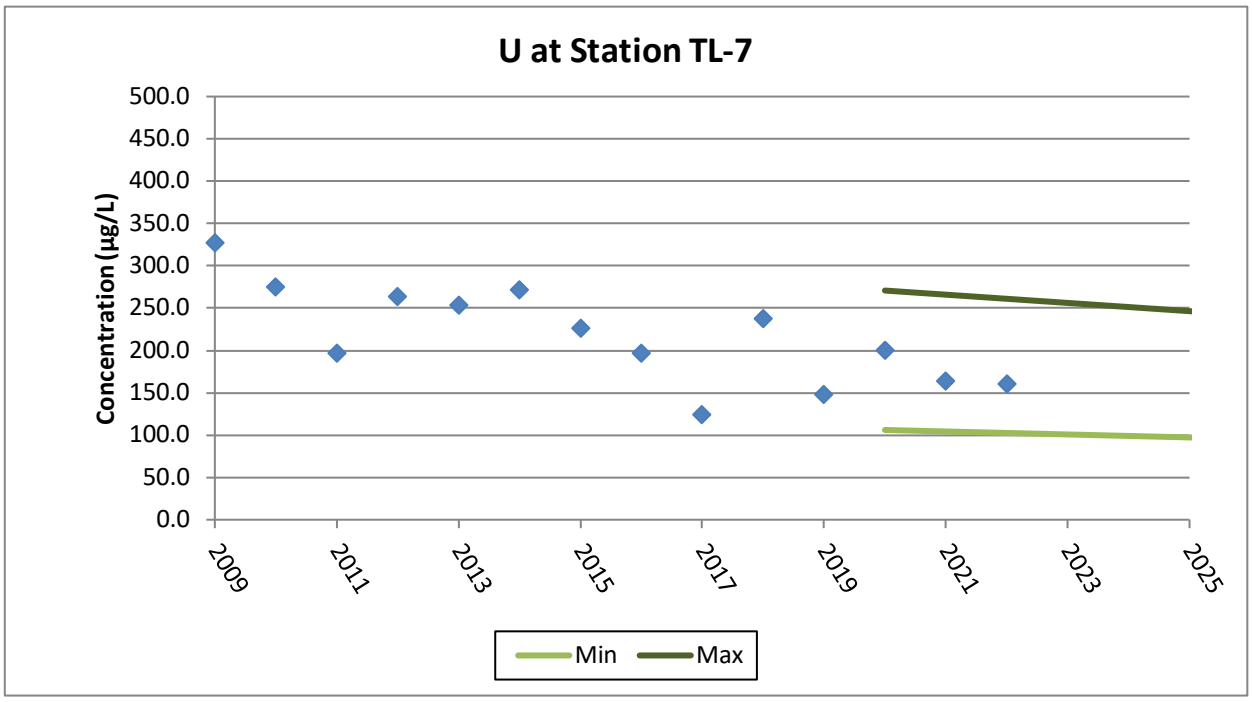
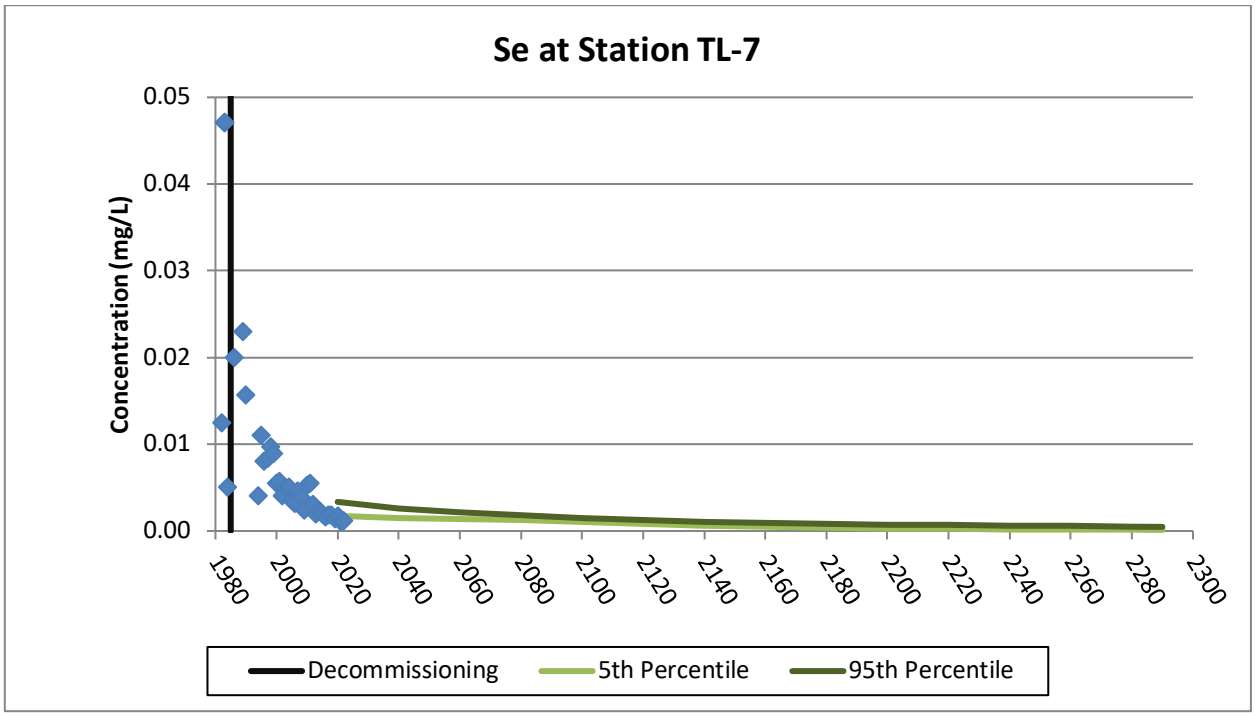


Figure 20: U Performance Indicator at TL-7



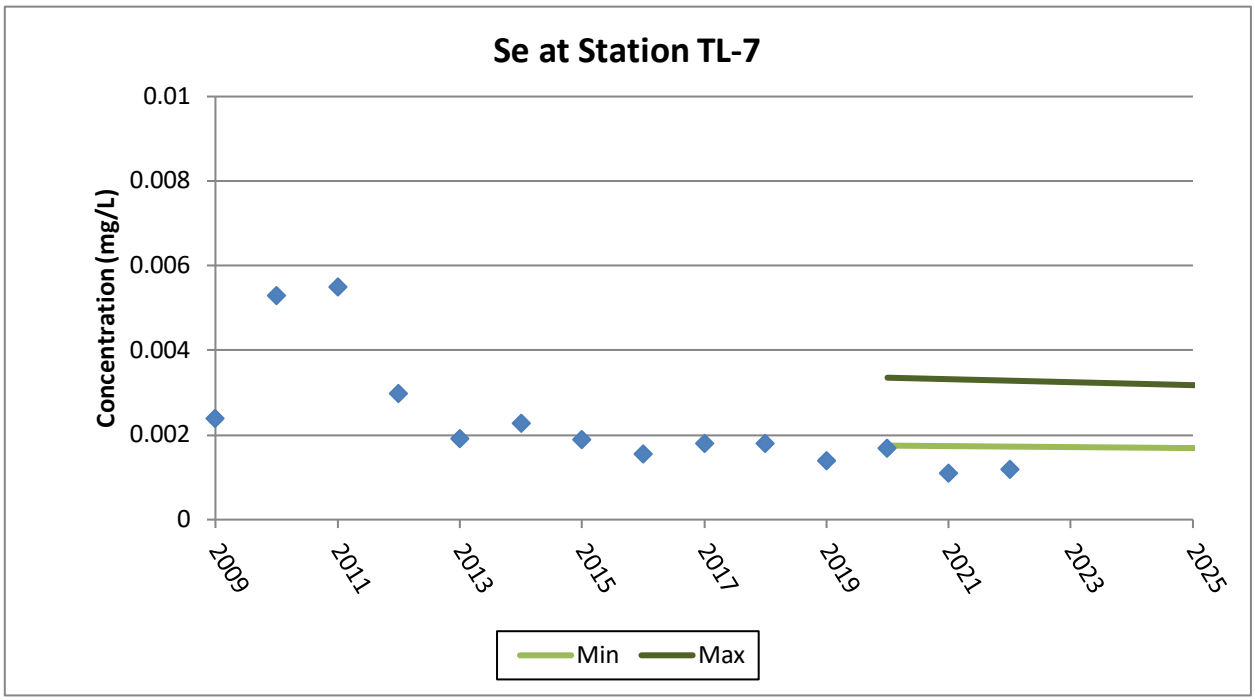


Figure 21: Se Performance Indicator at TL-7

The water quality of Minewater Reservoir Area will continue to be monitored as part of the Beaverlodge EMP until all the Beaverlodge properties are transferred to the provincial IC Registry. A long-term water monitoring program will then be implemented under the IC Program and water quality will continue to be compared to the predicted recovery from the 2020 ERA (CanNorth 2020).The Minewater Reservoir properties therefore meet the water quality within modelled predictions performance.

Site Free from Debris (Performance Indicator has been met)

All Beaverlodge related properties were inspected to locate historic debris not removed during initial decommissioning. During the main clean-up campaign in 2015 and 2017, GPS tracking was utilized to ensure adequate coverage of the properties, including the Minewater Reservoir properties, unless safety consideration, surface features or significant vegetation prohibited access to a specific area (**Figure 22**).

Following the above noted inspections, various debris found on the property, including the remaining electrical and power infrastructure (pole brackets) anchor bolts used to anchor the tailings line and the "V" Notch weir installed in the outlet channel from Minewater Reservoir were removed and disposed of in the Lower Fay Pit as approved by SkMOE. In addition, as final regulatory inspections of the properties occurred, any additional debris located was disposed of in Lower Fay Pit.

As a result of this activity, the Minewater Reservoir properties meets the performance indicator of being free of debris.

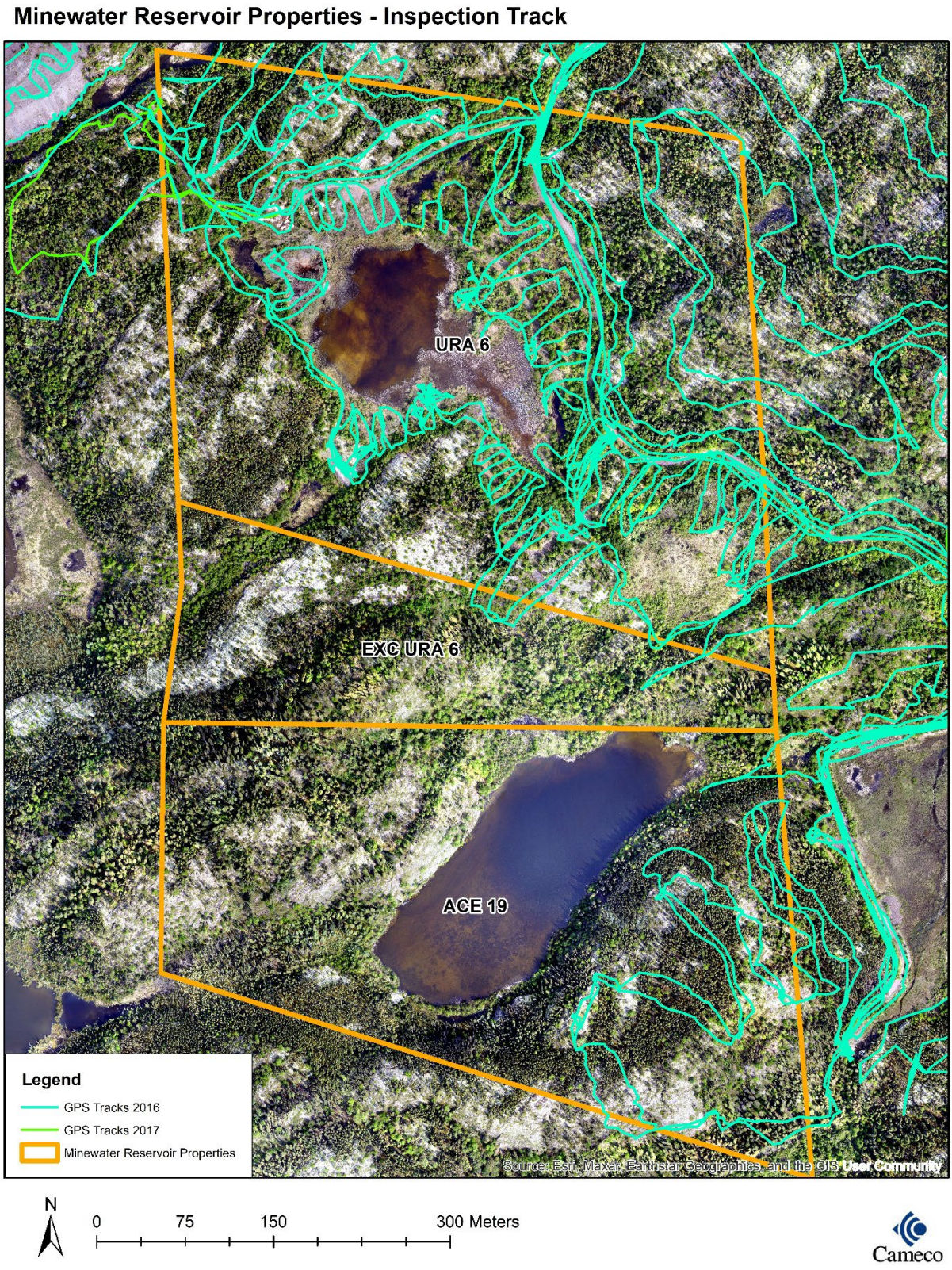


Figure 22: Minewater Reservoir Properties – Inspection Track

8.4.3 Decommissioning and Reclamation Documentation

Table 16 provides a summary of general documents which include refence to the Fay site and by extension the Minewater Reservoir properties.

Table 16: Documentation Log – Minewater Reservoir properties

Document	Date
Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site, Report No. 2, Operating History and Environmental Conditions, MacLaren Plansearch, Eldorado Resources Limited,	February 1983
Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site, Report No. 3 – Beaverlodge Tailings and Sludges Close-out Engineering Feasibility Studies, Eldorado Resources Limited	February 1983
Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site, Report No. 5 – Plan for the Close Out of the Beaverlodge Site, Eldorado Resources Limited	August 1983
Departure with Dignity, Decommissioning of the Beaverlodge Mine/Mill, Operations and Reclamation of the Site, MacLaren Plansearch, Eldorado Resources Limited	February 1987
Surface Lease Renegotiation, Appendix D – Decommissioning and Reclamation Plan, Historical Summary: 1981-2005, Cameco Corporation	November 2006
Waste Rock Stability Assessments – Former Beaverlodge Sites, SRK Project No. 4CC008.027, SRK Consulting (Canada) Inc	December 2010
Surficial Gamma Radiation Survey of Disturbed Areas at the Former Beaverlodge Mine Site, Final Rev. 1, ARCADIS SENES Canada Inc.	November 2014
2014 Uranium City Consultation on Land Use, SENES Consultants & Kingsmere Resources Services	January 2015
Beaverlodge Site Gamma Radiation Risk Evaluation, ARCADIS Canada Inc.,	June 2015
Beaverlodge Property – Crown Pillar Assessment (2014-2015), SRK Project No. 1CC007.048, SRK Consulting (Canada) Inc.	July 2015
Beaverlodge 2017: Borehole Decommissioning Report, Cameco Corporation (Cameco).	July 2017
Remediation of Utility Corridors & Related Infrastructure, Beaverlodge Properties, Kingsmere Resource Services Inc.	January 2018
Beaverlodge Property Inspection for Institutional Control Transfer Report, Kingsmere Resource Services Inc.	January 2018

8.4.4 Evaluation of Minewater Reservoir Properties

The properties meet the established performance objectives of safe, secure, stable/improving and have no remaining liabilities (see Table 17).

Table 17: Evaluation of Minewater Reservoir Properties

Performance Indicators	Acceptance Criteria	Minewater Reservoir Area
Acceptable Gamma Levels	Reasonable use scenario demonstrating gamma levels at the site are acceptable.	✓
Boreholes Plugged	All boreholes have been plugged at the time of transfer to institutional control.	NA
Stable Mine Openings	Mine openings have been secured and signed off by a qualified person, where applicable.	NA
Stable Crown Pillar	Crown pillar assessed, remediated if required, and signed off by a qualified person.	NA
Site Free from Debris	Site free of former mining debris at the time of transfer to institutional control.	✓
Water Quality Within Modelled Predictions	Water quality data is stable/improving.	✓

Based on the conclusions of the 2020 ERA the human and ecological risks are acceptable, and all relevant performance indicators have been met. As such, the properties associated with Minewater Reservoir should be considered for Release from Decommissioning and Reclamation by the SkMOE, released from CNSC License WFOL-W5-2120.0/2025 and transfer to the provincial Institutional Control Program for long term environmental stewardship.

The following section outlines the expectations for managing Minewater Reservoir properties while under Institutional Control.

8.4.5 Institutional Control Considerations and Requirements

Engineered Structures

The blasted drainage channel on the south side of Minewater Reservoir can be considered an engineered structure as it was designed to permanently alter the flow from the Minewater catchment area towards the TMA, and away from Ace Creek. The channel is not expected to require maintenance in the future but will require inspection to ensure the flow path continues to promote flow towards the TMA.

Beaverlodge Post Closure Land Status

The Minewater Reservoir properties described in this section fall within the proposed IC borders and the entire boundaries identified in Table 14 (above at the beginning of this section) and visually in Figure 1, will be included in the Saskatchewan Institutional Control Registry in order to establish administrative controls to restrict future land use.

Remaining Site Aspects Requiring Future Monitoring and Maintenance (2020)

To meet the requirements of section 22 of the MIEPR, Table 18 provides a summary of aspects of the Minewater Reservoir properties in terms of remaining liabilities and an assessment of the significance of the potential hazard posed by each in the unlikely event that it were realized.

Table 18: Remaining Site Aspects – Minewater Reservoir Properties

Site Aspect	Assessment Endpoint	Likelihood	Severity	Overall Residual Risk
Erosion of residual tailings and precipitate (increased gamma exposure)	Environment	Very Unlikely	Minor	Low
	Public Health & Safety	Very Unlikely	Minor	Low
Blockage of blasted channel (resulting in flow towards Ace Creek)	Environment	Unlikely	Minor	Low
	Public Health & Safety	Unlikely	Minor	Low

As noted earlier, the water quality of Fulton Creek watershed will continue to be monitored as part of the Beaverlodge EMP until all the Beaverlodge properties are transferred to the provincial IC Registry. A long-term water monitoring program will then be implemented under the IC Program and water quality will continue to be compared to the predicted recovery from the 2020 ERA (CanNorth 2020).

Institutional Control Monitoring

The site features associated with Minewater Reservoir properties are shown on **Figure 7**. Based on the historical activities at the Minewater Reservoir properties, the condition of the outlet channel will require inspection under the Province of Saskatchewan's institutional control management framework.

Such an inspection should be conducted of all disturbed areas and focus on the following aspects:

- Evidence of recent human visitation,
- Minewater Reservoir:
    - Condition of Minewater outflow channel
    - Evidence of erosional features
    - Although the saddle dam located west of Minewater Reservoir serves no purpose a note regarding its condition should be included in the monitoring report.

- Condition of vegetation, and
- Water quality.

Institutional Control Maintenance

Although it is not expected that the Minewater Reservoir properties will require maintenance under institutional control. Cameco has considered the time required for clearing of any potential beaver activity as part of the routine inspection of this area.

8.5 URA 1 [MSL 10]

8.5.1 Description

Table 19: URA 1 Property Coordinates

AECB License Number	Cameco Number	DNS[1] Number	Area (hectares)	Bounding Coordinates (UTM WGS 84 Zone 12)	
				Easting	Northing
MSL 10	URA 1	200010	17.5	642464	6604147
				642417	6604630
				642044	6604598
				642046	6604543
				642048	6604476
				642450	6604285
				642060	6604178

[1] – Department of Northern Saskatchewan

The URA 1 (MSL 10) property is a 17.5 hectare parcel of land and is listed in Appendix A of the Eldorado Resources Limited Decommissioning Approval AECB-DA-142-0 (November 1983) as "Mill annex buildings, O_2 plants, waste rock storage." The property is included on the *2006 Beaverlodge Surface Lease Agreement* map as MSL 10 and in the *Property Description Manual* referenced in the LCH, which is referenced in the CNSC issued Waste Facility Operating License WFOL-W5-2120.0/2025 (Figure 23).

