BEAVERLODGE PROJECT

Beaverlodge Project 2022 Annual Report

Year 37 Transition Phase Monitoring

Prepared for:
Canadian Nuclear Safety Commission
Compliance Report for Licence: WFOL-W5-2120.2/2023
& Saskatchewan Ministry of Environment
Compliance Report: Beaverlodge Surface Lease

Prepared and Submitted by:
Cameco Corporation

April 2023

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SECTION 1.0

1.0 INTRODUCTION

This report is submitted in compliance with Canadian Nuclear Safety Commission (CNSC) Waste Facility Operating Licence WFOL-W5-2120.2/2023 issued to Cameco Corporation (Cameco) for the decommissioned Beaverlodge properties.

The report is also submitted in compliance with the Beaverlodge Surface Lease Agreement between the Province of Saskatchewan and Cameco Corporation, dated December 24, 2006.

The report describes observations and activities on the decommissioned Beaverlodge properties between January 1, 2022 and December 31, 2022. Results of environmental monitoring programs conducted for the decommissioned Beaverlodge properties during this period are provided in the report. Where applicable, historical environmental data has been included and discussed as part of the overall assessment of the decommissioned properties. The status of current projects and activities conducted as of the end of December 2022 are provided, along with an overview of anticipated activities planned for 2023.

SECTION 2.0

GENERAL

2.0 GENERAL INFORMATION

2.1 Organizational Information

2.1.1 CNSC Licence/Provincial Surface Lease

The CNSC Waste Facility Operating Licence WFOL-W5-2120.2/2023 and the Province of Saskatchewan - Beaverlodge Surface Lease, December 24, 2006 are issued to:

Cameco Corporation
2121 - 11th Street West
Saskatoon, Saskatchewan S7M 1J3
Telephone: (306) 956-6200
Fax: (306) 956-6201

2.1.2 Officers and Directors

The officers and board of directors of Cameco as of December 31, 2022 are as follows:

Officers

Tim Gitzel	President and Chief Executive Officer
Brian Reilly	Senior Vice-President and Chief Operating Officer
Alice Wong	Senior Vice-President and Chief Corporate Officer
Grant Isaac	Senior Vice-President and Chief Financial Officer
Sean Quinn	Senior Vice-President, Chief Legal Officer, and Corporate Secretary

Board of Directors

Ian Bruce, chair
Leontine Atkins
Daniel Camus
Donald Deranger
Catherine Gignac
Tim Gitzel
Jim Gowans
Kathryn Jackson
Don Kayne

2.2 CNSC Licence

On May 27, 2013 the CNSC notified Cameco that the Commission had renewed the Waste Facility Operating Licence for a period of 10 years, from June 1, 2013 until May 31, 2023. The licence was revised in 2019 to accommodate the release of 20 properties from CNSC licensing. The licence was revised again in 2022 to accommodate the release of an additional 18 properties from CNSC licensing. Cameco's objective in managing the decommissioned Beaverlodge properties is to protect the health and safety of the public and environment, and to meet the requirements for transfer of the remaining properties to the Province of Saskatchewan's Institutional Control (IC) Program. Thus far, forty-three of the decommissioned Beaverlodge properties have been released from CNSC licensing to allow for IC transfer or free-release. It is anticipated that all remaining licensed properties will be transferred to the IC program or free released, as soon as feasible.

On August 10th 2022, an application was submitted by Cameco to the CNSC requesting a short licence renewal of 24 months to provide adequate time for regulatory processes, public and Indigenous engagement, and document preparation to support the final release of the decommissioned Beaverlodge properties and transfer to the IC program. The documents related to this licence renewal are posted on the CNSC website at,
"Browse hearing documents by date - Canadian Nuclear Safety Commission"
Once there click on the 'Download Hearing Documents' button and select the hearing you are interested in. All information related to that hearing should be posted there.

2.3 Provincial Surface Lease

The current provincial surface lease for the decommissioned Beaverlodge properties was issued to Cameco on December 24, 2006 with an expiry date of December 24, 2026.

2.4 Beaverlodge History

The decommissioned Beaverlodge properties are located north of Lake Athabasca, northeast of Beaverlodge Lake, in the northwest corner of Saskatchewan at approximately N59°33'15" and W108° 27'15" (**Figure 2.4**).

In 1950, Eldorado Mining and Refining Ltd. began development of the Ace Shaft followed by the Fay Shaft in 1951. In 1953, the carbonate-leach mill began production, and a small acid-leach circuit was added in 1957 to handle a small amount of ore containing sulphides. Non-sulphide ore was sent directly to the carbonate circuit, while the sulphide concentrate was treated in the acid-leach circuit.

During mining, the primary focus was on an underground area northeast of Beaverlodge Lake where the Ace, Fay and Verna shafts were located. Production from these areas continued until 1982. Over the entire 30-year production period (1952 to 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, were also developed and operated for shorter periods of time. During the mill operating period, tailings were separated into fine and coarse fractions. The fine fractions (approximately 60% of the tailings) were placed into water bodies within the Fulton Creek watershed, and the course fractions (remaining 40% of the tailings) were deposited underground for use as backfill.

During the early years of operation, uranium mining and milling activities conducted at the decommissioned Beaverlodge properties were undertaken using what were considered acceptable practices at the time. These practices, however, did not have the same level of rigor for the protection of the environment as is currently expected. Although the Atomic Energy Control Board (AECB) licensed the Beaverlodge activities, environmental protection legislation and regulation existed neither federally nor provincially and therefore was not a consideration during the early operating period. It was not until the mid-1970s, more than 22 years after operations began, that effluent treatment processes were initiated at the Beaverlodge site in response to discussions with provincial and federal regulatory authorities.

On December 3, 1981 Eldorado Nuclear Limited (formerly Eldorado Mining and Refining Ltd.) announced that its operation at Beaverlodge would be shut down. Subsequently mining operations at the Beaverlodge site ceased on June 25, 1982 and the mill discontinued processing ores in mid-August 1982. The AECB issued a decommissioning approval in November 1983, after which Eldorado Resources Limited (formerly Eldorado Nuclear Limited) initiated site decommissioning. To meet the accepted objectives of the regulatory approved decommissioning plan (i.e., safe, and stable condition, with activities based on good engineering practice of the day), buildings and structures were removed or dismantled, and all mine openings were sealed. Eldorado left the decommissioned Beaverlodge properties in a safe and secure condition with the expectation that environmental conditions on and downstream of the properties would naturally recover over an extended period.

The decommissioning and reclamation work was completed in 1985. Letters were issued by AECB indicating that the properties had been satisfactorily remediated (*Eldorado Nuclear Ltd. 1982*; *Eldorado Resources Ltd. 1983*; *MacLaren Plansearch 1987*). Transition-phase monitoring was then initiated to monitor the status of the remediation efforts.

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, a Canadian Mining and Energy Corporation, was created from the merger of the assets of the Saskatchewan Mining Development Corporation and Eldorado Resources Ltd. Following the merger, management (monitoring and maintenance) of the decommissioned Beaverlodge properties became the responsibility of Cameco, while the Government of Canada, through Canada Eldor Inc. (CEI), retained responsibility for the financial liabilities associated with the properties.

In 1990, the corporate name was changed to Cameco, with shares of Cameco being 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 lead, reclamation specialist, Beaverlodge within the Safety, Health, Environment and Quality (SHEQ) - Compliance and Licensing group at Cameco.

2.5 The Path Forward Plan

2.5.1 Institutional Control Program

In 2007, after significant consultation with stakeholders, including the CNSC, the mining industry, Indigenous organizations and communities in the major mining regions of the province, the Government of Saskatchewan proclaimed *The Reclaimed Industrial Sites Act* and its associated regulations to establish and enforce the IC Program. The IC Program establishes a formal process for transferring decommissioned mining and milling properties to provincial responsibility. This transfer can occur once remediation has been completed and a period of monitoring has shown the properties to be safe, secure and stable/improving.

2.5.2 The Beaverlodge Management Framework

The Beaverlodge Management Framework and supporting documents were developed in 2009 by Cameco and the Joint Regulatory Group (JRG), which included the CNSC, Environment and Climate Change Canada (ECCC), the Department of Fisheries and Oceans Canada (DFO), and the Saskatchewan Ministry of Environment (SkMOE). The intent of the Beaverlodge Management Framework is to provide a clear scope and objectives for the management of the decommissioned Beaverlodge properties along with a systematic process for assessing site-specific risks to allow decisions to be made regarding the transfer of decommissioned Beaverlodge properties to the IC Program. The framework has been reviewed by public stakeholders, including the Northern Saskatchewan Environmental Quality Committee (NSEQC), as well as residents and leaders of the Uranium City community. A simplified version is provided below in **Figure 2.5-1**.

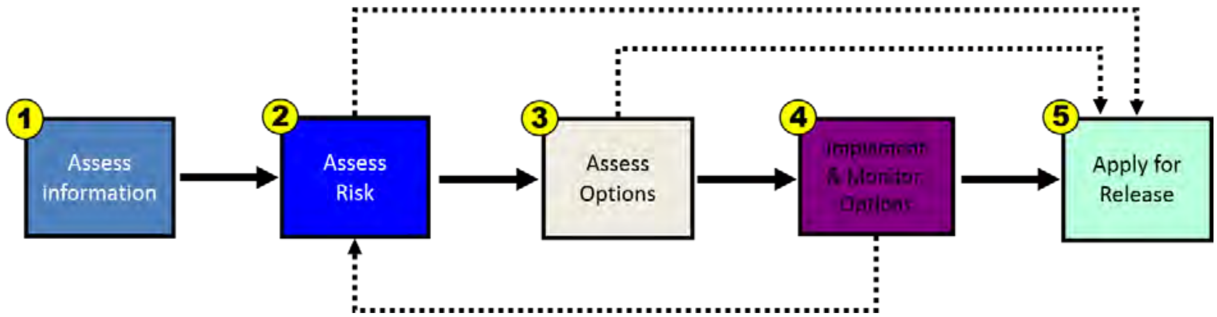


Figure 2.5-1 Simplified Beaverlodge Management Framework

The information gathered by Cameco and its consultants, combined with historical information, was used to develop the Beaverlodge Quantitative Site Model (QSM) in 2012.

The information gathered as part of Box 1 (of **Figure 2.5-1**) by Cameco and its consultants, combined with historical information, was used to develop the Beaverlodge Quantitative Site Model (QSM) in 2012 (Box 2 of **Figure 2.5-1**). The QSM was developed to assess ecological and human health risk from the 2012 baseline water and sediment quality established by information gathered in the first phase of the Management Framework. The QSM provides insight into the interactions between potential sources and transport in the Beaverlodge area watersheds, which established the predicted rates of natural recovery for the system. In addition, the QSM was developed with a feature that allows the simulation of potential remedial activities and compares results to the baseline option (natural recovery). This comparison allowed an assessment of the potential environmental benefits and other effects of implementing each remedial option alone or in combination with other options (Box 3 of **Figure 2.5-1**).

In 2020, the QSM was updated with the 2020 Beaverlodge Environmental Risk Assessment (ERA; *CanNorth 2020*). The performance indicators were updated alongside water quality predictions.

The Path Forward Report (*Cameco 2012*) describes specific remedial activities selected to improve local environmental conditions. In addition, the Path Forward Report also describes the monitoring expectations to assess the success of the implemented activities (Box 4 of **Figure 2.5-1**).

Once it has been shown that the selected remedial activities have been successfully implemented, and once properties are shown to meet the site performance objectives of safe, secure, and stable/improving, Cameco will initiate the process to transfer the eligible property to the IC Program for long-term monitoring and maintenance (Box 5 of **Figure 2.5-1**).

The licensed Beaverlodge properties will continue to be managed in accordance with the Beaverlodge Management Framework and related timelines, with additional groups of properties expected to be released in stages over the next few years. As properties are assessed to meet the performance objectives, an application will be made to have these properties Released from Decommissioning and Reclamation by SkMOE, released from CNSC licensing, and transferred to the IC Program for long-term monitoring and maintenance. Ultimately, it is Cameco's intent to transfer all Beaverlodge properties to the IC Program for long-term monitoring and maintenance.

2.5.3 Performance Objectives and Indicators

Criteria to determine the eligibility for release from CNSC licensing were presented to the Commission with the intent that each of the properties associated with the decommissioned Beaverlodge properties will be assessed through the Beaverlodge Management Framework. The performance objectives for the decommissioned Beaverlodge properties were later defined and presented to the Commission by CNSC staff during the 2014 update meeting 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.

Site specific performance indicators were established as a measure to determine if a site is meeting the performance objectives. 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 secure, boreholes are sealed, and the site is free from historical mining debris. To ensure the performance objectives of safe and secure continue to be met, once the properties have been transferred to the IC Program, inspections will be scheduled as part of the IC monitoring and maintenance plan.

The stable/improving objective is also related to the performance indicators discussed in the previous paragraph; however, it is more relevant to monitoring water quality. In order to verify that conditions on and downstream of the properties are stable/improving, Cameco will continue to monitor the progress of natural recovery and the expected localized improvements from the additional remedial measures implemented at the properties until they are transferred to the IC Program. To ensure the performance objective of stable/improving continues to be met once properties have been transferred to the IC Program, a long-term monitoring program will be implemented at the time of transfer.

Figure 2.5-2 is an illustration of the performance objectives and associated performance indicators. Further explanation of the performance indicators and the criteria to satisfy them are provided in **Table 2.5-1**.

Figure 2.5-2 Beaverlodge Performance Objectives

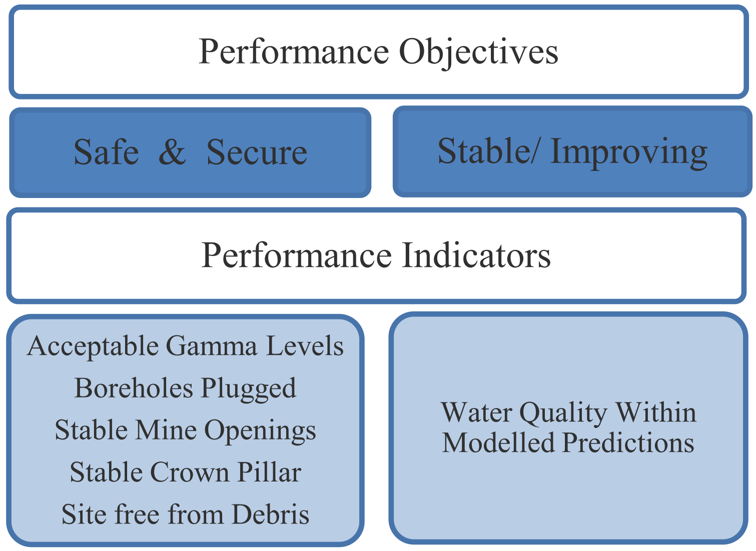


Table 2.5-1 Beaverlodge Performance Indicators

Performance Indicators	Description	Acceptance Criteria
Acceptable Gamma Levels	Cameco will complete a site wide gamma survey which 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 including 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 residual debris will be completed prior to releasing the properties from CNSC licensing and transferring them into the provincial Institutional Control Program.	Site free of former mining debris at the time of transfer to institutional control.
Water Quality Within Modelled Predictions	Water quality monitoring will be compared to model 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.

2.5.4 Release of the Beaverlodge Properties to Institutional Control

Once a property has been appropriately remediated and meets the performance objectives of safe, secure and stable/improving, and the relevant performance indicators (discussed in **Table 2.5-1**), a request will be made by Cameco to obtain the regulatory releases required to facilitate transferring the properties to the IC Program.

To facilitate release from CNSC licensing and transfer to the IC Program, Cameco proposed advancing properties in a staged approach. In 2009, Cameco successfully transferred five Beaverlodge properties to the IC Program. This occurred following the release from Decommissioning and Reclamation requirements by SkMOE, release from CNSC licensing, and acceptance into the IC Program by the Saskatchewan Ministry of Energy and Resources (SkMER). In 2019/2020, Cameco successfully transferred 19 properties to the 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 do not require any long-term monitoring or ongoing administrative controls. On March 24, 2022, a CNSC public hearing regarding the transfer of an additional 18 properties to the IC Program was held and on September 7th 2022, the release from CNSC licensing was granted.

Cameco is currently waiting for a release from the Decommissioning and Reclamation requirements from SkMOE. The properties will then be removed from the Beaverlodge surface lease agreement and will be eligible for transfer to the IC Program

A summary of all properties transferred or free released to date, as well as those remaining is provided in **Appendix A.**

SECTION 3.0

SITE ACTIVITIES

3.0 SITE ACTIVITIES

The performance of the decommissioned Beaverlodge properties compared to the performance objectives is assessed through routine inspections conducted by Cameco personnel, third party consultants and/or members of the JRG. Additional studies and work are completed where required to gather information to support characterization of the properties, and aid in assessing the performance of specific components of the decommissioned properties. Results from the activities completed each year as well as updates on the status of the remediation projects at the decommissioned Beaverlodge properties are communicated through regular meetings with the public. The following section outlines activities related to the decommissioned Beaverlodge properties during the reporting period.

3.1 Routine Inspections and Engagement Activities

3.1.1 Joint Regulatory Group Inspections

The JRG is comprised of representatives from relevant federal and provincial regulatory agencies. The SkMOE represents the Province of Saskatchewan and is responsible for oversight of uranium mining and milling activities in the province, while the CNSC is responsible for regulating and licensing all uranium mining and milling operations in Canada and is the lead federal agency. The DFO and ECCC are additional federal regulators that provide oversight when requested or if necessary.

The JRG inspections are conducted to ensure 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 licence continue to be met. In 2022, one regulatory inspection was completed at the decommissioned Beaverlodge properties. The objective of the inspection was to complete a general assessment of the safety, security and stability of the decommissioned Beaverlodge properties, while focusing on the properties planned for transfer to the IC Program and to identify any remaining tasks to be completed prior to transferring properties. In addition, the inspection was completed to verify compliance with Cameco's approved licence documents, elements of *The Environmental Management and Protection Act, 2010,* and associated regulations.

The 2022 regulatory inspection occurred from June 6 to June 10. Participants for the inspection included representatives from Cameco, the CNSC, SkMOE, and SkMER. Inspection reports were received from the CNSC and SkMOE on June 25 and July 5, respectively. In the CNSC inspection report, one notice of non-compliance and two recommendations were provided. The findings were considered low risk and did not pose concern regarding the protection of the environment, the health and safety of workers, or the public. The SkMOE inspection report provided observations and georeferenced images of debris to be removed from the properties before they would be considered eligible for transfer to the IC Program however, no new action items, recommendations, or requests for additional information were identified. On August 12 and 26, Cameco provided written responses to the CNSC and SkMOE, respectively, regarding the items listed in the inspection reports. On August 15 and November 7, the CNSC and SkMOE accepted Cameco's response to their respective inspection reports.

3.1.2 Geotechnical Inspection

The 2022 geotechnical inspection was completed by Cameco personnel using the Geotechnical Inspection Checklist. A summary of the results is provided below for each of the inspected areas:

- The Fookes Delta.
    - There are no development of new tailings boils or exposures.
    - There are no signs of excessive erosions on the cover material.
    - Earthern berms and erosion protection are still in place and limiting vehicular traffic from accessing the delta.
- The two outlet spillways at Fookes and Marie Reservoirs.
    - Both spillways are performing as expected with no erosion occurring in the spillway or on the rip-rap embankments.
    - A beaver dam previously noted at the Marie spillway remains active.
- The Crown Pillar areas at Ace, Hab and Dubyna.
    - No evidence of subsidence and no signs of tension cracks in overlying material.
- The Zora Creek Reconstruction Area
    - Channel embankments remain stable with the vegetation on the downstream portion well established and thriving.
    - The beaver dam located at the outlet of Zora Lake appears stable and remains intact.

For detailed results, the full inspection report including a general map and photographic records is provided in **Appendix B.**

3.1.3 Community Engagement

Engagement activities are targeted towards rights bearing First Nation and Métis communities of the Athabasca Basin, which are located in the vicinity of the site. The closest community is the northern settlement of Uranium City (Uranium City). The community is located 8 km west of the former mine/mill site and is the only community with year-round road access to the former Beaverlodge properties. Cameco builds strong relationships in the north through its northern strategy and its commitments in maintaining open channels of communication. The Beaverlodge Public Information Program (PIP) was developed to assist in ensuring that Cameco's activities at the decommissioned properties are efficiently communicated to the public in a manner that complies with established regulations. The PIP was revised in 2021 to follow the format that was developed for Cameco's northern Saskatchewan operations that was accepted by the CNSC in the same year.

General updates on the decommissioned Beaverlodge properties are provided annually during a public meeting, normally held in Uranium City. Cameco engages directly with those interested and presents project plan updates in an effort to elicit feedback and provide meaningful response. The primary audience is the residents of Uranium City, and that includes the Uranium City Métis Local #50. The residents of this community have become well versed in the activities occurring at the Beaverlodge properties through participation in regular engagement. The discussions vary amongst participants but often focus on community benefits from the Cameco operating sites that pertain to employment opportunities.

In June 2016, Cameco and Orano Canada Inc (Orano) signed the Ya'thi Néné Collaboration Agreement with the three First Nation and four municipal communities in the Athabasca Basin. The agreement reflects the five pillars within Cameco's northern and Indigenous sustainability and stakeholder relations strategy, which is focused on workforce and business development, community engagement and investment as well as environmental stewardship.

The Athabasca Joint Engagement and Environment Subcommittee (AJES) – a joint committee of community and industry representatives that was established under the agreement meets regularly and discusses the northern Saskatchewan operations, company activities and environmental-related matters of importance to the Athabasca communities. AJES also provides a channel for the communities to share questions and concerns, in addition to traditional knowledge with the companies. Cameco continues to keep the subcommittee engaged regarding the Beaverlodge properties, which includes representation from Fond du Lac First Nation (Fond du Lac), Hatchet Lake First Nation (Hatchet Lake), Black Lake First Nation (Black Lake), a PRO (permanent resident organization) representing Uranium City, the northern hamlet of Stony Rapids (Stony Rapids), the northern settlement of Wollaston Lake (Wollaston Lake) and the northern settlement of Camsell Portage (Camsell Portage), and the executive director from the Ya'thi Néné Land and Resource Office (established to provide support to the AJES subcommittee).

In 2022, Cameco provided a presentation regarding the Beaverlodge properties during quarterly AJES meetings on February 10 (virtually) and June 28 and December 5 in-person and virtually. Discussions focused on a request for a 24-month renewal of the CNSC licence, Cameco's planned application to release the remaining properties from CNSC licensing, and the development of a long-term monitoring program for the properties in IC.

Cameco provides information and responds to inquiries from the Northern Administration District communities, non-government organizations and other groups that may express interest in the decommissioned Beaverlodge properties through our websites and social media channels and direct engagement when appropriate. In addition, Cameco featured Beaverlodge in the Ya'thi Néné newsletter in 2022. The Ya'thi Néné community newsletter was established in 2020 and is distributed in both print and online by subscribing with a focus on news and updates for the Athabasca Basin. Also, a feature has been added that allows subscribers to listen in Dene.

In 2022, Cameco provided updates to the Northern Saskatchewan Environmental Quality Committee (NSEQC) established in 1995 to bring northern residents together. The first general meeting was hosted virtually on March 2, Cameco presented an update on the Beaverlodge properties to the committee. The Minister's Order (Order) renewing the committee was signed late 2021 and expired at the end of June. Discussions with the NSEQC representatives focused on decommissioning and the IC program.

Cameco also engaged the Métis Nation - Saskatchewan (MN-S) and the Athabasca Chipewyan First Nation (ACFN) in 2022 as they had expressed interest during the 2019 Commission hearing regarding release of properties from CNSC licensing.

On February 18, Cameco hosted a virtual meeting with the MN-S to discuss Cameco's application to amend the licence for the Beaverlodge decommissioned properties and release of 18 properties from licensing in March. Cameco and MN-S representatives participated in addition to the Uranium City Métis Local #50 President, the Stony Rapids Métis Local #80 and #79, and Northern Region #1 Director. Discussions focused on the IC program and long-term monitoring.

Following the easing of travel restrictions, resulting from the COVID-19 pandemic, a "boots on the ground" tour and update which included discussion on the proposed 24-month licence renewal, was held in Uranium City. In lieu of traditional PowerPoint presentations at the Ben McIntyre School, participants were provided an opportunity to visit the last set of properties being prepared for release into the province of Saskatchewan's Institutional Control Program while Cameco, CNSC and provincial representatives provided a 2022 update in an effort to promote more dialogue and discussion while touring the sites. A summary document was prepared and given to participants to assist Cameco and regulatory representatives share information.

Recognizing the limited in-community resources to host all those that had expressed interest, the annual public meeting was separated into two visits. A tour was held on June

8 in Uranium City with representation from the NSEQC, Fond du Lac, and the MN-S with the Uranium City Métis Local #50 and Stony Rapids Métis Local #80 Presidents in conjunction with the annual regulatory inspection. The MN-S Northern Region #1 Director confirmed her attendance, but later declined the visit. An invitation to participate was also extended to ACFN representatives but was later declined noting competing priorities. The discussions focused on building a general understanding of the facilities, in addition to specific questions on the potential for acid rock drainage, which is not a concern at Beaverlodge due to the nature of the ore body.

On September 13, 2022, Cameco hosted a second tour that was advertised locally to Uranium City community members, and the tour was also attended by Fond du Lac and AJES representatives, the Community Liaison representing Fond du Lac, Camsell Portage and Uranium City, and the Ya'thi Néné Land and Resource Land Technician, who has an office in the community of Uranium City and the Uranium City Métis Local #50 President. Before starting both tours a land acknowledgement was provided to show respect and acknowledge the host community, its people, and its First Nation and Métis lands in addition to a tobacco offering and drum ceremony. Discussions focused on the Beaverlodge properties, the proposed licence renewal, fish and water advisory, the IC program and the development and communication of a long-term monitoring plan. Cameco indicated that funds would be provided to the province to execute on the long-term monitoring program when the final set of properties are transferred into the IC program.

Cameco adapted its engagement activities during the pandemic and in a continued interest to provide information to those interested both in-person and virtually, representatives from Cameco, CNSC and the province recorded the annual update presentations that described how the various agencies assess the decommissioned Beaverlodge properties to determine if they have met the requirements to proceed with transfer to the IC Program. In addition, the presentation discussed the activities completed in 2022 and plans for the upcoming year. Cameco also provided information regarding the proposed 24-month renewal of the CNSC licence. The recording was advertised and made available on the Beaverlodge Sites website (www.beaverlodgesites.com).

On December 6 and 7, Cameco representatives attended in-person Elder meetings in Fort Chipewyan, Alberta with the ACFN. Cameco was invited to provide an update during the quarterly meetings for the Elder's Council and the Elders General meeting along with representatives from the Dene Lands and Resource Management. Cameco presented to the Elder's Council in Dene and provided Dene translations to the Elders General meeting in an effort to facilitate and encourage dialogue. The discussions focused on environmental protection and community benefits.

Cameco continues to build strong relationships in the north through its PIP and its commitments to meaningful engagement.

3.2 2022 Remediation Activities to Prepare Sites for Transfer to IC Program

Cameco has prepared a work plan and schedule, based on the Path Forward Report recommendations (*Cameco 2012*), which was presented to the CNSC at the 2013 re-licensing hearing. The Path Forward describes remedial activities selected to improve local environmental conditions in order to meet performance objectives, and describes monitoring requirements to assess the success of implemented activities. The work plan describes specific site activities required to address residual human health and ecological risk, while demonstrating conditions on the properties are stable and/or improving. The remediation activities selected for advancement at the decommissioned Beaverlodge properties included:

- Rehabilitating historic mine openings.
- Re-establishment of the Zora Creek flow path.
- Final inspection and cleanup of properties.
- Decommission identified boreholes.
- Crown Pillar Remediation
- Site wide gamma assessment.

Since the development of the work plan, Cameco has undertaken numerous remedial activities. These activities include, but are not limited to the development of the Beaverlodge gamma radiation survey plan (*ARCADIS SENES 2014*); reconstruction of the Zora Creek flow path (*SRK 2017*); debris clean-up; closure of historic mine openings; and, sealing boreholes throughout the decommissioned Beaverlodge properties. In addition, crown pillars related to the underground working have been assessed and remediated as required.

Ultimately, the decommissioned Beaverlodge properties are managed to ensure they meet the performance objectives of safe, secure and stable/improving. Meeting these objectives will make the decommissioned properties eligible for acceptance into the IC Program or free-release. All work undertaken was intended to support the Management Framework established to move towards this goal. The following sections provide an overview of remedial activities completed in 2022 to advance the properties towards transfer to the IC Program.

3.2.1 Rehabilitate Historic Mine Openings

While the original decommissioning of the mine site included sealing most historic vertical mine openings with concrete, final drawings detailing the closure methods were not created for each opening. To ensure Cameco meets the performance objectives of safe, secure and stable/improving, mine openings have since been verified to be secured and subsequently signed off by a qualified person, where applicable. In 2022 a search for the mine openings known as the Sorting Plant Raise and Sorting Plant Bin was conducted. These openings were used for disposal of rock rejected from the mill and they accessed a short haulage way to the Sorted Waste Rock Adit where the material was dumped on surface a short distance away. These openings did not provide access to the underground workings and were backfilled with debris and waste rock during the original decommissioning. In May 2022 the foundations for these openings were excavated to confirm their location. The backfill in the openings appeared to be functioning as expected as no subsidence was noted after 40 years since closure. The area was re-covered with waste rock and a rock monument was placed at the location for ease of future inspections. All historic mine openings on the former Beaverlodge properties meet the performance objective for stable mine openings.

An overview of the remediation progress for mine openings undertaken to date is provided in **Table 3.2-1**.

Table 3.2-1 Mine Openings

Site	Opening	Property	Location		Status	Notes
Ace	Shaft	ACE MC	643697	6605390	Exposed	Stainless steel cover installed in 2016.
Ace	2157 Raise	ACE 1	643366	6605115	Exposed	Stainless steel cover installed in 2017.
Ace	2157 Finger Raise	ACE 1	643338	6605106	Exposed	Stainless steel cover installed in 2017.
Ace	130 Raise	ACE MC	643773	6605394	Exposed	Stainless steel cover installed in 2017.
Ace	195 Access Raise	ACE 1	643512	6605180	Buried	Leave “as-is”; Backfilled and buried by substantial waste rock below the Dorrclone.
Ace	195 Raise	ACE 1	643512	6605180	Buried	Leave “as-is”; Backfilled and buried by substantial waste rock below the Dorrclone.
Ace	105*2 Raise	ACE 1	643584	6605288	Buried	Engineered rock cover installed in 2018.
Ace	201 Raise	ACE MC	643615	6605277	Backfilled	Leave “as-is”. Removed concrete cap and excavated below, no indication of a raise opening. Raise area was backfilled, no further remediation planned at this location.
Dubyna	810394 Raise	JONES	647794	6608256	Exposed	Stainless steel cover installed in 2017.
Dubyna	820694 Raise	JONES	647820	6608451	Exposed	Stainless steel cover installed in 2017.
Dubyna	Dubyna Portal (Adit)	JONES	647806	6608229	Backfilled	Leave “as is”.
Eagle	Shaft	EAGLE 7	639549	6607252	Exposed	Concrete cap installed in 2001.
Eagle	Adit	EAGLE 1	640379	6607245	Submerged	Leave “as is”.
Fay	Shaft	URA 4	642668	6604711	Exposed	Stainless steel cover installed in 2020.
Fay	Custom Ore Raise	URA 4	642623	6604658	Buried	Engineered rock cover placed in 2020.
Fay	Custom Ore Bin	URA 4	642625	6604658	Buried	Engineered rock cover placed in 2020.
Fay	CB-1 Access Raise	URA 7	642558	6604563	Buried	Engineered closure design installed in 2021.
Fay	Surface Dump Raise	URA 4	642595	6604639	Exposed	Stainless steel cover installed in 2018.
Fay	Sorting Plant Raise	URA 7	642603	6604520	Backfilled	Located, Leave backfill as is.
Fay	Sorting Plant Bin	URA 7	642603	6604520	Backfilled	Beside the raise, Leave backfill as is.
Fay	Fine Ore Dump	URA 4	642682	6604715	Exposed	Stainless steel cover installed in 2020.
Fay	Pipe Drift Raise	URA 4			Buried	Leave “as-is”. Small diameter raise (borehole) for piping, backfilled in reservoir.
Fay	25373 Raise	URA 3	642253	6604665	Exposed	Stainless steel cover installed in 2017.
Fay	24094 Raise (Vent)	URA 4	642702	6604632	Exposed	Stainless steel cover installed in 2018.
Fay	Fay Ladder Access	URA 4	642606	6604655	Buried	Engineered rock cover placed in 2020.
Fay	Waste Haul Adit	URA 7	642638	6604450	Backfilled	Backfilled in 2017.
Hab	Vent Plant Raise	EXC 1	645542	6612182	Inaccessible	Leave “as-is”, Vent raise is in the adit (within mine workings).
Hab	13904 Raise	EXC 1	645229	6612203	Exposed	Stainless steel cover installed in 2017.
Hab	13905 Raise	EXC 1	645246	6612213	Exposed	Stainless steel cover installed in 2017.
Hab	13918 Raise	HAB 1	645292	6612236	Buried	No further remediation required- backfilled in Hab pit.
Hab	13927 Raise	HAB 1	645295	6612230	Exposed	Stainless steel cover installed in 2017.
Hab	13909 Raise	HAB 1	645308	6612255	Buried	No further remediation required- backfilled in Hab pit.
Hab	13929 Raise	HAB 1	645352	6612255	Buried	No further remediation required- backfilled in Hab pit.
Hab	13810 Raise	HAB 2A	645561	6611886	Exposed	Stainless steel cover installed in 2017.
Hab	Shaft	HAB 2	645568	6612133	Exposed	Stainless steel cover installed in 2018.
Hab	Heater Raise	EXC 1	645519	6612198	Exposed	Stainless steel cover installed in 2019
Hab	Haulage Adit (west)	EXC 1	645505	6612187	Backfilled	Leave “as is”.
Hab	Service Adit (east)	EXC 1	645519	6612200	Backfilled	Leave “as is”.
Martin	Adit (BVL)	RA 9	639081	6602968	Backfilled	Leave “as is”.
Martin	Adit (MRTN)	RA 6	638063	6602968	Backfilled	Leave “as is”.
Verna	Shaft	ACE 8	645470	6606022	Exposed	Stainless steel cover installed in 2018.
Verna	026594 Raise	NW 3 EX	645659	6606028	Exposed	Stainless steel cover installed in 2019.
Verna	026594 Finger Raise	NW 3 EX	645668	6606030	Exposed	Stainless steel cover installed in 2018.
Verna	Bored Raise	ACE 3	644806	6605250	Exposed	Stainless steel cover installed in 2017.
Verna	Verna Ladder Access	NW 3 EX	645669	6606035	Exposed	Stainless steel cover installed in 2018.
Verna	72 Zone Portal	NW 3	645836	6605771	Backfilled	Leave “as is”.
Verna	Shaft Adit	-	-	-	Backfilled	Leave “as is. Listed as sealed during operations (*Departure with Dignity 1987*)
Verna	46 Zone Portal	EMAR 21	645318	6607236	Backfilled	Leave “as is”.

3.2.2 Monitoring the Zora Creek Reconstruction

Final construction work on the Zora Creek Reconstruction was completed in 2016. A detailed description of the work conducted along with final As-built drawings was submitted to the CNSC and SkMOE in a report titled "*Bolger Flow Path Reconstruction: 2016 Final As-Built Report*" (*SRK 2017*) on March 10, 2017.

During the 2022 regulatory inspection, the Zora Creek flow path was inspected by Cameco and the regulatory agencies. No notable changes to the condition of the channel were observed. Visual inspections will continue to be performed annually by Cameco personnel until the associated property is transferred to the IC Program. At which point inspections will continue as part of the IC Program Monitoring and Maintenance Program.

Water quality monitoring upstream and downstream of the Zora Creek Reconstruction project continued in 2022. A description of the 2022 water quality results for sample stations ZOR-01, ZOR-02, AC-6A, and AC-8 are provided in **Section 4.3.1**. Water quality from this area will continue to be monitored in order to evaluate the success of this remediation effort.

3.2.3 Final Inspection and Clean-up of the Properties

Prior to free-releasing or transferring properties to the IC Program, a final site inspection and clean-up must be conducted in order to identify and remove debris from the properties, and ensure the site is in a safe and stable condition.

A site wide inspection of all the decommissioned Beaverlodge properties was performed by Kingsmere Resources (Kingsmere) from 2015 to 2017, resulting in a significant amount of debris being removed from the properties (*Kingsmere 2018*). In addition, prior to properties being transferred to the IC Program, the regulatory agencies will typically conduct a final inspection of the property to ensure the clean-up and remediation is adequate. During this process, additional minor amounts of debris may be identified for clean-up. In 2022, approximately 30 m^3 of debris was identified during the regulatory inspection that required removal as the properties were undergoing final inspection before being proposed for transfer to the IC Program. Debris was disposed of in Lower Fay Pit, in accordance with regulatory approved methods. The table below includes the volume of waste disposed of to date and includes Bolger Pit, which is no longer in use.

Table 3.2-2
Summary of the materials (m^3) deposited to Bolger and Fay Pits since 2015.

	Bolger	*Fay*	***Total***
Debris	82	807	**889**
Core	1303	126	**1429**
Concrete	0	647	**647**
Total	**1385**	**1580**	**2965**

3.2.4 Decommission Identified Boreholes

A search of drilling records on file with the Government of Saskatchewan, followed by field investigations was conducted in 2010 (*SRK 2011*). This investigation resulted in numerous historic boreholes dating from the Eldorado operation (exploration drill holes) being identified and sealed. Since 2013, additional non-flowing historic boreholes have been discovered during regulatory inspections as well as during the final property inspections and have since been sealed. Collectively, 242 boreholes have been decommissioned since 2011 across the decommissioned Beaverlodge properties. No new boreholes were identified in 2022. All boreholes identified on the Beaverlodge properties have been sealed, and the performance indicator has been met.

As a permanent record of borehole locations associated with the decommissioned Beaverlodge properties, Cameco maintains a master list that includes the GPS locations for each borehole in the Annual Report (**Appendix C**). As properties are transferred to the IC Program, this permanent record will be transferred to the Province of Saskatchewan.

3.2.5 Crown Pillar Remediation

Cameco retained SRK to assess the potential risk associated with crown pillars across all Beaverlodge properties, and provide recommendations for long term remediation/inspection of potential areas of concern. Results of the *Beaverlodge Property – Crown Pillar Assessment* (*SRK 2015*) identified one area that warranted physical remediation and two additional areas for future monitoring (Hab and Dubyna). It was recommended that the crown pillar associated with the Ace Stope Area undergo remediation to limit risks from settling related to the crown pillar failure. The majority of remediation was undertaken in 2016 and completed in 2019 with the closure of the 105#2 Raise (*SRK 2019*).

The crown pillars associated with the Ace Stope area as well as the Hab and Dubyna crown pillar areas were inspected by Cameco in 2022 and there were no observable changes to the landforms in these areas. The results and photos are provided in the Geotechnical Inspection Report (**Appendix B)**.

3.2.6 Follow-up to the Site Wide Gamma Assessment

Gamma surveys and risk assessments completed site wide and have shown that radiation exposure resulting from casual access on the decommissioned Beaverlodge properties is negligible and that the public dose limit would not be exceeded.

Prior to a property being proposed for transfer to the IC Program, if there has been any disturbance of the site since the site wide gamma survey was completed, the area will be rescanned to ensure the readings are representative of the original scanned results.

In 2022, no gamma surveys were completed, however some previously scanned areas located on the URA7 property were disturbed while performing remediation activities, therefore follow-up surveys will be required to confirm the gamma readings are similar to the original scanning results.

A comprehensive, up-to-date gamma survey file and figures will be provided to the Province when all on-site work is completed.

3.3 Additional Studies/Work

3.3.1 Mill Cover

Subsidence spots in the mill hill area were identified in the SkMOE inspection report received October 5, 2021. An additional internal review of aerial imagery was completed to comprehensively evaluate the area. Identified subsidence spots were inspected, excavated to fully expose potential voids, filled with locally sourced waste rock, compacted and contoured to the surrounding topography in the fall of 2021. This work was done in preparation for a ~1ft cover that was applied in 2022 using clean waste rock sourced from a road-bed on the ACE 8 property. The cover focused on the area corresponding with the portion of the mill building that had a large basement and where most of the subsidence spots were in close proximity and remnants of cut I-beams that previously formed the walls of the mill had become exposed due to shifting and settling of the waste rock cover over the 40-years since decommissioning was completed.

The ACE 8 road identified above, was reclaimed, sloped to 3(H) to 1(V) and had brush spread over to promote vegetation growth in 2021. After remediation was complete, the area was surveyed for gamma. Results continue to meet the criteria identified in the *Guidelines for Northern Mine Decommissioning and Reclamation, EPB 381* (*SkMOE 2008*) with values ranging from >0.1 µSv/h to 1 µSv/h above background.

3.3.2 Licensing Document Update

In 2022, three licensing documents were updated. These documents were the Quality Management Program (QMP), the Beaverlodge Facility Licence Manual (FLM) and the Property Description Manual (PDM).

The purpose of the QMP is to define and describe how Cameco manages the Beaverlodge properties with respect to organization and quality processes. The QMP is built upon internationally recognized standards (ex. ISO 9001) which ensure Cameco's processes are systematically monitored, controlled and improved when possible. The purpose of the FLM is to ensure Cameco's license supporting documents, activities and processes are compliant with respect to all Beaverlodge property licenses. The purpose of the PDM is to document the Beaverlodge properties descriptions and boundaries. All documents' updates were accepted by the CNSC.

3.3.3 Environmental Contingency Plan

The Beaverlodge Surface Lease stipulates that the site is to maintain an Environmental Contingency Plan and provide annual updates. An Environmental Contingency Plan is intended to provide information regarding the storage and use of Hazardous Substances and Waste Dangerous Goods (HSWDG) on a site. As the decommissioned Beaverlodge properties do not have any HSWDG located on site, an Environmental Contingency Plan is not applicable.

At the request of SkMOE Cameco prepared a Wildfire Prevention and Preparedness Plan for the decommissioned Beaverlodge properties. The plan was developed using the ministry's plan template provided on the Wildfire Prevention and Preparedness Plans webpage. Additional information was included with respect to Sections 5, 7, 10 and 11 of the templates; and included site maps showing the locations of notable site features, such as access roads, locked gates and bodies of water. The Beaverlodge 2022 Wildfire Prevention and Preparedness Plan was submitted to SkMOE on March 8, 2022.

The SkMOE maintains a checklist of compliance for industrial sites and compares it with various provincial requirements. SkMOE provided Cameco a final version of the Beaverlodge Project 2021-22 Environmental Compliance Management System (ECMS) on March 28, 2022. The Beaverlodge ECMS confirms that the Beaverlodge properties are meeting all the relevant provincial requirements identified in the ECMS.

SECTION 4.0

ENVIRONMENTAL MONITORING

4.0 ENVIRONMENTAL MONITORING PROGRAMS

Cameco retains a local contractor (Urdel Ltd.) to conduct the required water quality and radon in air sampling at various established station locations throughout the year. While collecting samples, employees from Urdel Ltd., also perform cursory inspections and report any unusual conditions to Cameco.

Saskatchewan Research Council (SRC) and Bureau Veritas Labs (BV Labs) are used to analyze water samples. SRC is also used to analyze radon in air through track etch cup monitoring. SRC holds the Canadian Association for Laboratory Accreditation (CALA) and is certified in several other inter-laboratory performance assessment programs as seen in **Appendix D**. Bureau Veritas Quality Program is designed to comply with or exceed the data quality objectives of the industry, Canadian Regulators, US Environmental Protection Agency and International Standards Organization (ISO/IEC 17025).

4.1 Site Specific Objectives

The performance objectives of safe, secure and stable/improving have been established as benchmarks for entering the provincial IC Program. Performance indicators consisting of modelled water quality for several stations were developed to assess when the performance objective has been met for the associated properties. The predictions provide an expected range to which water quality trends will be compared when defining whether the station is stable or improving.

These predicted water quality concentrations were originally modelled as part of the development of the QSM and provided the foundation for assessing the outcome of remedial options presented in the Path Forward Report (*Cameco 2012*). With the path forward strategy accepted by the regulatory agencies, the water quality performance indicators were updated and incorporated in the 2013 Status of the Environment (SOE) report (*SENES 2013*). A revised SOE was submitted in October 2018 (relabeled as an Environmental Performance Report (EPR)) that included updates to the model based on data gathered since 2013 (*CanNorth 2018*). In 2020, the Beaverlodge ERA model and performance indicators were updated (*CanNorth 2020*). The current model utilizes an updated format with the ability to better assess a wide range of environmental variability. The model assumptions are based on the current understanding of environmental conditions informed by 40 years of monitoring.

Note that as the performance indicators reflect mean annual values, it is not the expectation that all individual water quality results will be within the predicted maximum and minimum bounds every year. The 2022 water quality and corresponding trends are evaluated and discussed below.

Table 4.1-1 Comparison of Key Parameter Annual Averages to Modelled Predictions/Performance Indicators

Station	Water Quality Meets SEQG or is Within or Below Modelled Predictions			Comments
	Uranium	Radium-226	Selenium	
Ace Lake (AC-8)	✓	✓	✓	-.
Beaverlodge Lake (BL-5)	✓	✓	✓	-
Dubyna Lake (DB-6)	✓	✓	✓	-
Fookes Reservoir (TL-3)	✓		✓	Ra-226 was above the upper bound prediction in 2022
Greer Lake (TL-9)	✓	✓	✓	-
Lower Ace (AC-14)	✓	✓	✓	-
Marie Reservoir (TL-4)	✓	✓	✓	-
Meadow Fen (TL-7)	✓		✓	Ra-226 was above the upper bound prediction in 2022
Pistol Lake (AN-5)	✓	✓	✓	-_
Verna Lake (AC-6A)	✓	✓	✓	-

4.2 Water Quality Monitoring Program

This section provides a summary of water quality trends at each of the licensed monitoring stations at the decommissioned Beaverlodge properties. An initial comparison to the Saskatchewan Environmental Quality Guidelines (SEQG; *Government of Saskatchewan 2021*) will be made and if the data shows a stable trend below the SEQG, no detailed discussion will be provided. If the data is above the SEQG, a comparison to the modelled predictions will be made. As surface water quality guidelines are not intended to be applied within tailings management areas, discussion regarding water quality within the TMA is focused on the comparisons to the modelled predictions for stations TL-3, TL-4, TL-6, or TL-7.

The water quality summary in this section focuses on three main constituents of potential concern identified for the decommissioned Beaverlodge properties: Se, U and ^{226}Ra. Total dissolved solids (TDS) is also included as a general indicator of water quality.

The two watersheds influenced by historic mining activities are Ace Creek and Fulton Creek. **Figure 4.2** provides an overview of the various stations at which water quality is monitored. Within the Ace Creek watershed, the routine sampling stations (from upstream to downstream) include:

AN-5 Pistol Creek downstream of the decommissioned Hab mine site and upstream of the first confluence. This system flows through Mickey Lake into Ace Lake.

DB-6 Dubyna Creek downstream of the decommissioned Dubyna mine site and before the creek enters Ace Creek upstream of Ace Lake.

AC-6A Verna Lake outlet to Ace Lake.

AC-8 Ace Lake outlet to Lower Ace Creek.

AC-14 Lower Ace Creek at the outlet into Beaverlodge Lake.

The Fulton Creek watershed contains the bulk of the decommissioned tailings deposited during operations. Within the Fulton Creek watershed, the regulatory approved sampling stations (from upstream to downstream) include:

AN-3 Fulton Lake at outlet into Fookes Reservoir (represents un-impacted or background condition).

TL-3 Outlet of Fookes Reservoir.

TL-4 Outlet of Marie Reservoir (which flows into Meadow Fen).

TL-6 Outlet of Minewater Reservoir (which flows into Meadow Fen).

TL-7 Outlet of Meadow Fen upstream of Greer Lake.

TL-9 Fulton Creek downstream of Greer Lake and before it enters Beaverlodge Lake.

Additional sampling stations located downstream of the Beaverlodge site include:

BL-3 Located in Fulton Bay, Beaverlodge Lake immediately opposite the Fulton Creek outlet.

BL-4 Beaverlodge Lake (central location).

BL-5 Outlet of Beaverlodge Lake.

ML-1 Outlet of Martin Lake.

CS-1 Crackingstone River at bridge.

CS-2 Crackingstone Bay of Lake Athabasca.

Figures 4.2.1-1 to **4.3-8** are graphical representations of the historical annual average concentrations of U, ^{226}Ra, Se, and TDS at each station with comparisons to their respective SEQG values where applicable, as well as comparisons to the performance indicators that were presented in the ERA (*CanNorth 2020*). It should be noted that Se monitoring began at selected water stations in 1996, and that the lab detection limit for selenium changed in 2003.

Tables 4.2.1-1 to **4.3.1-2** show summary statistics and comparisons to historical results (previous 4 years) of parameters monitored at Beaverlodge water sampling stations.

Sections 4.2.1 and **4.2.2** cover the water quality results and trends at the water quality stations located within each watershed. **Section 4.2.3** covers the water quality results and trends at the water quality locations in Beaverlodge Lake and downstream. Trends are identified through visual interpretation of the graphs and include trends in the short-term (less than five years) and in the long-term trends.

The detailed water quality results for the current reporting period, January 2022 to December 2022, are provided in **Appendix E**.

4.2.1 Ace Creek Watershed

During operations several satellite mines operated within the Ace Creek watershed. Water quality is monitored at stations within the Ace Creek watershed as part of the Beaverlodge EMP. The results of the 2020 Beaverlodge ERA show that immediate and downstream environments associated with the Ace Creek watershed will continue to naturally recover over time. The water quality predictions for the various waterbodies within the Ace Creek watershed are based on aquatic and sediment studies and 40 years of water quality monitoring.

AN-5 Pistol Lake

Station AN-5 is located in Pistol Creek downstream of the decommissioned Hab satellite mine (**Figure 4.2**). Pistol Lake is a small non-fish bearing waterbody which typically exhibits higher variability in measured data than other areas within the Ace Creek Watershed. Due to the small size and depth of Pistol Lake, and the hydraulic connection between the flooded Hab underground workings and the surface water, measured data exhibits high variability correlated to fluctuations in annual precipitation rates. Three of the four scheduled samples were collected at AN-5 in 2022. The regularly scheduled March sample was not collected due to no water being available.

A historical summary of annual average ^{226}Ra, U, Se, and TDS concentrations at AN-5 along with the predicted recovery are presented in **Figures 4.2.1-1** to **4.2.1-4**. The annual averages from 2018 to 2022 for the COPC are presented in **Table 4.2.1-1**.

The annual average U concentration was 99.3 µg/l, which is a decrease relative to 2021. As discussed in previous annual reports, uranium concentrations have shown a distinct seasonal fluctuation, with the highest concentrations occurring in the winter months, which decrease throughout the spring and summer months, followed by an increase again in fall. Uranium concentrations measured throughout the year ranged from 40.0 µg/L to 207.0 µg/L. Overall, the long-term trend for U at AN-5 has shown a decrease in annual average concentrations post-decommissioning (**Figure 4.2.1-1**). The annual average U concentration is above the SEQG (15 µg/L) but within modelled predictions.

The long-term trend for ^{226}Ra at AN-5 is predicted to remain relatively constant into the future, however seasonal fluctuations have occurred in the past and can influence annual average results. As shown in **Appendix E**, results in 2022 were consistent with previous results and ranged between 0.610 Bq/L and 0.740 Bq/L. The annual average ^{226}Ra concentration in 2022 at AN-5 was 0.667 Bq/L. This is above the SEQG (0.11 Bq/L) but is within modelled predictions.

Selenium values at AN-5 remained at or below detection limits throughout 2022 and remain below the SEQG of (0.001 mg/L).

TDS concentrations exhibit a seasonal fluctuation that affects the annual average. This is because of the contribution of U to overall TDS concentrations.

DB-6 Dubyna Lake

Station DB-6 is located in Dubyna Creek, downstream of Dubyna Lake and the decommissioned Dubyna satellite mine, before the creek enters Ace Creek, and upstream of Ace Lake (**Figure 4.2**). All four scheduled samples at DB-6 were collected in 2022.

A historical summary of annual average ^{226}Ra, U, Se, and TDS concentrations at DB-6 along with the predicted recovery are presented in **Figures 4.2.1-5** to **4.2.1-8**. The annual averages from 2018 to 2022 for all parameters are presented in **Table 4.2.1-2**.

The average U concentrations at DB-6 in 2022 was 106.5 µg/L and is within modelled predictions.

The long-term trend for ^{226}Ra at DB-6 has been relatively consistent and has remained below the SEQG since decommissioning. Values remain within modelled predictions.

Selenium has remained relatively stable over the past decade. The water quality trend for Se has also remained below the SEQG since the analytical laboratory detection limit for Se was lowered in 2003, and is within modelled predictions.

The TDS trend has been relatively consistent since decommissioning, and no notable changes were observed in 2022.

AC-6A Verna Lake

Water quality monitoring at this station began in May 2010, and is located at a road crossing between Verna Lake and Ace Lake (**Figure 4.2**). Flows from Verna Lake are largely dependent on spring snow melt and precipitation events, and as such, not all scheduled samples can be collected during low precipitation years. This station is downstream of the Zora Creek Reconstruction project and as such continued recovery is expected following project completion in 2016. Water quality from this area will continue to be monitored in order to evaluate the success of implementing this remedial option.

In 2022, there were eight samples scheduled. Due to lower than normal precipitation observed in 2022, water levels in Verna Lake were low, resulting in five of the scheduled samples at AC-6A to not be collected. An additional sample was attempted to be collected in November, however there was still no flow at the station. As a result, only three samples were collected at AC-6A in 2022. It should be noted that of the five samples not collected, only the March sample is part of the approved EMP. All other samples were project specific samples aimed at gathering data on the recovery of Verna Lake following the Zora Creek reconstruction project (discussed in **Section 4.3.1**).

A historical summary of annual average ^{226}Ra, U, Se and TDS concentrations at AC-6A along with the predicted recovery are presented in **Figures 4.2.1-9** to **4.2.1-12.** The annual averages from 2018 to 2022 for all parameters are presented in **Table 4.2.1-3**.

The average U concentration at AC-6A in 2022 was 204.3 µg/L. This is above the SEQG but is within modelled predictions.

The annual average ^{226}Ra concentration at AC-6A in 2022 was 0.087 Bq/L. This is within modelled predictions and below the SEQG.

Se concentrations at station AC-6A observed no changes throughout 2022 and the annual average concentration was 0.00020 mg/l. Se continues to measure below the SEQG and is within modelled predictions.

TDS concentrations ranged from 162 mg/L to 184 mg/L in 2022 with an average of 172 mg/l. This is below the annual averages recorded in the last 4 years.

AC-8 Ace Lake

Station AC-8 is located at the outlet of Ace Lake into Lower Ace Creek. Ace Lake is downstream of stations DB-6, AN-5, and AC-6A (**Figure 4.2**). As a result of changes to the approved Beaverlodge EMP, sample collection is scheduled once per year. As such results discussed within the below text are of a single sample result. In 2022, the scheduled sample at AC-8 was collected.

In August 2021, the weir at Ace Lake was removed. The sample taken in 2022 was the first measure of water quality at this site since its removal. All parameters discussed are within historical trends, modelled predictions and below respective SEQG's indicating that the water quality at this station has remained stable.

A historical summary of ^{226}Ra, U, Se, and TDS concentrations at AC-8 along with the predicted recovery are presented in **Figures 4.2.1-13** to **4.2.1-16**. The annual averages from 2018 to 2022 for all parameters are presented in **Table 4.2.1-4**.

The U concentration recorded at AC-8 in 2022 was 8.6 µg/l. This is below the SEQG and below modelled predictions. Overall, U at AC-8 has been trending downward since decommissioning and has been consistently meeting SEQG since 2012.

The ^{226}Ra concentration recorded at AC-8 in 2022 was 0.010 Bq/L. This is below the SEQG and within modelled predictions. The Se concentration recorded at AC-8 in 2022 was <0.00010 mg/l which is the lab detection limit. Se concentrations have been recorded at detection limit since sampling began. Se at AC-8 is below the SEQG.

The TDS concentration recorded in 2022 was 62 mg/l. TDS concentrations have remained relatively stable at this station since decommissioning.

AC-14 Lower Ace Creek

Station AC-14 is located in Lower Ace Creek at the outlet into Beaverlodge Lake (**Figure 4.2**). All four scheduled samples were collected in 2022.

A historical summary of annual average ^{226}Ra, U, Se, and TDS concentrations at AC-14 along with the predicted recovery are presented in **Figures 4.2.1-17** to **4.2.1-20.** The annual averages from 2018 to 2022 for all parameters are presented in **Table 4.2.1-5**.

Uranium concentrations at station AC-14 have been following an overall downward trend since decommissioning. Annual average uranium levels are currently above SEQG, however they are predicted to continue to improve in the future. In 2022, the average U concentrations at AC-14 was 28.0 µg/L which is an increase relative to 2021 (18.3 µg/L). In 2021, increased flows were observed resulting in uranium values to be at the lower bound of their predictions. Due to lower flows observed in the region in 2022, an increase in uranium concentration was anticipated.

The annual average ^{226}Ra concentration recorded in 2022 was 0.060 Bq/L. Annual average ^{226}Ra concentrations have been in a downward trend since decommissioning. Radium is within modelled predictions and has been below the SEQG since 1990.

The annual average Se concentration recorded in 2022 was 0.0001 mg/l. This is below the SEQG and within modelled trends. Se concentrations have been below the SEQG since the inception of sampling at this station. In 2003, a laboratory detection limit change from 0.0010 mg/l to 0.0001 mg/l occurred, which is why values before 2003 appear much greater as opposed to what is observed to date.

TDS concentrations have remained relatively stable at this station since decommissioning, except for one outlier in 1991.

4.2.2 Fulton Creek Watershed

As previously discussed, surface water quality guidelines are not intended to be applied within tailings management areas, and thus they are not compared to water quality at stations TL-3, TL-4, TL-6, or TL-7. No predictions are provided for station AN-3 as this station is considered a reference area, un-impacted by historic mining activities.

The water quality predictions for the Tailings Management Area (TMA) are based on sediment studies and more than 35 years of water quality monitoring. The results of the 2020 ERA show that immediate and downstream environments will continue to naturally recover over time. Radium^{226} is anticipated to be steady or slightly increase in the Fulton Creek watershed until approximately 2150 and then decline gradually.

It is important to note that the predicted ^{226}Ra trends in the TMA do not result in a predicted increase of ^{226}Ra concentrations in Beaverlodge Lake, located immediately downstream of the TMA. As a result, Cameco does not anticipate that ^{226}Ra concentrations in the TMA will pose any risk to the natural recovery of the TMA and downstream environment in the future.

AN-3 Fulton Lake

Station AN-3 is located at the outflow of Fulton Lake prior to Fookes Reservoir and was not impacted by mining/milling activities in the area (**Figure 4.2**). Water quality at this station is typical of background water quality in the region. Since 1986, sampling has been conducted on an annual basis. The one scheduled sample for AN-3 was collected in 2022.

A historical summary of annual average ^{226}Ra, U, Se, and TDS concentrations at AN-3 are presented in **Figures 4.2.2-1** to **4.2.2-4**. The concentrations from 2018 to 2022 for all parameters are presented in **Table 4.2.2-1**.

As expected with a reference location, the long-term trend for concentrations of U, ^{226}Ra, recorded at AN-3 have remained relatively stable and below their respective SEQG concentrations. TDS concentrations have remained stable, and since Se monitoring began, concentrations at AN-3 have been at or below the detectable laboratory limits.

TL-3 Fookes Reservoir

Station TL-3 is located at the outlet of Fookes Reservoir, which received the majority of tailings during operation, and is the first sampling location within the recovering TMA (**Figure 4.2**). The two scheduled samples for TL-3 were collected in 2022.

A historical summary of annual average ^{226}Ra, U, Se, and TDS concentrations at TL-3 along with the predicted recovery as outlined in the 2020 ERA, are presented in **Figures 4.2.2-5** to **4.2.2-10**. The annual averages from 2018 to 2022 for all parameters are presented in **Table 4.2.2-2**.

Overall, the long-term trend for the mean concentration of U has shown a decrease since 1991. The average U concentration measured in 2022 was 194.0 µg/L, which is within the bounds of the modelled predictions.

The average annual ^{226}Ra concentration recorded in 2022 was 1.700 Bq/L. This is above the modelled predictions for ^{226}Ra at this station. The comparison between measured data and the performance indicator is conducted to evaluate observed surface water trends, as "based on the employed model assumptions, it is not the expectation that water quality results will be within the derived bounds every year rather that trends in surface water quality will fall within the derived bounds". Thus, it is not expected that every measured annual average will fall within the performance indicator bounds but that the performance indicator should be used to evaluate observed long-term trends (ERA 2020). The trend at TL-3 will continue to be monitored.

Selenium concentrations have been gradually decreasing in since decommissioning. In 2022, the average Se concentration was 0.0026 mg/L, which is slightly higher than the 2021 average but remainsbelow the lower bounds of the modelled predictions at TL-3.

TDS concentrations continue to gradually decrease in the long-term.

TL-4 Marie Reservoir

Station TL-4 is located within the Fulton Creek drainage downstream of TL-3 and at the outlet of Marie Reservoir (**Figure 4.2**). The two scheduled TL-4 samples were collected in 2022.

A historical summary of annual average ^{226}Ra, U, Se, and TDS concentrations at TL-4 along with the predicted recovery are presented in **Figures 4.2.2-11** to **4.2.2-16**. The annual averages from 2018 to 2022 for all parameters are presented in **Table 4.2.2-3**.

Annual average concentration of U and ^{226}Ra in 2022 was 166.0 µg/L and 1.850 Bq/L, respectively. Both U and ^{226}Ra are within the model predictions.

The annual average Se concentration recorded in 2022 was 0.0014 mg/l, which is slightly below the modelled predictions. Se concentrations have been in a long-term downward trend since decommissioning.

Annual average concentrations of TDS at TL-4 remain on an overall downward trend. The annual average concentration in 2022 was 175 mg/L.

TL-6 Minewater Reservoir

Station TL-6 is located at the outlet of Minewater Reservoir (**Figure 4.2**), 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. During decommissioning activities, the water level in Minewater Reservoir was lowered and efforts were made to relocate settled precipitate sludge to the underground workings. Although a large volume of precipitate was relocated, these efforts were not successful in removing all sludge, which is reflected by the water quality and the variability of the results observed to date.

This water quality station represents the outflow of a small drainage area and generally exhibits ephemeral flows dependent on local precipitation. As a result, not all scheduled samples are typically collected. Of the two scheduled samples, neither were collected in 2022 due to no water flowing at the site.

The 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 2020*). Contributions from this station are incorporated in the model predictions at the downstream station (TL-7).

A historical summary of annual average ^{226}Ra, U, Se, and TDS concentrations at TL-6 is presented in **Figures 4.2.2-17** to **4.2.2-20**. The annual averages from 2018 to 2021 for all parameters are presented in **Table 4.2.2-4**. The 2022 average is absent from the tables and figures as there were no samples taken at TL-6 in 2022.

TL-7 Meadow Fen

Station TL-7 is located at the outlet of Meadow Fen (**Figure 4.2**) in the TMA. Three of the four scheduled samples for the 2022 reporting period were collected. The regularly scheduled March sample was not collected due to no water being available.

A historical summary of annual average ^{226}Ra, U, Se, and TDS concentrations at TL-7 along with the predicted recovery are presented in **Figures 4.2.2-21** to **4.2.2-26**. The annual averages from 2018 to 2022 for all parameters are presented in **Table 4.2.2-5**.

The annual average U concentration recorded at TL-7 in 2022 was 161.0 µg/L. Uranium concentrations have been in a long-term downward trend since decommissioning with values observed in recent years being significantly lower than those observed 40 years ago. The U concentrations at TL-7 are within modelled predictions.

The average ^{226}Ra concentration in 2022 was 2.00 Bq/L, which is slightly above the performance indicator derived from the ERA predictions. The 2020 ERA predicted that mean annual ^{226}Ra concentrations in the Fulton Creek watershed would continue to increase due to the release of historically precipitated radium from sediment, gradually declining in the future as the system continues to recover. The comparison between measured data and the performance indicator is conducted to evaluate observed surface water trends, as “based on the employed model assumptions, it is not the expectation that water quality results will be within the derived bounds every year rather that trends in surface water quality will fall within the derived bounds". Thus, it is not expected that every measured annual average will fall within the performance indicator bounds but that the performance indicator should be used to evaluate observed long-term trends (ERA 2020). This observed and predicted trend increase is due to submerged tailings in the watershed, increased solubility for the barium, radium sulfate co-precipitate as sulfate concentrations in the porewater and water column decline and increased solubility of calcium which is bound to radium in the sediments (ERA 2020).

The annual average Se concentration at TL-7 recorded in 2022 was 0.0012 mg/l. Se concentrations have been in a downward trend since decommissioning. The annual average Se concentration was below the modelled predictions and continues to remain on the expected downward trend.

The average annual TDS concentration recorded at TL-7 in 2022 was 179 mg/l. TDS concentrations have been in a long-term downward trend since decommissioning with values observed in recent years being significantly lower than those observed 40 years ago.

TL-9 Greer Lake

Station TL-9 is located downstream of Greer Lake immediately before the water enters Beaverlodge Lake (**Figure 4.2)**. Sampling at this station began in 1981 and continued until 1985 at which time it was discontinued. Sampling resumed in 1990 in order to re-assess the water quality entering Beaverlodge Lake. All four scheduled samples were collected in 2022.

A historical summary of annual average ^{226}Ra, U, Se, and TDS concentrations at TL-9 along with the predicted recovery are presented in **Figures 4.2.2-27** to **4.2.2-32**. The annual averages from 2018 to 2022 for all parameters can be found in **Table 4.2.2-6**.

The annual average U concentration at TL-9 in 2022 was 169.8 µg/L which is a decrease relative to 2021. Uranium at TL-9 has been in a downward trend since decommissioning and continues to be within modelled predictions.

The annual ^{226}Ra average was in 2022 was 2.250 Bq/L. Radium concentrations are in an upward trend at TL-9, as expected, and the results are within modelled predictions.

The Se annual average at TL-9 in 2022 was 0.0023 mg/l. This is an increase relative to 2021, however, Se concentrations are within modelled predictions.

The TDS concentrations at TL-9 have been in a downward trend since decommissioning.

4.2.3 Downstream Monitoring Stations

While Beaverlodge Lake is the receiving environment for water from the decommissioned Beaverlodge properties, it is also the receiving environment for other, non-Eldorado, former uranium mine sites and one former uranium mill tailings area (Lorado Uranium Mining Ltd. mill site) within the Beaverlodge Lake watershed. The results of the 2020 ERA show that downstream environments will continue to naturally recover over time. Model predictions to assess natural recovery of Beaverlodge Lake have been applied to Station BL-5, collected at the outlet of Beaverlodge Lake.

BL-3 Fulton Bay

Station BL-3 is located in Fulton Bay of Beaverlodge Lake, approximately 100 metres from the Fulton Creek outlet (**Figure 4.2**). Sampling at this station was originally carried out during the operational mining and milling phase in order to monitor the near-field impacts of the operations on Beaverlodge Lake, however monitoring appears to have stopped following the shutdown of the mine/mill..

Sampling at this location re-commenced during the 1998-1999 reporting period and has continued since that time. In 2022, both scheduled samples were collected.

A historical summary of annual average ^{226}Ra, U, Se, and TDS concentrations at BL-3 are presented in **Figures 4.2.3-1** to **4.2.3-4**. The annual averages from 2018 to 2022 for all parameters are presented in **Table 4.2.3-1**.

U concentrations overall have been trending downward since sampling resumed post-decommissioning. The annual average U concentration recorded in 2022 was 115.0 µg/l. This is above the SEQG however is within historical trends and modelled predictions.

Selenium concentrations at BL-3 have overall been trending downward since sampling resumed post-decommissioning. The annual average Se concentration recorded in 2022 was 0.0021 mg/L. This is above the SEQG, but it remains within historical trends and is below modelled predictions.

Radium activity does not exhibit a clear trend however, all measured activity continues to remain below the SEQG.

The TDS annual average was 141 mg/l and remains on the relatively stable, long-term trend observed at this station.

BL-4 Beaverlodge Lake Centre

Station BL-4 is located in the approximate center of the north end of Beaverlodge Lake **(Figure 4.2**). The one scheduled 3-depth composite sample was collected in 2022.

A historical summary of annual average ^{226}Ra, U, TDS, and Se concentrations at BL-4 are presented in **Figures 4.2.3-5** to **4.2.3-8**. The annual averages from 2018 to 2022 are presented in **Table 4.2.3-2**.

The long-term trend for U at BL-4 has been an overall decrease since decommissioning. The U concentration recorded at BL-4 in 2022 was 120.0 µg/L. This is above the SEQG, however is historical trends and modelled predictions.

The ^{226}Ra concentration recorded in 2022 was 0.02 Bq/L and remains well below the SEQG. The annual average has ranged between 0.02 Bq/L and 0.04 Bq/L consistently since 2003.

The Se concentration recorded in 2022 was 0.0021 mg/l. The Se concentrations have been in a downward trend at BL-4. Selenium concentrations remain above the SEQG, however a decreasing trend since 2008 has been observed and results remain within the modelled predictions.

The TDS concentration was recorded at 142 mg/l and remains on the relatively stable, long-term trend observed at this station.

BL-5 Beaverlodge Lake Outlet

Station BL-5 is located at the outlet of Beaverlodge Lake and is a measure of the water quality leaving Beaverlodge Lake (**Figure 4.2**). The one scheduled sample was collected in 2022.

A historical summary of annual average ^{226}Ra, U, Se, and TDS concentrations at BL-5 along with the predicted recovery are presented in **Figures 4.2.3-9** to **4.2.3-12**. The annual averages from 2018 to 2022 for all parameters are presented in **Table 4.2.3-3**.

The U concentration recorded in 2022 was 114.0 µg/l. This is above the SEQG but continues to follow the long-term downward trend and is within the modeled predictions.

The Se concentration recorded in 2022 was 0.0021 mg/l. This is above the SEQG but is within the modeled predictions.

The Radium^{226} concentration recorded in 2022 was 0.030 Bq/L which is below the SEQG and slightly below the modeled predictions.

The TDS concentration recorded in 2022 was 144 mg/l. TDS concentrations continue to remain on the stable long-term trend observed at BL-5.

ML-1 Martin Lake

Station ML-1 is located at the outlet of Martin Lake (**Figure 4.2**). Both scheduled samples were collected in 2022.

