Greenstone Mine
2024 Indigenous Peoples Health Risk Assessment Follow-up Report

(To satisfy Federal EIS Conditions 5.3, 5.4, 5.5, and 5.6)

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December 31, 2024

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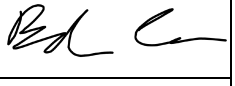
12/31/2024	**0**	**IFU**	Signature:	N/A	N/A	
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EQUINOXGOLD
GREENSTONE MINE

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Abbreviations

2024 Monitoring Period	October 1, 2023 through September 30, 2024
AAQC	Ontario Ambient Air Quality Criteria
ADD	Average Daily Dose
CAAQS	Canadian Ambient Air Quality Standards
COPC	Contaminant of Potential Concern
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPC	Exposure Point Concentration
ETP	Effluent Treatment Plant
GGM	Greenstone Gold Mines GP Inc.
HHRA	Human Health Risk Assessment
HQ	Hazard Quotient
IAAC	Impact Assessment Agency Of Canada
IUR	Inhalation Unit Risk
ILCR	Incremental Lifetime Cancer Risk
MECP	Ontario Ministry of Environment, Conservation and Parks
Mine	Greenstone Mine
MTO	Ontario Ministry of Transportation
NO_2	Nitrogen Dioxide
the Plan	Indigenous Peoples Health Risk Assessment Follow-up Plan
PM_{10}	Coarse Particulate Matter

$PM_{2.5}$	Fine Particulate Matter
SWAT	Southwest Arm Tributary
TDI	Tolerable Daily Intake
TMF	Tailings Management Facility
TSP	Total suspended particulates
UCLM	Upper Confidence Limit of the Mean
USEPA	United States Environmental Protection Agency

1 Introduction

Greenstone Gold Mines GP Inc. (GGM) has recently commissioned the Greenstone Mine (the Mine), with commercial production announced November 6, 2024 . The Mine site is located at 7921 Highway 11, within the municipality of Greenstone, near the intersection of Highway 11 and Highway 584. The Mine was subject to a federal environmental assessment (EA) (Stantec 2017) under the *Canadian Environmental Assessment Act, 2012*. The federal Decision Statement for the Mine's Environmental Impact Statement (EIS) was issued on December 13, 2018 and amended on February 10, 2021, to account for detailed design of the Mine. Another amendment to the Decision Statement is currently being processed by the Impact Assessment Agency of Canada (IAAC), who issued a draft Decision Statement on June 1, 2024 for consultation to incorporate a temporary bypass channel.

The EIS included a human health risk assessment (HHRA) that evaluated the potential for Mine construction, operation, and closure to affect human health for various human receptors, including Indigenous people who may engage in traditional practices such as the harvesting of terrestrial and aquatic country foods. Overall, the HHRA concluded that human health risks related to the Mine during construction, operation, and closure will be negligible for Indigenous People as well as for other human receptors.

The amended federal Decision Statement issued February 10, 2021 contained 11 conditions. Conditions 5.3, 5.4, 5.5, and 5.6 describe the requirement for a follow-up program to verify the accuracy of the assumptions relied on in the HHRA as it pertains to the potential for adverse environmental effects on the health of Indigenous People. Therefore, in 2020, GGM prepared an Indigenous Peoples Health Risk Assessment Follow-up Plan (the Plan) (GGM 2020a) to address these conditions. Review and finalization of the Plan was completed in consultation with Indigenous communities, and submitted to and subsequently accepted by, IAAC. The Plan describes an approach wherein concentrations of contaminants of potential concern (COPCs) are monitored in environmental media (e.g., air, surface water, and country foods) during various phases of the Mine. The measured COPC concentrations are then compared to those relied on to predict exposure (and risk) in the HHRA to determine whether the conclusions of the HHRA remain applicable or if further evaluation of potential for adverse environmental effects on the health of Indigenous People is required.

This report is the 2024 Indigenous Peoples Health Risk Assessment Follow-up Report, and provides a review and evaluation of environmental data collected during the period of October 1, 2023 through September 30, 2024 (i.e., the 2024 monitoring period) to satisfy the requirements of the Plan.

2 Review of Applicable Conditions

A summary of the overall objectives related to conditions 5.3, 5.4, 5.5, and 5.6 of the Decision Statement, and a reference to the applicable section of this report showing how these conditions are being addressed, is provided in Table 2-1.

Table 2-1: Conditions of Federal Decision Statement Related to Monitoring Potential Effects of the Mine on the Health of Indigenous Peoples

Condition Number	Condition	Applicable Section of this Report
5.3	*The Proponent shall develop, prior to construction and in consultation with Indigenous groups and relevant authorities, a follow-up program to verify the accuracy of the environmental assessment and to determine the effectiveness of the mitigation measures as it pertains to the adverse environmental effects on the health of Indigenous Peoples of changes to air quality. As part of the follow-up program, the Proponent shall:*	3
5.3.1	• *Identify monitoring locations for air contaminants within areas used by Indigenous groups for traditional purposes or within areas representative of air quality in areas used by Indigenous groups for traditional purposes*	3
5.3.2	• *Monitor, during construction, operation and the first five years of decommissioning, total suspended particulates, particulate matter (PM10), fine particulate matter (PM2.5) and nitrogen dioxide at the monitoring locations identified pursuant to condition 5.3.1, using as benchmarks the standards and criteria set out in the Canadian Council of Ministers of the Environment's Canadian Ambient Air Quality Standards and Ontario's Ambient Air Quality Criteria. The Proponent shall monitor total suspended particulates, fine particulate matter (PM2.5) and nitrogen dioxide at least monthly and shall monitor particulate matter (PM10) in real-time*	4.1
5.3.3	• *Monitor, at least annually during construction and for the first two years of operation, airborne benzene and benzo(a)pyrene at the monitoring locations identified pursuant to condition 5.3.1. The Proponent shall determine, in consultation with Indigenous groups and relevant authorities and based on the results of the monitoring, if additional monitoring is required after the first two years of operation and at what frequency this additional monitoring shall occur; and*	4.1
5.3.4	• *Monitor, during construction and for the first two years of operation, silt content on roads within the project development area. The Proponent shall determine, in consultation with Indigenous groups and relevant authorities and based on the results of the monitoring, if additional monitoring is required after the first two years of operation and at what frequency this additional monitoring shall occur.*	4.1

Condition Number	Condition	Applicable Section of this Report
5.4	*The Proponent shall develop, prior to construction and in consultation with Indigenous groups and relevant authorities, a follow-up program to verify the accuracy of the environmental assessment as it pertains to the adverse environmental effects on the health of Indigenous Peoples of changes in concentrations of contaminants in water and fish. As part of the implementation of the follow-up program, the Proponent shall:*	3
5.4.1	• *Monitor, at least quarterly during construction and the first five years of operation, mercury in the Southwest Arm Tributary, using as a benchmark a concentration of 0.04 micrograms per litre. The Proponent shall determine, in consultation with Indigenous groups and relevant authorities and based on the results of the monitoring, if additional monitoring is required after the first five years of operation and at what frequency this additional monitoring shall occur*	4.2
5.4.2	• *Monitor, at least quarterly during construction and the first five years of operation, methylmercury in the Southwest Arm Tributary, using as a benchmark a concentration of 0.0001 micrograms per litre. The Proponent shall determine, in consultation with Indigenous groups and relevant authorities and based on the results of the monitoring, if additional monitoring is required after the first five years of operation and at what frequency this additional monitoring shall occur.*	4.2
5.5	*The Proponent shall develop, prior to construction and in consultation with Indigenous groups and relevant authorities, a follow-up program to verify the accuracy of the environmental assessment and to determine the effectiveness of the mitigation measures as it pertains to the adverse environmental effects on the health of Indigenous Peoples of changes in concentrations of contaminants in country foods caused by the Designated Project. The Proponent shall implement the follow-up program during all phases of the Designated Project. As part of the development of the follow-up program, the Proponent shall identify, in consultation with Indigenous groups and relevant authorities, species of vegetation, fish and wildlife that shall be monitored and shall determine, in consultation with Indigenous groups and relevant authorities, the sampling and analytical methodology that shall be applied for the monitoring of each species, including how samples will be collected. As part of the implementation of the follow-up program, the Proponent shall:*	3

Condition Number	Condition	Applicable Section of this Report
5.5.1	• *Monitor, at least every two years, during the first six years of operation, mercury, methylmercury and arsenic concentrations in Walleye (Sander vitreus) tissue according to the methodology determined pursuant to condition 5.5. The Proponent shall determine, in consultation with Indigenous groups and relevant authorities and based on the results of the monitoring, if additional monitoring is required after the first six years of operation and at what frequency this additional monitoring shall occur*	4.3
5.5.2	• *Monitor, at least every two years, during the first six years of operation, concentrations of metals, including mercury and arsenic, in small mammals according to the methodology determined pursuant to condition 5.5. The Proponent shall determine, in consultation with Indigenous groups and relevant authorities and based on the results of the monitoring, if additional monitoring is required after the first six years of operation and at what frequency this additional monitoring shall occur.*	4.4
5.6	*Participate in any regional initiative that is established for the analysis of contaminants in moose (Alces alces) tissue in the region, should there be any such initiative(s) during construction or operation of the Designated Project.*	4.5

3 Indigenous Peoples Health Risk Assessment Follow-up Plan

As noted above, review and finalization of the Plan (GGM 2020a) was completed in consultation with Indigenous communities, and the Plan was submitted and subsequently accepted by IAAC. The Plan did not provide specific details with respect to how the environmental data identified for monitoring in conditions 5.3, 5.4, 5.5, and 5.6 of the Decision Statement would be collected. Rather, details regarding environmental monitoring were deferred to applicable environmental monitoring plans (see Section 3.1).

For the data collected in support of conditions 5.3, 5.4, 5.5, and 5.6 of the Decision Statement, the Plan did provide a data evaluation approach applicable to reviewing and evaluating collected environmental data with respect to monitoring the potential for the Mine to affect the health of Indigenous Peoples. This data evaluation approach is described in Section 3.2.

3.1 Environmental Monitoring Plans

The environmental monitoring plans identified in the Plan to describe collection of the environmental data targeted in conditions 5.3, 5.4, 5.5, and 5.6 of the Decision Statement are summarized in Table 3-1.

