

AGNICO EAGLE

MEADOWBANK GOLD MINE

2024 WATER MANAGEMENT PLAN

AUGUST 2024

VERSION 13

EXECUTIVE SUMMARY

Agnico Eagle Mines Ltd. Meadowbank Division (Agnico) is operating the Meadowbank Gold Mine (the Mine), located on Inuit-owned surface lands in the Kivalliq region approximately 70 km north of the Hamlet of Baker Lake, Nunavut. The mine is subject to the terms and conditions of both the Project Certificate issued in accordance with the Nunavut Land Claims Agreement Article 12.5.12 on December 30, 2006, and the Nunavut Water Board Water Licence No. 2AM-MEA1530 issued in May 2020.

The Water Management Plan is updated on a yearly basis as required by the Nunavut Water Board Water License 2AM-MEA1530. The full annual update was provided in version 12 of the Water Management Plan including a revised site-wide Water Balance. Recommendations obtained during the 2023 Meadowbank Annual Report Review have been included in Water Management Plan v12 and carried forward into this Water Management Plan v13.

Water Management Plan v13 includes Appendices A through E from Water Management Plan v12 (Water Balance, flow sheets and Water Quality Forecast [Appendix A, B, C], the Freshet Action Plan [Appendix D], and the Ammonia Management Plan [Appendix E]). Water Management Plan v13 includes Appendix F (total dissolved solids (TDS) Action Plan and site-specific water quality program). The Freshet Action Plan details the RSF seepage issue at ST-16 and the Assay Road seepage as well as providing revised monitoring.

This water management plan update considers changes in the observed natural pit water inflows, updated tailings deposition parameters, mine and milling life schedule and production rate, tailings management strategy, and pit backfilling strategy.

The significant updates to this plan are:

- Development of a TDS Action Plan and site-specific water quality program (Section 4.0 and Appendix F)

The water management objectives are to keep the different water types separated to the extent practical; to control and minimize contact water; minimize freshwater usage to the extent practical; meet discharge criteria before any site contact water is released to the downstream environment; achieve a reduction in freshwater intake per ton mined and ensure no events of non-compliance related to freshwater withdrawal criteria and effluent loading limits. The water balance update is based on these objectives, and quantitative targets have been added to the plan to help Operations track progress of actions taken to achieve these targets and help identify corrective actions to be implemented. Annual predictions of water quality in the pit lakes (Pit A, Pit E and Goose Pit) during Operations has shown measured concentrations of TDS to be greater than the forecasted model predictions in the pit lakes by more than 20%. Causes associated with the differences between modeled vs measured values have been presented within the latest Annual Report (2023, Appendix 16) and summarized within this plan in Section 4.0. The

implications of increasing TDS loadings in the pits could lead to the risk of not being able to meet the Pit Lake water quality criteria at closure. As a result, Agnico Eagle has pre-emptively developed an Action Plan herein (Section 4.1) to address water License conditions Part E, Item 7 beginning with the development of an appropriate site-specific water quality program for effluent release using guidance from Part F, Item 6 of the license (Appendix F).

The Water Balance determines the demand and storage requirements of water over the life of the mine. The storage strategies and required transfers are presented. Closure related elements remain at a conceptual stage and will be further detailed in the Closure and Reclamation Plan (CRP) update until their designs are presented in the Final Mine Closure and Reclamation Plan to be submitted prior to final closure in accordance with the current Type A Water License.

The freshwater reduction per ton milled objective is achieved by reclaiming contact water from the tailings deposition area while transferring water from the active deposition area to the inactive pit. Pit E was the main area for tailings deposition in 2024. The tailings deposition will change to Pit A at the end of 2024, to manage tailings storage capacities in both Portage Pits. A volume of tailings was also deposited in the South Cell in August and September 2023 to improve the landforms for closure purposes. For the remainder of mill operations, reclaim water is planned to be pumped from the in-pit. The current concept for Portage and Goose area flooding at closure is to remove as much water as possible from each pit by using a water treatment plant (WTP) and to reflood the area using a combination of passive and active water inflow (from Third Portage Lake). This is a conservative assumption that will be revised in the Closure and Reclamation Plan (CRP) and Final Closure and Reclamation Plan (FCRP) as further data becomes available on the water treatment design for the in-pit water. Different flooding sequence concepts are being looked at for the reflooding of the Portage and Goose Area to ensure the closure objectives will be met. The final elevation of the reflooding will be the elevation of Third Portage Lake which is around 133.6 metres above sea level (masl) based on available data. The Goose Dike and South Camp Dike will be breached to allow reconnection of the area with Third Portage Lake when the closure objectives for pit flooding will have been achieved. The dikes shall not be breached until the water quality in the re-flooded area meets CCME Water Quality Guidelines for the Protection of Aquatic Life, baseline concentrations, or appropriate site-specific water quality objectives, as per the Water License.

The flooding of the Vault Pit area will involve a combination of passive flooding (runoff) and active flooding at closure using water from Wally Lake. The final elevation of the reflooding will be 139.9 masl for Phaser and Vault Lake. The Vault Dike will be breached to allow reconnection of the area with Wally Lake when the closure objectives for pit flooding will be achieved, as per Portage and Goose Pits. BB Phaser Pit and Phaser Lake will be flooded exclusively from their watershed run off inflows until the target elevation of Wally Lake is reached.

The 2023 water quality forecasting model is included in this report. The report identifies certain contaminants of concern which may require removal by treatment for the pit water quality to meet water quality objectives. Based on the forecasted concentrations at the end of in-pit deposition, the new water treatment plant required at closure are being evaluated to treat and manage the following parameters of concern for aluminum, arsenic, cadmium, copper, mercury, nickel, total dissolved solids (TDS), total ammonia, pH, total suspended solids (TSS), and potentially low concentration of total cyanide. Treatment options for the pit water are being assessed as per the schedule outlined in the Meadowbank Water Quality Forecasting Update Technical Note rev. 00 (AtkinsRéalis, 2024). An update on the water treatment concept and pit flooding strategy will be provided in the next CRP update and the final design will be submitted as part of the FCRP.

DOCUMENT CONTROL

Version	Date (YM)	Section	Page	Revision
1	March 2014	ALL	-	Revision for the 2012 Water Management Plan (by SNC) according to the updated LOM and water mgmt strategies
2	March 2015	ALL	-	Revision for the 2013 Water Management Plan (by Agnico) according to the updated LOM and water mgmt strategies
3	October 2015	ALL	-	Update of sections according to Water License renewal conditions
4	March 2016	ALL	-	Revision of the 2014 Water Management Plan (by Agnico) according to the updated LOM and water mgmt strategies
5	March 2017	ALL	-	Revision of the 2015 Water Management Plan (by Agnico) according to the updated LOM and water mgmt strategies
6	March 2018	ALL	-	Revision of the 2016 Water Management Plan (by Agnico) according to the updated LOM and water mgmt strategies
7	March 2019	ALL	-	Revision of the 2017 Water Management Plan (by Agnico) according to the updated LOM and water mgmt strategies
8	March 2020	ALL	-	Revision of the 2018 Water Management Plan (by Agnico) according to the updated LOM and water mgmt strategies
9	April 2021	ALL	-	Revision of the 2019 Water Management Plan (by Agnico) according to the updated LOM and water mgmt strategies
10	April 2022	ALL	-	Revision of the 2020 Water Management Plan (by Agnico) according to the updated LOM and water mgmt strategies. Addition of quantitative water management targets
11	March 2023	Section 3.1, 3.4, 4	-	Section 3.1 water management targets, Section 3.4 pit flooding profiles, Section 4 water quality forecast update
12	March 2024	ALL	-	Revision of the 2023 Water Management Plan (by Agnico) according to the updated LOM and water mgmt strategies. 2.1.1 Climate: updated maximum wind gust recorded. Table 3.1: Added target 2024 for water objectives. 3.3.6 Goose pit: Updated water management strategy information. 3.3.9. Mill seepage collection system: Added information on Assay Road Seep South.

Version	Date (YM)	Section	Page	Revision
				Figure 3.2: RSF seepage area: Changed figure. 3.3.12 Central Dike Seepage: Updated information. 3.4.1 Portage and Goose Area Flooding: Updated information. Table 3.2 and 3.3L: Updated according to the Water balance. Section 4 Water quality forecast: Updated information and add note for ongoing work. Appendix A : Added a note on reported values
13	August, 2024	Sections 3.3.7, 3.3.9 ,4, and 4.1		Updates to reflect the most recent water management strategy for active closure and post closure: 3.3.7 – Updated information 3.3.9 – Updated information Updates to the water quality forecast: 4.0 – 4.1 TDS Action Plan and Site-Specific Water Quality Program details New Appendix F: TDS-Site Specific Water Quality Program Technical Memorandum

Approved by: 

Eric Haley – Environment & Critical Infrastructure Superintendent

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Appendix D: 2024 Freshet Action Plan

Appendix E: 2024 Ammonia Management Plan

Appendix F: TDS-Site Specific Water Quality Program Technical Memorandum

1 INTRODUCTION

Agnico Eagle Mines Ltd. (Agnico) has been operating the Meadowbank Gold Mine since 2008, officially beginning production in 2010. The mine is located approximately 70km north of the Hamlet of Baker Lake, Nunavut. The mine is subject to the terms and conditions of both the Project Certificate issued in accordance with the Nunavut Land Claims Agreement Article 12.5.12 on December 30, 2006, and the Nunavut Water Board Water License No. 2AM-MEA1530 issued on May 2020.

This document presents an updated version of the 2023 Water Management Plan with all of the same components as the previous version of the plan (V12), with the addition of an action plan to address differences between predicted and measured total dissolved solids (TDS) values observed to be greater than 20% in Pit A, Pit E and Goose Pit. Included with this version of the plan is the 2023 revised site-wide water balance and water quality forecast that determines the demand, storage requirements, and quality of water over the life of the mine (LOM). The storage strategies and required transfers are presented. Closure related elements based on the Meadowbank Closure and Reclamation Plan (CRP) remain at a conceptual stage and will be further detailed in the Final Mine Closure and Reclamation Plan (FCRP) to be submitted prior to final closure in accordance with the current Type A Water License.

This water management plan update considers changes in the observed natural pit water inflows, updated tailings deposition parameters, mine and milling life schedule and production rate, tailings management strategy, and pit backfilling strategy that were all captured within V12 of the water management plan.

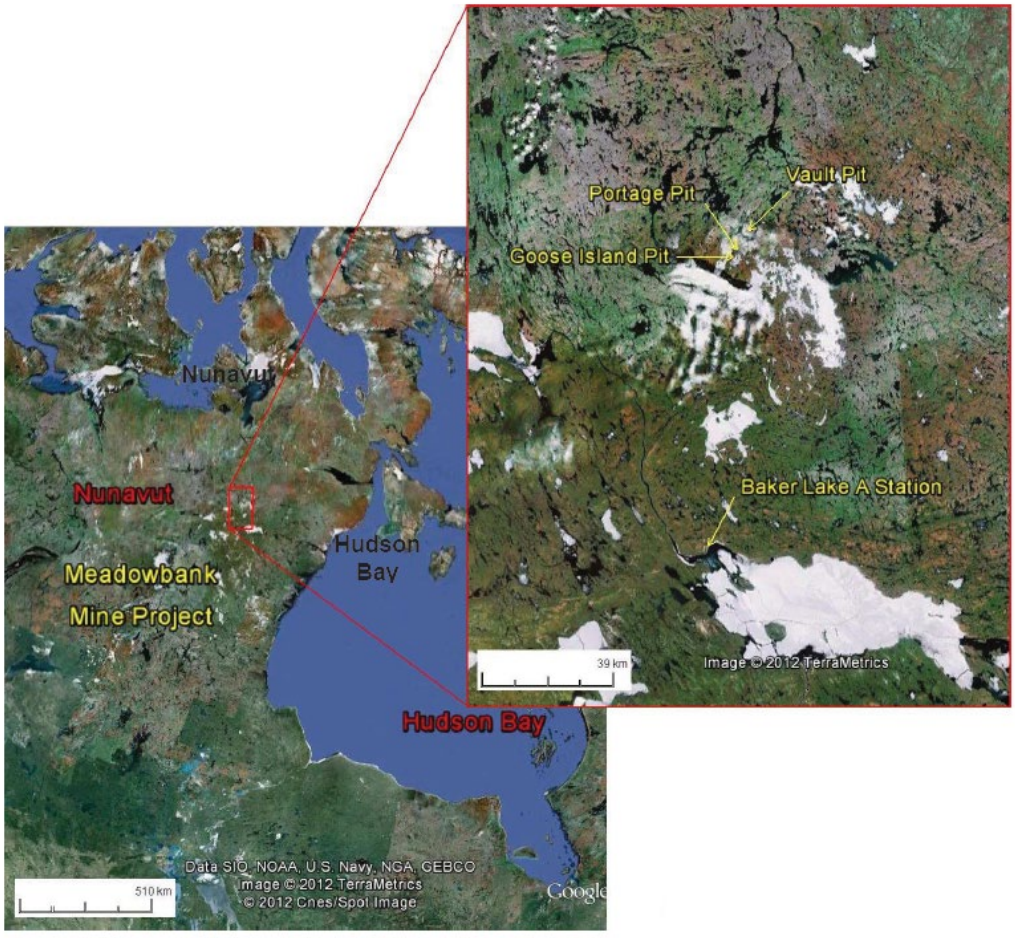
Main updates to this version of the plan include:

- Updates of a TDS Action Plan that supports a site-specific water quality program to enable water to be moved around the site and for possible effluent release to Wally Lake (Appendix F)

2 BACKGROUND INFORMATION

2.1 SITE CONDITIONS

The location of the Meadowbank mine site is shown below in Figure 2.1. A close-up is also provided to show the location of the Baker Lake A Station used to obtain meteorological data.



Source: Google Earth Pro, 2012

Figure 2.1: Meadowbank mine location

2.1.1 Climate

The Meadowbank mine is located within a low Arctic Eco climate described as one of the coldest and driest regions of Canada. Arctic winter conditions occur from October through May, with

temperatures ranging from +5°C to -40°C. Summer temperatures range from -5°C to +25°C with isolated rainfall increasing through September (Table 2-1).

Table 2-1: Estimated average monthly climate data – Baker Lake

Month	Max. Air Temp. (°C)	Min. Air Temp. (°C)	Rainfall (mm)	Snowfall (mm)	Total Precip. (mm)	Lake Evap. (mm)	Min. Relative Humidity (%)	Max. Relative Humidity (%)	Wind Speed (km/h)	Soil Temp. (°C)
January	-29.1	-35.5	0	6.9	6.9	0	67.1	75.9	16.3	-25.5
February	-27.8	-35.2	0	6.0	6.1	0	66.6	76.5	16.0	-28.1
March	-22.3	-30.5	0.0	9.2	9.2	0	68.4	81.4	16.9	-24.9
April	-13.3	-22.5	0.4	13.6	14.0	0	71.3	90.1	17.3	-18.1
May	-3.1	-9.9	5.2	7.7	12.8	0	75.7	97.2	18.9	-8.0
June	7.6	0.0	18.6	3.1	21.7	8.8	62.6	97.2	16.4	2.0
July	16.8	7.2	38.6	0.0	38.6	99.2	47.5	94.3	15.1	10.5
August	13.3	6.4	42.8	0.6	43.4	100.4	59.2	97.7	18.4	9.3
September	5.7	0.9	35.2	6.7	41.9	39.5	70.8	98.6	19.3	3.6
October	-5.0	-10.6	6.5	22.6	29.1	0.1	83.1	97.4	21.4	-2.8
November	-14.8	-22.0	0.2	16.2	16.4	0	80.6	91.1	17.9	-11.7
December	-23.3	-29.9	0	9.4	9.5	0	73.3	82.7	17.7	-19.9

Note: Data from Baker Lake A station is available from 1946 to 2011. During this period, the data quality is good, with the exception of years 1946 to 1949, and 1993, which were removed from the compilation.

The long-term mean annual air temperature for Meadowbank is estimated to be approximately -11.1°C. Air temperatures in the Meadowbank area are, on average, about 0.6°C cooler than Baker Lake air temperatures, and extreme temperatures tend to be larger in magnitude. This climatic difference is thought to be the effect of a moderating maritime influence at Baker Lake.

The prevailing winds at Meadowbank for both the winter and summer months are from the northwest. A maximum daily wind gust of 117 km/h was recorded on November 22nd, 2023. Light to moderate snowfall is accompanied by variable winds up to 70 km/h, creating large, deep drifts and occasional whiteout conditions. Skies tend to be more overcast in winter than in summer.

Table 2-1 presents monthly rainfall, snowfall, and total precipitation values for the mine site. August is the wettest month, with a total precipitation of 43.4 mm, and February is the driest month, with a total precipitation of 6.1 mm. During an average year, the total precipitation is 249.6 mm, split between 147.5 mm of rainfall and 102.1 mm of snowfall precipitation.

2.1.2 Faults

Two main faults are inferred in the Portage deposit area and included in the groundwater model (Golder, 2011) used to estimate groundwater inflows and brackish water upwelling to the pits during mine life. These are the Bay Zone Fault and the Second Portage Fault shown in Figure 2.2 by bright blue lines.

The Second Portage fault trends to the northwest under Central Dike and the Tailings Storage Facilities (TSF), roughly parallel to the orientation of Second Portage Lake. This fault is a potential pathway for the Central Dike Seepage.

The Bay Zone Fault trends from South to North and crosses Third Portage Lake, Goose Pit and Portage Pit. This fault is a potential pathway for water infiltration from Third Portage Lake into Goose Pit.

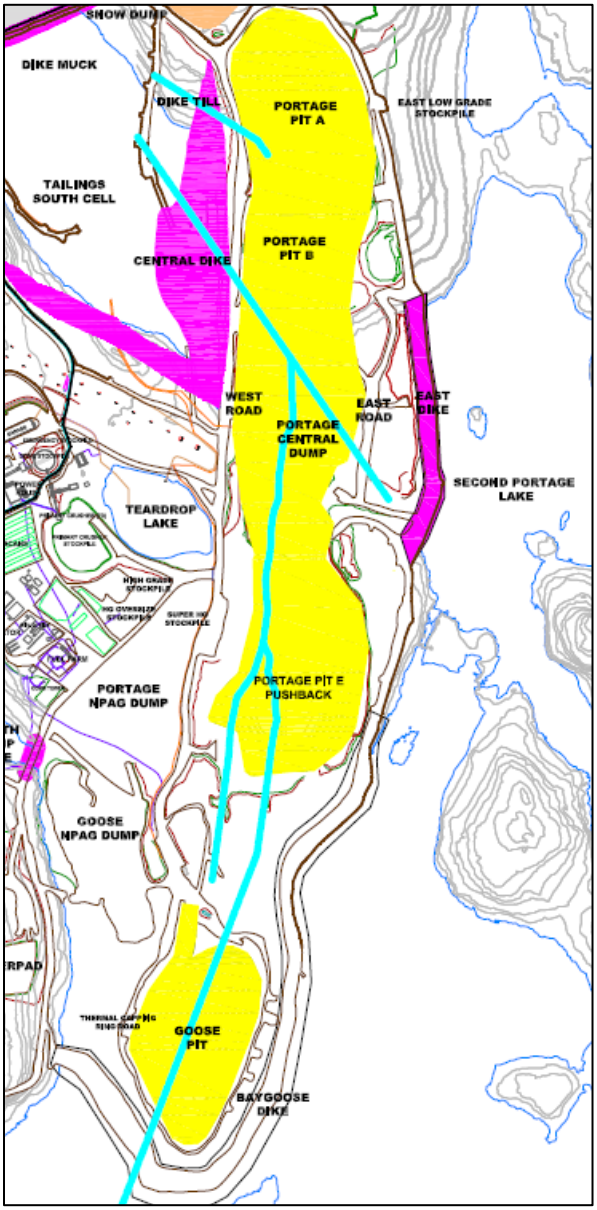


Figure 2.2: Portage Pit area – fault location

2.1.3 Permafrost

The Meadowbank Gold Mine is in an area of continuous permafrost. Lake ice thicknesses of between 1.5 m and 2.5 m have been encountered during geotechnical investigations performed mid to late spring. Taliks (areas of permanently unfrozen ground) could be expected where water depth is and/or has been greater than about 2 to 2.5 m. Based on thermal studies and measurements of ground temperatures (Golder, 2003), the depth of permafrost at site is

estimated to be in the order of 450 to 550 m, depending on proximity to lakes. The depth of the active layer ranges from about 1 to 1.5 m based on depth of overburden, vegetation and organics, and proximity to lakes.

Based on ground conductivity surveys and compilation of regional data, the ground ice content is expected to be low. Locally on land, ice lenses and ice wedges are present, as indicated by ground conductivity, and by permafrost features such as frost mounds. These areas of local ground ice are generally associated with low-lying areas of poor drainage.

2.1.4 Hydrology

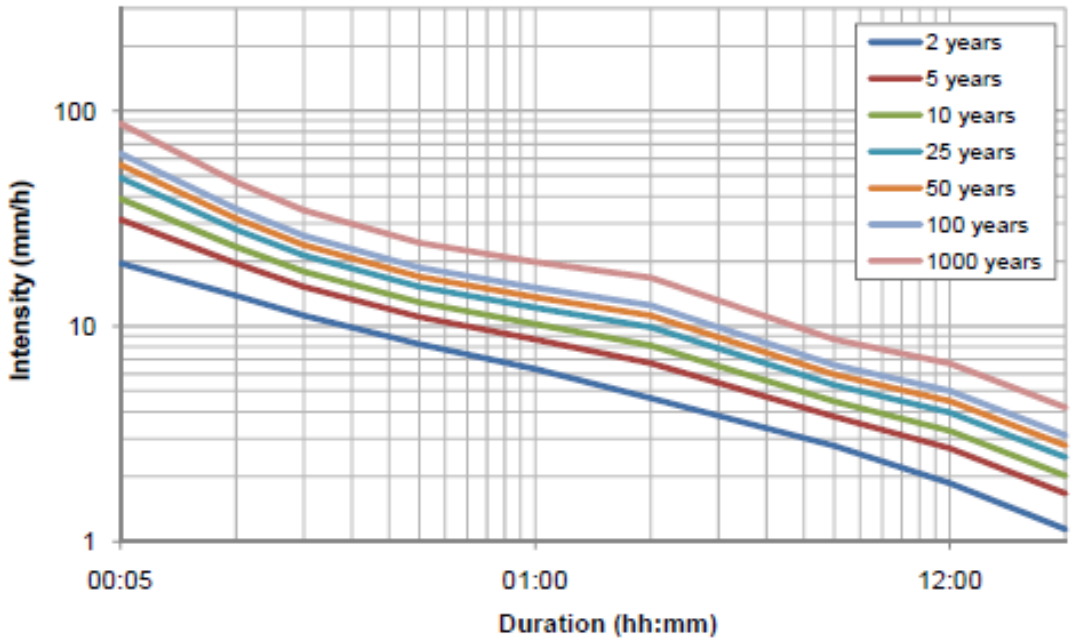
As shown above in Table 2-1, the Baker Lake A meteorological station was used to tabulate the monthly precipitation data. Using this data, SNC-Lavalin completed a Log-Pearson 3 probability distribution to determine the annual precipitation for different return periods. The results of this statistical analysis are presented in Table 2-2.

Table 2-2: Total annual precipitation for varying return periods

Return Period (years)	Precipitation (mm)
2	246
5	295
10	322
20	345
100	391

Source: SNC-Lavalin 2012 Water Management Plan (SNC, 2013)

Intensity duration frequency curves (IDF) computed by SNC-Lavalin (SNC, 2013) from the Baker Lake A meteorological station are presented in Figure 2.3. These IDF curves are for precipitations of short duration (5min-24hrs) based on data between 1987 and 2006.



Source: SNC-Lavalin Water Management Plan 2013 (SNC,2013)

Figure 2.3: Baker Lake A meteorological IDF curves

The beginning of freshet (spring period) varies from year to year however it has been observed that the winter snow accumulation (October to May) usually begins to melt at the beginning of June and continues throughout the month.

2.2 MINING OPERATION DESCRIPTION

The Meadowbank Gold Mine consists of several gold-bearing deposits within close proximity to one another. The three main deposits are Vault (Vault, Phaser and BB Phaser), Portage (South, Center and North Portage deposits), and Goose. Mining of these pits is completed, and no mining activity was done since 2019 at the Meadowbank site.

The South Portage deposit is located on a peninsula and extends northward under Second Portage Lake (2PL) and southward under Third Portage Lake (3PL). The North Portage deposit is located on the northern shore of 2PL. The South, Center and North Portage deposits are mined as a single pit, termed the Portage Pit, which extends approximately 2 km in a north-south direction. Portage Pit is isolated from the Second Portage Lake by the East Dike built in 2008-2009 and the Bay-Goose Dike (Pit E) built from 2009 to 2011.

The Goose deposit lies approximately 1 km to the south of the Portage deposit, and beneath 3PL. The pit is isolated from the Second Portage Lake and the Third Portage Lake by the Bay-Goose Dike and the South Camp Dike constructed in 2009-2010.

The Vault deposit is located adjacent to Vault Lake, approximately 6 km north of the Portage deposits. The deposit is isolated from Wally Lake by the Vault Dike built in 2013.

2.2.1 Portage Pit Area

The Portage area located between the Third Portage Lake (3PL) and Second Portage Lake (2PL) contains most of the infrastructure of the Meadowbank mine site including but not limited to the Portage Rock Storage Facility (RSF), the North and South Tailings Storage Facilities (NC & SC TSF), the mill, the camp, and the Stormwater Management Pond. The East Dike was constructed to isolate the north portion of the Portage Pit from the 2PL. Subsequent renaming of the pits led to the nomenclature for each pit (A, B, C, D and E). Mining activities in the Portage area ended in October 2019. Figure 2.4 presents the evolution of the Portage Pit and Figure 2.5 shows the Portage Pit Area and surrounding infrastructures.

Inflow of water into the bottom benches of Pit C and D has been observed before these pits were backfilled. Several areas of these pits are in an inferred talik area and cross a regional fault (Golder, 2009). The water inflow is thus likely a combination of ground and surface water. Pits A and B are in the permafrost and a minimal amount of water has been observed historically. Some water inflow is observed from the Pit E south wall since 2015. This inflow is mixed with other water sources at the bottom of Pit E.

On May 17th, 2019, Agnico received approval of amendment No.3 to the Meadowbank Type A water license 2AM-MEA1526 which permitted in-pit tailings disposal to take place within the Portage Pit. First, tailings were deposited in Goose pit, between July 2019 and August 2020. Since August 2020, tailings have been deposited in Pit E. An updated Tailings Deposition Plan has been prepared for the 2023 revision of the Water Management Plan. The updated deposition plan is presented in the 2023 version of the Meadowbank Mine Waste Rock and Tailings Management Plan. The latest life of mine exercise presents milling operations until 2026. For more information regarding in-pit tailings disposal please refer to the Waste Rock & Tailings Management Plan.

2.2.1.1 Tailings Storage Facility

The Tailings Storage Facility (TSF) is located in the Portage Pit Area and consists of the South Cell and the North Cell. These cells are delimited by tailings retaining dikes that were progressively built as capacity was required. More detailed information on the TSF can be found in the Meadowbank Waste Rock and Tailings Management Plan.

Stormwater Dike, constructed in 2009-2010, is an internal dike (El. 150m) that divides the TSF in the North and South Cell.

The peripheral structures of the North Cell are SD1, SD2, RF1 and RF2 built to El. 150 m from 2009 to 2010. In 2018, a North Cell Internal Structure (NCIS) was built in the northern part of the North

Cell over the existing tailings (variable El. from 152 to 154 m) to increase the tailings storage capacity.

The peripheral structures of the South Cell are SD3, SD4, SD5 and Central Dike built to El. 145 m from 2012 to 2018.

The diversion ditches (East and West), located around the perimeter of the North Cell TSF and the Portage RSF, are designed to collect the non-contact water runoff from the surrounding watershed. The ditches are divided in two sections – the west and east sections, to divert non-contact water respectively to Third Portage Lake and to NP2 Lake. On the west end of the diversion ditches, an Interception Sump was constructed in 2014-2015. The objective of the interception sump is to collect runoff water from the west section of the diversion ditches and to retain it until the total suspended solids in the water have reached the criteria allowing discharge to the environment.

As part of the construction of the NCIS, a ditch was built during the summer of 2018 in the rockfill capping located downstream of the NCIS, but within the TSF footprint, to avoid ponding of water against the structure. One sump was also built in a natural topographic low point at the north area of the cell and upstream of RF2, within the tailings footprint areas.

A volume of tailings was deposited in the South Cell during August and September 2023 to improve the landforms for closure purposes. Additional tailings may be deposited within the North and South Cells to improve the landforms for closure.

2.2.1.2 Stormwater Management Pond

The Stormwater Management Pond (SMP) is a small, shallow, and fishless, water body adjacent to Portage Pit (Figure 2.5). Treated sewage effluent is discharged to this pond as well as water containing hydrocarbon products. The pond also collects freshet flows within its catchment area, including most of the Primary Crusher area.

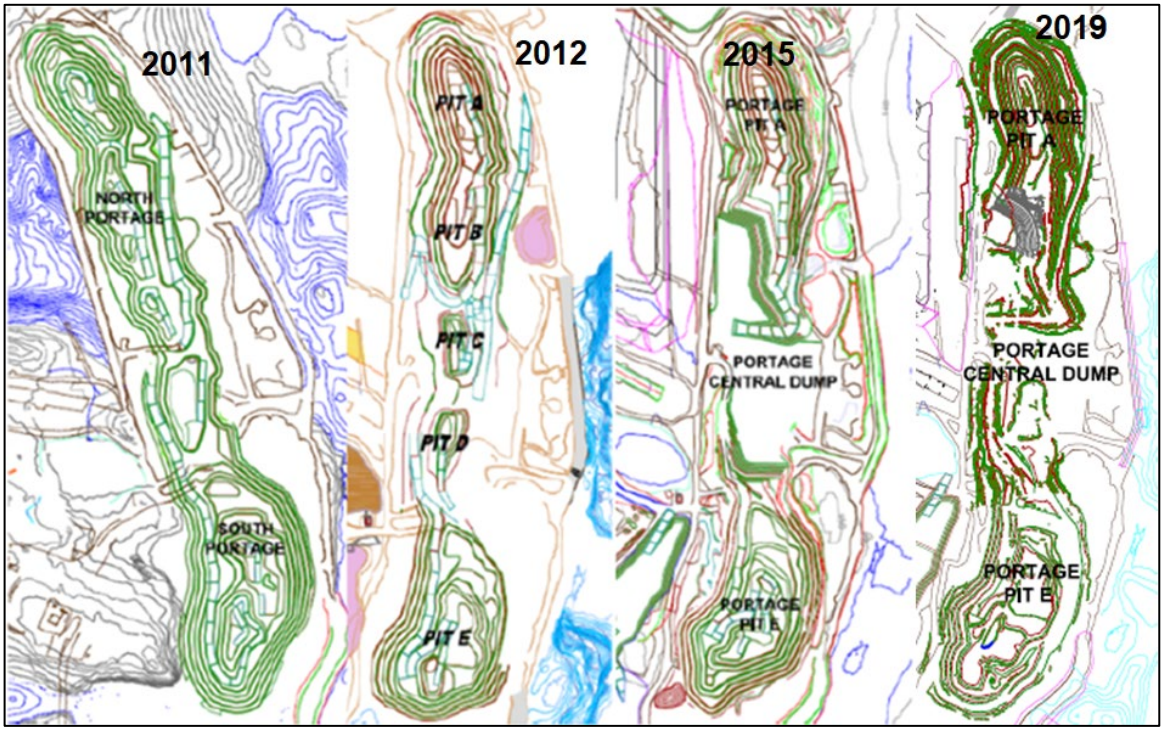


Figure 2.4: Portage Pit terminology

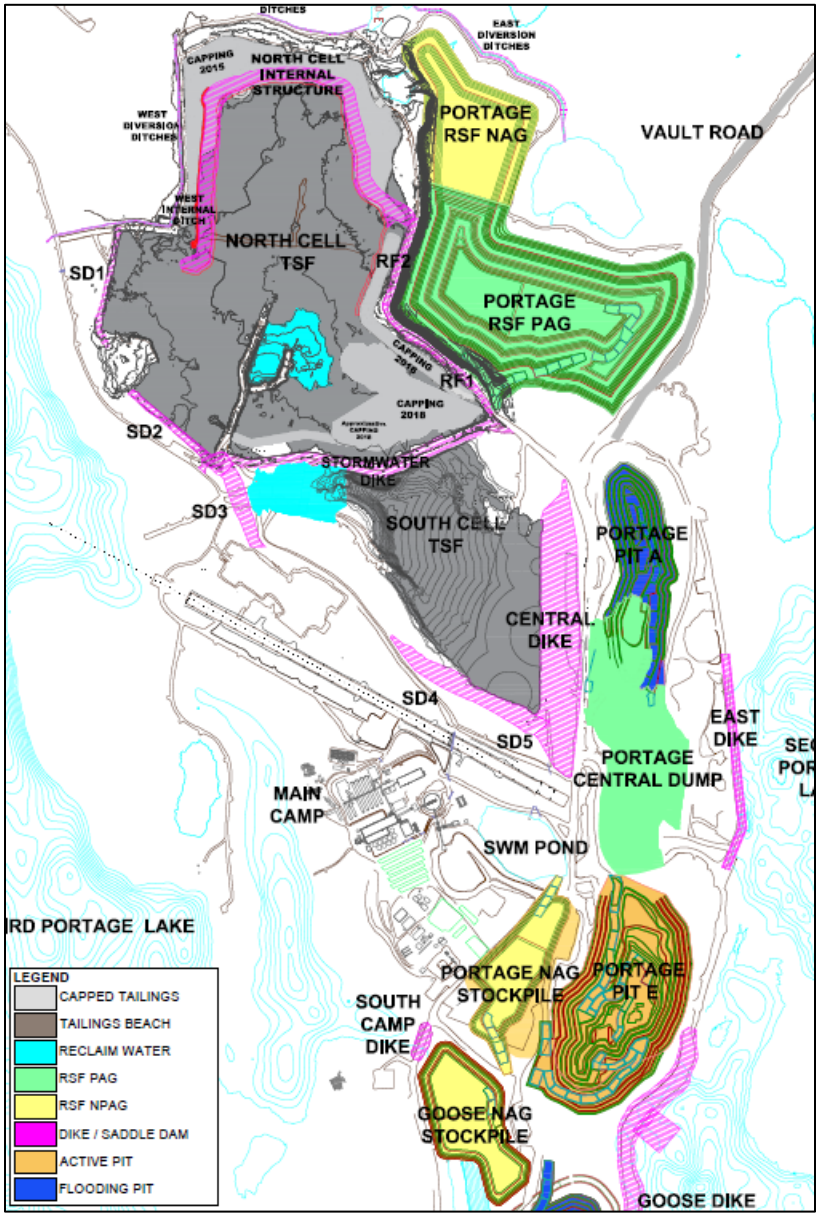


Figure 2.5: Portage Pit area map

2.2.2 Goose Pit Area

The Goose Pit area is located within the dewatered portion of 3PL. Mining in Goose Pit began in 2012 and was completed in April 2015. On May 17th, 2019, Agnico received approval of amendment No.3 to the Meadowbank Type A water license 2AM-MEA1526 which permitted in-pit tailings disposal to take place within the Goose Pit. The Goose Pit area and surrounding infrastructures are illustrated in Figure 2.6. For more information regarding in-pit tailings disposal please refer to the Waste Rock & Tailings Management Plan.

The majority of Goose Pit is located within a talik zone. Historically, the main water inflow into Goose Pit has been observed from the fractured quartzite rock formation located in the South and West wall. No major water inflow has been observed from the eastern wall associated with the iron formation type rock with small volcanic lenses. Between the quartzite and iron formation, there is a large band of ultramafic rock (soapstone).

Since mining was completed in 2015, pumping of water out of the pit has ceased and the inflows are collected in the pit as part of the natural flooding process. As mentioned above, from July 5th, 2019, to August 19th, 2020, tailings have also been deposited in the Goose pit. Water is transferred between Goose Pit and Pit A as required.

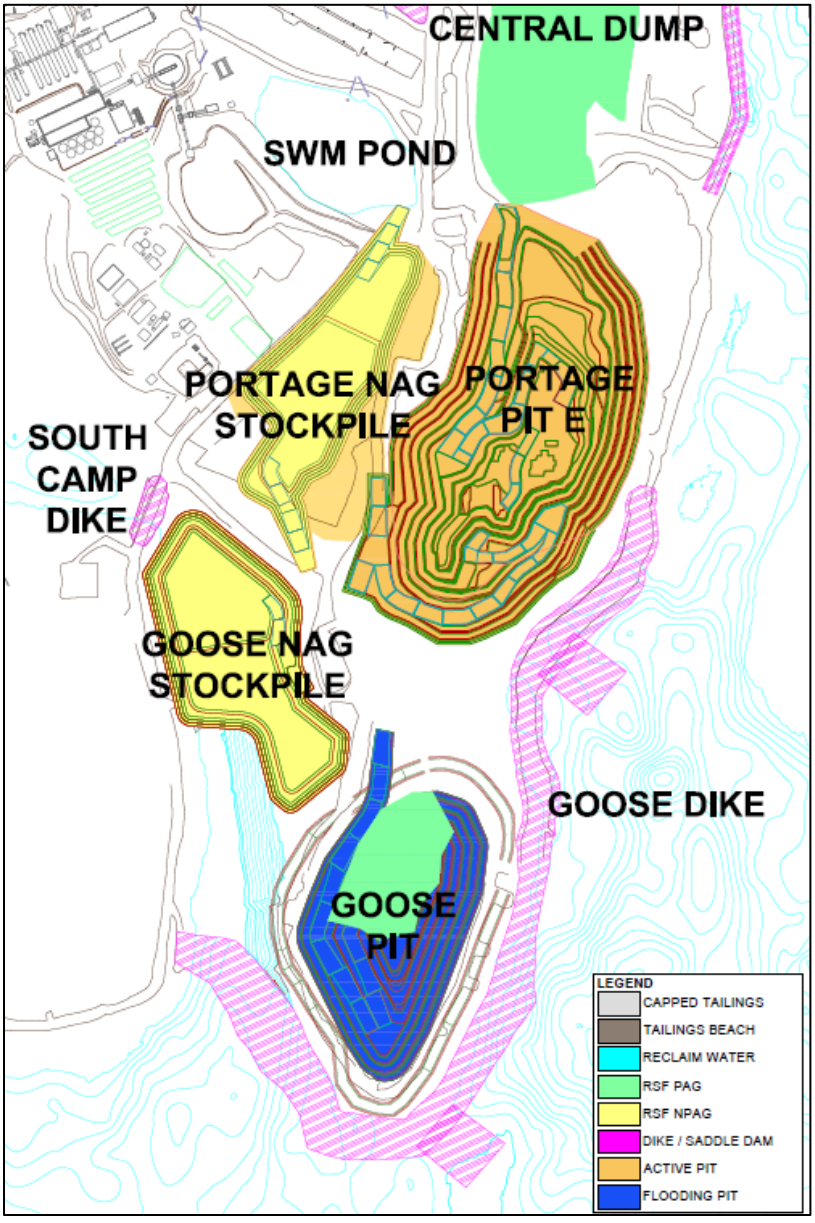


Figure 2.6: Goose Pit area map

2.2.3 Vault Pit Area

The infrastructure of the Vault Pit area includes the Vault RSF, ore and marginal pads, Vault Dike, Vault Pit, Phaser Pit, BB Phaser Pit, Vault attenuation pond and the emergency shelter. Figure 2.7 illustrates the Vault Pit area and surrounding infrastructure.

The Vault Pit, which is located under the former Vault Lake, required the construction of Vault Dike to isolate the mining area from Wally Lake and allow dewatering. Dewatering was undertaken in 2013 and 2014. This allowed for mining of Vault Pit and the creation of the Vault Attenuation Pond (ATP).

The Vault Pit began pre-mining operations in 2013 with active mining started in 2014 and completed in March 2019. The dewatering of Phaser Lake occurred during summer 2016 in preparation for mining activity in Phaser Pit and BB Phaser Pit. Phaser Pit mining activities were completed in October 2018. BB Phaser mining began in early 2018 and was completed in June 2019.

The Vault Attenuation Pond is comprised of four internal ponds named Pond A, B C & D. These ponds promote natural settling of the suspended solids. Water levels of these ponds are measured by surveying with a GPS at the location indicated by the red crosses on Figure 2.7.

Most of the water migrating into the pits of the Vault area has been observed to be runoff from the surrounding area during the freshet period. A localized water venue from the East wall of Vault Pit was historically above the 109 masl catch bench. During mining operations this inflow was collected in a sump located at the toe of the wall and then pumped into the Vault Attenuation Pond.

Water pumped from Vault Pit during mining operations was directed to the Vault Attenuation Pond (ATP). When required, the water was discharged into Wally Lake in accordance with the Water License and the MDMER. Agnico monitors the water quality of the Vault Attenuation Pond and discharge at sampling locations ST-25 and ST-10 respectively in accordance with the Water License. Water treatment for TSS has not been required to meet MDMER and Water license criteria prior to discharging in Wally Lake.

Since mining operations in the Vault area were completed in 2019, there has been no active water management in that area. Under the current model scenarios for 2023, passive reflooding will be ongoing until active reflooding begins during closure.

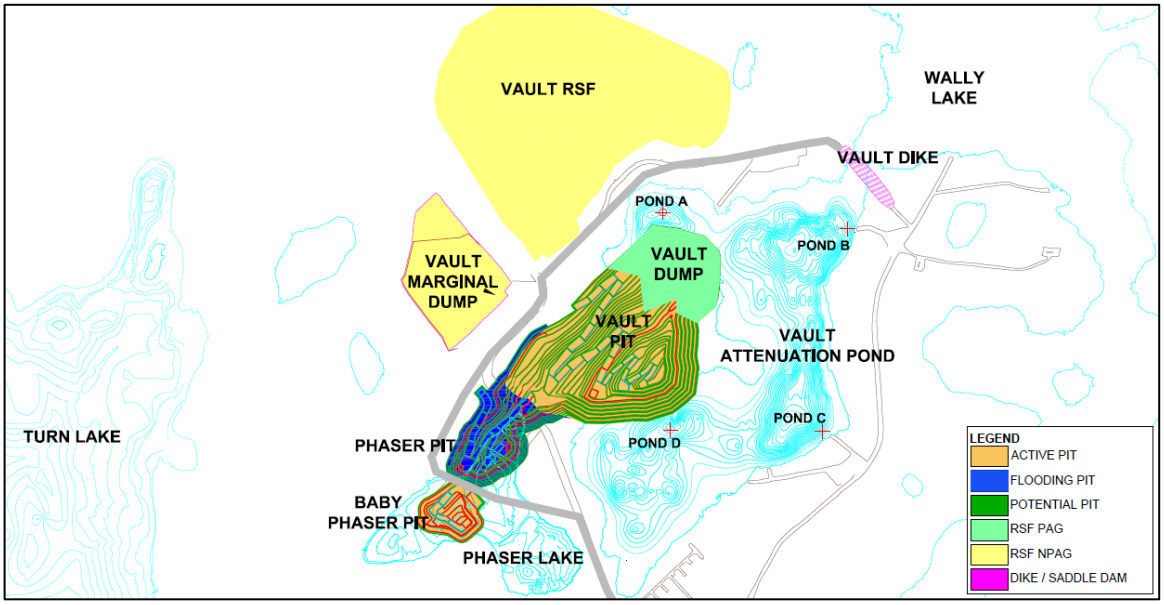


Figure 2.7: Vault Pit area map

2.3 LIFE OF MINE DESCRIPTION

The life-of-mine (LOM) is summarized in Table 3.1 of the 2023 Whale Tail Project Waste Rock Management Plan. The Meadowbank Process Plant will be operational until 2026.

3 WATER MANAGEMENT PLAN AND WATER BALANCE

3.1 WATER MANAGEMENT OBJECTIVES AND TARGETS

The water management objectives for the Meadowbank Site are:

- Keep the different water types (i.e. contact, non-contact, and freshwater) separated to the extent practical
- Control and minimize contact water through diversion and containment.
- Minimize freshwater usage by reclaiming the contact water to the extent practical
- Meet discharge criteria before any site contact water is released to the downstream environment.
- Reduction in freshwater intake per ton mined.
- No events of non-compliance.
    - Regulatory/Water License water quality criteria (effluent loading limits);
    - Regulatory/Water License freshwater withdrawal criteria.

The water management targets are summarized in Table 3-1. These targets are aligned with the water objectives of the Meadowbank Complex and go beyond the Water License limits. These targets strive to minimize risk, conserve freshwater, and minimize water usage. The 2024 targets assume continued improvements in the amount of reclaim water withdrawn from the pits to reuse in the Mill which will also decrease the amount of freshwater used per ton processed and increase the amount of water in recirculation. Targets are set to ensure continuous effort is made to improve water management and to encourage all groups to find and pursue opportunities to reduce freshwater consumption.

Table 3-1: 2024 Targeted water hourly consumption per month – for Mill and Camp usage

WATER OBJECTIVE	TARGET 2023	TARGET 2024
Fresh Water Withdrawn from 3PL (Mill and Camp)	865,000 m^3	900 000 m^3
Contact Water Withdrawn from Pit (reclaim water to Mill)	3,470,000 m^3	3,300,000 m^3
Freshwater per ton processed	0.20 m^3/t	0.20 m^3/t
Water discharge (treated)	0 m^3	0 m^3
Water discharge (fresh) – East Dike to 2PL	70,000 m^3	35,000 m^3
Water in recirculation (water recycled / total water use)	80.0%	80.0%

3.2 WATER MANAGEMENT STRATEGY

To achieve the above water management objectives and targets the following key strategies are implemented in the Water Management Plan.

- Two levels of catchment disturbance have been defined for the area, namely undisturbed and disturbed. Areas that have been disturbed as part of the mine development are considered disturbed catchments, while the areas left unaffected are considered undisturbed catchments.
- For mine water management, runoff from undisturbed areas is considered non-contact water, while runoff from disturbed catchment areas is considered contact water. Surface water that is diverted around the mine facilities, or groundwater that does not emerge into a mine facility, is considered non-contact water. Any non-contact water that mixes with contact water becomes contact water.
- Conveyance and storage of contact water is controlled by channels, piping, and containment structures such as sumps and ponds. Sumps are installed in low points surrounding pits, the WRSF, and the TSF. Contact water is diverted in various sumps and water collection ponds and is conveyed to the TSF or the in-pit area.

- Contact water stored in the in-pit is reclaimed for the milling process.
- East Dike seepage is discharged into Second Portage Lake (when discharge criteria is met) or otherwise sent to the in-pit area.
- The collected water in the Meadowbank area will be treated prior to discharge if the water quality does not meet the discharge criteria established in the Water License 2AM-MEA1530.
- Non-treated effluent from the Vault Attenuation Pond may be discharged to Wally Lake in accordance with Water License 2AM-MEA1530 discharge criteria, if required.
- Non-contact water is intercepted and directed away from disturbed areas by means of natural catchment boundaries and/or diversion structures or pumping systems and will be allowed to flow or to be discharged to the neighboring waterbodies.
- As per the Water License 2AM-MEA1530, (Part E, Condition 10) Agnico will conduct weekly inspections of all water management structures during periods of flow. This is part of the Freshet Action Plan (Appendix D).

3.3 WATER MANAGEMENT SYSTEM AND WATER BALANCE

The water management system includes the following components below. Additional water management system components can be put in place if required to adapt effectively to the site conditions and meet the water management objectives and targets.

The water management system includes the following components:

- Tailings Storage Facility (North Cell and South Cell) and associated dikes (SD1, SD2, SD3, SD4, SD5, Stormwater Dike, Central Dike, NCIS)
- In-pit tailings disposal area (Portage Pit and Goose Pit)
- In-Pit water storage (Vault Pit)
- Four water retention dikes (East Dike, Bay-Goose Dike, South Camp Dike, Vault Dike)
- Water diversion channel around the North Cell of the TSF (East and West Diversion)
- Seepage Management System (Mill Seepage, Central Dike Seepage, East Dike Seepage)
- Stormwater Management Pond
- Sump for WRSF and TSF contact water management
- Reclaim system to the Process Plant
- Freshwater intake and pump system
- Culverts
- Sewage treatment plant (STP)

- Pipelines and associated pump systems
- Potable WTP

As per the requirements of Water License 2AM-MEA1530 (Part E, condition 7) the Water Management Plan includes a yearly updated Water Balance according to the water management strategy and the applicable LOM.

The Water Balance is presented in Appendix A of this report. In this Water Management Plan version, revisions/modifications were made to the Water Balance for optimization purposes including:

- Fresh water consumption revision;
- Total daily mill water requirements;
- Reclaimed water volumes;
- Updated tailings deposition plan for In-Pit Tailings Disposal;
- Water treatment and reflooding sequence and volumes updated as per the latest flooding strategy;
- Update to the seepage section.

3.3.1 Fresh Water from Third Portage Lake

Fresh water from Third Portage Lake is pumped from a freshwater barge. The two primary consumers of fresh water are the mill and the camp. The amount pumped from the barge is tracked in the water balance and reported in the Annual Report as per the requirement of the Type A Water License. The freshwater withdrawal limit for Third Portage Lake as per the Type A Water License is 4,935,000 m^3 per year, including use for pit reflooding.

The freshwater consumed at the process plant is used as part of the milling process and is then discharged in the Portage Pit or TSF as slurry with the tailings. Depending on the time of year, 35% – 75% of the total water volume discharged into the pits is available to be recirculated back to the process plant.

The fresh water used in the camp includes laundry facilities, cleaning, cooking, and drinking water consumption. Most of the camp fresh water is returned as sewage treatment effluent to the Stormwater Management Pond, which ultimately is transferred to the TSF or Portage Pit.

3.3.2 Tailings Deposition Strategy and Reclaim Water

The water management objective related to tailings deposition is to minimize the freshwater per ton processed while maximizing the water in recirculation. This is achieved by reclaiming contact water from the tailings deposition area. More information on the tailings deposition plan can be found in the waste rock and tailings management plan.

For the remainder of mill operations, reclaim water will continue to come from the in-pit disposal pits Pit A and Pit E.

3.3.3 North Cell

Water inflows in the North Cell include runoff, water from tailings deposition, and water transfers from various sumps as needed (Western Interception Sump, WEP, SD1-2, NCIS, ST-16). As per the design specifications, the level of the North Cell reclaim pond must be maintained with a two-meter freeboard with the peripheral water retaining structures, which are at 150.0 masl elevation. Therefore, the pond must respect an elevation of 148.0 masl. This strategy requires transfers from the North Cell to the South Cell generally from May to October. Following landform cover placement over the TSF and until the water quality closure objectives of the TSF are achieved, the runoff water from the North and South Cells will be collected and directed to the pits. Details on the water management for the TSF at closure are available in the Meadowbank Closure and Reclamation Plan and will be further presented in the Final Mine Closure and Reclamation Plan (FCRP).

Runoff water (non-contact water) from the surrounding North Cell TSF watershed area is captured in the diversion ditches located north of the North Cell TSF. Water from the Western Diversion Ditch is conveyed to the Western Interception Sump. From there, it is pumped into the North Cell or redirected to Third Portage Lake via the West Diversion Ditch if water quality meets the required criteria.

3.3.4 South Cell

The water management strategy is to keep the water level at a minimum.

Water inflows in the South Cell include runoff, water from tailings deposition, and water transfers from the North Cell, and various sumps (SD3-4-5). As per the design specifications, the level of the South Cell reclaim pond must maintain a two-meter freeboard with the peripheral impermeable structures, which are at 145.0 masl elevation. Therefore, the pond must respect an elevation of 143.0 masl. Water is transferred from the South Cell to Pit A and water transfers are planned to comply with the freeboard requirement and to minimize water accumulation. Water management strategies within the Water Balance reflect the tailings deposition plan presented in the 2023 Mine Waste and Tailings Management Plan (Agnico, 2024).

Until the closure objectives of the cell are achieved, the strategy is to transfer the water accumulating in the South Cell to the open pits. The water transfers are included in the pit flooding process. Details on the water management for the TSF at closure are available in the Meadowbank Closure and Reclamation Plan and will be further presented in the FCRP.

3.3.5 Portage Pit

The Portage Pit is part of the in-pit tailings disposal facility. The water management strategy is to maximize the reclaim to the mill to maximize tailings storage capacity.

The pit flooding strategy and sequence will continue to be refined until the FCRP submission based on the Water Quality Forecast completed each year (Appendix C).

The Portage Pit inflow is modelled based on measured onsite data including the Central Dike seepage water, Goose Pit transfer, pit wall inflow, runoff water, groundwater, and a contribution from the East Dike seepage water (which is pumped back to Second Portage Lake when discharge criteria are met).

It is likely that the water inflow is filling up the porosity voids of the Portage Central Dump to some extent (former Pit C and Pit D).

3.3.6 Goose Pit

Goose Pit is part of the in-pit tailings disposal facility. The water management strategy is to transfer water between Goose Pit and Portage Pit to meet requirements for the deposition plan.

As part of the closure concept and to achieve the closure objectives, Goose Pit water will be treated, discharged in Third Portage Lake and the pit will be reflooded. The pit flooding strategy and sequence will continue to be refined until the FCRP submission based on the Water Quality Forecast completed each year (Appendix C).

The Goose Pit inflow is modelled based on measured onsite data including pit wall inflow, runoff water, Pit A transfer and groundwater. It was historically observed that the pit inflow diminishes during the winter due to the freezing of the pit walls.

3.3.7 Vault Pits Area

No active water management is currently occurring in the Vault Area. The current strategy to manage water is to let the area flood passively until the beginning of closure. There is the possibility of discharging water to Wally Lake using the approved discharge (ST-10), but this is not currently needed as per the water balance.

As part of the closure concept and to achieve the closure objectives, the operation is considering the transfer of water to the Vault area to advance reflooding efforts with the possibility of discharge to Wally Lake pending the approval of the TDS Action Plan and Site-Specific Water Quality Program presented herein Section 4.1, and Appendix F. The pit flooding strategy and sequence will continue to be refined until the FCRP submission based on the Water Quality Forecast completed each year (Appendix C).

The Vault area natural inflow is modelled based on measured onsite data including pit inflow and runoff water.

3.3.8 Stormwater Management Pond

The Stormwater Management Pond inflow includes treated sewage effluent, runoff, and transfers from trucks containing hydrocarbon contaminated water. The pond water is transferred as required to either the South Cell or the Portage Area.

3.3.9 Mill Seepage Collection System

In November 2013, Agnico observed seepage discharging west of the access road in front of the Assay Lab shown on Figure 3.1. The source was determined to be a leak from internal containment structures within the mill. Third Portage Lake (3PL), approximately 200 m to the west, was identified as a possible sensitive receptor. Remedial measures were undertaken immediately, and this included construction of an impermeable interception/collection trench downstream of the seepage flow path. A comprehensive monitoring system was implemented which included installation of monitoring wells, a recovery well (MW 203) and a water sampling program. Repairs (sealing) were completed within the mill (containment structures) in 2014 to eliminate the source of contaminants.

On December 15th and December 26th, 2023 Agnico observed water inflow within the Assay Road Seep South retention berm. An investigation was undertaken to identify potential sources of the water, in May of 2024 the source of the water inflow has been identified as originating from the leach pad no water inflow has been observed since. The water inflow was contained within the existing water management infrastructure that was built in 2014. Monitoring of the area is still ongoing.

Seepage collected in the trench and recovery well is pumped back to the mill to be used as process water. The pumping occurs in the warmer months beginning when freshet starts. The recovery well is pumped year-round when water is available.

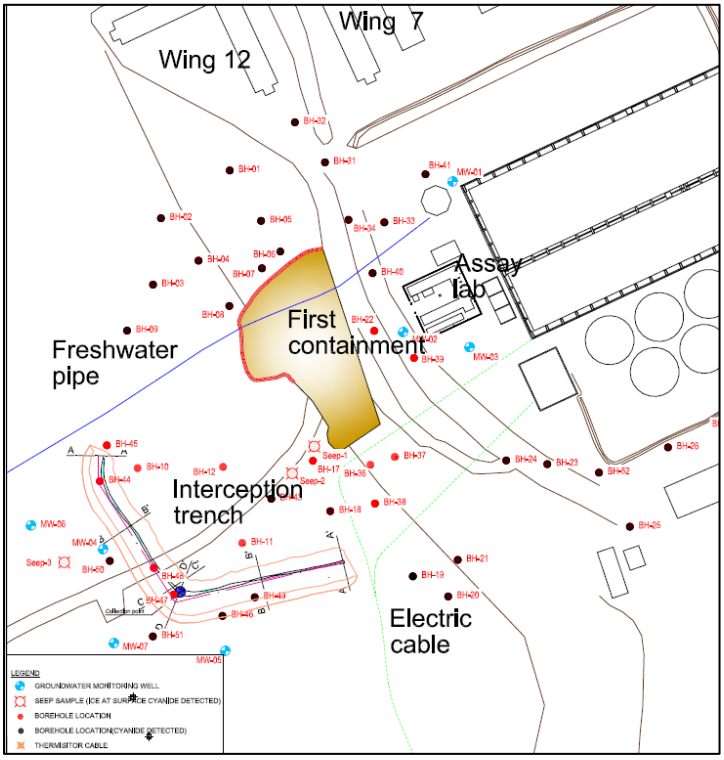


Figure 3.1: Mill seepage area

3.3.10 Portage RSF Water Management

The Portage Rock Storage Facility water management system consists of three sumps located behind the Portage waste dump to collect contact water (WEP-1, WEP-2, and ST-16). The location of these sumps is indicated on Figure 3.2. Water collected from WEP-1 and WEP-2 is pumped to the ST-16 sump and then transferred to either North Cell or pit A.

Low contaminant levels are still observed by the sampling program. The Freshet Action Plan (Appendix D) presents more information on the history, long term monitoring plan, and remedial actions for this location.



Figure 3.2: RSF seepage area

3.3.11 East Dike Seepage Collection

The East Dike seepage system collects the East Dike seepage from Second Portage Lake (2PL). The seepage is collected in two pumping stations (as illustrated in Figure 3.3) and is discharged, as a combined flow, through a diffuser, to 2PL (in accordance with the Water License and the MDMER criteria). When the discharge does not meet the discharge criteria (mainly because of TSS level), the seepage water is pumped to the Portage Pit area (usually at freshet and after large precipitation events in summer) specifically in the Portage Central Waste Rock area, where the water flows in the rock backfill pores towards Pit B and Pit E.

At closure, this seepage water will be an inflow contributing to the natural pit reflooding process.

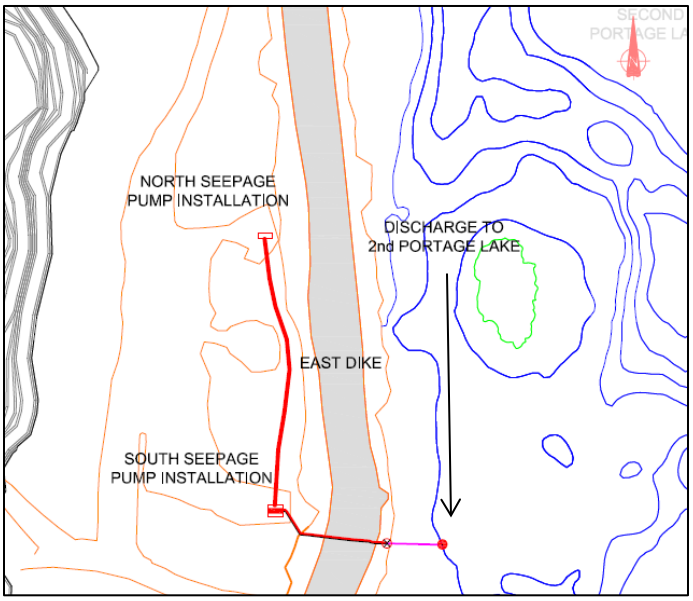


Figure 3.3: East Dike pumping system

3.3.12 Central Dike Seepage

The Central Dike downstream area collects the Central Dike seepage. The source of that seepage includes water from the TSF and a regional component. The water from Central Dike downstream is pumped to either the in-pit area or the TSF (as illustrated in Figure 3.4) as to maintain the downstream seepage collection pond level within the operational levels specified in the OMS Manual.

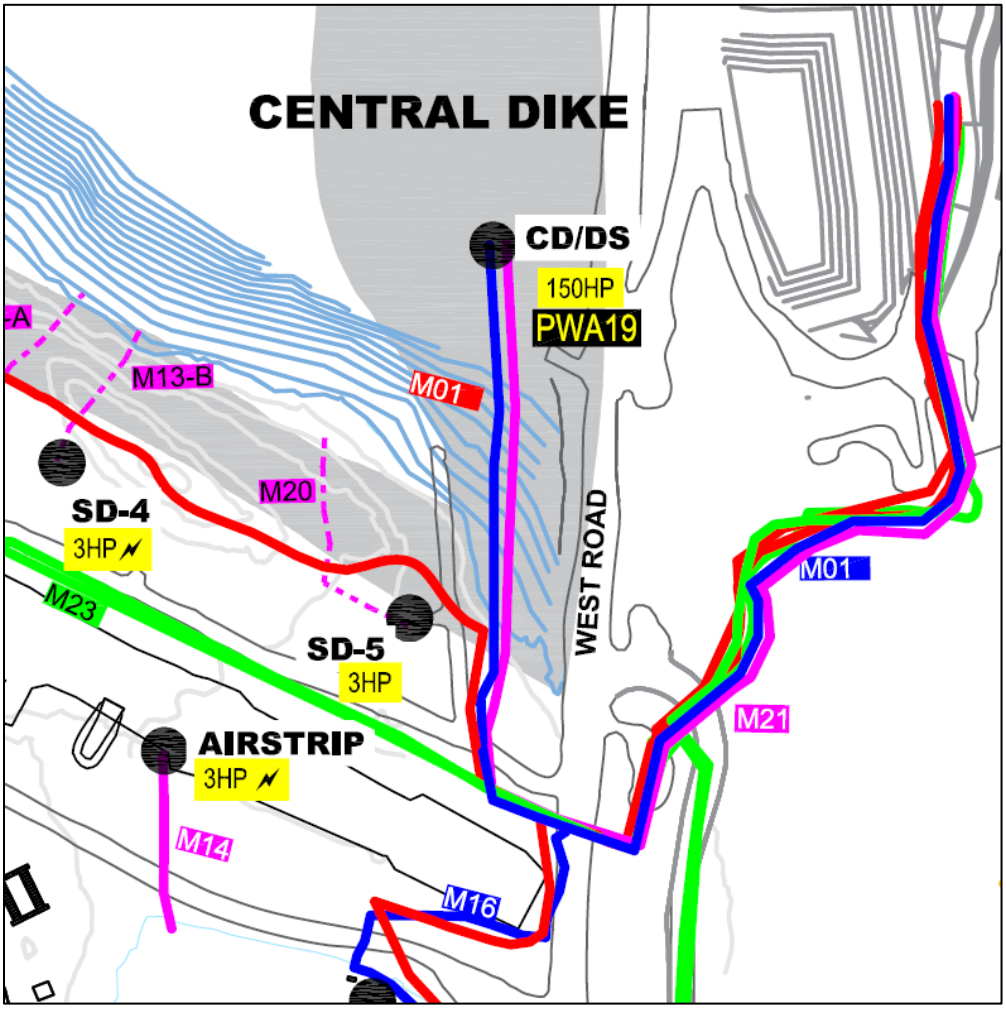


Figure 3.4: Central Dike seepage pumping system

3.4 PIT FLOODING – CLOSURE CONCEPT

As per the water License requirement, Agnico will provide at least 30 days' notice to the Nunavut Water Board and Inspector prior to starting the flooding of each pit from water obtained from Third Portage Lake and Wally Lake.

As prescribed in the Nunavut Water Board Water License No. 2AM-MEA1530 (Part E, Conditions 1 and 2), the use of water from Third Portage Lake, for all purposes, including flooding of the pits, shall not exceed a maximum of 4,935,000 m^3 starting in 2018 through to the expiry of the License 2AM-MEA1530. The use of water from Wally Lake shall not exceed a total 4,185,000 m^3 per year starting in 2018 through the expiry of the License 2AM-MEA1530.

The reflooding concept for the Vault area includes passive flooding until the beginning of closure and then active flooding using water from Wally Lake. Blended water from Portage and Goose Pit

will be treated for metals and discharged as needed provided water quality meets site-specific criteria or Canadian Council of Ministers of the Environment (CCME) guidelines.

The reflooding concept of the Portage and Goose area includes management of water from tailings deposition activity, water treatment, passive flooding, water transfers between the pits, and active flooding from Third Portage Lake. More details on the in-pit water treatment strategy and design, including the discharge location and assimilative capability of the receiver is required to advance the Portage Area flooding concept. The assimilative capacity of Third Portage Lake and Wally Lake will be assessed with the objective of determining water quality objectives in the receiver and in the final pit lake post-closure.

Updates on the pit flooding concept will be provided in the next update of the CRP and the final in-pit water treatment and pit flooding strategy will be submitted as part of the FCRP.

3.4.1 Portage and Goose Area Flooding

The Portage and Goose area will be connected as one waterbody when the pit water level reaches approximately elevation 131.0 masl. Figure 3.5 shows a concept of the the extent of the flooded area at closure.

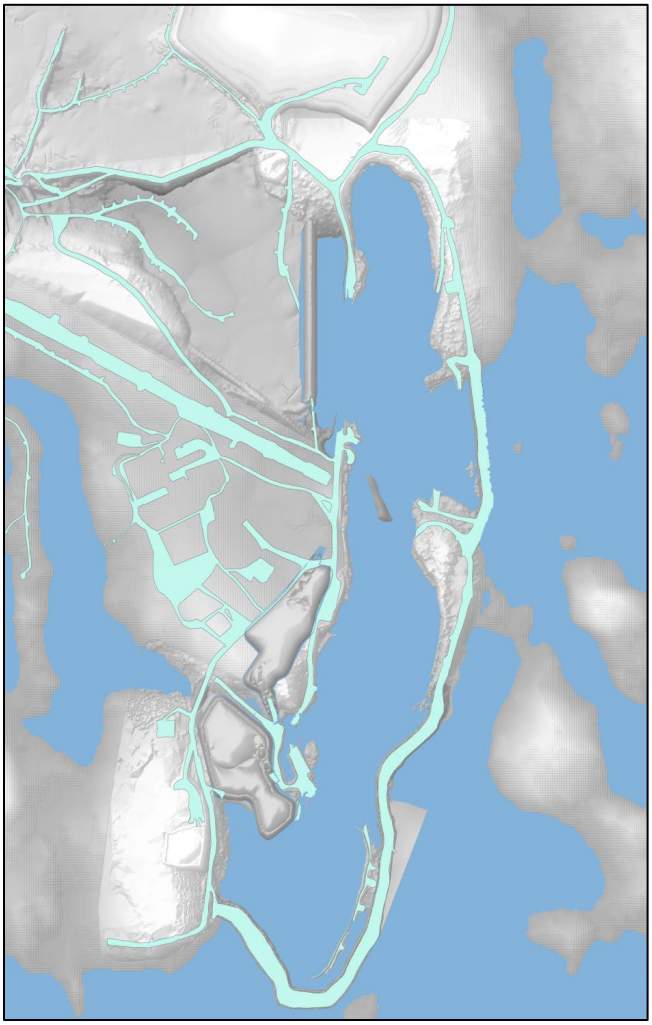


Figure 3.5: Flooded Portage and Goose area at closure

The current concept for Portage and Goose pits flooding at closure is to treat reclaim water from each pit by using a water treatment plant (WTP) and to discharge the treated water in Third Portage Lake. The pits area will then be reflooded using a combination of passive and active water inflow (from Third Portage Lake). This is a conservative assumption that will be revised in the CRP and FCRP as further data becomes available on the water treatment design for the in-pit water. Different flooding sequence concepts are being looked at for the reflooding of the Portage and Goose Area to ensure the closure objectives will be met. The flooding sequence will be informed by the water treatment strategy that is being established. The location of the discharge, type of treatment, water quality and discharge criteria of the effluent, as well as yearly volume of water to be discharged are being assessed as part of the design of the closure strategy and will impact the pit reflooding strategy. Some of the work associated with the water quality forecast and water treatment plant design is presented in the Meadowbank Water Quality Forecasting Update Technical Note rev. 00 completed by AtkinsRéalis (AtkinsRealis, 2024). An update on the pit

flooding concept will be provided in the next CRP update and the final design will be submitted as part of the FCRP.

Agnico is committed to update the Water Quality Forecast Model using up to date data on a yearly basis and to use this model to inform on the water treatment design and re-flooding sequence.

The final elevation of the reflooding will be the elevation of Third Portage Lake which is around 133.7 masl based on available data. The Bay-Goose Dike and South Camp Dike will be breached to allow reconnection of the area with Third Portage Lake once the closure water quality objectives for pit flooding will have been achieved, as per the condition of the Water License 2AM-MEA1530, part E, item 7. The dikes shall not be breached until the water quality in the re-flooded area meets CCME Water Quality Guidelines for the Protection of Aquatic Life, baseline concentrations, or appropriate SSWQO, as per the Water License. It is not planned to breach East Dike and reconnect the area with Second Portage Lake as per the current closure concept, to maintain the water level difference between Second and Third Portage Lake.

Details of the complete mechanical flooding system will be available in the Final Closure and Reclamation Plan and is currently involving syphon systems. Table 3-2 shows the main volumes for the Portage and Goose Area flooding concept.

Pit Flooding Profile – Portage and Goose Area				
Year	Treated Water Volume (m^3)	Natural Inflow Water Volume (m^3)	Active Flooding Water Volume (m^3)	Volume of water in Pit (at end of year)
2027		898 643	0	19 962 196.00
2028	756 019	898 643	0	21 582 111.00
2029	2 999 424	836 407	0	21 032 780.00
2030	2 999 424	836 407	0	20 163 767.00
2031	2 999 424	836 407	0	19 240 753.00
2032	3 007 642	836 407	0	18 336 521.00
2033	2 999 424	836 407	0	17 440 508.00
2034	2 999 424	836 407	0	16 544 494.00
2035	2 999 424	836 407	0	15 648 480.00
2036	3 007 642	836 407	0	14 744 248.00
2037	2 999 424	836 407	0	14 024 171.00
2038	3 167 146	836 407	4 935 000	12 960 435.00
2039	0	836 407	4 935 000	19 980 845.00
2040	0	836 407	2 841 723	27 037 255.00
2041	0	836 407	0	31 982 388.00
2042	0	836 407	0	34 085 799.00
2043	0	836 407	0	36 189 209.00
2044	0	836 407	0	38 292 619.00
Total	**30 934 417**	**15 179 798**	**12 711 723**	**38 292 619.00**

Table 3-2: Portage and Goose Area flooding profile

3.4.2 Vault Area Flooding

The Vault Pit area is composed of many basins in the former lake (Vault Atteunation Pond) and two pits that are all linked together (Vault Pit and Phaser Pit). The flooding of the Vault Pit area will involve a combination of passive flooding (runoff), and active flooding using water from Wally Lake (while respecting the Water License limit). The concept for the reflooding system is currently including a syphon system. Table 3-3 shows the main assumptions and data for the Vault Area flooding concept.

The final elevation of the reflooding will be 139.9 masl for Phaser and Vault Lake. The Vault Dike will be breached to allow reconnection of the area with Wally Lake when the closure water quality objectives for pit flooding will have been achieved, as per the condition of the Water License 2AM-MEA1530, part E, item 7. The dikes shall not be breached until the water quality in the re-flooded area meets CCME Water Quality Guidelines for the Protection of Aquatic Life, baseline concentrations, or appropriate site-specific water quality objectives, as per the Water License.

BB Phaser Pit and Phaser Lake will be flooded exclusively from their watershed run off inflows until the target elevation of Wally is reached.

Table 3-3: Vault Area flooding profile

Pit Flooding Profile – Vault Area (Vault, Phaser, and BB Phaser Pits)				
Year	Treated Water Volume (m^3)	Natural Inflow Water Volume (m^3)	Active Flooding Water Volume (m^3)	Volume of water in Pit (at end of year)
2024	0	542 442	0	1 834 712
2025	0	542 442	314 194	1 989 592
2026	0	542 442	0	2 144 471
2027	0	542 442	0	2 299 351
2028	0	542 442	0	2 454 230
2029	0	542 442	0	2 780 579
2030	0	542 442	0	3 106 928
2031	0	542 442	0	3 433 277
2032	0	542 442	0	3 759 626
2033	0	542 442	0	4 085 975
2034	0	542 442	0	6 590 778
2035	0	542 442	0	10 762 247
2036	0	542 442	0	14 933 717
2037	0	542 442	0	19 105 186
2038	0	542 442	0	23 105 186
2039	0	542 442	0	27 105 186
2040	0	542 442	0	30 438 520
Total	**0**	**9 221 514**	**314 194**	**159 929 561**

4 MEADOWBANK WATER QUALITY FORECASTING UPDATE

An updated water quality forecast report is presented in Appendix C. That update is a continuation of a series of yearly water quality modelling updates, which began in 2012, and will continue until mine closure, as per the Water License part E item 7. The purposes of the report are to identify, through a mass balance approach, the contaminants of concern during the pit flooding process, and to inform water treatment design and requirements for closure activities.

This water quality forecast builds on the work of previous years as new monitoring data is available. Forecasted model values of the prior years are compared with the actual sample results from the following years for model accuracy purposes.

The latest water quality forecast identified that treatment may be required for aluminum, arsenic, cadmium, copper, mercury, nickel, total dissolved solids (TDS), total ammonia, pH, total suspended solids (TSS), and potentially low concentration of total cyanide as the pit water quality may exceed water quality objectives, based on the completely mixed assumption. Annual water quality predictions in the pit lakes (Pit A, Pit E and Goose Pit) during operations have shown measured concentrations of TDS to be greater than the forecasted model predictions in the pit lakes by more than 20%, summarized below in Table 4.1. Causes associated with the differences between modeled vs measured values have been presented to the Board within the most recent Annual Report (2023, Appendix 16). The main causes were identified to be related to measured water levels that were either higher or lower than predicted in the model (i.e., less water in the pits than had been predicted), and/or there were increased/decreased infiltration rates from surface runoff (i.e., higher volumes of elevated TDS entering pits than predicted) resulting in an increase in measured TDS loadings relative to predictions depending on the year in question (see Section 4.4.3.1 of the 2023 Annual Report for specific details). The implications of increasing TDS loadings may lead to the risk of not being able to meet the Pit Lake water quality criteria for effluent discharge during operations and closure. As a result, Agnico Eagle has pre-emptively developed an Action Plan within this version of the Water Management Plan (Section 4.1) to address water Licence conditions Part E, Item 7, by following guidelines outlined in Part F, Item 6 beginning with the development of an appropriate site-specific TDS water quality program for effluent release (Appendix F), that provides an Interim benchmark for Environmental Quality Criteria (EQC) at the end of the pipe and a Site-Specific Water Quality Objective (SSWQO) to be protective of the receiving environment at the edge of the mixing zone. Lake wide assessment of the assimilative capacity of discharging elevated TDS to Wally Lake is ongoing and will be provided as an addendum once completed.