A historical summary of annual average ^{226}Ra, U, Se, and TDS concentrations at ML-1 are presented in **Figures 4.2.3-13** to **4.2.3-16**. The annual averages from 2018 to 2022 for all parameters is presented in **Table 4.2.3-4**.

The average U concentration in 2022 was 58 µg/L. This is above the SEQG but is within the historic range and below modelled predictions.

The average ^{226}Ra concentration in 2022 was 0.006 Bq/L. ^{226}Ra remains on a relatively stable long term trend and well below the SEQG.

The average Se concentration in 2022 was 0.0011 mg/l. Se concentrations have remained relatively stable with concentrations near the SEQG. In 2022, the Se average concentration is just above the SEQG.

The average TDS concentration in 2022 was 118 mg/l. TDS remains on the relatively stable long-term trend observed at this station.

CS-1 Crackingstone River

Station CS-1 is located near the bridge in Crackingstone River approximately half way between the outlet of Martin Lake and an inlet of Lake Athabasca (**Figure 4.2**). The one scheduled sample was collected in 2022.

A historical summary of annual average ^{226}Ra, U, Se, and TDS concentrations at CS-1 are presented in **Figures 4.2.3-17** to **4.2.3-20**. The annual averages from 2018 to 2022 for all parameters is presented in **Table 4.2.3-5**.

The U concentration recorded at CS-1 was 54.0 µg/L in 2022. The U concentration observed at CS-1 in 2022 is above the SEQG (15 µg/l) but is within the range of values previously observed at this station.

The ^{226}Ra concentration recorded at CS-1 in 2022 was 0.005 Bq/L. Radium at CS-1 remains below the SEQG (0.11 Bq/L) and on the relatively stable trend observed historically at this station.

The Se concentration recorded at CS-1 in 2022 was 0.0010 mg/l, is equal to the SEQG and remains on a relatively stable historical trend.

The TDS concentration recorded at CS-1 in 2022 was 110 mg/l. TDS concentrations remain on the relatively stable trend observed at this station.

CS-2 Crackingstone Bay

Station CS-2 is located in Crackingstone Bay on Lake Athabasca (**Figure 4.2**), approximately 1 km from the mouth of the Crackingstone River. The one scheduled sample was collected in 2022.

A historical summary of annual average ^{226}Ra, U, Se, and TDS concentrations at CS-2 are presented in **Figures 4.2.3-21** to **4.2.3-24**. The annual averages from 2018 to 2022 for all parameters is presented in **Table 4.2.3-6**.

The recorded U concentration at CS-2 in June 2022 was 41.0 µg/l. This is above the SEQG, an increase relative to 2021 (32 µg/l) and remains elevated compared to what has been previously recorded at this station. Water levels continue to remain at historical highs in Lake Athabasca which is thought to be influencing the mixing regime in Crackingstone Bay, thereby limiting dispersion. This theory is supported by the fact that uranium measured at CS-1, in Crackingstone River), upstream of this station is 54ug/L, indicating there has been very limited mixing with Lake Athabasca. Hydrology data obtained from ECC for Lake Athabasca shows that during the first 9 years of sampling at CS-2, water levels were at least 1 metre less than those observed in the past 3 years. It is expected once water levels normalize in Lake Athabasca, U concentrations at CS-2 will meet SEQG.

An investigation into the spatial extent of the elevated U in Crackingstone Bay was conducted in August 2022, with the results provided in **Section 4.3.3**.

Both Se and ^{226}Ra concentrations recorded at CS-2 were below their respective SEQG values. Selenium and TDS concentration have shown an increasing trend over the last 3 years as well. The results are similar to those measured at CS-1 following a similar pattern to what has been observed with the U values.

4.3 Additional Water Quality Sampling

4.3.1 ZOR-01 and ZOR-02

The Beaverlodge Path Forward Report (*Cameco 2012*) describes the activities required to prepare the Beaverlodge properties for transfer to the IC Program. One of the potential remedial measures identified in the 2012 Path Forward Report was the flow path reconstruction of the Zora Lake outflow. This project was initiated in 2014 and completed in 2016. It involved relocating a portion of the Bolger waste rock pile that was placed in the valley separating Zora Lake from Verna Lake during mining operations. This project re-established theflow in Zora Creek which reduces the contact time between the remaining Bolger waste rock pile and the water flowing from Zora Creek into Verna Lake (**Figure 4.3**).

With the project plan to re-establish the Zora Creek flow path, monthly sampling to monitor water quality was implemented in August 2013 at the outlet from Zora Lake outflow (ZOR-01) and the outlet from the waste rock pile, which flowed into Verna Lake (ZOR-02). The ZOR-01 station represents the baseline for comparing water quality to ZOR-02 as ZOR-01 is upstream of the stream reconstruction.

In 2022, eight samples were collected at each station from March to October. In the March sample at ZOR-01, field contamination resulting from sampling error in As, Cu, Fe, Pb, TSS and U values being excluded from analysis.

A historical summary of annual average ^{226}Ra, U, Se, and TDS concentrations at ZOR-01 and ZOR-02 are presented in **Figures 4.3-1** to **4.3-8.** The annual averages from 2018 to 2022 for all parameters are presented in **Table 4.3.1-1** and **Table 4.3.1-2**.

Sampling completed at ZOR-02 prior to 2015 represents water quality as it flowed through the Bolger waste rock pile prior to entering Verna Lake. Sampling completed during 2015 at this station represents construction activities during relocation of the waste rock, and samples post-2016 represent water flowing through the newly created flow path.

Since sampling started in 2013, ^{226}Ra, Se, and TDS concentrations at ZOR-01 have remained relatively constant. Radium^{226} and Se have both remained below their respective SEQG values. Uranium concentrations have been below the SEQG for the past two years.

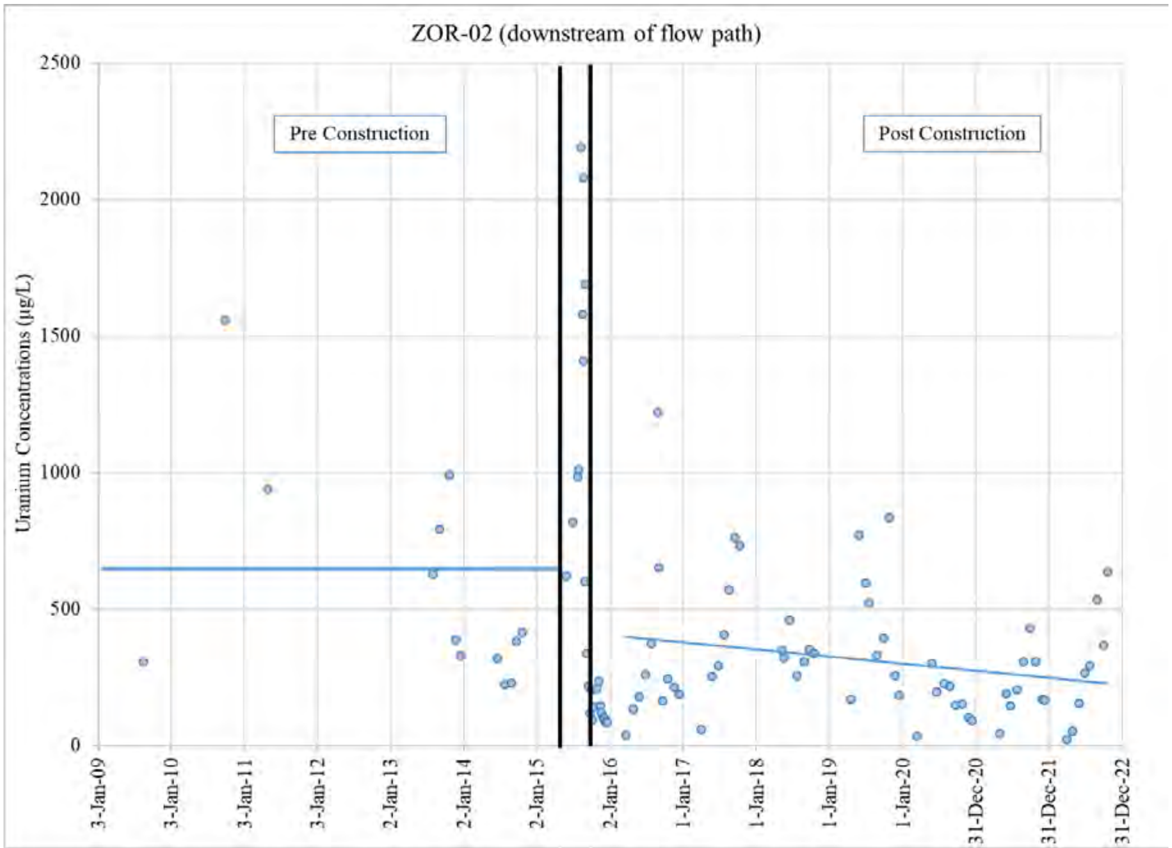
Selenium and TDS concentrations at ZOR-02 have also remained relatively stable, with Se remaining below the SEQG value.

The annual average U concentration in at this station was 290.4 µg/l which is an increase from the average concentration in 2021. ZOR-02 is a station where annual U averages exhibit some variability based on regional precipitation. This is because contact times with the waste rock in the channel are based on the flow of water through the constructed channel. Above average temperatures and below average precipitation observed in 2022 relative to the past 10-years in Uranium City, particularly in August where the precipitation recorded was 9.50 mm, and the 10-year average is 53.13 mm, resulted in a low flow through the channel and affected the U concentration measured in 2022. Uranium concentrations at ZOR-02 also experience a seasonal trend where U concentrations are higher in the late summer and fall compared to those observed in the spring and early summer. This trend contributes to the increased averages observed at the station. Uranium concentrations at ZOR-02 ranged between 23 µg/l to 636 µg/l in 2022. As shown in figures 4.3-5 and 4.3-9. Although uranium values are higher than previous years the water quality has still shown improvement since the stream reconstruction project was completed is a downward trend.

The ^{226}Ra annual average at ZOR-02 was 0.165 Bq/L which is an increase relative to 2021. ^{226}Ra is above the SEQG (0.11 Bq/L) however it remains on an overall downward trend since monitoring began.

Figure 4.3-9 shows the results of water sample data collected at ZOR-02 through the various phases of pre-construction, construction and post construction. Also provided are general trend lines showing the relative improvement in water quality post-construction. The Pre-Construction trend line is the overall average U concentration for that period, while the Post-Construction (starting in 2016) is a linear trend line created using the annual U concentration averages.

Figure 4.3-9 - ZOR-02 Uranium Concentrations Pre and Post Construction



The fluctuations in U concentrations observed through construction and following construction are reflected in the concentration of U measured at the outlet of Verna Lake (AC-6A) which increased, as expected, immediately following construction but has seen improvement in subsequent years. Uranium concentrations measured at the monitoring station AC-8 located in Ace Lake (immediately downstream) have remained below the SEQG since 2012. A summary of annual mean U and ^{226}Ra data from 2010 to 2022 at ZOR-02, AC-6A, and AC-8 is presented in **Table 4.3-3**. As AC-6A flows into Ace Lake, data from the outlet of Ace Lake (AC-8) is presented for context, as the downstream water quality monitoring station meets SEQG.

Monitoring data reflects the expected results following the remedial work and are expected to gradually improve in the future.

4.3.2 Compliance Water Sample

In 2022, regulatory agencies did not collect or request additional duplicate samples during the inspection. Duplicate samples were taken in accordance with the Beaverlodge EMP and these results are outlined in the QA/QC section.

4.3.3 Crackingstone Bay Investigation

For the past three years, U levels have been elevated relative to the stable trend previously observed at CS-2. An investigation was conducted in August 2022 to understand the spatial extent of the elevated U concentrations at CS-2. On August 28, 2022 samples were collected at five locations on a linear transect starting at CS-2 and moving south towards Lake Athabasca at 250m intervals out to 1000m (stations CS-3, CS-4, CS-5, and CS-6). **Figure 4.3.10** provides the sample locations and geographic coordinates used to conduct the investigation.

The concentrations from CS-2 into Lake Athabasca recorded were 15 µg/l, 5.2 µg/l, 3.1 µg/l, 3.2 µg/l and 3.1 µg/l, respectively. All these values are below the SEQG (15 µg/l) and show that uranium concentration is in decline as you move further away from CS-2. Lake Athabasca water levels dropped through the summer and a reduction in the measured concentration at CS-2 was noted, compared to the Beaverlodge EMP value measured in June.

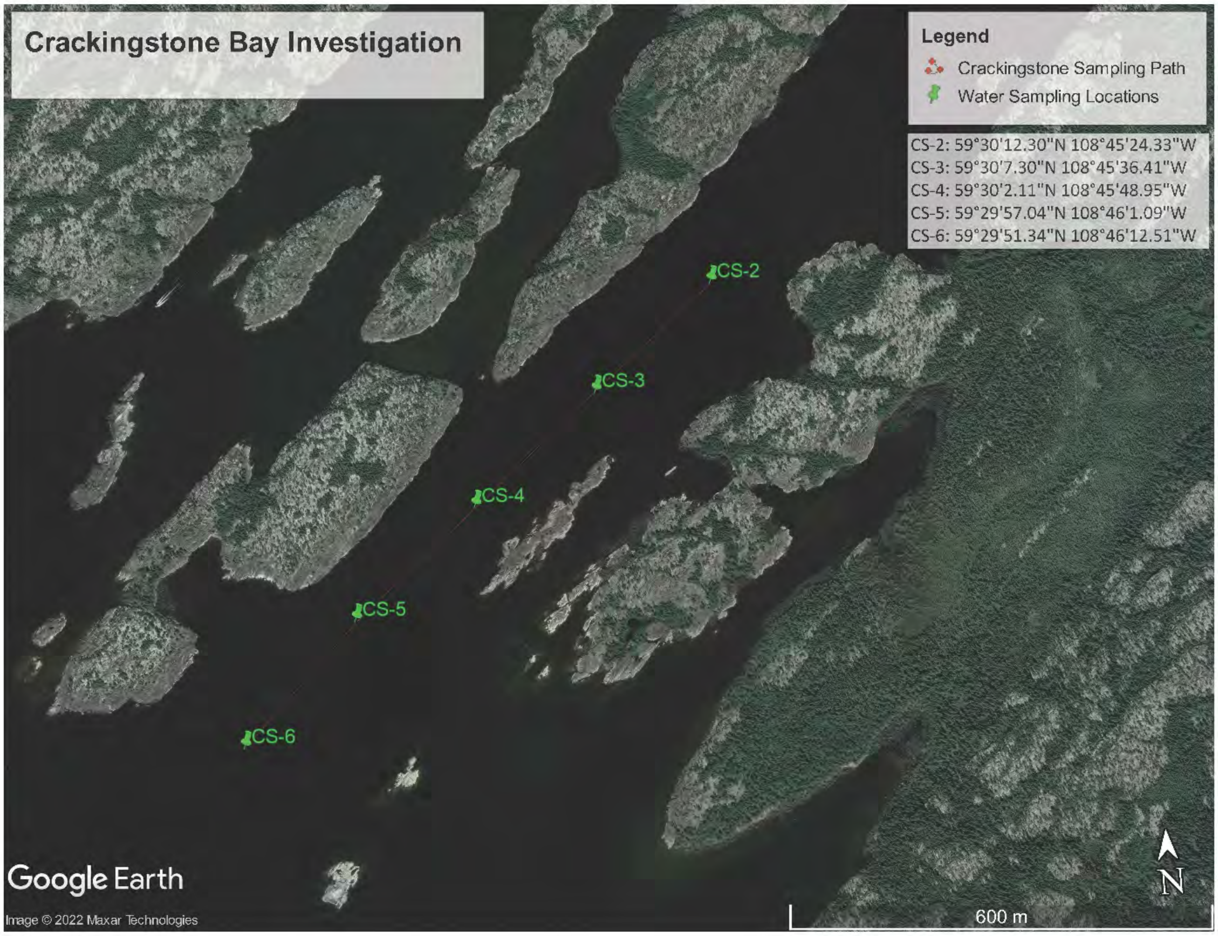


Figure 4.3.10 – Crackingstone Bay sample locations

4.4 QA/QC Analysis

As outlined in the Beaverlodge EMP, Cameco's QA/QC program involves the collection of field and trip blank, blind, and duplicate samples in order to assure that field sampling and laboratory analyses produce reliable and accurate results.

Field blanks are used to identify possible contamination arising from equipment, preservatives, sampling techniques, sample handling, and the general ambient conditions during sampling. Field blanks are collected by obtaining analyte-free water from the laboratory, transporting the water into the field, and taking it through all sample collection, handling and processing steps that the primary samples undergo. Field blanks are transported, stored and analyzed in the same manner as primary samples.

Trip blanks are used to determine if any potential contamination is being introduced through transport, storage, sample bottles, preservatives or analysis. Samples of analyte-free water are sent from the laboratory to the field and then back to the laboratory along with primary samples. The trip blank sample seal remains unbroken in the field. Blind replicate samples involve the collection of two homogenous samples of water from a single sampling location. The water samples are sent to the same analytical laboratory to test the lab's ability to duplicate results through their analytical methods. The blind samples are labelled differently, as a result the identity of the field blind replicate sample is known only to the submitter and not to the analyst. Blind samples test the labs ability to provide consistent results. In the Beaverlodge EMP, blind samples are conducted in September and December.

Duplicate samples involve collection of two homogeneous samples of water from a single sample location that are sent for analysis to two different labs to determine if the labs analyzing the samples obtain similar results. In the Beaverlodge EMP, duplicate samples are sent out in June to SRC and BV Laboratories.

In a case where results from the regular monitoring and results from the blind sample vary, SRC would be contacted to determine the source of inconsistency in the results. If there were discrepancies in the blank or duplicate laboratory results, it would be at the discretion of the lead, reclamation specialist, Beaverlodge to investigate the discrepancy and determine if corrective action is warranted.

Results with an absolute difference greater than 50% are subject to further investigation. If either value is greater than five times the entered detection limit and are outside their associated range of entered uncertainty (= Value +/- Entered Uncertainty) then samples are considered noncompliant and additional investigation is required.

Blank Samples

Station DB-6 trip and laboratory blank samples were prepared, collected, and analyzed in September 2022. When results from DB-6 TB (trip blank) and DB-6 FB (field blank) were compared, absolute differences above 50% were recorded for Alkalinity, HCO3 and Sum of Ions (**Appendix F**). For each of these parameters however, the measured or calculated values were less than or equal to five times the detection limit, therefore were within acceptable uncertainty.

Blind Replicate Samples (Split samples)

A blind replicate sample was collected in September 2022 at station TL-7 (Blind-6) and in December 2022 at AC-14 (Blind-1). When results from Blind-6 were compared with the sample results for TL-7, all results were found to be within the acceptable range of variation. When results from Blind-1 were compared with the sample results for AC-14, all results were found to be within the acceptable range of variation.

Duplicate Samples (Side by side samples)

Duplicate samples at station TL-4 were collected in June 2022. Results from June indicated that arsenic, lead, lead^{210}, polonium^{210} and zinc were found to have absolute differences greater than 50%. For arsenic where an absolute difference of 199.6% was observed, this was due to the SRC and BV Labs reporting in micrograms per litre and milligrams per litre, respectively and the exported table not recognizing the units were different. When the values are converted to account for the difference in units, their absolute difference is within an acceptable range. For lead, lead^{210} and zinc, the absolute differences >50% were due to differences in detection limits. SRC recorded the lead concentration at a detection limit of <0.0002 mg/l, respectively whereas the BV Labs recorded lead concentration at a detection limit of <0.0001 mg/l. Lead^{210} was recorded by the SRC at 0.05 Bq/L whereas the BV Labs recorded it at a detection limit of < 0.10 Bq/L. Zinc was recorded at detection limit by BV Labs at < 0.001 mg/l while SRC recorded it at <0.003 mg/l. For polonium^{210}, measurements at both labs were above detection limit however, they were also within five times the entered detection limit, so the discrepancy did not require ordering a re-check with the lab.

4.5 Air Quality

This section presents a summary of the results of historic and on-going radon monitoring at five separate locations in and around the decommissioned mill site and at Uranium City (**Figure 4.5.1-1**).

4.5.1 Ambient Radon Monitoring

As part of the transitional phase monitoring program, radon levels have been monitored on and around the decommissioned Beaverlodge properties and at other locations in the region since 1985. In 2021, Cameco utilized the RadTrak2 model, supplied by Radonova, to monitor radon in the Uranium City area. In 2022, Cameco switched to the alpha track detector model which is supplied and analyzed by SRC. This change to a local supplier was a corrective action implemented because of the loss of samples in transit during 2020 to the Radonova lab, which was discussed in the previous annual report.

As per the Beaverlodge EMP, radon monitoring devices are collected and replaced semi-annually from five stations established throughout the area, illustrated in **Figure 4.5.1-1** and listed below:

Eldorado Town Site
Ace Creek
Fookes Delta
Marie Delta
Uranium City

Table 4.5.1 presents a summary of the radon monitoring conducted at the five sites for the 2022 monitoring period. Where applicable, stations monitored in 1982 have been included in the summary table for comparison.

Figure 4.5.1-2 compares the most recent five years of data to operational levels. Overall, measured radon levels have remained relatively constant in recent years and are much lower than during operation. The radon levels measured for the background stations display a rapid decrease to background levels as the distance from the former mine and mill site increases.

OUTLOOK

SECTION 5.0

5.0 OUTLOOK

This section of the report describes those tasks and activities planned for 2023.

5.1 Regular Scheduled Monitoring

Representatives of Cameco continue to implement the Beaverlodge EMP, assessing:

- Water,
- Radon in air,
- Formerly flowing boreholes, and
- Geotechnical stability of features, where required

Additional water samples will be collected at the sample locations ZOR-01 and ZOR-02 to continue to monitor the success of the Zora Creek Reconstruction project through the Bolger Waste Rock Pile. The flow path reconstruction is discussed in more detail in **Section 3.3.2**.

5.2 Planned Public Meetings

Cameco has developed a PIP for Beaverlodge that describes communication with rights-holders and other 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, 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 and interested groups regarding the plan and schedule for transferring properties to the Province of Saskatchewan's IC Program. This engagement opportunity allows residents to provide feedback to Cameco and the JRG regarding potential concerns with the properties and their suitability for transfer to the IC Program.

In 2023, Cameco plans to host its annual public meeting in Uranium City and will continue to invite representatives from the NSEQC as well as the Uranium City Métis Local #50 President. In addition, Cameco plans to invite members of the AJES as defined under the Yáthi Néné collaboration agreement. The annual public meeting will be conducted as part of a 'boots on the ground' tour of the properties (weather permitting). The meeting and tour will focus on providing information regarding the activities that have been completed since the previous tour as well as a summary of the upcoming plans as the properties are being readied for release for transfer to the Province of Saskatchewan's IC Program. The meeting and tour provide an opportunity for land-users to reconnect with Beaverlodge lands and enhance Cameco's understanding of the land in which it has been used by Indigenous Peoples through time.

In addition, in 2023 Cameco will start collecting information from land users regarding their use of access roads to determine if there are any roads associated with the former Beaverlodge mine/mill and satellite properties that can be closed.

5.3 Planned Regulatory Inspections

The JRG conducts an annual inspection of the decommissioned Beaverlodge properties, often in conjunction with the annual Uranium City public meeting. The regulatory inspection involves travelling to the decommissioned Beaverlodge properties and ensuring that site conditions remain safe, stable, and secure. In addition, activities to address previous inspection recommendations are assessed to confirm that the activity or action was completed to the satisfaction of the regulatory agencies. As Cameco continues the process of transferring properties to the Province of Saskatchewan IC Program, inspections will focus on the properties being requested for release.

5.4 2023 Work Plan

The physical work required to prepare the Beaverlodge properties for transfer to the IC Program is nearing completion. As a result, there are a limited number of activities planned for 2023. The sections below describe the activities planned for completion in 2023.

5.4.1 Beaverlodge EMP

Environmental monitoring will continue to be conducted in accordance with the regulatory approved Beaverlodge Environmental Monitoring Program in 2023.

5.4.2 Gamma Assessment of recently disturbed areas

The site wide gamma scanning program and assessment was completed in 2014 and 2015. As minor reclamation and site clean-up activities are completed as part of preparing the sites for transfer to the IC Program, some areas previously scanned may be disturbed. The disturbed areas will be re-scanned once all work in the area is complete, and the results will be compared to the 2014 site wide surficial gamma survey.
It is anticipated that additional gamma scanning will be required in 2023 in the following areas:

- Former mill area following the application of additional cover material in 2022.
- Closure of the Lower Fay Pit waste disposal site.

- The sorted waste rock pile located approximately 200m south of the former mill site, as this material was used as coarse fill for the mill cover and the closure of the Lower Fay Pit waste disposal site.
- Other smaller areas where waste rock has been disturbed during remediation activities.

Final gamma survey results will be provided to the regulatory agencies once completed and records will be maintained by the Province of Saskatchewan once the property is accepted into the IC Program.

5.4.3 Final Inspection and Clean-up of the Properties

This site-wide project was largely completed from 2015 to 2017. Final inspection of the remaining properties occurred in 2022 and Cameco plans to submit a closure plan for the Lower Fay Pit landfill to the regulators in 2023, with plans to complete the closure in 2023.

5.4.4 Road Closure

Cameco is planning to meet with land users in 2023 to discuss the existing road network that provided access to the former Beaverlodge mining properties. For roads that are not actively used for traditional activities (hunting, gathering, firewood collection) by land users Cameco will make plans to close the roads. It is not Cameco's intent to prevent access to areas being utilized by land users.

5.4.5 Short-Term Licence Renewal

In December 2022, Cameco submitted documentation in support of a short-term licence renewal for the Beaverlodge Properties as the current licence (WFOL-W5-2120.2/2023) is set to expire on May 31, 2023. Cameco requested the short-term (24 months) licence renewal to provide adequate time for regulatory processes, public and Indigenous engagement, and document preparation to support the final release of the decommissioned Beaverlodge properties from CNSC licensing and transfer to the IC program. The CNSC hearing is planned as a hearing in writing and is scheduled for March 31, 2023.

5.4.6 Final Closure Report Preparation

Cameco is planning to submit the Beaverlodge Final Closure Report for regulatory review in 2023. This document will provide the supporting information required to receive a release from decommissioning and reclamation requirements from SkMOE, will form the basis for a request to be released from CNSC licensing in 2025, and provide the required information to support a transfer of the properties to the IC Program managed by SkMER.

5.4.7 Development of a Long-Term Monitoring and Inspection Plan

Cameco will begin development and public engagement regarding a proposed long-term monitoring and inspection plan to be implemented once all of the Beaverlodge properties are transferred to the IC Program. The long-term monitoring plan will identify the inspection requirements to ensure the properties continue to perform as expected and the water and fish monitoring program will monitor the natural recovery of the area, and aid in future iterations of the Healthy Fish Consumption Advisory.

SECTION 6.0

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6.0 REFERENCES

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TABLES

TABLES

Table 4.2.1-1 AN-5 Summary Statistics and Comparison to Historical Results

		Previous Period Averages				Year 2022 Statistics					
		2018	2019	2020	2021	Avg	Count	Count < DL	StDev	Min	Max
M Ions	Alk (mg/l)	103	125	72	88	96	3	0	27	71	124
	Ca (mg/l)	30.8	37.2	24.0	26.0	28.0	3	0	7.2	22.0	36.0
	Cl (mg/l)	0.8	1.0	0.5	0.5	0.5	3	0	0.3	0.2	0.8
	CO3 (mg/l)	<1	<1	<1	<1	<1	3	3	0	1	1
	Cond-L (µS/cm)	204	255	168	186	198	3	0	52	148	252
	Hardness (mg/l)	107	130	82	90	96	3	0	25	75	123
	HCO3 (mg/l)	126	153	87	107	117	3	0	32	87	151
	K (mg/l)	1.3	1.6	0.9	1.1	1.0	3	0	0.5	0.5	1.4
	Na (mg/l)	3.7	4.6	2.5	2.7	2.9	3	0	0.8	2.2	3.7
	OH (mg/l)	<1	<1	<1	<1	<1	3	3	0	1	1
	SO4 (mg/l)	13.6	15.5	14.3	13.0	10.6	3	0	3.1	7.9	14.0
	Sum of Ions (mg/l)	184	222	135	157	166	3	0	45	127	216
Metal	As (µg/l)	0.3	0.3	0.3	0.2	0.3	3	0	0.1	0.2	0.3
	Ba (mg/l)	0.1236	0.1500	0.1013	0.0998	0.1233	3	0	0.0153	0.1100	0.1400
	Cu (mg/l)	0.0007	0.0009	0.0014	0.0017	0.0005	3	0	0.0001	0.0004	0.0006
	Fe (mg/l)	0.2084	0.3607	0.2050	0.1783	0.1833	3	0	0.0208	0.1600	0.2000
	Mo (mg/l)	0.0032	0.0027	0.0027	0.0028	0.0020	3	0	0.0006	0.0013	0.0025
	Ni (mg/l)	0.0005	0.0005	0.0007	0.0008	0.0006	3	0	0.0001	0.0005	0.0006
	Pb (mg/l)	0.0001	0.0002	0.0001	0.0004	<0.0001	3	3	0.0000	0.0001	0.0001
	Se (mg/l)	0.0001	0.0002	0.0001	0.0001	0.0001	3	2	0.0000	0.0001	0.0001
	U (µg/l)	163.2	169.5	78.0	125.0	99.3	3	0	93.4	40.0	207.0
	Zn (mg/l)	0.0007	0.0019	0.0020	0.0008	0.0007	3	1	0.0002	0.0005	0.0009
Nutrient	C-(org) (mg/l)	8.2	10.6	13.0	12.0	9.5	1	0		9.5	9.5
	NO3 (mg/l)	0.09	0.09	<0.04	0.17	<0.04	1	1		0.04	0.04
	P-(TP) (mg/l)	<0.01	0.02	0.01	<0.01	<0.01	1	1		0.01	0.01
Phys Para	pH-L (pH Unit)	7.80	7.63	7.67	7.67	7.54	3	0	0.22	7.30	7.74
	TDS (mg/l)	148	173	112	124	137	3	0	36	113	178
	Temp-H20 (°C)	7.2	10.7	17.3	8.8	11.4	3	0	7.3	3.4	17.6
	TSS (mg/l)	1	1	<1	2	1	3	2	0	1	1
Rads	Pb210 (Bq/L)	0.22	0.10	0.06	0.08	<0.02	1	1		0.02	0.02
	Po210 (Bq/L)	0.008	0.040	0.030	0.030	0.040	1	0		0.040	0.040
	Ra226 (Bq/L)	0.646	0.900	0.497	0.478	0.667	3	0	0.067	0.610	0.740

Table 4.2.1-2 DB-6 Summary Statistics and Comparison to Historical Results

		Previous Period Averages				Year 2022 Statistics					
		2018	2019	2020	2021	Avg	Count	Count < DL	StDev	Min	Max
M Ions	Alk (mg/l)	86	92	85	78	81	4	0	11	68	92
	Ca (mg/l)	34.0	36.0	32.8	28.5	30.5	4	0	4.1	26.0	34.0
	Cl (mg/l)	0.6	0.7	0.6	0.5	0.4	4	0	0.1	0.3	0.6
	CO3 (mg/l)	<1	<1	<1	<1	<1	4	4	0	1	1
	Cond-L (µS/cm)	204	217	203	185	192	4	0	27	157	216
	Hardness (mg/l)	106	112	101	89	95	4	0	13	81	106
	HCO3 (mg/l)	104	112	103	95	99	4	0	13	83	112
	K (mg/l)	0.9	0.9	0.8	0.8	0.9	4	0	0.2	0.7	1.0
	Na (mg/l)	2.0	2.1	1.9	1.7	1.7	4	0	0.3	1.4	2.0
	OH (mg/l)	<1	<1	<1	<1	<1	4	4	0	1	1
	SO4 (mg/l)	21.0	21.5	19.0	17.5	17.0	4	0	2.9	14.0	20.0
	Sum of Ions (mg/l)	168	179	163	148	154	4	0	22	129	175
Metal	As (µg/l)	0.1	0.1	0.1	0.1	0.1	4	0	0.0	0.1	0.1
	Ba (mg/l)	0.0438	0.0445	0.0405	0.0355	0.0403	4	0	0.0054	0.0360	0.0480
	Cu (mg/l)	0.0007	0.0007	0.0007	0.0011	0.0006	4	0	0.0002	0.0003	0.0007
	Fe (mg/l)	0.0473	0.0275	0.0253	0.0323	0.1090	4	0	0.0922	0.0240	0.2400
	Mo (mg/l)	0.0021	0.0021	0.0020	0.0018	0.0016	4	0	0.0003	0.0013	0.0019
	Ni (mg/l)	0.0002	0.0002	0.0002	0.0002	0.0002	4	0	0.0001	0.0001	0.0002
	Pb (mg/l)	<0.0001	0.0001	<0.0001	0.0001	<0.0001	4	4	0.0000	0.0001	0.0001
	Se (mg/l)	0.0001	0.0001	0.0001	0.0001	0.0001	4	2	0.0000	0.0001	0.0001
	U (µg/l)	193.5	177.5	118.8	101.3	106.5	4	0	72.9	29.0	190.0
	Zn (mg/l)	0.0005	0.0010	0.0008	0.0008	0.0006	4	1	0.0001	0.0005	0.0007
Nutrient	C-(org) (mg/l)	8.6	8.9	9.8	10.0	9.3	1	0		9.3	9.3
	NO3 (mg/l)	0.07	0.14	<0.04	0.21	<0.04	1	1		0.04	0.04
	P-(TP) (mg/l)	<0.01	0.01	<0.01	<0.01	0.01	1	0		0.01	0.01
Phys Para	pH-L (pH Unit)	7.94	7.88	7.74	7.74	7.59	4	0	0.14	7.46	7.75
	TDS (mg/l)	147	157	134	137	138	4	0	28	110	175
	Temp-H20 (°C)	8.6	10.2	13.5	7.4	9.6	4	0	6.9	3.5	18.3
	TSS (mg/l)	<1	1	2	2	1	4	3	0	1	1
Rads	Pb210 (Bq/L)	0.24	0.09	0.10	0.11	<0.02	1	1		0.02	0.02
	Po210 (Bq/L)	<0.005	<0.005	0.006	0.008	0.010	1	0		0.010	0.010
	Ra226 (Bq/L)	0.040	0.032	0.028	0.025	0.033	4	0	0.013	0.020	0.050

Table 4.2.1-3 AC-6A Summary Statistics and Comparison to Historical Results

		Previous Period Averages				Year 2022 Statistics					
		2018	2019	2020	2021	Avg	Count	Count < DL	StDev	Min	Max
M Ions	Alk (mg/l)	95	96	108	104	94	3	0	4	90	98
	Ca (mg/l)	40.0	42.0	42.5	41.3	37.7	3	0	2.1	36.0	40.0
	Cl (mg/l)	0.5	0.5	0.5	0.7	0.4	3	0	0.0	0.4	0.4
	CO3 (mg/l)	<1	<1	<1	<1	<1	3	3	0	1	1
	Cond-L (µS/cm)	264	272	282	282	251	3	0	12	244	265
	Hardness (mg/l)	137	142	144	139	125	3	0	7	119	132
	HCO3 (mg/l)	116	117	131	127	115	3	0	5	110	120
	K (mg/l)	0.9	0.9	1.0	0.9	0.8	3	0	0.1	0.7	0.8
	Na (mg/l)	2.3	2.4	2.4	2.2	2.0	3	0	0.3	1.8	2.3
	OH (mg/l)	<1	<1	<1	<1	<1	3	3	0	1	1
	SO4 (mg/l)	47.0	47.0	45.6	40.7	33.7	3	0	0.6	33.0	34.0
	Sum of Ions (mg/l)	215	219	233	221	197	3	0	7	189	202
Metal	As (µg/l)	0.2	0.2	0.2	0.2	0.2	3	0	0.1	0.1	0.2
	Ba (mg/l)	0.0205	0.0210	0.0216	0.0223	0.0213	3	0	0.0012	0.0200	0.0220
	Cu (mg/l)	0.0005	0.0005	0.0005	0.0006	0.0004	3	0	0.0000	0.0004	0.0004
	Fe (mg/l)	0.0125	0.0135	0.0077	0.0094	0.0114	3	0	0.0058	0.0070	0.0180
	Mo (mg/l)	0.0010	0.0011	0.0012	0.0011	0.0010	3	0	0.0001	0.0009	0.0010
	Ni (mg/l)	0.0001	<0.0001	0.0001	0.0001	0.0001	3	2	0.0000	0.0001	0.0001
	Pb (mg/l)	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	3	3	0.0000	0.0001	0.0001
	Se (mg/l)	0.0002	0.0002	0.0002	0.0002	0.0002	3	0	0.0000	0.0002	0.0002
	U (µg/l)	278.5	271.5	292.0	248.3	204.3	3	0	15.9	186.0	214.0
	Zn (mg/l)	<0.0005	0.0014	0.0007	0.0007	<0.0005	3	3	0.0000	0.0005	0.0005
Nutrient	C-(org) (mg/l)			8.0	9.5	7.4	1	0		7.4	7.4
	NO3 (mg/l)	0.04	0.05	<0.04	0.14	<0.04	1	1		0.04	0.04
	P-(TP) (mg/l)			<0.01	<0.01	<0.01	1	1		0.01	0.01
Phys Para	pH-L (pH Unit)	7.96	7.97	7.86	7.91	7.80	3	0	0.10	7.73	7.92
	TDS (mg/l)	197	228	193	185	172	3	0	11	162	184
	Temp-H20 (°C)	14.4	22.7	12.5	10.6	16.2	3	0	3.6	12.1	18.5
	TSS (mg/l)	1	2	2	1	<1	3	3	0	1	1
Rads	Pb210 (Bq/L)			0.18	0.07	<0.02	1	1		0.02	0.02
	Po210 (Bq/L)			0.010	0.007	0.010	1	0		0.010	0.010
	Ra226 (Bq/L)	0.100	0.090	0.099	0.097	0.087	3	0	0.006	0.080	0.090

Table 4.2.1-4 AC-8 Summary Statistics and Comparison to Historical Results

		Previous Period Averages				Year 2022 Statistics					
		2018	2019	2020	2021	Avg	Count	Count < DL	StDev	Min	Max
M Ions	Alk (mg/l)	52	52	44	41	41	1	0		41	41
	Ca (mg/l)	17.0	17.0	14.0	12.0	13.0	1	0		13.0	13.0
	Cl (mg/l)	0.9	1.1	0.8	0.6	0.6	1	0		0.6	0.6
	CO3 (mg/l)	<1	<1	<1	<1	<1	1	1		1	1
	Cond-L (µS/cm)	112	112	98	94	81	1	0		81	81
	Hardness (mg/l)	56	56	46	38	43	1	0		43	43
	HCO3 (mg/l)	63	63	54	50	50	1	0		50	50
	K (mg/l)	0.8	0.9	0.7	0.7	0.7	1	0		0.7	0.7
	Na (mg/l)	1.6	1.6	1.4	1.3	1.2	1	0		1.2	1.2
	OH (mg/l)	<1	<1	<1	<1	<1	1	1		1	1
	SO4 (mg/l)	6.6	6.3	5.6	5.8	4.7	1	0		4.7	4.7
	Sum of Ions (mg/l)	93	94	79	73	73	1	0		73	73
Metal	As (µg/l)	0.2	0.1	0.1	0.1	0.1	1	0		0.1	0.1
	Ba (mg/l)	0.0230	0.0240	0.0210	0.0190	0.0210	1	0		0.0210	0.0210
	Cu (mg/l)	0.0005	0.0006	0.0005	0.0006	0.0004	1	0		0.0004	0.0004
	Fe (mg/l)	0.0320	0.0155	0.0300	0.0430	0.0270	1	0		0.0270	0.0270
	Mo (mg/l)	0.0010	0.0010	0.0008	0.0008	0.0008	1	0		0.0008	0.0008
	Ni (mg/l)	0.0002	0.0002	0.0002	0.0002	<0.0001	1	1		0.0001	0.0001
	Pb (mg/l)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	1	1		0.0001	0.0001
	Se (mg/l)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	1	1		0.0001	0.0001
	U (µg/l)	12.5	12.5	12.0	8.9	8.6	1	0		8.6	8.6
	Zn (mg/l)	<0.0005	0.0006	0.0014	0.0015	<0.0005	1	1		0.0005	0.0005
Nutrient	C-(org) (mg/l)	7.0	6.2	8.8	9.0	7.5	1	0		7.5	7.5
	NO3 (mg/l)	0.20	0.09	<0.04	0.12	<0.04	1	1		0.04	0.04
	P-(TP) (mg/l)	<0.01	<0.01	<0.01	<0.01	<0.01	1	1		0.01	0.01
Phys Para	pH-L (pH Unit)	7.67	7.58	7.63	7.67	7.62	1	0		7.62	7.62
	TDS (mg/l)	87	85	57	63	62	1	0		62	62
	Temp-H20 (°C)	4.0	7.5	18.4	15.9	18.1	1	0		18.1	18.1
	TSS (mg/l)	<1	<1	<1	2	<1	1	1		1	1
Rads	Pb210 (Bq/L)	<0.02	<0.02	<0.02	<0.02	<0.02	1	1		0.02	0.02
	Po210 (Bq/L)	0.006	<0.005	0.005	<0.005	<0.005	1	1		0.005	0.005
	Ra226 (Bq/L)	0.020	0.025	<0.005	0.010	0.010	1	0		0.010	0.010

Table 4.2.1-5 AC-14 Summary Statistics and Comparison to Historical Results

		Previous Period Averages				Year 2022 Statistics					
		2018	2019	2020	2021	Avg	Count	Count < DL	StDev	Min	Max
M Ions	Alk (mg/l)	52	53	49	48	48	4	0	5	41	52
	Ca (mg/l)	17.4	17.5	15.8	15.0	15.5	4	0	1.7	13.0	17.0
	Cl (mg/l)	1.5	1.3	0.9	0.9	1.1	4	0	0.4	0.7	1.5
	CO3 (mg/l)	<1	<1	<1	<1	<1	4	4	0	1	1
	Cond-L (µS/cm)	121	119	109	111	112	4	0	17	88	128
	Hardness (mg/l)	57	57	52	49	51	4	0	5	43	55
	HCO3 (mg/l)	63	64	60	59	59	4	0	6	50	63
	K (mg/l)	0.9	0.9	0.8	0.8	0.8	4	0	0.1	0.7	0.8
	Na (mg/l)	2.2	2.0	1.7	1.6	1.9	4	0	0.5	1.4	2.5
	OH (mg/l)	<1	<1	<1	<1	<1	4	4	0	1	1
	SO4 (mg/l)	9.3	8.6	6.7	6.8	7.6	4	0	2.5	5.6	11.0
	Sum of Ions (mg/l)	98	98	89	87	89	4	0	10	74	96
Metal	As (µg/l)	0.1	0.1	0.2	0.2	0.1	4	0	0.1	0.1	0.2
	Ba (mg/l)	0.0241	0.0246	0.0230	0.0217	0.0235	4	0	0.0019	0.0220	0.0260
	Cu (mg/l)	0.0006	0.0007	0.0006	0.0006	0.0007	4	0	0.0001	0.0006	0.0008
	Fe (mg/l)	0.0513	0.0465	0.0448	0.0600	0.0605	4	0	0.0127	0.0430	0.0730
	Mo (mg/l)	0.0010	0.0010	0.0010	0.0009	0.0009	4	0	0.0001	0.0009	0.0010
	Ni (mg/l)	0.0002	0.0002	0.0002	0.0002	0.0002	4	0	0.0001	0.0001	0.0002
	Pb (mg/l)	0.0003	0.0004	0.0002	0.0004	0.0002	4	1	0.0001	0.0001	0.0002
	Se (mg/l)	0.0002	0.0002	0.0001	0.0001	0.0001	4	1	0.0001	0.0001	0.0002
	U (µg/l)	35.8	34.1	18.8	18.3	28.0	4	0	15.9	15.0	50.0
	Zn (mg/l)	0.0005	0.0011	0.0018	0.0012	0.0005	4	3	0.0000	0.0005	0.0006
Nutrient	C-(org) (mg/l)	7.1	6.7	9.0	9.0	7.6	1	0		7.6	7.6
	NO3 (mg/l)	0.13	0.11	<0.04	0.15	<0.04	1	1		0.04	0.04
	P-(TP) (mg/l)	<0.01	<0.01	<0.01	<0.01	<0.01	1	1		0.01	0.01
Phys Para	pH-L (pH Unit)	7.86	7.82	7.72	7.68	7.69	4	0	0.18	7.44	7.88
	TDS (mg/l)	86	84	79	81	77	4	0	8	71	87
	Temp-H20 (°C)	7.6	10.3	12.3	11.3	8.6	4	0	6.6	2.7	14.6
	TSS (mg/l)	1	1	<1	2	1	4	3	0	1	1
Rads	Pb210 (Bq/L)	0.02	0.04	<0.02	<0.02	<0.02	1	1		0.02	0.02
	Po210 (Bq/L)	0.008	0.008	0.010	0.020	0.010	1	0		0.010	0.010
	Ra226 (Bq/L)	0.050	0.061	0.030	0.033	0.060	4	0	0.022	0.040	0.090

Table 4.2.2-1 AN-3 Summary Statistics and Comparison to Historical Results

		Previous Period Averages				Year 2022 Statistics					
		2018	2019	2020	2021	Avg	Count	Count < DL	StDev	Min	Max
M Ions	Alk (mg/l)	70	73	69	62	64	1	0		64	64
	Ca (mg/l)	21.0	21.0	20.0	18.0	18.0	1	0		18.0	18.0
	Cl (mg/l)	0.6	0.8	0.6	0.5	0.5	1	0		0.5	0.5
	CO3 (mg/l)	<1	<1	<1	<1	<1	1	1		1	1
	Cond-L (µS/cm)	135	140	138	125	122	1	0		122	122
	Hardness (mg/l)	72	72	68	60	62	1	0		62	62
	HCO3 (mg/l)	85	89	84	76	78	1	0		78	78
	K (mg/l)	0.8	0.8	0.7	0.7	0.7	1	0		0.7	0.7
	Na (mg/l)	2.0	1.9	1.9	1.8	1.7	1	0		1.7	1.7
	OH (mg/l)	<1	<1	<1	<1	<1	1	1		1	1
	SO4 (mg/l)	4.4	4.2	4.1	4.3	3.9	1	0		3.9	3.9
	Sum of Ions (mg/l)	119	122	116	105	107	1	0		107	107
Metal	As (µg/l)	<0.1	0.1	0.1	0.1	0.1	1	0		0.1	0.1
	Ba (mg/l)	0.0170	0.0170	0.0170	0.0160	0.0170	1	0		0.0170	0.0170
	Cu (mg/l)	0.0006	0.0005	0.0006	0.0008	0.0006	1	0		0.0006	0.0006
	Fe (mg/l)	0.0150	0.0063	0.0150	0.0280	0.0170	1	0		0.0170	0.0170
	Mo (mg/l)	0.0018	0.0018	0.0017	0.0018	0.0018	1	0		0.0018	0.0018
	Ni (mg/l)	0.0002	0.0002	0.0002	0.0003	0.0002	1	0		0.0002	0.0002
	Pb (mg/l)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	1	1		0.0001	0.0001
	Se (mg/l)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	1	1		0.0001	0.0001
	U (µg/l)	1.8	1.6	1.9	1.6	1.6	1	0		1.6	1.6
	Zn (mg/l)	<0.0005	0.0006	0.0019	0.0021	<0.0005	1	1		0.0005	0.0005
Nutrient	C-(org) (mg/l)	7.9	7.2	8.4	10.0	9.1	1	0		9.1	9.1
	NO3 (mg/l)	<0.04	<0.04	<0.04	0.08	<0.04	1	1		0.04	0.04
	P-(TP) (mg/l)	<0.01	<0.01	<0.01	<0.01	<0.01	1	1		0.01	0.01
Phys Para	pH-L (pH Unit)	7.89	8.02	7.87	7.83	7.88	1	0		7.88	7.88
	TDS (mg/l)	109	84	81	109	90	1	0		90	90
	Temp-H20 (°C)	9.5	10.4	23.0	16.3	19.6	1	0		19.6	19.6
	TSS (mg/l)	2	<1	<1	3	2	1	0		2	2
Rads	Pb210 (Bq/L)	<0.02	<0.02	<0.02	<0.02	<0.02	1	1		0.02	0.02
	Po210 (Bq/L)	<0.005	<0.005	<0.005	0.006	<0.005	1	1		0.005	0.005
	Ra226 (Bq/L)	<0.005	0.010	0.006	0.008	<0.005	1	1		0.005	0.005

Table 4.2.2-2 TL-3 Summary Statistics and Comparison to Historical Results

		Previous Period Averages				Year 2022 Statistics					
		2018	2019	2020	2021	Avg	Count	Count < DL	StDev	Min	Max
M Ions	Alk (mg/l)	126	133	114	115	124	2	0	14	114	134
	Ca (mg/l)	28.7	30.3	28.5	28.5	31.0	2	0	4.2	28.0	34.0
	Cl (mg/l)	2.6	2.5	1.8	1.9	1.8	2	0	0.3	1.6	2.0
	CO3 (mg/l)	<1	<1	<1	<1	<1	2	2	0	1	1
	Cond-L (µS/cm)	287	302	252	258	273	2	0	42	243	302
	Hardness (mg/l)	94	99	94	92	99	2	0	13	90	108
	HCO3 (mg/l)	153	162	139	140	151	2	0	17	139	163
	K (mg/l)	1.2	1.2	1.1	1.0	1.1	2	0	0.1	1.0	1.2
	Na (mg/l)	29.7	28.8	18.0	20.0	21.0	2	0	2.8	19.0	23.0
	OH (mg/l)	<1	<1	<1	<1	<1	2	2	0	1	1
	SO4 (mg/l)	27.3	26.3	17.0	20.5	20.5	2	0	3.5	18.0	23.0
	Sum of Ions (mg/l)	248	257	211	217	235	2	0	33	212	258
Metal	As (µg/l)	0.8	0.7	0.5	0.5	0.8	2	0	0.1	0.7	0.8
	Ba (mg/l)	0.0387	0.0408	0.0365	0.0380	0.0450	2	0	0.0028	0.0430	0.0470
	Cu (mg/l)	0.0011	0.0012	0.0017	0.0014	0.0016	2	0	0.0004	0.0013	0.0018
	Fe (mg/l)	0.0160	0.0145	0.0165	0.0260	0.0500	2	0	0.0226	0.0340	0.0660
	Mo (mg/l)	0.0117	0.0113	0.0075	0.0081	0.0096	2	0	0.0003	0.0094	0.0098
	Ni (mg/l)	0.0003	0.0003	0.0004	0.0004	0.0005	2	0	0.0001	0.0004	0.0005
	Pb (mg/l)	0.0008	0.0007	0.0005	0.0006	0.0003	2	0	0.0001	0.0002	0.0003
	Se (mg/l)	0.0023	0.0024	0.0016	0.0020	0.0026	2	0	0.0003	0.0024	0.0028
	U (µg/l)	243.0	232.8	147.0	175.0	194.0	2	0	0.0	194.0	194.0
	Zn (mg/l)	0.0006	0.0011	0.0019	<0.0005	0.0009	2	1	0.0005	0.0005	0.0012
Nutrient	C-(org) (mg/l)	7.5	7.1	8.4	9.3	7.9	1	0		7.9	7.9
	NO3 (mg/l)	<0.04	0.16	<0.04	0.09	<0.04	1	1		0.04	0.04
	P-(TP) (mg/l)	<0.01	<0.01	<0.01	<0.01	<0.01	1	1		0.01	0.01
Phys Para	pH-L (pH Unit)	8.23	8.16	8.01	8.01	8.08	2	0	0.04	8.05	8.11
	TDS (mg/l)	203	189	158	160	176	2	0	14	166	186
	Temp-H20 (°C)	10.9	9.3	16.7	9.5	13.1	2	0	12.1	4.5	21.6
	TSS (mg/l)	<1	1	<1	1	1	2	1	0	1	1
Rads	Pb210 (Bq/L)	0.10	0.18	0.13	0.08	0.35	1	0		0.35	0.35
	Po210 (Bq/L)	0.060	0.060	0.060	0.060	0.070	1	0		0.070	0.070
	Ra226 (Bq/L)	1.433	1.350	0.895	1.210	1.700	2	0	0.283	1.500	1.900

Table 4.2.2-3 TL-4 Summary Statistics and Comparison to Historical Results

		Previous Period Averages				Year 2022 Statistics					
		2018	2019	2020	2021	Avg	Count	Count < DL	StDev	Min	Max
M Ions	Alk (mg/l)	121	131	132	129	132	2	0	23	116	148
	Ca (mg/l)	23.0	24.3	29.0	31.0	31.5	2	0	4.9	28.0	35.0
	Cl (mg/l)	2.5	2.7	2.1	1.9	1.8	2	0	0.3	1.6	2.0
	CO3 (mg/l)	<1	<1	<1	<1	<1	2	2	0	1	1
	Cond-L (µS/cm)	271	289	289	273	277	2	0	52	240	313
	Hardness (mg/l)	80	84	94	99	101	2	0	15	90	111
	HCO3 (mg/l)	148	160	161	157	161	2	0	27	142	180
	K (mg/l)	1.3	1.4	1.2	1.1	1.2	2	0	0.2	1.0	1.3
	Na (mg/l)	31.3	32.8	26.0	21.0	21.5	2	0	3.5	19.0	24.0
	OH (mg/l)	<1	<1	<1	<1	<1	2	2	0	1	1
	SO4 (mg/l)	23.0	22.0	21.0	18.0	16.5	2	0	2.1	15.0	18.0
	Sum of Ions (mg/l)	234	249	245	235	239	2	0	39	211	266
Metal	As (µg/l)	0.9	1.0	0.9	0.7	0.8	2	0	0.1	0.7	0.9
	Ba (mg/l)	0.0760	0.0870	0.0750	0.0730	0.0870	2	0	0.0184	0.0740	0.1000
	Cu (mg/l)	0.0005	0.0004	0.0009	0.0009	0.0007	2	0	0.0001	0.0006	0.0008
	Fe (mg/l)	0.0477	0.0523	0.0375	0.0400	0.0465	2	0	0.0163	0.0350	0.0580
	Mo (mg/l)	0.0081	0.0083	0.0087	0.0076	0.0077	2	0	0.0011	0.0069	0.0085
	Ni (mg/l)	0.0005	0.0005	0.0005	0.0006	0.0006	2	0	0.0001	0.0005	0.0006
	Pb (mg/l)	0.0002	0.0002	0.0004	0.0003	<0.0001	2	2	0.0000	0.0001	0.0001
	Se (mg/l)	0.0013	0.0012	0.0017	0.0014	0.0014	2	0	0.0001	0.0013	0.0014
	U (µg/l)	187.3	187.0	197.5	168.5	166.0	2	0	28.3	146.0	186.0
	Zn (mg/l)	<0.0005	0.0008	0.0012	0.0011	0.0006	2	1	0.0001	0.0005	0.0006
Nutrient	C-(org) (mg/l)	9.0	8.6	12.0	9.9	9.3	1	0		9.3	9.3
	NO3 (mg/l)	0.04	0.05	<0.04	0.09	<0.04	1	1		0.04	0.04
	P-(TP) (mg/l)	<0.01	<0.01	0.01	<0.01	<0.01	1	1		0.01	0.01
Phys Para	pH-L (pH Unit)	8.10	8.10	8.07	7.98	8.06	2	0	0.08	8.00	8.11
	TDS (mg/l)	181	195	171	173	175	2	0	15	164	185
	Temp-H20 (°C)	10.8	8.6	16.5	9.8	10.4	2	0	11.7	2.1	18.6
	TSS (mg/l)	1	<1	<1	3	<1	2	2	0	1	1
Rads	Pb210 (Bq/L)	0.10	0.10	0.04	0.10	0.05	1	0		0.05	0.05
	Po210 (Bq/L)	0.020	0.030	0.030	0.020	0.020	1	0		0.020	0.020
	Ra226 (Bq/L)	1.733	1.750	1.550	1.600	1.850	2	0	0.354	1.600	2.100

Table 4.2.2-4 TL-6 Summary Statistics and Comparison to Historical Results

		Previous Period Averages				Year 2022 Statistics					
		2018	2019	2020	2021	Avg	Count	Count < DL	StDev	Min	Max
M Ions	Alk (mg/l)	228	300	277	204			0			
	Ca (mg/l)	41.0	39.0	54.0	60.0			0			
	Cl (mg/l)	31.0	44.7	34.0	12.0			0			
	CO3 (mg/l)	<1	<1	<1	<1			0			
	Cond-L (µS/cm)	558	741	743	512			0			
	Hardness (mg/l)	144	148	184	189			0			
	HCO3 (mg/l)	278	367	338	249			0			
	K (mg/l)	2.1	3.3	2.4	1.2			0			
	Na (mg/l)	72.0	116.7	94.0	42.0			0			
	OH (mg/l)	<1	<1	<1	<1			0			
	SO4 (mg/l)	33.0	32.7	71.0	56.0			0			
	Sum of Ions (mg/l)	468	615	605	431			0			
Metal	As (µg/l)	2.5	2.1	1.6	1.3			0			
	Ba (mg/l)	0.9550	1.0533	1.2700	0.8800			0			
	Cu (mg/l)	0.0007	0.0003	0.0007	0.0012			0			
	Fe (mg/l)	2.9450	1.2367	0.4300	0.6300			0			
	Mo (mg/l)	0.0014	0.0008	0.0020	0.0050			0			
	Ni (mg/l)	0.0004	0.0003	0.0005	0.0007			0			
	Pb (mg/l)	0.0004	0.0002	0.0003	0.0007			0			
	Se (mg/l)	0.0026	0.0021	0.0038	0.0033			0			
	U (µg/l)	171.5	123.3	241.0	276.0			0			
	Zn (mg/l)	0.0007	0.0016	0.0020	0.0009			0			
Nutrient	C-(org) (mg/l)	55.0	38.5	38.0	39.0			0			
	NO3 (mg/l)	<0.04	<0.04	<0.04	0.12			0			
	P-(TP) (mg/l)	0.01	0.02	0.02	0.01			0			
Phys Para	pH-L (pH Unit)	7.89	7.91	7.80	7.85			0			
	TDS (mg/l)	408	518	521	367			0			
	Temp-H20 (°C)	12.1	14.0	20.4	15.2			0			
	TSS (mg/l)	4	2	<1	2			0			
Rads	Pb210 (Bq/L)	0.37	0.20	0.07	<0.02			0			
	Po210 (Bq/L)	0.050	0.035	0.050	0.050			0			
	Ra226 (Bq/L)	7.000	5.067	7.700	6.300			0			

Table 4.2.2-5 TL-7 Summary Statistics and Comparison to Historical Results

		Previous Period Averages				Year 2022 Statistics					
		2018	2019	2020	2021	Avg	Count	Count < DL	StDev	Min	Max
M Ions	Alk (mg/l)	140	127	132	120	135	3	0	23	118	161
	Ca (mg/l)	26.7	25.0	30.0	29.0	32.0	3	0	5.3	28.0	38.0
	Cl (mg/l)	3.8	6.2	3.1	2.3	1.9	3	0	0.2	1.6	2.0
	CO3 (mg/l)	<1	<1	<1	<1	<1	3	3	0	1	1
	Cond-L (µS/cm)	316	287	294	266	288	3	0	50	244	342
	Hardness (mg/l)	93	87	98	95	103	3	0	17	90	122
	HCO3 (mg/l)	170	155	162	147	165	3	0	28	144	196
	K (mg/l)	1.7	1.2	1.2	1.1	1.3	3	0	0.5	0.9	1.9
	Na (mg/l)	35.0	32.2	26.7	20.5	22.3	3	0	4.2	19.0	27.0
	OH (mg/l)	<1	<1	<1	<1	<1	3	3	0	1	1
	SO4 (mg/l)	26.2	19.8	20.7	17.5	17.0	3	0	2.6	15.0	20.0
	Sum of Ions (mg/l)	270	246	249	223	245	3	0	42	213	292
Metal	As (µg/l)	1.1	0.9	0.8	0.7	0.8	3	0	0.3	0.6	1.1
	Ba (mg/l)	0.3467	0.4400	0.1600	0.2400	0.5100	3	0	0.2452	0.2700	0.7600
	Cu (mg/l)	0.0007	0.0005	0.0007	0.0009	0.0006	3	0	0.0001	0.0005	0.0007
	Fe (mg/l)	0.1042	0.0637	0.0283	0.0360	0.0837	3	0	0.0582	0.0410	0.1500
	Mo (mg/l)	0.0096	0.0062	0.0091	0.0073	0.0071	3	0	0.0013	0.0061	0.0086
	Ni (mg/l)	0.0005	0.0004	0.0004	0.0005	0.0005	3	0	0.0001	0.0004	0.0006
	Pb (mg/l)	0.0003	0.0002	0.0002	0.0002	<0.0001	3	3	0.0000	0.0001	0.0001
	Se (mg/l)	0.0018	0.0014	0.0017	0.0011	0.0012	3	0	0.0002	0.0010	0.0014
	U (µg/l)	238.4	148.7	200.7	164.5	161.0	3	0	50.4	128.0	219.0
	Zn (mg/l)	0.0011	0.0012	<0.0005	<0.0005	0.0006	3	2	0.0001	0.0005	0.0007
Nutrient	C-(org) (mg/l)	9.8	8.9	10.0	9.9	8.6	1	0		8.6	8.6
	NO3 (mg/l)	0.07	0.08	<0.04	0.08	<0.04	1	1		0.04	0.04
	P-(TP) (mg/l)	0.01	<0.01	<0.01	0.01	<0.01	1	1		0.01	0.01
Phys Para	pH-L (pH Unit)	7.99	7.91	7.94	8.17	7.84	3	0	0.05	7.79	7.89
	TDS (mg/l)	212	188	188	165	179	3	0	25	162	208
	Temp-H20 (°C)	8.1	12.8	15.2	15.0	11.9	3	0	8.3	2.7	18.7
	TSS (mg/l)	1	1	<1	2	1	3	2	0	1	1
Rads	Pb210 (Bq/L)	0.22	0.16	0.06	0.11	<0.02	1	1		0.02	0.02
	Po210 (Bq/L)	0.023	0.008	0.020	0.010	0.010	1	0		0.010	0.010
	Ra226 (Bq/L)	1.744	1.550	1.667	1.500	2.000	3	0	0.265	1.700	2.200

Table 4.2.2-6 TL-9 Summary Statistics and Comparison to Historical Results

		Previous Period Averages				Year 2022 Statistics					
		2018	2019	2020	2021	Avg	Count	Count < DL	StDev	Min	Max
M Ions	Alk (mg/l)	116	109	138	137	137	4	0	18	124	161
	Ca (mg/l)	20.3	17.5	29.3	33.0	32.0	4	0	6.5	24.0	40.0
	Cl (mg/l)	3.9	4.0	3.2	2.5	2.1	4	0	0.2	2.0	2.3
	CO3 (mg/l)	<1	<1	<1	<1	<1	4	4	0	1	1
	Cond-L (µS/cm)	268	245	286	297	285	4	0	42	246	336
	Hardness (mg/l)	76	68	97	108	105	4	0	19	82	128
	HCO3 (mg/l)	142	133	169	167	167	4	0	21	151	196
	K (mg/l)	1.2	1.2	1.2	1.3	1.1	4	0	0.1	1.0	1.2
	Na (mg/l)	30.8	30.3	25.3	23.0	21.3	4	0	3.2	18.0	24.0
	OH (mg/l)	<1	<1	<1	<1	<1	4	4	0	1	1
	SO4 (mg/l)	21.2	18.0	19.0	18.3	16.3	4	0	2.6	14.0	19.0
	Sum of Ions (mg/l)	226	210	253	251	247	4	0	33	217	290
Metal	As (µg/l)	1.3	1.2	1.0	0.9	1.2	4	0	0.2	0.9	1.4
	Ba (mg/l)	0.6567	0.6217	0.4267	0.4433	0.6400	4	0	0.1497	0.4400	0.8000
	Cu (mg/l)	0.0005	0.0006	0.0006	0.0007	0.0008	4	0	0.0002	0.0006	0.0010
	Fe (mg/l)	0.0435	0.0517	0.0383	0.0520	0.0408	4	0	0.0207	0.0230	0.0690
	Mo (mg/l)	0.0084	0.0066	0.0083	0.0081	0.0076	4	0	0.0007	0.0069	0.0084
	Ni (mg/l)	0.0003	0.0003	0.0004	0.0005	0.0005	4	0	0.0001	0.0004	0.0005
	Pb (mg/l)	0.0005	0.0011	0.0005	0.0005	0.0002	4	1	0.0001	0.0001	0.0003
	Se (mg/l)	0.0022	0.0023	0.0017	0.0016	0.0023	4	0	0.0005	0.0017	0.0028
	U (µg/l)	172.3	132.5	187.0	181.0	169.8	4	0	59.0	109.0	249.0
	Zn (mg/l)	0.0006	0.0012	0.0013	0.0011	0.0012	4	1	0.0008	0.0005	0.0021
Nutrient	C-(org) (mg/l)	9.4	8.7	11.0	11.0	9.4	1	0		9.4	9.4
	NO3 (mg/l)	0.18	0.36	0.16	0.15	0.27	1	0		0.27	0.27
	P-(TP) (mg/l)	<0.01	0.01	0.01	<0.01	<0.01	1	1		0.01	0.01
Phys Para	pH-L (pH Unit)	8.16	8.05	8.07	8.15	8.07	4	0	0.06	8.01	8.15
	TDS (mg/l)	178	162	176	172	183	4	0	36	145	231
	Temp-H20 (°C)	10.1	12.7	13.3	11.2	9.4	4	0	6.7	3.1	15.9
	TSS (mg/l)	1	2	<1	3	1	4	3	1	1	2
Rads	Pb210 (Bq/L)	0.20	0.17	0.07	0.09	0.10	1	0		0.10	0.10
	Po210 (Bq/L)	0.037	0.045	0.080	0.030	0.060	1	0		0.060	0.060
	Ra226 (Bq/L)	2.333	2.033	1.700	2.133	2.250	4	0	0.379	1.700	2.500

Table 4.2.3-1 BL-3 Summary Statistics and Comparison to Historical Results

		Previous Period Averages				Year 2022 Statistics					
		2018	2019	2020	2021	Avg	Count	Count < DL	StDev	Min	Max
M Ions	Alk (mg/l)	70	73	69	68	70	2	0	4	67	72
	Ca (mg/l)	21.5	21.3	21.0	19.0	21.0	2	0	1.4	20.0	22.0
	Cl (mg/l)	12.5	13.0	12.0	10.0	10.5	2	0	0.7	10.0	11.0
	CO3 (mg/l)	<1	<1	<1	<1	<1	2	2	0	1	1
	Cond-L (µS/cm)	236	237	228	220	223	2	0	21	208	237
	Hardness (mg/l)	76	75	74	66	74	2	0	5	70	77
	HCO3 (mg/l)	85	89	84	83	85	2	0	4	82	88
	K (mg/l)	1.2	1.2	1.1	1.0	1.2	2	0	0.1	1.1	1.2
	Na (mg/l)	18.5	18.8	17.0	17.0	16.5	2	0	0.7	16.0	17.0
	OH (mg/l)	<1	<1	<1	<1	<1	2	2	0	1	1
	SO4 (mg/l)	30.5	29.0	27.5	28.0	27.0	2	0	1.4	26.0	28.0
	Sum of Ions (mg/l)	175	177	168	162	167	2	0	10	160	174
Metal	As (µg/l)	0.2	0.3	0.2	0.3	0.2	2	0	0.0	0.2	0.2
	Ba (mg/l)	0.0360	0.0448	0.0395	0.0380	0.0380	2	0	0.0042	0.0350	0.0410
	Cu (mg/l)	0.0019	0.0014	0.0012	0.0030	0.0021	2	0	0.0013	0.0012	0.0030
	Fe (mg/l)	0.0093	0.0066	0.0040	0.0091	0.0052	2	0	0.0017	0.0040	0.0064
	Mo (mg/l)	0.0036	0.0037	0.0034	0.0032	0.0032	2	0	0.0000	0.0032	0.0032
	Ni (mg/l)	0.0058	0.0014	0.0018	0.0038	0.0029	2	0	0.0016	0.0018	0.0040
	Pb (mg/l)	0.0003	0.0002	<0.0001	0.0002	0.0002	2	1	0.0001	0.0001	0.0003
	Se (mg/l)	0.0023	0.0023	0.0022	0.0019	0.0021	2	0	0.0000	0.0021	0.0021
	U (µg/l)	129.8	132.3	123.5	116.0	115.0	2	0	0.0	115.0	115.0
	Zn (mg/l)	0.0068	0.0035	0.0017	0.0098	0.0058	2	0	0.0060	0.0015	0.0100
Nutrient	C-(org) (mg/l)	3.2	3.0	3.7	3.6	3.5	1	0		3.5	3.5
	NO3 (mg/l)	0.06	<0.04	<0.04	0.09	0.52	2	1	0.68	0.04	1.00
	P-(TP) (mg/l)	<0.01	<0.01	<0.01	<0.01	<0.01	1	1		0.01	0.01
Phys Para	pH-L (pH Unit)	7.96	8.04	7.90	7.88	7.94	2	0	0.08	7.88	7.99
	TDS (mg/l)	157	153	121	143	141	2	0	4	138	144
	Temp-H20 (°C)	6.4	7.9	15.9	9.9	7.4	2	0	9.0	1.0	13.7
	TSS (mg/l)	1	<1	<1	2	<1	2	2	0	1	1
Rads	Pb210 (Bq/L)	0.09	0.10	0.02	0.22	<0.02	1	1		0.02	0.02
	Po210 (Bq/L)	<0.005	<0.005	<0.005	<0.005	<0.005	1	1		0.005	0.005
	Ra226 (Bq/L)	0.035	0.053	0.050	0.070	0.050	2	0	0.014	0.040	0.060