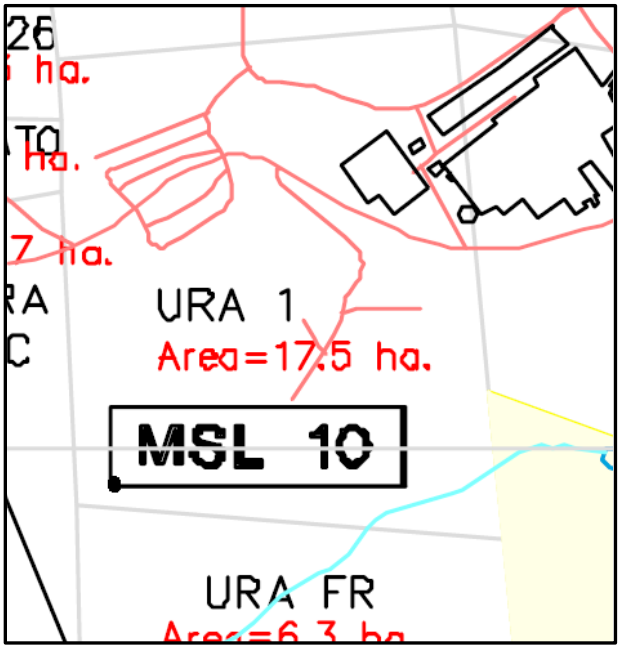


Figure 23: URA 1 (MSL 10) Property (Source: Beaverlodge Surface Lease Map)

During operations, the URA 1 property hosted;

- Mill annex buildings
- Oxygen plant
- A small open pit (Lower Fay Pit)
- Waste rock

8.5.2 Initial Decommissioning Activities

Departure with Dignity (Eldorado 1987) states that the demolition of the mill structures, including the mill annex building and oxygen plant commenced in April 1984 and was undertaken in various campaigns over the following 13 months. During this activity mill related structures were demolished with the material removed and deposited with the voids of the mill proper. After demolition was complete, the entire area was covered and contoured with waste rock to suit the existing topography. A total of approximately 259,100 m^3 of waste rock was hauled to the mill complex and placed to cover the mill building and associated infrastructure. Any settling of cover material since decommissioning has been remediated.

Historical records also show that a number of pressure vessels were placed in the mined out Lower Fay Pit and covered with waste rock.

The majority of the telecommunications and electrical transmission poles and related infrastructure on the URA 1 property were originally decommissioned by cutting the poles above the mounting brackets and removing them from the property, leaving the mounting brackets and pole stubs in place. The mounting brackets have since been removed as part of the general site clean-up.

The main haul road and several short spurs roads transect the URA 1 property and were left “as is.”

8.5.3 Recent Decommissioning Activities and Beaverlodge Performance Indicators

Acceptable Gamma Levels (Performance Indicator has been met)

During 2014, a detailed surficial gamma survey was conducted primarily focusing on the disturbed areas (i.e., Fay area, roads and the former tailings pipeline corridor) of the URA 1 property (ARCADIS SENES 2014). The property was surveyed on a 10 m grid (approximately), as terrain and vegetation allowed considering safety and physical accessibility, with each radiation technician using a Ludlum 2221 ratemeter connected to a 2” x 2” sodium iodide (NaI) crystal scintillation detector (Ludlum 44-10). When areas originally scanned in 2014 were disturbed as a result of additional remediation a follow up gamma scan was completed to ensure that gamma levels remain acceptable.

The resulting radiation dose rates were then averaged on a 1 ha basis to allow comparison to the 1 µSv/h reference gamma value in the provincial *Guidelines for Northern Mine Decommissioning and Reclamation* (SkMOE 2008).

As shown in **Figure 24**, the surface gamma survey results ranged from <0.1 µSv/h to 1.0 µSv/h above background (ARCADIS SENES 2014), which meets the *Guidelines for Northern Mine Decommissioning and Reclamation* (SkMOE 2008). Therefore, the URA 1 property meets the performance indicator associated with acceptable gamma levels.

In addition to the above, in 2023 the final cover was placed on the Lower Fay Pit. Located on property URA 1, the area was used as a regulatory approved disposal location for debris collected from the Beaverlodge Properties. The debris in the Lower Fay pit was compacted and covered following a regulatory approved remediation plan. The final cover consisted of clean waste rock sourced from road bed material removed from the ACE 3 property. A final gamma scan will be completed in May 2024 to ensure the gamma measurements continue to meet the gamma performance indicator. The results of this gamma survey will be provided to the regulatory agencies once complete.

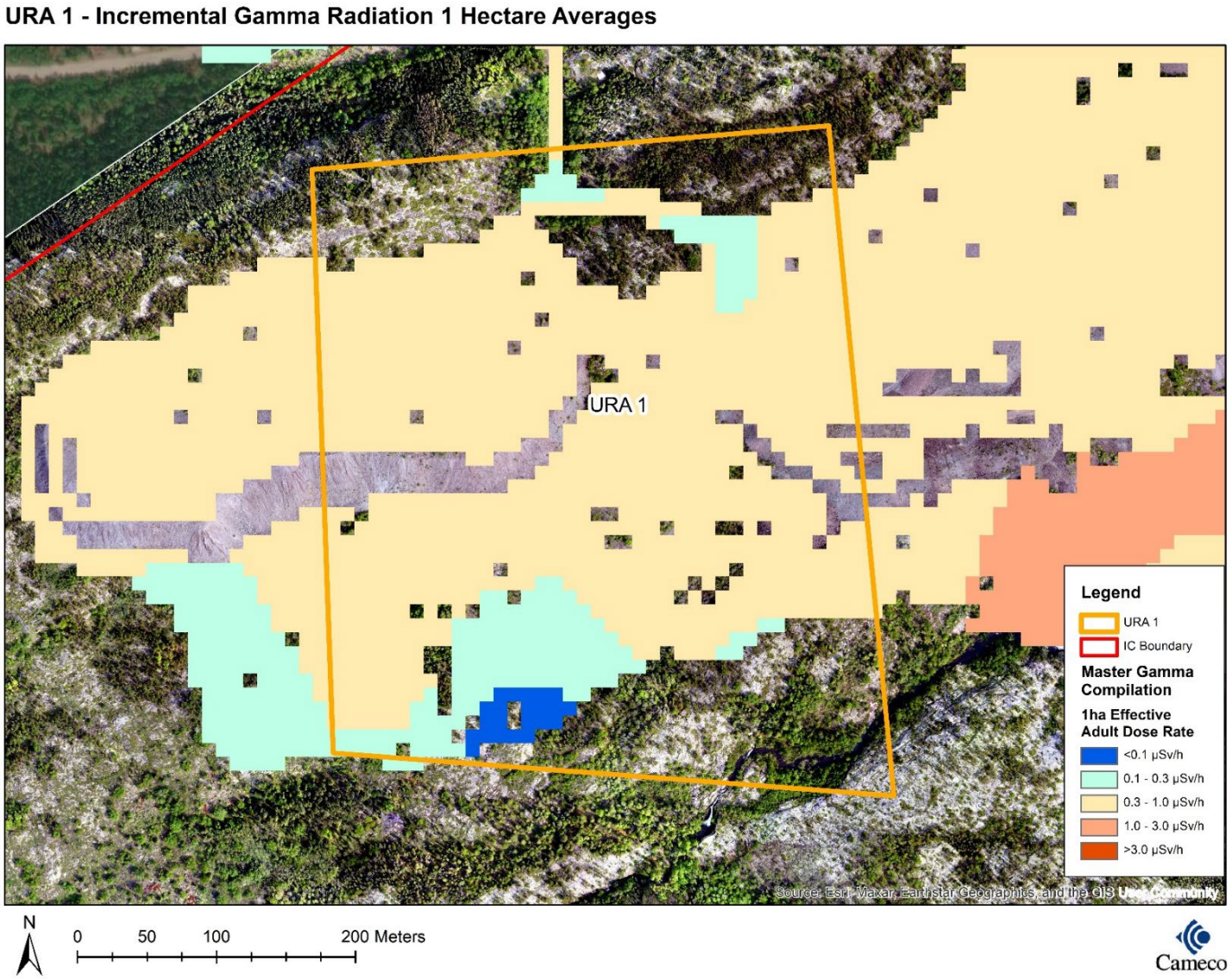


Figure 24: Incremental Gamma Radiation 1 Hectare Averages: URA 1 Property

Boreholes Plugged (Performance Indicator has been met)

Activities completed since 1985 have included sealing exploration boreholes according to accepted methods (Cameco 2017). Surface inspections in support of transferring the properties to IC identified eight exploration bore holes on the URA 1 property. The following provides the designation and location of each hole (**Table 20**).

Table 20: URA 1 Property Borehole Coordinates

Designation	*Coordinate System: WGS 84 UTM Zone 12*		*Year Remediated*
	Easting	*Northing*	
BH-15	642101.665	6604192.497	*2016*
BH-31	642101.048	6604195.52	*2017*
BH-32	642260.649	6604592.012	*2017*
BH-40	642242.735	6604550.461	*2017*
BH-43	642254	6604397	*2017*
BH-011	642224.883	6604354.110	*2021*
BH-012	642224.798	6604351.877	*2021*
BH-007	642090	6604218	*2011*

Drills holes BH-011, BH-012, BH-32, BH-40 and BH-43 were found dry. Drill hole BH-43 was located along a bedrock bench at the back of the Lower Fay pit. In 2016 debris was being end dumped into the pit from the top edge of the pit and buried the borehole. As a result, this borehole is no longer exposed at surface. As noted above, BH-43 was found to be dry with no evidence of past discharge. Although the borehole is considered inaccessible the coordinates of this borehole have been recorded in the borehole log as part of the record. Drill holes BH-007, BH-15 and BH-31 have shown evidence of discharges in the past. Notwithstanding the observed condition, all drillholes exposed at surface were plugged with a concrete grout to a depth of 30 m or refusal in accordance with regulatory accepted methods.

As a result of the activities conducted since 1985, the URA 1 property meets the boreholes plugged performance indicator.

Stable Mine Openings (Performance Indicator is not applicable)

The URA 1 property does not host any mine openings to surface.

Geotechnical Stability

Crown Pillar (Performance Indicator has been met)

The Fay/Ace/Verna mine discontinued operation in 1982 and the mine allowed to flood. A review of the underground Fay/Ace/Verna mine plan superimposed on the surface maps indicates sections of the Fay mine underground workings extend under the URA 1 property.

In 2014, SRK was retained by Cameco to undertake a geotechnical assessment for the crown pillar stability at six historic Beaverlodge sites including the Fay mine. Based on available information, underground workings and stoping around the Fay shaft area appear to be typically 25m or greater below the ground surface. The report concluded that no additional investigation or remediation was required, and that the Fay mine area has a "low" likelihood of subsidence due to the thickness of the crown pillar and depths of the underground workings (SRK 2015).

The underground workings have been decommissioned for 40 years and no indication of instability or subsidence have been identified in association with the mine workings underlying the URA 1 property.

The URA 1 property therefore meets the crown pillar performance indicator.

Pit Walls

There is one relatively small open pit associated with the URA 1 property: the Lower Fay Pit. This pit has been used since 2016 as a regulatory approved depository for materials generated during the final decommissioning of various aspects of the site and the debris collected during the general clean-up of all of the Beaverlodge properties. The material/debris disposed of in the pit was compacted and covered in 2023 with a layer of clean waste rock sourced from road bed material removed from the ACE 3 property in 2021. As a result, the remaining Lower Fay Pit walls are approximately 5 meters high and pose no greater risk than natural landforms found in the area.

Tailings

Figure 4.3 of *Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site, Report No. 2, Operating History and Environmental Conditions* (Eldorado 1983) shows that no tailings spills from the tailings pipeline were present on the URA 1 property at the cessation of operations.

Waste Rock

The Fay mine is reported to have produced a total of 3,030,000 tonnes of waste rock which covered an area of approximately 33.0 hectares, the majority of which was deposited on areas south and southwest of the mill with a portion situated on the URA 1 property. During operation, waste rock was used on the URA 1 property as construction material for building foundations, roads, etc. and during initial decommissioning waste rock was re-contoured on the URA 1 property as required. During the summer of 1982, Eldorado collected waste rock samples from various Beaverlodge sites for analysis. Section 4.1 of Eldorado 1983 provides a summary of the volumes and analysis of the waste rock on a variety of the Beaverlodge mine sites.

The uranium content of the waste rock reported in Eldorado 1983 for the Fay area was 0.015%, which is below the threshold considered to be special/mineralized waste rock at the operating uranium mines in northern Saskatchewan (0.03%). This is reflected in the gamma survey results provided above showing areas where waste rock is located are typically below 1µSv/hr. In addition,

recent waste rock sampling completed by Cameco on the Fay Waste Rock pile has confirmed that the site waste rock has a low potential for acid generation and that the uranium content of the waste rock sampled is less than 0.03%. Visual observation and monitoring of the sites for more than 60 years have not identified any acidic leachate from waste rock piles, nor has it identified any impacts that could be attributed to such a condition.

In 2010, SRK Consulting (Canada) Inc. (SRK) completed a waste rock stability assessment of all the former Eldorado Beaverlodge sites including the Fay waste rock pile, including the waste rock on the URA 1 property. That assessment concluded that there were no signs of instability observed on either the waste rock slope or the adjacent ground downslope and the only risk in terms of stability is predominantly associated with the potential for an occasional rolling rock. The assessment also concluded that there is an insufficient risk that a deep-seated failure, potentially affecting the global stability of the waste rock, will occur in the foreseeable future. Based on the SRK site observations, the waste rock dump at the Fay site is in good condition, the rock is durable and global instability and the risk of a deep-seated failure that would affect the global stability of the dump is judged to be very low (SRK 2010).

Water Quality within Modelled Predictions (Performance Indicator has been met)

After receiving drainage from the Hab, Dubyna, and Bolger mine sites, Ace Lake discharges into Lower Ace Creek, which passes through a portion of the URA 1 property, and eventually reaches Ace Bay of Beaverlodge Lake. During the 2014 update meeting with the Commission (CNSC 2014), CNSC Staff indicated that the water quality performance indicator for the Lower Ace Creek area would be associated with the URA 1 property based on the potential influence on Lower Ace Creek water quality and the downstream environment. The principal source of constituents measured in Lower Ace Creek is, or have been, the seeps from the former mill area and formerly flowing boreholes. As discussed in the Boreholes Plugged section, identified boreholes have been sealed as one of the remedial activities in an effort to reduce loads from the underground mine workings on surface water bodies. Seep 1 has been identified on the western edge of the URA 1 property, originating at the base of the waste rock pile downgradient of the mill site. Water quality samples and flow measurements were collected opportunistically since 2004 to identify long-term water quality trends; however, flow from the seep is intermittent and is typically limited to freshet and major precipitation events. In 2019, the JRG accepted that the seep monitoring program objective had been met and it was removed from the Beaverlodge Environmental Monitoring Program. Constituent loadings associated with runoff from the main site waste rock and spilled tailings were also considered during the model development and are a small source of the primary constituents of concern (i.e., radium-226, selenium and uranium) when compared to the loadings associated with the formerly flowing boreholes and seeps.

To determine if natural recovery is occurring as expected, water quality has been monitored downstream of the URA 1 property at the outlet of Lower Ace Creek (station AC-14) and concentrations have helped inform modelled predictions. The water quality constituents that are assessed as part of the performance indicator include: radium-226, uranium, and selenium. As shown in **Figure 25, 26, and 27,** and discussed in greater detail in the 2020 Beaverlodge ERA (CanNorth

2020), the following observations can be made that demonstrate the Lower Ace Creek water quality data is meeting the water quality performance indicator as defined by regulatory accepted assessment methodologies:

- Radium-226 and selenium levels in Lower Ace Creek are predicted to remain below the SEQG of 0.11 Bq/L and 1 µg/L, respectively, over the entire simulation period.
- Uranium levels in Lower Ace Creek meet the performance indicator (i.e., predictions) and are expected to continually improve over the long-term.

Water quality measured at AC-14 is within the modelled predictions and therefore the water quality performance indicator has been met for the URA 1 property.

The water quality of Lower Ace Creek will continue to be monitored as part of the Beaverlodge EMP until all the Beaverlodge properties located within the entire Ace Lake watershed are transferred to the provincial IC Registry. A long-term water monitoring program will then be implemented under the IC Program and water quality will continue to be compared to the predicted recovery from the 2020 ERA (CanNorth 2020).

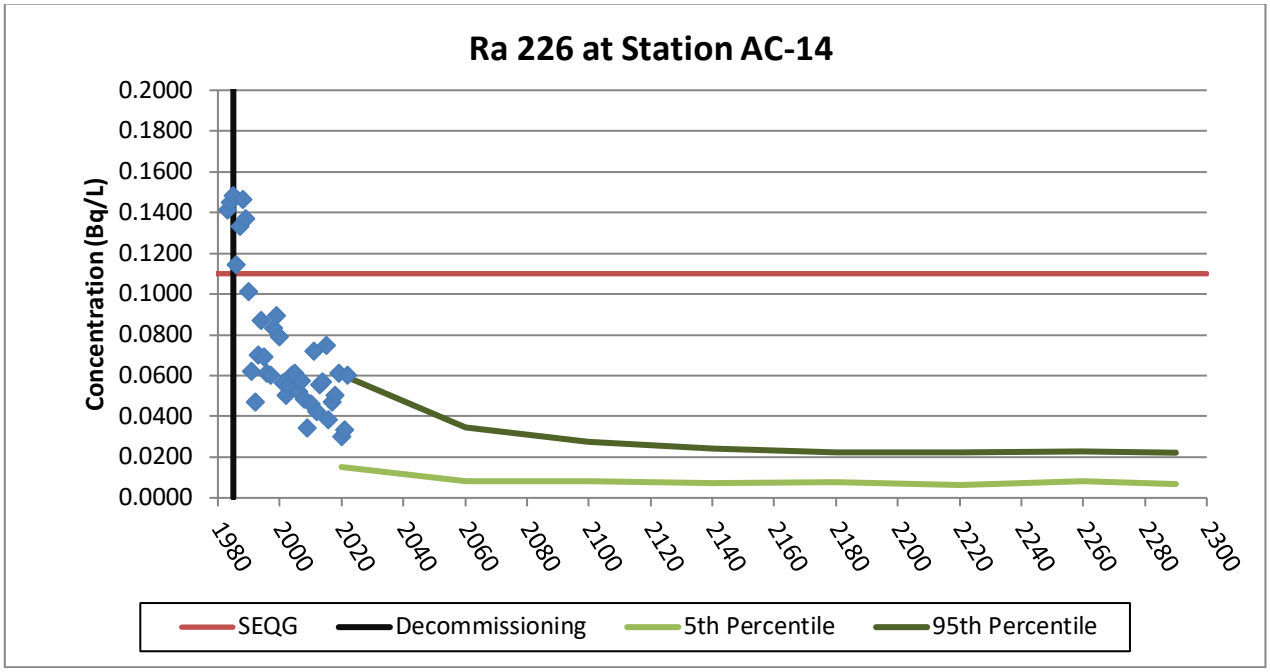


Figure 25: Ra-226 Performance Indicator at AC-14

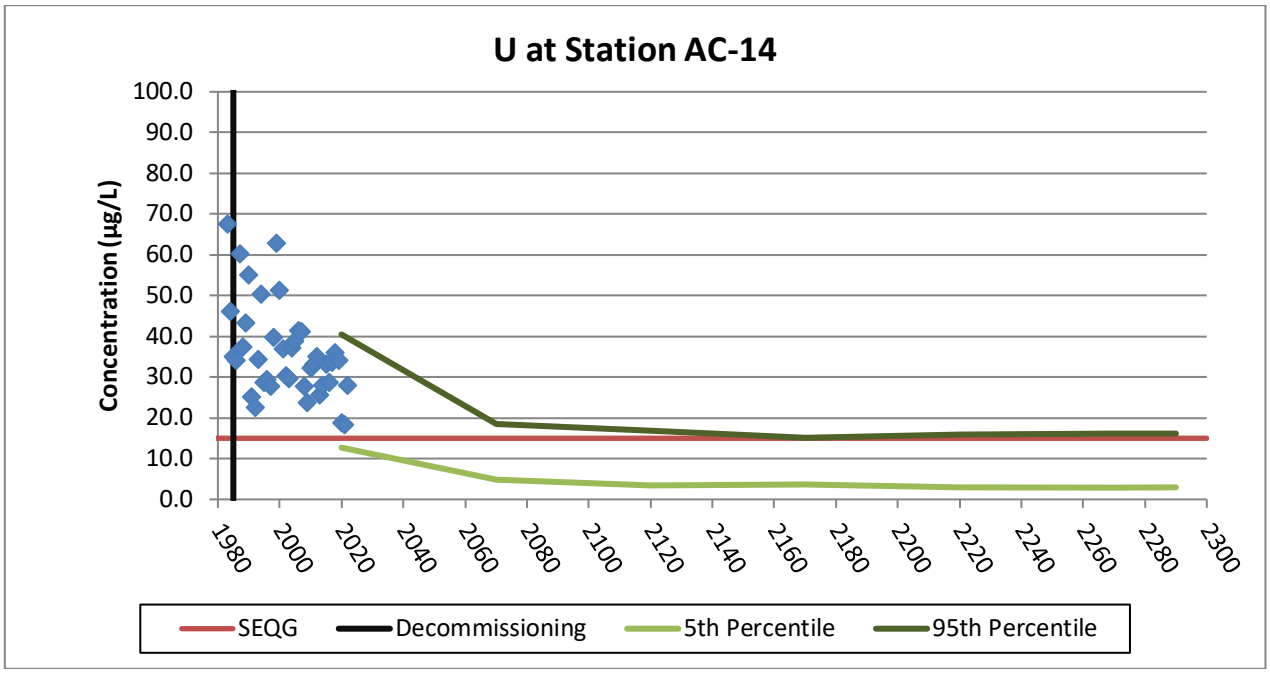


Figure 26: U Performance Indicator at AC-14

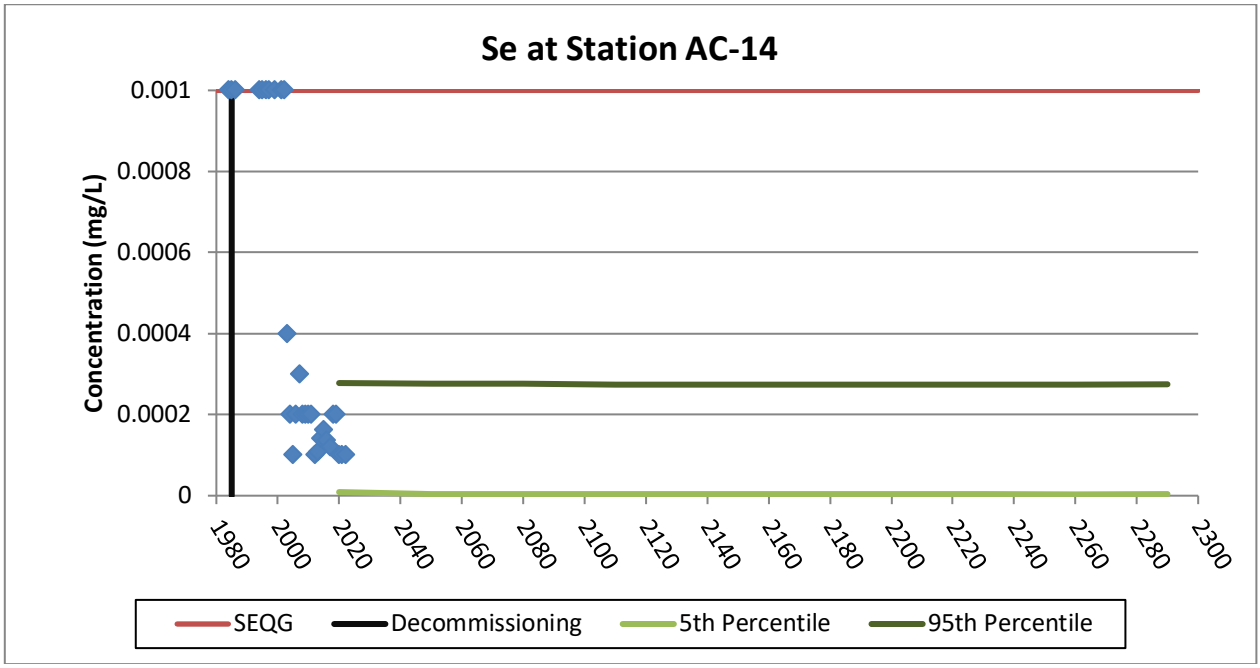


Figure 27: Se Performance Indicator at AC-14

*Note: The reduction in Se concentration noted in the figure is the result of a reduction in lab detection limits

