Nanisivik Mine

2024 Water Quality Report

Prepared by BGC Engineering Inc. for:

CanZinco Mines Ltd.

February 13, 2025

Project 0255036

Pioneering responsible solutions to complex earth science challenges

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Attention: Zied Tebaibi, P.Geo.

2024 Water Quality Report

Please find the above-captioned report attached documenting the 2024 Water Quality Monitoring undertaken at Nanisivik Mine, Nunavut. If there are any questions or comments regarding this report, please contact the undersigned at your convenience.

Yours sincerely,

BGC Engineering Inc.
per:

Scott Garrison, M.Eng., P.Eng.
Senior Geological Engineer

EXECUTIVE SUMMARY

This report provides a summary of the 2024 water quality monitoring results for the Nanisivik Mine (the Mine) located on the Borden Peninsula of northern Baffin Island in Nunavut, Canada. The 2024 water quality monitoring program was conducted as a single sampling event completed on August 7, 2024, in parallel with the geotechnical monitoring program, as required under Water Licence 1AR-NAN2030. The objective of the water quality monitoring program is to assess the effectiveness and adequacy of mine reclamation, as demonstrated by monitoring of key water quality parameters at six monitoring stations identified in Water Licence 1AR-NAN2030 (i.e., Stations 159-4, 159-6, 159-14, NML-23, NML-29, and NML-30) with comparison to specific criteria. In 2024, three additional voluntary stations not identified in Water Licence 1AR-NAN2030 were included in the water quality monitoring program (i.e., Stations 159-14-US-01, 159-14-US-05, and 159-14-US-07), based on recommendations from a 2023 water quality site investigation (BGC, November 27, 2023) following an exceedance of the zinc criteria at Station 159-14 in 2022.

Results for the final discharge point of the West Twin Disposal Area (WTDA), monitored at Station 159-4, were compared to the maximum authorized concentrations stated in Water Licence 1AR-NAN2030. Results from the five remaining monitoring stations identified in the Water Licence were compared to station-specific Action Levels, as referenced in the Mine's *Contingency Plan for Water Quality Exceedances* (Stantec, March 27a, 2020). No exceedances relative to these criteria were identified in 2024. Results from the additional voluntary stations sampled in 2024 provided support for the conceptualization of zinc loading in the Chris Creek watershed introduced as part of the 2023 water quality site investigation (BGC, November 27, 2023).

Overall, water quality monitoring at the decommissioned Nanisivik Mine in 2024 indicated that the decommissioning and reclamation work completed at the Mine are meeting its objectives.

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GLOSSARY

Term	Definition
BGC	BGC Engineering Inc.
CanZinco	CanZinco Mines Ltd.
CBE	Charge balance error
CCME	Canadian Council of Ministers of the Environment
COA	Certificate of Analysis
DQO	Data Quality Objective
Eurofins	Eurofins Environment Testing Canada
MECCS	British Columbia Ministry of Environment and Climate Change Strategy
Mine	Nanisivik Mine
NWB	Nunavut Water Board
QA/QC	Quality Assurance and Quality Control
RPD	Relative percent difference
SC	Specific Conductance
TSS	Total Suspended Solids
WTDA	West Twin Disposal Area

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1.0 INTRODUCTION

Nanisivik Mine (the Mine) was an underground lead and zinc mine located on the northern tip of Baffin Island, Nunavut that operated from 1976 to 2002, following which reclamation activities began. BGC Engineering Inc. (BGC) has provided geotechnical engineering, mine waste, and mine closure support to the Mine since 2000, including the development and implementation of the reclamation plan for tailings deposits, waste rock piles, portals, and open pits. BGC has overseen the implementation of the post-closure geotechnical and geothermal performance monitoring plan since completion of the bulk of the reclamation measures in 2004/2005. Since 2020, BGC has been retained by CanZinco Mines Ltd. (CanZinco) to provide post-closure water quality monitoring, in parallel with geotechnical and geothermal monitoring, at the Mine. Water quality monitoring is required under Water Licence 1AR-NAN2030 (Nunavut Water Board [NWB], January 9, 2020) to assess the overall performance of reclamation and closure activities at the site.

The scope of the 2024 water quality monitoring carried out by BGC included:

1. A single water quality sampling event, as required by Water Licence 1AR-NAN2030.
2. Additional water quality monitoring at three sites identified as part of the site investigation in 2023, undertaken in follow up to an Action Level exceedance in the Chris Creek watershed (BGC, November 27, 2023).
3. Review and interpretation of water quality data, as collected in the field and provided by a third-party analytical laboratory.
4. Documentation of the water quality monitoring in a report.

The work described herein was carried out in accordance with the applicable contract terms, as per BGC's Consultancy Agreement with CanZinco dated May 24, 2024.

1.1 Regulatory Framework

Since 1976, the Mine has operated under six different Water Licences issued by the Northwest Territories Water Board and the NWB:

1. Northwest Territories Water Licence N5L3-0159 – Northwest Territories Water Board (July 1976); renewed in 1978, 1983, 1988, and 1991.
2. Nunavut Water Licence NWB1NAN9702 – NWB (July 1997; the original term of five years was extended until closure in September 2002.
3. Nunavut Water Licence NWB1NAN0208 – NWB (October 2002 to May 2008).
4. Nunavut Water Licence NWB1AR-NAN0914 – NWB (April 2009 to December 2014).
5. Nunavut Water Licence 1AR-NAN1419 – NWB (December 2014 to December 2019).
6. Nunavut Water Licence 1AR-NAN2030 – NWB (January 9, 2020, through January 8, 2030) – current approved Water Licence.

The current, approved Water Licence 1AR-NAN2030 authorizes and establishes the conditions for continued post-closure monitoring that may be needed "*to ensure the continued integrity and functionality of completed reclamation works*" [Part A, 1a(iii)]. The water quality monitoring conditions of Water Licence 1AR-NAN2030 represent a reduction in sampling locations, frequency and parameters required for analysis relative to the previous licences (listed above).

These changes align with the progression of the decommissioning and post-closure monitoring period at the Mine. The period stipulated by Water Licence 1AR-NAN2030 is 2020 to 2029 (inclusive) and includes a monitoring schedule of annual (i.e., one-time yearly) monitoring in years 2020, 2021, 2022, 2024, 2026, and 2029 (Schedule H, Table 1). Monitoring is not required in years 2023, 2025, 2027, and 2028.

1.2 Water Quality Criteria

Six water quality monitoring stations are outlined in Water Licence 1AR-NAN2030, i.e., stations NML-23, 159-4, 159-6, 159-14, NML-29, and NML-30 (Drawing 01).

Part D, Item 2 of the Water Licence documents maximum authorized concentrations of select water quality parameters associated with discharge from the decommissioned West Twin Disposal Area (WTDA), as monitored at Station 159-4 (Table 1-1; Drawing 01).

Table 1-1 Effluent quality requirements for the WTDA monitored at Station 159-4.

Parameter	Maximum Authorized Concentration (mg/L)
Total Arsenic (mg/L)	0.25
Total Cadmium (mg/L)	0.005
Total Copper (mg/L)	0.10
Total Lead (mg/L)	0.10
Total Nickel (mg/L)	0.50
Total Zinc (mg/L)	0.25
Total Suspended Solids (TSS) (mg/L)	15.0
pH (pH units)	6.0 – 9.5
Hydrocarbons (Oil and grease)	15.0[1]

Note:

1. Per Part D, Item 3 of Water Licence 1AR-NAN2030, guideline to be applied if visible sheen is observed.

Data for the remaining five water quality monitoring stations (i.e., Stations NML-23, NML-29, NML-30, 159-6, and 159-14) are to be compared to station-specific Action Levels for select parameters (i.e., cadmium, lead, zinc, sulphate, total suspended solids (TSS), pH, and hydrocarbons), which are described in the Mine's *Contingency Plan for Water Quality Exceedances* (Contingency Plan; Stantec Consulting Ltd. [Stantec], March 27, 2020a; Table 1-2). In accordance with Water Licence 1AR-NAN2030 (Part H, Item 3), hydrocarbons (i.e., oil and grease) are also included with the station-specific Action Levels; that is, any observed hydrocarbon sheen necessitates the collection of additional water samples for hydrocarbon analysis and results are assessed against a 15.0 mg/L maximum concentration (Table 1-2). Further details of the monitoring requirements are discussed in Section 3.0.

Table 1-2 Station-specific Action Levels (as presented in Stantec, March 27a, 2020).

Parameter	Units	Station				
		Twin Lakes Creek Watershed		Chris Creek Watershed	Landfill Watershed	
		159-6	NML-23	159-14	NML-29[1]	NML-30
Total Cadmium	mg/L	0.0297	0.0135	0.0010	0.0017	0.0017
Total Lead	mg/L	0.0893	0.0553	0.0115[2]	0.0062	0.0062
Total Zinc	mg/L	8.9	0.23	0.68	0.09	0.09
Total Sulphate	mg/L	614	118	960	340	340
Total Suspended Solids (TSS)	mg/L	140	20	158	113	113
pH[3]	pH units	6.0 – 9.5				
Hydrocarbons (Oil and grease)[4]	mg/L	15.0				

Notes:

1. As documented in Stantec (March 10, 2020), flow at Station NML-29 is intermittent and Action Levels (in case of flow) at this Station are the same as at Station NML-30.
2. As reported in the 2020 Annual Report for Water Licence 1AR-NAN2030 (Nyrstar, March 25, 2021). The value shown in the Contingency Plan was incorrectly shown as 0.00115 mg/L.
3. For pH, the Contingency Plan indicates the site-specific Action Levels reflect the acceptable range listed for Station 159-4 noted in the Water Licence 1AR-NAN2030 (and previously shown in Table 1-1).
4. Action Levels for hydrocarbons were not identified in Stantec (March 27a, 2020); however, Part H, Item 3 of Water Licence 1AR-NAN2030 establishes the maximum concentration of oil and grease in water at any station where a hydrocarbon sheen may have been visually observed. This maximum concentration is 15.0 mg/L, which is outlined in Part D, Item 3 of Water Licence 1AR-NAN2030.

Exceedance of the station-specific Action Levels requires that additional steps to be taken in accordance with the Contingency Plan. These steps are to be taken within one month of an Action Level exceedance, and are as follows:

1. Confirm the parameter(s) and sampling station where the Action Level was exceeded.
2. Reconcile the Action Level against site conditions and the condition of infrastructure.
3. Document the data evaluation and recommend an appropriate timeline for a follow-up investigation.
4. Submit the documentation and recommendation to the NWB for review.

1.3 Voluntary Monitoring Stations

Results from the 2022 water quality monitoring program identified a zinc Action Level exceedance at Station 159-14 (BGC, March 15, 2023). The steps listed in the Mine's Contingency Plan were addressed in a technical memorandum (BGC, October 4, 2022). Based on field and laboratory results in 2022, the origin of the zinc Action Level exceedance at Station 159-14 was unclear. BGC completed a site investigation in 2023 to assess the potential source(s) and pathway(s) that may have contributed to the elevated zinc value observed at Station 159-14 in 2022, and completed an assessment of historical data to identify potential trends and/or correlations with other parameters (BGC, November 27, 2023).

Based on the results of the 2023 zinc source and pathway investigation (BGC, November 27, 2023; discussed in more detail in Section 2.2), BGC recommended that two additional voluntary monitoring stations along Chris Creek be added to the monitoring program for the remainder of the post-closure monitoring period (i.e., Stations 159-14-US-05 and 159-14-US-07; Drawing 01). In addition, BGC recommended the sample location noted to produce the highest total zinc concentration in 2023 (i.e., Station 159-14-US-01; Drawing 01) be included as part of post-closure monitoring in 2024 only. As such, the 2024 post-closure monitoring program comprised the six water quality stations outlined in Water Licence 1AR-NAN2030 (i.e., Stations NML-23, 159-4, 159-6, 159-14, NML-29, and NML-30) and the three stations recommended in BGC (November 27, 2023; Stations 159-14-US-01, 159-14-US-05, and 159-14-US-07) for a total of nine water quality stations.

2.0 BACKGROUND

2.1 Site Description

The Mine is located 750 kilometres (km) north of the Arctic Circle at an approximate latitude of 73° north and is approximately 33 km (by road) from the hamlet of Arctic Bay, in northern Baffin Island (Drawing 01).

Prior to decommissioning, the Mine facilities consisted of an underground mine and a 2,200 tonne per day concentrator that used conventional crushing, rod and ball mill grinding, differential lead and zinc flotation, and concentrate drying. Between 1976 and 2002, the underground facility extracted and shipped zinc and lead concentrates. Ore concentrates were shipped from a concentrate storage shed located adjacent to Strathcona Sound, where a deep-water wharf allowed ocean-going vessels to moor. Concentrates were transferred to ships using a ship-loader. Process tailings were transported to and deposited at the WTDA, where the resulting effluent was discharged into Twin Lakes Creek. The Mine was in operation from its opening in 1976 until closure in September 2002 (Stantec, March 10, 2020).

Reclamation activities began at the Mine in 2002. On July 30, 2006, Environment Canada approved the Nanisivik Mine as having achieved “recognized closed mine” status under the *Metal Mining Effluent Regulations* and therefore, mine effluent and environmental effects monitoring requirements under those regulations were no longer required. On October 1, 2008, reclamation of the site was completed, and a post-closure monitoring period began (Stantec, March 10, 2020).

2.2 Previous Water Quality Monitoring Programs

Water quality monitoring in post-closure, up to 2019, was previously carried out by Stantec. A summary of the monitoring results from the Stantec-led programs from 2009 to 2019 can be found in Stantec’s 2020 report (March 10, 2020) and references therein. In the years 2020, 2021, and 2022, BGC conducted the Mine’s post-closure water quality monitoring in parallel with its geotechnical and geothermal monitoring program and in accordance with Water Licence 1AR-NAN2030 (BGC, March 24, 2021; March 18, 2022; March 15, 2023). In accordance with the Mine’s Contingency Plan, a water quality site investigation was completed in 2023 following a zinc Action Level exceedance at Station 159-14 in 2022 during annual monitoring of the Mine. A summary of the results from the 2022 annual monitoring and the 2023 water quality site investigation is as follows, with a complete description provided in BGC (March 15, 2023; November 27, 2023):

- 2022 Monitoring:
    - Monitoring in 2022 occurred during a single event in August 2022, which included the collection of samples at the six stations identified in Water Licence 1AR-NAN2030 (i.e., Stations 159-4, 159-6, 159-14, NML-23, NML-29, and NML-30).
    - The 2022 results showed no exceedances of maximum authorized concentrations at Station 159-4 (i.e., the final discharge point of the WTDA) nor

exceedances of site-specific Action Levels at Station 159-6, Station NML-23, Station NML-29, and Station NML-30.
    - An Action Level exceedance of zinc at Station 159-14 was identified in 2022, which reflected the highest zinc value measured to date at this station during the post-closure period (i.e., Zn concentration of 1.04 mg/L). The field observations in 2022 did not provide a clear assessment as to the zinc source (BGC, October 4, 2022).
- 2023 Investigation:
    - A site investigation and evaluation of historical data was undertaken in 2023 to assess the potential source(s) and pathway(s) that may have contributed to the elevated zinc value measured at Station 159-14 in 2022. The site investigation occurred in August 2023 and involved the measurement of field parameters and collection of surface water samples at Station 159-14, one location downstream of Station 159-14 (i.e., the previously monitored Station 159-13), and 11 additional locations along Chris Creek and tributaries within the Chris Creek watershed. A review of the historical precipitation data was also conducted to identify a potential correlation between precipitation and the occurrence of elevated zinc concentrations.
    - Results from the 2023 water quality data and evaluation of precipitation records helped to inform a conceptual model for elevated zinc values. Namely, zinc is released through oxidation of zinc-bearing sulphides, which are present as mineralized outcrops within the Chris Creek watershed, most notably in the headwater region and along the eastern flank of Chris Creek near Station 159-14. In drier periods, zinc released through sulphide weathering is interpreted to be attenuated by precipitation of zinc-bearing carbonate mineral phases (e.g., smithsonite), which forms precipitates along ephemeral drainage pathways. During summer months at the Mine (i.e., July and August), these precipitates are conceptualized to be remobilized by rainfall events, transporting elevated zinc loads. Hence, years with lower rainfall totals (or if monitoring events are scheduled soon after rainfall events) have been noted to result in higher zinc concentrations measured at Station 159-14.

2.3 Precipitation Records at the Mine

No precipitation measurements are taken at the Mine, and the weather station at the Arctic Bay Airport does not reliably collect precipitation data. However, it has been interpreted that water quality trends at the Mine may be influenced by the timing and amount of precipitation in summer months, particularly July and August (BGC, November 27, 2023). As such, BGC recommended that precipitation data for the Mine be reviewed annually in conjunction with water quality monitoring events (BGC, November 27, 2023).

Historical precipitation data for 2009 to 2024 were sourced from the Environment and Climate Change Canada (ECCC) Regional Deterministic Precipitation Analysis (RDPA) data product[2].

[2] Data accessed on September 26, 2024, and retrieved from https://weather.gc.ca/grib/grib2_RDPA_ps10km_e.html

The RDPA provides a precipitation estimation with a spatial resolution of approximately 10 km at any given location in Canada, on a timestep of six hours. The precipitation estimates are based on integrated data from *in situ* precipitation gauge measurements, weather radar, satellite imagery and numerical weather prediction models. Precipitation estimates for the Mine were extracted from the RDPA data product using the grid cell nearest to the Mine. Results were summed for the months of July and August over this 16-year period and are presented in Table 2-1; results for 2012 are not shown as precipitation estimates were not available in the months of July to September of that year.

The RDPA dataset indicates approximately 115.0 mm of precipitation fell in 2024 in the months of July and August, in comparison to an average of 69.4 mm for July and August over the 16-year period; Table 2-1). The wetter-than-average conditions in July and August in 2024 is in contrast to 2022 and 2023 estimates of 21.6 mm and 34.1 mm, respectively (Table 2-1), which were corroborated by the drier field condition observations noted by field staff during those years (BGC, March 15, 2023; November 27, 2023).

Table 2-1 Estimated precipitation at Nanisivik in July and August, 2009-2024.

Year	Precipitation (mm)			
	July	August	Total July + August	Average July + August
2009	62.5	39.9	102.4	69.4
2010	26.7	39.3	66.1	
2011	11.1	7.0	18.1	
2012	n.d.	n.d.	-	
2013	44.1	31.8	75.9	
2014	44.2	75.6	119.9	
2015	11.4	18.1	29.5	
2016	60.8	23.5	84.3	
2017	33.9	45.4	79.3	
2018	31.1	55.3	86.4	
2019	47.0	45.1	92.1	
2020	36.9	26.7	63.6	
2021	34.2	18.7	52.8	
2022	2.0	19.7	21.6	
2023	0.6	33.5	34.1	
2024	59.8	55.2	115.0	

Note: Precipitation estimates sourced from ECCC (2024).

3.0 2024 SAMPLING PROGRAM

3.1 Field Program

Water samples were collected at the Mine from the Twin Lakes Creek, Chris Creek, and Landfill watersheds on August 7, 2024, by BGC representatives Mr. Scott Garrison (P.Eng. [NU/NT]) and Ms. Shelby DeMars (P.Eng. [AB/BC]). The 2024 water quality monitoring program was carried out in conjunction with annual geotechnical monitoring, as required by Water Licence 1AR-NAN2030. Nine stations were sampled as part of the 2024 water quality monitoring program, including the six stations identified in Water Licence 1AR-NAN2030 (i.e., Stations 159-4, 159-6, 159-14, NML-23, NML-29, and NML-30) and three stations recommended in BGC (November 27, 2023) (i.e., Stations 159-14-US-01, 159-14-US-05, and 159-14-US-07) (Drawing 01).

3.2 Water Quality Analysis

Field parameters were recorded at the time of sampling at the nine stations sampled in 2024. Field parameter measurements were taken by BGC field personnel with a YSI ProQuatro Multiparameter Meter, which included measurements of the following parameters: specific conductance[3] (SC), temperature, pH, and total suspended solids (TSS). The pH sensor was calibrated prior to sampling in the morning of the sampling day, using three pH calibration buffer solutions (pH 4.01, pH 7.01 and pH 10.01). The conductivity sensor was calibrated prior to the field program using a 1,413 µS/cm calibration solution. The presence or absence of a hydrocarbon sheen was also visually noted and recorded at the time of sampling.

The following prescribed parameter suites are described in Water Licence 1AR-NAN2030 (Schedule H, Table 2):

- NAN-1:
  - Total metals: cadmium, calcium, lead, magnesium, potassium, sodium, and zinc
  - Major anions and nutrients: bicarbonate alkalinity, total alkalinity, hardness, chloride, sulphate, ammonia [as N], and nitrite + nitrate [as N]
  - TSS
  - Field parameters: specific conductivity, temperature, pH, and visual observations for hydrocarbon sheen.
- NAN-2: petroleum hydrocarbon analysis of F2 to F4 hydrocarbons.[4]

[3] SC represents conductivity temperature-corrected to 25°C.