Table 3-1: Summary of Environmental Monitoring Plans Applicable to the Indigenous Peoples Health Risk Assessment Follow-up Plan

Condition of Decision Statement	Environmental Media	Environmental Monitoring Plan
5.3 5.3.1, 5.3.2, 5.3.3, 5.3.4	Air Quality	Air Quality Management and Monitoring Plan (GGM 2020b)
5.4 5.4.1, 5.4.2	Water	Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021)[A]
5.5 5.5.1	Fish	Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021)[A]
5.5 5.5.2	Vegetation and Wildlife	Biodiversity Management and Monitoring Plan (GGM 2022)[B]
5.6	Moose	No plan specified. Contingent on establishment of a regional initiative to monitor moose tissue concentrations and not the sole purview of GGM

Notes:

A. The environmental monitoring plans identified in Table 3-1 were not finalized at the time when the Plan was written. Therefore, in some cases, the title of the applicable sampling plan has changed. For monitoring of water quality and fish tissue, the Plan referenced a "Water Management and Monitoring Plan" for water quality and an "Aquatic Management and Monitoring Plan" for fish tissue. Sampling plans for these media in response to conditions 5.4 and 5.5 are now provided in the "Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan" as identified in this table.

B. Updates to the Biodiversity Management and Monitoring Plan are underway to include sampling of small mammals and terrestrial vegetation during Mine operation.

With respect to monitoring of vegetation and wildlife per condition 5.5 and 5.5.2 of the Decision Statement, baseline data for terrestrial vegetation, small mammals, and co-located soil samples were collected in 2018. These baseline data were relied on to define pre-existing baseline concentrations for COPCs in country foods assessed as part of the HHRA submitted as a component of the EIS for the Mine and were combined with predicted emissions from the Mine to predict contaminant concentrations in country foods during operation. The environmental monitoring plan applicable to vegetation and wildlife sampling relevant to Mine operation in Table 3-1 is the Biodiversity Management and Monitoring Plan. However, the most recent version of the Biodiversity Management and Monitoring Plan (GGM 2022) does not currently include a sampling plan to collect small mammals and terrestrial vegetation as representatives of country foods per condition 5.5 of the Decision Statement. Therefore, an update to the Biodiversity Management and Monitoring Plan is currently underway to describe this country food sampling. To permit a direct comparison to the baseline data used in the EIS, future country food sampling for terrestrial vegetation and wildlife will include the same species and locations that were sampled in 2018. Per conditions 5.5.1 and 5.5.2 of the Decision Statement, country food sampling

should occur at least every two years, during the first six years of operation. During the 2024 monitoring period, the Mine was still in the commissioning phase. Therefore, finalization of the country food sampling plan in 2025 will allow for the first sampling event to occur under the targeted schedule of 'at least every two years, during the first six years of operation' described in conditions 5.5.1 and 5.5.2 of the Decision Statement.

3.2 Benchmarks and Data Evaluation Approach

Benchmarks for data evaluation were generally not provided in conditions 5.3, 5.4, 5.5, and 5.6 of the Decision Statement. When they were, they were limited to conditions 5.3.2, 5.4.1 and 5.4.2 of the Decision Statement. Specifically, condition 5.3.2 of the Decision Statement requires that data for certain air quality parameters be compared to applicable Canadian Ambient Air Quality Standards (CAAQS) and Ontario's Ambient Air Quality Criteria (AAQC), and conditions 5.4.1 and 5.4.2 of the Decision Statement provide specific monitoring guidelines for mercury and methyl-mercury for surface water in the Southwest Arm Tributary (SWAT).

For the remaining environmental data targeted for monitoring under conditions 5.3, 5.4, 5.5, and 5.6 of the Decision Statement, a method for establishing benchmarks and evaluating data in comparison to those benchmarks was established in the Plan. This method was based on comparison of measured COPC concentrations in air, surface water, and country foods to the concentrations of these COPCs in those environmental media that were relied on in the HHRA. Specifically, this method described calculating trigger levels for each monitored COPC and environmental medium that are equal to the exposure point concentration (EPC) relied on in the HHRA plus 20%. Updated EPCs based on measured data could then be compared to the trigger levels derived from the HHRA. If the updated EPC does not exceed the applicable trigger level, then the conclusions of the HHRA will continue to be applicable and further evaluation of the potential for risk to Indigenous Health will not be required. However, if the EPCs based on monitoring data are higher than applicable trigger levels, further evaluation of the potential human health risks for Indigenous People will be required.

Updated EPCs based on monitoring data may be derived by calculating a 95% upper confidence limit of the mean (UCLM) of measured COPC concentrations in the collected monitoring data if there are at least ten samples with measured concentrations greater than the reported detection limit. In the absence of sufficient data to support calculation of a 95% UCLM (i.e., less than 10 detected concentrations), EPCs may be represented by the maximum measured concentrations (if at least one sample has a detected concentration), or the maximum detection limit (if there are no samples with detected concentrations).

The Plan included tables of trigger levels derived from the EPCs relied on in the HHRA as described above. However, given that the Plan was written before the media sampling plans identified in Table 3-1 were finalized, in some cases the tabulated trigger concentrations from the Plan refer to monitoring data and/or sampling locations that have not been targeted for collection in the final environmental monitoring plans. Therefore, updated trigger levels that integrate the data evaluation approach described in the Plan with the actual monitoring data targeted for collection and analysis are provided in Appendix A of this report. The monitoring data reviewed herein, and in future years, will be compared to the trigger levels in Appendix A. In addition, where applicable, sampled media should also be compared to the benchmarks specifically identified in conditions 5.3.2 (for air quality) and conditions 5.4.1 and 5.4.2 (for mercury and methyl-mercury in surface water from the SWAT) of the Decision Statement. For completeness, these specific benchmarks are referenced where applicable in Appendix A.

4 Monitoring Results

Sections 4.1 to 4.5 provide a summary of the environmental data collected during the 2024 monitoring period to meet the requirements of conditions 5.3, 5.4, 5.5, and 5.6 of the Decision Statement. A comparison of these data to applicable trigger levels and other applicable criteria are summarized in Appendix A according to the data evaluation methods described in Section 3.2.

4.1 Air Quality (Conditions 5.3, 5.3.1, 5.3.2, 5.3.3, and 5.3.4 of the Decision Statement)

Conditions 5.3, 5.3.1, 5.3.2, 5.3.3, and 5.3.4 of the Decision Statement refer to monitoring and evaluation of the potential for adverse effects on the health of Indigenous Peoples due to changes in air quality. These conditions include specific monitoring requirements for the following air quality contaminants during construction, operation, and/or decommissioning:

- Total suspended particulates (TSP), coarse particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), and nitrogen dioxide (NO_2) (Condition 5.3.2 of the Decision Statement)
- Benzene and benzo(a)pyrene (Condition 5.3.3 of the Decision Statement)
- Silt content on haul roads (Condition 5.3.4 of the Decision Statement)

Trigger levels for air contaminants are provided in Table A-1 (Appendix A).

The locations that were selected for monitoring TSP, PM_{10}, NO_2, $PM_{2.5}$, benzo(a)pyrene, and benzene in the Air Quality Management and Monitoring Plan (GGM 2020b) are shown on Figure 1 summarized below:

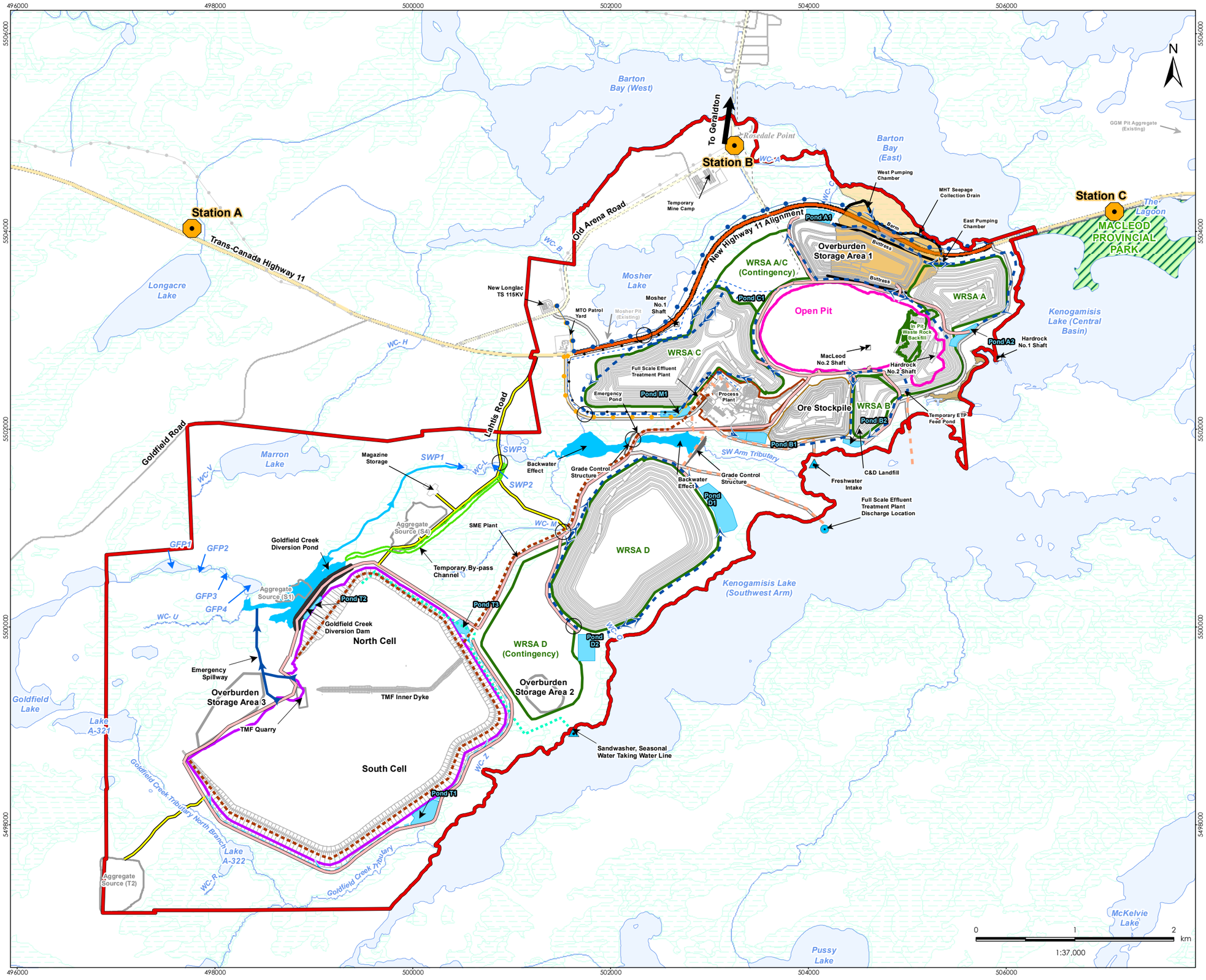
- Station A (Upwind) - A site located in a predominantly upwind location from the Mine (west of the tailings management facility [TMF]). The site for this station is on an existing drill pad north of the TransCanada Highway and Longacre Lake.
- Station B (Downwind) – Located in a downwind direction in the vicinity of the nearest residential area (the Rosedale Point neighborhood). The site for this station is near the intersection of Michael Power Boulevard and Old Arena Road in an open field. The meteorological tower is also installed at this location.
- Station C (Downwind) - Located in a predominantly downwind direction near MacLeod Provincial Park, which contains campgrounds and is considered sensitive to air quality. The location is near the entrance gate to the park.