Site Free from Debris (Performance Indicator has been met)

All decommissioned Beaverlodge properties were inspected in an effort to locate historic debris not removed during initial decommissioning. During the main clean-up campaign in 2015 and 2017, GPS tracking was utilized to ensure adequate coverage of the properties, including the URA 1 property, unless safety consideration, surface features or significant vegetation prohibited access to a specific area (**Figure 28**).

Following the above noted inspections, various debris found on the property, including the remaining electrical and power infrastructure (pole brackets) and concrete pilons and anchor bolts used to anchor the tailings line on the URA 1 property were removed and disposed of in the Lower Fay Pit as approved by SkMOE. In addition, as final regulatory inspections of the properties occurred, any additional debris located was disposed of in Lower Fay Pit.

The debris disposed of in the Lower Fay pit was compacted and covered following a regulatory approved remediation plan in September 2023 and the final cover consisted of clean waste rock sourced from the ACE 3 property and stockpiled nearby. A final radiation scan will be completed on the covered material in May 2024 to ensure the gamma measurements continue to meet the gamma performance indicator. The results of this gamma survey will be provided to the regulatory agencies once complete.

As a result of this activity, the URA 1 property meets the performance indicator of being free of debris.

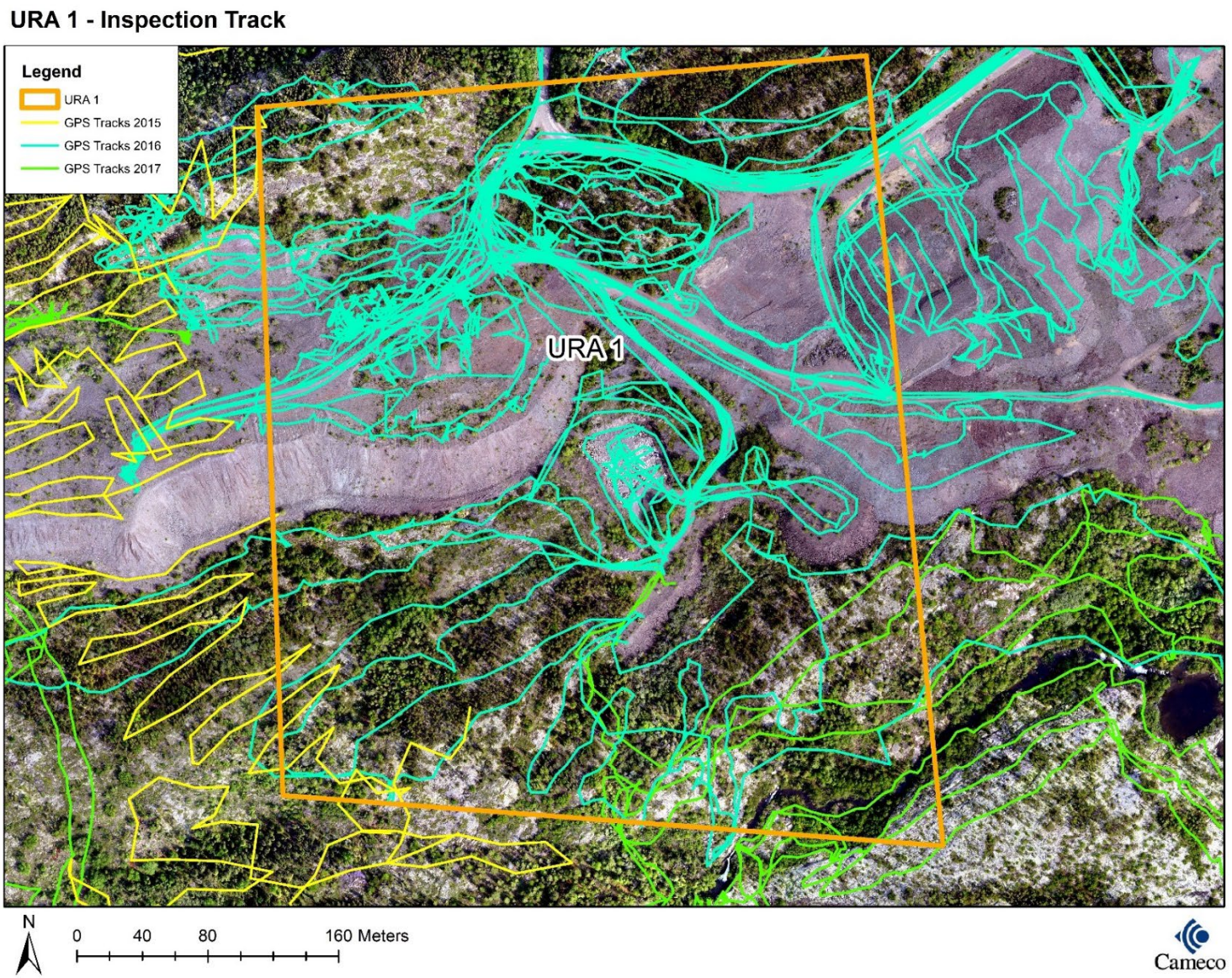


Figure 28: URA 1 – Inspection Track

8.5.4 Decommissioning and Reclamation Documentation

Table 21 provides a summary of general documents which include refence to the Fay site and by extension the URA 1 property. The majority of discussion in these documents combines discussion of the Fay mine with the entire Fay/Ace/Verna mine complex.

Table 21: Documentation Log – URA 1

Document	Date
Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site, Report No. 2, Operating History and Environmental Conditions, MacLaren Plansearch, Eldorado Resources Limited,	February 1983
Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site, Report No. 5 – Plan for the Close Out of the Beaverlodge Site, Eldorado Resources Limited	August 1983
Departure with Dignity, Decommissioning of the Beaverlodge Mine/Mill, Operations and Reclamation of the Site, MacLaren Plansearch, Eldorado Resources Limited	February 1987
Surface Lease Renegotiation, Appendix D – Decommissioning and Reclamation Plan, Historical Summary: 1981-2005, Cameco Corporation	November 2006
Waste Rock Stability Assessments – Former Beaverlodge Sites, SRK Project No. 4CC008.027, SRK Consulting (Canada) Inc	December 2010
Surficial Gamma Radiation Survey of Disturbed Areas at the Former Beaverlodge Mine Site, Final Rev. 1, ARCADIS SENES Canada Inc.	November 2014
2014 Uranium City Consultation on Land Use, SENES Consultants & Kingsmere Resources Services	January 2015
Beaverlodge Site Gamma Radiation Risk Evaluation, ARCADIS Canada Inc.,	June 2015
Beaverlodge Property – Crown Pillar Assessment (2014-2015), SRK Project No. 1CC007.048, SRK Consulting (Canada) Inc.	July 2015
Beaverlodge 2017: Borehole Decommissioning Report, Cameco Corporation (Cameco).	July 2017
Remediation of Utility Corridors & Related Infrastructure, Beaverlodge Properties, Kingsmere Resource Services Inc.	January 2018
Beaverlodge Property Inspection for Institutional Control Transfer Report, Kingsmere Resource Services Inc.	January 2018

8.5.5 Evaluation of URA 1

The current condition of the property, combined with the limited use of the property by local land users demonstrates that the URA 1 property meets the established performance objectives of safe, secure, stable/improving and has no remaining liabilities (see **Table 22**).

Table 22: Evaluation of URA 1

Performance Indicators	Acceptance Criteria	URA 1
Acceptable Gamma Levels	Reasonable use scenario demonstrating gamma levels at the site are acceptable.	✓
Boreholes Plugged	All boreholes have been plugged at the time of transfer to institutional control.	✓
Stable Mine Openings	Mine openings have been secured and signed off by a qualified person, where applicable.	NA
Stable Crown Pillar	Crown pillar assessed, remediated if required, and signed off by a qualified person.	✓
Site Free from Debris	Site free of former mining debris at the time of transfer to institutional control.	✓
Water Quality Within Modelled Predictions	Water quality data is stable/improving.	✓

Based on the conclusions of the 2020 ERA the human and ecological risks are acceptable, and all relevant performance indicators have been met. As such, the URA 1 property should be considered for Release from Decommissioning and Reclamation by the SkMOE, released from CNSC License WFOL-W5-2120.0/2025 and transfer to the provincial Institutional Control Program for long term environmental stewardship.

The following section outlines the expectations for managing URA 1 property while under Institutional Control.

8.5.6 Institutional Control Considerations and Requirements

Engineered Structures

The URA 1 property hosts no engineered structures.

Beaverlodge Post Closure Land Status

The URA 1 property falls entirely within the planned extent of the Beaverlodge IC borders and will therefore be included in the Saskatchewan Institutional Control Registry in order to establish administrative controls to restrict future land use.

Remaining Site Aspects Requiring Future Monitoring and Maintenance (2020)

To meet the requirements of section 22 of the MIEPR, **Table 23** provides a summary of aspects of the URA 1 property in terms of remaining liabilities and an assessment of the significance of the potential hazard posed by each in the unlikely event that it were realized.

Table 23: Remaining Site Aspects – URA 1 Property

Site Aspect	Assessment Endpoint	Likelihood	Severity	Overall Residual Risk
Waste Rock Slope Failure	Environment	Very Unlikely	Minor	Low
	Public Health & Safety	Very Unlikely	Minor	Low

As noted earlier, the water quality of Lower Ace Creek will continue to be monitored as part of the Beaverlodge EMP until all the Beaverlodge properties located within the entire Ace Lake watershed are transferred to the provincial IC Registry. A long-term water monitoring program will then be implemented under the IC Program and water quality will continue to be compared to the predicted recovery from the 2020 ERA (CanNorth 2020).

Institutional Control Monitoring

Figure 29 outlines the site features associated with URA 1 property. Based on the historical activities at the URA 1 property, the waste rock slopes will require inspection under the Province of Saskatchewan's institutional control management framework.

Such an inspection should be conducted of all disturbed areas and focus on the following aspects:

- Evidence of recent human visitation,
- Condition of waste rock
- Condition of cover in Lower Fay Pit
    - Subsidence of cover
    - Exposed debris (historical)
    - New debris
- Note any seepage from former open pit
- Observe and note condition of Seep 1 at 642442E; 6604345N (UTM WGS 84 Zone 12), and
- Evidence of flow from sealed boreholes that were previously flowing:
    - BH-007 at 642090E and 6604218N;
    - BH-15 at 642101.665E and 6604192.497N;
    - BH-31 at 642101.048E and 6604195.52N (UTM WGS 84 Zone 12)

Institutional Control Maintenance

No aspect of the URA 1 property will require maintenance in the IC Program.

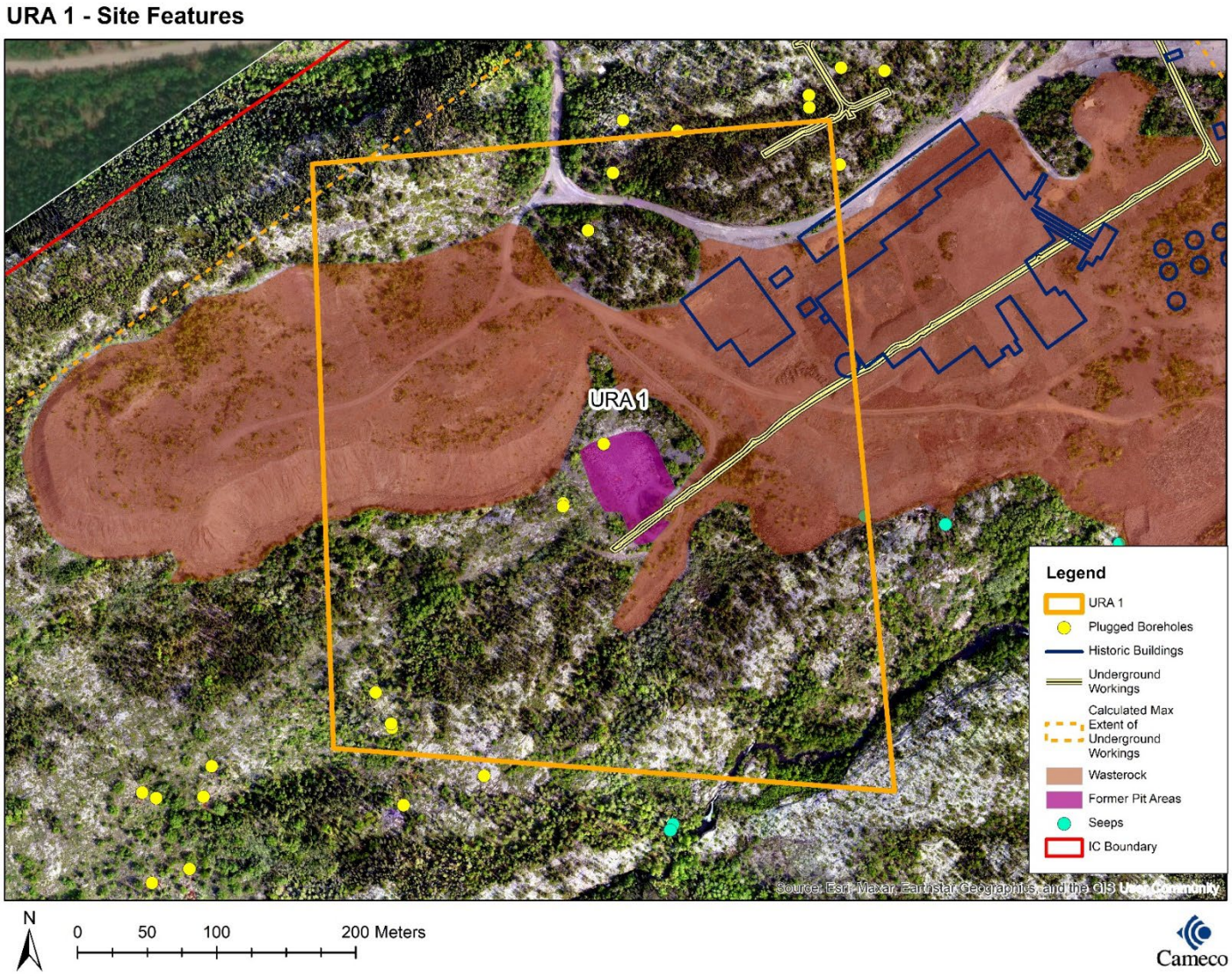


Figure 29: URA 1 – Site Features

8.6 URA 7 [MSL 15]

8.6.1 Description

Table 24: URA 7 Property Coordinates

AECB License Number	Cameco Number	DNS[1] Number	Area (hectares)	Bounding Coordinates (UTM WGS 84 Zone 12)	
				Easting	Northing
MSL 15	URA 7	200015	20.9	642979	6604091
				642417	6604630
				642957	6604545
				642450	6604285
				642975	6604162

[1] – Department of Northern Saskatchewan

The URA 7 (MSL 15) property is a 20.9 hectare parcel of land and is listed in Appendix A of the Eldorado Resources Limited Decommissioning Approval AECB-DA-142-0 (November 1983) as "Mill site." The property is included on the *2006 Beaverlodge Surface Lease Agreement (Figure 30)* map as MSL 15 and in the *Property Description Manual* referenced in the LCH, which is referenced in the CNSC issued Waste Facility Operating License WFOL-W5-2120.0/2025.

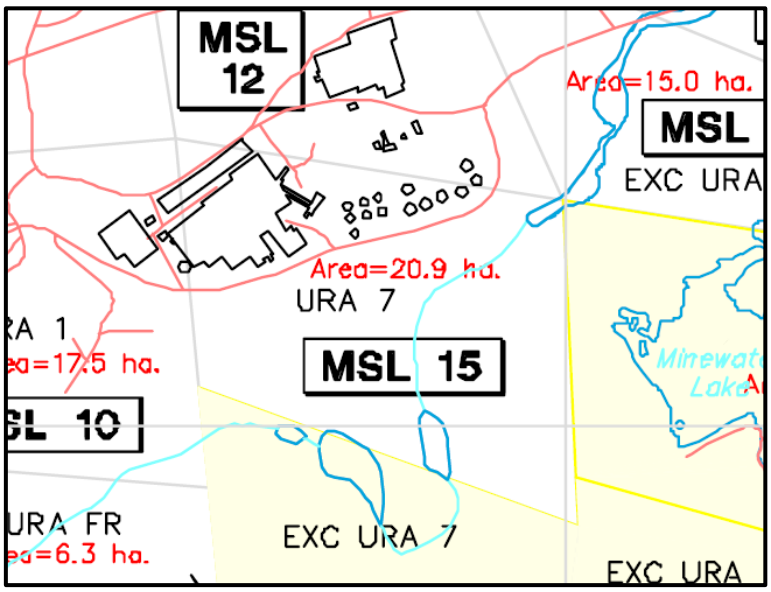


Figure 30: Mill Facility (Source: Beaverlodge Surface Lease Map)

During operations, the URA 7 property hosted;

- The mill facility (Figure 30),
- The 1.5 X 1.5 m Sorting Plant Bin located at 642603E: 6604520N (WGS 84 UTM Zone 12) or 59°33'16.64"N, 108°28'36.49"W,

- The 1.5 X 2.4 m Sorting Plant Raise at 642603E: 6604520N (WGS 84 UTM Zone 12) or 59°33’16.64”N, 108°28’36.49”W,
- The 2.4 X 2.4 m CB-1 Access Raise located at 642558E: 6604563N (WGS 84 UTM Zone 12) or 59°33’18.09”N, 108°28’39.25”W,
- The Waste Haulage Adit at 642638E: 6604455N (WGS 84 UTM Zone 12) or 59°33’14.34”N, 108°28’34.43”W, and
- The bulk fuel storage tanks.