[4] The parameters analyzed to assess for “oil and grease”, as described in Section 1.2, are not explicitly described in Water Licence 1AR-NAN2030, but are interpreted to be those parameters analyzed as part of the NAN-2 suite.

Additionally, the samples were analyzed for the following parameters, which are not included in Water Licence 1AR-NAN2030, but allow for an assessment of the electroneutrality (i.e., chemical completeness)[5] and representativeness of the samples collected:

- Total metals: arsenic, copper, nickel, silver, aluminum, boron, barium, beryllium, cobalt, chromium, iron, antimony, manganese, mercury, molybdenum, selenium, silicon, strontium, thallium, titanium, and vanadium
- Laboratory pH and specific conductivity.

A summary of the analytical schedule for the samples collected in 2024 is described in Table 3-1.

Table 3-1 Analytical schedule 2024 water quality monitoring.

Station	Station Description	Parameter Suite[1,2]
Twin Lakes Creek Watershed		
159-4	Outflow from WTDA; final discharge point	NAN-1
159-6	Outlet of Twin Lakes Creek into Strathcona Sound	NAN-1, NAN-2
NML-23	Outflow from East Twin Lake	NAN-1
Chris Creek Watershed		
159-14	Chris Creek downstream of K-Baseline[3]	NAN-1
159-14-US-01	Tributary that connects to Chris Creek approximately 60 m upstream of Station 159-14	NAN-1
159-14-US-05	Section of Chris Creek flowing through the flat grassy valley at the base of K-Baseline	NAN-1
159-14-US-07	Approximately 4 m wide waterfall flowing over an escarpment, approximately 20 m high, in the upper reaches of the Chris Creek watershed	NAN-1
Landfill Watershed		
NML-29	Downstream of Landfill – East Drainage System	NAN-1, NAN-2
NML-30	Downstream of Landfill – West Drainage	NAN-1, NAN-2

Notes: For the six stations regulated by Water Licence 1AR-NAN2030 (i.e., Stations 159-4, 159-6, 159-14, NML-23, NML-29, and NML-30), the above is in accordance with details provided therein in Schedule H, Table 3.

1. Field parameters also recorded at each station (i.e., specific conductivity, temperature, pH, TSS, visual observations for hydrocarbon sheen).
2. Additional parameters not included in Water Licence 1AR-NAN2030 were also tested for all stations, as described in Section 3.2.
3. K-baseline is understood by BGC to refer to historical mine workings, as shown in Drawing 01.

Samples for total metals analysis did not require filtration and were dispensed into bottles that were pre-charged by the laboratory with nitric acid for sample acidification. Samples were kept

[5] Electroneutrality is a principle in water chemistry that states the sum of positive (i.e., cation) and negative (i.e., anion) charges within the water must balance to zero. If the result reflects an appreciable positive or negative value, it may be interpreted that a component of the water chemistry was not analyzed.

cool during transport from the Mine to Eurofins Environment Testing Canada (Eurofins; Ottawa, Ontario).

3.3 Quality Assurance and Quality Control (QA/QC)

Four additional samples were collected for the purposes of QA/QC, which included two field duplicate samples collected at Station 159-4 and Station 159-6, as well as one travel blank and one field blank. Duplicate samples were collected as sample splits and followed the same handling practices and storage environment. Duplicates were submitted as ‘blind’ duplicates to the laboratory (i.e., duplicate labels did not indicate its complementary parent sample), and for the same analytical suite as its parent sample. The field blank and travel blank were analyzed for the NAN-1 and NAN-2 parameter suites.

The *2020 Quality Assurance/Quality Control Plan for Surface Water Monitoring Samples* (Stantec, March 27b, 2020) indicates one field duplicate and one field blank is to be submitted for each water quality monitoring event. The QA/QC samples collected in 2024 satisfied the QA/QC Plan requirements and aligned with BGC typical practices.

The 13 samples, comprising nine ‘discrete’ (i.e., Station-specific) samples and four QA/QC samples, were shipped in coolers with cold packs and a chain-of-custody to Eurofins in Ottawa, Ontario, Canada for analysis. Samples were received at Eurofins by laboratory staff on August 13, 2024, with a shipment receipt temperature of 12^{o}C.

4.0 RESULTS

Photographs of the water quality monitoring stations are provided in Appendix A. Laboratory certificates of analysis (COAs) for the 13 samples collected are provided in Appendix B. Time-series figures of select parameters from the six monitoring stations identified in Water Licence 1AR-NAN2030 are shown in Appendix C.

4.1 QA/QC Review

Upon receipt of the laboratory results, a data quality review of the samples was completed, using the Data Quality Objectives (DQOs) outlined in Table 4-1. These DQOs are based on guidance provided from the *British Columbia Environmental Laboratory Manual* (British Columbia Ministry of Environment and Climate Change Strategy [ENV], August 2023), Canadian Council of Ministers of the Environment (CCME) (2016a; 2016b) and typical QA/QC practices from analytical laboratories. The purpose of the QA/QC review is to provide confidence in field and laboratory methods and to determine if measured data from collected samples are reproducible and representative of site conditions. The goal of a DQO is to provide a threshold whereby data is scrutinized for robustness and sample representativeness.

Table 4-1 Data Quality Objectives (DQOs) for water quality samples.

QA/QC Review	Purpose	DQO
Field-measured pH versus laboratory-measured pH	Evaluation of the potential shift in chemical conditions with time (i.e., between sample collection and laboratory analysis), and assessing the field sampling and sensor calibration methods	Less than ±0.5 pH unit difference between field and laboratory measurements
Field-measured specific conductivity versus laboratory-measured specific conductivity		Less than 20% relative percent difference (RPD)[6] between field and laboratory measurements
Field duplicates	Assess robustness of field sampling procedures and environmental heterogeneity	Less than 40% RPD between parent and duplicate sample for parameters with concentrations greater than five times (5x) the detection limit For parameters where one or both of the parent and duplicate concentrations are within 5x the detection limit, the difference between the parent and duplicate concentration is considered acceptable if it is less than two times (2x) the detection limit
Field and travel blanks	Assess robustness of sample handling and transport procedures	Concentrations below 5x the parameter-specific detection limit
Charge balance error (CBE)	Evaluate electroneutrality or completeness of analyzed parameters	Within ±10%
Laboratory QC results	Assess internal laboratory practices	Meets laboratory-defined QC limits
Shipment temperature	Assess sample integrity	Sample temperature be ≤10°C, but not frozen, upon receipt at the laboratory
Hold time exceedances	Assess integrity of analytical results	Analyzed within laboratory-specified holding times

4.1.1 Field versus Laboratory pH

Field-measured pH values were compared to corresponding laboratory measurements (Figure 4-1). The DQO for comparison of field versus laboratory pH is less than ±0.5 pH unit difference. Results indicate that none of the nine discrete samples met the DQO. Five of the nine samples had a pH difference between 0.5 pH units to 1.0 pH units, and four of the nine samples had a pH difference greater than 1.0 pH units. All samples reported higher field-measured pH values in comparison to laboratory-measured values.

The pH sensor was calibrated on the day of sample collection using a three-point calibration (using pH 4.01, pH 7.01 and pH 10.01 buffer solutions). The temperature-compensated calibration slope for the YSI ProQuatro was 95.3%, which is within the generally accepted calibration range (i.e., a slope between 95% and 105%; Bier, December 2018).

[6] Relative Percent Difference (RPD) % = |Sample 1 – Sample 2|/Average (Sample 1, Sample 2) * 100.

It is difficult to accurately measure the pH of low conductivity water (e.g., < 50 uS/cm) due to the limited buffering capacity of low ionic strength solutions; use of a pH probe in low conductivity water can cause drift of the pH sensor. It is speculated that the low conductivity of some of the samples collected at the Mine (e.g., NML-23; field-measured specific conductivity = 39.4 uS/cm) may have impacted the field-measured pH values.

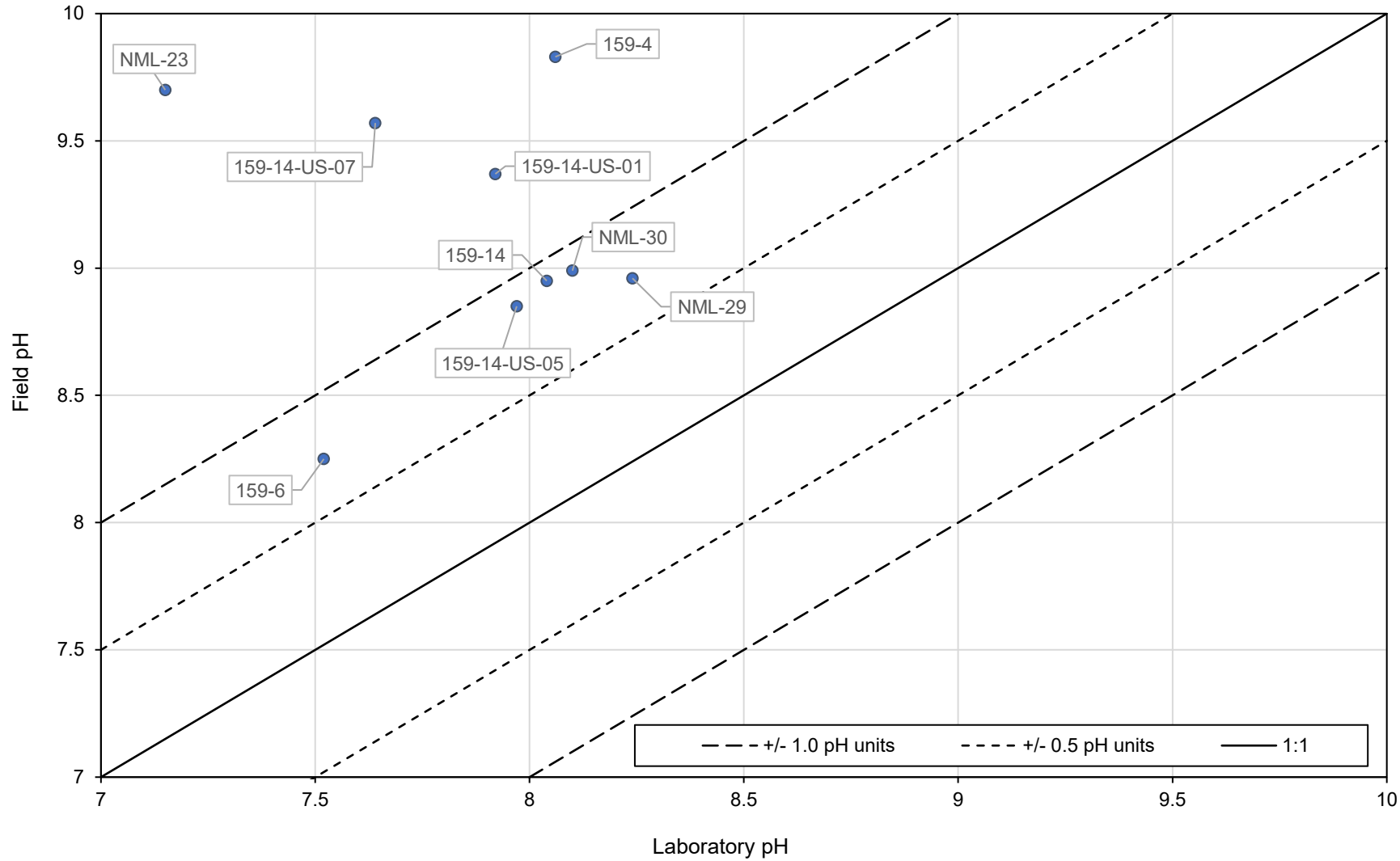
Additionally, the YSI instrument used to measure field parameters was rented from Hoskin Scientific, and a record of the historical use of the instrument was not available. Although the pH sensor was confirmed to have been calibrated by the rental company prior to its use by BGC, the absence of a service record suggests it is possible the age or condition of the sensor may have contributed to the observed issues in obtaining field-measured pH values meeting the pH DQO.

Simulation of theoretical field pH values in PHREEQC (Parkhurst & Appelo, 2013), which assumed equilibration with estimated atmospheric conditions, was conducted to assess if sensor drift or sensor condition may have contributed to the discrepancy between field-measured and laboratory-measured values. Modelled results are provided in Table 4-2, with theoretical pH values falling between field-measured and laboratory-measured values.

Table 4-2 Comparison of field-measured, laboratory-measured, and theoretical pH.

Sample ID	Field-Measured pH	Theoretical pH	Laboratory-Measured pH
NML-23	9.70	7.55	7.15
159-14-US-05	8.85	8.51	7.97
159-14	8.95	8.53	8.04
NML-29	8.96	8.73	8.24
159-4	9.83	8.45	8.06
159-6	8.25	8.16	7.52
NML-30	8.99	8.69	8.10
159-14-US-07	9.57	8.39	7.64
159-14-US-01	9.37	8.61	7.92

As none of the samples collected in 2024 met the DQO for field versus laboratory pH, and simulation of theoretical field pH values suggested that the field-measured pH may have been consistently high, it was interpreted that field pH measurements may not have been representative of environmental conditions at the time of sampling. As such, the laboratory-measured pH values were used for comparison to maximum authorized water quality limits at Station 159-4 and station-specific Action Levels (as applicable). It is recognized that this represents a departure from the approach defined in the Contingency Plan; however, as it was interpreted by BGC that the field-measured pH values were non-representative, it was concluded that they should not be used for comparison purposes. Recommendations to improve the reliability of field-measured pH values are included in Section 5.2.



NOTES:

1. This Figure should be read in conjunction with BGC's report titled 2024 Water Quality Report, and dated February 2025.

PREPARED BY: ADC	FIGURE TITLE: COMPARISON OF LABORATORY VERSUS FIELD PH		
CHECKED BY: SB	CLIENT: CANZINCO MINES LTD. NANISIVIK MINE		
APPROVED BY: ADC	SCALE: NTS	PROJECT NO: 0255036	FIGURE NO: 4-1

0 5 10 mm in ANSI A sized paper

BGC Engineering

4.1.2 Field versus Laboratory Specific Conductivity

Field-measured SC values were compared to corresponding laboratory measurements (Figure 4-2). The DQO for comparison of field versus laboratory specific conductivity values is less than 20% RPD. Results indicate that one of the nine discrete samples met the DQO. For the eight samples that did not meet the DQO, the calculated RPD values were generally between 20% and 38%. One of the eight samples that did not meet the DQO had a calculated RPD value of 57% (i.e., NML-23; field-measured specific conductivity = 39.4 µS/cm, laboratory-measured specific conductivity = 22 µS/cm). Eight of the nine samples reported higher laboratory-measured specific conductivity in comparison to field-measured values.

The SC sensor was calibrated on the day of sample collection using 1,413 µS/cm calibration solution.

The poor agreement between field-measured and laboratory-measured specific conductivity suggests that the calibration of the specific conductivity sensor may not have been adequate. The sample with the greatest calculated RPD between field-measured and laboratory-measured specific conductivity (i.e., NML-23) also had the lowest measured specific conductivity; use of a lower conductivity calibration solution, or SC sensor specific for low SC conditions, for future monitoring at the Mine may improve agreement between field-measured and laboratory-measured specific conductivity.

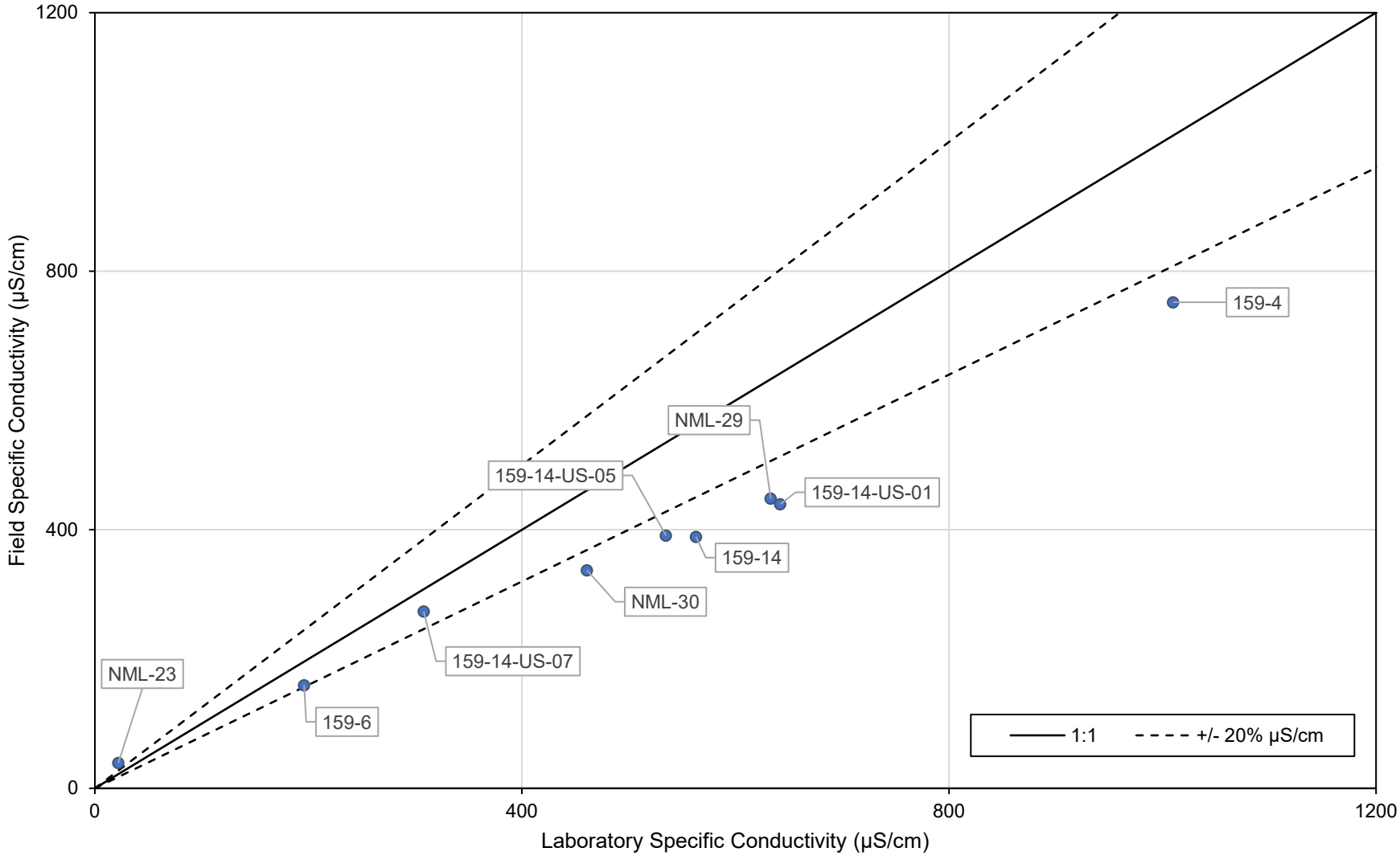
4.1.3 Duplicate Samples

Results from the duplicate samples collected at Stations 159-4 and 159-6 are provided in Table 4-3. All parameters met the relevant DQO. The assessment of field duplicates indicates good agreement between the parent and duplicate samples, suggesting that the field sampling procedures were robust, and did not introduce contamination.

4.1.4 Field and Travel Blanks

Field blank samples were collected using deionized water (provided by the laboratory) and were subjected to the same field sample collection and handling methods as discrete samples; their purpose is to detect contamination associated with sample collection and handling. Travel blank samples were laboratory-prepared samples that remain unopened throughout the shipment to the field, sampling, and return to the laboratory; their purpose is to detect contamination associated with sample transport and storage. The DQO for both field and travel blanks is the same, whereby all measured parameter concentrations are less than or equal to 5x the parameter-specific detection limit.

The field and travel blank results are provided in Table 4-4. All parameters were below the parameter-specific detection limits, thereby meeting the DQO. These results suggest there was no introduction of contamination during sample collection, handling, and transport.



NOTES:

1. This Figure should be read in conjunction with BGC's report titled "2024 Water Quality Report", and dated February 2025.

PREPARED BY: ADC	FIGURE TITLE: COMPARISON OF LABORATORY VERSUS FIELD SPECIFIC CONDUCTIVITY		
CHECKED BY: SB	CLIENT: CANZINCO MINES LTD. NANISIVIK MINE		
APPROVED BY: ADC	SCALE: NTS	PROJECT NO: 0255036	FIGURE NO: 4-2

0 5 10 mm in ANSI A sized paper

BGC Engineering

Table 4-3 Field duplicate QA/QC assessment.