For the Vault area, ammonia and nitrate are the parameters of concern, but no actual or forecasted concentration exceeds the Type A Water License discharge requirements for this area.

Table 4-1: Summary of Percentage Differences Between Measured and Forecasted TDS in Pit Lakes (2020-2023)

Pit	Year	*Forecasted TDS (mg/L)	Measured Mean TDS (mg/L)	%Difference
Pit A (ST-17)	2020	1710	853	-50%
	2021	2659	929	-65%
	2022	2659	1456	-45%
	2023	703	1711	143%
Pit E (ST-19)	2020	3760	833	-78%
	2021	1741	1931	11%
	2022	1741	3130	80%
	2023	793	3742	372%
Goose Pit (ST-20)	2020	884	828	-6%
	2021	282	1134	302%
	2022	282	1114	295%
	2023	241	771	220%

***Forecasted TDS obtained from 2023 Annual Report Appendix 16 - Meadowbank Predicted Water Quantity and Quality (2012-2023)**
***Red font denotes %difference >20% between measured and forecasted TDS**

As the afore mentioned parameters may be of concern, treatment options for the pit water are being assessed for all other parameters listed above as per the schedule outlined in the Meadowbank Water Quality Forecasting Update Technical Note rev. 00 (AtkinsRéalis, 2024). Updates on the pit flooding and water treatment strategy will be provided in the next CRP update and the final design will be submitted as part of the FCRP.

As part of the ongoing work on the water treatment concept, a sampling program was performed in the fall of 2023 to sample pit water from various locations and depths within the pits including near the tailings/water interface. Tailings pore water sampling was also completed. It is planned to continue this sampling program in 2024 so that results can be used in future water quality forecast work.

Agnico is committed to implementing the following strategy related to the water quality forecast:

1. Continue the current monthly monitoring program of all inflows and outflows of the North and South Cells TSF Pond for cyanide, a complete total and dissolved metal scan, ammonia, nitrate, fluoride, chloride, sulphates, total dissolved solids (TDS) and total suspended solids (TSS). This will provide an indication of the runoff quality that accumulated in these ponds following the end of tailings deposition in these areas.

2. Considering that deposition of the tailings is now occurring in the pits, regularly monitor pit water quality (Portage and Goose), when the site can be safely accessed, and analyze for cyanide, total and dissolved metals, ammonia, nitrate, chloride, fluoride, sulphates, total dissolved solids (TDS), and total suspended solids (TSS). This information will be useful in developing and calibrating a water quality forecast model of the pit water quality based on loadings from the mill effluent, surface runoff, and possible pit seepages. Consider measuring the conductivity of water in the pits at different depths to detect if there is any stratification occurring in the pit lakes.
3. Once Portage and Goose Pits are hydraulically connected, it is recommended to sample the water at different points in the pit area to evaluate the mixing efficiency over the entire area. The samples should be taken at different depths over the entire area of the flooded pits before and after the filling season.
4. Continue to sample and analyze, as per the Water License requirement, water from the Vault Pit, Vault Attenuation Pond, Phaser Pit, and Phaser Attenuation Pond.
5. Continue bench scale water treatment tests to evaluate the contaminant removal efficiency using treatment approaches such as lime neutralization, coagulation/flocculation with aluminum sulphate or ferric sulphate, and coagulation/flocculation with proprietary coagulants designed for metal removal, as well as alternative treatment options such as biological treatment for ammonia.

Alternatives for water quality modelling methodologies are actively being assessed to further refine the understanding and forecasting of water quality on site. In addition, studies are ongoing to define the most optimal water management strategies to improve water quality on site for closure.

4.1 TDS ACTION PLAN

As discussed above, the following action plan has been developed by Agnico Eagle to allow water quality at the End of Pipe and in the Receiving Environment to be protective of aquatic life throughout all phases of the project.

One of the closure concepts for flooding Portage and Goose area currently being explored is to move as much water as needed to Vault Pit, treat for any deleterious substances above criteria (if required) by using a water treatment plant (WTP), prior to discharge to Wally Lake (ST-10) through the Vault Attenuation Pond as identified in Part F, Item 4 of the Licence. Pits may be reflooded using a combination of passive and active water inflow (from Third Portage Lake and/or Wally Lake). This is a conservative assumption that will be revised in the Closure and Reclamation Plan (CRP) as further data becomes available on the water treatment design for the in-pit water. Different flooding sequence concepts are being looked at for the reflooding of the Portage and Goose Area to ensure the closure objectives will be met.

The Goose Dike and South Camp Dike may only be breached to allow reconnection of the area with Third Portage Lake when the closure objectives for pit flooding are achieved. The dikes shall not be breached until the water quality in the re-flooded area meets CCME Water Quality Guidelines for the Protection of Aquatic Life, baseline concentrations, or appropriate SSWQOs, as per Part E, Item 7 of the Water Licence.

To achieve this, Agnico Eagle has developed a site-specific water quality program for TDS which includes an assessment of risk through evaluating acute and chronic toxicity data collected from pit waters from the Meadowbank Mine as well as literature values. An evaluation of assimilative capacity in the receiving environment is also being conducted and will be amended to the application once finalized. A high-level summary of the site-specific water quality program is provided below, further details can be found in Appendix F.

4.1.1 Site Specific Water Quality Program and Risk Assessment

As recommended in Part F, Item 6 of the Water Licence a site-specific water quality program for effluent release has been developed for TDS, details provided in Appendix F. Through this program an interim SSWQO for acute and chronic exposures to TDS was developed. Final EQC and SSWQO benchmarks for TDS will be developed and provided to the NWB in an addendum to Appendix F once site-specific chronic toxicity to Rainbow Trout and the assimilative capacity of the receiving environment have been completed in Q4, 2024.

Literature and site-specific toxicity data were compiled, evaluated, and used to derive interim EQC for effluent at the end-of-pipe evaluated to assess TDS concentrations that are safe to aquatic life at the end of pipe and within the receiving environment at the edge of the mixing zone (SSWQO) details are provided in the attached Technical Memorandum in Appendix F.

Site-specific toxicity of TDS was evaluated from controlled studies in the laboratory using samples prepared to simulate future predicted exposure conditions. Toxicological studies to support development of the proposed benchmarks were undertaken to validate literature-based data. The objectives of the site-specific toxicological studies were to:

a) Evaluate the acute toxicity of synthesized site effluent blends of TDS to the acute regulatory test species *Daphnia magna* (48-hr exposure) and Rainbow Trout (*Oncorhynchus mykiss*; 96-hr exposure).
b) Evaluate the chronic toxicity of TDS, under future exposure conditions simulating the edge of the mixing zone during effluent discharge, using a battery of sensitive, surrogate laboratory test species: the water flea *Ceriodaphnia dubia*, an algae *Raphidocelis subcapitata*, and early life stage Rainbow Trout.

The information gathered from the site-specific toxicity program was integrated with literature data for comparable TDS mixtures to establish proposed benchmarks that are protective of aquatic life under acute (EQC) and chronic (SSWQO) exposure conditions. Site-specific data were used as the primary line of evidence to establish the benchmarks, with supplementary literature data providing additional evidence to evaluate concurrence or divergence in toxicity benchmarks for TDS under comparable exposure scenarios.

4.1.2 Acute Toxicity (EQG)

The proposed site-specific EQC benchmark for TDS lies between 4,000 to 10,000 mg/L (as calculated TDS). Refinement of the EQC to a single numerical value will be informed by evaluation of assimilation capacity in the receiving environment (i.e., confirmation that the proposed SSWQO that can be met at the edge of the mixing zone given a specified EQC). The collective lines of evidence presented in the attached Technical Memorandum (Appendix F, Section 3.1) provide high confidence that no acute lethality is expected at the point of discharge at TDS concentrations below 4,000 mg/L, therefore the interim Maximum Allowable Concentration (MAC) for the Meadowbank Mine could be set at 4,000 mg/L to ensure the protection of aquatic life.

Given the conservatism of the assessment, the results could support an extension of the EQC above 4,000 mg/L, providing assimilative capacity conditions are met. However, at this stage, the lower end of the proposed range has been advanced as the interim benchmark, providing a margin of safety for operations.

4.1.3 Chronic Toxicity (SSWQO)

The proposed interim SSWQO benchmark for TDS for the Meadowbank Mine was indicated to be 1,000 mg/L (as calculated TDS) to be protective against chronic toxicity in the receiving environment. The proposed SSWQO of 1000 mg/L is supported by the weight of evidence outlined in detail in the Technical Memorandum (Appendix F, Section 3.2) showing negligible chronic toxicity of pit lake water to sensitive invertebrate (*C.dubia*) and algae(*R.subcapitata*) species; that the ionic matrix of the pit lake water at closure and post-closure at the Meadowbank Complex was favourable for not exhibiting chronic toxicity to aquatic life at TDS concentrations below 1,000 mg/L; and the literature review of other mine sites also supported the interim SSWQO of 1,000 mg/L.

This proposed SSWQO of 1,000 mg/L TDS is an interim value pending confirmation of:

a) no chronic toxicity to Rainbow Trout in the planned fall 2024 toxicity test program; and
b) confirmation of assimilative capacity in the receiving environment.

The TDS action plan has been presented in this current version of the Water Management Plan update (V13, dated August, 2024). Conclusions of the above studies and analyses will be presented as an addendum to a future update of this Plan.

4.1.4 Proposed Interim Acute (EQC) and Chronic (SSWQO) Toxicity Benchmarks

Interim acute (EQC) and chronic (SSWQO) toxicity benchmarks proposed to be protective of aquatic life at the end of pipe and in the receiving environment are outlined in **Table 4-2**, described in section 4.1.2 and 4.1.3 above, and detailed in Appendix F.

Table 4-2: Proposed EQC and SSWQO Benchmarks for TDS

Toxicity Evaluation	Benchmark Type	Interim Benchmark (mg/L)
Acute	EQC (End of Pipe)	4,000
Chronic	SSWQO (Receiving Environment)	1,000

5 REFERENCES

1. Agnico (2024) – 2023 Mine Waste and Tailings Management Plan
2. Environment Canada (2011a) - National Climate Data and Information Archive, http://climat.meteo.gc.ca/advanceSearch/searchHistoricData_f.html.
14. Nunavut Water Board, Water Licence NO: 2AM-MEA0815, June 9, 2008, to May 3, 2015.
3. Golder Associates Ltd. (Golder), 2003. Report on Permafrost Thermal Regime Baseline Studies, Meadowbank Project. December 18, 2003.
4. Golder (2009) – Meadowbank Gold Project Updated Water Management Plan. Golder Associates Limited. July 2009.
5. SNC (2013) – Water Management Plan 2012. SNC Lavalin. March 2013.
6. AtkinsRéalis (2024) – Meadowbank Water Quality Forecasting Update for the 2023 Water Management Plan. March 2024.

APPENDIX A – 2023 WATER BALANCE UPDATE

Note: Reported values for October, November and December are estimated based on historical values, due to time constraint to produce the water balance for the end of the year 2023.

	Month	Nbr days	Fresh Water 3rd Portage Lake					Fresh Water 3rd Porta	Water Transfer							Water Transfer	Reclaim Tailings Water							Reclaim Water
											Enter 1 for the origin			Enter 1 for the destination					Enter 1 for the origin					
raw inflow			Fresh Water Flow (m^3/h)	Total Fresh Water Volume (m^3) x	Total Camp Water Volume (m^3)	Total Mill Fresh Water Volume (m^3)	Fresh water per tons (m^3/t)		Transfer flow (m^3/h)	Total Reclaim Water Volume (m3)	GOOSE	PIT A	PIT E	GOOSE	PIT A	PIT E		Reclaim Water Flow (m^3/h)	Total Reclaim Water Volume (m^3)	NC	SC	PIT E	PIT A	Reclaim water per tons (m^3/t)	
2013 AVERAGES & TOTALS			**181**	**1 587 409**	**34675**	**1 552 734**	**0.37**											**261**	**2 286 400**					**0.56**	
2014 AVERAGES & TOTALS			**125**	**1 098 373**	**34675**	**1 063 698**	**0.26**											**279**	**2 447 002**					**0.59**	
2015 AVERAGES & TOTALS			**93**	**812 285**	**34675**	**777 610**	**0.20**											**313**	**2 743 821**					**0.68**	
2016 AVERAGES & TOTALS			**65**	**572 843**	**40532**	**539 482**	**0.14**											**328**	**2 880 483**					**0.72**	
2017 AVERAGES & TOTALS			**55**	**477 383**	**42100**	**448 817**	**0.12**											**339**	**2 972 495**					**0.77**	
2018 AVERAGES & TOTALS			**114**	**988 132**	**39944**	**948 188**	**0.29**											**249**	**2 191 390**					**0.67**	
2019 AVERAGES & TOTALS			**255**	**2 226 927**	**40222**	**2 186 705**	**0.80**											**69**	**606 807**					**0.24**	
2020 AVERAGES & TOTALS			**238**	**2 086 286**	**33637**	**2 052 649**	**0.79**			**1 376 334**									**1 367 816**					**0.41**	
2021 AVERAGES & TOTALS			**123**	**1 079 342**	**31461**	**1 053 471**	**0.20**			**670 758**									**2 735 553**					**0.78**	
2022 AVERAGES & TOTALS			**115**	**993 806**	**35823**	**957 983**	**0.26**												**2 888 010**	**0.804**	**1.004**			**0.78**	
Q1	January-23	31	72	53 462	3288	50 174	0.15		152	112 802			1		1			379	281 692			1	0	0.81	
	February-23	28	88	58 818	2944	55 874	0.18		235	158 175			1		1			370	248 962			1	0	0.76	
	March-23	31	88	65 387	2980	62 407	0.19		218	162 309			1		1			383	285 244			1	0	0.83	
Q2	April-23	30	89	64 077	3131	60 946	0.21		221	159 090			1		1			400	287 931			1	0	0.96	
	May-23	31	69	51 171	3024	48 147	0.28		175	130 514			1		1			360	268 126			1	0	1.47	
	June-23	30	103	74 060	3003	71 057	0.20		105	75 786			1		1			425	306 018			0.35	0.65	0.84	
Q3	July-23	31	127	94 371	3066	91 305	0.26		162	120 598			1		1			422	313 608			0	1	0.87	
	August-23	31	159	118 099	2983	115 116	0.32		110	81 613			1		1			395	294 203			0	1	0.81	
	September-23	30	118	84 801	2902	81 899	0.24		78	56 360			1		1			418	301 079			0.294	0.706	0.85	
Q4	October-23	31	91	68 070	2836	65 234	0.22		195	145 371			1		1			378	281 544			1	0	0.90	
	November-23	30	99	70 979	2957	68 022	0.22		182	130 811			1		1			341	245 475			1	0	0.76	
	December-23	31	93	69 460	2894	66 566	0.23		195	145 115			1		1			384	285 346			1	0	0.95	
2023 AVERAGES & TOTALS			**100**	**872 754**	**36008**	**836 746**	**0.22**												**3 399 228**					**0.90**	
Q1	January-24	31	97	72 156	2945	69 211	0.20		160	119 040			1		1			390	290 042			1	0	0.80	
	February-24	29	97	67 344	2755	64 589	0.20		160	111 360			1		1			389	270 723			1	0	0.80	
	March-24	31	97	72 156	2945	69 211	0.20		160	119 040			1		1			390	290 067			1	0	0.80	
Q2	April-24	30	84	60 588	2850	57 738	0.20		160	115 200			1		1			338	243 564			1	0	0.80	
	May-24	31	92	68 124	2945	65 179	0.20		160	119 040			1		1			368	273 858			1	0	0.80	
	June-24	30	97	69 740	2850	66 890	0.20		160	115 200			1		1			389	280 355			1	0	0.80	
Q3	July-24	31	97	72 156	2945	69 211	0.20		160	119 040			1		1			390	290 067			1	0	0.80	
	August-24	31	94	70 020	2945	67 075	0.20		160	119 040			1		1			378	281 480			1	0	0.80	
	September-24	30	97	69 740	2850	66 890	0.20		160	115 200			1		1			389	280 355			1	0	0.80	
Q4	October-24	31	82	61 132	2945	58 187	0.20		160	119 040			1		1			330	245 751			1	0	0.80	
	November-24	30	91	65 708	2850	62 858	0.20		160	115 200			1		1			367	264 146			1	0	0.80	
	December-24	31	97	72 156	2945	69 211	0.20		160	119 040			1		1			390	290 067			1	0	0.80	
2024 AVERAGES & TOTALS			**93**	**821 020**	**34770**	**786 250**	**0.20**												**3 300 475**					**0.80**	
Q1	January-25	31	99	73 391	2945	70 446	0.20		160	119 040			1		1			397	295 007			1	0	0.80	
	February-25	28	102	68 475	2660	65 815	0.20		160	107 520			1		1			410	275 269			1	0	0.80	
	March-25	31	99	73 391	2945	70 446	0.20		160	119 040			1		1			397	295 033			1	0	0.80	
Q2	April-25	30	85	61 210	2850	58 360	0.20		160	115 200			1		1			342	246 063			1	0	0.80	
	May-25	31	93	69 359	2945	66 414	0.20		160	119 040			1		1			375	278 824			1	0	0.80	
	June-25	30	99	70 956	2850	68 106	0.20		160	115 200			1		1			396	285 243			1	0	0.80	
Q3	July-25	31	99	73 391	2945	70 446	0.20		160	119 040			1		1			397	295 033			1	0	0.80	
	August-25	31	96	71 248	2945	68 303	0.20		160	119 040			1		1			385	286 417			1	0	0.80	
	September-25	30	99	70 956	2850	68 106	0.20		160	115 200			1		1			396	285 243			1	0	0.80	
Q4	October-25	31	83	61 758	2945	58 813	0.20		160	119 040			1		1			334	248 269			1	0	0.80	
	November-25	30	93	66 924	2850	64 074	0.20		160	115 200			1		1			374	269 034			1	0	0.80	
	December-25	31	99	73 391	2945	70 446	0.20		160	119 040			1		1			397	295 033			1	0	0.80	
2025 AVERAGES & TOTALS			**95**	**834 451**	**34675**	**799 776**	**0.20**												**3 354 466**					**0.80**	
Q1	January-26	31	98	72 898	2945	69 953	0.20		160	119040								394	293 025			1	0	0.80	
	February-26	28	108	72 898	2660	70 238	0.20		160	107520								436	293 051			0	1	0.80	
	March-26	31	98	72 898	2945	69 953	0.20		160	119040								394	293 051			0	1	0.80	

Q2	April-26	30	95	68 143	2850	65 293	0.20	160	115200							380	273 937			0	1	0.80
	May-26	31	92	68 143	2945	65 198	0.20	160	119040							368	273 937			0	1	0.80
	June-26	30	95	68 143	2850	65 293	0.20	160	115200							380	273 937			0	1	0.80
Q3	July-26	31	98	72 834	2945	69 889	0.20	160	119040							394	292 791			0	1	0.80
	August-26	31	98	72 834	2945	69 889	0.20	160	119040							394	292 791			0	1	0.80
	September-26	30	101	72 834	2850	69 984	0.20	160	115200							407	292 791			0	1	0.80
Q4	October-26	31	92	68 326	2945	65 381	0.20	160	119040							369	274 672			0	1	0.80
	November-26	30	95	68 326	2850	65 476	0.20	160	115200							381	274 672			0	1	0.80
	December-26	31	92	68 326	2945	65 381	0.20	160	119040							369	274 672			0	1	0.80
2026 AVERAGES & TOTALS			**97**	**846 605**	**34675**	**811 930**	**0**										**3 403 328**					
Q1	January-27	31	98	72 898	2945	69 953	0.20	160	119040							392	291 593			0	1	0.80
	February-27	28	108	72 898	2660	70 238	0.20	160	107520							434	291 593			0	1	0.80
	March-27	31	98	72 898	2945	69 953	0.20	160	119040							392	291 593			0	1	0.80
Q2	April-27	30	95	68 143	2850	65 293	0.20	160	115200							379	272 574			0	1	0.80
	May-27	31	92	68 143	2945	65 198	0.20	160	119040							366	272 574			0	1	0.80
	June-27	30	95	68 143	2850	65 293	0.20	160	115200							379	272 574			0	1	0.80
Q3	July-27	31	98	72 834	2945	69 889	0.20	160	119040							392	291 334			0	1	0.80
	August-27	31	98	72 834	2945	69 889	0.20	160	119040							392	291 334			0	1	0.80
	September-27	30	101	72 834	2850	69 984	0.20	160	115200							405	291 334			0	1	0.80
Q4	October-27	31	92	68 326	2945	65 381	0.20	160	119040							367	273 306			0	1	0.80
	November-27	30	95	68 326	2850	65 476	0.20	160	115200							380	273 306			0	1	0.80
	December-27	31	92	68 326	2945	65 381	0.20	160	119040							367	273 306			0	1	0.80
2027 AVERAGES & TOTALS			**97**	**846 605**	**34675**	**811 930**																
Q1	January-28	31	98	72 898	2945	69 953	0.20	160	119040							392	291 593			0	1	0.80
	February-28	29	105	72 898	2755	70 143	0.20	160	111360							419	291 593			0	1	0.80
	March-28	31	98	72 898	2945	69 953	0.20	160	119040							392	291 593			0	1	0.80
Q2	April-28	30	95	68 143	2850	65 293	0.20	160	115200							379	272 574			0	1	0.80
	May-28	31	92	68 143	2945	65 198	0.20	160	119040							366	272 574			0	1	0.80
	June-28	30	95	68 143	2850	65 293	0.20	160	115200							379	272 574			0	1	0.80
Q3	July-28	31	4	2 945	2945	0		160	119040							0	0					0.80
	August-28	31	4	2 945	2945	0		50	37200	1		1				0	0					0.80
	September-28	30	4	2 850	2850	0		50	36000	1		1				0	0					0.80
Q4	October-28	31	4	2 945	2945	0		50	37200	1		1				0	0					0.80
	November-28	30	4	2 850	2850	0		50	36000	1		1				0	0					0.80
	December-28	31	4	2 945	2945	0		50	37200	1		1				0	0					0.80
2028 AVERAGES & TOTALS			**50**	**440 605**	**34770**	**405 835**										**194**	**1 692 502**					
Q1	January-29	31	4	2 945	2945	0		200	148800	0	1	1				0	0					
	February-29	28	4	2 660	2660	0		200	134400	0	1	1				0	0					
	March-29	31	4	2 945	2945	0		200	148800	0	1	1				0	0					
Q2	April-29	30	4	2 850	2850	0		200	144000	1	1	1				0	0					
	May-29	31	4	2 945	2945	0		200	148800	1	1	1				0	0					
	June-29	30	4	2 850	2850	0		200	144000	1	1	1				0	0					
Q3	July-29	31	4	2 945	2945	0		200	148800	1	1	1				0	0					
	August-29	31	4	2 945	2945	0		200	148800	1	1	1				0	0					
	September-29	30	4	2 850	2850	0		200	144000	1	1	1				0	0					
Q4	October-29	31	4	2 945	2945	0		200	148800	1	1	1				0	0					
	November-29	30	4	2 850	2850	0		200	144000	1	1	1				0	0					
	December-29	31	4	2 945	2945	0		200	148800	1	1	1				0	0					
2029 AVERAGES & TOTALS			**4**	**34 675**	**34675**	**0**										**0**	**0**					
Q1	January-30	31	4	2 945	2945	0		250	186000	1	1	1				0	0					
	February-30	28	4	2 660	2660	0		250	168000	1	1	1				0	0					
	March-30	31	4	2 945	2945	0		250	186000	1	1	1				0	0					
Q2	April-30	30	4	2 850	2850	0		250	180000	1	1	1				0	0					
	May-30	31	4	2 945	2945	0		250	186000	1	1	1				0	0					
	June-30	30	4	2 850	2850	0		250	180000	1	1	1				0	0					
Q3	July-30	31	4	2 945	2945	0		250	186000	1	1	1				0	0					
	August-30	31	4	2 945	2945	0		250	186000	1	1	1				0	0					
	September-30	30	4	2 850	2850	0		250	180000	1	1	1				0	0					
	October-30	31	4	2 945	2945	0		250	186000	1	1	1				0	0					

Q4	November-30	30	4	2 850	2850	0		250	180000		1	1	1			0	0						
	December-30	31	4	2 945	2945	0		250	186000		1	1	1			0	0						
2030 AVERAGES & TOTALS			**4**	**34 675**	**34675**	**0**										**0**	**0**						
	January-31	31	4	2 945	2945	0		250	186000		0	1	1			0	0						
Q1	February-31	28	4	2 660	2660	0		250	168000		0	1	1			0	0						
	March-31	31	4	2 945	2945	0		250	186000		0	1	1			0	0						
	April-31	30	4	2 850	2850	0		250	180000		0	1	1			0	0						
Q2	May-31	31	4	2 945	2945	0		250	186000		0	1	1			0	0						
	June-31	30	4	2 850	2850	0		250	180000		0	1	1			0	0						
	July-31	31	4	2 945	2945	0		250	186000		0	1	1			0	0						
Q3	August-31	31	4	2 945	2945	0		250	186000		0	1	1			0	0						
	September-31	30	4	2 850	2850	0		250	180000		0	1	1			0	0						
	October-31	31	4	2 945	2945	0		250	186000		0	1	1			0	0						
Q4	November-31	30	4	2 850	2850	0		250	180000		0	1	1			0	0						
	December-31	31	4	2 945	2945	0		250	186 000		0.35	0.65	1			0	0						
2031 AVERAGES & TOTALS			**4**	**34 675**	**34675**	**0**										**0**	**0**						
	January-32	31	4	2 945	2945	0		250	186 000		0.35	0.65	1			0	0						
Q1	February-32	29	4	2 755	2755	0		250	174 000		0.35	0.65	1			0	0						
	March-32	31	4	2 945	2945	0		250	186 000		0.35	0.65	1			0	0						
	April-32	30	4	2 850	2850	0		250	180 000		0.35	0.65	1			0	0						
Q2	May-32	31	4	2 945	2945	0		250	186 000		0.35	0.65	1			0	0						
	June-32	30	4	2 850	2850	0		250	180 000		0.35	0.65	1			0	0						
	July-32	31	4	2 945	2945	0		250	186 000		0.35	0.65	1			0	0						
Q3	August-32	31	4	2 945	2945	0		250	186 000		0.35	0.65	1			0	0						
	September-32	30	4	2 850	2850	0		250	180 000		0.35	0.65	1			0	0						
	October-32	31	4	2 945	2945	0		250	186 000		0.35	0.65	1			0	0						
Q4	November-32	30	4	2 850	2850	0		250	180 000		0.35	0.65	1			0	0						
	December-32	31	4	2 945	2945	0		250	186 000		0.35	0.65	1			0	0						
2032 AVERAGES & TOTALS			**4**	**34 770**	**34770**	**0**										**0**	**0**						
	January-33	31	4	2 945	2945	0		250	186000		0	1	1			0	0						
Q1	February-33	28	4	2 660	2660	0		250	168000		0	1	1			0	0						
	March-33	31	4	2 945	2945	0		120	89280		1		1			0	0						
	April-33	30	4	2 850	2850	0		120	86400		1		1			0	0						
Q2	May-33	31	4	2 945	2945	0		120	89280		1		1			0	0						
	June-33	30	4	2 850	2850	0		120	86400		1		1			0	0						
	July-33	31	4	2 945	2945	0		120	89280		1		1			0	0						
Q3	August-33	31	4	2 945	2945	0		120	89280		1		1			0	0						
	September-33	30	4	2 850	2850	0		120	86400		1		1			0	0						
	October-33	31	4	2 945	2945	0		120	89280		1		1			0	0						
Q4	November-33	30	4	2 850	2850	0		120	86400		1		1			0	0						
	December-33	31	4	2 945	2945	0		120	89280		1		1			0	0						
2033 AVERAGES & TOTALS			**4**	**34 675**	**34675**	**0**										**0**	**0**						
	January-34	31	4	2 945	2945	0		100	74400		1		1			0	0						
Q1	February-34	28	4	2 660	2660	0		100	67200		1		1			0	0						
	March-34	31	4	2 945	2945	0		100	74400		1		1			0	0						
	April-34	30	4	2 850	2850	0		100	72000		1		1			0	0						
Q2	May-34	31	4	2 945	2945	0		100	74400		1		1			0	0						
	June-34	30	4	2 850	2850	0		100	72000		1		1			0	0						
	July-34	31	4	2 945	2945	0		100	74400		1		1			0	0						
Q3	August-34	31	4	2 945	2945	0		100	74400		1		1			0	0						
	September-34	30	4	2 850	2850	0		100	72000		1		1			0	0						
	October-34	31	4	2 945	2945	0		100	74400		1		1			0	0						
Q4	November-34	30	4	2 850	2850	0		100	72000		1		1			0	0						
	December-34	31	4	2 945	2945	0		100	74400		1		1			0	0						
2034 AVERAGES & TOTALS			**4**	**34 675**	**34675**	**0**										**0**	**0**						
	January-35	31	4	2 945	2945	0		100	74 400		1		1			0	0						
Q1	February-35	28	4	2 660	2660	0		100	67 200		1		1			0	0						
	March-35	31	4	2 945	2945	0		100	74 400		1		1			0	0						
	April-35	30	4	2 850	2850	0		100	72 000		1		1			0	0						

Q2	May-35	31	4	2 945	2945	0		100	74 400		1		1			0	0						
	June-35	30	4	2 850	2850	0		100	72 000		1		1			0	0						
	July-35	31	4	2 945	2945	0		100	74 400		1		1			0	0						
Q3	August-35	31	4	2 945	2945	0		100	74 400		1		1			0	0						
	September-35	30	4	2 850	2850	0		100	72 000		1		1			0	0						
	October-35	31	4	2 945	2945	0		100	74 400		1		1			0	0						
Q4	November-35	30	4	2 850	2850	0		100	72 000		1		1			0	0						
	December-35	31	4	2 945	2945	0		100	74 400		1		1			0	0						
2035 AVERAGES & TOTALS			**4**	**34 675**	**34675**	**0**										**0**	**0**						
	January-36	31	4	2 945	2945	0		100	74 400		1		1			0	0						
Q1	February-36	29	4	2 755	2755	0		100	69 600		1		1			0	0						
	March-36	31	4	2 945	2945	0		100	74 400		1		1			0	0						
	April-36	30	4	2 850	2850	0		100	72 000		1		1			0	0						
Q2	May-36	31	4	2 945	2945	0		100	74 400		1		1			0	0						
	June-36	30	4	2 850	2850	0										0	0						
	July-36	31	4	2 945	2945	0										0	0						
Q3	August-36	31	4	2 945	2945	0										0	0						
	September-36	30	4	2 850	2850	0										0	0						
	October-36	31	4	2 945	2945	0										0	0						
Q4	November-36	30	4	2 850	2850	0										0	0						
	December-36	31	4	2 945	2945	0										0	0						
2036 AVERAGES & TOTALS			**4**	**34 770**	**34770**	**0**										**0**	**0**						
	January-37	31	4	2 945	2945	0										0	0						
Q1	February-37	28	4	2 660	2660	0										0	0						
	March-37	31	4	2 945	2945	0										0	0						
	April-37	30	4	2 850	2850	0										0	0						
Q2	May-37	31	4	2 945	2945	0										0	0						
	June-37	30	4	2 850	2850	0										0	0						
	July-37	31	4	2 945	2945	0										0	0						
Q3	August-37	31	4	2 945	2945	0										0	0						
	September-37	30	4	2 850	2850	0										0	0						
	October-37	31	4	2 945	2945	0										0	0						
Q4	November-37	30	4	2 850	2850	0										0	0						
	December-37	31	4	2 945	2945	0										0	0						
2037 AVERAGES & TOTALS			**4**	**34 675**	**34675**	**0**										**0**	**0**						
	January-38	31	4	2 945	2945	0										0	0						
Q1	February-38	28	4	2 660	2660	0										0	0						
	March-38	31	4	2 945	2945	0										0	0						
	April-38	30	4	2 850	2850	0										0	0						
Q2	May-38	31	4	2 945	2945	0										0	0						
	June-38	30	4	2 850	2850	0										0	0						
	July-38	31	4	2 945	2945	0										0	0						
Q3	August-38	31	4	2 945	2945	0										0	0						
	September-38	30	4	2 850	2850	0										0	0						
	October-38	31	4	2 945	2945	0										0	0						
Q4	November-38	30	4	2 850	2850	0										0	0						
	December-38	31	4	2 945	2945	0										0	0						
2038 AVERAGES & TOTALS			**4**	**34 675**	**34675**	**0**										**0**	**0**						
	January-39	31	4	2 945	2945	0										0	0						
Q1	February-39	28	4	2 660	2660	0										0	0						
	March-39	31	4	2 945	2945	0										0	0						
	April-39	30	4	2 850	2850	0										0	0						
Q2	May-39	31	4	2 945	2945	0										0	0						
	June-39	30	4	2 850	2850	0										0	0						
	July-39	31	4	2 945	2945	0										0	0						
Q3	August-39	31	4	2 945	2945	0										0	0						
	September-39	30	4	2 850	2850	0										0	0						
	October-39	31	4	2 945	2945	0										0	0						
Q4	November-39	30	4	2 850	2850	0										0	0						

	December-39	31	4	2 945	2945	0												0	0						
2039 AVERAGES & TOTALS			**4**	**34 675**	**34675**	**0**												**0**	**0**						
	January-40	31	4	2 945	2945	0												0	0						
Q1	February-40	29	4	2 755	2755	0												0	0						
	March-40	31	4	2 945	2945	0												0	0						
	April-40	30	4	2 850	2850	0												0	0						
Q2	May-40	31	4	2 945	2945	0												0	0						
	June-40	30	4	2 850	2850	0												0	0						
	July-40	31	4	2 945	2945	0												0	0						
Q3	August-40	31	4	2 945	2945	0												0	0						
	September-40	30	4	2 850	2850	0												0	0						
	October-40	31	4	2 945	2945	0												0	0						
Q4	November-40	30	4	2 850	2850	0												0	0						
	December-40	31	4	2 945	2945	0												0	0						
2040 AVERAGES & TOTALS			**4**	**34 770**	**34770**	**0**												**0**	**0**						
	January-41	31	4	2 945	2945	0												0	0						
Q1	February-41	28	4	2 660	2660	0												0	0						
	March-41	31	4	2 945	2945	0												0	0						
	April-41	30	4	2 850	2850	0												0	0						
Q2	May-41	31	4	2 945	2945	0												0	0						
	June-41	30	4	2 850	2850	0												0	0						
	July-41	31	4	2 945	2945	0												0	0						
Q3	August-41	31	4	2 945	2945	0												0	0						
	September-41	30	4	2 850	2850	0												0	0						
	October-41	31	4	2 945	2945	0												0	0						
Q4	November-41	30	4	2 850	2850	0												0	0						
	December-41	31	4	2 945	2945	0												0	0						
2041 AVERAGES & TOTALS			**4**	**34 675**	**34675**	**0**												**0**	**0**						
	January-42	31	4	2 945	2945	0												0	0						
Q1	February-42	28	4	2 660	2660	0												0	0						
	March-42	31	4	2 945	2945	0												0	0						
	April-42	30	4	2 850	2850	0												0	0						
Q2	May-42	31	4	2 945	2945	0												0	0						
	June-42	30	4	2 850	2850	0												0	0						
	July-42	31	4	2 945	2945	0												0	0						
Q3	August-42	31	4	2 945	2945	0												0	0						
	September-42	30	4	2 850	2850	0												0	0						
	October-42	31	4	2 945	2945	0												0	0						
Q4	November-42	30	4	2 850	2850	0												0	0						
	December-42	31	4	2 945	2945	0												0	0						
2042 AVERAGES & TOTALS			**4**	**34 675**	**34675**	**0**												**0**	**0**						
	January-43	31	4	2 945	2945	0												0	0						
Q1	February-43	28	4	2 660	2660	0												0	0						
	March-43	31	4	2 945	2945	0												0	0						
	April-43	30	4	2 850	2850	0												0	0						
Q2	May-43	31	4	2 945	2945	0												0	0						
	June-43	30	4	2 850	2850	0												0	0						
	July-43	31	4	2 945	2945	0												0	0						
Q3	August-43	31	4	2 945	2945	0												0	0						
	September-43	30	4	2 850	2850	0												0	0						
	October-43	31	4	2 945	2945	0												0	0						
Q4	November-43	30	4	2 850	2850	0												0	0						
	December-43	31	4	2 945	2945	0												0	0						
2043 AVERAGES & TOTALS			**4**	**34 675**	**34675**	**0**												**0**	**0**						
	January-44	31	4	2 945	2945	0												0	0						
Q1	February-44	29	4	2 755	2755	0												0	0						
	March-44	31	4	2 945	2945	0												0	0						
	April-44	30	4	2 850	2850	0												0	0						
Q2	May-44	31	4	2 945	2945	0												0	0						

	June-44	30	4	2 850	2850	0												0	0						
Q3	July-44	31	4	2 945	2945	0												0	0						
	August-44	31	4	2 945	2945	0												0	0						
	September-44	30	4	2 850	2850	0												0	0						
Q4	October-44	31	4	2 945	2945	0												0	0						
	November-44	30	4	2 850	2850	0												0	0						
	December-44	31	4	2 945	2945	0												0	0						
2044 AVERAGES & TOTALS			**4**	**34 770**	**34770**	**0**												**0**	**0**						
Q1	January-45	31	4	2 945	2945	0												0	0						
	February-45	28	4	2 660	2660	0												0	0						
	March-45	31	4	2 945	2945	0												0	0						
Q2	April-45	30	4	2 850	2850	0												0	0						
	May-45	31	4	2 945	2945	0												0	0						
	June-45	30	4	2 850	2850	0												0	0						
Q3	July-45	31	4	2 945	2945	0												0	0						
	August-45	31	4	2 945	2945	0												0	0						
	September-45	30	4	2 850	2850	0												0	0						
Q4	October-45	31	4	2 945	2945	0												0	0						
	November-45	30	4	2 850	2850	0												0	0						
	December-45	31	4	2 945	2945	0												0	0						
2045 AVERAGES & TOTALS			**4**	**34 675**	**34675**	**0**												**0**	**0**						

Mill												North Cell										
Mill Throughput (t)	Moisture content (%)	Water Content (m^3) x	Mill Process Water (m^3)	Enter 1 for the destination: NC	SC	GOOSE	PIT E	PIT A	Total water consumption (m^3/h)	Mill Throughput cumulative (t)	Total water per tons (m^3/t)	Runoff Volume (m^3)	Total Free Water Volume (m^3)	Total Ice Volume (m^3)	Total Pond Volume (Ice + Water) (m^3)	Tailings Deposited (t)	Cummulative Tailings Deposited (m^3)	Cummulative Volume (Tailings + Pond) (m^3)	Volume Available Remaining (m^3)	Flat Geometry Cell Elevation (m)	TSF Deposition Plan Ice Elevation (m)	Surveyed Ice elevation (m)
4 142 842	**1.14%**	**47 083**	**3 886 217**						**442**		**0.94**	**159832**				**4 142 842**						
4 120 164	**0.90%**	**37 075**	**3 547 775**						**405**		**0.86**	**177594**				**3 650 809**						
4 030 158	**0.99%**	**37 135**	**3 559 646**						**406**		**0.89**	**82885**				**1 292 685**						
3 992 396	**0.99%**	**37 991**	**3 457 956**						**393**		**0.87**	**9289**				**0**						
3 853 027	**0.99%**	**34 438**	**3 455 750**						**396**		**0.90**	**148 451**				**0**						
3 264 050	**0.00%**	**39 441**	**3 179 019**						**365**		**0.97**	**148451**				**474 746**						
2 750 145	**2.10%**	**57 567**	**2 851 079**						**324**		**1.09**	**148451**				**603 632**						
2 602 828	**1.19%**	**36 099**	**3 455 892**						**393**		**1.64**	**148451**				**0**						
3 570 525	**1.20%**	**42 837**	**3 831 861**						**437**		**1.09**	**148451**				**515 737**						
3 788 703	**1.43%**	**42 061**	**3 888 054**						**446**		**1.05**	**148451**				**0**						
348 343	1.63%	5 853	337 719				1		450	42 012 594	0.96	0	117 017	143 021	260 038	0	15 239 920	15 499 958	292 157	149.796		
325 867	1.75%	5 146	309 982				1		458	42 338 461	0.94	0	117 017	143 021	260 038	0	15 239 920	15 499 958	292 157	149.796		
345 469	1.51%	5 195	352 846				1		471	42 683 930	1.01	0	117 017	143 021	260 038	0	15 239 920	15 499 958	292 157	149.796		
298 713	14.60%	4 481	353 358				1		489	42 982 643	1.18	0	117 017	143 021	260 038	0	15 239 920	15 499 958	292 157	149.796		
182 698	1.36%	2 510	318 783				1		429	43 165 341	1.75	0	53 889	65 865	119 754	0	15 239 920	15 359 674	432 441	149.698		
363 441	1.48%	5 418	382 493				1		528	43 528 782	1.05	77826	185 972	0	185 972	0	15 239 920	15 425 892	366 223	149.745		
358 560	0.97%	3 483	408 396				1		548	43 887 342	1.14	20794	218 460	0	218 460	0	15 239 920	15 458 380	333 735	149.767		
364 730	0.87%	3 279	412 598		0.1679		0.8321		554	44 252 072	1.13	56114	270 968	0	270 968	0	15 239 920	15 510 888	281 227	149.804		
353 573	1.07%	3 829	386 807		0.7186		0.2814		536	44 605 645	1.09	26452	268 539	0	268 539	0	15 239 920	15 508 459	283 656	149.802		
313 279	1.04%	3 258	350 036				1		470	44 918 923	1.12	0	218 488	44 750	263 238	0	15 239 920	15 503 158	288 957	149.798		
323 782	1.16%	3 756	317 253				1		440	45 242 705	0.98	0	110 560	152 678	263 238	0	15 239 920	15 503 158	288 957	149.798		
301 066	1.80%	5 419	357 331				1		477	45 543 771	1.18	0	92 133	171 105	263 238	0	15 239 920	15 503 158	288 957	149.798		
3 879 520	**2.44%**	**51 627**	**4 287 601**						**488**		**1.13**	**181187**				**0**						
360 780	1.36%	4 907	364 159				1		487	45 904 551	1.00	0	118 457	144 781	263 238	0	15 239 920	15 503 158	288 957	149.798		
336 720	1.06%	3 569	338 881				1		486	46 241 271	1.00	0	118 457	144 781	263 238	0	15 239 920	15 503 158	288 957	149.798		
360 780	1.20%	4 329	363 607				1		487	46 602 051	1.00	0	118 457	144 781	263 238	0	15 239 920	15 503 158	288 957	149.798		
302 940	0.85%	2 575	303 877				1		422	46 904 991	1.00	0	118 457	144 781	263 238	0	15 239 920	15 503 158	288 957	149.798		
340 620	0.91%	3 100	342 137				1		460	47 245 611	1.00	0	119 134	145 609	264 743	0	15 239 920	15 504 663	287 452	149.800		
348 700	2.50%	8 718	355 962				1		486	47 594 311	1.00	77826	354 604	0	354 604	0	15 239 920	15 594 524	197 591	149.862		
360 780	2.20%	7 937	367 215				1		487	47 955 091	1.00	20794	390 219	0	390 219	0	15 239 920	15 630 139	161 976	149.887		
350 100	1.20%	4 201	352 757	1					472	48 305 191	1.00	56114	281 903	0	281 903	350 100	15 464 343	15 746 247	45 868	149.968		
348 700	1.40%	4 882	352 127				1		486	48 653 891	1.00	26452	312 991	0	312 991	0	15 464 343	15 777 334	14 781	149.990		
305 660	1.48%	4 524	308 461				1		412	48 959 551	1.00	0	80 006	16 387	96 393	0	15 464 343	15 560 736	231 379	149.839		
328 540	1.48%	4 862	331 867				1		458	49 288 091	1.00	0	40 485	55 908	96 393	0	15 464 343	15 560 736	231 379	149.839		
360 780	1.48%	5 340	364 618				1		487	49 648 871	1.00	0	33 738	62 656	96 393	0	15 464 343	15 560 736	231 379	149.839		
4 105 100	**1.43%**	**58 943**	**4 145 668**						**469**		**1.00**	**181187**			**166 845**	**350 100**						
366 956	1.36%	4 991	370 443				1		495	50 015 827	1.00	0	43 377	53 016	96 393	0	15 464 343	15 560 736	231 379	149.839		
342 374	1.06%	3 629	344 713				1		512	50 358 201	1.00	0	43 377	53 016	96 393	0	15 464 343	15 560 736	231 379	149.839		
366 956	1.20%	4 403	369 882				1		495	50 725 157	1.00	0	43 377	53 016	96 393	0	15 464 343	15 560 736	231 379	149.839		
306 048	0.85%	2 601	307 024				1		427	51 031 205	1.00	0	43 377	53 016	96 393	0	15 464 343	15 560 736	231 379	149.839		
346 796	0.91%	3 156	348 394				1		468	51 378 001	1.00	0	44 054	53 844	97 898	0	15 464 343	15 562 241	229 874	149.840		
354 780	2.50%	8 870	362 219				1		495	51 732 781	1.00	77826	187 759	0	187 759	0	15 464 343	15 652 102	140 013	149.902		
366 956	2.20%	8 073	373 552				1		495	52 099 737	1.00	20794	223 374	0	223 374	0	15 464 343	15 687 717	104 398	149.927		
356 240	1.20%	4 275	358 995		1				481	52 455 977	1.00	56114	281 903	0	281 903	0	15 464 343	15 746 246	45 869	149.968		
354 780	1.40%	4 967	358 316				1		495	52 810 757	1.00	26452	312 991	0	312 991	0	15 464 343	15 777 334	14 781	149.990		
308 792	1.48%	4 570	311 652				1		417	53 119 549	1.00	0	80 006	16 387	96 393	0	15 464 343	15 560 736	231 379	149.839		
334 620	1.48%	4 952	338 061				1		467	53 454 169	1.00	0	40 485	55 908	96 393	0	15 464 343	15 560 736	231 379	149.839		
366 956	1.48%	5 431	370 910				1		495	53 821 125	1.00	0	33 737	62 655	96 393	0	15 464 343	15 560 736	231 379	149.839		
4 172 254	**1.43%**	**59 918**	**4 214 160**						**478**		**1.00**	**181187**				**0**						
364 492	1.36%	4 957	367 936				1		492	54 185 616	1.00	0	43 377	53 016	96 393	0	15 464 343	15 560 736	231 379	149.839		
364 492	1.06%	3 864	367 153				1		545	54 550 108	1.00	0	43 377	53 016	96 393	0	15 464 343	15 560 736	231 379	149.839		
364 492	1.20%	4 374	367 379				1		492	54 914 600	1.00	0	43 377	53 016	96 393	0	15 464 343	15 560 736	231 379	149.839		
340 717	0.85%	2 896	342 126				1		475	55 255 317	1.00	0	43 377	53 016	96 393	0	15 464 343	15 560 736	231 379	149.839		
340 717	0.91%	3 101	342 236				1		460	55 596 034	1.00	0	44 054	53 844	97 898	0	15 464 343	15 562 241	229 874	149.840		
340 717	2.50%	8 518	347 748				1		475	55 936 752	1.00	77826	187 759	0	187 759	0	15 464 343	15 652 102	140 013	149.902		
364 168	2.20%	8 012	370 691				1		491	56 300 920	1.00	20794	223 373	0	223 373	0	15 464 343	15 687 716	104 399	149.927		
364 168	1.20%	4 370	367 050				1		491	56 665 088	1.00	56114	281 902	0	281 902	0	15 464 343	15 746 246	45 869	149.968		
364 168	1.40%	5 098	367 873				1		508	57 029 256	1.00	26452	312 990	0	312 990	0	15 464 343	15 777 333	14 782	149.990		
341 632	1.48%	5 056	345 110				1		461	57 370 888	1.00	0	80 006	16 387	96 392	0	15 464 343	15 560 735	231 380	149.839		
341 632	1.48%	5 056	345 205				1		476	57 712 520	1.00	0	40 485	55 907	96 392	0	15 464 343	15 560 735	231 380	149.839		
341 632	1.48%	5 056	345 110				1		461	58 054 152	1.00	0	33 737	62 655	96 392	0	15 464 343	15 560 735	231 380	149.839		

4 233 027	**1.43%**	**60 358**	**4 275 616**						**486**		**1.00**	**181187**				**0**							
364 492	1.36%	4 957	366 504					1	490	58 418 643	1.00	0	43 376	53 016	96 392	0	15 464 343	15 560 735	231 380	149.839			
364 492	1.06%	3 864	365 695					1	542	58 783 135	1.00	0	43 376	53 016	96 392	0	15 464 343	15 560 735	231 380	149.839			
364 492	1.20%	4 374	365 921					1	490	59 147 627	1.00	0	43 376	53 016	96 392	0	15 464 343	15 560 735	231 380	149.839			
340 717	0.85%	2 896	340 763					1	473	59 488 344	1.00	0	43 376	53 016	96 392	0	15 464 343	15 560 735	231 380	149.839			
340 717	0.91%	3 101	340 873					1	458	59 829 061	1.00	0	44 054	53 843	97 897	0	15 464 343	15 562 240	229 875	149.840			
340 717	2.50%	8 518	346 385					1	473	60 169 779	1.00	77826	187 758	0	187 758	0	15 464 343	15 652 101	140 014	149.902			
364 168	2.20%	8 012	369 235					1	489	60 533 947	1.00	20794	223 373	0	223 373	0	15 464 343	15 687 716	104 399	149.927			
364 168	1.20%	4 370	365 593					1	489	60 898 115	1.00	56114	281 902	0	281 902	0	15 464 343	15 746 245	45 870	149.968			
364 168	1.40%	5 098	366 416					1	506	61 262 283	1.00	26452	312 990	0	312 990	0	15 464 343	15 777 333	14 782	149.990			
341 632	1.48%	5 056	343 743					1	459	61 603 915	1.00	0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
341 632	1.48%	5 056	343 838					1	474	61 945 547	1.00	0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
341 632	1.48%	5 056	343 743					1	459	62 287 179	1.00	0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
4 233 027	**1.43%**	**60 358**	**4 258 710**									**181187**				**0**							
364 492	1.36%	4 957	366 504					1	490	62 651 670	1.00	0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
364 492	1.06%	3 864	365 600					1	524	63 016 162	1.00	0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
364 492	1.20%	4 374	365 921					1	490	63 380 654	1.00	0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
340 717	0.85%	2 896	340 763					1	473	63 721 371	1.00	0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
340 717	0.91%	3 101	340 873					1	458	64 062 088	1.00	0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
340 717	2.50%	8 518	346 385					1	473	64 402 806	1.00	77826	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	2.20%	0	0						0	64 402 806	0.80	20794	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	1.20%	0	0						0	64 402 806	0.80	56114	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	1.40%	0	0						0	64 402 806	0.80	26452	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	1.48%	0	0						0	64 402 806	0.80	0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	1.48%	0	0						0	64 402 806	0.80	0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	1.48%	0	0						0	64 402 806	0.80	0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
2 115 627	**0.00%**	**27 709**	**2 126 046**							**767 651 585**		**181187**				**0**							
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		77826	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		20794	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		56114	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		26452	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	**0.00%**	**0**	**0**							**0**		**181187**			**0**	**0**							
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		77826	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		20794	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		56114	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		26452	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	**0.00%**	**0**	**0**							**0**		**181187**				**0**							
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771			

0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		77826	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		20794	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		56114	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		26452	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
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0	**0.00%**	**0**	**0**							**0**		**181187**				**0**						
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		77826	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		20794	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		56114	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		26452	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	**0.00%**	**0**	**0**							**0**		**181187**				**0**						
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		77826	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		20794	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		56114	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		26452	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	**0.00%**	**0**	**0**							**0**		**181187**				**0**						
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		77826	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		20794	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		56114	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		26452	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	**0.00%**	**0**	**0**							**0**		**181187**				**0**						
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		77826	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		20794	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		56114	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		26452	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	**0.00%**	**0**	**0**							**0**		**181187**				**0**						
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		

0	0.00%	0	0							0		77826	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		20794	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		56114	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		26452	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	**0.00%**	**0**	**0**							**0**		**181187**				**0**						
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		77826	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		20794	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		56114	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		26452	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	**0.00%**	**0**	**0**							**0**		**181187**				**0**						
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		77826	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		20794	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		56114	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		26452	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	**0.00%**	**0**	**0**							**0**		**181187**				**0**						
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		77826	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		20794	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		56114	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		26452	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	**0.00%**	**0**	**0**							**0**		**181187**				**0**						
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		77826	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		20794	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		56114	0	0	0	0	15 464 343	15 464 343	327 772	149.771		

0	0.00%	0	0							0		26452	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	**0.00%**	**0**	**0**							**0**		**181187**				**0**						
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		77826	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		20794	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		56114	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		26452	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	**0.00%**	**0**	**0**							**0**		**181187**				**0**						
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		77826	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		20794	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		56114	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		26452	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	**0.00%**	**0**	**0**							**0**		**181187**				**0**						
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		77826	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		20794	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		56114	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		26452	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	0.00%	0	0							0		0	0	0	0	0	15 464 343	15 464 343	327 772	149.771		
0	**0.00%**	**0**	**0**							**0**		**181187**				**0**						

South Cell						South Cell	Portage Pit								Portage Pit
Total Pond Volume (Ice + Water) (m^3)	Tailings Deposited (t)	Cummulative Tailings Deposited (m^3)	Cummulative Volume (Tailings + Pond) (m^3)	Volume Available Remaining (m^3)	Flat Geometry Cell Elevation (m)		Portage Inflow (m^3)	Enter 1 for the discharge location				Volume Pumped from 3rd Portage (m^3)	Cummulative Volume (m^3)	Volume Available Remaining (m^3)	Water Elevation (m)
								NC	SC	Goose	Portage				
	0						**676 706**					**0**			
	467 197						**165 877**					**0**			
	2 737 473						**136627**					**0**			
	3 992 396						**132359**					**0**			
	3 853 027						**341192**					**0**			
	2 789 304						**2424**					**0**			
	786 010						**289269**					**0**			
	0						**696360**					**0**			
	0						**2082707**					**0**			
	0						**228210**					**0**			
702 985	0	11 172 268	11 875 253	4 357 266	143.283		4278				1		14 183 178	23 892 349	97.35
702 985	0	11 172 268	11 875 253	4 357 266	143.283		3864				1		14 417 677	23 657 851	97.90
702 985	0	11 172 268	11 875 253	4 357 266	143.283		4278				1		14 663 442	23 412 086	98.47
702 985	0	11 172 268	11 875 253	4 357 266	143.283		4140				1		14 935 617	23 139 911	99.09
962 910	0	11 172 268	12 135 178	4 097 341	143.712		4278				1		15 388 778	22 686 750	100.13
1 051 008	0	11 172 268	12 223 276	4 009 243	143.857		104772				1		16 041 501	22 034 027	101.60
1 115 944	0	11 172 268	12 288 212	3 944 307	143.964		14341				1		16 295 341	21 780 187	102.16
1 268 961	61 224	11 211 514	12 480 475	3 752 044	144.271		20587				1		16 468 646	21 606 882	102.55
1 229 046	254 078	11 374 384	12 603 430	3 629 089	144.467		54976				1		16 860 178	21 215 349	103.41
1 251 004	0	11 374 384	12 625 388	3 607 131	144.502		4278				1		16 886 535	21 188 993	103.47
1 251 004	0	11 374 384	12 625 388	3 607 131	144.502		4140				1		17 130 875	20 944 652	104.01
0	0	11 374 384	11 374 383	4 858 136	142.458		4278				1		17 277 849	20 797 679	104.33
	315 301						**228210**					**0**			
0	0	11 374 384	11 374 383	4 858 136	142.458		4278				1		17 441 637	20 633 891	104.68
0	0	11 374 384	11 374 383	4 858 136	142.458		3864				1		17 587 841	20 487 686	105.00
0	0	11 374 384	11 374 383	4 858 136	142.458		4278				1		17 748 764	20 326 764	105.35
0	0	11 374 384	11 374 383	4 858 136	142.458		4140				1		17 885 729	20 189 799	105.64
0	0	11 374 384	11 374 383	4 858 136	142.458		4278				1		18 105 539	19 969 989	106.11
0	0	11 374 384	11 374 383	4 858 136	142.458		104772				1		18 779 083	19 296 445	107.53
0	0	11 374 384	11 374 383	4 858 136	142.458		14341				1		19 185 800	18 889 728	108.37
0	0	11 374 384	11 374 383	4 858 136	142.458		20587				1		19 479 299	18 596 228	108.97
0	0	11 374 384	11 374 383	4 858 136	142.458		54976				1		19 821 502	18 254 026	109.63
0	0	11 374 384	11 374 383	4 858 136	142.458		4278				1		20 286 384	17 789 144	110.51
0	0	11 374 384	11 374 383	4 858 136	142.458		4140				1		20 459 553	17 615 975	110.83
0	0	11 374 384	11 374 383	4 858 136	142.458		4278				1		20 621 933	17 453 595	111.13
	0						**228210**					**0**			
0	0	11 374 384	11 374 383	4 858 136	142.458		4278				1		20 788 034	17 287 494	111.43
0	0	11 374 384	11 374 383	4 858 136	142.458		3864				1		20 936 396	17 139 131	111.70
0	0	11 374 384	11 374 383	4 858 136	142.458		4278				1		21 099 627	16 975 901	112.00
0	0	11 374 384	11 374 383	4 858 136	142.458		4140				1		21 237 748	16 837 780	112.25

0	0	11 374 384	11 374 383	4 858 136	142.458	4278				1		21 459 856	16 615 672	112.64
0	0	11 374 384	11 374 383	4 858 136	142.458	104772				1		22 135 713	15 939 815	113.84
0	0	11 374 384	11 374 383	4 858 136	142.458	14341				1		22 544 770	15 530 758	114.56
0	356 240	11 602 743	11 602 742	4 629 777	142.834	20587				1		22 669 776	15 405 752	114.78
0	0	11 602 743	11 602 742	4 629 777	142.834	54976				1		23 014 257	15 061 271	115.37
0	0	11 602 743	11 602 742	4 629 777	142.834	4278				1		23 480 314	14 595 214	116.17
0	0	11 602 743	11 602 742	4 629 777	142.834	4140				1		23 655 764	14 419 764	116.47
0	0	11 602 743	11 602 742	4 629 777	142.834	4278				1		23 820 460	14 255 068	116.75
	356 240					**228210**					**0**			
0	0	11 602 743	11 602 742	4 629 777	142.834	4278				1		23 985 638	14 089 890	117.02
0	0	11 602 743	11 602 742	4 629 777	142.834	3864				1		24 142 250	13 933 278	117.29
0	0	11 602 743	11 602 742	4 629 777	142.834	4278				1		24 304 559	13 770 969	117.56
0	0	11 602 743	11 602 742	4 629 777	142.834	4140				1		24 455 572	13 619 956	117.81
0	0	11 602 743	11 602 742	4 629 777	142.834	4278				1		24 675 418	13 400 110	118.17
0	0	11 602 743	11 602 742	4 629 777	142.834	104772				1		25 345 925	12 729 603	119.27
0	0	11 602 743	11 602 742	4 629 777	142.834	14341				1		25 753 926	12 321 602	119.93
0	0	11 602 743	11 602 742	4 629 777	142.834	20587				1		26 110 696	11 964 831	120.49
0	0	11 602 743	11 602 742	4 629 777	142.834	54976				1		26 458 695	11 616 833	121.04
0	0	11 602 743	11 602 742	4 629 777	142.834	4278				1		26 937 071	11 138 457	121.79
0	0	11 602 743	11 602 742	4 629 777	142.834	4140				1		27 115 151	10 960 377	122.06
0	0	11 602 743	11 602 742	4 629 777	142.834	4278				1		27 270 348	10 805 180	122.30
	0					**228210**					**0**			
0	0	11 602 743	11 602 742	4 629 777	142.834	4278				1		27 436 213	10 639 314	122.55
0	0	11 602 743	11 602 742	4 629 777	142.834	3864				1		27 593 525	10 482 003	122.79
0	0	11 602 743	11 602 742	4 629 777	142.834	4278				1		27 756 534	10 318 994	123.04
0	0	11 602 743	11 602 742	4 629 777	142.834	4140				1		27 908 201	10 167 327	123.27
0	0	11 602 743	11 602 742	4 629 777	142.834	4278				1		28 128 701	9 946 827	123.59
0	0	11 602 743	11 602 742	4 629 777	142.834	104772				1		28 799 862	9 275 666	124.58
0	0	11 602 743	11 602 742	4 629 777	142.834	14341				1		29 208 562	8 866 966	125.17
0	0	11 602 743	11 602 742	4 629 777	142.834	20587				1		29 566 032	8 509 496	125.67
0	0	11 602 743	11 602 742	4 629 777	142.834	54976				1		29 914 730	8 160 798	126.15
0	0	11 602 743	11 602 742	4 629 777	142.834	4278				1		30 490 154	7 585 374	126.91
0	0	11 602 743	11 602 742	4 629 777	142.834	4140				1		30 668 890	7 406 638	127.01
0	0	11 602 743	11 602 742	4 629 777	142.834	4278				1		30 824 743	7 250 785	127.02
	0					**228210**					**0**			
0	0	11 602 743	11 602 742	4 629 777	142.834	4278				1		30 877 064	7 198 463	127.02
0	0	11 602 743	11 602 742	4 629 777	142.834	3864				1		30 920 782	7 154 746	127.02
0	0	11 602 743	11 602 742	4 629 777	142.834	4278				1		30 970 248	7 105 280	127.03
0	0	11 602 743	11 602 742	4 629 777	142.834	4140				1		31 015 777	7 059 751	127.03
0	0	11 602 743	11 602 742	4 629 777	142.834	4278				1		31 131 644	6 943 884	127.04
0	0	11 602 743	11 602 742	4 629 777	142.834	104772				1		31 786 529	6 288 999	127.08
0	0	11 602 743	11 602 742	4 629 777	142.834	14341				1		32 093 703	5 981 825	127.10
0	0	11 602 743	11 602 742	4 629 777	142.834	20587				1		32 243 266	5 832 262	127.11
0	0	11 602 743	11 602 742	4 629 777	142.834	54976				1		32 356 360	5 719 168	127.12
0	0	11 602 743	11 602 742	4 629 777	142.834	4278				1		32 417 393	5 658 135	127.12
0	0	11 602 743	11 602 742	4 629 777	142.834	4140				1		32 432 800	5 642 728	127.13

0	0	11 602 743	11 602 742	4 629 777	142.834	4278				1		32 424 173	5 651 355	127.13
	0					228210					0			
0	0	11 602 743	11 602 742	4 629 777	142.834	4278				1		32 305 567	5 769 961	127.12
0	0	11 602 743	11 602 742	4 629 777	142.834	3864				1		32 193 227	5 882 301	127.11
0	0	11 602 743	11 602 742	4 629 777	142.834	4278				1		32 072 068	6 003 460	127.10
0	0	11 602 743	11 602 742	4 629 777	142.834	4140				1		31 953 867	6 121 661	127.10
0	0	11 602 743	11 602 742	4 629 777	142.834	4278				1		31 888 604	6 186 924	127.09
0	0	11 602 743	11 602 742	4 629 777	142.834	104772				1		32 008 157	6 067 371	127.10
0	0	11 602 743	11 602 742	4 629 777	142.834	14341				1		31 967 268	6 108 260	127.10
0	0	11 602 743	11 602 742	4 629 777	142.834	20587				1		32 005 231	6 070 297	127.10
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-3	0	11 602 743	11 602 740	4 629 779	142.834	14341				1		40 384 235	-2 308 708	129.77
-3	0	11 602 743	11 602 740	4 629 779	142.834	20587				1		40 729 249	-2 653 721	130.07
-3	0	11 602 743	11 602 740	4 629 779	142.834	54976				1		40 979 218	-2 903 690	130.29
-3	0	11 602 743	11 602 740	4 629 779	142.834	4278				1		41 114 279	-3 038 751	130.40
-3	0	11 602 743	11 602 740	4 629 779	142.834	4140				1		41 199 963	-3 124 435	130.47
-3	0	11 602 743	11 602 740	4 629 779	142.834	4278				1		41 262 631	-3 187 103	130.53
	0					**228210**					**0**			
-4	0	11 602 743	11 602 739	4 629 780	142.834	4278				1		41 326 920	-3 251 392	130.58
-4	0	11 602 743	11 602 739	4 629 780	142.834	3864				1		41 383 257	-3 307 729	130.63
-4	0	11 602 743	11 602 739	4 629 780	142.834	4278				1		41 444 993	-3 369 465	130.68
-4	0	11 602 743	11 602 739	4 629 780	142.834	4140				1		41 504 887	-3 429 359	130.73
-4	0	11 602 743	11 602 739	4 629 780	142.834	4278				1		41 625 621	-3 550 093	130.82
-4	0	11 602 743	11 602 739	4 629 780	142.834	104772				1		42 189 150	-4 113 623	131.28
-4	0	11 602 743	11 602 739	4 629 780	142.834	14341				1		42 487 646	-4 412 118	131.52
-4	0	11 602 743	11 602 739	4 629 780	142.834	20587				1		42 832 659	-4 757 131	131.78
-4	0	11 602 743	11 602 739	4 629 780	142.834	54976				1		43 082 628	-5 007 101	131.98
-4	0	11 602 743	11 602 739	4 629 780	142.834	4278				1		43 217 689	-5 142 161	132.08
-4	0	11 602 743	11 602 739	4 629 780	142.834	4140				1		43 303 373	-5 227 845	132.15
-4	0	11 602 743	11 602 739	4 629 780	142.834	4278				1		43 366 041	-5 290 513	132.19
	0					**228210**					**0**			
-4	0	11 602 743	11 602 739	4 629 780	142.834	4278				1		43 430 330	-5 354 802	132.24
-4	0	11 602 743	11 602 739	4 629 780	142.834	3864				1		43 486 667	-5 411 139	132.29
-4	0	11 602 743	11 602 739	4 629 780	142.834	4278				1		43 548 403	-5 472 875	132.33
-4	0	11 602 743	11 602 739	4 629 780	142.834	4140				1		43 608 297	-5 532 769	132.38
-4	0	11 602 743	11 602 739	4 629 780	142.834	4278				1		43 729 031	-5 653 503	132.47
-4	0	11 602 743	11 602 739	4 629 780	142.834	104772				1		44 292 561	-6 217 033	132.89
-4	0	11 602 743	11 602 739	4 629 780	142.834	14341				1		44 591 056	-6 515 528	133.10
-4	0	11 602 743	11 602 739	4 629 780	142.834	20587				1		44 936 069	-6 860 541	133.35
-4	0	11 602 743	11 602 739	4 629 780	142.834	54976				1		45 186 039	-7 110 511	133.60
-4	0	11 602 743	11 602 739	4 629 780	142.834	0				1		45 186 039	-7 110 511	133.53
-4	0	11 602 743	11 602 739	4 629 780	142.834	0				1		45 186 039	-7 110 511	133.53
-4	0	11 602 743	11 602 739	4 629 780	142.834	0				1		45 186 039	-7 110 511	133.53
	0					**215514**					**0**			

Pit A															Pit A
Pit A Inflow (m^3)	Enter 1 for the discharge location		INFLOW	OUTFLOW	All Pit A inflows Except Pit E	Total Pond Volume (Ice + Water) (m^3)	Tailings Deposited (t)	Cummulative Tailings Deposited (m^3)	Cummulative Volume (m^3)	Volume Available Remaining (m^3)	Water Elevation (m)	Surveyed Water Elevation (m)	Pit A Error (m3)	Overflow to pit E Via Central Dump	
	Pit A	Pit E													
x															
0															
0															
0															
0															
0															
0															
212679															
410360				0											
695168															
119054															
2 480	1	0	169 311	35 836	133 475	5 310 166	0	0	5 310 166	15 309 240	92.43	92.43	40 000	35836	
2 240	1	0	243 219	42 510	200 709	5 510 875	0	0	5 510 875	15 108 531	93.72	93.72	69 240	42510	
2 480	1	0	263 709	52 545	211 164	5 722 039	0	0	5 722 039	14 897 367	95.05	95.05	85 000	52545	
2 400	1	0	377 521	63 103	314 418	6 036 457	0	0	6 036 457	14 582 949	96.99	96.99	205 000	63103	
2 480	1	0	492 278	78 824	458 327	6 494 784	0	0	6 494 784	14 124 622	99.74	99.75	123 000	78824	
53 245	1	0	439 078	300 652	168 271	6 663 055	0	0	6 663 055	13 956 351	100.73	100.65	89 155	101740	
7 564	1	0	231 548	423 762	-183 882	6 479 173	0	0	6 479 173	14 140 233	99.65	100.20	35 668	110154	
10 720	1	0	121 359	395 163	-262 885	6 216 288	0	0	6 216 288	14 403 118	98.08	99.63	-50 919	100960	
28 085	1	0	574 587	300 238	280 946	6 497 234	0	0	6 497 234	14 122 171	99.76	99.76	241 525	87816	
2 480	1	0	176 105	101 863	76 804	6 574 039	0	0	6 574 039	14 045 367	100.21	99.79	200 000	101 863	
2 400	1	0	236 424	105 703	130 721	6 704 760	0	0	6 704 760	13 914 646	100.98	100.39	-15 000	105 703	
2 480	1	0	171 890	112 239	59 651	6 764 411	0	0	6 764 411	13 854 995	101.33	101.55	-1 251 004	112 239	
119054													**-228 335**	**673 487**	
2 480	1	0	147 436	115 222	32 214	6 796 625	0	0	6 796 625	13 822 781	101.51			115 222	
2 240	1	0	131 796	116 832	14 964	6 811 589	0	0	6 811 589	13 807 817	101.60			116 832	
2 480	1	0	144 883	117 581	27 302	6 838 891	0	0	6 838 891	13 780 515	101.76			117 581	
2 400	1	0	139 259	118 946	20 313	6 859 204	0	0	6 859 204	13 760 201	101.88			118 946	
2 480	1	0	211 817	119 961	91 856	6 951 060	0	0	6 951 060	13 668 346	102.41			119 961	
53 245	1	0	590 715	124 554	481 488	7 432 548	0	0	7 432 548	13 186 857	105.12			124 554	
7 564	1	0	359 558	148 629	235 194	7 667 743	0	0	7 667 743	12 951 663	106.40			148 629	
10 720	1	0	678 211	160 388	523 764	8 191 507	0	0	8 191 507	12 427 899	109.13			160 388	
28 085	1	0	295 970	186 577	114 755	8 306 262	0	0	8 306 262	12 313 144	109.67			186 577	
2 480	1	0	466 535	192 314	276 680	8 582 942	0	0	8 582 942	12 036 464	110.94			192 314	
2 400	1	0	164 867	206 148	-41 281	8 541 661	0	0	8 541 661	12 077 745	110.75			206 148	
2 480	1	0	145 815	204 084	-58 269	8 483 391	0	0	8 483 391	12 136 014	110.49			204 084	
119054				0	**1 718 980**										
2 480	1	0	147 436	201 171	-53 735	8 429 657	0	0	8 429 657	12 189 749	110.24			201 171	
2 240	1	0	127 956	198 484	-70 528	8 359 129	0	0	8 359 129	12 260 277	109.92			198 484	
2 480	1	0	144 883	194 958	-50 075	8 309 054	0	0	8 309 054	12 310 352	109.69			194 958	
2 400	1	0	139 259	192 454	-53 195	8 255 859	0	0	8 255 859	12 363 547	109.44			192 454	
2 480	1	0	211 817	189 794	22 023	8 277 882	0	0	8 277 882	12 341 524	109.54			189 794	
53 245	1	0	590 715	190 895	415 147	8 693 029	0	0	8 693 029	11 926 377	111.43			190 895	