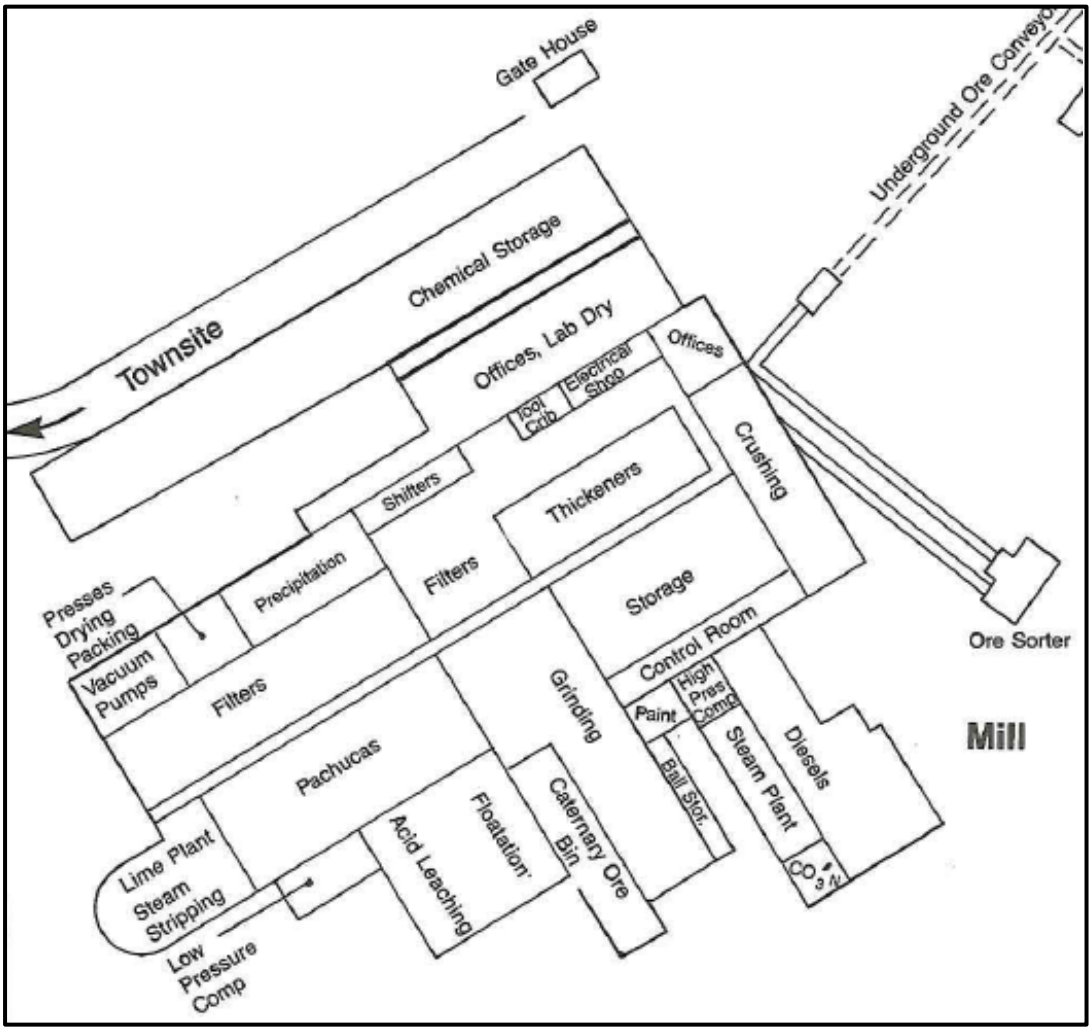


Figure 31: Beaverlodge Mill Source: Plan View Before Decommissioning 1983, Eldorado Nuclear Ltd.)

During operations, the URA 7 property also hosted a portion of the telecommunications and electrical power infrastructure that extended from the mill site to the Ace and Verna mine sites.

The Beaverlodge mill operated continuously for nearly 30 years with the decision to permanently shut down announced in December 1981. The last ore was hoisted from the Fay mine on June 25, 1982 and the mill ceased processing in mid-August 1982.

According to Eldorado (1983), the Beaverlodge mill was a carbonate leaching uranium mill with an 1,800 t/ per day rated capacity. During operations between 1953 and 1982, it produced approximately 20 X 10^6 kilograms of yellowcake from slightly more than 10 X 10^6 tonnes of ore milled, with an average recovery rate of 90%. Although primarily a carbonate leach mill, a small acid circuit was added to extract the uranium from small amounts of sulphide mineralization present in some ore.

8.6.2 Initial Decommissioning Activities

Departure with Dignity (Eldorado 1987) states that to render the mill out of service, the following tasks were undertaken:

- Removal of the ore solids and leached solids from the plant,
- Recovery of uranium from the mill solution as yellowcake,
- Removal of residual yellowcake from the precipitation and recovery circuits,
- Implementation of procedures to dispose of mill solutions underground,
- Removal of all saleable supplies, equipment and structures, and
- The development and implementation of procedures for abandonment, demolition and reclamation of the site.

Demolition of the mill structures commenced in April 1984 and was undertaken in various campaigns over the following 13 months. During this activity, mill structures were partially demolished, and the resulting voids were filled with the demolition material and waste rock. After demolition was complete, the entire area was covered and contoured with waste rock to suit the existing topography. A total of approximately 259,100 m^3 of waste rock was hauled to the mill complex and placed to cover the mill building. Any settling of cover material since decommissioning has been remediated.

Table 5.1 of *Departure with Dignity* (Eldorado 1987) indicates that the 1.5 X 1.5 m Sorting Plant Bin, the 1.5 X 2.4 m Sorting Plant Raise and the 2.4 X 2.4 m CB-1 Access Raise were all sealed during the Summer/Fall of 1984, however no mention is made of the Waste Haulage Adit.

All tanks from the bulk fuel tank farm area were salvaged and sold.

The majority of the telecommunications and electrical transmission poles and related infrastructure on the URA 7 property were originally decommissioned by cutting the poles above the mounting brackets and removing them from the property, leaving the mounting brackets and pole stubs in place. The mounting brackets have since been removed as part of the general site clean-up and were disposed of in Lower Fay Pit.

The main haul road and a number of short spurs roads transect the URA 7 property and were left “as is.”

8.6.3 Recent Decommissioning Activities and Beaverlodge Performance Indicators

Acceptable Gamma Levels (Performance Indicator has been met)

During 2014, a detailed surficial gamma survey was conducted primarily focusing on the disturbed areas (i.e., Fay area, roads, waste rock piles and the former tailings pipeline corridors) on the URA 7 property (ARCADIS SENES 2014). The property was surveyed on a 10 m grid (approximately), as terrain and vegetation allowed considering safety and physical accessibility, with each radiation technician using a Ludlum 2221 ratemeter connected to a 2" x 2" sodium iodide (NaI) crystal scintillation detector (Ludlum 44-10).

The resulting radiation dose rates were then averaged on a 1 ha basis to allow comparison to the 1 µSv/h reference gamma value in the provincial *Guidelines for Northern Mine Decommissioning and Reclamation* (SkMOE 2008).

The majority of the surface gamma survey results ranged from <0.1 µSv/h to 1.0 µSv/h above background (ARCADIS SENES 2014), which meets the *Guidelines for Northern Mine Decommissioning and Reclamation* (SkMOE 2008). However, on a portion of the URA 7 property the survey results range from 1.0 µSv/h to 3.0 µSv/h. As such, a risk-based approach was applied to evaluate potential radiation risk at the property and concluded incremental dose from the Beaverlodge properties based on the measured gamma results and the reported land use are well below the public dose criterion of 1 mSv/yr. (ARCADIS 2015) and meet the performance indicator associated with acceptable gamma levels.

Following the gamma survey completed in 2014 material on the URA 7 property was disturbed in the process of performing additional remediation to prepare the sites for long term stability. Material from the former sorted waste pile was removed and added as the base layer of cover material during the closure of the Lower Fay Pit (on the URA 1 property). The Former Mill Site was covered with a layer of clean waste rock, and several former mine openings were exposed to confirm their location prior to being resealed. Following completion of this additional remediation a gamma scan of these areas will be completed in May 2024 to confirm the results of the 2014 survey and risk assessment. The results of this gamma survey will be provided to the regulatory agencies once complete The gamma results provided in **Figure 32** represent to most recent result for all areas reported.

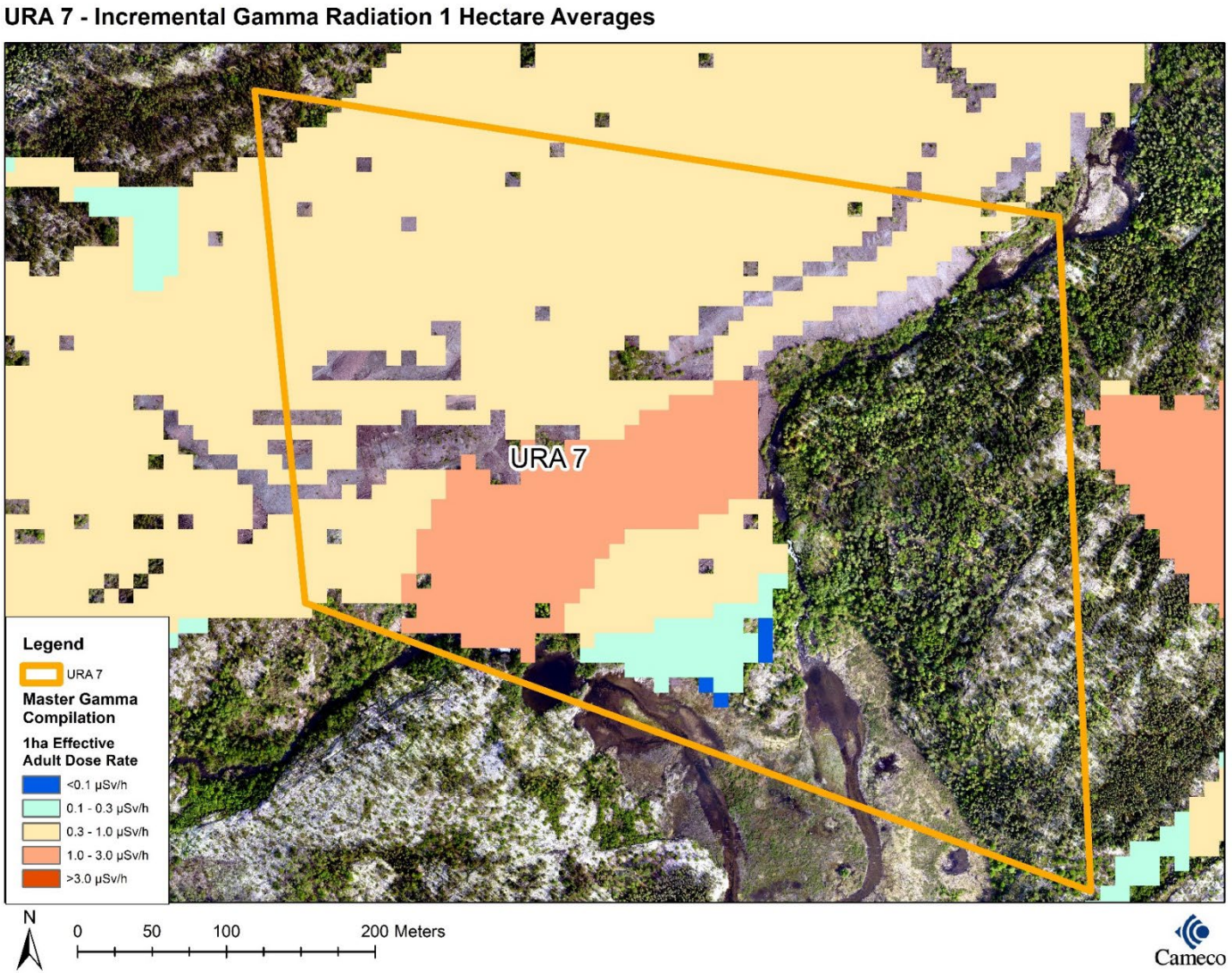


Figure 32: Incremental Gamma Radiation 1 Hectare Averages: URA 7 Property

Boreholes Plugged (Performance Indicator has been met)

Activities completed since 1985 have included sealing exploration boreholes according to accepted methods (Cameco 2017). Surface inspections in support of transferring the properties to IC identified five exploration bore holes on the URA 7 property. The following provides the designation and location of each hole (see **Table 25**).

Table 25: URA 7 Property Borehole Coordinates

Designation	Coordinate System: WGS 84 UTM Zone 12		Year Remediated
	Easting	Northing	
BH-22	642959.407	6604439.281	2017
BH-23	642954.958	6604432.3	2017
BH-24	642940.515	6604415.339	2017
BH-25	642930.8	6604406.299	2017
BH-33	642423.877	6604597.892	2017

Each of the holes was found dry with no evidence of past liquid discharge. Notwithstanding this condition, the drill holes were plugged with a concrete grout to a depth of 30 m or refusal in accordance with regulatory accepted methods in 2017.

As a result of the activities conducted since 1985, the URA 7 property meets the boreholes plugged performance indicator.

Stable Mine Openings (Performance Indicator has been met)

During operation, waste rock rejected from the milling process (due to insufficient grade) was sent through the Sorting Plant Bin and Sorting Plant Raise to a haulage-way and transported via rail approximately 100 metres to the Waste Haul Adit, where the material was then dumped on surface in an area referred to as the sorted waste rock pile.

In 2016, the Waste Haulage Adit (originally secured in 1982) was excavated and re-secured by placing sorted waste rock into the adit to a depth of more than twice the height of the adit filling the area and creating a slope on surface to prevent erosion and/or subsidence. A summary of the remediation along with a request for exemption from *The Mine Regulations, 2003* Section 407 (2)(3), for the Sealing of a Horizontal Opening was submitted November 21, 2016 and was granted in early 2017 by the Ministry LRWS.

The Sorting Plant Bin, Sorting Plant Raise, and the CB-1 Access Raise were all sealed during the Summer/Fall of 1984. The Sorting Plant Raise and Bin were excavated in 2016 (and again in 2022 to confirm the location), and it was determined that the openings were backfilled and the surface contoured with waste rock to match the surrounding topography. Both the Sorting Plant Raise and Sorting Plant Bin openings are relatively shallow, do not provide access to the underground workings and have showed no evidence of settling in the nearly 40 years since they were

decommissioned. Therefore, these openings have been left 'as is' with identification markers placed at their locations. In 2021, the CB-1 Access Raise was permanently secured with a regulatory approved engineer designed closure.

The following table provides a summary of the location and final closure methods employed at each of the four openings to surface on the URA 7 property and the year in which the closure was completed. The URA 7 property meets the stable mine openings performance indicator (see **Table 26**).

Table 26: URA 7 Property Openings

Designation (Source: *Fay Area Map, Nov. 1986*)	Location (UTM WGS 84, 12N)		Closure Method	Date of Final Closure
	Easting	Northing		
Sorting Plant Bin	642603	6604520	Backfilled	1984
Sorting Plant Raise	642603	6604520	Backfilled	1984
CB-1 Access Raise	642558	6604563	Engineered rock and backfill cover	2021
Waste Haulage Adit	642638	6604455	Backfilled to a depth of more than twice the height of the adit	2016

Geotechnical Stability

Crown Pillar (Performance Indicator has been met)

The Fay/Ace/Verna mine discontinued operation in 1982 and the mine allowed to flood. A review of the underground Fay/Ace/Verna mine plan superimposed on the surface maps indicates sections of the Fay mine underground workings extend under the URA 7 property.

In 2014, SRK was retained by Cameco to undertake a geotechnical assessment for the crown pillar stability at six historic Beaverlodge sites including the Fay mine. Based on available information, underground workings and stoping around the Fay shaft area appear to be typically 25m or greater below the ground surface. The report concluded that no additional investigation or remediation was required, and that the Fay mine area has a "low" likelihood of subsidence due to the thickness of the crown pillar and depths of the underground workings (SRK 2015).

The underground workings have been decommissioned for 40 years and no indication of instability or subsidence have been identified in association with the mine workings underlying the URA 7 property.

The URA 7 property therefore meets the crown pillar performance indicator.

Pit Walls

There are no open pits associated with the URA 7 property.

Tailings

Figure 4.3 of *Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site, Report No. 2, Operating History and Environmental Conditions* (Eldorado 1983) shows a small area along the north edge of property experienced a tailings spill associated with the tailings pipeline from the mill. The majority of this identified spill was on the URA 4 property (already in ICP). The area was covered with waste rock at decommissioning.

Waste Rock

The Fay mine is reported to have produced a total of 3,030,000 tonnes of waste rock which covered an area of approximately 33.0 hectares, the majority of which was deposited on areas south and southwest of the mill with a portion situated on the URA 7 property. During operation, waste rock was used on the URA 7 property as construction material for building foundations, roads, etc. and during initial decommissioning waste rock was re-contoured on the URA 7 property as required. During the summer of 1982, Eldorado collected waste rock samples from various Beaverlodge sites for analysis. Section 4.1 of Eldorado 1983 provides a summary of the volumes and analysis of the waste rock on a variety of the Beaverlodge mine sites. The uranium content of the waste rock reported in Eldorado 1983 for the Fay area was 0.015%, which is below the threshold considered to be special/mineralized waste rock at the operating uranium mines in northern Saskatchewan (0.03%). In addition, recent waste rock sampling completed by Cameco on the Fay Waste Rock pile has confirmed that the site waste rock has a low potential for acid generation and that the uranium content of the waste rock sampled is less than 0.03%. Visual observation and monitoring of the sites for more than 60 years have not identified any acidic leachate from waste rock piles, nor has it identified any impacts that could be attributed to such a condition.

In 2010, SRK Consulting (Canada) Inc. (SRK) completed a waste rock stability assessment of all the former Eldorado Beaverlodge sites including the Fay waste rock pile, including the waste rock on the URA 7 property. That assessment concluded that there were no signs of instability observed on either the waste rock slope or the adjacent ground downslope and the only risk in terms of stability is predominantly associated with the potential for an occasional rolling rock. The assessment concluded that a deep-seated failure affecting the global stability of the waste rock, was unlikely to occur in the foreseeable future. Based on the SRK site observations, the waste rock dump at the Fay site is in good condition, the rock is durable and global instability and the risk of a deep-seated failure that would affect the global stability of the dump is judged to be very low (SRK 2010).

In 2011, SaskPower, as part of ongoing power line right-of-way maintenance, placed cut trees on the sorted waste rock pile on URA 7. As the trees decay, they will provide a source of nutrients for natural encroachment of vegetation.

Water Quality within Modelled Predictions (Performance Indicator has been met)

After receiving drainage from the Hab, Dubyna, and Bolger mine sites, Ace Lake discharges into Lower Ace Creek, which passes through the URA 7 property, and eventually reaches Ace Bay of

Beaverlodge Lake. During the 2014 update meeting with the Commission (CNSC 2014), CNSC Staff indicated that the water quality performance indicator for the Lower Ace Creek area would be associated with the URA 7 property based on the potential influence on water quality on Lower Ace Creek and the downstream environment. Historically, Lower Ace Creek has received inputs from Fay waste rock pile drainage; from the former mill site area; runoff/seepage from tailings spill areas; drainage from Ace shaft waste rock pile; drainage from tailings deposited during operation near the former Dorrclone plant; and, formerly flowing boreholes that are connected to the underground mine workings (SENES 2012). The principal source of constituents measured in Lower Ace Creek is, or have been, the seeps from the former mill area and formerly flowing boreholes. As discussed in the Boreholes Plugged section, identified boreholes have been sealed as one of the remedial activities to reduce loads from the underground mine workings on surface water bodies. Seeps 2 and 3 have been identified on the URA 7 property, originating at the base of the waste rock pile downgradient of the mill site. Water quality samples and flow measurements were collected opportunistically since 2004 to identify long-term water quality trends; however, flow from the seep is intermittent and is typically limited to freshet and major precipitation events. In 2019, the JRG accepted that the seep monitoring program objective had been met and it was removed from the Beaverlodge Environmental Monitoring Program. Constituent loadings associated with runoff from the main site waste rock and spilled tailings were also considered during the model development and are a small source of the primary constituents of concern (i.e., radium-226, selenium and uranium) when compared to the loadings associated with the formerly flowing boreholes and seeps.

A detailed discussion on the water quality performance indicator for the Lower Ace Creek is provided in the URA 1 property section to reduce duplication.

Water quality measured at AC-14 is within the modelled predictions and therefore the water quality performance indicator has been met for the URA 7 property.

Site Free from Debris (Performance Indicator has been met)

All decommissioned Beaverlodge properties were inspected in an effort to locate historic debris not removed during initial decommissioning. During the main clean-up campaign from 2015 to 2017, GPS tracking was utilized to ensure adequate coverage of the properties, including the URA 7 property, unless safety consideration, surface features or significant vegetation prohibited access to a specific area (**Figure 33**).

Following the above noted inspections, various debris found on the property, including the remaining electrical and power infrastructure (pole brackets) and concrete pilons and anchor bolts used to anchor the tailings line on the URA 7 property were removed and disposed of in the Lower Fay Pit as approved by SkMOE. In addition, as final regulatory inspections of the properties occurred, any additional debris located was disposed of in Lower Fay Pit.

As a result of this activity, the URA 7 property meets the performance indicator of being free of debris.