Table 4.2.3-2 BL-4 Summary Statistics and Comparison to Historical Results

		Previous Period Averages				Year 2022 Statistics					
		2018	2019	2020	2021	Avg	Count	Count < DL	StDev	Min	Max
M Ions	Alk (mg/l)	69	70	67	66	67	1	0		67	67
	Ca (mg/l)	21.5	21.0	20.0	19.0	20.0	1	0		20.0	20.0
	Cl (mg/l)	12.5	12.5	12.0	10.0	10.0	1	0		10.0	10.0
	CO3 (mg/l)	<1	<1	<1	<1	<1	1	1		1	1
	Cond-L (µS/cm)	232	235	224	217	211	1	0		211	211
	Hardness (mg/l)	76	74	70	65	70	1	0		70	70
	HCO3 (mg/l)	85	86	82	80	82	1	0		82	82
	K (mg/l)	1.2	1.1	1.0	1.1	1.1	1	0		1.1	1.1
	Na (mg/l)	18.5	18.5	17.0	17.0	16.0	1	0		16.0	16.0
	OH (mg/l)	<1	<1	<1	<1	<1	1	1		1	1
	SO4 (mg/l)	30.0	28.5	27.0	28.0	26.0	1	0		26.0	26.0
	Sum of Ions (mg/l)	174	173	164	160	160	1	0		160	160
Metal	As (µg/l)	0.3	0.2	0.2	0.2	0.2	1	0		0.2	0.2
	Ba (mg/l)	0.0345	0.0345	0.0360	0.0330	0.0360	1	0		0.0360	0.0360
	Cu (mg/l)	0.0012	0.0012	0.0006	0.0015	0.0010	1	0		0.0010	0.0010
	Fe (mg/l)	0.0042	0.0074	0.0031	0.0058	0.0042	1	0		0.0042	0.0042
	Mo (mg/l)	0.0036	0.0036	0.0033	0.0031	0.0033	1	0		0.0033	0.0033
	Ni (mg/l)	0.0012	0.0012	0.0008	0.0032	0.0017	1	0		0.0017	0.0017
	Pb (mg/l)	0.0003	0.0002	<0.0001	0.0001	0.0001	1	0		0.0001	0.0001
	Se (mg/l)	0.0024	0.0023	0.0021	0.0019	0.0021	1	0		0.0021	0.0021
	U (µg/l)	126.0	126.0	121.0	116.0	120.0	1	0		120.0	120.0
	Zn (mg/l)	0.0047	0.0036	0.0018	0.0052	0.0032	1	0		0.0032	0.0032
Nutrient	C-(org) (mg/l)	3.4	3.3	3.5	3.3	3.6	1	0		3.6	3.6
	NO3 (mg/l)	0.05	<0.04	<0.04	0.12	<0.04	1	1		0.04	0.04
	P-(TP) (mg/l)	<0.01	<0.01	<0.01	<0.01	<0.01	1	1		0.01	0.01
Phys Para	pH-L (pH Unit)	7.97	8.02	7.82	7.84	7.83	1	0		7.83	7.83
	TDS (mg/l)	141	156	116	137	142	1	0		142	142
	Temp-H20 (°C)	4.6	10.3	14.4	7.9	9.9	1	0		9.9	9.9
	TSS (mg/l)	<1	<1	<1	1	<1	1	1		1	1
Rads	Pb210 (Bq/L)	0.05	0.07	0.08	0.12	<0.02	1	1		0.02	0.02
	Po210 (Bq/L)	<0.005	<0.005	<0.005	<0.005	<0.005	1	1		0.005	0.005
	Ra226 (Bq/L)	0.025	0.025	0.030	0.030	0.020	1	0		0.020	0.020

Table 4.2.3-3 BL-5 Summary Statistics and Comparison to Historical Results

		Previous Period Averages				Year 2022 Statistics					
		2018	2019	2020	2021	Avg	Count	Count < DL	StDev	Min	Max
M Ions	Alk (mg/l)	67	61	66	71	66	1	0		66	66
	Ca (mg/l)	20.5	19.0	20.0	19.0	20.0	1	0		20.0	20.0
	Cl (mg/l)	12.0	11.1	11.0	10.0	11.0	1	0		11.0	11.0
	CO3 (mg/l)	<1	<1	<1	<1	<1	1	1		1	1
	Cond-L (µS/cm)	224	202	221	219	209	1	0		209	209
	Hardness (mg/l)	73	66	70	66	70	1	0		70	70
	HCO3 (mg/l)	82	75	80	87	80	1	0		80	80
	K (mg/l)	1.1	1.0	1.0	1.1	1.1	1	0		1.1	1.1
	Na (mg/l)	18.0	16.0	17.0	17.0	16.0	1	0		16.0	16.0
	OH (mg/l)	<1	<1	<1	<1	<1	1	1		1	1
	SO4 (mg/l)	29.5	25.7	27.0	29.0	26.0	1	0		26.0	26.0
	Sum of Ions (mg/l)	168	152	161	168	159	1	0		159	159
Metal	As (µg/l)	0.2	0.2	0.2	0.2	0.3	1	0		0.3	0.3
	Ba (mg/l)	0.0330	0.0293	0.0360	0.0320	0.0360	1	0		0.0360	0.0360
	Cu (mg/l)	0.0004	0.0004	0.0003	0.0003	0.0003	1	0		0.0003	0.0003
	Fe (mg/l)	0.0056	0.0095	0.0030	0.0092	0.0032	1	0		0.0032	0.0032
	Mo (mg/l)	0.0035	0.0030	0.0033	0.0031	0.0031	1	0		0.0031	0.0031
	Ni (mg/l)	0.0002	0.0002	0.0002	0.0002	0.0002	1	0		0.0002	0.0002
	Pb (mg/l)	0.0003	0.0001	<0.0001	<0.0001	<0.0001	1	1		0.0001	0.0001
	Se (mg/l)	0.0022	0.0019	0.0021	0.0019	0.0021	1	0		0.0021	0.0021
	U (µg/l)	124.5	103.7	120.0	115.0	114.0	1	0		114.0	114.0
	Zn (mg/l)	0.0006	0.0008	<0.0005	0.0023	<0.0005	1	1		0.0005	0.0005
Nutrient	C-(org) (mg/l)	3.2	3.0	3.6	3.3	3.3	1	0		3.3	3.3
	NO3 (mg/l)	<0.04	<0.04	<0.04	0.48	<0.04	1	1		0.04	0.04
	P-(TP) (mg/l)	<0.01	<0.01	<0.01	<0.01	<0.01	1	1		0.01	0.01
Phys Para	pH-L (pH Unit)	7.97	7.91	8.02	7.87	7.87	1	0		7.87	7.87
	TDS (mg/l)	149	126	128	142	144	1	0		144	144
	Temp-H20 (°C)	11.8	12.3	15.7	7.9	13.8	1	0		13.8	13.8
	TSS (mg/l)	<1	<1	<1	2	<1	1	1		1	1
Rads	Pb210 (Bq/L)	0.06	0.11	0.08	0.04	<0.02	1	1		0.02	0.02
	Po210 (Bq/L)	<0.005	<0.005	<0.005	<0.005	<0.005	1	1		0.005	0.005
	Ra226 (Bq/L)	0.025	0.030	0.020	0.040	0.030	1	0		0.030	0.030

Table 4.2.3-4 ML-1 Summary Statistics and Comparison to Historical Results

		Previous Period Averages				Year 2022 Statistics					
		2018	2019	2020	2021	Avg	Count	Count < DL	StDev	Min	Max
M Ions	Alk (mg/l)	66	68	55	54	65	2	0	10	58	72
	Ca (mg/l)	20.3	20.3	16.5	16.0	19.5	2	0	2.1	18.0	21.0
	Cl (mg/l)	7.4	7.1	3.5	5.4	7.7	2	0	1.9	6.3	9.0
	CO3 (mg/l)	<1	<1	<1	<1	<1	2	2	0	1	1
	Cond-L (µS/cm)	181	182	135	151	186	2	0	30	164	207
	Hardness (mg/l)	69	69	56	53	67	2	0	8	61	72
	HCO3 (mg/l)	81	83	67	66	80	2	0	12	71	88
	K (mg/l)	1.2	1.2	1.0	1.0	1.1	2	0	0.1	1.0	1.2
	Na (mg/l)	10.6	10.1	5.2	8.7	11.5	2	0	2.1	10.0	13.0
	OH (mg/l)	<1	<1	<1	<1	<1	2	2	0	1	1
	SO4 (mg/l)	17.8	16.0	8.9	15.0	18.0	2	0	2.8	16.0	20.0
	Sum of Ions (mg/l)	143	142	106	115	142	2	0	22	126	157
Metal	As (µg/l)	0.2	0.2	0.2	0.2	0.2	2	0	0.0	0.2	0.2
	Ba (mg/l)	0.0430	0.0440	0.0365	0.0360	0.0430	2	0	0.0042	0.0400	0.0460
	Cu (mg/l)	0.0009	0.0011	0.0004	0.0004	0.0004	2	0	0.0001	0.0003	0.0005
	Fe (mg/l)	0.0140	0.0109	0.0207	0.0230	0.0076	2	0	0.0049	0.0041	0.0110
	Mo (mg/l)	0.0019	0.0019	0.0010	0.0015	0.0021	2	0	0.0002	0.0019	0.0022
	Ni (mg/l)	0.0002	0.0002	0.0002	0.0001	0.0002	2	0	0.0001	0.0001	0.0002
	Pb (mg/l)	0.0002	0.0002	<0.0001	<0.0001	<0.0001	2	2	0.0000	0.0001	0.0001
	Se (mg/l)	0.0010	0.0009	0.0005	0.0008	0.0011	2	0	0.0001	0.0010	0.0012
	U (µg/l)	60.8	55.8	23.4	44.0	58.0	2	0	2.8	56.0	60.0
	Zn (mg/l)	0.0016	0.0023	0.0009	0.0022	0.0006	2	1	0.0001	0.0005	0.0007
Nutrient	C-(org) (mg/l)	6.1	6.0	6.3	7.2	5.8	1	0		5.8	5.8
	NO3 (mg/l)	0.13	0.07	<0.04	0.09	<0.04	1	1		0.04	0.04
	P-(TP) (mg/l)	0.01	0.01	<0.01	<0.01	<0.01	1	1		0.01	0.01
Phys Para	pH-L (pH Unit)	7.97	7.93	7.77	7.70	7.89	2	0	0.04	7.86	7.92
	TDS (mg/l)	124	127	100	105	118	2	0	8	112	124
	Temp-H20 (°C)	7.8	11.0	14.0	15.0	12.2	2	0	9.2	5.7	18.7
	TSS (mg/l)	2	<1	<1	2	<1	2	2	0	1	1
Rads	Pb210 (Bq/L)	0.04	0.07	<0.02	<0.02	0.15	1	0		0.15	0.15
	Po210 (Bq/L)	<0.005	<0.005	<0.005	<0.005	<0.005	1	1		0.005	0.005
	Ra226 (Bq/L)	0.007	0.007	0.005	0.005	0.006	2	1	0.001	0.005	0.007

Table 4.2.3-5 CS-1 Summary Statistics and Comparison to Historical Results

		Previous Period Averages				Year 2022 Statistics					
		2018	2019	2020	2021	Avg	Count	Count < DL	StDev	Min	Max
M Ions	Alk (mg/l)	64	67	60	53	59	1	0		59	59
	Ca (mg/l)	20.0	20.0	18.0	16.0	18.0	1	0		18.0	18.0
	Cl (mg/l)	7.2	8.0	5.8	5.0	6.2	1	0		6.2	6.2
	CO3 (mg/l)	<1	<1	<1	<1	<1	1	1		1	1
	Cond-L (µS/cm)	180	182	163	145	158	1	0		158	158
	Hardness (mg/l)	68	68	61	53	61	1	0		61	61
	HCO3 (mg/l)	78	82	73	65	72	1	0		72	72
	K (mg/l)	1.1	1.1	1.0	0.9	1.0	1	0		1.0	1.0
	Na (mg/l)	11.0	11.0	8.7	7.9	9.5	1	0		9.5	9.5
	OH (mg/l)	<1	<1	<1	<1	<1	1	1		1	1
	SO4 (mg/l)	17.0	16.0	14.0	14.0	15.0	1	0		15.0	15.0
	Sum of Ions (mg/l)	139	143	124	112	126	1	0		126	126
Metal	As (µg/l)	0.2	0.2	0.2	0.2	0.2	1	0		0.2	0.2
	Ba (mg/l)	0.0400	0.0430	0.0420	0.0380	0.0420	1	0		0.0420	0.0420
	Cu (mg/l)	0.0003	0.0003	0.0012	0.0004	0.0008	1	0		0.0008	0.0008
	Fe (mg/l)	0.0210	0.0250	0.0450	0.0710	0.0420	1	0		0.0420	0.0420
	Mo (mg/l)	0.0020	0.0020	0.0017	0.0015	0.0019	1	0		0.0019	0.0019
	Ni (mg/l)	0.0001	0.0001	0.0002	0.0002	0.0003	1	0		0.0003	0.0003
	Pb (mg/l)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	1	1		0.0001	0.0001
	Se (mg/l)	0.0009	0.0009	0.0008	0.0007	0.0010	1	0		0.0010	0.0010
	U (µg/l)	62.0	56.0	44.0	37.0	54.0	1	0		54.0	54.0
	Zn (mg/l)	<0.0005	<0.0005	0.0028	<0.0005	0.0013	1	0		0.0013	0.0013
Nutrient	C-(org) (mg/l)	5.8	5.6	6.4	7.8	5.9	1	0		5.9	5.9
	NO3 (mg/l)	<0.04	<0.04	<0.04	0.09	<0.04	1	1		0.04	0.04
	P-(TP) (mg/l)	<0.01	<0.01	<0.01	0.01	<0.01	1	1		0.01	0.01
Phys Para	pH-L (pH Unit)	7.98	8.05	7.74	7.75	7.87	1	0		7.87	7.87
	TDS (mg/l)	124	100	118	101	110	1	0		110	110
	Temp-H20 (°C)	9.3	10.8	16.4	15.4	13.2	1	0		13.2	13.2
	TSS (mg/l)	1	<1	1	7	2	1	0		2	2
Rads	Pb210 (Bq/L)	0.07	0.12	0.03	0.04	<0.02	1	1		0.02	0.02
	Po210 (Bq/L)	<0.005	<0.005	<0.005	<0.005	<0.005	1	1		0.005	0.005
	Ra226 (Bq/L)	<0.005	<0.005	<0.005	0.020	0.005	1	0		0.005	0.005

Table 4.2.3-6 CS-2 Summary Statistics and Comparison to Historical Results

		Previous Period Averages				Year 2022 Statistics					
		2018	2019	2020	2021	Avg	Count	Count < DL	StDev	Min	Max
M Ions	Alk (mg/l)	27	28	41	50	51	1	0		51	51
	Ca (mg/l)	7.1	7.3	12.0	14.0	15.0	1	0		15.0	15.0
	Cl (mg/l)	3.1	3.6	4.4	4.8	5.4	1	0		5.4	5.4
	CO3 (mg/l)	<1	<1	<1	<1	<1	1	1		1	1
	Cond-L (µS/cm)	64	66	111	134	138	1	0		138	138
	Hardness (mg/l)	27	27	42	47	52	1	0		52	52
	HCO3 (mg/l)	33	34	50	61	62	1	0		62	62
	K (mg/l)	0.8	0.8	0.9	1.0	1.0	1	0		1.0	1.0
	Na (mg/l)	2.8	2.9	5.4	7.2	8.1	1	0		8.1	8.1
	OH (mg/l)	<1	<1	<1	<1	<1	1	1		1	1
	SO4 (mg/l)	3.7	3.9	8.1	12.0	13.0	1	0		13.0	13.0
	Sum of Ions (mg/l)	53	55	84	103	108	1	0		108	108
Metal	As (µg/l)	0.1	0.2	0.2	0.2	0.2	1	0		0.2	0.2
	Ba (mg/l)	0.0110	0.0120	0.0230	0.0350	0.0360	1	0		0.0360	0.0360
	Cu (mg/l)	0.0022	0.0013	0.0012	0.0030	0.0003	1	0		0.0003	0.0003
	Fe (mg/l)	0.0057	0.0100	0.0300	0.0830	0.0620	1	0		0.0620	0.0620
	Mo (mg/l)	0.0002	0.0003	0.0008	0.0014	0.0015	1	0		0.0015	0.0015
	Ni (mg/l)	0.0046	0.0012	0.0017	0.0040	0.0002	1	0		0.0002	0.0002
	Pb (mg/l)	0.0001	<0.0001	<0.0001	0.0002	<0.0001	1	1		0.0001	0.0001
	Se (mg/l)	<0.0001	<0.0001	0.0003	0.0006	0.0008	1	0		0.0008	0.0008
	U (µg/l)	0.5	1.4	18.0	32.0	41.0	1	0		41.0	41.0
	Zn (mg/l)	0.0037	0.0034	0.0020	0.0061	<0.0005	1	1		0.0005	0.0005
Nutrient	C-(org) (mg/l)	3.3	3.0	4.4	7.6	5.6	1	0		5.6	5.6
	NO3 (mg/l)	<0.04	0.08	<0.04	0.12	<0.04	1	1		0.04	0.04
	P-(TP) (mg/l)	<0.01	<0.01	<0.01	<0.01	<0.01	1	1		0.01	0.01
Phys Para	pH-L (pH Unit)	7.57	7.67	7.61	7.68	7.77	1	0		7.77	7.77
	TDS (mg/l)	53	34	92	85	95	1	0		95	95
	Temp-H20 (°C)	10.1	8.2	19.4	15.1	12.9	1	0		12.9	12.9
	TSS (mg/l)	1	<1	<1	5	2	1	0		2	2
Rads	Pb210 (Bq/L)	<0.02	<0.02	<0.02	0.02	<0.02	1	1		0.02	0.02
	Po210 (Bq/L)	<0.005	<0.005	<0.005	<0.005	<0.005	1	1		0.005	0.005
	Ra226 (Bq/L)	<0.005	0.007	0.006	0.010	0.007	1	0		0.007	0.007

Table 4.3.1-1 ZOR-01 Summary Statistics and Comparison to Historical Results

		Previous Period Averages				Year 2022 Statistics					
		2018	2019	2020	2021	Avg	Count	Count < DL	StDev	Min	Max
M Ions	Alk (mg/l)	96	94	101	93	92	8	0	9	81	106
	Ca (mg/l)	31.2	30.5	32.1	29.9	30.4	8	0	3.0	26.0	35.0
	Cl (mg/l)	0.3	0.3	0.3	0.4	0.3	8	0	0.1	0.2	0.4
	CO3 (mg/l)	<1	<1	<1	<1	<1	8	8	0	1	1
	Cond-L (µS/cm)	213	204	218	207	208	8	0	21	181	236
	Hardness (mg/l)	110	108	112	103	105	8	0	11	90	121
	HCO3 (mg/l)	117	115	123	113	112	8	0	11	99	129
	K (mg/l)	0.8	0.8	0.8	0.7	0.7	8	0	0.1	0.6	0.9
	Na (mg/l)	1.8	1.8	1.8	1.7	1.8	8	0	0.3	1.4	2.2
	OH (mg/l)	<1	<1	<1	<1	<1	8	8	0	1	1
	SO4 (mg/l)	18.8	17.9	18.0	16.3	16.3	8	0	1.9	14.0	19.0
	Sum of Ions (mg/l)	178	174	184	169	169	8	0	18	147	195
Metal	As (µg/l)	0.2	0.1	0.2	0.1	0.1	7	0	0.0	0.1	0.2
	Ba (mg/l)	0.0217	0.0208	0.0230	0.0216	0.0226	8	0	0.0042	0.0180	0.0320
	Cu (mg/l)	0.0009	0.0009	0.0016	0.0015	0.0011	7	0	0.0009	0.0004	0.0031
	Fe (mg/l)	0.0087	0.0048	0.0092	0.0163	0.0091	7	0	0.0044	0.0055	0.0180
	Mo (mg/l)	0.0008	0.0008	0.0009	0.0008	0.0010	8	0	0.0002	0.0007	0.0013
	Ni (mg/l)	0.0001	0.0002	0.0002	0.0003	0.0003	8	1	0.0003	0.0001	0.0011
	Pb (mg/l)	0.0001	0.0002	0.0003	0.0002	0.0002	7	3	0.0001	0.0001	0.0003
	Se (mg/l)	0.0001	0.0001	0.0001	0.0001	0.0002	8	1	0.0001	0.0001	0.0005
	U (µg/l)	15.8	15.4	15.4	12.3	11.5	7	0	1.1	9.5	13.0
	Zn (mg/l)	0.0009	0.0019	0.0031	0.0025	0.0029	8	1	0.0029	0.0005	0.0076
Nutrient	C-(org) (mg/l)	8.2	7.9	9.2	11.0	8.8	1	0		8.8	8.8
	NO3 (mg/l)	<0.04	0.11	<0.04	0.09	<0.04	1	1		0.04	0.04
	P-(TP) (mg/l)	<0.01	<0.01	<0.01	<0.01	<0.01	1	1		0.01	0.01
Phys Para	pH-L (pH Unit)	8.08	8.00	7.92	7.88	7.88	8	0	0.15	7.57	8.04
	TDS (mg/l)	148	134	148	136	135	8	0	15	118	167
	Temp-H20 (°C)	11.9	11.5	10.8	10.6	12.3	8	0	5.7	4.5	19.1
	TSS (mg/l)	1	2	1	2	1	7	5	0	1	1
Rads	Pb210 (Bq/L)	0.02	0.03	0.03	<0.02	<0.02	1	1		0.02	0.02
	Po210 (Bq/L)	0.009	0.005	0.008	<0.005	<0.005	1	1		0.005	0.005
	Ra226 (Bq/L)	0.030	0.019	0.022	0.023	0.022	8	1	0.010	0.005	0.040

Table 4.3.1-2 ZOR-02 Summary Statistics and Comparison to Historical Results

		Previous Period Averages				Year 2022 Statistics					
		2018	2019	2020	2021	Avg	Count	Count < DL	StDev	Min	Max
M Ions	Alk (mg/l)	95	99	103	102	103	8	0	13	84	125
	Ca (mg/l)	41.3	46.3	38.2	38.2	40.9	8	0	11.2	30.0	62.0
	Cl (mg/l)	0.5	0.6	0.4	0.4	0.5	8	2	0.4	0.2	1.0
	CO3 (mg/l)	<1	<1	<1	<1	<1	8	8	0	1	1
	Cond-L (µS/cm)	272	297	254	254	267	8	0	63	203	381
	Hardness (mg/l)	138	154	130	128	135	8	0	34	101	200
	HCO3 (mg/l)	116	121	125	124	126	8	0	16	102	152
	K (mg/l)	0.8	0.9	0.8	0.7	0.8	8	0	0.1	0.6	1.0
	Na (mg/l)	2.0	2.1	1.9	1.9	2.1	8	0	0.3	1.7	2.6
	OH (mg/l)	<1	<1	<1	<1	<1	8	8	0	1	1
	SO4 (mg/l)	46.9	56.9	31.8	31.3	37.3	8	0	20.3	18.0	74.0
	Sum of Ions (mg/l)	216	238	207	205	216	8	0	47	163	305
Metal	As (µg/l)	0.2	0.2	0.2	0.2	0.2	8	0	0.0	0.1	0.2
	Ba (mg/l)	0.0257	0.0251	0.0229	0.0227	0.0255	8	0	0.0042	0.0190	0.0320
	Cu (mg/l)	0.0015	0.0018	0.0013	0.0018	0.0017	8	0	0.0006	0.0006	0.0024
	Fe (mg/l)	0.1996	0.4163	0.0476	0.0669	0.0715	8	0	0.0292	0.0140	0.1200
	Mo (mg/l)	0.0014	0.0016	0.0012	0.0012	0.0012	8	0	0.0003	0.0008	0.0016
	Ni (mg/l)	0.0002	0.0004	0.0002	0.0002	0.0002	8	0	0.0001	0.0001	0.0003
	Pb (mg/l)	0.0002	0.0004	0.0001	0.0002	<0.0001	8	8	0.0000	0.0001	0.0001
	Se (mg/l)	0.0003	0.0004	0.0002	0.0002	0.0002	8	0	0.0001	0.0001	0.0003
	U (µg/l)	340.6	475.4	164.0	218.1	290.4	8	0	217.7	23.0	636.0
	Zn (mg/l)	<0.0005	0.0011	0.0006	0.0012	<0.0005	8	8	0.0000	0.0005	0.0005
Nutrient	C-(org) (mg/l)	6.8	6.2	8.3	10.0	7.3	1	0		7.3	7.3
	NO3 (mg/l)	0.61	0.99	0.19	0.33	0.58	1	0		0.58	0.58
	P-(TP) (mg/l)	<0.01	<0.01	<0.01	<0.01	<0.01	1	1		0.01	0.01
Phys Para	pH-L (pH Unit)	7.98	7.91	7.92	7.94	7.93	8	0	0.10	7.72	8.03
	TDS (mg/l)	189	203	177	171	182	8	0	39	134	246
	Temp-H20 (°C)	8.2	9.7	10.3	9.4	10.3	8	0	5.3	2.7	16.8
	TSS (mg/l)	1	2	1	2	1	8	7	0	1	2
Rads	Pb210 (Bq/L)	0.34	0.48	0.11	0.05	0.05	1	0		0.05	0.05
	Po210 (Bq/L)	0.010	0.010	0.020	0.030	0.050	1	0		0.050	0.050
	Ra226 (Bq/L)	0.253	0.238	0.140	0.154	0.165	8	0	0.075	0.060	0.260

Table 4.3-3 Downstream Water Quality

Year	Flow Path (ZOR-02)		Verna Lake (AC-6A)		Ace Lake (AC-8)	
	Uranium (µg/l)	Radium (Bq/L)	Uranium (µg/l)	Radium (Bq/L)	Uranium (µg/l)	Radium (Bq/L)
2010	1560.0	0.400	263.0	0.100	15.3	0.015
2011	940.0	1.200			16.5	0.015
2012			117.0	0.085	13.5	0.009
2013	624.8	0.368	201.0	0.140	11.5	0.020
2014	313.8	0.336	154.0	0.150	11.5	0.020
2015	595.2	0.667	389.3	0.109	13.5	0.030
2016	332.7	0.235	331.0	0.108	14.5	0.015
2017	424.5	0.311	279.3	0.115	12.5	0.025
2018	340.6	0.253	278.5	0.100	12.5	0.020
2019	451.1	0.232	271.5	0.090	12.5	0.025
2020	164.0	0.140	292.0	0.099	12.0	0.005
2021	218.1	0.154	248.3	0.097	8.9	0.010
2022	290.4	0.165	204.3	0.087	8.6	0.010

Table 4.5.1 Radon Track Etch Summary

	Annual Average (Bq/m3) and Sample Number (n)										
	1982	2018		2019		2020		2021		2022	
		Average	n	Average	n	Average	n	Average	n	Average	n
Ace Creek Track Etch Cup	395.9	257.5	2	285.5	285.5	203.0	1	267.0	2	270	2
Eldorado Townsite Track Etch Cup	136.9	25.0	2	27.0	27	31.0	1	37.5	2	35	2
Fookes Delta Track Etch Cup	217.8	100.0	2	126.5	126.5	101.0	1	104.0	2	145	2
Marie Delta Track Etch Cup	144.5	94.5	2	96.0	96	59.0	1	98.0	2	115	2
Uranium City Town Track Etch Cup		5.5	2	7.0	7	7.0	1	11.5	2	13.5	2

FIGURES

FIGURES

Figure 2.4 Beaverlodge Location Map

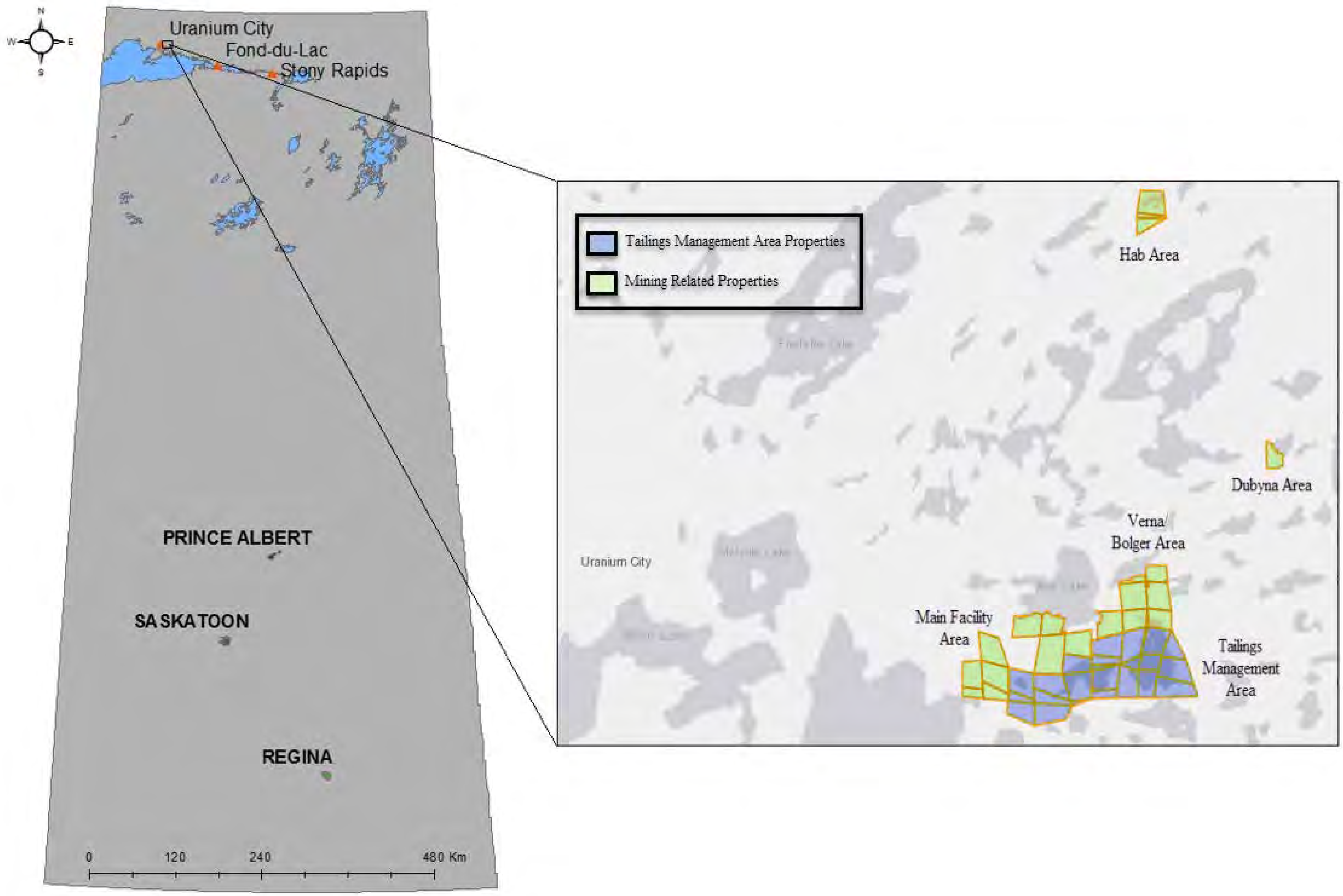


Figure 4.2 Regulatory Water Quality Monitoring Station Locations

Figure 4.2.1-1 AN-5 Pistol Creek below Hab Site

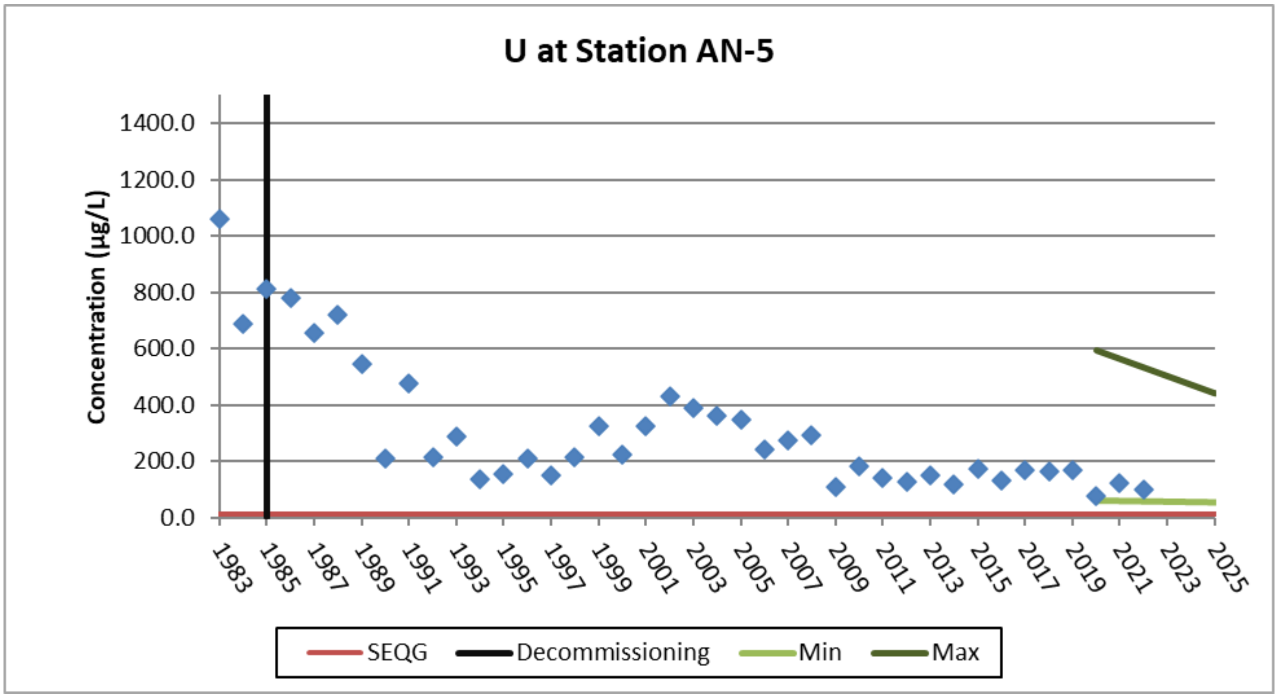


Figure 4.2.1-2 AN-5 Pistol Creek below Hab Site

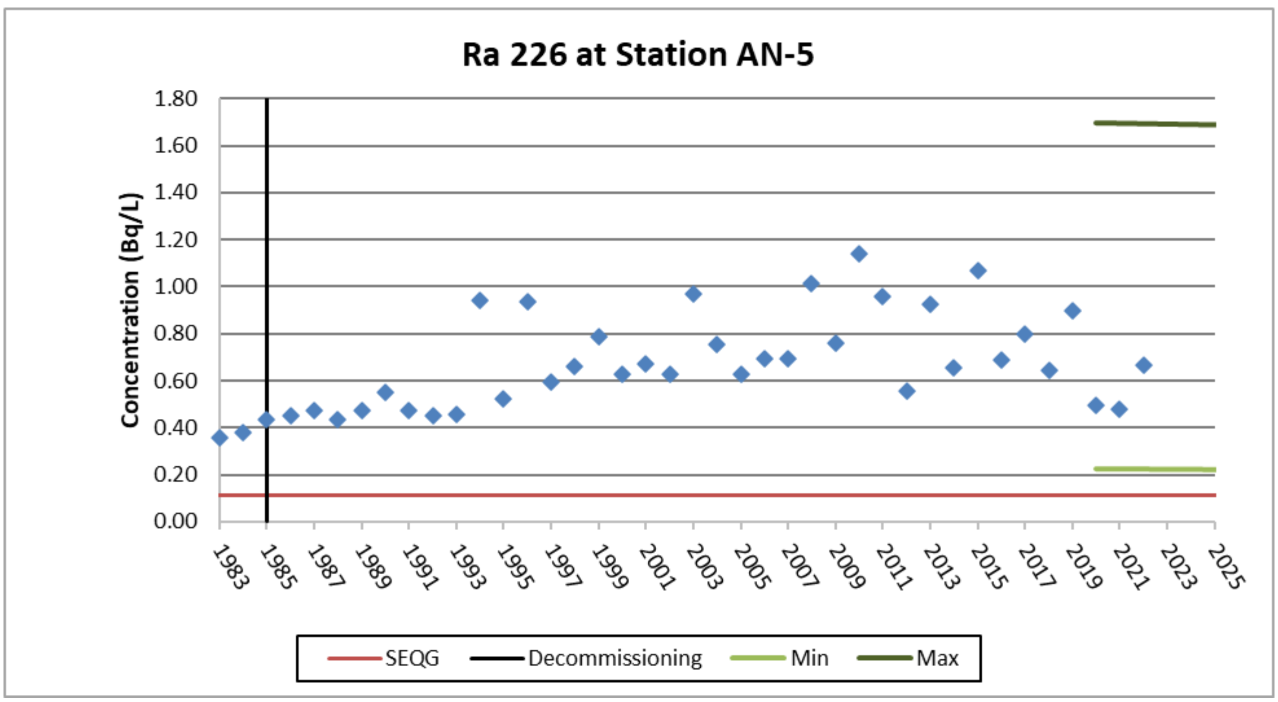
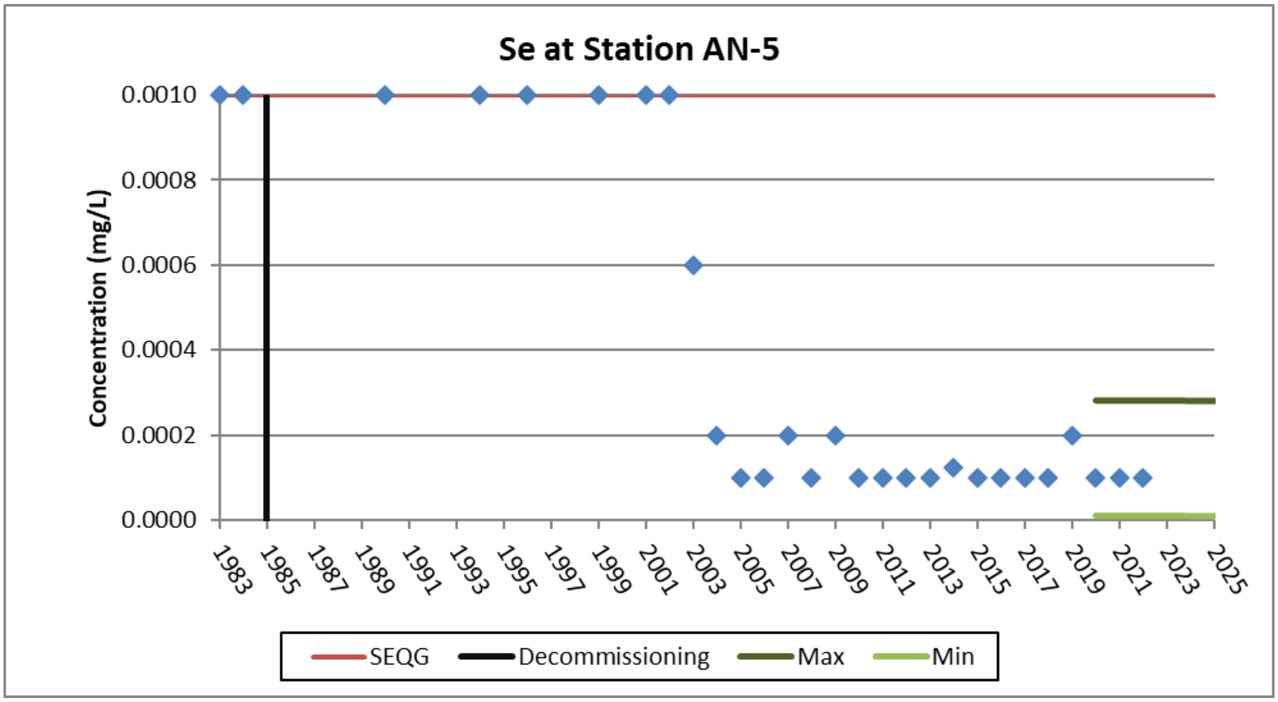


Figure 4.2.1-3 AN-5 Pistol Creek below Hab Site



Note: Method detection limit changed from 0.001 mg/L to 0.0001 mg/L in 2003.

Figure 4.2.1-4 AN-5 Pistol Creek below Hab Site

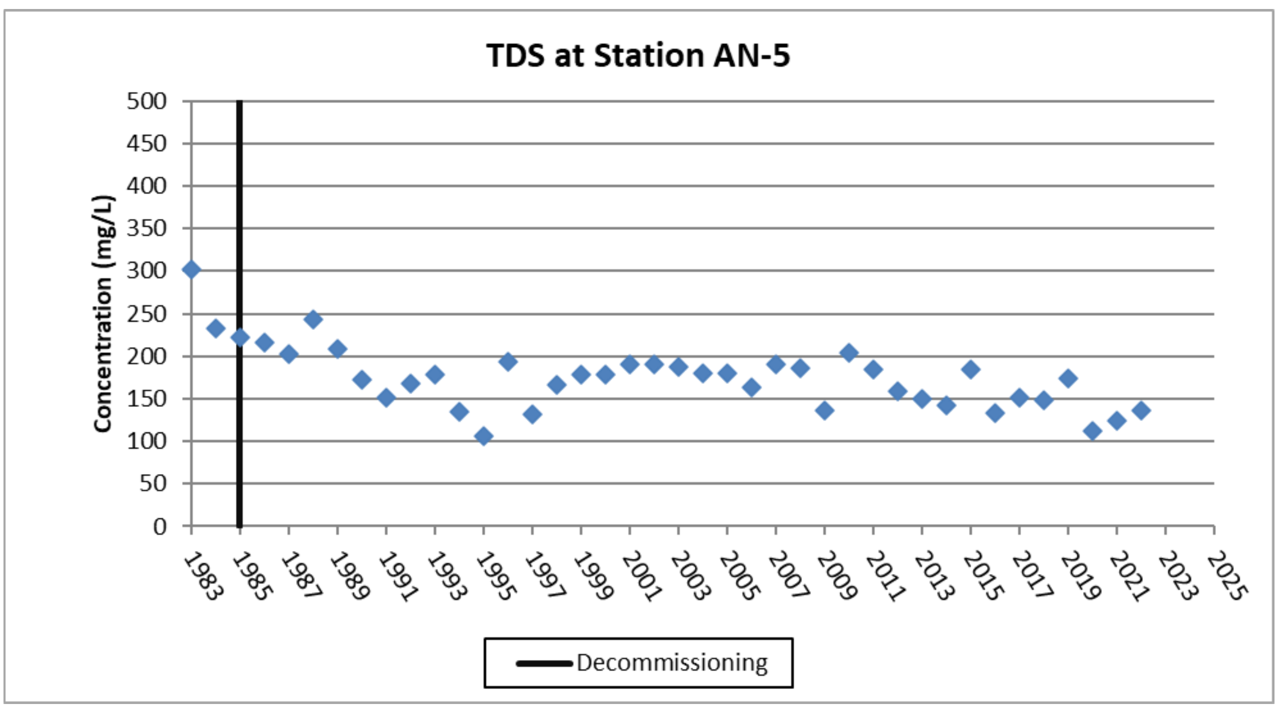


Figure 4.2.1-5 DB-6 Dubyna Creek

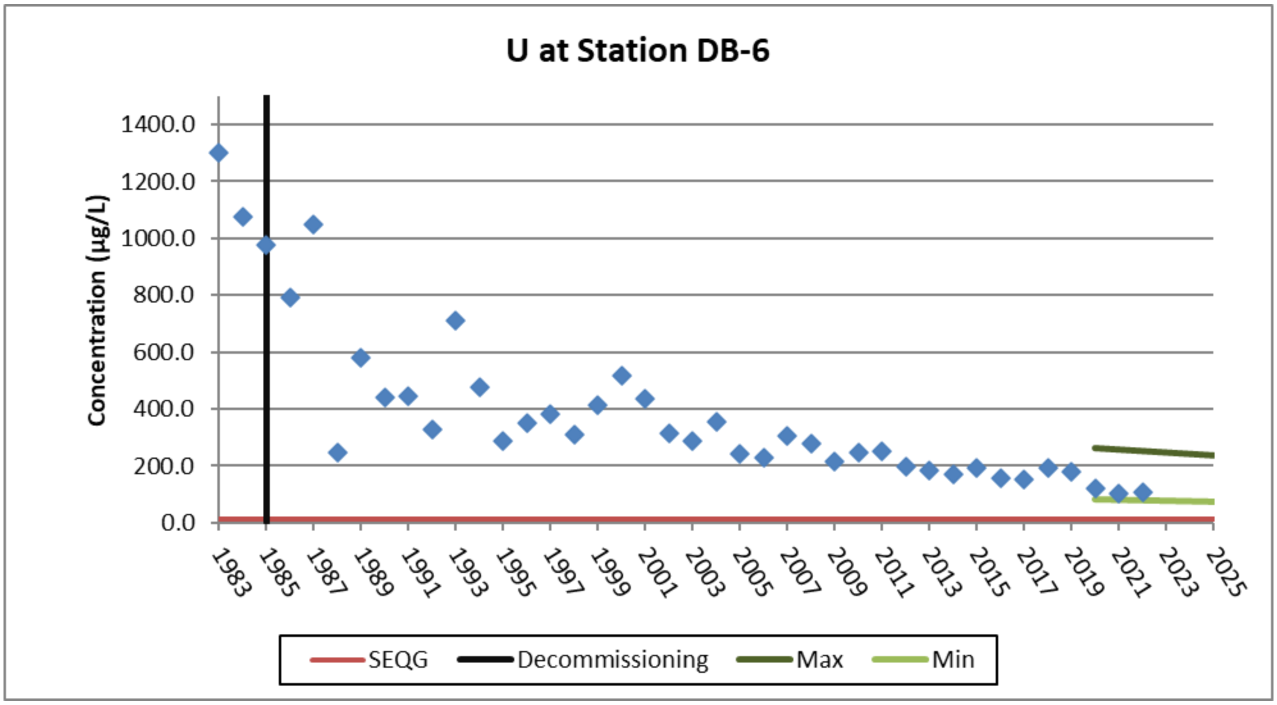


Figure 4.2.1-6 DB-6 Dubyna Creek

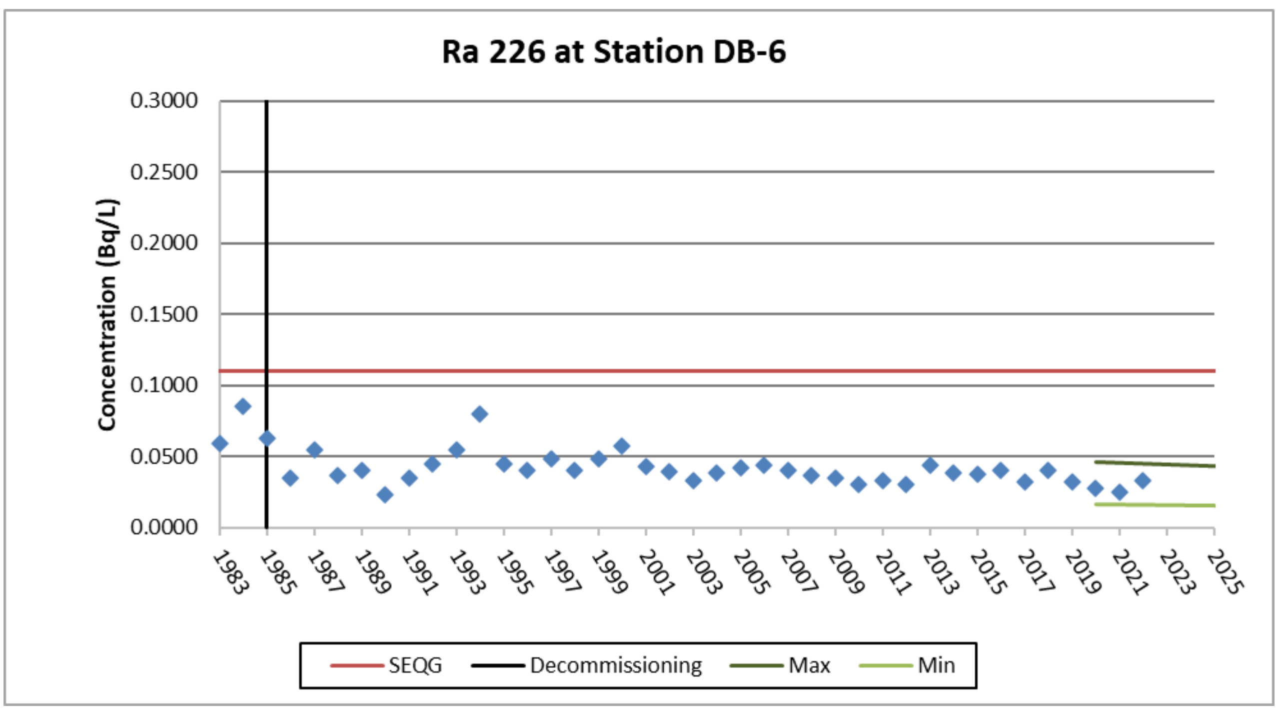


Figure 4.2.1-7 DB-6 Dubyna Creek

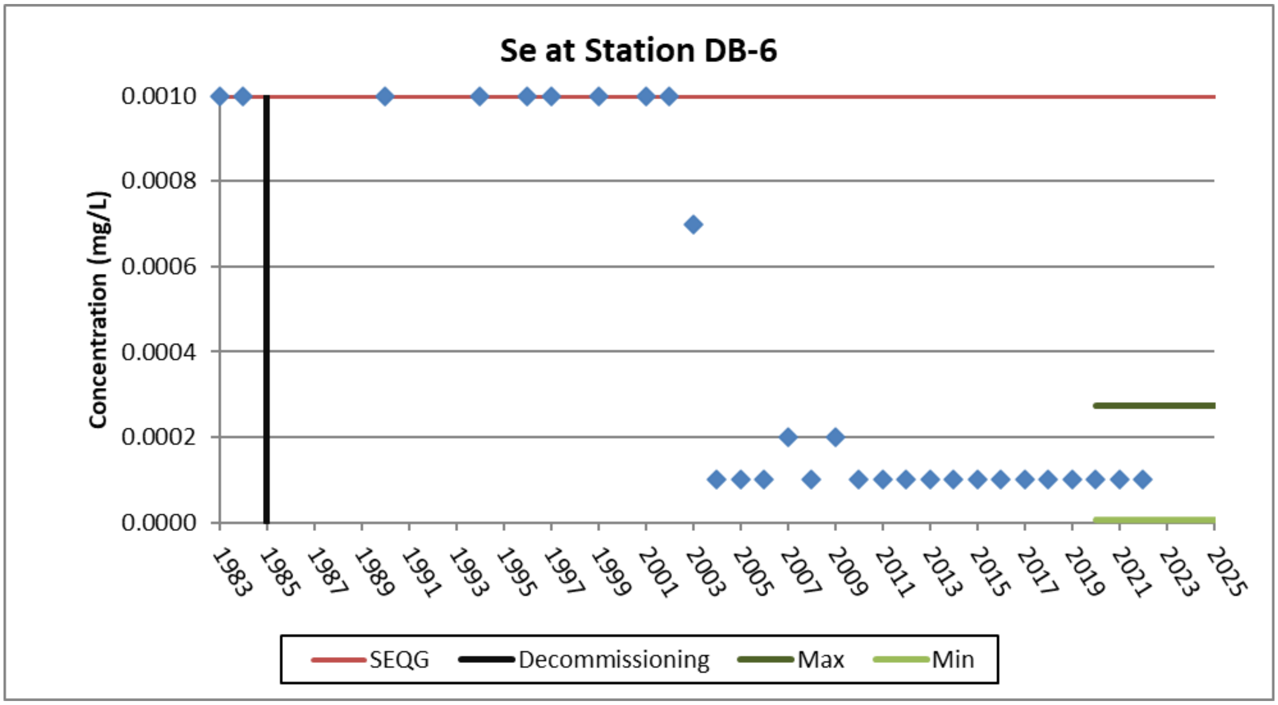


Figure 4.2.1-8 DB-6 Dubyna Creek

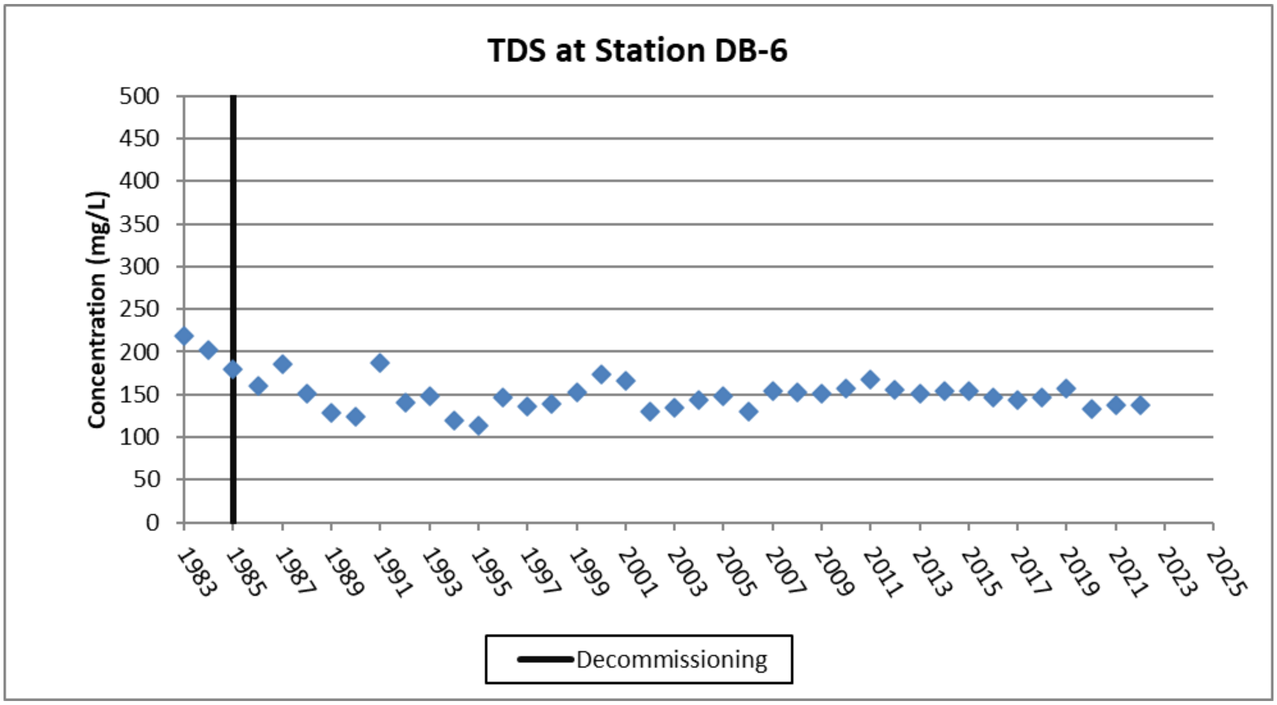


Figure 4.2.1-9 AC-6A Verna Lake Outlet to Ace Lake

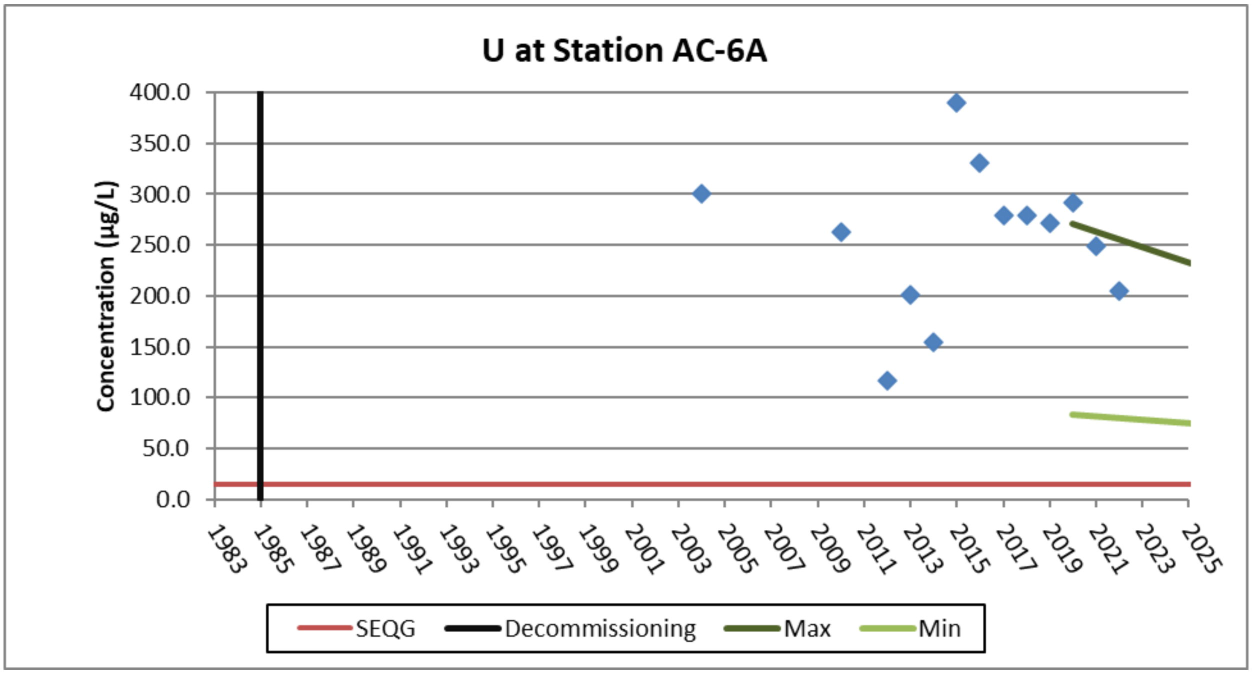


Figure 4.2.1-10 AC-6A Verna Lake Outlet to Ace Lake

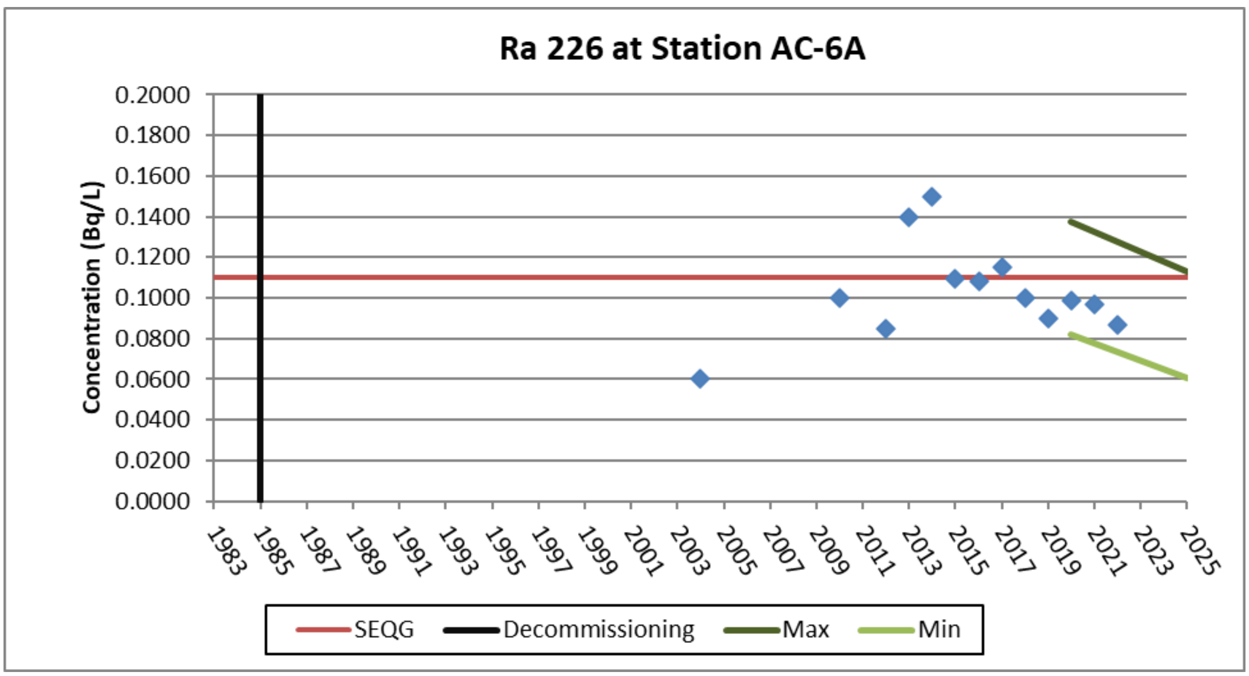
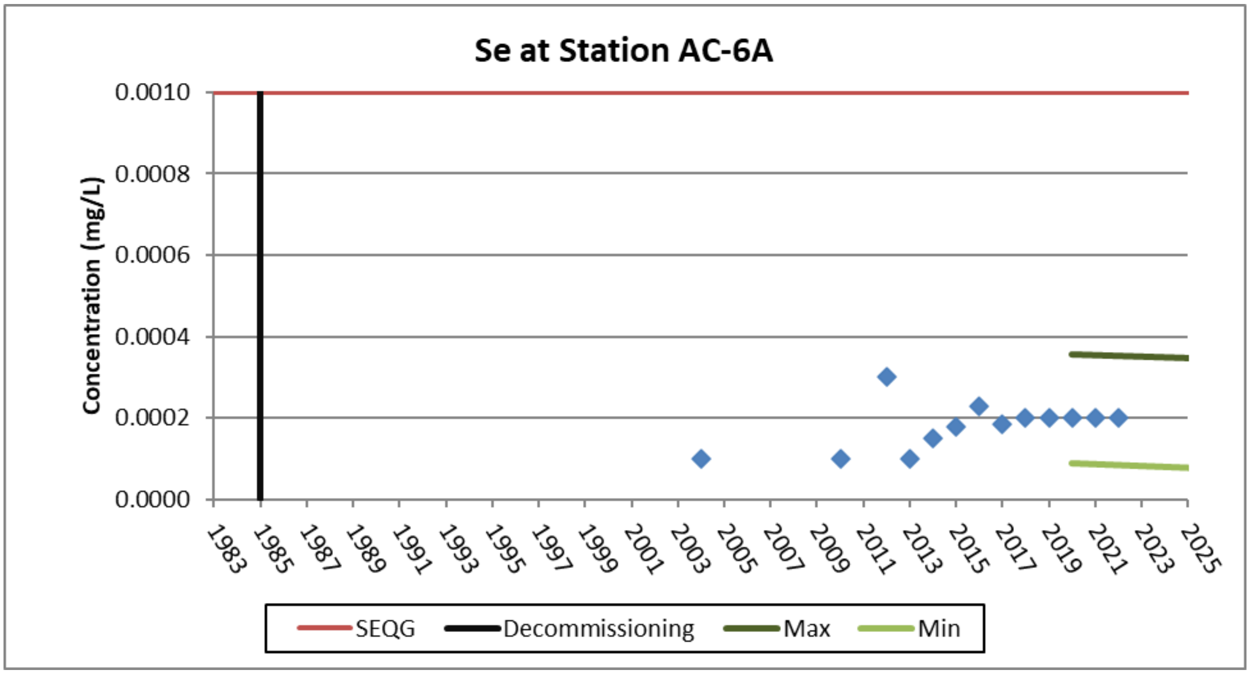


Figure 4.2.1-11 AC-6A Verna Lake Outlet to Ace Lake



Note: Method detection limit changed from 0.001 mg/L to 0.0001 mg/L in 2003.

Figure 4.2.1-12 AC-6A Verna Lake Outlet to Ace Lake

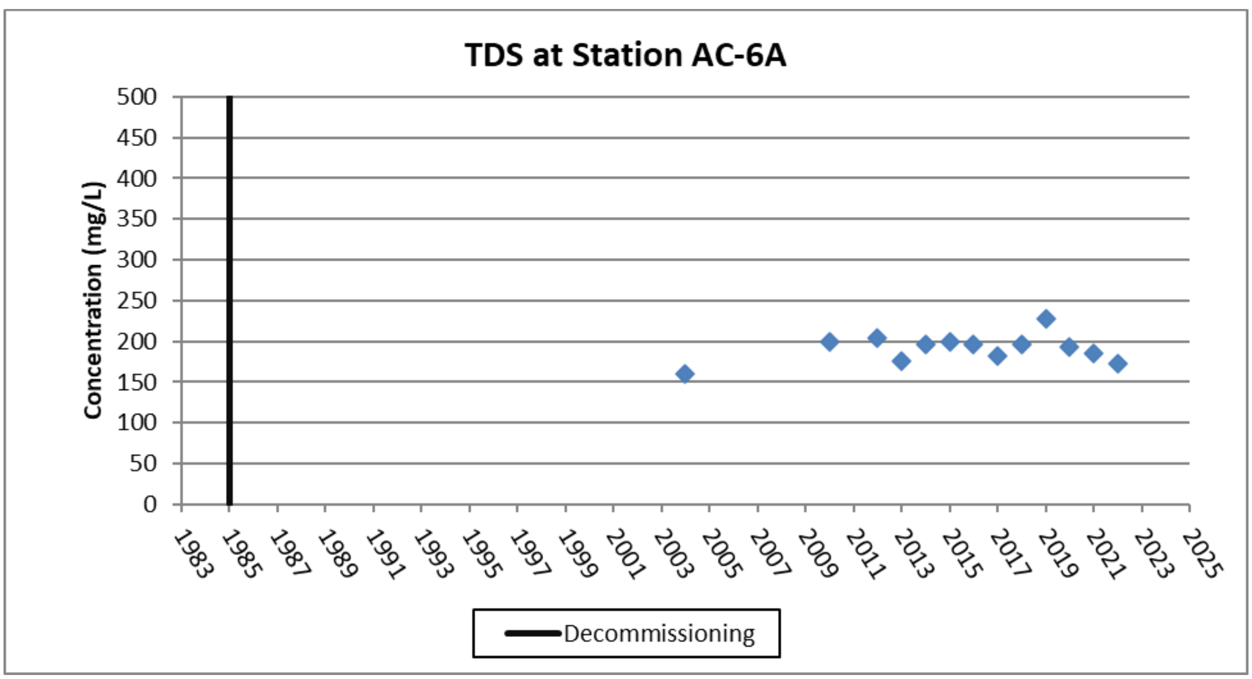


Figure 4.2.1-13 AC-8 Ace Lake Outlet to Ace Creek

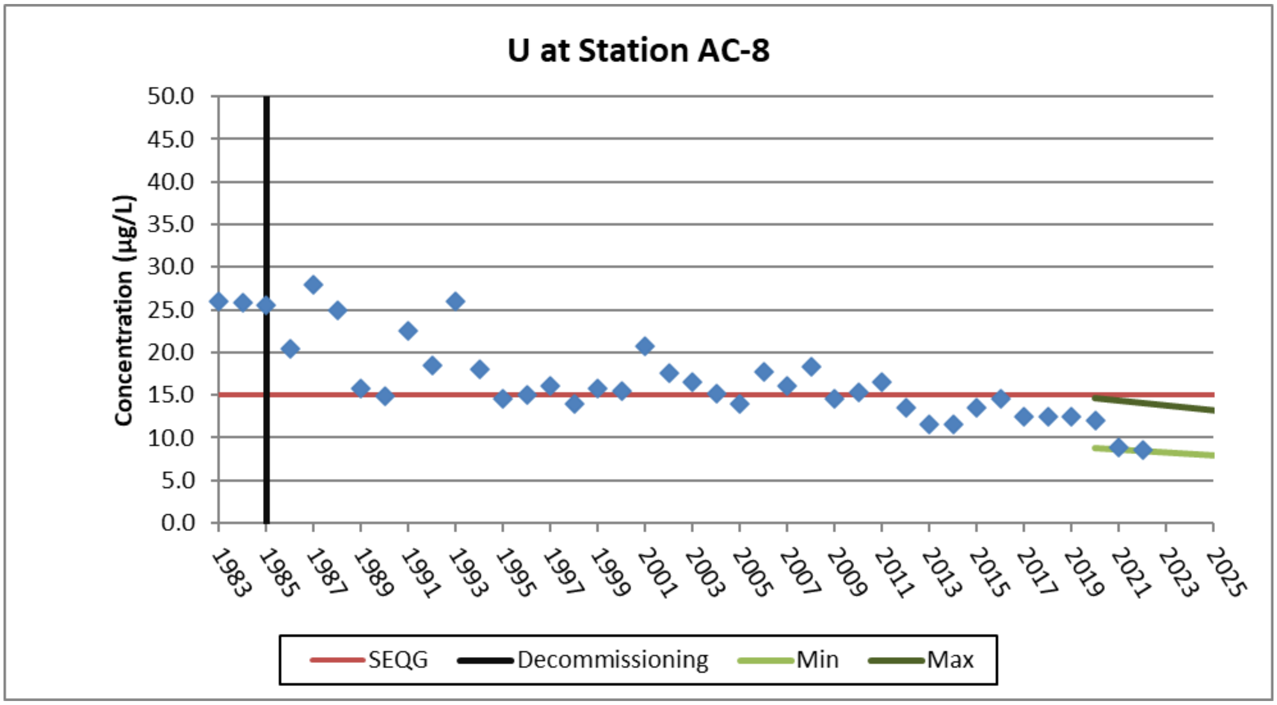


Figure 4.2.1-14 AC-8 Ace Lake Outlet to Ace Creek

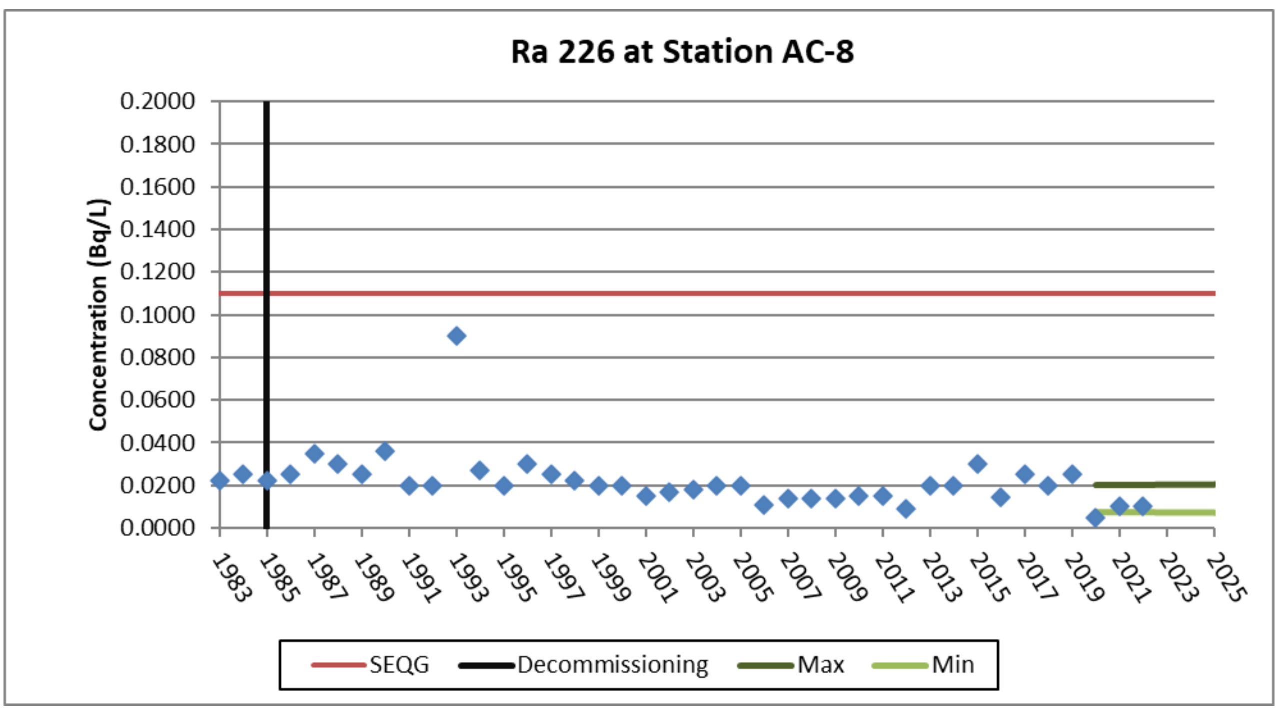
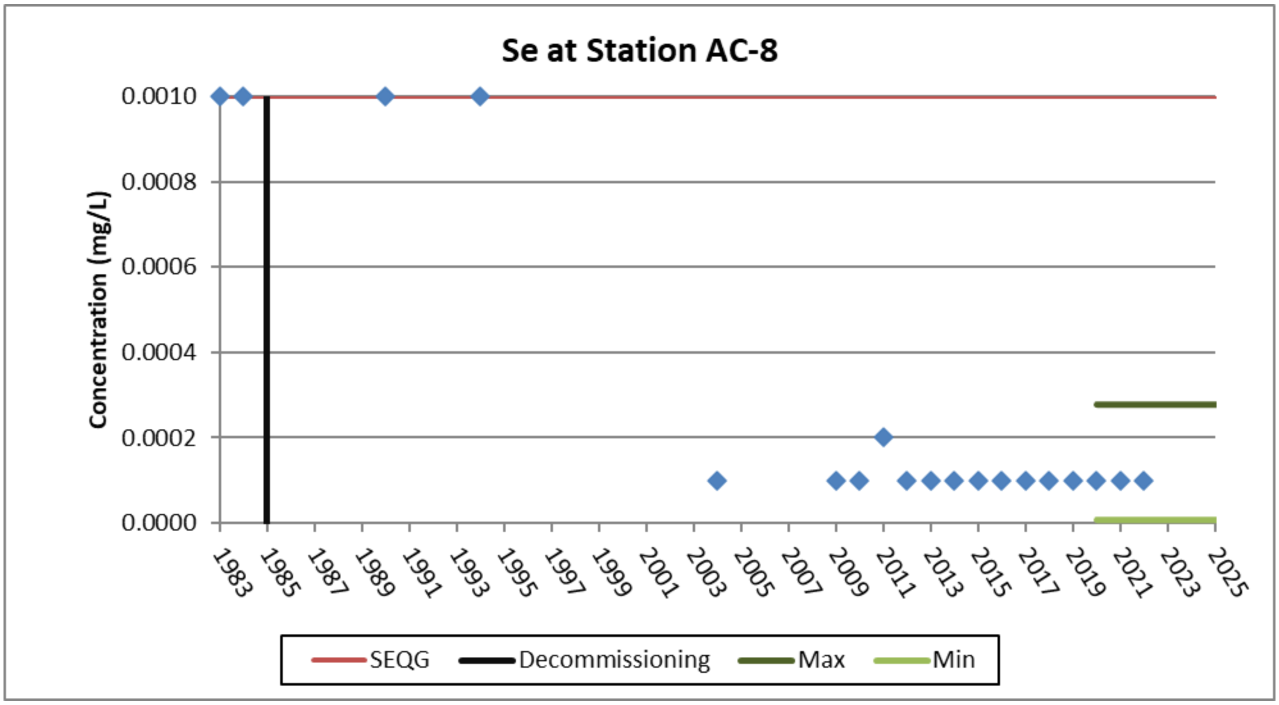


Figure 4.2.1-15 AC-8 Ace Lake Outlet to Ace Creek



Note: Method detection limit changed from 0.001 mg/L to 0.0001 mg/L in 2003.