7 564	1	0	359 558	211 653	172 170	8 865 199	0	0	8 865 199	11 754 207	112.19			211 653
10 720	1	0	514 654	220 261	300 335	9 165 534	0	0	9 165 534	11 453 872	113.51			220 261
28 085	1	0	295 970	235 278	66 054	9 231 588	0	0	9 231 588	11 387 818	113.79			235 278
2 480	1	0	466 535	238 581	230 413	9 462 002	0	0	9 462 002	11 157 404	114.79			238 581
2 400	1	0	164 867	250 101	-85 234	9 376 767	0	0	9 376 767	11 242 639	114.42			250 101
2 480	1	0	145 815	245 840	-100 025	9 276 743	0	0	9 276 743	11 342 663	113.99			245 840
119054				0	**793 351**									
2 480	1	0	28 396	0	28 396	9 305 139	0	0	9 305 139	11 314 267	114.11			
2 240	1	0	20 436	293 051	-272 615	9 032 523	0	0	9 032 523	11 586 882	112.93			
2 480	1	0	25 843	293 051	-267 208	8 765 315	0	0	8 765 315	11 854 091	111.75			
2 400	1	0	24 059	273 937	-249 878	8 515 437	0	0	8 515 437	12 103 968	110.63			
2 480	1	0	92 777	273 937	-181 160	8 334 278	0	0	8 334 278	12 285 128	109.80			
53 245	1	0	475 515	273 937	216 906	8 551 184	0	0	8 551 184	12 068 222	110.79			
7 564	1	0	240 518	292 791	-28 008	8 523 175	0	0	8 523 175	12 096 231	110.67			
10 720	1	0	206 414	292 791	-80 435	8 442 740	0	0	8 442 740	12 176 665	110.30			
28 085	1	0	180 770	292 791	-106 659	8 336 081	0	0	8 336 081	12 283 325	109.81			
2 480	1	0	347 495	274 672	75 282	8 411 363	0	0	8 411 363	12 208 043	110.16			
2 400	1	0	49 667	274 672	-225 005	8 186 358	0	0	8 186 358	12 433 048	109.10			
2 480	1	0	26 775	274 672	-247 897	7 938 461	0	0	7 938 461	12 680 945	107.84			
119054					**-1 338 282**									
2 480	1	0	218 978	291 593	-72 615	7 865 845	364 492	236 683	8 102 528	12 516 878	108.69			
2 240	1	0	210 598	291 593	-80 996	7 784 850	364 492	473 366	8 258 215	12 361 190	109.45			
2 480	1	0	216 122	291 593	-75 472	7 709 378	364 492	710 049	8 419 427	12 199 979	110.20			
2 400	1	0	201 256	272 574	-71 318	7 638 060	340 717	931 294	8 569 354	12 050 052	110.87			
2 480	1	0	270 031	272 574	-2 543	7 635 517	340 717	1 152 539	8 788 056	11 831 350	111.85			
53 245	1	0	655 635	272 574	398 389	8 033 906	340 717	1 373 784	9 407 690	11 211 716	114.55			
7 564	1	0	432 520	291 334	165 450	8 199 357	364 168	1 610 256	9 809 613	10 809 793	116.26			
10 720	1	0	396 522	291 334	111 130	8 310 487	364 168	1 846 729	10 157 216	10 462 190	117.71			
28 085	1	0	371 306	291 334	85 334	8 395 821	364 168	2 083 202	10 479 023	10 140 383	119.04			
2 480	1	0	622 633	273 306	351 787	8 747 608	341 632	2 305 041	11 052 649	9 566 757	121.35			
2 400	1	0	228 463	273 306	-44 843	8 702 765	341 632	2 526 880	11 229 645	9 389 761	122.05			
2 480	1	0	205 521	273 306	-67 784	8 634 981	341 632	2 748 719	11 383 700	9 235 706	122.66			
					696 520									
2 480	1	0	218 978	291 593	-72 615	8 562 365	364 492	2 871 858	11 434 223	9 185 183	122.86			
2 240	1	0	210 548	291 593	-81 045	8 481 320	364 492	2 994 997	11 476 317	9 143 089	123.02			
2 480	1	0	216 122	291 593	-75 472	8 405 849	364 492	3 118 136	11 523 985	9 095 421	123.21			
2 400	1	0	201 256	272 574	-71 318	8 334 531	340 717	3 233 243	11 567 774	9 051 632	123.38			
2 480	1	0	271 536	272 574	-1 038	8 333 493	340 717	3 348 350	11 681 843	8 937 563	123.82			
53 245	0	1	692 251	272 574	435 005	8 768 498	340 717	3 463 458	12 231 956	8 387 450	125.92			
7 564	0	1	268 568	0	292 833	9 061 331	0	3 463 458	12 524 789	8 094 617	126.98			
10 720	0	1	160 234	37 200	128 976	9 190 307	0	3 463 458	12 653 765	7 965 641	127.44			
28 085	0	1	88 756	36 000	58 118	9 248 425	0	3 463 458	12 711 883	7 907 523	127.64			
2 480	0	1	91 496	37 200	56 755	9 305 180	0	3 463 458	12 768 638	7 850 768	127.83			
2 400	0	1	47 267	36 000	11 267	9 316 447	0	3 463 458	12 779 905	7 839 501	127.87			
2 480	0	1	24 295	37 200	-12 905	9 303 542	0	3 463 458	12 767 000	7 852 406	127.83			
119054					**668 561**									
2 480	0	1	25 916	37 200	-11 284	9 292 258	0	3 463 458	12 755 716	7 863 690	127.79			
2 240	0	1	18 196	33 600	-15 404	9 276 854	0	3 463 458	12 740 312	7 879 094	127.73			
2 480	0	1	23 363	37 200	-13 837	9 263 017	0	3 463 458	12 726 475	7 892 931	127.69			

2 400	0	1	21 659	72 000	-50 341	9 212 676	0	3 463 458	12 676 134	7 943 272	127.51			
2 480	0	1	79 259	74 400	4 859	9 217 535	0	3 463 458	12 680 993	7 938 413	127.53			
53 245	0	1	143 453	72 000	86 781	9 304 316	0	3 463 458	12 767 774	7 851 632	127.83			
7 564	0	1	69 305	74 400	19 170	9 323 486	0	3 463 458	12 786 944	7 832 462	127.89			
10 720	0	1	160 234	74 400	91 776	9 415 262	0	3 463 458	12 878 720	7 740 686	128.08			
28 085	0	1	88 756	72 000	22 118	9 437 380	0	3 463 458	12 900 838	7 718 568	128.11			
2 480	0	1	91 496	74 400	19 555	9 456 935	0	3 463 458	12 920 393	7 699 013	128.14			
2 400	0	1	47 267	72 000	-24 733	9 432 202	0	3 463 458	12 895 660	7 723 746	128.11			
2 480	0	1	24 295	74 400	-50 105	9 382 097	0	3 463 458	12 845 555	7 773 851	128.04			
119054														
2 480	0	1	25 916	93 000	-67 084	9 315 013	0	3 463 458	12 778 471	7 840 935	127.87			
2 240	0	1	18 196	84 000	-65 804	9 249 209	0	3 463 458	12 712 667	7 906 739	127.64			
2 480	0	1	23 363	93 000	-69 637	9 179 572	0	3 463 458	12 643 030	7 976 376	127.40			
2 400	0	1	21 659	90 000	-68 341	9 111 231	0	3 463 458	12 574 689	8 044 717	127.16			
2 480	0	1	79 259	93 000	-13 741	9 097 490	0	3 463 458	12 560 948	8 058 458	127.11			
53 245	0	1	143 453	90 000	68 781	9 166 271	0	3 463 458	12 629 729	7 989 677	127.35			
7 564	0	1	69 305	93 000	570	9 166 841	0	3 463 458	12 630 299	7 989 107	127.35			
10 720	0	1	160 234	93 000	73 176	9 240 017	0	3 463 458	12 703 475	7 915 931	127.61			
28 085	0	1	88 756	90 000	4 118	9 244 135	0	3 463 458	12 707 593	7 911 813	127.62			
2 480	0	1	91 496	93 000	955	9 245 090	0	3 463 458	12 708 548	7 910 858	127.63			
2 400	0	1	47 267	90 000	-42 733	9 202 357	0	3 463 458	12 665 815	7 953 591	127.48			
2 480	0	1	24 295	93 000	-68 705	9 133 652	0	3 463 458	12 597 110	8 022 296	127.24			
119054														
2 480	0	1	25 916	65 100	-39 184	9 094 468	0	3 463 458	12 557 926	8 061 480	127.10			
2 240	0	1	18 196	58 800	-40 604	9 053 864	0	3 463 458	12 517 322	8 102 084	126.95			
2 480	0	1	23 363	65 100	-41 737	9 012 127	0	3 463 458	12 475 585	8 143 821	126.81			
2 400	0	1	21 659	63 000	-41 341	8 970 786	0	3 463 458	12 434 244	8 185 162	126.66			
2 480	0	1	79 259	65 100	14 159	8 984 945	0	3 463 458	12 448 403	8 171 003	126.71			
53 245	0	1	143 453	63 000	95 781	9 080 726	0	3 463 458	12 544 184	8 075 222	127.05			
7 564	0	1	69 305	65 100	28 470	9 109 196	0	3 463 458	12 572 654	8 046 752	127.15			
10 720	0	1	160 234	65 100	101 076	9 210 272	0	3 463 458	12 673 730	7 945 676	127.51			
28 085	0	1	88 756	63 000	31 118	9 241 390	0	3 463 458	12 704 848	7 914 558	127.61			
2 480	0	1	91 496	65 100	28 855	9 270 245	0	3 463 458	12 733 703	7 885 703	127.71			
2 400	0	1	47 267	63 000	-15 733	9 254 512	0	3 463 458	12 717 970	7 901 436	127.66			
2 480	0	1	24 295	65 100	-40 805	9 213 707	0	3 463 458	12 677 165	7 942 241	127.52			
119054														
2 480	0	1	25 916	65 100	-39 184	9 174 523	0	3 463 458	12 637 981	7 981 425	127.38			
2 240	0	1	18 196	60 900	-42 704	9 131 819	0	3 463 458	12 595 277	8 024 129	127.23			
2 480	0	1	23 363	65 100	-41 737	9 090 082	0	3 463 458	12 553 540	8 065 866	127.08			
2 400	0	1	21 659	63 000	-41 341	9 048 741	0	3 463 458	12 512 199	8 107 207	126.94			
2 480	0	1	79 259	65 100	14 159	9 062 900	0	3 463 458	12 526 358	8 093 048	126.99			
53 245	0	1	143 453	63 000	95 781	9 158 681	0	3 463 458	12 622 139	7 997 267	127.32			
7 564	0	1	69 305	65 100	28 470	9 187 151	0	3 463 458	12 650 609	7 968 797	127.42			
10 720	0	1	160 234	65 100	101 076	9 288 227	0	3 463 458	12 751 685	7 867 721	127.77			
28 085	0	1	88 756	63 000	31 118	9 319 345	0	3 463 458	12 782 803	7 836 603	127.88			
2 480	0	1	91 496	65 100	28 855	9 348 200	0	3 463 458	12 811 658	7 807 748	**127.98**			
2 400	0	1	47 267	63 000	-15 733	9 332 467	0	3 463 458	12 795 925	7 823 481	127.93			
2 480	0	1	24 295	65 100	-40 805	9 291 662	0	3 463 458	12 755 120	7 864 286	127.79			
119054														

2 480	0	1	25 916	65 100	-39 184	9 252 478	0	3 463 458	12 715 936	7 903 470	127.65			
2 240	0	1	18 196	65 687	-47 491	9 204 987	0	3 463 458	12 668 444	7 950 961	127.49			
2 480	0	1	23 363	89 280	-65 917	9 139 070	0	3 463 458	12 602 527	8 016 878	127.26			
2 400	0	1	21 659	86 400	-64 741	9 074 329	0	3 463 458	12 537 786	8 081 619	127.03			
2 480	0	1	79 259	89 280	-10 021	9 064 308	0	3 463 458	12 527 765	8 091 640	126.99			
53 245	0	1	143 453	86 400	72 381	9 136 689	0	3 463 458	12 600 146	8 019 259	127.25			
7 564	0	1	69 305	89 280	4 290	9 140 979	0	3 463 458	12 604 436	8 014 969	127.26			
10 720	0	1	160 234	89 280	76 896	9 217 875	0	3 463 458	12 681 332	7 938 073	127.53			
28 085	0	1	88 756	86 400	7 718	9 225 593	0	3 463 458	12 689 050	7 930 355	127.56			
2 480	0	1	91 496	89 280	4 675	9 230 268	0	3 463 458	12 693 725	7 925 680	127.57			
2 400	0	1	47 267	86 400	-39 133	9 191 135	0	3 463 458	12 654 592	7 964 813	127.44			
2 480	0	1	24 295	89 280	-64 985	9 126 150	0	3 463 458	12 589 607	8 029 798	127.21			
119054														
2 480	0	1	25 916	74 400	-48 484	9 077 666	0	3 463 458	12 541 123	8 078 282	127.04			
2 240	0	1	18 196	67 200	-49 004	9 028 662	0	3 463 458	12 492 119	8 127 286	126.86			
2 480	0	1	23 363	74 400	-51 037	8 977 625	0	3 463 458	12 441 082	8 178 323	126.68			
2 400	0	1	21 659	72 000	-50 341	8 927 284	0	3 463 458	12 390 741	8 228 664	126.50			
2 480	0	1	79 259	74 400	4 859	8 932 143	0	3 463 458	12 395 600	8 223 805	126.52			
53 245	0	1	143 453	72 000	86 781	9 018 924	0	3 463 458	12 482 381	8 137 024	126.83			
7 564	0	1	69 305	74 400	19 170	9 038 094	0	3 463 458	12 501 551	8 117 854	126.90			
10 720	0	1	160 234	74 400	91 776	9 129 870	0	3 463 458	12 593 327	8 026 078	127.22			
28 085	0	1	88 756	72 000	22 118	9 151 988	0	3 463 458	12 615 445	8 003 960	127.30			
2 480	0	1	91 496	74 400	19 555	9 171 543	0	3 463 458	12 635 000	7 984 405	127.37			
2 400	0	1	47 267	72 000	-24 733	9 146 810	0	3 463 458	12 610 267	8 009 138	127.28			
2 480	0	1	24 295	74 400	-50 105	9 096 705	0	3 463 458	12 560 162	8 059 243	127.11			
119054														
2 480	0	1	25 916	74 400	-48 484	9 048 221	0	3 463 458	12 511 678	8 107 727	126.93			
2 240	0	1	18 196	67 200	-49 004	8 999 217	0	3 463 458	12 462 674	8 156 731	126.76			
2 480	0	1	23 363	74 400	-51 037	8 948 180	0	3 463 458	12 411 637	8 207 768	126.58			
2 400	0	1	21 659	72 000	-50 341	8 897 839	0	3 463 458	12 361 296	8 258 109	126.39			
2 480	0	1	79 259	74 400	4 859	8 902 698	0	3 463 458	12 366 155	8 253 250	126.41			
53 245	0	1	143 453	72 000	86 781	8 989 479	0	3 463 458	12 452 936	8 166 469	126.72			
7 564	0	1	69 305	74 400	19 170	9 008 649	0	3 463 458	12 472 106	8 147 299	126.79			
10 720	0	1	160 234	74 400	91 776	9 100 425	0	3 463 458	12 563 882	8 055 523	127.12			
28 085	0	1	88 756	72 000	22 118	9 122 543	0	3 463 458	12 586 000	8 033 405	127.20			
2 480	0	1	91 496	74 400	19 555	9 142 098	0	3 463 458	12 605 555	8 013 850	127.27			
2 400	0	1	47 267	72 000	-24 733	9 117 365	0	3 463 458	12 580 822	8 038 583	127.18			
2 480	0	1	24 295	74 400	-50 105	9 067 260	0	3 463 458	12 530 717	8 088 688	127.00			
119054						**14 005 553**								
2 480	0	1	25 916	74 400	-48 484	9 018 776	0	3 463 458	12 482 233	8 137 172	126.83			
2 240	0	1	18 196	69 600	-51 404	8 967 372	0	3 463 458	12 430 829	8 188 576	126.64			
2 480	0	1	23 363	74 400	-51 037	8 916 335	0	3 463 458	12 379 792	8 239 613	126.46			
2 400	0	1	21 659	72 000	-50 341	8 865 994	0	3 463 458	12 329 451	8 289 954	126.28			
2 480	0	1	79 259	74 400	-122 762	8 743 232	0	3 463 458	12 206 690	8 412 716	125.82			
53 245	0	1	143 453	0	-87 747	8 655 485	0	3 463 458	12 118 943	8 500 463	125.49			
7 564	0	1	69 305	0	-161 176	8 494 309	0	3 463 458	11 957 767	8 661 639	124.88			
10 720	0	1	160 234	0	-88 570	8 405 740	0	3 463 458	11 869 197	8 750 208	124.54			
28 085	0	1	88 756	0	-152 410	8 253 330	0	3 463 458	11 716 787	8 902 618	123.95			
2 480	0	1	91 496	0	-160 791	8 092 539	0	3 463 458	11 555 997	9 063 409	123.33			

2 400	0	1	47 267	0	-199 261	7 893 278	0	3 463 458	11 356 736	9 262 670	122.55			
2 480	0	1	24 295	0	-230 451	7 662 828	0	3 463 458	11 126 285	9 493 121	121.64			
119054														
2 480	0	1	25 916	0	-228 830	7 433 998	0	3 463 458	10 897 456	9 721 950	120.73			
2 240	0	1	18 196	0	-211 897	7 222 101	0	3 463 458	10 685 559	9 933 847	119.88			
2 480	0	1	23 363	0	-231 383	6 990 719	0	3 463 458	10 454 176	10 165 230	118.94			
2 400	0	1	21 659	0	-224 869	6 765 850	0	3 463 458	10 229 307	10 390 099	118.01			
2 480	0	1	79 259	0	-175 487	6 590 363	0	3 463 458	10 053 821	10 565 585	117.28			
53 245	0	1	143 453	0	-87 747	6 502 616	0	3 463 458	9 966 074	10 653 332	116.92			
7 564	0	1	69 305	0	-161 176	6 341 440	0	3 463 458	9 804 898	10 814 508	116.24			
10 720	0	1	160 234	0	-88 570	6 252 871	0	3 463 458	9 716 328	10 903 077	115.87			
28 085	0	1	88 756	0	-152 410	6 100 461	0	3 463 458	9 563 918	11 055 487	115.22			
2 480	0	1	91 496	0	-160 791	5 939 670	0	3 463 458	9 403 128	11 216 278	114.53			
2 400	0	1	47 267	0	-199 261	5 740 409	0	3 463 458	9 203 867	11 415 539	113.67			
2 480	0	1	24 295	0	-230 451	5 509 959	0	3 463 458	8 973 416	11 645 990	112.67			
119054														
2 480	0	1	25 916	0	-228 830	5 281 129	0	3 463 458	8 744 587	11 874 819	111.66			
2 240	0	1	18 196	0	-211 897	5 069 232	0	3 463 458	8 532 690	12 086 716	110.71			
2 480	0	1	23 363	0	-231 383	4 837 850	0	3 463 458	8 301 307	12 318 099	109.65			
2 400	0	1	21 659	0	-224 869	4 612 981	0	3 463 458	8 076 438	12 542 968	108.55			
2 480	0	1	79 259	0	-175 487	4 437 494	0	3 463 458	7 900 952	12 718 454	107.64			
53 245	0	1	143 453	0	-87 747	4 349 747	0	3 463 458	7 813 205	12 806 201	107.17			
7 564	0	1	69 305	0	-161 176	4 188 571	0	3 463 458	7 652 029	12 967 377	106.31			
10 720	0	1	160 234	0	-88 570	4 100 002	0	3 463 458	7 563 459	13 055 946	105.83			
28 085	0	1	88 756	0	-152 410	3 947 592	0	3 463 458	7 411 049	13 208 356	105.00			
2 480	0	1	91 496	0	-160 791	3 786 801	0	3 463 458	7 250 259	13 369 147	104.10			
2 400	0	1	47 267	0	-199 261	3 587 540	0	3 463 458	7 050 998	13 568 408	102.98			
2 480	0	1	24 295	0	-230 451	3 357 090	0	3 463 458	6 820 547	13 798 859	101.65			
119054														
2 480	0	1	25 916	0	-228 830	3 128 260	0	3 463 458	6 591 718	14 027 688	100.31			
2 240	0	1	18 196	0	-211 897	2 916 363	0	3 463 458	6 379 821	14 239 585	99.06			
2 480	0	1	23 363	0	-231 383	2 684 981	0	3 463 458	6 148 438	14 470 968	97.67			
2 400	0	1	21 659	0	-224 869	2 460 112	0	3 463 458	5 923 569	14 695 837	96.30			
2 480	0	1	79 259	0	-175 487	2 284 625	0	3 463 458	5 748 083	14 871 323	95.21			
53 245	0	1	143 453	0	-87 747	2 196 878	0	3 463 458	5 660 336	14 959 070	94.66			
7 564	0	1	69 305	0	-161 176	2 035 702	0	3 463 458	5 499 160	15 120 246	93.65			
10 720	0	1	160 234	0	-88 570	1 947 133	0	3 463 458	5 410 590	15 208 815	93.08			
28 085	0	1	88 756	0	-152 410	1 794 723	0	3 463 458	5 258 180	15 361 225	92.09			
2 480	0	1	91 496	0	-160 791	1 633 932	0	3 463 458	5 097 390	15 522 016	91.04			
2 400	0	1	47 267	0	-199 261	1 434 671	0	3 463 458	4 898 129	15 721 277	89.71			
2 480	0	1	24 295	0	-230 451	1 204 221	0	3 463 458	4 667 678	15 951 728	88.11			
119054														
2 480	0	1	25 916	0	-228 830	975 391	0	3 463 458	4 438 849	16 180 557	86.33			
2 240	0	1	18 196	0	-220 114	755 277	0	3 463 458	4 218 734	16 400 672	84.54			
2 480	0	1	23 363	0	-231 383	523 894	0	3 463 458	3 987 352	16 632 054	82.60			
2 400	0	1	21 659	0	-224 869	299 025	0	3 463 458	3 762 483	16 856 923	80.65			
2 480	0	1	79 259	0	-175 487	123 538	0	3 463 458	3 586 996	17 032 410	79.09			
53 245	0	1	143 453	0	-87 747	35 791	0	3 463 458	3 499 249	17 120 157	78.30			
7 564	0	1	69 305	0	-35 791	0	0	3 463 458	3 463 458	17 155 948	77.97			

10 720	1	0	1 035 493	0	1 041 435	1 041 435	0	3 463 458	4 504 893	16 114 513	86.86			
28 085	1	0	595 702	0	601 064	1 642 499	0	3 463 458	5 105 957	15 513 449	91.10			
2 480	1	0	522 923	0	525 382	2 167 881	0	3 463 458	5 631 338	14 988 067	94.48			
2 400	1	0	475 881	0	475 881	2 643 762	0	3 463 458	6 107 219	14 512 186	97.42			
2 480	1	0	452 989	0	452 989	3 096 751	0	3 463 458	6 560 208	14 059 198	100.13			
119054														
2 480	1	0	454 610	0	454 610	3 551 361	0	3 463 458	7 014 818	13 604 588	102.77			
2 240	1	0	446 650	0	446 650	3 998 011	0	3 463 458	7 461 468	13 157 938	105.28			
2 480	1	0	452 057	0	452 057	4 450 067	0	3 463 458	7 913 525	12 705 881	107.71			
2 400	1	0	450 273	0	450 273	4 900 340	0	3 463 458	8 363 798	12 255 608	109.94			
2 480	1	0	510 873	0	510 873	5 411 213	0	3 463 458	8 874 671	11 744 735	112.23			
53 245	1	0	847 209	0	862 537	6 273 750	0	3 463 458	9 737 208	10 882 198	115.96			
7 564	1	0	648 461	0	672 726	6 946 476	0	3 463 458	10 409 934	10 209 472	118.76			
10 720	1	0	691 157	0	697 099	7 643 576	0	3 463 458	11 107 033	9 512 373	121.57			
28 085	1	0	595 702	0	601 064	8 244 639	0	3 463 458	11 708 097	8 911 309	123.92			
2 480	1	0	524 721	0	527 180	8 771 819	0	3 463 458	12 235 277	8 384 129	125.93			
2 400	1	0	477 621	0	477 621	9 249 440	0	3 463 458	12 712 898	7 906 508	127.64			
2 480	1	0	454 787	0	454 787	9 704 227	0	3 463 458	13 167 685	7 451 721	128.48			
119054														
2 480	1	0	456 408	0	456 408	10 160 635	0	3 463 458	13 624 092	6 995 313	129.11			
2 240	1	0	448 274	0	448 274	10 608 909	0	3 463 458	14 072 366	6 547 039	129.73			
2 480	1	0	453 855	0	472 986	11 081 895	0	3 463 458	14 545 352	6 074 054	130.38			
2 400	1	0	452 013	0	471 144	11 553 039	0	3 463 458	15 016 496	5 602 910	131.03			
2 480	1	0	512 671	0	531 984	12 085 023	0	3 463 458	15 548 480	5 070 926	131.76			
53 245	1	0	898 736	0	974 780	13 059 802	0	3 463 458	16 523 260	4 096 146	133.10			
7 564	1	0	655 238	0	709 745	13 769 547	0	3 463 458	17 233 005	3 386 401	134.08			
10 720	1	0	701 024	0	756 263	14 525 811	0	3 463 458	17 989 268	2 630 138	135.12			
28 085	1	0	211 355	0	249 982	14 775 793	0	3 463 458	18 239 251	2 380 155	135.46			
2 480	1	0	113 471	0	135 061	14 910 854	0	3 463 458	18 374 312	2 245 094	135.65			
2 400	1	0	66 371	0	85 684	14 996 538	0	3 463 458	18 459 995	2 159 410	135.77			
2 480	1	0	43 537	0	62 668	15 059 206	0	3 463 458	18 522 663	2 096 742	135.85			
119054														
2 480	1	0	45 158	0	64 289	15 123 495	0	3 463 458	18 586 952	2 032 454	135.94			
2 240	1	0	37 024	0	56 337	15 179 832	0	3 463 458	18 643 289	1 976 117	136.02			
2 480	1	0	42 605	0	61 736	15 241 568	0	3 463 458	18 705 025	1 914 381	136.10			
2 400	1	0	40 763	0	59 894	15 301 461	0	3 463 458	18 764 919	1 854 487	136.18			
2 480	1	0	101 421	0	120 734	15 422 195	0	3 463 458	18 885 653	1 733 753	136.35			
53 245	1	0	487 486	0	563 530	15 985 725	0	3 463 458	19 449 183	1 170 223	137.13			
7 564	1	0	243 988	0	298 495	16 284 220	0	3 463 458	19 747 678	871 728	137.54			
10 720	1	0	289 774	0	345 013	16 629 234	0	3 463 458	20 092 691	526 715	138.01			
28 085	1	0	211 343	0	249 970	16 879 203	0	3 463 458	20 342 661	276 745	138.36			
2 480	1	0	113 471	0	135 061	17 014 264	0	3 463 458	20 477 722	141 684	138.54			
2 400	1	0	66 371	0	85 684	17 099 948	0	3 463 458	20 563 406	56 000	138.66			
2 480	1	0	43 537	0	62 668	17 162 616	0	3 463 458	20 626 074	-6 668	138.75			
119054														
2 480	1	0	45 158	0	64 289	17 226 905	0	3 463 458	20 690 363	-70 957	138.83			
2 240	1	0	37 024	0	56 337	17 283 242	0	3 463 458	20 746 699	-127 294	138.91			
2 480	1	0	42 605	0	61 736	17 344 978	0	3 463 458	20 808 435	-189 030	139.00			
2 400	1	0	40 763	0	59 894	17 404 872	0	3 463 458	20 868 329	-248 923	139.08			

2 480	1	0	101 421	0	120 734	17 525 606	0	3 463 458	20 989 063	-369 657	139.25			
53 245	1	0	487 486	0	563 530	18 089 135	0	3 463 458	21 552 593	-933 187	140.02			
7 564	1	0	243 988	0	298 495	18 387 630	0	3 463 458	21 851 088	-1 231 682	140.43			
10 720	1	0	289 774	0	345 013	18 732 644	0	3 463 458	22 196 101	-1 576 696	140.91			
28 085	1	0	211 343	0	249 970	18 982 613	0	3 463 458	22 446 071	-1 826 665	141.25			
2 480	1	0	113 471	0	135 061	19 117 674	0	3 463 458	22 581 132	-1 961 726	141.44			
2 400	1	0	66 371	0	85 684	19 203 358	0	3 463 458	22 666 816	-2 047 410	141.55			
2 480	1	0	43 537	0	62 668	19 266 026	0	3 463 458	22 729 484	-2 110 078	141.64			
119054														
2 480	1	0	45 158	0	64 289	19 330 315	0	3 463 458	22 793 773	-2 174 367	141.73			
2 240	1	0	37 024	0	56 337	19 386 652	0	3 463 458	22 850 110	-2 230 704	141.81			
2 480	1	0	42 605	0	61 736	19 448 388	0	3 463 458	22 911 846	-2 292 440	141.89			
2 400	1	0	40 763	0	59 894	19 508 282	0	3 463 458	22 971 739	-2 352 334	141.97			
2 480	1	0	101 421	0	120 734	19 629 016	0	3 463 458	23 092 473	-2 473 068	142.14			
53 245	1	0	487 486	0	563 530	20 192 546	0	3 463 458	23 656 003	-3 036 597	142.92			
7 564	1	0	243 988	0	298 495	20 491 041	0	3 463 458	23 954 498	-3 335 092	143.33			
10 720	1	0	289 774	0	345 013	20 836 054	0	3 463 458	24 299 512	-3 680 106	143.80			
28 085	1	0	211 343	0	249 970	21 086 024	0	3 463 458	24 549 481	-3 930 075	144.15			
						21 086 024	0	3 463 458	24 549 481	-3 930 075	144.15			
						21 086 024	0	3 463 458	24 549 481	-3 930 075	144.15			
						21 086 024	0	3 463 458	24 549 481	-3 930 075	144.15			
111694														

Pit E																	Pit E
Pit E Inflow (m^3)	Enter 1 for the discharge location		INFLOW	OUTFLOW	All Pit E inflows Except Pit A	Total Pond Volume (Ice + Water) (m^3)	Tailings Deposited (t)	Cummulative Tailings Deposited (m^3)	Cummulative Volume (m^3)	Water Elevation (m)	Planned Tailing Elevation (m)	Surveyed Water Elevation (m)	Pit E Error (m3)	Overflow Towards Pit A Via Central Dump	Outflow to Pit A above 128	Overflow Towards Goose above 131	
	Pit A	Pit E															
x																	
0																	
0																	
0																	
0																	
0																	
0																	
76590																	
286000			0	0										0	0		
1387539			0	0	0									0	0		
109156														0	0		
1 798	0	1	231 248	394 494	-163 246	3 200 409	348 343	5 672 604	8 873 013	85.77	68.35	85.99	18 000	0	0		
1 624	0	1	229 324	407 137	-177 813	3 022 596	325 867	5 884 206	8 906 802	85.93	69.62	86.03	24 000	0	0		
1 798	0	1	257 823	447 553	-189 730	2 832 866	345 469	6 108 537	8 941 402	86.10	70.92	86.20	20 000	0	0		
1 740	0	1	210 809	447 021	-236 212	2 596 653	298 713	6 302 506	8 899 160	85.90	72.02	86.00	-38 000	0	0		
1 798	0	1	274 839	398 640	-123 801	2 472 853	182 698	6 421 141	8 893 994	85.87	72.68	85.97	22 000	0	0		
51 527	0	1	431 344	182 892	248 451	2 721 304	363 441	6 657 142	9 378 446	88.18	73.99	88.36	62 000	0	0		
6 777	0	1	325 489	120 598	204 891	2 926 195	358 560	6 889 973	9 816 168	90.15	75.25	90.23	-36 000	0	0		
9 867	0	1	320 721	81 613	239 108	3 165 302	303 506	7 087 055	10 252 357	92.02	76.29	92.12	1 000	0	0		
26 891	0	1	190 995	145 016	45 979	3 211 281	99 495	7 151 663	10 362 944	92.49	76.63	92.72	-12 000	0	0		
1 798	0	1	173 039	426 915	-253 876	2 957 406	313 279	7 355 090	10 312 496	92.27	77.69	92.54	-130 000	0	0		
1 740	0	1	279 658	376 286	-96 628	2 860 777	323 782	7 565 338	10 426 115	92.75	78.77	92.99	0	0	0		
1 798	0	1	322 286	430 461	-108 175	2 752 602	301 066	7 760 835	10 513 438	93.12	79.76	93.32	15 000	0	0		
109156													**-54 000**	0	0		
1 798	0	1	306 383	409 082	-102 699	2 649 903	360 780	7 995 108	10 645 011	93.67	80.93			0	0		
1 624	0	1	294 675	382 083	-87 408	2 562 495	336 720	8 213 758	10 776 252	94.21	82.00			0	0		
1 798	0	1	308 455	409 107	-100 653	2 461 842	360 780	8 448 030	10 909 873	94.77	83.12			0	0		
1 740	0	1	278 702	358 764	-80 062	2 381 780	302 940	8 644 745	11 026 525	95.24	84.06			0	0		
1 798	0	1	299 671	392 898	-93 228	2 288 553	340 620	8 865 926	11 154 479	95.77	85.09			0	0		
51 527	0	1	361 182	395 555	-34 373	2 254 179	348 700	9 092 355	11 346 534	96.55	86.13			0	0		
6 777	0	1	346 358	409 107	-62 750	2 191 430	360 780	9 326 628	11 518 058	97.24	86.93			0	0		
9 867	0	1	170 255	400 520	-230 265	1 961 165	0	9 326 628	11 287 792	96.31	86.93			0	0		
26 891	0	1	396 573	395 555	1 019	1 962 183	348 700	9 553 056	11 515 240	97.23	87.56			0	0		
1 798	0	1	354 512	364 791	-10 278	1 951 905	305 660	9 751 537	11 703 442	97.99	88.11			0	0		
1 740	0	1	380 459	379 346	1 113	1 953 018	328 540	9 964 874	11 917 892	98.84	88.70			0	0		
1 798	0	1	395 483	409 107	-13 624	1 939 394	360 780	10 199 147	12 138 541	99.72	89.35			0	0		
109156														0	0		
1 798	0	1	395 599	414 047	-18 447	1 920 947	366 956	10 437 430	12 358 377	100.58	90.01			0	0		
1 624	0	1	379 359	382 789	-3 430	1 917 517	342 374	10 659 751	12 577 268	101.44	90.63			0	0		
1 798	0	1	389 094	414 073	-24 978	1 892 539	366 956	10 898 034	12 790 573	102.27	91.29			0	0		
1 740	0	1	353 846	361 263	-7 416	1 885 122	306 048	11 096 767	12 981 889	103.01	91.84			0	0		
1 798	0	1	372 757	397 864	-25 107	1 860 015	346 796	11 321 959	13 181 974	103.78	92.46			0	0		
51 527	0	1	430 776	400 443	30 333	1 890 348	354 780	11 552 335	13 442 684	104.77	93.10			0	0		
6 777	0	1	412 677	414 073	-1 396	1 888 952	366 956	11 790 618	13 679 571	105.67	93.77			0	0		
9 867	0	1	230 128	405 457	-175 329	1 713 624	0	11 790 618	13 504 242	105.01	93.77			0	0		
26 891	0	1	448 493	400 443	48 050	1 761 674	354 780	12 020 995	13 782 669	106.06	94.40			0	0		
1 798	0	1	402 438	367 309	35 129	1 796 803	308 792	12 221 509	14 018 312	106.94	94.96			0	0		
1 740	0	1	427 633	384 234	43 398	1 840 201	334 620	12 438 795	14 278 996	107.91	95.56			0	0		
1 798	0	1	440 511	414 073	26 438	1 866 639	366 956	12 677 078	14 543 717	108.88	96.23			0	0		

109156													0	0	
1 798	0	1	193 125	293 025	-99 901	1 766 738	364 492	12 913 761	14 680 500	109.37	96.88		0	0	
1 624	0	1	192 544	0	192 544	1 959 282	364 492	13 150 444	15 109 726	110.88	97.54		0	0	
1 798	0	1	192 835	0	192 835	2 152 117	364 492	13 387 127	15 539 244	112.34	98.20		0	0	
1 740	0	1	179 646	0	179 646	2 331 763	340 717	13 608 372	15 940 135	113.69	98.81		0	0	
1 798	0	1	179 761	0	179 761	2 511 523	340 717	13 829 617	16 341 140	115.01	99.42		0	0	
51 527	0	1	232 356	0	232 356	2 743 879	340 717	14 050 862	16 794 741	116.50	100.04		0	0	
6 777	0	1	199 537	0	199 537	2 943 416	364 168	14 287 335	17 230 750	117.90	100.70		0	0	
9 867	0	1	200 733	0	200 733	3 144 149	364 168	14 523 807	17 667 956	119.29	101.35		0	0	
26 891	0	1	218 185	0	218 185	3 362 334	364 168	14 760 280	18 122 614	120.72	87.39		0	0	
1 798	0	1	181 255	0	181 255	3 543 589	341 632	14 982 119	18 525 708	121.97	87.99		0	0	
1 740	0	1	181 246	0	181 246	3 724 835	341 632	15 203 958	18 928 793	123.20	88.57		0	0	
1 798	0	1	181 255	0	181 255	3 906 090	341 632	15 425 797	19 331 887	124.41	89.14		0	0	
109156															
1 798	0	1	1 798	0	1 798	3 907 888	0	15 425 797	19 333 685	124.41	89.14		0	0	
1 624	0	1	1 624	0	1 624	3 909 512	0	15 425 797	19 335 309	124.42	89.14		0	0	
1 798	0	1	1 798	0	1 798	3 911 310	0	15 425 797	19 337 107	124.43	89.14		0	0	
1 740	0	1	1 740	0	1 740	3 913 050	0	15 425 797	19 338 847	124.43	89.14		0	0	
1 798	0	1	1 798	0	1 798	3 914 848	0	15 425 797	19 340 645	124.44	89.14		0	0	
51 527	0	1	51 527	0	51 527	3 966 375	0	15 425 797	19 392 172	124.59	89.14		0	0	
6 777	0	1	6 777	0	6 777	3 973 152	0	15 425 797	19 398 949	124.61	89.14		0	0	
9 867	0	1	9 867	0	9 867	3 983 019	0	15 425 797	19 408 816	124.64	89.14		0	0	
26 891	0	1	26 891	0	26 891	4 009 910	0	15 425 797	19 435 707	124.71	89.14		0	0	
1 798	0	1	1 798	0	1 798	4 011 708	0	15 425 797	19 437 505	124.72	89.14		0	0	
1 740	0	1	1 740	0	1 740	4 013 448	0	15 425 797	19 439 245	124.73	89.14		0	0	
1 798	0	1	1 798	0	1 798	4 015 246	0	15 425 797	19 441 043	124.73	89.14		0	0	
109156															
1 798	0	1	1 798	0	1 798	4 017 044	0	15 425 797	19 442 841	124.74	89.14		0	0	
1 624	0	1	1 624	0	1 624	4 018 668	0	15 425 797	19 444 465	124.74	89.14		0	0	
1 798	0	1	1 798	0	1 798	4 020 466	0	15 425 797	19 446 263	124.75	89.14		0	0	
1 740	0	1	1 740	0	1 740	4 022 206	0	15 425 797	19 448 003	124.75	89.14		0	0	
1 798	0	1	1 798	0	1 798	4 024 004	0	15 425 797	19 449 801	124.76	89.14		0	0	
51 527	0	1	104 772	0	104 772	4 128 776	0	15 425 797	19 554 573	125.06	89.14		0	0	
6 777	0	1	14 341	0	14 341	4 143 117	0	15 425 797	19 568 914	125.10	89.14				
9 867	0	1	20 587	0	20 587	4 163 704	0	15 425 797	19 589 501	125.16	89.14				
26 891	0	1	54 976	0	54 976	4 218 680	0	15 425 797	19 644 477	125.32	89.14				
1 798	0	1	4 278	0	4 278	4 222 958	0	15 425 797	19 648 755	125.33	89.14				
1 740	0	1	4 140	0	4 140	4 227 098	0	15 425 797	19 652 895	125.34	89.14				
1 798	0	1	4 278	0	4 278	4 231 376	0	15 425 797	19 657 173	125.36	89.14				
109156															
1 798	0	1	4 278	111 600	-107 322	4 124 054	0	15 425 797	19 549 851	125.05					
1 624	0	1	3 864	100 800	-96 936	4 027 118	0	15 425 797	19 452 915	124.77					
1 798	0	1	4 278	111 600	-107 322	3 919 796	0	15 425 797	19 345 593	124.45					
1 740	0	1	4 140	72 000	-67 860	3 851 936	0	15 425 797	19 277 733	124.25					
1 798	0	1	4 278	74 400	-70 122	3 781 814	0	15 425 797	19 207 611	124.04					
51 527	0	1	104 772	72 000	32 772	3 814 586	0	15 425 797	19 240 383	124.14					
6 777	0	1	14 341	74 400	-60 059	3 754 527	0	15 425 797	19 180 324	123.96					
9 867	0	1	20 587	74 400	-53 813	3 700 714	0	15 425 797	19 126 511	123.80					
26 891	0	1	54 976	72 000	-17 024	3 683 690	0	15 425 797	19 109 487	123.75					
1 798	0	1	4 278	74 400	-70 122	3 613 568	0	15 425 797	19 039 365	123.54					
1 740	0	1	4 140	72 000	-67 860	3 545 708	0	15 425 797	18 971 505	123.33					
1 798	0	1	4 278	74 400	-70 122	3 475 586	0	15 425 797	18 901 383	123.12					
109156															
1 798	0	1	4 278	93 000	-88 722	3 386 864	0	15 425 797	18 812 661	122.85					
1 624	0	1	3 864	84 000	-80 136	3 306 728	0	15 425 797	18 732 525	122.61					

1 798	0	1	4 278	93 000	-88 722	3 218 006	0	15 425 797	18 643 803	122.34						
1 740	0	1	4 140	90 000	-85 860	3 132 146	0	15 425 797	18 557 943	122.07						
1 798	0	1	4 278	93 000	-88 722	3 043 424	0	15 425 797	18 469 221	121.80						
51 527	0	1	104 772	90 000	14 772	3 058 196	0	15 425 797	18 483 993	121.85						
6 777	0	1	14 341	93 000	-78 659	2 979 537	0	15 425 797	18 405 334	121.60						
9 867	0	1	20 587	93 000	-72 413	2 907 124	0	15 425 797	18 332 921	121.38						
26 891	0	1	54 976	90 000	-35 024	2 872 100	0	15 425 797	18 297 897	121.27						
1 798	0	1	4 278	93 000	-88 722	2 783 378	0	15 425 797	18 209 175	120.99						
1 740	0	1	4 140	90 000	-85 860	2 697 518	0	15 425 797	18 123 315	120.73						
1 798	0	1	4 278	93 000	-88 722	2 608 796	0	15 425 797	18 034 593	120.45						
109156					**-866 790**											
1 798	0	1	4 278	120 900	-116 622	2 492 174	0	15 425 797	17 917 971	120.08						
1 624	0	1	3 864	109 200	-105 336	2 386 838	0	15 425 797	17 812 635	119.75						
1 798	0	1	4 278	120 900	-116 622	2 270 216	0	15 425 797	17 696 013	119.38						
1 740	0	1	4 140	117 000	-112 860	2 157 356	0	15 425 797	17 583 153	119.03						
1 798	0	1	4 278	120 900	-116 622	2 040 734	0	15 425 797	17 466 531	118.65						
51 527	0	1	104 772	117 000	-12 228	2 028 506	0	15 425 797	17 454 303	118.62						
6 777	0	1	14 341	120 900	-106 559	1 921 947	0	15 425 797	17 347 744	118.28						
9 867	0	1	20 587	120 900	-100 313	1 821 634	0	15 425 797	17 247 431	117.95						
26 891	0	1	54 976	117 000	-62 024	1 759 610	0	15 425 797	17 185 407	117.76						
1 798	0	1	4 278	120 900	-116 622	1 642 988	0	15 425 797	17 068 785	117.38						
1 740	0	1	4 140	117 000	-112 860	1 530 128	0	15 425 797	16 955 925	117.02						
1 798	0	1	4 278	120 900	-116 622	1 413 506	0	15 425 797	16 839 303	116.64						
109156					**-1 195 290**											
1 798	0	1	4 278	120 900	-116 622	1 296 884	0	15 425 797	16 722 681	116.26						
1 624	0	1	3 864	113 100	-109 236	1 187 648	0	15 425 797	16 613 445	115.91						
1 798	0	1	4 278	120 900	-116 622	1 071 026	0	15 425 797	16 496 823	115.52						
1 740	0	1	4 140	117 000	-112 860	958 166	0	15 425 797	16 383 963	115.15						
1 798	0	1	4 278	120 900	-116 622	841 544	0	15 425 797	16 267 341	114.77						
51 527	0	1	104 772	117 000	-12 228	829 316	0	15 425 797	16 255 113	114.73						
6 777	0	1	14 341	120 900	-106 559	722 757	0	15 425 797	16 148 554	114.38						
9 867	0	1	20 587	120 900	-100 313	622 444	0	15 425 797	16 048 241	114.05						
26 891	0	1	54 976	117 000	-62 024	560 420	0	15 425 797	15 986 217	113.84						
1 798	0	1	4 278	120 900	-116 622	443 798	0	15 425 797	15 869 595	113.45						
1 740	0	1	4 140	117 000	-112 860	330 938	0	15 425 797	15 756 735	113.08						
1 798	0	1	4 278	120 900	-116 622	214 316	0	15 425 797	15 640 113	112.68						
109156					**-1 199 190**											
1 798	0	1	4 278	120 900	-116 622	97 694	0	15 425 797	15 523 491	112.29						
1 624	0	1	3 864	102 313	-98 449	-755	0	15 425 797	15 425 042	111.96						
1 798	0	1	4 278	0	4 278	3 523	0	15 425 797	15 429 320	111.97						
1 740	0	1	19 104	0	19 104	22 627	0	15 425 797	15 448 424	112.04						
1 798	0	1	22 162	0	22 162	44 789	0	15 425 797	15 470 586	112.11						
51 527	0	1	344 033	0	344 033	388 822	0	15 425 797	15 814 619	113.27						
6 777	0	1	174 683	0	174 683	563 505	0	15 425 797	15 989 302	113.85						
9 867	0	1	129 540	0	129 540	693 045	0	15 425 797	16 118 842	114.28						
26 891	0	1	122 587	0	122 587	815 632	0	15 425 797	16 241 429	114.69						
1 798	0	1	21 975	0	21 975	837 607	0	15 425 797	16 263 404	114.76						
1 740	0	1	19 104	0	19 104	856 711	0	15 425 797	16 282 508	114.82						
1 798	0	1	19 242	0	19 242	875 953	0	15 425 797	16 301 750	114.88						
109156																
1 798	0	1	19 242	0	19 242	895 195	0	15 425 797	16 320 992	114.95						
1 624	0	1	18 828	0	18 828	914 023	0	15 425 797	16 339 820	115.01						
1 798	0	1	19 242	0	19 242	933 265	0	15 425 797	16 359 062	115.07						
1 740	0	1	19 104	0	19 104	952 369	0	15 425 797	16 378 166	115.14						
1 798	0	1	22 162	0	22 162	974 530	0	15 425 797	16 400 327	115.21						

51 527	0	1	344 033	0	344 033	1 318 563	0	15 425 797	16 744 360	116.33						
6 777	0	1	174 683	0	174 683	1 493 246	0	15 425 797	16 919 043	116.90						
9 867	0	1	129 540	0	129 540	1 622 787	0	15 425 797	17 048 584	117.32						
26 891	0	1	122 587	0	122 587	1 745 373	0	15 425 797	17 171 170	117.71						
1 798	0	1	21 975	0	21 975	1 767 348	0	15 425 797	17 193 145	117.78						
1 740	0	1	19 104	0	19 104	1 786 452	0	15 425 797	17 212 249	117.84						
1 798	0	1	19 242	0	19 242	1 805 694	0	15 425 797	17 231 491	117.90						
109156																
1 798	0	1	19 242	0	19 242	1 824 936	0	15 425 797	17 250 733	117.97						
1 624	0	1	18 828	0	18 828	1 843 764	0	15 425 797	17 269 561	118.03						
1 798	0	1	19 242	0	19 242	1 863 006	0	15 425 797	17 288 803	118.09						
1 740	0	1	19 104	0	19 104	1 882 110	0	15 425 797	17 307 907	118.15						
1 798	0	1	22 162	0	22 162	1 904 272	0	15 425 797	17 330 069	118.22						
51 527	0	1	344 033	0	344 033	2 248 304	0	15 425 797	17 674 101	119.31						
6 777	0	1	174 683	0	174 683	2 422 988	0	15 425 797	17 848 785	119.86						
9 867	0	1	129 540	0	129 540	2 552 528	0	15 425 797	17 978 325	120.27						
26 891	0	1	122 587	0	122 587	2 675 114	0	15 425 797	18 100 911	120.66						
1 798	0	1	21 975	0	21 975	2 697 089	0	15 425 797	18 122 886	120.72						
1 740	0	1	19 104	0	19 104	2 716 193	0	15 425 797	18 141 990	120.78						
1 798	0	1	19 242	0	19 242	2 735 435	0	15 425 797	18 161 232	120.84						
109156																
1 798	0	1	19 242	0	19 242	2 754 677	0	15 425 797	18 180 474	120.90						
1 624	0	1	18 828	0	18 828	2 773 505	0	15 425 797	18 199 302	120.96						
1 798	0	1	19 242	0	19 242	2 792 747	0	15 425 797	18 218 544	121.02						
1 740	0	1	19 104	0	19 104	2 811 851	0	15 425 797	18 237 648	121.08						
1 798	0	1	22 162	0	22 162	2 834 013	0	15 425 797	18 259 810	121.15						
51 527	0	1	344 033	0	344 033	3 178 046	0	15 425 797	18 603 843	122.21						
6 777	0	1	174 683	0	174 683	3 352 729	0	15 425 797	18 778 526	122.75						
9 867	0	1	129 540	0	129 540	3 482 269	0	15 425 797	18 908 066	123.14						
26 891	0	1	122 587	0	122 587	3 604 856	0	15 425 797	19 030 653	123.51						
1 798	0	1	21 975	0	21 975	3 626 830	0	15 425 797	19 052 627	123.58						
1 740	0	1	19 104	0	19 104	3 645 934	0	15 425 797	19 071 731	123.64						
1 798	0	1	19 242	0	19 242	3 665 176	0	15 425 797	19 090 973	123.69						
109156																
1 798	0	1	19 242	0	19 242	3 684 418	0	15 425 797	19 110 215	123.75						
1 624	0	1	18 828	0	18 828	3 703 246	0	15 425 797	19 129 043	123.81						
1 798	0	1	19 242	0	19 242	3 722 488	0	15 425 797	19 148 285	123.86						
1 740	0	1	19 104	0	19 104	3 741 592	0	15 425 797	19 167 389	123.92						
1 798	0	1	22 162	0	22 162	3 763 754	0	15 425 797	19 189 551	123.99						
51 527	0	1	344 033	0	344 033	4 107 787	0	15 425 797	19 533 584	125.00						
6 777	0	1	174 683	0	174 683	4 282 470	0	15 425 797	19 708 267	125.50						
9 867	0	1	129 540	0	129 540	4 412 010	0	15 425 797	19 837 807	125.87						
26 891	0	1	122 587	0	122 587	4 534 597	0	15 425 797	19 960 394	126.22						
1 798	0	1	21 975	0	21 975	4 556 572	0	15 425 797	19 982 369	126.28						
1 740	0	1	19 104	0	19 104	4 575 676	0	15 425 797	20 001 473	126.33						
1 798	0	1	19 242	0	19 242	4 594 918	0	15 425 797	20 020 715	126.38						
109156																
1 798	0	1	19 242	0	19 242	4 614 159	0	15 425 797	20 039 956	126.44						
1 624	0	1	18 828	0	18 828	4 632 987	0	15 425 797	20 058 784	126.49						
1 798	0	1	19 242	0	19 242	4 652 229	0	15 425 797	20 078 026	126.54						
1 740	0	1	19 104	0	19 104	4 671 333	0	15 425 797	20 097 130	126.59						
1 798	0	1	19 242	0	19 242	4 690 575	0	15 425 797	20 116 372	126.65						
51 527	0	1	119 736	0	119 736	4 810 311	0	15 425 797	20 236 108	126.97						
6 777	0	1	-470 695	0	-470 695	4 339 616	0	15 425 797	19 765 413	125.67						
9 867	0	1	-464 449	0	-464 449	3 875 167	0	15 425 797	19 300 964	124.32						

26 891	0	1	69 940	0	69 940	3 945 107	0	15 425 797	19 370 904	124.52						
1 798	0	1	19 242	0	19 242	3 964 349	0	15 425 797	19 390 146	124.58						
1 740	0	1	19 104	0	19 104	3 983 453	0	15 425 797	19 409 250	124.64						
1 798	0	1	19 242	0	19 242	4 002 695	0	15 425 797	19 428 492	124.69						
109156																
1 798	0	1	19 242	0	19 242	4 021 937	0	15 425 797	19 447 734	124.75						
1 624	0	1	18 828	0	18 828	4 040 765	0	15 425 797	19 466 562	124.81						
1 798	0	1	19 242	0	19 242	4 060 007	0	15 425 797	19 485 804	124.86						
1 740	0	1	19 104	0	19 104	4 079 110	0	15 425 797	19 504 907	124.92						
1 798	0	1	19 242	0	19 242	4 098 352	0	15 425 797	19 524 149	124.97						
51 527	0	1	119 736	0	119 736	4 218 088	0	15 425 797	19 643 885	125.32						
6 777	0	1	29 305	0	29 305	4 247 393	0	15 425 797	19 673 190	125.40						
9 867	0	1	35 551	0	35 551	4 282 944	0	15 425 797	19 708 741	125.51						
26 891	0	1	69 940	0	69 940	4 352 884	0	15 425 797	19 778 681	125.70						
1 798	0	1	19 242	0	19 242	4 372 126	0	15 425 797	19 797 923	125.76						
1 740	0	1	19 104	0	19 104	4 391 230	0	15 425 797	19 817 027	125.81						
1 798	0	1	19 242	0	19 242	4 410 472	0	15 425 797	19 836 269	125.87						
109156																
1 798	0	1	19 242	0	19 242	4 429 714	0	15 425 797	19 855 511	125.92						
1 624	0	1	18 828	0	18 828	4 448 542	0	15 425 797	19 874 339	125.98						
1 798	0	1	19 242	0	19 242	4 467 784	0	15 425 797	19 893 581	126.03						
1 740	0	1	19 104	0	19 104	4 486 888	0	15 425 797	19 912 685	126.08						
1 798	0	1	19 242	0	19 242	4 506 130	0	15 425 797	19 931 927	126.14						
51 527	0	1	119 736	0	119 736	4 625 865	0	15 425 797	20 051 662	126.47						
6 777	0	1	29 305	0	29 305	4 655 170	0	15 425 797	20 080 967	126.55						
9 867	0	1	59 164	0	59 164	4 714 334	0	15 425 797	20 140 131	126.71						
26 891	0	1	60 156	0	60 156	4 774 490	0	15 425 797	20 200 287	126.88						
1 798	0	1	20 929	0	20 929	4 795 419	0	15 425 797	20 221 216	126.93						
1 740	0	1	21 053	0	21 053	4 816 472	0	15 425 797	20 242 269	126.99						
1 798	0	1	20 929	0	20 929	4 837 401	0	15 425 797	20 263 198	127.05						
109156																
1 798	0	1	20 929	0	20 929	4 858 330	0	15 425 797	20 284 127	127.10						
1 624	0	1	20 937	0	20 937	4 879 267	0	15 425 797	20 305 064	127.16						
1 798	0	1	20 929	0	20 929	4 900 196	0	15 425 797	20 325 993	127.22						
1 740	0	1	20 871	0	20 871	4 921 067	0	15 425 797	20 346 864	127.27						
1 798	0	1	21 111	0	21 111	4 942 178	0	15 425 797	20 367 975	127.33						
51 527	0	1	112 243	0	112 243	5 054 421	0	15 425 797	20 480 218	127.63						
6 777	0	1	37 019	0	37 019	5 091 440	0	15 425 797	20 517 237	127.73						
9 867	0	1	59 164	0	59 164	5 150 604	0	15 425 797	20 576 401	127.89						
26 891	0	1	60 156	0	60 156	5 210 760	0	15 425 797	20 636 557	128.02						
1 798	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 740	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 798	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
109156																
1 798	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 624	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 798	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 740	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 798	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
51 527	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
6 777	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
9 867	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
26 891	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 798	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 740	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						

1 798	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
109156																
1 798	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 624	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 798	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 740	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 798	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
51 527	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
6 777	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
9 867	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
26 891	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 798	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 740	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 798	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
109156																
1 798	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 624	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 798	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 740	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 798	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
51 527	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
6 777	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
9 867	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
26 891	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 798	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 740	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 798	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
109156																
1 798	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 624	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 798	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 740	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
1 798	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
51 527	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
6 777	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
9 867	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
26 891	1	0	0	0	0	5 210 760	0	15 425 797	20 636 557	128.02						
						5 210 760	0	15 425 797	20 636 557	128.02						
						5 210 760	0	15 425 797	20 636 557	128.02						
						5 210 760	0	15 425 797	20 636 557	128.02						
103820																

Goose Pit														Goose Pit
Goose Inflow (m^3)	Enter 1 for the discharge location				Total Pond Volume (Ice + Water) (m^3)	Tailings Deposited (t)	Cummulative Tailings Deposited (m^3)	Cummulative Volume (m^3)	Volume Available Remaining (m^3)	Water Elevation (m)	Planned Tailing Elevation (m)	Modeled Tailing Elevation (m)	Surveyed Water Elevation (m)	
	NC	SC	Goose	Portage										
x														
344 994														
307 769														
383 800														
375 300														
464 019														
89 963														
327 114														
389 350														
199 289														
253 500														
27 218			1		3 357 995	0	1 773 921	5 131 916	2 742 356	113.22	89.87		113.14	
24 584			1		3 382 579	0	1 773 921	5 156 500	2 717 772	113.43	89.87		113.24	
27 218			1		3 409 797	0	1 773 921	5 183 718	2 690 554	113.65	89.87		113.35	
26 340			1		3 436 137	0	1 773 921	5 210 058	2 664 214	113.87	89.87		113.44	
27 218			1		3 463 355	0	1 773 921	5 237 276	2 636 996	114.09	89.87		113.96	
65 316			1		3 528 671	0	1 773 921	5 302 592	2 571 680	114.62	89.87		114.26	
31 116			1		3 559 787	0	1 773 921	5 333 708	2 540 564	114.87	89.87		114.41	
33 535			1		3 593 322	0	1 773 921	5 367 243	2 507 029	115.15	89.87		114.58	
46 029			1		3 751 874	0	1 773 921	5 525 795	2 348 477	116.42	89.87		115.42	
27 218			1		4 042 334	0	1 773 921	5 816 255	2 058 017	118.71	89.87			
26 340			1		3 997 728	0	1 773 921	5 771 649	2 102 623	118.36	89.87			
27 218			1		4 024 946	0	1 773 921	5 798 867	2 075 405	118.58	89.87			
389 350														
27 218			1		4 052 164	0	1 773 921	5 826 085	2 048 187	118.79	89.87			
24 584			1		4 076 748	0	1 773 921	5 850 669	2 023 603	118.98	89.87			
27 218			1		4 103 966	0	1 773 921	5 877 887	1 996 385	119.19	89.87			
26 340			1		4 130 306	0	1 773 921	5 904 227	1 970 045	119.39	89.87			
27 218			1		4 157 524	0	1 773 921	5 931 445	1 942 827	119.60	89.87			
65 316			1		4 222 840	0	1 773 921	5 996 761	1 877 511	120.10	89.87			
31 116			1		4 253 956	0	1 773 921	6 027 877	1 846 395	120.33	89.87			
33 535			1		4 287 491	0	1 773 921	6 061 412	1 812 860	120.59	89.87			
46 029			1		4 333 520	0	1 773 921	6 107 441	1 766 831	120.93	89.87			
27 218			1		4 360 738	0	1 773 921	6 134 659	1 739 613	121.13	89.87			

26 340			1		4 387 078	0	1 773 921	6 160 999	1 713 273	121.33	89.87		
27 218			1		4 414 296	0	1 773 921	6 188 217	1 686 055	121.53	89.87		
389 350													
27 218			1		4 441 514	0	1 773 921	6 215 435	1 658 837	121.73	89.87		
24 584			1		4 466 098	0	1 773 921	6 240 019	1 634 253	121.91	89.87		
27 218			1		4 493 316	0	1 773 921	6 267 237	1 607 035	122.10	89.87		
26 340			1		4 519 656	0	1 773 921	6 293 577	1 580 695	122.29	89.87		
27 218			1		4 546 874	0	1 773 921	6 320 795	1 553 477	122.49	89.87		
65 316			1		4 612 190	0	1 773 921	6 386 111	1 488 161	122.95	89.87		
31 116			1		4 643 306	0	1 773 921	6 417 227	1 457 045	123.17	89.87		
33 535			1		4 676 841	0	1 773 921	6 450 762	1 423 510	123.41	89.87		
46 029			1		4 722 870	0	1 773 921	6 496 791	1 377 481	123.73	89.87		
27 218			1		4 750 088	0	1 773 921	6 524 009	1 350 263	123.91	89.87		
26 340			1		4 776 428	0	1 773 921	6 550 349	1 323 923	124.09	89.87		
27 218			1		4 803 646	0	1 773 921	6 577 567	1 296 705	124.28	89.87		
389 350													
27 218			1		4 830 864	0	1 773 921	6 604 785	1 269 487	124.47	89.87		
24 584			1		4 855 448	0	1 773 921	6 629 369	1 244 903	124.63	89.87		
27 218			1		4 882 666	0	1 773 921	6 656 587	1 217 685	124.82	89.87		
26 340			1		4 909 006	0	1 773 921	6 682 927	1 191 345	124.99	89.87		
27 218			1		4 936 224	0	1 773 921	6 710 145	1 164 127	125.17	89.87		
65 316			1		5 001 540	0	1 773 921	6 775 461	1 098 811	125.60	89.87		
31 116			1		5 032 656	0	1 773 921	6 806 577	1 067 695	125.79	89.87		
33 535			1		5 066 191	0	1 773 921	6 840 112	1 034 160	126.00	89.87		
46 029			1		5 112 220	0	1 773 921	6 886 141	988 131	126.27	89.87		
27 218			1		5 139 438	0	1 773 921	6 913 359	960 913	126.42	89.87		
26 340			1		5 165 778	0	1 773 921	6 939 699	934 573	126.57	89.87		
27 218			1		5 192 996	0	1 773 921	6 966 917	907 355	126.73	89.87		
389 350													
27 218			1		5 220 214	0	1 773 921	6 994 135	880 137	126.88	89.87		
24 584			1		5 244 798	0	1 773 921	7 018 719	855 553	127.01	89.87		
27 218			1		5 272 016	0	1 773 921	7 045 937	828 335	127.16	89.87		
26 340			1		5 298 356	0	1 773 921	7 072 277	801 995	127.30	89.87		
27 218			1		5 325 574	0	1 773 921	7 099 495	774 777	127.44	89.87		
65 316			1		5 390 890	0	1 773 921	7 164 811	709 461	127.78	89.87		
31 116			1		5 422 006	0	1 773 921	7 195 927	678 345	127.94	89.87		
33 535			1		5 455 541	0	1 773 921	7 229 462	644 810	128.11	89.87		
46 029			1		5 501 570	0	1 773 921	7 275 491	598 781	128.33	89.87		
27 218			1		5 528 788	0	1 773 921	7 302 709	571 563	128.47	89.87		
26 340			1		5 555 128	0	1 773 921	7 329 049	545 223	128.59	89.87		

27 218			1		5 582 346	0	1 773 921	7 356 267	518 005	128.72	89.87		
389 350													
27 218			1		5 609 564	0	1 773 921	7 383 485	490 787	128.85			
24 584			1		5 634 148	0	1 773 921	7 408 069	466 203	128.96			
27 218			1		5 661 366	0	1 773 921	7 435 287	438 985	129.09			
26 340			1		5 687 706	0	1 773 921	7 461 627	412 645	129.21			
27 218			1		5 714 924	0	1 773 921	7 488 845	385 427	129.33			
65 316			1		5 780 240	0	1 773 921	7 554 161	320 111	129.63			
31 116			1		5 683 983	0	1 773 921	7 457 904	416 368	129.19			
33 535			1		5 721 335	0	1 773 921	7 495 256	379 016	129.36			
46 029			1		5 775 117	0	1 773 921	7 549 038	325 234	129.60			
27 218			1		5 749 083	0	1 773 921	7 523 004	351 268	129.49			
26 340			1		5 688 159	0	1 773 921	7 462 080	412 192	129.21			
27 218			1		5 625 204	0	1 773 921	7 399 125	475 147	128.92			
389 350													
27 218			1		5 546 476	0	1 773 921	7 320 397	553 875	128.55			
24 584			1		5 475 368	0	1 773 921	7 249 289	624 983	128.20			
27 218			1		5 396 640	0	1 773 921	7 170 561	703 711	127.81			
26 340			1		5 320 452	0	1 773 921	7 094 373	779 899	127.41			
27 218			1		5 254 267	0	1 773 921	7 028 188	846 084	127.06			
65 316			1		5 585 733	0	1 773 921	7 359 654	514 618	128.74			
31 116			1		5 710 167	0	1 773 921	7 484 088	390 184	129.31			
33 535			1		5 731 746	0	1 773 921	7 505 667	368 605	129.41			
46 029			1		5 770 263	0	1 773 921	7 544 184	330 088	129.58			
27 218			1		5 728 457	0	1 773 921	7 502 378	371 894	129.39			
26 340			1		5 652 269	0	1 773 921	7 426 190	448 082	129.05			
27 218			1		5 573 541	0	1 773 921	7 347 462	526 810	128.68			
389 350													
19 131			1		5 523 926	0	1 773 921	7 297 847	576 425	128.44			
19 313			1		5 481 147	0	1 773 921	7 255 068	619 204	128.23			
19 131			1		5 431 532	0	1 773 921	7 205 453	668 819	127.99			
19 131			1		5 384 135	0	1 773 921	7 158 056	716 216	127.74			
19 313			1		5 337 622	0	1 773 921	7 111 543	762 729	127.51			
60 716			1		5 556 107	0	1 773 921	7 330 028	544 244	128.60			
30 242			1		5 662 982	0	1 773 921	7 436 903	437 369	129.10			
49 297			1		5 737 523	0	1 773 921	7 511 444	362 828	129.44			
33 265			1		5 756 906	0	1 773 921	7 530 827	343 445	129.52			
19 131			1		5 710 025	0	1 773 921	7 483 946	390 326	129.31			
19 313			1		5 662 810	0	1 773 921	7 436 731	437 541	129.10			
19 131			1		5 613 195	0	1 773 921	7 387 116	487 156	128.87			

327 114												
19 131			1		5 563 580	0	1 773 921	7 337 501	536 771	128.63		
19 313			1		5 520 801	0	1 773 921	7 294 722	579 550	128.43		
19 131			1		5 471 186	0	1 773 921	7 245 107	629 165	128.18		
19 131			1		5 423 789	0	1 773 921	7 197 710	676 562	127.95		
19 313			1		5 377 276	0	1 773 921	7 151 197	723 075	127.71		
60 716			1		5 595 761	0	1 773 921	7 369 682	504 590	128.78		
30 242			1		5 702 636	0	1 773 921	7 476 557	397 715	129.28		
49 297			1		5 777 177	0	1 773 921	7 551 098	323 174	129.61		
33 265			1		5 796 560	0	1 773 921	7 570 481	303 791	129.70		
19 131			1		5 749 679	0	1 773 921	7 523 600	350 672	129.49		
19 313			1		5 702 464	0	1 773 921	7 476 385	397 887	129.28		
19 131			1		5 652 849	0	1 773 921	7 426 770	447 502	129.05		
327 114												
19 131			1		5 603 234	0	1 773 921	7 377 155	497 117	128.82		
19 313			1		5 558 237	0	1 773 921	7 332 158	542 114	128.61		
19 131			1		5 508 622	0	1 773 921	7 282 543	591 729	128.37		
19 131			1		5 461 225	0	1 773 921	7 235 146	639 126	128.13		
19 313			1		5 414 713	0	1 773 921	7 188 634	685 638	127.90		
60 716			1		5 633 198	0	1 773 921	7 407 119	467 153	128.96		
30 242			1		5 740 072	0	1 773 921	7 513 993	360 279	129.45		
49 297			1		5 814 613	0	1 773 921	7 588 534	285 738	129.78		
33 265			1		5 833 997	0	1 773 921	7 607 918	266 354	129.86		
19 131			1		5 787 115	0	1 773 921	7 561 036	313 236	129.66		
19 313			1		5 739 900	0	1 773 921	7 513 821	360 451	129.45		
19 131			1		5 690 285	0	1 773 921	7 464 206	410 066	129.22		
327 114												
19 131			1		5 640 671	0	1 773 921	7 414 592	459 680	129.00		
19 313			1		5 597 891	0	1 773 921	7 371 812	502 460	128.79		
19 131			1		5 451 556	0	1 773 921	7 225 477	648 795	128.09		
19 131			1		5 310 559	0	1 773 921	7 084 480	789 792	127.36		
19 313			1		5 164 407	0	1 773 921	6 938 328	935 944	126.57		
60 716			1		5 064 995	0	1 773 921	6 838 916	1 035 356	125.99		
30 242			1		4 929 771	0	1 773 921	6 703 692	1 170 580	125.13		
49 297			1		4 813 603	0	1 773 921	6 587 524	1 286 748	124.35		
33 265			1		4 686 740	0	1 773 921	6 460 661	1 413 611	123.48		
19 131			1		4 540 405	0	1 773 921	6 314 326	1 559 946	122.44		
19 313			1		4 399 590	0	1 773 921	6 173 511	1 700 761	121.42		
19 131			1		4 253 255	0	1 773 921	6 027 176	1 847 096	120.33		
327 114												

19 131			1		4 092 041	0	1 773 921	5 865 962	2 008 310	119.10			
19 313			1		3 948 461	0	1 773 921	5 722 382	2 151 890	117.98			
19 131			1		3 787 246	0	1 773 921	5 561 167	2 313 105	116.70			
19 131			1		3 631 849	0	1 773 921	5 405 770	2 468 502	115.46			
19 313			1		3 470 817	0	1 773 921	5 244 738	2 629 534	114.15			
60 716			1		3 357 005	0	1 773 921	5 130 926	2 743 346	113.22			
30 242			1		3 206 901	0	1 773 921	4 980 822	2 893 450	111.97			
49 297			1		3 075 853	0	1 773 921	4 849 774	3 024 498	110.87			
33 265			1		2 934 590	0	1 773 921	4 708 511	3 165 761	109.64			
19 131			1		2 773 375	0	1 773 921	4 547 296	3 326 976	108.14			
19 313			1		2 618 160	0	1 773 921	4 392 081	3 482 191	106.65			
19 131			1		2 456 945	0	1 773 921	4 230 866	3 643 406	105.07			
327 114													
19 131			1		2 295 731	0	1 773 921	4 069 652	3 804 620	103.46			
19 313			1		2 152 151	0	1 773 921	3 926 072	3 948 200	102.01			
19 131			1		1 990 936	0	1 773 921	3 764 857	4 109 415	100.35			
19 131			1		1 835 539	0	1 773 921	3 609 460	4 264 812	98.72			
19 313			1		1 674 507	0	1 773 921	3 448 428	4 425 844	97.01			
60 716			1		1 560 695	0	1 773 921	3 334 616	4 539 656	95.77			
30 242			1		1 410 591	0	1 773 921	3 184 512	4 689 760	94.12			
49 297			1		1 279 543	0	1 773 921	3 053 464	4 820 808	92.66			
33 265			1		1 138 280	0	1 773 921	2 912 201	4 962 071	91.04			
19 131			1		977 065	0	1 773 921	2 750 986	5 123 286	89.14			
19 313			1		821 850	0	1 773 921	2 595 771	5 278 501	87.17			
19 131			1		660 635	0	1 773 921	2 434 556	5 439 716	84.99			
327 114													
19 131			1		499 421	0	1 773 921	2 273 342	5 600 930	82.72			
19 313			1		350 023	0	1 773 921	2 123 944	5 750 328	80.55			
19 131			1		188 809	0	1 773 921	1 962 730	5 911 542	78.12			
19 131			1		33 412	0	1 773 921	1 807 333	6 066 939	75.68			
19 313			1		0	0	1 773 921	1 773 921	6 100 351	75.14			
60 716			1		60 716	0	1 773 921	1 834 637	6 039 635	76.12			
30 242			1		90 958	0	1 773 921	1 864 879	6 009 393	76.60			
49 297			1		140 255	0	1 773 921	1 914 176	5 960 096	77.37			
33 265			1		173 520	0	1 773 921	1 947 441	5 926 831	77.88			
19 131			1		192 651	0	1 773 921	1 966 572	5 907 700	78.18			
19 313			1		211 964	0	1 773 921	1 985 885	5 888 387	78.47			
19 131			1		231 095	0	1 773 921	2 005 016	5 869 256	78.76			
327 114													
19 131			1		250 226	0	1 773 921	2 024 147	5 850 125	79.05			

19 313			1		269 539	0	1 773 921	2 043 460	5 830 812	79.35		
19 131			1		288 670	0	1 773 921	2 062 591	5 811 681	79.63		
19 131			1		307 801	0	1 773 921	2 081 722	5 792 550	79.92		
19 313			1		327 114	0	1 773 921	2 101 035	5 773 237	80.21		
60 716			1		387 830	0	1 773 921	2 161 751	5 712 521	81.11		
30 242			1		418 072	0	1 773 921	2 191 993	5 682 279	81.55		
49 297			1		467 369	0	1 773 921	2 241 290	5 632 982	82.26		
33 265			1		500 634	0	1 773 921	2 274 555	5 599 717	82.74		
19 131			1		519 765	0	1 773 921	2 293 686	5 580 586	83.02		
19 313			1		539 078	0	1 773 921	2 312 999	5 561 273	83.29		
19 131			1		558 209	0	1 773 921	2 332 130	5 542 142	83.56		
327 114												
19 131			1		577 340	0	1 773 921	2 351 261	5 523 011	83.83		
19 313			1		596 653	0	1 773 921	2 370 574	5 503 698	84.10		
19 131			1		615 784	0	1 773 921	2 389 705	5 484 567	84.37		
19 131			1		634 915	0	1 773 921	2 408 836	5 465 436	84.64		
19 313			1		657 148	0	1 773 921	2 431 069	5 443 203	84.94		
60 716			1		942 161	0	1 773 921	2 716 082	5 158 190	88.72		
30 242			1		1 617 781	0	1 773 921	3 391 702	4 482 570	96.39		
49 297			1		2 261 067	0	1 773 921	4 034 988	3 839 284	103.11		
33 265			1		2 346 979	0	1 773 921	4 120 900	3 753 372	103.98		
19 131			1		2 368 843	0	1 773 921	4 142 764	3 731 508	104.20		
19 313			1		2 388 156	0	1 773 921	4 162 077	3 712 195	104.39		
19 131			1		2 407 287	0	1 773 921	4 181 208	3 693 064	104.58		
327 114												
19 131			1		2 426 418	0	1 773 921	4 200 339	3 673 933	104.77		
19 313			1		2 445 731	0	1 773 921	4 219 652	3 654 620	104.96		
19 131			1		2 464 862	0	1 773 921	4 238 783	3 635 489	105.15		
19 131			1		2 483 993	0	1 773 921	4 257 914	3 616 358	105.34		
19 313			1		2 506 226	0	1 773 921	4 280 147	3 594 125	105.56		
60 716			1		2 791 239	0	1 773 921	4 565 160	3 309 112	108.31		
30 242			1		2 966 859	0	1 773 921	4 740 780	3 133 492	109.92		
49 297			1		3 110 145	0	1 773 921	4 884 066	2 990 206	111.16		
33 265			1		3 196 057	0	1 773 921	4 969 978	2 904 294	111.88		
19 131			1		3 217 921	0	1 773 921	4 991 842	2 882 430	112.06		
19 313			1		3 237 234	0	1 773 921	5 011 155	2 863 117	112.22		
19 131			1		3 256 365	0	1 773 921	5 030 286	2 843 986	112.38		
327 114												
19 131			1		3 275 496	0	1 773 921	5 049 417	2 824 855	112.54		
19 313			1		3 294 809	0	1 773 921	5 068 730	2 805 542	112.70		