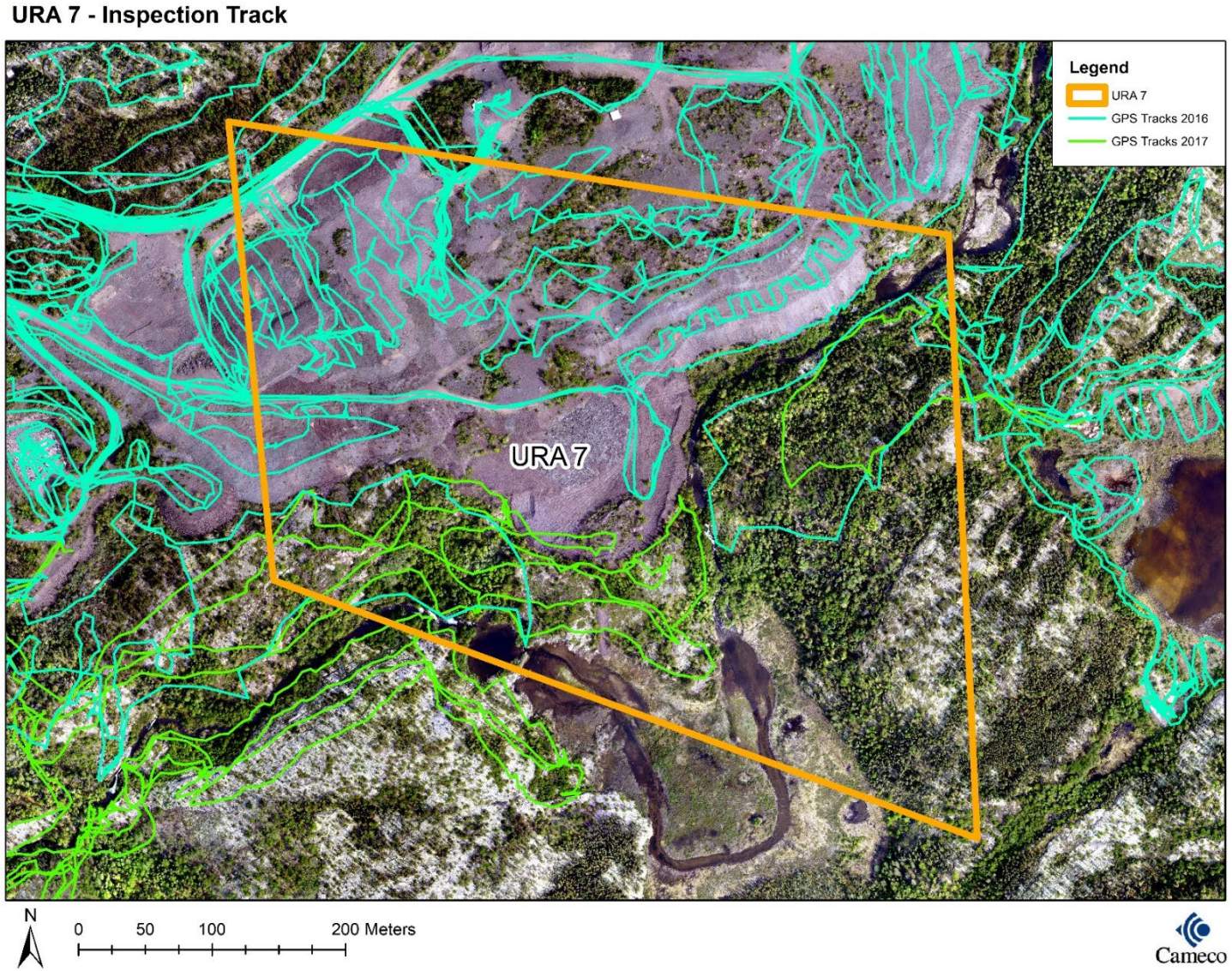


Figure 33: URA 7 – Inspection Track

8.6.4 Decommissioning and Reclamation Documentation

Table provides a summary of general documents which include refence to the Fay site and by extension the URA 7 property. The majority of discussion in these documents combines discussion of the Fay mine with the entire Fay/Ace/Verna mine complex.

Table 27: Documentation Log – URA 7

Document	Date
Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site, Report No. 2, Operating History and Environmental Conditions, MacLaren Plansearch, Eldorado Resources Limited,	February 1983
Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site, Report No. 5 - Plan for the Close Out of the Beaverlodge Site, Eldorado Resources Limited	August 1983
Departure with Dignity, Decommissioning of the Beaverlodge Mine/Mill, Operations and Reclamation of the Site, MacLaren Plansearch, Eldorado Resources Limited	February 1987
Surface Lease Renegotiation, Appendix D - Decommissioning and Reclamation Plan, Historical Summary: 1981-2005, Cameco Corporation	November 2006
Waste Rock Stability Assessments – Former Beaverlodge Sites, SRK Project No. 4CC008.027, SRK Consulting (Canada) Inc	December 2010
Surficial Gamma Radiation Survey of Disturbed Areas at the Former Beaverlodge Mine Site, Final Rev. 1, ARCADIS SENES Canada Inc.	November 2014
2014 Uranium City Consultation on Land Use, SENES Consultants & Kingsmere Resources Services	January 2015
Beaverlodge Site Gamma Radiation Risk Evaluation, ARCADIS Canada Inc.,	June 2015
Beaverlodge Property – Crown Pillar Assessment (2014-2015), SRK Project No. 1CC007.048, SRK Consulting (Canada) Inc.	July 2015
Beaverlodge Request for Exception from Mines Regulations Section 407 (2) (3) for Sealing of a Horizontal Mine Opening	November 2016
Beaverlodge 2017: Borehole Decommissioning Report, Cameco Corporation (Cameco).	July 2017
Remediation of Utility Corridors & Related Infrastructure, Beaverlodge Properties, Kingsmere Resource Services Inc.	January 2018
Beaverlodge Property Inspection for Institutional Control Transfer Report, Kingsmere Resource Services Inc.	January 2018
Decommissioned Beaverlodge Properties – As-Builts for Mine Openings Sealed After 2000, Cameco 2022	April 2022

8.6.5 Evaluation of URA 7

The current condition of the property, combined with the limited use of the property by local land users demonstrates that the URA 7 property meets the established performance objectives of safe, secure, stable/improving and has no remaining liabilities (see **Table 28**).

Table 28: Evaluation of URA 7

Performance Indicators	Acceptance Criteria	URA 7
Acceptable Gamma Levels	Reasonable use scenario demonstrating gamma levels at the site are acceptable.	✓
Boreholes Plugged	All boreholes have been plugged at the time of transfer to institutional control.	✓
Stable Mine Openings	Mine openings have been secured and signed off by a qualified person, where applicable.	✓
Stable Crown Pillar	Crown pillar assessed, remediated if required, and signed off by a qualified person.	✓
Site Free from Debris	Site free of former mining debris at the time of transfer to institutional control.	✓
Water Quality Within Modelled Predictions	Water quality data is stable/improving.	✓

Based on the conclusions of the 2020 ERA the human and ecological risks are acceptable, and all relevant performance indicators have been met. As such, the URA 7 property should be considered for Release from Decommissioning and Reclamation by the SkMOE, released from CNSC License WFOL-W5-2120.2/2025 and transfer to the provincial Institutional Control Program for long term environmental stewardship.

The following section outlines the expectations for managing URA 7 property while under Institutional Control.

8.6.6 Institutional Control Considerations and Requirements

Engineered Structures

The URA 7 property hosts an engineer designed closure over the CB-1 Access Raise. In addition, openings related to the operation of the mill, Sorting Plant Bin, the Sorting Plant Raise and the Waste Haul Adit have all been backfilled.

Beaverlodge Post Closure Land Status

The URA 7 property falls entirely within the planned extent of the Beaverlodge IC borders and will therefore be included in the Saskatchewan Institutional Control Registry in order to establish administrative controls to restrict future land use.

Remaining Site Aspects Requiring Future Monitoring and Maintenance (2020)

To meet the requirements of section 22 of the MIEPR, **Table 29** provides a summary of aspects of the URA 7 property in terms of remaining liabilities and an assessment of the significance of the potential hazard posed by each in the unlikely event that it were realized.

Table 29: Remaining Site Aspects – URA 7 Property

Site Aspect	Assessment Endpoint	Likelihood	Severity	Overall Residual Risk
Waste Rock Slope Failure	Environment	Very Unlikely	Minor	Low
	Public Health & Safety	Very Unlikely	Minor	Low
Erosion of Waste Haulage Adit cover	Environment	Very Unlikely	Minor	Low
	Public Health & Safety	Very Unlikely	Minor	Low
Erosion of Sorting Plant Bin cover	Environment	Very Unlikely	Minor	Low
	Public Health & Safety	Very Unlikely	Minor	Low
Erosion of Sorting Plant Raise cover	Environment	Very Unlikely	Minor	Low
	Public Health & Safety	Very Unlikely	Minor	Low
Erosion of CB-1 Access Raise cover	Environment	Very Unlikely	Minor	Low
	Public Health & Safety	Very Unlikely	Minor	Low

As noted earlier, the water quality of Lower Ace Creek will continue to be monitored as part of the Beaverlodge EMP until all the Beaverlodge properties located within the entire Ace Lake watershed are transferred to the provincial IC Registry. A long-term water monitoring program will then be implemented under the IC Program and water quality will continue to be compared to the predicted recovery from the 2020 ERA (CanNorth 2020).

Institutional Control Monitoring

Figure 34 outlines the site features associated with URA 7 property. Based on the historical activities at the URA 7 property, covers over the openings to surface and waste rock slopes will require inspection under the Province of Saskatchewan's institutional control management framework.

Such an inspection should be conducted of all disturbed areas and focus on the following aspects:

- Evidence of recent human visitation:
- Condition of waste rock,

- Observe and note condition of
    - Seep 2 at 642500: 6604339N (WGS 84 UTM Zone 12); and
    - Seep 3 at 642625E: 6604325N (WGS 84 UTM Zone 12)
- The condition of:
    - The 1.5 X 1.5 m Sorting Plant Bin located at 642603E: 6604520N (WGS 84 UTM Zone 12)

      or 59°33'16.64"N, 108°28'36.49"W,
    - The 1.5 X 2.4 m Sorting Plant Raise at 642603E: 6604520N (WGS 84 UTM Zone 12)

      or 59°33'16.64"N, 108°28'36.49"W,
    - The 2.4 X 2.4 m CB-1 Access Raise located at 642558E: 6604563N (WGS 84 UTM Zone 12) or 59°33’18.09"N, 108°28'39.25"W, and
    - The Waste Haulage Adit at 642638E: 6604455N (WGS 84 UTM Zone 12) or 59°33'14.34"N, 108°28'34.43"W.

Institutional Control Maintenance

No aspect of the URA 7 property will require maintenance under institutional control.

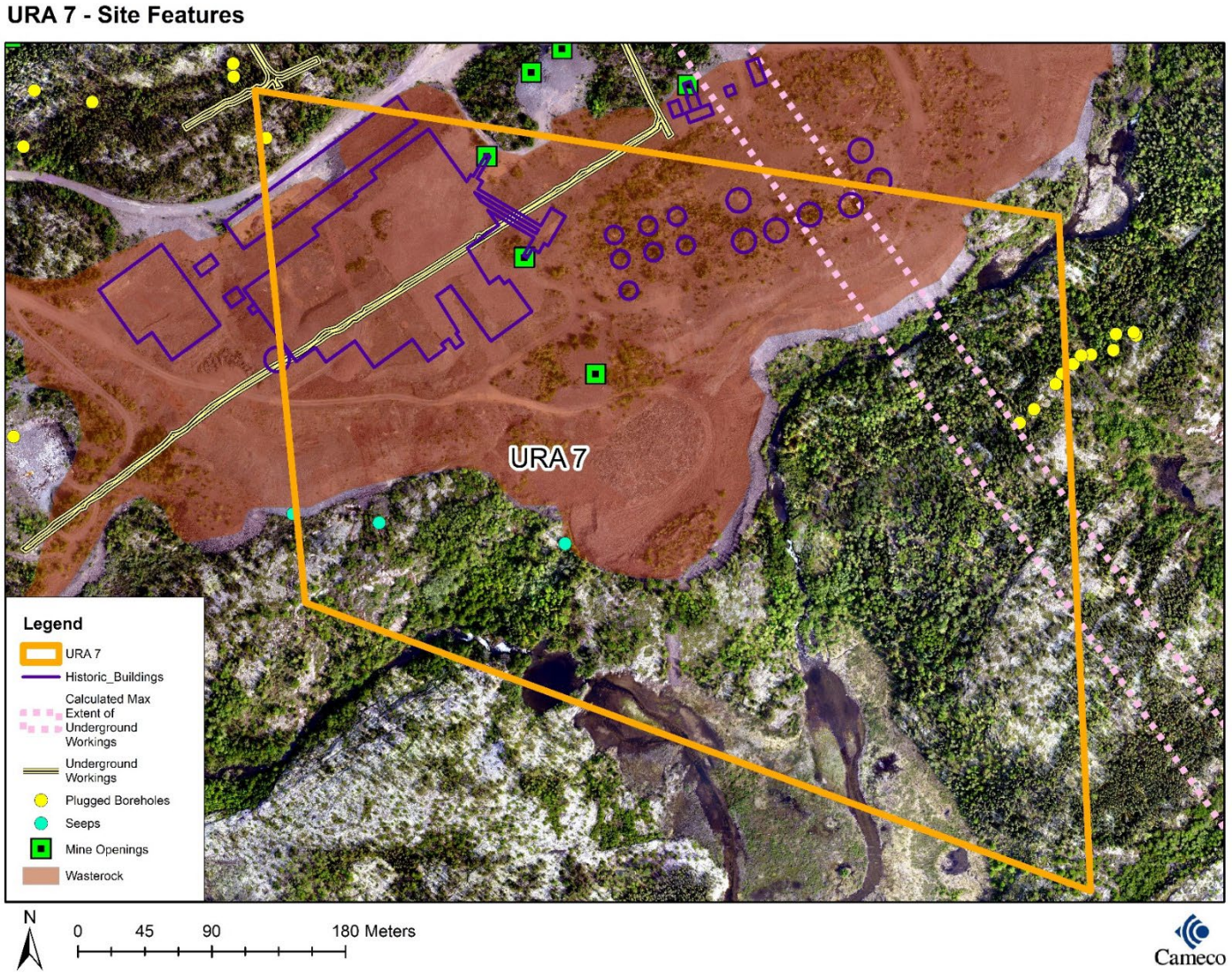


Figure 34: URA 7 - Site Features

8.7 BOLGER 1 [MSL 10]

8.7.1 Description

Table 30: BOLGER 1 Property Coordinates

AECB License Number	Cameco Number	DNS[1] Number	Area (hectares)	Bounding Coordinates (UTM WGS 84 Zone 12)	
				Easting	Northing
MSL 132	Bolger 1	200063	11.5	646041	6606067
				645600	6606081
				646036	6606093
				645592	6606202
				645641	6606347
				646007	6606357
				646027	6606141
				646008	6606113
				645975	6606098
				645671	6606079

[1] – Department of Northern Saskatchewan

The BOLGER 1 (MSL 132) property is a 11.5-hectare parcel of land and is listed in Appendix A of the Eldorado Resources Limited Decommissioning Approval AECB-DA-142-0 (November 1983) as "Bolger open pit". The property is included on the *2006 Beaverlodge Surface Lease Agreement* map as MSL 132 (**Figure 35**) and in the *Property Description Manual* referenced in the LCH, which is referenced in the CNSC issued Waste Facility Operating License WFOL-W5-2120.0/2025.

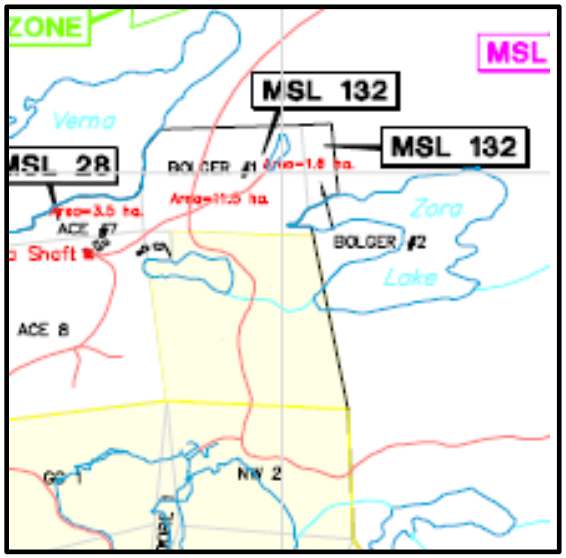


Figure 35: Bolger 1 (MSL 132) Property (Source: Beaverlodge Surface Lease Map)

The Bolger pit was operated intermittently between 1958 and 1980 and was the largest pit at the Eldorado Beaverlodge site.

An unusual feature of the Bolger deposit prior to its development was that the overburden in an area of approximately 6,500 square feet (≈ 605 m^2) and as much as several feet deep in places was extremely rich in secondary uranium minerals. This overburden was stripped off and approximately 1,440 tons, grading 0.73% was run through the Beaverlodge mill (Beck, 1969).

8.7.2 Initial Decommissioning Activities

Bolger was the largest open pit in the region and was partially backfilled over a 42-week period in late 1984 and early 1985. *Departure with Dignity* (Eldorado 1987) states that the Bolger Pit was used for the disposal of a variety of material during decommissioning of various properties and was backfilled with waste rock to natural ground surface at the southwest side, once it was no longer required for scrap disposal.

In addition, the majority of electrical transmission poles and related infrastructure were removed by cutting the poles above the mounting brackets and removing them from the property, leaving the mounting brackets and pole stubs in place. The pole mounting brackets have since been removed as part of the general site clean-up.

8.7.3 Recent Decommissioning Activities and Beaverlodge Performance Indicators

Acceptable Gamma Levels (Performance Indicator has been met)

Detailed surficial gamma surveys were conducted on the disturbed areas of the BOLGER 1 property in 2014 (ARCADIS SENES 2014). In 2016, following the completion of the Bolger Flow Path Reconstruction Project all areas that were disturbed by the earthworks were rescanned. During each survey, the property was surveyed on a 10 m grid (approximately), as terrain and vegetation allowed considering safety and physical accessibility, with each radiation technician using a Ludlum 2221 ratemeter connected to a 2” x 2” sodium iodide (NaI) crystal scintillation detector (Ludlum 44-10).

The 2014 gamma results were overlapped and replaced where applicable with the 2016 gamma results. The resulting radiation dose rates were then averaged on a 1 ha basis to allow comparison to the 1 µSv/h reference gamma value in the provincial *Guidelines for Northern Mine Decommissioning and Reclamation* (SkMOE 2008).

As shown in **Figure 36** the entire BOLGER1 property ranged from < 0.1 µSv/h to 1.0 µSv/h above background averaged over 1 ha, which meets the *Guidelines for Northern Mine Decommissioning and Reclamation* (SkMOE 2008) and meets the performance indicator associated with acceptable gamma levels.

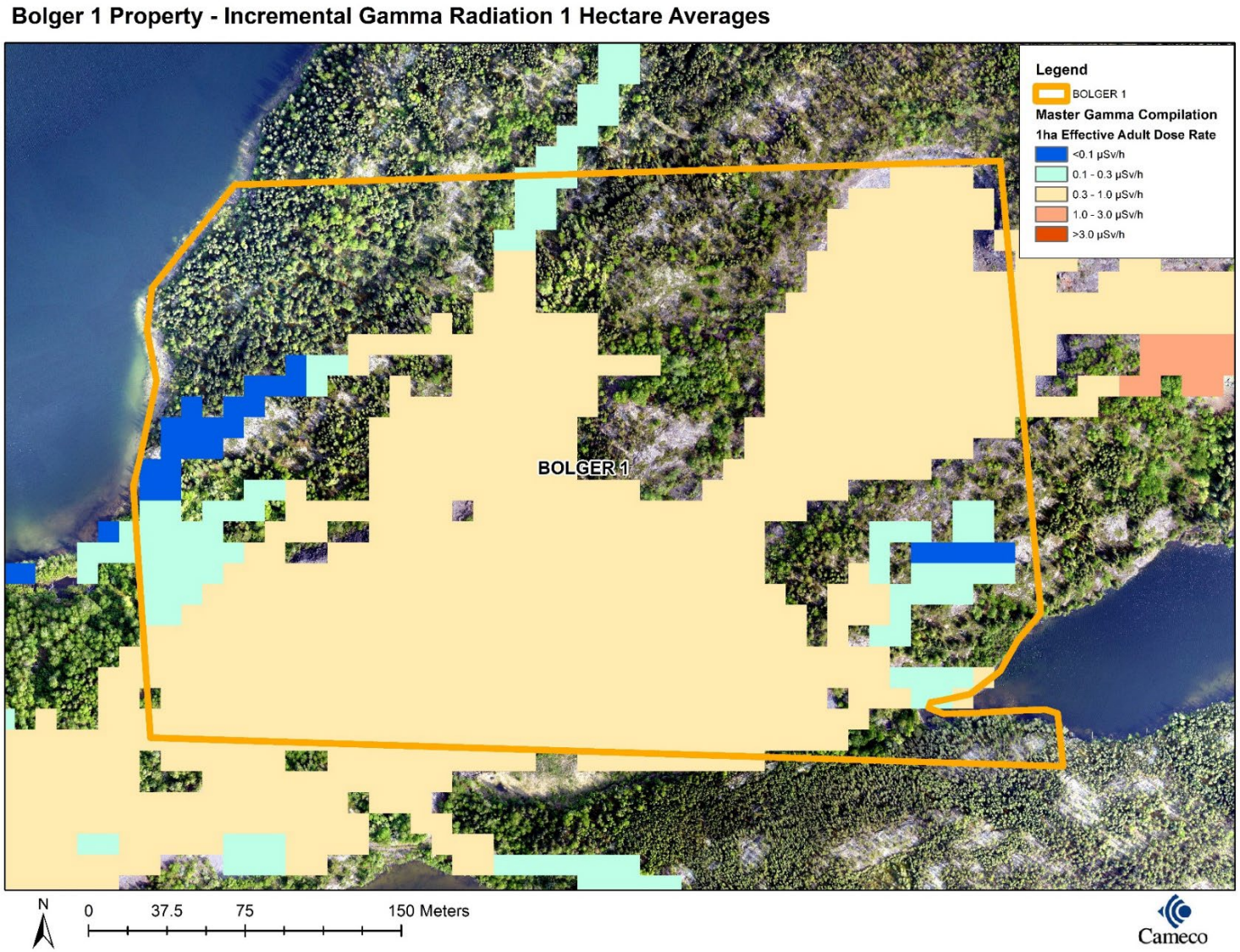


Figure 36: Incremental Gamma Radiation 1 Hectare Averages: Bolger 1 Property

Boreholes Plugged (Performance Indicator has been met)

Activities completed since 1985 have included sealing exploration boreholes according to accepted methods (Cameco 2017). Surface inspections in support of transferring the properties to IC identified two exploration bore holes on the BOLGER 1 property. **Table 31** provides the designation and location of each hole.