Station B (Rosedale Point) and Station C (MacLeod Provincial Park) represent areas that were evaluated in the HHRA, and the trigger levels for TSP, PM_{10}, NO_2, $PM_{2.5}$, benzo(a)pyrene, and

benzene are specific to these two areas Table A-1 (Appendix A). Measured concentrations from these areas are also compared to those from Station A, which acts as a predominantly upwind background location. In contrast, the trigger level for silt content on haul roads is not specific to a single haul road and rather will be used to evaluate a composite of collected road surface silt content samples.

Condition 5.3.2 also specified that monitored concentrations of TSP, PM_{10}, $PM_{2.5}$, and NO_2 be compared to "standards and criteria set out in the Canadian Council of Ministers of the Environment's Canadian Ambient Air Quality Standards and Ontario's Ambient Air Quality Criteria". These criteria (if available) are also summarized in Table A-1 (Appendix A).

Comparisons of the applicable air quality monitoring data from the 2024 monitoring period to the trigger levels and regulatory guidelines summarized in Table A-1 (Appendix A) are provided in Section 4.1.1 to Section 4.1.3, below.



Stantec

Legend

- Proposed Monitoring Station Location
- Model Property Boundary

Preliminary Site Plan

- Discharge Location
- Existing Mine Shaft
- Freshwater Intake
- Watercrossing
- Temporary By-Pass Channel Limit of Grading
- Access Road
- Construction Access Road
- Diversion Channel
- Emergency Spillways
- Haul Road
- Potable Water Pipeline
- Pipeline (Intake and Discharge)
- 44 kV Distribution Line
- 12.5 kV Distribution Line
- 115 kV Transmission Line
- Seepage Collection Ditch
- Subsurface Seepage Collection System
- Contact Water Collection Ditch
- Tailings Pipeline and 13.8 kV Distribution Line
- Water Line
- Aggregate Source
- Collection Ponds
- Open Pit- Full Extent
- Ore Stockpile
- Process Plant Area
- Tailings Management Facility
- Waste Rock Storage Area

Highway Realignment

- New Highway 11 Alignment

Existing Features*

- Highway
- Major Road
- Local Road
- Existing Power Line
- Existing Potable Water Pipeline
- Watercourse
- Provincial Park
- Waterbody
- Wetland (Eco-Site Based)

Historical Tailings Areas

- Historical Hardrock Tailings
- Historical MacLeod High Tailings
- Historical MacLeod Low Tailings

Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.

* Existing Features have been removed in the PDA and do not reflect current conditions.

December 2024
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Client/Project

GREENSTONE GOLD MINES GP INC. (GGM)
HARDROCK PROJECT, 2024 INDIGENOUS PEOPLES HEALTH RISK ASSESSMENT FOLLOW-UP REPORT

Figure No.

1

Title

Locations of Ambient Monitoring Stations

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Revised: 2024-12-17 By: bcowper

4.1.1 Comparison to Air Quality Standards and Criteria (Condition 5.3.2 and 5.3.3 of Decision Statement)

The available air quality monitoring data at Station A (Upwind), Station B (Rosedale Point), and Station C (MacLeod Provincial Park) for TSP, PM_{10}, $PM_{2.5}$, NO_2, benzene and benzo(a)pyrene are summarized in Table 4-1 and compared to applicable AAQC and CAAQS. The maximum measured concentration for each contaminant was less than the applicable AAQC for the 2024 monitoring period.

A comparison to the CAAQS for $PM_{2.5}$ and NO_2 requires averaging the 98th percentile daily concentrations in each of three consecutive years, with a minimum of 2 calendar years of data. Starting in 2024, monitoring has been conducted for more than 2 years, so there is sufficient data to make comparisons to the CAAQS. $PM_{2.5}$ and NO_2 monitoring data from Q4 2022 to Q3 2024 were used to make preliminary comparisons to the CAAQS. The available two years of data are not calendar years, therefore the comparisons to the CAAQS are provided for informational purposes only. Table 4-1 shows that for $PM_{2.5}$ Stations A and B are greater than the daily CAAQS by 30% and 11%, respectively. These exceedances are due to the influence of northern Ontario wildfires on ambient air quality in the fall of 2023. $PM_{2.5}$ measurements were less than annual CAAQS for Stations A, B and C. The NO_2 measurements were less than the CAAQS.

The data presented in Table 4-1 has been edited to remove exceedances that were not attributable to the Mine.

The maximum measured rolling 24-hour average PM_{10} concentration (41 µg/m^3) presented in Table 4-1 for Station A (Upwind) is 83% of the AAQC. When this measurement occurred, winds were blowing from the north, which is a direction for which emissions from the Mine would not be carried towards Station A, and therefore is not attributable to GGM.

The maximum rolling 24-hour PM_{10} concentration measured at Station B (Rosedale Point) was 86 µg/m^3, which is 73% above the AAQC. During the timeframe when elevated hourly average PM_{10} concentrations resulted in the rolling 24-hour exceedance, winds were blowing from southwesterly to southerly directions, for which the Mine is upwind of the monitor. When the hourly average PM_{10} concentrations are the highest, the measured wind speed decreases to calm conditions. Therefore, the exceedance at Station B is likely attributable to the Mine emissions with anomalous meteorological conditions (causing poor atmospheric dispersion) resulting in the elevated concentrations.

In September 2024, Station C (MacLeod Provincial Park) measured a rolling 24-hour average PM_{10} concentration of 47 µg/m^3, which is 94% of the AAQC. During the times in which hourly average PM_{10} measurements resulted in this rolling 24-hour average concentration, winds varied between southwesterly and northwesterly directions. For these wind directions, both the Mine and the highway/ a Ministry of Transportation Ontario (MTO) aggregate pit (located on the north side of Highway 11) were upwind of Station C. The elevated PM_{10} concentrations were likely due to a combination of emissions from these sources.

4.1.2 Comparison to Trigger Levels

The available air quality monitoring data for Station B (Rosedale Point) and Station C (MacLeod Provincial Park) for TSP, PM_{10}, $PM_{2.5}$, NO_2, benzene and benzo(a)pyrene were compared to their trigger levels in Table 4-2. The upper confidence levels calculated from the ambient monitoring data at Stations B and C were below their respective trigger levels.

Table 4-1: Comparison of Ambient Air Quality Monitoring Data to Ambient Air Quality Criteria

Contaminant	Averaging Period	Units	Ontario Ambient Air Quality Criteria (AAQC)	Canadian Ambient Air Quality Standards (CAAQS)	Station A - Upwind			Station B - Rosedale Point			Station C - MacLeod Provincial Park		
					Maximum	95% UCLM of Measured Data	% Criteria	Maximum	95% UCLM of Measured Data	% Criteria	Maximum	95% UCLM of Measured Data	% Criteria
TSP	24-hour	µg/m^3	120	-	27	10	23%	99	25	83%	118	22	98%
	Annual	µg/m^3	60	-	4.3	-	7%	9.5	-	16%	10	-	16%
PM_{10}	24-hour	µg/m^3	50	-	41	7.2	83%	86	10	173%	47	9.8	94%
NO_2	1-hour	ppb	200	-	-	-	-	26	1.5	13%	-	-	-
	1-hour	ppb	-	60 [A]	-	-	-	22	-	38%	-	-	-
	24-hour	ppb	100	-	-	-	-	11	1.5	11%	-	-	-
	Annual	ppb	-	17 [B]	-	-	-	1.5	-	7%	-	-	-
$PM_{2.5}$	24-hour	µg/m^3	27 [C]	27 [C]	35	13	130%	30	6.3	111%	25	5.3	94%
	Annual	µg/m^3	8.8 [D]	8.8 [D]	7.6	-	86%	6.2	-	71%	5.6	-	63%
Benzo(a) Pyrene	24-hour	µg/m^3	5.0E-05	-	9.5E-06	6.7E-06	19%	3.4E-06	3.7E-06	7%	1.3E-05	8.8E-06	26%
	Annual	µg/m^3	1.0E-05	-	2.8E-06	-	28%	2.5E-06	-	25%	3.2E-06	-	32%
Benzene	24-hour	µg/m^3	2.3	-	1.1	0.7	48%	1.2	0.8	53%	1.2	0.7	53%
	Annual	µg/m^3	120	-	0.56	-	124%	0.57	-	127%	0.52	-	115%

Notes:

A. Canadian Ambient Air Quality Standards (CAAQS) for Nitrogen Dioxide effective by 2020 (CCME 2012). The 1-hour CAAQS for NO2 is referenced to the 3-year average of the annual 98th percentile of the daily maximum 1-hour average concentrations.

B. Annual Canadian Ambient Air Quality Standard for Nitrogen Dioxide, effective by 2020 (CCME 2012). The Nitrogen Dioxide Objective is the average over a single calendar year of all 1-hour average concentrations.

C. Canadian Ambient Air Quality Standards (CAAQS) for Respirable Particulate Matter, effective by 2020 (CCME 2012). The Respirable Particulate Matter Objective is referenced to the 98th percentile daily average concentration averaged over 3 consecutive years.

D. Annual Canadian Ambient Air Quality Standard for Respirable Particulate Matter, effective by 2020. The Respirable Particulate Matter Objective is referenced to the 3-year average of the annual average concentrations.

INS – Insufficient. 95% UCLM – 95% Upper Confidence Limit of the Mean

Table 4-2: Summary of Ambient Air Quality Monitoring Upper Confidence Levels to Trigger Levels

Contaminant	Averaging Period [A, B]	Units	Station B - Rosedale Point			Station C - MacLeod Provincial Park		
			Measured Data	Trigger Level	% of Trigger Level	Measured Data	Trigger Level	% of Trigger Level
TSP	24-hour	µg/m^3	25	123.8	20%	22	102.1	21%
	Annual	µg/m^3	9.5	19.8	48%	10	22.4	43%
PM_{10}	24-hour	µg/m^3	10	84.7	12%	9.8	67.9	14%
NO_2	1-hour	ppb	1.5	138.2	1%	-	-	-
	24-hour	ppb	1.5	68.0	2%	-	-	-
	Annual	ppb	1.5	16.2	N/A	-	-	-
$PM_{2.5}$	24-hour	µg/m^3	6.3	17.7	36%	5.3	18.4	29%
	Annual	µg/m^3	3.5	8.8	40%	3.2	9	35%
Benzo(a)Pyrene	24-hour	µg/m^3	3.7E-06	1.81E-04	2%	8.8E-06	1.82E-04	5%
	Annual	µg/m^3	2.5E-06	9.80E-05	3%	3.2E-06	9.84E-05	3%
Benzene	24-hour	µg/m^3	0.8	1.2	68%	0.7	1.2	58%
	Annual	µg/m^3	0.6	0.68	85%	0.5	0.69	76%

Notes:
N/A – Not Applicable
A. 95% Upper Confidence Limit of the Mean is presented for the 24-hour averaging period.
B. the 2024 annual average value is provided for contaminants with an annual averaging period.