19 131			1		3 313 940	0	1 773 921	5 087 861	2 786 411	112.86			
19 131			1		3 333 071	0	1 773 921	5 106 992	2 767 280	113.02			
19 313			1		4 115 304	0	1 773 921	5 889 225	1 985 047	119.28			
60 716			1		5 160 317	0	1 773 921	6 934 238	940 034	126.54			
30 242			1		6 095 937	0	1 773 921	7 869 858	4 414	130.98			
49 297				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
33 265				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
19 313				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
327 114													
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
19 313				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
19 313				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
60 716				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
30 242				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
49 297				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
33 265				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
19 313				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
327 114													
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
19 313				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
19 313				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
60 716				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
30 242				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
49 297				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
33 265				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
19 313				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
327 114													
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
19 313				1	6 100 351	0	1 773 921	7 874 272	0	131.00			
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00			

19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
19 313				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
60 716				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
30 242				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
49 297				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
33 265				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
19 313				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
327 114												
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
19 313				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
19 313				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
60 716				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
30 242				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
49 297				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
33 265				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
19 313				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
327 114												
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
19 313				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
19 131				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
19 313				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
60 716				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
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49 297				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
33 265				1	6 100 351	0	1 773 921	7 874 272	0	131.00		
					6 100 351	0	1 773 921	7 874 272	0	131.00		
					6 100 351	0	1 773 921	7 874 272	0	131.00		
					6 100 351	0	1 773 921	7 874 272	0	131.00		
269 539												

Water Transfers																				
NC to SC (m^3)	SC to NC (m^3)	Tear Drop Lake to SC (m^3)	Tear Drop Lake to NC (m^3)	Tear Drop Lake to Goose (m^3)	Tear Drop Lake to CD Seepage (m^3)	SC to Pit A (m^3)	Goose to Pit A (m^3)	Goose to Pit E (m^3)	Landfill to SC (m3)	Central Dike D/S pond to Pit E (m^3)	Goose to SC (m^3)	China sump to SC (m^3)	SD1-2, NC-A-B-C-D-E to NC (m^3)	Waste rock seep (ST16) to NC (m^3)	Waste rock seep (ST16) to Pit A (m^3)	SD3-4-5 to SC (m^3)	Central Dike D/S pond to Pit A (m^3)	Central Dike D/S pond to SC (m^3)	SC to Central Dike D/S pond (m^3)	SC Vol correction (m3)
						x				x							x			
0	**507 144**	**0**	**0**	**0**		**0**					**0**									
0	**0**	**10 342**	**26 242**	**0**		**0**					**0**	**0**								
1 085 614	**0**	**53 394**	**0**	**0**		**0**					**-50 431**	**171 214**	**15 569**	**19 236**				**2 904 219**	**2 572 663**	**242 577**
342 538	**0**	**46 338**	**0**	**0**		**0**					**0**	**120 052**	**23 586**	**26 340**		**34 927**				**385 353**
238 762	**0**	**71 433**	**0**	**32 461**		**0**					**-332 177**	**193 556**	**16 250**	**50 553**		**45 638**		**4 366 869**	**4 623 032**	**-256 163**
534 054	**0**	**70 152**	**0**	**0**		**0**					**0**	**113 643**	**46 745**	**34 550**		**28 163**				
848 851	**0**	**61 489**	**0**	**0**	**20 492**	**0**	**615 600**	**0**		**0**	**-358 156**	**128 037**	**103 916**	**68 893**		**73 769**		**754 347**	**2 294 063**	**-171 040**
258 123	**0**	**0**	**0**	**0**	**0**	**253 452**	**1 376 334**	**0**	**0**	**237 631**	**0**	**150 783**	**12 087**	**14 246**		**19 042**	**447 910**	**54 734**	**121 160**	**0**
463 598	**0**	**0**	**0**	**0**	**0**	**294 781**	**416 907**	**0**		**33 024**	**0**	**270 043**	**19 713**	**25 391**		**36 161**	**857 194**	**0**	**0**	**0**
499 627	**0**	**0**	**0**	**0**	**22 907**	**267 309**	**0**	**0**	**28 486**	**0**	**0**	**66 699**	**73 000**	**61 579**		**16 528**	**510 579**	**13 852**	**0**	**0**
0																	*14 029*			
0																	*13 564*			
0																	*13 920*			
0																	*11 031*			
194 582		*11 369*				**124 030**			4 614			*129 044*	54 298		*44 873*	*44 346*	*112 254*			
56 788					*16 380*	**91 823**			*11 322*			*42 185*	45 180		*29 845*	*26 717*	*112 689*			
4 934									*15 962*			*6 840*	16 628		*8 332*	*25 735*	*67 718*			
26 743					*20 492*				*31 511*			*0*	23 136		*10 919*	*27 324*	*59 453*			
35 476						**251 809**	**-112 523**						6 596		*6 598*	*15 342*	*109 331*			
9 683	*0*						**-263 242**		0	0		*7 759*	*4 382*		*2 563*	*4 516*	*91 496*			
0	*0*						**70 946**		0	0			*0*		*0*	*0*	*47 267*			
0	*0*					**1 251 004**	**0**		0	0			*0*		*0*	*0*	*24 295*			
328 206	**0**	**11 369**	**0**	**0**	**36 872**	**1 718 666**	**-304 819**	**0**	**63 409**	**0**	**0**	**185 828**	**150 220**		**103 130**	**143 980**	**677 047**	**0**	**0**	**0**
						0	**0**	**0**				0	0		0	0	25 916			
						0	**0**	**0**				0	0		0	0	18 196			
						0	**0**	**0**				0	0		0	0	23 363			
						0	**0**	**0**				0	0		0	0	21 659			
					33 280	11 038	**0**	**0**				9 623	1 505		0	1 415	45 979			
					16 380	278 817	**0**	**0**				144 381	12 035		15 328	91 527	127 073			
						163 649	**0**	**0**				53 885	14 820		24 265	98 299	69 305			
352 757					20 492	388 217	**0**	**0**				0	2 415		5 942	4 522	139 742			
						63 929	**0**	**0**				42 370	4 636		5 362	6 975	88 756			
219 057						253 519	**0**	**0**				34 188	2 459		2 459	274	91 496			
						0	**0**	**0**				0	0		0	0	47 267			
						0	**0**	**0**				0	0		0	0	24 295			
571 814	**0**	**0**	**0**	**0**	**70 152**	**1 159 168**	**0**	**0**		**0**	**0**	**284 447**	**37 870**		**53 356**	**203 012**	**723 047**	**0**	**0**	**0**
						0	**0**	**0**				0	0		0	0	25 916			
						0	**0**	**0**				0	0		0	0	18 196			
						0	**0**	**0**				0	0		0	0	23 363			
						0	**0**	**0**				0	0		0	0	21 659			
					33 280	11 038	**0**	**0**				9 623	1 505		0	1 415	45 979			
					16 380	278 817	**0**	**0**				144 381	12 035		15 328	91 527	127 073			
						163 649	**0**	**0**				53 885	14 820		24 265	98 299	69 305			
					20 492	224 660	**0**	**0**				0	2 415		5 942	4 522	139 742			
						63 929	**0**	**0**				42 370	4 636		5 362	6 975	88 756			
219 057						253 519	**0**	**0**				34 188	2 459		2 459	274	91 496			
						0	**0**	**0**				0	0		0	0	47 267			
						0	**0**	**0**				0	0		0	0	24 295			
219 057	**0**	**0**	**0**	**0**	**70 152**	**995 612**	**0**	**0**		**0**	**0**	**284 447**	**37 870**		**53 356**	**203 012**	**723 047**	**0**	**0**	**0**
						0	**0**	**0**				0	0		0	0	25 916			
						0	**0**	**0**				0	0		0	0	18 196			
						0	**0**	**0**				0	0		0	0	23 363			
						0	**0**	**0**				0	0		0	0	21 659			
					33 280	11 038	**0**	**0**				9 623	1 505		0	1 415	45 979			
					16 380	278 817	**0**	**0**				144 381	12 035		15 328	91 527	127 073			
						163 649	**0**	**0**				53 885	14 820		24 265	98 299	69 305			

					20 492	35 460	0	0				0	2 415		5 942	4 522	139 742			
						63 929	0	0				42 370	4 636		5 362	6 975	88 756			
219 057						253 519	0	0				34 188	2 459		2 459	274	91 496			
						0	0	0				0	0		0	0	47 267			
						0	0	0				0	0		0	0	24 295			
219 057	**0**	**0**	**0**	**0**	**70 152**	**806 412**	**0**	**0**		**0**	**0**	**284 447**	**37 870**		**53 356**	**203 012**		**0**	**0**	**0**
						0	0	0				0	0		0	0	25 916			
						0	0	0				0	0		0	0	18 196			
						0	0	0				0	0		0	0	23 363			
						0	0	0				0	0		0	0	21 659			
					33 280	11 038	0	0				9 623	1 505		0	1 415	45 979			
					16 380	278 817	0	0				144 381	12 035		15 328	91 527	127 073			
						163 649	0	0				53 885	14 820		24 265	98 299	69 305			
					20 492	35 460	0	0				0	2 415		5 942	4 522	139 742			
						63 929	0	0				42 370	4 636		5 362	6 975	88 756			
315 449						349 911	0	0				34 188	2 459		2 459	274	91 496			
						0	0	0				0	0		0	0	47 267			
						0	0	0				0	0		0	0	24 295			
315 449	**0**	**0**	**0**	**0**	**70 152**	**902 804**	**0**	**0**		**0**	**0**	**284 447**	**37 870**		**53 356**	**203 012**		**0**	**0**	**0**
0						0	0					0	0		0	0	25 916			
0						0	0					0	0		0	0	18 196			
0						0	0					0	0		0	0	23 363			
0						0	0					0	0		0	0	21 659			
1 505					33 280	12 543	0					9 623	1 505		0	1 415	45 979			
89 861					16 380	368 678	0					144 381	12 035		15 328	91 527	127 073			
35 614						199 263	0					53 885	14 820		24 265	98 299	69 305			
58 529					20 492	0	0				-93 989	0	2 415		5 942	4 522	139 742			
31 088						0	0				-95 017	42 370	4 636		5 362	6 975	88 756			
2 459						0	0				-36 921	34 188	2 459		2 459	274	91 496			
0						0	0				0	0	0		0	0	47 267			
0						0	0				0	0	0		0	0	24 295			
219 057	**0**	**0**	**0**	**0**	**70 152**	**580 484**	**0**	**0**	**0**	**0**	**-225 927**	**284 447**	**37 870**	**0**	**53 356**	**203 012**	**723 047**	**0**	**0**	**0**
0						0	0					0	0		0	0	25 916			
0						0	0					0	0		0	0	18 196			
0						0	0					0	0		0	0	23 363			
0						0	0					0	0		0	0	21 659			
1 505					33 280	0	0				-12 543	9 623	1 505		0	1 415	45 979			
89 861					16 380	0	0				-368 678	144 381	12 035		15 328	91 527	127 073			
35 614						0	0				-199 263	53 885	14 820		24 265	98 299	69 305			
58 529					20 492	0	0				-93 989	0	2 415		5 942	4 522	139 742			
31 088						0	0				-95 017	42 370	4 636		5 362	6 975	88 756			
2 459						0	0				-36 921	34 188	2 459		2 459	274	91 496			
0						0	0				0	0	0		0	0	47 267			
0						0	0				0	0	0		0	0	24 295			
219 057	**0**	**0**	**0**	**0**	**70 152**	**0**	**0**	**0**		**0**	**-806 411**	**284 447**	**37 870**		**53 356**	**203 012**		**0**	**0**	**0**
0						0	0						0		0	0	25 916			
0						0	0						0		0	0	18 196			
0						0	0						0		0	0	23 363			
0						0	0						0		0	0	21 659			
1 505					33 280	0	0				-2 920		1 505		0	1 415	45 979			
89 861					16 380	0	0				-224 297		12 035		15 328	91 527	127 073			
35 614						0	0				-145 378		14 820		24 265	98 299	69 305			
58 529					20 492	0	0				-93 989		2 415		5 942	4 522	139 742			
31 088						0	0				-52 647		4 636		5 362	6 975	88 756			
2 459						0	0				-2 733		2 459		2 459	274	91 496			
0						0	0				0		0		0	0	47 267			
0						0	0				0		0		0	0	24 295			
219 057	**0**	**0**	**0**	**0**	**70 152**	**0**	**0**	**0**		**0**	**-521 964**	**0**	**37 870**		**53 356**	**203 012**		**0**	**0**	**0**
0						0	0	0					0		0	0	25 916			
0						0	0	0					0		0	0	18 196			
0						0	0	0					0		0	0	23 363			
0						0	0	0					0		0	0	21 659			
1 505					33 280	0	0	0			-2 920		1 505		0	1 415	45 979			

89 861					16 380	0	**0**	**0**			-224 297		12 035		15 328	91 527	127 073			
35 614						0	**0**	**0**			-145 378		14 820		24 265	98 299	69 305			
58 529					20 492	0	**0**	**0**			-93 989		2 415		5 942	4 522	139 742			
31 088						0	**0**	**0**			-52 647		4 636		5 362	6 975	88 756			
2 459						0	**0**	**0**			-2 733		2 459		2 459	274	91 496			
0						0	**0**	**0**			0		0		0	0	47 267			
0						0	**0**	**0**			0		0		0	0	24 295			
219 057	**0**	**0**	**0**	**0**	**70 152**	**0**	**0**	**0**		**0**	**-521 964**	**0**	**37 870**		**53 356**	**203 012**		**0**	**0**	**0**
0						0	**0**	**0**					0		0	0	25 916			
0						0	**0**	**0**					0		0	0	18 196			
0						0	**0**	**0**					0		0	0	23 363			
0						0	**0**	**0**					0		0	0	21 659			
1 505					33 280	0	**0**	**0**			-2 920		1 505		0	1 415	45 979			
89 861					16 380	0	**0**	**0**			-224 297		12 035		15 328	91 527	127 073			
35 614						0	**0**	**0**			-145 378		14 820		24 265	98 299	69 305			
58 529					20 492	0	**0**	**0**			-93 989		2 415		5 942	4 522	139 742			
31 088						0	**0**	**0**			-52 647		4 636		5 362	6 975	88 756			
2 459						0	**0**	**0**			-2 733		2 459		2 459	274	91 496			
0						0	**0**	**0**			0		0		0	0	47 267			
0						0	**0**	**0**			0		0		0	0	24 295			
219 057	**0**	**0**	**0**	**0**	**70 152**	**0**	**0**	**0**		**0**	**-521 964**	**0**	**37 870**		**53 356**	**203 012**		**0**	**0**	**0**
0						0	**0**	**0**					0		0	0	25 916			
0						0	**0**	**0**					0		0	0	18 196			
0						0	**0**	**0**					0		0	0	23 363			
0						0	**0**	**0**					0		0	0	21 659			
1 505					33 280	0	**0**	**2 920**			-2 920		1 505		0	1 415	45 979			
89 861					16 380	0	**0**	**224 297**			-224 297		12 035		15 328	91 527	127 073			
35 614						0	**0**	**145 378**			-145 378		14 820		24 265	98 299	69 305			
58 529					20 492	0	**0**	**93 989**			-93 989		2 415		5 942	4 522	139 742			
31 088						0	**0**	**52 647**			-52 647		4 636		5 362	6 975	88 756			
2 459						0	**0**	**2 733**			-2 733		2 459		2 459	274	91 496			
0						0	**0**	**0**			0		0		0	0	47 267			
0						0	**0**	**0**			0		0		0	0	24 295			
219 057	**0**	**0**	**0**	**0**	**70 152**	**0**	**0**	**521 964**		**0**	**-521 964**	**0**	**37 870**		**53 356**	**203 012**		**0**	**0**	**0**
0						0	**0**	**0**					0		0	0	25 916			
0						0	**0**	**0**					0		0	0	18 196			
0						0	**0**	**0**					0		0	0	23 363			
0						0	**0**	**0**					0		0	0	21 659			
1 505					33 280	0	**0**	**2 920**			-2 920		1 505		0	1 415	45 979			
89 861					16 380	0	**0**	**224 297**			-224 297		12 035		15 328	91 527	127 073			
35 614						0	**0**	**145 378**			-145 378		14 820		24 265	98 299	69 305			
58 529					20 492	0	**0**	**93 989**			-93 989		2 415		5 942	4 522	139 742			
31 088						0	**0**	**52 647**			-52 647		4 636		5 362	6 975	88 756			
2 459						0	**0**	**2 733**			-2 733		2 459		2 459	274	91 496			
0						0	**0**	**0**			0		0		0	0	47 267			
0						0	**0**	**0**			0		0		0	0	24 295			
219 057	**0**	**0**	**0**	**0**	**70 152**	**0**	**0**	**521 964**		**0**	**-521 964**	**0**	**37 870**		**53 356**	**203 012**		**0**	**0**	**0**
0						0	**0**	**0**					0		0	0	25 916			
0						0	**0**	**0**					0		0	0	18 196			
0						0	**0**	**0**					0		0	0	23 363			
0						0	**0**	**0**					0		0	0	21 659			
1 505					33 280	0	**0**	**2 920**			-2 920		1 505		0	1 415	45 979			
89 861					16 380	0	**0**	**224 297**			-224 297		12 035		15 328	91 527	127 073			
35 614						0	**0**	**145 378**			-145 378		14 820		24 265	98 299	69 305			
58 529					20 492	0	**0**	**93 989**			-93 989		2 415		5 942	4 522	139 742			
31 088						0	**0**	**52 647**			-52 647		4 636		5 362	6 975	88 756			
2 459						0	**0**	**2 733**			-2 733		2 459		2 459	274	91 496			
0						0	**0**	**0**			0		0		0	0	47 267			
0						0	**0**	**0**			0		0		0	0	24 295			
219 057	**0**	**0**	**0**	**0**	**70 152**	**0**	**0**	**521 964**		**0**	**-521 964**	**0**	**37 870**		**53 356**	**203 012**		**0**	**0**	**0**
0						0	**0**	**0**					0		0	0	25 916			
0						0	**0**	**0**					0		0	0	18 196			
0						0	**0**	**0**					0		0	0	23 363			

0						0	**0**	**0**					0		0	0	21 659			
1 505					33 280	0	**0**	**2 920**			-2 920		1 505		0	1 415	45 979			
89 861					16 380	0	**0**	**224 297**			-224 297		12 035		15 328	91 527	127 073			
35 614						0	**0**	**145 378**			-145 378		14 820		24 265	98 299	69 305			
58 529					20 492	0	**0**	**93 989**			-93 989		2 415		5 942	4 522	139 742			
31 088						0	**0**	**52 647**			-52 647		4 636		5 362	6 975	88 756			
2 459						0	**0**	**2 733**			-2 733		2 459		2 459	274	91 496			
0						0	**0**	**0**			0		0		0	0	47 267			
0						0	**0**	**0**			0		0		0	0	24 295			
219 057	**0**	**0**	**0**	**0**	**70 152**	**0**	**0**	**521 964**		**0**	**-521 964**	**0**	**37 870**		**53 356**	**203 012**		**0**	**0**	**0**
0						0	**0**	**0**					0		0	0	25 916			
0						0	**0**	**0**					0		0	0	18 196			
0						0	**0**	**0**					0		0	0	23 363			
0						0	**0**	**0**					0		0	0	21 659			
1 505					33 280	0	**0**	**2 920**			-2 920		1 505		0	1 415	45 979			
89 861					16 380	0	**0**	**224 297**			-224 297		12 035		15 328	91 527	127 073			
35 614						0	**0**	**145 378**			-145 378		14 820		24 265	98 299	69 305			
58 529					20 492	0	**0**	**93 989**			-93 989		2 415		5 942	4 522	139 742			
31 088						0	**0**	**52 647**			-52 647		4 636		5 362	6 975	88 756			
2 459						0	**0**	**2 733**			-2 733		2 459		2 459	274	91 496			
0						0	**0**	**0**			0		0		0	0	47 267			
0						0	**0**	**0**			0		0		0	0	24 295			
219 057	**0**	**0**	**0**	**0**	**70 152**	**0**	**0**	**521 964**		**0**	**-521 964**	**0**	**37 870**		**53 356**	**203 012**		**0**	**0**	**0**
0						0	**0**						0		0	0	25 916			
0						0	**0**						0		0	0	18 196			
0						0	**0**						0		0	0	23 363			
0						0	**0**						0		0	0	21 659			
1 505					33 280	0	**0**				-2 920		1 505		0	1 415	45 979			
89 861					16 380	0	**0**				-224 297		12 035		15 328	91 527	127 073			
35 614						0	**0**	**-500 000**			-145 378		14 820		24 265	98 299	69 305			
58 529					20 492	0	**0**	**-500 000**			-93 989		2 415		5 942	4 522	139 742			
31 088						0	**0**				-52 647		4 636		5 362	6 975	88 756			
2 459						0	**0**				-2 733		2 459		2 459	274	91 496			
0						0	**0**				0		0		0	0	47 267			
0						0	**0**				0		0		0	0	24 295			
181 187	**0**	**0**	**0**	**0**	**70 152**	**0**					**-521 964**									
0						0	**0**						0		0	0	25 916			
0						0	**0**						0		0	0	18 196			
0						0	**0**						0		0	0	23 363			
0						0	**0**						0		0	0	21 659			
1 505					33 280	0	**0**				-2 920		1 505		0	1 415	45 979			
89 861					16 380	0	**0**				-224 297		12 035		15 328	91 527	127 073			
35 614						0	**0**				-145 378		14 820		24 265	98 299	69 305			
58 529					20 492	0	**0**				-93 989		2 415		5 942	4 522	139 742			
31 088						0	**0**				-52 647		4 636		5 362	6 975	88 756			
2 459						0	**0**				-2 733		2 459		2 459	274	91 496			
0						0	**0**				0		0		0	0	47 267			
0						0	**0**				0		0		0	0	24 295			
181 187	**0**	**0**	**0**	**0**	**70 152**	**0**					**-521 964**									
0						0	**0**						0		0	0	25 916			
0						0	**0**						0		0	0	18 196			
0						0	**0**						0		0	0	23 363			
0						0	**0**						0		0	0	21 659			
1 505					33 280	0	**0**				-2 920		1 505		0	1 415	45 979			
89 861					16 380	0	**0**				-224 297		12 035		15 328	91 527	127 073			
35 614						0	**0**				-145 378		14 820		24 265	98 299	69 305			
58 529					20 492	93 989	**0**	**0**					2 415		5 942	4 522	139 742			
31 088						52 647	**0**	**0**					4 636		5 362	6 975	88 756			
2 459						2 733	**0**	**0**					2 459		2 459	274	91 496			
0						0	**0**	**0**					0		0	0	47 267			
0						0	**0**	**0**					0		0	0	24 295			
181 187	**0**	**0**	**0**	**0**	**70 152**	**149 369**					**-372 595**									
0						0	**0**	**0**					0		0	0	25 916			

0						0	0	0					0		0	0	18 196			
0						0	0	0					0		0	0	23 363			
0						0	0	0					0		0	0	21 659			
1 505					33 280	2 920	0	0					1 505		0	1 415	45 979			
89 861					16 380	224 297	0	0					12 035		15 328	91 527	127 073			
35 614						145 378	0	0					14 820		24 265	98 299	69 305			
58 529					20 492	93 989	0	0					2 415		5 942	4 522	139 742			
31 088						52 647	0	0					4 636		5 362	6 975	88 756			
2 459						2 733	0	0					2 459		2 459	274	91 496			
0						0	0	0					0		0	0	47 267			
0						0	0	0					0		0	0	24 295			
181 187	**0**	**0**	**0**	**0**	**70 152**	**521 964**					**0**									
0						0	0	0					0		0	0	25 916			
0						0	0	0					0		0	0	18 196			
0						0	0	0					0		0	0	23 363			
0						0	0	0					0		0	0	21 659			
1 505					33 280	2 920	0	0					1 505		0	1 415	45 979			
89 861					16 380	224 297	0	0					12 035		15 328	91 527	127 073			
35 614						145 378	0	0					14 820		24 265	98 299	69 305			
58 529					20 492	93 989	0	0					2 415		5 942	4 522	139 742			
31 088						52 647	0	0					4 636		5 362	6 975	88 756			
2 459						2 733	0	0					2 459		2 459	274	91 496			
0						0	0	0					0		0	0	47 267			
0						0	0	0					0		0	0	24 295			
181 187	**0**	**0**	**0**	**0**	**70 152**	**521 964**					**0**									
0						0	0	0					0		0	0	25 916			
0						0	0	0					0		0	0	18 196			
0						0	0	0					0		0	0	23 363			
0						0	0	0					0		0	0	21 659			
1 505					33 280	2 920	0	0					1 505		0	1 415	45 979			
89 861					16 380	224 297	0	0					12 035		15 328	91 527	127 073			
35 614						145 378	0	0					14 820		24 265	98 299	69 305			
58 529					20 492	93 989	0	0					2 415		5 942	4 522	139 742			
31 088						52 647	0	0					4 636		5 362	6 975	88 756			
2 459						2 733	0	0					2 459		2 459	274	91 496			
0						0	0	0					0		0	0	47 267			
0						0	0	0					0		0	0	24 295			
181 187	**0**	**0**	**0**	**0**	**70 152**	**521 964**					**0**									
0						0	0	0					0		0	0	25 916			
0						0	0	0					0		0	0	18 196			
0						0	0	0					0		0	0	23 363			
0						0	0	0					0		0	0	21 659			
1 505					33 280	2 920	0	0					1 505		0	1 415	45 979			
89 861					16 380	224 297	0	0					12 035		15 328	91 527	127 073			
35 614						145 378	0	0					14 820		24 265	98 299	69 305			
58 529					20 492	93 989	0	0					2 415		5 942	4 522	139 742			
31 088						52 647	0	0					4 636		5 362	6 975	88 756			
2 459						2 733	0	0					2 459		2 459	274	91 496			
0						0	0	0					0		0	0	47 267			
0						0	0	0					0		0	0	24 295			
181 187	**0**	**0**	**0**	**0**	**70 152**	**521 964**					**0**									
0						0	0	0					0		0	0	25 916			
0						0	0	0					0		0	0	18 196			
0						0	0	0					0		0	0	23 363			
0						0	0	0					0		0	0	21 659			
1 505					33 280	2 920	0	0					1 505		0	1 415	45 979			
89 861					16 380	224 297	0	0					12 035		15 328	91 527	127 073			
35 614						145 378	0	0					14 820		24 265	98 299	69 305			
58 529					20 492	93 989	0	0					2 415		5 942	4 522	139 742			
31 088						52 647	0	0					4 636		5 362	6 975	88 756			
2 459						2 733	0	0					2 459		2 459	274	91 496			
0						0	0	0					0		0	0	47 267			
0						0	0	0					0		0	0	24 295			

181 187	0	0	0	0	70 152	521 964					0									

Closure											
Pit A Treatment (m3)	Cumulative Pit A Treatment (m^3)	Pit E Treatment (m3)	Cumulative Pit E Treatment (m^3)	Goose Pit Treatment (m3)	Cumulative Goose Pit (m^3)	Cumulative Treatment (m^3)	Pit A flooding (m^3)	Pit E Flooding (m^3)	Goose Pit Flooding (m^3)	Flooding Volume (m^3)	Cumulative Portage and Goose Flooding (m^3)

	0		0		0	0				0	0	1.10	55%	55%	1.08	1.05	1.54	90%	65%	48%
	0		0		0	0				0	0	1.30	55%	55%	1.08	1.05	1.54	90%	65%	48%
	0		0		0	0				0	0	1.60	55%	55%	1.08	1.05	1.54	90%	65%	48%
	0		0		0	0				0	0	1.70	55%	55%	1.08	1.05	1.54	90%	65%	48%
	0		0		0	0				0	0	0.00	55%	55%	1.08	1.31	1.54	90%	40%	48%
	0		0		0	0				0	0	0.00	0%	55%	1.56	1.56	1.54	30%	25%	48%
	0		0		0	0				0	0	0.00	0%	55%	1.56	1.56	1.54	30%	25%	48%
	0		0		0	0				0	0	0.00	0%	55%	1.56	1.56	1.54	30%	25%	48%
	0		0		0	0				0	0	0.00	0%	55%	1.56	1.56	1.54	30%	25%	48%
	0		0		0	0				0	0	0.20	17%	55%	1.32	1.31	1.54	75%	40%	48%
	0		0		0	0				0	0	0.50	58%	55%	1.08	1.05	1.54	80%	65%	48%
	0		0		0	0				0	0	0.80	65%	55%	1.08	1.05	1.54	90%	65%	48%
	0		**0**		**0**	**0**				**0**	**0**					**1.26**				**48%**
	0	0	0		0	0				0	0	1.10	55%	55%	1.08	1.05	2.96	90%	65%	48%
	0		0		0	0				0	0	1.30	55%	55%	1.08	1.05	2.96	90%	65%	48%
	0		0		0	0				0	0	1.60	55%	55%	1.08	1.05	2.96	90%	65%	48%
	0		0		0	0				0	0	1.70	55%	55%	1.08	1.05	2.96	90%	65%	48%
	0		0		0	0				0	0	0.00	55%	55%	1.08	1.31	2.96	90%	40%	48%
	0		0		0	0				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	25%	48%
	0		0	127 373	127 373	127 373				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	25%	48%
	0		0	127 373	254 746	254 746				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	25%	48%
	0		0	123 264	378 010	378 010				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	25%	48%
	0		0	127 373	505 382	505 382				0	0	0.20	17%	55%	1.32	1.31	2.96	75%	40%	48%
	0		0	123 264	628 646	628 646				0	0	0.50	58%	55%	1.08	1.05	2.96	80%	65%	48%
	0		0	127 373	756 019	756 019				0	0	0.80	65%	55%	1.08	1.05	2.96	90%	65%	48%
0	**0**	**0**	**0**	**756 019**	**756 019**		**0**	**0**	**0**	**0**	**0**					**1.26**				**48%**
	0		0	254 746	1 010 765	1 010 765				0	0	1.10	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	230 093	1 240 858	1 240 858				0	0	1.30	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	254 746	1 495 603	1 495 603				0	0	1.60	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	246 528	1 742 131	1 742 131				0	0	1.70	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	254 746	1 996 877	1 996 877				0	0	0.00	55%	55%	1.08	1.31	2.96	90%	40%	40%
	0		0	246 528	2 243 405	2 243 405				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	254 746	2 498 150	2 498 150				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	254 746	2 752 896	2 752 896				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	246 528	2 999 424	2 999 424				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	254 746	3 254 170	3 254 170				0	0	0.20	17%	55%	1.32	1.31	2.96	75%	40%	40%
	0		0	246 528	3 500 698	3 500 698				0	0	0.50	58%	55%	1.08	1.05	2.96	80%	46%	65%
	0		0	254 746	3 755 443	3 755 443				0	0	0.80	65%	55%	1.08	1.05	2.96	90%	46%	65%
0	**0**	**0**	**0**	**2 999 424**	**3 755 443**		**0**	**0**	**0**	**0**	**0**					**1.26**				**48%**
	0		0	254 746	4 010 189	4 010 189				0	0	1.10	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	230 093	4 240 282	4 240 282				0	0	1.30	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	254 746	4 495 027	4 495 027				0	0	1.60	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	246 528	4 741 555	4 741 555				0	0	1.70	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	254 746	4 996 301	4 996 301				0	0	0.00	55%	55%	1.08	1.31	2.96	90%	40%	40%
	0		0	246 528	5 242 829	5 242 829				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	254 746	5 497 574	5 497 574				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	254 746	5 752 320	5 752 320				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	246 528	5 998 848	5 998 848				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	254 746	6 253 594	6 253 594				0	0	0.20	17%	55%	1.32	1.31	2.96	75%	40%	40%
	0		0	246 528	6 500 122	6 500 122				0	0	0.50	58%	55%	1.08	1.05	2.96	80%	46%	65%
	0		0	254 746	6 754 867	6 754 867				0	0	0.80	65%	55%	1.08	1.05	2.96	90%	46%	65%
0	**0**	**0**	**0**	**2 999 424**	**6 754 867**		**0**	**0**	**0**	**0**	**0**					**1.26**				**48%**
	0		0	254 746	7 009 613	7 009 613				0	0	1.10	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	230 093	7 239 706	7 239 706				0	0	1.30	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	254 746	7 494 451	7 494 451				0	0	1.60	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	246 528	7 740 979	7 740 979				0	0	1.70	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	254 746	7 995 725	7 995 725				0	0	0.00	55%	55%	1.08	1.31	2.96	90%	40%	40%
	0		0	246 528	8 242 253	8 242 253				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	254 746	8 496 998	8 496 998				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	254 746	8 751 744	8 751 744				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	246 528	8 998 272	8 998 272				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	254 746	9 253 018	9 253 018				0	0	0.20	17%	55%	1.32	1.31	2.96	75%	40%	40%
	0		0	246 528	9 499 546	9 499 546				0	0	0.50	58%	55%	1.08	1.05	2.96	80%	46%	65%
	0		0	254 746	9 754 291	9 754 291				0	0	0.80	65%	55%	1.08	1.05	2.96	90%	46%	65%
	0		**0**	**2 999 424**	**9 754 291**		**0**	**0**	**0**	**0**	**0**					**1.26**				**48%**
	0		0	254 746	10 009 037	10 009 037				0	0	1.10	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	238 310	10 247 347	10 247 347				0	0	1.30	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	254 746	10 502 093	10 502 093				0	0	1.60	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	246 528	10 748 621	10 748 621				0	0	1.70	55%	55%	1.08	1.05	2.96	90%	46%	65%

	0		0	254 746	11 003 366	11 003 366				0	0	0.00	55%	55%	1.08	1.31	2.96	90%	40%	40%
	0		0	246 528	11 249 894	11 249 894				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	254 746	11 504 640	11 504 640				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	254 746	11 759 386	11 759 386				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	246 528	12 005 914	12 005 914				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	254 746	12 260 659	12 260 659				0	0	0.20	17%	55%	1.32	1.31	2.96	75%	40%	40%
	0		0	246 528	12 507 187	12 507 187				0	0	0.50	58%	55%	1.08	1.05	2.96	80%	46%	65%
	0		0	254 746	12 761 933	12 761 933				0	0	0.80	65%	55%	1.08	1.05	2.96	90%	46%	65%
	0		**0**	**3 007 642**	**12 761 933**		**0**	**0**	**0**	**0**	**0**					**1.26**				**48%**
	0		0	254 746	13 016 678	13 016 678				0	0	1.10	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	230 093	13 246 771	13 246 771				0	0	1.30	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	254 746	13 501 517	13 501 517				0	0	1.60	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	246 528	13 748 045	13 748 045				0	0	1.70	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	254 746	14 002 790	14 002 790				0	0	0.00	55%	55%	1.08	1.31	2.96	90%	40%	40%
	0		0	246 528	14 249 318	14 249 318				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	254 746	14 504 064	14 504 064				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	254 746	14 758 810	14 758 810				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	246 528	15 005 338	15 005 338				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	254 746	15 260 083	15 260 083				0	0	0.20	17%	55%	1.32	1.31	2.96	75%	40%	40%
	0		0	246 528	15 506 611	15 506 611				0	0	0.50	58%	55%	1.08	1.05	2.96	80%	46%	65%
	0		0	254 746	15 761 357	15 761 357				0	0	0.80	65%	55%	1.08	1.05	2.96	90%	46%	65%
																1.26				**48%**
	0		0	254 746	16 016 102	16 016 102				0	0	1.10	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	230 093	16 246 195	16 246 195				0	0	1.30	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	254 746	16 500 941	16 500 941				0	0	1.60	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	246 528	16 747 469	16 747 469				0	0	1.70	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	254 746	17 002 214	17 002 214				0	0	0.00	55%	55%	1.08	1.31	2.96	90%	40%	40%
	0		0	246 528	17 248 742	17 248 742				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	254 746	17 503 488	17 503 488				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	254 746	17 758 234	17 758 234				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	246 528	18 004 762	18 004 762				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	254 746	18 259 507	18 259 507				0	0	0.20	17%	55%	1.32	1.31	2.96	75%	40%	40%
	0		0	246 528	18 506 035	18 506 035				0	0	0.50	58%	55%	1.08	1.05	2.96	80%	46%	65%
	0		0	254 746	18 760 781	18 760 781				0	0	0.80	65%	55%	1.08	1.05	2.96	90%	46%	65%
																1.26				**48%**
	0		0	254 746	19 015 526	19 015 526				0	0	1.10	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	230 093	19 245 619	19 245 619				0	0	1.30	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	254 746	19 500 365	19 500 365				0	0	1.60	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	246 528	19 746 893	19 746 893				0	0	1.70	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	254 746	20 001 638	20 001 638				0	0	0.00	55%	55%	1.08	1.31	2.96	90%	40%	40%
	0		0	246 528	20 248 166	20 248 166				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	254 746	20 502 912	20 502 912				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	254 746	20 757 658	20 757 658				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	246 528	21 004 186	21 004 186				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	0		0	254 746	21 258 931	21 258 931				0	0	0.20	17%	55%	1.32	1.31	2.96	75%	40%	40%
	0		0	246 528	21 505 459	21 505 459				0	0	0.50	58%	55%	1.08	1.05	2.96	80%	46%	65%
	0		0	254 746	21 760 205	21 760 205				0	0	0.80	65%	55%	1.08	1.05	2.96	90%	46%	65%
																1.26				**48%**
	0		0	254 746	22 014 950	22 014 950				0	0	1.10	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	238 310	22 253 261	22 253 261				0	0	1.30	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	254 746	22 508 006	22 508 006				0	0	1.60	55%	55%	1.08	1.05	2.96	90%	46%	65%
	0		0	246 528	22 754 534	22 754 534				0	0	1.70	55%	55%	1.08	1.05	2.96	90%	46%	65%
127 621	127 621		0	127 125	22 881 659	23 009 280				0	0	0.00	55%	55%	1.08	1.31	2.96	90%	40%	40%
246 528	374 149		0		22 881 659	23 255 808				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
254 746	628 894		0		22 881 659	23 510 554				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
254 746	883 640		0		22 881 659	23 765 299				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
246 528	1 130 168		0		22 881 659	24 011 827				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
254 746	1 384 914		0		22 881 659	24 266 573				0	0	0.20	17%	55%	1.32	1.31	2.96	75%	40%	40%
246 528	1 631 442		0		22 881 659	24 513 101				0	0	0.50	58%	55%	1.08	1.05	2.96	80%	46%	65%
254 746	1 886 187		0		22 881 659	24 767 846				0	0	0.80	65%	55%	1.08	1.05	2.96	90%	46%	65%
																1.26				**48%**
254 746	2 140 933		0		22 881 659	25 022 592				0	0	1.10	55%	55%	1.08	1.05	2.96	90%	46%	65%
230 093	2 371 026		0		22 881 659	25 252 685				0	0	1.30	55%	55%	1.08	1.05	2.96	90%	46%	65%
254 746	2 625 771		0		22 881 659	25 507 430				0	0	1.60	55%	55%	1.08	1.05	2.96	90%	46%	65%
246 528	2 872 299		0		22 881 659	25 753 958				0	0	1.70	55%	55%	1.08	1.05	2.96	90%	46%	65%
254 746	3 127 045		0		22 881 659	26 008 704				0	0	0.00	55%	55%	1.08	1.31	2.96	90%	40%	40%
246 528	3 373 573		0		22 881 659	26 255 232				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
254 746	3 628 318		0		22 881 659	26 509 978				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
254 746	3 883 064		0		22 881 659	26 764 723				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%

246 528	4 129 592		0		22 881 659	27 011 251				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
254 746	4 384 338		0		22 881 659	27 265 997				0	0	0.20	17%	55%	1.32	1.31	2.96	75%	40%	40%
246 528	4 630 866		0		22 881 659	27 512 525				0	0	0.50	58%	55%	1.08	1.05	2.96	80%	46%	65%
254 746	4 885 611		0		22 881 659	27 767 270				0	0	0.80	65%	55%	1.08	1.05	2.96	90%	46%	65%
																1.26				48%
254 746	5 140 357		0		22 881 659	28 022 016				0	0	1.10	55%	55%	1.08	1.05	2.96	90%	46%	65%
230 093	5 370 450		0		22 881 659	28 252 109				0	0	1.30	55%	55%	1.08	1.05	2.96	90%	46%	65%
254 746	5 625 195		0		22 881 659	28 506 854				0	0	1.60	55%	55%	1.08	1.05	2.96	90%	46%	65%
246 528	5 871 723		0		22 881 659	28 753 382				0	0	1.70	55%	55%	1.08	1.05	2.96	90%	46%	65%
254 746	6 126 469		0		22 881 659	29 008 128				0	0	0.00	55%	55%	1.08	1.31	2.96	90%	40%	40%
246 528	6 372 997		0		22 881 659	29 254 656				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
254 746	6 627 742		0		22 881 659	29 509 402				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
254 746	6 882 488		0		22 881 659	29 764 147				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
246 528	7 129 016		0		22 881 659	30 010 675				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
254 746	7 383 762		0		22 881 659	30 265 421				0	0	0.20	17%	55%	1.32	1.31	2.96	75%	40%	40%
246 528	7 630 290		0		22 881 659	30 511 949				0	0	0.50	58%	55%	1.08	1.05	2.96	80%	46%	65%
254 746	7 885 035		0		22 881 659	30 766 694				0	0	0.80	65%	55%	1.08	1.05	2.96	90%	46%	65%
																1.26				48%
254 746	8 139 781		0		22 881 659	31 021 440				0	0	1.10	55%	55%	1.08	1.05	2.96	90%	46%	65%
230 093	8 369 874		0		22 881 659	31 251 533				0	0	1.30	55%	55%	1.08	1.05	2.96	90%	46%	65%
254 746	8 624 619		0		22 881 659	31 506 278				0	0	1.60	55%	55%	1.08	1.05	2.96	90%	46%	65%
246 528	8 871 147		0		22 881 659	31 752 806				0	0	1.70	55%	55%	1.08	1.05	2.96	90%	46%	65%
254 746	9 125 893		0		22 881 659	32 007 552				0	0	0.00	55%	55%	1.08	1.31	2.96	90%	40%	40%
246 528	9 372 421		0		22 881 659	32 254 080				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
254 746	9 627 166		0		22 881 659	32 508 826				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
254 746	9 881 912		0		22 881 659	32 763 571				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
246 528	10 128 440		0		22 881 659	33 010 099				0	0	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
254 746	10 383 186		0		22 881 659	33 264 845				0	0	0.20	17%	55%	1.32	1.31	2.96	75%	40%	40%
246 528	10 629 714		0		22 881 659	33 511 373				0	0	0.50	58%	55%	1.08	1.05	2.96	80%	46%	65%
254 746	10 884 459		0		22 881 659	33 766 118				0	0	0.80	65%	55%	1.08	1.05	2.96	90%	46%	65%
																1.26				48%
254 746	11 139 205		0		22 881 659	34 020 864				0	0	1.10	55%	55%	1.08	1.05	2.96	90%	46%	65%
238 310	11 377 515		0		22 881 659	34 259 174				0	0	1.30	55%	55%	1.08	1.05	2.96	90%	46%	65%
254 746	11 632 261		0		22 881 659	34 513 920				0	0	1.60	55%	55%	1.08	1.05	2.96	90%	46%	65%
246 528	11 878 789		0		22 881 659	34 760 448				0	0	1.70	55%	55%	1.08	1.05	2.96	90%	46%	65%
254 746	12 133 534		0		22 881 659	35 015 194			760 000	760 000	760 000	0.00	55%	55%	1.08	1.31	2.96	90%	40%	40%
246 528	12 380 062		0		22 881 659	35 261 722			760 000	760 000	1 520 000	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
129 361	12 509 424		0		22 881 659	35 391 083			760 000	760 000	2 280 000	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083	755 586		4 414	760 000	3 040 000	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	3 451 250	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	3 862 500	0.20	17%	55%	1.32	1.31	2.96	75%	40%	40%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	4 273 750	0.50	58%	55%	1.08	1.05	2.96	80%	46%	65%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	4 685 000	0.80	65%	55%	1.08	1.05	2.96	90%	46%	65%
										4 685 000						1.26				48%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	5 096 250	1.10	55%	55%	1.08	1.05	2.96	90%	46%	65%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	5 507 500	1.30	55%	55%	1.08	1.05	2.96	90%	46%	65%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	5 918 750	1.60	55%	55%	1.08	1.05	2.96	90%	46%	65%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	6 330 000	1.70	55%	55%	1.08	1.05	2.96	90%	46%	65%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	6 741 250	0.00	55%	55%	1.08	1.31	2.96	90%	40%	40%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	7 152 500	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	7 563 750	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	7 975 000	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083	411 250	0		411 250	8 386 250	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	8 797 500	0.20	17%	55%	1.32	1.31	2.96	75%	40%	40%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	9 208 750	0.50	58%	55%	1.08	1.05	2.96	80%	46%	65%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	9 620 000	0.80	65%	55%	1.08	1.05	2.96	90%	46%	65%
										4 935 000						1.26				48%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	10 031 250	1.10	55%	55%	1.08	1.05	2.96	90%	46%	65%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	10 442 500	1.30	55%	55%	1.08	1.05	2.96	90%	46%	65%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	10 853 750	1.60	55%	55%	1.08	1.05	2.96	90%	46%	65%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	11 265 000	1.70	55%	55%	1.08	1.05	2.96	90%	46%	65%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	11 676 250	0.00	55%	55%	1.08	1.31	2.96	90%	40%	40%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	12 087 500	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	12 498 750	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083	411 250			411 250	12 910 000	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083	13			13	12 910 013	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083				0	12 910 013	0.20	17%	55%	1.32	1.31	2.96	75%	40%	40%
	12 509 424		0		22 881 659	35 391 083				0	12 910 013	0.50	58%	55%	1.08	1.05	2.96	80%	46%	65%
	12 509 424		0		22 881 659	35 391 083				0	12 910 013	0.80	65%	55%	1.08	1.05	2.96	90%	46%	65%

									3 290 013						1.26					48%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	1.10	55%	55%	1.08	1.05	2.96	90%	46%	65%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	1.30	55%	55%	1.08	1.05	2.96	90%	46%	65%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	1.60	55%	55%	1.08	1.05	2.96	90%	46%	65%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	1.70	55%	55%	1.08	1.05	2.96	90%	46%	65%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.00	55%	55%	1.08	1.31	2.96	90%	40%	40%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.20	17%	55%	1.32	1.31	2.96	75%	40%	40%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.50	58%	55%	1.08	1.05	2.96	80%	46%	65%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.80	65%	55%	1.08	1.05	2.96	90%	46%	65%
															1.26					48%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	1.10	55%	55%	1.08	1.05	2.96	90%	46%	65%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	1.30	55%	55%	1.08	1.05	2.96	90%	46%	65%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	1.60	55%	55%	1.08	1.05	2.96	90%	46%	65%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	1.70	55%	55%	1.08	1.05	2.96	90%	46%	65%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.00	55%	55%	1.08	1.31	2.96	90%	40%	40%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.20	17%	55%	1.32	1.31	2.96	75%	40%	40%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.50	58%	55%	1.08	1.05	2.96	80%	46%	65%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.80	65%	55%	1.08	1.05	2.96	90%	46%	65%
															1.26					48%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	1.10	55%	55%	1.08	1.05	2.96	90%	46%	65%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	1.30	55%	55%	1.08	1.05	2.96	90%	46%	65%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	1.60	55%	55%	1.08	1.05	2.96	90%	46%	65%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	1.70	55%	55%	1.08	1.05	2.96	90%	46%	65%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.00	55%	55%	1.08	1.31	2.96	90%	40%	40%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.00	0%	55%	1.56	1.56	2.96	30%	32%	25%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.20	17%	55%	1.32	1.31	2.96	75%	40%	40%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.50	58%	55%	1.08	1.05	2.96	80%	46%	65%
	12 509 424		0		22 881 659	35 391 083			0	12 910 013	0.80	65%	55%	1.08	1.05	2.96	90%	46%	65%
															1.26					48%

3 years monitoring

East Dike Seepage					East Dike Seepage	Vault Pit					Vault Pit	Phaser Pit									Phaser Pit	Vault ATP		Vault ATP
Volume pumped	Discharge location			Volume pumped 2PL		Vault Pit Inflow (m^3)	Enter 1 for the discharge location		Volume Pumped from Wally (m^3)	Cummulative Volume (m^3)		Phaser Pit Inflow (m^3)	Enter 1 for the discharge location				Volume Pumped from Wally (m^3)	Cummulative Volume (m^3)	Volume Available Remaining (m^3)	Water Elevation (m)		Vault ATP Inflow (m^3)	Cummulative Volume (m^3)	
	2PL	Pit E	Pit A				Vault Pit	Vault ATP					Vault Pit	Phaser Pit	Phaser Lake	Vault ATP								
x				-x																				
36 537				0		0			0			0					0					0		
207 466				141 392		101 617			0			0					0					123 925		
208 047				169 585		111 336			0			0					0					631 435		
179 567				179 548		54 964			0			0					0					-31 131		
194 954				99 731		149 876			0			173 290					0					74 702		
213 221				155 869		116 338			0			137 172					0					67 302		
151 208				21 482		154 880			0			171 470					0					216 100		
162 967				89 497		154 880			0			171 470					0					216 100		
134 165				34 440		154 880			0			171 470					0					216 100		
193 904				22 336		154 880			0			171 470					0					216 100		
8 619	1	0	0	8 619		0	1			619 518		0		1				685 878	219 560	132.8		0	1 493 939	
7 548	1	0	0	7 548		0	1			619 518		0		1				685 878	219 560	132.8		0	1 493 939	
7 466	1	0	0	7 466		0	1			619 518		0		1				685 878	219 560	132.8		0	1 493 939	
5 108	0.9561	0.043	0	4 884		0	1			619 518		0		1				685 878	219 560	132.8		0	1 493 939	
6 450	0	1	0	0		0	1		0	619 518		0		1				685 878	219 560	132.8		0	1 493 939	
17 180	0	1	0	0		66 526	1		0	686 044		73 652		1				759 530	145 908	134.8		118 708	1 612 647	
32 192	0	1	0	0		17 775	1		0	703 820		19 679		1				779 210	126 229	135.3		6 053	1 618 700	
30 357	0	1	0	0		47 967	1		0	751 786		53 105		1				832 314	73 124	136.8		60 667	1 679 367	
31 688	0	1	0	0		22 611	1		0	774 398		25 033		1				857 348	48 091	137.7		30 672	1 710 039	
17 359	0	1	0	0		0	1		0	774 398		0		1				857 348	48 091	137.7		0	1 710 040	
7 243	0	1	0	0		0	1		0	774 398		0		1				857 348	48 091	137.7		0	1 710 040	
7 437	0	1	0	0		0	1			774 398		0		1				857 348	48 091	137.7		0	1 710 040	
178 648				28 517		154 880			0			171 470					0					216 100		
8 928	1			8 928		0	1			774 398		0		1				857 348	48 091	137.7		0	1 710 040	
8 352	1			8 352		0	1			774 398		0		1				857 348	48 091	137.7		0	1 710 040	
8 928	1			8 928		0	1			774 398		0		1				857 348	48 091	137.7		0	1 710 040	
8 640	1			8 640		0	1		0	774 398		0		1				857 348	48 091	137.7		0	1 710 040	
8 928	1			8 928		0	1		0	774 398		0		1				857 348	48 091	137.7		0	1 710 040	
8 640	1			8 640		66 526	1		0	840 924		73 652		0.65	0.35			905 435	3	140.0		118 708	1 828 748	
8 928	1			8 928		17 775	1		0	858 699		19 679			1			905 435	3	140.0		6 053	1 834 801	
8 928	1			8 928		47 967	1		0	906 666		53 105			1			905 435	3	140.0		60 667	1 895 468	
8 640	1			8 640		22 611	1		0	929 277		25 033			1			905 435	3	140.0		30 672	1 926 140	
8 928	1			8 928		0	1		0	929 277		0			1			905 435	3	140.0		0	1 926 140	
8 640	1			8 640		0	1		0	929 277		0			1			905 435	3	140.0		0	1 926 140	
8 928	1			8 928		0	1			929 277		0			1			905 435	3	140.0		0	1 926 140	
105 408				105 408		154 880			0			171 470					0					216 100		
8 928	1			8 928		0	1			929 277		0			1			905 435	3	140.0		0	1 926 140	
8 064	1			8 064		0	1			929 277		0			1			905 435	3	140.0		0	1 926 140	
8 928	1			8 928		0	1			929 277		0			1			905 435	3	140.0		0	1 926 140	
8 640	1			8 640		0	1			929 277		0			1			905 435	3	140.0		0	1 926 140	
8 928	1			8 928		0	1			929 277		0			1			905 435	3	140.0		0	1 926 140	
8 640	1			8 640		66 526	1			995 803		73 652			1			905 435	3	140.0		118 708	2 044 848	
8 928	1			8 928		17 775	1			1 013 579		19 679			1			905 435	3	140.0		6 053	2 050 901	
8 928	1			8 928		47 967	1			1 061 545		53 105			1			905 435	3	140.0		60 667	2 111 568	
8 640	1			8 640		22 611	1			1 084 157		25 033			1			905 435	3	140.0		30 672	2 456 434	
8 928	1			8 928		0	1			1 084 157		0			1			905 435	3	140.0		0	2 456 434	
8 640	1			8 640		0	1			1 084 157		0			1			905 435	3	140.0		0	2 456 434	
8 928	1			8 928		0	1			1 084 157		0			1			905 435	3	140.0		0	2 456 434	
105 120				105 120		154 880			0			171 470					0					216 100		
8 928	1			8 928		0	1			1 084 157		0			1			905 435	3	140.0		0	2 456 434	
8 064	1			8 064		0	1			1 084 157		0			1			905 435	3	140.0		0	2 456 434	
8 928	1			8 928		0	1			1 084 157		0			1			905 435	3	140.0		0	2 456 434	
8 640	1			8 640		0	1			1 084 157		0			1			905 435	3	140.0		0	2 456 434	
8 928	1			8 928		0	1			1 084 157		0			1			905 435	3	140.0		0	2 456 434	
8 640	1			8 640		66 526	1			1 150 683		73 652			1			905 435	3	140.0		118 708	2 575 142	
8 928	1			8 928		17 775	1			1 168 458		19 679			1			905 435	3	140.0		6 053	2 581 195	
8 928	1			8 928		47 967	1			1 216 425		53 105			1			905 435	3	140.0		60 667	2 641 862	
8 640	1			8 640		22 611	1			1 239 036		25 033			1			905 435	3	140.0		30 672	2 672 534	

8 928	1			8 928	0	1			1 239 036	0			1			905 435	3	140.0	0	2 672 534
8 640	1			8 640	0	1			1 239 036	0			1			905 435	3	140.0	0	2 672 534
8 928	1			8 928	0	1			1 239 036	0			1			905 435	3	140.0	0	2 672 534
105 120				**105 120**	**154 880**			**0**		**171 470**					**0**				**216 100**	
8 928	1			8 928	0	1			1 239 036	0			1			905 435	3	140.0	0	2 672 534
8 064	1			8 064	0	1			1 239 036	0			1			905 435	3	140.0	0	2 672 534
8 928	1			8 928	0	1			1 239 036	0			1			905 435	3	140.0	0	2 672 534
8 640	1			8 640	0	1			1 239 036	0			1			905 435	3	140.0	0	2 672 534
8 928	1			8 928	0	1			1 239 036	0			1			905 435	3	140.0	0	2 672 534
8 640	1			8 640	66 526	1			1 305 562	73 652			0.71	0.29		905 435	3	140.0	118 708	2 812 793
8 928	1			8 928	17 775	1			1 323 338	19 679				1		905 435	3	140.0	6 053	2 838 525
8 928	1			8 928	47 967	1			1 371 304	53 105				1		905 435	3	140.0	60 667	2 952 297
8 640	1			8 640	22 611	1			1 393 916	25 033				1		905 435	3	140.0	30 672	3 008 002
8 928	1			8 928	0	1			1 393 916	0				1		905 435	3	140.0	0	3 008 002
8 640	1			8 640	0	1			1 393 916	0				1		905 435	3	140.0	0	3 008 002
8 928	1			8 928	0	1			1 393 916	0				1		905 435	3	140.0	0	3 008 002
105 120				**105 120**	**154 880**			**0**		**171 470**					**0**				**216 100**	
8 928	1			8 928	0	1			1 393 916	0				1		905 435	3	140.0	0	3 008 002
8 352	1			8 352	0	1			1 393 916	0				1		905 435	3	140.0	0	3 008 002
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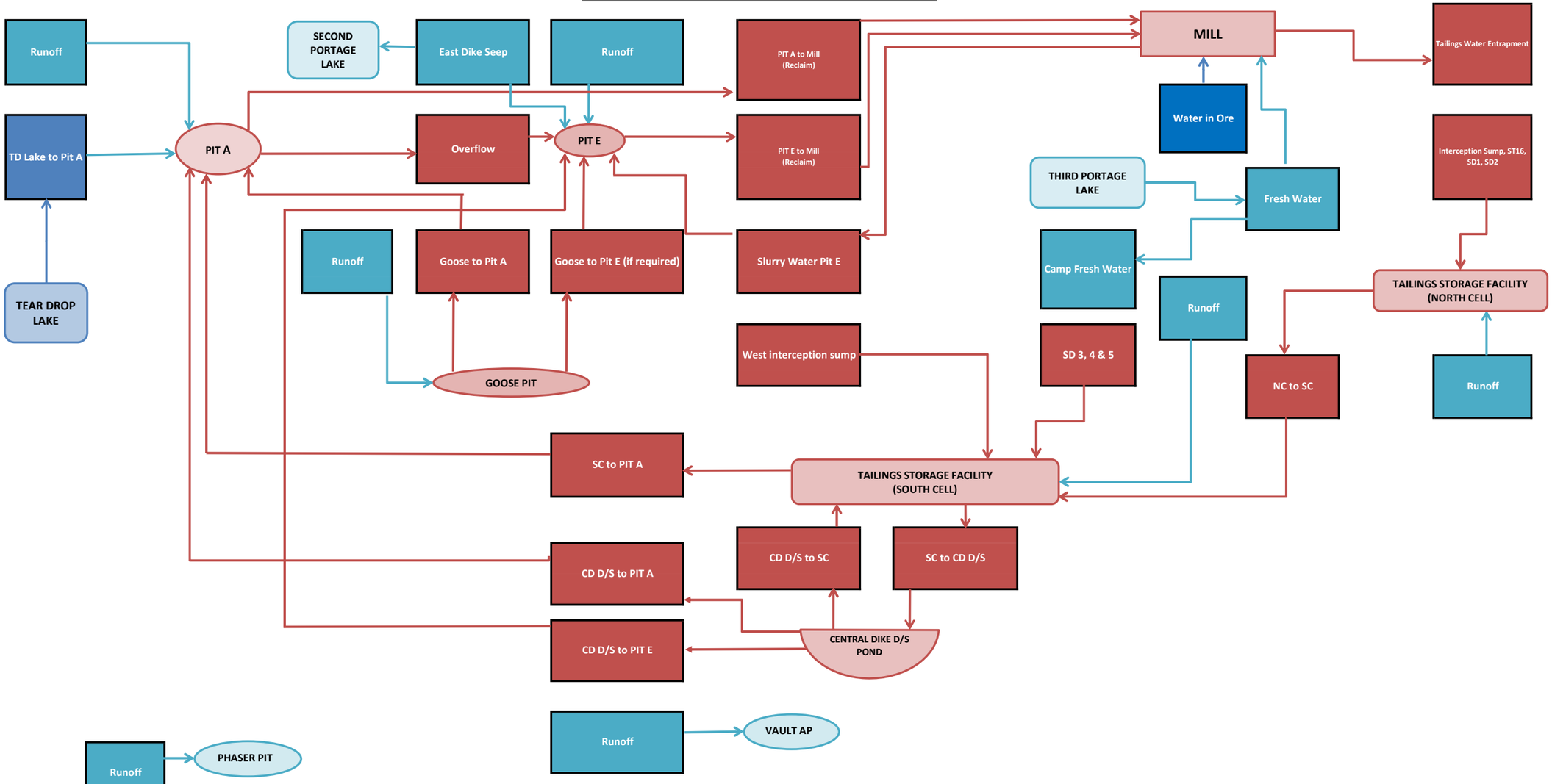
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14 964			1	0	333 333	1			34 533 085		0				1		905 435	3	140.0		0	1 728 906
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134 675				**0**	**3 333 333**			**0**			**171 470**					**0**					**216 100**	

APPENDIX B – WATER MANAGEMENT SCHEMATIC FLOWSHEETS

General Water Movement - 2021 to 2023

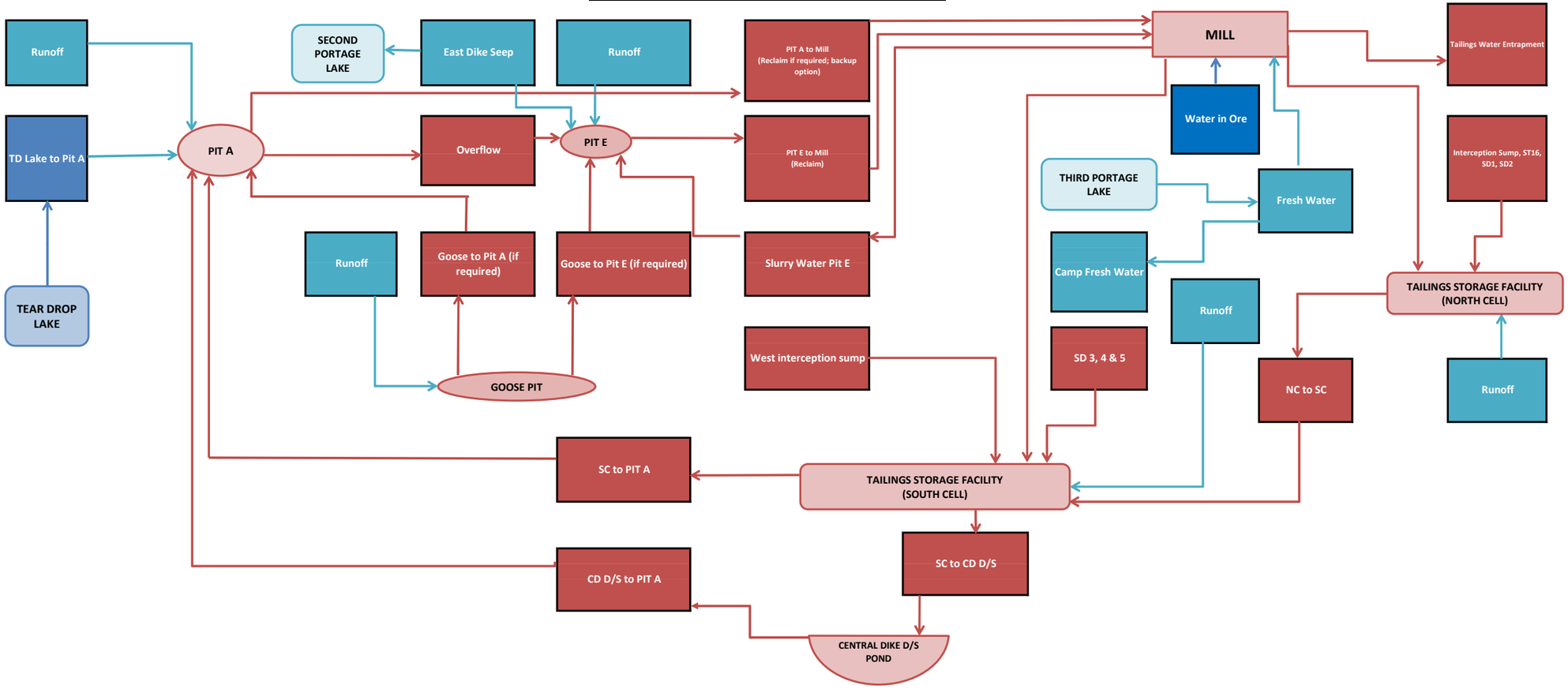


Legend

- Fresh water
- Contact water
- Mill contaminated water

*Small water transfers are not shown on this drawing, refer to water balance tables for detailed water movement.

General Water Movement - 2024 to 2027

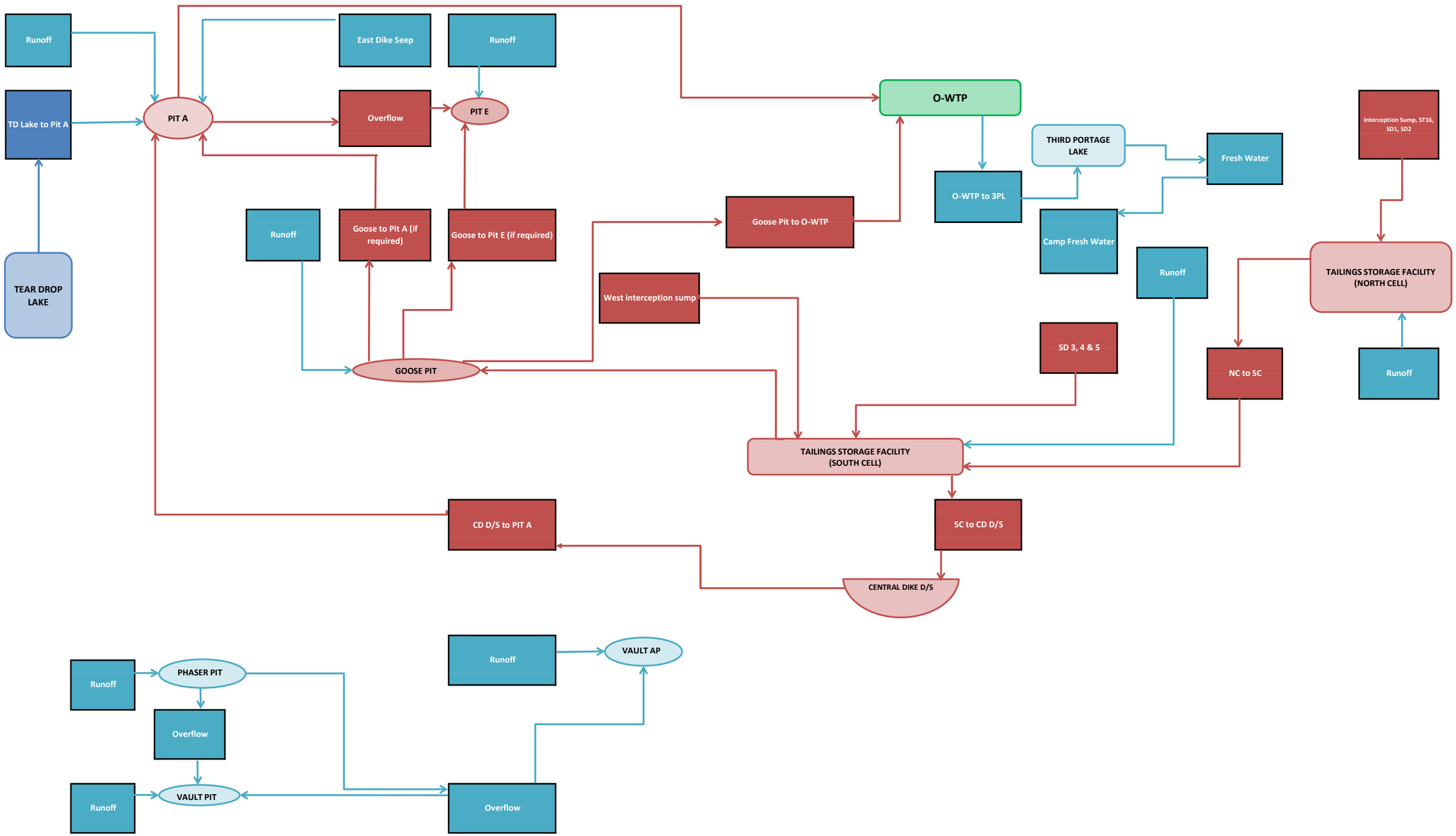


Legend

- Fresh water
- Contact water
- Mill contaminated water

*Small water transfers are not shown on this drawing, refer to water balance tables for detailed water movement.

General Water Movement - 2028 to 2036

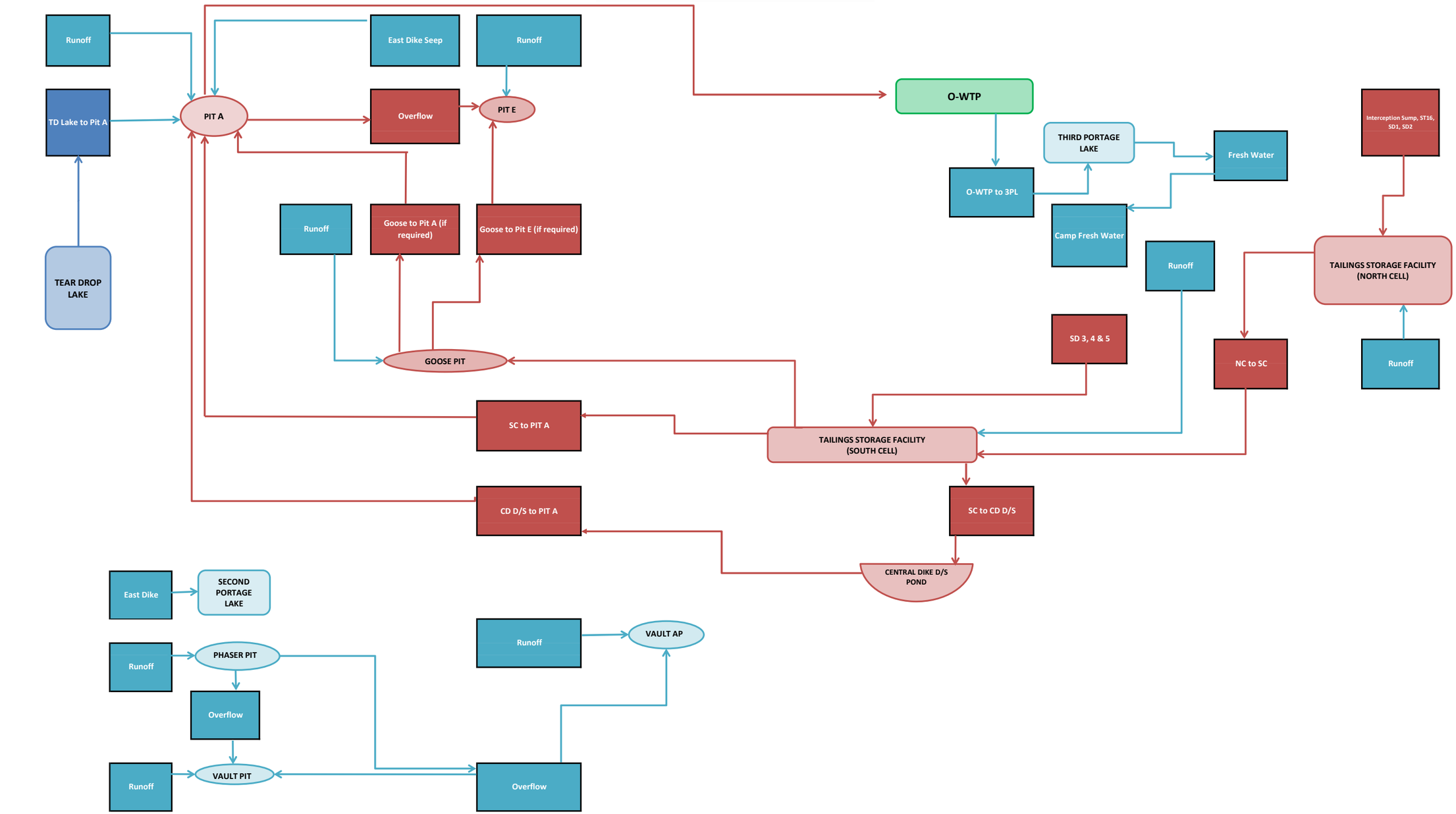


Legend

- Fresh water
- Contact water
- Mill contaminated water

*Small water transfers are not shown on this drawing, refer to water balance tables for detailed water movement.

General Water Movement - 2037 to 2038

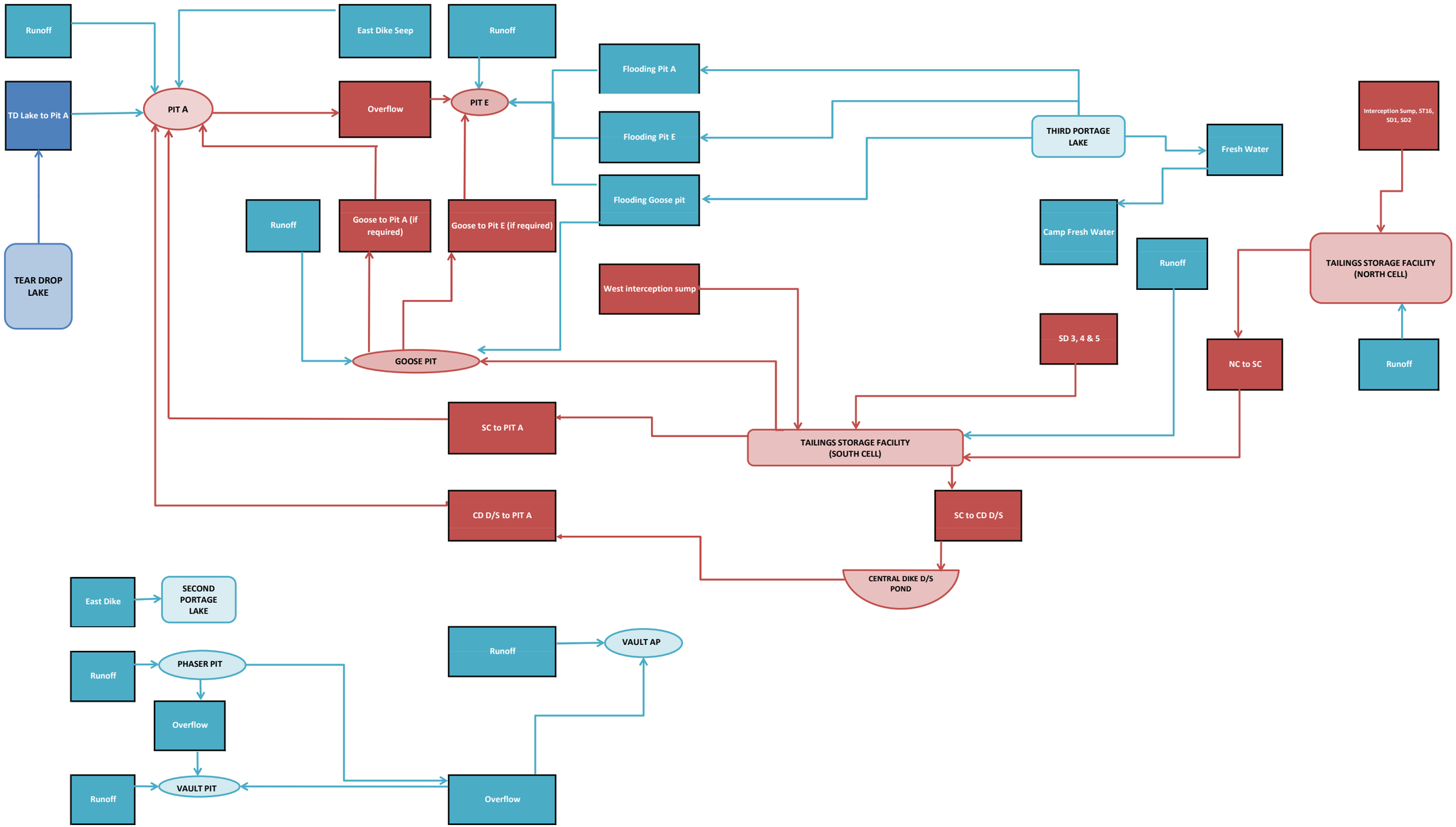


Legend

- Fresh water
- Contact water
- Mill contaminated water

*Small water transfers are not shown on this drawing, refer to water balance tables for detailed water movement.