Table 31: BOLGER 1 Property Boreholes

Designation	Coordinate System: WGS 84 UTM Zone 12		Year Remediated
	Easting	Northing	
VR 03	645987.422	6606161.403	2016
VR 05	645751.166	6606305.443	2017

Each of the holes was found dry with no evidence of past liquid discharge. Notwithstanding this condition, the drill holes were plugged with a concrete grout to a depth of 30 m or refusal in accordance with regulatory accepted methods in 2017.

As a result of the activities conducted since 1985, the BOLGER 1property meets the boreholes plugged performance indicator.

Stable Mine Openings (Performance Indicator is not applicable)

The BOLGER 1 property does not host any mine openings to surface.

Geotechnical Stability

Crown Pillar (Performance Indicator has been met)

The Fay/Ace/Verna mine discontinued operation in 1982 and the mine allowed to flood. A review of the underground Fay/Ace/Verna mine plan superimposed on the surface maps indicates sections of the Verna mine underground workings extend under the BOLGER 1 property.

In 2014, SRK was retained by Cameco to undertake a geotechnical assessment for the crown pillar stability at six historic Beaverlodge sites including the Verna mine. Based on available information, underground workings and stoping around the Verna shaft area appear to be typically 80 m below the ground surface. The report concluded crown pillar collapse is not considered to be a significant risk and no further investigation or assessment is warranted (SRK 2015).

The underground workings have been decommissioned for 40 years and no indication of instability or subsidence have been identified in association with the mine workings underlying the BOLGER 1 property.

The BOLGER 1 property therefore meets the crown pillar performance indicator.

Pit Walls

In 2010, SRK performed an inspection of the Bolger pit and noted that the pit had been backfilled during decommissioning to natural ground surface at the southwest side, leaving rock slopes of approximately 20 to 36 m in height along the west, north and east walls. Overall pit slope angles vary from approximately 50 degrees for the eastern pit walls up to 57 degrees along the west and north pit walls (SRK 2010). The 2010 inspection concluded that the rock mass at Bolger is very competent with moderate jointing and no indications of slope instability. Given the competent nature of the rock mass, slope failure at Bolger is not expected (SRK 2010). During excavation work related to the Bolger Flow Path Reconstruction Project (2014 to 2016), additional waste rock was placed in the pit reducing the pit wall height to approximately 15 m. Geotechnical inspections of Bolger pit have since been completed in 2018 (SRK 2019) and 2020 (SRK 2021) with no concerns noted.

SRK concluded in 2021 that, from a geotechnical perspective, it would be reasonable for Cameco to transfer the property associated with the Bolger pit to the IC Program (SRK 2021).

Tailings

Figure 4.3 of *Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site, Report No. 2, Operating History and Environmental Conditions* (Eldorado 1983) shows that no tailings spills from the tailings pipeline were present on the BOLGER 1 property at the cessation of operations.

Waste Rock

The Bolger mine is reported to have produced a total of 639,300 tonnes of waste rock which covered an area of approximately 4.5 hectares, the majority of which was deposited in an area south of the pit and filling the valley that originally connected Zora and Verna Lake on the Bolger property.

During the summer of 1982, Eldorado collected waste rock from various Beaverlodge sites for analysis. Section 4.1 of Eldorado 1983 provides a summary of the volumes and analysis of the waste rock on a variety of the Beaverlodge mine sites. Waste rock analysis completed by Eldorado in 1982 indicated the waste rock piles were not acid generating and the uranium content of the waste rock reported in Eldorado 1983 for the Bolger pit averaged 0.027%, which is below the threshold considered to be special/mineralized waste rock at the operating uranium mines in northern Saskatchewan (0.03%).

One of the remedial options selected for implementation on the Beaverlodge properties, following the 2012 Remedial Options Workshop was the re-establishment of flow from Zora Lake the Verna Lake. Implementing this project resulted in the relocation of waste rock that had previously been place in the valley between Zora and Verna lakes and transporting it to Bolger Pit. Waste rock samples were collected prior to, and during, project implementation for analysis.

Waste rock analysis completed on the Bolger waste rock pile in 2011, 2014 and 2015 confirmed that the average uranium concentration in the Bolger Waste Rock pile is below 0.03%. Waste rock

sampling has also shown the waste rock is non-acid generating and visual observation for more than 60 years has not identified any impacts that could be attributed to the generation of acidic conditions.

In 2010, SRK completed a waste rock stability assessment of all the former Eldorado Beaverlodge sites including the waste rock that is located on the BOLGER 1 property. That assessment concluded that the waste rock pile is in good condition, the rock is durable and global instability at this site has a very low risk. Therefore, SRK's opinion is that in the context of the waste rock pile condition and the remoteness of the site, no further remedial works are required.

Between 2014 and 2016, Cameco implemented the Bolger Flow Path Reconstruction project in an effort to improve the immediate downstream water quality by reducing the duration of contact between Zora Creek and the waste rock. Full details of the as constructed channel are provided in the As-Built Report (SRK 2017a). Following construction, inspections have been completed by Cameco personnel since 2016 as well as by a third-party geotechnical expert in 2017 (SRK 2017), 2018 (SRK 2019) and 2020 (SRK 2021) with no observable changes to the landform and no concerns identified.

SRK concluded in 2021 that, from a geotechnical perspective, it would be reasonable for Cameco to transfer the property associated with the Bolger Pit and the Drainage Channel to the IC Program (SRK 2021).

Water Quality within Modelled Predictions (Performance Indicator has been met)

The BOLGER 1 property borders Zora Lake to the east and Verna Lake to the west. During the early years of operation of the Bolger mine site, mine water was discharged untreated to Verna Lake, which then discharges to Ace Lake. Waste rock from the open pit mine was placed into the area west of the pit, extending across a valley through which Zora Creek historically flowed and connected Zora Lake to Verna Lake, resulting in flow from Zora Creek filtering through the waste rock pile. To improve water quality from Zora Creek into Verna Lake, flow in Zora Creek was re-established following construction of a channel through the waste rock pile between 2014 and 2016 (SRK 2016, SRK 2017). Water quality was expected to decline in the short term, during and following the re-establishment of Zora Creek, due to an increased loading of uranium that resulted from construction activities disturbing the flow path. Recent improvements in water quality have seen uranium concentrations fall within the performance indicator established for this station.

To determine if the anticipated localized benefits to Verna Lake are being achieved, water quality has been monitored at station AC-6A (located at the outflow of Verna Lake downstream of the BOLGER 1 property) and concentrations have helped inform modelled predictions. The modelled data helped establish WQ performance indicators, which CNSC Staff have deemed appropriate for evaluating the recovery of Verna Lake. The relevant water quality constituents that are assessed as part of the performance indicator include: radium-226, uranium, and selenium. As shown in **Figure 37, 38, and 39** and discussed in greater detail in the 2020 Beaverlodge ERA (CanNorth 2020a), the following observations can be made that demonstrate the Verna Lake water quality data is meeting the water quality performance indicator as defined by regulatory accepted assessment methodologies:

- Selenium concentrations in Verna Lake meet the performance indicator (i.e., predictions) outlined in the 2020 ERA and are predicted to remain below the SEQG value of 1 µg/L, over the entire simulation period.

- Uranium concentrations in Verna Lake have seen recent improvements as water quality in the reconstructed Zora Creek continues to improve and now meets the performance indicator (i.e., predictions) outlined in the 2020 ERA and are expected to continually improve over the long-term.

- Radium-226 levels in Verna Lake meet the performance indicator (i.e., predictions) outlined in the 2020 ERA and are predicted to drop below the SEQG value (0.11 Bq/L) consistently within the next 10 years.

The water quality of Verna Lake will continue to be monitored as part of the Beaverlodge EMP until all the Beaverlodge properties are transferred to the provincial IC Registry. A long-term water monitoring program will then be implemented under the IC Program and water quality will continue to be compared to the predicted recovery from the 2020 ERA (CanNorth 2020).

The BOLGER 1 property therefore meets the water quality within modelled predictions performance indicator.

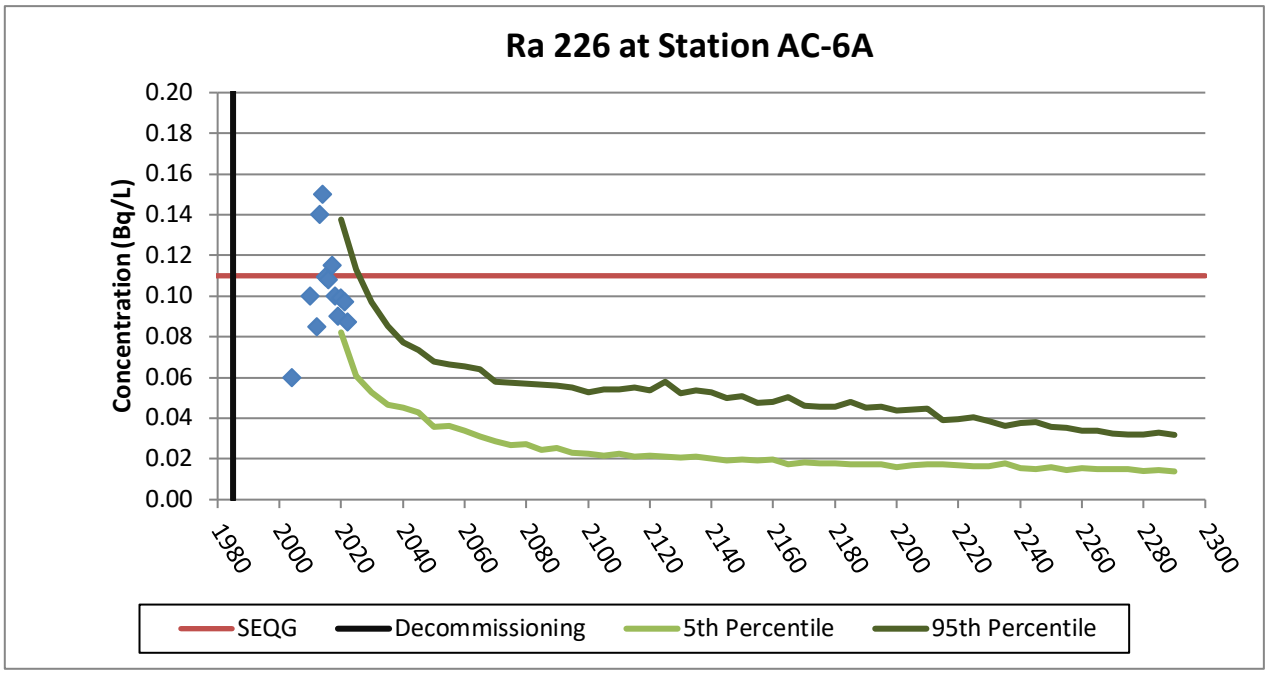


Figure 37: Ra-226 Performance Indicator at AC-6A

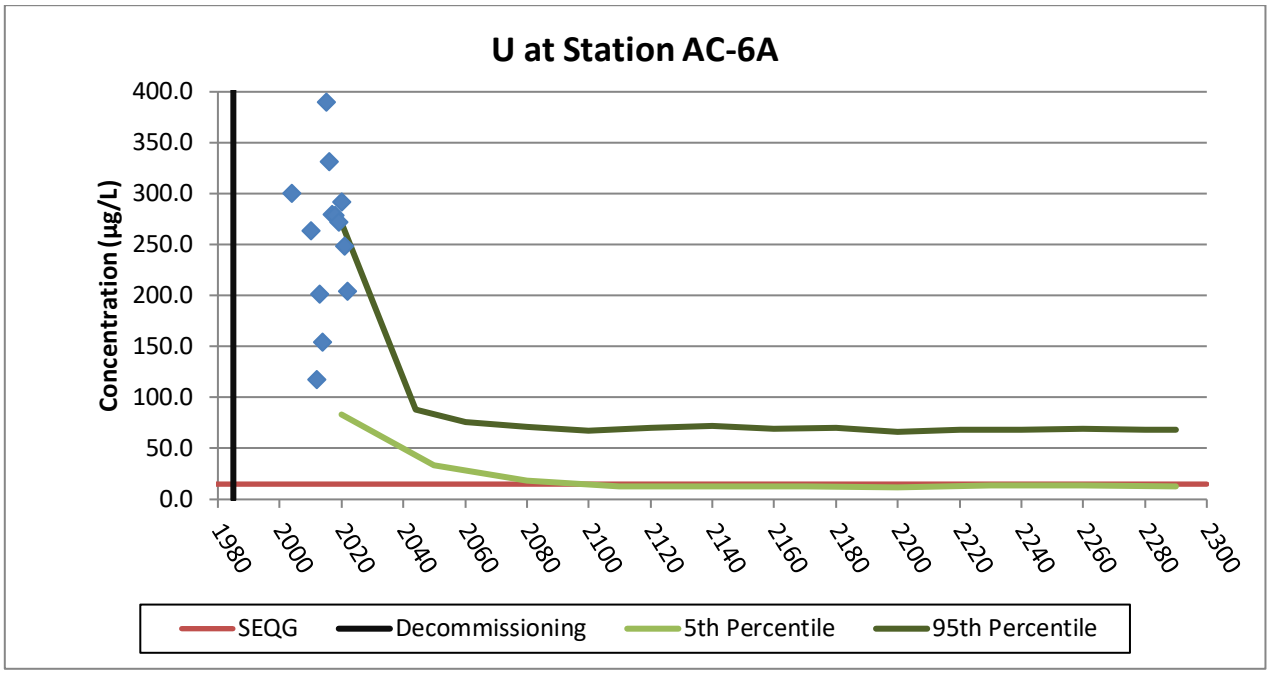


Figure 38: U Performance Indicator at AC-6A

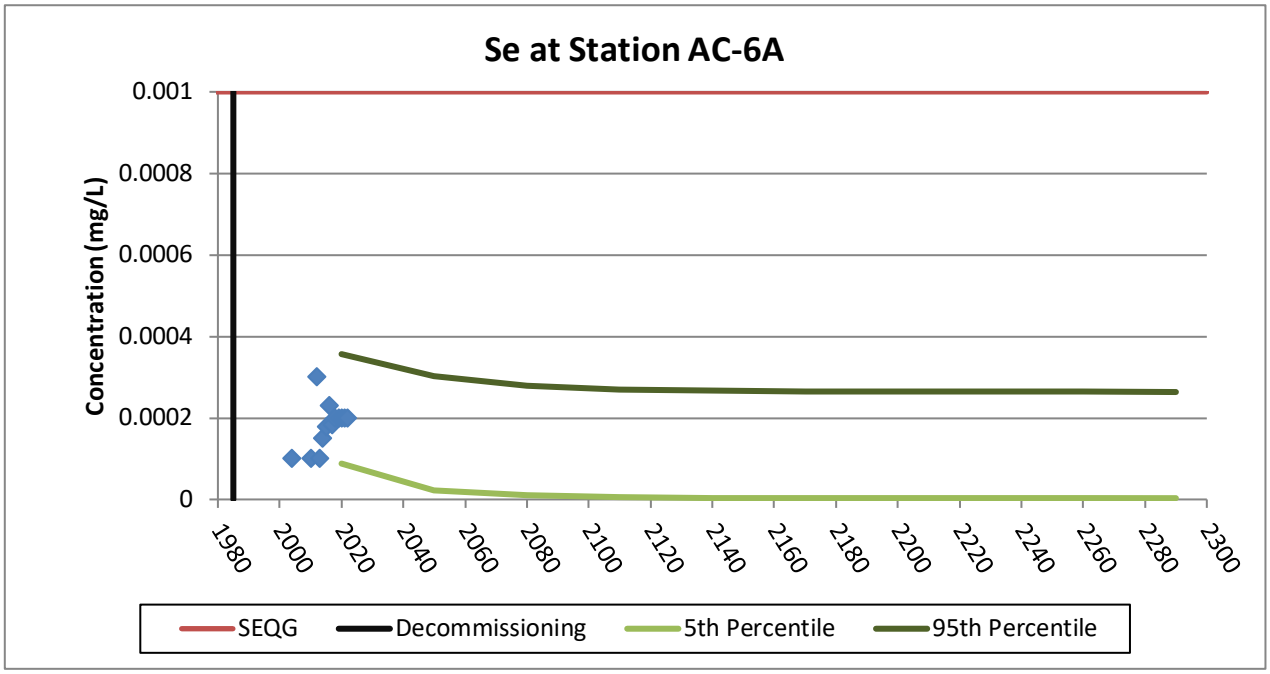


Figure 39: Se Performance Indicator at AC-6A

Site Free from Debris (Performance Indicator has been met)

Following regulatory approval, the Bolger Pit was used as a disposal location for debris gathered from the decommissioned properties. In 2010 a trench approximately 26m long X 15m wide X 1.5m deep was excavated near the entrance to Bolger Pit that received material such as steel, wood and tires gathered from the properties. The types and volumes of material disposed of in Bolger Pit was presented in the corresponding annual reports. The original trench excavated in 2010 was completely

backfilled with waste rock during the Bolger Flow Path Reconstruction Project. However, as the Bolger Pit was being filled with waste rock from the channel excavation a small portion in the northwest corner of the pit, against the pit wall (approximate 59°34'10.9" N 108°24'58.3" W), was left open to allow disposal of waste materials encountered during property inspections completed in 2015 and 2016. During this period Bolger Pit received waste, such as tires, wood, metal and drill core. The disposal area was backfilled/covered with waste rock that had been stockpiled nearby for that purpose.

All Beaverlodge related properties were inspected in an effort to locate historic debris not removed during initial decommissioning. During the main clean-up campaign in 2015 and 2017, GPS tracking was utilized to ensure adequate coverage of the properties, including the BOLGER 1 property, unless safety consideration, surface features or significant vegetation prohibited access to a specific area (**Figure 40**).

Subsequent to the above noted inspections, any additional debris found on the property, including the remaining electrical and power infrastructure (pole brackets) on the BOLGER 1 property were removed and disposed of in the Lower Fay Pit as approved by SkMOE. In addition, as final regulatory inspections of the properties occurred, any additional debris located was disposed of in Lower Fay Pit.

As a result of this activity, the BOLGER 1 property meets the performance indicator of being free of debris.