4.1.3 Silt content on Roads (Condition 5.3.4 of Decision Statement)

The requirement for silt content sampling during construction is for specific haul roads. Samples were collected in Q4 2024 and the laboratory results are pending. No results with respect to silt content on roads are therefore presented in this report.

4.1.4 Summary

Overall, the monitoring data reviewed herein suggests that the assumptions relied on in the HHRA remain applicable. Further evaluation of the potential for Mine-related changes to air quality to affect the health of Indigenous Peoples is not required based on the data collected during the 2024 monitoring period. These assumptions will be re-evaluated based on updated monitoring data in next year's Indigenous Peoples Health Risk Assessment Follow Up Report.

4.2 Surface Water (Conditions 5.4, 5.4.1, and 5.4.2 of Decision Statement)

Condition 5.4 of the Decision Statement refers to monitoring adverse environmental effects on the health of Indigenous Peoples due to changes in contaminant concentrations in water and fish. However, the specific monitoring requirements in conditions 5.4.1 and 5.4.2 of the Decision Statement refer only to monitoring and evaluation of contaminant concentrations in surface water. Therefore, this section focuses on reporting of surface water quality only. Fish tissue monitoring is discussed separately in Section 4.3, below.

Trigger levels for total metals in surface water collected for the four basins of Kenogamisis Lake evaluated in the HHRA (Barton Bay, Southwest Arm, Central Basin, and Outlet Basin), derived by adding 20% to the EPCs of these parameters at these locations that were relied on to predict exposure in the HHRA, are provided in Table A-3 (Appendix A). In addition, in the HHRA, the final risk characterization related to exposure to COPCs in surface water was completed based on exposure to an overall lake-wide EPC for Kenogamisis Lake that was derived by calculating a weighted average of the EPCs for the individual basins that took into account the normalized area of each sub-basin as shown in Table A-4 (Appendix A). Therefore, trigger levels for the overall weighted mean of Kenogamisis Lake, derived by adding 20% to the lake-wide EPCs of these parameters that were relied on to predict exposure to these parameters lake-wide in the HHRA, are also provided in Table A-5 (Appendix A).

In addition to the trigger levels derived based on concentrations relied on in the HHRA provided in Table A-4 (Appendix A) and Table A-5 (Appendix A) for surface water collected in Kenogamisis Lake, conditions 5.4.1 and 5.4.2 of the Decision Statement specified that monitored concentrations of mercury and methyl-mercury concentrations for surface water collected from the SWAT be compared to the benchmarks of 0.04 µg/L and 0.0001 µg/L, respectively.

A detailed description of the surface water quality monitoring methods (i.e., data collection, laboratory analysis, and data analysis) for the 2024 monitoring period is provided in the 2024 Fish and Fish Habitat Federal EIS Follow-Up Monitoring Report (GGM 2024). The analytical results summarized herein are reported in full in Appendix B2 of the 2024 Fish and Fish Habitat Federal EIS Follow-Up Monitoring Report (GGM 2024).

A comparison of the available surface water quality monitoring data for the 2024 monitoring period to the trigger levels summarized in Table A-3 (Appendix A) and the benchmarks for mercury and methyl-mercury defined in conditions 5.4.1 and 5.4.2 of the Decision Statement is provided in Section 4.2.1 and Section 0, below.

4.2.1 Total Metals in Kenogamisis Lake Basins (Barton Bay, Southwest Arm, Central Basin, and Outlet Basin)

As described in the 2024 Fish and Fish Habitat Federal EIS Follow-Up Monitoring Report (GGM 2024e), metals concentrations in surface water in Kenogamisis Lake were monitored at Stations 2 and 4 (Barton Bay), 47 (Central Basin), 8, 11, and 17 (Outlet Basin), and 1A, 23, 24, and 46 (Southwest Arm).

To identify potential increases in total metals in surface water relative to the concentrations relied on in the HHRA, a two-step process was undertaken.

- The first step was to calculate EPCs for the individual Kenogamisis Lake basins (Barton Bay, Southwest Arm, Central Basin, and Outlet Basin) using the 2024 monitoring data, grouped by basin according to the stations identified in Table A-2 (Appendix A), and compare the basin-specific EPCs to the basin-specific trigger levels provided in Table A-3 (Appendix A).

- The second step was to calculate an updated lake-wide EPC for each metal. These lake-wide EPCs were generated by multiplying the exposure estimates for each basin by the applicable normalized area from Table A-4 (Appendix A) and summing the resulting products. This updated lake-wide EPC was then compared to the lake-wide trigger levels provided in Table A-5 (Appendix A).

In cases where the lake-wide EPCs do not exceed the lake-wide trigger levels, it is concluded that the assumptions relied on in the HHRA with respect to surface water concentrations remain applicable in 2024. As such, there is no predicted change to the conclusion of the HHRA that human health risks related to the Mine during construction, operation, and closure will be negligible for Indigenous People as well as for all other human receptors.

However, in cases where lake-wide EPCs exceed the lake-wide trigger levels, further interpretation of the potential for the observed concentrations to affect conclusions of the HHRA and the health of Indigenous People is required.

Comparisons of the EPCs calculated using 2024 monitoring data to the applicable trigger levels are provided in Table 4-3 and Table 4-4 for the basin-specific and lake-wide EPCs, respectively.

Table 4-3: Summary of Total Metals in Kenogamisis Lake Basins (Barton Bay, Southwest Arm, Central Basin, and Outlet Basin) in the 2024 Monitoring Period

Analyte	Basin of Kenogamisis Lake	Trigger Level (µg/L)	Number of Samples	Number of Samples with Detected Concentrations	Maximum Detected Concentration (µg/L)	Maximum Reported Detection Limit (µg/L)	Median (µg/L)	EPC Based on Measured Data[A] (µg/L)	% of Trigger Level[D]	Do Measured Concentrations Change the Conclusion of the HHRA?
Antimony	Barton Bay	0.52	20	19	0.9	0.1	0.42	0.49	94%	No. Basin-specific trigger levels not exceeded.
	Central Basin	3.9	10	7	0.2	0.1	0.11	0.2[B]	5%	
	Outlet Basin	2.7	33	29	0.22	0.5	0.16	0.16	6%	
	Southwest Arm	3	42	2	0.2	0.1	0.1	0.2[B]	7%	
Arsenic	Barton Bay	17	20	20	130	N/A	25	55	**324%**	No. See text.
	Central Basin	7.9	10	10	21	N/A	7.4	13	**165%**	
	Outlet Basin	5.3	33	33	24	N/A	10	13	**245%**	
	Southwest Arm	2.7	42	42	5.8	N/A	1.2	2	74%	
Barium	Barton Bay	7.8	20	20	12	N/A	7.7	8.4	**108%**	No. See text.
	Central Basin	11	10	10	14	N/A	10	12	**109%**	
	Outlet Basin	11	33	33	31	N/A	11	12	**109%**	
	Southwest Arm	13	42	42	14	N/A	12	12	92%	
Beryllium	Barton Bay	0.32	20	0	N/A	0.05	0.05	0.05[C]	16%	No. Basin-specific trigger levels not exceeded.
	Central Basin	0.27	10	0	N/A	0.05	0.05	0.05[C]	19%	
	Outlet Basin	0.29	33	1	0.1	0.25	0.05	0.1[B]	34%	
	Southwest Arm	0.28	42	0	N/A	0.05	0.05	0.05[C]	18%	
Chromium	Barton Bay	0.6	20	4	0.79	0.5	0.5	0.79[B]	**132%**	No. See text.
	Central Basin	0.43	10	1	0.21	0.5	0.5	0.21[B]	49%	
	Outlet Basin	0.42	33	4	9	2.5	0.5	9[B]	**2143%**	
	Southwest Arm	0.44	42	3	0.77	0.5	0.5	0.77[B]	**175%**	
Cobalt	Barton Bay	0.21	20	13	0.24	0.1	0.1	0.12	57%	No. See text.
	Central Basin	0.24	10	1	0.09	0.1	0.07	0.09[B]	38%	
	Outlet Basin	0.23	33	3	2.5	0.25	0.05	2.5[B]	**1087%**	
	Southwest Arm	0.34	42	3	0.13	0.1	0.05	0.13[B]	38%	

Analyte	Basin of Kenogamisis Lake	Trigger Level (µg/L)	Number of Samples	Number of Samples with Detected Concentrations	Maximum Detected Concentration (µg/L)	Maximum Reported Detection Limit (µg/L)	Median (µg/L)	EPC Based on Measured Data[A] (µg/L)	% of Trigger Level[D]	Do Measured Concentrations Change the Conclusion of the HHRA?
Copper	Barton Bay	3.4	20	20	4.9	N/A	1.8	2.5	74%	No. See text.
	Central Basin	2	10	10	1.4	N/A	0.93	1.1	55%	
	Outlet Basin	1.4	33	33	11	N/A	1.2	2.1	**150%**	
	Southwest Arm	0.63	42	35	0.7	0.5	0.5	0.52	83%	
Lead	Barton Bay	0.48	20	20	0.35	N/A	0.19	0.21	44%	No. See text.
	Central Basin	0.32	10	7	0.7	0.05	0.065	0.7[B]	**219%**	
	Outlet Basin	0.33	33	20	3.9	0.25	0.06	0.44	**133%**	
	Southwest Arm	0.29	42	20	3.5	0.05	0.05	0.33	**114%**	
Manganese	Barton Bay	23	20	20	41	N/A	14	23	100%	No. See text.
	Central Basin	16	10	10	18	N/A	11	13	81%	
	Outlet Basin	18	33	33	180	N/A	12	25	**139%**	
	Southwest Arm	16	42	42	26	N/A	12	14	88%	
Mercury	Barton Bay	0.011	20	20	0.0052	N/A	0.0017	0.0027	25%	No. Basin-specific trigger levels not exceeded.
	Central Basin	0.035	10	10	0.0027	N/A	0.0012	0.0017	5%	
	Outlet Basin	0.009	33	33	0.0043	N/A	0.00097	0.0015	17%	
	Southwest Arm	0.008	42	42	0.0036	N/A	0.0012	0.0017	21%	
Nickel	Barton Bay	1.1	20	20	1.7	N/A	0.68	0.88	80%	No. Lake-wide trigger level not exceeded (see Table 4-4)
	Central Basin	0.8	10	8	0.65	0.5	0.4	0.65[B]	81%	
	Outlet Basin	0.71	33	25	7.1	0.5	0.4	0.97	**137%**	
	Southwest Arm	0.73	42	32	0.67	0.5	0.3	0.31	42%	
Selenium	Barton Bay	0.34	20	16	0.11	0.05	0.067	0.08	24%	No. Basin-specific trigger levels not exceeded.
	Central Basin	0.29	10	8	0.12	0.05	0.065	0.12[B]	41%	
	Outlet Basin	0.31	33	29	0.15	0.25	0.07	0.078	25%	
	Southwest Arm	0.3	42	37	0.12	0.05	0.06	0.071	24%	
Thallium	Barton Bay	0.09	20	0	N/A	0.01	0.005	0.01[C]	11%	No. Basin-specific trigger levels not exceeded.
	Central Basin	0.07	10	1	0.005	0.01	0.005	0.005[B]	7%	
	Outlet Basin	0.08	33	2	0.047	0.025	0.005	0.047[B]	59%	
	Southwest Arm	0.08	42	0	N/A	0.01	0.005	0.01[C]	13%	