General Water Movement - 2039 to 2044

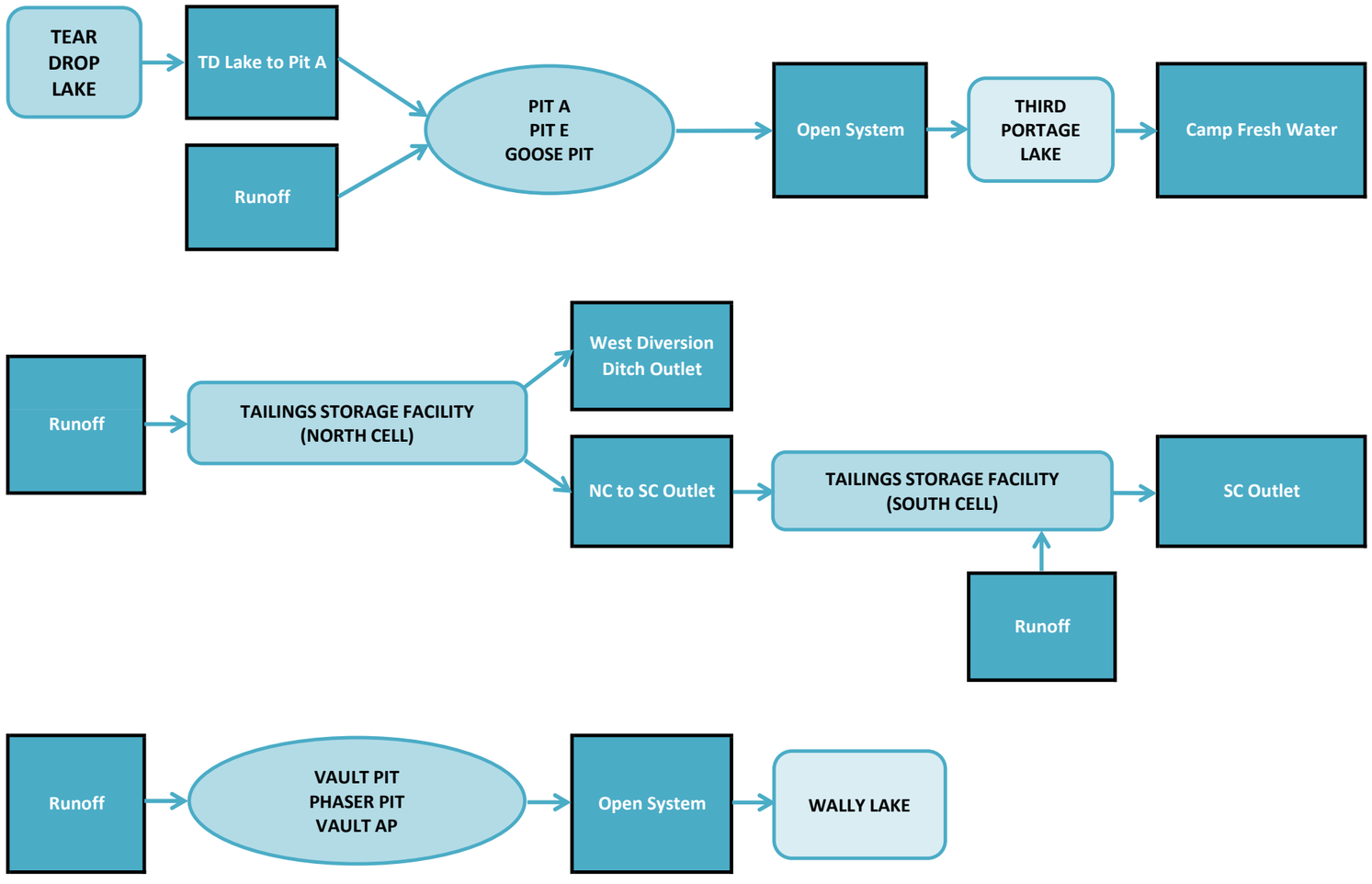


Legend

- Fresh water
- Contact water
- Mill contaminated water

*Small water transfers are not shown on this drawing, refer to water balance tables for detailed water movement.

General Water Movement - Post-Closure



Legend

- Fresh water
- Contact water
- Mill contaminated water

*Small water transfers are not shown on this drawing, refer to water balance tables for detailed water movement.

APPENDIX C – 2023 MEADOWBANK WATER QUALITY FORECASTING UPDATE

AtkinsRéalis	TECHNICAL NOTE Meadowbank Water Quality Forecasting Update for the 2023 Water Management Plan		
	Document No :	**Rev.**	**Date :**
	699141-1000-40ER-0001	00	March 26, 2024

Title of document: **MEADOWBANK WATER QUALITY FORECASTING UPDATE FOR THE 2023 WATER MANAGEMENT PLAN**

Client: **AGNICO EAGLE MINES**

Project: **MEADOWBANK GOLD PROJECT**

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[1] ICS: Immediate control and supervision.
In terms of supervising the engineering activities and supervision of people who are not engineers or junior engineers, the Ordre des ingénieurs du Québec uses a term often used in its regulation: Immediate control and supervision (ICS). In other words, an engineer must be involved in a continuous and active manner throughout the reserved tasks entrusted to him, and not just before or after.

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This report must be read as a whole, as sections taken out of context may be misleading. If discrepancies occur between the preliminary (draft) and final version of this report, it is the final version that takes precedence. Nothing in this report is intended to constitute or provide a legal opinion.

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List of Revisions

#	Prep.	Rev.	App.	Date	Pages	Remarks
PA	RA	ALN	ALN	Mar. 4, 2024	All	Issue for internal comments
PB	RA	ALN	ALN	Mar. 8, 2024	All	Issue for client's comments
00	RA	ALN	ALN	Mar. 26, 2024	All	Final

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1.0 Introduction

1.1 Mandate

AtkinsRéalis was mandated by Agnico Eagle Mines (Agnico) to review and update the water quality forecasting model developed in 2012 and updated yearly using the Water Balance reported in the 2023 Water Management Report and Plan (2023 WMP) to be submitted in March 2024 for Agnico.

1.2 Study Objectives and Content

This Technical Note presents the water quality forecast model updated for the Meadowbank Gold Project, based on the Water Balance 2023 (WB 2023) of Agnico (latest revision provided on January 18th, 2024). The WB 2023 was developed according to the updated Life of Mine (LOM) (Meadowbank 2023 Waste Management Plan) and to the mine development sequence provided by Agnico and summarized in **Table 1-1**. The updated water quality forecast model applies to the North and South Cell Tailings Storage Facility (TSF) Reclaim Ponds, Portage and Goose Pits, and Vault Pit.

The objective of this Technical Note is to forecast the concentration of the selected parameters of concern within the North and South Cell TSF Reclaim Ponds and the Portage and Goose Pits until closure, verify last year's assumptions and results, update the model, if necessary, and develop recommendations and assess water treatment requirements.

For the Vault Pit, no treatment is planned during the re-flooding of the pit since there is no tailings disposal facility at the Vault site. The Vault Attenuation Pond only receives mine pit runoff water and fresh water. This will be confirmed through regular monitoring required by the Type A Water Licence 2AM-MEA1530. The first modelling of the Vault area was realized in 2016, based on the 2014 and 2015 data, and updated on a yearly basis using sampling data collected for that year. For this year's report, the measurements taken in 2023 for this monitoring campaign were analyzed and are presented in **Section 5.0**.

1.3 Water Balance

The Water Balance 2023 (WB 2023) was developed by Agnico (Agnico 2024). The water balance examined the water transfers required for the water management infrastructure during the active LOM under average hydrologic conditions.

The WB 2023 was based on the revised mining schedule presented in **Table 1-1** below for Meadowbank and Vault areas.

Table 1-1: Water Management Phases (Based on Meadowbank 2023 Waste Management Plan)

ACTIVITY	UPDATED START DATE[1]	UPDATED END DATE[1]
Pits Mining		
Portage Pit	January 2010	June 2019
North (Pit A)	January 2010	June 2018
Central (Pit B, C D)	January 2010	April 2013
South (Pit E)	January 2010	June 2019
Goose Pit	April 2012	May 2015
Vault Pit	January 2014	September 2018
Phaser and BB Phaser Pit	July 2018	September 2018
Whale Tail Project Pits (and underground)	July 2019	December 2025
Tailings Storage Facility Operations		
North Cell	January 2010	June 2026
South Cell	November 2014	June 2026
Goose Pit (in pit tailings deposition)	July 2019	August 2020
Portage (in pit tailings deposition)	August 2020	June 2026
Rock Storage Facility (RSF) Operations		
Portage RSF	January 2009	October 2019
Vault RSF	January 2014	September 2018
Attenuation/Reclaim Pond Water Management		
Attenuation Pond (South Cell)[2]	January 2009	November 2014
Attenuation/Phaser Ponds Vault Lake	January 2014	September 2018
Other Key Activities		
Mill Operations	January 2010	June 2026
Dewatering of Vault Lake	June 2013	July 2014
Dewatering of Phaser Lake	July 2016	October 2016
Flooding of Vault Pit[4]	June 2019	August 2040
Flooding of Phaser and BB Phaser Pits[4]	-	-
Reclaim Water Treatment[5, 6] – Goose Pit	July 2028	January- 2031
Reclaim Water Treament[5,6] – Portage Pit	January 2031	December 2038
North and South Cell TSF Cover Construction	January 2026	December 2027
Flooding of Portage and Goose Pits[3, 5]	January 2031	July 2041
Breaching of dikes[5]	n/a	August 2041 only if water criteria are met

Notes:

1. *Periods are given from the beginning of the starting month to the end of the ending month.*
2. *After November 2014, the Reclaim Pond is relocated to the South Cell TSF. After this date, there is no Attenuation Pond.*
3. *Artificial flooding only with a combination of pumps and siphons, natural run-off inflow as part of re-flooding not accounted for in this table.*
4. *Vault and Phaser pits and lakes are expected to will mostly be flooded passively (run-offs) due to the small flooding volume required to re-establish the initial elevation combined with its large watershed.*
5. *Tentative dates. Water treatment at Meadowbank may be required to meet approved effluent criteria and to allow cover construction if deemed necessary. Schedule will be modified if required based on monitoring and water quality results. The closure schedule for the overall project is based on the preliminary closure methods and strategies discussed in the Meadowbank ICRP. It is anticipated that the schedule will be refined throughout the project life as the designs are advanced, and as the closure methods and strategies are further developed.*
6. *In-pit tailings cover may be required in Goose and Portage Pits based on monitoring results and feasibility assessment.*

2.0 Review of Water Balance and Water Quality Data for 2023

2.1 Documents Reviewed

A review of the available water balance and water quality data measured in 2023 was undertaken by AtkinsRéalis and compiled with previous data measured since 2012. This includes a review of the following documents:

- WB 2023 based on the Meadowbank 2023 Waste Management Plan.
- Water quality chemical analysis results from the Portage Area for 2023. The chemical analysis results of interest for this Technical Note are presented in **Section 8.0** of the 2023 Annual Report and were integrated in the data previously obtained, specifically:
  - North Cell TSF Reclaim Pond (ST-21) from January 2014 to October 2023;
  - South Cell TSF Reclaim Pond (ST-21) (former South Cell TSF Attenuation Pond ST-18) from June 2014 to October 2023;
  - Mill effluent metal and cyanide concentrations from January 2013 to November 2023;
  - Monthly grab samples of Mill Effluent taken in 2023;
  - Portage North Pit (ST-17, Pit A) from May 2015 to November 2023 and for Portage South Pit (ST-19, Pit E) from November 2014 to November 2023;
  - Goose Pit (samples taken in the sump pit and in the lake, ST-20) from March 2014 to October 2023;
  - Central Dike seepages collected in the downstream collection pond (ST-S-5) sampled in 2023;
  - East Dike (ST-1) seepage and Saddle Dam 3 (ST-32) sump sampled in 2023;
  - Saddle Dam 1 downstream sump (ST-S-2) and Portage Rock Storage Facility seepage (RSF) (ST-16) sampled from 2015 to 2023;
  - Results of shake flask extraction (SFE) tests conducted in 2023 on the tailings.
- Water quality chemical analysis results for the Vault Area for 2023, specifically:
  - Vault Pit lake (ST-26);
  - Vault RSF (ST-24);
  - Vault Attenuation Pond (ST-25);
  - Phaser Pit (ST-41);
  - Phaser Attenuation Pond (ST-43).

It is important to remember that the review of the Meadowbank water quality data was undertaken to gain a better understanding of the water quality in the Portage Area, particularly as it affects the TSF Reclaim Ponds and the tailings in-pit deposition, and to provide a basis for the development and update of the water quality forecast mass balance model.

An analysis of the Vault water quality data was undertaken to gain a better understanding of the water quality in this area.

2.2 Updates to the Water Balance

The initial WB was developed in 2012. It has been updated on a yearly basis based on actual water transfers conducted on site, field survey of the different pond levels and updates to the LOM. **Table 2-1** summarizes the main differences between the WB from 2012 to 2023.

The WB 2023 integrates the extension of the LOM of Meadowbank Mine through the construction and operation of the Whale Tail Pit, a satellite deposit located on the Whale Tail property, and by continuing mine operations and milling at Meadowbank. It also integrates in-pit deposition of tailings in Goose and Portage Pits.

Table 2-1: Updates to the Water Balance

WB YEAR	FORECASTED END OF DEPOSITION	MAIN DIFFERENCES
2012	February 2018	Initial WB model based on the 2012 WMP. Tailings' deposition started in the North Cell TSF and continued until March 2015, and was then transferred to the South Cell TSF until February 2018. Reclaim Water was then transferred to the pits. It was anticipated that there would be approximately 6 Mm^3 of non-contact water already accumulated in each pit at that time.
2013	September 2017	In this WB, the LOM included the deposition of tailings in North and South Cell TSF in 2014 and 2015. Deposition in the North Cell TSF was planned to end in October 2015 and to continue in the South Cell TSF until September 2017. Furthermore, it was anticipated that South Cell TSF Reclaim Water would be transferred as of 2015 to the pits when there would be very little water in the pits. This was done while tailings deposition in South Cell TSF was ongoing. Runoff water will then be allowed to flow into the pit and mix with the South Cell Reclaim Water.
2014	September 2017	In this WB, tailings were deposited in the North and South Cell TSF in 2014 and 2015. Deposition in the South Cell TSF started in November 2014. Deposition in the North Cell TSF was planned to end in September 2015 and to continue in the South Cell TSF. Based on the volume of Reclaim Water in the North Cell TSF and South Cell TSF Ponds, it was anticipated that South Cell Reclaim Water would be transferred to Portage Pit starting August 2017. No Reclaim Water was to be transferred to Goose Pit. Furthermore, the percentage of tailings water/ice entrapment was also updated in 2014 WMP to better reflect what was currently observed on site.
2015	September 2018	From January to July 2015, tailings were deposited in the South Cell TSF. Deposition in the North Cell TSF continued from July to October 2015. As of October 2015, the deposition of

WB YEAR	FORECASTED END OF DEPOSITION	MAIN DIFFERENCES
		tailings continued only in the South Cell TSF until the end of the LOM. The LOM was extended compared to WB 2014, where tailings deposition was planned to end in September 2017. The transfer of Reclaim Water to the Portage Pit was postponed for one year due to the longer LOM and was planned to start in September 2018. No Reclaim Water will be transferred to Goose Pit other than the 50,431 m^3 transferred from the Central Dike Downstream Pond (CDDP), which has a similar water quality than the South Cell Reclaim Pond. Those transfers were proposed by the Meadowbank Dike Review Board (MDRB) to further assess the Central Dike seepage (ST-S-5) that was identified that same year.
2016	September 2018	The tailings deposition and water transfer schedule are similar to the WB 2015. Water in sumps from Saddle Dam 3-4-5 was added as a new input to the South Cell TSF Reclaim Pond. Furthermore, the transfer of seepages and runoff water from the North Cell interception sump, RSF and Saddle Dam 1 to the North Cell TSF continued past 2018 until closure. Portage and Goose Pit filling rates were also adjusted in this WB.
2017	September 2018	The tailings deposition and water transfer schedule are similar to the WB 2016. The actual volumes of water transferred and of tailings deposited in 2017 were entered into the model. About 332,177 m^3 of pond water was transferred to Goose Pit from the CDDP between August and October 2017 to reduce the hydraulic gradient between the South Cell and ST-S-5. This strategy was presented to the MDRB as part of an action plan on Central Dike. The updated water balance does not plan for any other pond water transfer during tailings deposition in 2018. Portage and Goose Pit flooding rates were also adjusted. A different percentage of tailings water/ice entrapment for North and South Cell TSF was also used in the WB 2017 to better characterize the difference of ice entrapment cover between the two, partly due to the continuing water inflow from the mill effluent in the South Cell TSF.
2018	December 2021	The tailings deposition and water transfer schedule were extended until December 2021. Tailings will be deposited in the North Cell and South Cell TSF. The additional tailings come from the continuation of the milling of ore produced from the Whale Tail Pit at the Whale Tail site. The actual volumes of water transferred and of tailings deposited in 2018 were entered into the model. In 2018, no Reclaim Water was transferred from CDDP or South Cell TSF to Goose Pit. In the Vault area, there was no discharge to Wally Lake as well.
2019	July 2022	The tailings deposition and water transfer schedule were extended until July 2022. Tailings were deposited in the South Cell TSF and North Cell until April 2019 and July 2019, respectively. Tailings were then deposited in Goose and Portage pits. In-pit deposition started in Goose Pit in July 2019. The additional tailings came from the continuation of the milling of ore produced from the Whale Tail pit operation.

WB YEAR	FORECASTED END OF DEPOSITION	MAIN DIFFERENCES
		The actual volumes of water transferred and of tailings deposited in 2019 were integrated into the model. In 2019, Reclaim Water was transferred from South Cell TSF Reclaim Pond to Goose Pit. Reclaim Water from CDDP was transferred back to SC Reclaim Pond or to Portage North Pit (Pit A). In the Vault area, there was no discharge to Wally Lake in 2019. Natural pit flooding was allowed to begin in the Vault area.
2020	June 2026	The tailings deposition and water transfer schedule were extended until June 2026. In-pit deposition occurred in Goose Pit from July 2019 until August 2020. In-pit deposition continued in Portage Pit starting in August 2020 and is projected to end in June 2026. The additional tailings come from the continuation of the milling of ore produced from the Whale Tail Pit, IVR Pit and underground mine operation at the Whale Tail site. The actual volumes and quantity of water transferred and of tailings deposited in 2020 were integrated into the model. In 2020, Reclaim Water was transferred from South Cell TSF Reclaim Pond to Portage Pit. Reclaim Water from CDDP was transferred back to SC Reclaim Pond or to Portage South Pit (Pit E). Reclaim Water was pumped from South Cell TSF and Portage North Pit (Pit A) to the mill. In the Vault area, natural pit flooding was allowed to continue. Following in-pit deposition, the Interim Closure and Reclamation Plan (ICRP) includes the treatment of the Reclaim Water in Portage and Goose Pits. The treated effluent shall be discharged to Third Portage Lake. Once treatment is completed, if necessary, cover construction over the tailings in the pits will begin, followed by re-flooding of the pits with natural runoff and water transfer from Third Portage Lake. Note that the cover requirement will be reviewed based on monitoring results and the feasibility of building the cover will be evaluated and updated in the closure plan.
2021	December 2026	The tailings deposition and water transfer schedule were extended until December 2026. In-pit deposition occurred in Goose Pit from July 2019 until August 2020. In-pit deposition continued in Portage Pit starting in August 2020 and is projected to end in December 2026. The additional tailings come from the continuation of the milling of ore produced from the Whale Tail Pit, IVR Pit and underground mine operation at the Whale Tail site. In 2021, tailings were deposited in the North Cell TSF in July and August. The actual volumes and quantity of water transferred and of tailings deposited in 2021 were integrated into the model. In 2021, Reclaim Water was transferred from South Cell (SC) TSF Reclaim Pond to Portage North Pit (A). Reclaim Water from CDDP was transferred back to SC Reclaim Pond or to Portage North Pit (Pit A). Reclaim Water was pumped from Portage South Pit (Pit E) to the mill and to Portage North Pit (Pit A). In the Vault area, natural pit flooding was allowed to continue.

WB YEAR	FORECASTED END OF DEPOSITION	MAIN DIFFERENCES
		Following in-pit deposition, the ICRP includes the treatment of the Reclaim Water in Portage and Goose Pits. The treated effluent shall be discharged to Third Portage Lake. Once treatment is completed, if necessary, cover construction over the tailings in the pits will begin, followed by re-flooding of the pits with natural runoff and water transfer from Third Portage Lake. Note that the cover requirement will be reviewed based on monitoring results and the feasibility of building the cover will be evaluated and updated in the closure plan.
2022	December 2026	The tailings deposition and water transfer schedule are still forecasted to continue until December 2026. The actual volumes and quantity of water transferred and of tailings deposited in 2022 were integrated into the model. In 2022, Reclaim Water was transferred from South Cell (SC) TSF Reclaim Pond to Portage North Pit (A). Reclaim Water from CDDP was transferred back to SC Reclaim Pond or to Portage North Pit (Pit A). Reclaim Water was pumped mainly from Portage South Pit (Pit E) to the mill. Water was also transferred from Portage South Pit (Pit E) to Portage North Pit (Pit A). In the Vault area, natural pit flooding was allowed to continue. There are no changes to the current closure plan. At closure, if necessary, Reclaim Water in Portage and Goose Pits shall be treated and discharged to Third Portage Lake. Once treatment is completed, if necessary, cover construction over the tailings in the pits will begin, followed by re-flooding of the pits with natural runoff and water transfer from Third Portage Lake. Note that the cover requirement will be reviewed based on monitoring results and the feasibility of building the cover will be evaluated and updated in the closure plan.
2023	June 2026	The tailings deposition and water transfer schedule are forecasted to continue until June 2026. The actual volumes and quantity of water transferred and of tailings deposited in 2023 were integrated into the model. Since 2022, Reclaim Water was transferred from South Cell (SC) TSF Reclaim Pond to Portage North Pit (A). Reclaim Water from CDDP was transferred back to SC Reclaim Pond or to Portage North Pit (Pit A). Reclaim Water was pumped mainly from Portage South Pit (Pit E) and Portage North Pit (Pit A) to the mill. Water was also transferred from Portage North Pit (Pit A) to Goose Pit in 2023. In the Vault area, natural pit flooding was allowed to continue. There are no changes to the current closure plan. At closure, if necessary, Reclaim Water in Portage and Goose Pits shall be treated and discharged to Third Portage Lake. Once treatment is completed, if necessary, cover construction over the tailings in the pits will begin, followed by re-flooding of the pits with natural runoff and water transfer from Third Portage Lake. Note that the cover requirement will be reviewed based on monitoring results and the feasibility of building the cover will be evaluated and updated in the closure plan.

2.3 Parameters of Concern

A review of the chemical analysis for water samples collected in the North Cell (Station ST-21-N now transferred to the South Cell) and South Cell TSF Reclaim Ponds (Station ST-21-S) and in Portage and Goose Pits (ST-17/19 and ST-20) was undertaken by AtkinsRéalis to identify contaminants that could be above the discharge criteria as stipulated in the Metal and Diamond Mining Effluent Regulations (MDMER), the Canadian Council of Ministers of the Environment (CCME) guidelines and the Water Licence, Part F.

In the current LOM, Reclaim Water collected from the North Cell and South Cell TSF and the CDDP is currently transferred to Portage Pit until the end of in-pit deposition. The Reclaim Water is then pumped back to the mill for re-use. There is no discharge of Reclaim Water to the environment during operations. At closure, the Reclaim Water stored in Portage and Goose Pits shall be treated and discharged to the environment. The pits will then be reflooded with natural runoff and water transfer from Third Portage Lake.

For the purpose of this analysis, the following parameters of concern, which are listed in the Water Licence, shall be reviewed, specifically:

- Total Cyanide
- Total Aluminum
- Total Arsenic
- Total Cadmium
- Total Nickel
- Total Zinc
- Total dissolved solids
- Total Aluminum
- Total Mercury
- Chloride
- Total Ammonia
- Nitrate

Furthermore, the water quality review from past studies also identified the following parameters in the Reclaim Water that should be monitored since they could represent a potential long-term contamination risk:

- Total Iron
- Total Selenium
- Fluoride
- Sulphate

It is understood that the MDMER and the Water Licence criteria apply to mining effluents discharged to the environment and are as such not applicable to the North Cell, South Cell TSF Reclaim Ponds and Portage and Goose Pits since no effluent is discharged from these areas to the environment during operations. However, the MDMER, the Water Licence criteria, as well as the CCME guidelines are used as a guide to identify potential parameters of concern at the start of closure activities.

It should be noted that the parameters of concern were only determined based on the chemical analyses provided by Agnico. **Table 2-2** presents the MDMER, the Water Licence 2AM-MEA1530 at ST-9 (Nunavut Water Board Licence, 2020) discharge criteria and the CCME discharge guidelines for the parameters of concern. For the water

quality forecast report, the British Columbia guidelines for sulphate for the protection of aquatic life were used as a benchmark for reference only. However, final site-specific closure limits will be developed through review of the closure plan by regulatory agencies.

Table 2-2: Discharge Criteria and CCME Guidelines for the Parameters Evaluated

PARAMETER	DISCHARGE CRITERIA & WATER QUALITY GUIDELINES		
	MDMER[1]	Water Licence[2] (Part F)	CCME[3] (Issue Date)
Cyanide (CN)	0.5 mg/L (as total CN)	0.5 mg/L (as total CN)	0.005 mg/L (as free CN) (1987)
Aluminum (Al)	*no criteria*	1.5 mg/L	0.16 mg/L[8] (2021)
Arsenic (As)	0.3 mg/L	0.3 mg/L	0.005 mg/L (1997)
Cadmium (Cd)	*no criteria*	0.002 mg/L	0.00004 mg/L[9] (2014)
Copper (Cu)	0.3 mg/L	0.1 mg/L	0.002 mg/L[4] (1987)
Iron (Fe)	*no criteria*	no criteria	0.3 mg/L (1987)
Lead (Pb)	0.1 mg/L	0.1 mg/L	0.001 mg/L[9] (1987)
Mercury (Hg)	*no criteria*	0.0004 mg/L	0.000026 mg/L (2003)
Nickel (Ni)	0.5 mg/L	0.2 mg/L	0.025 mg/L[9] (1987)
Selenium (Se)	*no criteria*	no criteria	0.001 mg/L (1987)
Zinc (Zn)	0.5 mg/L	0.4 mg/L	0.013 mg/L[9] (2018)
Total Ammonia (NH_3)	*no criteria*	16 mg N/L	1.83 mg N/L[5] (2001)
Un-ionized ammonia	0.5 mg N/L	n/a	0.019 mg N/L (2001)
Nitrate (NO_3)	*no criteria*	20 mg N/L	2.94 mg N/L[7] (2012)
Total Dissolved Solids	*no criteria*	1,400 mg/L	*no criteria*
Chloride (Cl)	*no criteria*	1,000 mg/L	120 mg/L[6] (2011)
Sulphate (SO4)	*no criteria*	no criteria	128 mg/L[10] (2013)
Fluoride (F)	*no criteria*	no criteria	0.12 mg/L (2002)

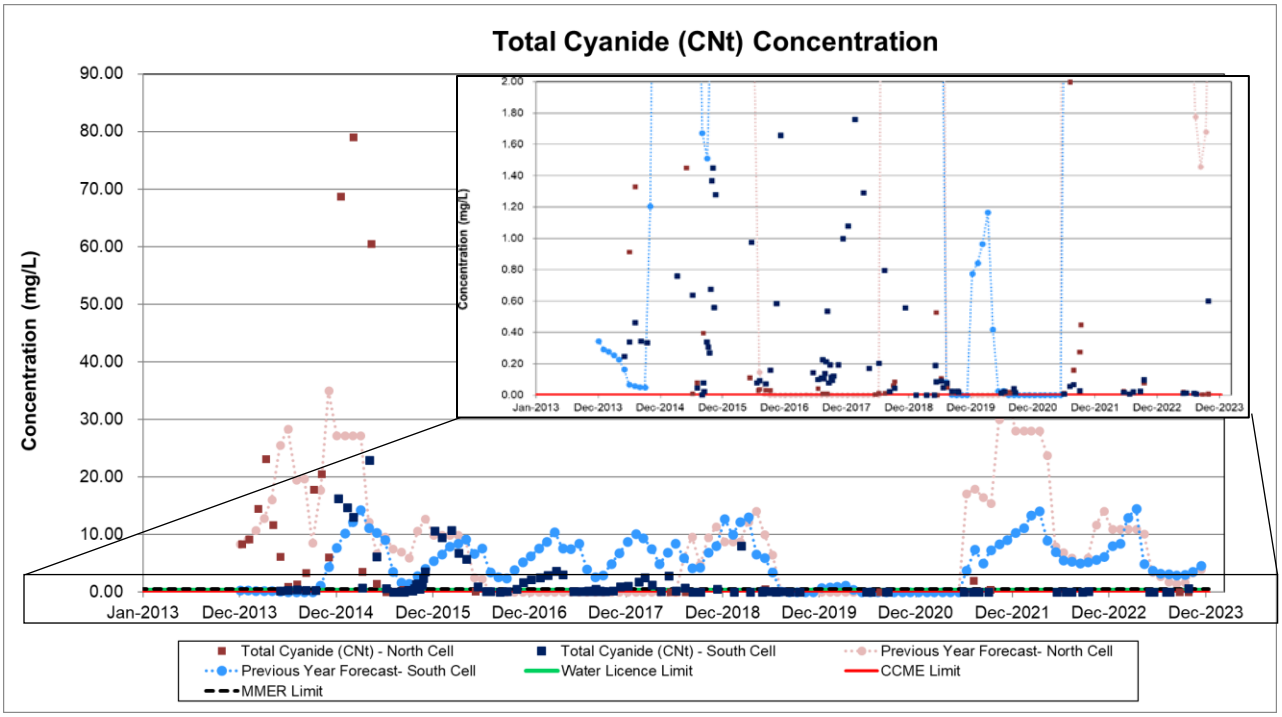
Notes:

1. *Current MDMER criteria (as of December 2021) corresponding to the maximum average monthly concentration (schedule 4, table 2).*
2. *Water Licence (Part F) criteria for Third Portage Lake (ST-9) corresponding to the maximum average concentration (2020).*
3. *CCME criteria as per the Water Quality Guidelines for the Protection of Aquatic Life for freshwater and long-term exposure. Criteria referenced from www.ccme.ca in 2021.*
4. *The copper discharge criterion depends on hardness. A Third Portage Lake hardness level is approx. 12 mg/L as $CaCO_3$. For hardness between 0 to 82 mg/L $CaCO_3$, the copper limit is set at 2 µg/L.*
5. *The ammonia concentration limit depends on temperature and pH (an increase in temperatures and pH leads to a more stringent ammonia concentration limit). In this case, 2.22 mg/L of NH_3, or 1.83 mg N/L, was determined based on an average pH of 7.5 in Third Portage Lake and a maximum measured temperature of approx. 15°C.*
6. *This is the long-term chloride concentration limit. The short-term concentration limit is 640 mg/L.*
7. *This is the long-term nitrate concentration limit (13 mg/L as NO_3). The short-term concentration limit is 550 mg/L.*
8. *Aluminum criterion in fresh water is calculated using the equation described in Appendix B of the Federal Environmental Quality Guidelines (FWQG). The FWQG equation is valid between hardness 10 and 430 mg/L, pH 6 and 8.7, and dissolved organic carbon (DOC) 0.08 and 12.3 mg/L. The Al criterion is calculated based on the Third Portage Lake water quality (hardness of 12 mg/L $CaCO_3$, pH 7.09 and DOC 1.47 mg/).*
9. *Cadmium, lead, nickel, and zinc discharge criteria depend on hardness. Third Portage Lake hardness level is approx. 12 mg/L as $CaCO_3$. For hardness between 0 to 17 mg/L $CaCO_3$, the limit is set at 0.04 µg/L for cadmium. For hardness between 0 to 60 mg/L $CaCO_3$, the limit is set at 0.001 mg/L for lead and 0.025 mg/L for nickel. For hardness of 12 mg/L as $CaCO_3$, the limit for zinc is 0.013 mg/L.*
10. *Threshold value for sulphate based on BC Environment guidelines for the protection of aquatic life for very soft water (0-30 mg/L) (April 2013).*

2.4 North and South Cell TSF Reclaim Ponds

At the start of operations, tailings were deposited in the North and South Cell TSF. Reclaim Water was collected in the North and South Cell TSF Reclaim Ponds and transferred back to the mill for re-use. Since 2019, tailings are no longer deposited constantly in these cells and the contact water collected in these areas is transferred to Portage Pit. In 2021, tailings were deposited in the North Cell TSF in July and August. In 2023, no tailings were deposited in the North Cell TSF, while 293,227 tons of tailings were deposited in the South Cell TSF.

Figure 2-1 to **Figure 2-3** present the concentration of the parameters of concern measured in the North and South Cell TSF Reclaim Ponds from January 2013 to December 2023. Also shown in these figures are the forecasted concentrations from the Water Quality Forecasting Update based on the planned water transfers described in the 2022 Water Management Plan (SNC-Lavalin, 2023). For the metal parameters, total concentration values are shown in the figures in this year's report since the discharge criteria and CCME water quality guidelines are based on total concentration measurements.


Total Cyanide (CNt) Concentration
Concentration (mg/L)
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Jan-2013
Dec-2013
Dec-2014
Dec-2015
Dec-2016
Dec-2017
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
Dec-2023
Total Cyanide (CNt) - North Cell
Total Cyanide (CNt) - South Cell
Previous Year Forecast- North Cell
Previous Year Forecast- South Cell
Water Licence Limit
CCME Limit
MMER Limit

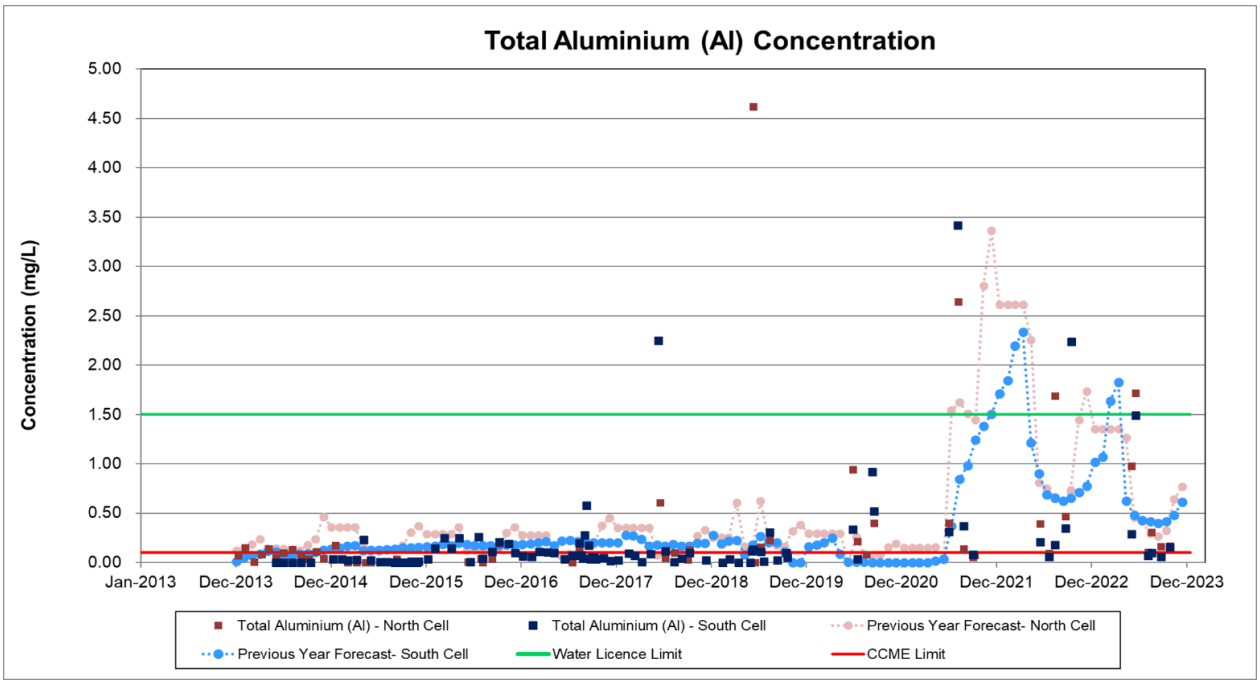
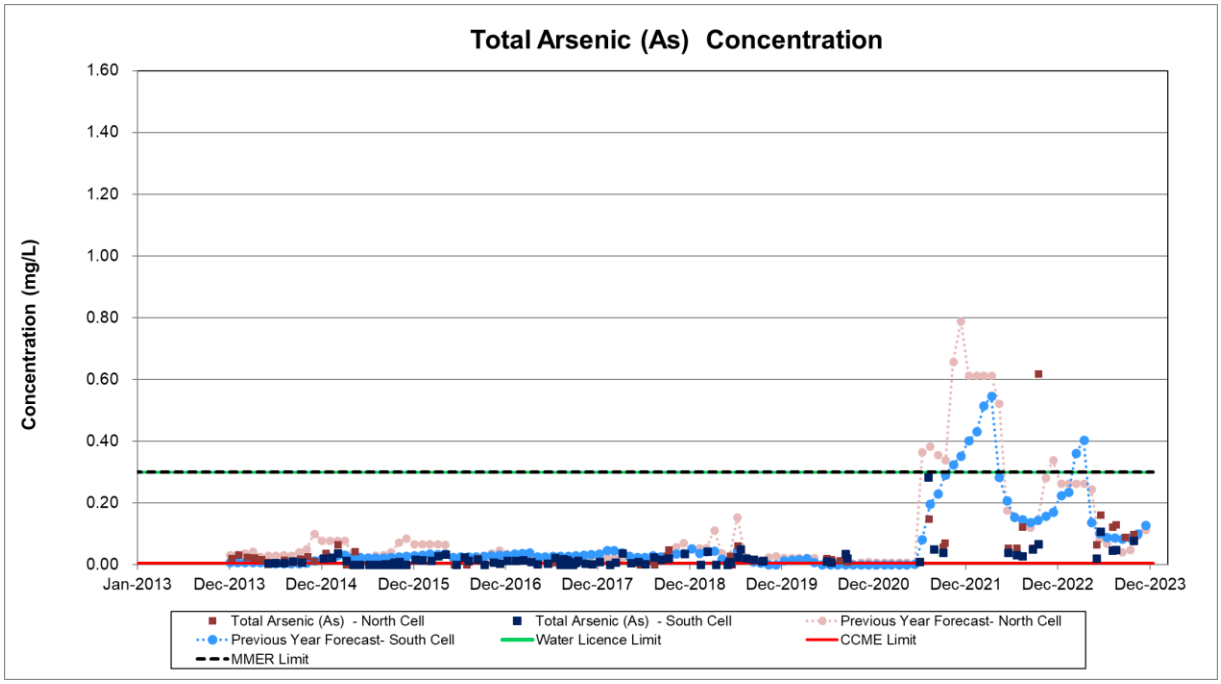

Total Aluminium (Al) Concentration
Concentration (mg/L)
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Jan-2013
Dec-2013
Dec-2014
Dec-2015
Dec-2016
Dec-2017
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
Dec-2023
Total Aluminium (Al) - North Cell
Total Aluminium (Al) - South Cell
Previous Year Forecast- North Cell
Previous Year Forecast- South Cell
Water Licence Limit
CCME Limit

Figure 2-1: Concentrations North and South Cell TSF Reclaim Ponds – Total Cyanide & Metals



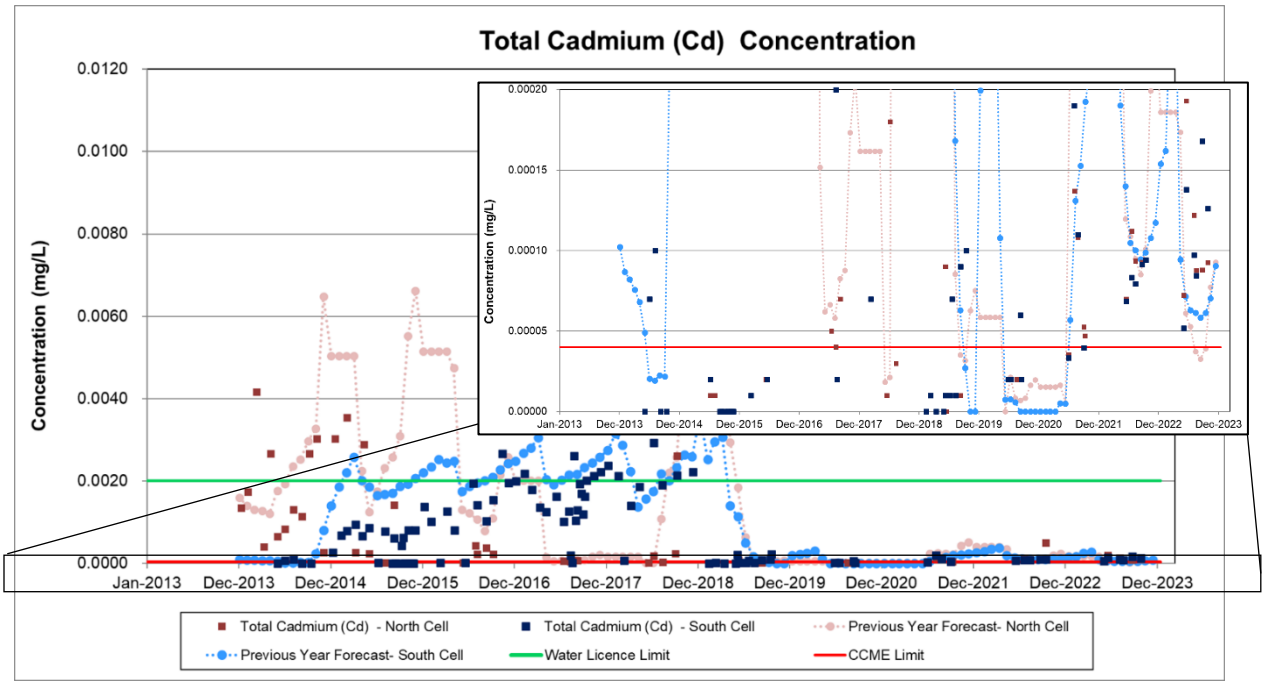
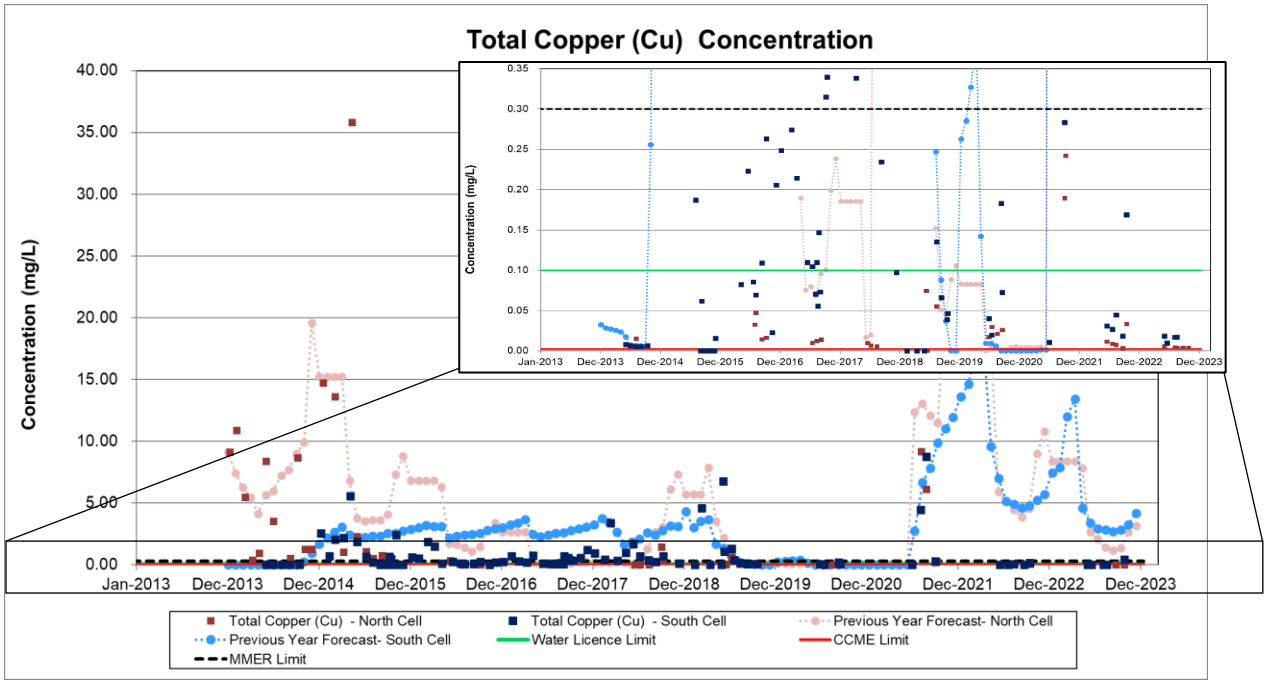


Figure 2-1: (continued) Concentrations North and South Cell TSF Reclaim Ponds – Total Cyanide & Metals



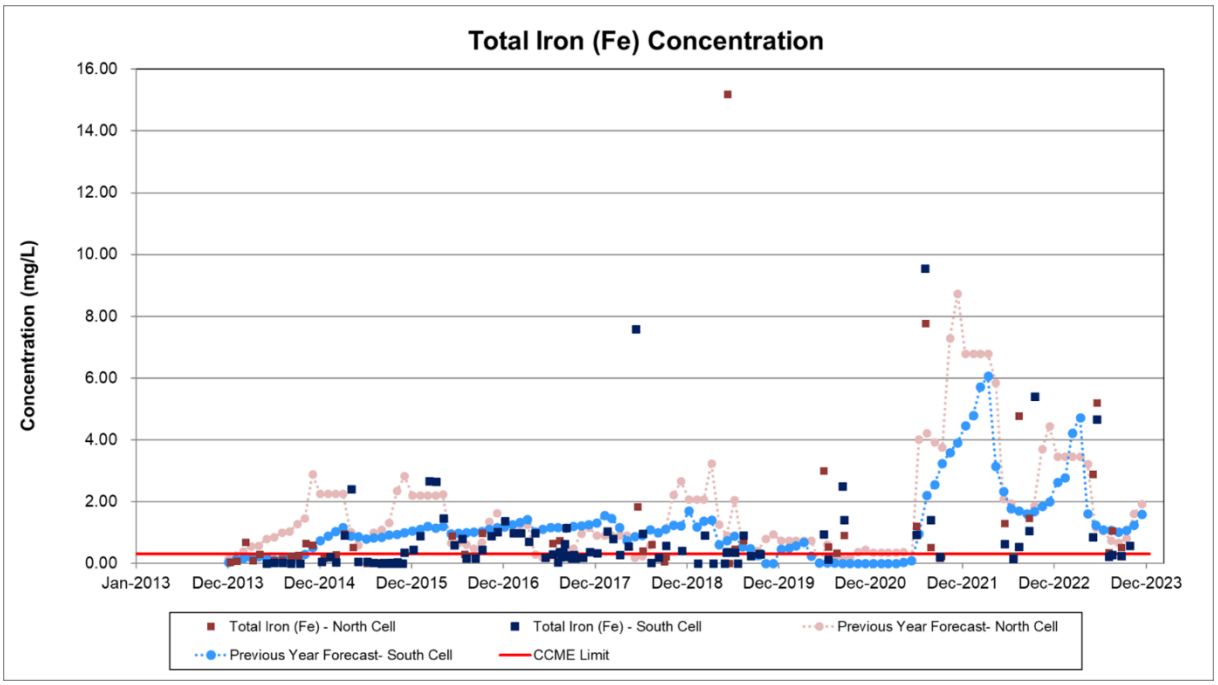
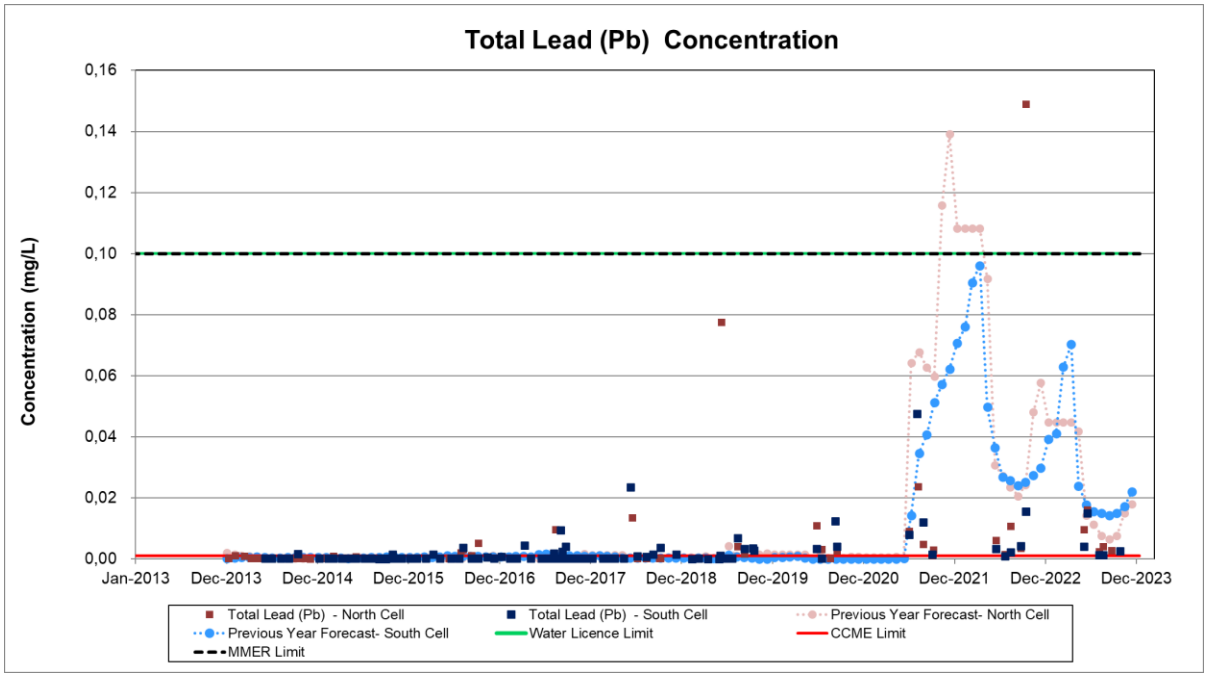


Figure 2-1: (continued) Concentrations North and South Cell TSF Reclaim Ponds – Total Cyanide & Metals



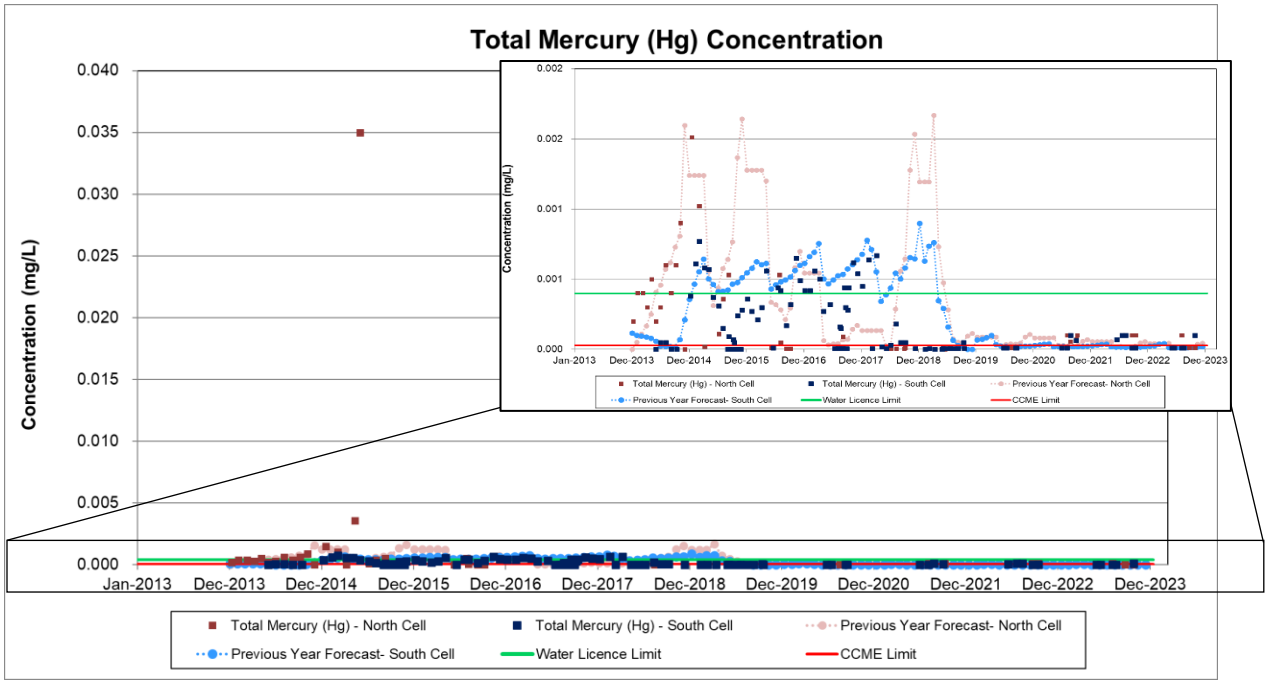
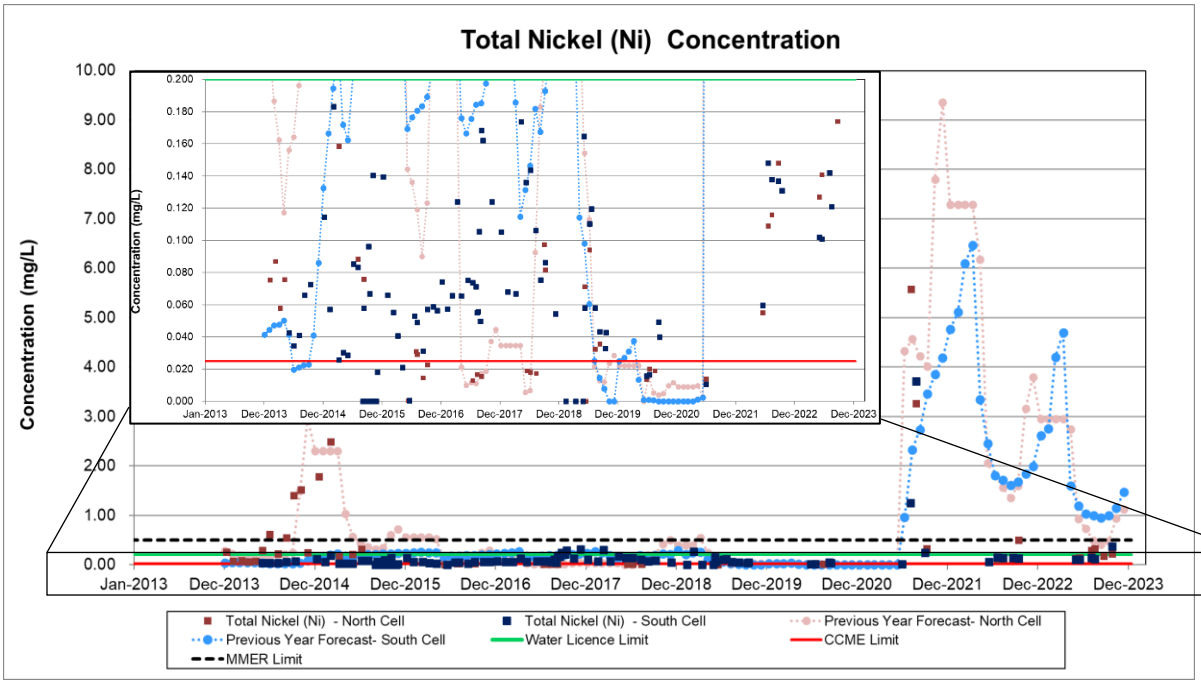


Figure 2-1: (continued) Concentrations North and South Cell TSF Reclaim Ponds – Total Cyanide & Metals



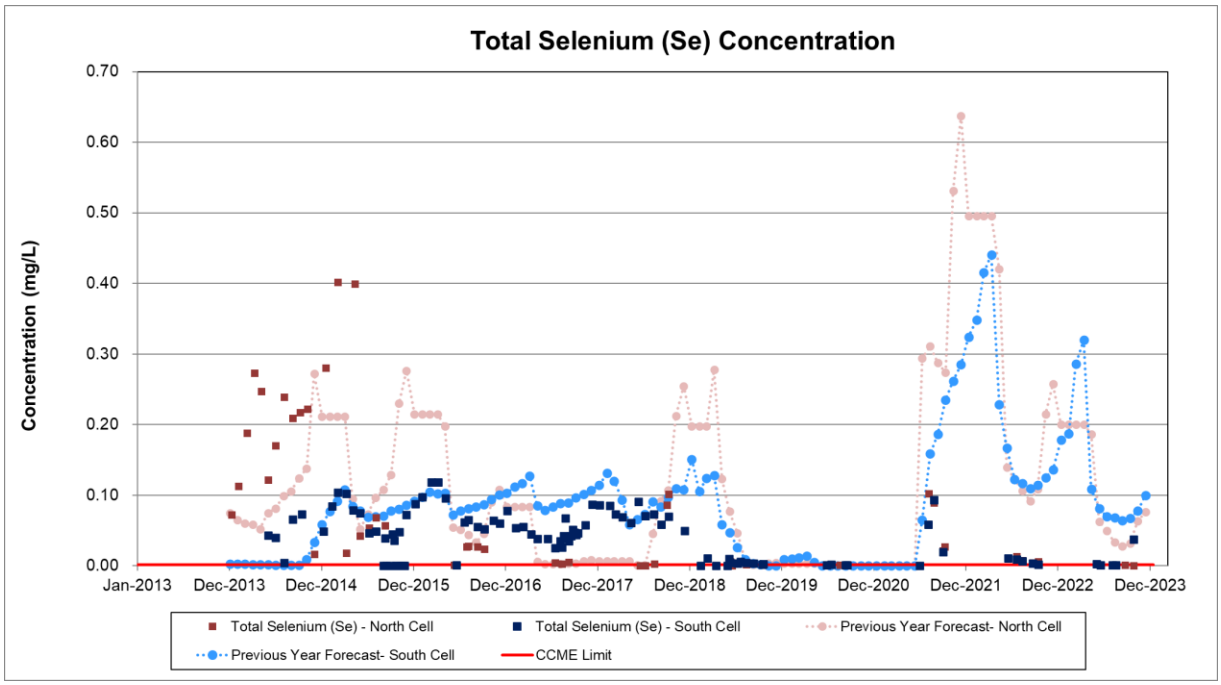


Figure 2-1: (continued) Concentrations North and South Cell TSF Reclaim Ponds – Total Cyanide & Metals

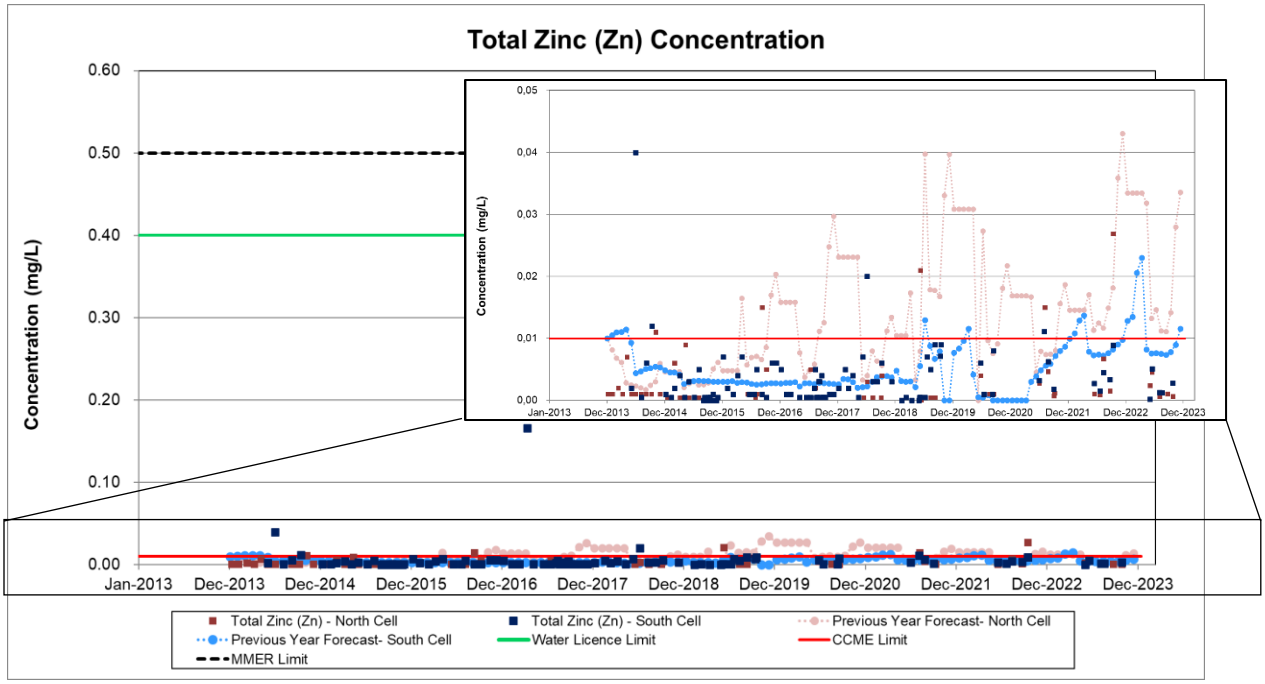


Figure 2-1: (continued) Concentrations North and South Cell TSF Reclaim Ponds – Total Cyanide & Metals

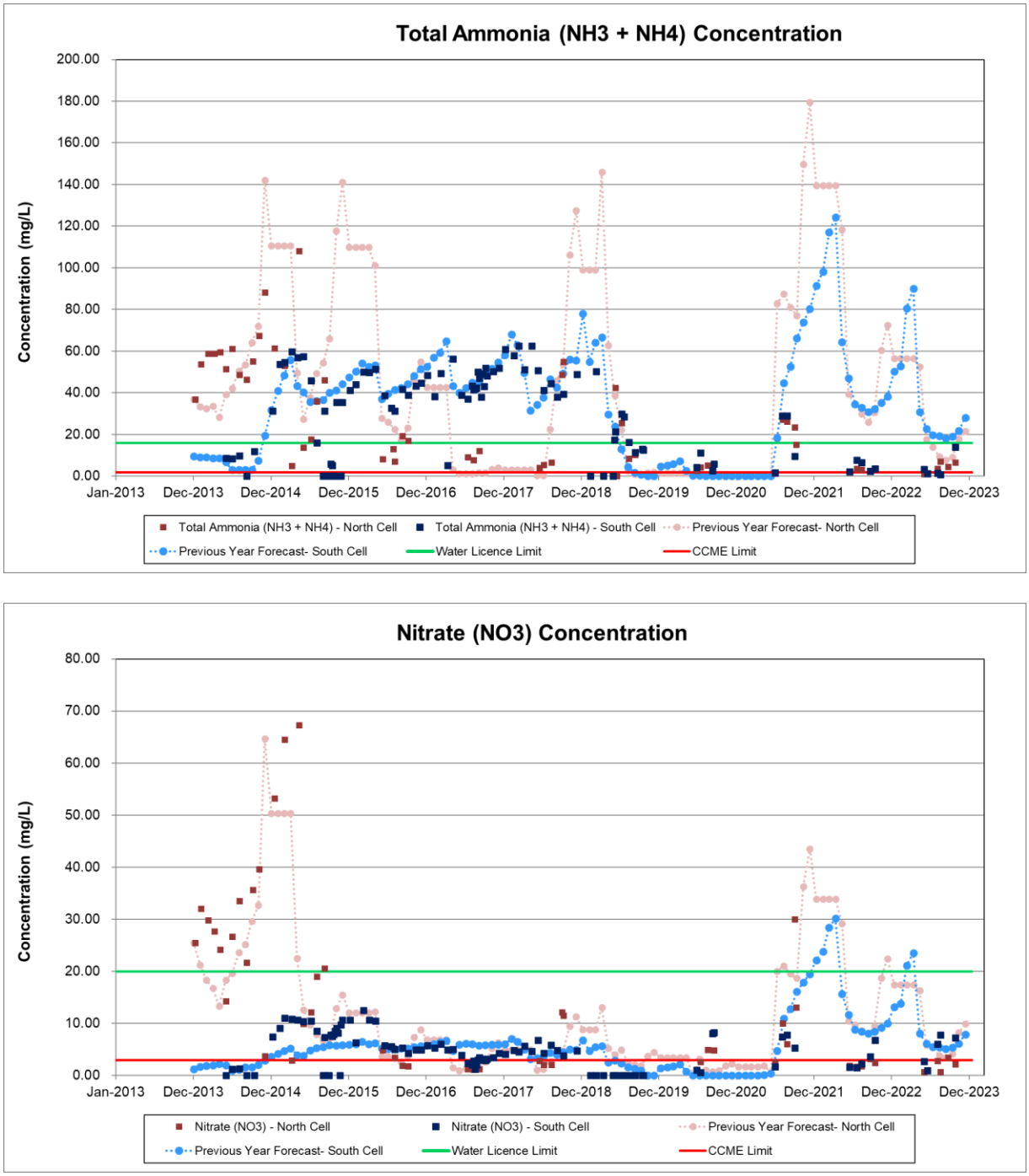


Figure 2-2: Concentrations North and South Cell TSF Reclaim Ponds – Ammonia & Nitrate

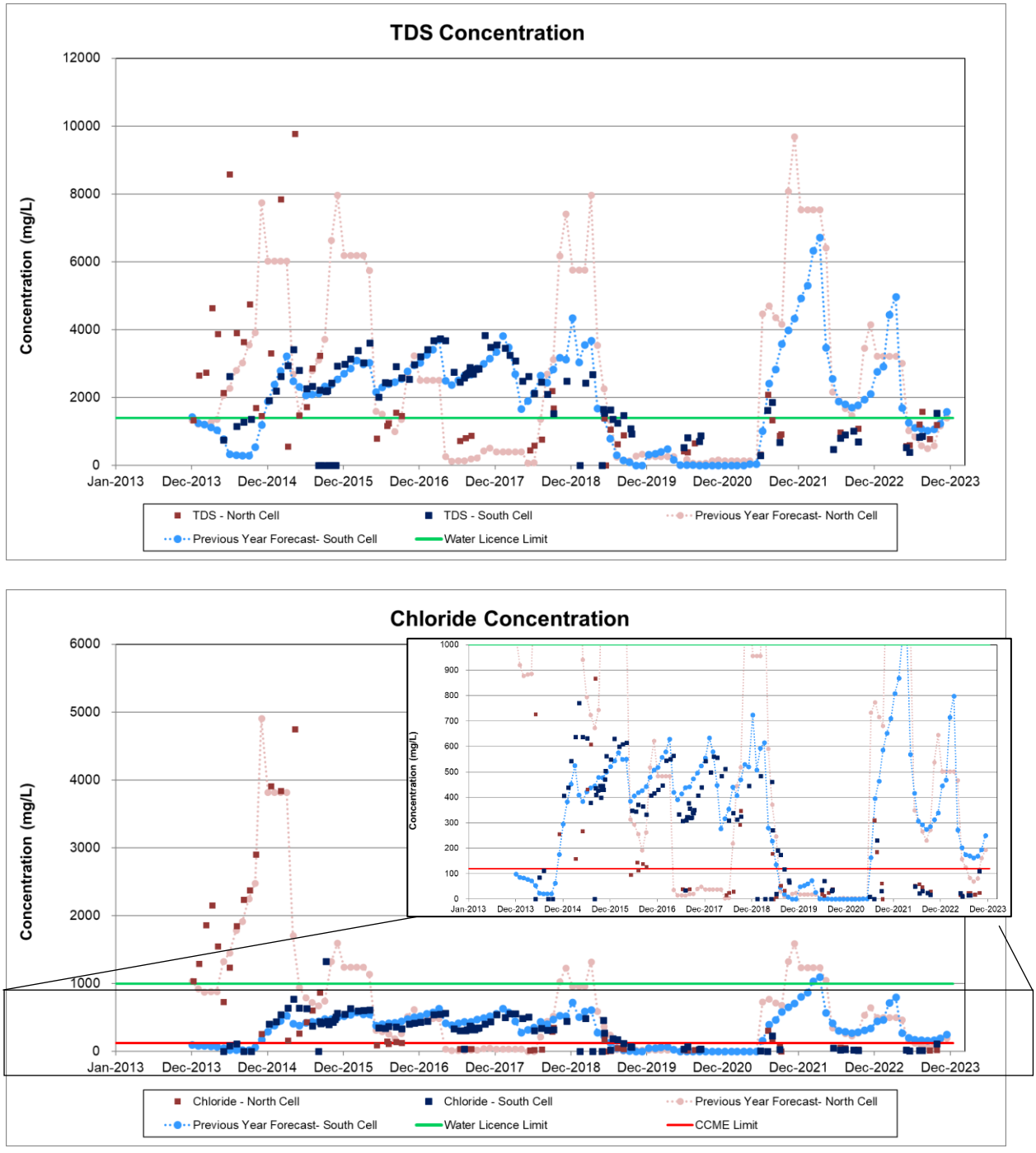


Figure 2-3: Concentrations North and South Cell TSF Reclaim Ponds – TDS & Anions

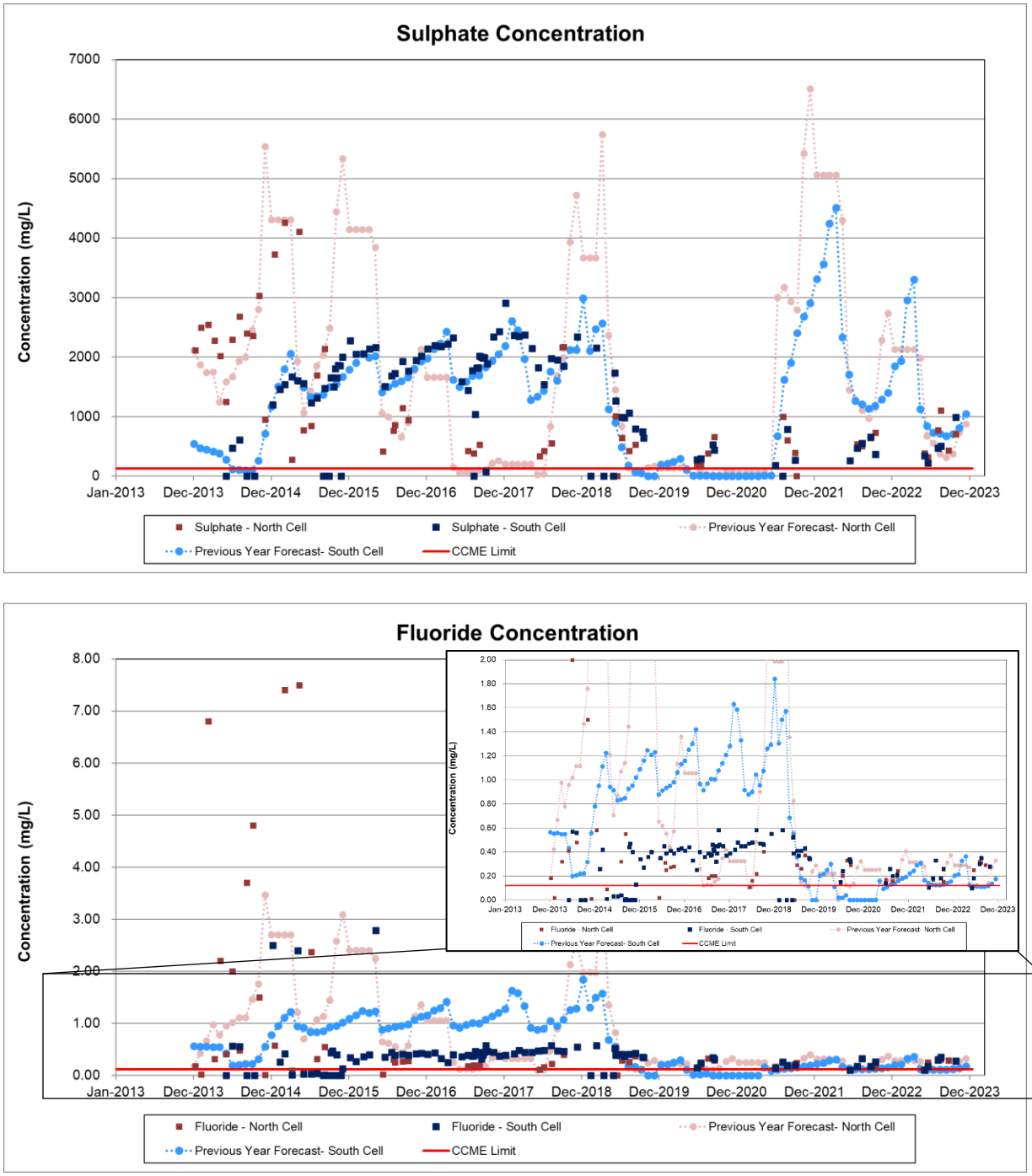


Figure 2-3: (continued) Concentrations North and South Cell TSF Reclaim Ponds – TDS & Anions

Table 2-3 summarizes the observations that can be made based on the measured values and forecasted concentrations as shown in **Figure 2-3**. For some parameters, the graphs observations have been divided into North Cell TSF Reclaim Pond (NC) and South Cell TSF Reclaim Pond (SC). The forecasted values are based on the previous model (SNC-Lavalin, 2023).