Parameter	Unit	Detection Limit[1]	159-6				159-4			
			Parent Sample	Duplicate Sample	RPD (%)[2,3,4]	Difference[2,3,4]	Parent Sample	Duplicate Sample	RPD (%)[2,3,4]	Difference[2,3,4]
pH	-	1	7.52	7.55	-	0.03	8.06	8.03	-	0.03
Specific Conductivity	µS/cm	5	196	198	1.0	2.0	1010	1020	1.0	10.0
Total Suspended Solids (TSS)	mg/L	2	<2	<2	-	-	<2	<2	-	-
Bicarbonate Alkalinity (as CaCO3)	mg/L	1	39	39	0	0	91	89	2.2	2.0
Total Alkalinity (as CaCO3)	mg/L	5	39	39	0	0	91	89	2.2	2.0
Hardness (as CaCO3)	mg/L	1	115	115	0	0	603	596	1.2	7.0
Chloride (Cl)	mg/L	1	2	2	0	0	8	8	0	0
Sulphate (SO4)	mg/L	1	69	69	0	0	480	498	3.7	18.0
Ammonia [as N]	mg/L	0.02	<0.020	<0.020	-	-	<0.020	<0.020	-	-
Nitrate + Nitrite [as N]	mg/L	0.1	<0.10	<0.10	-	-	<0.10	<0.10	-	-
Total Aluminum (Al)	mg/L	0.01	0.03	0.03	0	0	0.02	0.02	0	0
Total Antimony (Sb)	mg/L	0.0005	<0.0005	<0.0005	-	-	<0.0005	<0.0005	-	-
Total Arsenic (As)	mg/L	0.001	<0.001	<0.001	-	-	<0.001	<0.001	-	-
Total Barium (Ba)	mg/L	0.01	0.02	0.02	0	0	0.03	0.03	0	0
Total Beryllium (Be)	mg/L	0.0005	<0.0005	<0.0005	-	-	<0.0005	<0.0005	-	-
Total Boron (B)	mg/L	0.01	0.06	0.06	0	0	0.56	0.56	0	0
Total Cadmium (Cd)	mg/L	0.0001	0.0003	0.0003	0	0	0.0001	0.0001	0	0
Total Calcium (Ca)	mg/L	1	23	23	0	0	131	130	0.8	1.0
Total Chromium (Cr)	mg/L	0.001	<0.001	<0.001	-	-	<0.001	<0.001	-	-
Total Cobalt (Co)	mg/L	0.0002	<0.0002	<0.0002	-	-	<0.0002	<0.0002	-	-
Total Copper (Cu)	mg/L	0.001	<0.001	<0.001	-	-	<0.001	<0.001	-	-
Total Iron (Fe)	mg/L	0.03	<0.03	<0.03	-	-	0.03	0.07	80.0	0.04
Total Lead (Pb)	mg/L	0.001	<0.001	<0.001	-	-	<0.001	<0.001	-	-
Total Magnesium (Mg)	mg/L	1	14	14	0	0	67	66	1.5	1.0
Total Manganese (Mn)	mg/L	0.01	<0.01	<0.01	-	-	<0.01	<0.01	-	-
Total Mercury (Hg)	mg/L	0.0001	<0.0001	<0.0001	-	-	<0.0001	<0.0001	-	-
Total Molybdenum (Mo)	mg/L	0.005	<0.005	<0.005	-	-	<0.005	<0.005	-	-
Total Nickel (Ni)	mg/L	0.005	<0.005	<0.005	-	-	<0.005	<0.005	-	-
Total Potassium (K)	mg/L	1	<1	<1	-	-	6	6	0	0
Total Selenium (Se)	mg/L	0.001	<0.001	<0.001	-	-	<0.001	<0.001	-	-
Total Silicon (Si)	mg/L	0.1	0.6	0.6	0	0	0.9	0.9	0	0
Total Silver (Ag)	mg/L	0.0001	<0.0001	<0.0001	-	-	<0.0001	<0.0001	-	-

Parameter	Unit	Detection Limit[1]	159-6				159-4			
			Parent Sample	Duplicate Sample	RPD (%)[2,3,4]	Difference[2,3,4]	Parent Sample	Duplicate Sample	RPD (%)[2,3,4]	Difference[2,3,4]
Total Sodium (Na)	mg/L	1	<1	<1	-	-	3	3	0	0
Total Strontium (Sr)	mg/L	0.001	0.062	0.062	0	0	0.546	0.552	1.1	0.01
Total Thallium (Tl)	mg/L	0.0001	<0.0001	<0.0001	-	-	<0.0001	<0.0001	-	-
Total Titanium (Ti)	mg/L	0.01	<0.01	<0.01	-	-	<0.01	<0.01	-	-
Total Vanadium (V)	mg/L	0.001	<0.001	<0.001	-	-	<0.001	<0.001	-	-
Total Zinc (Zn)	mg/L	0.01	0.11	0.11	0	0	0.04	0.04	0	0
F2 (C10-C16)	ug/L	20	<20	<20	-	-	N.A.	N.A.	N.A.	N.A.
F3 (C16-C34)	ug/L	50	<50	<50	-	-	N.A.	N.A.	N.A.	N.A.
F4 (C34-C50)	ug/L	50	<50	<50	-	-	N.A.	N.A.	N.A.	N.A.

Notes:

1. Detection limits are provided by the laboratory and can be referenced in the CoAs provided as Appendix B.
2. RPD = relative percent difference; refer to Table 4-1 for equation. Difference = absolute difference between parent and duplicate sample.
3. "-" = RPD and Difference not calculated as one or both duplicate and parent samples contain values less than the detection limit; N.A. = not analyzed.
4. Shaded cells indicate calculated value to which the DQO should be applied; refer to Table 4-1 for more details.

Table 4-4 Field and travel blank QA/QC assessment.

Parameter	Unit	Detection Limit[1]	Field Blank	Travel Blank
pH	-	1	5.71	5.89
Specific Conductivity	µS/cm	5	<5	<5
Total Suspended Solids (TSS)	mg/L	2	<2	<2
Bicarbonate Alkalinity (as CaCO3)	mg/L	1	<1	<1
Total Alkalinity (as CaCO3)	mg/L	5	<5	<5
Hardness (as CaCO3)	mg/L	1	<1	<1
Chloride (Cl)	mg/L	1	<1	<1
Sulphate (SO4)	mg/L	1	<1	<1
Ammonia [as N]	mg/L	0.02	<0.020	<0.020
Nitrate + Nitrite [as N]	mg/L	0.1	<0.10	<0.10
Total Aluminum (Al)	mg/L	0.01	<0.01	<0.01
Total Antimony (Sb)	mg/L	0.0005	<0.0005	<0.0005
Total Arsenic (As)	mg/L	0.001	<0.001	<0.001
Total Barium (Ba)	mg/L	0.01	<0.01	<0.01
Total Beryllium (Be)	mg/L	0.0005	<0.0005	<0.0005
Total Boron (B)	mg/L	0.01	<0.01	<0.01
Total Cadmium (Cd)	mg/L	0.0001	<0.0001	<0.0001
Total Calcium (Ca)	mg/L	1	<1	<1
Total Chromium (Cr)	mg/L	0.001	<0.001	<0.001
Total Cobalt (Co)	mg/L	0.0002	<0.0002	<0.0002
Total Copper (Cu)	mg/L	0.001	<0.001	0.003
Total Iron (Fe)	mg/L	0.03	<0.03	<0.03
Total Lead (Pb)	mg/L	0.001	<0.001	<0.001
Total Magnesium (Mg)	mg/L	1	<1	<1
Total Manganese (Mn)	mg/L	0.01	<0.01	<0.01
Total Mercury (Hg)	mg/L	0.0001	<0.0001	<0.0001
Total Molybdenum (Mo)	mg/L	0.005	<0.005	<0.005
Total Nickel (Ni)	mg/L	0.005	<0.005	<0.005
Total Potassium (K)	mg/L	1	<1	<1
Total Selenium (Se)	mg/L	0.001	<0.001	<0.001
Total Silicon (Si)	mg/L	0.1	<0.1	0.2
Total Silver (Ag)	mg/L	0.0001	<0.0001	<0.0001
Total Sodium (Na)	mg/L	1	<1	<1
Total Strontium (Sr)	mg/L	0.001	<0.001	<0.001
Total Thallium (Tl)	mg/L	0.0001	<0.0001	<0.0001
Total Titanium (Ti)	mg/L	0.01	<0.01	<0.01
Total Vanadium (V)	mg/L	0.001	<0.001	<0.001
Total Zinc (Zn)	mg/L	0.01	<0.01	<0.01
F2 (C10-C16)	ug/L	20	<20	<20
F3 (C16-C34)	ug/L	50	<50	<50
F4 (C34-C50)	ug/L	50	<50	<50

Note:

1. Detection limits are provided by the laboratory and can be referenced in Appendix B.

4.1.5 Charge Balance Error

The calculation of a sample's CBE[7] is an assessment of electrical neutrality and the completeness of a sample's chemical results. The CBE is calculated based on the soluble major cation and anion constituents present in solution. The CBE for all samples was calculated using the hydrogeochemical speciation software PHREEQC (Parkhurst & Appelo, 2013). Water chemistry from all sampled stations had CBEs within the DQO of ±10%.

4.1.6 Shipment Temperature

The Province of BC (ENV, August 2023) and CCME (2011) recommends the temperature of water samples is kept less than 10ºC during transit to the laboratory to maintain sample integrity following sample collection. Specifically, warmer temperatures are of concern with concentration of nitrogen-species. The DQO for temperature is such that sample temperatures be ≤10°C, but not frozen, upon receipt at the laboratory. The sample shipment was received by the laboratory at a temperature of 12°C, which is higher than the recommended temperature range defined by the DQO.

A review of the nitrogen-species (i.e., ammonia [as N], and nitrite + nitrate [as N]) - concentrations indicated that for seven of the nine (discrete) samples, nitrogen-species concentrations were below detection limits. For the two samples with detectable nitrite + nitrate [as N] (i.e., 159-14-US-01 and 159-14-US-07), concentrations were similar to those measured in 2023.

These results were not suggestive of integrity impacts to the samples due to warmer shipment conditions.

4.1.7 Hold Time Exceedances

The analysis of ammonia [as N] for all samples was performed one day past the accepted hold time of seven days. Ammonia [as N] concentrations were all below the detection limit (i.e., < 0.020 mg/L) in 2024, which is comparable to concentrations measured in August at these nine stations since 2018. Therefore, the time delay of one day was not interpreted to have influenced ammonia [as N] concentrations in 2024.

4.1.8 QA/QC Summary

Overall, the QA/QC procedures implemented by BGC as part of the 2024 water quality monitoring program generally met the various DQOs to support the accuracy of sampling and laboratory methods used as part of this monitoring program. The exception to this is for field-measured pH and SC:

- Field pH measurements may not have been representative of environmental conditions at the time of sampling, potentially due to the low specific conductivity of some of the samples and/or the age or service condition of the pH probe on the rented YSI

[7] $CBE = \frac{\sum cations - |\sum anions|}{\sum cations + |\sum anions|} \times 100$

instrument. The laboratory-measured pH values are used to screen sample results against maximum authorized water quality limits and station-specific Action Levels (where applicable).

- Poor agreement between field-measured and laboratory-measured specific conductivity suggests that the calibration of the specific conductivity sensor may not have been adequate.

4.2 Twin Lakes Creek Watershed

4.2.1 Final Discharge Point (Station 159-4)

Water quality data collected at Station 159-4 were compared to the maximum authorized water quality limits for discharge from the WTDA, as provided in Part D, Items 2 and 3 of Water Licence 1AR-NAN2030. The water quality data for the parameters specified in Water Licence 1AR-NAN2030 at Station 159-4 are presented in Table 4-5, with time series figures of the station's historical dataset provided in Appendix C (Figure C-1).

Measured concentrations of the regulated parameters (i.e., arsenic, cadmium, copper, lead, nickel, zinc, and TSS) were below the maximum authorized concentrations. Laboratory-measured pH was within the authorized range of pH 6.0 to pH 9.5. As no hydrocarbon sheen was observed during the 2024 sampling program at Station 159-4, sampled water was not submitted for the NAN-2 parameter suite per Water Licence 1AR-NAN2030.

Sulphate is not included in the parameter list for Station 159-4 but is typically reviewed to assess the presence of acid rock drainage (ARD) conditions. Sulphate concentration at Station 159-4 was 480 mg/L and within the historical post-closure range observed at this station (i.e., 107 mg/L to 1,090 mg/L (2009 to present day); Appendix C, Figure C-1). Additionally, concentrations of sulphate, as well as other metals (e.g., Cu, Pb, Zn), presented a visually interpreted decreasing trend with time from operations to post-closure periods, suggestive of improving conditions.

Table 4-5 Comparison of August 7, 2024 chemistry at Station 159-4 to maximum authorized concentrations, as provided in Water Licence 1AR-NAN2030.

Parameter	Units	Station 159-4	
		Maximum Authorized Concentration[1]	Result
Total Arsenic	mg/L	0.25	<0.001
Total Cadmium	mg/L	0.005	0.0001
Total Copper	mg/L	0.10	<0.001
Total Lead	mg/L	0.10	<0.001
Total Nickel	mg/L	0.50	<0.005
Total Zinc	mg/L	0.25	0.04
Total Suspended Solids (TSS)	mg/L	15.0	<2
pH[2]	pH units	6.0 – 9.5	8.06
Hydrocarbons (Oil and grease)[3]	mg/L	15.0	N.A.[4]

Notes:

Bolded text reflects exceedance of maximum authorized concentration criterion.
N.A. = Not Analyzed.

1. From Part D, Items 2 and 3 of Water Licence 1AR-NAN2030.
2. Laboratory-measured pH value presented due to concerns with field pH measurements (as described in Section 4.1.1).
3. Refer to Section 3.2 for description of parameters analyzed as part of the hydrocarbon (oil and grease) analysis.
4. No visible hydrocarbon sheen observed.

4.2.2 Other Stations

In addition to Station 159-4, two other stations present in the Twin Lakes Creek watershed were sampled in 2024 (i.e., Stations 159-6 and NML-23) in accordance with Water Licence 1AR-NAN2030. Station 159-6 is located along Twin Lakes Creek, prior to discharging into Strathcona Sound. Station NML-23 is located in the upper reach of the Twin Lakes Creek watershed near the outlet of East Twin Lake, which is also upstream of the confluence of Twin Lakes Creek and the outflow from WTDA (Drawing 01). Water quality data for these two stations are presented in Table 4-6 along with the station-specific Action Levels. Time-series figures of these stations' historical data are provided in Appendix C (Figure C-2 and Figure C-3).

There were no exceedances of the station-specific Action Levels at either Station 159-6 or Station NML-23 as part of the 2024 monitoring program. No visible hydrocarbon sheen was observed at these monitoring stations in the Twin Lakes Creek watershed; however, hydrocarbon analyses (i.e., NAN-2 parameter suite) were performed at Station 159-6 (in accordance with Table 3 of Water Licence 1AR-NAN2030) and all reported concentrations were below laboratory detection limits.

Table 4-6 Select data from the Twin Lakes Creek watershed, Station 159-6 and Station NML-23, collected August 7, 2024.

Parameter	Units	Station 159-6		Station NML-23	
		Action Level[1]	Result	Action Level[1]	Result
Total Cadmium	mg/L	0.0297	0.0003	0.0135	<0.0001
Total Lead	mg/L	0.0893	<0.001	0.0553	<0.001
Total Zinc	mg/L	8.9	0.11	0.23	<0.01
Total Sulphate	mg/L	614	69	118	7
Total Suspended Solids (TSS)	mg/L	140	<2	20	<2
pH[2]	pH units	6.0 – 9.5	7.52	6.0 – 9.5	7.15
Hydrocarbons (Oil and grease)[3]	mg/L	15.0	b.d.[4,5]	15.0	N.A.[4]

Notes:

Bolded text reflects exceedance of station-specific Action Levels.
'b.d.' indicates that the result was below the laboratory detection limit.
N.A. = Not Analyzed.

1. Provided in Stantec (March 27a, 2020); refer to Section 1.2.
2. Laboratory-measured pH value presented due to concerns with field pH measurements (as described in Section 4.1.1).
3. Refer to Section 3.2 for description of parameters analyzed as part of the hydrocarbon (oil and grease) analysis.
4. No visible hydrocarbon sheen observed.
5. Results are below analytical detection limits for petroleum hydrocarbon F2, F3, and F4, which are 0.020 mg/L, 0.050 mg/L, and 0.050 mg/L, respectively, and below the 15.0 mg/L Action Level.

4.3 Chris Creek Watershed

One station in the Chris Creek watershed, Station 159-14, is identified in Water Licence 1AR-NAN2030 for post-closure monitoring. Additionally, in 2024, samples were also collected at three voluntary stations in this watershed as recommended in BGC (November 27, 2023), namely: Stations 159-14-US-01, 159-14-US-05, and 159-14-US-07. Results from the sample collected at Station 159-14 are discussed in Section 4.3.1, with results from the voluntary monitoring stations discussed in Section 4.3.2.

4.3.1 Station 159-14

Station 159-14 is located in Chris Creek approximately 1.6 km upstream of its discharge to Strathcona Sound and downstream of the historic mine workings (i.e., K-baseline, East Trench, and East Open Pit; Drawing 01). Water quality data for Station 159-14 are presented in Table 4-7 along with the comparison to station-specific Action Levels, with time-series figures of this station's historical dataset provided in Appendix C (Figure C-4).

Results shown in Table 4-7 indicate there were no exceedances of the station-specific Action Levels at Station 159-14 as part of the 2024 monitoring program. No visible hydrocarbon sheen was observed at Station 159-14, such that no sample was collected for hydrocarbon analysis.

Table 4-7 Select data from the Chris Creek watershed, Station 159-14, collected August 7, 2024.

Parameter	Units	Station 159-14	
		Action Level[1]	Result
Total Cadmium	mg/L	0.0010	<0.0001
Total Lead	mg/L	0.0115	<0.001
Total Zinc	mg/L	0.68	0.16
Total Sulphate	mg/L	960	197
TSS	mg/L	158	<2
pH[2]	pH units	6.0 – 9.5	8.04
Hydrocarbons (Oil and grease)[3]	mg/L	15.0	N.A.[4]

Notes:

Bolded text reflects exceedance of station-specific Action Levels.
N.A. = Not Analyzed.

1. Provided in Stantec (March 27a, 2020); refer to Section 1.2.
2. Laboratory-measured pH value presented due to concerns with field pH measurements (as described in Section 4.1.1).
3. Refer to Section 3.2 for description of parameters analyzed as part of the hydrocarbon (oil and grease) analysis.
4. No visible hydrocarbon sheen observed; therefore, testing for hydrocarbons (i.e., NAN-2 parameter suite) was not required at Station 159-14 in 2024.

4.3.2 Voluntary Stations

In accordance with the Mine's Contingency Plan, a water quality site investigation was carried out in 2023 following a zinc Action Level exceedance at Station 159-14 in 2022 during annual monitoring of the Mine (BGC, November 27, 2023). As discussed in Section 2.2, the results of the 2023 water quality investigation suggested that weathering of zinc-bearing sulphides present within the Chris Creek watershed, mobilization of zinc to surface water, subsequent zinc attenuation via precipitation of zinc-bearing carbonate minerals along ephemeral drainages, and remobilization of zinc via flushing of carbonate precipitates following rain events reflects the conceptualized source-pathway contributing to observed zinc concentrations at Station 159-14.

BGC recommended two additional voluntary monitoring stations along Chris Creek (i.e., Stations 159-14-US-05 and 159-14-US-07) be included as monitoring stations for the remainder of the post-closure monitoring period and one additional voluntary monitoring station (i.e., Station 159-14-US-01) be included as part of post-closure monitoring in 2024 (only). Monitoring at these voluntary stations would provide data to support or refute this conceptualization, and help interpret the observed water quality at Station 159-14. BGC also recommended that any observed precipitates like those observed in 2023 be sampled (BGC, November 27, 2023); however, no precipitates were observed during the field inspection in 2024.

Selected results from water quality samples collected at these voluntary stations are presented in Table 4-8 for the parameters included in Water Licence 1AR-NAN2030 for Station 159-14. There are no station-specific Action Levels identified for the voluntary stations and comparison to those criteria defined for Station 159-14 is for screening purposes only.

Table 4-8 Select data from the Chris Creek watershed, voluntary stations, collected August 7, 2024.

Parameter	Units	Action Levels (Station 159-14)	159-14-US-07	159-14-US-05	159-14-US-01
Relative distance upstream of Station 159-14			*1.10 km*	*0.60 km*	*0.14 km*
Total Cadmium	mg/L	0.0010	0.0006	0.0002	0.0003
Total Lead	mg/L	0.0115	<0.001	<0.001	<0.001
Total Zinc	mg/L	0.68	**1.56**	0.34	**1.35**
Total Sulphate	mg/L	960	141	190	241
TSS	mg/L	158	8	<2	<2
pH[1]	pH units	6.0 – 9.5	7.64	7.97	7.92

Notes:

N.A. = Not Analyzed.
Bolded values are greater than Action Levels at Station 159-14; however, comparison to Action Levels is for screening purposes only and not required by the Water Licence 1AR-NAN2030.