Figure 4.2.1-16 AC-8 Ace Lake Outlet to Ace Creek

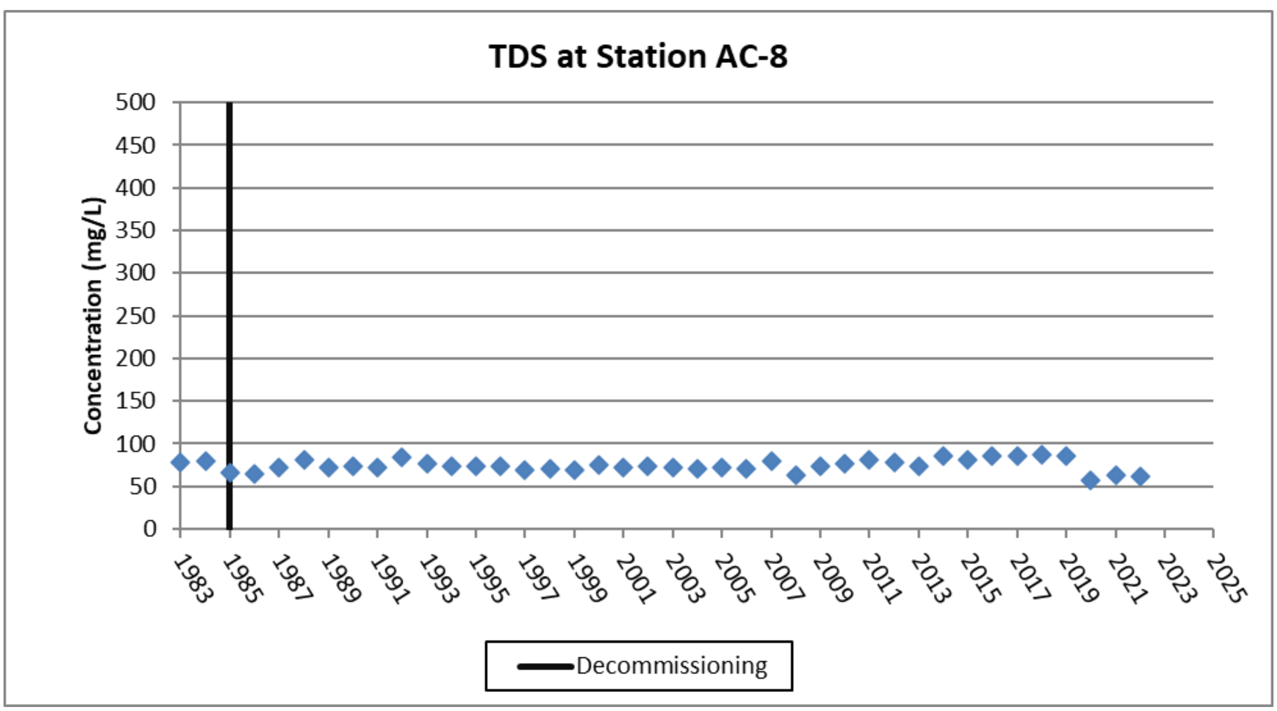


Figure 4.2.1-17 AC-14 - Ace Creek

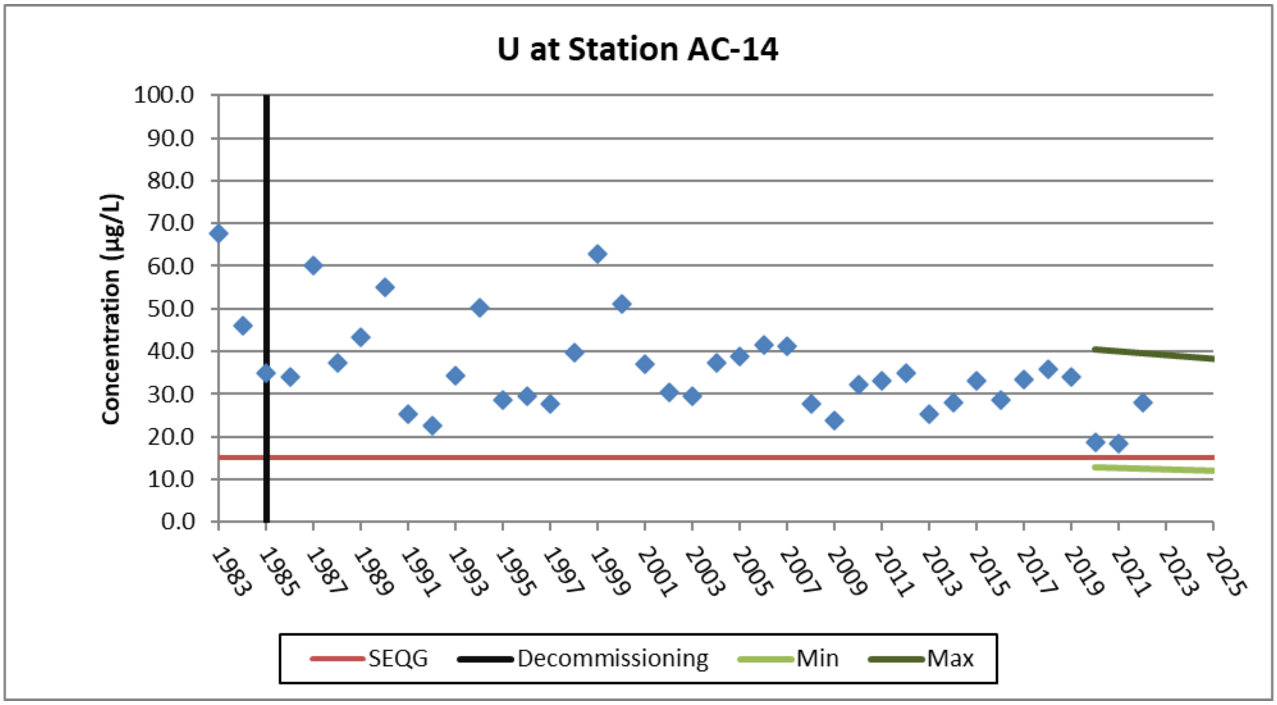


Figure 4.2.1-18 AC-14 - Ace Creek

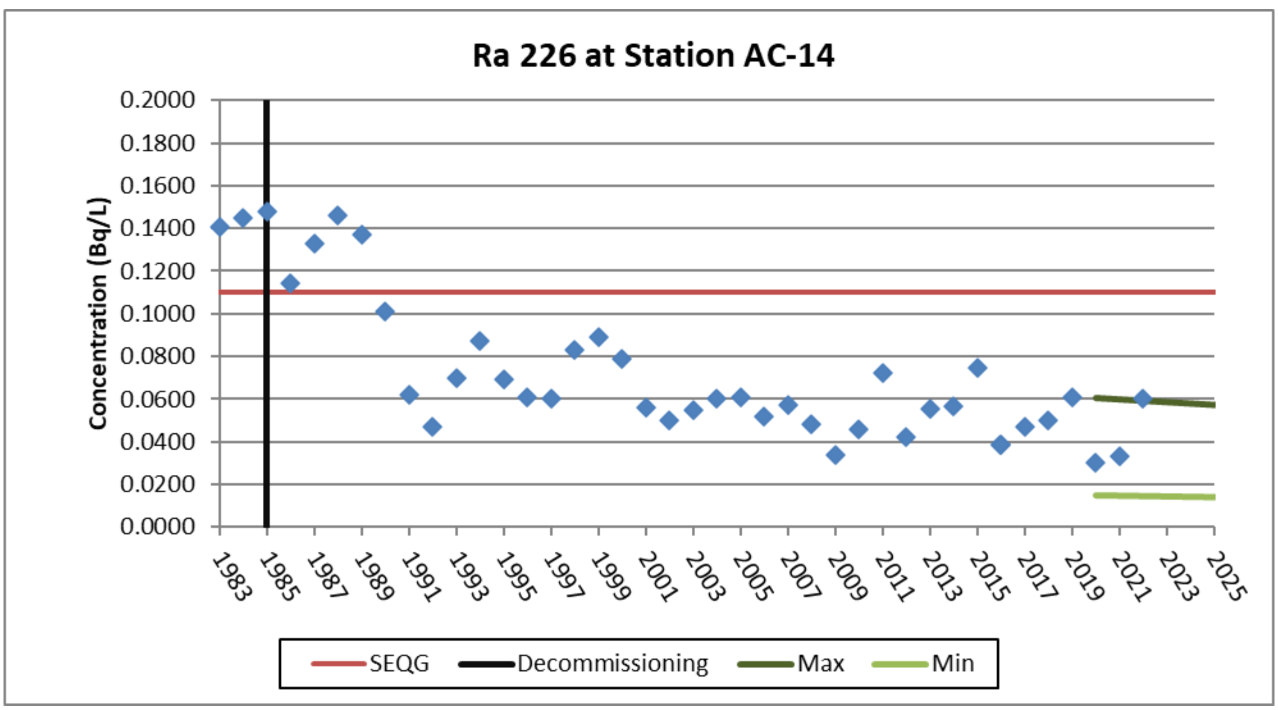
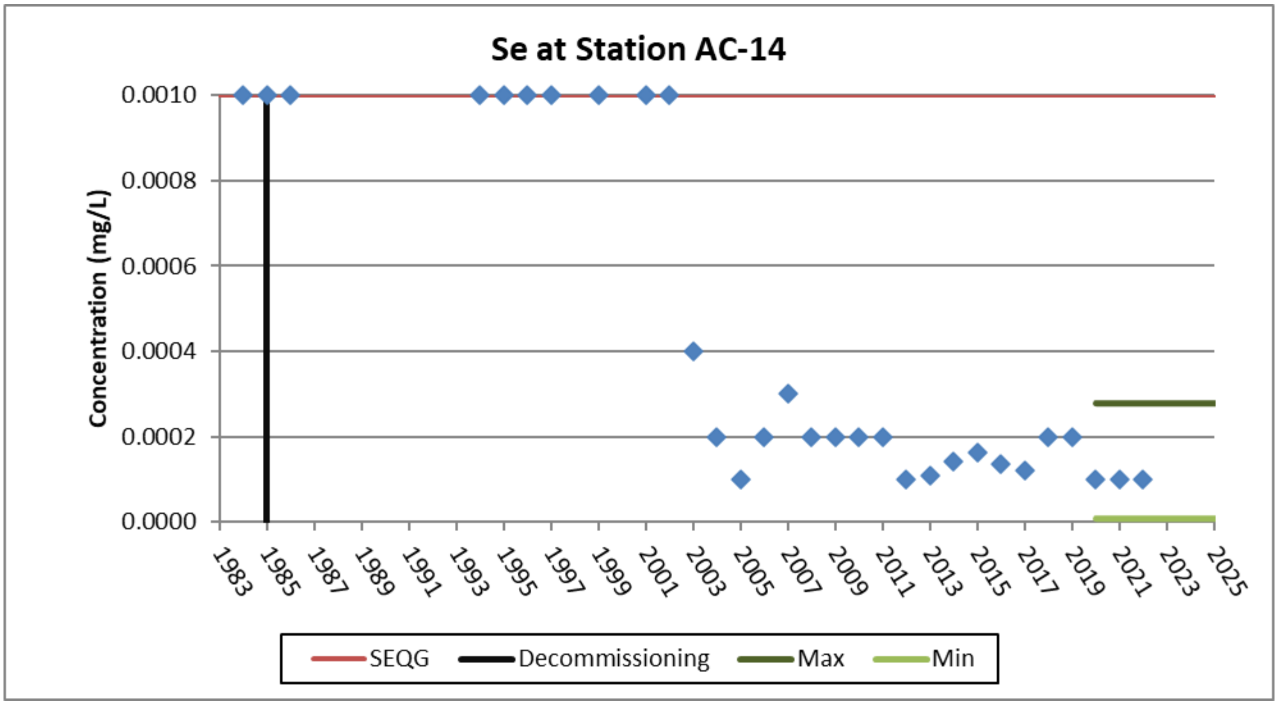


Figure 4.2.1-19 AC-14 - Ace Creek



Note: Method detection limit changed from 0.001 mg/L to 0.0001 mg/L in 2003.

Figure 4.2.1-20 AC-14 - Ace Creek

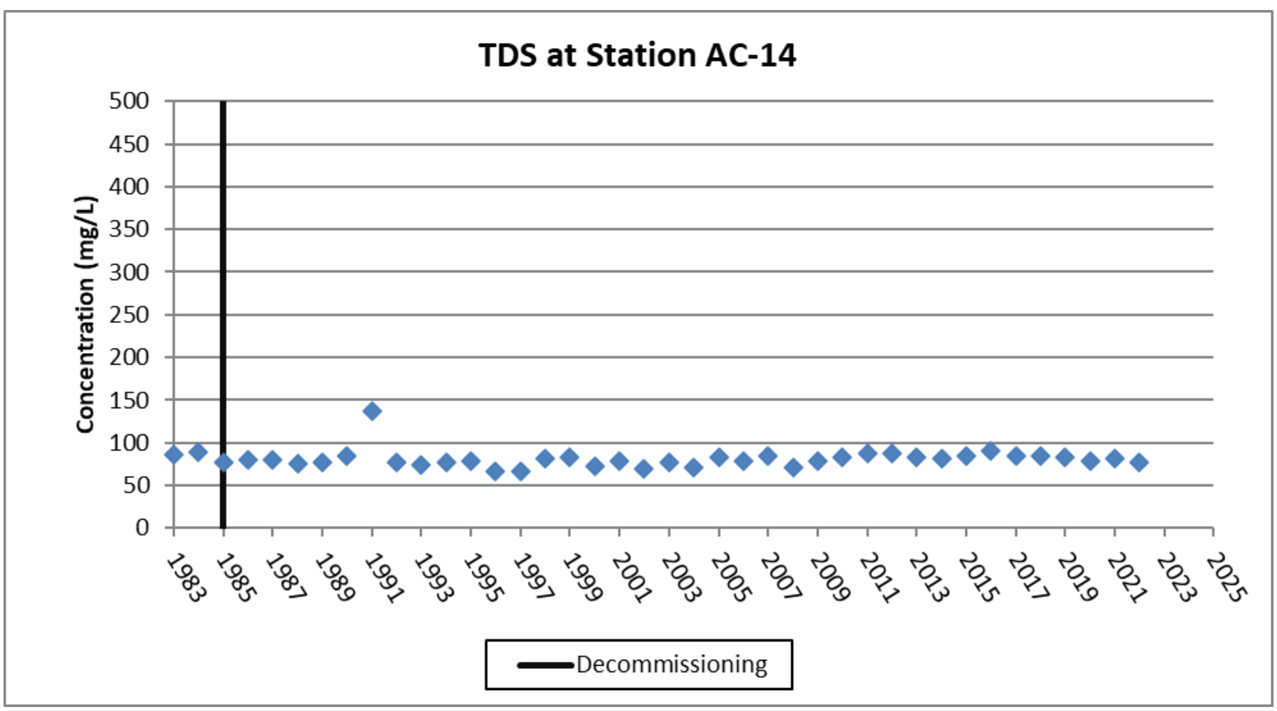
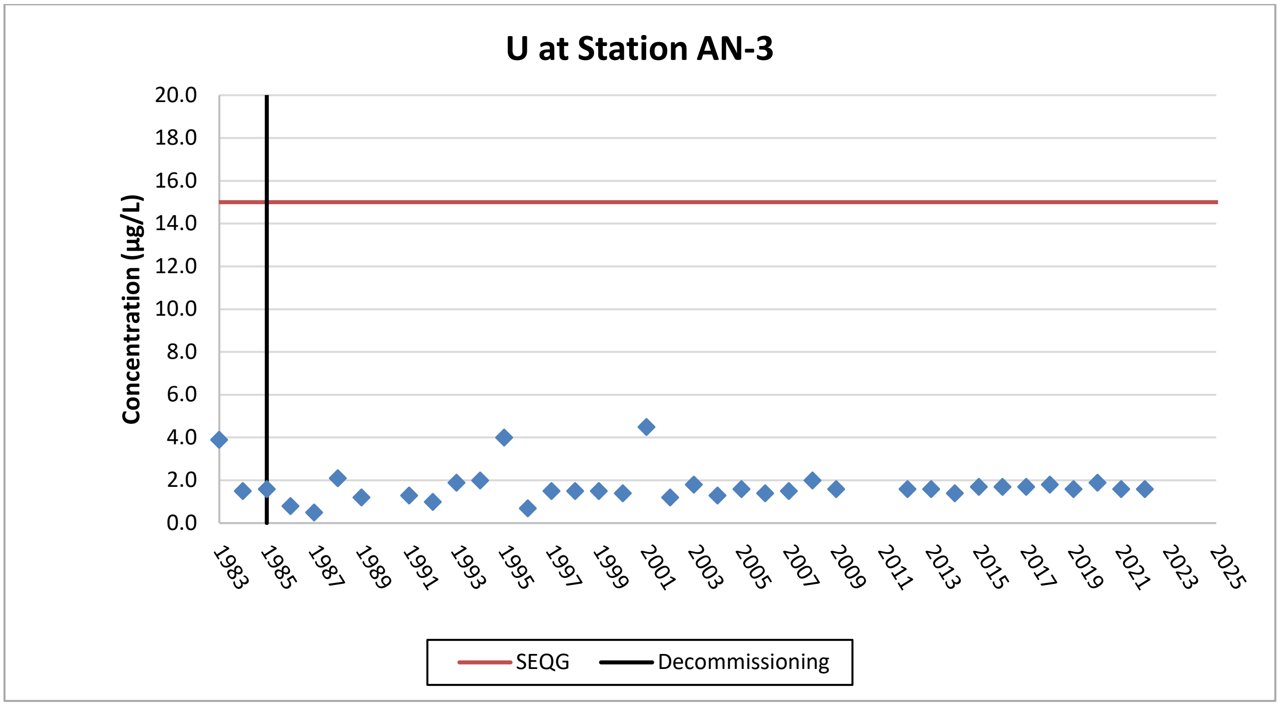
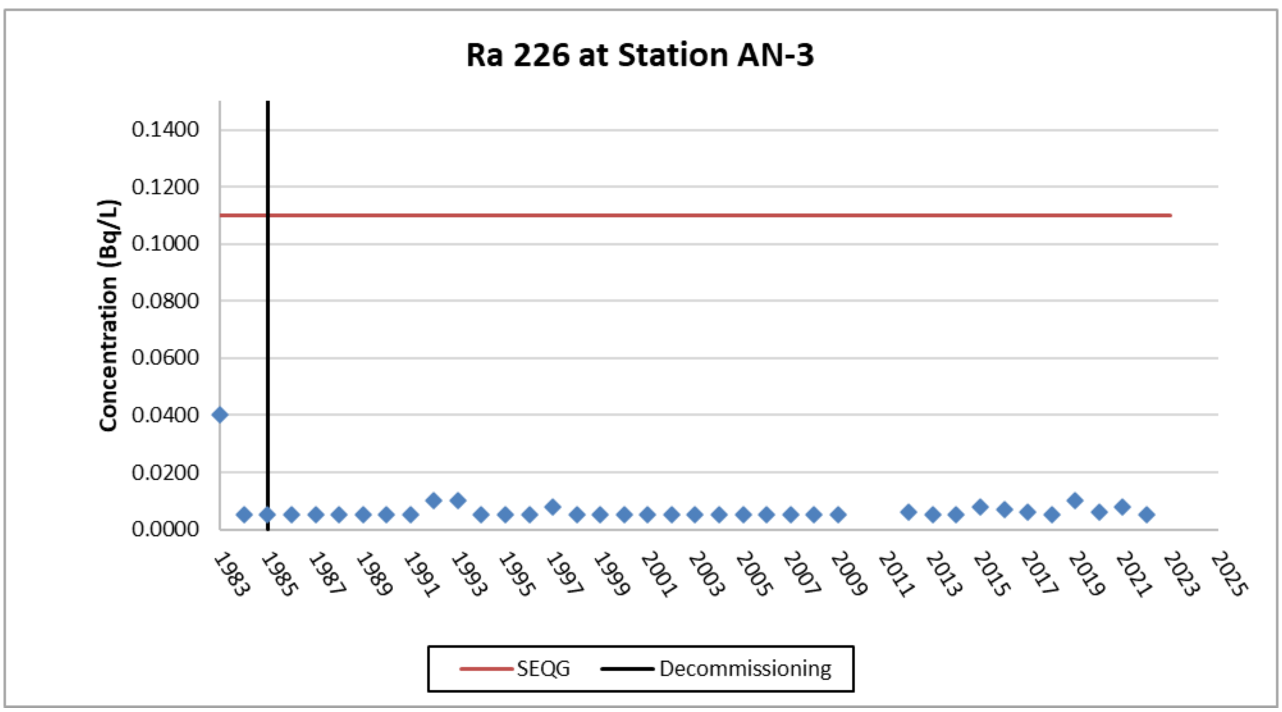


Figure 4.2.2-1 AN-3 Fulton Lake (Upstream of TL Stations)



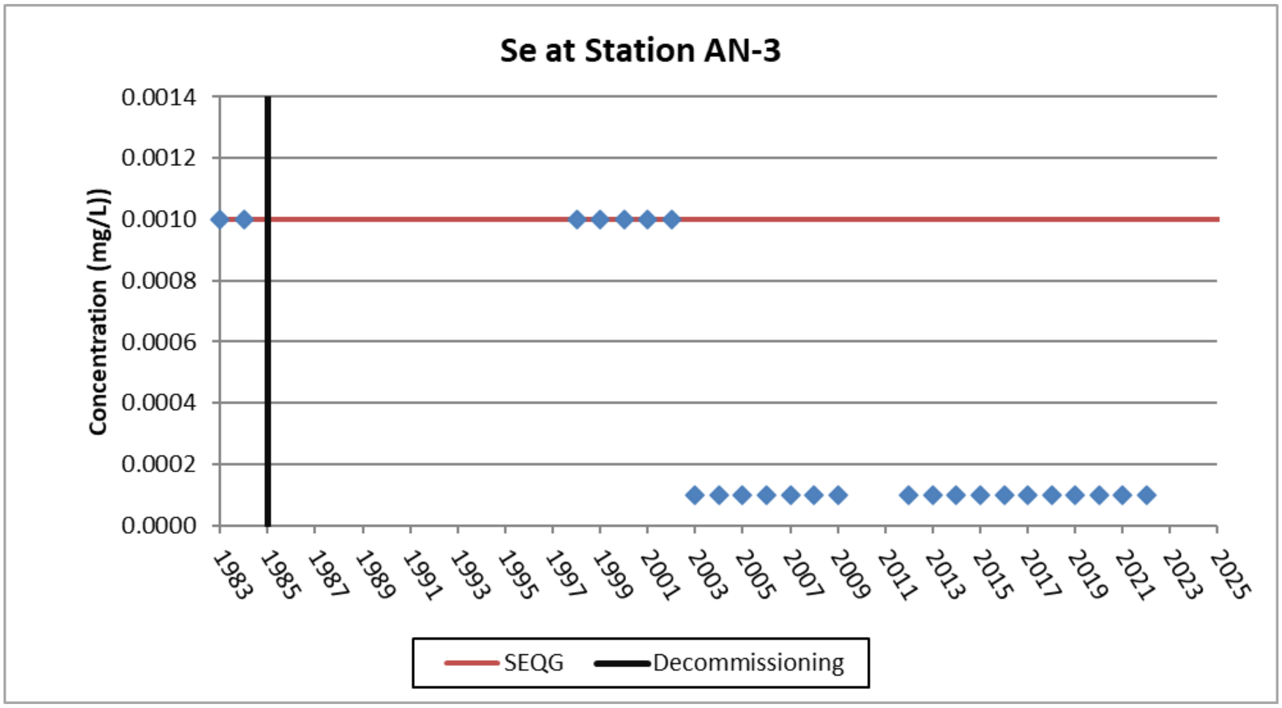
**The 2010 and 2011 scheduled sampling was not completed due to a lack of water flow.*

Figure 4.2.2-2 AN-3 Fulton Lake (Upstream of TL Stations)



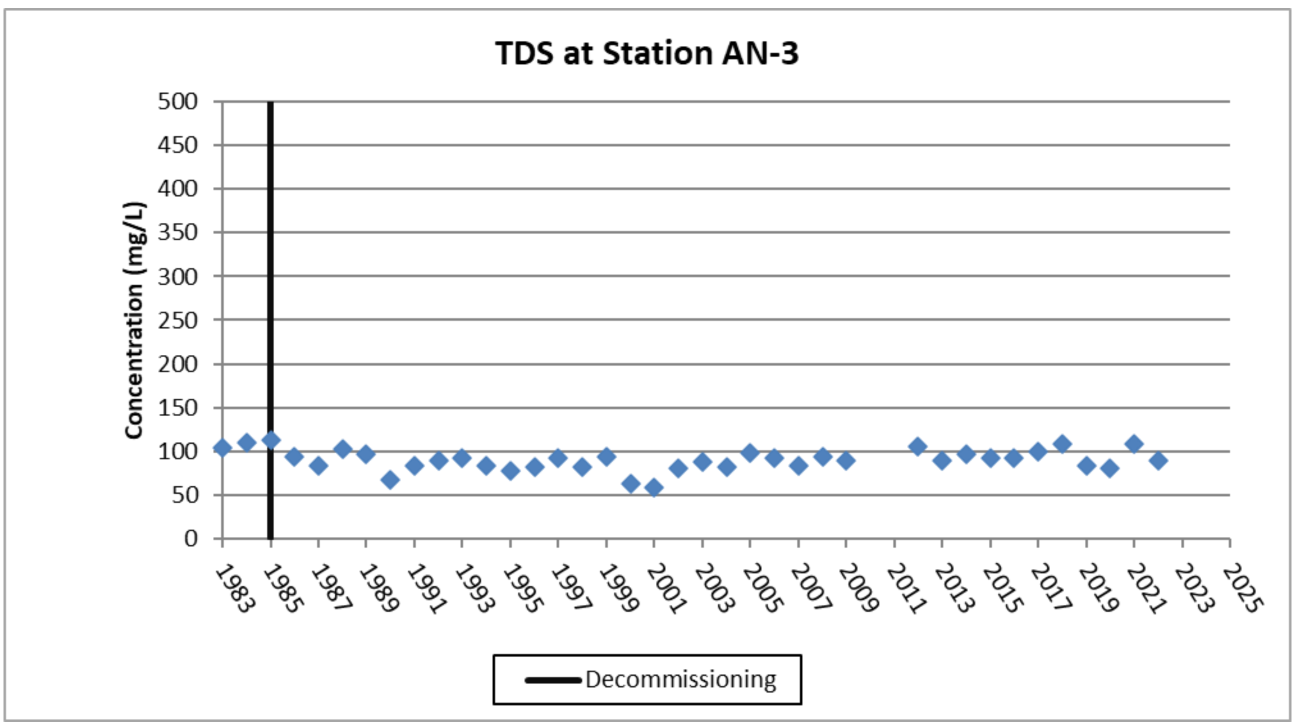
**The 2010 and 2011 scheduled sampling was not completed due to a lack of water flow.*

Figure 4.2.2-3 AN-3 Fulton Lake (Upstream of TL Stations)



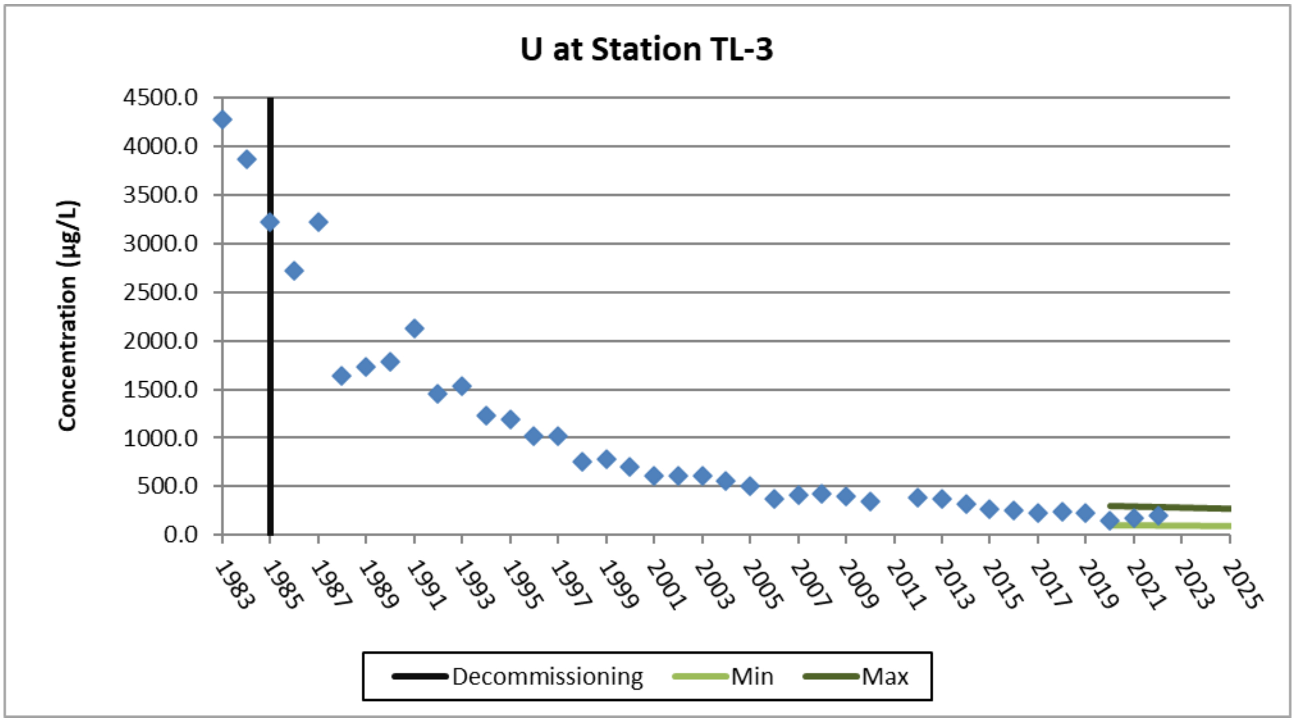
**The 2010 and 2011 scheduled sampling was not completed due to a lack of water flow.*
Note: Method detection limit changed from 0.001 mg/L to 0.0001 mg/L in 2003.

Figure 4.2.2-4 AN-3 Fulton Lake (Upstream of TL Stations)



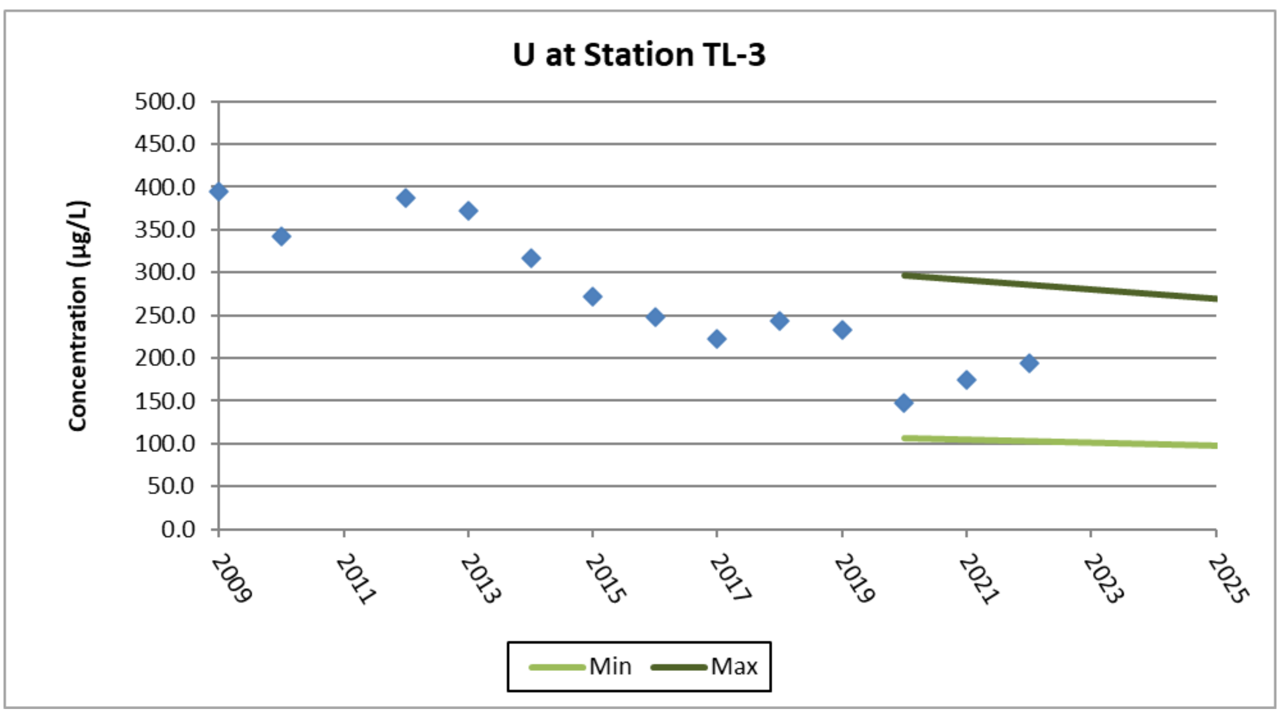
**The 2010 and 2011 scheduled sampling was not completed due to a lack of water flow.*

Figure 4.2.2-5 TL-3 Fookes Reservoir Outlet



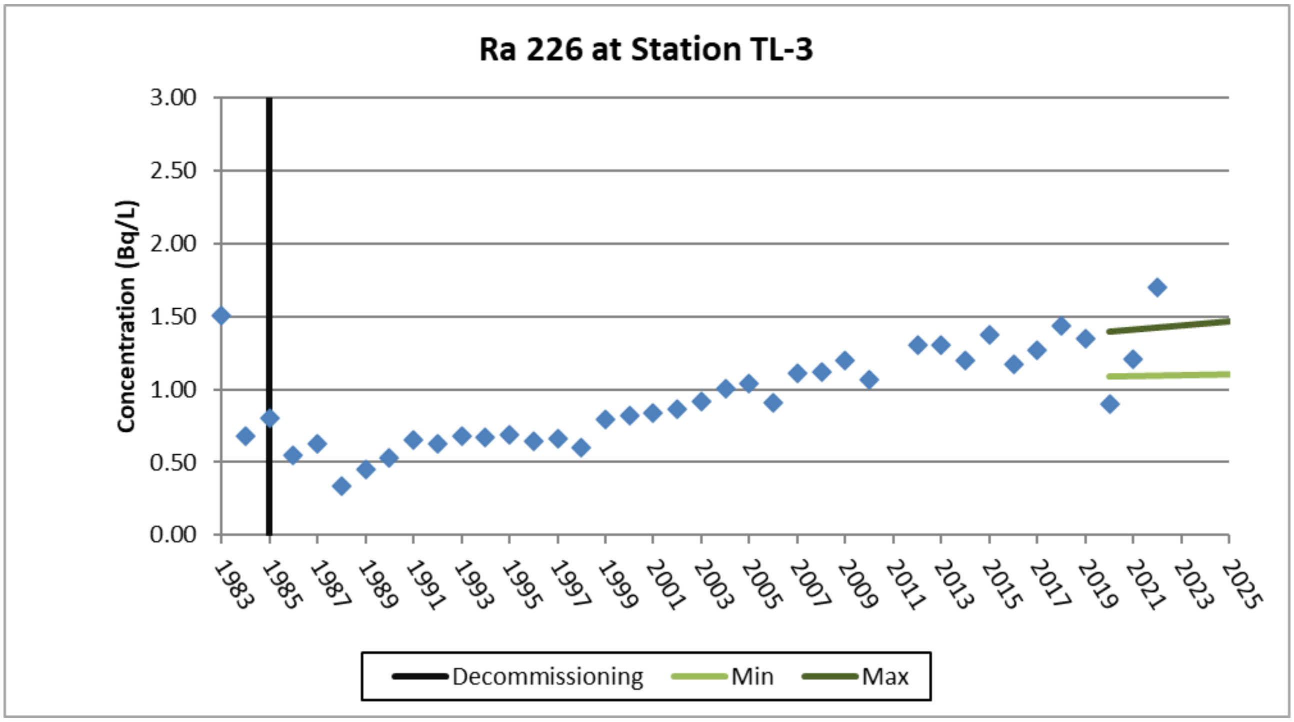
**No data available for 2011 due to a lack of water flow.*

Figure 4.2.2-6 TL-3 Fookes Reservoir Outlet – Detailed Trend



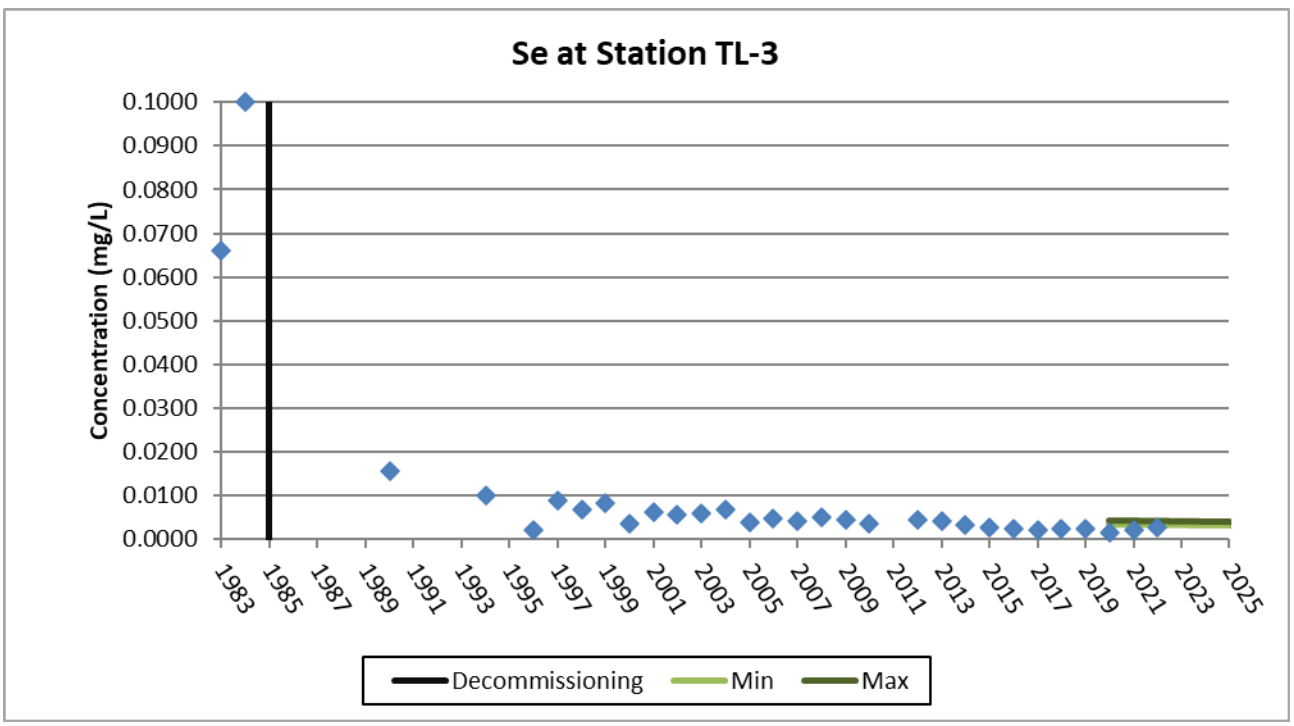
**No data available for 2011 due to a lack of water flow.*

Figure 4.2.2-7 TL-3 Fookes Reservoir Outlet



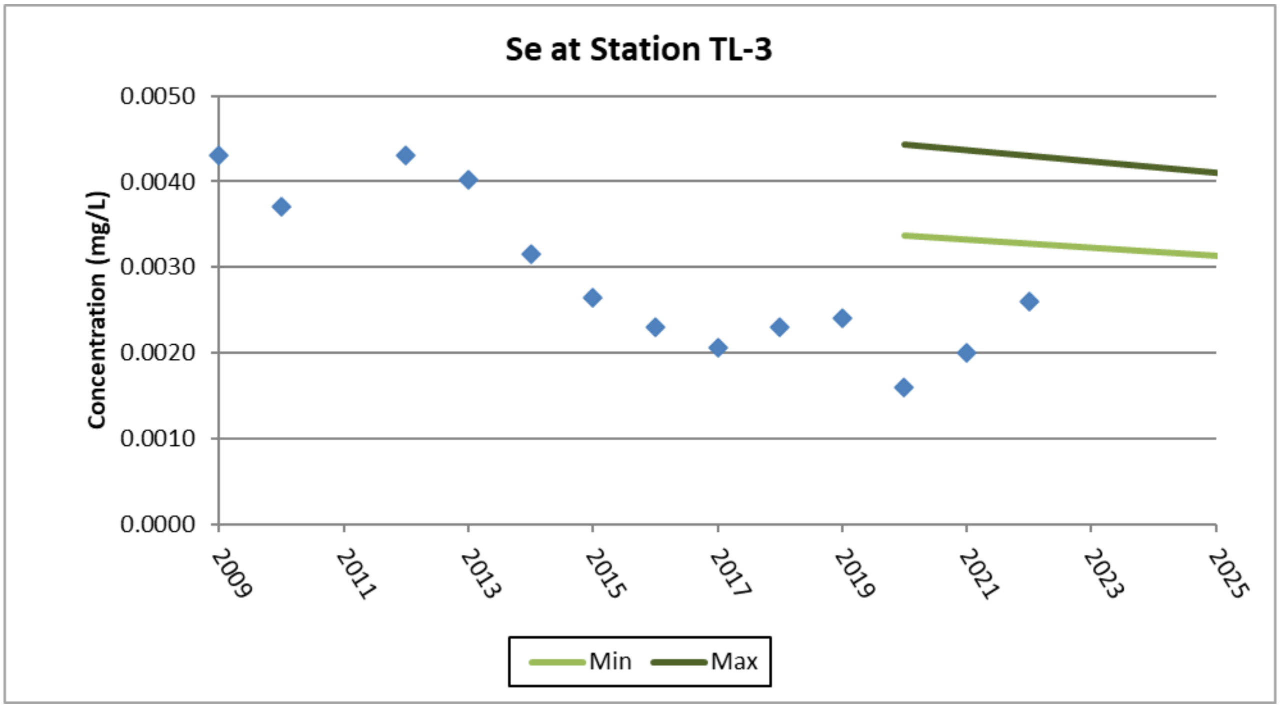
**No data available for 2011 due to a lack of water flow.*

Figure 4.2.2-8 TL-3 Fookes Reservoir Outlet



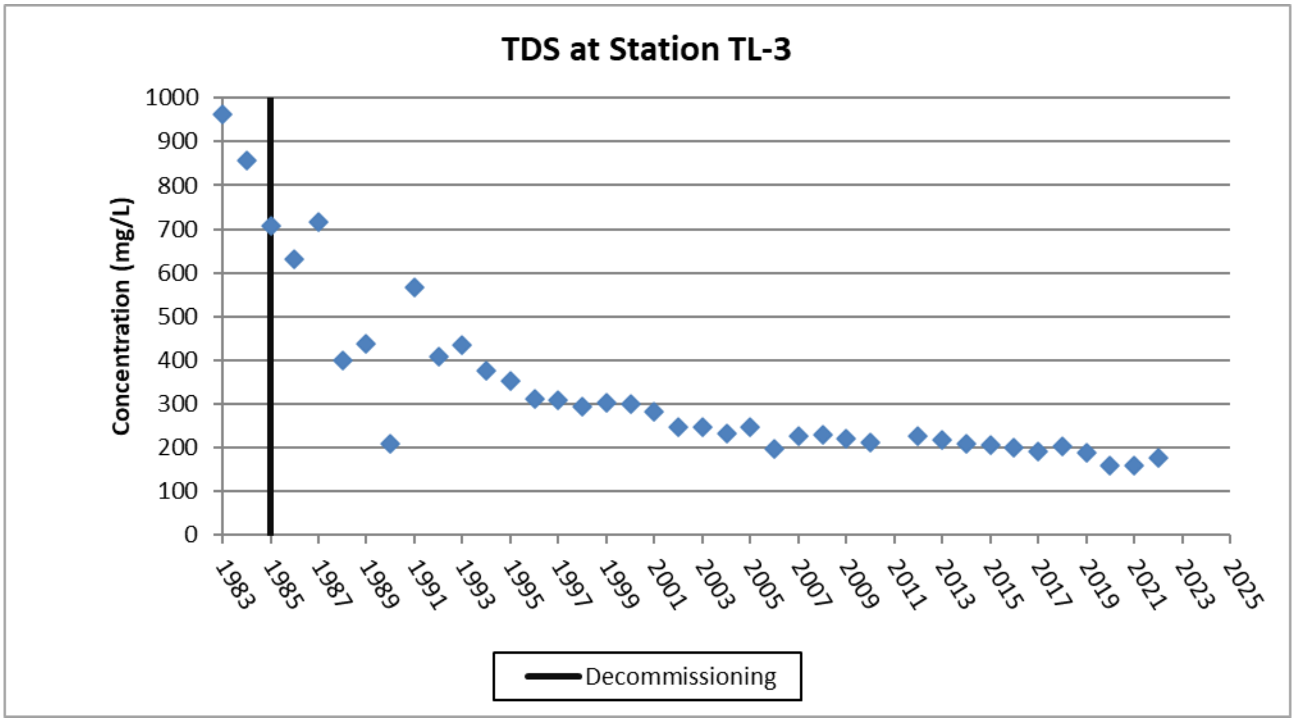
**No data available for 2011 due to a lack of water flow.*

Figure 4.2.2-9 TL-3 Fookes Reservoir Outlet – Detailed Trend



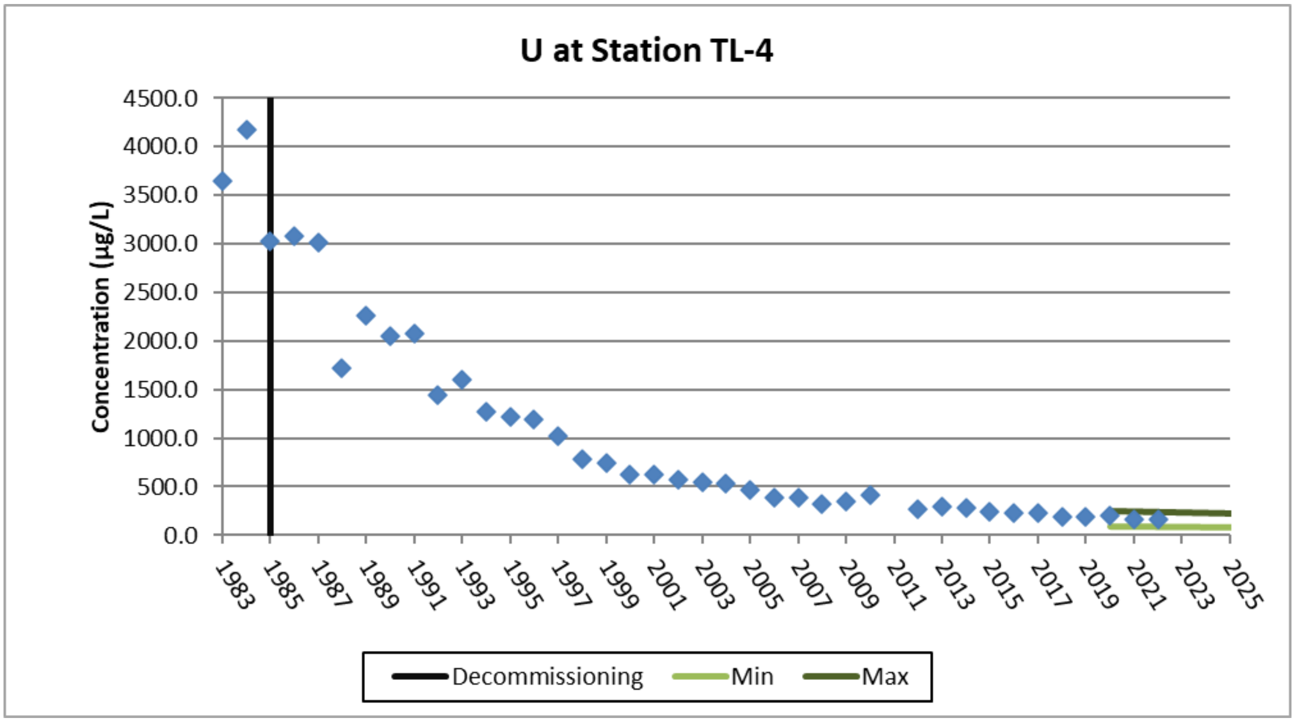
**No data available for 2011 due to a lack of water flow.*

Figure 4.2.2-10 TL-3 Fookes Reservoir Outlet



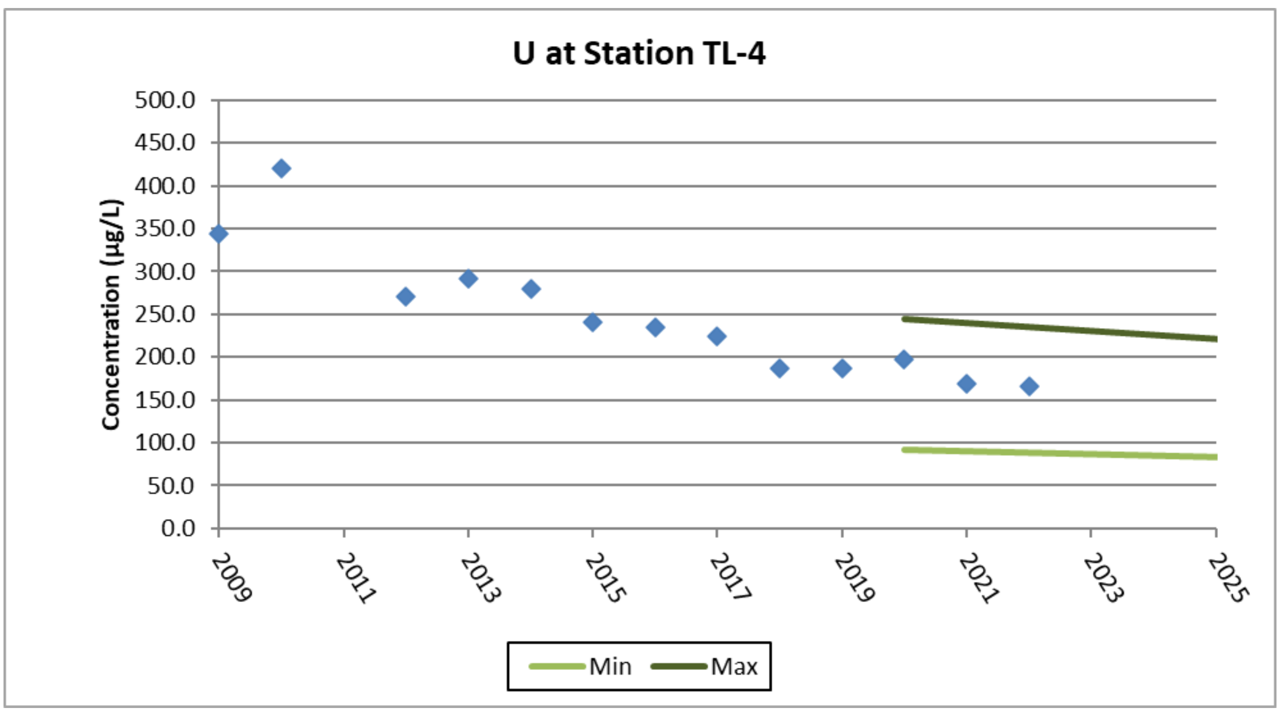
**No data available for 2011 due to a lack of water flow.*

Figure 4.2.2-11 TL-4 Marie Reservoir Outlet



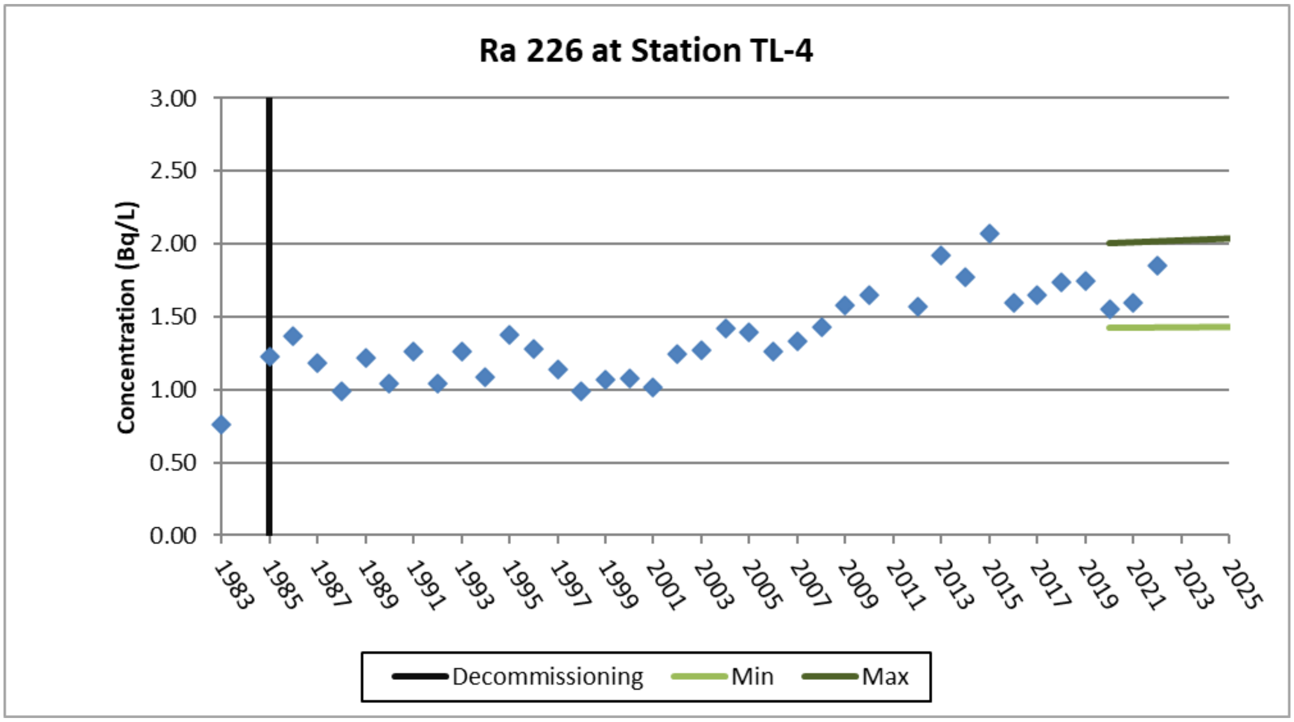
**No data available for 2011 due to a lack of water flow.*

Figure 4.2.2-12 TL-4 Marie Reservoir Outlet – Detailed Trend



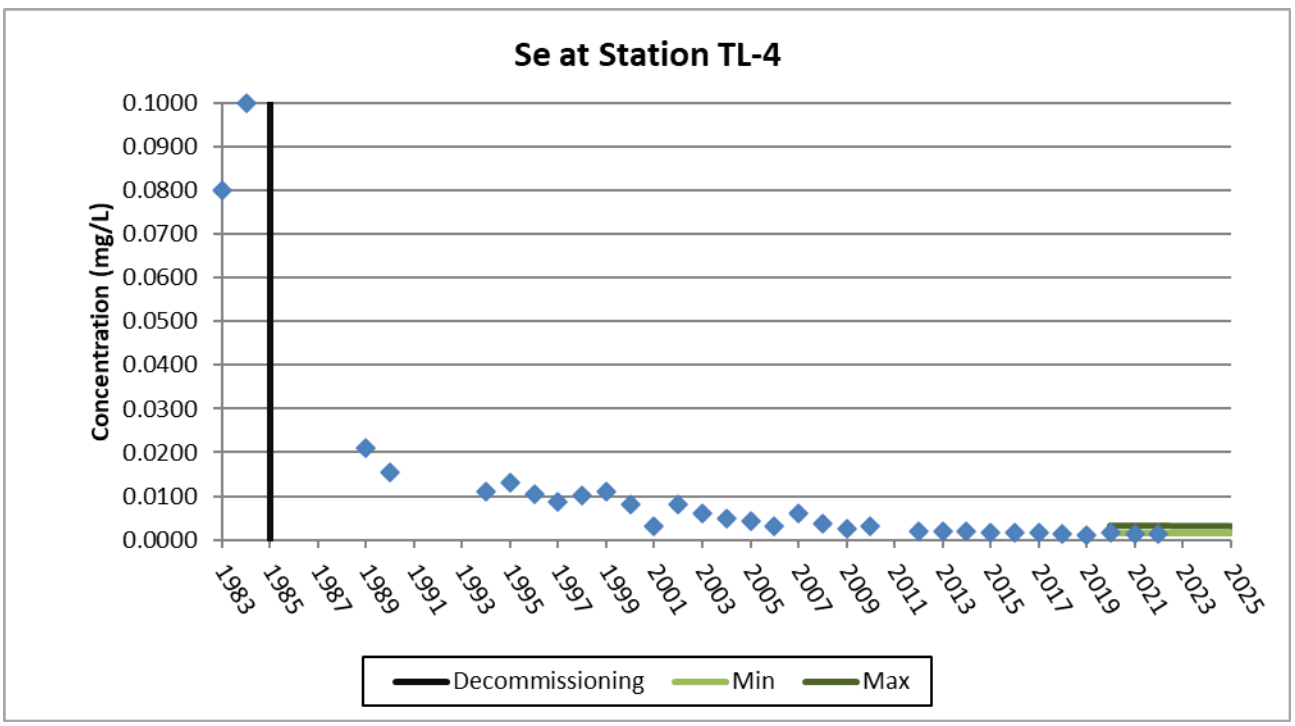
**No data available for 2011 due to a lack of water flow.*

Figure 4.2.2-13 TL-4 Marie Reservoir Outlet



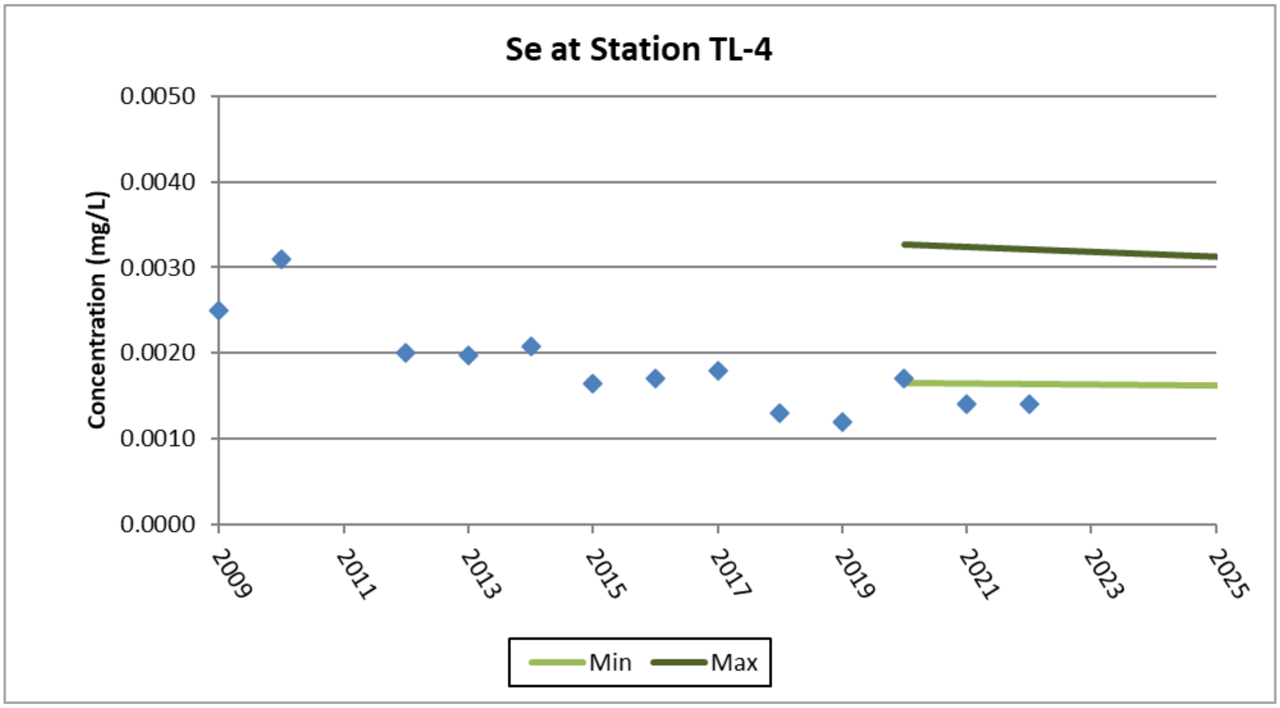
**No data available for 2011 due to a lack of water flow.*

Figure 4.2.2-14 TL-4 Marie Reservoir Outlet



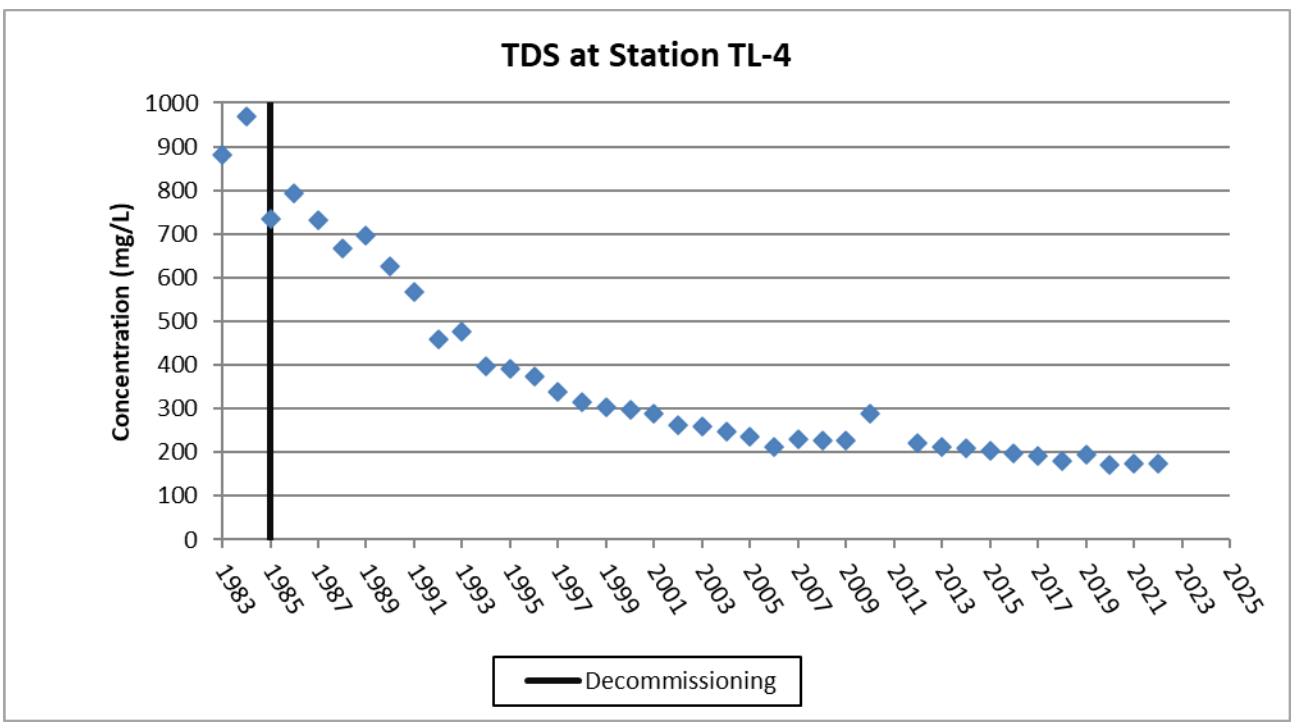
**No data available for 2011 due to a lack of water flow.*

Figure 4.2.2-15 TL-4 Marie Reservoir Outlet – Detailed Trend



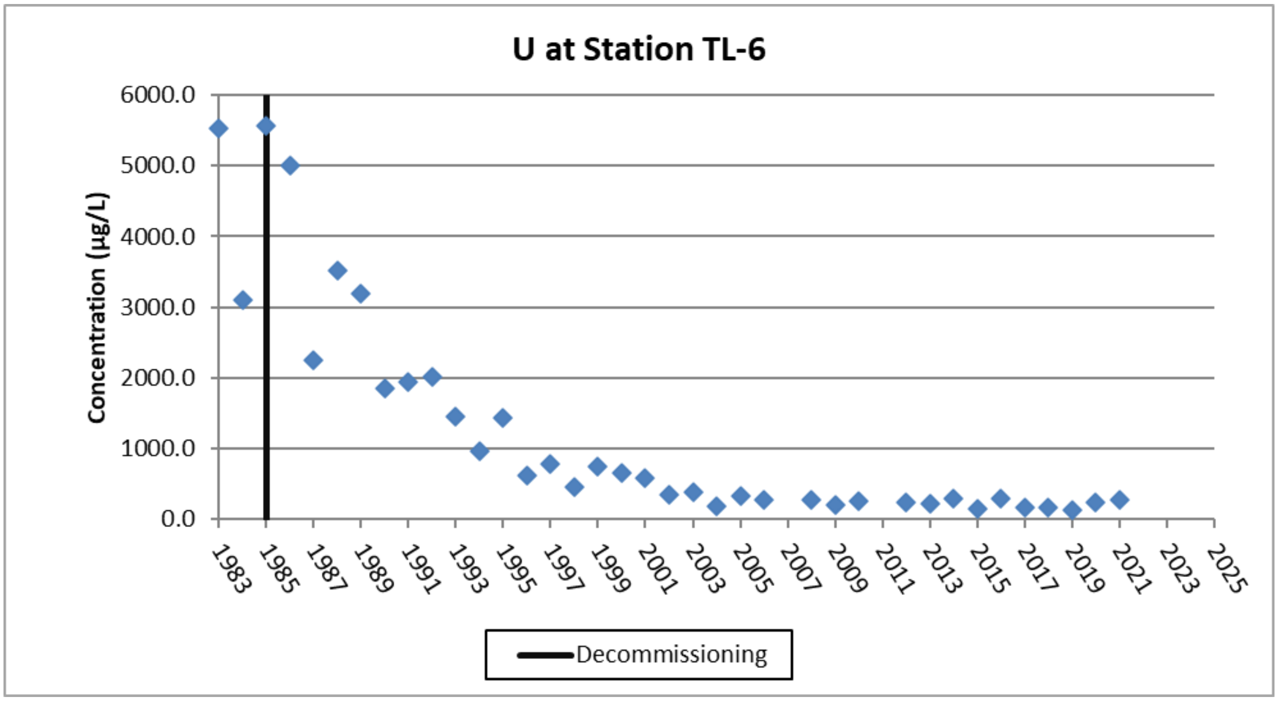
**No data available for 2011 due to a lack of water flow.*