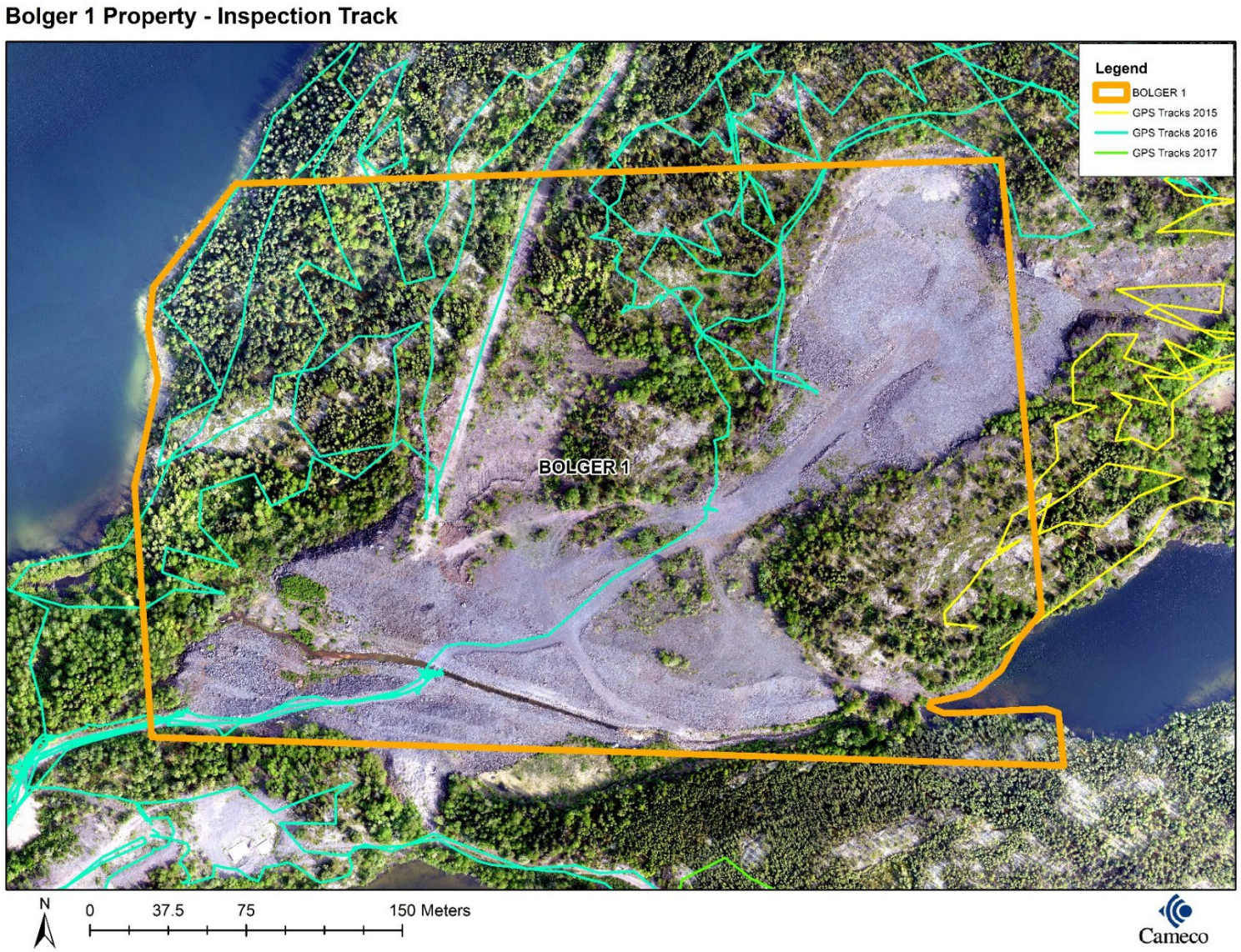


Figure 40: Bolger 1 – Inspection Track

8.7.4 Decommissioning and Reclamation Documentation

Table 32 provides a summary of general documents which include refence to the Verna site and by extension the BOLGER 1 property. The majority of discussion in these documents combines discussion of the Bolger mine with the entire Fay/Ace/Verna mine complex.

Table 32: Documentation Log – BOLGER 1

Document	Date
Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site, Report No. 2, Operating History and Environmental Conditions, MacLaren Plansearch, Eldorado Resources Limited,	February 1983
Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site, Report No. 5 - Plan for the Close Out of the Beaverlodge Site, Eldorado Resources Limited	August 1983
Departure with Dignity, Decommissioning of the Beaverlodge Mine/Mill, Operations and Reclamation of the Site, MacLaren Plansearch, Eldorado Resources Limited	February 1987
Surface Lease Renegotiation, Appendix D - Decommissioning and Reclamation Plan, Historical Summary: 1981-2005, Cameco Corporation	November 2006
Waste Rock Stability Assessments – Former Beaverlodge Sites, SRK Project No. 4CC008.027, SRK Consulting (Canada) Inc	December 2010
Surficial Gamma Radiation Survey of Disturbed Areas at the Former Beaverlodge Mine Site, Final Rev. 1, ARCADIS SENES Canada Inc.	November 2014
2014 Uranium City Consultation on Land Use, SENES Consultants & Kingsmere Resources Services	January 2015
Beaverlodge Site Gamma Radiation Risk Evaluation, ARCADIS Canada Inc.,	June 2015
Beaverlodge Property – Crown Pillar Assessment (2014-2015), SRK Project No. 1CC007.048, SRK Consulting (Canada) Inc.	July 2015
Beaverlodge 2017: Borehole Decommissioning Report, Cameco Corporation (Cameco).	July 2017
Remediation of Utility Corridors & Related Infrastructure, Beaverlodge Properties, Kingsmere Resource Services Inc.	January 2018
Beaverlodge Property Inspection for Institutional Control Transfer Report, Kingsmere Resource Services Inc.	January 2018
Bolger Flow Path Reconstruction 2016 Final As-Built Report, SRK Project No. 1CC007.062, SRK Consulting (Canada) Inc.	February 2017
2020 Geotechnical Inspection Report Decommissioned Beaverlodge Mine/Mill Site, SRK Consulting (Canada) Inc., 1CC007.067	February 2021

8.7.5 Evaluation of BOLGER 1

The BOLGER 1 property meets the established performance objectives of safe, secure, stable/improving and has no remaining liabilities (see **Table 33**).

Table 33: Evaluation of BOLGER 1

Performance Indicators	Acceptance Criteria	BOLGER 1
Acceptable Gamma Levels	Reasonable use scenario demonstrating gamma levels at the site are acceptable.	✓
Boreholes Plugged	All boreholes have been plugged at the time of transfer to institutional control.	✓
Stable Mine Openings	Mine openings have been secured and signed off by a qualified person, where applicable.	NA
Stable Crown Pillar	Crown pillar assessed, remediated if required, and signed off by a qualified person.	✓
Site Free from Debris	Site free of former mining debris at the time of transfer to institutional control.	✓
Water Quality Within Modelled Predictions	Water quality data is stable/improving.	✓

Based on the conclusions of the 2020 ERA the human and ecological risks are acceptable, and all relevant performance indicators have been met. As such, the BOLGER 1 property should be considered for Release from Decommissioning and Reclamation by the SkMOE, released from CNSC License WFOL-W5-2120.0/2025 and transfer to the provincial Institutional Control Program for long term environmental stewardship.

The following section outlines the expectations for managing BOLGER 1 property while under Institutional Control.

8.7.6 Institutional Control Considerations and Requirements

Engineered Structures

The BOLGER 1 property hosts no engineered structures.

Beaverlodge Post Closure Land Status

As previously shown, **Figure 1** provides an outline of the proposed IC borders. The BOLGER 1 property falls entirely within the planned extent of the Beaverlodge IC borders and will therefore be included in the Saskatchewan Institutional Control Registry in order to establish administrative controls to restrict future land use.

Remaining Site Aspects Requiring Future Monitoring and Maintenance

To meet the requirements of section 22 of the MIEPR, **Table 34** provides a summary of aspects of the BOLGER 1 property in terms of remaining liabilities and an assessment of the significance of the potential hazard posed by each in the unlikely event that it were realized.

Table 34: Remaining Site Aspects – BOLGER 1 Property

Site Aspect	Assessment Endpoint	Likelihood	Severity	Overall Residual Risk
Waste Rock Slope Failure	Environment	Very Unlikely	Minor	Low
	Public Health & Safety	Very Unlikely	Minor	Low
Pit Wall Failure	Environment	Very Unlikely	Minor	Low
	Public Health & Safety	Very Unlikely	Minor	Low
Zora Channel Slope Failure	Environment	Very Unlikely	Minor	Low
	Public Health & Safety	Very Unlikely	Minor	Low

Water quality associated with the Bolger 1 property will continue to be monitored at Station AC-6A as part of the Beaverlodge EMP until all the Beaverlodge properties are transferred to the provincial IC Registry. A long-term water monitoring program will then be implemented under the IC Program and water quality monitoring results from Station AC-6A will continue to be compared to the predicted recovery from the 2020 ERA (CanNorth 2020).

Institutional Control Monitoring

Figure 41 outlines the site features associated with BOLGER 1 property. Based on the historical activities at the BOLGER 1 property, waste rock slopes will require inspection under the Province of Saskatchewan's institutional control management framework.

Such an inspection should be conducted of all disturbed areas and focus on the following aspects:

- Evidence of recent human visitation,
- Condition of waste rock,
- Condition of channel,
    - Evidence of new beaver activity
    - Condition of the beaver dam at the outlet of Zora Lake. Sudden failure may result in scour of the area immediately adjacent to the beaver dam and the area downstream of the drainage channel prior to entering Verna Lake,
    - Channel side slopes intact,

    - Note condition of channel base; vegetation growth; flow restriction resulting from excessive sediment accumulation

- Water quality at AC-6A (if flowing).

Institutional Control Maintenance

No aspect of the BOLGER 1 property will require maintenance under institutional control.

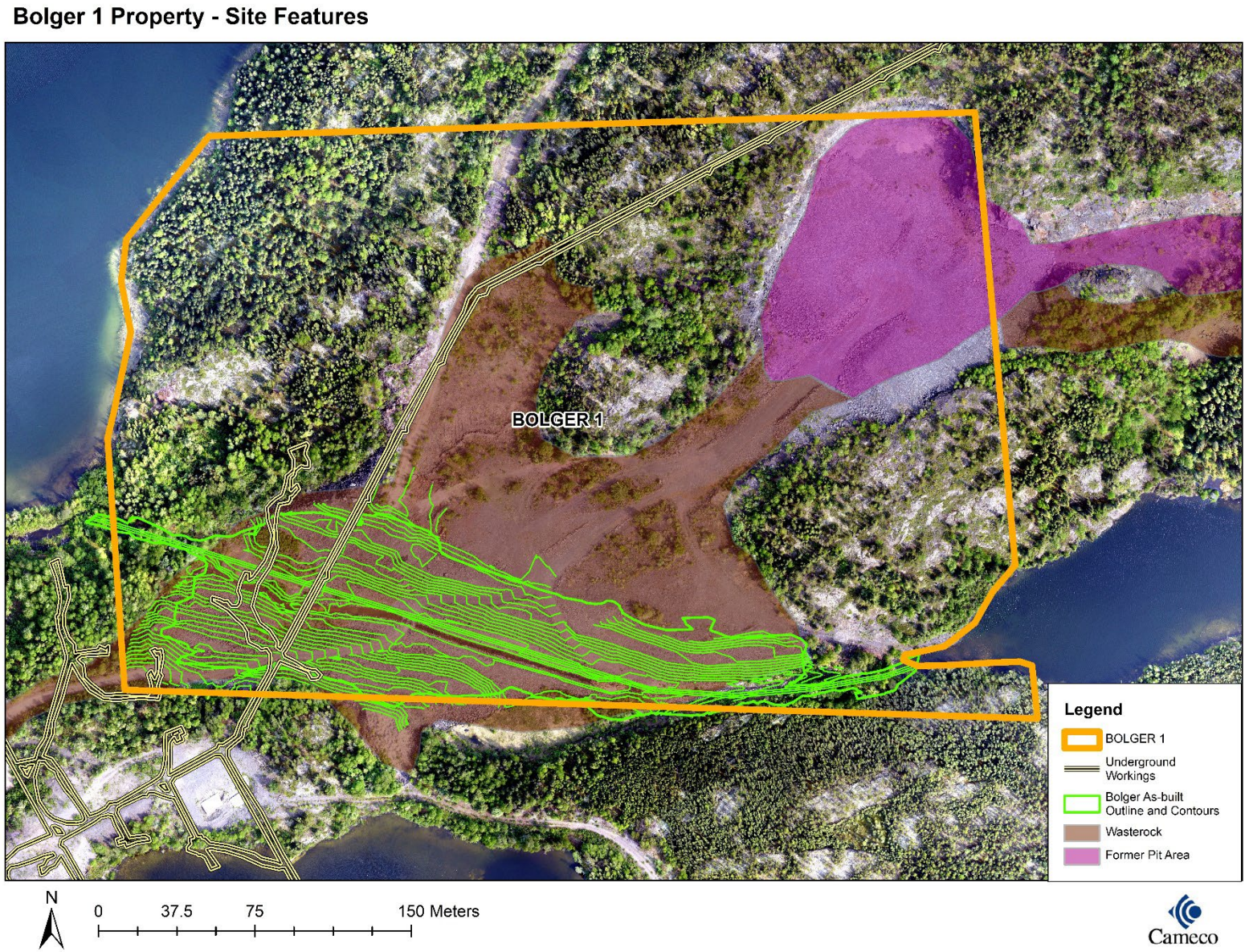


Figure 41: Bolger 1 - Site Features

9 Summary

Table 35 provides a summary of the properties that are the subject of this application for a Release from Decommissioning and Reclamation from the SkMOE, removal of the properties from the Saskatchewan Beaverlodge Surface Lease Agreement (December 2006) and a release of the properties from the CNSC issued Waste Facility Operating License WFOL-W5-2120.0/2025, and for their transfer to the IC Program managed by SkMER.

Table 35: Summary of Properties

Cameco Property Number	AECB Property Number	DNS[1] Property Number	Description[2]	Surface Area (hectares)	Mine Opening to Surface	Tailings Present on Property	Waste Rock Piles on Property	Engineered Structure on Property	Remaining Mine Related Hazard/Risk on Property	Beaverlodge Post Closure Land Status	IC Requirements
URA 1	MSL 10	200010	Mill annex buildings, O_2 plants, waste rock storage	17.5	None	None	Yes	None	Waste rock slope	Managed in IC	Regular inspection of waste rock slope
URA 7	MSL 15	200015	Mill site	20.9	Sorting plant bin, sorting plant raise, CB-1 Access raise, waste haulage adit	None	Yes	CB-1 Access Raise; Waste haulage adit	Waste rock slope	Managed in IC	Regular inspection of sorting plant bin, sorting plant raise, CB-1 Access raise, waste haulage adit and waste rock slope
Bolger 1	MSL 132	200063	Bolger open pit	11.5	None	None	Yes	None	Waste rock slope	Managed in IC	Regular inspection of waste rock slope, channel, and channel slope
Fookes Reservoir Area	N-294	300089	N-294 Tailing's storage and treatment system	180.4	None	Yes	No	Fookes Delta, outlet structures at Fookes	Residual tailings	Managed in IC	Regular inspection of residual tailings deltas, water quality
Marie Reservoir Area	N-294	300089	N-294 Tailing's storage and treatment system	133.5	None	Yes	No	Outlet structures at Marie	Residual tailings	Managed in IC	Regular inspection of residual tailings deltas, water quality
Minewater Reservoir Area	N-294	300089	N-294 Tailing's storage and treatment system	42.5	None	Yes	No	None	Residual tailings	Managed in IC	Regular inspection of residual tailings, Minewater saddle dam, Minewater outflow channel, condition of Meadow basin concrete dam, water quality

Note:
The Fookes Reservoir Area consists of the following individual properties (GC 3, EXC GC 3, GC 5, GC 1, GORE 1, NW 2, NW 1, LEE 4, GORE 2, LEE 3, EXC LEE 3, LEE 2); the Marie Reservoir Area consists of the following individual properties (EXC ACE 18, EXC ACE 17, ACE 17, ACE 15, EXC ACE 14, GORE, EXC GC 2, GC 4, EXC GC 4); and the Minewater Reservoir Area consists of the following individual properties (EXC URA 6, ACE 19, URA 6)

10 Community Engagement

Cameco has developed a Public Information Program (PIP) (Cameco 2021) for Beaverlodge that describes communication with stakeholders. The PIP formalizes the communication process, ensuring that Cameco's activities or plans at the decommissioned Beaverlodge properties are effectively communicated to the public in a manner that complies with established guidelines. It is based on the PLAN-DO-CHECK-ACT model outlined in internationally recognized management standards.

Each year, Cameco hosts a public meeting in Uranium City, typically with the CNSC and SkMOE in attendance, to review the results of any activities completed since the previous meeting and to preview the plans for the upcoming year, including any activities or planned studies that are to be completed. This meeting also provides an opportunity for Cameco to engage local residents regarding the plan and schedule for transferring properties to the Province of Saskatchewan's IC Program. Due to the COVID-19 pandemic, Cameco held the 2020 and 2021 annual public meetings/site tours virtually to ensure the health and safety of its participants. Presentations were provided by Cameco, CNSC, SkMOE and SkMER with an opportunity for participants to ask questions during the meeting or to submit questions at a later date for follow-up. These engagement opportunities allow interested parties to provide feedback to Cameco and the JRG regarding potential concerns with the properties and their suitability for transfer to the IC Program. An in-person meeting was conducted in Uranium City on September 13, 2022. The meeting was held outside on the Beaverlodge properties that are the subject of this document, to allow participants to reconnect with the land and see first-hand the state of the remediation. Presentations describing the conditions of these properties and the plan to transfer them to the IC Program were provided on September 12 and 13, 2023 in Uranium City. The following groups are the focus of such engagement activities as outlined in our PIP:

- Northern Settlement of Uranium City – Only community with year-round road access to the Beaverlodge properties;
- Athabasca sub-committee of the Northern Saskatchewan Environment Quality Committee (EQC) – includes representatives from each of the Athabasca communities (Wollaston Lake, Stony Rapids, Fond du Lac, and Camsell Portage) and First Nations (Hatchet Lake Denésuline Nation and Black Lake Denésuline Nation); and,
- Athabasca Joint Engagement and Environment Subcommittee (AJES) – which is a joint committee of community and industry representatives that meets regularly to discuss operational and environment-related matters of importance to the Athabasca communities and provides a channel for the communities to share traditional knowledge with the companies.

- Yá thi Néné Land and Resource Office – established to provide support to the AJES subcommittee and the executive director is an AJES member and is invited to attend all public meetings associated with Beaverlodge.

In addition to engagement as per our regulatory approved PIP, the Athabasca Chipewyan First Nation (ACFN) through the Dene Lands and Resources Management (DLRM) and the Métis Nation of Saskatchewan (MN-S) through the Uranium City (Local #50) President were invited to attend the 2020 and 2021 public meetings as they had expressed interest during a previous Commission hearing regarding release of properties from CNSC licensing. Cameco continues to make information publicly available; a recording of the public meeting has been posted to the Beaverlodge website and sent as follow-up to invited participants in an effort to provide further opportunity to elicit feedback.

Based on the most recent Record for Decision (DEC 19-H6; CNSC 2019), Cameco had planned to increase the 'boots on the ground' tours of the Beaverlodge site with First Nations and Métis communities to ensure physical interaction with and provide opportunities for reconnection with the Beaverlodge lands; however, the pandemic forced Cameco to pivot and expand its engagement efforts in other ways. In addition to hosting a virtual public meeting and posting the public meeting to the Beaverlodge website; to help people reconnect with the land, virtual site tours were created in 2020 and 2021. The virtual site tour provides a bird's eye view of many of the properties that are the subject of this request. These virtual site tours are publicly available on the Beaverlodge website. Cameco also uses a range of communication tools including fact sheets, posters, presentations, and a specially-purposed website (www.beaverlodgesites.com) for the Beaverlodge properties to engage and communicate information of interest to the public for routine and non-routine situations, events and activities. Since 2016, meeting summaries and/or presentations have been provided in the corresponding Annual Report.

In preparing for the CNSC hearing regarding the release of the final set of Decommissioned Beaverlodge properties Cameco will prepare an Engagement Report consistent with guidance identified *in REGDOC-3.2.2, Indigenous Engagement,* which will provide a comprehensive update on engagement efforts on the Beaverlodge Project. The engagement report will be provided as a supplementary information to Cameco's Commission Member Document (CMD) prepared in support of the request for these properties to be released from CNSC licensing to ensure that the most recent engagement efforts are provided to Commission.

11 Community Related Monitoring

11.1 Country Foods Assessment

In 2010, Cameco contracted Canada North Environmental Services (CanNorth) a third party First Nations-owned company to complete a two-year Country Foods assessment with a primary objective of determining whether there were any potential human health risks associated with the consumption of country foods gathered in the Uranium City area by local residents. Information regarding country food consumption habits and locations of country food harvesting were gathered during Year 1. The focus of the Year 2 study was to complete the gathering of samples to determine if locally harvested country foods were safe to consume. Vegetation and animal samples were collected over a two-year period from the Beaverlodge properties, Camsell Portage, and areas around Uranium City by researchers and local land users and sent to Saskatchewan Research Council laboratory for chemical analysis. Maps of the sampling locations were also provided at a public meeting to provide the attendees with a visual aid to see exactly what areas had been sampled. After the tissue sample results were provided by the lab, a risk assessment was conducted, and it was concluded that consumption of country foods does not present health risks to Uranium City residents provided the fish consumption advisories in place are followed (CanNorth and SENES 2012). This report has been submitted and accepted by regulators.

11.2 Eastern Athabasca Regional Monitoring Program

The Eastern Athabasca Regional Monitoring Program (EARMP) was established in 2011 under the Province of Saskatchewan's Boreal Watershed Initiative and is currently supported by funding contributions from SkMOE, CNSC, Cameco and Orano. The EARMP was designed to identify potential cumulative effects downstream of uranium mining and milling operations in the Eastern Athabasca region of northern Saskatchewan.

The community-based component of the program partners with communities annually to monitor the safety of traditionally harvested country foods by collecting and testing representative water, fish, berry, and mammal tissue samples from the seven communities located in the region. Harvesting and consuming traditional foods are an important part of the culture in northern Saskatchewan, which contributes to an overall healthy lifestyle through physical activity and healthy eating.

Community members play a key role in the program, as local knowledge is used to determine locations for the water, fish, berry and mammal samples. Locations focus on areas where community members routinely fish, hunt, and gather. Samples are then collected by, or with the aid of, community members.

The 2021/2022 program results continue to show that country foods are safe for consumption with chemical profiles for water, fish, berry, and mammal tissue samples similar to natural background.