Table 2-3: Observations from Measured and Forecasted Concentrations in NC and SC TSF Reclaim Ponds

PARAMETER	MEASURED VALUES OBSERVATIONS	FORECASTED VALUES OBSERVATIONS
Total Cyanide (CN)	**NC & SC:** Since the end of deposition of tailings in NC and SC in 2019, the CN concentrations are very low. For comparison purposes only, concentrations were below MDMER and Water Licence criterion for all the analyzed samples. The concentrations are generally above the CCME limit. However, tailings were deposited in 2021 in NC, and the CN concentration did increase slightly in NC and SC compared to 2020. No deposition occurred in 2022 and CN concentration decreased. In 2023, limited deposition of tailings occurred in SC, but CN concentration remains low.	**NC& SC:** In 2019, as there was no tailings deposition in both North Cell (after April) and South Cell (after August) between 2019 and 2020, cyanide volatizes in the summer and its concentration slowly reduces in the cell with time. This was confirmed with the monitored data. In 2021, tailings were deposited in the NC, which was not included in the previous year's forecast. In 2022, it was forecasted that the concentration would decrease in both cells, with a slight increase at the end of the year in the NC. The forecasted values were above the measured values indicating that the forecast model is conservative. In 2023, forecasted concentrations decreased in both cells, with a slight increase at the end of the year in both cells. The forecasted values were above the measured values indicating that the forecast model is conservative.
Total Metals (general)	See specific parameters for details.	The current forecasting model was based on a mass balance using the water balance around the site and does not consider possible geochemical reactions that could help precipitate the metals out of the water column phase at equilibrium. For this reason, some of the forecasted values can be higher than the measured values. Furthermore, for both NC and SC: Deposition of tailings in 2021 in the NC was accounted for in the forecast. Forecasted concentration indicated an increase in concentration in 2021 in both cells followed by a decrease in 2022 and 2023. The measured values generally followed this trend. See specific parameters for additional details.

PARAMETER	MEASURED VALUES OBSERVATIONS	FORECASTED VALUES OBSERVATIONS
Total Aluminum	**NC & SC:** Measured concentrations decreased in 2022 compared to previous years since no tailings deposition occurred at this location. However, there were some peak concentrations that were higher than the Water Licence discharge criterion. Measured concentrations continued to decrease in 2023. However, some values slightly increased towards the end of the year. Almost all concentrations are below the Water Licence discharge criterion.	**NC & SC:** Prior to the deposition of tailings in NC, the measured values were higher than the forecasted values. This indicates that natural runoff into the NC and SC were carrying suspended solids that contain metal particulates. The forecasted model integrated the tailings deposition in the NC in 2021. Forecasted concentration indicated an increase in concentration in 2021 in both cells followed by a decrease in 2022 and 2023. The measured values generally followed this trend.
Total Arsenic	**NC & SC:** Measured concentrations were in the same range/trend as last year. In general for 2023, concentrations decreased compared to 2022 and were above CCME limits and lower than the Water Licence discharge criterion.	See notes on Total Metals.
Total Cadmium	**NC & SC:** Measured concentrations were relatively low. For comparison purposes only, all the collected samples showed concentrations below the Water Licence criterion and slightly above the CCME limit.	**NC & SC:** Forecasted concentration was expected to be close to the CCME limit.
Total Copper	**NC & SC:** Measured concentrations decreased in 2022 compared to previous years. This was expected since no tailings were deposited in the NC. In 2023, measured concentrations continued to decrease. Concentrations were near the CCME limit, but remained below the Water Licence discharge criterion.	See notes on Total Metals.
Total Iron	**NC & SC:** Measured concentrations decreased in 2022 and 2023 between January and June compared to previous years. In July and August concentrations started to increase slightly, coinciding with runoff season. In 2023, 50% of concentrations exceeded the CCME limit, while the remaining concentrations were below or near the CCME limit.	Forecasted concentration was expected to be approaching the CCME limit. In the summer period, certain measured values were higher.

PARAMETER	MEASURED VALUES OBSERVATIONS	FORECASTED VALUES OBSERVATIONS
Total Lead	**NC & SC:** Measured concentrations increased in 2022 during the summer months. This increase could be due to runoff scouring the surface of the tailings. Nevertheless, measured concentrations decreased in 2023. However, concentrations were lower than the Water Licence discharge criterion, but above the CCME limit.	**NC & SC:** Forecasted concentrations were expected to be close to the CCME limit. The deposition of tailings in the NC in 2021 led to an increase in concentrations that are above the CCME limit but below the Water Licence discharge criterion. This trend continued in 2022. However, in 2023, forecasted concentrations were expected to decrease and to be close to the CCME limit, but below the Water Licence discharge criterion.
Total Mercury	**NC & SC:** Measured concentrations in 2022 are similar compared to previous years. This was due to the deposition of tailings in NC in July and August of 2021. Measured concentrations in 2023 are similar to values measured in the previous year. However, all concentrations were lower than the Water Licence discharge criterion, but almost all of them were below or close to the CCME limit.	**NC & SC:** Forecasted concentrations were expected to be close to the CCME limit. Despite the deposition of tailings in both cells, the forecasted concentrations in 2023 remained close to the CCME limit.
Total Nickel	**NC & SC:** Measured concentrations decreased in 2022 compared to 2021 since no deposition was going in the NC. Compared to 2022, measured concentrations increased slightly in 2023. In 2022, all concentrations were between the CCME limit and Water Licence discharge criterion. In 2023, almost all concentrations were between the CCME limit and Water Licence discharge criterion, but lower than the MDMER limit.	See notes on Total Metals.
Total Selenium	**NC & SC:** Measured concentrations decreased in 2022 compared to 2021. A possible geochemical reaction may contribute to a decrease in the concentration of selenium. As in 2022, measured concentrations continued to decrease more in 2023. Almost all concentrations were below the CCME limit.	See notes on Total Metals.

PARAMETER	MEASURED VALUES OBSERVATIONS	FORECASTED VALUES OBSERVATIONS
Total Zinc	**NC & SC:** Concentration values in 2023 were similar when compared to previous years. All concentrations remain below the Water Licence criterion and the CCME limit.	**NC & SC:** Forecasted concentration was expected to be close to the CCME limit. In 2021, despite the deposition of tailings in the NC, the forecasted concentrations remained below the CCME limit for SC and above the same limit for NC after August. Compared to 2022, in 2023, almost all forecasted concentrations were expected to be below the CCME limit for both cells.
Total Ammonia	**NC & SC:** Measured concentrations decreased in 2022 compared to 2021. However, they continued to decrease until the midpoint of 2023, then increased until the end of the year. This was due to the deposition of tailings in August and September 2023 in SC. Concentrations were lower than the Water Licence criterion but, slightly above CCME limit.	**NC & SC:** Forecasted concentrations in 2023 were expected to decrease initially and then increase slightly. Generally, the forecasted concentrations of NC are still below the Water Licence criterion and close to the CCME limit. However, the forecasted concentrations of SC were above the Water Licence criterion and close to the CCME limit. Measured values were below this forecast.
Nitrate	**NC & SC:** As in 2022, measured concentrations increased in 2023. This was due to the deposition of tailings in August and September 2023 in SC. Concentrations were lower than the Water Licence criterion for both cells, and close to the CCME limit for NC.	**NC & SC:** Compared to 2022, forecasted concentrations in 2023 were expected to increase slightly but remained below the Water Licence criterion and close to the CCME limit.
TDS	**NC & SC:** Measured concentrations increased slightly in 2023 compared to 2022. Most of the concentrations were below the Water Licence criterion.	**NC & SC:** Forecasted concentrations in 2023 were expected to decrease until the midpoint of the year, followed by a slight increase until the end of the year. Most of the measured values for SC were below the forecasted values. However, most of the measured values for NC were slightly above the forecasted values.
Chloride	The primary source of chloride found in the TSF Reclaim Ponds was most likely from the use of calcium chloride in the winter months as an anti-freeze solution on the ore and a dust suppressant in the Mill dome. **NC & SC:** Despite the deposition of tailings in the NC in 2021, the concentrations decreased slightly in 2022 compared to 2021 and remained below the water license criteria and the CCME limit. In 2023, concentrations remained generally stable for NC. Towards the end of the year, there was a slight increase observed for SC. Measured values were below the Water License criterion and the CCME limit.	**NC & SC:** Generally, forecasted concentrations in 2023 were expected to decrease more than in 2022 and were expected to range between the CCME limit and the Water Licence criterion. Measured values were below the forecasted values.

PARAMETER	MEASURED VALUES OBSERVATIONS	FORECASTED VALUES OBSERVATIONS
Sulphate	**NC & SC:** As in 2022, measured concentrations slightly increased in 2023. This was due to the deposition of tailings in July and August in 2023. Concentrations were generally higher than the adopted limit for this criterion.	**NC & SC:** As in 2022, forecasted concentrations in 2023 were expected to decrease more and to be slightly above the BC Environmental limit for this parameter. Measured values were below the forecasted values.
Fluoride	**NC & SC:** Fluoride concentrations were more or less constant and low during the year, despite the deposition of tailings in the NC in 2021. For comparison purposes only, the concentrations were generally slightly above the CCME limit.	**NC & SC:** Forecasted concentrations in 2023 were expected to increase until the midpoint of the year, followed by a slight decrease until the end of the year while remaining close to the CCME limit. The forecasted values trended approximately with the measured data.

2.5 Portage and Goose Pits

In 2020, in-pit tailings deposition continued in Goose Pit from January to August 2020 and was then transferred to South Portage Pit (Pit E).

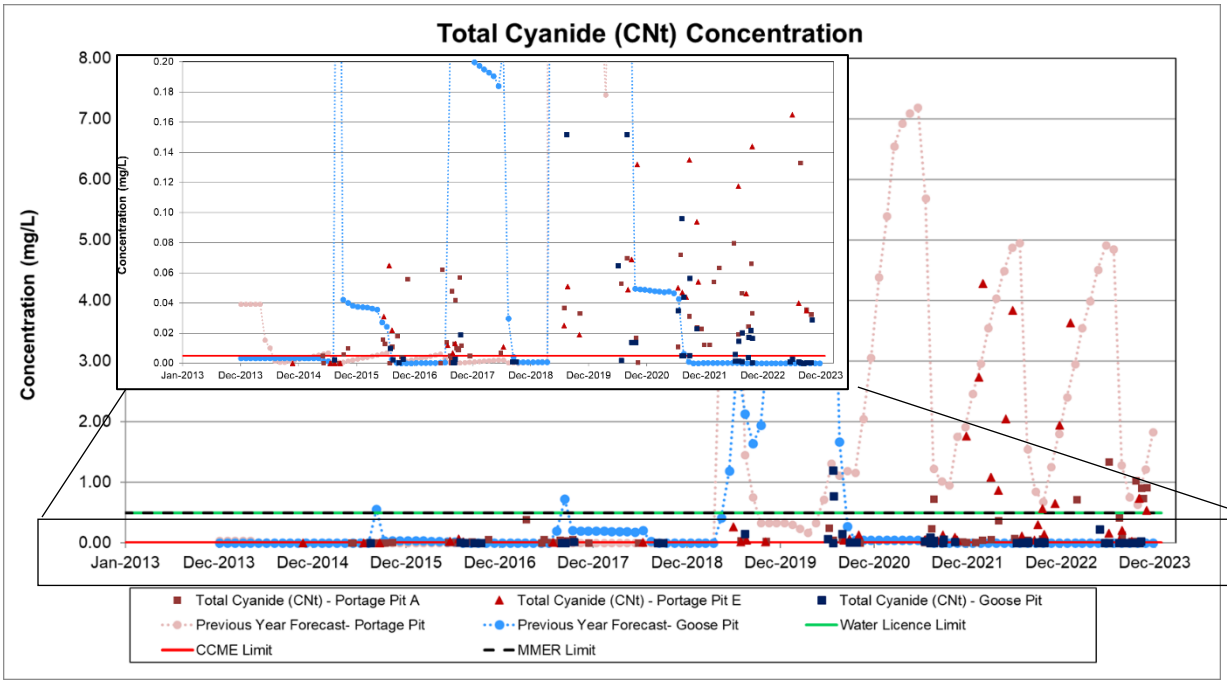
In Goose Pit, Reclaim Water and natural runoff from its sub-catchment area were allowed to accumulate in the pit. Water was then transferred to Portage North (Pit A) between May to September 2020 and in May and June 2021. There was no water transfer in 2022. In 2023, about 439,935 m^3 of reclaim water from Portage North (Pit A) was transferred to Goose Pit.

In Portage Pit E, Reclaim Water (as of August 2020) and natural runoff from its sub-catchment area also accumulated in the pit. No water transfer occurred in 2020. Water was transferred to Portage North Pit (Pit A) from October to December 2021, between January to December 2022, and between January to December 2023. Reclaim water was also pumped from Pit E to the Mill.

North Portage Pit (Pit A) continues to receive its natural runoff from its sub-catchment area, as well as water transfer from East Dike Seepage, South Cell TSF, CDDP, Portage Pit E, and Storm Water Management Pond. Water from Pit A was also pumped to the Mill to be reused as Reclaim Water intermittently: from June 2020 to the end of 2021; from January to April 2022 and July to October 2022; and from June to September 2023.

Water quality analysis of samples taken from the pit lakes formed in Portage Pit A (ST-17) and Pit E (ST-19), and in Goose Pit (ST-20) in 2023 are tabulated in Section 8.0 of AEM's 2023 Annual Report.

Figure 2-4 to **Figure 2-6** present the concentration of the parameters of concern measured in the Portage and Goose Pits from 2013 to 2023. Based on the graphs shown in **Figure 2-4** to **Figure 2-6**, observations from measured and forecasted concentrations in Portage and Goose Pits are summarized in **Table 2-4**.To facilitate the reading, Portage Pit has been abbreviated as PP and Goose Pit as GP.



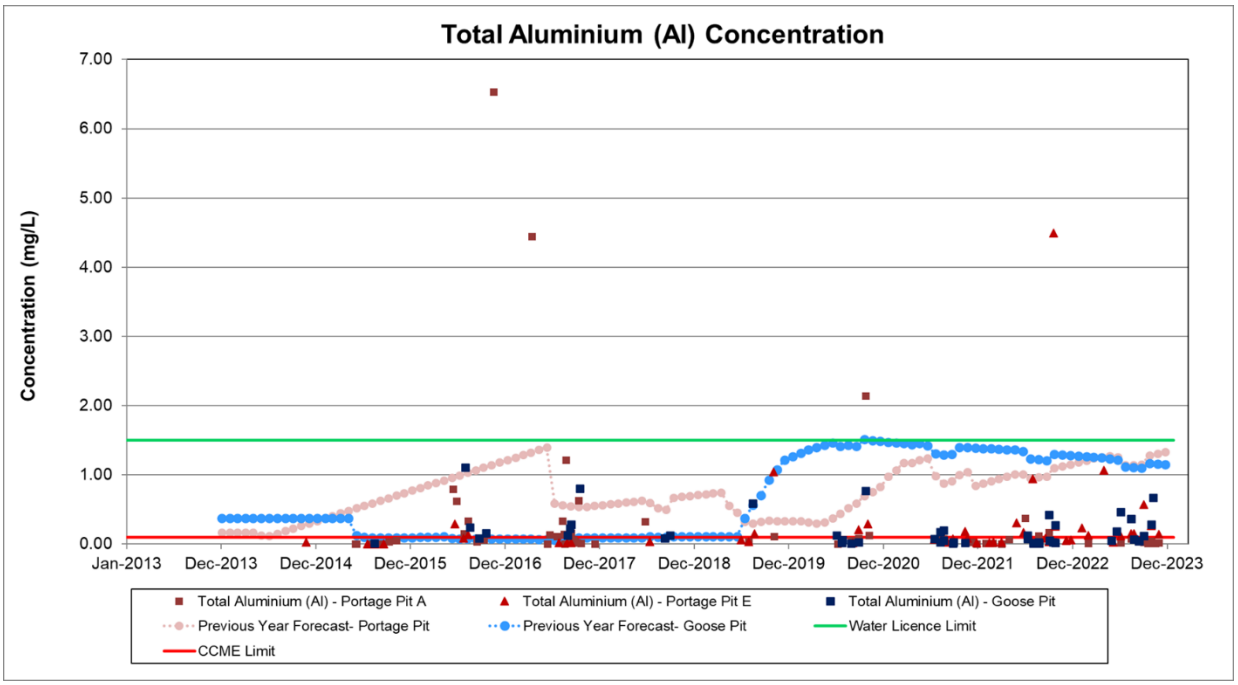
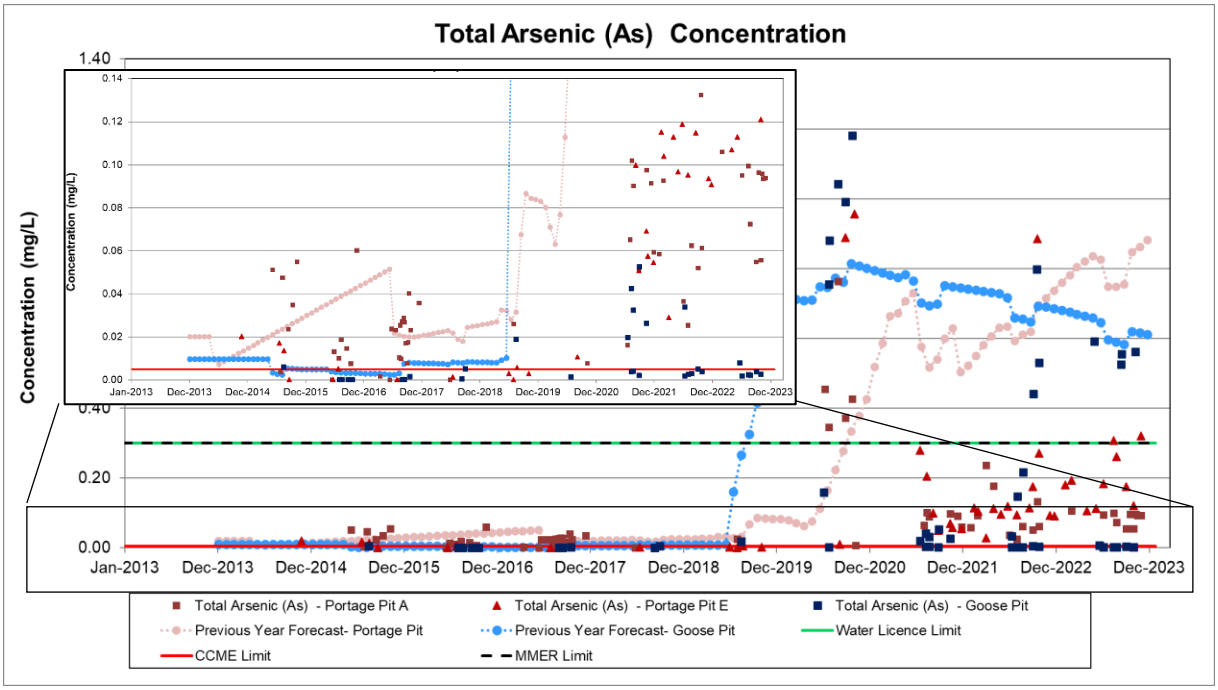


Figure 2-4: Concentrations Portage Pit and Goose Pit – Total Cyanide & Metals



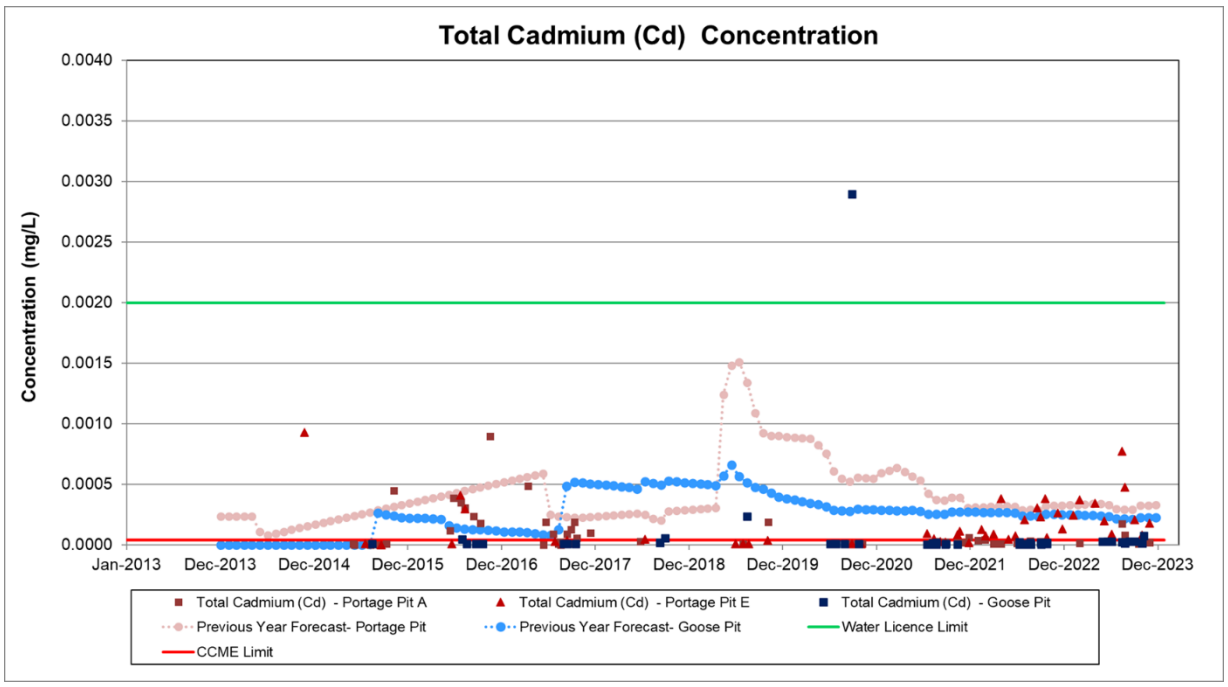


Figure 2-4: (continued) Concentrations Portage Pit and Goose Pit – Total Cyanide & Metals

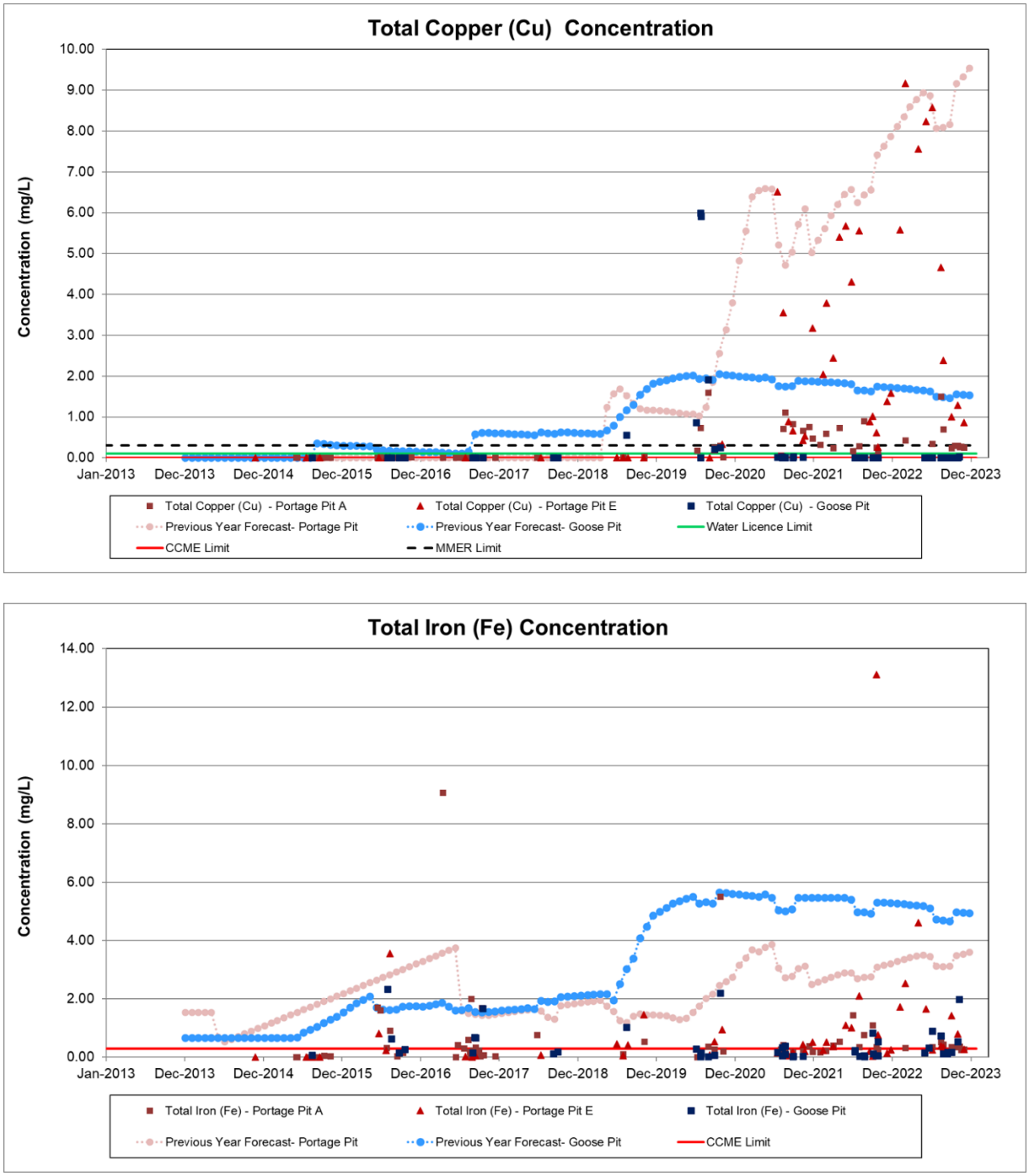
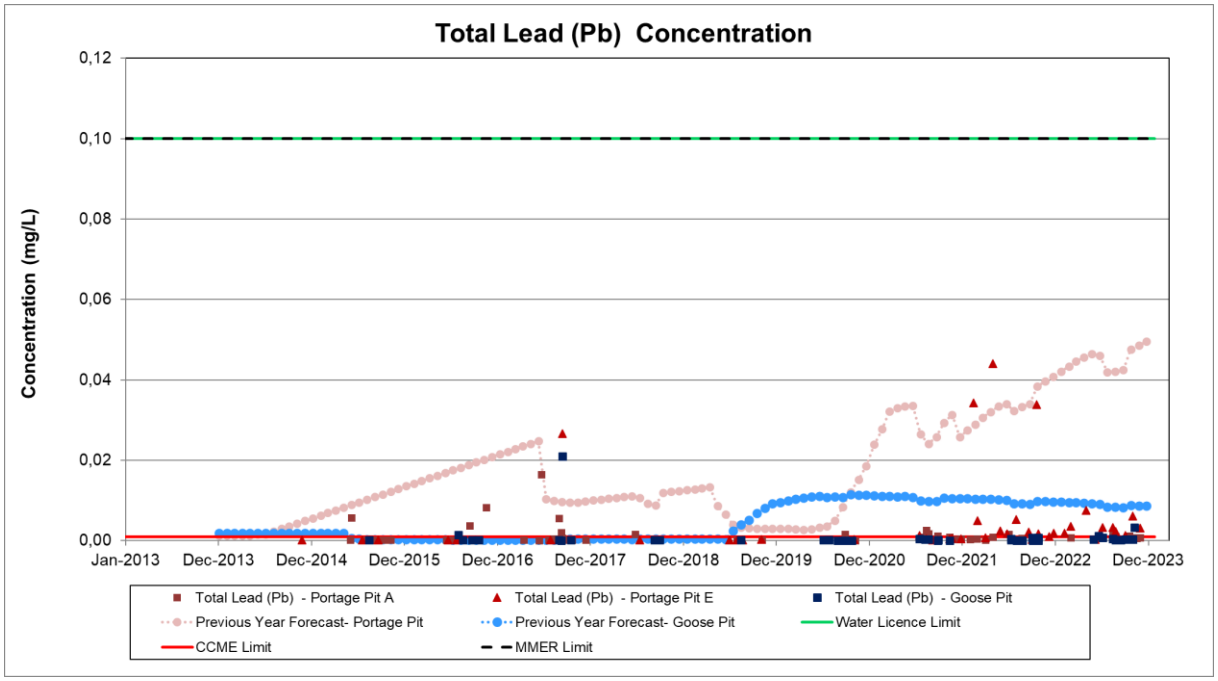


Figure 2-4: (continued) Concentrations Portage Pit and Goose Pit – Total Cyanide & Metals



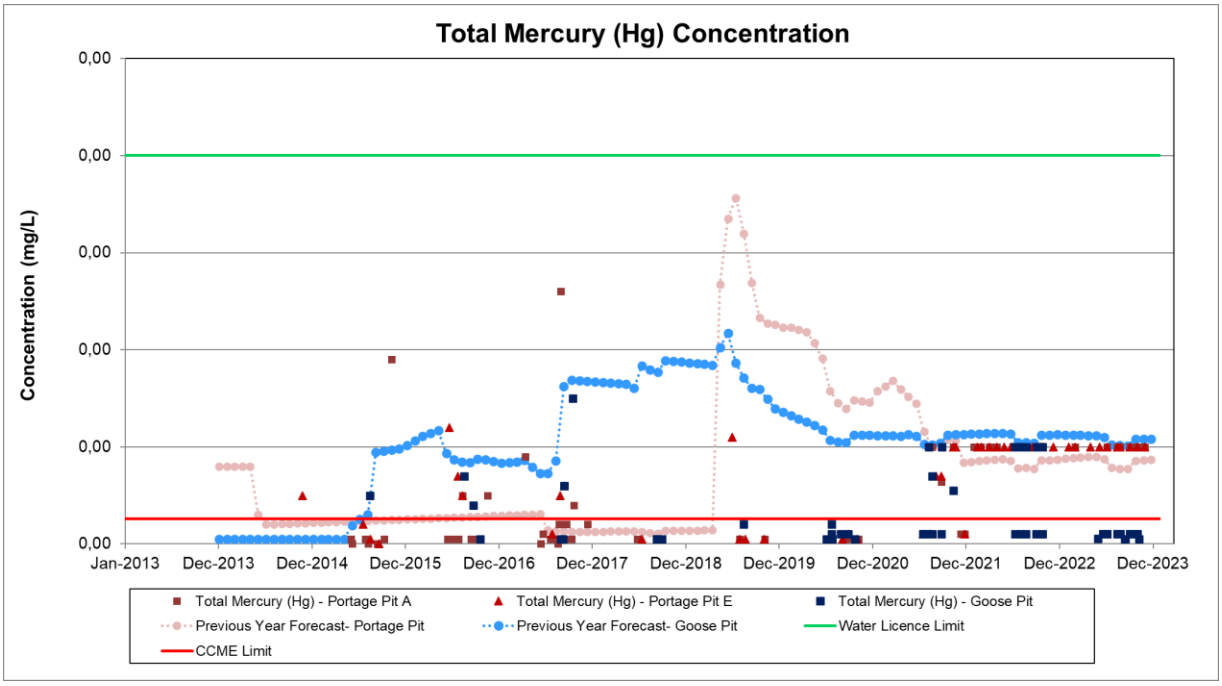
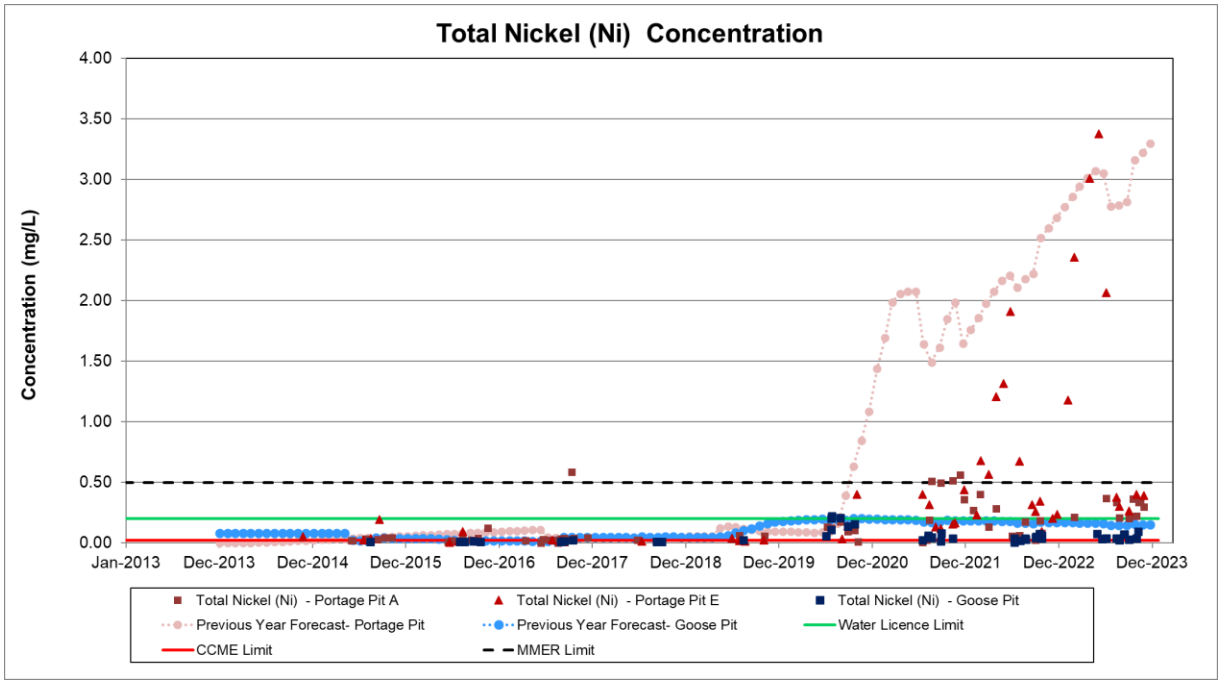


Figure 2-4: (continued) Concentrations Portage Pit and Goose Pit – Total Cyanide & Metals



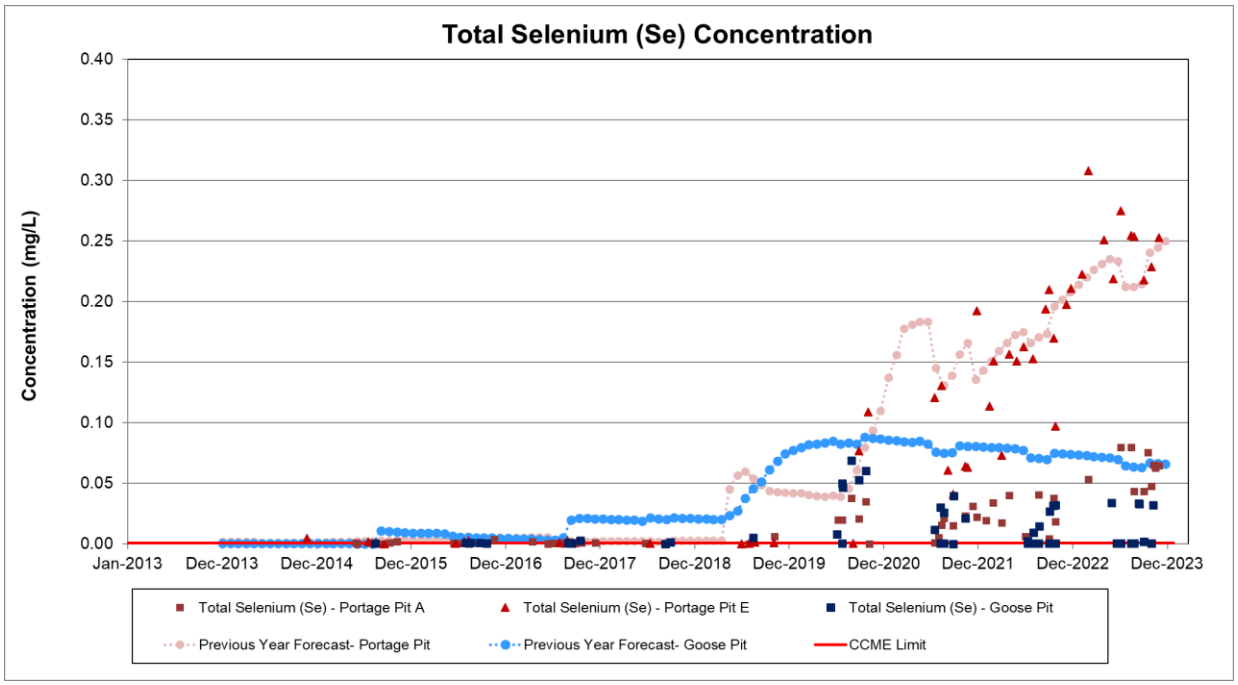


Figure 2-4: (continued) Concentrations Portage Pit and Goose Pit – Total Cyanide & Metals

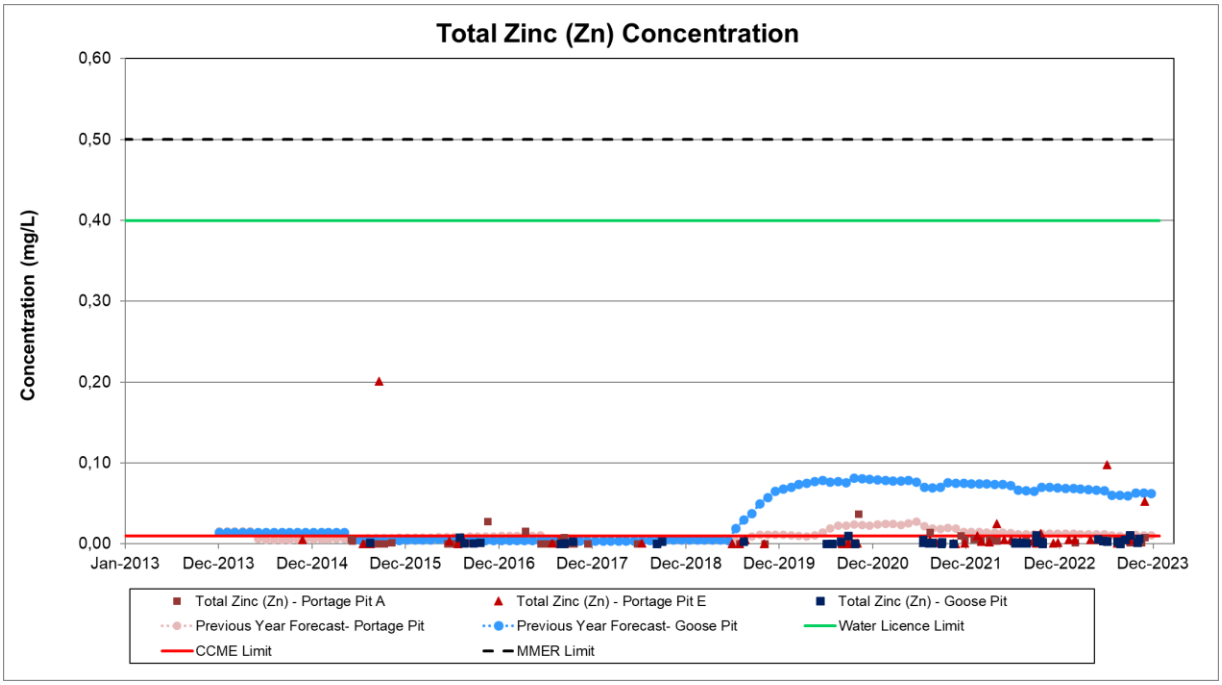


Figure 2-4: (continued) Concentrations Portage Pit and Goose Pit – Total Cyanide & Metals

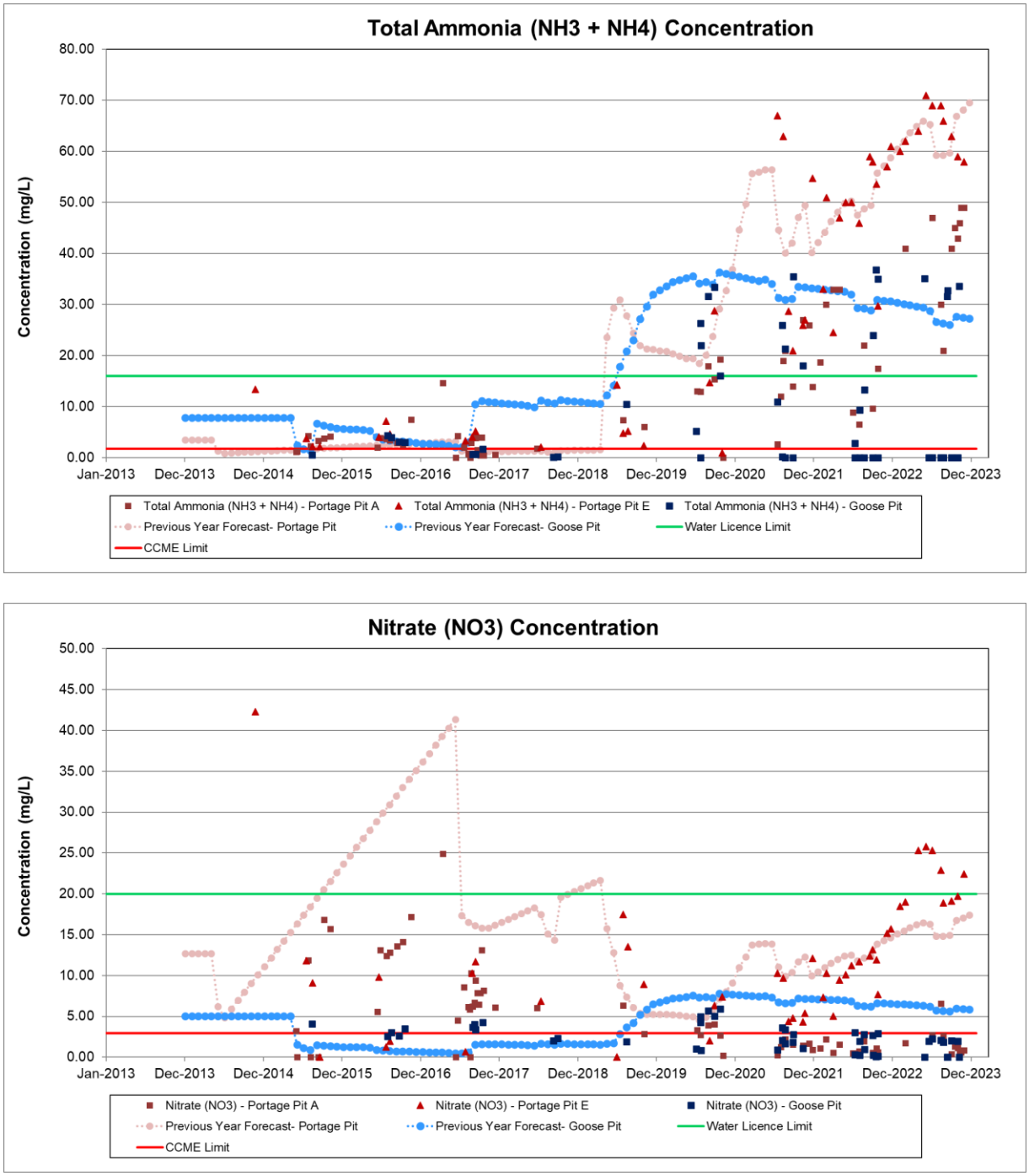


Figure 2-5: Concentrations Portage Pit and Goose Pit – Ammonia & Nitrate

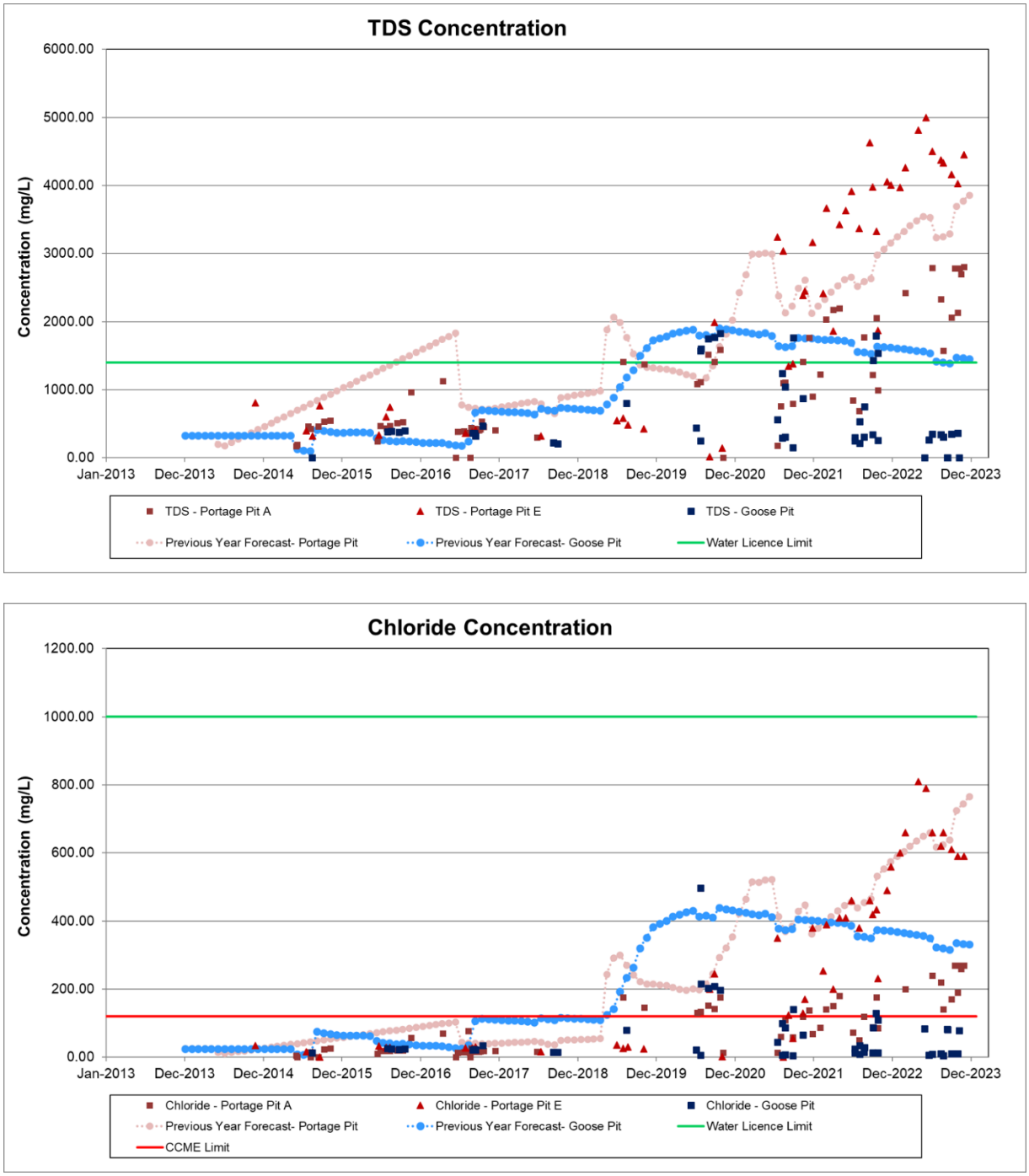
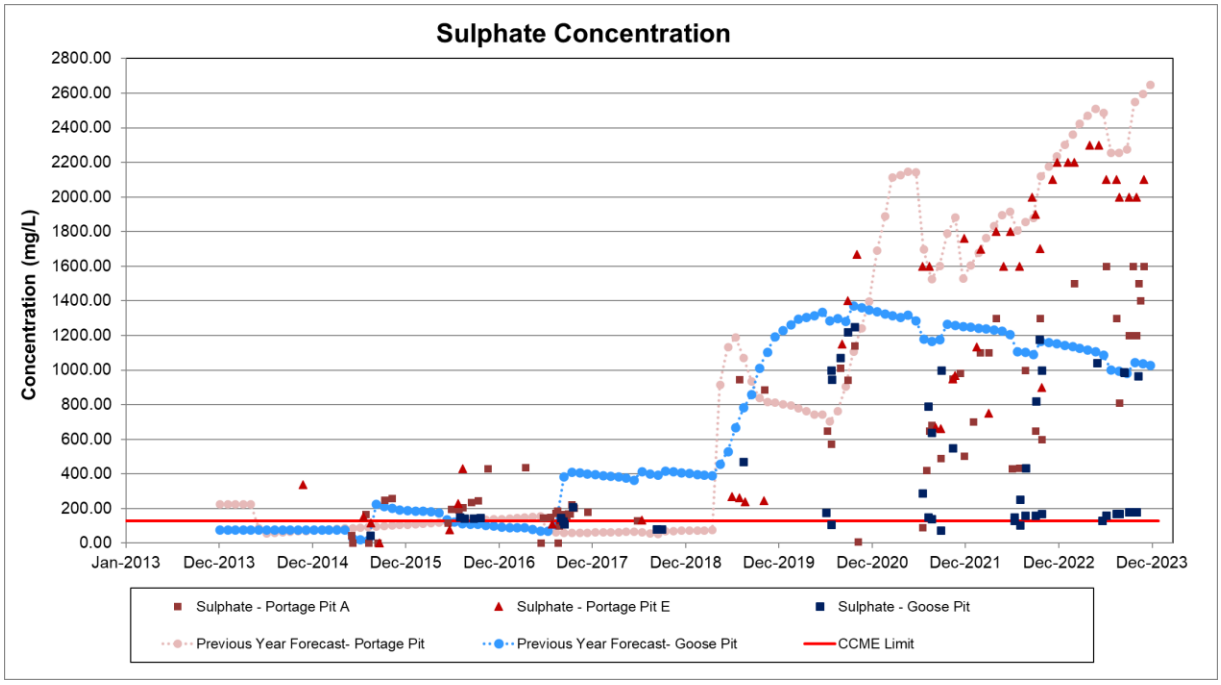


Figure 2-6: Concentrations Portage Pit and Goose Pit – TDS & Anions



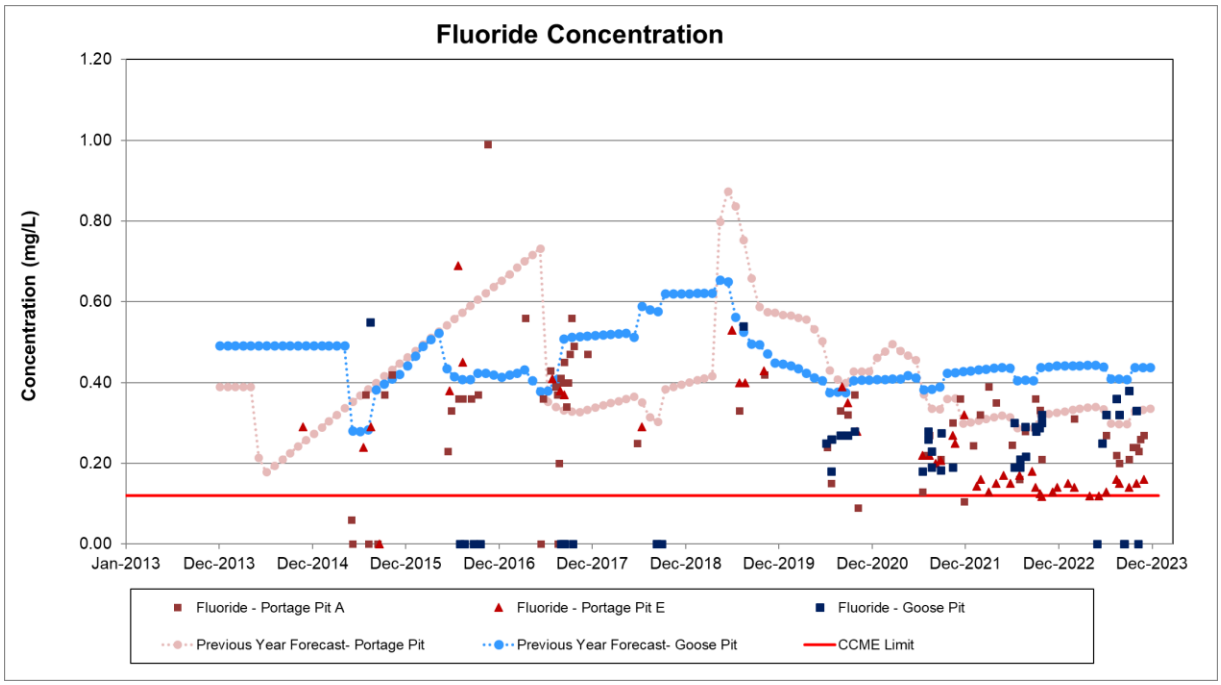


Figure 2-6: (continued) Concentrations Portage Pit and Goose Pit – TDS & Anions

Table 2-4: Observations from Measured and Forecasted Concentrations in Portage and Goose Pits

PARAMETER	MEASURED VALUES OBSERVATIONS	FORECASTED VALUES OBSERVATIONS
Total cyanide	**PP:** Measured values continued to increase in 2022 since deposition of tailings started in PP Pit E. For comparison purposes only, the measured concentrations of Pit E and Pit A were generally below Water Licence and MDMER limits during the summer months and increased above these limits in winter. The concentrations remained above the CCME limit. In 2023, measured values of Pit A decreased. However, the measured concentrations of Pit E continued to increase, albeit slightly compared to the previous year. Measured concentrations were below 2 mg/L, and generally, below the Water Licence and MDMER limits for Pit E, while exceeding these limits in autumn for Pit A. The concentrations remained above the CCME limit. **GP:** Measured concentrations were very low since no deposition occurred in this pit. For comparison purposes only, the measured concentrations were below MDMER and Water Licence limits and were slightly above the CCME limit. In 2023, with the exception of one concentration (~0,03 mg/L), the trend of measured concentrations was similar to that of 2022.	**PP:** The forecast model predicted an increase in total cyanide values since tailings deposition started in this pit. In 2022, the measured concentrations were higher than the forecasted values. However, in 2023, the forecasted values were higher than the measured concentrations. **GP:** Forecasted values for 2022 and 2023 were lower than measured concentrations, suggesting that the model slightly overestimated the impact of natural degradation occurring in the pit lake, but the concentration remains low (< 0.02 mg/L). Forecasted values for PP are expected to be above the Water Licence limits, and below the limits for GP.
Total Aluminum	**PP:** In 2022, measured values were similar to those in 2021. For comparison purposes only, all values were below the Water Licence limit and were slightly above the CCME limit. The transfer of Reclaim Water to Pit A from Pit E and the deposition of tailings in Pit E did not contribute to increase the concentration for this parameter. In 2023, measured concentrations of both Pit E and Pit A were below the Water Licence limit and slightly above and close to the CCME limit for Pit E. **GP:** Measured values decreased slightly until summer 2023 and then increased in the fall. For comparison purposes only, the concentrations were generally below the Water Licence limit and slightly above and close to the CCME limit.	**PP & GP:** The forecasted concentrations were generally higher than the measured concentrations and continued to increase slightly for PP and to decrease slightly for GP, suggesting that the load for this constituent assumed in the model is conservative. The lower measured concentration could also be explained by a good settling of suspended particles in these pits. Forecasted concentrations were expected to be lower than the Water Licence limit.

PARAMETER	MEASURED VALUES OBSERVATIONS	FORECASTED VALUES OBSERVATIONS
Total Arsenic	**PP:** Measured concentrations in 2023 are relatively lower compared to last year's data. For comparison purposes only, most of the measured values were below MDMER and Water Licence limits but remained above the CCME limit. **GP:** As of 2022, measured concentrations increased after the summer. Concentrations increased from 0,005 to approximately 0,55 mg/L. For comparison purposes only, 40% of concentrations were slightly above the MDMER and Water Licence limits, but the majority were below these limits and close to the CCME limit.	**PP:** As of 2022, forecasted values of 2023 indicated a slight increase in concentrations during tailings deposition, which was observed based on the measured data. However, the forecasted values are higher than the measured values, which suggest that the load assumed for this constituent in the model is conservative. Furthermore, the model assumes a constant loading for this constituent from the mill effluent over time and does not consider any variability in mill effluent chemistry over the year, resulting in a conservative assessment. Also, the model considers that the solid fraction associated with Arsenic remains in suspension, again resulting in a conservative assessment. **GP:** As of 2022, forecasted values indicated a slight decrease until the summer in 2023, followed by an increase in autumn. This trend was observed based on the measured data. The forecasted values are higher than the measured values, which suggest that the load assumed for this constituent in the model is conservative.
Total Cadmium	**PP:** Measured concentrations were generally below the detection limit. For comparison purposes only, the concentrations were below the limits for Pit A. For Pit E, measured values were below the Water Licence limit and generally slightly above the CCME limit. Concentrations values decreased. **GP:** Measured concentrations were generally below the detection limit and demonstrate a slight decrease. For comparison purposes only, the concentrations were generally below the limits.	**PP and GP:** In general, forecasted values were higher than the measured ones, which suggest that the load assumed for this constituent in the model is conservative. Based on measured data, forecasted values continued to decrease slightly.

PARAMETER	MEASURED VALUES OBSERVATIONS	FORECASTED VALUES OBSERVATIONS
Total Copper	**PP:** In contrast to 2022, measured concentrations decreased for both Pits in 2023, which could be due to a better settling of the Cu in the pits or a lower use of Cu in the mill. For comparison purpose only, values were higher than the MDMER and Water Licence limits. **GP:** Measured concentrations in 2023 remain low since no tailings deposition took place in this pit. For comparison purposes only, measured values were lower than the MDMER and Water Licence limits and slightly above and close to the CCME limit.	**PP:** Forecasted values indicated a decrease in concentrations until summer and an increase starting in the fall. The measured values did follow this trend in winter, but decreased in the summer months. Most measured values remain below the forecasted values, suggesting that the load for this constituent assumed in the model is conservative. The lower measured concentration could also be explained by a good settling of suspended particles in these pits. **GP:** Forecasted values indicated a decrease in concentration. The measured values do follow this trend, but remain well below the forecasted values, suggesting that the load for this constituent assumed in the model is conservative. The lower measured concentration could also be explained by a good settling of suspended particles in these pits.
Total Iron	**PP:** Measured concentrations were relatively low in 2023. However, almost all of these concentrations were above the CCME limit. **GP:** Measured concentrations were generally low until summer 2023 and increased in the fall. For comparison purposes only, 50% of values were below or close to the CCME limit.	**PP & GP:** Forecasted values were much higher than the measured values, suggesting that the load for this constituent assumed in the model is conservative. The lower measured concentration could also be explained by a good settling of suspended particles in these pits.
Total Lead	**PP & GP:** Measured concentrations in 2023 were relatively low. For comparison purposes only, most values of Pit A and Goose Pit were below the Water Licence limit and close to the CCME limit. However, most values of Pit E were slightly above the CCME limit.	**PP & GP:** Forecasted values were generally higher than the measured values, suggesting that the load for this constituent assumed in the model is conservative. The lower measured concentration could also be explained by a good settling of suspended particles in these pits.
Total Mercury	**PP:** Measured concentrations were at the detection limit for 2023. For comparison purposes only, concentration values were below the Water Licence discharge criterion and slightly above the CCME limit. **GP:** Measured concentrations were generally at the detection limit for 2023 and showed a similar trend. For comparison purposes only, all values were below limits.	**PP & GP:** Concentrations were forecasted to remain below the Water Licence discharge criterion. Forecasted concentrations values were higher than the measured values, suggesting that the load for this constituent assumed in the model is conservative. The lower measured concentration could also be explained by a good settling of suspended particles in these pits.

PARAMETER	MEASURED VALUES OBSERVATIONS	FORECASTED VALUES OBSERVATIONS
Total Nickel	**PP:** Measured concentrations decreased until the summer 2023, then increased in autumn, which was expected since deposition of tailings continued in these pits. For comparison purposes only, except for some concentrations of Pit E, which were exceeding the MMER limit, all measurements of both Pits were below the MMER limit and most of them were above the Water Licence and CCME limits. **GP:** Measured concentrations in 2023 were generally similar compared to last year. This was expected since no deposition took place in this pit. For comparison purposes only, measured concentrations were below the Water Licence limit and slightly above the CCME limit.	**PP:** Forecasted values indicated an increase in concentration as tailings deposition continued in this pit. In 2023, one of the measured values was higher than the forecasted value. Since the model assumes a constant load for this constituent to the pit, it does not consider any variability of the mill effluent water chemistry over the year. **GP:** Forecasted values were slightly higher than the measured values, suggesting that the load for this constituent assumed in the model is conservative. The lower measured concentration could also be explained by a good settling of suspended particles in these pits.
Total Selenium	**PP:** Measured concentrations decreased during the summer 2023, then increased in autumn, due to tailings deposition. For comparison purposes only, the measured values were above the CCME limit. **GP:** Compared to 2022, measured concentrations in 2023 decreased during the summer and increased in the fall. For comparison purposes only, 40% of measured values were slightly above the CCME limit.	**PP:** Forecasted values projected a similar trend of measured data. Some of the measured values were higher than the forecasted values. Since the model assumes a constant load for this constituent to the pit, it does not consider the variability of the mill effluent water chemistry over the year. **GP:** Forecasted values projected a decrease in concentration and were generally higher than measured ones, suggesting that the load for this constituent assumed in the model is conservative.
Total Zinc	**PP & GP:** Measured concentrations in both pits were low in 2023. For comparison purposes only, measured values remained below Water Licence limits and were generally below or close to the CCME limit. Concentrations values decreased during the summer then increased in autumn.	**PP & GP:** Forecasted concentrations in the previous model projected an increasing trend for PP this year due to the deposition of tailings. In GP, the model projected a slight decreasing trend. The measured values are much lower than the forecasted values, suggesting that the load for this constituent assumed in the model is conservative.

PARAMETER	MEASURED VALUES OBSERVATIONS	FORECASTED VALUES OBSERVATIONS
Total Ammonia	**PP:** In Pit A, measured concentrations in 2023 decreased slightly during the summer, then increased due to the transfer of Reclaim Water from Pit E. In Pit E, measured data increased during the year due to tailings deposition in this pit. For comparison purposes only, all of the measured concentrations exceeded the Water Licence criterion. **GP:** Measured concentrations in 2023 were relatively similar compared to the last year. Concentrations varied during the season, with a lower concentration measured at the start of the summer and then increasing in the fall. For comparison purposes only, in general, most measurements were below the Water Licence criterion early in the summer and then were above it in the fall.	**PP:** Forecasted concentrations in the previous model projected a generally increasing trend this year due to the deposition of tailings in Pit E. The measured values reflect this trend. However, some measured values of Pit E are higher than the forecasted values. Since the model assumes a constant load for this constituent to the pit, it does not consider any variability of the mill effluent water chemistry over the year. **GP:** Forecasted concentrations projected a continuing decreasing trend. This was observed based on the measured values. Almost all of the measured values were lower than the forecasted values except for some samples, suggesting that the load for this constituent assumed in the model is conservative.
Nitrate	**PP:** During the summer 2023, measured concentrations continued to increase due to tailings deposition in the Pits. Most of the measured concentrations were above the Water Licence criterion for Pit E and below the CCME limit for Pit A. **GP:** Measured concentrations in 2023 were relatively similar compared to last year. For comparison purposes only, most of the measurements were below the Water Licence criterion and the CCME limit.	**PP:** Forecasted concentrations in the previous model projected an increasing trend this year due to the deposition of tailings. The measured values reflect this trend. However, measured values in Pit E are higher than the forecasted values. **GP:** Forecasted concentrations projected a slight decreasing trend. This was observed based on the measured values. The measured values were lower than the forecasted values.
TDS	**PP:** During the summer 2023, measured concentrations increased due to tailings deposition in Pit E. However, in Pit A, measured values decreased during the summer, then increased in the fall following the transfer of water from Pit E. For comparison purposes only, measured concentrations were above the Water Licence criterion. **GP:** Compared to the previous year, measured values in 2023 decreased and were below the Water Licence criterion.	**PP:** Forecasted concentrations in the previous model projected an increasing trend this year due to the deposition of tailings. The measured values reflect this trend. Since the model assumes a constant load for this constituent to the pit, it does not consider any variability of the mill effluent water chemistry over the year. Measured values in both pits were higher than the forecasted values. **GP:** Compared to the previous year, forecasted concentrations projected a decreasing trend. This observation was based on the measured values. The measured values were much lower than the forecasted values, suggesting that the load for this constituent assumed in the model is conservative.

PARAMETER	MEASURED VALUES OBSERVATIONS	FORECASTED VALUES OBSERVATIONS
Chloride	**PP:** In Pit E, measured concentrations in 2023 increased slightly during winter due to tailings deposition in the Pit. Then, measured values decreased during the summer and in autumn. Conversely, in Pit A, the trend of measured values was opposite of that observed in Pit E. Measured concentrations were lower than the Water Licence criterion but remained above or close to the CCME limit. **GP:** Measured concentrations in 2023 are generally lower than for previous years and relatively similar compared to the previous year. For comparison purposes only, measured concentrations were below the Water Licence criterion and the CCME limit.	**PP:** Forecasted concentrations in the previous model projected an increasing trend this year due to the deposition of tailings. The measured values reflect this trend. Some measured values of Pit E are higher than the forecasted values. **GP:** Compared to the three previous years, forecasted concentration projected a continuing decreasing trend. This was observed based on the measured values. The measured values were lower than the forecasted values, suggesting that the load for this constituent assumed in the model is conservative.
Sulphate	**PP:** Compared to the previous year, measured concentrations in 2023 increased due to tailings deposition in Pit E. Generally, three trends were observed for both Pits. Measured values increased during winter and fall and decreased during the summer. For comparison purposes only, measured values were higher than the threshold value for sulphate based on BC Environment guidelines for the protection of aquatic life for very soft water. **GP:** Measured concentrations in 2023 are relatively similar in comparison to the concentrations of the previous year. For comparison purposes only, measured values were slightly above or close to the threshold value for sulphate based on BC Environment guidelines for the protection of aquatic life for very soft water.	**PP:** Forecasted concentrations in the previous model projected an increasing trend this year due to the deposition of tailings. The measured values reflect this trend. **GP:** Forecasted concentrations projected a decreasing trend. This was observed based on the measured values. Some measured values were much lower than the forecasted values, while others were close to the forecasted values, suggesting that the load for this constituent assumed in the model is conservative.
Fluoride	**PP & GP:** Measured concentrations were generally lower than 0.4 mg/L. For comparison purposes only, the measured values of Pit E were close to the CCME limit. However, in Pit A and Goose Pit, the measured concentrations were above the CCME limit.	**PP and GP:** Forecasted values were higher than the measured values, suggesting that the load for this constituent assumed in the model is conservative.

2.6 Mill Effluent

2.6.1 Mill Effluent Measurements

A review of the chemical analysis for the Mill Effluent was undertaken by AtkinsRéalis to identify the impact of the Mill Effluent water quality on the water quality observed in the North and South Cell TSF Reclaim Ponds as well as in both Portage and Goose pits. The Mill Effluent is tested twice daily for gold (solid and dissolved), iron (dissolved), copper (dissolved) and cyanide (CN-WAD) using the on-site lab, which is not accredited for environmental water quality chemical analysis. These chemical analyses were provided to AtkinsRéalis between January 2013 and November 2023.

Figure 2-7 shows the monthly average dissolved metal concentrations and cyanide (CN-WAD) in the Mill Effluent sampled at the final tailings sampling point 360-SA-008 for the last six (6) years. This figure illustrates the following:

- Dissolved iron and copper concentrations were present in the Mill Effluent. Thus, the main source of iron and copper in the Reclaim Water comes from the Mill Effluent.
- There is a relationship between copper and cyanide concentrations in the Mill Effluent. The two trends behaved similarly in 2021, less so in 2022. However, in 2023, this similar trend was not observed. A very low concentration of CN-WAD was generally associated with less cyanide (average of 1.9 mg/L) required to extract the gold in certain ore types, resulting in less copper catalyst (average of 8.2 mg/l) required in the cyanide destruction.

Compared to the values of 2017, the peaks observed in 2018, 2019, 2020, 2021 and 2022 for copper and CN-WAD were generally higher, as shown in **Figure 2-7**. This figure also shows that the concentrations measured in 2021 were still the highest compared to the other years. Compared to the previous years, the peak of copper decreased to less than 13 mg/L and the measured concentrations of CN-WAD were very low.

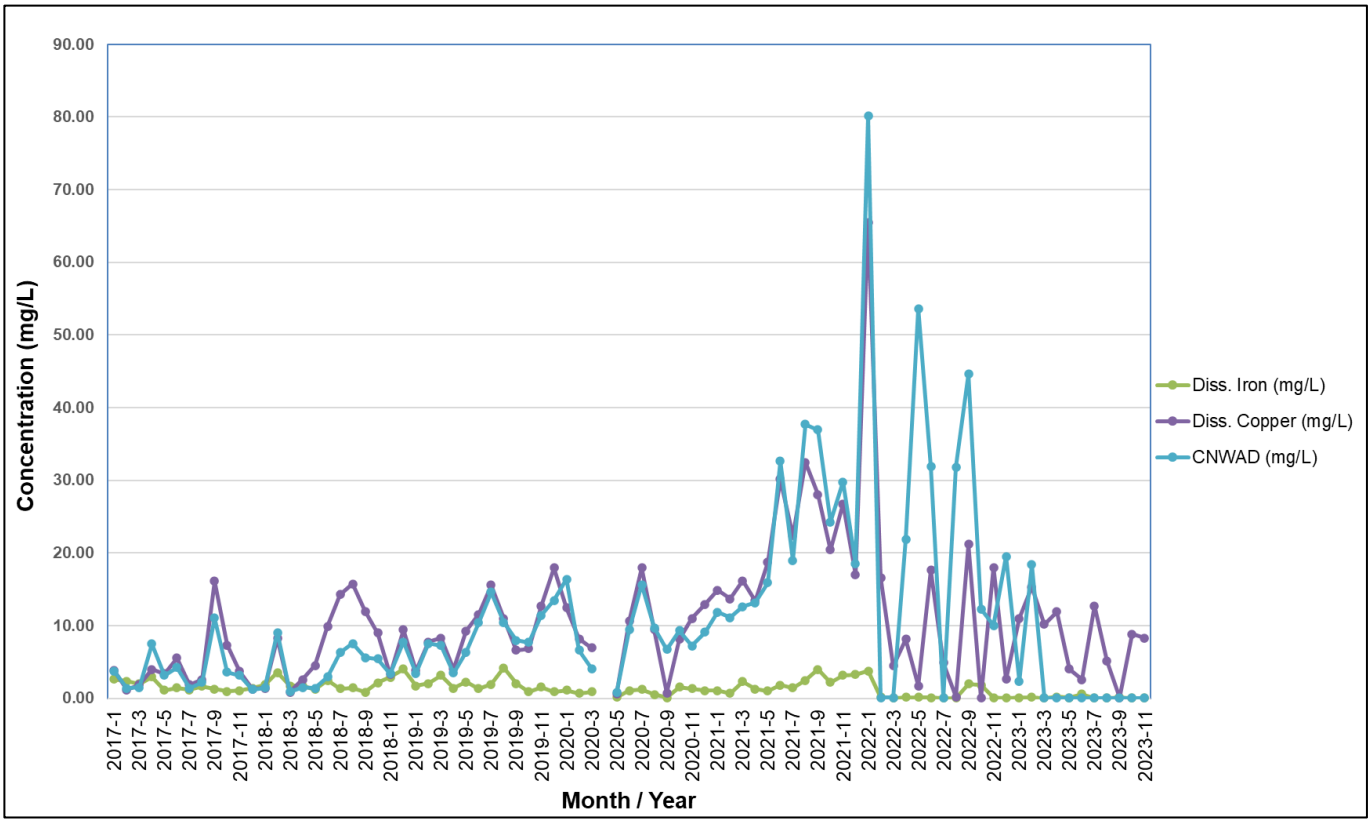


Figure 2-7: Mill Effluent Monthly Average 2017 to 2023: Iron, Copper and Cyanide (CN-WAD)

2.6.2 Additional Mill Effluent Water Quality Results

Agnico analyzed the water fraction of Mill Effluent after cyanide destruction on a monthly basis to obtain representative data of the tailings water being discharged to the Portage Pit in 2023. The water quality analysis was completed by an external accredited laboratory. Parameters of concern are plotted on **Figure 2-8** and **Figure 2-9**.