Figure 4.2.2-16 TL-4 Marie Reservoir Outlet



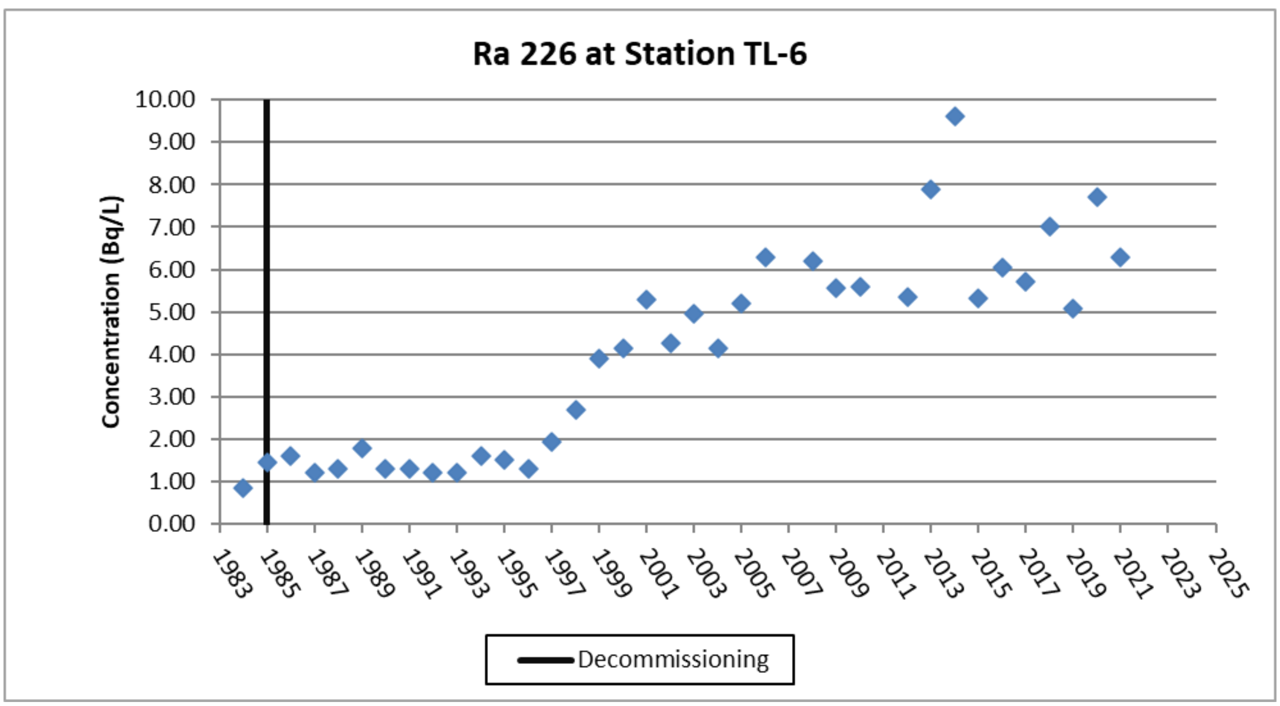
**No data available for 2011 due to a lack of water flow.*

Figure 4.2.2-17 TL-6 Minewater Reservoir Outlet



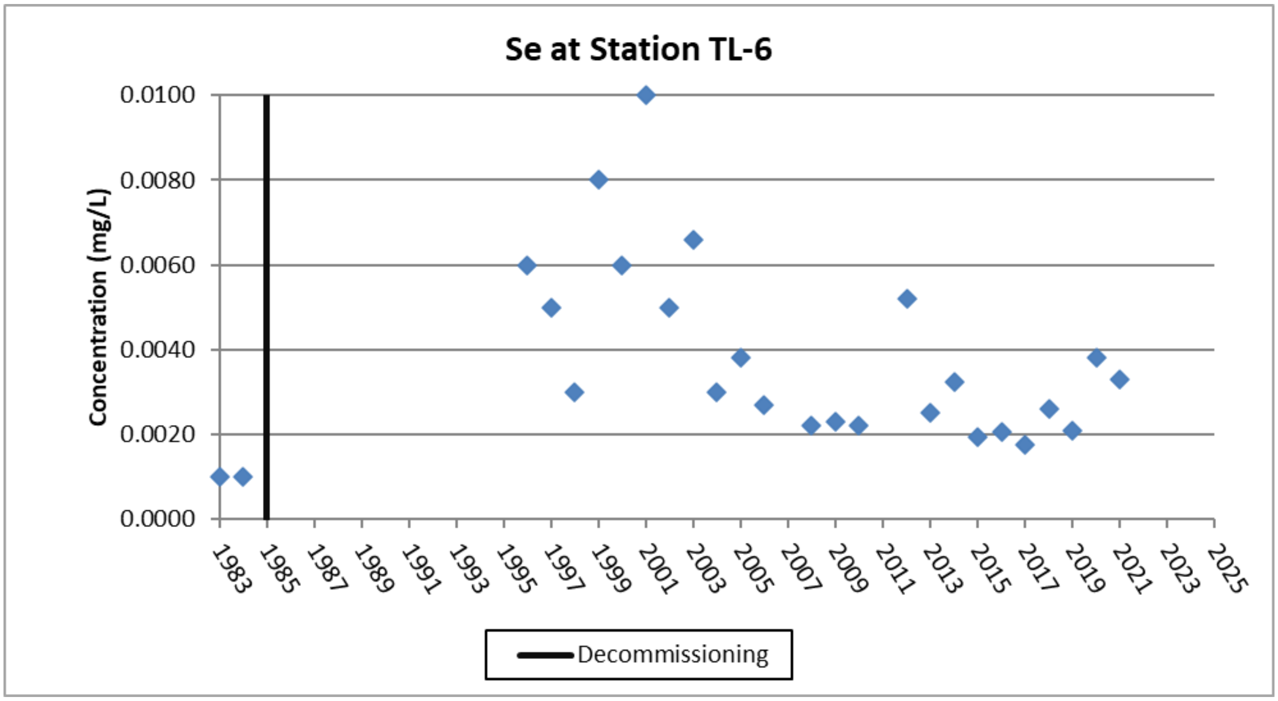
**No data available for 2007, 2011, and 2022 due to a lack of water flow.*

Figure 4.2.2-18 TL-6 Minewater Reservoir Outlet



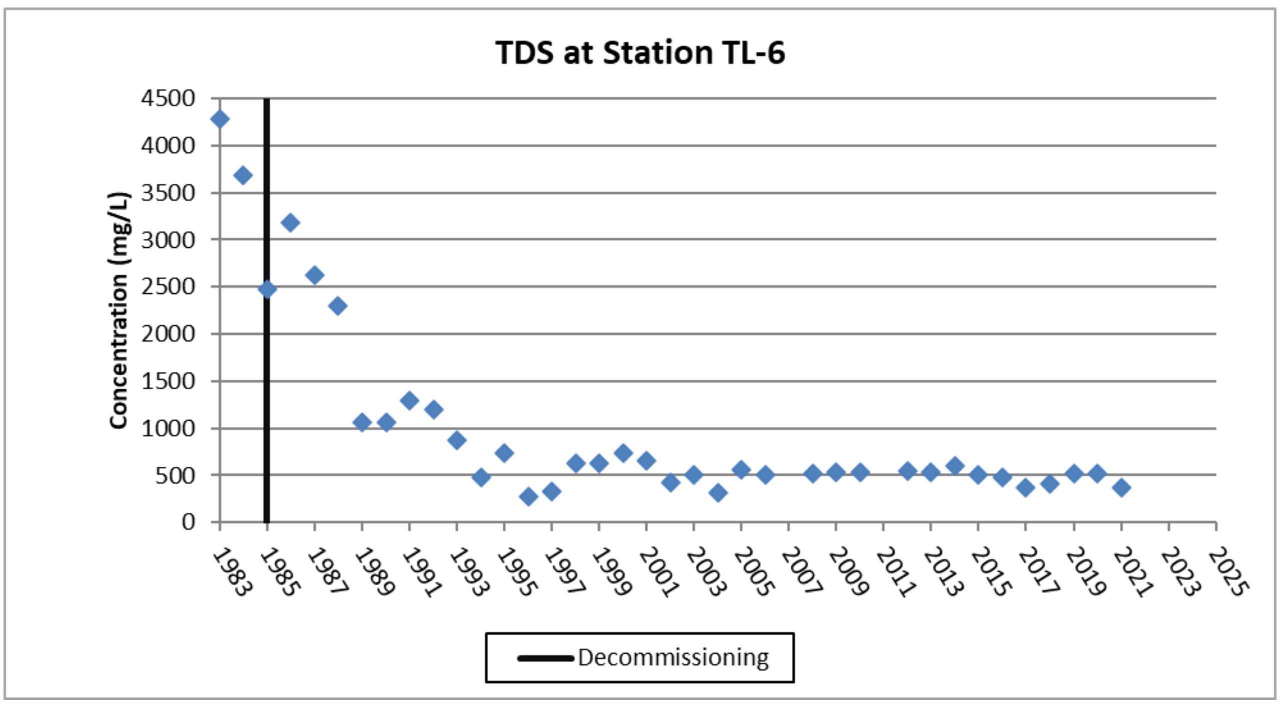
**No data available for 2007, 2011, and 2022 due to a lack of water flow.*

Figure 4.2.2-19 TL-6 Minewater Reservoir Outlet



**No data available for 2007, 2011, and 2022 due to a lack of water flow.*

Figure 4.2.2-20 TL-6 Minewater Reservoir Outlet



**No data available for 2007, 2011, and 2022 due to a lack of water flow.*

Figure 4.2.2-21 TL-7 Meadow Fen Outlet

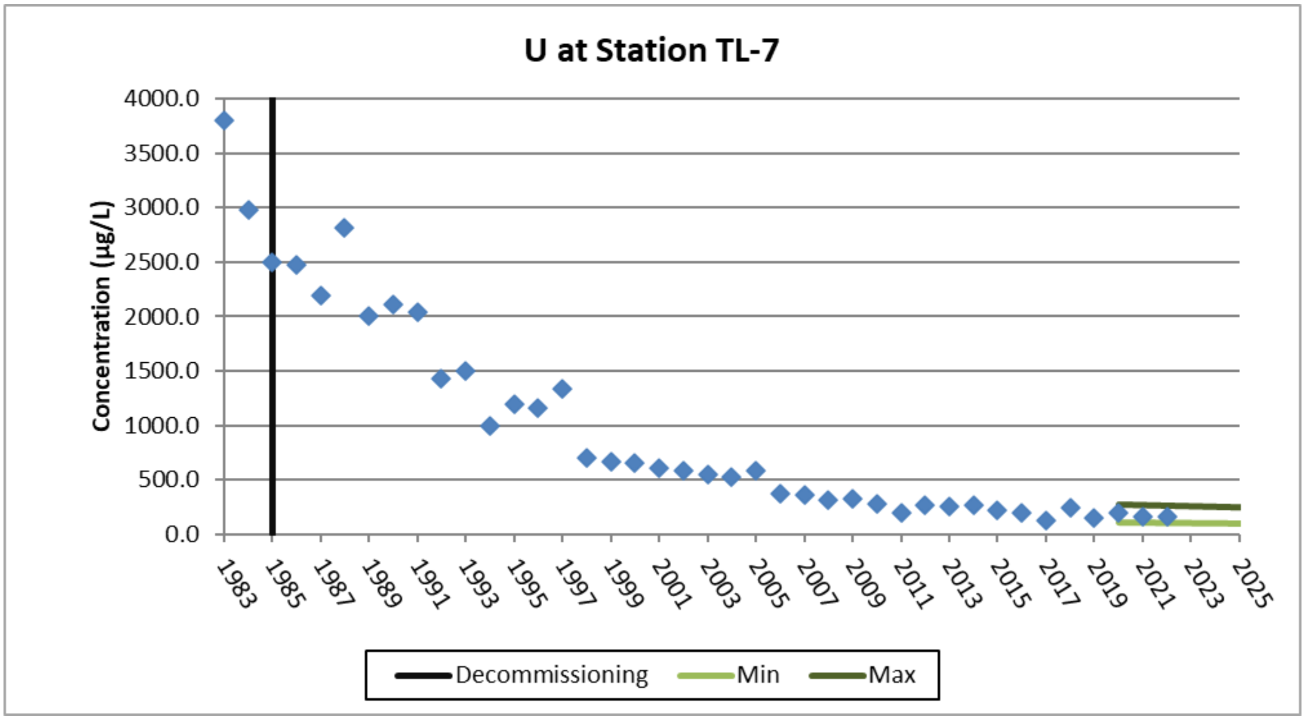


Figure 4.2.2-22 TL-7 Meadow Fen Outlet - Detailed Trend

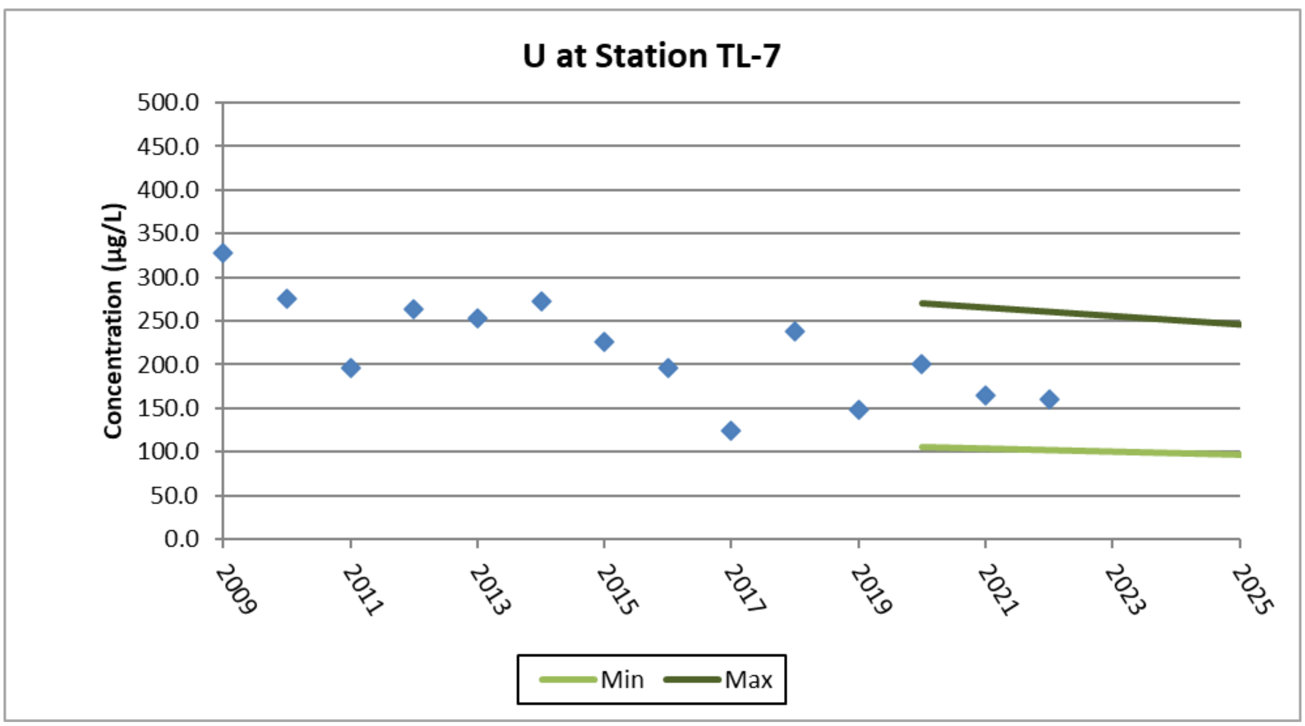


Figure 4.2.2-23 TL-7 Meadow Fen Outlet

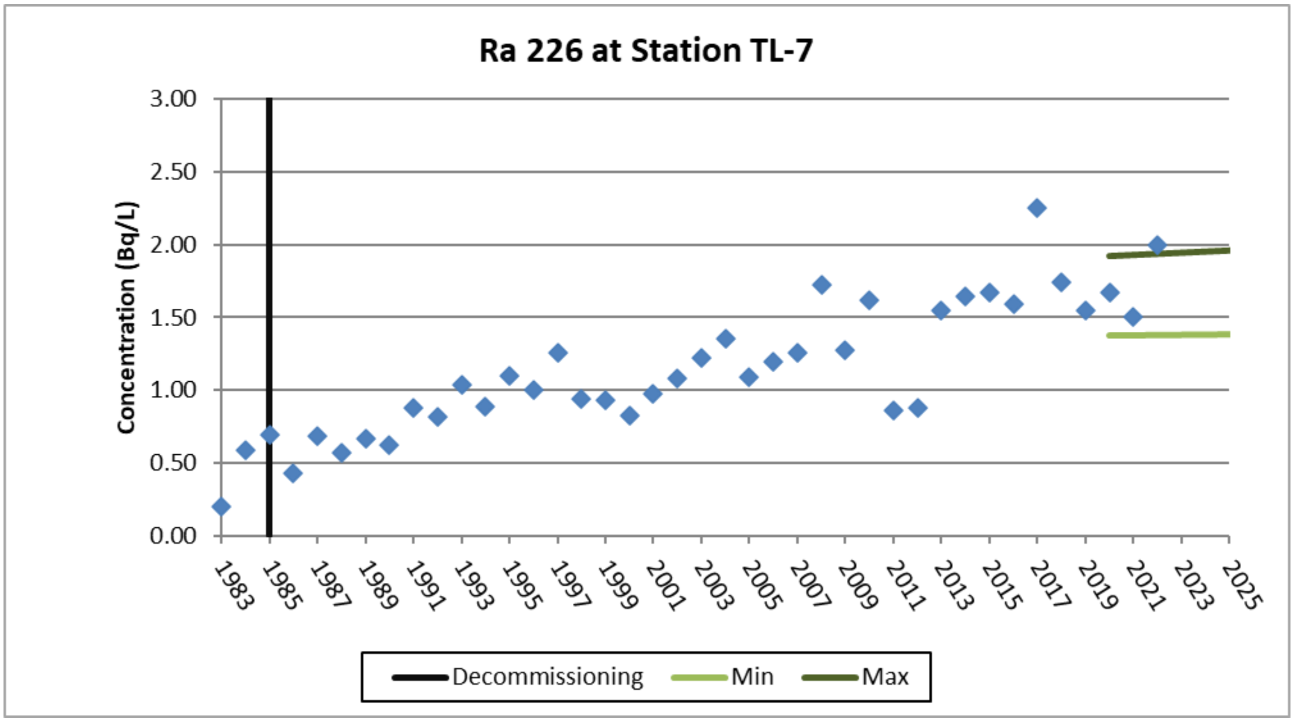


Figure 4.2.2-24 TL-7 Meadow Fen Outlet

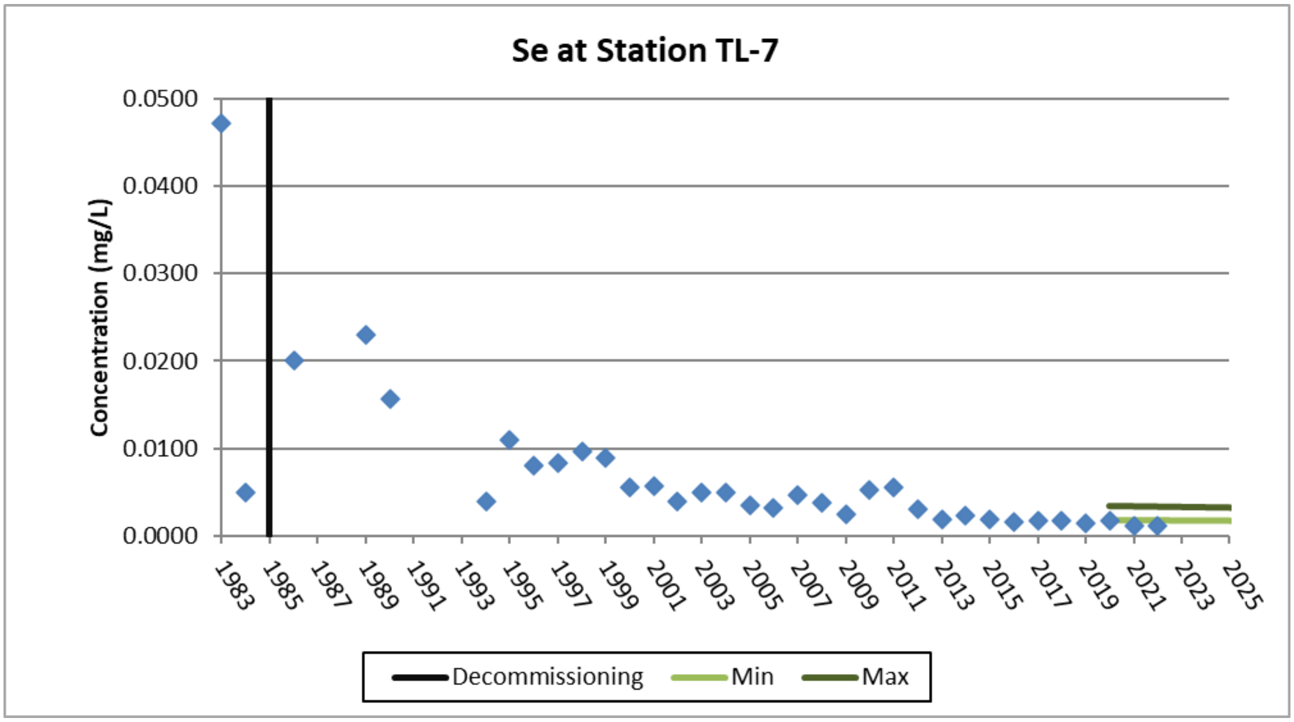


Figure 4.2.2-25 TL-7 Meadow Fen Outlet – Detailed Trend

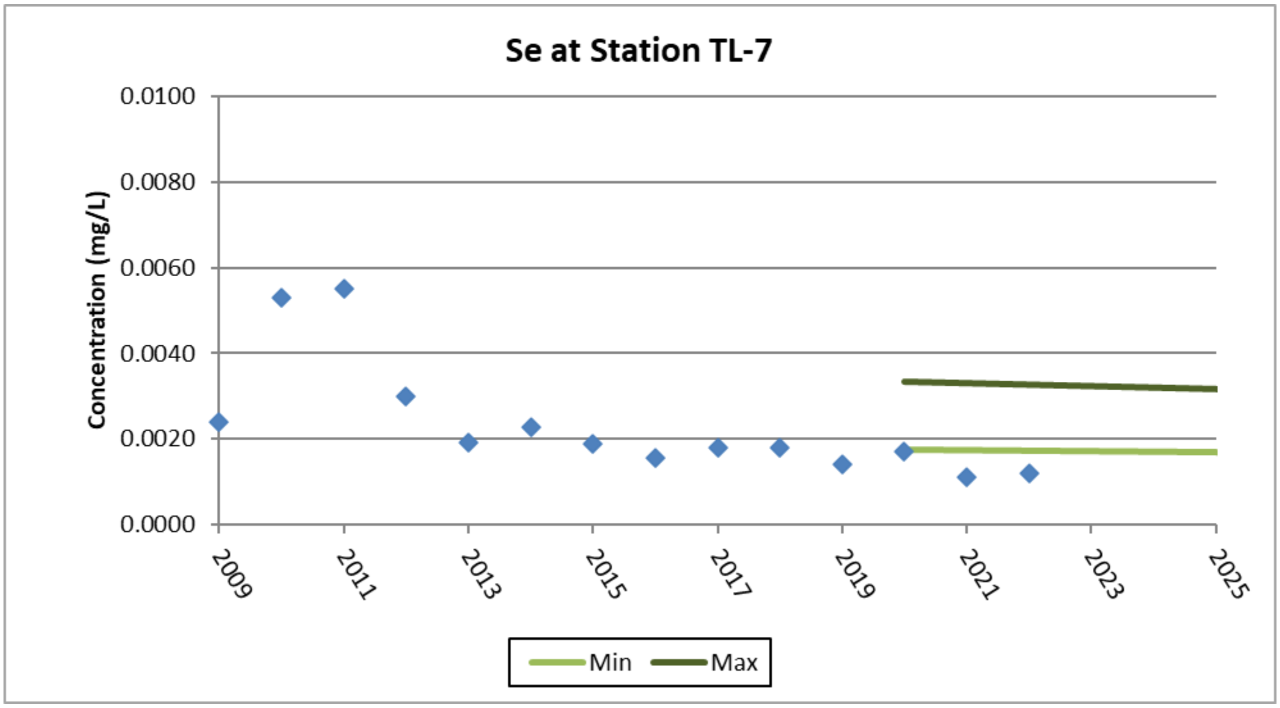


Figure 4.2.2-26 TL-7 Meadow Fen Outlet

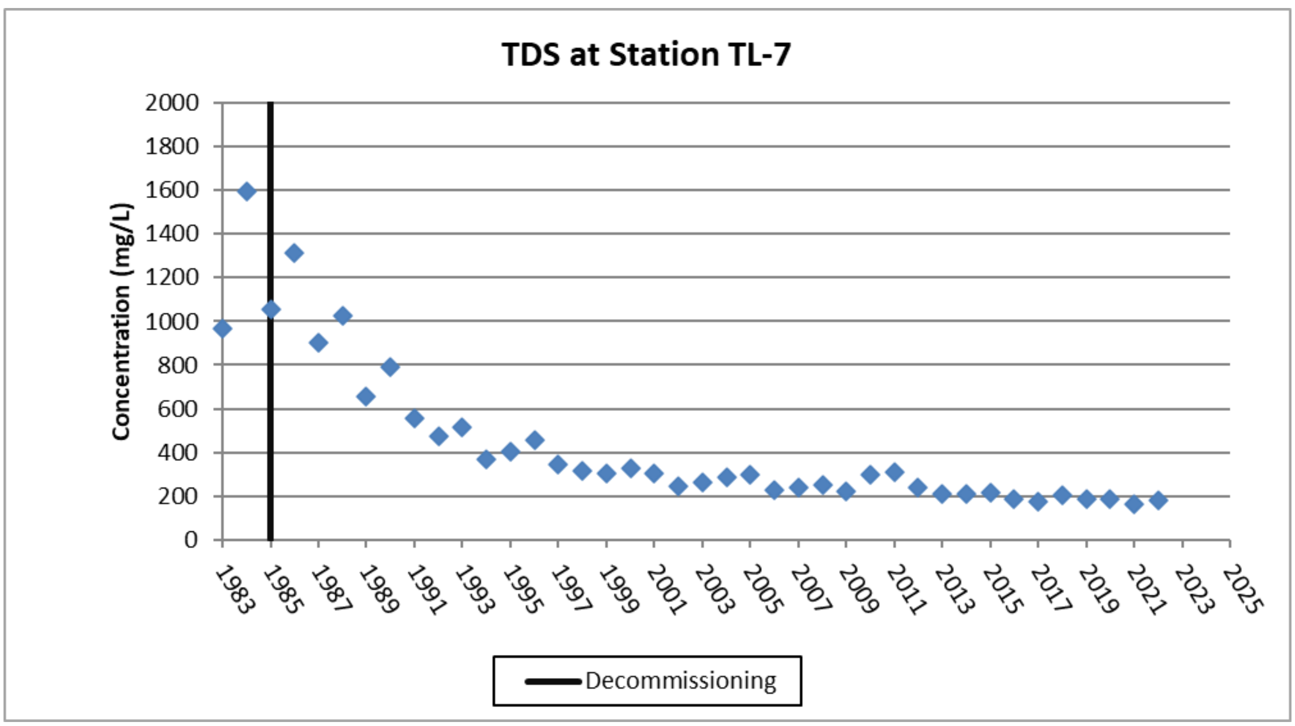
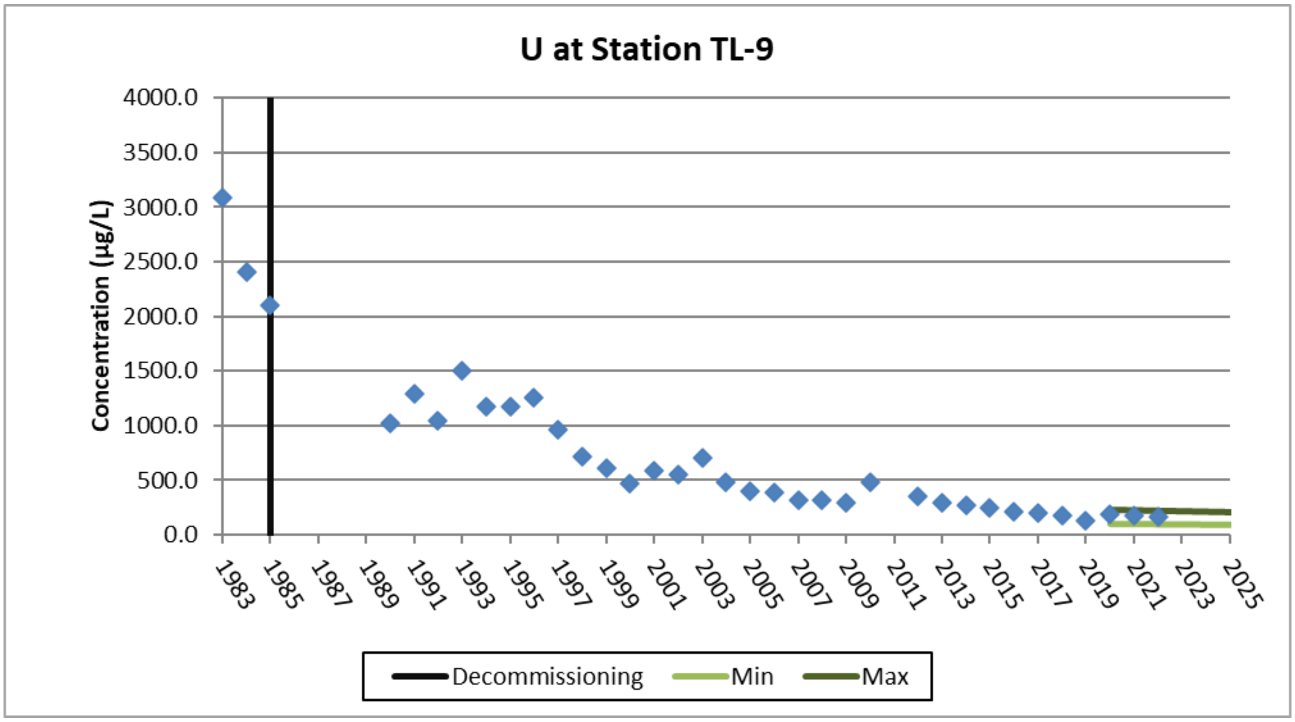
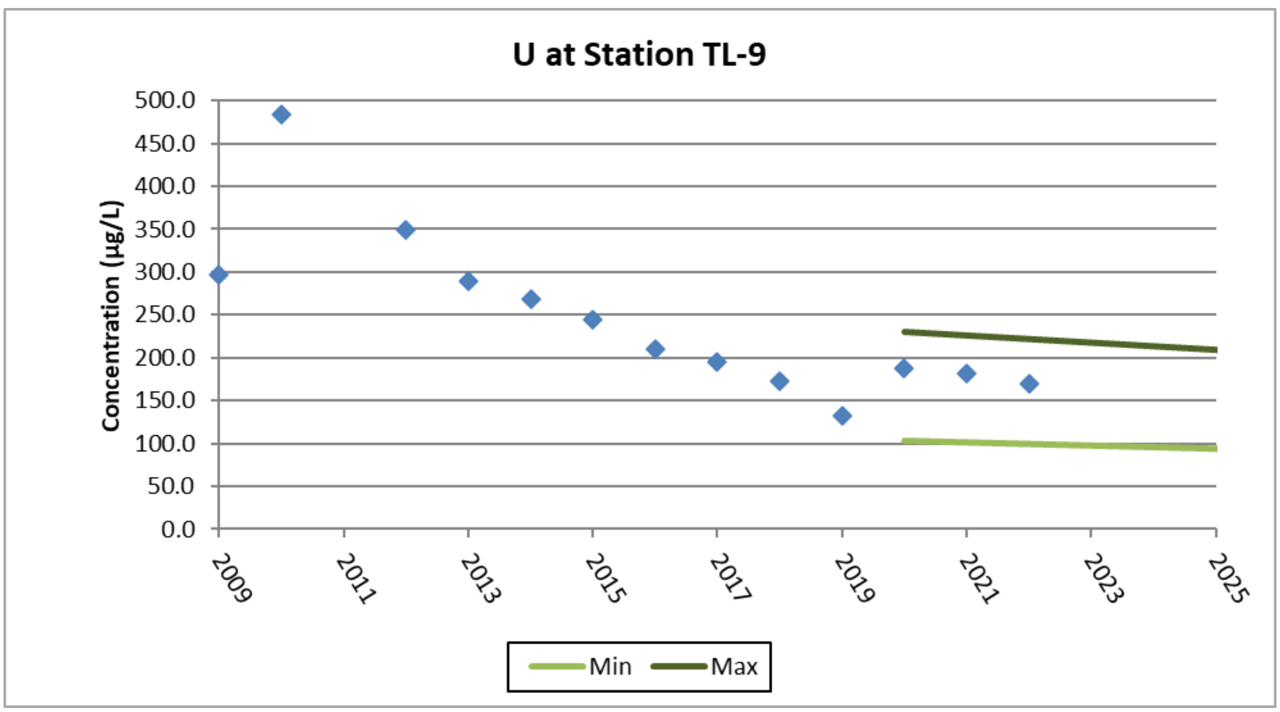


Figure 4.2.2-27 TL-9 Fulton Creek Downstream of Greer Lake



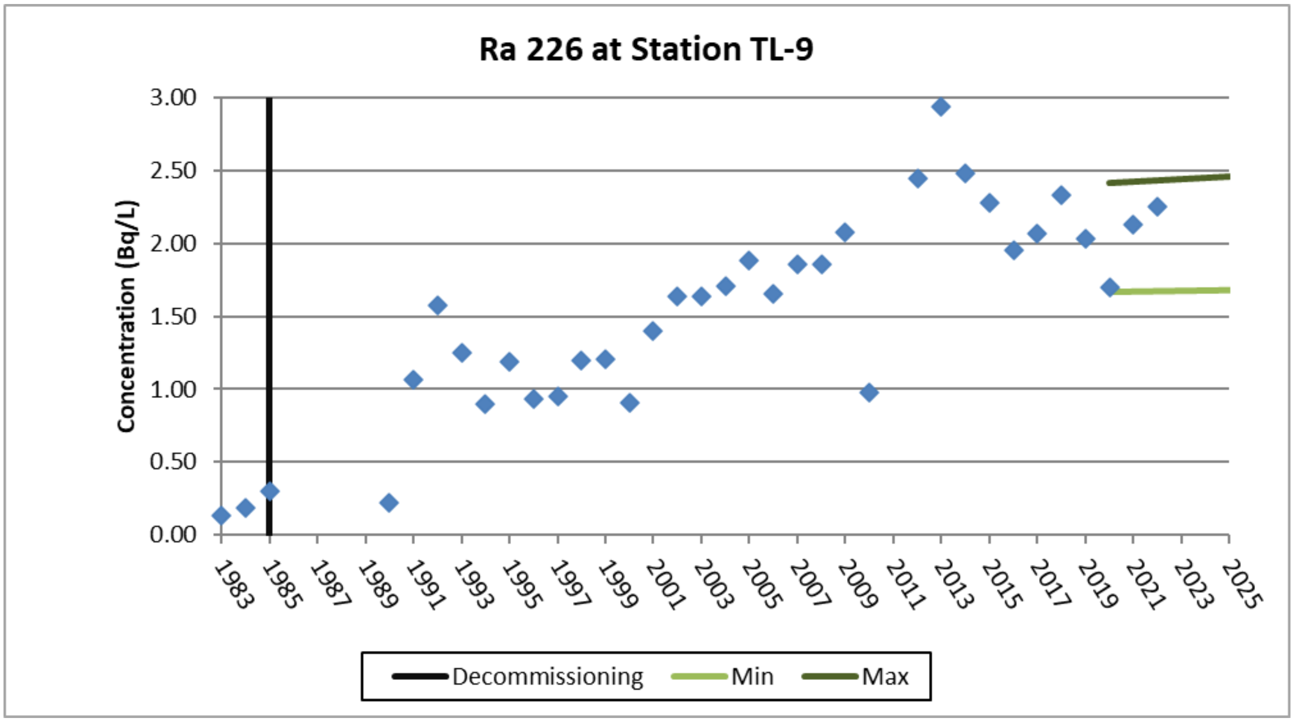
**There was no water flow at TL-9 in 2011.*

Figure 4.2.2-28 TL-9 Fulton Creek Downstream of Greer Lake – Detailed Trend



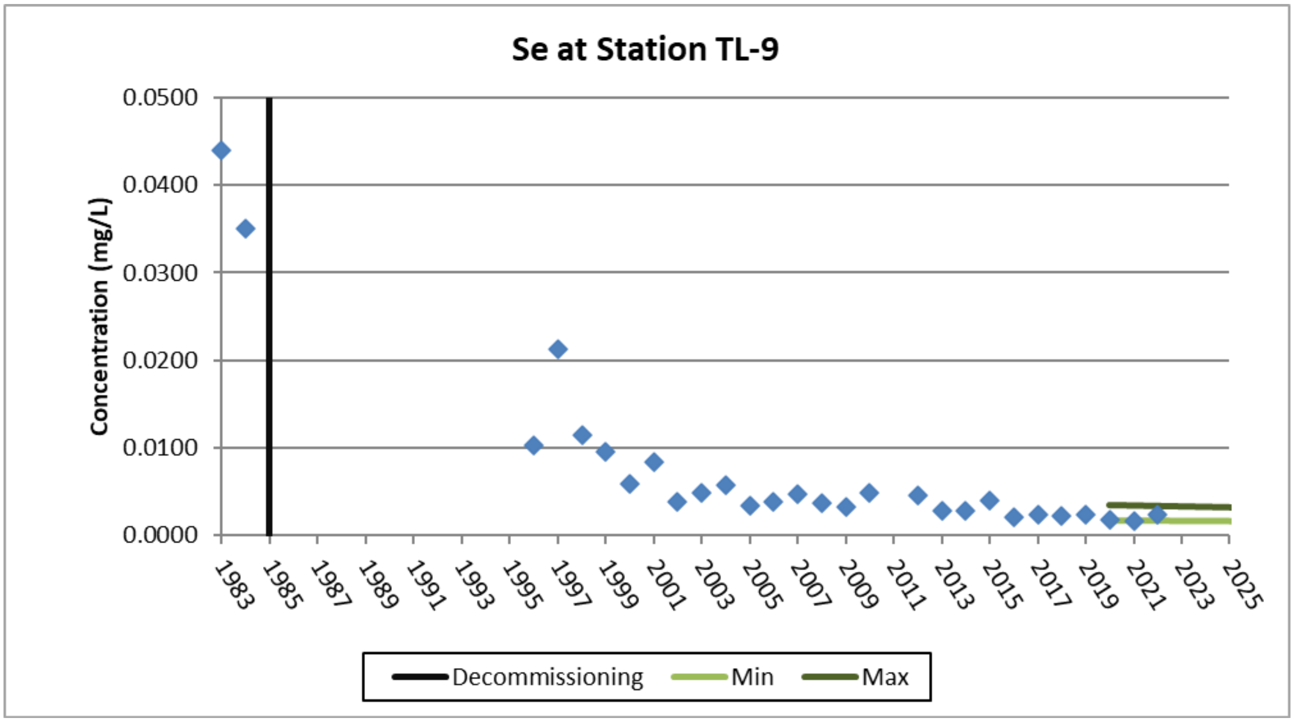
**There was no water flow at TL-9 in 2011.*

Figure 4.2.2-29 TL-9 Fulton Creek Downstream of Greer Lake



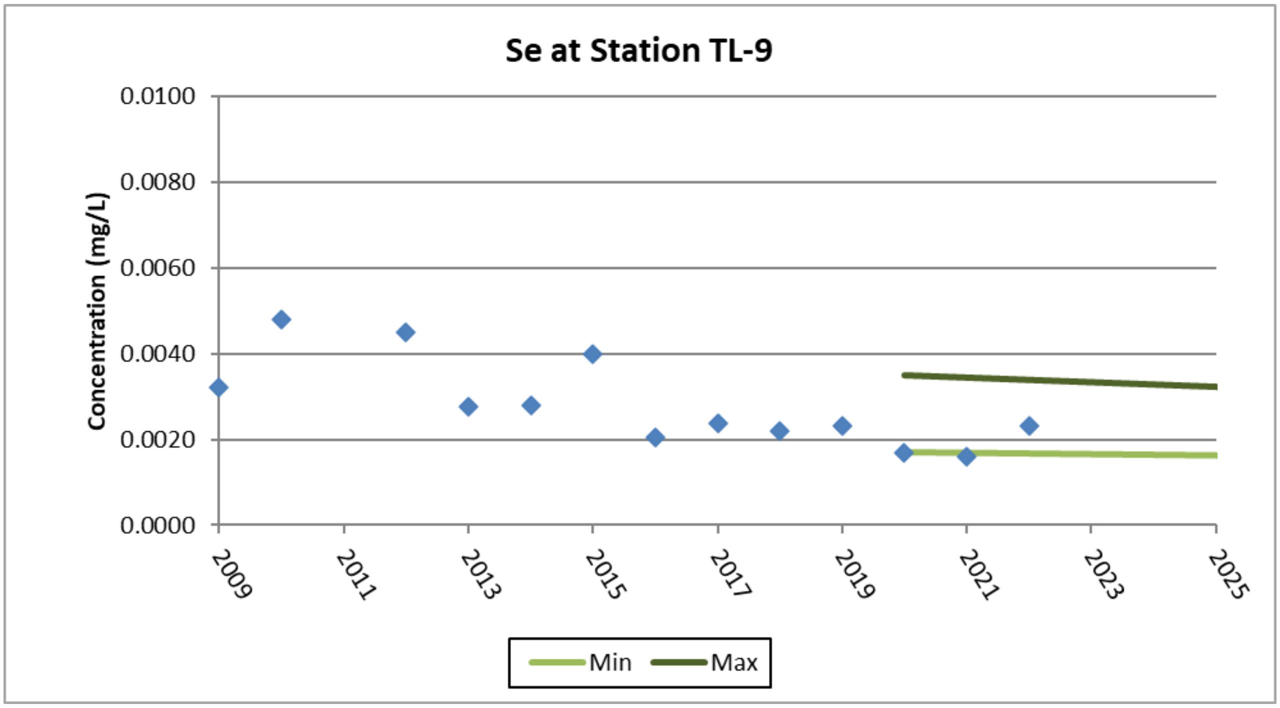
**There was no water flow at TL-9 in 2011.*

Figure 4.2.2-30 TL-9 - Fulton Creek Downstream of Greer Lake



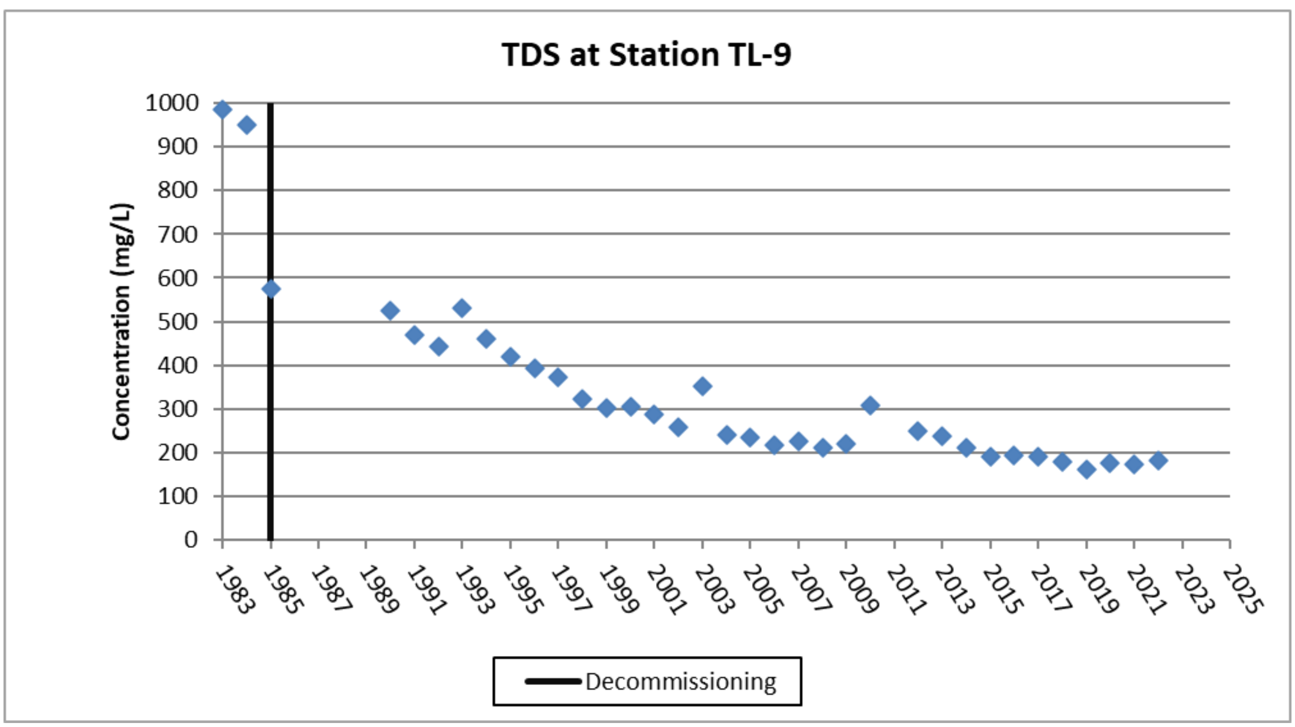
**There was no water flow at TL-9 in 2011.*

Figure 4.2.2-31 TL-9 - Fulton Creek Downstream of Greer Lake – Detailed Trend



**There was no water flow at TL-9 in 2011.*

Figure 4.2.2-32 TL-9 - Fulton Creek Downstream of Greer Lake



**There was no water flow at TL-9 in 2011.*

Figure 4.2.3-1 BL-3 - Beaverlodge Lake Opposite Fulton Creek Outlet

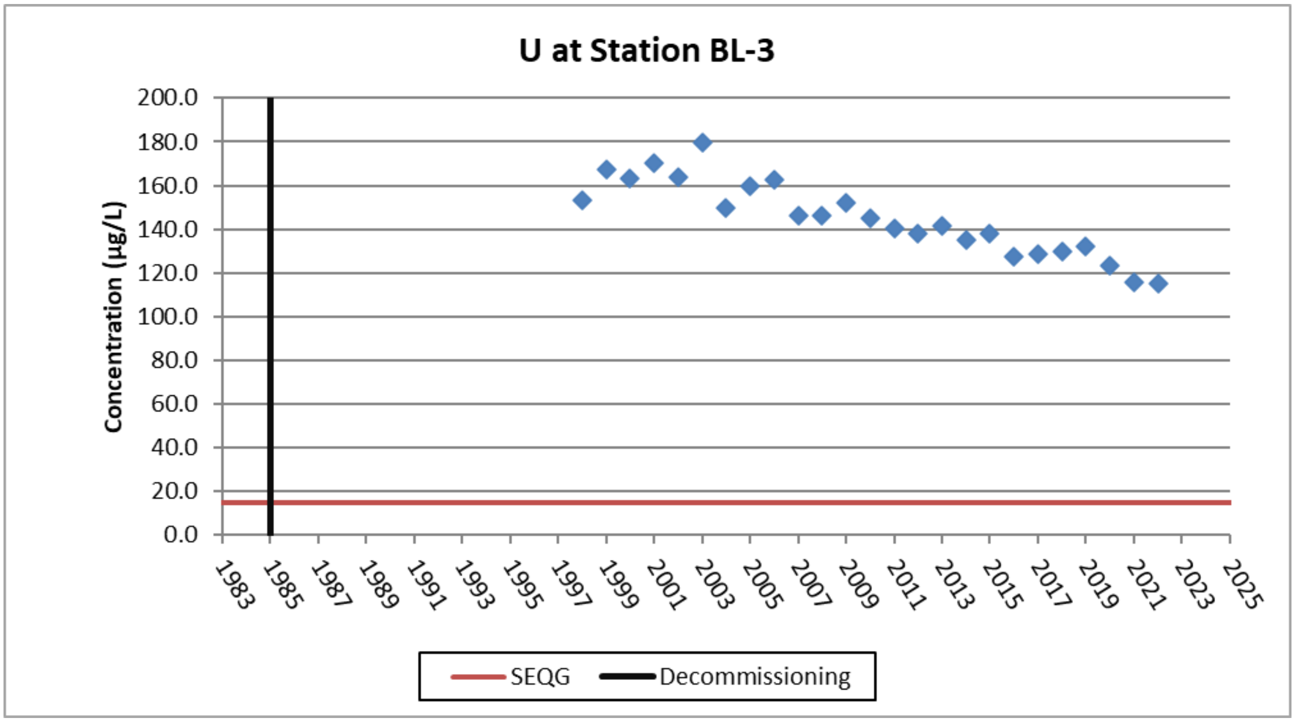


Figure 4.2.3-2 BL-3 - Beaverlodge Lake Opposite Fulton Creek Outlet

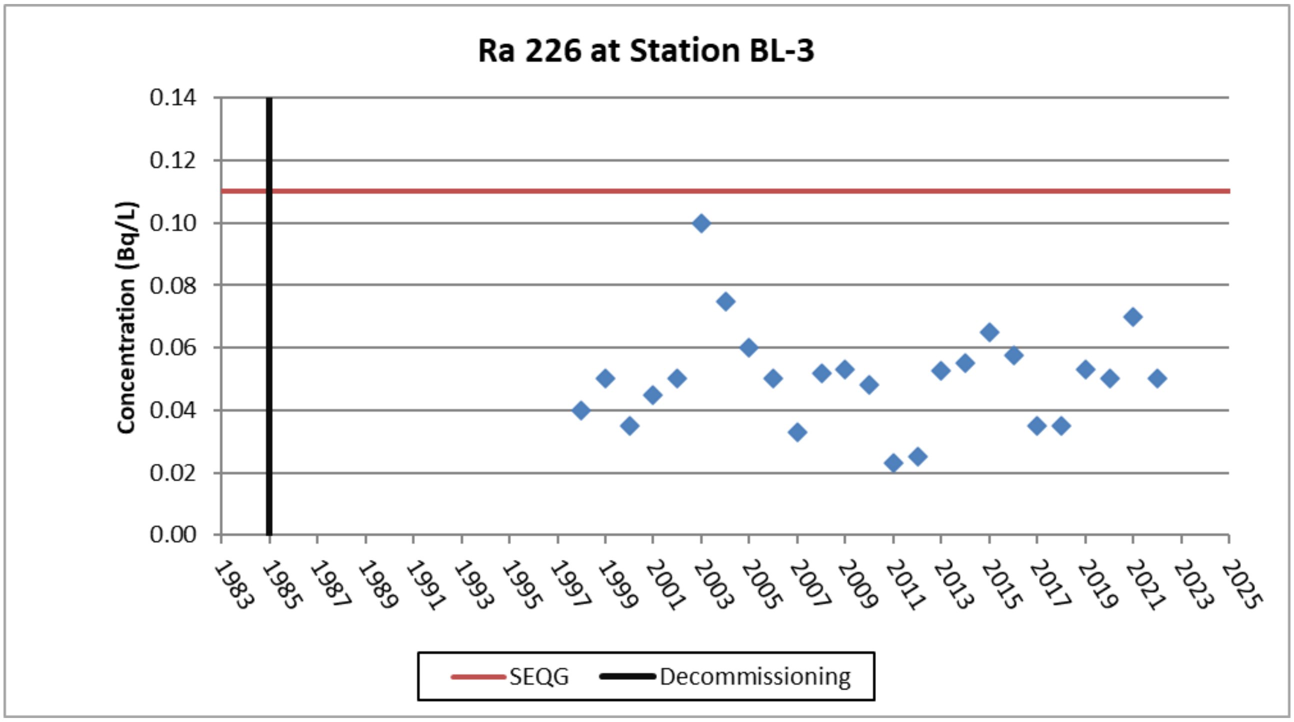
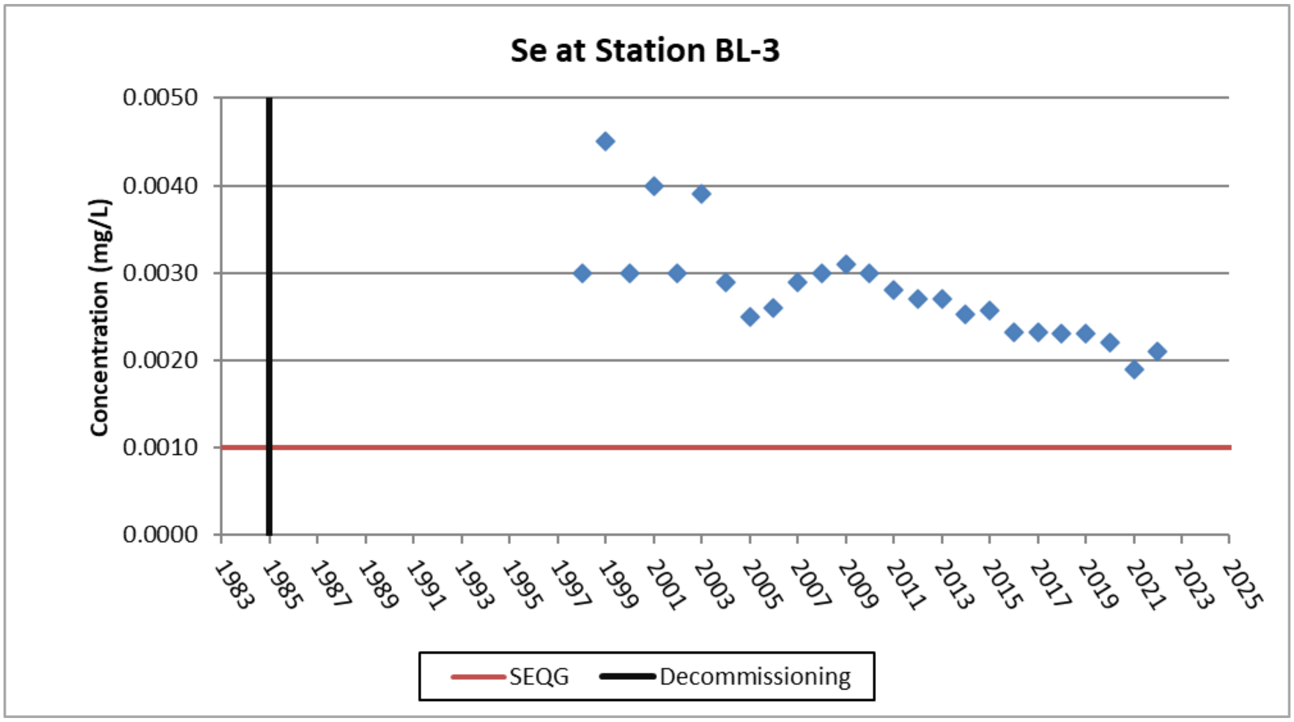


Figure 4.2.3-3 BL-3 - Beaverlodge Lake Opposite Fulton Creek Outlet



Note: Method detection limit changed from 0.001mg/L to 0.0001mg/L in 2003.

Figure 4.2.3-4 BL-3 - Beaverlodge Lake Opposite Fulton Creek Outlet

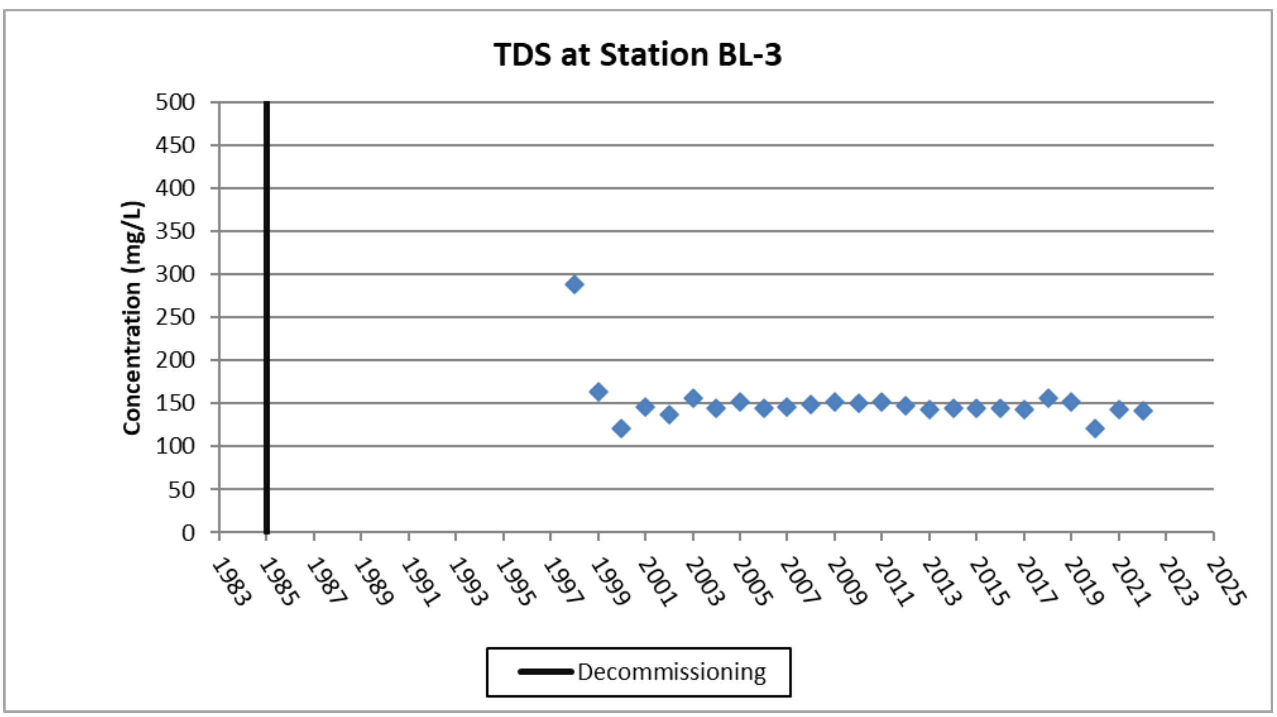


Figure 4.2.3-5 BL-4 Beaverlodge Lake Centre

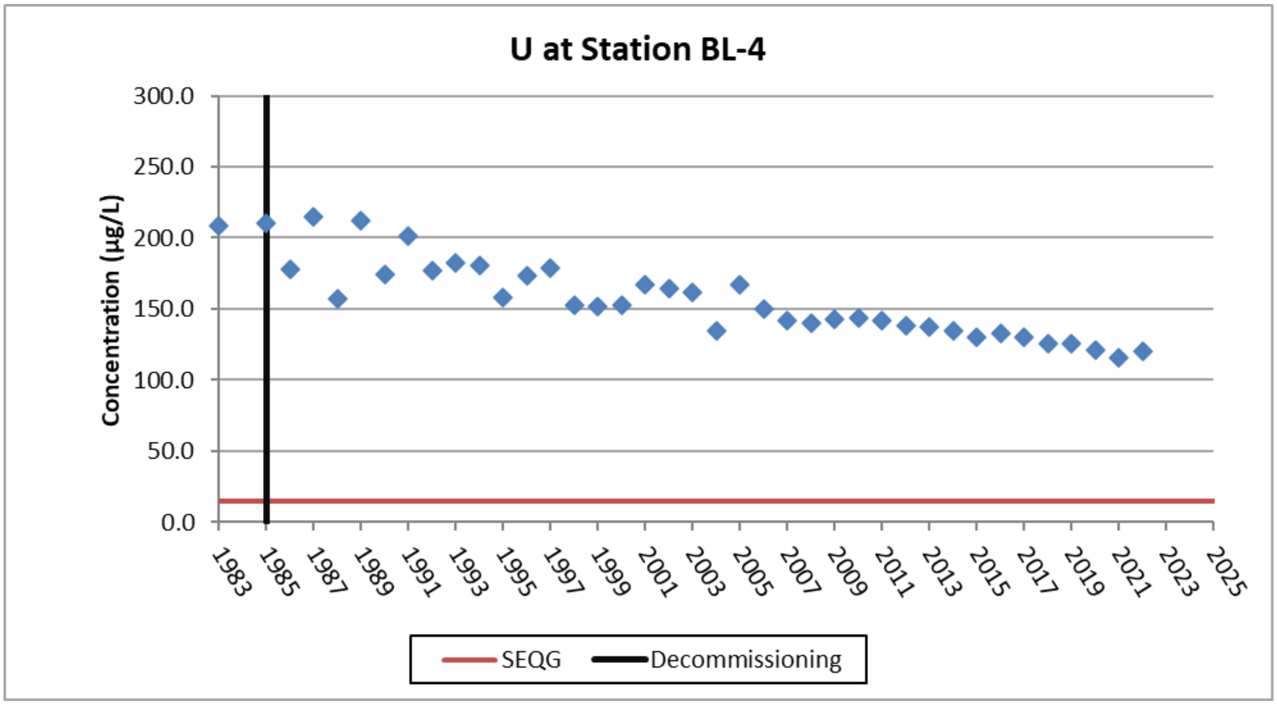


Figure 4.2.3-6 BL-4 Beaverlodge Lake Centre

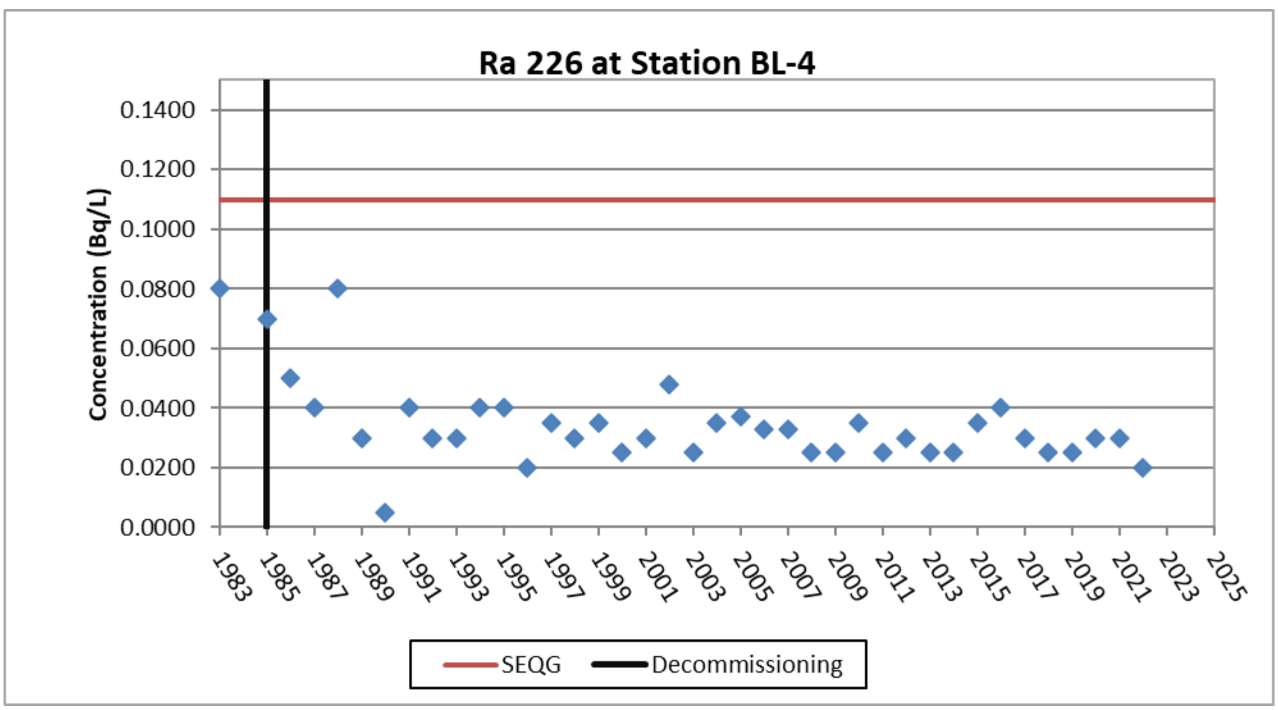
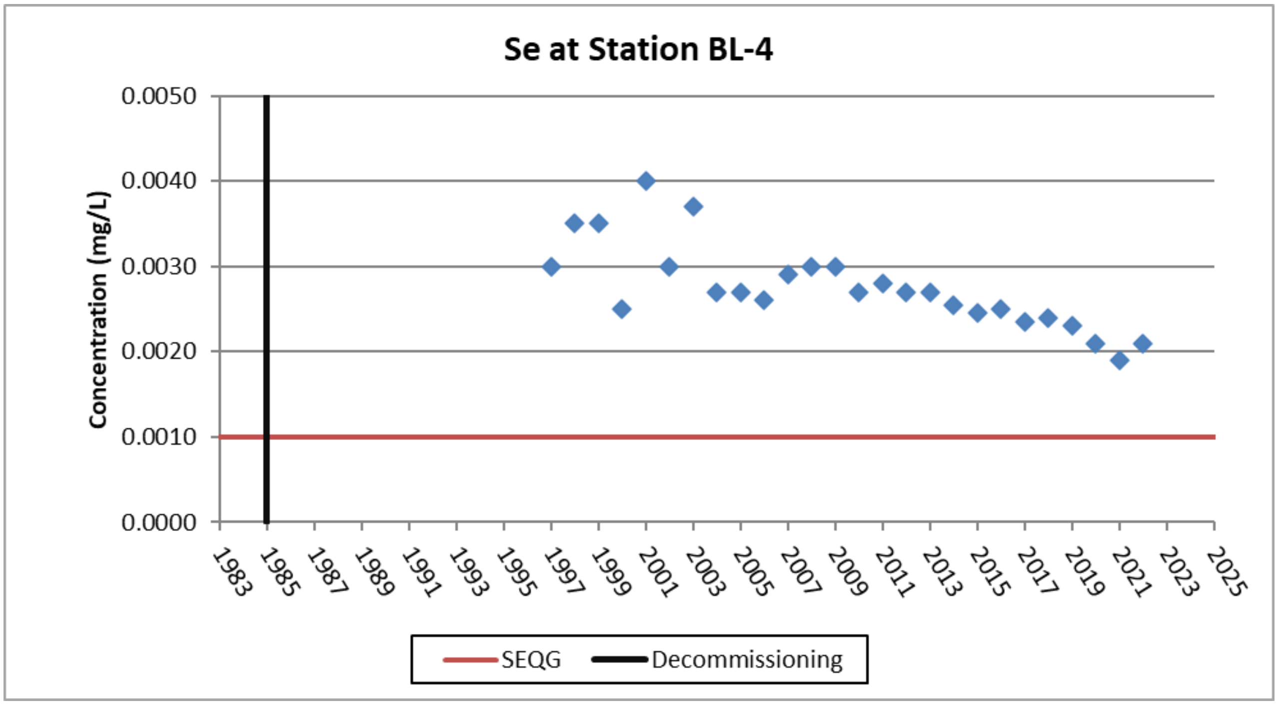


Figure 4.2.3-7 BL-4 Beaverlodge Lake Centre



Note: Method detection limit changed from 0.001mg/L to 0.0001mg/L in 2003.