1. Laboratory-measured pH value presented due to concerns with field pH measurements (as described in Section 4.1.1).

Sample location 159-14-US-07 is located approximately 1.1 km upstream of Station 159-14 in the headwater region of the Chris Creek watershed (Drawing 01). At this location, Chris Creek flows via a drainage channel cut into an oxidized outcrop (Appendix A). The total zinc measured at this location was 1.56 mg/L in 2024, which was the highest zinc value measured in 2024, and represents a concentration greater than 2x the Station 159-14 zinc Action Level (of 0.68 mg/L).

Sample location 159-14-US-05 is situated in the main Chris Creek channel, approximately 0.6 km upstream of Station 159-14. The total zinc measured at this location was 0.34 mg/L, which reflected an approximate 5x decrease in total zinc concentration in comparison to Station 159-14-US-07. A similar magnitude of decrease between these two stations was observed in 2023 (i.e., 3.54 mg/L [159-14-US-07] versus 0.70 mg/L [159-14-US-05]; BGC, November 27, 2023), which is interpreted to be due to dilution from tributaries discharging to the main stem of Chris Creek.

These results support the findings of the 2023 water quality investigation (BGC, November 27, 2023), which suggested sulphide mineralization in the headwater region is a loading source of zinc, amongst other parameters, to Chris Cheek. The previous interpretation of a separate loading source downstream of the headwater region also remains valid.

Sample location 159-14-US-01 is located approximately 140 m upstream from Station 159-14 along a tributary east of, and discharging into, Chris Creek (Drawing 01). In 2023, white precipitates were observed on an outcrop upstream of 159-14-US-01, which were interpreted to reflect zinc-bearing carbonate mineral phases based on geochemical modelling of the water chemistry collected at this station (BGC, November 27, 2023). In 2024, no white precipitates were observed and the total zinc measured at 159-14-US-01 was 1.35 mg/L, or less than half of the measured concentration at the same station in 2023 (i.e., 3.66 mg/L).

Evaluation of the relationship between precipitation and zinc concentration at Station 159-14 was completed as part of the 2023 investigation. A summary of the evaluation of historical precipitation data follows, as documented in BGC (November 27, 2023):

- Historical precipitation data were estimated using RDPA (described in Section 2.3)
- A moderate correlation (R^2 = 0.60) was found between summed July/August precipitation and zinc concentrations at Station 159-14, such that zinc concentrations at Station 159-14 are more likely to be elevated in dry years and not elevated in wet years
- It was postulated that prolonged dry periods followed by sudden rainfall events may result in precipitation of zinc-bearing carbonate minerals and subsequent mineral dissolution and remobilization of zinc.

The 2024 results (i.e., total zinc concentration at Station 159-14 and July/August precipitation amounts estimated by the RDPA (ECCC, 2024)) were compared to the relationship presented in BGC (November 27, 2023). Results were interpreted to be in alignment with the previously-presented relationship, as shown in Figure 4-3. That is, zinc concentration at Station 159-14 was not elevated, and estimated precipitation amounts suggest July/August 2024 was wetter than average (Section 2.3). The correlation between summed July/August precipitation and zinc concentrations at Station 159-14 was updated to include 2024 results; the inclusion of the 2024 results did not change the R^2 value of the correlation (i.e., R^2 = 0.60).

These results support the findings of the 2023 water quality investigation; the absence of white precipitates, wetter-than-average July and August, and lack of elevated total zinc at Station 159-14 suggest that the postulated zinc-carbonate precipitation/remobilization mechanism may not have been a meaningfully contributing pathway/source of zinc in 2024.

4.4 Landfill Watershed

The former Landfill is located west of the Mine and has been reclaimed with a thermal cover system. Seepage and runoff (i.e., thawing porewaters from the active layer and/or snowmelt/precipitation) from the Landfill area are interpreted to migrate radially and northward and eventually report to Station NML-30. Runoff from areas upslope of the Landfill is generally directed northward and diverted around the Landfill by a water diversion berm (located to the south of the Landfill), and eventually reports to Station NML-30. Stations NML-29 and NML-30 are located along the east- and west -flowing drainages, respectively, located to the north of the Landfill and drainages are divided by a roadway (Drawing 01). The roadway bisecting the NML-29 and NML-30 drainage is interpreted to act as a sub-watershed divide (i.e., hydraulic barrier), which suggests that the water chemistries observed at the Stations NML-29 and NML-30 are not directly related (BGC, March 18, 2022). Flow has only occasionally been observed at Station NML-29, but flow is regularly observed at Station NML-30. In 2024, water was observed to be flowing at both Station NML-29 and Station NML-30 (Appendix A).

Water quality data for Stations NML-29 and NML-30 are presented in Table 4-9 along with comparison to station-specific Action Levels, with the complete data provided in Appendix B. Time-series figures of these datasets are provided in Appendix C (Figure C-5 and Figure C-6).

Results shown in Table 4-9 indicate there were no exceedances of the station-specific Action Levels at Station NML-29 or NML-30 as part of the 2024 monitoring program. No visible hydrocarbon sheen was observed at these monitoring stations in the Landfill watershed. Hydrocarbon analyses (i.e., NAN-2 parameter suite) of the samples collected at Station NML-29 and Station NML-30 reported concentrations that were below the laboratory detection limit.

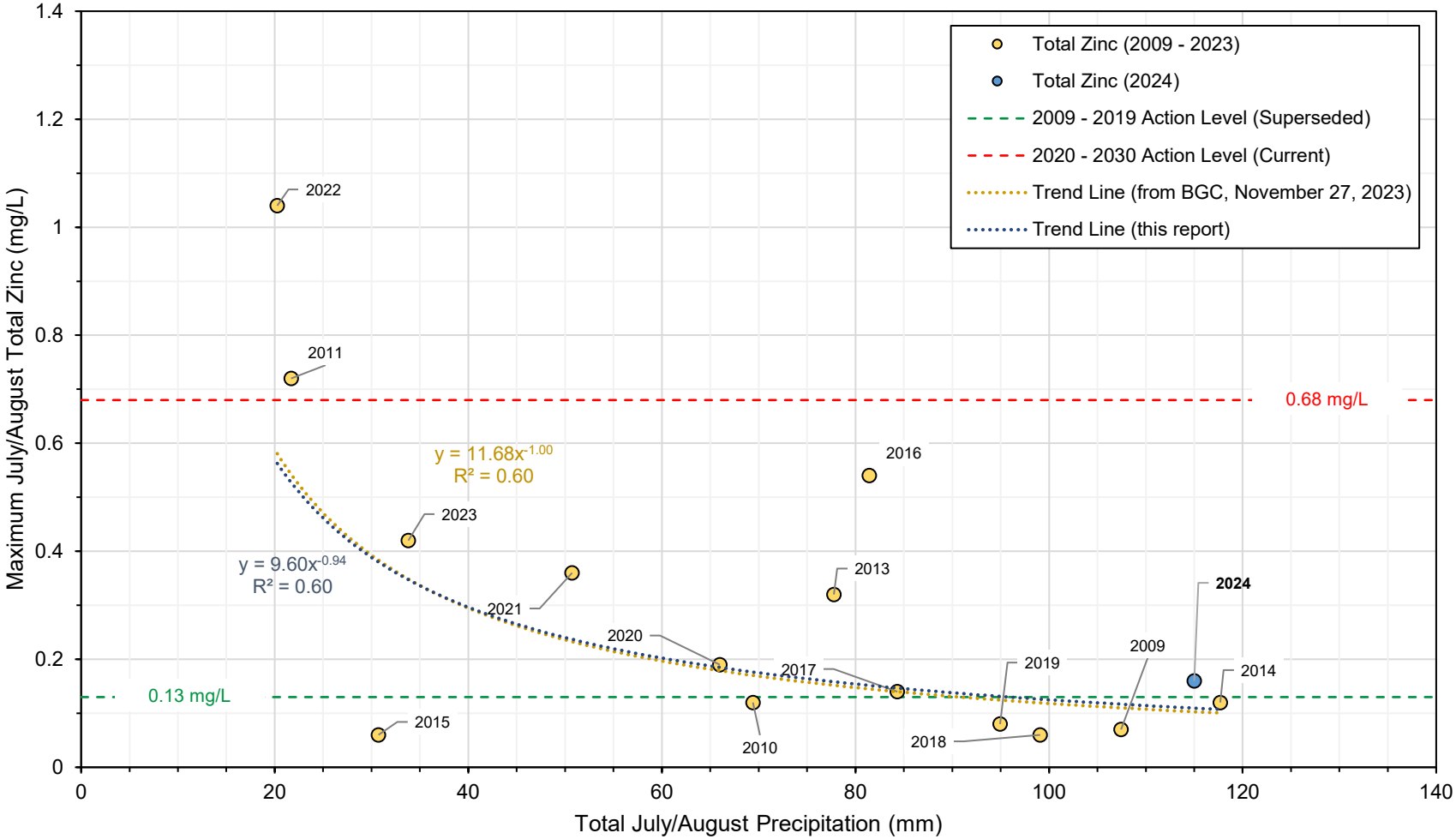
Table 4-9 Select data from the Landfill watershed, Station NML-29 and Station NML-30, collected August 7, 2024.

Parameter	Units	Station NML-29		Station NML-30	
		Action Level[1]	Result	Action Level[1]	Result
Total Cadmium	mg/L	0.0017	<0.0001	0.0017	<0.0001
Total Lead	mg/L	0.0062	<0.001	0.0062	<0.001
Total Zinc	mg/L	0.09	<0.01	0.09	<0.01
Total Sulphate	mg/L	340	187	340	98
TSS	mg/L	113	<2	113	<2
pH[2]	pH units	6.0 – 9.5	8.24	6.0 – 9.5	8.1
Hydrocarbons (Oil and grease)[3]	mg/L	15	b.d.[4,5]	15	b.d.[4,5]

Notes:

Bolded text reflects exceedance of station-specific Action Levels.
'b.d.' indicates that the result was below the laboratory detection limit.

1. Provided in Stantec (March 27a, 2020); refer to Section 1.2.
2. Laboratory-measured pH value presented due to concerns with field pH measurements (as described in Section 4.1.1).
3. Refer to Section 3.2 for description of parameters analyzed as part of the hydrocarbon (oil and grease) analysis.
4. No visible hydrocarbon sheen observed.
5. Results are below analytical detection limits for petroleum hydrocarbon F2, F3, and F4, which are 0.020 mg/L, 0.050 mg/L and 0.050 mg/L, respectively, and below the 15.0 mg/L Action Level.



NOTES:

1. This Figure should be read in conjunction with BGC's report titled "2024 Water Quality Report", and dated February 2025.
2. Figure modified from *2023 Nanisivik Water Quality Site Investigation* (BGC, November 27, 2023).
3. The 2020 – 2030 Action Level is described in Water Licence 1AR-NAN2030.
4. The 2009 – 2019 Action Level is described in Water Licences 1AR-NAN0914 and 1AR-NAN1419.

PREPARED BY: ADC	FIGURE TITLE: MAXIMUM JULY/AUGUST TOTAL ZINC CONCENTRATIONS AT STATION 159-14 VERSUS TOTAL JULY/AUGUST PRECIPITATION, 2009-2024		
CHECKED BY: SB	CLIENT: CANZINCO MINES LTD. NANISIVIK MINE		
APPROVED BY: ADC	SCALE: NTS	PROJECT NO: 0255036	FIGURE NO: 4-3

0 5 10 mm in ANSI A sized paper

BGC Engineering

5.0 SUMMARY AND RECOMMENDATIONS

5.1 Summary

Water quality monitoring in accordance with Water Licence 1AR-NAN2030 for the decommissioned Nanisivik Mine was conducted in a single, annual event on August 7, 2024. Nine monitoring stations were sampled in 2024, including the six monitoring stations outlined in Water Licence 1AR-NAN2030 (i.e., Stations 159-4, 159-6, 159-14, NML-23, NML-29, and NML-30), and three voluntary stations as recommended in BGC (November 27, 2023) (i.e., Stations 159-14-US-01, 159-14-US-05, and 159-14-US-07). Four samples were collected for QA/QC purposes (i.e., two field duplicates, one field blank, and one travel blank), meeting the QA/QC requirements outlined in the QA/QC Plan (Stantec, March 27b, 2020) for the Mine.

Sample collection and analysis methods provided results that are considered representative of the site conditions at the time of sampling; some challenges with obtaining field measurements of pH and SC were encountered. Specifically, the low SC of some samples may have contributed to difficulties in measuring field pH. Similarly, the low SC of some samples meant calibration of the SC sensor with standard calibration solutions may not provide accurate results. Therefore, use of field pH and SC sensors specific to low SC conditions may improve field measurements for future sampling events.

A comparison of the 2024 results showed no exceedances of maximum authorized concentrations at Station 159-4 (i.e., the final discharge point of the WTDA) and no exceedances of station-specific Action Levels at Stations 159-6, 159-14, NML-23, NML-29, or NML-30.

Assessment of zinc concentrations in samples collected at stations in the Chris Creek watershed in 2024 provides support for the conceptualization of zinc sources and pathways described in BGC (March 27, 2023). In particular:

- The headwater region of Chris Creek is likely mineralized and a loading source of zinc to Chris Creek
- Flushing of zinc-bearing carbonate precipitates may be a source of zinc loading to Chris Creek, particularly in dry years.

5.2 Recommendations

Water quality monitoring is not required in 2025, per Schedule H, Table 1 of Water Licence 1AR-NAN2030. The following outlines recommendations for 2026 water quality monitoring at the Mine:

1. The results from 2024 support the previous recommendation (BGC, November 27, 2023), to include two additional voluntary monitoring stations along Chris Creek (i.e., Stations 159-14-US-05 and 159-14-US-07) for the remainder of the post-closure monitoring period.
2. BGC recommends Station 159-14-US-01 also be included as a voluntary monitoring station for the remainder of the post-closure monitoring period to improve the dataset with which to support an interpretation of naturally elevated zinc conditions in the Chris

Creek watershed and potentially offset the need for additional site investigations following future zinc Action Level exceedance(s), should they occur.

3. As part of water quality monitoring events, review precipitation data (i.e., the RDPA data product) for the Mine to continue to assess the hypothesized relationship between zinc loading and precipitation.
4. For future monitoring events, the use of field pH and SC sensors specific to low SC conditions is recommended to help improve confidence in the representativeness of field-measured parameters. In addition, the specific conductivity sensor should be calibrated with a lower conductivity solution, based on the range of specific conductivity values historically observed at the Mine.

6.0 CLOSURE

We trust the above satisfies your requirements. Should you have any questions or comments, please do not hesitate to contact us.

Yours sincerely,

BGC Engineering Inc.
per:

REGISTERED PROFESSIONAL GEOSCIENTIST
Feb 13, 2025
A.D. CHONG
LICENSEE
NT/NU

Andrea Chong, M.Sc., P.Geo.
Senior Hydrogeologist

Reviewed by:

Sharon Blackmore, Ph.D., P.Geo.
Principal Hydrogeochemist

PERMIT TO PRACTICE
BGC ENGINEERING INC.
Signature
Date Feb 13/2025
PERMIT NUMBER: P285
NT/NU Association of Professional Engineers and Geoscientists

SG/SB/gc/th

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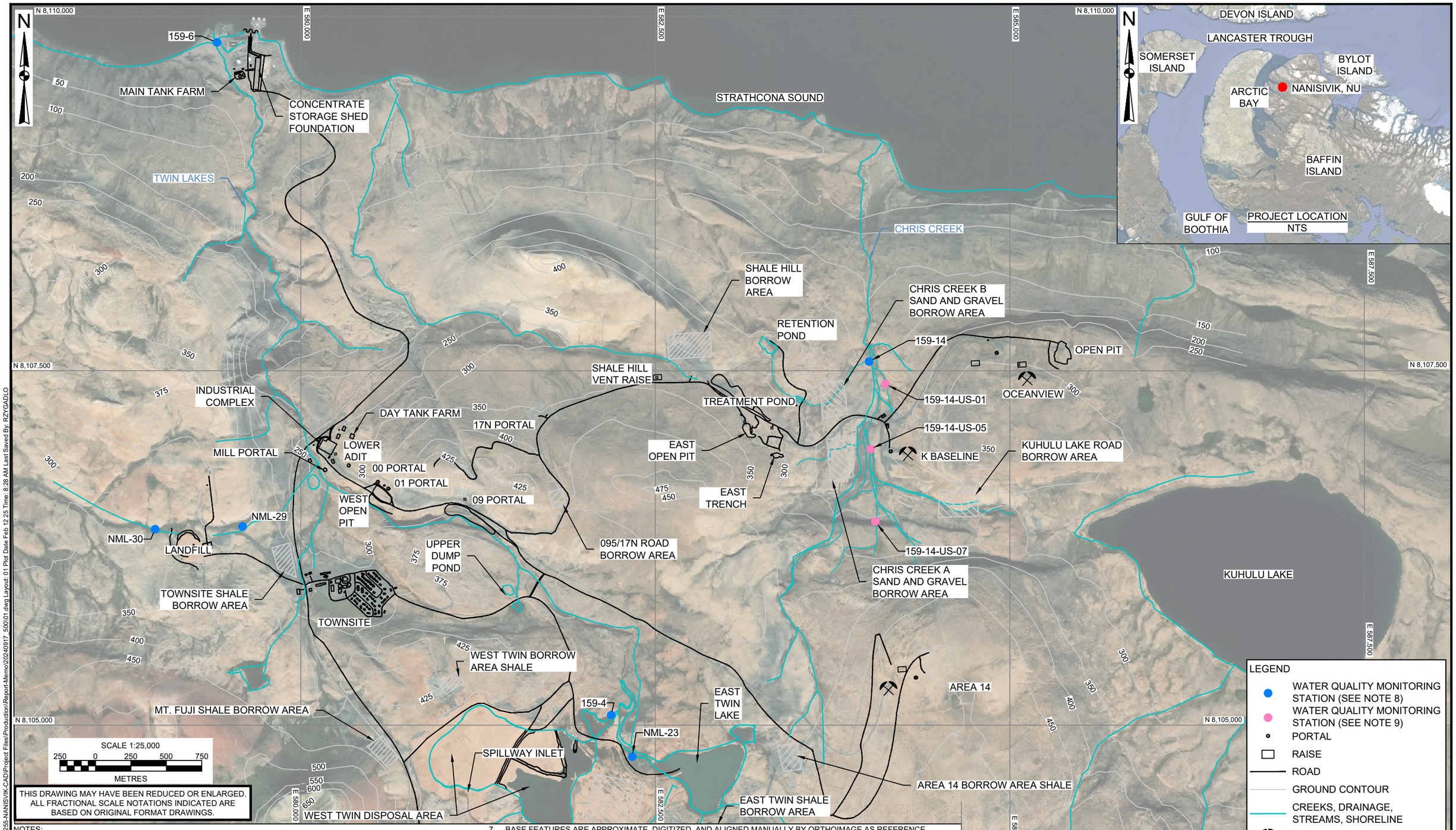
DRAWINGS



NOTES:
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. THIS DRAWING MUST BE READ IN CONJUNCTION WITH BGC'S REPORT TITLED "2024 WATER QUALITY REPORT", AND DATED FEBRUARY 2025.
3. BASE TOPOGRAPHIC DATA BASED ON STANTEC DRAWING NAMED "WATER SAMPLING LOCATIONS - MINE AREA - WATER QUALITY MONITORING: A-2, PROVIDED BY NYRSTAR CANADA (HOLDINGS) LTD., DATED FEBRUARY 21, 2020. CONTOUR INTERVAL IS 50.0 m.
4. COORDINATE SYSTEM IS NAD83 UTM ZONE 16N. VERTICAL DATUM IS UNKNOWN.
5. ORTHOIMAGE FROM ESRI WORLD IMAGERY SERVER RETRIEVED FROM GLOBAL MAPPER VER. 21.1 ON FEBRUARY 11, 2021. DATUM IS GOOGLE MAPS (SPHERE RADIUS 6378137).
6. OVERVIEW MAP IMAGERY FROM GOOGLE EARTH PRO V7.3.3.7786. (DECEMBER 30, 2016). NANISVIK, NUNAVUT, IMAGE LANDSAT/COPERNICUS. CAPTURED ON FEBRUARY 19, 2021.
7. BASE FEATURES ARE APPROXIMATE, DIGITIZED, AND ALIGNED MANUALLY BY ORTHOIMAGE AS REFERENCE.
8. WATER QUALITY MONITORING STATIONS IDENTIFIED IN WATER LICENCE 1AR-NAN2030.
9. VOLUNTARY WATER QUALITY MONITORING STATION, NOT IDENTIFIED IN WATER LICENCE 1AR-NAN2030.
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SCALE:	1:25,000
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REVIEW:	SB
APPROVED:	ADC

CLIENT: **CANZINCO MINES LTD.**

PROJECT: **NANISIVIK MINE 2024 WATER QUALITY REPORT**

TITLE: **SITE LOCATION PLAN**

PROJECT No.: **0255036**

DWG No.: **01**

C:_BIM\ACCDocs\BGC BIM Account\0255-NANISVIK-CAD\Project Files\Production\Report-Memo\20240917_500\01 dwg Layout\ - 01 Plot Date: Feb 12,25 Time: 8:28 AM Last Saved By: RZYGADLO

APPENDIX A
SAMPLING STATION PHOTOGRAPHS

Station:	**159-4**
Latitude:	73.03 N
Longitude:	84.48 W
Date Sampled:	August 7, 2024
Time Sampled:	4:00 PM
Field Temperature (°C):	11.3
Field Conductivity (µS/cm)[1]:	752.0
Field pH[2]:	9.83
Field TDS (mg/L)	660.2
Flow Condition[3]:	Flowing
Visible Hydrocarbons?:	No

Looking upstream

Looking southeast

Notes:

1. Conductivity measurements reflect specific conductance (i.e., conductivity temperature-corrected to 25ºC).
2. Field-measured pH values interpreted to be non-representative of site conditions (see Section 4.1)
3. Flow conditions were qualitatively documented as “stagnant” for standing or pooled water, or “flowing” if water movement was observed.