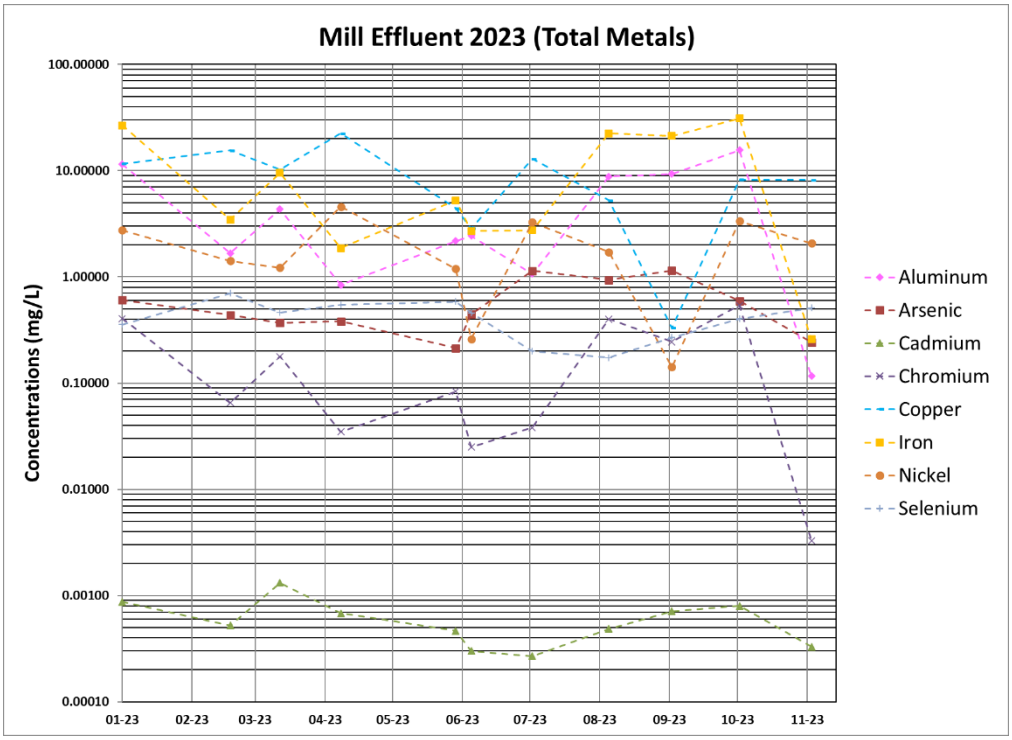


Figure 2-8: Mill Effluent Concentrations Sampled in 2023 – Total Metals

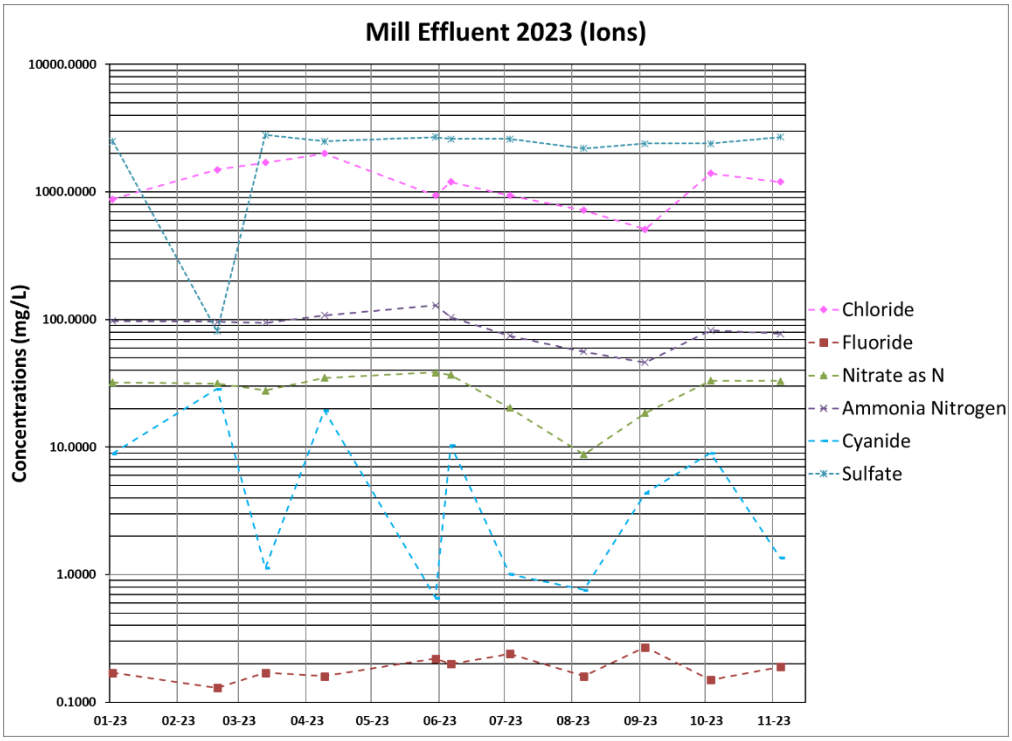


Figure 2-9: Mill Effluent Concentrations Sampled in 2023 – Major Ions

Samples of Mill Effluent were taken and analyzed throughout the year to compare the concentration of key parameters.

Table 2-5 compares the yearly average Mill Effluent samples between 2015 and 2023 for some parameters of concern.

Since 2020, only ore from the Whale Tail pit was processed at the Mill. When comparing with the measured values taken from 2022 to 2023, the measured concentrations are mostly similar, except for cyanide, copper, and nickel, which were low and aluminum, cadmium, chromium, iron, ammonia, and nitrate, which were higher.

In 2023, as in 2022, the measured data confirmed some of the differences observed in the measurements taken in 2019 regarding the Mill Effluent quality produced when processing Portage/Vault ore versus Whale Tail ore:

- Aluminum, copper, iron, ammonia, nitrate, and chloride were slightly higher to one order of magnitude higher on the Mill Effluent when processing Whale Tail ore;
- Arsenic, cadmium, selenium, and chromium were one to two orders of magnitude higher in the Mill Effluent when processing Whale Tail ore;
- Cyanide and nickel concentrations were similar when processing both types of ores; and

- Fluoride was about 30% lower with the Whale Tail ore.

Table 2-5: Mill Effluent Concentrations Sampled from 2015 to 2023

PARAMETER	Average 2015	Average 2016	Average 2017	Average 2018	Average 2019 w/o Whale Tail	Average 2019 Whale Tail only	Average 2020 Whale Tail only	Average 2021 Whale Tail only	Average 2022 Whale Tail only	Average 2023 Whale Tail only
Total Cyanide (CNt)	18.2	9.3	20.4	6.2	11.7	11.8	24.6	23.8	37.4	7.78
Total Aluminum (Al)	0.629	0.326	1.541	2.2	0.394	109.5**	1.73	0.59	2.32	5.26
Total Arsenic (As)	0.036	0.026	0.018	0.025	0.034	9.0**	0.72	0.93	0.46	0.59
Total Cadmium (Cd)	0.0020	0.0003	0.0072	0.0004	0.0002	0.0035	0.017	0.0003	0.0004	0.001
Total Chromium (Cr)	0.002	0.001	0.009	0.005	0.002	3.5	0.654	0.026	0.090	0.18
Total Copper (Cu)	11.0	3.6	5.3	0.161	3.925	9.1**	6.4	8.3	18.92	9.25
Total Iron (Fe)	5.9	2.8	6.9	6.5	5.6	401.7**	5.6	1.9	6.05	11.57
Total Nickel (Ni)	0.423	0.024	0.982	0.026	2.7	7.7	2.8	6.8	6.62	1.99
Total Selenium (Se)	0.131	0.166	0.076	0.131	0.007	0.143	0.144	0.189	0.30	0.42
Ammonia (NH_3-NH_4)	127	105	79	84	64	75	65	60	74.4	87.76
Nitrate (NO_3)	15.9	13.3	12.7	8.9	10.0	12.9	9.2	12.0	20.01	28.69
Chloride (Cl)	775	558	630	515	660	767	411	861	1247	1180.91
Fluoride (F)	0.545	0.645	0.335	0.680	0.565	0.297	0.28	0.20	0.18	0.19

Note:
*** Samples taken in 2019 when treating Whale Tail ore contained much higher suspended solids compared to the following years.*

2.7 Central Dike Downstream Pond

2.7.1 General

From December 2015 to April 2019, Agnico has been depositing tailings into the South Cell (formerly Attenuation Pond) as per their water management plan. As expected, the operating water level in the South Cell increased as tailings' deposition progressed in the South Cell. Due in part to the higher hydraulic gradient, seepage flows were being observed downstream of Central Dike, located to the east of the South Cell TSF. The water was accumulating at the base of Central Dike and being mixed with snowmelt runoff water and possible underground water resurgence. In order to compensate for this unexpected accumulation, Agnico recirculated the accumulated water downstream of Central Dike back to the South Cell Reclaim Pond from 2015 to 2019 to control the pond of water accumulated at the base of Central Dike to an elevation of 115 masl, per the action plan on the Central Dike. Some seepage water accumulated downstream was also transferred to Goose and Portage Pits in 2019.

Since 2020, no continuous tailings deposition was occurring in the SC TSF. Only natural runoff coming from the NC TSF and SC TSF catchment area was collected in the SC Reclaim Pond and transferred to North Portage Pit (i.e., Pit A). In 2021, tailings were deposited in the NC and the resulting Reclaim Water was transferred to the SC TSF and eventually to Portage Pit A. In 2023, tailings were deposited in SC. Water accumulation downstream of the Central Dike was still observed from 2020 to 2023 and was transferred to Portage Pit A.

In September 2015, approximately 50,431 m^3 of pond water was transferred to Goose Pit as part of the water management plan around the Central Dike Downstream Pond (CDDP). This steady state test proved the 1:1 ratio used in the water balance, meaning that if the D/S pond was recirculated, there was globally no net loss of water in the South Cell. As of 2016, Agnico continued to recirculate the accumulated water downstream of Central Dike back to the South Cell TSF Reclaim Pond in order to maintain a constant water elevation at approximately 115 masl in the downstream pond. Water from the CDDP was also transferred to either Goose Pit, South Portage Pit (Pit E) or North Portage Pit (A):

- Between August and October 2017, about 332,177 m^3 of pond water was transferred to Goose Pit from the CDDP.
- In 2018, no reclaim water was transferred from CDDP to Goose Pit.
- Between May and November of 2019, water downstream of Central Dike was discharged to the Portage Pit (i.e., North Portage Pit [Pit A]). Additionally, 358,156 m^3 of reclaim water were transferred from the CDDP to Goose Pit between May and July 2019.
- Between February and June of 2020, water from the CDDP was discharged to the South Portage Pit (Pit E). From July to December of 2020, water was then discharged to North Portage Pit (Pit A).
- As of 2021, water from CDDP was discharged mainly to Portage Pit A.

Water samples from the CDDP were routinely collected during the year (sampling point ST-S-5) as per the Water Licence requirement.

2.7.2 Water Balance

Table 2-6 presents the estimated monthly inflows and outflows around the CDDP for 2023 based on:

- the seepage volume from the South Cell TSF to the CDDP estimated by Agnico;
- the total volume pumped back to the South Cell TSF;
- the total volume transferred to Portage Pits (Pit A and Pit E).

The volume of seepage estimated in 2023 from South Cell TSF to CDDP was about 25% higher compared to the previous year and approximately 24% lower compared to 2021. This increase in 2023 was expected since some tailings were deposited in the South Cell, which increased the volume of Reclaim Water stored in the South Cell TSF Reclaim Pond. In 2023, no volume of water was transferred from CDDP to South Cell TSF.

Table 2-6: Estimated Monthly Inflows and Outflows to Central Dike D/S Pond for 2023

Date	Estimated Seepage Flow from South Cell TSF to Central Dike D/S Pond	Volume of Water Transferred from Central Dike D/S Pond to South Cell TSF	Volume of Water Transferred from Central Dike D/S Pond to Goose Pit or Portage Pit (Pit A or Pit E)
	m^3/month	m^3/month	m^3/month
Jan-23	14,029	0	14,029
Feb-23	13,564	0	13,564
Mar-23	13,920	0	13,920
Apr-23	11,031	0	11,031
May-23	112,254	0	112,254
Jun-23	112,254	0	112,254
Jul-23	67,718	0	67,718
Aug-23	59,453	0	59,453
Sep-23	109,331	0	109,331
Oct-23	91,496	0	91,496
Nov-23	47,267	0	47,267
Dec-23	24,295	0	24,295
Total 2023	677,047	0	677,047
Total 2022	510,579	13,852	510,579
Total 2021	890,218	0	890,218
Total 2020	702,031	54,734	685,541
		739,915	
Total 2019	**2,294,063**	**754,347**	**1,368,676**
		2,123,023	
Total 2018	**2,171,246**	**2,300,416**	
Total 2017	**4,636,032**	**4,366,869**	**332,177**

2.7.3 Water Quality

The water analysis taken from the CDDP is tabulated and presented in Section 8.0 of the 2023 Annual Report. **Table 2-7** summarizes the data for key parameters of concern and compares the measurements to the average values measured in the South Cell TSF Reclaim Pond in 2023.

The data confirms that one of the main inflows to the CDDP was from the South Cell TSF Reclaim Pond. The water in the CDDP has detectable concentrations of all the key parameters of concern found in the South Cell TSF Reclaim Pond.

The average measured values in the South Cell TSF were higher than the values measured in the CDDP for all parameters but not for total arsenic, iron, ammonia, chloride, fluoride, and sulphate.

The lower concentration detected for these parameters in the CDDP may indicate that either some of the parameters were subject to a natural degradation process, precipitating out of solution in the Central Dike D/S Pond or were being reduced through anaerobic microbial reaction as the water seeps through the Central Dike. Furthermore, under anaerobic condition, iron reducing bacteria could be reducing the ferric oxide in the soil to a soluble ferrous hydroxide, thus increasing the total iron concentration in the Central Dike D/S Pond.

The higher concentration measured in the pond for parameters such as total arsenic, ammonia, chloride, sulphate, and fluoride could originate from the pore water in the tailings flowing towards the pond.

Table 2-7: Water Quality in Central Dike D/S Pond for 2023

PARAMETER	Central Dike Downstream Pond (ST-S-5) (mg/L)			South Cell TSF Reclaim Pond (ST-21-S) (mg/L)		
	Min	Mean	Max	Min	Mean	Max
Total Cyanide (CNt)	0.006	0.040	0.077	0.007	0.130	0.603
Aluminum (Al)	0.006	0.044	0.154	0.069	0.421	1.490
Arsenic (As)	0.047	0.096	0.138	0.021	0.060	0.108
Cadmium (Cd)	0.00001	0.00004	0.00017	0.0000519	0.00010	0.00014
Chromium (Cr)	0.00045	0.0020	0.0050	0.0018	0.0154	0.0551
Copper (Cu)	0.0004	0.0010	0.0025	0.0010	0.0974	0.421
Iron (Fe)	1.350	2.186	2.910	0.225	1.3182	4.660
Nickel (Ni)	0.0020	0.00808	0.01761	0.101	0.168	0.374
Selenium (Se)	0.00018	0.00048	0.00141	0.0009	0.0086	0.0375
Total Ammonia-Nitrogen (mg N/L)	14.0	20.0	23.0	0.8	4.1	14.0
Nitrate (NO_3) (mg N/L)	0.1000	0.311	0.970	0.960	4.948	7.80
Chloride (Cl)	70	131	190	11	34	110
Fluoride (F)	0.330	0.469	0.530	0.100	0.242	0.350
Sulphate (SO_4)	770	1191	1400	220	504	990

2.8 Ammonia Loading to Environment at Meadowbank

Ammonia that is found in the TSF Reclaim Water at Meadowbank originates mainly from the hydrolysis of cyanate which is the by-product produced following cyanide destruction. To a lesser extent, ammonia also comes from un-reacted ammonium nitrate-based explosive used in Portage, Goose and Vault pits and from the treated effluent from the mine site sewage treatment plant, which is discharged to the Stormwater Management Pond. This latter is pumped twice yearly to the South Cell TSF.

In 2023:

- Approximately 1,683,638 m^3 of pond water from the South Cell TSF Reclaim Pond were transferred to North Portage Pit (Pit A). The average concentration measured in 2023 in the SC TSF Reclaim Pond was approximately 4.1 mg N/L. Thus, using this average concentration value of ammonia, the total load of ammonia transferred to Portage Pit A in 2023 is evaluated at approximately 6,896 kg of ammonia (expressed as N).
- Approximately 677,047 m^3 of pond water from the Central Dike D/S Pond were transferred to North Portage Pit (Pit A). The average concentration measured was approximately 20 mg N/L. Thus, using this average concentration value of ammonia, the total load of ammonia transferred to the North Portage Pit in 2023 is evaluated at approximately 13,541 kg of ammonia (expressed as N). This additional load of ammonia in the North Portage Pit is taken into account in this year's forecasting model.
- Approximately 3,653,292 m^3 of Reclaim Water is transferred with the tailings in South Portage Pit (Pit E). Approximately 48% of this volume is entrapped in the pore water of the tailings, leaving 1,899,712 m^3 in the pit. The average concentration measured in the mill effluent was approximately 87.76 mg N/L, resulting in a total load evaluated at approximately 165,841 kg of ammonia (expressed as N).

This additional load of ammonia to Portage Pit A and Pit E is considered in this year's forecasting model.

3.0 Updated Mass Balance Model

3.1 Description

The water quality updated mass balance model presented in this Technical Note was developed to help forecast trends in water quality in the Portage Area of Meadowbank for different parameters of interest. The starting date for the model was arbitrarily set for January 2014 in order to keep in-line with the previous models.

For this year, the end date of the model is set at the end of pit reflooding, which is projected to be in July 2041. Per the Meadowbank ICRP 2019 update, the Reclaim Water stored in the pits shall be treated and discharged to Third Portage Lake. Once the cover will be installed on the tailings if deemed required, pit flooding will commence with natural runoff and transfer of water from Third Portage Lake.

The main objectives for this year's model are to:

- Forecast the Reclaim Water quality at the end of in-pit deposition to help define the water treatment system that shall be required at the start of closure;
- Forecast the water quality following pit reflooding.

This mass balance model was based on the following:

- Flows and volumes provided in the Water Balance – 2023-IPD Plan (Agnico 2023);
- Assumptions presented below in **Section 3.2**;
- Chemical analyses for ST-21 (North and South Cell TSF Reclaim Pond) (2014-2023);
- Chemical analyses for Third Portage Lake (2015);
- Chemical analyses for the Mill Effluent (samples taken in 2023);
- Chemical analyses for Portage North Pit (ST-17, Pit A) and Portage South Pit (ST-19, Pit E) (from 2013 to 2023);
- Chemical analysis for Goose Pit (samples taken in the sump pit and in the lake, ST-20) (from 2013 to 2023);
- East Dike (ST-1) seepage and Saddle Dam 3 (ST-32) sumps sampled in 2023;
- Stormwater management pond water sampled in 2018;
- Saddle Dam 1 seepage (ST-S-2) and Portage RSF runoff (ST-16) (2015 to 2023);
- Portage Pit A and Pit E seepage water quality sampled from 2017 to 2020 and Goose Pit seepage water quality sampled from 2017 to 2019.

Furthermore, this year's water quality forecast mass balance model will also include the following changes:

- Deposition of Whale Tail pit tailings in Goose Pit (2019) and Portage Pit E;
- End of tailings deposition projected for June 2026.

3.2 Assumptions

Table 3-1 summarizes the assumptions used in the development of the water quality forecast model for the Meadowbank site.

Table 3-1: Water Quality Forecast Model Assumptions

PARAMETERS	ASSUMPTIONS
Water quality forecast model	▪ Mass balance model. ▪ Assume completely mixed system. ▪ Ponds to model: North and South Cell TSF Reclaim Pond, Goose Pit and North Portage Pit (Pit A) and South Portage Pit (Pit E). ▪ Portage Pit E and Pit A are hydraulically connected through the waste rock deposited between both pits. For simplification of the model, the parameters are assumed to be inert: they do not degrade or react with other elements in the system, with the exception of cyanide.
Model time period	▪ Start: January 2014. ▪ End: July 2041 (projected end date of pit reflooding).
Input Source Terms: **Mill Effluent / Pore Water**	▪ Mill Effluent is the main source terms for metal contaminants, cyanide, sulphate, chloride, ammonia and nitrate in the Reclaim Pond. ▪ Mill Effluent quality is assumed to be constant over time for all parameters. ▫ Assumed two different types of Mill Effluent quality: – One when Portage/Vault ore is processed: 2014 to June 2019; – One when Whale Tail ore is processed: July 2019 to June 2026. ▫ From 2015 to June 2019, the average Mill Effluent quality measured for that year was considered in the model, based on the processing of Portage/Vault ore. ▫ From July 2019 to the end of the model, the average Mill Effluent quality measured for that year was considered in the model, based on the processing of Whale Tail ore. Adjustment factors were applied for certain parameters so that the forecasted values followed a similar trend to that of the measured values. ▪ As of April 2021, consider additional brine (i.e., chloride and TDS) loading the pore water contained in the underground ore mined at the Whale Tail site. ▪ At closure, the pore water released from tailings consolidations is expected to be very low since consolidation occurs rapidly during operation. In the model, the volume of reclaim water released from the tailings due to consolidation is taken into account each month when tailings are actively deposited in the NC and SC TSF and in the pits.

PARAMETERS	ASSUMPTIONS
Other Input Source Terms	▪ The following source terms are considered in the model, based on measured water quality data: ▫ Mill effluent; ▫ Portage Pit E and Pit A transfer; ▫ Goose Pit transfer; ▫ Stormwater Management Pond; ▫ Portage RSF; ▫ Saddle Dam 1 sump; ▫ Saddle Dam 3 sump; ▫ East Dike seepage. ▪ Precipitation runoff loading: ▫ Assumed negligible loading and to have similar water characteristics as Third Portage Lake water. ▪ Assumed constant water quality for each stream.
Input Source Terms: **Pit seepage loading**	▪ Seepage flow considered into Goose Pit and Portage Pit based on the hydrogeological modelling results conducted for the in-pit deposition project (SNC-Lavalin, 2018b). ▪ Seepage quality based on the average water quality measured from the seepages sampled in the pits. ▪ Assumed constant water quality for each seepage stream.
Input Source Terms: **North and South Cell TSF after Closure**	▪ Assumed that the water accumulated in closed North and South Cell TSF is transferred to Portage Pit and will have a water quality similar to non-contact runoff water once closure work is completed.
Cyanide modelling	▪ The total cyanide in the TSF Reclaim Pond is comprised of free cyanide and metal-cyanide complexes (weak and strong metal cyanide complexes). As per discussions with Agnico, most of the iron and metal-cyanide complexes are precipitated in the mill. However, since the reaction is not complete or perfect, some dissolved iron- and metal-cyanide complexes are expected to remain in the Mill Effluent. Therefore, it was assumed that 10% of the total cyanide concentration was bound as strong iron-cyanide complexes, and that another 10% of the total cyanide concentration was present as weak metal-cyanide complexes (cyanide bound with copper, zinc, and nickel). The balance is presented as free cyanide (i.e., HCN and CN-). This agrees with values observed at other gold mine tailings sites (Simovic, 1984). These same proportions are assumed to apply to the cyanide at the Mill Effluent. ▪ For this model, natural cyanide degradation is only considered for the summer months.

PARAMETERS	ASSUMPTIONS
Water treatment	▪ For this analysis, it is assumed that no treatment will take place at the North or South Cell TSF Reclaim Pond or at the Portage or Goose Pits during in-pit deposition. ▪ During the closure, Reclaim Water will be pumped to a water treatment plant and discharged to the environment. ▪ Projected water treatment period of the Reclaim Water in the pits: ▫ Portage Pits: January 2031 to December 2038; ▫ Goose Pit: July 2028 to January 2031. ▪ Water treatment to be done to meet approved effluent criteria and to allow cover construction if deemed necessary. ▪ The closure schedule for the overall Project is based on the preliminary closure methods and strategies discussed in the Meadowbank ICRP. Schedule may be modified based on monitoring and water quality results. ▪ It is anticipated that the schedule will be refined throughout the Project life as the designs are advanced, and the closure methods and strategies are further developed.
Pit reflooding	▪ Pits shall be reflooded by natural runoff from the site and active transfer of water from Third Portage Lake. ▪ Period of pit reflooding: January 2039 to July 2041.

3.3 Limitations

The limitations of the Meadowbank water quality mass balance model and ensuing results and conclusions presented in this Technical Note are listed below:

1. In order to simplify the model, the mass balance model assumes that the pond and pits are completely mixed systems. Consequently, the results from this model provide an indication of the concentrations in the ponds and pits and should not be considered as an absolute value at this time. Future monitoring results both for flows and water quality will provide for a better indication of concentrations of contaminants.
2. The mass balance model is based on the water quality analysis results provided by Agnico.
3. The model does make some allowances for the impact that changes in the TSF will have on the TSF Reclaim Pond water quality over time (i.e., water body surface area on natural cyanide degradation in the summer months, free water volume in the pond on the forecasted concentration measurements).
4. The model is based on a monthly time step and the resulting concentrations provided represent monthly values.
5. It should be noted at this point that the model should be used to evaluate at a high level the impact of Mill Effluent on the future water quality in the North and South Cell TSF Reclaim Pond and Portage and Goose Pits. The model provides only an order of magnitude forecast of the concentration trends in these areas.
6. Furthermore, this model is intended as a mass balance model for the Portage Area and should be updated and calibrated on a yearly basis as additional water quality data, pond volumes, and flows in the Portage Area become available. Refer to **Section 6.2** for recommendations on improving the mass balance.

3.4 Input Parameters

3.4.1 General

The mass balance model for the Meadowbank site was developed originally in 2012 to forecast the long-term concentration of cyanide, copper, iron, ammonia, nitrate and chloride in the North and South Cell TSF Reclaim Pond and in Portage and Goose Pits. Since 2015, the report also evaluated a broader selection of parameters: alkalinity, hardness, aluminum, silver, arsenic, barium, cadmium, chromium, manganese, mercury, molybdenum, nickel, lead, selenium, zinc, fluoride, sulphate and total dissolved solids (TDS).

The mass balance model is based on the assumptions presented in **Section 3.2** and on the following input parameters:

- Mill effluent concentration (refer to **Section 3.4.2** for more details);
- SFE leaching test results conducted in 2019 on tailings from ores from Vault and Portage Pit and test results conducted in 2023 from ores from Whale Tail Pit (concentration in the liquid portion) were used to compute the loading coming from the leaching of the tailings.
- Initial concentration in the North and South Cells TSF Reclaim Pond;
- Initial concentration in the Portage and Goose Pits;
- Runoff from the Portage RSF;
- Sumps from Saddle Dam 1 (ST-S-2), Saddle Dam 3 (ST-32) and East Dike seepage (ST-8);
- Runoff water quality similar to Third Portage Lake;
- Stormwater Management Pond concentration used to compute the influent loading to the TSF Reclaim Pond;
- Goose Pit and Portage Pit seepage estimated water flow and water quality data; and
- Agnico 2023 Water Balance which defines all of the input and output flows in the North and South Cell TSF, CDDP, Portage Pit and Goose Pit.

3.4.2 Mill Effluent Concentration

The Mill Effluent concentrations considered for the input parameters of the mass balance are divided into three types:

- Type 1: Based on the ore produced from Portage/Goose/Vault pits for model years between 2014 and June 2019. For each model year, the characteristics of the Mill Effluent are based on the yearly average measured concentrations for samples taken for that year. The average concentrations considered in the model between 2015 and 2019 are presented in **Table 2-5**.
- Type 2: Based on the ore produced from Whale Tail pit as of 2019. For each model year, the characteristics of the Mill Effluent are based on the yearly average measured concentrations for samples taken that year. The average concentrations considered in the model between 2019 and 2023 are also presented in **Table 2-5**.
- Type 3: For the future modelling years from 2023 to 2026, the same adjusted Mill Effluent quality considered for the model year 2023 was used.

Please note the items below on the parameters used for the Mill Effluent when processing Meadowbank Mine site ore for the updated water quality forecast model based on the 2023 WMP:

- Mill Effluent adjustment factors:
  - Adjustment factors were applied to some constituents measured in the Mill Effluent to obtain forecasted concentrations that are in the same order of magnitude as the measured values.
- Ammonia, Chloride, Sulphate and TDS are present in the Mill Effluent due to the following processes in the mill:
  - Ammonia is present due to the hydrolysis of cyanate to ammonia. The concentration of cyanate is proportional to the concentration of cyanide removed in the cyanide destruction system;
  - Chloride is present due to the continued use of calcium chloride as a dust suppressant in the mill and crusher;
  - Sulphates are present due to the oxidation of sulphide produced in the ore; and
  - The overall TDS of the Mill Effluent will continue to increase due to the increase in ammonia, chloride, and sulphate.
- Copper, Nitrate, Total Cyanide and Chloride in the North Cell:
  - Higher concentrations of the listed parameters were considered for the Mill Effluent when tailings were deposited in the North Cell TSF in 2014. These values were selected based on the measured values from the North Cell TSF Reclaim Pond.

Table 3-2 presents the adjusted Mill Effluent concentration considered in the model from July 2019 to the end of the LOM.

Table 3-2: Mill Effluent Concentration Selected for Mass Balance Model from July 2019 to end of LOM

Parameters (mg/L)	Model Year 2019	Model Year 2020	Model Year 2021	Model Year 2022	Model Year 2023-2026
Alkalinity	77	86	68	83	78
Hardness	1658	1511	1392	1750	1940
Total Dissolved Solids (TDS)	3460	3544	5908	6809	8084
Aluminum (Al)	1.0953	1.7270	0.5684	2.3224	5.2596
Silver (Ag)	0.0018	0.0024	0.0080	0.0033	0.0028
Arsenic (As)	2.7020	0.3619	0.4670	0.2333	0.2962
Barium (Ba)	0.6147	0.0987	0.1219	0.1378	0.1299
Cadmium (Cd)	0.0035	0.0170	0.0003	0.0004	0.0006
Chromium (Cr)	0.3496	0.6540	0.0261	0.0901	0.1833
Copper (Cu)	9.1487	6.3693	8.2979	18.9212	9.2593
Iron (Fe)	4.0173	2.7862	0.9676	3.0234	5.7881
Manganese (Mn)	0.2910	0.2351	0.1064	0.2118	0.4082
Mercury (Hg)	0.00001	0.00001	0.00002	0.00001	0.00011
Molybdenum (Mo)	0.0972	1.0134	0.1244	0.1260	0.1498
Nickel (Ni)	7.6640	2.8217	6.8443	6.6183	1.9984
Lead (Pb)	0.8460	0.0205	0.0075	0.0245	0.0541
Selenium (Se)	0.1432	0.1436	0.1886	0.2983	0.4240
Strontium (Sr)	1.3833	1.5081	1.9413	3.4075	4.1745
Thallium (Tl)	0.00183	0.00005	0.00002	0.00004	0.00009
Uranium (U)	0.0381	0.0563	0.0252	0.0298	0.0414
Zinc (Zn)	0.2723	0.1431	0.0041	0.0082	0.0186
Chloride	767	411	646	935	886
Fluoride (F)	0.30	0.28	0.20	0.18	0.19
Sulphate (SO_4)	2185	1800	1967	2958	2316
Total Cyanide (CNt)	12	25	24	37	35
Total Ammonia (NH_3-NH_4)	75	65	60	112	123
Nitrate (NO_3)	13	9	12	28	46

Notes:

Grey highlighted cells indicate values that were increased with an adjustment factor to obtain forecasted concentrations that are in the same order of magnitude as the measured values.

Green highlighted cells indicate values that were decreased with an adjustment factor to obtain forecasted concentrations that are in the same order of magnitude as the measured values.

3.4.3 Concentrations Used in the Model

As noted previously, the mass balance model arbitrarily begins in January 2014 to fit the previous models. The initial concentrations selected for the following streams are based on the following:

- North Cell TSF Reclaim Pond corresponds to the January 8th, 2014 chemical analysis results from station ST-21.
- Concentrations selected for the South Cell TSF Reclaim Pond (former Attenuation Pond) correspond to the twelve (12) months (2014) average concentrations' results from station ST-18 (current Attenuation Pond). When there was no or little data available, the average values from 2010 to 2014 were used. In general, the concentrations observed in the Attenuation Pond had little variation from one month to the other.
- The initial concentrations of all parameters in the Portage and Goose Pits were assumed to be the average of 2013. For Portage Pit, the average concentrations measured in 2013 in Pit E (ST-19) were used. For Goose Pit, the average concentrations measured in 2013 in the Goose Pit sump (ST-20) were used.

For the other water inputs, the water quality was based on the following:

- Runoff from the Portage RSF is based on the average concentration measured in 2015 to 2023 at sampling station ST-16.
- Saddle Dam 1 sump that is transferred to the North Cell is based on the average concentration measured from 2015 to 2023 at sampling station ST-S-2.
- Saddle Dam 3 sump that is transferred to the South Cell is based on the average concentration measured from 2016 to 2023 at sampling station ST-32.
- East dike seepage quality is based on the average concentrations measured in 2015 to 2023 at sampling stations ST-8 and ST-S-1.
- Stormwater Management Pond quality is based on the value measured in July 2018.
- Surface runoff water is assumed to be of similar quality to that of Third Portage Lake. The water quality for Third Portage Lake is based on the average concentration obtained in summer 2015 in the East Basin.

The average leaching rate inferred from the results obtained from the SFE Leach Tests conducted on the tailings produced from Portage and Vault ore bodies in 2019 were used to account for possible leaching of contaminants from the tailings. The SFE Leach Tests conducted on the tailings produced from the Whale Tail ore bodies in 2023 were used to account for possible leaching of contaminants from this type of tailings.

Table 3-3 summarizes the leaching rates used in the model while **Table 3-4** summarizes the water quality characteristics for various input source streams used in the water quality forecast model based on total metals. Measurements that are higher than CCME guidelines for Protection of Aquatic Life are also highlighted in **Table 3-4**, which are used for comparison purposes only.

Table 3-3: Leaching Rate Used in Water Quality Forecast Model

PARAMETERS	UNITS	LEACHING OF TAILS FROM PORTAGE/VAULT (kg/ton)	LEACHING OF TAILS FROM WHALE TAIL PIT (kg/ton)	LEACHING OF TAILS FROM WHALE TAIL PIT (kg/ton)
		From SFE Leach Test- Avg 2019 tests	From SFE Leach Test- Avg 2022 tests	From SFE Leach Test- Avg 2023 tests
Alkalinity	mg $CaCO_3$/L	3.90E-02	2.57E-02	4.02E-02
Hardness	mg $CaCO_3$/L	1.89E-01	2.23E-01	2.58E-01
Total Dissolved Solids (TDS)	mg/L	0 (1)	0 (1)	0 (1)
Total Aluminum (Al)	mg/L	8.67E-05	6.25E-05	4.59E-05
Total Silver (Ag)	mg/L	2.50E-08	2.02E-07	1.85E-07
Total Arsenic (As)	mg/L	1.26E-05	6.76E-04	3.22E-04
Total Barium (Ba)	mg/L	1.13E-05	3.99E-05	4.03E-05
Total Cadmium (Cd)	mg/L	0 (1)	6.07E-08	6.15E-08
Total Chromium (Cr)	mg/L	1.20E-04	1.83E-07	9.00E-08
Total Copper (Cu)	mg/L	1.54E-06	2.79E-06	2.15E-05
Total Iron (Fe)	mg/L	1.34E-04	1.55E-04	1.20E-04
Total Manganese (Mn)	mg/L	1.57E-05	1.25E-05	6.98E-05
Total Mercury (Hg)	mg/L	6.67E-09	5.00E-09	5.45E-09
Total Molybdenum (Mo)	mg/L	4.63E-05	4.11E-05	3.38E-05
Total Nickel (Ni)	mg/L	1.13E-06	1.58E-05	6.07E-05
Total Lead (Pb)	mg/L	6.67E-08	1.33E-07	1.48E-07
Total Selenium (Se)	mg/L	1.43E-06	2.39E-05	2.20E-05
Total Strontium (Sr)	mg/L	2.44E-04	4.50E-04	5.35E-04
Total Thallium (Tl)	mg/L	9.00E-09	6.68E-09	1.09E-08
Total Uranium (U)	mg/L	9.30E-07	2.86E-07	6.78E-07
Total Zinc (Zn)	mg/L	1.00E-06	1.00E-06	1.18E-06
Chloride	mg/L	0 (1)	0 (1)	0 (1)
Fluoride (F)	mg/L	3.40E-04	1.63E-04	1.63E-04
Sulphate (SO_4)	mg SO_4/L	2.30E-01	2.94E-01	3.26E-01
Total Cyanide (CNt)	mg/L	0 (1)	0 (1)	0 (1)
Total Ammonia (NH_3 + NH_4)	mg N/L	3.10E-03	3.89E-03	3.89E-03
Nitrate (NO_3)	mg N/L	3.00E-04	1.53E-03	1.53E-03

Note:

1. No data available. Assume negligible.

Table 3-4: Input Source Stream Concentrations used in the Water Quality Forecast Model

PARAMETERS	UNITS	RECLAIM ST-21 NORTH CELL	ATTEN. POND / SOUTH CELL	PORTAGE RSF TO NORTH CELL	SADDLE DAM 1 SUMP TO NORTH CELL	SADDLE DAM 3 SUMP TO SOUTH CELL	EAST DIKE SEEPAGE TO PORTAGE	STORM WATER MGMT POND	THIRD PORTAGE LAKE	PORTAGE PIT ST-19	GOOSE PIT ST-20	CCME GUIDELINES	WATER LICENCE MEADOWBANK MAX. AVG. CONC.
		Initial condition for model January-08-14	Initial condition for model Average 2014	Average 2015 to 2023 sampled at ST-16	Average 2015 to 2023 sampled at ST-S-2	Average 2016 to 2023 sampled at ST-32	Average 2015 to 2023 sampled at ST-8 and ST-S-1	July 2018	Average-East Basin Summer 2015	Initial Condition for Model Average 2013	Initial Condition for Model Average 2013	Long Term Based on 3PL quality	Part F of License
Alkalinity	mg $CaCO_3$/L	135	106	68	55	132	36	129	9.1	72.2	129.8	n/a	n/a
Hardness	mg $CaCO_3$/L	1329	362	143	268	220	79	134	12	274	130	n/a	n/a
Total Dissolved Solids (TDS)	mg/L	1329	1437	215	374	343	131	293	22	320	326	n/a	1400
Total Aluminum (Al)	mg/L	0.119[1]	0.010[1]	0.295	0.537	1.876	0.04416	0.229	0.0075	0.1720	0.3708	0.16[7]	1.5
Total Silver (Ag)	mg/L	0.0001[1]	0.0001[1]	0.0001	0.0001	0.0001	0.00099	0.0001	0.000005	0.00005	0.00005	0.00025	n/a
Total Arsenic (As)	mg/L	0.032[1]	0.008[1]	0.022	0.024	0.024	0.00107	0.004	0.0005	0.0202	0.0099	0.005	0.3
Total Barium (Ba)	mg/L	0.094[1]	0.051[1]	0.016	0.032	0.060	0.16151	0.020	0.0037	0.0110	0.0219	n/a	n/a
Total Cadmium (Cd)	mg/L	0.00160	0.00010	0.00003	0.00004	0.00004	0.00023	0.00001	0.000003	0.000240	0.000000	0.00004	0.002
Total Chromium (Cr)	mg/L	0.0008	0[4]	0.003	0.006	0.017	0.02259	0.002	0.0001	0.0027	0.0026	0.001	n/a
Total Copper (Cu)	mg/L	9.135	0.033[1]	0.014	0.007	0.017	0.00129	0.003	0.0006	0.0042	0.0069	0.002	0.1
Total Iron (Fe)	mg/L	0.140[1]	0.047[1]	0.763	1.246	3.869	0.62951	0.880	0.017	1.5	0.7	0.3	n/a

PARAMETERS	UNITS	RECLAIM ST-21 NORTH CELL	ATTEN. POND / SOUTH CELL	PORTAGE RSF TO NORTH CELL	SADDLE DAM 1 SUMP TO NORTH CELL	SADDLE DAM 3 SUMP TO SOUTH CELL	EAST DIKE SEEPAGE TO PORTAGE	STORM WATER MGMT POND	THIRD PORTAGE LAKE	PORTAGE PIT ST-19	GOOSE PIT ST-20	CCME GUIDELINES	WATER LICENCE MEADOWBANK MAX. AVG. CONC.
		Initial condition for model January-08-14	Initial condition for model Average 2014	Average 2015 to 2023 sampled at ST-16	Average 2015 to 2023 sampled at ST-S-2	Average 2016 to 2023 sampled at ST-32	Average 2015 to 2023 sampled at ST-8 and ST-S-1	July 2018	Average-East Basin Summer 2015	Initial Condition for Model Average 2013	Initial Condition for Model Average 2013	Long Term Based on 3PL quality	Part F of License
Total Manganese (Mn)	mg/L	0.065[1]	2.898[1]	0.801	0.187	0.583	0.09390	0.410	0.002	0.257	0.108	***0.23***	***n/a***
Total Mercury (Hg)	mg/L	0.000000	0.000117	0.010263	0.000097	0.000016	0.00001	0.000005	0.000003	0.000080	0.000005	***0.000026***	***0.0004***
Total Molybdenum (Mo)	mg/L	0.596[1]	0.026[1]	0.014	0.011	0.007	0.03057	0.004	0.0002	0.0664	0.0082	***0.073***	***n/a***
Total Nickel (Ni)	mg/L	0.277[1]	0.041[1]	0.017	0.034	0.073	0.00092	0.011	0.00059	0.00394	0.07973	***0.025***	***0.2***
Total Lead (Pb)	mg/L	0.002[2]	0.000[1]	0.001	0.003	0.004	0.00051	0.0002	0.00003	0.00131	0.00192	***0.001***	***0.1***
Total Selenium (Se)	mg/L	0.075[1]	0.003[1]	0.001	0.001	0.001	0.00260	0.003	0.00003	0.00183	0.00080	***0.001***	***n/a***
Total Strontium (Sr)	mg/L	0.743[3]	0[4]	0.151	0[4]	0[4]	0[4]	0.29	0.0132	0[4]	0[4]	***n/a***	***n/a***
Total Thallium (Tl)	mg/L	0.005[3]	0[4]	0.001	0.001	0[4]	0.00070	0.0004	0.000005	0.0020	0.0016	***0.0008***	***n/a***
Total Uranium (U)	mg/L	0.010[3]	0[4]	0.005	0[4]	0[4]	[4]	0.002	0.000049	0[4]	0[4]	***0.015***	***n/a***
Total Zinc (Zn)	mg/L	0.010[1]	0.010[1]	0.004	0.088	0.017	0.00353	0.005	0.002	0.016	0.015	***0.01***	***0.4***
Chloride	mg/L	1035	98	5	7	15	7.83739	52	0.793	26.117	24.978	***120***	***1000***
Fluoride (F)	mg/L	0.180	0.565	0.184	0.193	0.292	0.12146	0.860	0.0793	0.3900	0.4922	***0.12***	***n/a***
Sulphate (SO_4)	mg SO_4/L	2115	542	65	212	126	9.44783	30	5	224	77	***128***[5]	***n/a***

PARAMETERS	UNITS	RECLAIM ST-21 NORTH CELL	ATTEN. POND / SOUTH CELL	PORTAGE RSF TO NORTH CELL	SADDLE DAM 1 SUMP TO NORTH CELL	SADDLE DAM 3 SUMP TO SOUTH CELL	EAST DIKE SEEPAGE TO PORTAGE	STORM WATER MGMT POND	THIRD PORTAGE LAKE	PORTAGE PIT ST-19	GOOSE PIT ST-20	CCME GUIDELINES	WATER LICENCE MEADOWBANK MAX. AVG. CONC.
		Initial condition for model January-08-14	Initial condition for model Average 2014	Average 2015 to 2023 sampled at ST-16	Average 2015 to 2023 sampled at ST-S-2	Average 2016 to 2023 sampled at ST-32	Average 2015 to 2023 sampled at ST-8 and ST-S-1	July 2018	Average-East Basin Summer 2015	Initial Condition for Model Average 2013	Initial Condition for Model Average 2013	Long Term Based on 3PL quality	Part F of License
Total Cyanide (CNt)	mg/L	8	0.346	0.002	0.010	0.012	0.0025	0.002	0.0005	0.0393	0.0033	***0.005***	***0.5***
Total Ammonia ($NH_3 + NH_4$)	mg N/L	37	10	0.216	0.362	1.852	0.30490	1.320	0.015	3.6	7.9	***1.83***	***16***
Nitrate (NO_3)	mg N/L	26	1	4	7	10	0.28322	0.06	0.0331	12.7	5.1	***2.94***[6]	***20***

Notes:

1. *No total concentration value measured. Estimated using dissolved concentration value divided by the ratio of dissolved/total concentration values from sample taken on July 1, 2014 from the North Cell.*
2. *Used dissolved concentration value when the value is higher than the total concentration measured.*
3. *No data available for sample taken on January 8, 2014. Used data sampled on July 1, 2014.*
4. *No data. Assume negligible.*
5. *Threshold value for sulphate based on BC Environment guidelines for the protection of aquatic life for very soft water (0-30 mg/L) (April 2013).*
6. *Value based on the threshold concentration for classification of an oligotrophic lake in terms of nutrient concentrations (Nurnberg 1996).*
7. *Aluminum criterion in fresh water is calculated using the equation described in Appendix B of the Federal Environmental Quality Guidelines (FWQG).*
8. *Pink cells indicate values higher than CCME Guidelines (Long Term), or other criterion, based on Third Portage Lake water quality. Provided as a guide to help identify potential parameters of concern.*

3.5 Cyanide Decay

The water quality model developed during this study takes natural cyanide degradation into account: the most important mechanism in the natural degradation of cyanide is the volatilization of hydrogen cyanide (HCN). In fact, tests carried out on tailings in Canada found that volatilization of HCN accounted for 90% of cyanide removed from solution in a tailing's impoundment (Botz and Mudder, 2000). Oxidation of cyanide ions (CN-) to orthocyanate (OCN) with atmospheric oxygen is possible but extremely slow when compared to HCN volatilization. Similarly, the probability of microbial degradation of cyanide to carbon dioxide, ammonia, nitrite, and nitrate is low due to the limited presence of microorganisms and low nutrient levels in tailings water.

Cyanide volatilization can be summarized as a two (2) step process presented in **Figure 3-1** below:

- First, metal-cyanide complexes dissociate to free cyanide (HCN and CN-) based on a first-order decay constant (k1). Note that: (1) equilibrium between HCN and CN- is based on pH; (2) a first order decay constant signifies that the final concentration (Cf) can be estimated as Cf=Cie-kt, where k is the first order decay constant.
- It is then followed by HCN volatilization based on a first-order decay constant (kv).
- Both decay constants k1 and kv depend on the presence of UV light (sun) and air (wind), and water temperature and pH. The volatilization decay constant, kv, also depends on the surface area to volume ratio of the pond.

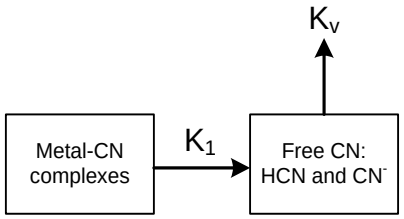


Figure 3-1: Cyanide Volatilization Process

Since both constants depend to a great extent on temperature, UV light and air, separate constants were determined for summer (May to October) and winter (November to April) conditions. The decay constants were based on laboratory values recorded by Simovic (1984). The assumptions made for the development of the cyanide decay constants were the following:

- Summer conditions: An average water temperature of 10 °C, presence of air and UV light. Furthermore, since metal-CN dissociation and HCN volatilization by air and UV is particularly important in the summer months, the decay constant factors in the physical property of the tailing's impoundment, represented by the open surface area to volume ratio. Multiplying the decay constant by this ratio takes into account the accelerated reaction due to a large exposed surface area of the Reclaim Pond.
- Winter conditions: No natural cyanide degradation occurs.

- The pH in the Reclaim Pond is maintained constant at 8.0, which means that most (94%) of the free cyanide will be present as HCN. Note that as the pH decreases, the proportion of free cyanide as HCN increases, which increases cyanide degradation through volatilization.

As stated in **Section 3.2**, it was assumed that 10% of the total cyanide concentration was bound as iron-cyanide complexes, another 10% as metal (copper, nickel and zinc) cyanide complexes, and 80% as free cyanide. This agrees with values observed at other gold mine tailings impoundments.

It should be noted that these decay constants (referred to as k0) were established based on an hourly time step and were not deemed reliable for longer time periods (i.e., months). Therefore, the summer and winter decay constants obtained based on volatilization conditions and assumptions were calibrated to represent more accurately and conservatively the expected cyanide concentrations on a monthly time step.

Table 3-5 presents the assumptions and cyanide decay constants used in the water quality model.

Table 3-5: Natural Cyanide Degradation – Assumptions and Constants

DECAY CONSTANT	DESCRIPTION	WINTER CONDITIONS			SUMMER CONDITIONS		
		Conditions	k_0	Calibrated value (k)	Conditions	k_0	Calibrated value (k)
K_1	Metal-CN dissociation	4° No air No UV	n/a	n/a	10° Air (wind) UV (sunlight)	0.01443/ hr	2.11/month
K_V	HCN volatilization		n/a	n/a		2.382 cm/hr	58.0 m/month

3.6 Portage and Goose Pit Groundwater Seepage Loading

Loadings from groundwater seepages to Portage and Goose Pits shall be estimated based on the following information:

- In the hydrogeological modelling of the groundwater flow in Goose Pit and Portage Pit, the seepage flow entering each pit was estimated at: 196 m^3/day in Portage Pit and 423 m^3/day in Goose Pit (AtkinsRéalis 2018b). This seepage flow is assumed to be constant over the modelling period;
- The average concentration measured from samples taken of the pit seepages in each pit between 2017 and 2019 shall be used to estimate the loadings to each pit assuming a constant seepage flow rate.

Table 3-6 presents the average concentration considered for seepages reporting to Goose Pit and Portage Pit in the water quality forecast model.

Table 3-6: Pit Seepage Water Quality Considered in the Model

Parameters	Units	Portage Pit Seepage	Goose Pit Seepage
		Average Data from 2017-2020	Average Data from 2017-2019
Alkalinity	mg CaCO3/L	69.8	80.3
Hardness	mg CaCO3/L	523	81
Total Dissolved Solids (TDS)	mg/L	813	175
Total Aluminum (Al)	mg/L	0.63	0.127
Total Silver (Ag)	mg/L	0.0000355	0.00005
Total Arsenic (As)	mg/L	0.0217	0.0022
Total Barium (Ba)	mg/L	0.0318	0.0417
Total Cadmium (Cd)	mg/L	0.000251	0.000013
Total Chromium (Cr)	mg/L	0.0002	0.0001
Total Copper (Cu)	mg/L	0.0011	0.0020
Total Iron (Fe)	mg/L	1.6	5.1
Total Manganese (Mn)	mg/L	0.357	0.043
Total Mercury (Hg)	mg/L	0.000005	0.000171
Total Molybdenum (Mo)	mg/L	0.0801	0.0093
Total Nickel (Ni)	mg/L	0.05101	0.00682
Total Lead (Pb)	mg/L	0.0114	0.00015
Total Selenium (Se)	mg/L	0.00257	0.00071
Total Strontium (Sr)	mg/L	0.74650	0.22333
Total Thallium (Tl)	mg/L	0.00023	0.00035
Total Uranium (U)	mg/L	0.06960	0.00333
Total Zinc (Zn)	mg/L	0.003	0.007
Chloride (Cl)	mg/L	45.5	16.2
Fluoride (F)	mg/L	0.2720	0.8333
Sulphate (SO_4)	mg SO_4/L	48	0
Total Cyanide (CN_t)	mg/L	0.0119	0.0023
Total Ammonia (NH_3 + NH_4)	mg N/L	1.1	0.3
Nitrate (NO_3)	mg N/L	17.9	0.1

4.0 Water Quality Forecast Results

4.1 Results

The results of the mass balance model around the North and South Cell TSF Reclaim Ponds, Portage and Goose Pits are presented in **Figure 4-1** to **Figure 4-17** for the following parameters of concern that were identified in **Section 2.3**.

1. Total Cyanide
2. Total Aluminum
3. Total Arsenic
4. Total Cadmium
5. Total Copper
6. Total Iron
7. Total Lead
8. Total Mercury
9. Total Nickel
10. Total Selenium
11. Total Zinc
12. Total Ammonia
13. Nitrate
14. Total dissolved solids
15. Chloride
16. Sulphate
17. Fluoride

The graphs show the forecasted monthly concentrations of the parameters from 2014 to the end of in-pit tailings deposition in 2026 for the North and South Cell TSF Reclaim Ponds, and until the end of pit reflooding in 2041 for Portage and Goose Pits. A total of two (2) graphs are presented per parameter: the first shows the forecasted concentrations in the North and South Cells TSF Reclaim Ponds and the second shows the forecasted concentrations in the Portage and Goose Pits.

For comparison purposes only, the Water Licence, MDMER and CCME limits (refer to **Table 2-1**) were also included in the figures, where applicable.

Again, it is important to remember that the results presented in the figures in **Section 4.0** of this report are based on the input parameters presented in **Section 3.0**. These results must be reviewed while keeping in mind the assumptions and limitations described in **Sections 3.2** and **3.3**. It is also important to note that the results from this model assume that treatment of the Reclaim Pond effluent shall be undertaken following the end of in-pit deposition and that the treated water shall be discharged to the environment.

4.2 Discussions

4.2.1 Key Dates

The mass balance model presented in this Technical Note is based on the WB 2023. The following key dates are important to keep in mind while reviewing the forecasted concentration data presented in **Figure 4-1** to **Figure 4-17**:

- November 2014: The former Attenuation Pond becomes the South Cell and TSF Reclaim Pond;
- May 2015: Start of natural re-flooding of Goose Pit with surface runoff water only;
- September 2015: Transfer of 50,431 m^3 of CDDP water to Goose Pit;
- October 2015: End of deposition in the North Cell TSF;
- July 2017: Allow runoff water and ground water to accumulate in the North Portage Pit (Pit A);
- August to October 2017: Approximately 332,177 m^3 of pond water is transferred from CDDP to Goose Pit;
- August to October 2018: Deposition in North and South Cell TSF;
- April 2019: Deposition end in South Cell TSF;
- April to July 2019: Deposition resumes in North Cell TSF;
- May to July 2019: Approximately 358,156 m^3 of pond water is transferred from CDDP to Goose Pit;
- July 2019: End of processing ore from Portage/Goose/Vault pits at the mill. Start of processing of ore from Whale Tail;
- July 2019: Start of deposition of tailings from Whale Tail Pit;
- July 2019 to August 2020: Deposition of tailings in Goose Pit;
- August 2020 to June 2026: Deposition of tailings in Portage Pit E;
- Reclaim Water from Portage Pit E is returned to the mill or transferred to Portage Pit A;
- Reclaim Water from Portage Pit A is also returned to the mill or transferred to Portage Pit E or Goose Pit;
- Reclaim Water from Goose Pit is transferred to Portage Pit A;
- Allow East Dike Seepage to discharge to Second Portage Lake as long as discharge criteria are met. If not, East Dike Seepage is transferred to Portage Pit A or Pit E;
- July 2020: Start of water transfer from South Cell TSF Reclaim Pond to Portage Pit A;
- As of 2020: North Cell TSF Reclaim Pond is almost completely empty. The pond is maintained empty in the subsequent years by transferring the accumulated runoff water to the South Cell TSF Reclaim Pond;
- September 2020: South Cell TSF Reclaim Pond is almost completely empty. The pond is maintained empty in the subsequent years by transferring the accumulated runoff water to Portage Pit A;
- April 2021: Start of processing at the mill of some ore that comes from the underground mine at Whale Tail. Only a fraction of the ore shall come from the underground mine while the balance shall come from the pit operation at Whale Tail;
- June 2026: End of in-pit tailings deposition;
- July 2026 Start of closure activities;

- July 2028 to December 2038: Treatment of Reclaim Water in Portage and Goose Pits. Water treatment to be done to meet approved effluent criteria and to allow cover construction if deemed necessary. The closure schedule for the overall Project is based on the preliminary closure methods and strategies discussed in the Meadowbank ICRP. It is anticipated that the schedule will be refined throughout the Project life as the designs are advanced, and the closure methods and strategies are further developed;
- January 2039 to July 2041: Active pit reflooding of Portage and Goose Pits;
- August 2041: End of closure (only if water criteria are met).

4.2.2 Forecasted Concentrations in the North and South Cell TSF Reclaim Pond

The forecasted concentrations in the North and South Cell TSF Reclaim Pond are presented in **Figure 4-1** to **Figure 4-17**.

Based on the model for forecasting concentrations in the North and South Cell TSF Reclaim Pond, the following notes and observations can be made:

1. For the metal parameters, the fluctuations observed from 2014 to 2019 and from 2021 to 2023 are primarily due to seasonal variability (runoff from nearby areas, snow and ice melt, temperature, etc.). Furthermore, the forecasted concentrations are generally more conservative than the field measurements.
2. Natural degradation of cyanide during summer plays a significant role in reducing the measured concentration of total cyanide in the TSF Reclaim Ponds and it is considered in the forecasting model. The forecasted concentrations are generally more conservative than the field measurements, in particular the ones from 2014 to 2016 and from 2021 to 2023.
3. For ammonia, it is important to note that:
    a. The mass balance model developed here does not include seasonal variability (sunlight, microbial or algae degradation of ammonia, etc.); and
    b. Ammonia concentrations can vary significantly depending on temperature, pH, sunlight, algae activity, etc. Ammonia concentrations may be lower in the summer and higher in the winter. The forecasted concentrations in the South Cell TSF Reclaim Pond between 2014 and 2019 are more conservative than the measured values. From 2021 to 2023, ammonia concentrations decreased compared to previous years and the forecasted concentrations are more conservative than the measured values.
4. Similarly, for nitrate, it is important to remember that:
    a. The mass balance model developed here does not include seasonal variability; and
    b. Ammonia decomposes to nitrate; therefore, nitrate concentrations can vary significantly depending on temperature, pH, sunlight, algae activity, etc. Nitrate concentrations may be lower in the summer and higher in the winter. The forecasted values from 2014 to 2019 and from 2021 to 2023 are in the same range as the measured values in both cells Cell. From 2016 to 2019, nitrate concentrations decreased compared to previous years. Forecasted values are more conservative than the measured values.

5. Guidelines:

a. For comparison purposes, the forecasted concentrations in the North and South Cells TSF Reclaim Ponds for almost all the parameters are above the Water Licence discharge criteria when tailings depositions were occurring in this area, except for aluminum, arsenic (from 2014 to mid-2021), cadmium (from 2018 to mid-2024), lead, zinc, nitrate (from 2014 to mid-2024) and chloride (from 2016 to 2028). Following the end of tailings deposition, the forecasted values drop below the Water Licence limits.

b. For comparison purposes, almost all forecasted concentrations in the North and South Cells TSF Reclaim Ponds for the parameters of concern are also above the CCME guidelines for the protection of aquatic life during tailings depositions. Following deposition, the forecasted concentration drops close to or below the CCME guidelines.

c. However, it is important to note that no water in the TSF Reclaim Pond during tailings deposition is discharged to the environment. Thus, the Water Licence discharge criteria are not applicable but are rather used as a comparison herein. Also, the dikes around Portage and Goose Pits will only be breached if the water quality in those pits meets the selected discharge closure criteria.

4.2.3 Forecasted Concentration in Portage and Goose Pits

Table 4-1 presents the forecasted concentration of all parameters for Portage and Goose Pits at the end of in-pit deposition (IPD) projected to be in June 2026 and at the end of pit reflooding projected to be in July 2041.

Based on the model for forecasting of the concentrations in Portage and Goose Pits, the following notes and observations can be made:

1. The water quality forecast considers the extension of the Life of Mine at Meadowbank which adds the processing of ore body coming from the Whale Tail Pit, IVR Pit and the underground mine at the Whale Tail site. The ore body from Whale Tail Pit has a different geochemical behavior when compared to the Portage/Goose/Vault ore bodies. It has a higher potential to leach certain metals, such as arsenic, copper, and nickel.
2. The forecasted concentrations at the end of in-pit deposition are compared to the current Water Licence discharge criteria since the Reclaim Water shall be treated and discharged to the environment prior to pit reflooding. The following observations can be made for each of the parameters of concern:

a. Total Cyanide	Forecasted total concentration is projected to be higher than the Water Licence limit in Portage Pit E and Pit A and lower than this limit in Goose Pit.
b. Total Aluminum	Forecasted total concentration is projected to be higher than the Water Licence limit in Portage Pit E and Pit A and lower than this limit in Goose Pits.
c. Total Arsenic	Forecasted total concentration is projected to be higher than the Water Licence limit at the end of IPD in Portage and Goose Pits. The main source terms for this constituent are from the mill effluent and the pit seepages reporting to the pits.
d. Total Cadmium	Forecasted total concentration is projected to be higher than the Water Licence limit in Portage Pits and close to this limit in Goose Pit.

e. Total Copper	Forecasted total concentration is projected to be higher than the Water Licence limit at the end of IPD in Portage and Goose Pits. The main source terms for this constituent are from the mill effluent and the pit seepages reporting to the pits.
f. Total Iron	Elevated forecasted total concentration is projected in Portage Pit and Goose Pit. The main source terms for this constituent are from the mill effluent, surface runoff and the pit seepages reporting to the pits.
g. Total Lead	Forecasted total concentration is projected to be close to the Water Licence limit in Goose Pit at the end of deposition and lower than this limit in Portage Pits.
h. Total Mercury	Forecasted total concentration is projected to be lower than the Water Licence limit in Goose Pit and in Portage Pits.
i. Total Nickel	Forecasted total concentration is projected to be higher than the Water Licence limit at the end of IPD in Portage and Goose Pits. The main source term for this constituent is from the mill effluent reporting to the pits.
j. Total Selenium	There is no specific Water Licence limit for this constituent. However, total forecasted concentration remains higher than the CCME guidelines in Portage and Goose Pits. An increase is observed once IPD has started, suggesting that the main source term for this constituent is from the mill effluent reporting to the pits.
k. Total Zinc	Forecasted total concentration is projected to be lower than the Water Licence limit in Portage and Goose Pits.
l. Total Ammonia	Ammonia forecasted concentrations are higher than the Water Licence limit in Portage and Goose Pits at the end of IPD. A higher load of ammonia is forecasted in the pits due to the additional ammonia load coming from the mill effluent reporting to the pits (i.e., from cyanate hydrolysis).
m. Nitrate	Forecasted total concentration is projected to be higher than the Water Licence limit in Portage Pit E and lower than this limit in Goose Pit and Portage Pit A.
n. Total Dissolved Solids	Higher forecasted total concentration than the Water Licence limit is projected in Portage Pit E since tailings deposition is mainly occurring in this pit from 2019 to 2027. For Portage Pit A, reclaim water transferred from Pit E as well as natural runoff are allowed to accumulate in the pit, explaining the decrease in concentration. In that same period, for Goose Pit, natural runoff is allowed to accumulate in the pit, explaining the decrease in concentration.

o. Chloride	Forecasted concentration in Portage Pit at the end of IPD is projected to be higher than the Water Licence limit for this constituent. However, the forecasted value in Goose Pit is projected to be lower than this limit. Since 2019, the sulphate forecasted concentrations are compared against a threshold value based on BC Environment guidelines for the protection of aquatic life for very soft water (0-30 mg/L) (April 2013). There is no specific Water Licence limit for this constituent.
p. Sulphate	Forecasted concentration in Portage Pit and Goose Pit was projected to be higher than this guideline. An increase in sulphate concentration is observed once IPD has started, suggesting that the main load for this constituent comes from the mill effluent. Concentration of sulphate is expected to increase in Portage Pits (Pit A and E) due to continued deposition of tailings and decrease in Goose Pit due to water transfer to Portage Pit A.
q. Fluoride	There is no specific Water Licence limit for this constituent. However, total forecasted concentration remains higher than the CCME guidelines in Portage and Goose Pits. The fluoride load to the pits comes from the mill effluent and from pit seepages.

3. Based on the forecasted concentrations at the end of IPD, the new water treatment plant required at closure should be designed to treat and manage the following parameters of concern: **aluminum, arsenic, cadmium copper, mercury, nickel, lead, chloride, nitrate, TDS, total ammonia, and total cyanide.** The new water treatment plant should also be designed to meet **pH** and **total suspended solids** requirements.
4. The assimilative capacity of Third Portage Lake will be assessed with the objective of maintaining a baseline or guideline/protective water quality in the lake. Treated effluent discharge water criteria will be assessed based on this objective.
5. Water quality forecast at the end of pit reflooding:
    a. Pit reflooding shall begin once the Reclaim Water has been treated and discharged to the environment. Pit reflooding shall be done via natural reflooding and active transfer of water from Third Portage Lake.

It is important to note that once the water elevation in the pits reaches a level above 131 m, both Portage and Goose Pits will be hydraulically connected. For this reason, only the forecasted concentrations in the mixed Portage and Goose Pits are considered in the model.

    b. As shown in **Table 4-1**, when assuming complete mixing of both pits, most of the parameters are below the CCME guidelines. However, some total metals and elements such as aluminum, silver, arsenic, cadmium, chromium, nickel, lead, selenium, total nitrogen and total ammonia were above or close to these guidelines. As for copper and mercury concentrations, they are higher than the Water Licence limit.
    c. Total copper is higher than the Water Licence limit but is expected to be lower once the particulates are allowed to settle out in the pits.

d. For comparative purposes only, the total nitrogen equivalent concentration (i.e., sum of ammonia and nitrate) is higher than the threshold concentration for classification of an oligotrophic lake (i.e., a lake characterized by a low accumulation of dissolved nutrient salts, supporting but a sparse growth of algae and other organisms, and having a high oxygen content owing to the low organic content) in terms of nutrient concentration (Nurnberg 1996). However, the mass balance model does not consider any natural nitrogen degradation cycle that could occur over the summer months.

In summary, the forecasted values presented in this section provide an indication of the type of effluent that shall be managed and treated at the end of in-pit deposition and following pit reflooding. This information can be used to initiate the assessment of the type of water treatment system required for closure and initiate planning for water treatability testing. All of the parameters listed in **Table 4-1** shall be monitored in the pits and used to re-evaluate next year's water quality forecast model.

4.2.4 Comparison of Forecasted Values

As of 2019, in-pit tailings deposition has started in Goose Pit and Portage Pit instead of the North and South Cell TSF. For this reason, comparison of the model results shall focus on the trends forecasted in Portage and Goose Pits.

Chloride and sulphate shall be used to compare the model results since these constituents are likely to accumulate over time in the reclaim water and not precipitate out of solutions.

Figure 4-18 and **Figure 4-19** compare the forecasted value based on the Water Balance (WB) 2019, WB 2020, WB 2021, WB 2022, and WB 2023. Measured values for chloride and sulphate sampled in the pits are also presented.

Based on these figures, the following notes and observations can be made:

- The water quality forecast model based on WB 2019 overestimated the forecasted concentration for chloride in Goose and Portage Pits. The WB from 2020 to 2023 models and the current model correct the forecast to be more in line with the measured values.
- The water quality forecast model based on WB 2019 underestimated the forecasted concentration for sulphate in Goose and Portage Pits. The WB from 2020 to 2023 models and the current model correct the forecast to be more in line with the measured values.

The site Water Balance and Water Quality Forecast model will continue to be updated on a yearly basis, using the actual volumes and measured concentrations to calibrate the models.