Figure 4.2.3-8 BL-4 Beaverlodge Lake Centre

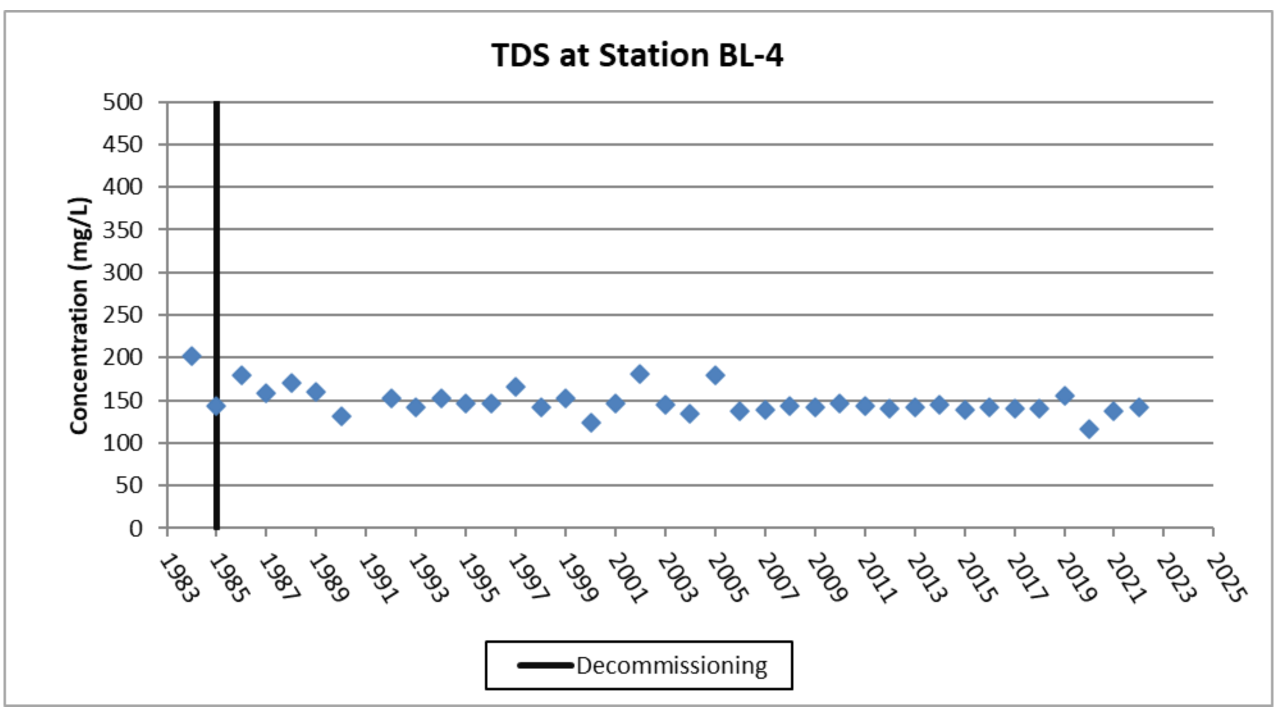
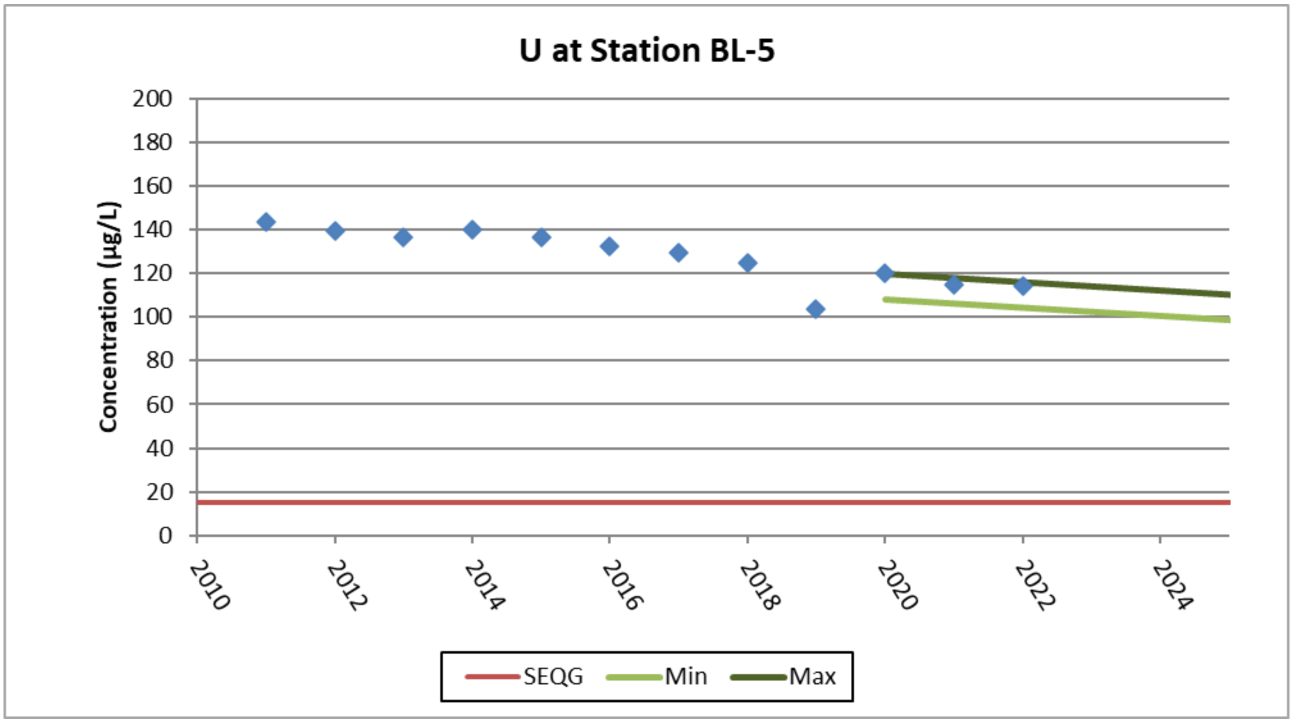
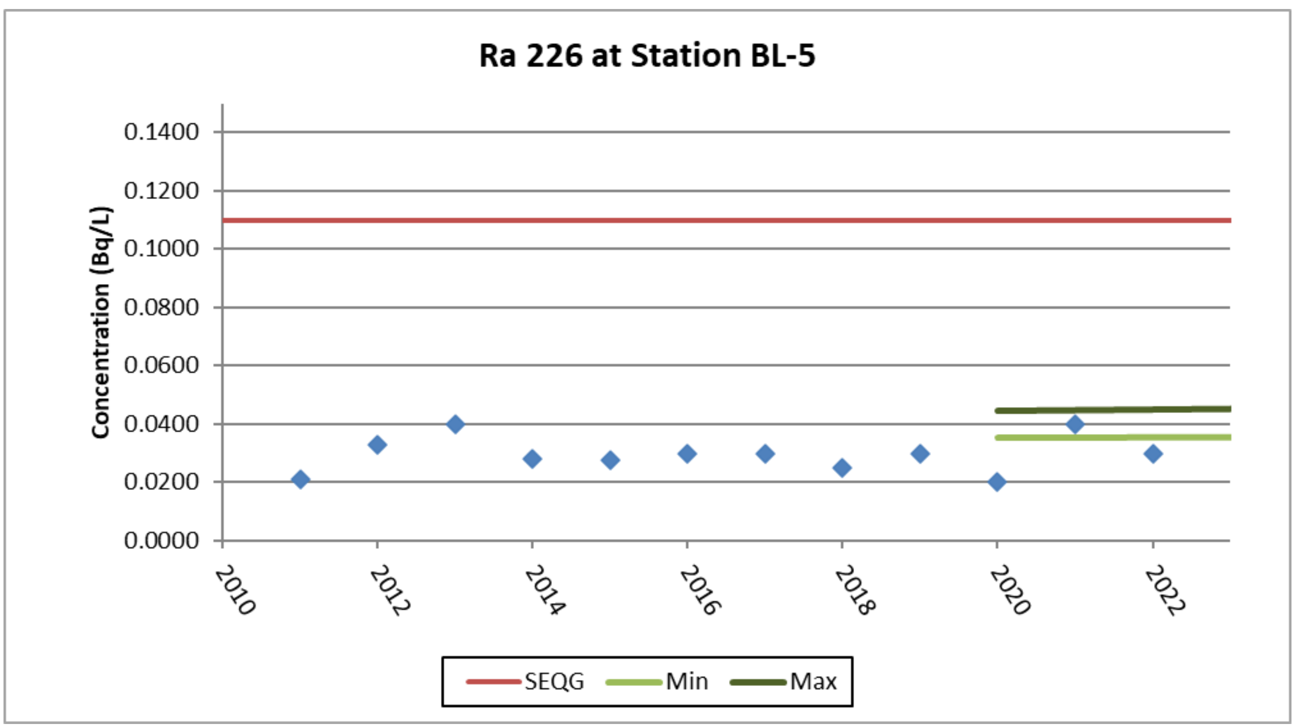


Figure 4.2.3-9 BL-5 Beaverlodge Lake Outlet



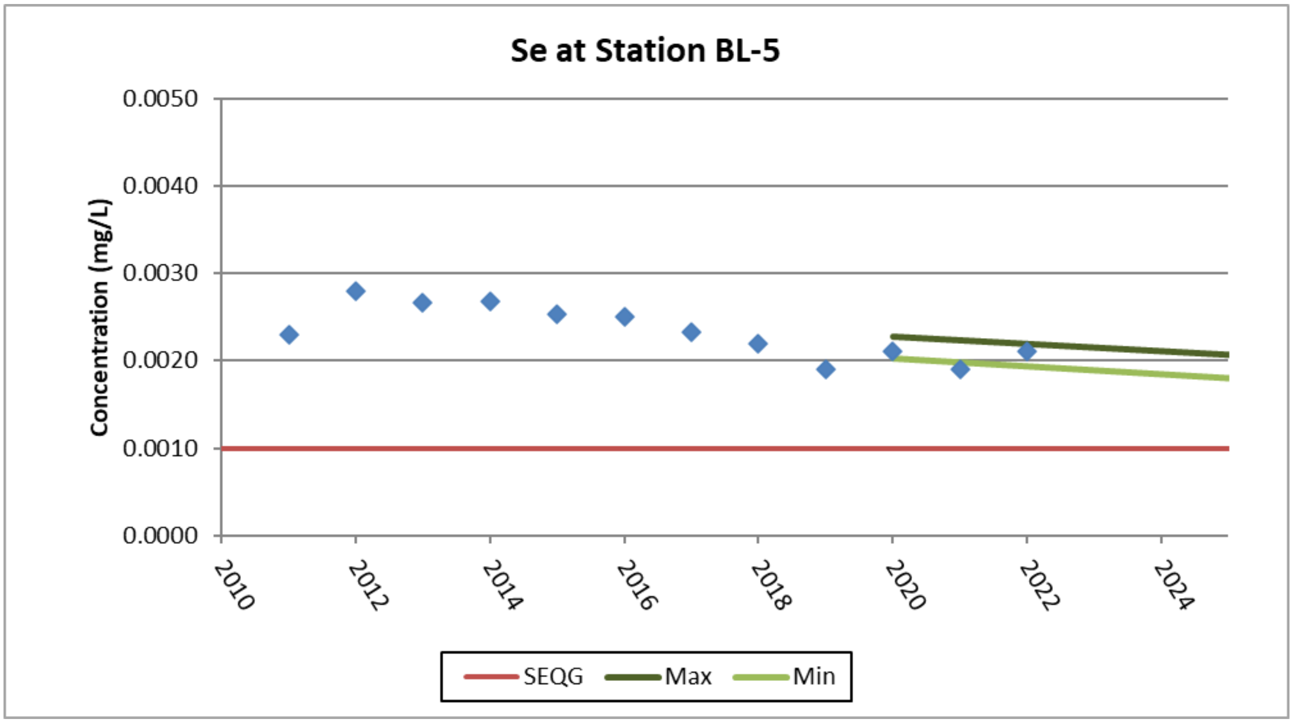
** Station implemented in water sampling program in 2011.*

Figure 4.2.3-10 BL-5 Beaverlodge Lake Outlet



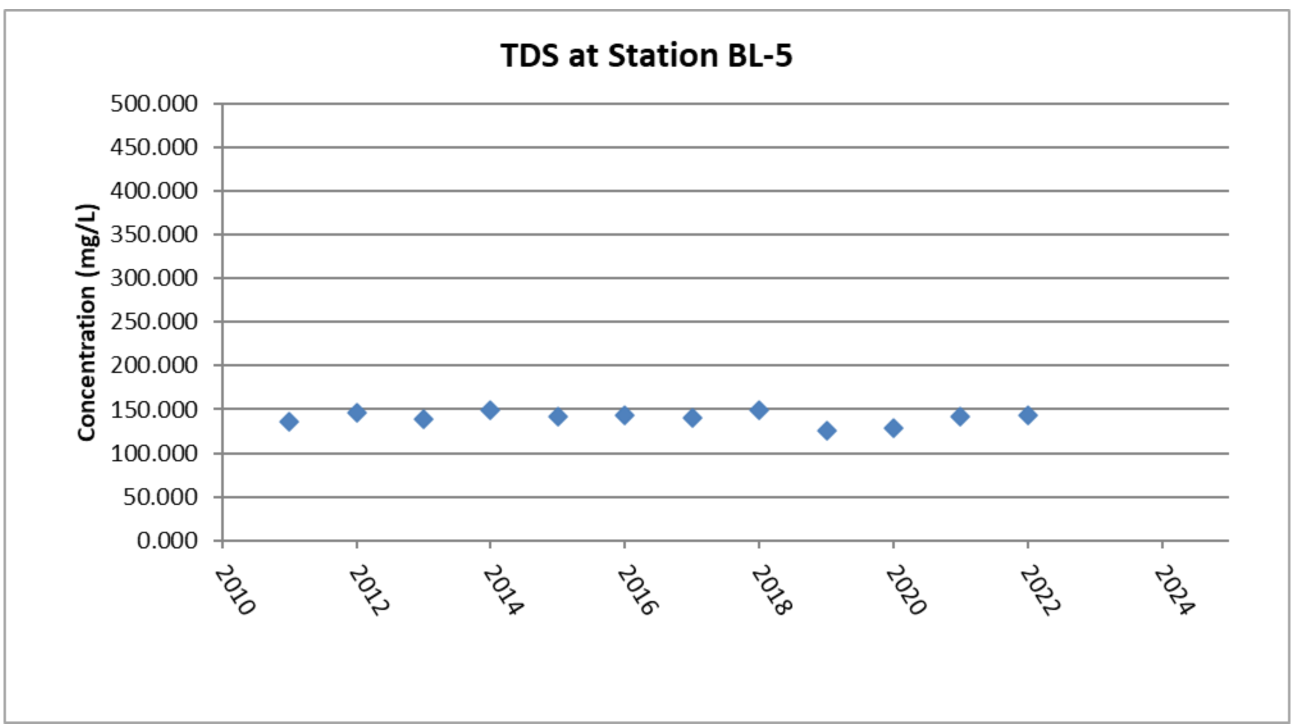
** Station implemented in water sampling program in 2011.*

Figure 4.2.3-11 BL-5 Beaverlodge Lake Outlet



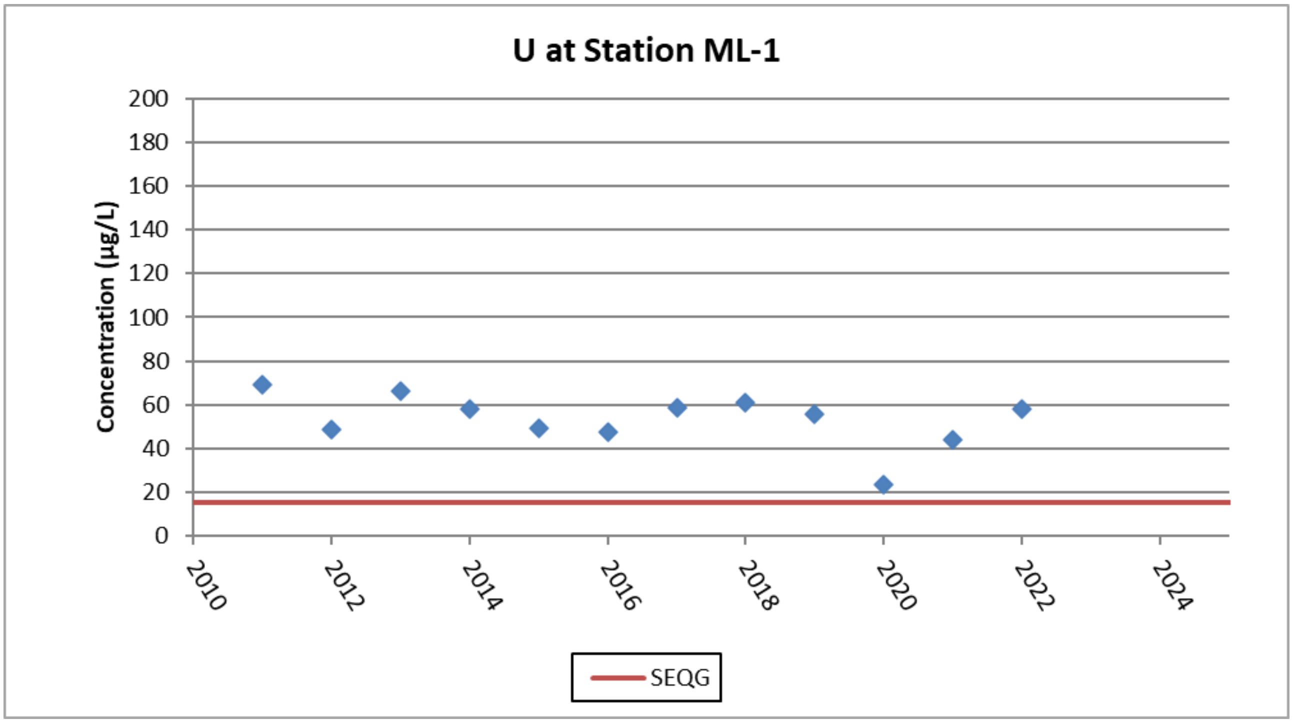
** Station implemented in water sampling program in 2011.*

Figure 4.2.3-12 BL-5 Beaverlodge Lake Outlet



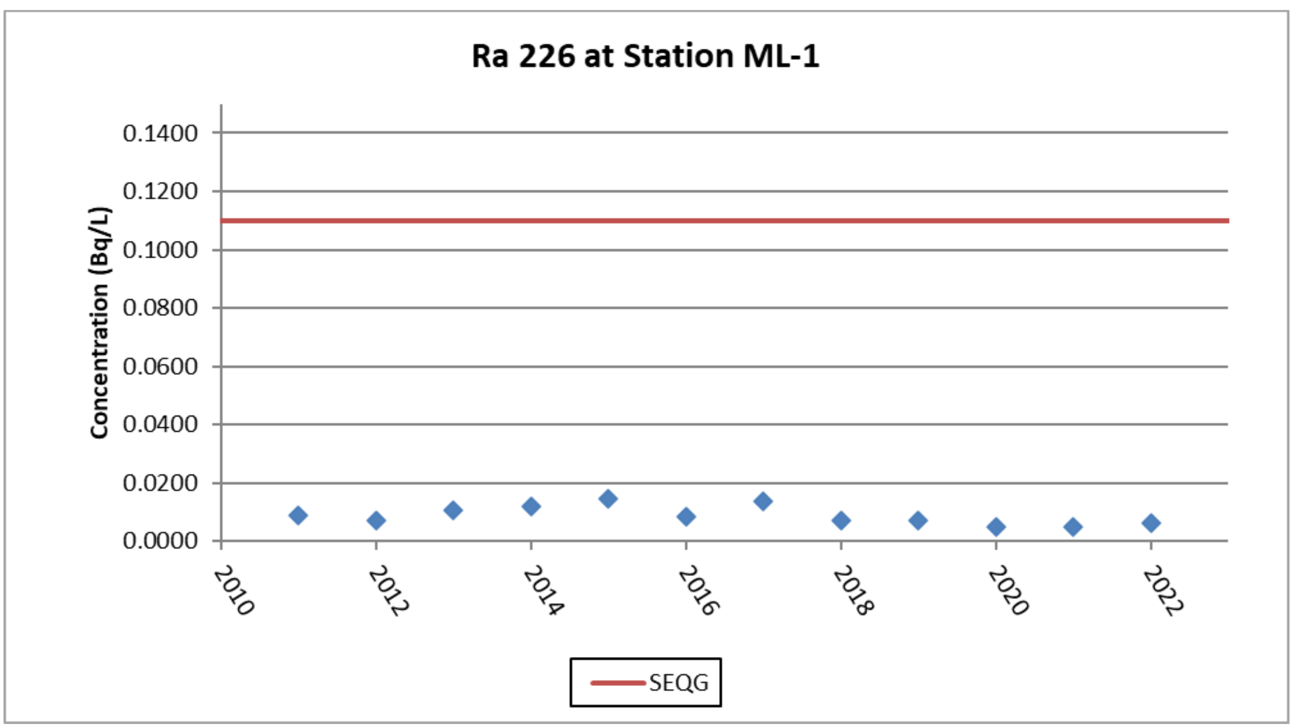
** Station implemented in water sampling program in 2011.*

Figure 4.2.3-13 ML-1 Outlet of Martin Lake



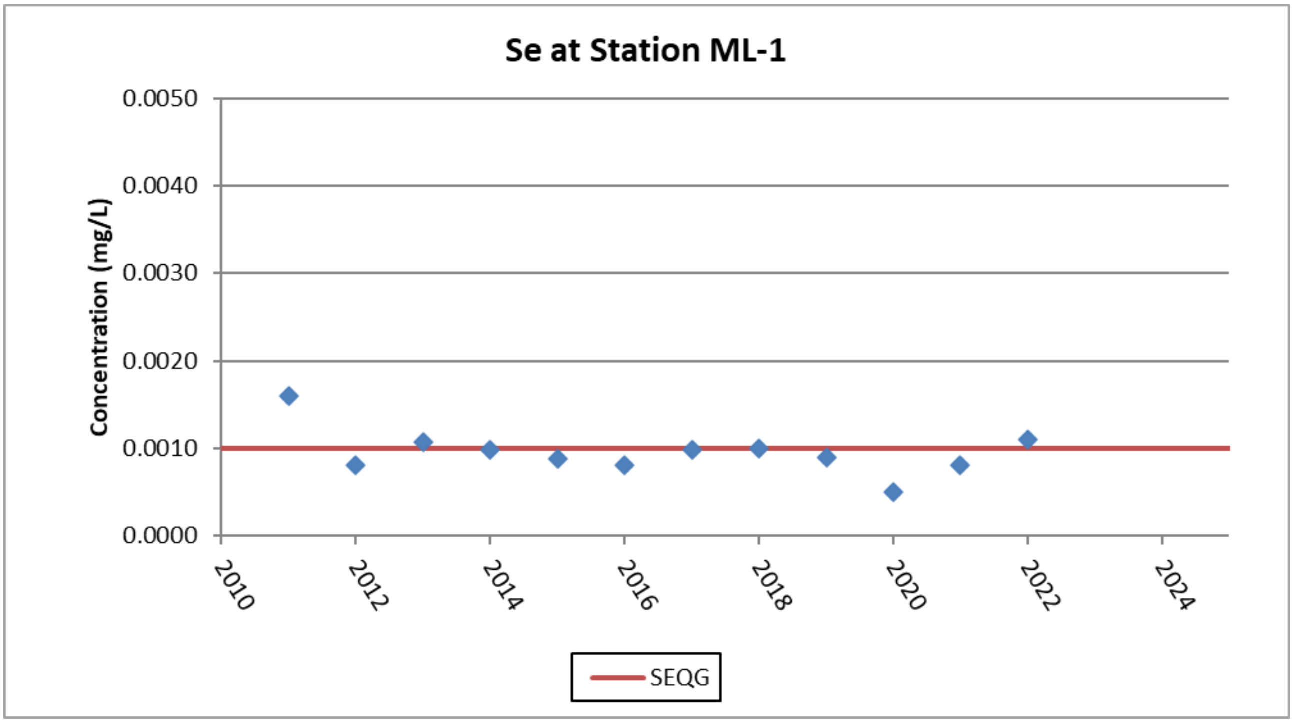
**Station implemented in water sampling program in 2011.*

Figure 4.2.3-14 ML-1 Outlet of Martin Lake



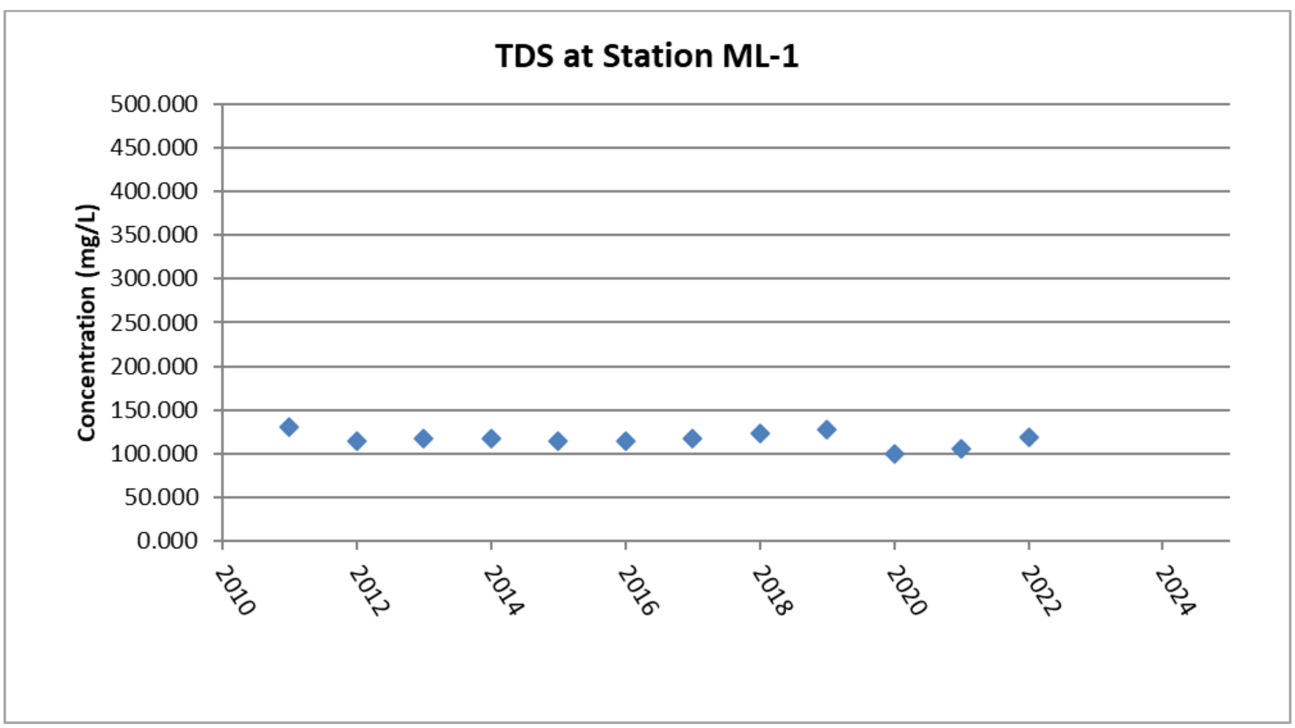
**Station implemented in water sampling program in 2011.*

Figure 4.2.3-15 ML-1 Outlet of Martin Lake



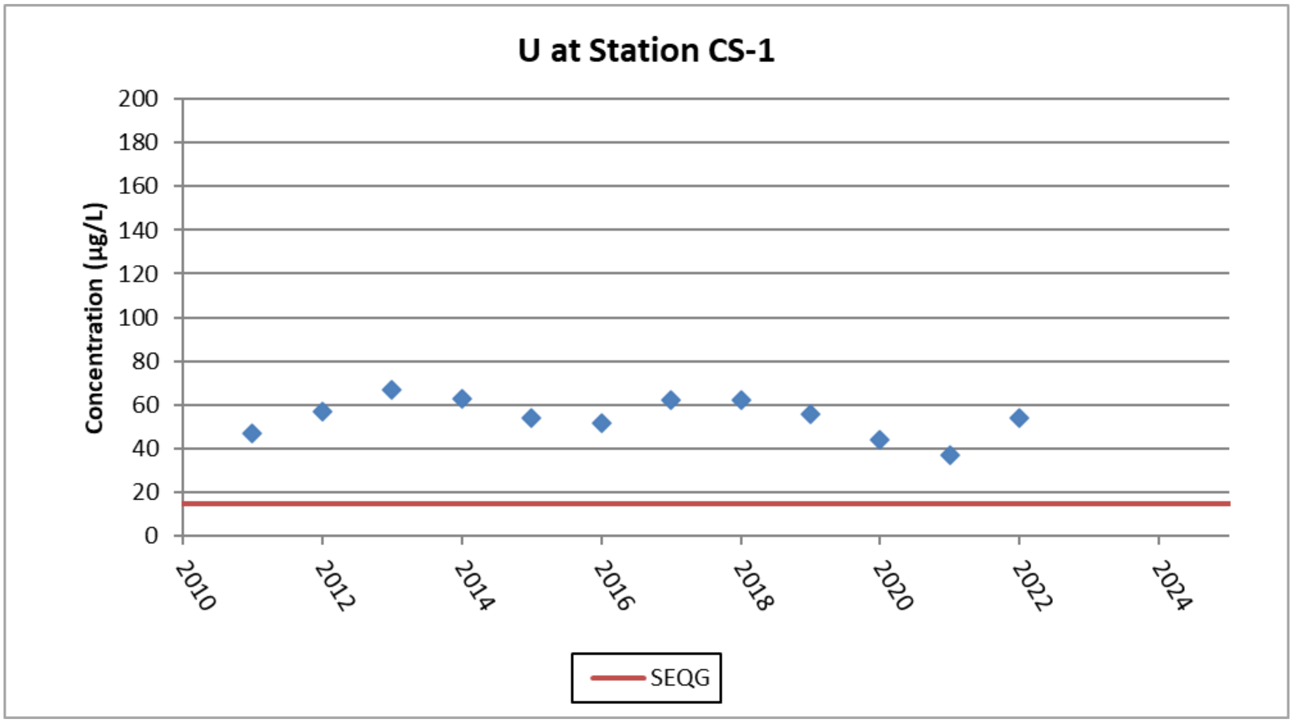
**Station implemented in water sampling program in 2011.*

Figure 4.2.3-16 ML-1 Outlet of Martin Lake



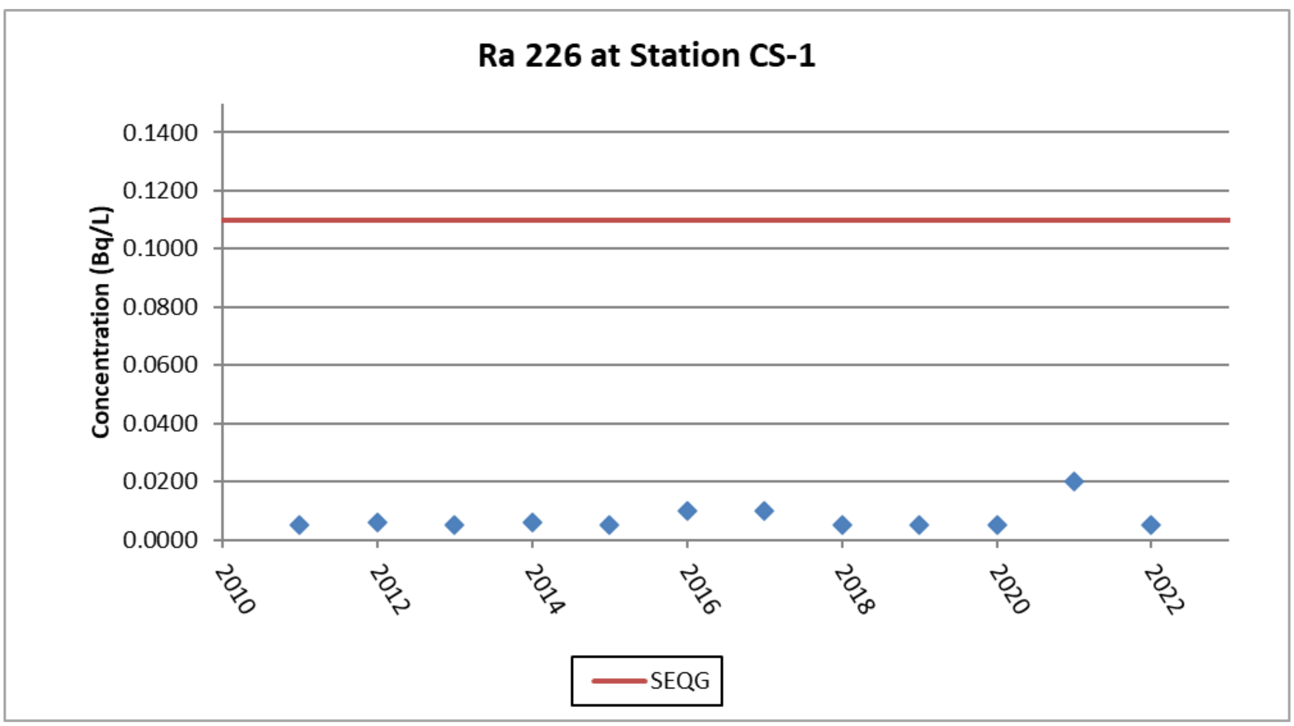
**Station implemented in water sampling program in 2011.*

Figure 4.2.3-17 CS-1 Crackingstone River at Bridge



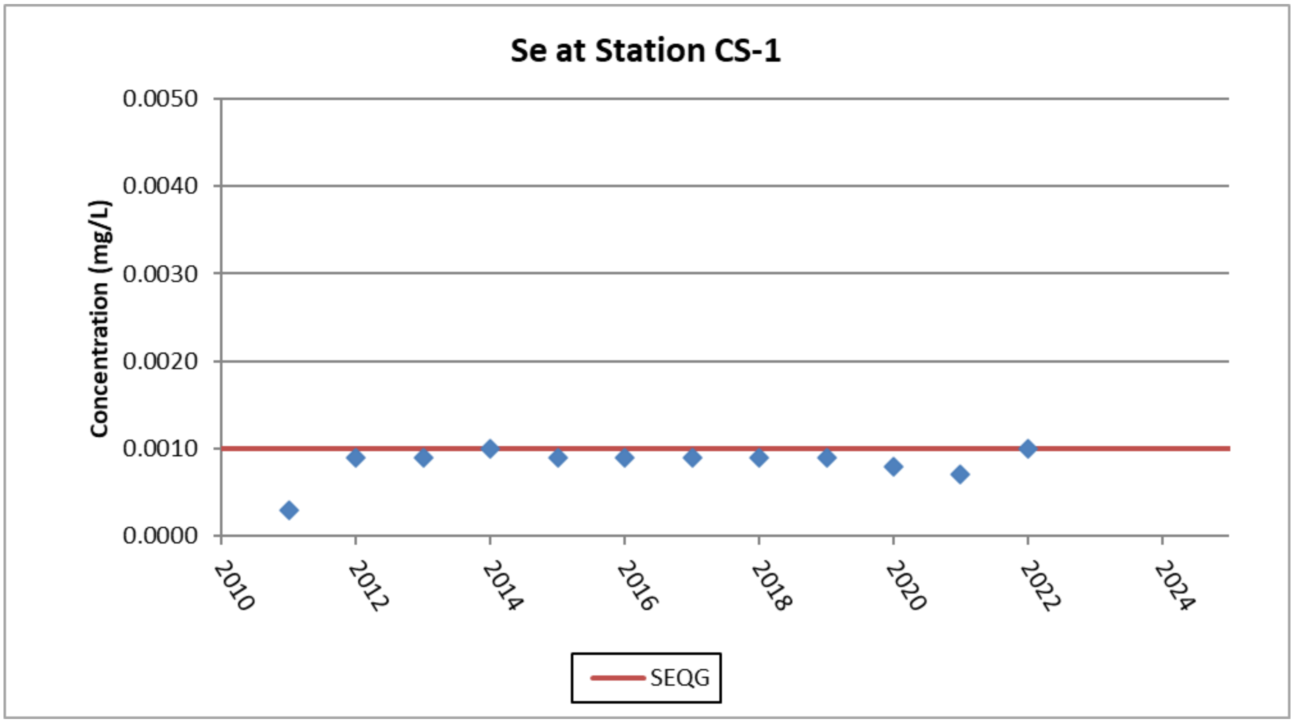
**Station implemented in water sampling program in 2011.*

Figure 4.2.3-18 CS-1 Crackingstone River at Bridge



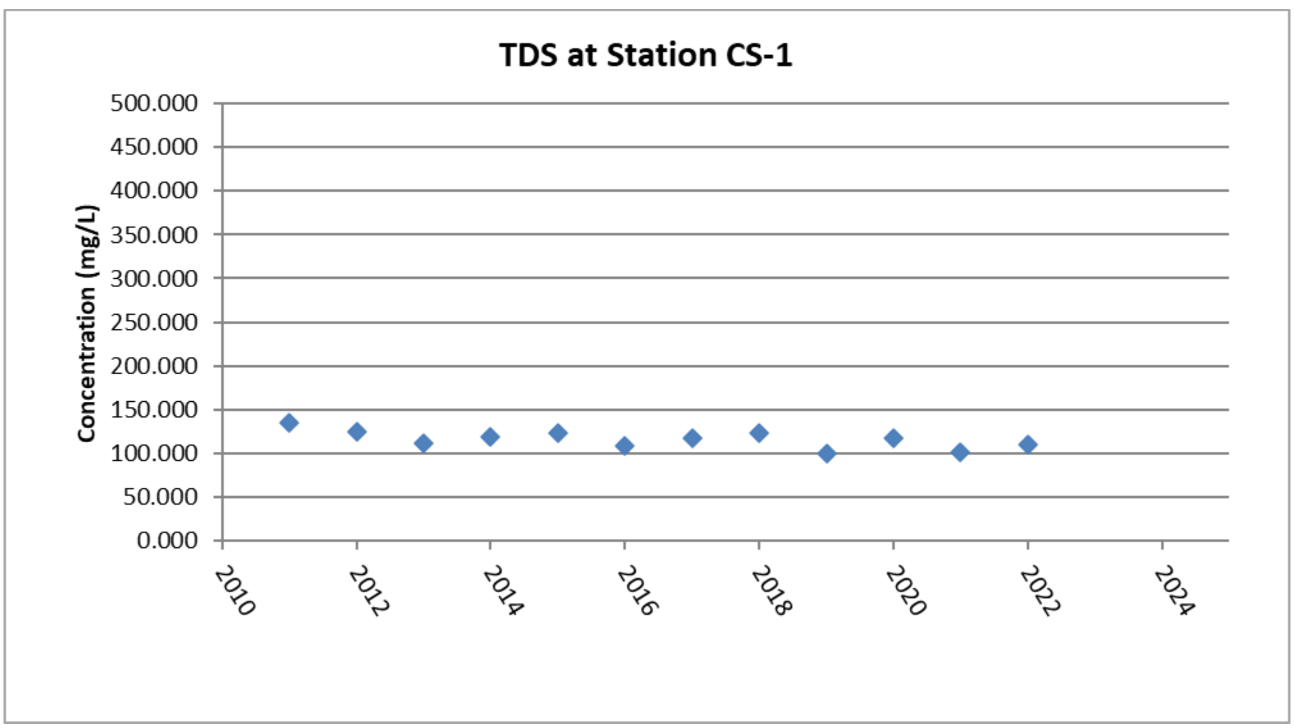
**Station implemented in water sampling program in 2011.*

Figure 4.2.3-19 CS-1 Crackingstone River at Bridge



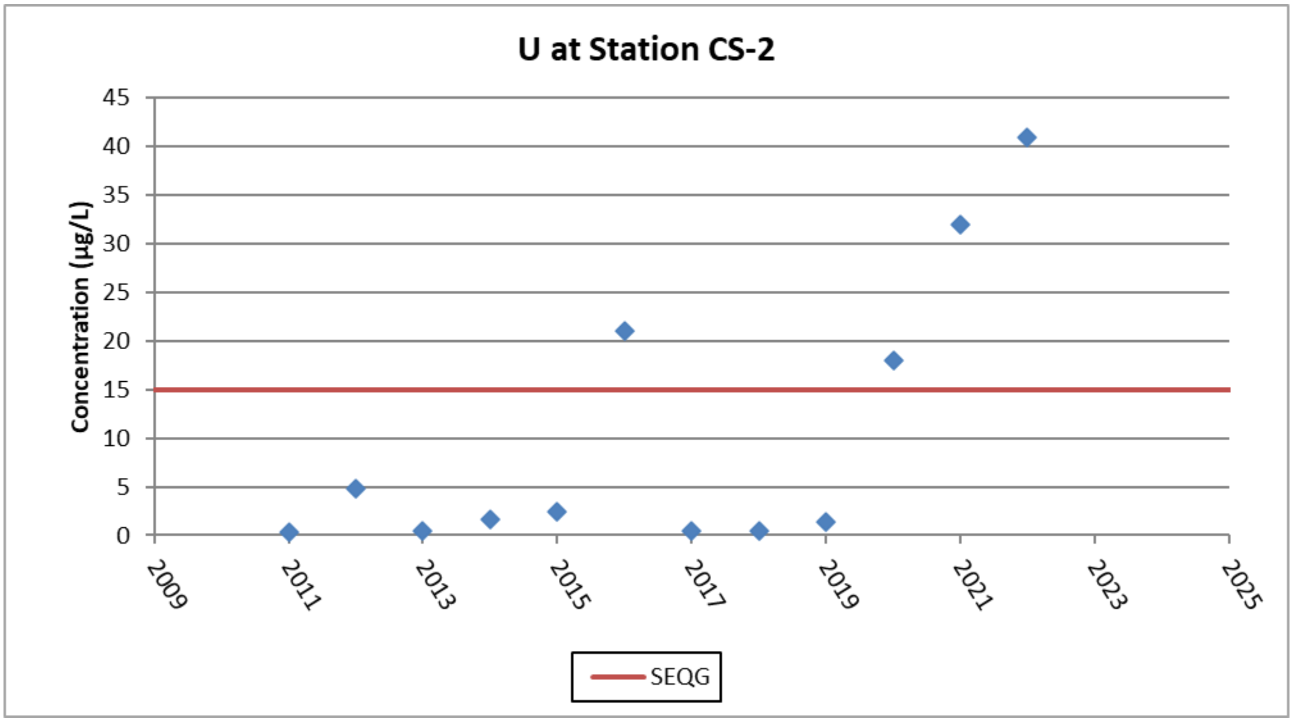
**Station implemented in water sampling program in 2011.*

Figure 4.2.3-20 CS-1 Crackingstone River at Bridge



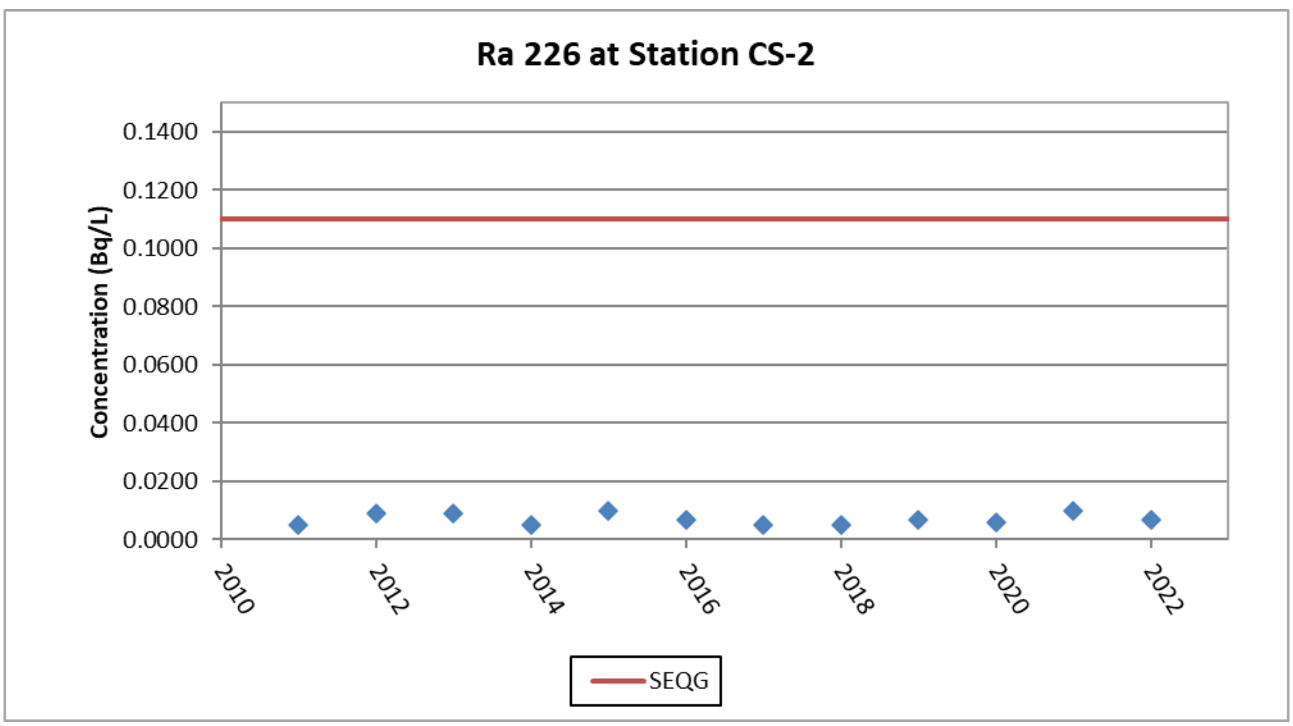
**Station implemented in water sampling program in 2011.*

Figure 4.2.3-21 CS-2 Crackingstone Bay



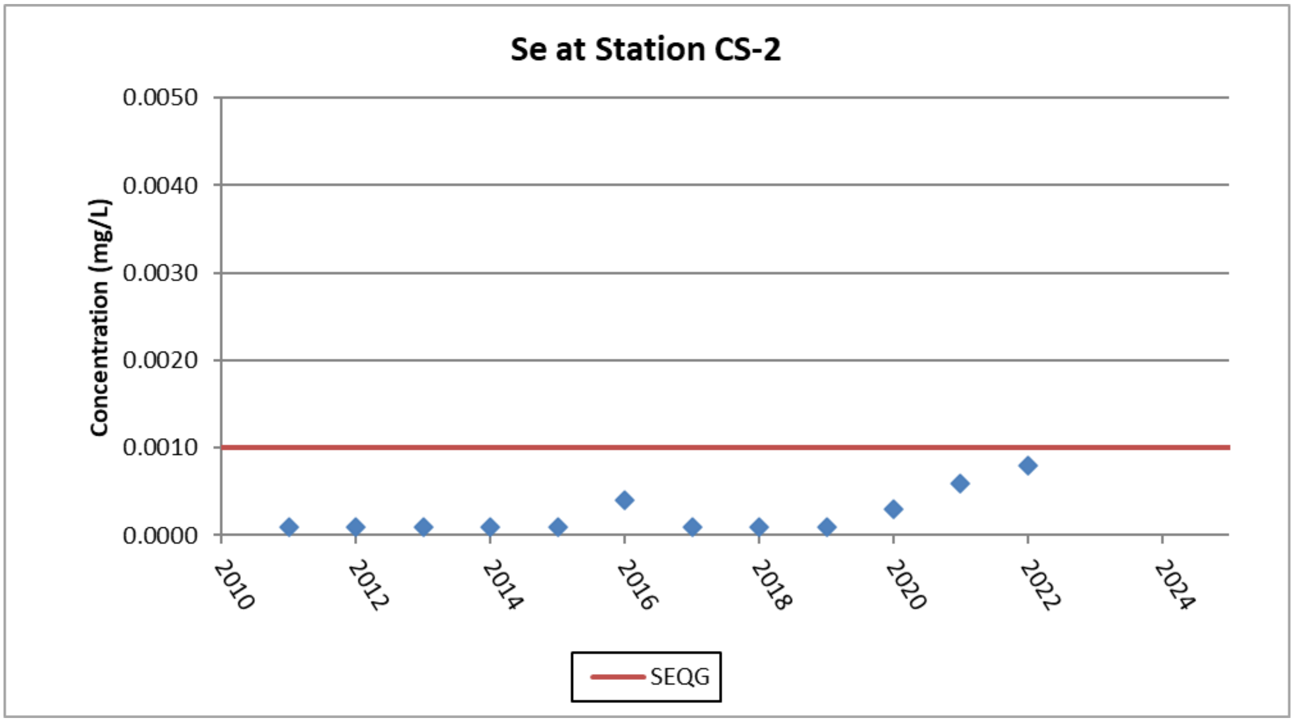
**Station implemented in water sampling program in 2011.*

Figure 4.2.3-22 CS-2 Crackingstone Bay



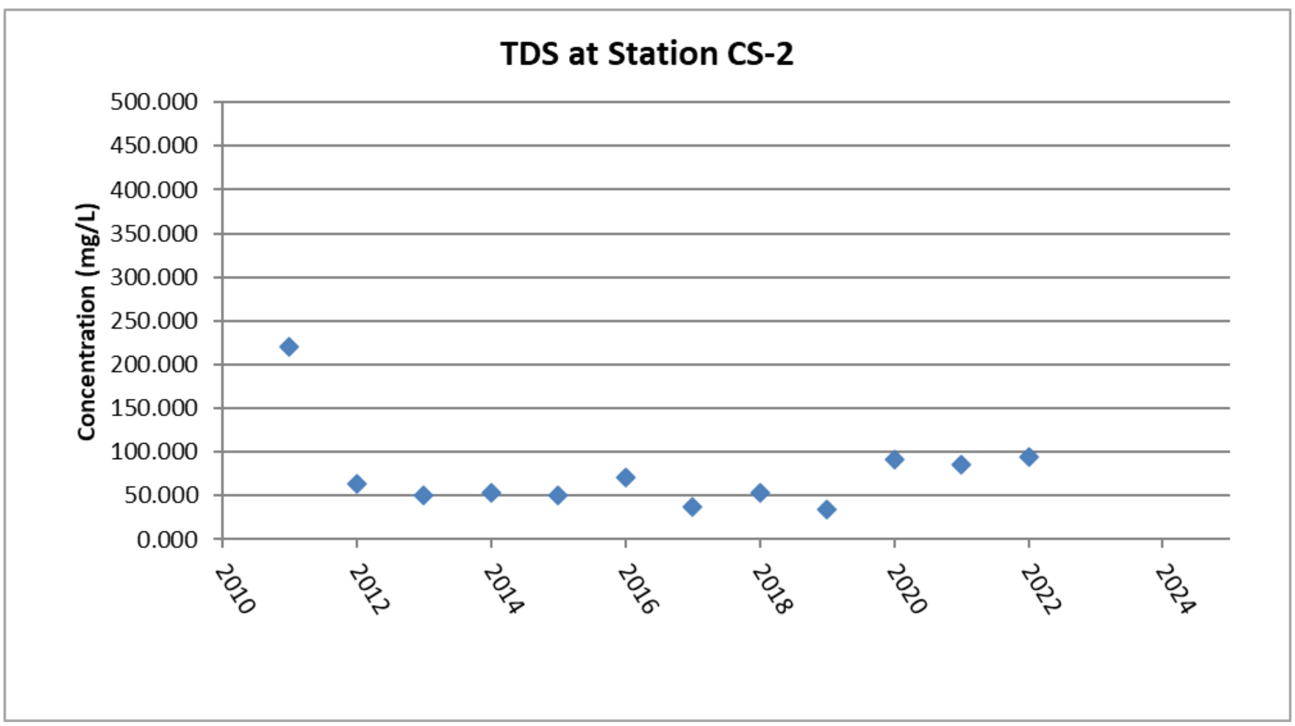
**Station implemented in water sampling program in 2011.*

Figure 4.2.3-23 CS-2 Crackingstone Bay



**Station implemented in water sampling program in 2011.*

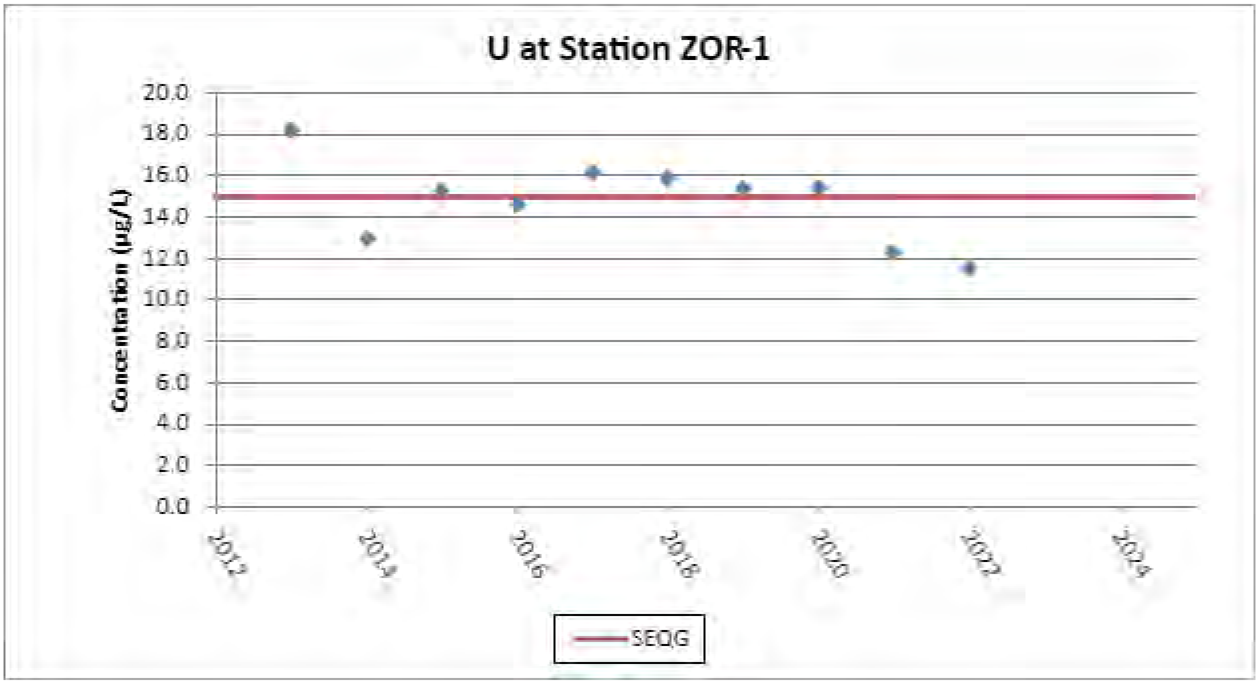
Figure 4.2.3-24 CS-2 Crackingstone Bay



**Station implemented in water sampling program in 2011.*

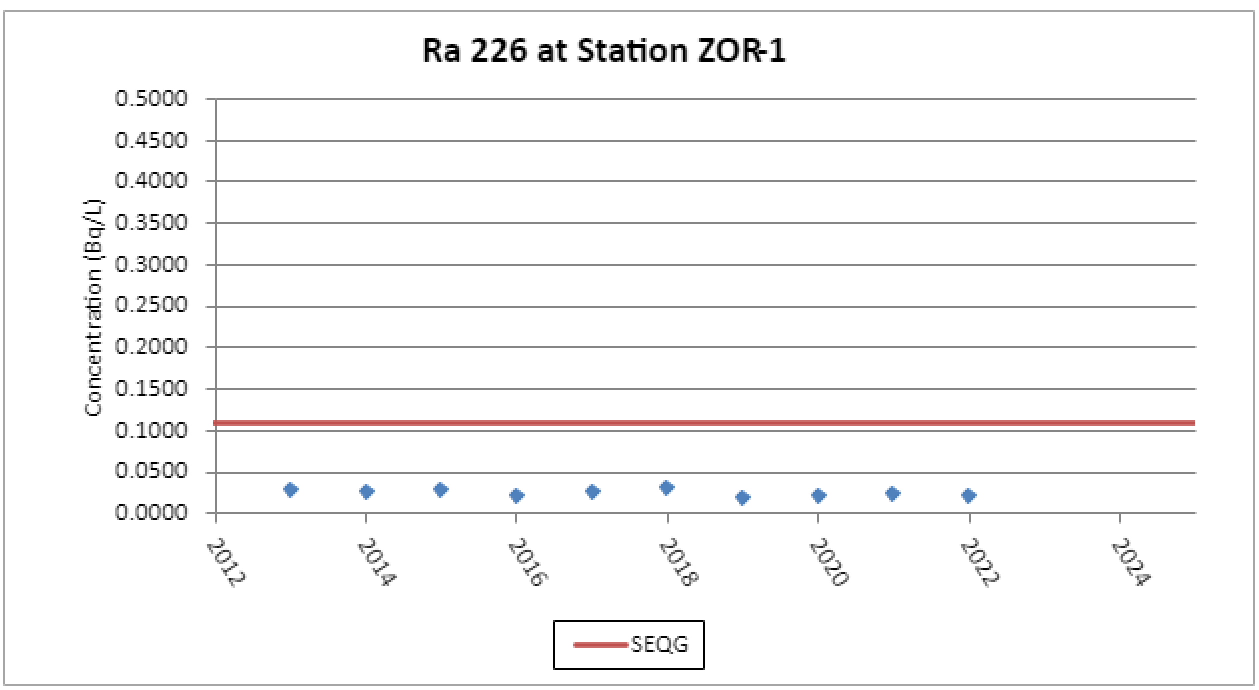
Figure 4.3 ZOR-01 and ZOR-02 sampling locations

Figure 4.3-1 ZOR-01 Outlet of Zora Lake



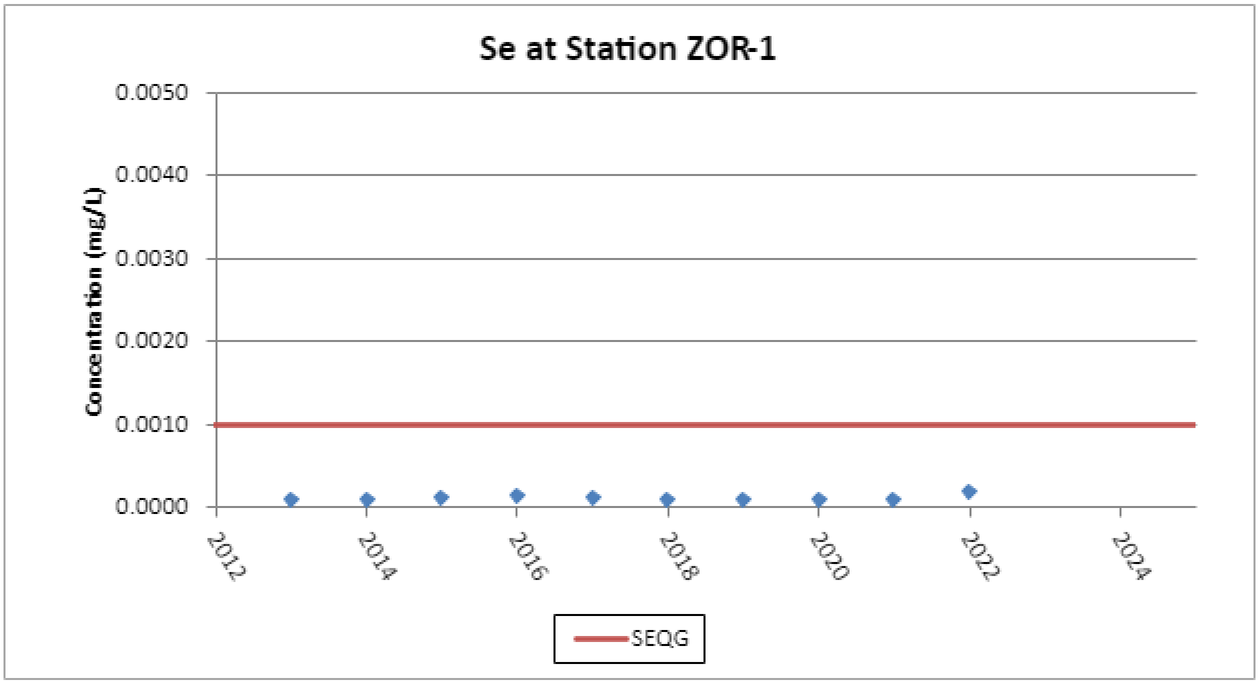
**Sampling initiated in 2013.*

Figure 4.3-2 ZOR-01 Outlet of Zora Lake



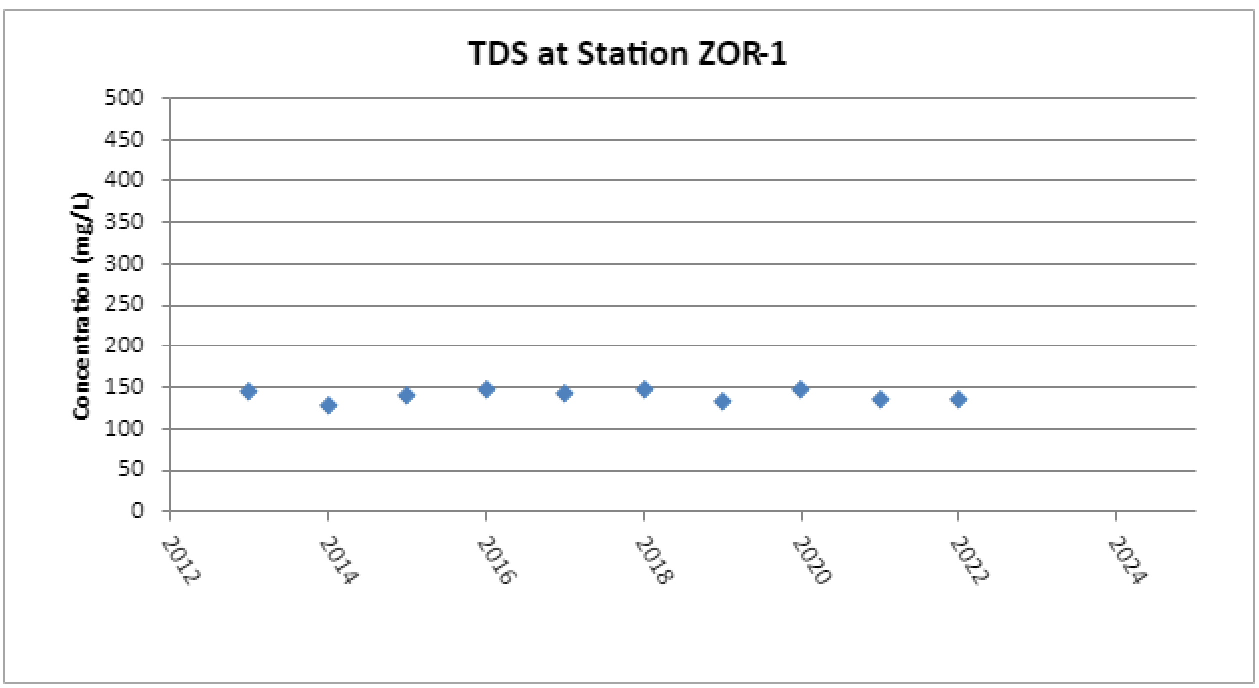
**Sampling initiated in 2013.*

Figure 4.3-3 ZOR-01 Outlet of Zora Lake



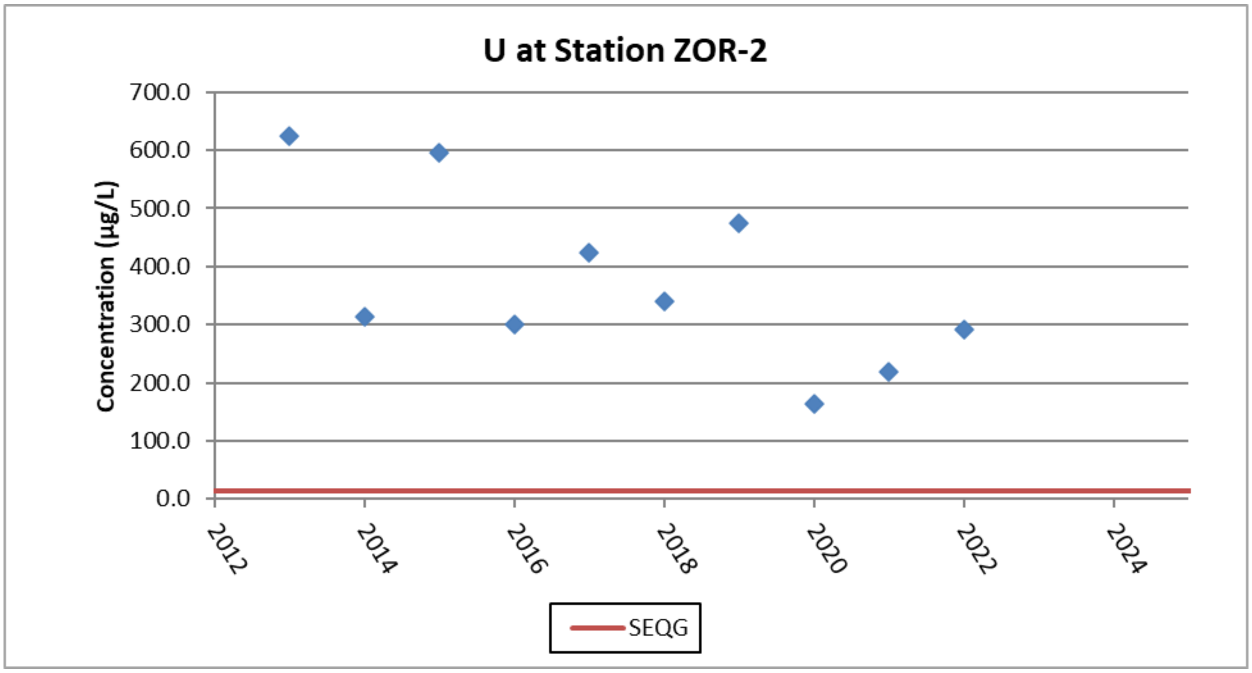
**Sampling initiated in 2013.*

Figure 4.3-4 ZOR-01 Outlet of Zora Lake



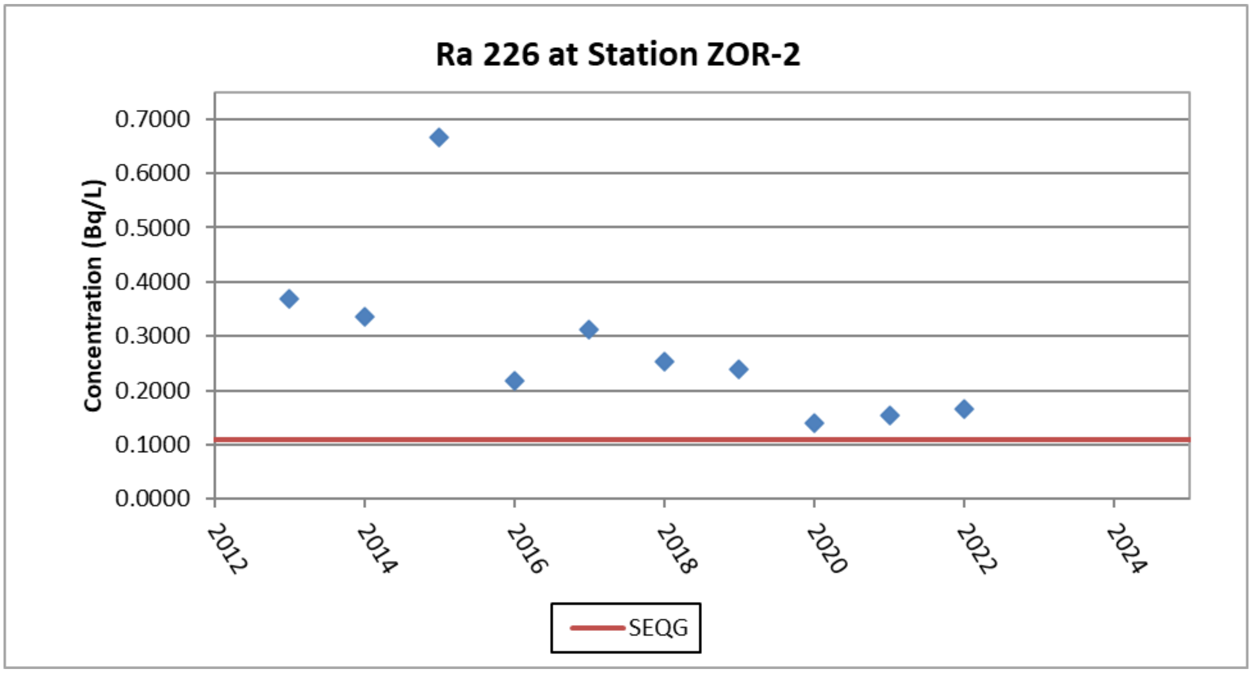
**Sampling initiated in 2013.*

Figure 4.3-5 ZOR-02 Outlet of the Zora Creek Flow Path



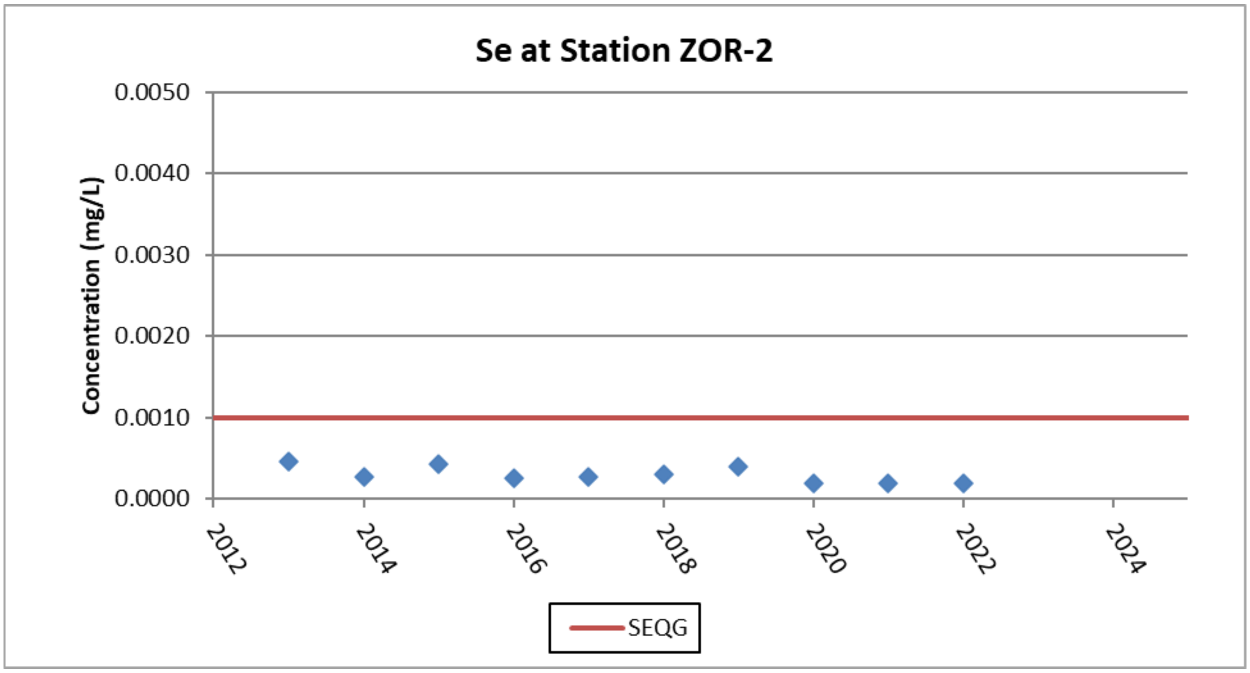
**Sampling initiated in 2013.*

Figure 4.3-6 ZOR-02 Outlet of the Zora Creek Flow Path



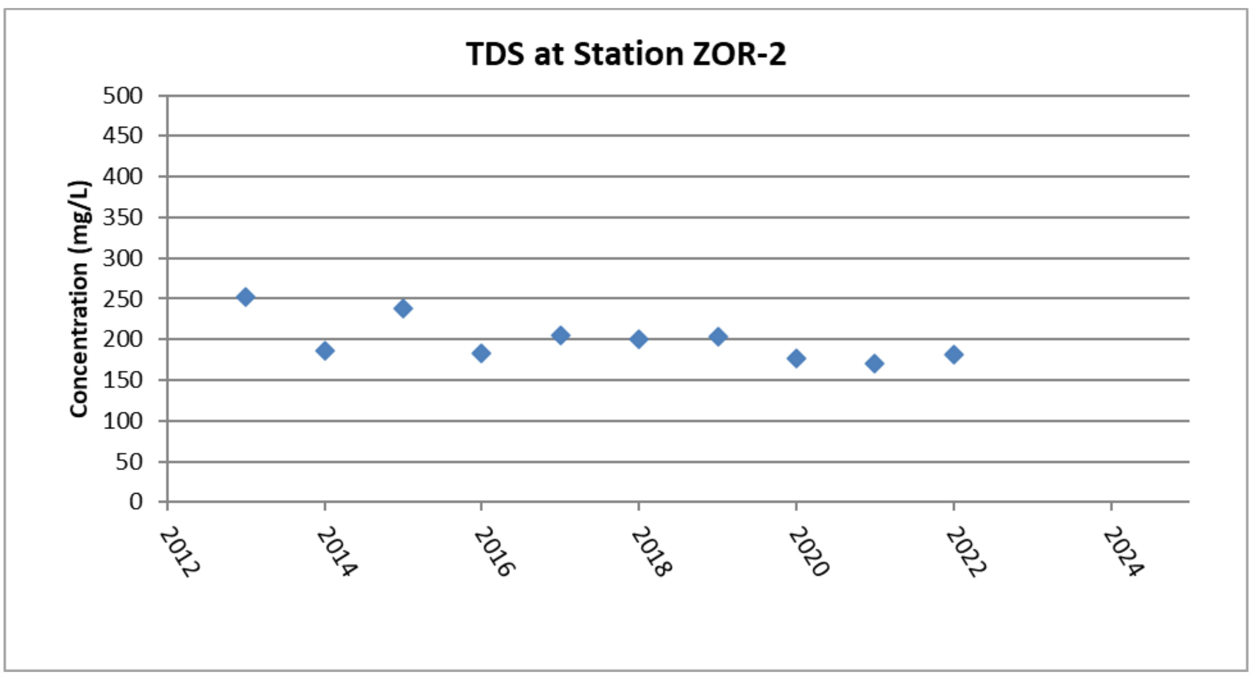
**Sampling initiated in 2013.*

Figure 4.3-7 ZOR-02 Outlet of the Zora Creek Flow Path



**Sampling initiated in 2013.*

Figure 4.3-8 ZOR-02 Outlet of the Zora Creek Flow Path



**Sampling initiated in 2013.*

Figure 4.5.1-1 - Air Sampling Locations

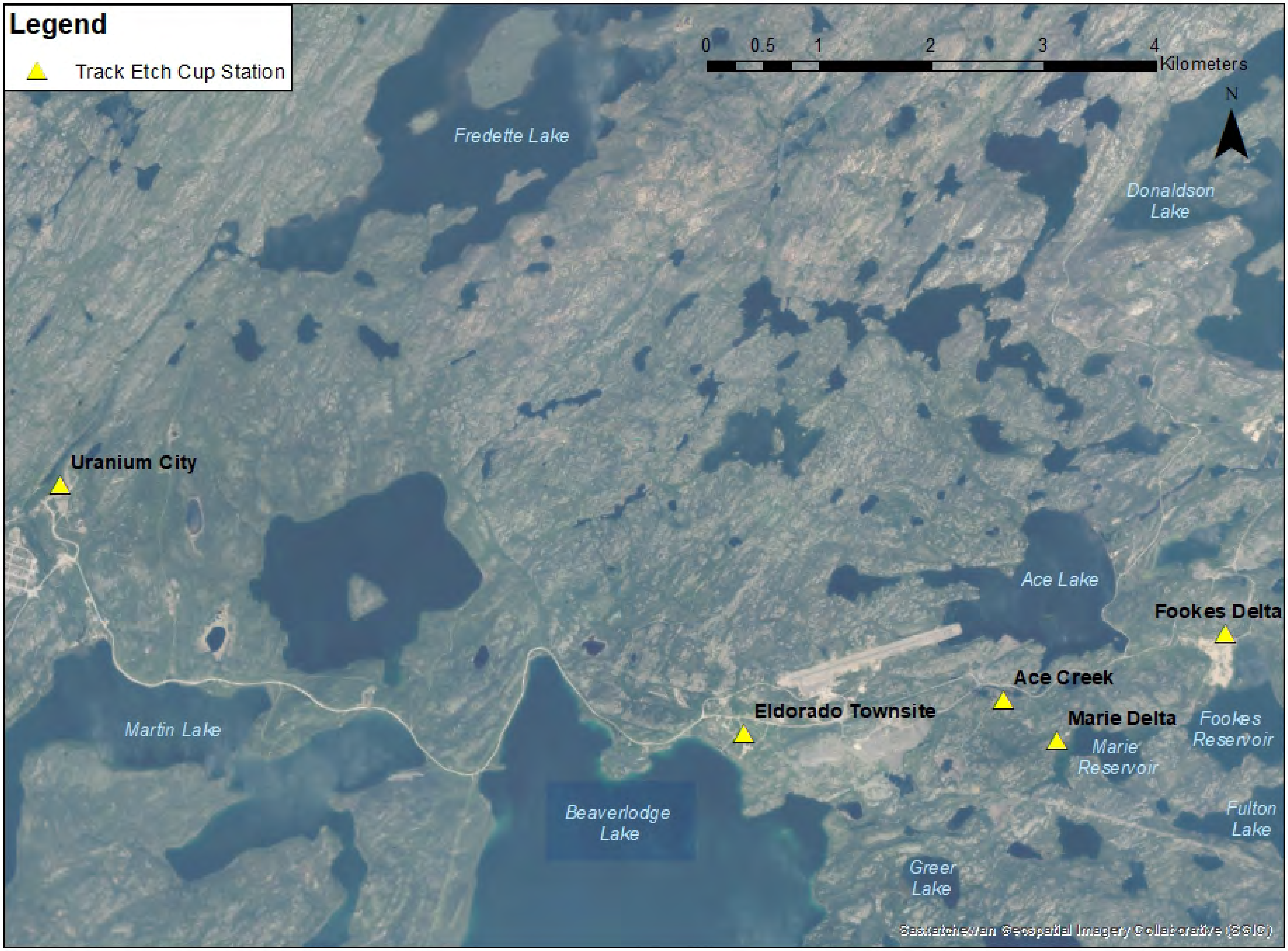
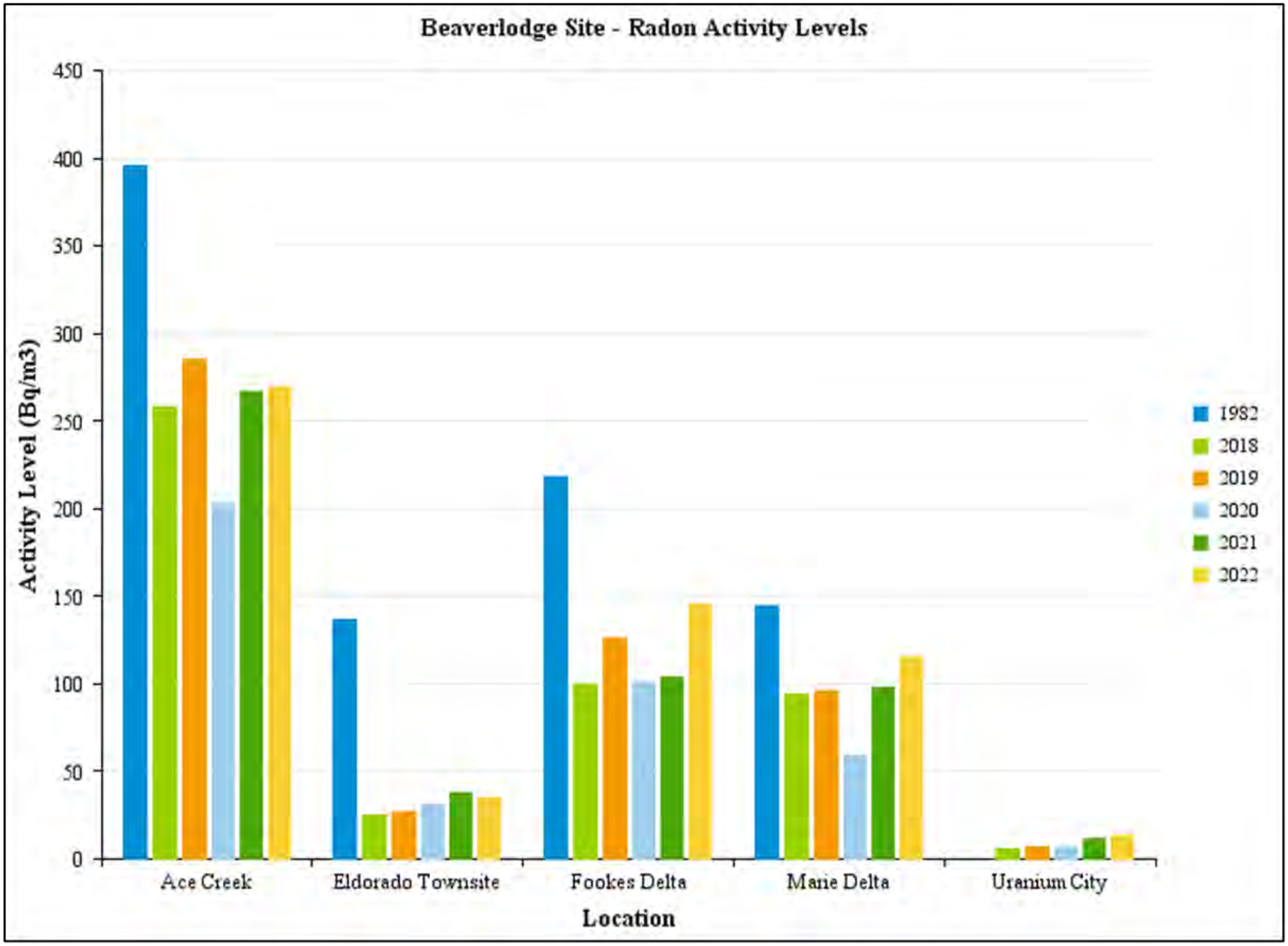