Station:	159-6
Latitude:	73.03 N
Longitude:	84.56 W
Date Sampled:	August 7, 2024
Time Sampled:	8:32 AM
Field Temperature (°C):	8.25
Field Conductivity (µS/cm)[1]:	159.5
Field pH[2]:	7.1
Field TDS (mg/L)	Not Measured
Flow Condition[3]:	Flowing
Visible Hydrocarbons?:	No

Looking upstream

Site overview – looking west

Looking downstream

Notes:

1. Conductivity measurements reflect specific conductance (i.e., conductivity temperature-corrected to 25ºC).
2. Field-measured pH values interpreted to be non-representative of site conditions (see Section 4.1)
3. Flow conditions were qualitatively documented as “stagnant” for standing or pooled water, or “flowing” if water movement was observed.

Station:	NML-23
Latitude:	73.02 N
Longitude:	84.47 W
Date Sampled:	August 7, 2024
Time Sampled:	2:55 PM
Field Temperature (°C):	8.9
Field Conductivity (µS/cm)[1]:	39.4
Field pH[2]:	7.90
Field TDS (mg/L)	37.0
Flow Condition[3]:	Flowing
Visible Hydrocarbons?:	No

Looking downstream

Looking upstream

Notes:

1. Conductivity measurements reflect specific conductance (i.e., conductivity temperature-corrected to 25ºC).
2. Field-measured pH values interpreted to be non-representative of site conditions (see Section 4.1)
3. Flow conditions were qualitatively documented as “stagnant” for standing or pooled water, or “flowing” if water movement was observed.

Station:	159-14
Latitude:	73.05 N
Longitude:	84.42 W
Date Sampled:	August 7, 2024
Time Sampled:	11:08 AM
Field Temperature (°C):	9.5
Field Conductivity (µS/cm)[1]:	389.2
Field pH[2]:	8.95
Field TDS (mg/L)	359.7
Flow Condition[3]:	Flowing
Visible Hydrocarbons?:	No

Looking upstream

Looking downstream

Notes:

1. Conductivity measurements reflect specific conductance (i.e., conductivity temperature-corrected to 25ºC).
2. Field-measured pH values interpreted to be non-representative of site conditions (see Section 4.1)
3. Flow conditions were qualitatively documented as “stagnant” for standing or pooled water, or “flowing” if water movement was observed.

Station:	159-14-US-01
Latitude:	73.05 N
Longitude:	84.42 W
Date Sampled:	August 7, 2024
Time Sampled:	12:21 PM
Field Temperature (°C):	7.0
Field Conductivity (µS/cm)[1]:	439.5
Field pH[2]:	9.37
Field TDS (mg/L)	434.7
Flow Condition[3]:	Flowing
Visible Hydrocarbons?:	No

Looking upstream

Looking downstream

Notes:

1. Conductivity measurements reflect specific conductance (i.e., conductivity temperature-corrected to 25ºC).
2. Field-measured pH values interpreted to be non-representative of site conditions (see Section 4.1)
3. Flow conditions were qualitatively documented as “stagnant” for standing or pooled water, or “flowing” if water movement was observed.

Station:	159-14-US-05
Latitude:	73.04 N
Longitude:	84.42 W
Date Sampled:	August 7, 2024
Time Sampled:	12:40 PM
Field Temperature (°C):	9.4
Field Conductivity (µS/cm)[1]:	391.0
Field pH[2]:	9.70
Field TDS (mg/L)	362.5
Flow Condition[3]:	Flowing
Visible Hydrocarbons?:	No

Looking upstream

Looking downstream

Notes:

1. Conductivity measurements reflect specific conductance (i.e., conductivity temperature-corrected to 25ºC).
2. Field-measured pH values interpreted to be non-representative of site conditions (see Section 4.1)
3. Flow conditions were qualitatively documented as “stagnant” for standing or pooled water, or “flowing” if water movement was observed.

Station:	159-14-US-07
Latitude:	73.04 N
Longitude:	84.42 W
Date Sampled:	August 7, 2024
Time Sampled:	12:55 PM
Field Temperature (°C):	7.2
Field Conductivity (µS/cm)[1]:	273.5
Field pH[2]:	9.57
Field TDS (mg/L)	269.8
Flow Condition[3]:	Flowing
Visible Hydrocarbons?:	No

Site overview – Looking upstream

Close up

Looking upstream

Notes:

1. Conductivity measurements reflect specific conductance (i.e., conductivity temperature-corrected to 25ºC).
2. Field-measured pH values interpreted to be non-representative of site conditions (see Section 4.1)
3. Flow conditions were qualitatively documented as “stagnant” for standing or pooled water, or “flowing” if water movement was observed.

Station:	NML-29
Latitude:	73.04 N
Longitude:	84.56 W
Date Sampled:	August 7, 2024
Time Sampled:	10:40 AM
Field Temperature (°C):	9.8
Field Conductivity (µS/cm)[1]:	448.2
Field pH[2]:	8.96
Field TDS (mg/L)	411.1
Flow Condition[3]:	Flowing
Visible Hydrocarbons?:	No

Looking upstream

Site overview

Looking downstream

Notes:

1. Conductivity measurements reflect specific conductance (i.e., conductivity temperature-corrected to 25ºC).
2. Field-measured pH values interpreted to be non-representative of site conditions (see Section 4.1)
3. Flow conditions were qualitatively documented as “stagnant” for standing or pooled water, or “flowing” if water movement was observed.

Station:	NML-30
Latitude:	73.04 N
Longitude:	84.57 W
Date Sampled:	August 7, 2024
Time Sampled:	10:05 AM
Field Temperature (°C):	9.4
Field Conductivity (µS/cm)[1]:	337.2
Field pH[2]:	8.99
Field TDS (mg/L)	312.5
Flow Condition[3]:	Flowing
Visible Hydrocarbons?:	No

Looking upstream

Looking downstream

Notes:

1. Conductivity measurements reflect specific conductance (i.e., conductivity temperature-corrected to 25ºC).
2. Field-measured pH values interpreted to be non-representative of site conditions (see Section 4.1)
3. Flow conditions were qualitatively documented as “stagnant” for standing or pooled water, or “flowing” if water movement was observed.

APPENDIX B
LABORATORY CERTIFICATES OF ANALYSIS

Certificate of Analysis

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Client: BGC Engineering Inc.(Nanisivik)
425, 1 Avenue SW
Calgary, AB
V6Z 0C8
Attention: Mr. Scott Garrison
PO#:
Invoice to: BGC Engineering Inc.(Nanisivik)

Report Number: 3010146
Date Submitted: 2024-08-13
Date Reported: 2024-08-19
Project: Nanisivik 0255036
COC #: 229276

Dear Scott Garrison:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

Emma-Dawn Ferguson
2024.08.19 17:41:59 -04'00'

APPROVAL: _____
Emma-Dawn Ferguson, Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: https://directory.cala.ca/.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is licensed by the Ontario Ministry of the Environment, Conservation, and Parks (MECP) for specific tests in drinking water (license #2318). A copy of the license is available upon request.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by the Ontario Ministry of Agriculture, Food, and Rural Affairs for specific tests in agricultural soils.

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline values listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official provincial or federal guideline as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

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Project: Nanisivik 0255036
COC #: 229276

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1739291 Water 2024-08-07 Field Blank	1739292 Water 2024-08-07 Travel Blank	1739293 Water 2024-08-07 NML-23	1739294 Water 2024-08-07 159-14-45-05
Anions	Cl	1	mg/L			<1	<1	1	2
	SO4	1	mg/L			<1	<1	7	190
General Chemistry	Alkalinity as CaCO3	5	mg/L			<5	<5	10	97
	CO3 as CaCO3	1	mg/L			N/A-PH	N/A-PH	N/A-PH	N/A-PH
	Conductivity	5	uS/cm			<5	<5	22	535
	HCO3 as CaCO3	1	mg/L			<1	<1	10	97
	pH	1.00				5.71	5.89	7.15	7.97
	Total Suspended Solids	2	mg/L			<2	<2	<2	<2
Hardness	Hardness as CaCO3	1	mg/L			<1	<1	18	290
Hydrocarbons	F2 (C10-C16)	20	ug/L			<20	<20		
	F3 (C16-C34)	50	ug/L			<50	<50		
	F4 (C34-C50)	50	ug/L			<50	<50		
Metals	Ag	0.0001	mg/L			<0.0001	<0.0001	<0.0001	<0.0001
	Al	0.01	mg/L			<0.01	<0.01	0.16	<0.01
	As	0.001	mg/L			<0.001	<0.001	<0.001	<0.001
	B	0.01	mg/L			<0.01	<0.01	<0.01	0.04
	Ba	0.01	mg/L			<0.01	<0.01	0.02	0.01
	Be	0.0005	mg/L			<0.0005	<0.0005	<0.0005	<0.0005
	Ca	1	mg/L			<1	<1	4	50
	Cd	0.0001	mg/L			<0.0001	<0.0001	<0.0001	0.0002
	Co	0.0002	mg/L			<0.0002	<0.0002	<0.0002	<0.0002
	Cr	0.001	mg/L			<0.001	<0.001	<0.001	<0.001
	Cu	0.001	mg/L			<0.001	0.003	<0.001	<0.001
	Fe	0.03	mg/L			<0.03	<0.03	0.07	<0.03
	Hg	0.0001	mg/L			<0.0001	<0.0001	<0.0001	<0.0001

Guideline = *** = Guideline Exceedence**

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Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1739291 Water 2024-08-07 Field Blank	1739292 Water 2024-08-07 Travel Blank	1739293 Water 2024-08-07 NML-23	1739294 Water 2024-08-07 159-14-45-05
Metals	K	1	mg/L			<1	<1	<1	<1
	Mg	1	mg/L			<1	<1	2	40
	Mn	0.01	mg/L			<0.01	<0.01	<0.01	<0.01
	Mo	0.005	mg/L			<0.005	<0.005	<0.005	<0.005
	Na	1	mg/L			<1	<1	<1	1
	Ni	0.005	mg/L			<0.005	<0.005	<0.005	<0.005
	Pb	0.001	mg/L			<0.001	<0.001	<0.001	<0.001
	Sb	0.0005	mg/L			<0.0005	<0.0005	<0.0005	<0.0005
	Se	0.001	mg/L			<0.001	<0.001	<0.001	<0.001
	Si	0.1	mg/L			<0.1	0.2	0.6	0.8
	Sr	0.001	mg/L			<0.001	<0.001	0.004	0.040
	Ti	0.01	mg/L			<0.01	<0.01	<0.01	<0.01
	Tl	0.0001	mg/L			<0.0001	<0.0001	<0.0001	<0.0001
	V	0.001	mg/L			<0.001	<0.001	<0.001	<0.001
	Zn	0.01	mg/L			<0.01	<0.01	<0.01	0.34
Nutrients	N-NH3	0.020	mg/L			<0.020	<0.020	<0.020	<0.020
Others	NO2 + NO3 as N	0.10	mg/L			<0.10	<0.10	<0.10	<0.10

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Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1739295 Water 2024-08-07 159-14	1739296 Water 2024-08-07 Field Duplicate 2	1739297 Water 2024-08-07 NML-29	1739300 Water 2024-08-07 159-4
Anions	Cl	1	mg/L			2	8	2	8
	SO4	1	mg/L			197	498	187	480
General Chemistry	Alkalinity as CaCO3	5	mg/L			102	89	173	91
	CO3 as CaCO3	1	mg/L			N/A-PH	N/A-PH	N/A-PH	N/A-PH
	Conductivity	5	uS/cm			563	1020	633	1010
	HCO3 as CaCO3	1	mg/L			102	89	173	91
	pH	1.00				8.04	8.03	8.24	8.06
	Total Suspended Solids	2	mg/L			<2	<2	<2	<2
Hardness	Hardness as CaCO3	1	mg/L			306	596	364	603
Hydrocarbons	F2 (C10-C16)	20	ug/L					<20	
	F3 (C16-C34)	50	ug/L					<50	
	F4 (C34-C50)	50	ug/L					<50	
Metals	Ag	0.0001	mg/L			<0.0001	<0.0001	<0.0001	<0.0001
	Al	0.01	mg/L			<0.01	0.02	<0.01	0.02
	As	0.001	mg/L			<0.001	<0.001	<0.001	<0.001
	B	0.01	mg/L			0.04	0.56	0.14	0.56
	Ba	0.01	mg/L			0.02	0.03	0.03	0.03
	Be	0.0005	mg/L			<0.0005	<0.0005	<0.0005	<0.0005
	Ca	1	mg/L			55	130	75	131
	Cd	0.0001	mg/L			<0.0001	0.0001	<0.0001	0.0001
	Co	0.0002	mg/L			<0.0002	<0.0002	<0.0002	<0.0002
	Cr	0.001	mg/L			<0.001	<0.001	<0.001	<0.001
	Cu	0.001	mg/L			<0.001	<0.001	<0.001	<0.001
	Fe	0.03	mg/L			<0.03	0.07	<0.03	0.03
	Hg	0.0001	mg/L			<0.0001	<0.0001	<0.0001	<0.0001

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Project: Nanisivik 0255036
COC #: 229276

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1739295 Water 2024-08-07 159-14	1739296 Water 2024-08-07 Field Duplicate 2	1739297 Water 2024-08-07 NML-29	1739300 Water 2024-08-07 159-4
Metals	K	1	mg/L			<1	6	2	6
	Mg	1	mg/L			41	66	43	67
	Mn	0.01	mg/L			<0.01	<0.01	<0.01	<0.01
	Mo	0.005	mg/L			<0.005	<0.005	<0.005	<0.005
	Na	1	mg/L			1	3	2	3
	Ni	0.005	mg/L			<0.005	<0.005	<0.005	<0.005
	Pb	0.001	mg/L			<0.001	<0.001	<0.001	<0.001
	Sb	0.0005	mg/L			<0.0005	<0.0005	<0.0005	<0.0005
	Se	0.001	mg/L			<0.001	<0.001	<0.001	<0.001
	Si	0.1	mg/L			1.0	0.9	1.2	0.9
	Sr	0.001	mg/L			0.046	0.552	0.180	0.546
	Ti	0.01	mg/L			<0.01	<0.01	<0.01	<0.01
	Tl	0.0001	mg/L			<0.0001	<0.0001	<0.0001	<0.0001
	V	0.001	mg/L			<0.001	<0.001	<0.001	<0.001
	Zn	0.01	mg/L			0.16	0.04	<0.01	0.04
Nutrients	N-NH3	0.020	mg/L			<0.020	<0.020	<0.020	<0.020
Others	NO2 + NO3 as N	0.10	mg/L			<0.10	<0.10	<0.10	<0.10

Guideline = *** = Guideline Exceedence**

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Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1739301 Water 2024-08-07 Field Duplicate 1	1739302 Water 2024-08-07 159-6	1739303 Water 2024-08-07 NML-30	1739304 Water 2024-08-07 159-14-US-07
Anions	Cl	1	mg/L			2	2	2	2
	SO4	1	mg/L			69	69	98	141
General Chemistry	Alkalinity as CaCO3	5	mg/L			39	39	152	70
	CO3 as CaCO3	1	mg/L			N/A-PH	N/A-PH	N/A-PH	N/A-PH
	Conductivity	5	uS/cm			198	196	461	308
	HCO3 as CaCO3	1	mg/L			39	39	152	70
	pH	1.00				7.55	7.52	8.10	7.64
	Total Suspended Solids	2	mg/L			<2	<2	<2	8
Hardness	Hardness as CaCO3	1	mg/L			115	115	262	218
Hydrocarbons	F2 (C10-C16)	20	ug/L			<20	<20	<20	
	F3 (C16-C34)	50	ug/L			<50	<50	<50	
	F4 (C34-C50)	50	ug/L			<50	<50	<50	
Metals	Ag	0.0001	mg/L			<0.0001	<0.0001	<0.0001	<0.0001
	Al	0.01	mg/L			0.03	0.03	<0.01	<0.01
	As	0.001	mg/L			<0.001	<0.001	<0.001	<0.001
	B	0.01	mg/L			0.06	0.06	0.13	<0.01
	Ba	0.01	mg/L			0.02	0.02	0.02	<0.01
	Be	0.0005	mg/L			<0.0005	<0.0005	<0.0005	<0.0005
	Ca	1	mg/L			23	23	57	36
	Cd	0.0001	mg/L			0.0003	0.0003	<0.0001	0.0006
	Co	0.0002	mg/L			<0.0002	<0.0002	<0.0002	<0.0002
	Cr	0.001	mg/L			<0.001	<0.001	<0.001	<0.001
	Cu	0.001	mg/L			<0.001	<0.001	<0.001	<0.001
	Fe	0.03	mg/L			<0.03	<0.03	<0.03	0.07
	Hg	0.0001	mg/L			<0.0001	<0.0001	<0.0001	<0.0001

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Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1739301 Water 2024-08-07 Field Duplicate 1	1739302 Water 2024-08-07 159-6	1739303 Water 2024-08-07 NML-30	1739304 Water 2024-08-07 159-14-US-07
Metals	K	1	mg/L			<1	<1	1	<1
	Mg	1	mg/L			14	14	29	31
	Mn	0.01	mg/L			<0.01	<0.01	<0.01	<0.01
	Mo	0.005	mg/L			<0.005	<0.005	<0.005	<0.005
	Na	1	mg/L			<1	<1	2	<1
	Ni	0.005	mg/L			<0.005	<0.005	<0.005	<0.005
	Pb	0.001	mg/L			<0.001	<0.001	<0.001	<0.001
	Sb	0.0005	mg/L			<0.0005	<0.0005	<0.0005	<0.0005
	Se	0.001	mg/L			<0.001	<0.001	<0.001	<0.001
	Si	0.1	mg/L			0.6	0.6	1.1	0.5
	Sr	0.001	mg/L			0.062	0.062	0.106	0.010
	Ti	0.01	mg/L			<0.01	<0.01	<0.01	<0.01
	Tl	0.0001	mg/L			<0.0001	<0.0001	<0.0001	<0.0001
	V	0.001	mg/L			<0.001	<0.001	<0.001	<0.001
	Zn	0.01	mg/L			0.11	0.11	<0.01	
		0.02	mg/L						1.56
Nutrients	N-NH3	0.020	mg/L			<0.020	<0.020	<0.020	<0.020
Others	NO2 + NO3 as N	0.10	mg/L			<0.10	<0.10	<0.10	0.11

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Group	Analyte	MRL	Units	Guideline	Lab I.D. / Sample Matrix / Sample Type / Sampling Date / Sample I.D.
					1739305 / Water / / 2024-08-07 / 159-14-US-01
Anions	Cl	1	mg/L		4
	SO4	1	mg/L		241
General Chemistry	Alkalinity as CaCO3	5	mg/L		127
	CO3 as CaCO3	1	mg/L		N/A-PH
	Conductivity	5	uS/cm		642
	HCO3 as CaCO3	1	mg/L		127
	pH	1.00			7.92
	Total Suspended Solids	2	mg/L		<2
Hardness	Hardness as CaCO3	1	mg/L		371
Metals	Ag	0.0001	mg/L		<0.0001
	Al	0.01	mg/L		<0.01
	As	0.001	mg/L		<0.001
	B	0.01	mg/L		0.05
	Ba	0.01	mg/L		0.02
	Be	0.0005	mg/L		<0.0005
	Ca	1	mg/L		76
	Cd	0.0001	mg/L		0.0003
	Co	0.0002	mg/L		<0.0002
	Cr	0.001	mg/L		<0.001
	Cu	0.001	mg/L		<0.001
	Fe	0.03	mg/L		<0.03
	Hg	0.0001	mg/L		<0.0001
	K	1	mg/L		1
	Mg	1	mg/L		44
	Mn	0.01	mg/L		<0.01