The EARMP collected and tested over 850 water and traditional food samples from the Athabasca Region from 2011 to 2021. Results indicate that the measured concentrations in the samples are

similar to baseline levels and the regional reference range, and those used in the 2018 Human Health Risk Assessment.

Results from ten years of sampling have consistently demonstrated that water and traditional foods remain safe for consumption, and that they continue to be a safe and healthy dietary choice for residents of the Athabasca Basin. The 10-year summary report, annual reports and data from the programs conducted to date are publicly available at www.earmp.ca.

11.3 Community Based Environmental Monitoring Program

Building off eighteen years of data collected through the Athabasca Working Group (AWG) Environmental Monitoring Program (which was a product of the original Impact Management Agreement signed in 1999), the program was enhanced in 2018 to create a Community Based Environmental Monitoring Program (CBEMP) for the Athabasca region. The new CBEMP allows community members to become more involved and provide input to steer the direction of the program in their particular community. The program focuses on individual communities within the region on a rotating basis.

The overall study objective of the CBEMP is to gain an understanding of traditional food use by community members and to assess if these foods remained safe for consumption. The involvement of community members is one of the fundamental goals of the study. The study obtained information regarding the quantity, type, and harvest location of traditional foods through community interviews. To accomplish these objectives, a Traditional Food Frequency Questionnaire is developed in collaboration with community leadership and band members are hired and trained to conduct interviews with community residents.

To date, CBEMP studies have been completed in Black Lake Denesuline First Nation /Stony Rapids, Hatchet Lake Denesuline First Nation/Wollaston Lake, and Fond du Lac Denesuline First Nation. The results of the CBEMP studies have indicated that country foods identified and harvested by members of the communities remain safe and that regular consumption of locally collected fish, meat, berries and vegetation is encouraged. The results of these studies have been shared with local leadership and community members and a publicly available document summarizing the findings is posted on Cameco's northern website.

In 2022, a Human Health Risk Assessment (HHRA) was completed based on information collected through the CBEMP. The HHRA provides an assessment for each community, based on their specific dietary rates and country food information. The HHRA results show that community members should continue regularly eating locally harvested fish, wild game, berries and plants. CBEMP summaries have been updated and include community specific HHRA results.

More recently, the study took place in in Uranium City and Camsell Portage in 2021/2022. In an effort to build capacity and understanding, the program saw increased involvement from the Ya' thi Néné Land and Resource Office. Results from the program indicated that chemicals in traditional

foods were generally low and within the range for the region, and were not of concern for the community.

12 Road Closure

In recognition that the current road network in the Uranium City area supports traditional activities, public engagement activities conducted in 2023 sought to gather information from local land users so that any potential road closures would not impact the ability to conduct traditional activities. regarding potential road closures related to the former Beaverlodge properties.

Land users were encouraged to provide feedback following the engagement meetings regarding potential road closures on the Beaverlodge properties, based on their current and future land use. Numerous residents stayed after the meetings to discuss their land use and how potential road closures may, or will not, impact their land use. The information that was shared modified the original proposed road closure locations. Based on these targeted discussions, the new planned locations for road closures will have minimal effect on land users' ability to access the land for traditional activities.

Based on feedback from local land users two minor access trails were closed in the September 2023, preventing vehicular access to access to areas within the tailing management area. Additional areas are planned for closure in 2024 based on the 2023 engagement activities. These additional closures will be implemented following a public meeting in Uranium City in 2024 notifying residents that the closure will be taking place, as these future closures will be more visible and potentially affect more vehicular travel.

13 Signage and Restrictions

Current warning signs will be replaced with a general warning sign in 2024noting that the area is home to a former Mine/Mill site. The sign will identify some of the remaining hazards on site, which are similar to other wilderness areas (slip, trip and fall hazards), as well as instructions not to dig or remove any materials from the sites without the expressed written consent of the SkMER and CNSC. Public engagement activities conducted in 2023 sought feedback regarding the preferred location and determined the best location for a permanent notification sign to be at the entrance to the Beaverlodge Mine/Mill location, near the access point from the Uranium City airport.

The SkMOE is responsible for maintaining the signage related to the Healthy Fish Consumption Advisory implemented by the Population Health Unit. The Healthy Fish Consumption Advisory is currently in place due to elevated levels of selenium measured in the fish flesh. A fish monitoring program will be implemented to monitor fish flesh to allow the Population Health Unit to remove the Healthy Fish Consumption Advisory, when it is appropriate to do so.

The decommissioned Beaverlodge Properties have been shown to be safe, secure and stable for the long term and do not present an unreasonable risk to casual land users practising traditional activities on the former Beaverlodge properties.

14 Monitoring Plan for the IC Program

Following the decommissioning activities completed between 1983 and 1985, regular monitoring and minor maintenance activities have been conducted on the properties to ensure that the site is recovering as expected. Where additional targeted remediation could be done to improve local conditions, those options were implemented and monitored to ensure their success. Monitoring and inspections completed on the Beaverlodge properties by Cameco and the regulatory agencies has confirmed that with the exception of the establishment of natural vegetation, there has been very little observed change. Once the properties are transferred to the IC Program, routine monitoring will continue, and part of a long-term monitoring program (LTMP) and inspections will continue following a detailed inspection checklist and field guide to ensure all relevant aspects of the former sites are inspected and reported consistently.

As the properties are transferred to the IC Program, water quality at various stations will continue to be monitored as part of the IC Program's Monitoring and Maintenance requirements. This monitoring will build on the more that 40 years of data that has been collected since the Beaverlodge mine shut down in 1982.

Additional water quality monitoring stations have been established in various locations downstream of the former Beaverlodge site and will continue to be monitored once the properties have been transferred to the IC Program.

Water quality performance indicators were discussed in the previous sections providing the expected recovery of the water quality monitoring stations directly downstream of the areas being discussed. Water quality predictions were also provided in the 2020 Beaverlodge ERA for the outlet of Beaverlodge Lake (STN BL-5), to which future water quality monitoring will be compared once the properties are in the IC Program. Below Figure 42, 43, and 44 detail the expected natural recovery of Beaverlodge Lake and the recent water quality results.

As shown below, the U, Se, and Radium^{226}concentrations in 2022 are within the modeled predictions. Radium^{226} was below the corresponding SEQG value of 0.11 Bq/L and slightly lower than the modelled predictions.

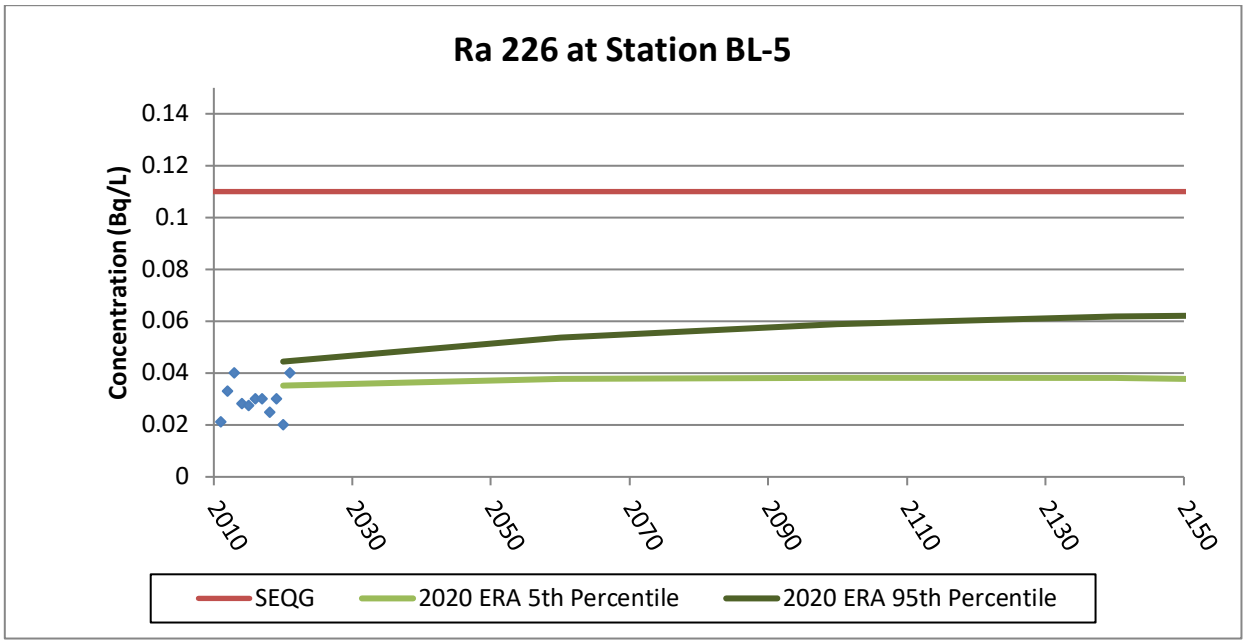


Figure 42. Ra-226 Expected Natural Recovery at BL-5

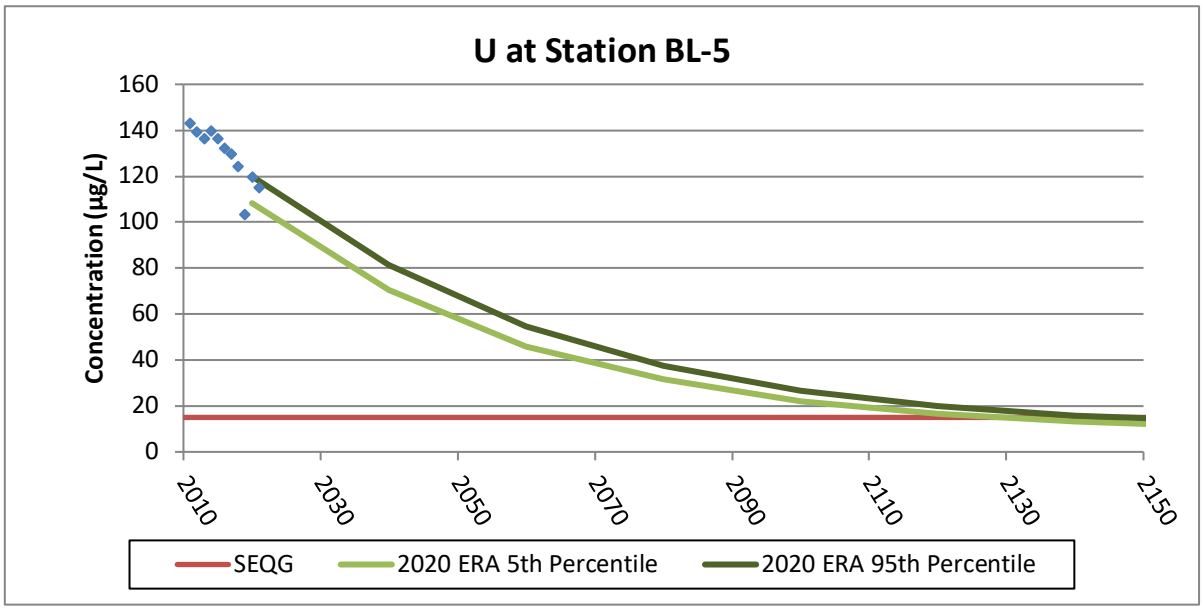


Figure 43. U Expected Natural Recovery at BL-5

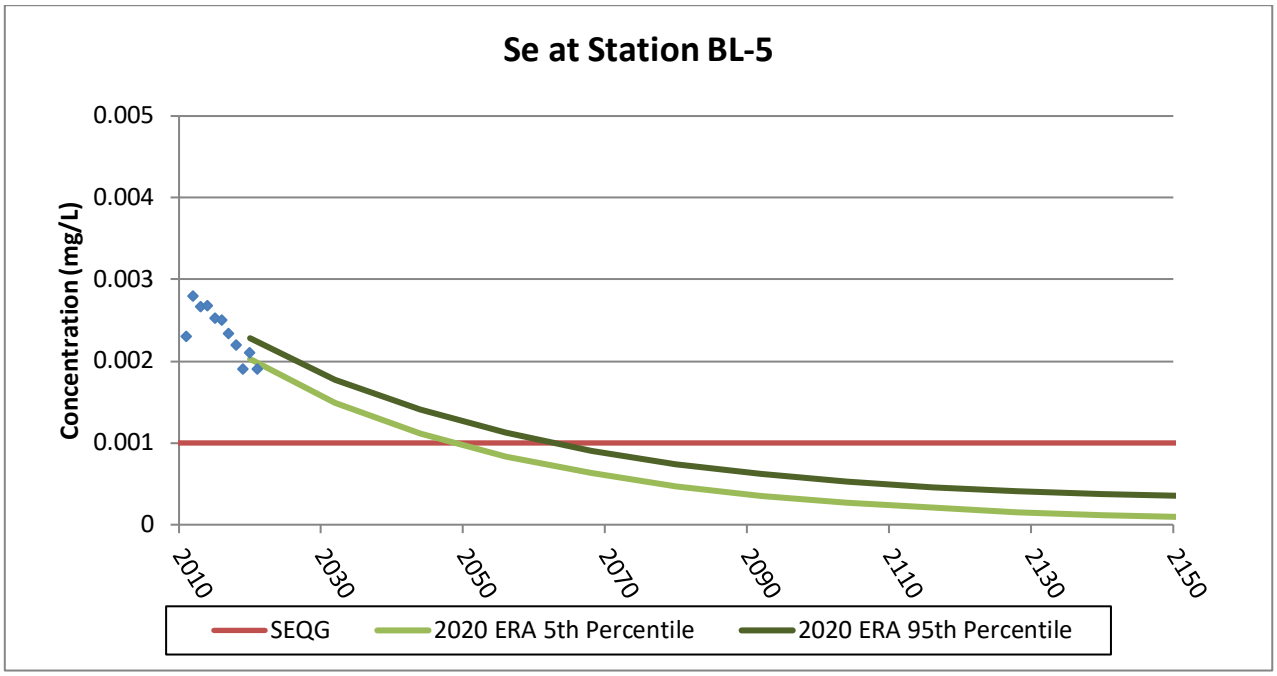


Figure 44. Se Expected Natural Recovery at BL-5

The IC Program funding discussion regarding the Monitoring and Maintenance Fund (MMF) and Unforeseen Events Fund (UFE) will occur with SkMER close to the date that the properties are planned for transfer to the IC Program, so that current and accurate costs can be used in the assessment. As the 27 properties that are the subject of this Final Closure Report are the final set of properties to be transferred to the IC Program, the funding requirements will consider the costs associated with on-site and downstream water and fish monitoring, as well as the general monitoring and maintenance of the 43 properties already released from CNSC licensing (42 properties or portions thereof to the IC Program and 1 free released), and the 27 properties that are the subject of this Final Closure Report. Based on 2023 costs, it is expected that the net present value for the total contribution to the MMF and the UFE for to conduct the monitoring and maintenance activities described in the LTMP and the Inspection Field Guide for all the Beaverlodge properties will be more than $1.5M.

14.1 Long-term Monitoring Program

Drawing on over 40 years of monitoring completed in the region, as well as input provided by community members and other interested parties, a Long-term Monitoring Program (LTMP) has been developed for implementation when all Beaverlodge properties have been accepted into the IC Program.

In developing the LTMP, a technical evaluation was completed to support development of a program to monitor long-term trends in surface water and fish quality after all the Beaverlodge properties have been released to the IC Program. The objectives of the evaluation was to define monitoring that would confirm long-term water trends continue to recover as expected and provide information to support the eventual removal of the healthy fish consumption guideline and drinking water advisories. The

evaluation informed a sampling program that reflected an understanding of the conditions in the area gathered through 40 years of data collected from the site.

In addition to the technical evaluation, various engagement activities were conducted to obtain input from members of rights-bearing First Nation and Métis communities in the Athabasca Basin, residents and/or former residents of Uranium City, northern stakeholder organizations, and provincial and federal regulatory agencies on what they view as a reasonable long-term monitoring program based on their personal experience with these areas and the IC Program.

Along with these specific engagement activities, an in-person workshop was held in June 2023 to exchange information and to invite feedback from various stakeholders on the specific aspects of the program. Following the workshop, the LTMP was presented in Uranium City in the September 2023 regulatory update.

The LTMP consists of two components: surface water and fish chemistry monitoring.

Surface water will be monitored as part of the LTMP which describes the locations and frequencies of water and fish monitoring to be conducted in the IC Program. The objective of the surface water monitoring component of the LTMP is to confirm the trends in water quality are recovering, consistent with predictions made in the 2020 ERA.

The surface water monitoring program follows a graduated approach, with the potential for reduced monitoring frequency if recovery is occurring as expected. While it is expected that the predictions developed in the 2020 ERA will continue to be met, a contingency plan has been developed should unexpected surface water results be encountered. Contingency funds will be provided as part of the MMF which will be sufficient to cover additional costs associated with water quality monitoring, should that be required.

In addition to water quality monitoring, fish chemistry monitoring will be completed to support the removal of the Healthy Fish Consumption Guideline. Sample locations and frequency are detailed in the LTMP and were informed by previous sampling campaigns completed in the region, as well as stakeholder feedback. Based on that feedback, sampling will take place every 10 years in Beaverlodge, Martin and Cinch Lakes and will be discontinued following removal of the guideline in each location.

14.2 Institutional Control Inspection Field Guide

The Beaverlodge Institutional Control Inspection Field Guide (Beaverlodge - ICIFG) provides a description of the relevant areas and a summary of the key aspects of the decommissioned Beaverlodge properties that will require future inspection as part of the IC Program. The Beaverlodge ICIFG was developed by reviewing an example of a relevant inspection plan that has been proposed for to the IC Program, past closure reports and commitments agreed up in the CNSC Commission Member Documents and Record of Decisions, previous IC inspection reports from 2014 and 2019, and current regulatory inspections.

The field guide consists of inspection tasks which provides detailed information regarding the different types of inspection tasks and what is required when the field team is conducting the inspection. This guide was developed from the inspection requirements identified in the various

property closure reports and were reviewed and accepted by the CNSC, SkMOE, and SkMER as properties were previously released from CNSC licensing and transferred to the IC Program.

The inspection tasks are then classified under the appropriate inspection areas. The former Beaverlodge properties within the area designated as Crown Reserve to be managed within the IC program have been separated into 10 areas: Eagle, Martin Lake, Fay, Ace, Tailings Management Area, Verna/Bolger, Dubyna, Hab, Moran Pit, and Fishhook Bay. Each of these areas have properties that require monitoring and/or inspections. The Moran Pit and Fishhook Bay areas were not subject to CNSC licensing; however, they have been remediated following the same process as the other Beaverlodge properties and will be managed in the IC program with established Crown Reserve areas.

It should be noted that the 10 areas identified in the Beaverlodge ICIFG differ from the original property boundaries identified in the closure reports, and are based on geographical location, accessibility, and the presence of aspects that require inspection. The guide also provides a checklist for conducting the inspections and figures that contain information regarding access points to the areas for inspection as well as the geographic location of some of the key features requiring inspection.

The monitoring frequency used in the calculation of the required funding under the Beaverlodge ICIFG includes inspections every five years, for the next 30 years, then every ten years out until 2125. It is further described in the field guide what type of inspections will occur, including detailed engineer inspections stainless steel caps.

15 Conclusion

The decommissioned Beaverlodge site consists of 27 individual properties and is currently managed following the Saskatchewan Beaverlodge Surface Lease Agreement (December 2006) and the CNSC issued Waste Facility Operating License WFOL-W5-2120.0/2025.

Given the completed remedial activities and subsequent assessments, the 27 decommissioned properties discussed herein (*URA 7, URA 1, BOLGER 1, the Fookes Reservoir Area (GC 3, EXC GC 3, GC 5, GC 1, GORE 1, NW 2, NW 1, LEE 4, GORE 2, LEE 3, EXC LEE 3, LEE 2), the Marie Reservoir Area (EXC ACE 18, EXC ACE 17, ACE 17, ACE 15, EXC ACE 14, GORE, EXC GC 2, GC 4, EXC GC 4) Minewater Reservoir Area (EXC URA 6, ACE 19, URA 6*) have been shown to meet the performance objectives of safe, secure and stable/improving, as well as all applicable performance indicators.

Based on these conditions, Cameco is making a request for "Release from Decommissioning and Reclamation" pursuant to Section 22 of *The Mineral Industry Environmental Protection Regulations*, 1996 from the Ministry of Environment Environmental Protection Branch; a request for SkMER review in support of an application for custodial transfer of the properties in accordance with *The Reclaimed Industrial Sites Act*; a request to receive a full Surrender of Surface Lease (Beaverlodge Surface Lease Agreement, 2006) from the Ministry of Environment - Lands Branch; and, an application for the release of the properties from the Waste Facility Operating License (WFOL-W5-2120.0/2025) issued to Cameco by the CNSC.

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This report, "*Final Closure Report - Beaverlodge Properties URA 7, URA 1, BOLGER 1, the Fookes TSA (GC 3, EXC GC 3, GC 5, GC 1, GORE 1, NW 2, NW 1, LEE 4, GORE 2, LEE 3, EXC LEE 3, LEE 2), the Marie TSA (EXC ACE 18, EXC ACE 17, ACE 17, ACE 15, EXC ACE 14, GORE, EXC GC 2, GC 4, EXC GC 4) Minewater TSA (EXC URA 6, ACE 19, URA 6*", has been prepared by Kingsmere Resource Services Inc.

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