Figure 4.5.1-2 Radon Summary (2018 - 2022 versus 1982)



** In 2020, the second set of the semi-annual radon samples (five stations) were not analyzed as per the Beaverlodge EMP requirements, due to the track-etch cups being lost in transit. The CNSC and SkMOE were notified of this occurrence on August 20, 2021.*

APPENDIX A

APPENDIX A

Property Name	Acceptable Gamma Levels	Boreholes Plugged	Stable Mine Openings	Stable Crown Pillar	Water Quality Within Modelled Predictions	Waste Rock	Tailings	IC Monitoring	IC Maintenance	Land Status
EAGLE 4/7	Y (Meets Guideline)	Y	Eagle shaft concrete collar and cap constructed in 2000.	Yes, no indication of instability or subsidence identified.	NA - Shaft Lake water sample	Y	No residual tailings	Inspection of evidence of recent human visitation, condition of concrete cap, evidence of artesian flow from boreole, evidence of significant pit wall failure, condition of vegetation.	Concrete cap will require maintenance or replacement.	Managed in IC
EAGLE (02 Zone)	Y (Meets Guideline)	Not Required in 2009	No mine openings to surface	NA	NA	Y	No residual tailings	Inspection of evidence of recent human visitation, evidence of significant pit wall failure, condition of vegetation.	No maintenance required	Managed in IC
EMAR 16 (K260)	Y (Meets Guideline)	Not Required in 2009	No mine openings to surface	NA	NA	Y	No residual tailings	Inspection of evidence of recent human visitation, evidence of significant pit wall failure, condition of vegetation.	No maintenance required	Managed in IC
EMAR 19 (11 Zone)	Y (Meets Guideline)	Not Required in 2009	No mine openings to surface	NA	NA	Y	No residual tailings	Inspection of evidence of recent human visitation, evidence of significant pit wall failure, condition of vegetation.	No maintenance required	Managed in IC
EMAR 21 (46 Zone)	Y (Meets Guideline)	Not Required in 2009	Adit was backfilled during original decommissioning. Shows no signs of deterioration	Yes, no indication of instability or subsidence identified.	NA	Y	No residual tailings	Inspection of evidence of recent human visitation, evidence of significant pit wall failure, condition of adit, evidence of instability of crown pillar above adit, condition of vegetation.	No maintenance required	Managed in IC
EXC ATO 26	Y (Meets Guideline)	NA	No mine openings to surface	Yes, no indication of instability or subsidence identified.	NA	Y	No residual tailings	Inspection of evidence of recent human visitation, evidence of significant waste rock slope failure and condition of vegetation.	No maintenance required	Managed in IC
EXC ACE 1	Y (Risk Assessment)	NA	No mine openings to surface	NA	NA	N	Accessible tailings were covered with 600mm of waste rock. Inaccessible residual tailings were left in place as vegetation cover had established.	Inspection of evidence of recent human visitation, evidence of disturbance of the waste rock covered tailings and condition of vegetation.	No maintenance required	Managed in IC and portion free released
ACE 2	Y (Meets Guideline)	NA	No mine openings to surface	Yes, no indication of instability or subsidence identified.	NA	N	All accessible tailings were covered with 600 mm of waste rock.	Inspection of evidence of recent human visitation, condition of waste rock cover of tailings, and cover of vegetation	No maintenance required	Managed in IC
EXC ACE 3	Y (Meets Guideline)	NA	No mine openings to surface	Yes, no indication of instability or subsidence identified.	NA	N	No residual tailings	No monitoring required	No maintenance required	Managed in IC
HAB 6	Y (Meets Guideline)	Y	No mine openings to surface	NA	NA	Y	No residual tailings	Inspection of evidence of recent human visitation, evidence of disturbance of the waste rock used to construct the trail, condition of waste rock used to construct the trail and the condition of vegetation on the trail.	No maintenance required	Managed in IC
EXC 2	Y (Meets Guideline)	Y	No mine openings to surface	NA	NA	N	No residual tailings	No monitoring required	No maintenance required	Managed in IC
ATO 26	Y (Meets Guideline)	NA	No mine openings to surface	NA	NA	N	No residual tailings	No monitoring required	No maintenance required	Managed in IC and portion free released
URA MC	Y (Meets Guideline)	NA	No mine openings to surface	Yes, no indication of instability or subsidence identified.	NA	Y	No residual tailings	Inspection of evidence of recent human visitation, condition of the plugged artesian drill holes, evidence of significant sluffing of waste rock slope and condition of vegetation	No maintenance required	Managed in IC
HAB 3	Y (Lack of Disturbance-No Readings)	Y	No mine openings to surface	No indication of instability or subsidence identified.	Monitor AN-5	N	No residual tailings	Inspection of evidence of recent human visitation, condition of the crown pillar area, condition of vegetation	No maintenance required	Managed in IC
BOLGER 2	Y (Risk Assessment)	NA	No mine openings to surface	NA	NA	Y	No residual tailings	Inspection of recent human visitation, general pit wall stability, evidence of significant pit wall failure, evidence of significant sluffing of waste rock slope, and condition of vegetation	No maintenance required	Managed in IC
RA 6	Y (Meets Guideline)	NA	Adits RA6 was sealed with steel graitng using #10 steel rail	Yes, no indication of instability or subsidence identified.	NA	Y	No residual tailings	Inspection of evidence of recent human visitation, RA 6 adit closure condition, condition of crown pillar, evidence of slumping of waste rock slopes, evidence of surface seeps from the adit, and condition of vegetation.	Steel grate is scheduled for replacement	Managed in IC
RA 9	Y (Meets Guideline)	Y	Adit was backfilled to a suffficient depth to eliminate future erosion to ensure long term stability.	Yes, no indication of instability or subsidence identified.	NA	Y	No residual tailings	Inspection of evidence of recent human visitation, RA 9 adit closure condition, condition of crown pillar, evidence of slumping of waste rock slopes, evidence of surface seeps from the adit, and condition of vegetation.	No maintenance required	Managed in IC
Eagle 1	Y (Meets Guideline)	Y	No mine openings to surface	Yes, no indication of instability or subsidence identified.	Monitor 12 Zone	Y	No residual tailings	Inspection of pit wall stability, vegetation condition, evidence of human visitation, sand cover over areas with elevated gamma, & status of flooded pit	No maintenance required	Managed in IC
ACE 10	Y (Lack of Disturbance-No Readings)	NA	No mine openings to surface	Yes, no indication of instability or subsidence identified.	NA	N	No residual tailings	No monitoring required	No maintenance required	Managed in IC and portion free released
URA 5	Y (Risk Assessment)	Y	No mine openings to surface	Yes, no indication of instability or subsidence identified.	Monitor AC-14	Y	Tailing spills identified in Ace Catchment Area I and Ace Stope Area were excavated and disposed of underground, covered with 600mm of waste rock or left undisturbed (if inaccessible).	Inspections of areas where residual tailings remain on URA 5 property	No maintenance required	Managed in IC
EXC URA 5	Y (Risk Assessment)	NA	No mine openings to surface	Yes, no indication of instability or subsidence identified.	NA	Y	Accessible tailing spills were covered with 600 mm of waste rock. Tailings at Ace Catchment I were removed.	Inspection of evidence of past tailing spill area for evidence of disturbance, the condition of waste rock slope, and the condition of vegetation.	No maintenance required	Managed in IC
URA 3	Y (Risk Assessment)	Y	25373 Raise secured with a stainless steel cap in 2017.	Yes, no indication of instability or subsidence identified.	NA	N	No residual tailings	Inspection of evidence of recent human visitation, the condition of stainless steel raise cap.	Stainless steel cap will require periodic material assessments.	Managed in IC and portion free released
ACE 5	Y (Lack of Disturbance-No Readings)	Y	No mine openings to surface	Yes, no indication of instability or subsidence identified.	NA	N	No residual tailings	No monitoring required	No maintenance required	Managed in IC

JO-NES	Y (Meets Guideline)	Y	810394 Vent Raise and 820694 Vent Raise filled with waste rock in 1982 and covered with a concrete cap. In 2017, stainless steel caps were placed over the concrete caps. Adit was filled with waste rock from site.	Yes, no indication of instability or subsidence identified.	NA	Y	No residual tailings	Inspection of evidence of recent human visitation, general pit wall stability, evidence of significant pit wall failure, evidence of significant sluffing of waste rock within the former pit, condition of stainless steel caps and adit, condition of vegetation.	Stainless steel caps will need periodic material assessments.	Managed in IC and portion free released
HAB 2A	Y (Meets Guideline)	Y	D013810 Raise (645553E; 6611886N) was made secure via installation of stainless steel cap in 2017.	Yes, no indication of instability or subsidence identified.	NA	N	No residual tailings	Inspection of evidence of recent human visitation, condition of stainless-steel caps installed on D013810 raise and condition of vegetation	Stainless steel cap will need periodic material assessment	Managed in IC
ACE MC	Y (Risk Assessment)	Y	Ace Shaft closed with concrete cap in 1984, secured by covering concrete cap with stainless steel cap in 2016. 103 Raise temporarily sealed in 1984, then sealed with concrete cap in 1985. Secured in 2017 by covering concrete cap with stainless steel cap. 201 Raise was backfilled at decomissioning with no evidence of material settling, additional sorted waste rock was placed on the raise.	Yes, no indication of instability or subsidence identified.	NA	Y	Residual tailings were present on property. Accessible residual tailings were covered with 600mm of waste rock.	Evidence of recent human visitation, past tailings spill areas for evidence of disturbance, condition of vegetation, condition of the waste rock, condition of the backfilled and stainless steel capped raises.	Stainless steel caps will need periodic material assessments.	Proposed for IC
URA FR	Y (Lack of Disturbance-No Readings)	Y	No mine openings to surface	Yes, no indication of instability or subsidence identified.	Monitor AC-14	N	No residual tailings	Condition of vegetation, condition of the waste rock seeps, evidence of flow from previously flowing sealed boreholes.	No maintenance required	Proposed for IC
URA 4	Y (Meets Guideline)	Y	Fine Ore Bin Raise, Surface Dump Raise, Fay Shaft, and 024094 Vent Raise all were permanently secured with stainless steel cap in 2020, 2018, 2020 and 2017 respectivley. Custom Ore Raise, Custom Ore Raise and Access to Custom Crusher (Adit) closed in 2020 with engineered waste rock covers.	No indication of instability or subsidence identified	N/A	Y	Accessible tailings were covered with 600mm of waste rock. Inaccessible areas were assessed on individual basis.	Evidence of recent human visitation, past tailings spill areas for evidence of disturbance, condition of vegetation, condition of the waste rock, condition of the stainless steel capped mine openings and the engineered rock covered mine openings.	Stainless steel caps will require periodic material assessments	Proposed for IC
ACE 7	Y (Meets Guideline)	NA	Shaft adit closed during operation and is now burried, adit closure is sufficient and no additional investigation required.	Yes, no indication of instability or subsidence identified.	N/A	Y	No residual tailings	Evidence of recent human visitation, condition of the waste rock, condition of vegetation.	No maintenance required	Proposed for IC
ACE 8	Y (Meets Guideline)	Y	Verna Shaft (645470E: 6606022N) closed with concrete cap in 1982, secured by replacing concrete cap with a stainless steel cap in 2018	Yes, no indication of instability or subsidence identified.	N/A	Y	No residual tailings	Evidence of recent human visitation, condition of the waste rock, condition of vegetation, condition of the stainless steel cap.	Stainless steel cap will require periodic material assessments	Proposed for IC
ACE 1	Y (Risk Assessment)	Y	105#2 Raise closed with reinforced concrete cap during September 1982, resecured with engineered rock cover in 2018. 2157 Raise and Finger Raise sealed during summer 1984 with concrete caps, further secured in 2017 by covering the existing concrete caps with stainless steel caps. 195 Access Raise and 195 Raise were sealed in summer of 1984, field verification conducted in 2019 and additional sorted waste rock placed above the area.	Placement of cover consisting of 1.5 to 2 meter berm over identified areas of risk placed in September 2016. No indication of instability or subsidence identified	NA	N	Residual tailings covered with 600mm of waste rock, residual tailings in inaccessible areas left undisturbed	Evidence of human visitation, condition of vegetation, past tailings spill areas for evidence of disturbance, evidence of crown pillar subsidence, condition of the stainless steel caps and the covered raises.	Stainless steel caps will need periodic material assessments.	Portions proposed for IC and Free Release
ACE 3	Y (Meets Guideline)	Y	Bored Vent Raise had a concrete cover installed in 1984, permanently sealed in 2017 with a stainless steel cap over the concrete cap.	Yes, no indication of instability or subsidence identified.	NA	N	No residual tailings	Evidence of recent human visitation, condition of vegetation, condition of the stainless steel capped raise.	Stainless steel cap will require periodic material assessments	Proposed for IC
ACE 9	Y (Risk Assessment)	Y	No mine openings to surface	Yes, no indication of instability or subsidence identified.	NA	N	Residual tailings from pipeline infrastructure dismantling were removed. Other accessible tailings were covered with 600mm of waste rock. Inaccessible areas left undisturbed.	Evidence of recent human visitation, past tailings spill areas for evidence of disturbance, evidence of significant erosion along the creek channel, and condition of vegetation	No maintenance required	Proposed for IC
EXC URA 7	Y (Lack of Disturbance-No Readings)	NA	No mine openings to surface	Yes, no indication of instability or subsidence identified.	Monitor at AC-14	N	No residual tailings	No monitoring required	NA	Proposed for IC
GC 2	Y (Meets Guideline)	NA	No mine openings to surface	NA	NA	N	Tailings considered inaccessible, showed signs of revegetation or were within Marie Reservoir drainage basin, and were left undisturbed.	Evidence of human visitation, past tailings spill areas for evidence of disturbance, condition of vegetation.	No maintenance required	Proposed for IC
NW 3 Ext	Y (Meets Guideline)	NA	Verna mine 026594 Ventilation Raise has a stainless steel cap covering the existing concrete cap, 026594 Finger Raise and Verna Manway had concrete caps replaced with stainless steel caps.	Yes, no indication of instability or subsidence identified.	NA	N	No residual tailings	Evidence of recent human visitation, condition of vegetation, condition of stainless steel caps.	Stainless steel caps will requrie periodic material assessments	Proposed for IC
NW 3	Y (Meets Guideline)	NA	72 Zone Portal (645831E: 6605769N) was sealed with waste rock by backfilling to a depth of 17m in 1982.	Yes, no indication of instability or subsidence identified.	NA	N	No residual tailings	Evidence of recent human visitation, condition of the waste rock, condition of vegetation, condition of the 72 Zone Portal plug.	No maintenance required	Proposed for IC
ACE 14	Y (Risk Assessment)	NA	No mine openings to surface	Yes, no indication of instability or subsidence identified.	N/A	N	Tailings considered inaccessible, showed signs of revegetation or were within Marie Reservoir drainage basin, and were left undisturbed.	Evidence of recent human visitation, past tailings spill areas for evidence of disturbance, condition of vegetation.	No maintenance required	Proposed for IC
EXC ACE 15	Y (Lack of Disturbance-No Readings)	NA	No mine openings to surface	NA	NA	N	No residual tailings	No monitoring required	No maintenance required	Portions proposed for IC and Free Release
EMAR 1	Y (Meets Guideline)	Y	No mine openings to surface	Yes, no indication of instability or subsidence identified.	Monitor at DB-6	Y	No residual tailings	Evidence of recent human visitation, condition of vegetation, condition of pit wall, condition of waste rock, evidence of crown pillar subsidence, water quality monitoring downstream of Dubyna Lake (DB-6).	No maintenance required	Proposed for IC
EXC 1	Y (Meets Guideline)	Y	Vertical mine openings: 013904 Raise and 013905 Raise were permanently sealed by covering original concrete cap with a stainless steel cap in 2017. Vertical Mine opening Heater Raise was permanently sealed by replacing concrete cap with stainless stealed cap in 2019. Two sealed adits: Haulage Adit and The Service Adit both had two walls constructed of 2" by 6" timbers with reinforced wire and 6" shotcrete applied to outside of form to prohibit access to shaft collar and entrance of Adit. The Vent Plant Raise located in the Haulage Adit was capped in 1975 and further secured with waste rock.	Yes, no indication of instability or subsidence identified.	Monitor at AN-5	Y	No residual tailings	Evidence of recent human visitation, condition of vegetation, condition of waste rock, evidence of crown pillar subsidence, condition of the three stainless steel capped raises and two sealed adits	Stainless steel caps will requrie periodic material assessments	Proposed for IC

HAB 1	Y (Meets Guideline)	Y	013918 Raise, 013909 Raise and 013929 Raise were backfilled with waste rock during mining of small pit, 013927 Raise was backfilled with waste rock and capped with concrete cap during original decommissioning. In 2017 a stainless steel cap covered the concrete cap.	Yes, no indication of instability or subsidence identified.	Monitor at AN-5	Y	No residual tailings	Evidence of recent human visitation, condition of vegetation, condition of the waste rock, evidence of crown pillar subsidence, condition of the beaver dam at the outlet of Beatrice Lake and evidence of flow from the southwest arm of Beatrice Lake, condition of the backfilled and stainless steel capped raises, water quality monitoring at the outlet of Pistol Lake (AN-5)	Stainless steel cap will require periodic material assessments.	Portions proposed for IC and Free Release
HAB 2	Y (Meets Guideline)	Y	The Hab shaft was made secure in 2018 when the original concrete cap was replaced with a stainless steel cap.	Yes, no indication of instability or subsidence identified.	Monitor at AN-5	Y	No residual tailings	Evidence of recent human visitation, condition of vegetation, condition of waste rock, condition of the stainless steel cap, water quality monitoring at the outlet of Pistol Lake (AN-5).	Stainless steel cap will require periodic material assessments.	Proposed for IC
URA 7	Once the Final Closure Report for these properties is submitted, these columns will be updated accordingly									
BOLGER 1										
EXC URA 6										
ACE 19										
URA 6										
EXC ACE 18										
EXC ACE 17										
ACE 17										
ACE 15										
EXC ACE 14										
GORE										
EXC GC 2										
GC 4										
EXC GC 4										
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										
URA 1										

APPENDIX B

APPENDIX B

Beaverlodge

Decommissioned Beaverlodge Mine/Mill Site

2022 Geotechnical Inspection Report

September 2022

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1.0 INTRODUCTION

From June 6 – June 10 Cameco Corporation (Cameco), along with representatives of the Saskatchewan Ministry of Environment (SkMOE), Saskatchewan Ministry of Energy and Resources (SkMER) and the Canadian Nuclear Safety Commission (CNSC), conducted an annual inspection of the decommissioned Beaverlodge properties. Cameco personnel were on site from May 27 until June 10 and conducted some aspects of the geotechnical inspection prior to the arrival of the regulatory agencies. As part of this inspection, geotechnical components were evaluated using the regulatory accepted criterion-based checklist developed with SRK Consultants. The geotechnical inspection completed in 2022 consisted of inspecting conditions at the Fookes Delta, the two outlet spillways at Fookes and Marie reservoirs and the relevant crown pillars associated with the former Hab, Dubyna and Ace mining areas. The properties associated with the crown pillars have been proposed for release from CNSC licensing and transfer to the Province of Saskatchewan's Institutional Control (IC) Program, however at the time of inspection a decision regarding their release by CNSC had not been reached, therefore the decision was made to inspect these areas in 2022.

The 2015 geotechnical inspection completed by SRK concluded that overall; the Fookes cover, and the two outlet structures were performing as expected. The report concluded that it would be reasonable for Cameco to move towards final close out and a return to Institutional Control for the properties associated with the cover and outlet structures (*SRK, 2016*). SRK recommended that in the meantime, documented inspections by Cameco and/or regulators should continue on an annual basis. A follow-up inspection was completed in 2020 by SRK, who noted that there were no observable changes to the landform and no concerns identified. Following the 2020 inspection, SRK recommended that Cameco continue with annual inspections using the existing inspection protocols, and that once the properties are transferred to the IC Program that they are inspected every five years for two cycles, then less frequently after that if the areas remain stable.

Figure 1 provides the locations of the Fookes Delta and the outlet structures. Additional details are provided in **Section 5.0**, including **Figures 3**, **Figure 4**, and **Figure 5,** which provide the locations of applicable crown pillar monitoring.

Figure 1 - Geotechnical Inspection locations

2.0 OUTLET STRUCTURE INSPECTIONS (FOOKES & MARIE RESERVOIR)

Both spillway structures consist of a rip-rap lined open channel (with trapezoidal cross-section), which discharge into a rip-rap lined stilling basin. The rip-rap lining in both the spillway channels 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 spillways are capable of passing a 500-year flood event with a depth of 0.3 m (680 L/sec) and 0.35 m (760 L/sec) at the entrances of the Fookes and Marie reservoir outlet spillways, respectively.

The cracking and displacement of the grout-intruded rip-rap within the two spillways was anticipated in their original designs and does not affect the performance of either outlet spillway. Additional cracking and ice-jacking are anticipated over time, but the condition of the two outlet spillways continues to be satisfactory and is expected to remain so moving forward. (SRK 2021).

2.1 General Observations

Local land users have noted water levels have been significantly higher than normal since 2020 and continued to be high during freshet in 2022. The snowpack through the winter of 2021/2022 was approximately 130% higher than the average snowpack measured over the last 10 years (as of March 2022). Freshet occurred later in the spring than normal with significant snowpack remaining well into May and ice remaining on Beaverlodge Lake well into June, which is uncommon.

Comparisons of photos between inspection years is presented in **Section 4.0**. Photos taken in 2022 were mostly in late May (some in June); therefore, the vegetation growth is less full than in 2021 as those photos were taken in August.

2.2 Inspection Checklist for Outlet Structures

The specific elements to be evaluated during these inspections include the following:

I. Check the condition of the spillway channel, with a view to confirming the grout-intruded rip-rap is still in place.
II. Check the condition of the rip-rap on either side of the spillway, with a view to confirming no erosion has occurred due to overtopping associated with an extreme flood event.
III. Document conditions with photographs.

2.3 Marie Reservoir Outlet Inspection

I. Check the condition of the spillway channel, with a view to confirming the grout-intruded rip-rap is still in place.

Previously, SRK identified that the grout-intruded rip-rap is relatively intact, except near the spillway entrance where one large block and several smaller ones on the right side of the spillway (looking downstream from Marie Reservoir) have been displaced due to ice-jacking.

In addition to the comparison photos provided in **Section 4.0,** photos taken during the 2022 inspection providing photographic record of the condition of the Marie Reservoir spillway channel are included in **Appendix A**. Despite the continued elevated flows over the past 3 years the spillway channel remains in a similar condition as observed in previous inspections.

The observations and photographic record from the 2022 inspection support the observations made by SRK that the spillway continues to perform as designed (*SRK 2021*).

II. *Check the condition of the rip-rap on either side of the spillway, with a view to confirming no erosion has occurred due to overtopping associated with an extreme flood event*

As noted during the 2021 inspection, higher than normal water levels over the last number of years have resulted in some natural debris and dimensional lumber along the leading edge of the rip-rap on either side of the spillway as well as the edges of the channel (**Appendix A, Photos A5 and A6)**. Following the 2022 inspection, all dimensional lumber was removed from the area as part of the final clean-up in preparation for transferring properties to the Province of Saskatchewan's Institutional Control Program. Despite the increased flows the spillway appears to be performing as expected with no erosion of the rip-rap embankment on either side of the spillway.

Despite the unusually high flows observed over the past 3 years the Marie Reservoir outlet spillway has, in general, changed little since 2004. Photographic comparison to previous inspection photos is provided in **Section 4.0**. The grout-intruded rip-rap is relatively intact except near the spillway entrance where one large block slab and several smaller ones on the left side of the spillway (looking upstream) continued to be displaced due to ice-jacking (**Appendix A, Photo A1**).

As noted in previous geotechnical inspections beaver activity at the outlet of Marie Reservoir has resulted in construction of a dam. The crest of the beaver dam appears to be similar to 2021, although the water level behind the dam is slightly higher than previous. This condition will continue to be monitored during future inspections. There are currently no plans to remove the beaver dam as it is naturally occurring. A photo of the Marie Outlet structure documenting the beaver dam is located in **Section 4.0**.

2.4 Fookes Reservoir Outlet Inspection

I. *Check the condition of the spillway channel, with a view to confirming the grout-intruded rip-rap is still in place*

Similar to the Marie Outlet, SRK also identified that the grout-intruded rip-rap along the length of the Fookes Reservoir outlet spillway shows signs of cracking. In addition, there has been some ice-jacking, with the most significant displacements located near the upper part of the spillway (i.e., on the sides of the spillway, within 5 to 6 m of the spillway entrance) (**Appendix B, Photo B3)**. The base of the channel does not show signs of significant displacement, and the middle to lower parts of the spillway remain in good condition.

In addition to the comparison photos provided in **Section 4.0,** photos taken during the 2022 inspection providing photographic record of the condition of the Fookes Reservoir spillway channel are included in **Appendix B**. During the 2022 inspection the12x12 inch timbers identified during the 2021 inspection were still lining the edges of the spillway channel and had not been further displaced. Following the 2022 inspection, all dimensional lumber was removed from the area as part of the final clean-up in preparation for transferring properties to the Province of Saskatchewan's Institutional Control Program.

II. Check the condition of the rip-rap on either side of the spillway, with a view to confirming no erosion has occurred due to overtopping associated with an extreme flood event

There is no evidence that overtopping of the rip-rap areas of the spillway has occurred and no erosion of the channel has occurred. Photographic comparison to previous inspection photos is provided in **Section 4.0**.

3.0 FOOKES DELTA

3.1 General Observations

Historically, the area along the northeast side of the Fookes Delta has contained standing water. The Fookes Delta cover in this area was purposefully graded to establish an overall preferential gradient towards Fookes Reservoir. **Figure 2** provides an overview of the cover design (*SRK, 2008*), with the surface drainage paths outlined. As per the SRK design for the Fookes cover, the northern drainage ditch area of the delta was never intended to provide fully channelized flow to Fookes Reservoir. As a result, some ponding in higher precipitation years was anticipated and may be expected to occur.

During the 2022 inspection of Fookes Delta, it was noted that the drainage area running along the north side of the delta and the drainage channel to Fookes Reservoir contained water and was performing as designed, with water present and minor amount of surface flow draining towards Fookes Reservoir (**Appendix C, Photo C6**). A small amount of ponded water was observed at the base of the north access ramp on the waste rock cover (**Appendix C, Photo C2**) due to recent snowmelt.

Generally, the cover was in good condition showing no areas of excessive erosion, despite greater than normal precipitation and the elevated water levels seen in Fookes Reservoir over the past number of years, discussed in Section 2.4. The east and west berms were in good condition with no evidence they have been breached by vehicular traffic. A small access trail was located adjacent to the north berm to allow all-terrain vehicle (ATV) access to facilitate removal of piezometer standpipes on the delta as the property is being prepared for transfer to the IC program. As a result, some localized ATV traffic was noted in on the Fookes Delta cover in 2022. Vegetation is well established within 50 m of the shoreline and the engineered drainage structures. Vegetation continues to gradually encroach and thicken over much of the delta.

Photographic comparison to previous inspection photos is provided in **Section 4**. Photos showing the conditions encountered during the site inspection are provided in **Appendix C**.

3.2 Inspection Checklist

I. Check for evidence of new tailing boils or tailings exposure due to frost action

II. Check for evidence of significant erosion of the cover material

   a. 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).

   b. 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.

III. Ensure erosion-protection devices are performing as expected on former north access road

   a. Waterbars (chevrons)

b. Diversion ditches
c. Erosion of cover adjacent to the former access road

IV. Ensure earthen berms are in place to limit access to the delta

3.3 Fookes Cover Inspection

I. Check for evidence of new tailing boils or tailings exposure due to frost action

No new boil development was noted on the delta.

II. Check for evidence of significant erosion of the cover material

The shoreline, where the edge of the sand cover contacts Fookes Reservoir, was inspected and was in good condition, despite the water levels in Fookes Reservoir being higher during freshet. Photos taken in 2022 continue to show significant vegetation coverage along the shoreline. Note, the photos from 2022 were taken in May before the vegetation had fully leafed-out.

The 2022 inspection showed that water is being captured in the drainage channels as per design and there is no evidence of any significant erosion of the cover. The drainage channel continues to vegetate heavily as can be seen in the photos in Section 4.

The Fookes Delta cover is in good condition and showed no sign of excessive erosion. As vegetation continues to establish on the shoreline, it will increase the stability of the cover.

III. Ensure erosion protection devices are performing as expected on former north access road

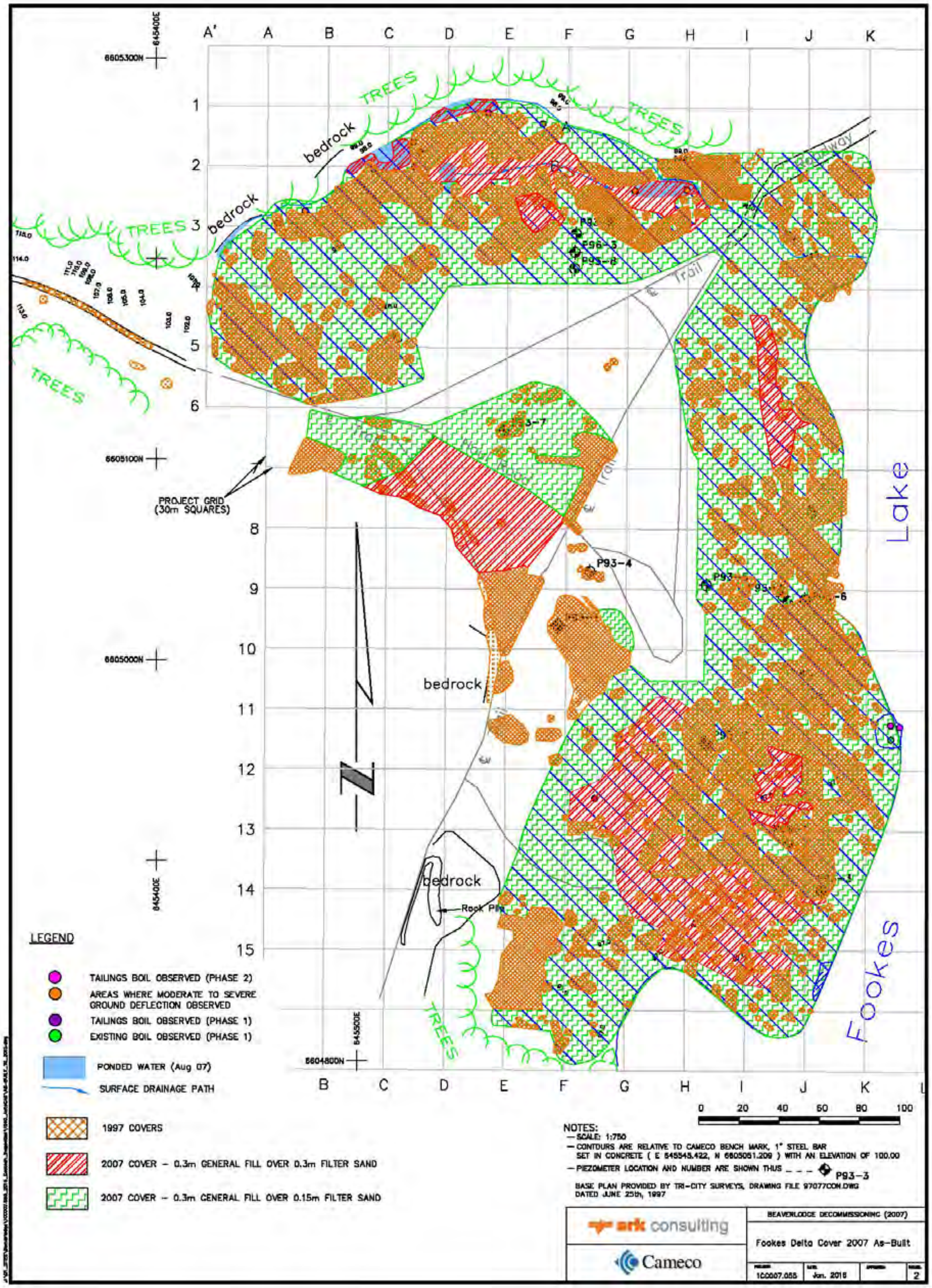
As part of the design and installation of the covers in 2005 and 2007, the area considered most vulnerable to erosion was in the area on and below the access ramp at the northwest corner of the delta (*SRK, 2010*). The general condition of the ramp is very good. Access to this ramp is closed off by a windrow of material at the top of the ramp, except for the small access trail to allow the remediation of the piezometer standpipes. The water bars (chevrons) are performing as expected and continue to show little sign of erosion (**Appendix C, Photo C1**).

In addition to the chevrons, run-out structures were installed to carry away excessive water during extreme run-off events. These run-out structures are also in good shape with no observed additional eroded material beyond that observed during previous inspections (**Appendix C, Photo C3**).

During the 2022 inspection it was noted that ponded water from recent snowmelt had accumulated on the exposed waste rock cover located at the base of the former access ramp. This ponded water did not result in any erosion and no tailings boils were noted.

IV. Ensure earthen berms are in place to limit access to the delta

Since the earthen berms protecting the east and west access points to the Fookes Delta were repaired and reinforced in 2011 and 2012 respectively, there has not been any new evidence of passenger vehicular traffic accessing the delta. In 2022, ATV tracks were noted on the delta as access was required to remediated former piezometers as the property is prepared for transfer to the IC Program. Occasional ATV tracks have been noted on the delta during past inspections, which should not affect the integrity of the cover. A photo of the berm located on the east access point is provided in Appendix C (**Photo C7**).



TREES
bedrock
Roadway
Trail
P93-4
PROJECT GRID (30m SQUARES)
Rock Pile
Lake
Fookes
LEGEND
TAILINGS BOIL OBSERVED (PHASE 2)
AREAS WHERE MODERATE TO SEVERE GROUND DEFLECTION OBSERVED
TAILINGS BOIL OBSERVED (PHASE 1)
EXISTING BOIL OBSERVED (PHASE 1)
PONDED WATER (Aug 07)
SURFACE DRAINAGE PATH
1997 COVERS
2007 COVER – 0.3m GENERAL FILL OVER 0.3m FILTER SAND
2007 COVER – 0.3m GENERAL FILL OVER 0.15m FILTER SAND
NOTES:
— SCALE: 1:750
— CONTOURS ARE RELATIVE TO CAMECO BENCH MARK, 1" STEEL BAR SET IN CONCRETE (E 545545.422, N 6605051.209) WITH AN ELEVATION OF 100.00
— PIEZOMETER LOCATION AND NUMBER ARE SHOWN THUS _ _ _ P93-3
BASE PLAN PROVIDED BY TRI-CITY SURVEYS, DRAWING FILE 97077CON.DWG DATED JUNE 25th, 1997
ark consulting
Cameco
BEAVERLODGE DECOMMISSIONING (2007)
Fookes Delta Cover 2007 As-Built
1C0007.055
Jan. 2016
2

4.0 PHOTOGRAPHIC COMPARISONS

Beaver dam constuction at the outlet structure for Marie Reservoir

Marie Outlet Structure looking upstream


June 2019


August 2021


May 2022

Marie Outlet Structure looking downstream

Marie Reservoir Outlet Structure
– Ice jacked block of grout intruded rip-rap

Fookes Outlet Structure looking upstream

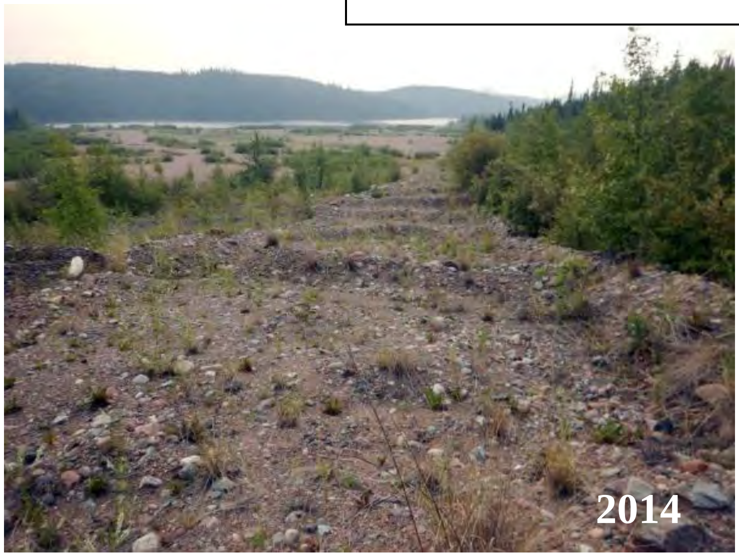
Fookes Outlet Structure looking downstream

Drainage area looking NW towards access point on hill

Fookes Cover Shoreline

Note: pictures are not taken from the exact same locations

Chevrons in place on north access point to the Fookes Delta



5.0 CROWN PILLAR AREAS

In 2016, the Geotechnical Inspection Checklist was updated to include the identified crown pillar areas at the Hab, Dubyna and Ace areas as per recommendations from SRK. Cameco committed to perform assessments of the relevant crown pillar locations annually until such time as the properties are transferred to the IC Program, where monitoring will continue under that program. As the Hab, Dubyna and Ace areas had not been transferred to the IC program at the time of the 2022 inspection Cameco completed the inspections of these crown pillars in 2022.

Tables 1 and **2** provide GPS points for locations associated with the Dubyna and Hab areas where visual monitoring was recommended. As shown in **Figure 3**, for the Dubyna area, the area between inspection points are expected to coincide with the Level 1 stoping area where crown pillar thicknesses would be expected to be the thinnest. As shown in **Figure 4**, for the Hab area, inspection points are expected to align roughly with the 2nd level workings where stoping of the Hab 039 Zone was conducted. **Figure 5** provides the layout of the Ace Stope Area cover along with the locations of historic subsidence observed in the area, where inspections typically focus.

Table 1: Visual Monitoring Location Recommendations for Dubyna

Location	Position	Elevation (approx.)	Comment
DUB-01	Zone:12 V 647946, 6608477	339 m	In mine waste backfill
DUB-02	Zone:12 V 647973, 6608480	339 m	Near edge of waste rock backfill
DUB-03	Zone:12 V 647997, 6608487	333 m	Close to lake

Table 2: Visual Monitoring Location Recommendations for Hab

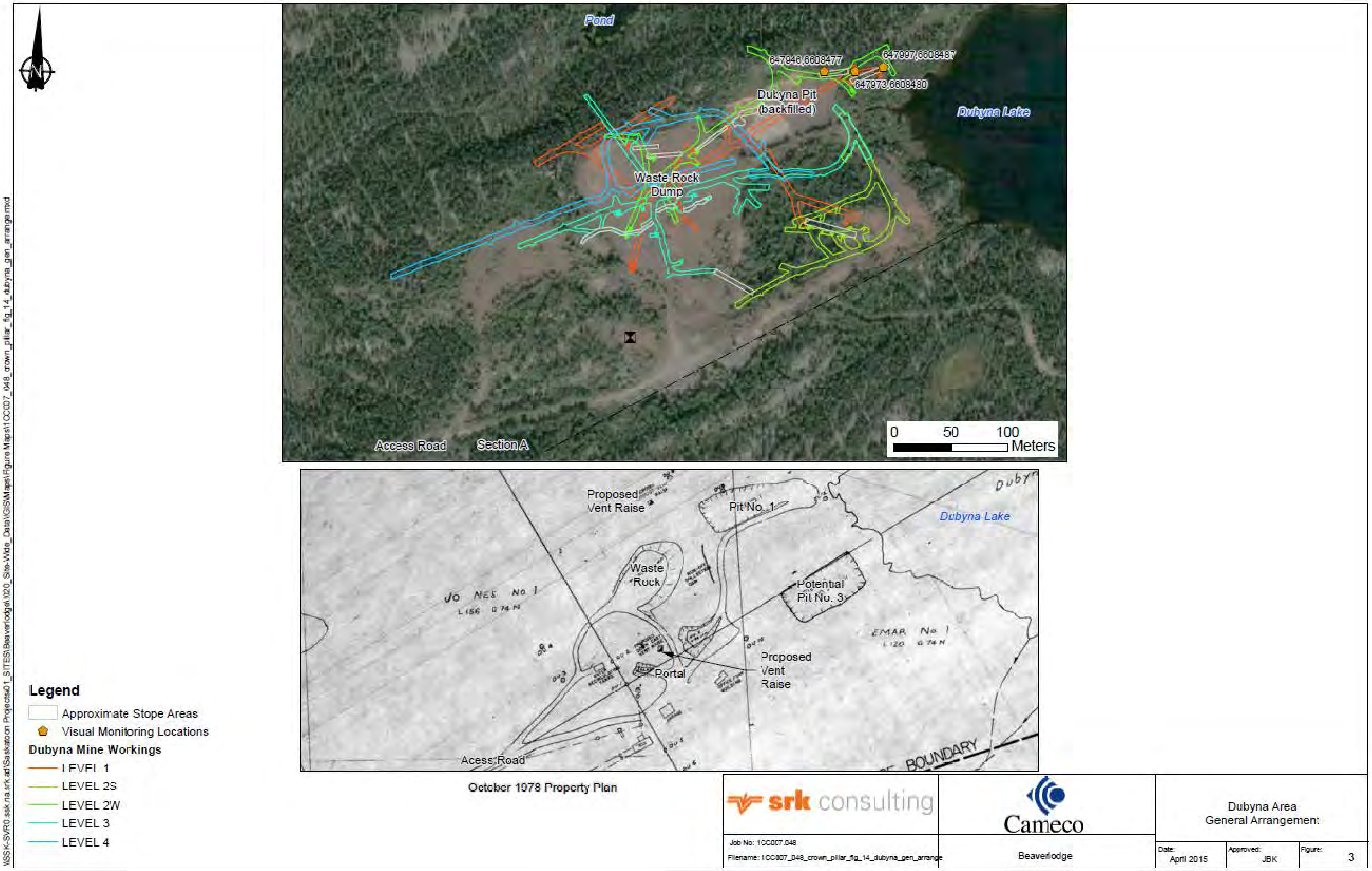
Location	Position	Elevation (approx.)	Comment
HAB039-01	Zone:12 V 645272, 6612203	408 m	Near the edge of the mine waste backfill
HAB039-02	Zone:12 V 645339, 6612234	415 m	Covered by mine waste backfill in the pit

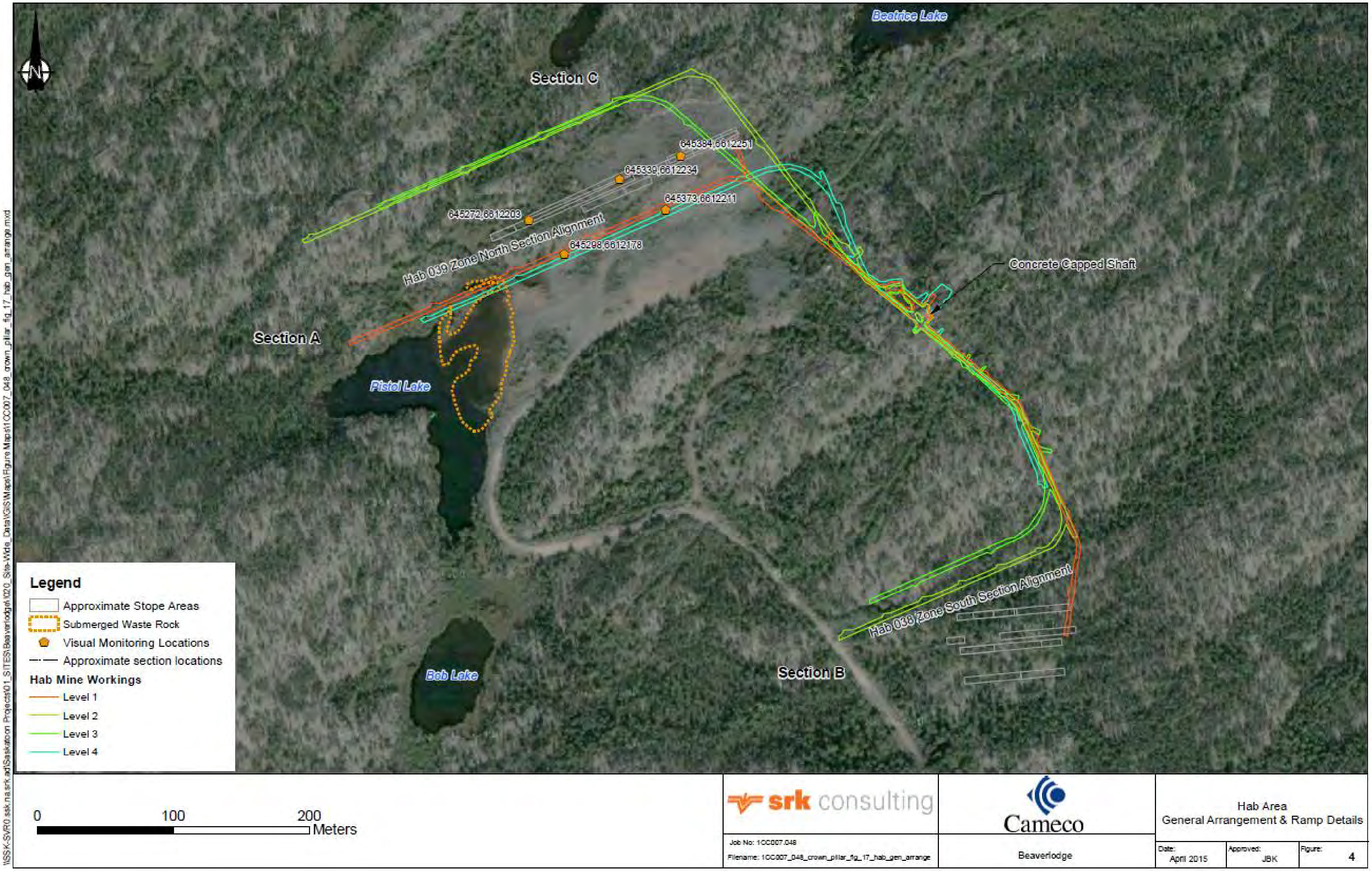
HAB039-03	Zone:12 V 645384, 6612251	419 m	Covered by mine waste backfill, near the edge of the pit rim
HAB039-04	Zone:12 V 645373, 6612211	408 m	Approximately above the 2nd level workings
HAB039-05	Zone:12 V 645298, 6612178	403 m	Approximately above the 2nd level workings

Inspections of the Ace, Hab and Dubyna crown pillars occurred on May 28 – 30, 2022. Photographs of the covered Ace Stope Area and the crown pillar areas at Hab and Dubyna are provided in **Appendix D**.

At the Ace area, the cover material over the stopes was inspected by walking the toe of the cover material, as well as the interface between the cover material and natural ground. No signs of tensions cracks or visible depressions were observed along the Ace stope cover material in 2022.

The crown pillar monitoring points at Hab and Dubyna were located, and a visual walking inspection was completed at each site. The inspection involved walking between and around the points identified in Tables 1 and 2. Observations at both areas did not show any evidence of tension cracks or slumping in 2022.


Pond
647946,6608477
647997,6608487
647973,6608480
Dubyna Pit (backfilled)
Dubyna Lake
Waste Rock Dump
Access Road
Section A
0 50 100 Meters
Proposed Vent Raise
Pit No. 1
Dubyna Lake
Waste Rock
Potential Pit No. 3
Proposed Vent Raise
Portal
Acess Road
BOUNDARY
October 1978 Property Plan
Legend
Approximate Stope Areas
Visual Monitoring Locations
Dubyna Mine Workings
LEVEL 1
LEVEL 2S
LEVEL 2W
LEVEL 3
LEVEL 4
srk consulting
Cameco
Dubyna Area General Arrangement
Job No: 1CC007.048
Beaverlodge
Date: April 2015
Approved: JBK
Figure: 3


Beatrice Lake
Section C
645384,6612251
645339,6612234
645373,6612211
645272,6612203
645298,6612178
Hab 039 Zone North Section Alignment
Concrete Capped Shaft
Section A
Pistol Lake
Legend
Approximate Stope Areas
Submerged Waste Rock
Visual Monitoring Locations
Approximate section locations
Hab Mine Workings
Level 1
Level 2
Level 3
Level 4
Bob Lake
Section B
Hab 038 Zone South Section Alignment
0
100
200
Meters
srk consulting
Job No: 1CC007.048
Filename: 1CC007_048_crown_pillar_fig_17_hab_gen_arrange
Cameco
Beaverlodge
Hab Area
General Arrangement & Ramp Details
Date: April 2015
Approved: JBK
Figure: 4

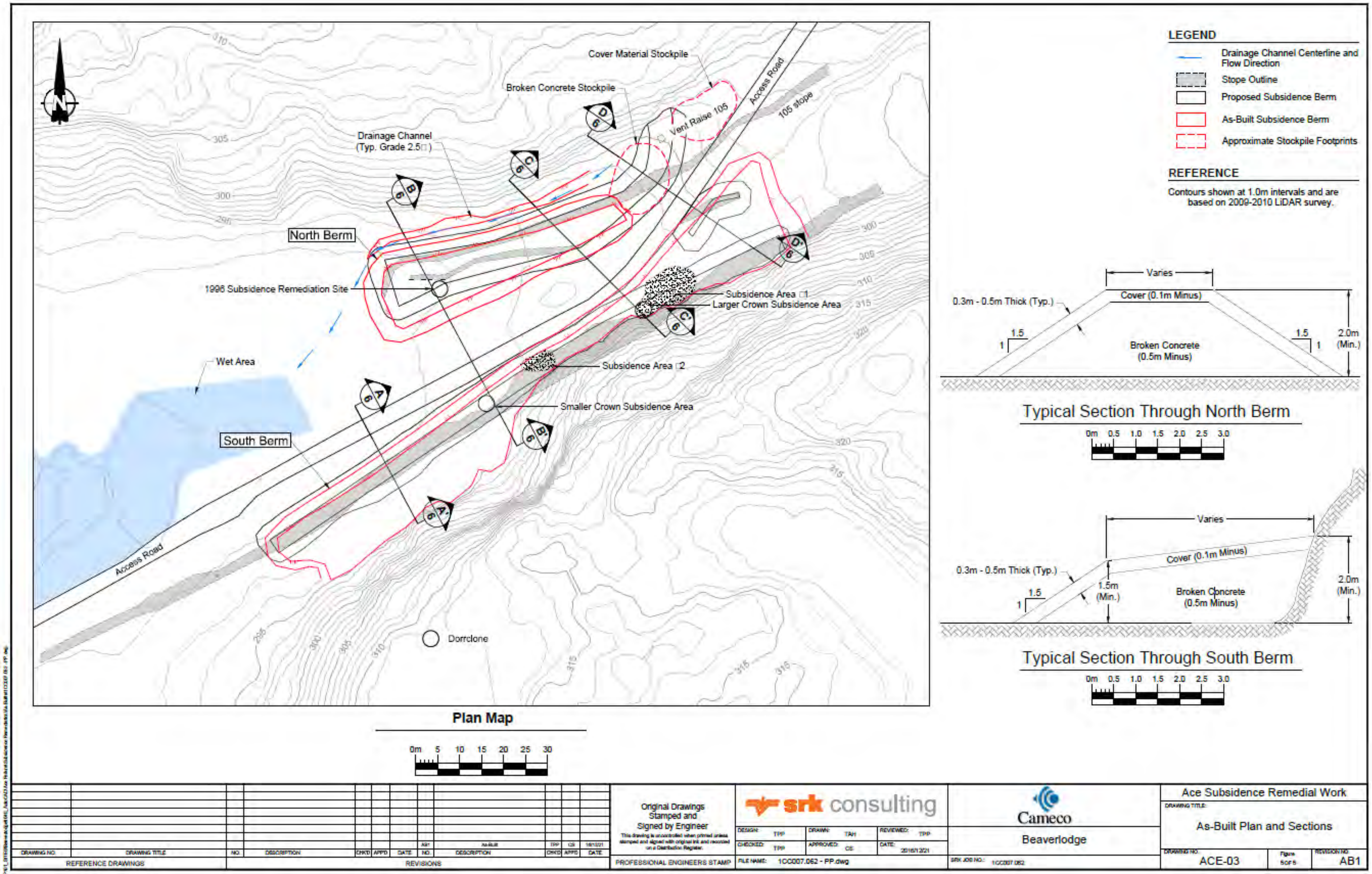


Figure 5 – Ace Crown Pillar Remediation

6.0 ZORA STREAM RECONSTRUCTION

Remedial work completed at the Bolger Pit site from 2014 to 2016 included the excavation of a channel through the existing Bolger Waste Rock Pile and the relocation of the excavated waste rock to the Bolger Pit. The intent of this work was to improve water quality, specifically uranium concentrations, in both Zora Creek and Verna Lake and to re-establish a more natural Zora Creek flow path.

In the Zora Creek Design Report (SRK, 2014), it was recommended to complete a geotechnical inspection in each of the first two years following construction. Subsequently, SRK completed geotechnical inspections in 2017 (SRK, 2017c) and 2018 (SRK, 2019) of the reconstructed Zora Creek flow path. Both the 2017 and 2018 inspections found that there were no immediate or significant areas of concern with regards to the performance or geotechnical stability of the reconstructed flow path. Continued monitoring of water quality and the potential presence of accumulated sediment were recommended. In addition, it was recommended that the next geotechnical inspection occur in 2023, or earlier if requested by Cameco (SRK, 2019). Cameco requested a geotechnical inspection for the area be completed in 2020 to align with other geotechnical inspections at the decommissioned Beaverlodge properties.

The 2020 SRK inspection identified that from a geotechnical perspective, it would be reasonable for Cameco to transfer the properties associated with the Bolger Pit and the Drainage Channel to the IC Program. However, in the interim it was recommended that Cameco continue with annual inspections of the area as part of the annual regulatory inspection. It was also noted that involvement by a geotechnical engineer should not be required except in the unlikely event that significant geotechnical concerns arise.

The Zora Creek Stream Reconstruction area was inspected on May 31, 2022; and toured again as part of the annual regulatory inspection on June 7, 2022. Overall, the conditions observed had not changed from previous years in that water quality results are performing as expected and no significant accumulation of sediment has been observed. The results of the 2022 assessment of the Bolger Pit and the Drainage Channel can be summarized as follows:

- The beaver dam located at the outlet of Zora Lake (inlet to the stream reconstruction) remains intact.
- The embankments along the sides of the channel remain stable with no evidence of sloughing or instability
- Vegetation along the downstream portion of the channel (near the stilling basin) is now well established and thickening.

Photographic record of the inspection is provided in Appendix E.

7.0 REFERENCES

SRK Consulting (2008). Beaverlodge Decommissioning: 2007 Construction Activities at the Fookes Lake Delta. Report prepared for Cameco Corporation, February, 2008.

SRK Consulting (2010). Beaverlodge Project: Inspection of Fookes Delta and Outlet Structures at Fookes Reservoir and Marie Reservoir. Report prepared for Cameco Corporation, September, 2010.

SRK Consulting (Canada) Inc. (2015). Beaverlodge Property – Crown Pillar Assessment (2014 – 2015), Project Number: 1CC007.048. Report submitted to Cameco Corporation, July 2015.

SRK Consulting (2016). Beaverlodge Project: Inspection of Select Areas within the Fookes and Marie Reservoirs and Ace Creek Catchment. Report prepared for Cameco Corporation, January, 2016.

SRK Consulting (Canada) Inc. (2021). Beaverlodge Project – 2020 Geotechnical Inspection Report - Decommissioned Beaverlodge Mine/Mill Site. Prepared for Cameco Corporation

8.0 APPENDICES

Appendix A – Marie Reservoir Outlet photos

Appendix B – Fookes Reservoir Outlet photos

Appendix C – Fookes Delta photos

Appendix D – Ace and Hab crown pillar inspection photos

Appendix E – Zora Stream Reconstruction photos

Appendix A
Marie Outlet Photos

Photo A1 – Marie Reservoir Spillway looking upstream (June 2022)

Photo A2 - Marie Reservoir Spillway inlet; beaver dam first noted in 2018

Photo A3 – Marie Reservoir Spillway (water flowing into stilling basin) (May 2022)

Photo A4 – Marie Reservoir Spillway looking west (May 2022)

Photo A5 — Showing detritus along leading edge of embankments indicating the extent of the elevated water levels during spring 2021. Appeared similar in 2022

Photo A6 — Showing debris and dimensional lumber along edges ice-jacked block of rip-rap along the edge of the Marie Reservoir channel. Dimensional lumber was removed in June 2022.

Appendix B

Fookes Outlet Photos

Photo B1 – Fookes Reservoir Spillway looking into Fookes Reservoir

Photo B2 – Fookes Reservoir Spillway looking upstream (near mouth)

Photo B3 – Fookes Reservoir Spillway looking downstream (mid channel)

Photo B4 – Fookes Reservoir Spillway stilling basin

Photo B5 – Fookes Reservoir Spillway broken rip-rap on north side of channel

Photo B6 – Fookes Reservoir Spillway broken rip-rap on south side of channel

Photo B7 - Fookes Outlet— south embankment in good condition, looking west

Appendix C

Fookes Delta Photos

Photo C1 – Chevrons in place on north access point to the Fookes delta looking south (May 29, 2022)

Photo C2 – ponded water on waste rock cover at bottom of hill near north access road during freshet (May 29, 2022)

Photo C3 – Chevron run-out structure along north access road

Photo C4 – Drainage collection area on edge of Fookes Tailings Delta approximately 100m from access point

Photo C5a-b – Panoramic views of the Fookes cover (Photos taken May 29, 2022) vegetations is yet to leaf-out

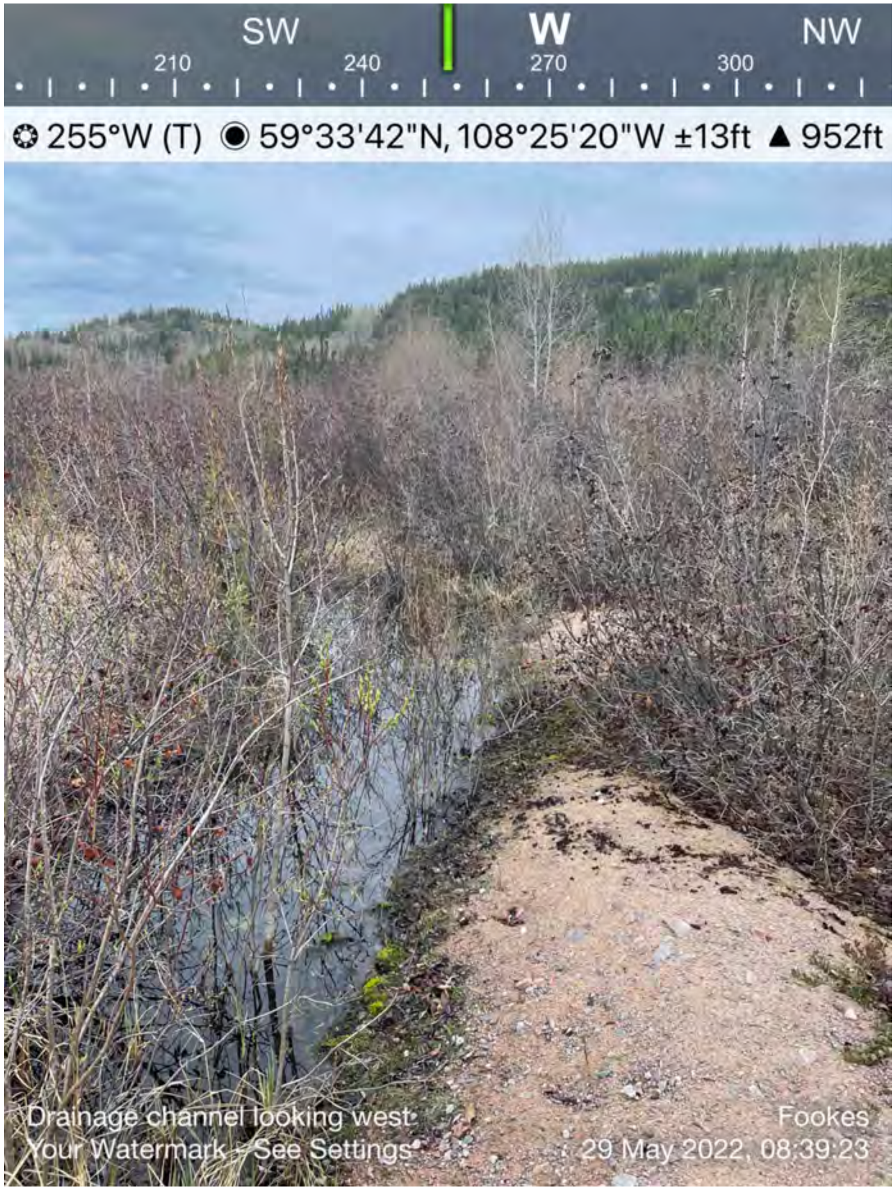


Photo C6 – View of vegetation establishing along drainage channel, water in channel (May 29, 2022)

Photo C7 – View of east berm looking onto the delta. No evidence of traffic crossing the berm (May 29, 2022)

Photo C8—Fookes Reservoir shoreline (looking west) Note vegetation along shoreline is well established despite not having leafed-out (photos from May 29, 2022)

Photo C9—Fookes Reservoir shoreline (looking west).