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Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
					1739305 Water 2024-08-07 159-14-US-01
Metals	Mo	0.005	mg/L		<0.005
	Na	1	mg/L		1
	Ni	0.005	mg/L		<0.005
	Pb	0.001	mg/L		<0.001
	Sb	0.0005	mg/L		<0.0005
	Se	0.001	mg/L		<0.001
	Si	0.1	mg/L		1.3
	Sr	0.001	mg/L		0.073
	Ti	0.01	mg/L		<0.01
	Tl	0.0001	mg/L		<0.0001
	V	0.001	mg/L		<0.001
	Zn	0.02	mg/L		1.35
Nutrients	N-NH3	0.020	mg/L		<0.020
Others	NO2 + NO3 as N	0.10	mg/L		0.12

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COC #: 229276

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 464348 **Analysis/Extraction Date** 2024-08-14 **Analyst** AaN **Method** EPA 200.8			
Silver	<0.0001 mg/L	96	80-120
Aluminum	<0.01 mg/L	119	80-120
Arsenic	<0.001 mg/L	101	80-120
Boron (total)	<0.01 mg/L	105	80-120
Barium	<0.01 mg/L	92	80-120
Beryllium	<0.0005 mg/L	108	80-120
Cadmium	<0.0001 mg/L	96	80-120
Cobalt	<0.0002 mg/L	98	80-120
Chromium Total	<0.001 mg/L	100	80-120
Copper	<0.001 mg/L	101	80-120
Iron	<0.03 mg/L	98	80-120
Mercury	<0.0001 mg/L	97	80-120
Manganese	<0.01 mg/L	99	80-120
Molybdenum	<0.005 mg/L	87	80-120
Nickel	<0.005 mg/L	101	80-120
Lead	<0.001 mg/L	98	80-120

Guideline = *** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Client: BGC Engineering Inc.(Nanisivik)
425, 1 Avenue SW
Calgary, AB
V6Z 0C8
Attention: Mr. Scott Garrison
PO#:
Invoice to: BGC Engineering Inc.(Nanisivik)

Report Number: 3010146
Date Submitted: 2024-08-13
Date Reported: 2024-08-19
Project: Nanisivik 0255036
COC #: 229276

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Antimony	<0.0005 mg/L	80	80-120
Selenium	<0.001 mg/L	102	80-120
Silicon	<0.1 mg/L	108	80-120
Strontium	<0.001 mg/L	93	80-120
Titanium	<0.01 mg/L	104	80-120
Thallium	<0.0001 mg/L	97	80-120
Vanadium	<0.001 mg/L	96	80-120
Zinc	<0.01 mg/L	101	80-120
Run No 464354 **Analysis/Extraction Date** 2024-08-14 **Analyst** SKH **Method** C SM4500-NO3-F			
NO2 + NO3 as N	<0.10 mg/L	111	80-120
Run No 464392 **Analysis/Extraction Date** 2024-08-15 **Analyst** IP **Method** SM 4110			
Chloride	<1 mg/L	100	90-110
SO4	<1 mg/L	95	90-110
Run No 464420 **Analysis/Extraction Date** 2024-08-15 **Analyst** AaN **Method** EPA 200.8			
Silver	<0.0001 mg/L	95	80-120
Aluminum	<0.01 mg/L	102	80-120

Guideline = *** = Guideline Exceedence**

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

Certificate of Analysis

Client: BGC Engineering Inc.(Nanisivik)
425, 1 Avenue SW
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Project: Nanisivik 0255036
COC #: 229276

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Arsenic	<0.001 mg/L	100	80-120
Boron (total)	<0.01 mg/L	102	80-120
Barium	<0.01 mg/L	88	80-120
Beryllium	<0.0005 mg/L	107	80-120
Cadmium	<0.0001 mg/L	92	80-120
Cobalt	<0.0002 mg/L	92	80-120
Chromium Total	<0.001 mg/L	93	80-120
Copper	<0.001 mg/L	95	80-120
Iron	<0.03 mg/L	90	80-120
Mercury	<0.0001 mg/L	97	80-120
Manganese	<0.01 mg/L	93	80-120
Molybdenum	<0.005 mg/L	83	80-120
Nickel	<0.005 mg/L	94	80-120
Lead	<0.001 mg/L	93	80-120
Antimony	<0.0005 mg/L	88	80-120
Selenium	<0.001 mg/L	101	80-120
Silicon	<0.1 mg/L	106	80-120
Strontium	<0.001 mg/L	87	80-120

Guideline = *** = Guideline Exceedence**

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

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Date Submitted: 2024-08-13
Date Reported: 2024-08-19
Project: Nanisivik 0255036
COC #: 229276

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Titanium	<0.01 mg/L	101	80-120
Thallium	<0.0001 mg/L	91	80-120
Vanadium	<0.001 mg/L	90	80-120
Zinc	<0.01 mg/L	99	80-120
Run No 464454 **Analysis/Extraction Date** 2024-08-15 **Analyst** SKH **Method** EPA 350.1			
N-NH3	<0.020 mg/L	101	80-120
Run No 464457 **Analysis/Extraction Date** 2024-08-16 **Analyst** IP **Method** SM 4110			
SO4	<1 mg/L	100	90-110
Run No 464465 **Analysis/Extraction Date** 2024-08-15 **Analyst** AsA **Method** SM2320,2510,4500H/F			
Alkalinity (CaCO3)	<5 mg/L	98	90-110
Conductivity	<5 uS/cm	101	90-110
pH		100	90-110
Run No 464472 **Analysis/Extraction Date** 2024-08-16 **Analyst** Z_S **Method** M SM3120B-3500C			
Calcium	<1 mg/L	103	90-110
Potassium	<1 mg/L	110	87-113

Guideline = *** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Certificate of Analysis

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V6Z 0C8
Attention: Mr. Scott Garrison
PO#:
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Report Number: 3010146
Date Submitted: 2024-08-13
Date Reported: 2024-08-19
Project: Nanisivik 0255036
COC #: 229276

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Magnesium	<1 mg/L	100	76-124
Sodium	<1 mg/L	107	82-118
Run No 464474 **Analysis/Extraction Date** 2024-08-16 **Analyst** AET **Method** SM 2320B			
CO3 as CaCO3			
Hardness as CaCO3			
HCO3 as CaCO3			
Run No 464479 **Analysis/Extraction Date** 2024-08-16 **Analyst** AaN **Method** EPA 200.8			
Zinc	<0.02 mg/L	91	80-120
Run No 464520 **Analysis/Extraction Date** 2024-08-19 **Analyst** MiV **Method** C SM2540			
Total Suspended Solids	<2 mg/L	94	90-110
Run No 464527 **Analysis/Extraction Date** 2024-08-16 **Analyst** AsA **Method** SM2320,2510,4500H/F			
Alkalinity (CaCO3)	<5 mg/L	100	90-110
Conductivity	<5 uS/cm	100	90-110
pH		100	90-110

Guideline = *** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

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Report Number: 3010146
Date Submitted: 2024-08-13
Date Reported: 2024-08-19
Project: Nanisivik 0255036
COC #: 229276

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 464535 **Analysis/Extraction Date** 2024-08-19 **Analyst** H_S **Method** CCME O.Reg 153/04			
Petroleum Hydrocarbons F2	<20 ug/L	90	60-140
Petroleum Hydrocarbons F3	<50 ug/L	90	60-140
Petroleum Hydrocarbons F4	<50 ug/L	90	60-140
Run No 464538 **Analysis/Extraction Date** 2024-08-19 **Analyst** AET **Method** SM 2320B			
CO3 as CaCO3			
Hardness as CaCO3			
HCO3 as CaCO3			

Guideline = *** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

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Certificate of Analysis

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V6Z 0C8
Attention: Mr. Scott Garrison
PO#:
Invoice to: BGC Engineering Inc.(Nanisivik)

Report Number: 3010146
Date Submitted: 2024-08-13
Date Reported: 2024-08-19
Project: Nanisivik 0255036
COC #: 229276

Sample Comment Summary

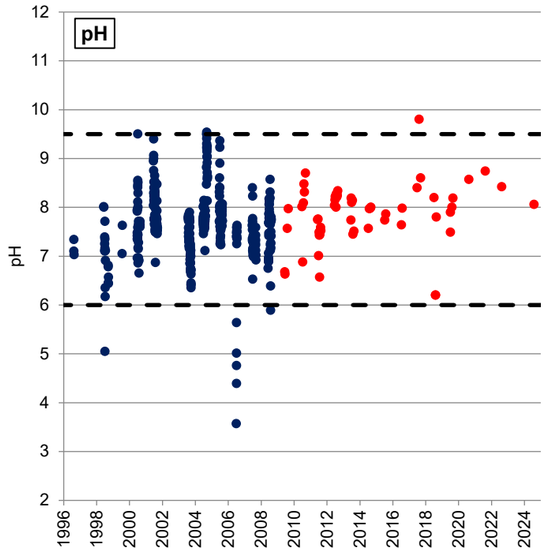
Sample ID: 1739291 Field Blank N-NH3 analzyed past holding time for this report.

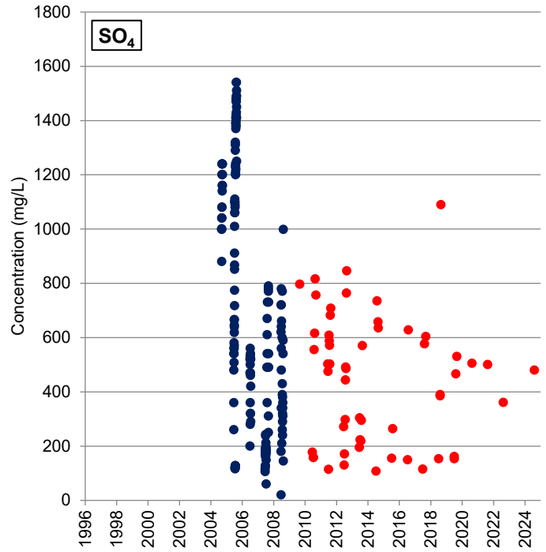
Guideline = *** = Guideline Exceedence**

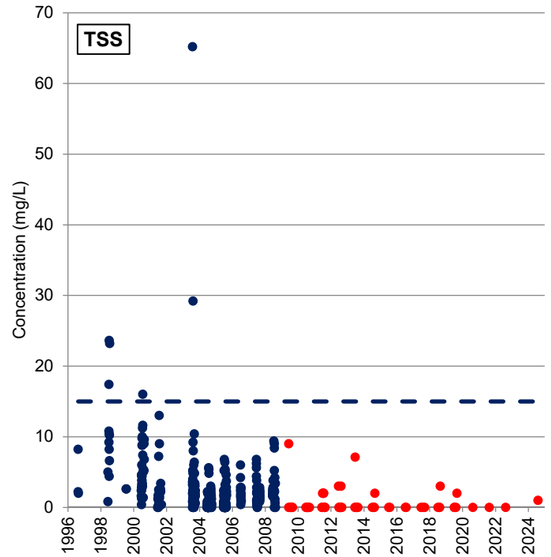
Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

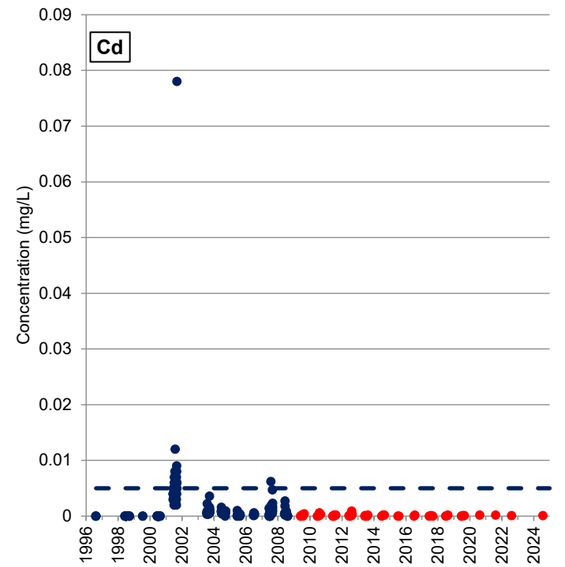
MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

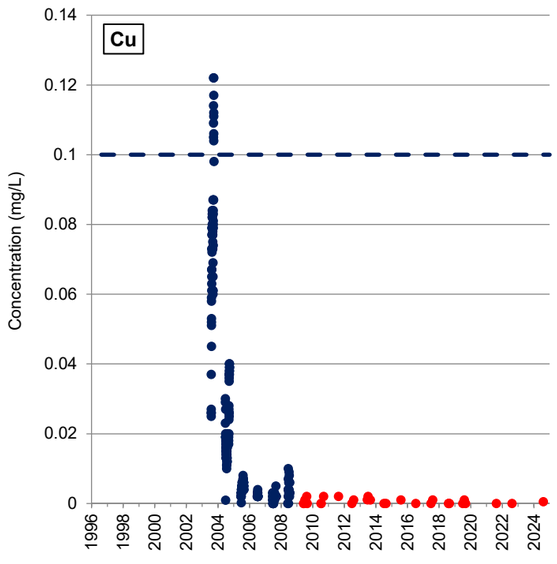
APPENDIX C
TIME SERIES

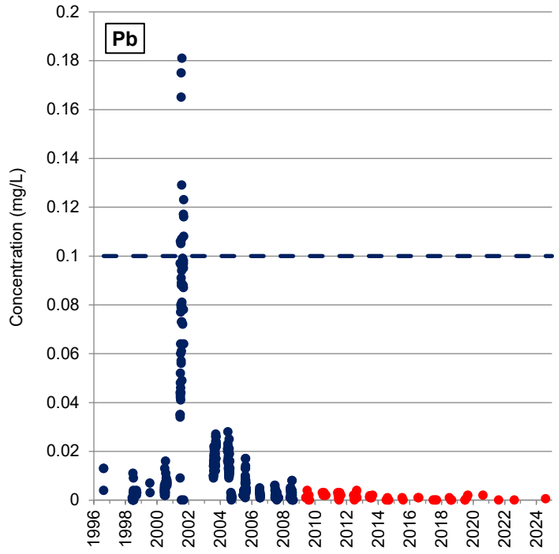


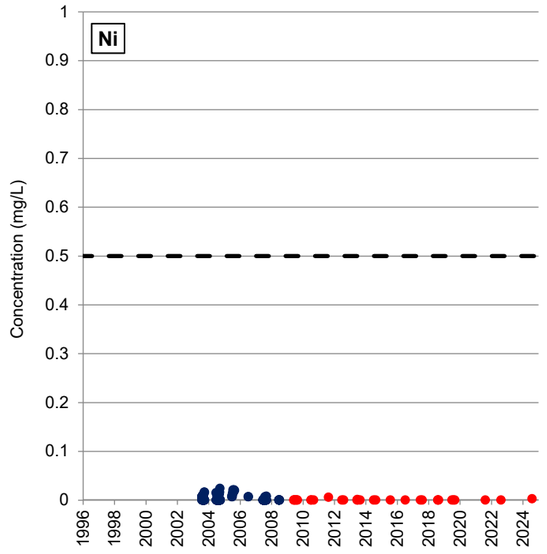


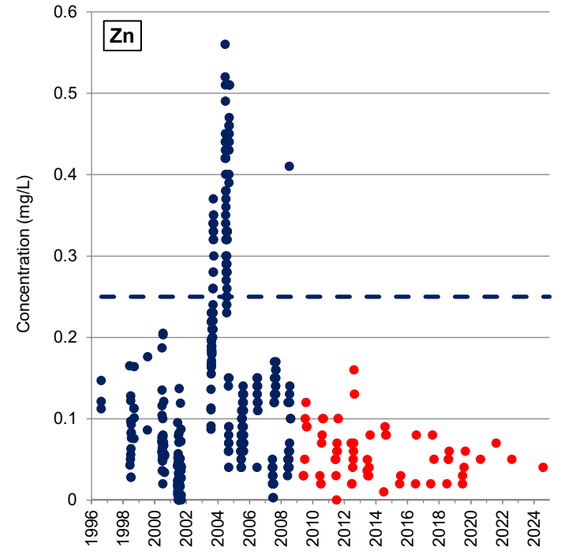










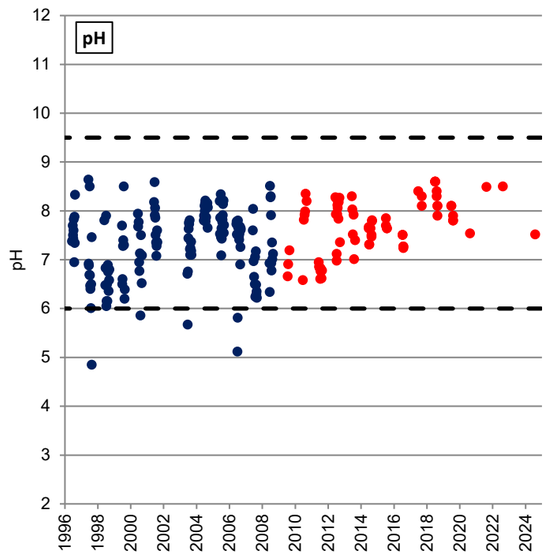


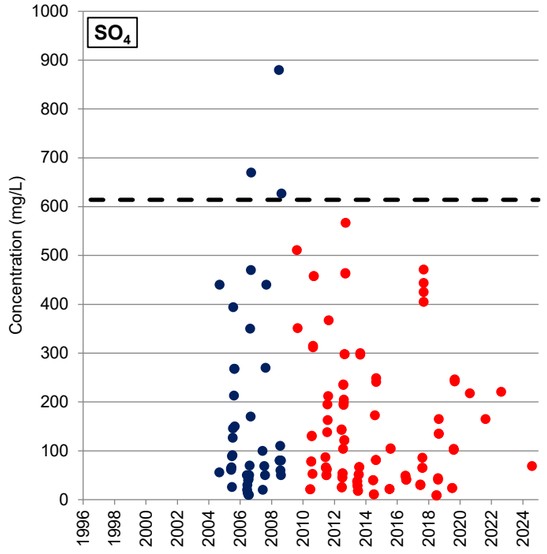
NOTES:

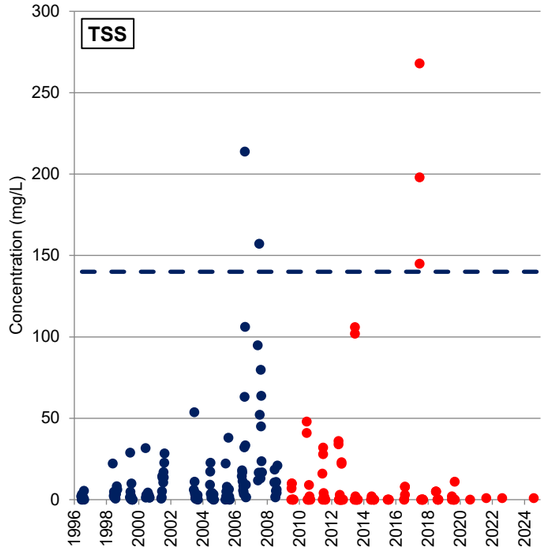
1. This Figure should be read in conjunction with BGC's report titled "2024 Water Quality Report", and dated February 2025.
2. Blue dots represent samples collected prior to closure, on October 1, 2008 (Stantec, March 10, 2020); red dots represent samples collected in post-closure.
3. Dashed lines indicate the maximum authorized concentrations (MAC) of specific water quality parameters, as defined in the Water Licence 1AR-NAN2030 for Station 159-4. For temporal plots where no dashed lines are present, no MAC were defined.
4. Data for total As not presented; however, values remain <0.003 mg/L (i.e., below the lab detection limit) and have not exceeded the MAC of 0.25 mg/L over its period of record (i.e., 2003 - 2024).
5. All results reported below the detection limit (DL) are presented as half the associated DL.