Analyte	Basin of Kenogamisis Lake	Trigger Level (µg/L)	Number of Samples	Number of Samples with Detected Concentrations	Maximum Detected Concentration (µg/L)	Maximum Reported Detection Limit (µg/L)	Median (µg/L)	EPC Based on Measured Data[A] (µg/L)	% of Trigger Level[D]	Do Measured Concentrations Change the Conclusion of the HHRA?
Uranium	Barton Bay	1.4	20	20	0.061	N/A	0.04	0.044	3%	No. Basin-specific trigger levels not exceeded.
	Central Basin	2.2	10	10	0.23	N/A	0.14	0.16	7%	
	Outlet Basin	2.2	33	33	0.39	N/A	0.13	0.16	7%	
	Southwest Arm	2.6	42	42	0.34	N/A	0.2	0.22	8%	
Vanadium	Barton Bay	0.59	20	15	1	0.5	0.28	0.37	63%	No. See text.
	Central Basin	0.49	10	7	0.64	0.5	0.27	0.64[B]	**131%**	
	Outlet Basin	0.49	33	26	7.6	0.5	0.3	0.9	**184%**	
	Southwest Arm	0.5	42	31	0.59	0.5	0.22	0.25	50%	
Zinc	Barton Bay	3.1	20	13	5	3	3	2.8	90%	No. See text.
	Central Basin	2.4	10	5	6.5	3	3	6.5[B]	**271%**	
	Outlet Basin	2.1	33	21	18	3	2.2	3.2	**152%**	
	Southwest Arm	2.2	42	24	6.5	3	3	2.3	**105%**	

Notes:

A. Exposure point concentration (EPC) of measured data from the 2024 monitoring period. Where there were sufficient data (i.e., at least 10 samples with detected concentrations) the EPC is represented by a 95% upper confidence limit of the mean (95% UCLM) calculated using USEPA's ProUCL Version 5.2 statistical software. If there were less than 10 samples with detected concentrations, the EPC is represented by the maximum measured concentration (if there is at least one sample with a detected concentration) or maximum reported detection limit (if there are no samples with a detected concentration).

B. EPC represented by maximum detected concentration

C. EPC represented by maximum reported detection limit

D. Comparison of EPC to trigger level (i.e., (EPC/trigger level) *100). Values greater than 100% are **bolded and shaded**.

NA - Not Applicable

Table 4-4: Summary of Lake-Wide Exposure Point Concentrations (EPCs) Calculated as a Weighted Average of the EPCs for Individual Basins

Analyte	Trigger Level (µg/L)	Lake-Wide EPC Based on Measured Data[A] (µg/L)	% of Trigger Level[B]	Do Measured Concentrations Change the Conclusion of the HHRA?
Antimony	2.5	0.22	9%	No. Trigger level not exceeded.
Arsenic	12	16	136%	No. See text.
Barium	11	12	105%	No. See text.
Beryllium	0.29	0.075	26%	No. Trigger level not exceeded.
Chromium	0.45	4.7	1045%	No. See text.
Cobalt	0.24	1.3	535%	No. See text.
Copper	1.5	1.7	110%	No. See text.
Lead	0.35	0.43	124%	No. See text.
Manganese	18	20	113%	No. See text.
Mercury	0.013	0.0017	13%	No. Trigger level not exceeded.
Nickel	0.81	0.77	95%	No. Trigger level not exceeded.
Selenium	0.34	0.084	25%	No. Trigger level not exceeded.
Thallium	0.081	0.027	34%	No. Trigger level not exceeded.
Uranium	2.1	0.16	7%	No. Trigger level not exceeded.
Vanadium	0.51	0.65	128%	No. See text.
Zinc	2.3	3.6	155%	No. See text.

Notes:

A. The lake-wide exposure point concentration (EPC) of measured data from the 2024 monitoring period was generated by multiplying the exposure estimates for each basin by their applicable normalized area from Table A 4 (Appendix A) and summing the resulting products.

B. Comparison of EPC to trigger level (i.e., (EPC/trigger level) *100). Values greater than 100% are **bolded and shaded**.

As shown in Table 4-3, basin-specific EPCs were less than the basin-specific trigger levels for all basins for antimony, beryllium, mercury, selenium, thallium, and uranium. Given that the lake-wide EPCs were calculated as a weighted average of the basin-specific EPCs, this means that the lake-wide EPCs for these parameters are also less than the lake-wide trigger levels for these parameters (Table 4-4). In addition, the lake-wide EPC for nickel was less than the lake-wide trigger level for nickel (Table 4-4) despite the occurrence of a basin-specific EPC greater than the basin-specific EPC for nickel in one basin (Outlet Basin, see Table 4-3). Therefore, the assumptions relied on in the HHRA with respect to surface water concentrations for antimony, beryllium, mercury, nickel, selenium, thallium, and uranium remain applicable and further evaluation of the potential for the measured surface water concentrations for these metals to affect the health of Indigenous People is not required.

However, lake-wide EPCs were greater than lake-wide trigger levels for arsenic, barium, chromium, cobalt, copper, lead, manganese, vanadium, and zinc (Table 4-4). Therefore, further evaluation of the potential for exposure to these parameters in surface water to affect the health of Indigenous People was required and is provided below.

- **Arsenic**

  The lake-wide EPC for total arsenic was 136% of the applicable lake-wide trigger level (Table 4-4). However, the trigger levels reported in Table A-3 (Appendix A) and Table A-5 (Appendix A) are based on the 'Future Case' scenario evaluated in the HHRA, which was selected to represent the highest predicted concentration during Mine Operation, Active Closure, or Post-Closure. For most parameters, this 'Future case' concentration was greater than or equal to the baseline concentration. However, for arsenic, the baseline concentration was higher than the 'Future Case' concentration as concentrations for arsenic were predicted to decrease over time to account for projected rehabilitation measures to address historical MacLeod and Hardrock tailings. At this time, most rehabilitation measures have not yet been implemented and the projected decreases in arsenic concentrations in surface water have not yet occurred.

  Therefore, to evaluate Mine-related changes in arsenic concentrations in surface water, it is more appropriate to compare to historical baseline data for these monitoring stations than to the reduced concentration 'Future Case' trigger levels identified in Table A-3 (Appendix A). The lake-wide baseline concentration for arsenic that was relied on in the HHRA was 14 µg/L. As such, the updated lake-wide EPC for arsenic based on measured surface water quality data from the 2024 monitoring period (16 µg/L) is within 20% of the baseline EPC relied on in the HHRA and would not trigger further evaluation based on comparison to baseline conditions according to the data evaluation approach described in Section 3.2.

In addition, a thorough comparison of arsenic concentrations in surface water for monitoring data from the 2024 monitoring period to existing baseline conditions is provided in the 2024 Fish and Fish Habitat Federal EIS Follow-Up Monitoring Report (GGM 2024e). This evaluation relied on trigger thresholds designed to detect consistent increases in surface water concentrations relative to baseline conditions (Trigger Threshold 1) and to determine if statistically significant increasing trends relative to baseline conditions were present (Trigger Threshold 2, investigated only if Trigger Threshold 1 was exceeded)[1]. This evaluation did not detect a consistent increase in surface water concentrations relative to baseline conditions (Trigger Threshold 1) for arsenic at the surface water trigger threshold monitoring stations during the 2024 monitoring period, as discussed in the 2024 Fish and Fish Habitat Federal EIS Follow-Up Monitoring Report (GGM 2024e).

Overall, these lines of evidence suggest that surface water concentrations of arsenic were not consistently elevated above pre-existing baseline concentrations. Therefore, the measured concentrations of arsenic in surface water do not change the conclusions of the HHRA.

- **Barium, Chromium, Cobalt, Copper, Lead, Manganese, Vanadium, and Zinc**

The lake-wide EPCs were greater than the applicable lake-wide trigger levels for barium, chromium, cobalt, copper, lead, manganese, vanadium, and zinc (Table 4-4). For barium, copper, lead, and manganese, lake-wide EPCs were between 105% to 124% of the lake-wide trigger levels, while higher magnitude exceedances were observed for cobalt (535%) and chromium (1045%). However, the higher magnitude exceedances for cobalt and chromium are driven by the adoption of maximum measured concentrations as basin-specific EPCs in the absence of sufficient detected concentrations to calculate a 95% UCLM and thus represent a single sampling event rather than a conservative estimate of average exposure (see Table 4-3). For these parameters, most monitoring results in 2024 were less than the reported detection limit (i.e., there were only 12 detected concentrations of chromium and 20 detected concentrations of cobalt over 105 sampling events in 2024 across all four basins). As such, the median measured concentrations in each basin for these parameters were typically similar to or less than the basin-specific trigger levels (see Table 4-3).

In the HHRA, exposure to metals via ingestion of surface water in Kenogamisis Lake was evaluated for Indigenous People as a component of the average daily dose (ADD), which

[1] For complete definitions of the Trigger 1 and Trigger 2 thresholds for surface water quality, see the 2024 Fish and Fish Habitat Federal EIS Follow-Up Monitoring Report (GGM 2024e)

was calculated as a sum of daily exposure via surface water ingestion, consumption of country foods (vegetation, fish, and wild meat), and direct contact with soil (i.e., incidental soil ingestion plus dermal contact with soil). The ADD for a given metal was then used to quantify risk. For non-carcinogens, risk was quantified by dividing the ADD by a tolerable daily intake (TDI) to generate a hazard quotient (HQ). For carcinogens, risk was quantified by multiplying the ADD by an inhalation unit risk (IUR) to generate an incremental lifetime cancer risk (ILCR). Calculated HQs were compared to a benchmark of 0.2, which means that 80% of an individual's exposure could occur from other sources without exceeding the TDI. Where HQs greater than 0.2 were already predicted based on baseline conditions, an evaluation of the relative change in HQ between baseline and future case conditions was undertaken. Calculated ILCRs were compared to a benchmark of 1-in-1,000,000, which is consistent with MOE (2011) guidance and is an order of magnitude more conservative than the target of 1-in-100,000 that has been defined to represent a negligible cancer risk by Health Canada (2021).