Appendix D
Crown Pillar Area Photos

Photo D1 - View of the cover placed over Ace 201 Stope

Photo D2 - view of Ace 105 and 208 Stope cover

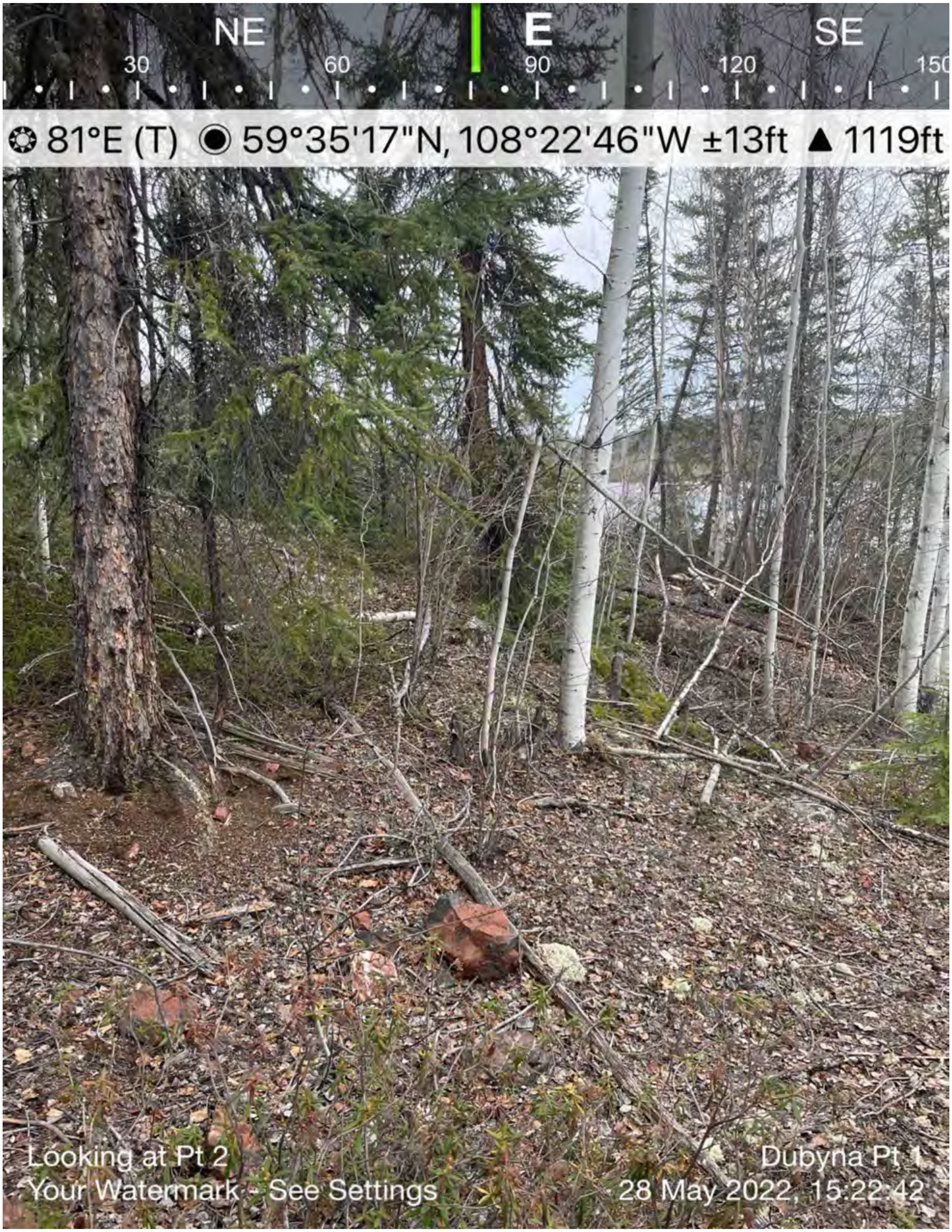


Photo D5—Dubyna CP-1 location (looking east)

Photo D6—Dubyna CP- 2 location (looking east)

Photo D7—Dubyna CP-2 location (looking west)

Photo D8—Dubyna CP– 3 location (looking west)

Photo D9—Dubyna CP– 3 location (looking east to Dubyna Lake)

Photo D10—HAB039-01 location (looking east)

Photo D11—HAB039-02 looking west

Photo D12—HAB039-02 location (looking east)

Photo D13—HAB039-03 looking west

Photo D13—HAB039-04 looking west

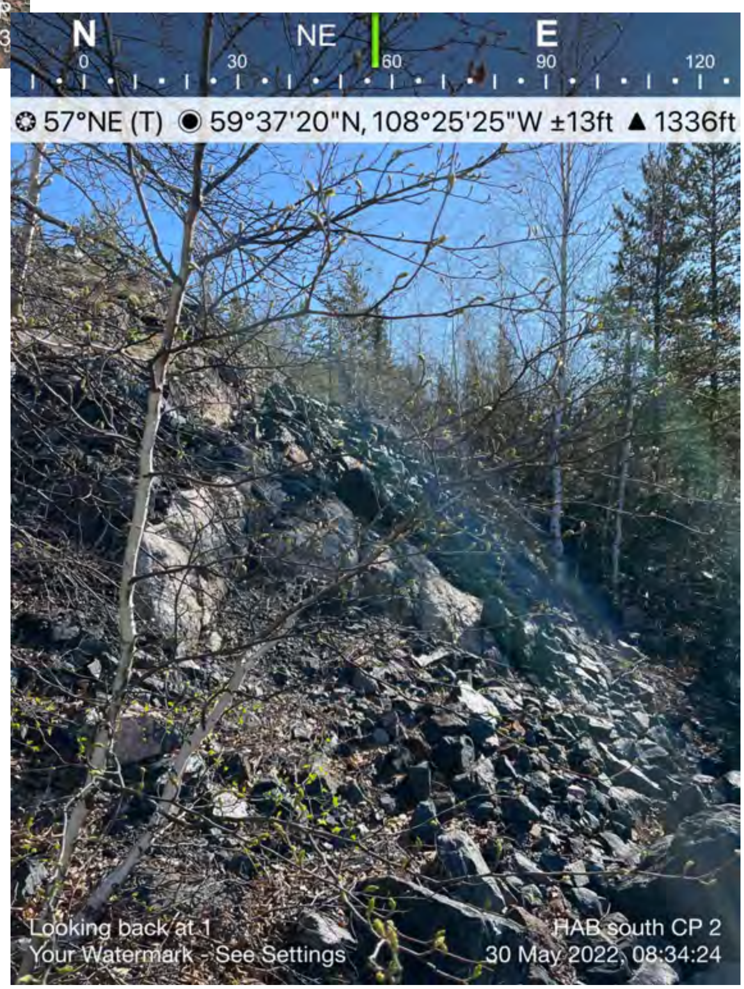


Photo D14—HAB039-05 location (looking east)

Appendix E

Zora Creek Reconstruction Photos

Photo E01—View from level crossing looking downstream towards Verna Lake (May 31, 2022)

Photo E02—View from level crossing looking upstream towards Zora Lake (May 31, 2022)

Photo E03—View near stilling basin looking upstream (May 31, 2022)

Photo E04—View near stilling basin, looking downstream at stilling basin (May 31, 2022) Note the glaciation remaining from the late spring

Photo E05—View of the beaver dam at the outlet of Zora Lake, looking upstream (May 31, 2022)

Photo E06—View near beaver dam at outlet of Zora Lake, looking downstream (May 31, 2022)

APPENDIX C

APPENDIX C

Table 1: Borehole summary including the coordinates of exploration drill holes located to date in and adjacent to the former Eldorado Beaverlodge properties. The table also identifies the condition of each hole when it was initially identified and the year in which each was permanently plugged.

Area	Designation	Coordinate System: WGS 84 UTM Zone 12		Status When Located	Year Remediated	Associated Property
		Easting	Northing			
Ace	AC 01	644022.013	6605350.955	Dry	2013	ACE MC
	AC 02	643881.016	6605325.928	Dry	2013	ACE MC
	AC 03	643969.014	6605393.956	Dry	2013	ACE MC
	AC 04	643958.014	6605381.941	Dry	2013	ACE MC
	AC 05	643943.013	6605376.906	Dry	2013	ACE MC
	AC 06	643929.017	6605371.911	Dry	2013	ACE MC
	AC 07	643914.011	6605366.988	Dry	2013	ACE MC
	AC 09	643888.017	6605351.946	Dry	2013	ACE MC
	AC 10	643876.015	6605374.894	Dry	2013	ACE MC
	AC 11	643965.016	6605324.914	Dry	2013	ACE MC
	AC 12	643877.017	6605339.931	Dry	2013	ACE MC
	AC 13	643857.016	6605337.938	Dry	2013	ACE MC
	AC 14	643848.015	6605331.908	Dry	2013	ACE MC
	AC 15	643792.014	6605338.902	Dry	2013	ACE MC
	AC 16	643560.257	6605183.669	Dry	2017	ACE 1
	AC 17	644021.3	6604729.1	Dry	2017	ACE 9
	AC 18	642872.1	6604789.8	Dry	2018	ACE URA 5
	AC 22	645034	6605863	2 holes/Dry	2019	
	AC 23	645038	6605837	Dry	2019	
	AC 24	643327	6605101	2 holes/1 flowing	2021	ACE 1
Lower Ace	BH-001	641929	6604081	Discharging	2012	
	BH-002	641956	6604091	Discharging	2011	
	BH-003	641922	6604146	Discharging	2011	
	BH-004	641932	6604142	Discharging	2012	
	BH-005	641966	6604143	Discharging	2011	
	BH-006	641972	6604165	Discharging	2011	
	BH-007	642090	6604218	Discharging	2011	URA 1
	BH-009	642110	6604137	Discharging	2012	URA FR
	BH-011	642224.883	6604354.110	Dry	2021	URA 1
	BH-012	642224.798	6604351.877	Dry	2021	URA 1
	BH-014	642168	6604158	Discharging	2011	URA FR
	BH-15	642101.665	6604192.497	Dry/past discharge	2016	URA 1
	BH-16	643009.193	6604465.019	Dry	2017	URA 6
	BH-17	642993.852	6604455.146	Dry	2017	URA 6
	BH-18	642995.637	6604466.051	Dry	2017	URA 6
	BH-19	642978.88	6604452.098	Dry	2017	URA 6

Lower Ace	BH-20	643007.541	6604467.124	Dry	2017	URA 6
	BH-21	642966.862	6604445.757	Dry	2017	URA 6
	BH-22	642959.407	6604439.281	Dry	2017	URA 7
	BH-23	642954.958	6604432.3	Dry	2017	URA 7
	BH-24	642940.515	6604415.339	Dry	2017	URA 7
	BH-25	642930.8	6604406.299	Dry	2017	URA 7
	BH-26	642972.143	6604451.532	Dry	2017	URA 6
	BH-27	643250.316	6604979.231	Dry	2017	URA 5
	BH-28	643113.492	6604895.363	Dry	2017	URA 5
	BH-29	643174.26	6604925.548	Dry	2017	URA 5
	BH-30	643285.271	6604977.469	Dry	2017	URA 5
	BH-31	642101.048	6604195.52	Discharging	2017	URA 1
	BH-32	642260.649	6604592.012	Dry	2017	URA 1
	BH-33	642423.877	6604597.892	Dry	2017	URA 7
	BH-34	642401.708	6604647.831	Dry	2017	URA 3
	BH-35	642268.019	6604629.757	Dry	2017	URA 3
	BH-36	643698.938	6605341.629	Dry	2017	ACE MC
	BH-37	642456.049	6604665.374	2 holes/dry	2017	URA 4
	BH-38	642424.846	6604667.596	Dry	2017	URA 4
	BH-39	643709.725	6605142.015	Dry	2017	ACE MC
	BH-40	642242.735	6604550.461	Dry	2017	URA 1
	BH-41	642296.4	6604025.8	Dry	2017	URA FR
	BH-42	642552.3	6604731	Dry	2017	URA 4
	BH-43	642254	6604397	Dry	Covered with debris	URA 1
	BH-44	642402	6604639	Dry	2019	URA 3
	BH-45	643250	6604981	2 holes/Dry	2019	URA 5
	BH-46	643610.340	6605209.997	Dry	2021	ACE MC
	BH-47	642306.845	6604621.952	Dry	2021	URA 1
Ace-Verna	Ace 01	645193.055	6605813.101	Dry	2016	ACE 8
	EXC 01	644740.299	6605272.359	Dry	2016	ACE 3
	Ace 02	645409.239	6605930.196	Dry	2017	ACE 8
	Ace 03	645627.645	6605877.357	Dry	2017	ACE 8
	Ace 04	645187.707	6605816.337	Dry	2017	ACE 8
Dubyna	DB 01	648069.018	6608350.909	Dry	Not located**	EMAR 1
	DB 02	648021.018	6608416.903	Discharging	2011	
	DB 03	648010.017	6608430.961	Discharging	2012	
	DB 04	648009.018	6608430.921	Dry	2013	
	DB 05	648074.019	6608329.926	Dry	2013	EMAR 1
	DB 06	648059.016	6608350.96	Dry	Not located**	EMAR 1
	DB 07	648060.013	6608305.962	Dry	2013	EMAR 1
	DB 08	648047.018	6608326.964	Dry	2013	EMAR 1
	DB 09	648004.013	6608445.996	Dry	2011	EMAR 1

	DB 10	647927.019	6608395.914	Dry	2013	EMAR 1
	DB 11	647906.016	6608372.901	Dry	2013	EMAR 1
	DB 12	647907.015	6608373.943	Dry	2013	EMAR 1
	DB 13	647922.017	6608349.899	Dry	2013	EMAR 1
	DB 13A	647937.016	6608388.951	Dry	2013	EMAR 1
	DB 14	647942.019	6608319.921	Discharging	2011	EMAR 1
	DB 15	647912.017	6608307.923	Dry	2013	EMAR 1
	DB 16	648002.017	6608424.96	Discharging	2012	EMAR 1
	DB 17	647310.016	6608147.994	Dry	2013	
	DB 18	647296.012	6608143.988	Dry	2013	
	DB 19	647294.014	6608148.926	Dry	2013	
	DB 20	647291.018	6608147.917	Dry	2013	
	DB 21	647289.015	6608145.943	Dry	2013	
	DB 22	647285.016	6608153.923	Dry	2013	
	DB 23	647282.019	6608145.891	Dry	2013	
	DB 24	647351.018	6608172.904	Dry	2013	
	DB 25	648014.014	6608458.988	Discharging	2011	
	DB 26	647374.017	6608190.976	Dry	2013	
	DB 27	647379.02	6608180.916	Dry	2013	
	DB 28	647715.679	6608234.967	Dry	2017	JO-NES
	DB 29	647513.47	6608225.766	Dry	2017	JO-NES
	DB 30	647413.386	6608235.144	Dry	2017	JO-NES
	DB 31	647411.222	6608290.178	Dry	2017	JO-NES
	DB 32	647603.393	6608298.979	Dry	2017	JO-NES
Dubyna	DB 33	646948.652	6608333.328	Dry	2017	
	DB 34	645934.9	6607576	2 holes/dry	2016	
	DB 35	645991.5	6607578.2	Dry	2017	
	DB 36	647421	6608222	Dry	2017	JO-NES
	DB 37	647661.2	6608361.3	Dry	2017	JO-NES
	DB 38	647561.2	6608066.9	Dry	2017	JO-NES
	DB 39	647742.5	6608236	Dry	2017	JO-NES
	DB 40	647593.6	6608297.4	Dry	2017	JO-NES
	DB 41	647611	6608249.4	Dry	2018	JO-NES
	DB 42	647579.4	6608258.1	Dry	2018	JO-NES
	DB 43	647579.4	6608255	Dry	2018	JO-NES
	DB 44	647585.8	6608256.1	Dry	2018	JO-NES
	DB 45	647572	6608231.8	Dry	2018	JO-NES
	DB 46	647521.1	6608238.1	2 holes/Dry	2018	JO-NES
	DB 47	647572.5	6608251.3	Dry	2018	JO-NES
	DB 48	647575.6	6608248.3	Dry	2018	JO-NES
	DB 49	647572.3	6608242.3	Dry	2018	JO-NES
	DB 50	647558.3	6608239.3	Dry	2018	JO-NES

Dubyna	DB 51	647547	6608230.5	Dry	2018	JO-NES
	DB 52	647578.7	6608236.1	Dry	2018	JO-NES
	DB 53	647427.7	6608225.5	Dry	2018	JO-NES
	DB 54	647419	6608244.3	Dry	2018	JO-NES
	DB 55	647413.4	6608238.8	Dry	2018	JO-NES
	DB 56	647395.2	6608229.4	Dry	Unknown	
	DB 57	647406.3	6608226.8	Dry	2018	JO-NES
	DB 58	647417.4	6608225.7	Dry	2018	JO-NES
	DB 59	647245.6	6608220.8	Dry	2018	
	DB 60	647613.1	6608506.8	2 holes/Dry	2018	
	DB 61	647683.9	6608518.9	Dry	2018	
	DB 62	647785.2	6608518.5	Dry	2018	
	DB 63	647703.9	6608176.9	Dry	2018	JO-NES
	DB 64	647946	6608148	Dry	2021	EMAR 1
Hab	HAB 01	645518.015	6612550.898	Dry	2013	HAB 1
	HAB 02	645531.009	6612559.987	Dry	2013	HAB 1
	HAB 03	645560.017	6612566.911	Dry	2013	HAB 1
	HAB 04	645559.011	6612570.997	Dry	2013	HAB 1
	HAB 05	645570.017	6612585.916	Dry	2013	HAB 1
	HAB 06	645516.013	6612592.957	Dry	2013	HAB 1
	HAB 07	645490.014	6612737.978	Dry	2013	
	HAB 08	645473.016	6612730.963	Dry	2013	
	HAB 09	645458.015	6612730.938	Dry	2013	
	HAB 10	645444.016	6612727.941	Dry	2013	
	HAB 11	645428.014	6612729.995	Dry	2013	
	HAB 12	645531.017	6612306.94	Dry	2013	HAB 1
	HAB 13	645454.012	6612205.961	Dry	2013	EXC 1
	HAB 14	645203.016	6612156.978	Dry	2013	EXC 1
	HAB 15	645180.016	6612129.889	Dry	2013	HAB 3
	HAB 16	645197.013	6612184.948	Dry	2013	EXC 1
	HAB 17	645236.014	6612327.921	Dry	2013	HAB 1
	HAB 18	645265.016	6612338.968	Dry	2013	HAB 1
	HAB 19	645265.016	6612338.968	Dry	2013	HAB 1
	HAB 20*	645244.013	6612340.94	Dry	No Remediation	HAB 1
	HAB 21*	645216.013	6612306.969	Dry	No Remediation	HAB 1
	HAB 22*	645206.015	6612316.948	Dry	No Remediation	
	HAB 23	645196.016	6612315.891	Dry	2013	
	HAB 24*	645157.014	6612278.93	Dry	No Remediation	
	HAB 25*	645195.017	6612271.932	Dry	No Remediation	
	HAB 26*	645193.013	6612334.948	Dry	No Remediation	
	HAB 27	645199.014	6612341.981	Dry	2013	
	HAB 28	645237.012	6612367.979	Dry	2013	HAB 1

	HAB 29	645186.014	6612187.977	Dry	2013	
	HAB 30	645196.016	6612166.962	Dry	2013	EXC 1
	HAB 31	645188.016	6612161.97	Dry	2013	
	HAB 32	645188.016	6612161.97	Dry	2013	
	HAB 33	645184.017	6612166.942	Dry	2013	
	HAB 34	645185.015	6612332.966	Dry	2013	
	HAB 35	645170.015	6612318.896	Dry	2013	
	HAB 36	645146.014	6612300.909	Dry	2013	
	Hab 37	645635.866	6611795.114	Dry	2016	EXC 2
	Hab 38	645957.616	6612503.136	Dry	2016	HAB 6
	HAB 39	645944.833	6612429.845	Dry	2016	HAB 6
	Hab 40 & 41	645134.075	6611789.562	2 holes/dry	2016	HAB 3
	Hab 42 & 43	645047.948	6611855.227	2 holes/dry	2016	HAB 3
	Hab 44	645155.8	6612277.4	Dry	2016	
	Hab 45	645120.288	6612036.091	Dry	2017	HAB 3
	Hab 46	645119.989	6612043.82	Dry	2017	HAB 3
	Hab 47	645737.923	6612087.024	Dry	2017	HAB 2A
	Hab 48	645053.768	6611971.583	Dry	2017	HAB 3
	Hab 49 & 50	645291.031	6612001.84	2 holes/dry	2017	HAB 2
	Hab 51	644786.442	6611947.92	Dry	2017	
	Hab 52	645309.971	6612079.678	Dry	2017	HAB 2
	Hab 53	644794.3	6611948.2	Dry	2017	
Hab	Hab 54	645613.7	6611925.2	Dry	2017	HAB 2A
	Hab 55	645670.8	6612093.7	Dry	2017	HAB 2A
	Hab 56	645653.1	6612056.8	Dry	2017	HAB 2A
	Hab 57	645680.6	6612065.6	Dry	2017	HAB 2A
	Hab 58	644798.2	6612050.6	Dry	2017	HAB 2A
	Hab 59	645648.7	6611994.7	Dry	2017	HAB 2A
	Hab 60	645671.6	6612016.6	Dry	2017	HAB 2A
	Hab 61	645622.4	6611980.3	Dry	2017	HAB 2A
	Hab 62	645076.2	6611788.8	Dry	2017	HAB 3
	Hab 63	645737	6612086.1	Dry	2018	HAB 2A
	Hab 64	645685.9	6612061.4	Dry	2018	HAB 2A
	Hab 65	645655.5	6612055.3	Dry	2018	HAB 2A
	Hab 66	645412	6611924	Dry	2019	HAB 2A
	Hab 67	645332	6611876	Dry	2019	HAB 2A
	Hab 68	645631	6612339	Dry	2019	HAB 1
	Hab 69	645276	6612220	Dry	2021	EXC 1
	Hab 70 & 71	645704	6612168	Dry	2021	EXC 1
	VR 01	645583.015	6605976.917	Dry	2013	ACE 8
Verna-Bolger	VR 02	645612.016	6605959.984	Dry	2013	ACE 8
	VR 03	645987.422	6606161.403	Dry	2016	BOLGER 1

	VR 04	644794.274	6611948.222	Dry	2017	
	VR 05	645751.166	6606305.443	Dry	2017	BOLGER 1
	VR 06	645976.488	6606405.551	Dry	2017	
	VR 08 & 09	645934.866	6607575.955	2 holes/dry	2016	
	VR 10	645991.476	6607578.159	Dry	2017	
	VR 11	646037.829	6605999.498	Dry	2021	NW 3
	VR 12	645997.589	6605976.863	Dry	2021	NW 3
	VR 13	646052.176	6605975.309	Dry	2021	NW 3
	VR 14	646001.812	6605948.268	Dry	2021	NW 3
	VR 15	645995.007	6605897.840	Dry	2021	NW 3
	VR 16	645946.764	6605852.599	Dry	2021	NW 3
	VR 17	645885.294	6605830.366	Dry	2021	NW 3
	VR 18	645925.276	6605820.439	Dry	2021	NW 3
	VR 19	645917.392	6605771.530	Dry	2021	NW 3
	VR 20	646013.386	6605836.910	Dry	2021	NW 3
	VR 21	646027.817	6605820.750	Dry	2021	NW 3
	VR 22	646132.041	6605638.424	Dry	2021	NW 3
	VR 23	645702.416	6605821.699	Dry	2021	NW 3
	VR 26	645981.109	6605927.954	Dry	2021	NW 3
	VR 27	646027.259	6605884.492	Dry	2021	NW 3
Eagle	EG 01	640289.749	6607204.128	Dry	2016	EAGLE 1
Eagle	EG 02	640322.527	6607209.033	Dry	2016	EAGLE 1
	EG 03	640292.348	6607226.853	Dry	2016	EAGLE 1
	EG 04	640328.697	6607263.213	Dry	2016	EAGLE 1
	EG 05	640351.111	6607264.052	Dry	2016	EAGLE 1
	EG 06	640486.081	6607170.013	Dry	2016	EAGLE 1
Martin Lake	MC 1	638979.011	6604055.98	Dry	2013	RA 9
Off Property[1]	OP 01	647251.597	6607892.5	Dry	2017	
	OP 02	646998.6	6605635.1	Dry	2017	
	OP 03	647108.6	6605695.2	Dry	2017	
	BH-8202	641471	6604205	Dry	2017	
	BH-NW01	641343.6	6604130.1	Discharging	2017	
	AC 19[2]	647069	6605704	Dry	2019	
	AC 20[2]	647055	6605663	Dry	2019	
	AC 21[2]	647001	6605642	Dry	2019	

*Recent exploration activity (Not Eldorado/Cameco)
**DB 01 and DB-06 were found to be dry when first identified; however, boreholes could not be relocated despite extensive searches when remediation equipment was brought to the site.
Note: AC 08 and VR 07 have been removed from past records due to coordinate error.

[1] The 'Off Property' areas were operated as part of the former Eldorado Beaverlodge activities; however, these areas were not listed in the *Eldorado Resources Limited Decommissioning Approval AECB-DA-142-0*. In addition, these areas do not appear on the current Beaverlodge surface lease or in the Canadian Nuclear Safety Commission licence; however, Cameco intends to prepare these areas for transfer into the IC Program and has remediated the boreholes identified in these areas accordingly.

[2] Previously listed under the "Ace" area mistakenly. These boreholes are located off Beaverlodge property, in the Moran Pit area.

APPENDIX D

APPENDIX D

SRC Environmental Analytical Laboratories Quality Assurance Program

Introduction

As one of the most modern, well-equipped laboratory complexes in Canada, SRC Environmental Analytical Laboratories (SRC Analytical) provides a wide range of commercial analytical services. SRC Analytical maintains an extensive *Quality Assurance Program* designed to ensure the reliability of analytical data. Key components of the Quality Assurance program are:

- Accreditation by Canadian Association for Laboratory Accreditation (CALA).
- Participation in interlaboratory performance assessment programs.
- Routine quality control practices.
- Computerized sample management.

Accreditation by CALA

SRC Analytical is accredited by the Canadian Association for Laboratory Accreditation (CALA), for specific environmental tests listed in the scope of accreditation approved by CALA. Accreditation ensures that procedures, facilities, and methods conform to ISO/IEC 17025:2017, the internationally recognized standard. The accreditation program consists of a biennial on-site assessment which assesses the accredited methods as well as the quality management system.

Proficiency Testing and Interlaboratory Performance Assessment

Proficiency Testing helps to ensure the accuracy of results through interlaboratory comparisons and is a mandatory requirement of accreditation. SRC Analytical participates in several proficiency testing and interlaboratory performance assessment programs including:

- Proficiency Testing Canada (PTC)
- Environment Canada's Ecosystems Interlaboratory Quality Assurance program
- ASTM's proficiency studies
- Commercially available programs such as those supplied by Environmental Resource Associates (ERA), Emerald Scientific, and NSI Lab Solutions

Quality Control

SRC Analytical employs a variety of techniques, such as the analysis of reference materials, control samples, duplicates, and spike recovery to ensure the validity of analytical results. If a problem is identified, the samples are repeated or other corrective action is taken to demonstrate that the analytical results are acceptable. If this is not possible, then the client is notified.

Computerized Sample Management

A computerized Laboratory Information Management System (LIMS) uniquely identifies samples, specifies the required analyses, monitors workflow, and stores the analytical results. All analytical data generated is the property of the client and is not released to a third party except at the written request of the client. The LIMS also prepares analytical reports and invoices.

Quality Assurance Department

Quality Assurance staff at SRC Analytical manages all aspects of the quality system. This includes reviews of quality control data, method validation, and quality audits. For further information, contact the SRC Analytical Laboratory.

APPENDIX E

APPENDIX E

Detailed Water Quality Results

AN-5

		6/28/22	9/28/22	12/10/22
M Ions	Alk (mg/l)	71	92	124
	Ca (mg/l)	22.0	26.0	36.0
	Cl (mg/l)	0.2	0.5	0.8
	CO3 (mg/l)	<1	<1	<1
	Cond-L (µS/cm)	148	194	252
	Hardness (mg/l)	75	90	123
	HCO3 (mg/l)	87	112	151
	K (mg/l)	0.5	1.1	1.4
	Na (mg/l)	2.2	2.8	3.7
	OH (mg/l)	<1	<1	<1
	SO4 (mg/l)	10.0	7.9	14.0
	Sum of Ions (mg/l)	127	156	216
Metal	As (µg/l)	0.3	0.3	0.2
	Ba (mg/l)	0.1100	0.1200	0.1400
	Cu (mg/l)	0.0006	0.0004	0.0005
	Fe (mg/l)	0.1900	0.2000	0.1600
	Mo (mg/l)	0.0022	0.0013	0.0025
	Ni (mg/l)	0.0006	0.0005	0.0006
	Pb (mg/l)	<0.0001	<0.0001	<0.0001
	Se (mg/l)	0.0001	<0.0001	<0.0001
	U (µg/l)	40.0	51.0	207.0
	Zn (mg/l)	<0.0005	0.0009	0.0007
Nutrient	C-(org) (mg/l)	9.5		
	NO3 (mg/l)	<0.04		
	P-(TP) (mg/l)	<0.01		
Phys Para	pH-L (pH Unit)	7.30	7.58	7.74
	TDS (mg/l)	119	113	178
	Temp-H20 (°C)	17.6	13.2	3.4
	TSS (mg/l)	<1	1	<1
Rads	Pb210 (Bq/L)	<0.02		
	Po210 (Bq/L)	0.040		
	Ra226 (Bq/L)	0.650	0.740	0.610

DB-6

		3/29/22	6/28/22	9/28/22	12/10/22
M Ions	Alk (mg/l)	88	68	76	92
	Ca (mg/l)	34.0	26.0	28.0	34.0
	Cl (mg/l)	0.4	0.3	0.4	0.6
	CO3 (mg/l)	<1	<1	<1	<1
	Cond-L (µS/cm)	210	157	186	216
	Hardness (mg/l)	105	81	87	106
	HCO3 (mg/l)	107	83	93	112
	K (mg/l)	0.7	0.8	1.0	1.0
	Na (mg/l)	1.8	1.4	1.6	2.0
	OH (mg/l)	<1	<1	<1	<1
	SO4 (mg/l)	20.0	14.0	15.0	19.0
	Sum of Ions (mg/l)	169	129	143	175
Metal	As (µg/l)	0.1	0.1	0.1	0.1
	Ba (mg/l)	0.0400	0.0360	0.0370	0.0480
	Cu (mg/l)	0.0007	0.0006	0.0003	0.0006
	Fe (mg/l)	0.0240	0.0800	0.2400	0.0920
	Mo (mg/l)	0.0019	0.0016	0.0013	0.0017
	Ni (mg/l)	0.0002	0.0001	0.0002	0.0002
	Pb (mg/l)	<0.0001	<0.0001	<0.0001	<0.0001
	Se (mg/l)	0.0001	0.0001	<0.0001	<0.0001
	U (µg/l)	142.0	65.0	29.0	190.0
	Zn (mg/l)	0.0005	0.0005	<0.0005	0.0007
Nutrient	C-(org) (mg/l)		9.3		
	NO3 (mg/l)		<0.04		
	P-(TP) (mg/l)		0.01		
Phys Para	pH-L (pH Unit)	7.75	7.46	7.49	7.65
	TDS (mg/l)	175	123	110	143
	Temp-H20 (°C)	3.5	18.3	11.8	4.8
	TSS (mg/l)	<1	1	<1	<1
Rads	Pb210 (Bq/L)		<0.02		
	Po210 (Bq/L)		0.010		
	Ra226 (Bq/L)	0.030	0.030	0.020	0.050

AC-6A

		5/29/22	6/28/22	7/21/22
M Ions	Alk (mg/l)	90	98	94
	Ca (mg/l)	36.0	37.0	40.0
	Cl (mg/l)	0.4	0.4	0.4
	CO3 (mg/l)	<1	<1	<1
	Cond-L (µS/cm)	244	245	265
	Hardness (mg/l)	119	124	132
	HCO3 (mg/l)	110	120	115
	K (mg/l)	0.8	0.7	0.8
	Na (mg/l)	1.8	1.9	2.3
	OH (mg/l)	<1	<1	<1
	SO4 (mg/l)	33.0	34.0	34.0
	Sum of Ions (mg/l)	189	202	200
Metal	As (µg/l)	0.1	0.2	0.2
	Ba (mg/l)	0.0200	0.0220	0.0220
	Cu (mg/l)	0.0004	0.0004	0.0004
	Fe (mg/l)	0.0070	0.0091	0.0180
	Mo (mg/l)	0.0009	0.0010	0.0010
	Ni (mg/l)	<0.0001	<0.0001	0.0001
	Pb (mg/l)	<0.0001	<0.0001	<0.0001
	Se (mg/l)	0.0002	0.0002	0.0002
	U (µg/l)	214.0	213.0	186.0
	Zn (mg/l)	<0.0005	<0.0005	<0.0005
Nutrient	C-(org) (mg/l)		7.4	
	NO3 (mg/l)		<0.04	
	P-(TP) (mg/l)		<0.01	
Phys Para	pH-L (pH Unit)	7.92	7.76	7.73
	TDS (mg/l)	162	171	184
	Temp-H20 (°C)	12.1	18.5	18.1
	TSS (mg/l)	<1	<1	<1
Rads	Pb210 (Bq/L)		<0.02	
	Po210 (Bq/L)		0.010	
	Ra226 (Bq/L)	0.080	0.090	0.090

AC-8

		6/28/22
M Ions	Alk (mg/l)	41
	Ca (mg/l)	13.0
	Cl (mg/l)	0.6
	CO3 (mg/l)	<1
	Cond-L (µS/cm)	81
	Hardness (mg/l)	43
	HCO3 (mg/l)	50
	K (mg/l)	0.7
	Na (mg/l)	1.2
	OH (mg/l)	<1
	SO4 (mg/l)	4.7
	Sum of Ions (mg/l)	73
Metal	As (µg/l)	0.1
	Ba (mg/l)	0.0210
	Cu (mg/l)	0.0004
	Fe (mg/l)	0.0270
	Mo (mg/l)	0.0008
	Ni (mg/l)	<0.0001
	Pb (mg/l)	<0.0001
	Se (mg/l)	<0.0001
	U (µg/l)	8.6
	Zn (mg/l)	<0.0005
Nutrient	C-(org) (mg/l)	7.5
	NO3 (mg/l)	<0.04
	P-(TP) (mg/l)	<0.01
Phys Para	pH-L (pH Unit)	7.62
	TDS (mg/l)	62
	Temp-H20 (°C)	18.1
	TSS (mg/l)	<1
Rads	Pb210 (Bq/L)	<0.02
	Po210 (Bq/L)	<0.005
	Ra226 (Bq/L)	0.010

AC-14

		3/29/22	6/29/22	9/28/22	12/10/22
M Ions	Alk (mg/l)	51	41	49	52
	Ca (mg/l)	16.0	13.0	17.0	16.0
	Cl (mg/l)	0.9	0.7	1.5	1.4
	CO3 (mg/l)	<1	<1	<1	<1
	Cond-L (µS/cm)	114	88	128	118
	Hardness (mg/l)	53	43	55	53
	HCO3 (mg/l)	62	50	60	63
	K (mg/l)	0.7	0.7	0.8	0.8
	Na (mg/l)	1.6	1.4	2.5	2.0
	OH (mg/l)	<1	<1	<1	<1
	SO4 (mg/l)	6.0	5.6	11.0	7.6
	Sum of Ions (mg/l)	91	74	96	94
Metal	As (µg/l)	0.1	0.1	0.2	0.1
	Ba (mg/l)	0.0220	0.0220	0.0260	0.0240
	Cu (mg/l)	0.0006	0.0006	0.0008	0.0007
	Fe (mg/l)	0.0430	0.0650	0.0730	0.0610
	Mo (mg/l)	0.0009	0.0009	0.0009	0.0010
	Ni (mg/l)	0.0002	0.0001	0.0002	0.0002
	Pb (mg/l)	0.0002	<0.0001	0.0002	0.0001
	Se (mg/l)	<0.0001	0.0001	0.0001	0.0002
	U (µg/l)	15.0	18.0	50.0	29.0
	Zn (mg/l)	<0.0005	<0.0005	0.0006	<0.0005
Nutrient	C-(org) (mg/l)		7.6		
	NO3 (mg/l)		<0.04		
	P-(TP) (mg/l)		<0.01		
Phys Para	pH-L (pH Unit)	7.88	7.44	7.69	7.74
	TDS (mg/l)	87	71	71	78
	Temp-H20 (°C)	3.1	14.6	14.0	2.7
	TSS (mg/l)	<1	1	<1	<1
Rads	Pb210 (Bq/L)		<0.02		
	Po210 (Bq/L)		0.010		
	Ra226 (Bq/L)	0.040	0.050	0.090	0.060

AN-3

		6/28/22
M Ions	Alk (mg/l)	64
	Ca (mg/l)	18.0
	Cl (mg/l)	0.5
	CO3 (mg/l)	<1
	Cond-L (µS/cm)	122
	Hardness (mg/l)	62
	HCO3 (mg/l)	78
	K (mg/l)	0.7
	Na (mg/l)	1.7
	OH (mg/l)	<1
	SO4 (mg/l)	3.9
	Sum of Ions (mg/l)	107
Metal	As (µg/l)	0.1
	Ba (mg/l)	0.0170
	Cu (mg/l)	0.0006
	Fe (mg/l)	0.0170
	Mo (mg/l)	0.0018
	Ni (mg/l)	0.0002
	Pb (mg/l)	<0.0001
	Se (mg/l)	<0.0001
	U (µg/l)	1.6
	Zn (mg/l)	<0.0005
Nutrient	C-(org) (mg/l)	9.1
	NO3 (mg/l)	<0.04
	P-(TP) (mg/l)	<0.01
Phys Para	pH-L (pH Unit)	7.88
	TDS (mg/l)	90
	Temp-H20 (°C)	19.6
	TSS (mg/l)	2
Rads	Pb210 (Bq/L)	<0.02
	Po210 (Bq/L)	<0.005
	Ra226 (Bq/L)	<0.005

TL-3

		6/28/22	12/10/22
M Ions	Alk (mg/l)	114	134
	Ca (mg/l)	28.0	34.0
	Cl (mg/l)	1.6	2.0
	CO3 (mg/l)	<1	<1
	Cond-L (µS/cm)	243	302
	Hardness (mg/l)	90	108
	HCO3 (mg/l)	139	163
	K (mg/l)	1.0	1.2
	Na (mg/l)	19.0	23.0
	OH (mg/l)	<1	<1
	SO4 (mg/l)	18.0	23.0
	Sum of Ions (mg/l)	212	258
Metal	As (µg/l)	0.7	0.8
	Ba (mg/l)	0.0430	0.0470
	Cu (mg/l)	0.0013	0.0018
	Fe (mg/l)	0.0340	0.0660
	Mo (mg/l)	0.0094	0.0098
	Ni (mg/l)	0.0004	0.0005
	Pb (mg/l)	0.0002	0.0003
	Se (mg/l)	0.0024	0.0028
	U (µg/l)	194.0	194.0
	Zn (mg/l)	<0.0005	0.0012
Nutrient	C-(org) (mg/l)	7.9	
	NO3 (mg/l)	<0.04	
	P-(TP) (mg/l)	<0.01	
Phys Para	pH-L (pH Unit)	8.11	8.05
	TDS (mg/l)	166	186
	Temp-H20 (°C)	21.6	4.5
	TSS (mg/l)	<1	1
Rads	Pb210 (Bq/L)	0.35	
	Po210 (Bq/L)	0.070	
	Ra226 (Bq/L)	1.500	1.900

TL-4

		6/28/22	12/10/22
M Ions	Alk (mg/l)	116	148
	Ca (mg/l)	28.0	35.0
	Cl (mg/l)	1.6	2.0
	CO3 (mg/l)	<1	<1
	Cond-L (µS/cm)	240	313
	Hardness (mg/l)	90	111
	HCO3 (mg/l)	142	180
	K (mg/l)	1.0	1.3
	Na (mg/l)	19.0	24.0
	OH (mg/l)	<1	<1
	SO4 (mg/l)	15.0	18.0
	Sum of Ions (mg/l)	211	266
Metal	As (µg/l)	0.7	0.9
	Ba (mg/l)	0.0740	0.1000
	Cu (mg/l)	0.0008	0.0006
	Fe (mg/l)	0.0580	0.0350
	Mo (mg/l)	0.0069	0.0085
	Ni (mg/l)	0.0005	0.0006
	Pb (mg/l)	<0.0001	<0.0001
	Se (mg/l)	0.0013	0.0014
	U (µg/l)	146.0	186.0
	Zn (mg/l)	<0.0005	0.0006
Nutrient	C-(org) (mg/l)	9.3	
	NO3 (mg/l)	<0.04	
	P-(TP) (mg/l)	<0.01	
Phys Para	pH-L (pH Unit)	8.00	8.11
	TDS (mg/l)	164	185
	Temp-H20 (°C)	18.6	2.1
	TSS (mg/l)	<1	<1
Rads	Pb210 (Bq/L)	0.05	
	Po210 (Bq/L)	0.020	
	Ra226 (Bq/L)	1.600	2.100

TL-6

No samples collected in 2022 due to no flow at the station.

TL-7

		6/28/22	9/28/22	12/10/22
M Ions	Alk (mg/l)	118	126	161
	Ca (mg/l)	28.0	30.0	38.0
	Cl (mg/l)	1.6	2.0	2.0
	CO3 (mg/l)	<1	<1	<1
	Cond-L (µS/cm)	244	278	342
	Hardness (mg/l)	90	96	122
	HCO3 (mg/l)	144	154	196
	K (mg/l)	0.9	1.1	1.9
	Na (mg/l)	19.0	21.0	27.0
	OH (mg/l)	<1	<1	<1
	SO4 (mg/l)	15.0	16.0	20.0
	Sum of Ions (mg/l)	213	230	292
Metal	As (µg/l)	0.7	0.6	1.1
	Ba (mg/l)	0.2700	0.5000	0.7600
	Cu (mg/l)	0.0007	0.0005	0.0006
	Fe (mg/l)	0.0600	0.0410	0.1500
	Mo (mg/l)	0.0065	0.0061	0.0086
	Ni (mg/l)	0.0005	0.0004	0.0006
	Pb (mg/l)	<0.0001	<0.0001	<0.0001
	Se (mg/l)	0.0012	0.0010	0.0014
	U (µg/l)	136.0	128.0	219.0
	Zn (mg/l)	<0.0005	<0.0005	0.0007
Nutrient	C-(org) (mg/l)	8.6		
	NO3 (mg/l)	<0.04		
	P-(TP) (mg/l)	<0.01		
Phys Para	pH-L (pH Unit)	7.83	7.89	7.79
	TDS (mg/l)	167	162	208
	Temp-H20 (°C)	18.7	14.3	2.7
	TSS (mg/l)	<1	<1	1
Rads	Pb210 (Bq/L)	<0.02		
	Po210 (Bq/L)	0.010		
	Ra226 (Bq/L)	1.700	2.200	2.100

TL-9

		3/29/22	6/29/22	9/28/22	12/10/22
M Ions	Alk (mg/l)	161	124	124	140
	Ca (mg/l)	40.0	32.0	24.0	32.0
	Cl (mg/l)	2.0	2.2	2.3	2.0
	CO3 (mg/l)	<1	<1	<1	<1
	Cond-L (µS/cm)	336	256	246	301
	Hardness (mg/l)	128	101	82	108
	HCO3 (mg/l)	196	151	151	171
	K (mg/l)	1.2	1.1	1.0	1.2
	Na (mg/l)	24.0	18.0	19.0	24.0
	OH (mg/l)	<1	<1	<1	<1
	SO4 (mg/l)	19.0	14.0	14.0	18.0
	Sum of Ions (mg/l)	290	224	217	255
Metal	As (µg/l)	0.9	1.1	1.2	1.4
	Ba (mg/l)	0.4400	0.6400	0.6800	0.8000
	Cu (mg/l)	0.0007	0.0007	0.0010	0.0006
	Fe (mg/l)	0.0230	0.0690	0.0430	0.0280
	Mo (mg/l)	0.0081	0.0071	0.0069	0.0084
	Ni (mg/l)	0.0005	0.0005	0.0004	0.0004
	Pb (mg/l)	0.0003	0.0002	0.0001	<0.0001
	Se (mg/l)	0.0022	0.0017	0.0023	0.0028
	U (µg/l)	249.0	148.0	109.0	173.0
	Zn (mg/l)	<0.0005	0.0014	0.0021	0.0006
Nutrient	C-(org) (mg/l)		9.4		
	NO3 (mg/l)		0.27		
	P-(TP) (mg/l)		<0.01		
Phys Para	pH-L (pH Unit)	8.10	8.03	8.01	8.15
	TDS (mg/l)	231	170	145	185
	Temp-H20 (°C)	3.1	15.9	14.3	4.2
	TSS (mg/l)	<1	2	<1	<1
Rads	Pb210 (Bq/L)		0.10		
	Po210 (Bq/L)		0.060		
	Ra226 (Bq/L)	1.700	2.500	2.500	2.300

BL-3

		6/29/22	12/10/22
M Ions	Alk (mg/l)	67	72
	Ca (mg/l)	20.0	22.0
	Cl (mg/l)	10.0	11.0
	CO3 (mg/l)	<1	<1
	Cond-L (µS/cm)	208	237
	Hardness (mg/l)	70	77
	HCO3 (mg/l)	82	88
	K (mg/l)	1.1	1.2
	Na (mg/l)	16.0	17.0
	OH (mg/l)	<1	<1
	SO4 (mg/l)	26.0	28.0
	Sum of Ions (mg/l)	160	174
Metal	As (µg/l)	0.2	0.2
	Ba (mg/l)	0.0410	0.0350
	Cu (mg/l)	0.0012	0.0030
	Fe (mg/l)	0.0040	0.0064
	Mo (mg/l)	0.0032	0.0032
	Ni (mg/l)	0.0018	0.0040
	Pb (mg/l)	<0.0001	0.0003
	Se (mg/l)	0.0021	0.0021
	U (µg/l)	115.0	115.0
	Zn (mg/l)	0.0015	0.0100
Nutrient	C-(org) (mg/l)	3.5	
	NO3 (mg/l)	<0.04	1.00
	P-(TP) (mg/l)	<0.01	
Phys Para	pH-L (pH Unit)	7.88	7.99
	TDS (mg/l)	144	138
	Temp-H20 (°C)	13.7	1.0
	TSS (mg/l)	<1	<1
Rads	Pb210 (Bq/L)	<0.02	
	Po210 (Bq/L)	<0.005	
	Ra226 (Bq/L)	0.060	0.040

BL-4

		6/29/22
M Ions	Alk (mg/l)	67
	Ca (mg/l)	20.0
	Cl (mg/l)	10.0
	CO3 (mg/l)	<1
	Cond-L (µS/cm)	211
	Hardness (mg/l)	70
	HCO3 (mg/l)	82
	K (mg/l)	1.1
	Na (mg/l)	16.0
	OH (mg/l)	<1
	SO4 (mg/l)	26.0
	Sum of Ions (mg/l)	160
Metal	As (µg/l)	0.2
	Ba (mg/l)	0.0360
	Cu (mg/l)	0.0010
	Fe (mg/l)	0.0042
	Mo (mg/l)	0.0033
	Ni (mg/l)	0.0017
	Pb (mg/l)	0.0001
	Se (mg/l)	0.0021
	U (µg/l)	120.0
	Zn (mg/l)	0.0032
Nutrient	C-(org) (mg/l)	3.6
	NO3 (mg/l)	<0.04
	P-(TP) (mg/l)	<0.01
Phys Para	pH-L (pH Unit)	7.83
	TDS (mg/l)	142
	Temp-H20 (°C)	9.9
	TSS (mg/l)	<1
Rads	Pb210 (Bq/L)	<0.02
	Po210 (Bq/L)	<0.005
	Ra226 (Bq/L)	0.020

BL-5

		6/29/22
M Ions	Alk (mg/l)	66
	Ca (mg/l)	20.0
	Cl (mg/l)	11.0
	CO3 (mg/l)	<1
	Cond-L (µS/cm)	209
	Hardness (mg/l)	70
	HCO3 (mg/l)	80
	K (mg/l)	1.1
	Na (mg/l)	16.0
	OH (mg/l)	<1
	SO4 (mg/l)	26.0
	Sum of Ions (mg/l)	159
Metal	As (µg/l)	0.3
	Ba (mg/l)	0.0360
	Cu (mg/l)	0.0003
	Fe (mg/l)	0.0032
	Mo (mg/l)	0.0031
	Ni (mg/l)	0.0002
	Pb (mg/l)	<0.0001
	Se (mg/l)	0.0021
	U (µg/l)	114.0
	Zn (mg/l)	<0.0005
Nutrient	C-(org) (mg/l)	3.3
	NO3 (mg/l)	<0.04
	P-(TP) (mg/l)	<0.01
Phys Para	pH-L (pH Unit)	7.87
	TDS (mg/l)	144
	Temp-H20 (°C)	13.8
	TSS (mg/l)	<1
Rads	Pb210 (Bq/L)	<0.02
	Po210 (Bq/L)	<0.005
	Ra226 (Bq/L)	0.030

ML-1

		6/28/22	12/10/22
M Ions	Alk (mg/l)	58	72
	Ca (mg/l)	18.0	21.0
	Cl (mg/l)	6.3	9.0
	CO3 (mg/l)	<1	<1
	Cond-L (µS/cm)	164	207
	Hardness (mg/l)	61	72
	HCO3 (mg/l)	71	88
	K (mg/l)	1.0	1.2
	Na (mg/l)	10.0	13.0
	OH (mg/l)	<1	<1
	SO4 (mg/l)	16.0	20.0
	Sum of Ions (mg/l)	126	157
Metal	As (µg/l)	0.2	0.2
	Ba (mg/l)	0.0400	0.0460
	Cu (mg/l)	0.0003	0.0005
	Fe (mg/l)	0.0110	0.0041
	Mo (mg/l)	0.0019	0.0022
	Ni (mg/l)	0.0001	0.0002
	Pb (mg/l)	<0.0001	<0.0001
	Se (mg/l)	0.0010	0.0012
	U (µg/l)	56.0	60.0
	Zn (mg/l)	<0.0005	0.0007
Nutrient	C-(org) (mg/l)	5.8	
	NO3 (mg/l)	<0.04	
	P-(TP) (mg/l)	<0.01	
Phys Para	pH-L (pH Unit)	7.86	7.92
	TDS (mg/l)	112	124
	Temp-H20 (°C)	18.7	5.7
	TSS (mg/l)	<1	<1
Rads	Pb210 (Bq/L)	0.15	
	Po210 (Bq/L)	<0.005	
	Ra226 (Bq/L)	0.007	<0.005

CS-1

		6/28/22
M Ions	Alk (mg/l)	59
	Ca (mg/l)	18.0
	Cl (mg/l)	6.2
	CO3 (mg/l)	<1
	Cond-L (µS/cm)	158
	Hardness (mg/l)	61
	HCO3 (mg/l)	72
	K (mg/l)	1.0
	Na (mg/l)	9.5
	OH (mg/l)	<1
	SO4 (mg/l)	15.0
	Sum of Ions (mg/l)	126
Metal	As (µg/l)	0.2
	Ba (mg/l)	0.0420
	Cu (mg/l)	0.0008
	Fe (mg/l)	0.0420
	Mo (mg/l)	0.0019
	Ni (mg/l)	0.0003
	Pb (mg/l)	<0.0001
	Se (mg/l)	0.0010
	U (µg/l)	54.0
	Zn (mg/l)	0.0013
Nutrient	C-(org) (mg/l)	5.9
	NO3 (mg/l)	<0.04
	P-(TP) (mg/l)	<0.01
Phys Para	pH-L (pH Unit)	7.87
	TDS (mg/l)	110
	Temp-H20 (°C)	13.2
	TSS (mg/l)	2
Rads	Pb210 (Bq/L)	<0.02
	Po210 (Bq/L)	<0.005
	Ra226 (Bq/L)	0.005

CS-2

		6/28/22
M Ions	Alk (mg/l)	51
	Ca (mg/l)	15.0
	Cl (mg/l)	5.4
	CO3 (mg/l)	<1
	Cond-L (µS/cm)	138
	Hardness (mg/l)	52
	HCO3 (mg/l)	62
	K (mg/l)	1.0
	Na (mg/l)	8.1
	OH (mg/l)	<1
	SO4 (mg/l)	13.0
	Sum of Ions (mg/l)	108
Metal	As (µg/l)	0.2
	Ba (mg/l)	0.0360
	Cu (mg/l)	0.0003
	Fe (mg/l)	0.0620
	Mo (mg/l)	0.0015
	Ni (mg/l)	0.0002
	Pb (mg/l)	<0.0001
	Se (mg/l)	0.0008
	U (µg/l)	41.0
	Zn (mg/l)	<0.0005
Nutrient	C-(org) (mg/l)	5.6
	NO3 (mg/l)	<0.04
	P-(TP) (mg/l)	<0.01
Phys Para	pH-L (pH Unit)	7.77
	TDS (mg/l)	95
	Temp-H20 (°C)	12.9
	TSS (mg/l)	2
Rads	Pb210 (Bq/L)	<0.02
	Po210 (Bq/L)	<0.005
	Ra226 (Bq/L)	0.007

ZOR-01

		3/29/22	4/28/22	5/29/22	6/28/22	7/21/22	8/29/22	9/28/22	10/18/22
M Ions	Alk (mg/l)	106	99	81	85	82	88	93	99
	Ca (mg/l)	35.0	33.0	26.0	28.0	29.0	29.0	30.0	33.0
	Cl (mg/l)	0.4	0.4	0.2	0.2	0.2	0.2	0.2	0.3
	CO3 (mg/l)	<1	1	<1	<1	<1	<1	<1	<1
	Cond-L (µS/cm)	236	230	183	181	200	202	211	224
	Hardness (mg/l)	121	115	90	96	99	100	104	114
	HCO3 (mg/l)	129	121	99	104	100	107	113	121
	K (mg/l)	0.8	0.9	0.7	0.6	0.7	0.7	0.7	0.7
	Na (mg/l)	2.2	2.2	1.4	1.5	1.9	1.5	1.6	1.8
	OH (mg/l)	<1	1	<1	<1	<1	<1	<1	<1
	SO4 (mg/l)	19.0	18.0	14.0	14.0	15.0	16.0	16.0	18.0
	Sum of Ions (mg/l)	195	187	147	155	153	161	168	183
Metal	As (µg/l)		0.2	0.1	0.1	0.1	0.1	0.2	0.1
	Ba (mg/l)	0.0320	0.0240	0.0180	0.0210	0.0200	0.0210	0.0220	0.0230
	Cu (mg/l)		0.0004	0.0031	0.0008	0.0009	0.0009	0.0007	0.0007
	Fe (mg/l)		0.0110	0.0180	0.0081	0.0085	0.0067	0.0055	0.0057
	Mo (mg/l)	0.0013	0.0010	0.0007	0.0009	0.0010	0.0010	0.0010	0.0008
	Ni (mg/l)	0.0011	0.0002	0.0003	0.0001	0.0002	0.0002	0.0002	<0.0001
	Pb (mg/l)		0.0001	0.0002	<0.0001	0.0002	0.0001	<0.0001	0.0003
	Se (mg/l)	0.0005	0.0001	<0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	U (µg/l)		12.0	9.5	11.0	12.0	13.0	12.0	11.0
	Zn (mg/l)	0.0060	0.0006	0.0051	<0.0005	0.0012	0.0076	0.0012	0.0008
Nutrient	C-(org) (mg/l)				8.8				
	NO3 (mg/l)				<0.04				
	P-(TP) (mg/l)				<0.01				
Phys Para	pH-L (pH Unit)	7.74	7.57	7.98	7.94	7.85	8.04	7.93	7.96
	TDS (mg/l)	167	138	128	126	139	132	118	132
	Temp-H20 (°C)	4.5	7.2	12.6	19.1	18.1	18.2	12.1	6.9
	TSS (mg/l)		1	<1	<1	<1	1	<1	1
Rads	Pb210 (Bq/L)				<0.02				
	Po210 (Bq/L)				<0.005				
	Ra226 (Bq/L)	0.040	0.005	0.020	0.020	0.030	0.020	0.020	0.020

ZOR-02

		3/29/22	4/28/22	5/29/22	6/28/22	7/21/22	8/29/22	9/28/22	10/18/22
M Ions	Alk (mg/l)	109	104	84	95	89	110	109	125
	Ca (mg/l)	35.0	30.0	30.0	35.0	38.0	50.0	47.0	62.0
	Cl (mg/l)	0.3	0.4	0.2	0.2	0.2	<1.0	<1.0	1.0
	CO3 (mg/l)	<1	1	<1	<1	<1	<1	<1	<1
	Cond-L (µS/cm)	236	203	206	228	253	316	311	381
	Hardness (mg/l)	121	104	101	116	125	161	152	200
	HCO3 (mg/l)	133	127	102	116	108	134	133	152
	K (mg/l)	0.6	0.8	0.7	0.7	0.8	0.9	0.8	1.0
	Na (mg/l)	2.4	2.0	1.8	1.7	2.0	2.1	2.0	2.6
	OH (mg/l)	<1	1	<1	<1	<1	<1	<1	<1
	SO4 (mg/l)	18.0	18.0	22.0	28.0	34.0	56.0	48.0	74.0
	Sum of Ions (mg/l)	198	186	163	189	191	252	240	305
Metal	As (µg/l)	0.2	0.2	0.1	0.2	0.2	0.2	0.1	0.2
	Ba (mg/l)	0.0240	0.0230	0.0190	0.0250	0.0240	0.0310	0.0260	0.0320
	Cu (mg/l)	0.0006	0.0010	0.0014	0.0022	0.0020	0.0019	0.0020	0.0024
	Fe (mg/l)	0.0140	0.0680	0.0680	0.0750	0.0800	0.0830	0.0640	0.1200
	Mo (mg/l)	0.0010	0.0008	0.0009	0.0012	0.0014	0.0016	0.0012	0.0014
	Ni (mg/l)	0.0002	0.0002	0.0002	0.0002	0.0003	0.0002	0.0002	0.0001
	Pb (mg/l)	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Se (mg/l)	0.0002	0.0001	0.0002	0.0003	0.0003	0.0003	0.0002	0.0002
	U (µg/l)	23.0	53.0	154.0	264.0	292.0	534.0	367.0	636.0
	Zn (mg/l)	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Nutrient	C-(org) (mg/l)				7.3				
	NO3 (mg/l)				0.58				
	P-(TP) (mg/l)				<0.01				
Phys Para	pH-L (pH Unit)	7.94	7.72	8.00	7.88	7.87	8.03	7.97	8.03
	TDS (mg/l)	195	134	138	164	171	221	184	246
	Temp-H20 (°C)	2.7	6.0	10.4	15.3	15.7	16.8	10.0	5.4
	TSS (mg/l)	<1	1	<1	<1	<1	<1	<1	2
Rads	Pb210 (Bq/L)				0.05				
	Po210 (Bq/L)				0.050				
	Ra226 (Bq/L)	0.070	0.060	0.110	0.200	0.210	0.260	0.180	0.230

APPENDIX F

APPENDIX F

Beaverlodge Operation
Quality Control/Quality Assurance for Environmental Sample Analysis

Parent Field **Station: AC-14**

Date: 2022/12/10

Assigned: SRC Lab

Parameter	Value	Method	Entered DL	Entered Uncertainty
Alk	52.0	Acid Titration	1.0	8.0
As	0.1	ICP-MS	0.1	0.1
Ba	0.024	ICP-MS	0.001	0.004
CO3	< 1.0	Acid Titration	1.0	
Ca	16.0	ICP-OES	0.1	2.0
Cl	1.40	Ion Chromatography	0.10	0.40
Cond-F	114			
Cond-L	118	Conductivity Meter	1	10
Cu	0.0007	ICP-MS	0.0002	0.0003
Fe	0.061	ICP-MS	0.001	0.006
HCO3	63.0	Acid Titration	1.0	9.0
Hardness	53	Calculated	1	8
K	0.8	ICP-OES	0.1	0.3
Mg	3.1	ICP-OES	0.1	0.5
Mo	0.0010	ICP-MS	0.0001	0.0002
Na	2.0	ICP-OES	0.1	0.3
Ni	0.00020	ICP-MS	0.00010	0.00010
OH	< 1.0	Acid Titration	1.0	
Pb	0.0001	ICP-MS	0.0001	0.0001
Ra226	0.060	Alpha Septroscopy	0.005	0.020
SO4	7.6	ICP-OES	0.2	1.0
Se	0.0002	ICP-MS	0.0001	0.0001
Sum of Ions	94	Calculated	1	10
TDS	78.00	Gravimetric	5.00	20.00
TSS	< 1.000	Gravimetric	1.000	
Temp-H20	2.7			
U	29.000	ICP-MS	0.100	3.000
Zn	< 0.001	ICP-MS	0.001	
pH-F	7.8000			
pH-L	7.74	pH Meter	0.07	0.30

Child Field **Station: Blind-1**

Date: 2022/12/10

Assigned: SRC Lab

Parameter	Value	Method	Entered DL	Entered Uncertainty	% Absolute Difference
Alk	50.0	Acid Titration	1.0	8.0	3.9
As	0.1	ICP-MS	0.1	0.1	0.0
Ba	0.023	ICP-MS	0.001	0.003	4.255
CO3	< 1.0	Acid Titration	1.0		0.0
Ca	16.0	ICP-OES	0.1	2.0	0.0
Cl	1.40	Ion Chromatography	0.10	0.40	0.00
Cond-F	114				0
Cond-L	118	Conductivity Meter	1	10	0
Cu	0.0007	ICP-MS	0.0002	0.0003	0.0000
Fe	0.054	ICP-MS	0.001	0.005	12.174
HCO3	61.0	Acid Titration	1.0	9.0	3.2
Hardness	53	Calculated	1	8	0
K	0.8	ICP-OES	0.1	0.3	0.0
Mg	3.1	ICP-OES	0.1	0.5	0.0
Mo	0.0009	ICP-MS	0.0001	0.0003	10.5263
Na	1.9	ICP-OES	0.1	0.5	5.1
Ni	0.00020	ICP-MS	0.00010	0.00010	0.00000
OH	< 1.0	Acid Titration	1.0		0.0
Pb	< 0.0001	ICP-MS	0.0001		0.0000
Ra226	0.040	Alpha Septroscopy	0.005	0.020	40.000
SO4	7.6	ICP-OES	0.2	1.0	0.0
Se	0.0002	ICP-MS	0.0001	0.0001	0.0000
Sum of Ions	92	Calculated	1	10	2
TDS	79.00	Gravimetric	5.00	20.00	1.27
TSS	< 1.000	Gravimetric	1.000		0.000
Temp-H20	2.7				0.0
U	28.000	ICP-MS	0.100	3.000	3.509
Zn	0.001	ICP-MS	0.001	0.001	33.333
pH-F	7.8000				0.0000
pH-L	7.79	pH Meter	0.07	0.30	0.64

Note: % Absolute Difference = abs(A-B)/((A+B)/2) Followup required where value is greater than 50%

Parent Field **Station: DB-6 FB**

Date: 2022/09/28

Assigned: SRC Lab

Parameter	Value	Method	Entered DL	Entered Uncertainty
Alk	2.0	Acid Titration	1.0	1.0
As	<0.1	ICP-MS	0.1	
Ba	<0.001	ICP-MS	0.001	
CO3	<1.0	Acid Titration	1.0	
Ca	<0.1	ICP-OES	0.1	
Cl	<0.10	Ion Chromatography	0.10	
Cond-L	2	Conductivity Meter	1	1
Cu	<0.0002	ICP-MS	0.0002	
Fe	0.001	ICP-MS	0.001	0.001
HCO3	2.0	Acid Titration	1.0	1.0
Hardness	<1	Calculated	1	
K	<0.1	ICP-OES	0.1	
Mg	<0.1	ICP-OES	0.1	
Mo	<0.0001	ICP-MS	0.0001	
Na	0.1	ICP-OES	0.1	0.1
Ni	<0.00010	ICP-MS	0.00010	
OH	<1.0	Acid Titration	1.0	
Pb	<0.0001	ICP-MS	0.0001	
Ra226	<0.005	Alpha Septroscopy	0.005	
SO4	<0.2	ICP-OES	0.2	
Se	<0.0001	ICP-MS	0.0001	
Sum of Ions	2	Calculated	1	1
TDS	<5.00	Gravimetric	5.00	
TSS	<1.000	Gravimetric	1.000	
U	<0.100	ICP-MS	0.100	
Zn	<0.001	ICP-MS	0.001	
pH-L	6.00	pH Meter	0.07	0.20

Child Field **Station: DB-6 TB**

Date: 2022/09/28

Assigned: SRC Lab

Parameter	Value	Method	Entered DL	Entered Uncertainty	% Absolute Difference
Alk	1.0	Acid Titration	1.0	1.0	66.7
As	< 0.100	ICP-MS	0.100		0.000
Ba	< 0.001	ICP-MS	0.001		0.000
CO3	< 1.0	Acid Titration	1.0		0.0
Ca	< 0.1	ICP-OES	0.1		0.0
Cl	< 0.10	Ion Chromatography	0.10		0.00
Cond-L	2	Conductivity Meter	1	1	0
Cu	< 0.0002	ICP-MS	0.0002		0.0000
Fe	< 0.001	ICP-MS	0.001		18.182
HCO3	1.0	Acid Titration	1.0	1.0	66.7
Hardness	< 1	Calculated	1		0
K	< 0.1	ICP-OES	0.1		0.0
Mg	< 0.1	ICP-OES	0.1		0.0
Mo	< 0.0001	ICP-MS	0.0001		0.0000
Na	0.1	ICP-OES	0.1	0.1	0.0
Ni	< 0.00010	ICP-MS	0.00010		0.00000
OH	< 1.0	Acid Titration	1.0		0.0
Pb	< 0.0001	ICP-MS	0.0001		0.0000
Ra226	< 0.005	Alpha Septroscopy	0.005		0.000
SO4	< 0.2	ICP-OES	0.2		0.0
Se	< 0.0001	ICP-MS	0.0001		0.0000
Sum of Ions	1	Calculated	1	1	67
TDS	< 5.00	Gravimetric	5.00		0.00
TSS	< 1.000	Gravimetric	1.000		0.000
U	< 0.100	ICP-MS	0.100		0.000
Zn	< 0.001	ICP-MS	0.001		0.000
pH-L	5.78	pH Meter	0.07	0.20	3.74

Note: % Absolute Difference = abs(A-B)/((A+B)/2) Followup required where value is greater than 50%

Parent Field	Station: TL-4 Duplicate				Child Field	Station: TL-4				
Date: 2022/06/28					Date: 2022/06/28					
Assigned: None-Selected					Assigned: SRC Lab					
Parameter	Value	Method	Entered DL	Entered Uncertainty	Parameter	Value	Method	Entered DL	Entered Uncertainty	% Absolute Difference
As	0.001				As	0.7	ICP-MS	0.1	0.2	199.6
Ba	0.072				Ba	0.074	ICP-MS	0.001	0.007	2.740
Cond-F	278				Cond-F	278				0
Cu	< 0.0010				Cu	0.0008	ICP-MS	0.0002	0.0003	22.2222
Fe	< 0.060				Fe	0.058	ICP-MS	0.001	0.006	3.390
Mo	0.0082				Mo	0.0069	ICP-MS	0.0001	0.0010	17.2185
Ni	0.00051				Ni	0.00050	ICP-MS	0.00010	0.00030	1.98020
Pb	< 0.0002				Pb	< 0.0001	ICP-MS	0.0001		66.6667
Pb210	< 0.10				Pb210	0.05	Beta Counting	0.02	0.03	66.67
Po210	0.038				Po210	0.020	Alpha Septroscopy	0.005	0.010	62.069
Ra226	1.500				Ra226	1.600	Alpha Septroscopy	0.010	0.200	6.452
Se	0.0016				Se	0.0013	ICP-MS	0.0001	0.0003	20.6897
Temp-H20	18.6				Temp-H20	18.6				0.0
U	140.000				U	146.000	ICP-MS	0.100	10.000	4.196
Zn	< 0.003				Zn	< 0.001	ICP-MS	0.001		142.857
pH-F	8.2000				pH-F	8.2000				0.0000

Note: % Absolute Difference = abs(A-B)/((A+B)/2) Followup required where value is greater than 50%

Parent Field **Station: TL-7**

Date: 2022/09/28

Assigned: SRC Lab

Parameter	Value	Method	Entered DL	Entered Uncertainty
Alk	126.0	Acid Titration	1.0	10.0
As	0.6	ICP-MS	0.1	0.2
Ba	0.500	ICP-MS	0.001	0.050
CO3	<1.0	Acid Titration	1.0	
Ca	30.0	ICP-OES	0.1	3.0
Cl	2.00	Ion Chromatography	0.10	0.30
Cond-F	279			
Cond-L	278	Conductivity Meter	1	30
Cu	0.0005	ICP-MS	0.0002	0.0003
Fe	0.041	ICP-MS	0.001	0.006
HCO3	154.0	Acid Titration	1.0	20.0
Hardness	96	Calculated	1	10
K	1.1	ICP-OES	0.1	0.3
Mg	5.2	ICP-OES	0.1	0.8
Mo	0.0061	ICP-MS	0.0001	0.0009
Na	21.0	ICP-OES	0.1	2.0
Ni	0.00040	ICP-MS	0.00010	0.00020
OH	<1.0	Acid Titration	1.0	
Pb	<0.0001	ICP-MS	0.0001	
Ra226	2.200	Alpha Septroscopy	0.020	0.200
SO4	16.0	ICP-OES	0.2	2.0
Se	0.0010	ICP-MS	0.0001	0.0002
Sum of Ions	230	Calculated	1	20
TDS	162.00	Gravimetric	5.00	20.00
TSS	<1.000	Gravimetric	1.000	
Temp-H20	14.3			
U	128.000	ICP-MS	0.100	10.000
Zn	<0.001	ICP-MS	0.001	
pH-F	7.5000			
pH-L	7.89	pH Meter	0.07	0.30

Child Field **Station: Blind-6**

Date: 2022/09/28

Assigned: SRC Lab

Parameter	Value	Method	Entered DL	Entered Uncertainty	% Absolute Difference
Alk	127.0	Acid Titration	1.0	10.0	0.8
As	0.6	ICP-MS	0.1	0.2	0.0
Ba	0.490	ICP-MS	0.001	0.050	2.020
CO3	< 1.0	Acid Titration	1.0		0.0
Ca	30.0	ICP-OES	0.1	3.0	0.0
Cl	1.90	Ion Chromatography	0.10	0.50	5.13
Cond-F	279				0
Cond-L	277	Conductivity Meter	1	30	0
Cu	0.0005	ICP-MS	0.0002	0.0003	0.0000
Fe	0.040	ICP-MS	0.001	0.006	2.469
HCO3	155.0	Acid Titration	1.0	20.0	0.6
Hardness	96	Calculated	1	10	0
K	1.1	ICP-OES	0.1	0.3	0.0
Mg	5.2	ICP-OES	0.1	0.8	0.0
Mo	0.0062	ICP-MS	0.0001	0.0009	1.6260
Na	21.0	ICP-OES	0.1	2.0	0.0
Ni	0.00050	ICP-MS	0.00010	0.00030	22.22222
OH	< 1.0	Acid Titration	1.0		0.0
Pb	< 0.0001	ICP-MS	0.0001		0.0000
Ra226	2.200	Alpha Septroscopy	0.005	0.200	0.000
SO4	16.0	ICP-OES	0.2	2.0	0.0
Se	0.0010	ICP-MS	0.0001	0.0002	0.0000
Sum of Ions	230	Calculated	1	20	0
TDS	163.00	Gravimetric	5.00	20.00	0.62
TSS	< 1.000	Gravimetric	1.000		0.000
Temp-H20	14.3				0.0
U	127.000	ICP-MS	0.100	10.000	0.784
Zn	< 0.001	ICP-MS	0.001		0.000
pH-F	7.5000				0.0000
pH-L	7.88	pH Meter	0.07	0.30	0.13

Note: % Absolute Difference = abs(A-B)/((A+B)/2) Followup required where value is greater than 50%