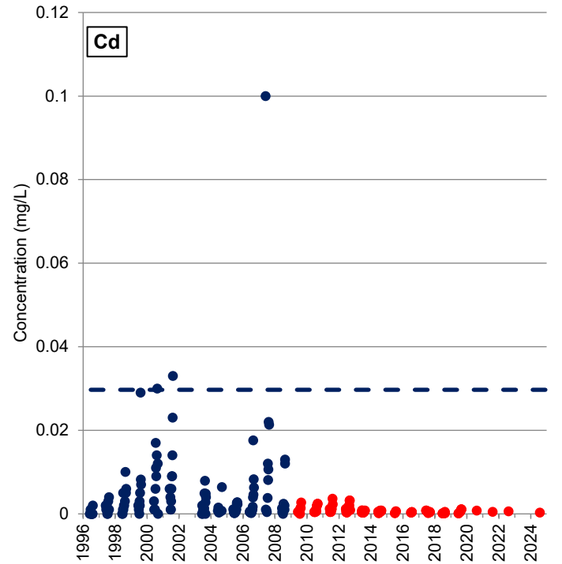
PREPARED BY:	FIGURE TITLE:		
ADC	TEMPORAL TRENDS AT STATION 159-4		
CHECKED BY:	CLIENT:		
SB	CANZINCO MINES LTD. NANISIVIK MINE		
APPROVED BY:	SCALE:	PROJECT NO:	FIGURE NO:
ADC	NTS	0255036	C-1

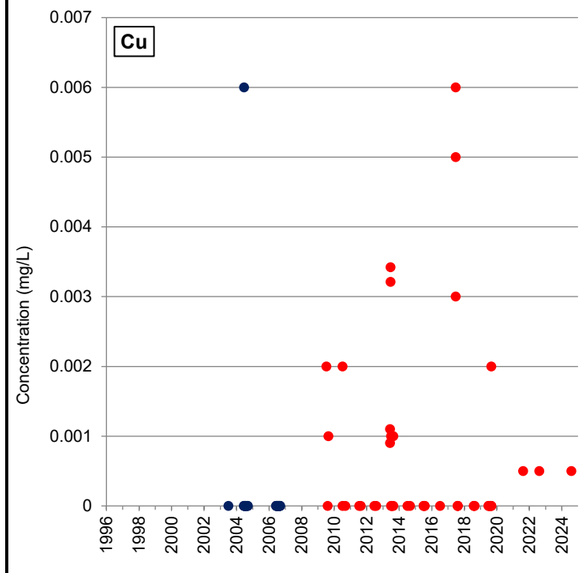
0 5 10 mm in ANSI B sized paper

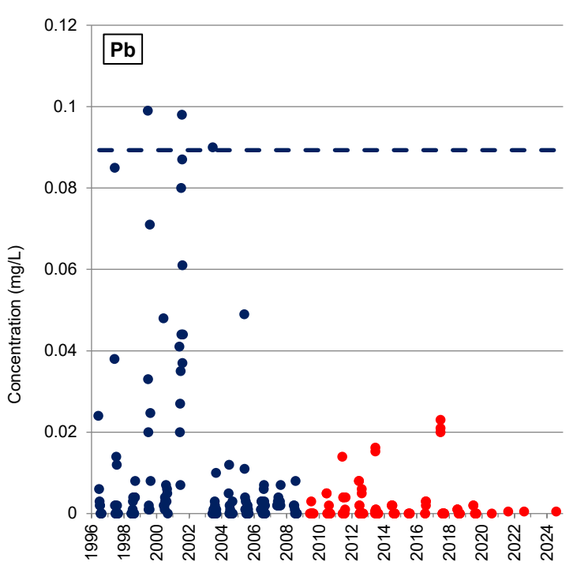


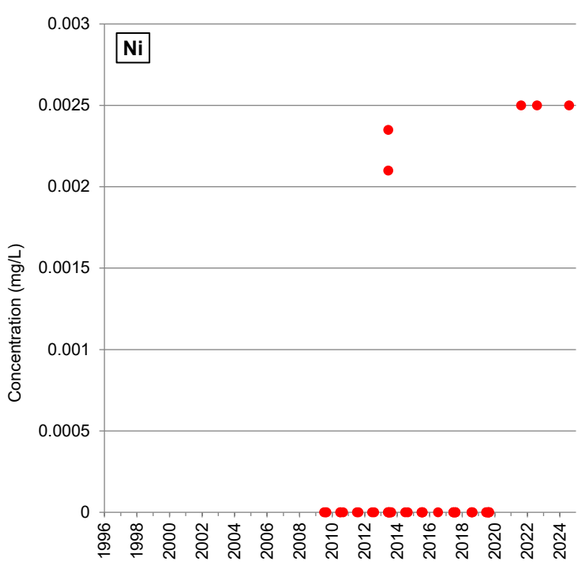


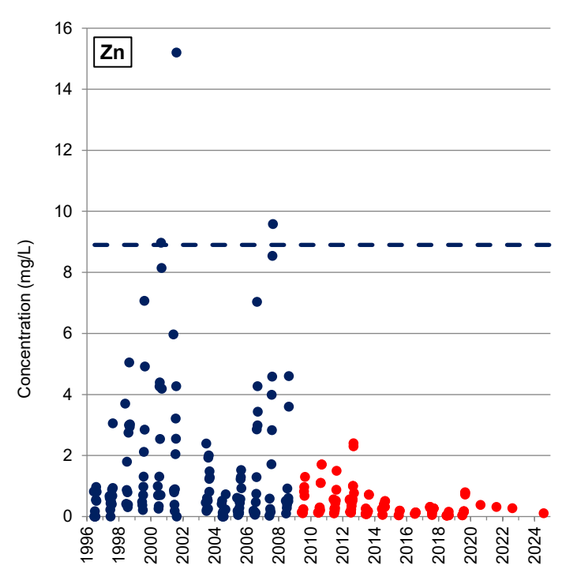












NOTES:

1. This Figure should be read in conjunction with BGC's report titled "2024 Water Quality Report", and dated February 2025.
2. Blue dots represent samples collected prior to closure, on October 1, 2008 (Stantec, March 10, 2020); red dots represent samples collected in post-closure.
3. Dashed lines indicate the site-specific Action Levels for station 159-6, as provided in the Mine's *Contingency Plan for Water Quality Exceedances* (Stantec, March 27a, 2020). pH guidance reflects the MAC range denoted in the Water Licence 1AR-NAN2030. For temporal plots where no dashed lines are present, no Action Levels are defined.
4. All results reported below the detection limit (DL) are presented as half the associated DL.

PREPARED BY:	FIGURE TITLE:		
ADC	TEMPORAL TRENDS AT STATION 159-6		
CHECKED BY:	CLIENT:		
SB	CANZINCO MINES LTD. NANISIVIK MINE		
APPROVED BY:	SCALE:	PROJECT NO:	FIGURE NO:
ADC	NTS	0255036	C-2

0 5 10 mm in ANSI B sized paper

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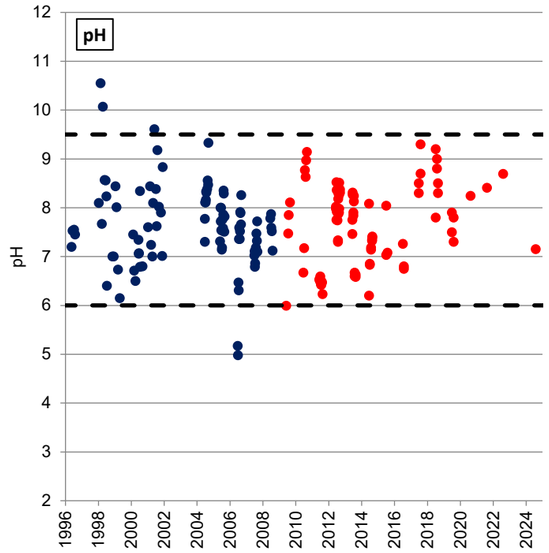
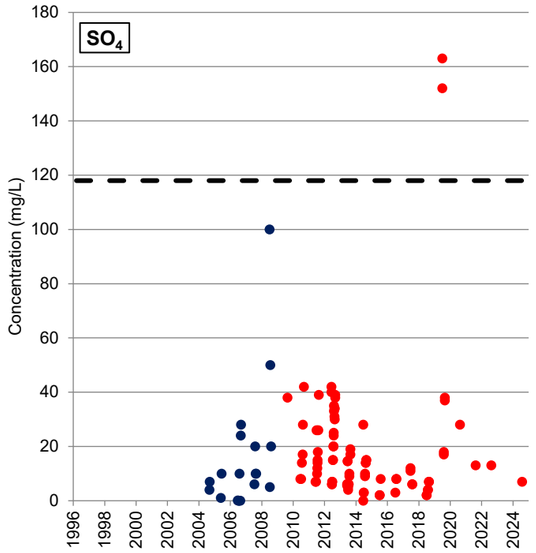
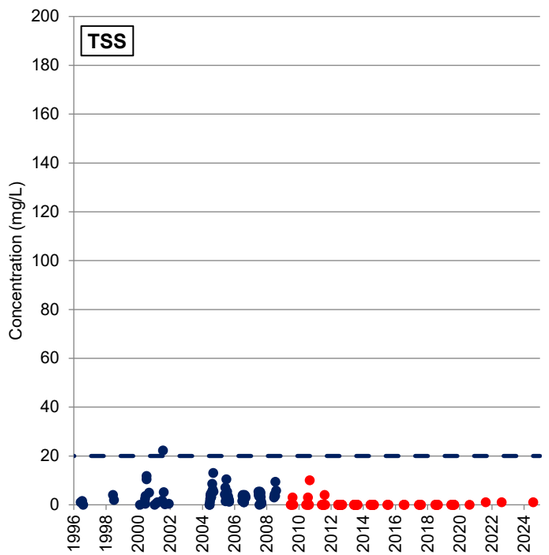
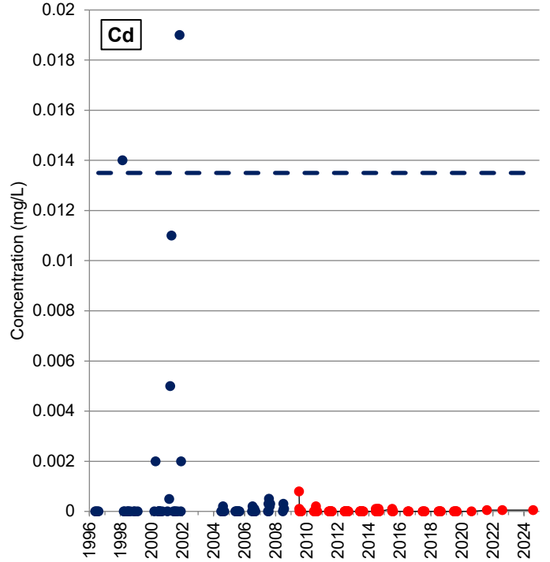
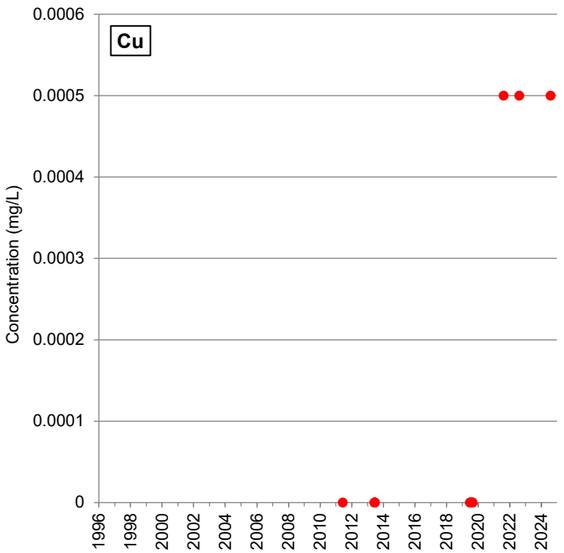
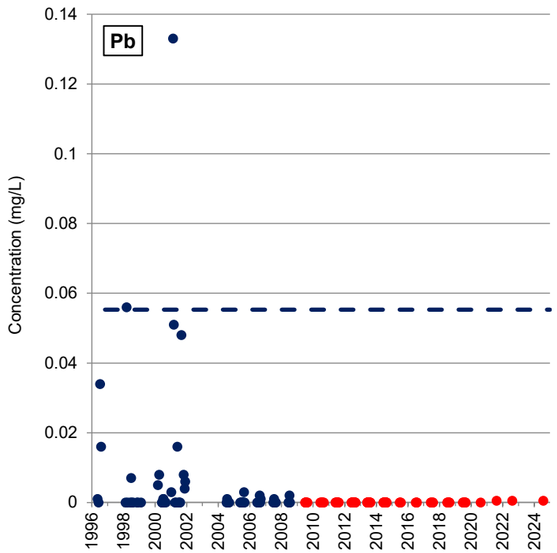


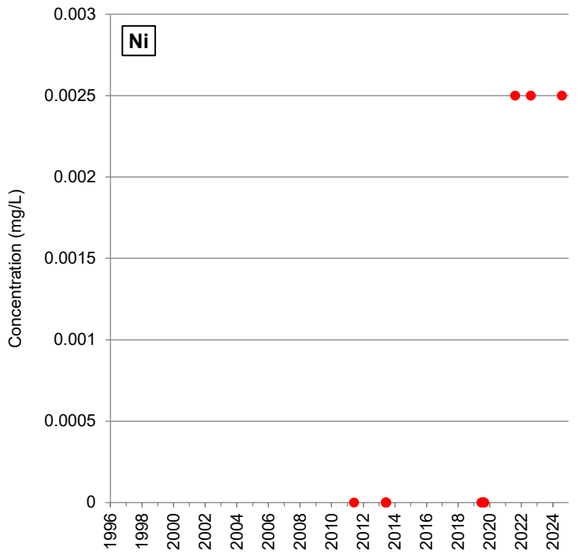


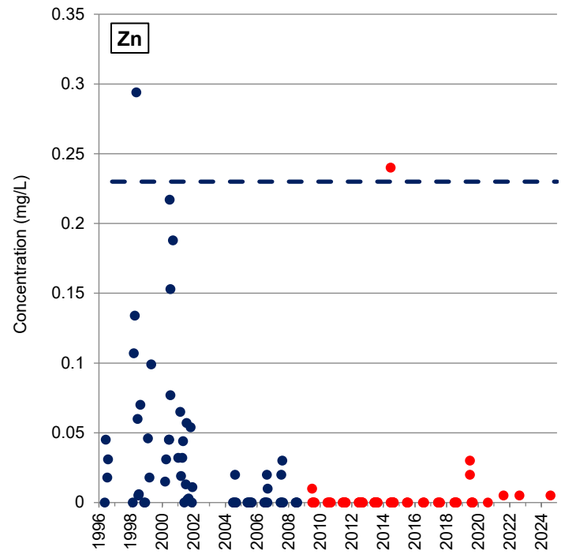












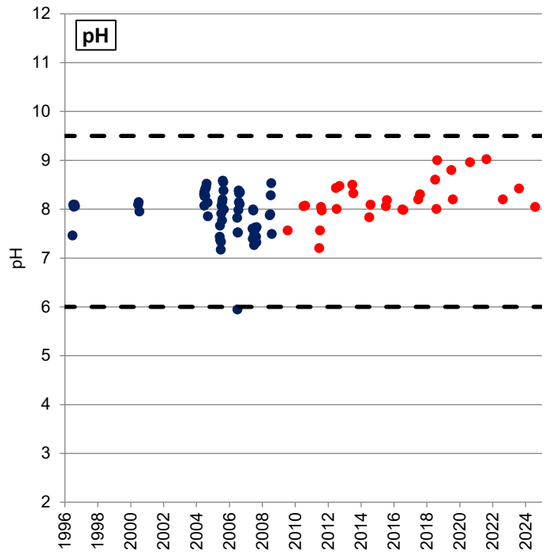
NOTES:

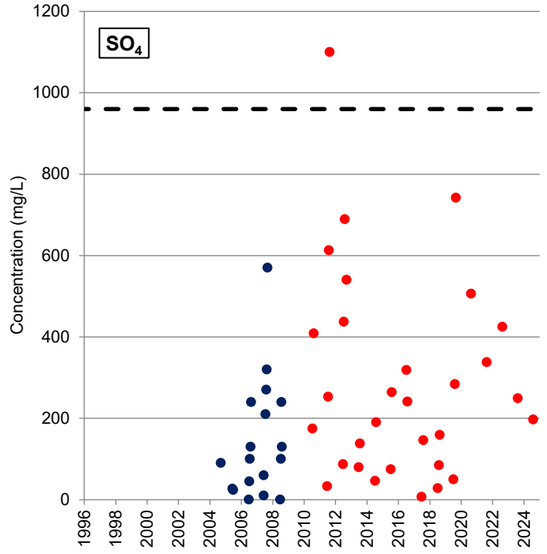
1. This Figure should be read in conjunction with BGC's report titled "2024 Water Quality Report", and dated February 2025.
2. Blue dots represent samples collected prior to closure, on October 1, 2008 (Stantec, March 10, 2020); red dots represent samples collected in post-closure.
3. Dashed lines indicate the site-specific Action Levels for station NML-23, as provided in the Mine's *Contingency Plan for Water Quality Exceedances* (Stantec, March 27a, 2020). pH guidance reflects the MAC range denoted in the Water Licence 1AR-NAN2030. For temporal plots where no dashed lines are present, no Action Levels are defined.
4. All results reported below the detection limit (DL) are presented as half the associated DL.

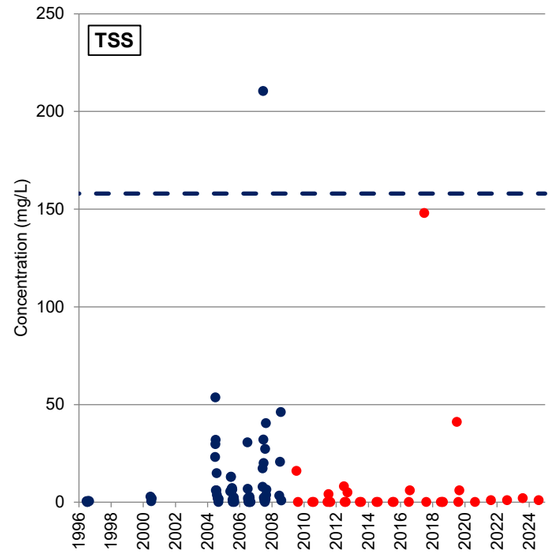
PREPARED BY: ADC	FIGURE TITLE: TEMPORAL TRENDS AT STATION NML-23		
CHECKED BY: SB	CLIENT: CANZINCO MINES LTD. NANISIVIK MINE		
APPROVED BY: ADC	SCALE: NTS	PROJECT NO: 0255036	FIGURE NO: C-3

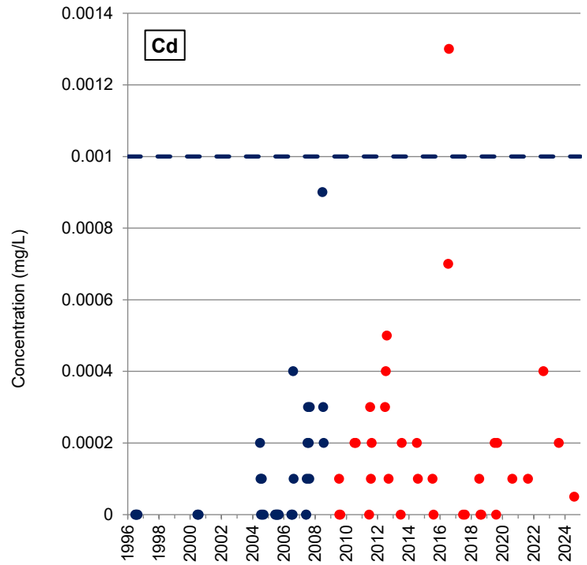
0 5 10 mm in ANSI B sized paper

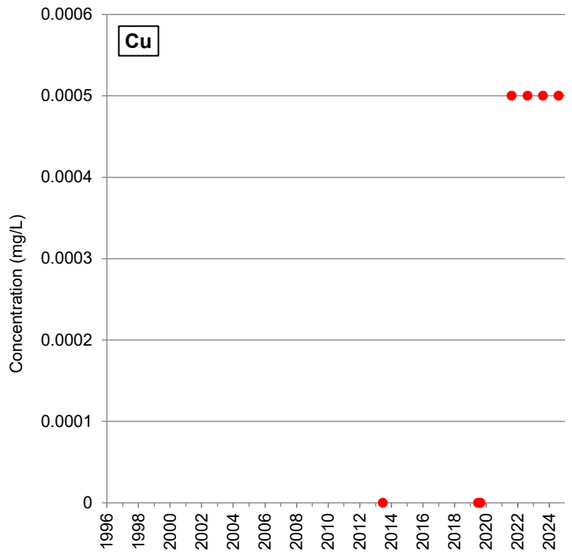
BGC Engineering

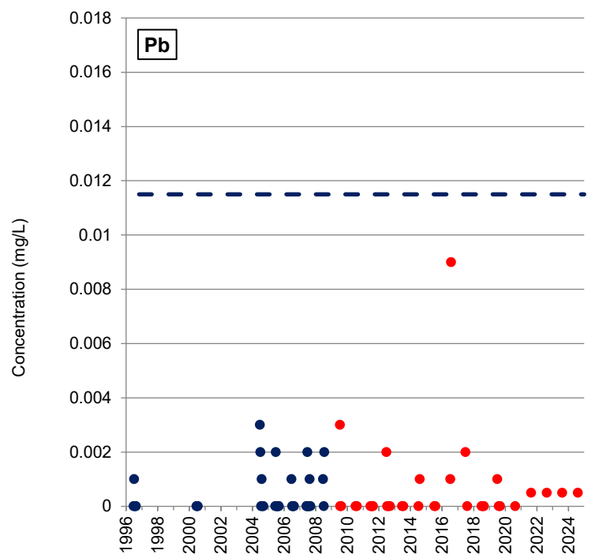


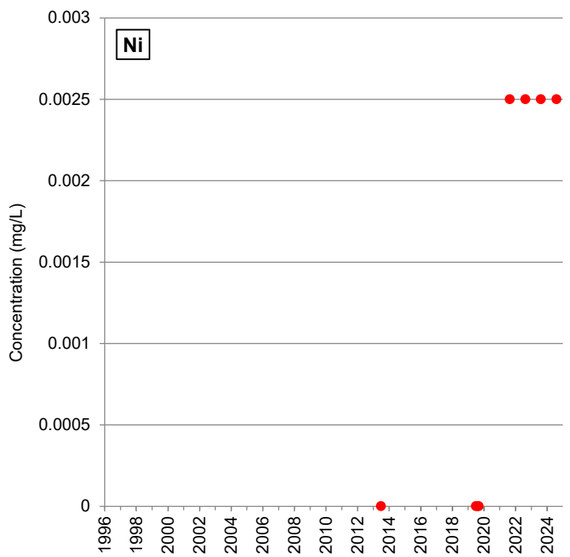


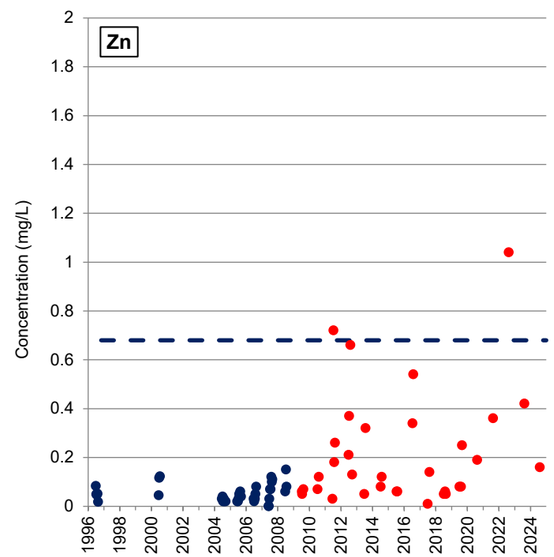












NOTES:

1. This Figure should be read in conjunction with BGC's report titled "2024 Water Quality Report", and dated February 2025.
2. Blue dots represent samples collected prior to closure, on October 1, 2008 (Stantec, March 10, 2020); red dots represent samples collected in post-closure.
3. Dashed lines indicate the site-specific Action Levels for station 159-14, as provided in the Mine's *Contingency Plan for Water Quality Exceedances* (Stantec, March 27a, 2020). pH guidance reflects the MAC range denoted in the Water Licence 1AR-NAN2030. For temporal plots where no dashed lines are present, no Action Levels are defined.
4. All results reported below the detection limit (DL) are presented as half the associated DL.