Barium, chromium, cobalt, copper, lead, manganese, vanadium, and zinc were all evaluated in the HHRA as non-carcinogens using the HQ approach. The baseline and future case HQs for 'total ingestion' (i.e., surface water ingestion, consumption of country foods (vegetation, fish, and wild meat), and direct contact with soil (i.e., incidental soil ingestion plus dermal contact with soil)) for these parameters as reported in the HHRA are summarized in Table 4-5, below. Surface water ingestion was typically a very small contributor to these HQs, representing 0.03% to 2.7% of the ADD. Adjusting these HQs to account for the increased lake-wide EPCs reported in Table 4-4 has a negligible effect on the total HQs for the future case, as shown in Table 4-5. Therefore, the measured concentrations of these parameters in surface water do not change the conclusions of the HHRA.

Table 4-5: Effect of Measured 2024 Measured Surface Water Concentrations on Hazard Quotients Based on Surface Water Ingestion, Consumption of Country Foods, and Direct Contact with Soil

Analyte	Total Hazard Quotient (HQ) Based on Surface Water Ingestion, Consumption of Country Foods, and Direct Contact with Soil (Unitless)		
	Baseline Case as Reported in HHRA	Future Case as Reported in HHRA	Future Case Calculated Using Lake-Wide EPC Based on Measured 2024 Surface Water Concentrations[A]
Barium	0.05	0.05	0.05
Chromium	0.0004	0.0004	0.0004
Cobalt	0.03	0.04	0.04
Copper	0.3	0.3	0.3
Lead	0.4	0.4	0.4
Manganese	0.2	0.2	0.2
Vanadium	0.03	0.03	0.03
Zinc	0.3	0.3	0.3

Notes:

A. Calculated by adjusting the HQ for surface water ingestion (future case) from the HHRA to account for increased exposure proportional to the increase in surface water EPC and then summing the updated surface water ingestion HQ with HQs for consumption of country foods and direct soil contact from the HHRA.

4.2.2 Mercury and Methyl-mercury in the Southwest Arm Tributary (SWAT)

As described in Appendix A (Section A.2), conditions 5.4.1 and 5.4.2 of the Decision Statement describe requirements for monitoring mercury and methyl-mercury in surface water in the SWAT during construction and the first five years of operation. The HHRA did not include estimates for mercury and methyl-mercury concentrations in water in the SWAT. Therefore, trigger levels based on the predicted values from the HHRA could not be calculated for these parameters in surface water for this location. Rather, concentrations of mercury and methyl-mercury in surface water from the SWAT are compared in this report to the benchmarks of 0.04 µg/L for mercury and 0.0001 µg/L for methyl-mercury that were defined in conditions 5.4.1 and 5.4.2 of the Decision Statement as well as previously collected baseline data for the SWAT. It is not clear how the 0.0001 µg/L methyl-mercury concentration was set in condition 5.4.2 of the Decision Statement. The mercury concentration benchmark of 0.04 µg/L per condition 5.4.1 of the Decision Statement is consistent with the predicted concentration of mercury in operation and closure from the EIS. However, the annual 95th percentile baseline concentration of methyl-mercury in the SWAT at the downstream monitoring station 25 is 0.0004 µg/L (GGM 2024). The future increase in methyl-mercury concentration, due to the inundation of the SWAT, was predicted in the EIS using two different methods and suggested a 0.0001 µg/L increase (based on St Louis et al. 2004) and <0.0002 µg/L increase (based on Hall et al. 2005). Meaning the annual 95th percentile

concentration of methyl-mercury is predicted to increase up to 0.0006 µg/L as a result of the inundation of an additional 15 ha of the SWAT. Therefore, the baseline and predicted future concentration of methyl-mercury from the EIS is greater than the 0.0001 µg/L benchmark in condition 5.4.2. As a result, we have compared the methyl-mercury concentrations to the benchmark of 0.0001 µg/L defined in condition 5.4.2 of the Decision Statement for compliance but have also evaluated methyl-mercury concentrations in accordance with trigger thresholds for methyl-mercury that are defined in the Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021).

As shown in the 2024 Fish and Fish Habitat Federal EIS Follow-Up Monitoring Report (GGM 2024), there are three surface water quality monitoring locations that are considered representative of conditions in the SWAT (25, 39, and 52). The mercury and methyl-mercury results measured at these three stations during the 2024 monitoring period are summarized and compared to the benchmarks of 0.04 µg/L for mercury and 0.0001 µg/L for methyl-mercury that were defined in conditions 5.4.1 and 5.4.2 of the Decision Statement in Table 4-6. As shown in in Table 4-6, the maximum detected concentration of mercury in surface water from these stations did not exceed the benchmark from the Decision Statement of 0.04 µg/L but the maximum detected concentration of methyl-mercury in surface water (0.00088 µg/L) was greater than the benchmark of 0.0001 µg/L that was provided in condition 5.4.2 of the Decision Statement. As stated previously, the exceedance of the methyl-mercury benchmark defined in condition 5.4.2 of the Decision Statement is expected as the benchmark is less than the baseline concentrations of methyl-mercury in the SWAT.

However, exceedances of the benchmarks provided for mercury and methyl-mercury in the SWAT in condition 5.4.2 of the Decision Statement do not necessarily indicate changes relative to baseline conditions nor potential for human health risk. Therefore, rather than relying solely on these benchmarks, GGM has a comprehensive mercury monitoring program described in the federal Fish Habitat Federal EIS Follow-Up Monitoring Plan that includes monthly surface water quality sampling throughout the length of the Goldfield Creek realignment/SWAT. This monitoring program, includes monthly sampling for low-level mercury and methyl-mercury with comparison to trigger thresholds designed to detect consistent increases in surface water concentrations relative to seasonal 95th percentile baseline concentrations (Trigger Threshold 1) and to determine if statistically significant increasing trends relative to baseline conditions are present (Trigger Threshold 2, investigated only if Trigger Threshold 1 was exceeded)[2]. Comparison to these trigger thresholds provides an “early warning” monitoring tool, which is evaluated in conjunction

[2] For complete definitions of the Trigger 1 and Trigger 2 thresholds for surface water quality, see the 2024 Fish and Fish Habitat Federal EIS Follow-Up Monitoring Report (GGM 2024e)

with biological and sediment data that are sampled less frequently (annually). Monitoring frequency has been selected based on the anticipated time for potentially appreciable changes to occur, considering natural variability. The approach described in the federal Fish Habitat Federal EIS Follow-Up Monitoring Plan allows for triggering of adaptive management if increasing trends of mercury or methyl-mercury in surface water are detected and deemed to be mine related.

In the 2024 Fish and Fish Habitat Federal EIS Follow-Up Monitoring Report (GGM 2024e), it is noted that the concentration of mercury and methyl-mercury at stations 25, 39, and 52 generally remained less than the Trigger 1 threshold with the exception of Station 25 for methyl-mercury. As described in the 2024 Fish and Fish Habitat Federal EIS Follow-Up Monitoring Report (GGM 2024), Trigger 1 and Trigger 2 exceedances were observed at Station 25 for methyl-mercury in September 2024, at the end of the 2024 monitoring period. As a result, an investigation into the exceedance is being completed. The outcome of the investigation will be reported once complete. In the EIS/EA, concentrations of methyl-mercury were predicted to increase within the SWAT due to inundation of 15 ha of land related to the construction of grade control structures within the SWAT. The investigation will evaluate whether the concentrations of methyl-mercury at Station 25 are consistent with that predicted in the EIS/EA. If the concentrations of methyl-mercury at Station 25 are determined to have increased beyond that predicted in the EIS/EA, this will trigger adaptive management and further evaluation with respect to potential effects on Indigenous Health may need to be undertaken.

Overall, the monitoring data reviewed herein remain supportive of the conclusion of the HHRA submitted as part of the EIS with respect to metals in surface water. For mercury and methyl-mercury in the SWAT, an investigation is currently underway to determine if concentrations of methyl-mercury at Station 25 have increased beyond that predicted in the EIS/EA. If this is determined to be the case, this will trigger further evaluation with respect to potential effects on Indigenous Health and whether adaptive management is required.

Table 4-6: Summary of Mercury and Methyl-mercury Concentrations Measured at SWAT Monitoring Stations in the 2024 Monitoring Period

Analyte	Benchmark from Decision Statement (µg/L)	Number of Samples	Number of Samples with Detected Concentrations	Maximum Detected Concentration (µg/L)	**Maximum Reported Detection Limit (µg/L)**	Median (µg/L)	EPC Based on Measured Data[A] (µg/L)	% of Trigger Level[B]
Mercury	0.04	34	33	0.00386	0.01	0.0013	0.00161	4%
Methyl-mercury	0.0001	33	24	0.00088	0.00005	0.00013	0.00028	**283%**

Notes:

A. Exposure point concentration (EPC) of measured data from the 2024 monitoring period. Where there were sufficient data (i.e., at least 10 samples with detected concentrations), the EPC is represented by a 95% upper confidence limit of the mean (95% UCLM), calculated using USEPA's ProUCL Version 5.2 statistical software. If there were less than 10 samples with detected concentrations, the EPC is represented by the maximum measured concentration (if there is at least one sample with a detected concentration) or maximum reported detection limit (if there are no samples with a detected concentration).

B. Comparison of EPC to trigger level (i.e., (EPC/trigger level) *100). Values greater than 100% are **bolded and shaded**.

4.3 Fish Tissue (Conditions 5.5 and 5.5.1 of the Decision Statement)

Conditions 5.5 and 5.5.1 of the Decision Statement refer to monitoring and evaluation of the potential for adverse effects on the health of Indigenous Peoples due to changes in concentrations of contaminants in country foods (i.e., fish, vegetation, and wildlife). This section focuses solely on monitoring of fish tissue.

The Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan describes an approach for monitoring contaminant concentrations in fish tissue that includes collection of Yellow Perch (*Perca flavescens*) in the SWAT and Walleye (*Sander vitreus*) in Kenogamisis Lake. However, the HHRA relied exclusively on metal concentrations in Walleye tissue in Kenogamisis Lake to assess potential health effects for human receptors due to consumption of fish. Therefore, the review of fish tissue data in this report focuses on Walleye tissue collected in Kenogamisis Lake. Trigger levels for metals in Walleye tissue collected in Kenogamisis Lake based on predicted concentrations in the HHRA are provided in Table A-6 (Appendix A).

The Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan indicated that Walleye tissue monitoring would be initiated within 24 months from when the Mine first began discharging effluent via the temporary effluent treatment plant (ETP), which occurred on September 15, 2021. As such, Walleye tissue monitoring was initiated in 2023 and the results of the 2023 Walleye tissue sampling were evaluated in the 2023 Indigenous Peoples Health Risk Assessment Follow-up Report. In that report, it was concluded that the assumptions relied on in the HHRA remain applicable with respect to metal concentrations in Walleye tissue in Kenogamisis Lake. As such, these data did not change the conclusion of the HHRA that human health risks related to the Mine during construction, operation, and closure will be negligible for Indigenous People.

As described in the Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan, Walleye tissue monitoring is scheduled to be repeated every two years for the first six years of operation, after which sampling methods and frequencies will be reviewed to assess whether additional monitoring is required and, if required, at what frequency this additional monitoring will occur.

Given that Walleye tissue samples were collected in 2023 and that Walleye tissue sampling is scheduled to occur every two years, no Walleye tissue samples were collected in 2024. Therefore, no reporting on metal concentrations in Walleye was completed in this report. Walleye tissue results will be reported on and compared to the trigger levels provided in Table A-6 (Appendix A), in the 2025 Indigenous Peoples Health Risk Assessment Follow-up Report following the next round of Walleye tissue sampling in 2025.

4.4 Vegetation and Wildlife (Conditions 5.5 and 5.5.2 of the Decision Statement)

Conditions 5.5 and 5.5.2 of the Decision Statement refer to monitoring and evaluation of the potential for adverse effects on the health of Indigenous Peoples due to changes in concentrations of contaminants in country foods (i.e., fish, vegetation, and wildlife). This section focuses solely on monitoring of vegetation and wildlife (i.e., small mammals). Trigger levels for metals in vegetation and wildlife (i.e., small mammals) based on predicted concentrations in the HHRA are provided in Table A-7 (Appendix A).

The monitoring requirements for small mammal tissue described in conditions 5.5 and 5.5.2 of the Decision Statement indicate that country foods be monitored "at least every two years, during the first six years of operation", with additional monitoring beyond this period to be determined based on the results of the initial monitoring. As the Mine was not in operation during the monitoring period, no country food monitoring was required to support the Indigenous Health Follow Up Plan this year. Therefore, no reporting on vegetation and wildlife (i.e., small mammals) concentrations was completed in this report. Vegetation and wildlife (i.e., small mammals) tissue results will be reported and compared to the trigger levels provided in Table A-7 (Appendix A), after the first round of sampling within the first two years of Mine operation.

4.5 Moose Tissue (Condition 5.6 of the Decision Statement)

Condition 5.6 of the Decision Statement indicates that the GGM is to participate in any regional initiative that is established for the analysis of contaminants in moose (*Alces alces)* tissue in the region, should there be any such initiative(s) established during construction or operation of the Mine. At this time, GGM is not aware that any such regional initiative has been established. Therefore, no reporting on moose tissue COPC concentrations is provided in this report. However, if such an initiative is established in the future, moose tissue results will be compared to the trigger levels for small mammals provided in Table A-7 (Appendix A) as the HHRA adopted small mammal tissue concentrations are expected to be representative of tissue concentrations in larger animals (e.g., moose, deer).

5 Conclusions

This 2024 Indigenous Peoples Health Risk Assessment Follow-up Report provides a review and evaluation of environmental data collected during the 2024 monitoring period to satisfy the requirements of the Plan. The data relevant to this report include air quality and surface water monitoring. For both air quality and surface water, the data collected during the 2024 monitoring period have been compared to applicable guidelines and trigger levels.

The monitoring data reviewed in this report generally support the conclusions of the HHRA. However, a review of methyl-mercury concentrations in surface water in the SWAT, as presented in the 2024 Fish and Fish Habitat Federal EIS Follow-Up Monitoring Report (GGM 2024), has triggered an investigation aimed at evaluating whether the concentrations of methyl-mercury at Station 25 are consistent with those predicted in the EIS/EA. If the concentrations at Station 25 are found to have increased beyond the predicted levels, this will trigger further evaluation of potential effects on Indigenous Health and whether adaptive management is required.

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Appendix A
Trigger Levels for Chemicals of Potential Concern (COPC) In Environmental Monitoring Data

A.1 Air Quality (Conditions 5.3, 5.3.1, 5.3.2, 5.3.3, and 5.3.4)

Conditions 5.3, 5.3.1, 5.3.2, 5.3.3, and 5.3.4 of the Decision Statement refer to monitoring and evaluation of the potential for adverse effects on the health of Indigenous Peoples due to changes in air quality. These conditions include specific monitoring requirements for the following air quality contaminants during construction, operation, and/or decommissioning:

- Total suspended particulates (TSP), coarse particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), and nitrogen dioxide (NO_2) (Condition 5.3.2)
- Benzene and benzo(a)pyrene (Condition 5.3.3)
- Silt content on haul roads (Condition 5.3.4)

Details regarding sampling locations, sampling frequency, and analytical methods for monitoring these parameters in accordance with the monitoring requirements from Condition 5.3 are provided in the Air Quality Management and Monitoring Plan (GGM 2020b).

Trigger levels for the above air contaminants, derived by adding 20% to the concentrations of these parameters that were relied on to predict exposure to these parameters in the HHRA, are provided in Table A-1. Notably, the trigger levels for TSP, PM_{10}, NO_2, $PM_{2.5}$, benzo(a)pyrene, and benzene are provided for two specific monitoring locations (Station B (Rosedale Point) and Station C (MacLeod Provincial Park)) and vary, in some cases, from the trigger levels that were provided in the Indigenous Peoples Health Risk Assessment Follow-up Plan due to changes in the actual vs. predicted monitoring locations.

The trigger level for silt content is the value at which particulate emissions from the haul roads would increase by greater than 20% of the emissions levels used to predict the concentrations assessed in the HHRA. Since silt content is non-linearly related to haul road emissions levels, the trigger level is not equivalent to a 20% increase of the silt content value used in the Environmental Assessment. The trigger level for silt content on haul roads is not specific to a single sampling location and rather will be evaluated using a composite of all collected haul road samples.

In addition to the trigger levels derived based on concentrations relied on in the HHRA, condition 5.3.2 of the Decision Statement also specified that monitored concentrations of TSP, PM_{10}, $PM_{2.5}$, and NO_2 be compared to “standards and criteria set out in the Canadian Council of Ministers of the Environment's Canadian Ambient Air Quality Standards and Ontario’s Ambient Air Quality Criteria”. Therefore, these criteria (if available) are also summarized in Table A-1.

Table A-1 Ambient Air Quality Monitoring Trigger Levels and Other Applicable Criteria

Contaminant	Averaging Period	Units	Trigger Level		Ontario Ambient Air Quality Criteria (AAQC)	Canadian Ambient Air Quality Standards (CAAQS)
			Station B Rosedale Point	Station C MacLeod Provincial Park		
TSP	24-hour	µg/m^3	123.8	102.1	120	NV
	Annual	µg/m^3	19.8	22.4	60	NV
PM_{10}	24-hour	µg/m^3	84.7	67.9	50[A]	NV
NO_2	1-hour	ppb	138.2	NA	200	60[B,C]; 42 [B,D]
	24-hour	ppb	68.0	NA	100	NV
	Annual	ppb	16.2	NA	NV	17 [C,E] ; 12 [D,E]
$PM_{2.5}$	24-hour	µg/m^3	17.7	18.4	27[F]	27[F]
	Annual	µg/m^3	8.8	9	8.8[G]	8.8[G]
Benzo(a)Pyrene	24-hour	µg/m^3	1.81E-04	1.82E-04	5.00E-05	NV
	Annual	µg/m^3	9.80E-05	9.84E-05	1.00E-05	NV
Benzene	24-hour	µg/m^3	1.2	1.2	2.3	NV
	Annual	µg/m^3	0.68	0.69	0.45	NV
Silt content on Haul Raads	N/A	%	7.5 [H]		NA	

Notes

NV – No value

NA – Not applicable. In the Air Quality Management and Monitoring Plan, NO_2 was not targeted for monitoring and evaluation at Station C.

A. AAQC for PM_{10} is an interim AAQC provided as a guide for decision making.

B. The 1-hour CAAQS for NO_2 is referenced to the 3-year average of the annual 98th percentile of the daily maximum 1-hour average concentrations

C. Canadian Ambient Air Quality Standards (CAAQS) for nitrogen dioxide (NO_2), effective by 2020 (CCME, 2012)

D. CAAQS for NO_2, effective by 2025 (CCME, 2012)

E. The annual CAAQS for NO2 is referenced to the average over a single calendar year of all 1-hour average concentrations

F. Canadian Ambient Air Quality Standards (CAAQS) for Respirable Particulate Matter, effective by 2020 (CCME, 2012). The Respirable Particulate Matter Objective is referenced to the 98th percentile daily average concentration averaged over 3 consecutive years.

G. Annual Canadian Ambient Air Quality Standard for Respirable Particulate Matter, effective by 2020. The Respirable Particulate Matter Objective is referenced to the 3-year average of the annual average concentrations.

H. Based on a composite of all haul road samples.

A.2 Surface Water (Conditions 5.4, 5.4.1, and 5.4.2)

Condition 5.4 of the Decision Statement refers to monitoring adverse environmental effects on the health of Indigenous Peoples due to changes in contaminant concentrations in water and fish. However, the specific monitoring requirements in conditions 5.4.1 and 5.4.2 of the Decision Statement refer only to monitoring and evaluation of contaminant concentrations in surface water. Therefore, this section focuses on reporting of surface water quality only. Fish tissue monitoring is discussed separately in Section A.3, below.

Details regarding sampling locations, sampling frequency, and analytical methods for monitoring contaminant concentrations in surface water in accordance with the monitoring requirements from conditions 5.4, 5.4.1, and 5.4.2 of the Decision Statement are provided in the Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021).

The Fish and Fish Habitat monitoring plan describes plans to monitor for total and dissolved metals at representative locations in Kenogamisis Lake, Mosher Lake, and the SWAT. However, evaluation of contaminant concentrations in surface water in the HHRA was focused solely on predictions of total metals in surface water in Kenogamisis Lake (as represented by sampling various basins of Kenogamisis Lake, specifically, Barton Bay, Southwest Arm, Central Basin, and Outlet Basin). The surface water sampling locations relied on to characterize these basins in the HHRA are summarized in Table A-2. Trigger levels for each individual basin, derived by adding 20% to the EPCs of these parameters that were relied on to predict exposure to these parameters for these basins in the HHRA, are provided in Table A-3. In addition, in the HHRA, the final risk characterization related to exposure to COPCs in surface water was completed based on exposure to an overall lake-wide EPC for Kenogamisis Lake that was derived by calculating a weighted average of the EPCs for the individual basins that took into account the normalized area of each sub-basin as shown in Table A-4. Trigger levels for the overall weighted mean of Kenogamisis Lake, derived by adding 20% to the concentrations of these parameters that were relied on to predict exposure to these parameters lake-wide in the HHRA, are provided in Table A-5.