PREPARED BY: ADC	FIGURE TITLE: TEMPORAL TRENDS AT STATION 159-14
CHECKED BY: SB	CLIENT: CANZINCO MINES LTD. NANISIVIK MINE
APPROVED BY: ADC	SCALE: NTS / PROJECT NO: 0255036 / FIGURE NO: C-4

0 5 10 mm in ANSI B sized paper

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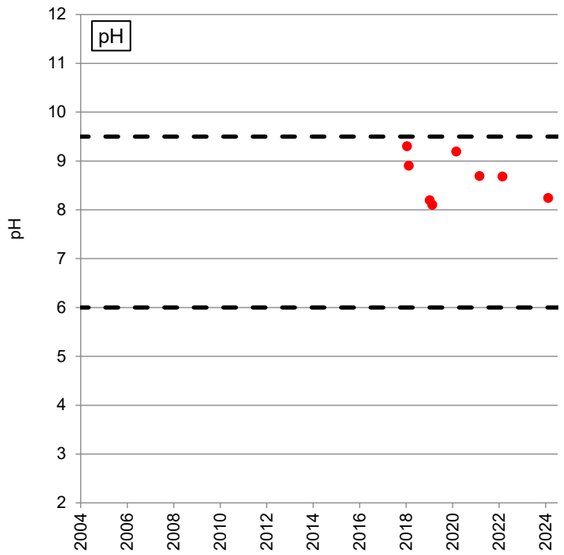

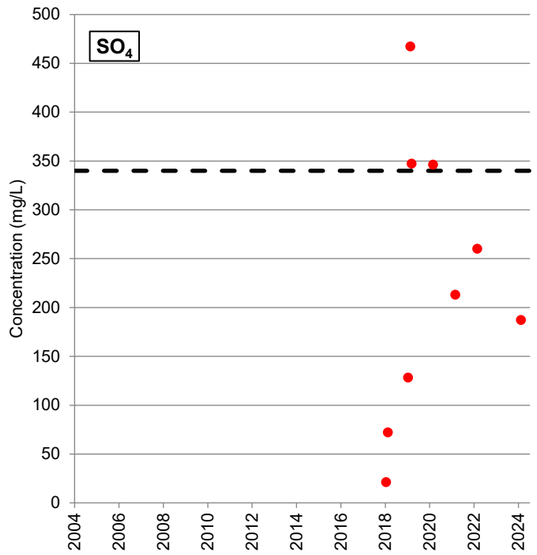

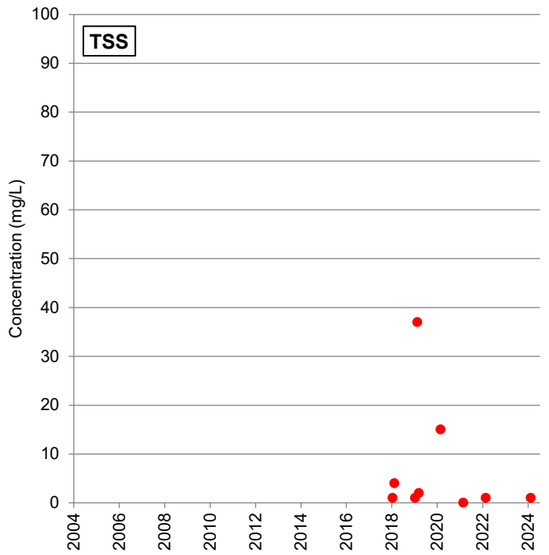

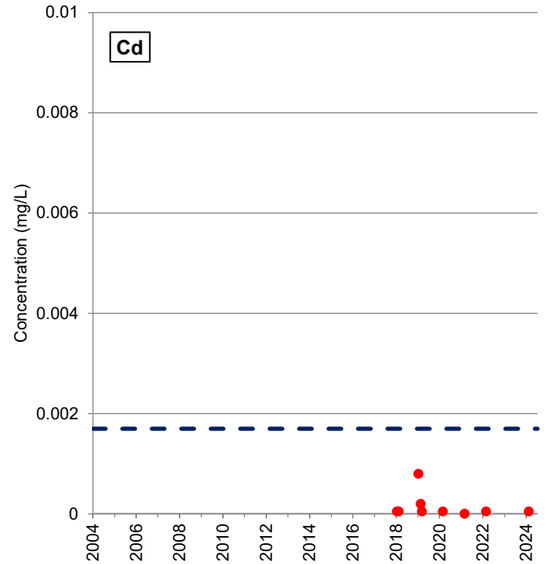

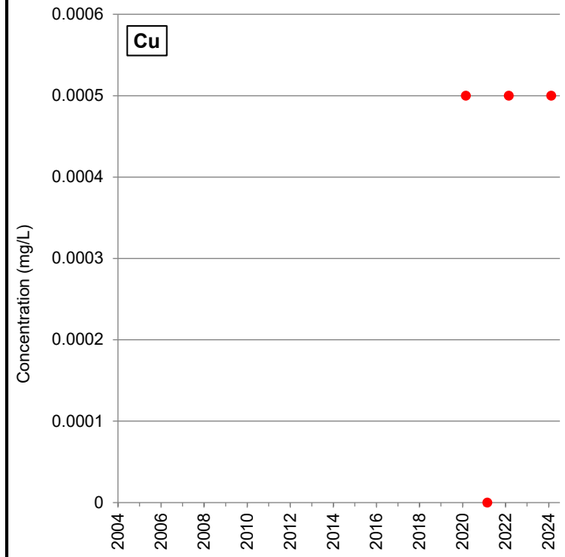

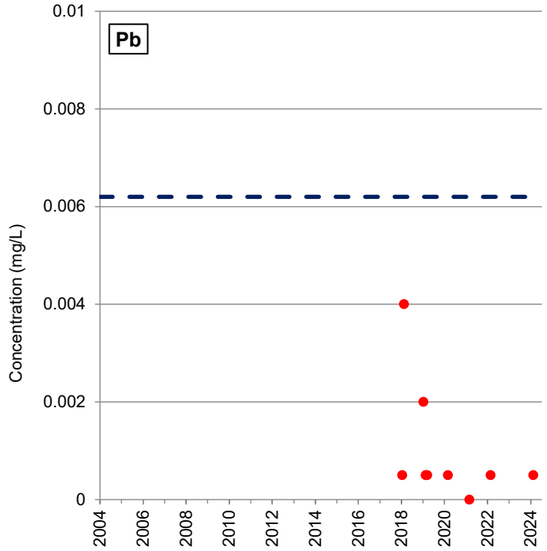

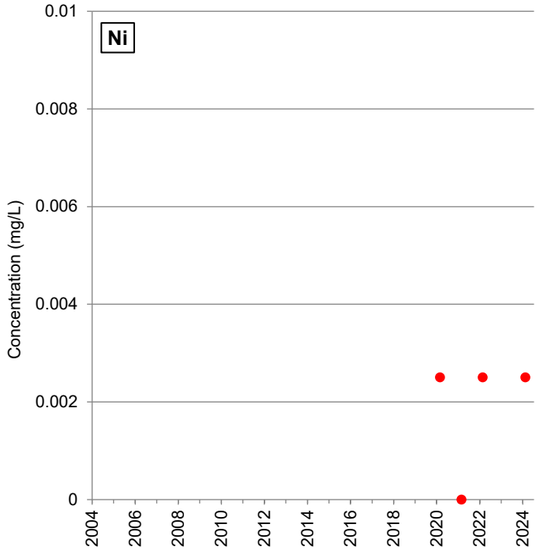

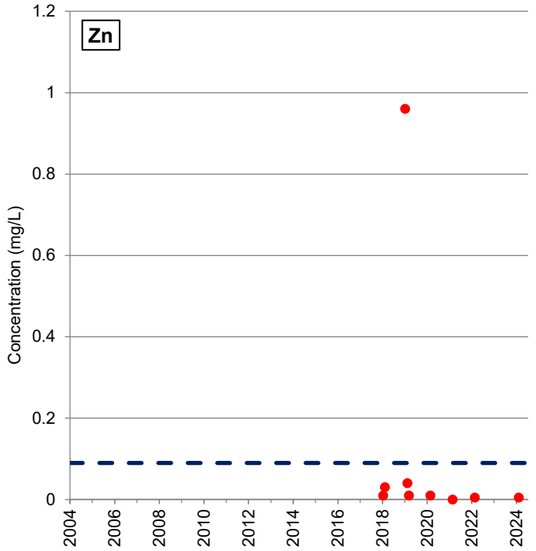

NOTES:

1. This Figure should be read in conjunction with BGC's report titled "2024 Water Quality Report", and dated February 2025.
2. Blue dots represent samples collected prior to closure, on October 1, 2008 (Stantec, March 10, 2020); red dots represent samples collected in post-closure.
3. Dashed lines indicate the site-specific Action Levels for station NML-29, as provided in the Mine's *Contingency Plan for Water Quality Exceedances* (Stantec, March 27a, 2020). pH guidance reflects the MAC range denoted in the Water Licence 1AR-NAN2030. For temporal plots where no dashed lines are present, no Action Levels are defined.
4. All results reported below the detection limit (DL) are presented as half the associated DL.

PREPARED BY: ADC	FIGURE TITLE: TEMPORAL TRENDS AT STATION NML-29		
CHECKED BY: SB	CLIENT: CANZINCO MINES LTD. NANISIVIK MINE		
APPROVED BY: ADC	SCALE: NTS	PROJECT NO: 0255036	FIGURE NO: C-5

0 5 10 mm in ANSI B sized paper

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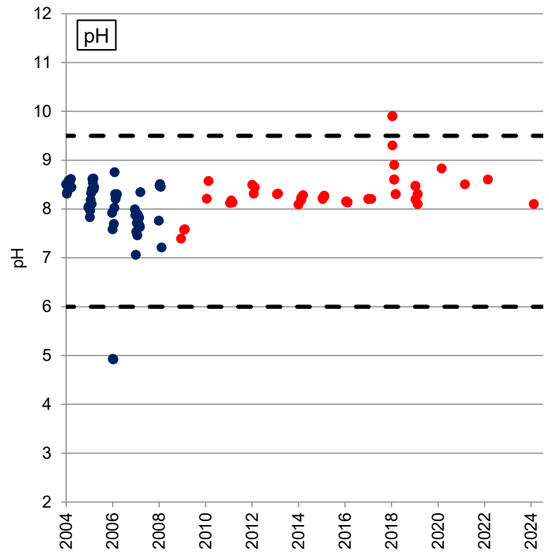

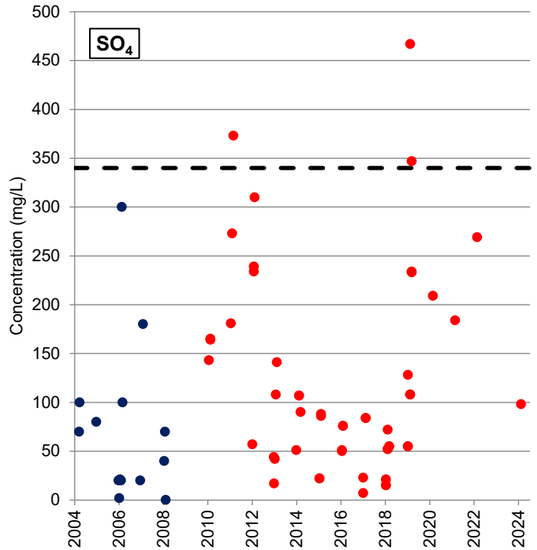

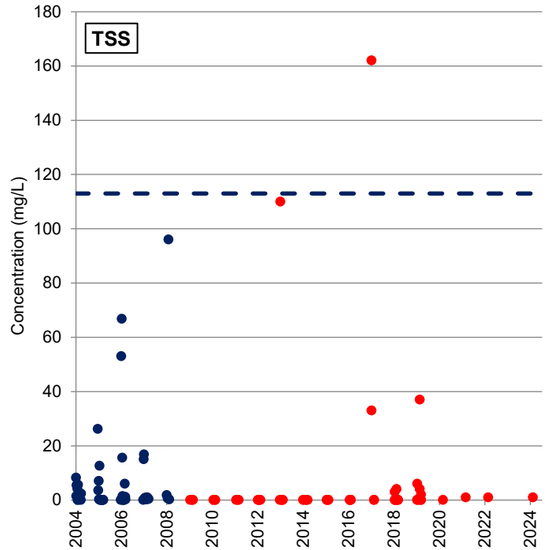

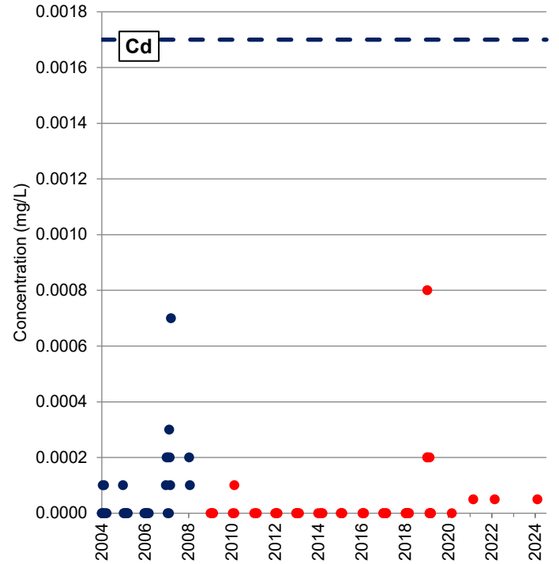

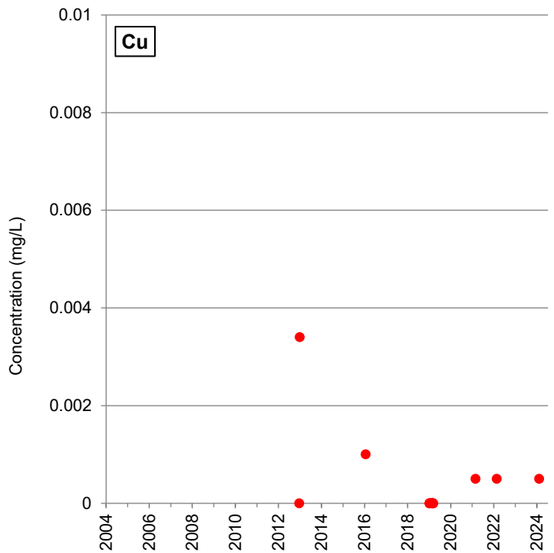

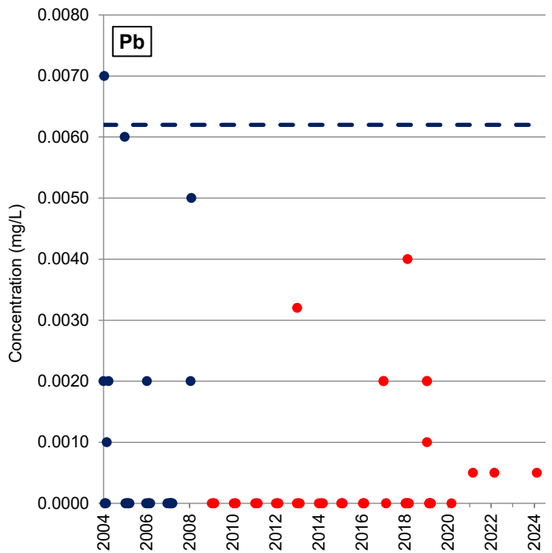

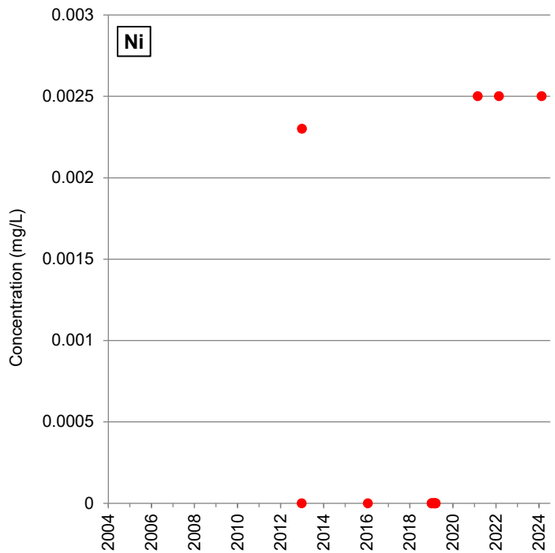

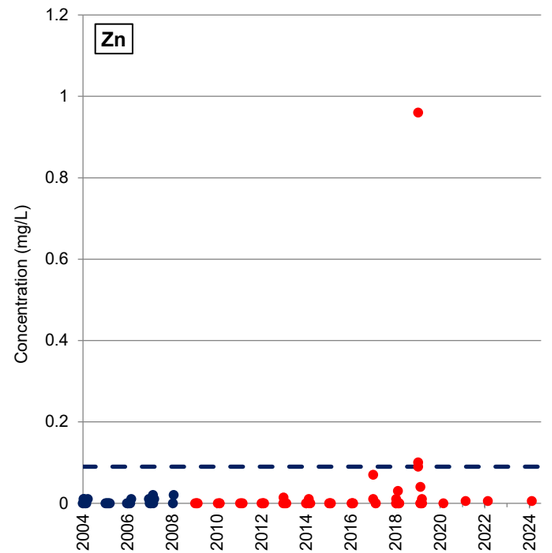

NOTES:

1. This Figure should be read in conjunction with BGC's report titled "2024 Water Quality Report", and dated February 2025.
2. Blue dots represent samples collected prior to closure, on October 1, 2008 (Stantec, March 10, 2020); red dots represent samples collected in post-closure.
3. Dashed lines indicate the site-specific Action Levels for station NML-30, as provided in the Mine's *Contingency Plan for Water Quality Exceedances* (Stantec, March 27a, 2020). pH guidance reflects the MAC range denoted in the Water Licence 1AR-NAN2030. For temporal plots where no dashed lines are present, no Action Levels are defined.
4. All results reported below the detection limit (DL) are presented as half the associated DL.

PREPARED BY: ADC	FIGURE TITLE: TEMPORAL TRENDS AT STATION NML-30		
CHECKED BY: SB	CLIENT: CANZINCO MINES LTD. NANISIVIK MINE		
APPROVED BY: ADC	SCALE: NTS	PROJECT NO: 0255036	FIGURE NO: C-6

0 5 10 mm in ANSI B sized paper

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