To identify potential increases in total metals in surface water relative to the concentrations relied on in the HHRA, the first step in evaluation will be to calculate updated EPCs using the collected monitoring data, grouped by basin according to the stations identified in Table A-2, and compare the updated EPCs to the applicable trigger levels for the individual basins provided in Table A-3. If the monitoring data from the individual basins are not greater than the trigger levels for individual basins, no further evaluation will be required. However, if the updated EPC is greater than the applicable trigger level for at least one of the individual basins, an updated Lake-wide EPC will be calculated as a weighted mean of the individual basin EPCs using the normalized area of each sub-basin as shown in Table A-4. This updated Lake-wide EPC will then be compared to the Lake-wide trigger levels provided in Table A-5.

Conditions 5.41 and 5.4.2 of the Decision Statement also describe requirements for monitoring mercury and methyl-mercury in water in surface water in the SWAT during construction and the first five years of operation. The HHRA did not include estimates for mercury and methyl-mercury concentrations in water in the Southwest Arm Tributary. Therefore, trigger levels based on the predicted values from the HHRA could not be calculated for these parameters in surface water for this location. Rather, concentrations of mercury and methyl-mercury in surface water from the SWAT will be compared to benchmarks of 0.04 µg/L for mercury and 0.0001 µg/L for methyl-mercury that are defined in conditions 5.41 and 5.4.2. of the Decision Statement. As explained in Section 4.2.2 of the main body of the report, the baseline and predicted future concentration of methyl-mercury from the EIS is greater than the 0.0001 µg/L benchmark in condition 5.4.2. As a result, we have compared the methyl-mercury concentrations to the benchmark of 0.0001 µg/L defined in condition 5.4.2 of the Decision Statement for compliance but have also evaluated methyl-mercury concentrations in accordance with trigger thresholds for methyl-mercury that are defined in the Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021).

Table A-2 Surface Water Monitoring Locations Representative of Regions from the HHRA

Basin of Kenogamisis Lake	Surface Water Sampling Locations Relied on to Characterize this Region in the HHRA
Barton Bay[A]	2, 3, 4, 5
Southwest Arm	1, 1A, 23, 24, 46
Central Basin[A]	6, 7, 12, 47
Outlet Basin	8, 11, 17, 48

Notes:

A. The HHRA included predictions for 'Barton Bay East' and 'Barton Bay West' and for 'Central Basin East' and 'Central Basin West'. However, the sample location(s) identified in the HHRA as representative of the west portion of these water bodies were also included in the characterization of the east portion of these water bodies. Specifically, 'Barton Bay West' was represented by Sample Location 2, which is also one of the four locations relied on to represent 'Barton Bay East', and Central Basin West was represented by Sample Locations 6 and 7, which are two of the four locations relied on to represent 'Central Basin East'. Therefore, the 'Barton Bay East' and 'Central Basin East' values relied on in the HHRA are considered generally representative of all of Barton Bay and Central Basin, respectively.

Table A-3 Surface Water Monitoring Trigger Levels for Total Metals in Surface Water in Representative Regions of Kenogamisis Lake

Contaminant	Trigger Level (µg/L)					
	Barton Bay[A]		Southwest Arm	Central Basin[A]		Outlet Basin
	East	West		East	West	
Antimony	0.52	0.50	2.98	3.91	0.31	2.70
Arsenic	16.90	34.10	2.69	7.90	7.99	5.30
Barium	7.84	7.33	13.30	11.10	10.30	10.70
Beryllium	0.32	0.35	0.28	0.27	0.31	0.29
Chromium	0.60	0.52	0.44	0.43	0.55	0.42
Cobalt	0.21	0.20	0.34	0.24	0.10	0.23
Copper	3.35	1.98	0.63	1.97	2.63	1.36
Lead	0.48	0.48	0.29	0.32	0.47	0.33
Manganese	22.80	23.50	16.20	16.30	14.90	17.90
Mercury	0.011	0.013	0.008	0.035	0.012	0.009
Nickel	1.11	1.08	0.73	0.80	0.66	0.71
Selenium	0.34	0.38	0.30	0.29	0.32	0.31
Thallium	0.09	0.10	0.08	0.07	0.09	0.08
Uranium	1.42	1.51	2.59	2.20	1.38	2.21
Vanadium	0.59	0.53	0.50	0.49	0.55	0.49
Zinc	3.12	2.88	2.23	2.38	2.29	2.05

Notes:

A. As described in Table A-2, above, the 'Barton Bay East' and 'Central Basin East' values are considered generally representative of all of Barton Bay and Central Basin, respectively. The 'Barton Bay West' and 'Central Basin West' values are retained here for historical comparison with the HHRA only.

Table A-4 Normalized Area of Kenogamisis Lake Sub-Basins as Reported in the HHRA

Basin of Kenogamisis Lake	Normalized Area (unitless)[A,B]
Barton Bay	0.13
Southwest Arm	0.2
Central Basin	0.18
Outlet Basin	0.49

Notes:

A. The normalized areas of each sub-basin reported here are the same as those developed and used in the fully integrated lake water and sediment model implemented in the STELLA™ modelling framework to predict arsenic concentrations in Kenogamisis Lake as previously reported in the HHRA. A detailed description of the mass balance model as well as modelling results are provided in the original Human Health Risk Assessment.

B. The normalized areas represent a proportion of the total area of Kenogamisis Lake accounted for by that basin and are therefore unitless and sum to one.

Table A-5 Surface Water Monitoring Trigger Levels for Total Metals in Surface Water in Kenogamisis (Lake-Wide)

Contaminant	Trigger Level (µg/L)
Antimony	2.5
Arsenic	12
Barium	11
Beryllium	0.29
Chromium	0.45
Cobalt	0.24
Copper	1.5
Lead	0.35
Manganese	18
Mercury	0.013
Nickel	0.81
Selenium	0.34
Thallium	0.081
Uranium	2.1
Vanadium	0.51
Zinc	2.3

A.3 Fish Tissue (Conditions 5.5 and 5.5.1)

Conditions 5.5 and 5.5.1 of the Decision Statement refer to monitoring and evaluation of the potential for adverse effects on the health of Indigenous Peoples due to changes in concentrations of contaminants in country foods (i.e., fish, vegetation, and wildlife). This section focuses solely on monitoring of fish tissue. Vegetation and wildlife monitoring is discussed in Section A.4, below.

Details regarding sampling locations, sampling frequency, and analytical methods for monitoring contaminant concentrations in fish tissue in accordance with the monitoring requirements from Conditions 5.4, 5.4.1, and 5.4.2 of the Decision Statement are provided in the Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021).

The Fish and Fish Habitat monitoring plan describes plans to monitor fish tissue in the SWAT and in Kenogamisis Lake. Yellow Perch (*Perca flavescens*) is targeted for monitoring in the SWAT and Walleye (*Sander vitreus*) is targeted for sampling in Kenogamisis Lake. The HHRA relied on Walleye concentrations in Kenogamisis Lake to assess potential health effects for human receptors. Therefore, review of fish tissue data for the Indigenous Peoples Health Risk Assessment Follow-up report will focus on Walleye tissue collected in Kenogamisis Lake. Trigger levels for Walleye tissue collected in Kenogamisis Lake, calculated by adding 20% to the predicted concentrations of those parameters in Walleye tissue that were to support the HHRA, are provided in Table A-6.

Table A-6 Walleye Fillet Monitoring Trigger Levels

Contaminant	Trigger Level (mg/kg ww)
Antimony	2.12E-02
Arsenic	9.94E-02
Barium	2.05E-02
Beryllium	2.40E-03
Chromium	7.00E-02
Cobalt	1.32E-01
Copper	8.62E-01
Lead	1.21E-02
Manganese	1.31E+00
Mercury (assumed as methyl-mercury)	7.03E-01
Nickel	4.70E-02
Selenium	6.24E-01
Thallium	1.69E-02
Uranium	1.12E-03
Vanadium	4.50E-02
Zinc	1.32E+01

A.4 Vegetation and Wildlife (Conditions 5.5 and 5.5.2)

Conditions 5.5 and 5.5.2 of the Decision Statement refer to monitoring and evaluation of the potential for adverse effects on the health of Indigenous Peoples due to changes in concentrations of contaminants in country foods (i.e., fish, vegetation, and wildlife). This section focuses solely on monitoring of vegetation and wildlife (i.e., small mammals). Fish tissue monitoring is discussed in Section A.3, above.

The environmental monitoring plan identified as applicable to vegetation and wildlife sampling is the Biodiversity Management and Monitoring Plan (GGM 2022).

Trigger levels for vegetation and wildlife (i.e., small mammals), calculated by adding 20% to the predicted concentrations of those parameters in vegetation and small mammal tissue that were to support the HHRA, are provided in Table A-7.

Table A-7 Vegetation and Small Mammal Trigger Levels

Contaminant	Trigger levels (mg/kg ww)			
	Vegetation (Browse)	Vegetation (Forage)	Vegetation (Berries)	Small Mammal Tissue
Antimony	2.46E-02	1.44E-02	4.66E-03	1.40E-02
Arsenic	1.36E-01	1.93E-01	5.32E-02	9.07E-01
Barium	2.44E+00	7.31E+00	1.30E+00	4.40E+00
Beryllium	4.68E-03	4.68E-03	4.68E-03	2.45E-03
Chromium	2.80E-02	1.22E-01	2.52E-02	1.93E-01
Cobalt	2.86E-01	8.77E-03	1.03E-02	5.30E-02
Copper	1.30E+00	5.12E-01	4.30E-01	4.07E+00
Lead	1.39E-02	2.57E-02	2.21E-02	7.26E-02
Manganese	4.46E+01	7.31E+01	1.90E+01	5.75E+00
Mercury	2.30E-02	2.30E-02	2.30E-02	5.46E-02
Nickel	5.98E-01	2.51E-01	6.38E-02	2.45E-01
Selenium	3.07E-02	2.35E-02	2.34E-02	3.68E-01
Thallium	5.39E-03	2.69E-03	3.83E-02	6.40E-03
Uranium	1.06E-03	1.54E-03	9.36E-04	7.48E-04
Vanadium	1.33E-02	6.89E-02	4.69E-02	4.18E-02
Zinc	2.84E+01	5.48E+00	3.24E+00	3.54E+01

A.5 Moose Tissue (Condition 5.6)

Condition 5.6 of the Decision Statement refers to GGM's participation in any regional initiative that is established for the analysis of contaminants in moose (*Alces alces*) tissue in the region, should there be any such initiative(s) during construction or operation of the Mine. In the HHRA, moose tissue concentrations were assumed to be equivalent to predicted small mammal tissue concentrations. Separate trigger levels for moose tissue samples are therefore not required. If moose tissue is collected, tissue samples can be compared to the small mammal tissue trigger levels described in Table A-7, above.