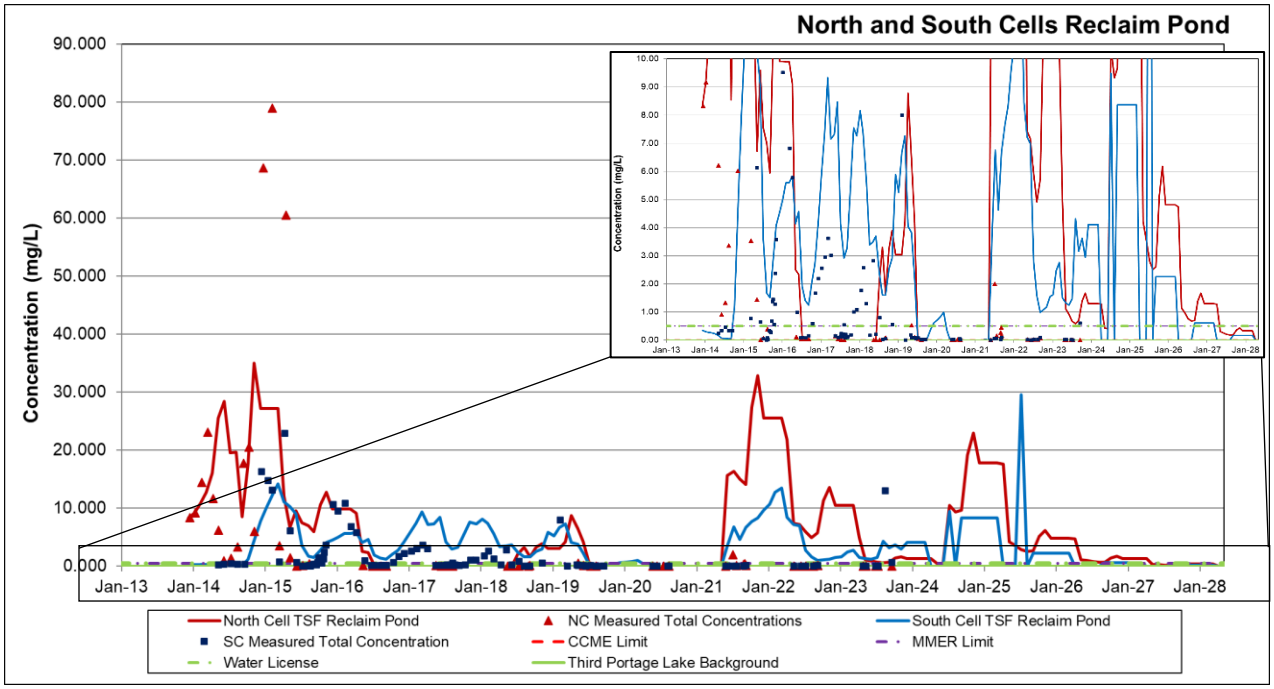
Table 4-1: Summary of Forecasted Concentrations at the End of Deposition and After Pit Reflooding

					END OF DEPOSITION (JUN. 2026)					END OF PIT FLOODING (JUL. 2041)
PARAMETERS	UNITS	WATER LICENCE at ST-9 (3)	CCME GUIDELINES	3rd PORTAGE LAKE	NORTH CELL	SOUTH CELL	PORTAGE PIT E	PORTAGE PIT A	GOOSE PIT	PORTAGE AND /GOOSE PITS (MIXED PITS)
pH (assumed)	---	---	---	---	---	---	---	---	---	---
Alkalinity	mg $CaCO_3$/L	n/a	n/a	9.1	18	113	166	193	62	16
Hardness	mg $CaCO_3$/L	n/a	n/a	12.05	136	188	2801	1288	670	85
Total Dissolved Solids (TDS)	mg/L	1400	n/a	22.1	370	293	7682	3634	1598	237
Total Aluminum (Al)	mg/L	1.5	0.10	0.0075	0.263	1.589	4.446	1.890	0.626	0.153
Total Silver (Ag)	mg/L	n/a	0.00025	0.000005	0.00012	0.00009	0.00288	0.00188	0.00152	0.00012
Total Arsenic (As)	mg/L	0.3	0.005	0.0005	0.017	0.020	0.770	0.346	0.511	0.010
Total Barium (Ba)	mg/L	n/a	n/a	0.0037	0.012	0.052	0.180	0.097	0.139	0.013
Total Cadmium (Cd)	mg/L	0.002	0.00004	0.000003	0.00003	0.00004	0.00076	0.00065	0.00306	0.00003
Total Chromium (Cr)	mg/L	n/a	0.001	0.0001	0.00706	0.01471	0.15613	0.07339	0.16174	0.00518
Total Copper (Cu)	mg/L	0.1	0.002	0.0006	0.322	0.014	8.021	3.941	3.063	0.229
Total Iron (Fe)	mg/L	n/a	0.30	0.0173	0.392	3.28	5.16	2.73	2.73	0.26
Total Manganese (Mn)	mg/L	n/a	0.23	0.0016	0.043	0.493	0.631	0.809	0.117	0.066
Total Mercury (Hg)	mg/L	0.0004	0.000026	0.000003	0.00003	0.000014	0.000183	0.000300	0.000075	0.000123
Total Molybdenum (Mo)	mg/L	n/a	0.073	0.0002	0.007	0.006	0.190	0.106	0.205	0.006
Total Nickel (Ni)	mg/L	0.2	0.025	0.0006	0.081	0.062	2.058	1.538	1.912	0.072
Total Lead (Pb)	mg/L	0.1	0.001	0.00003	0.002	0.00356	0.048	0.025	0.144	0.0015
Total Selenium (Se)	mg/L	n/a	0.001	0.00003	0.01479	0.0011	0.3826	0.1457	0.0591	0.0090

					END OF DEPOSITION (JUN. 2026)					END OF PIT FLOODING (JUL. 2041)
PARAMETERS	**UNITS**	**WATER LICENCE at ST-9 (3)**	**CCME GUIDELINES**	**3rd PORTAGE LAKE**	**NORTH CELL**	**SOUTH CELL**	**PORTAGE PIT E**	**PORTAGE PIT A**	**GOOSE PIT**	**PORTAGE AND /GOOSE PITS (MIXED PITS)**
Total Strontium (Sr)	mg/L	n/a	n/a	0.0132	0.155	0.002	4.294	1.694	0.749	0.113
Total Thallium (Ti)	mg/L	n/a	0.0008	0.000005	0.00014	0.000001	0.00012	0.00013	0.00042	0.00005
Total Uranium (U)	mg/L	n/a	0.015	0.000049	0.001	0.00001	0.0417	0.0377	0.0225	0.0011
Total Zinc (Zn)	mg/L	0.4	0.010	0.0015	0.015	0.014	0.024	0.026	0.073	0.003
Chloride	mg/L	1000	120	0.7925	45	13	1242	484	258	34
Fluoride (F)	mg/L	n/a	0.12	0.07925	0.094	0.26	0.46	0.31	0.41	0.10
Sulphate (SO_4)	mg SO_4/L	n/a	128[2]	5.1	117	107	2646	1721	822	63
Total Cyanide (CNt)	mg/L	0.5	0.005	0.0005	1.14	0.01	22.45	2.01	0.00009	0.00002
Total Ammonia	mg N/L	16.0	1.83	0.0145	4	2	114	66	29	2.7
Nitrate (NO_3)	mg N/L	20.0	2.94	0.03305	3	9	41	17	5	1.3
Total N equivalent	mg N/L	n/a	0.35[1]	0.04755	7	10	155	83	34	4.1

Notes:

1. *Value based on the threshold concentration for the classification of an oligotrophic lake in terms of nutrient concentrations (Nurnberg 1996).*
2. *Threshold value for sulphate based on BC Environment guidelines for the protection of aquatic life for very soft water (0-30 mg/L) (April 2013).*
3. *Mass balance forecasted concentration higher than current Water Licence limits at ST-9. For comparison purposes only.*
4. *Mass balance forecasted concentration higher than CCME limits. For comparison purposes only.*



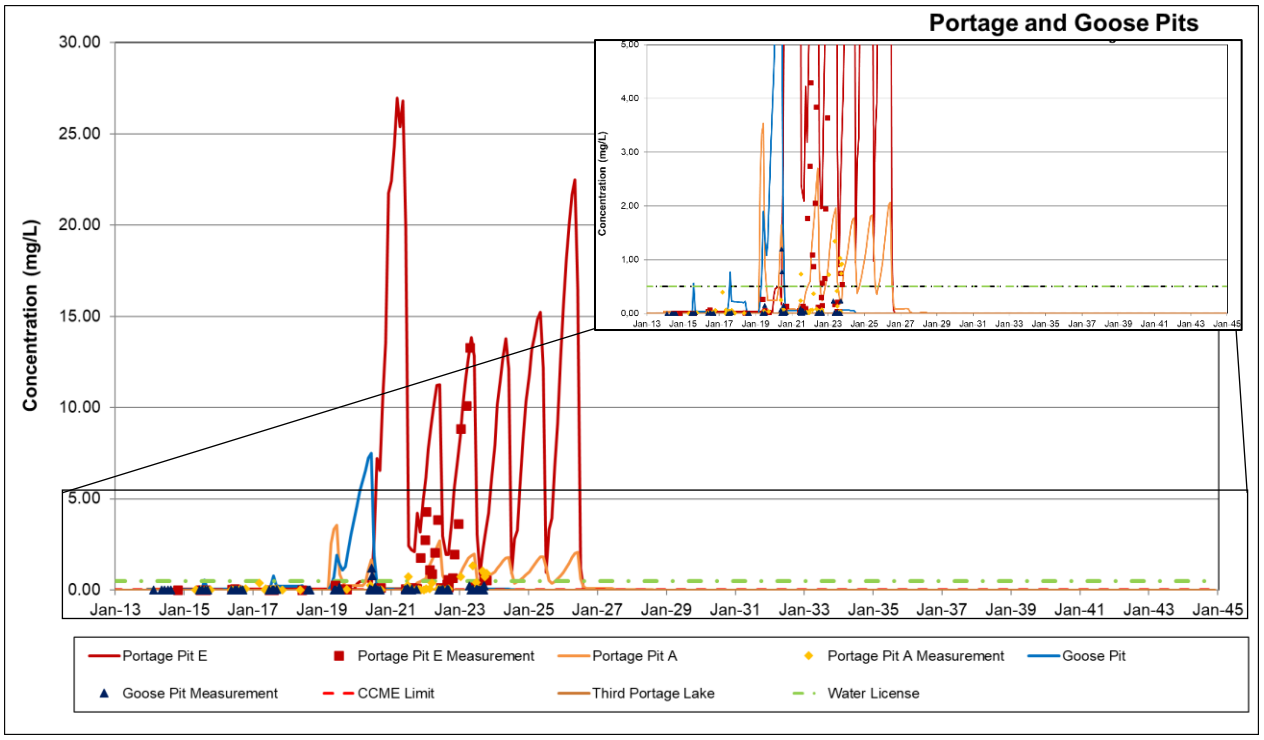
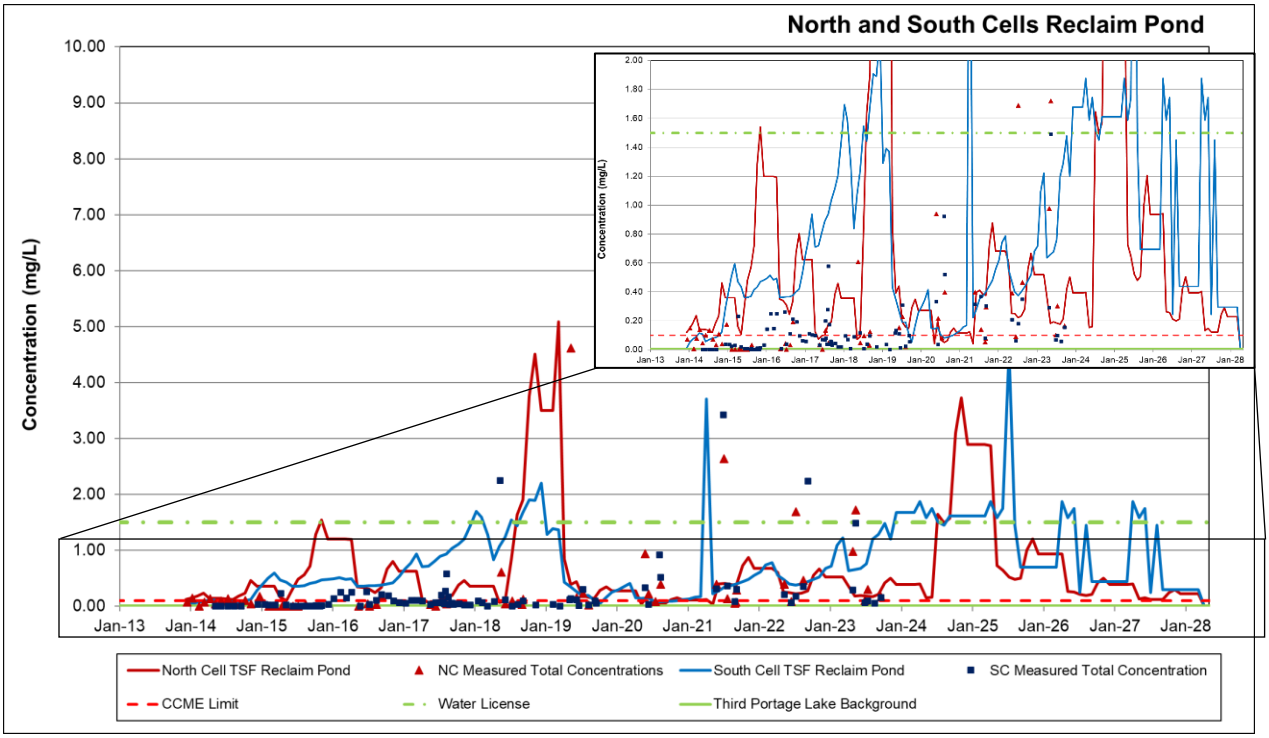


Figure 4-1: Total Cyanide Forecasted Concentration



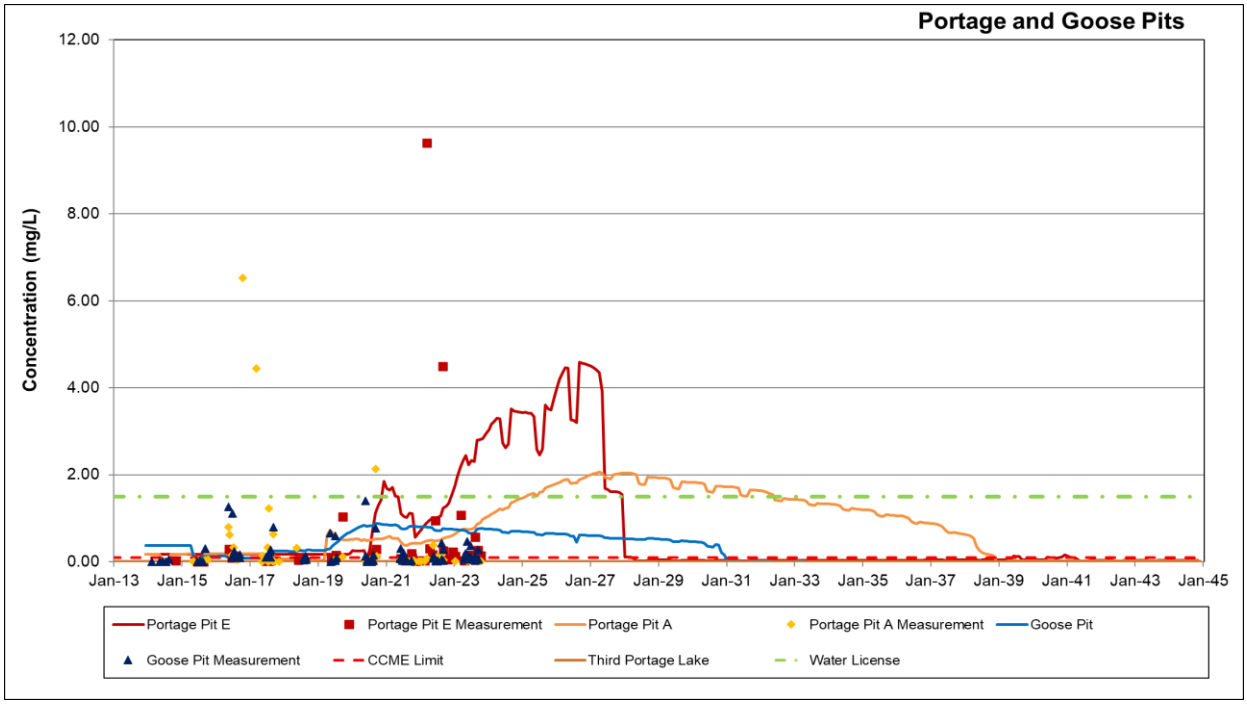
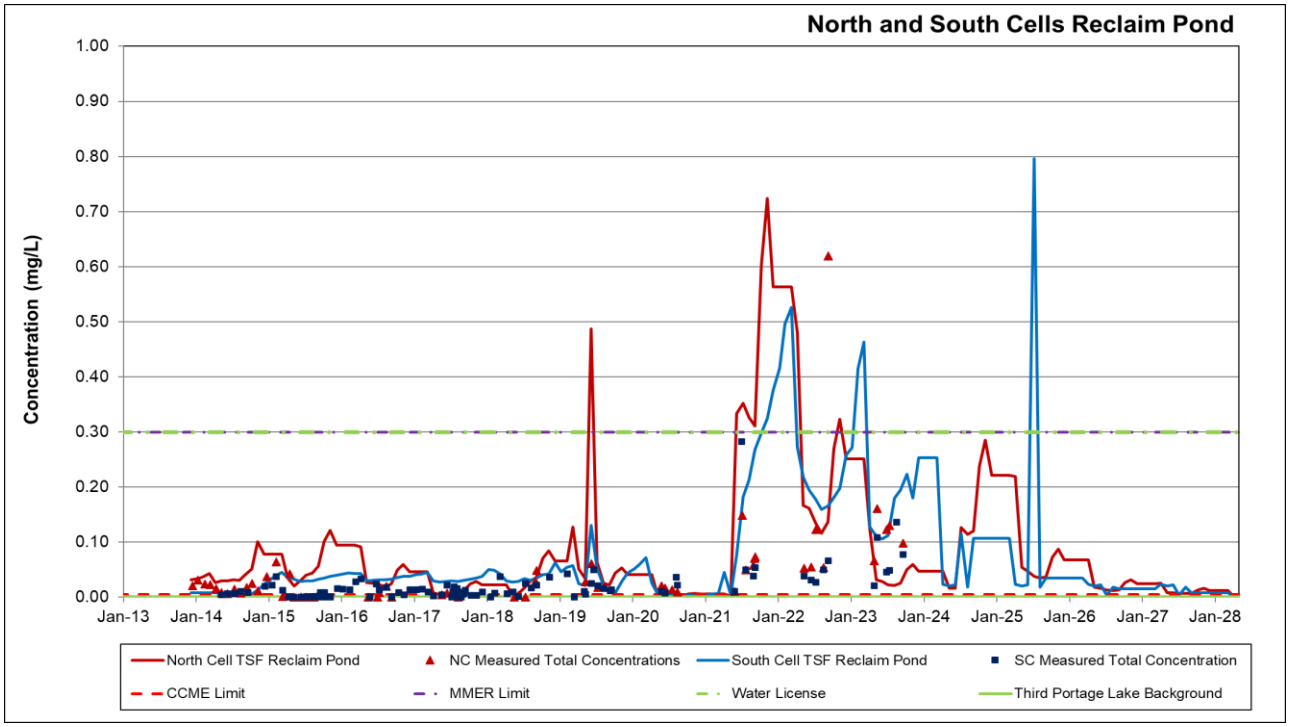


Figure 4-2: Total Aluminum Forecasted Concentration



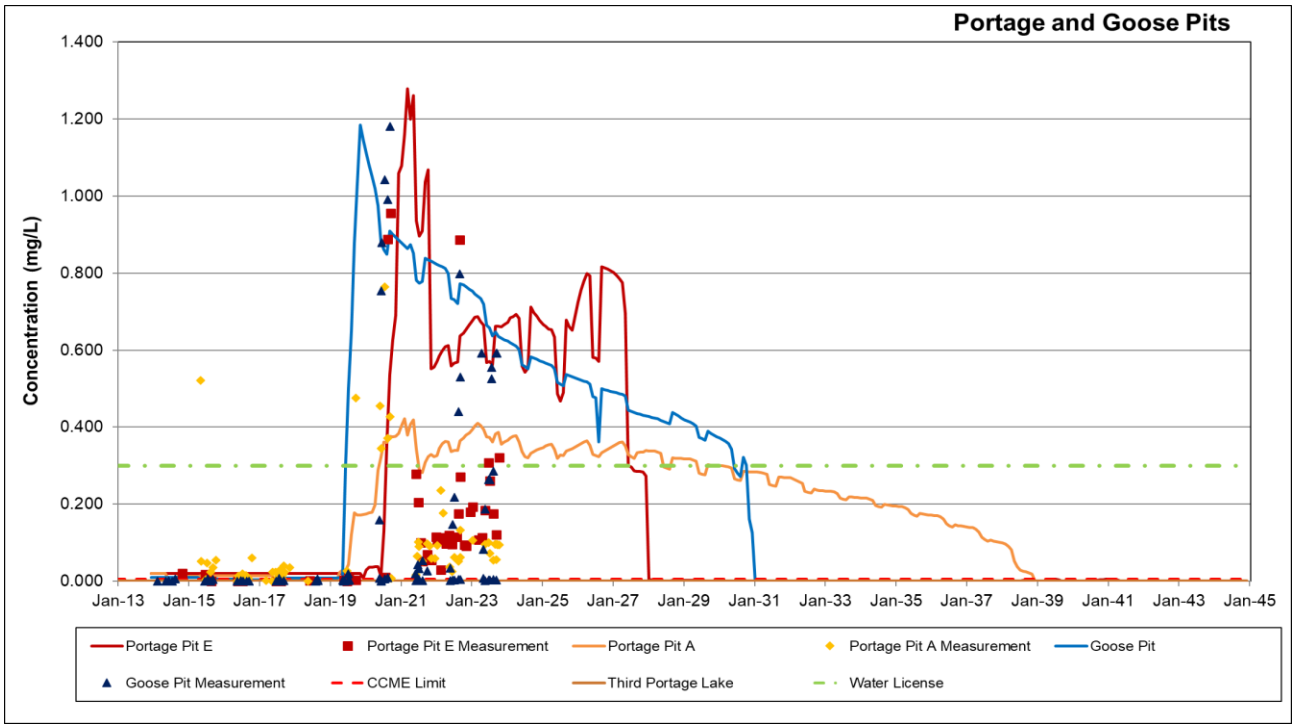
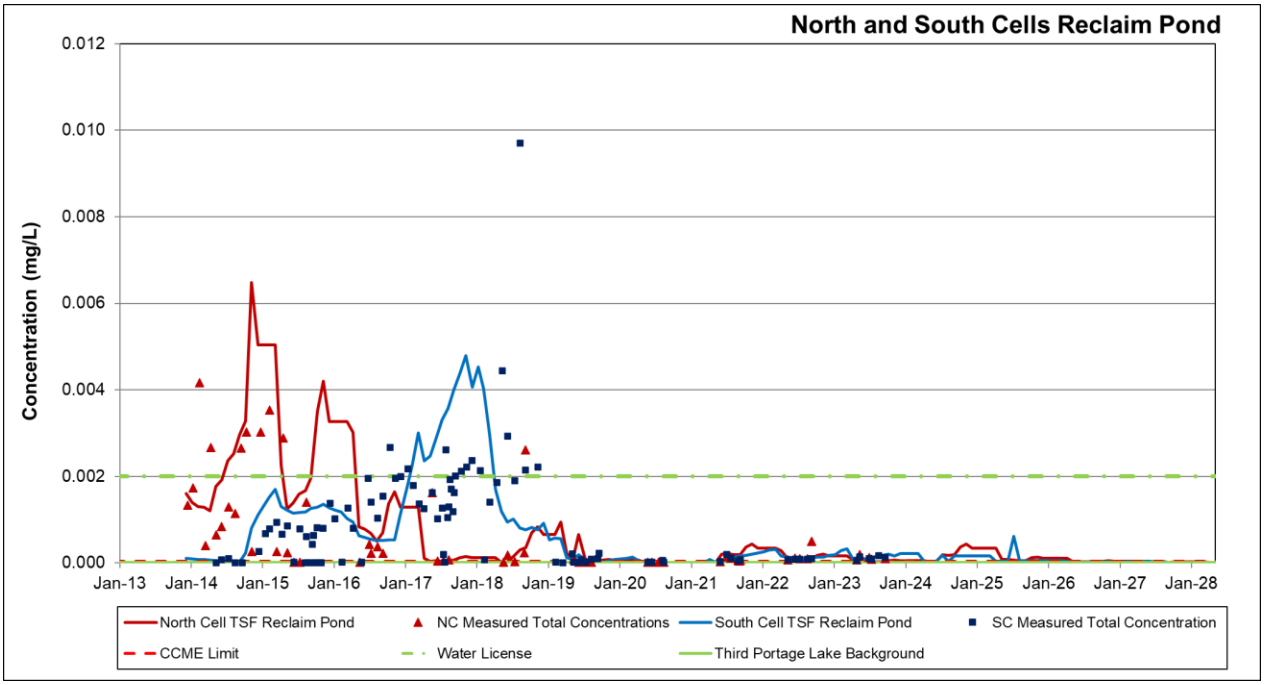


Figure 4-3: Total Arsenic Forecasted Concentration



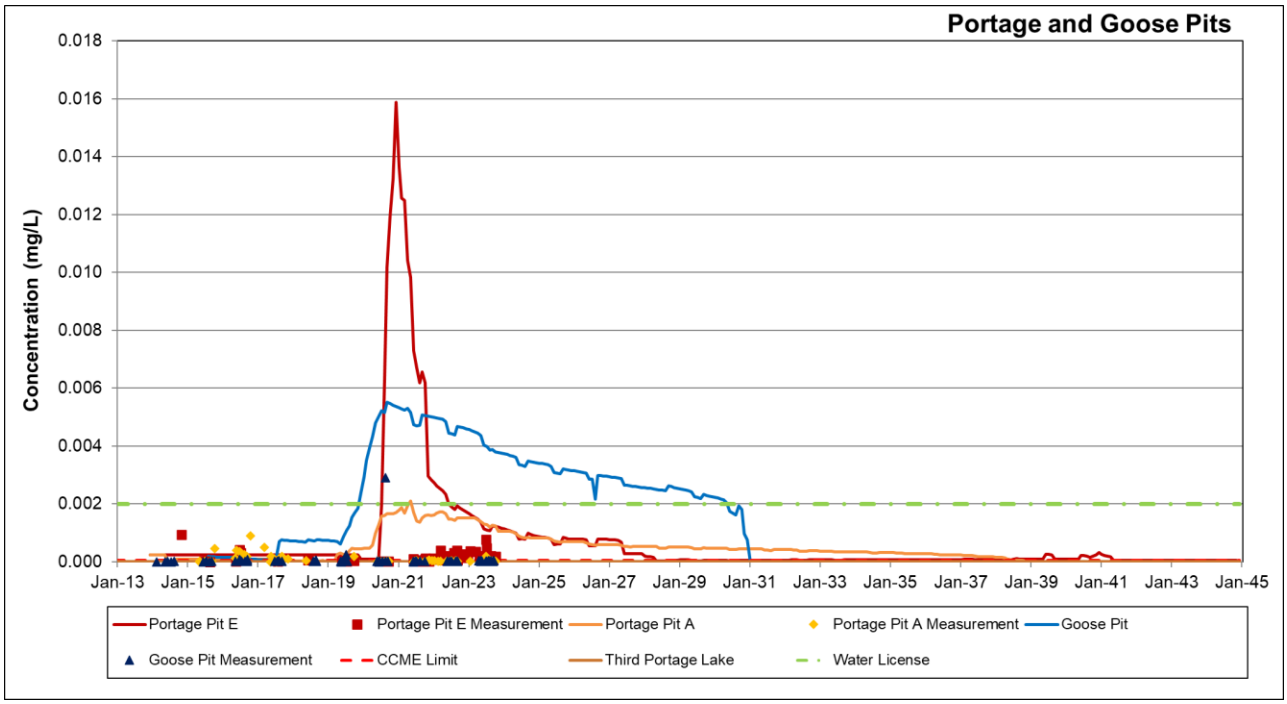
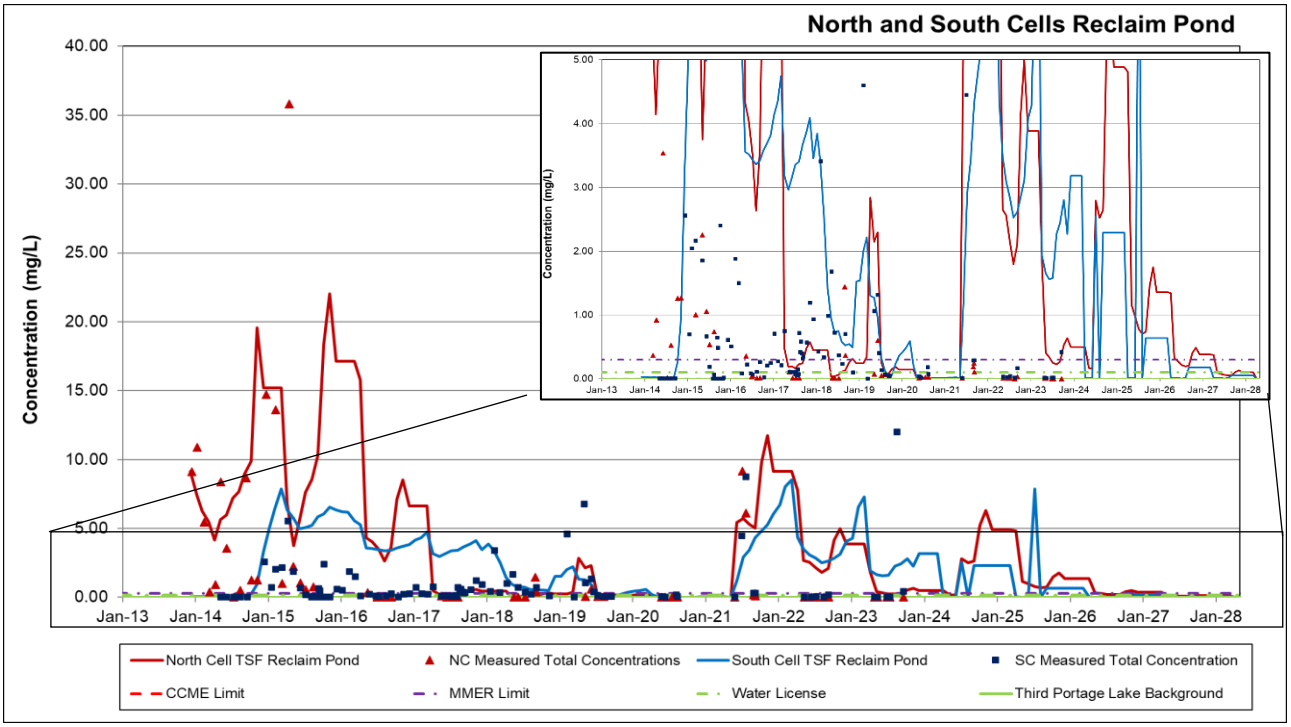


Figure 4-4: Total Cadmium Forecasted Concentration



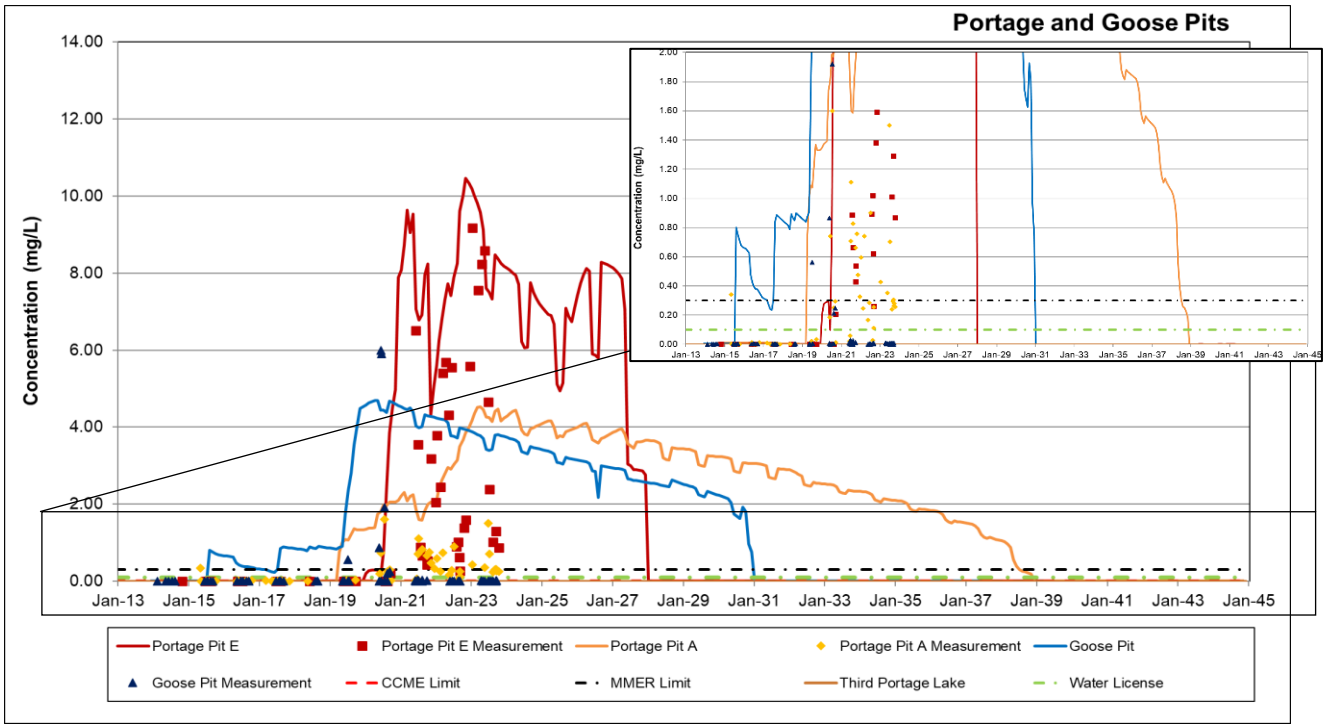


Figure 4-5: Total Copper Forecasted Concentration

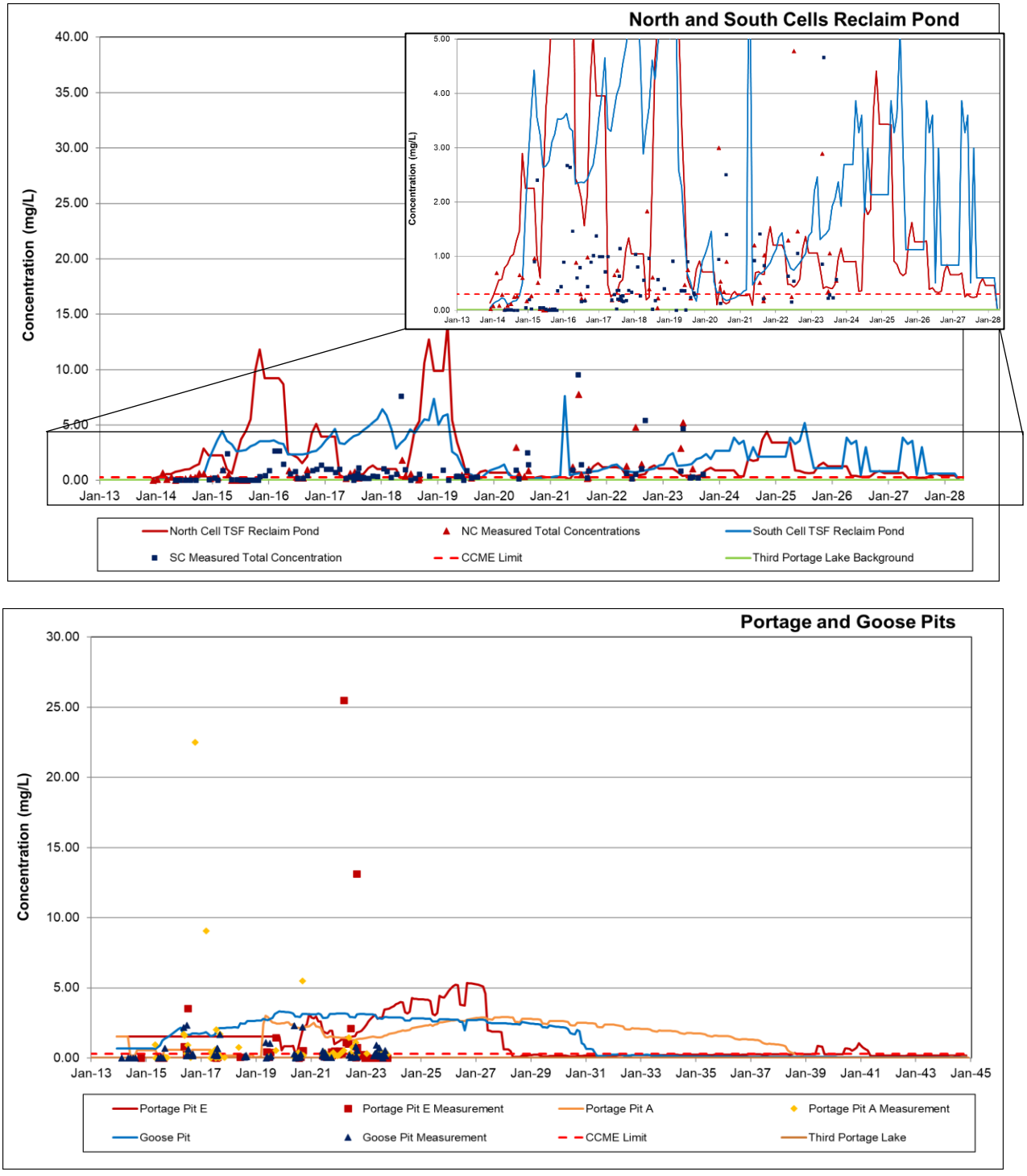
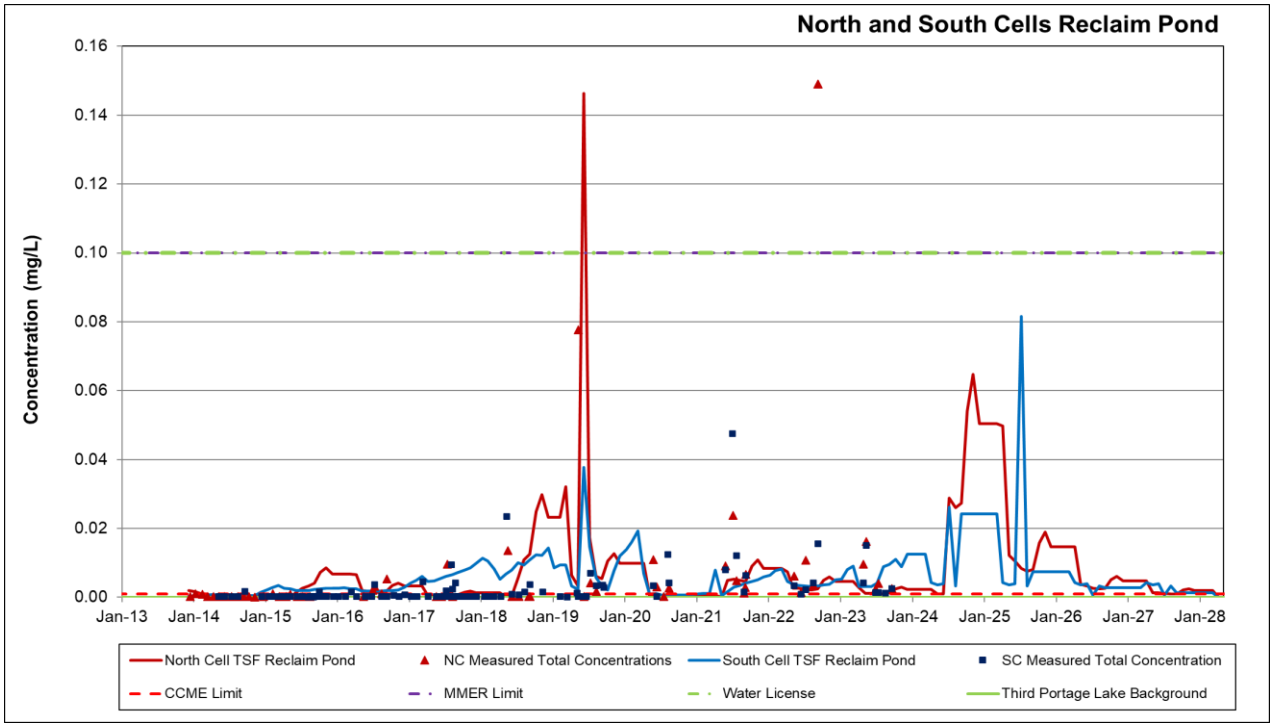


Figure 4-6: Total Iron Forecasted Concentration



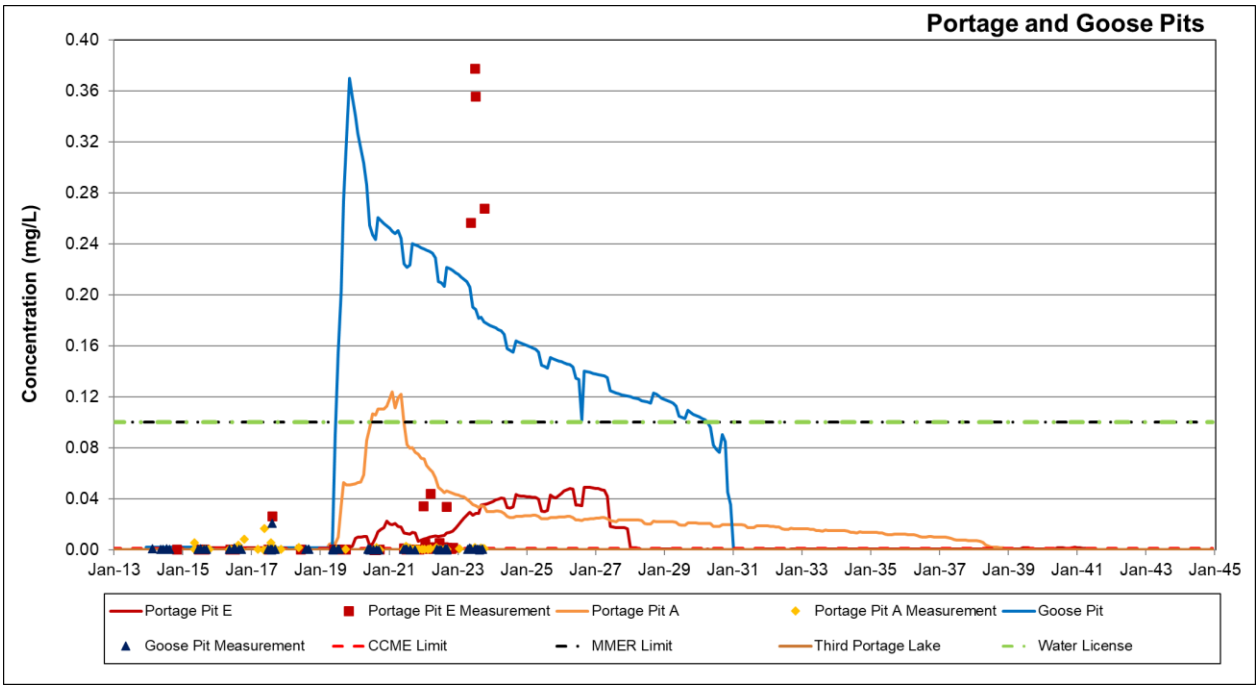
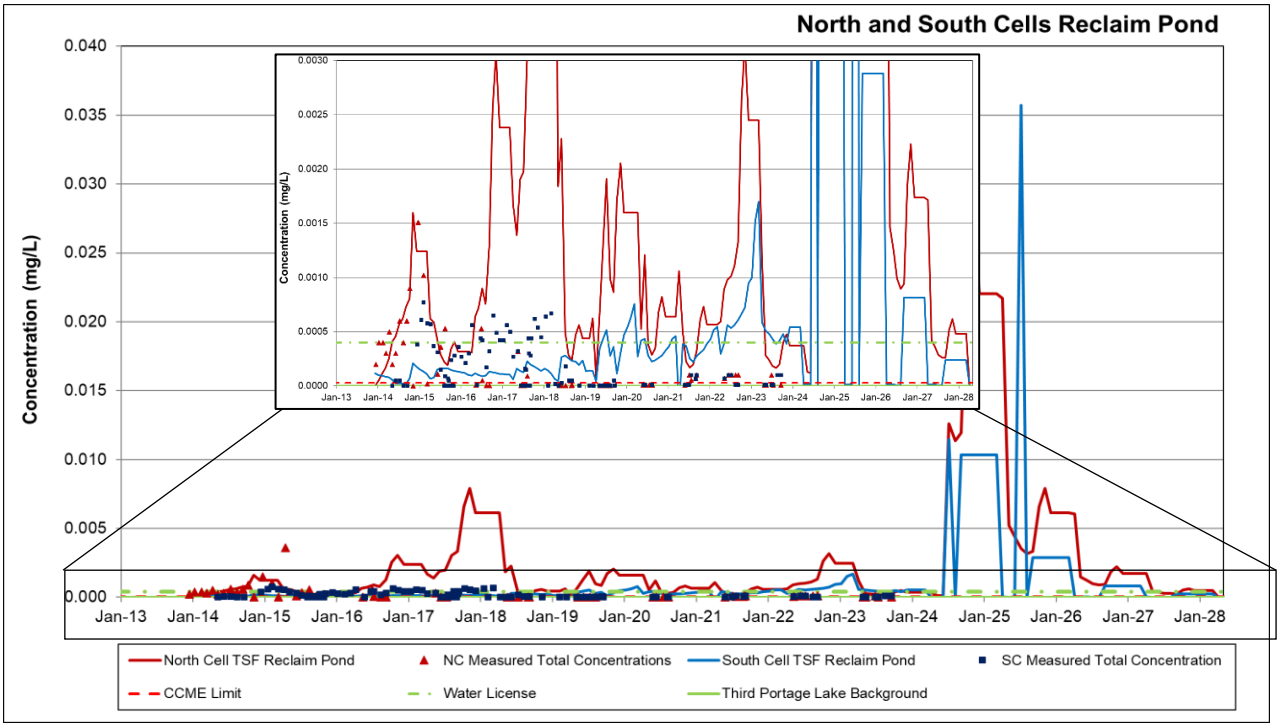


Figure 4-7: Total Lead Forecasted Concentration



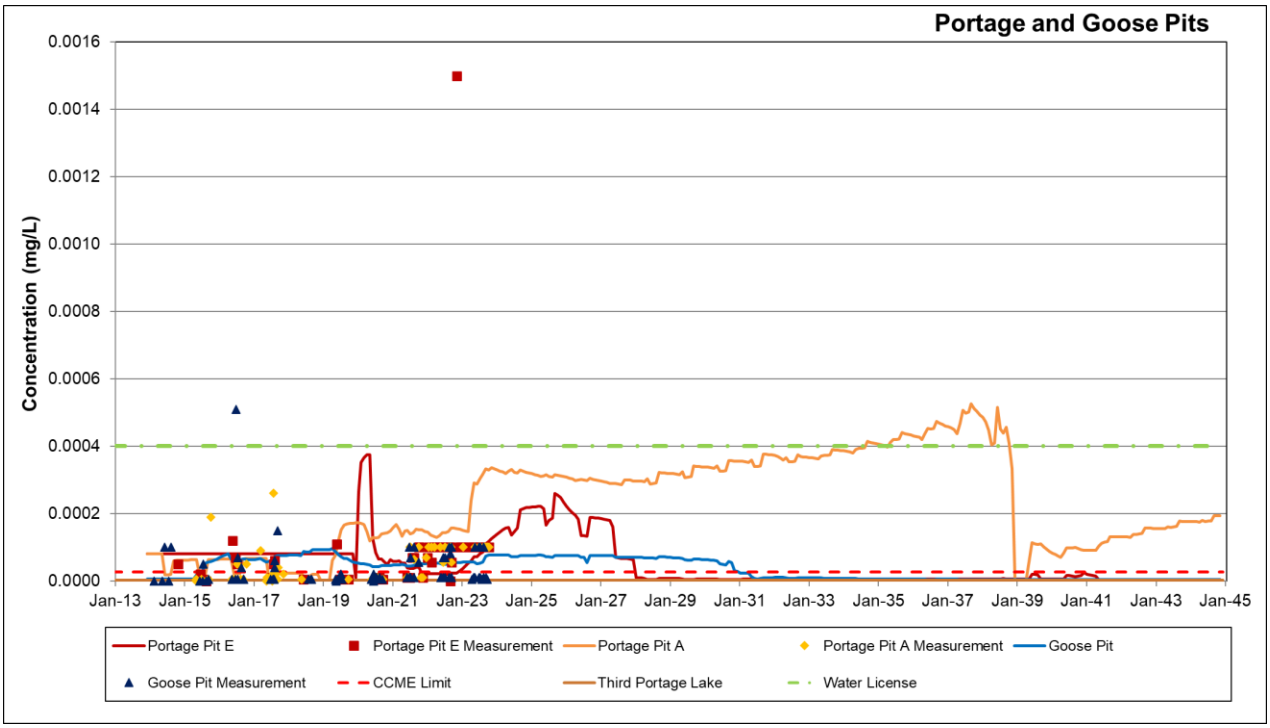
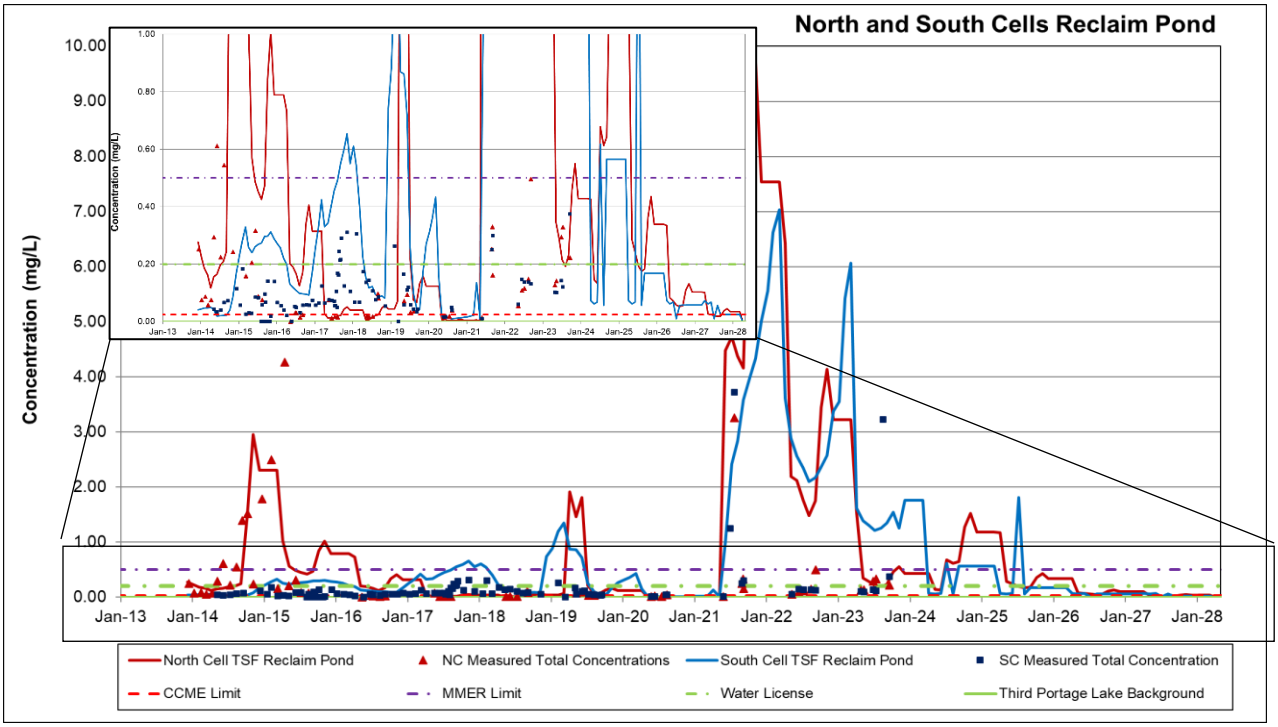


Figure 4-8: Total Mercury Forecasted Concentration



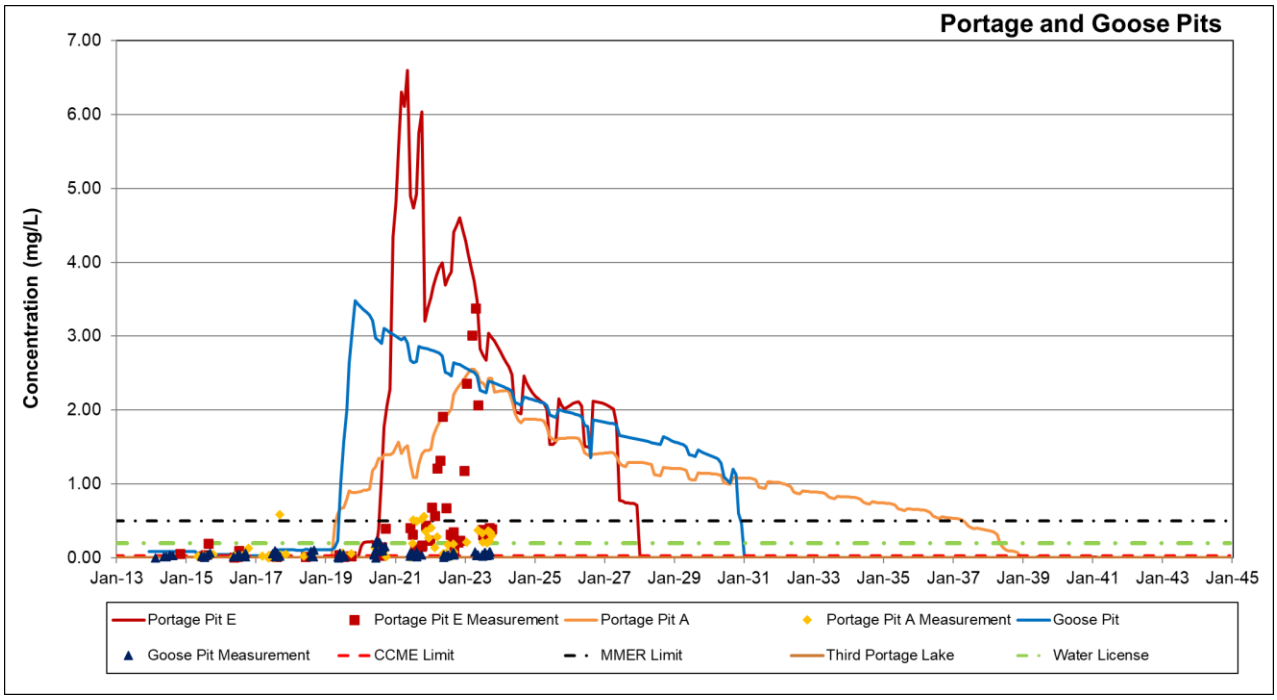
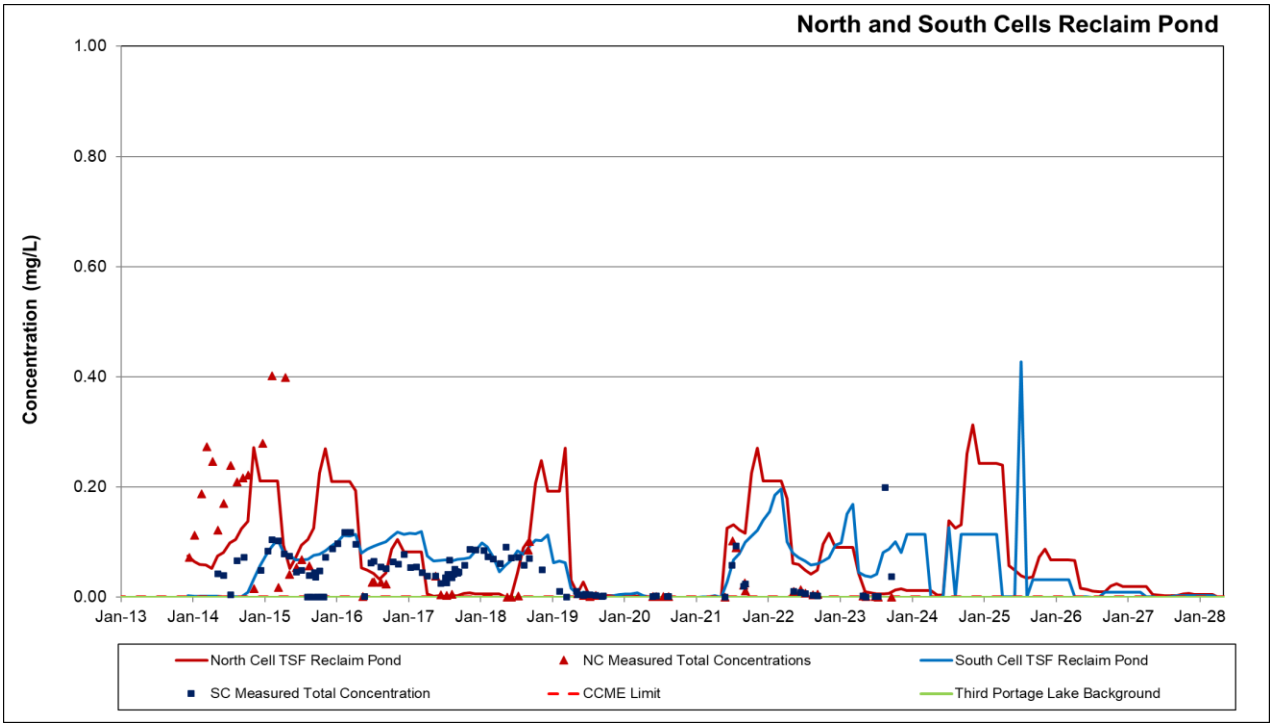


Figure 4-9: Total Nickel Forecasted Concentration



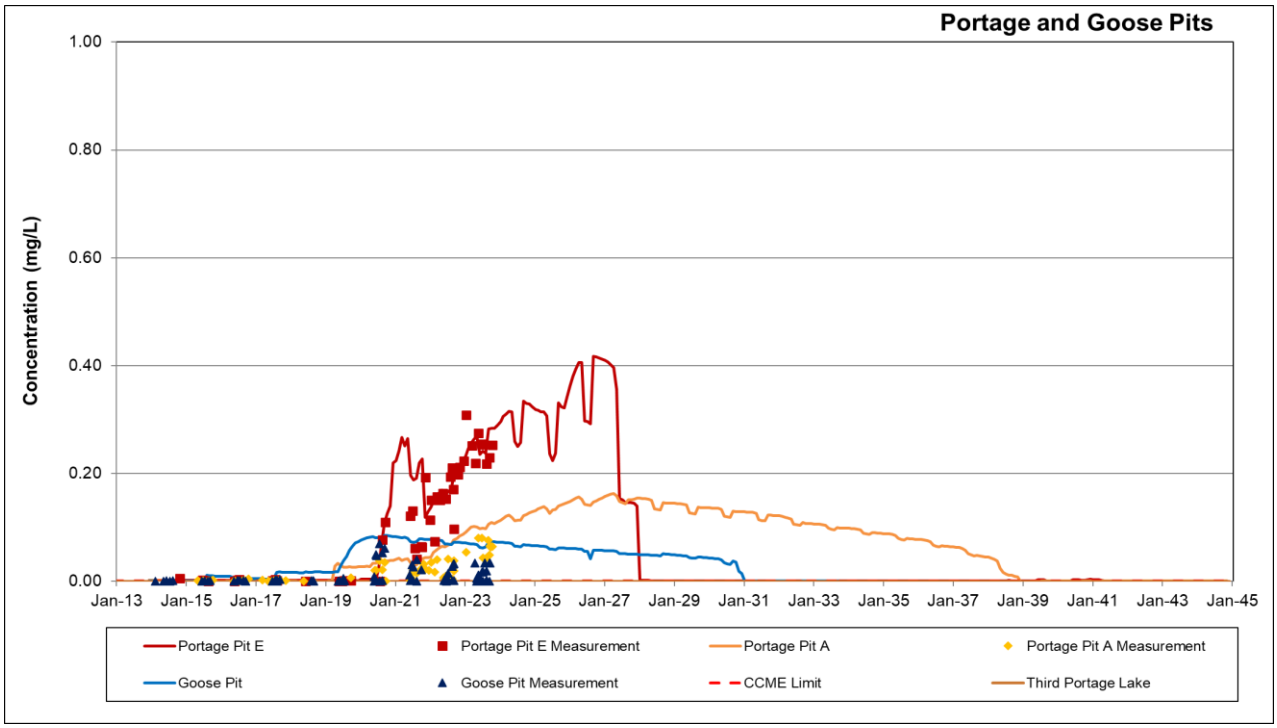
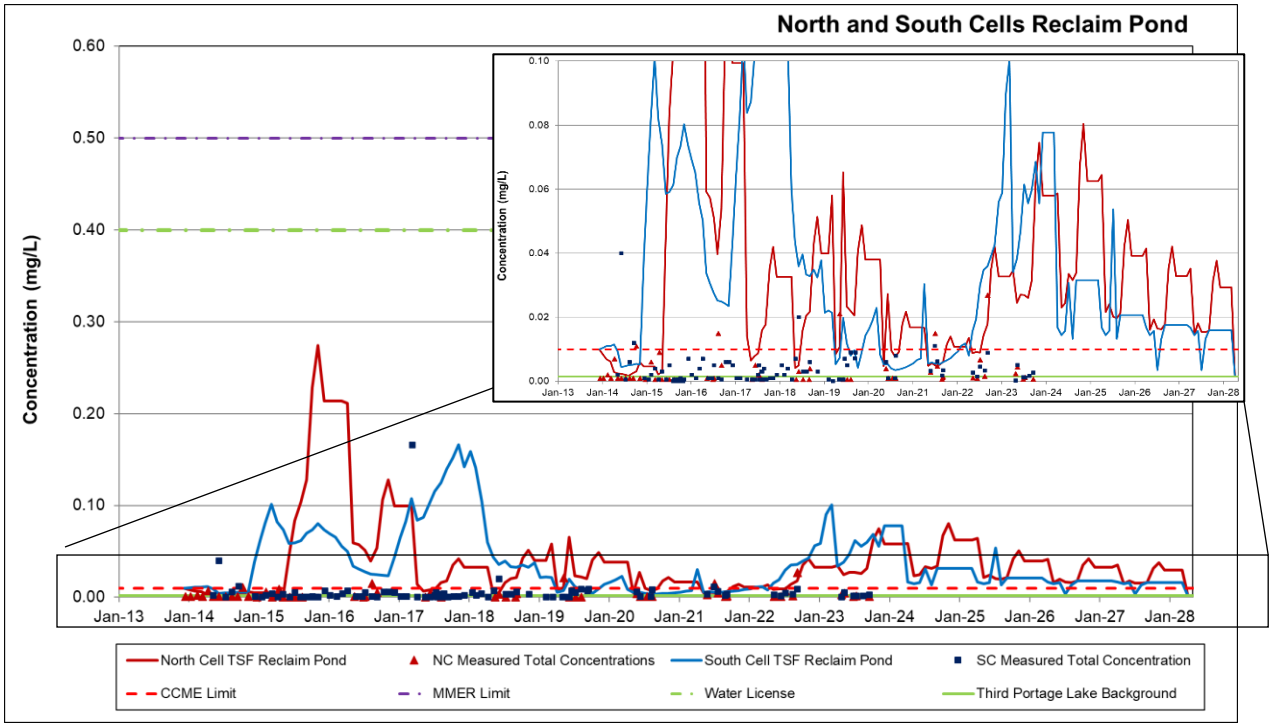


Figure 4-10: Total Selenium Forecasted Concentration



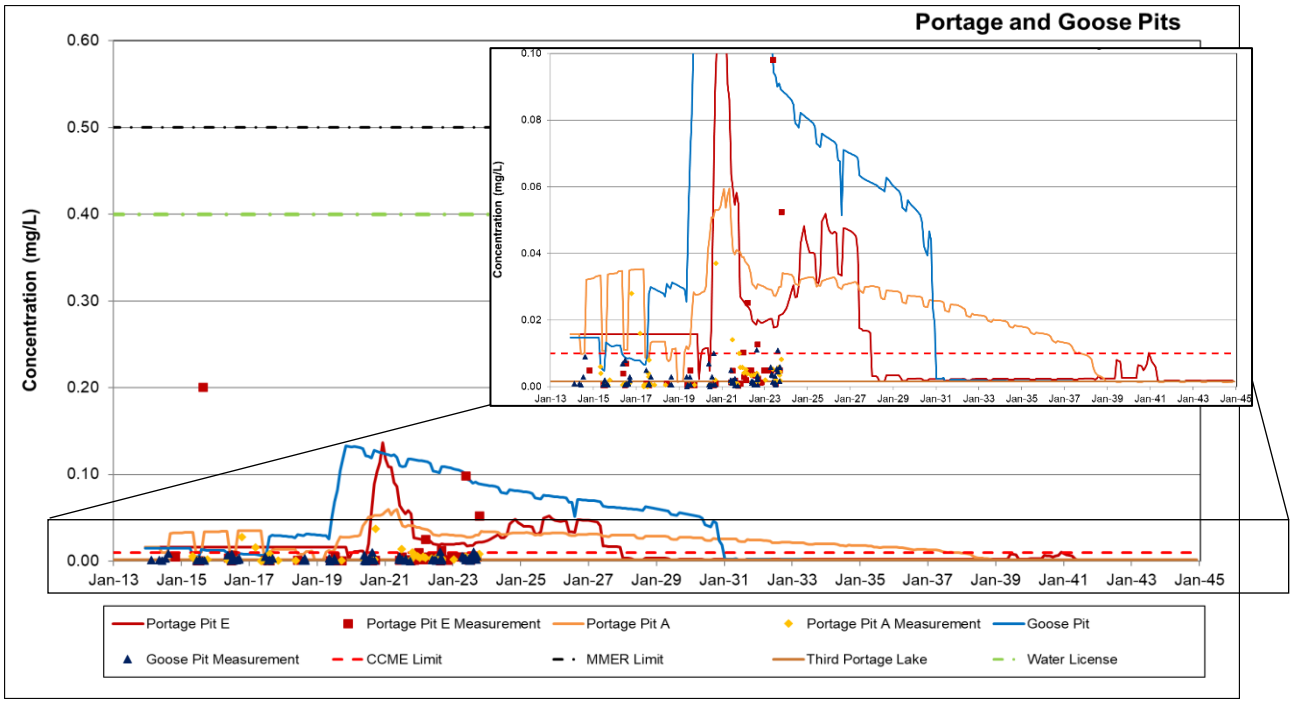
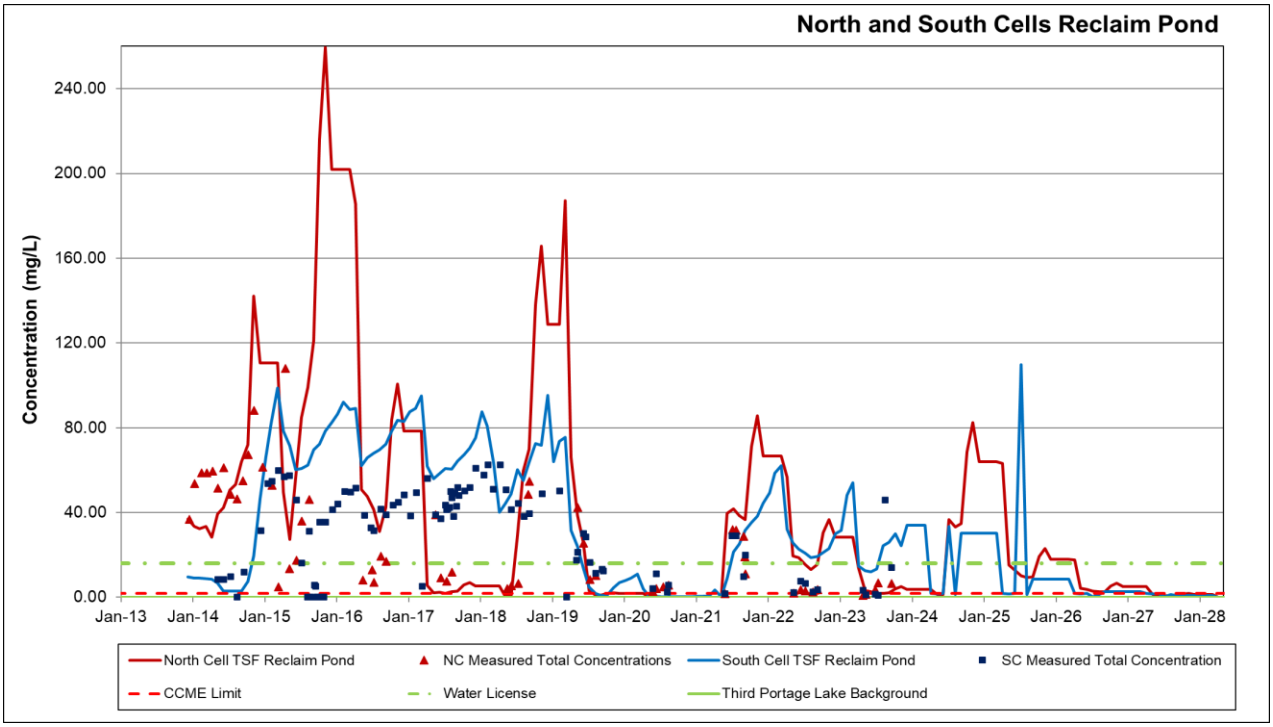


Figure 4-11: Total Zinc Forecasted Concentration



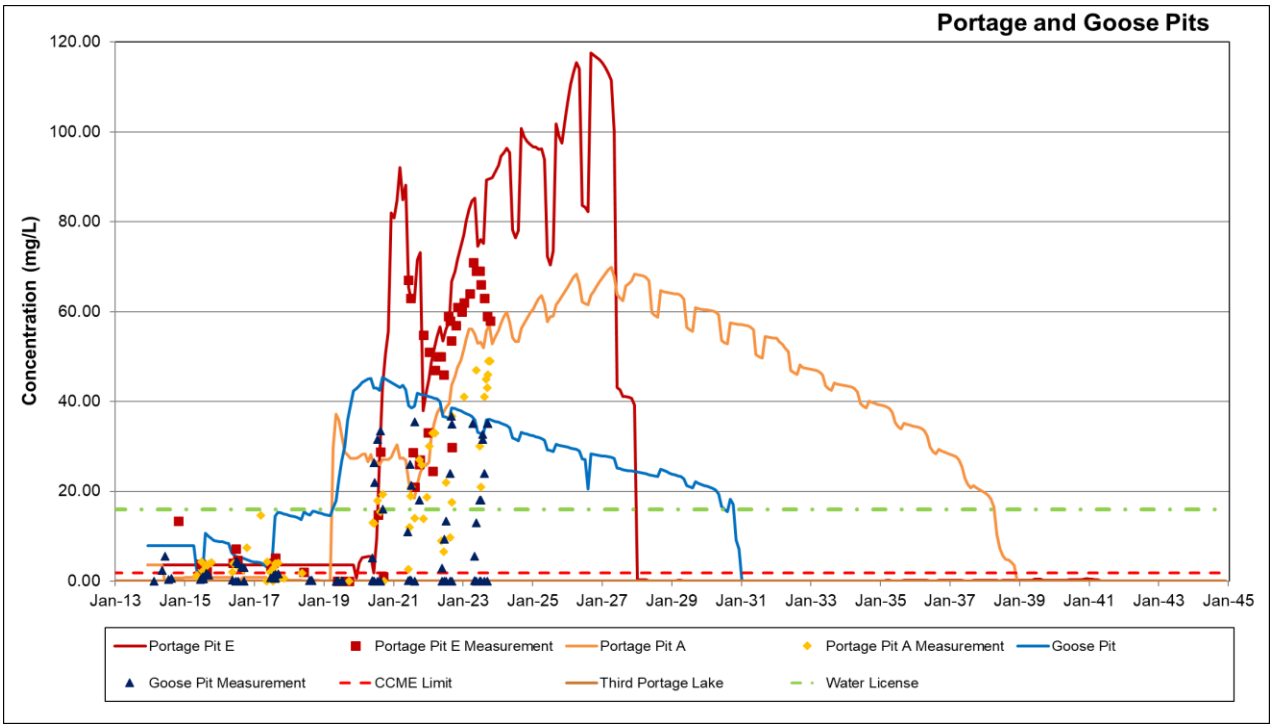
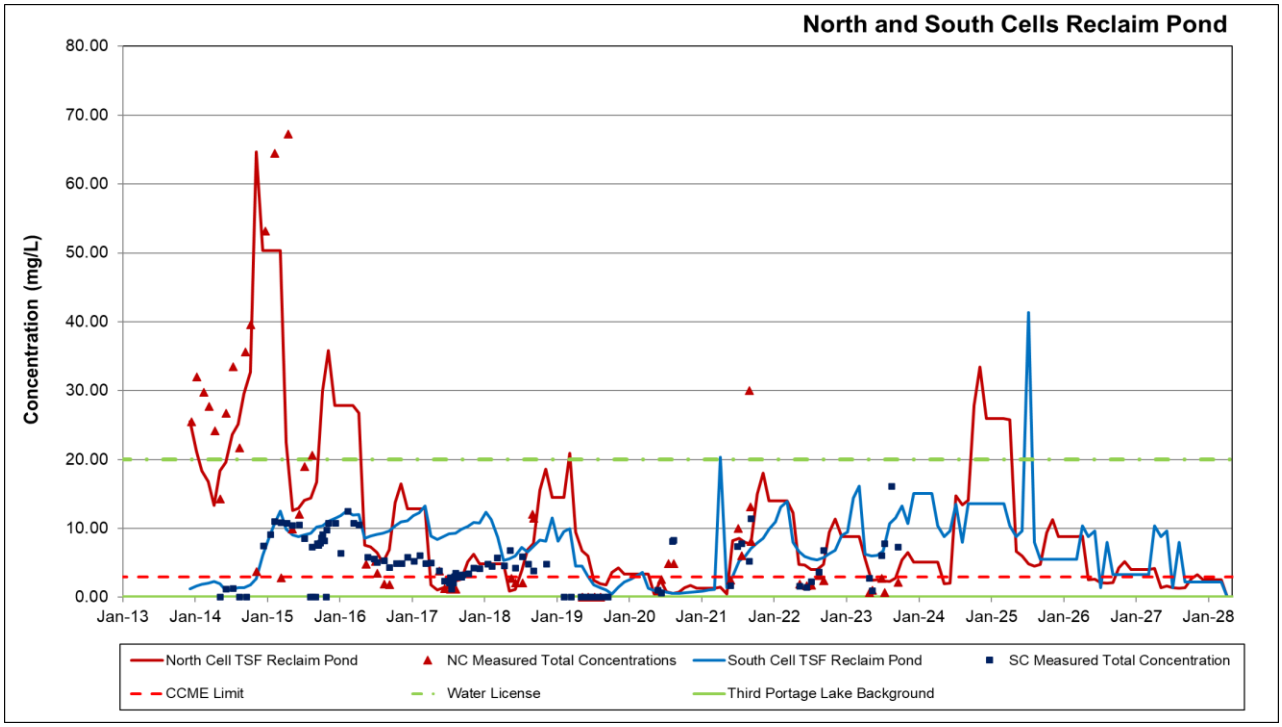


Figure 4-12: Total Ammonia Forecasted Concentration



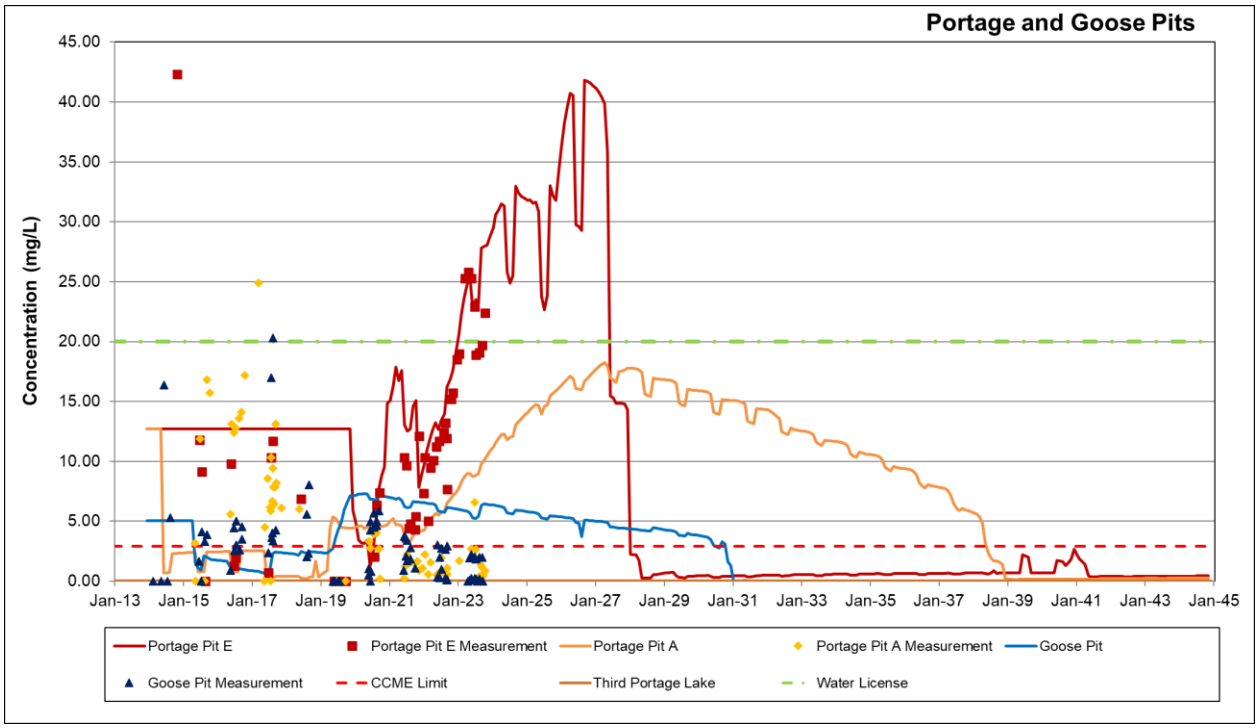


Figure 4-13: Nitrate Forecasted Concentration

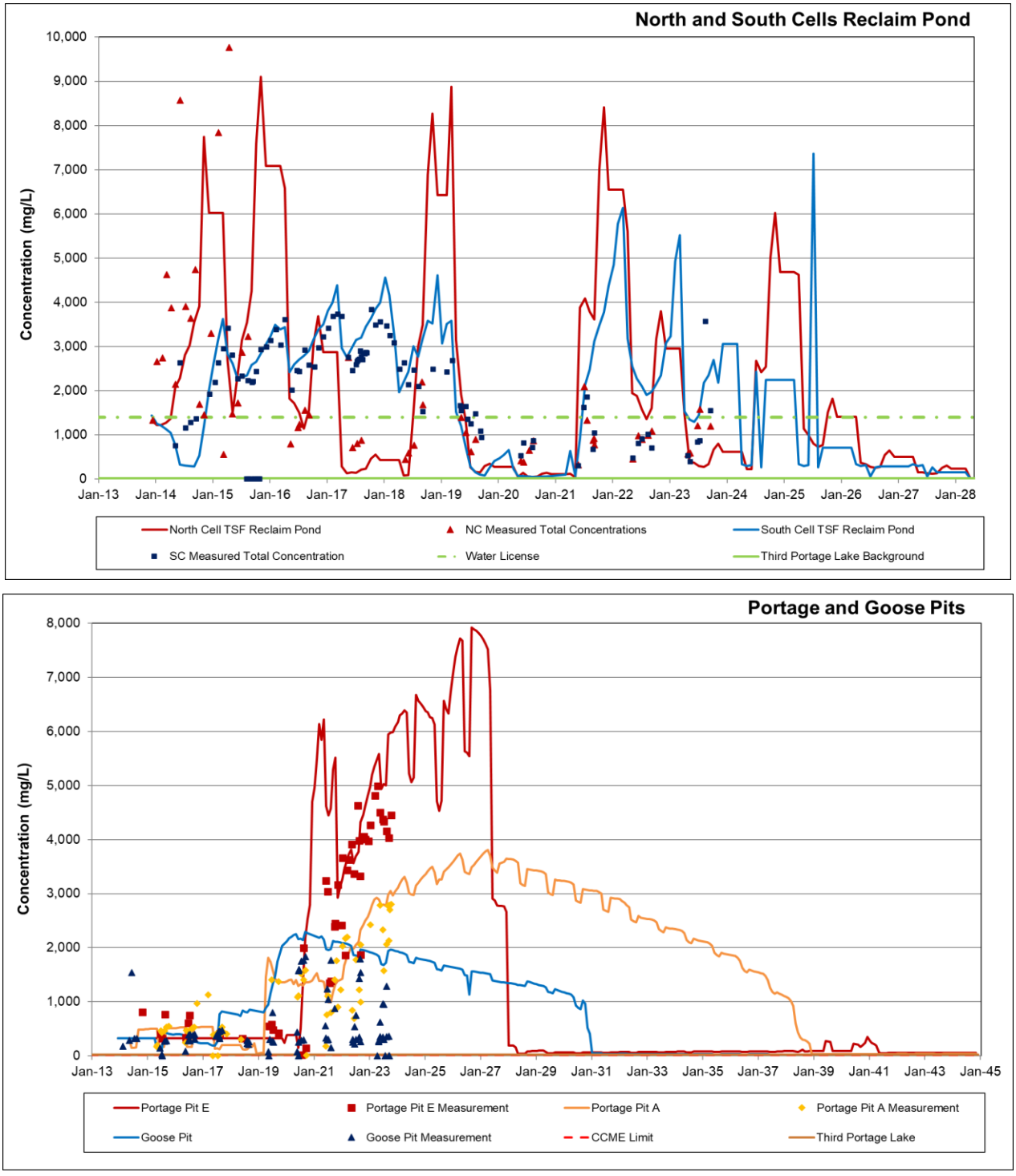
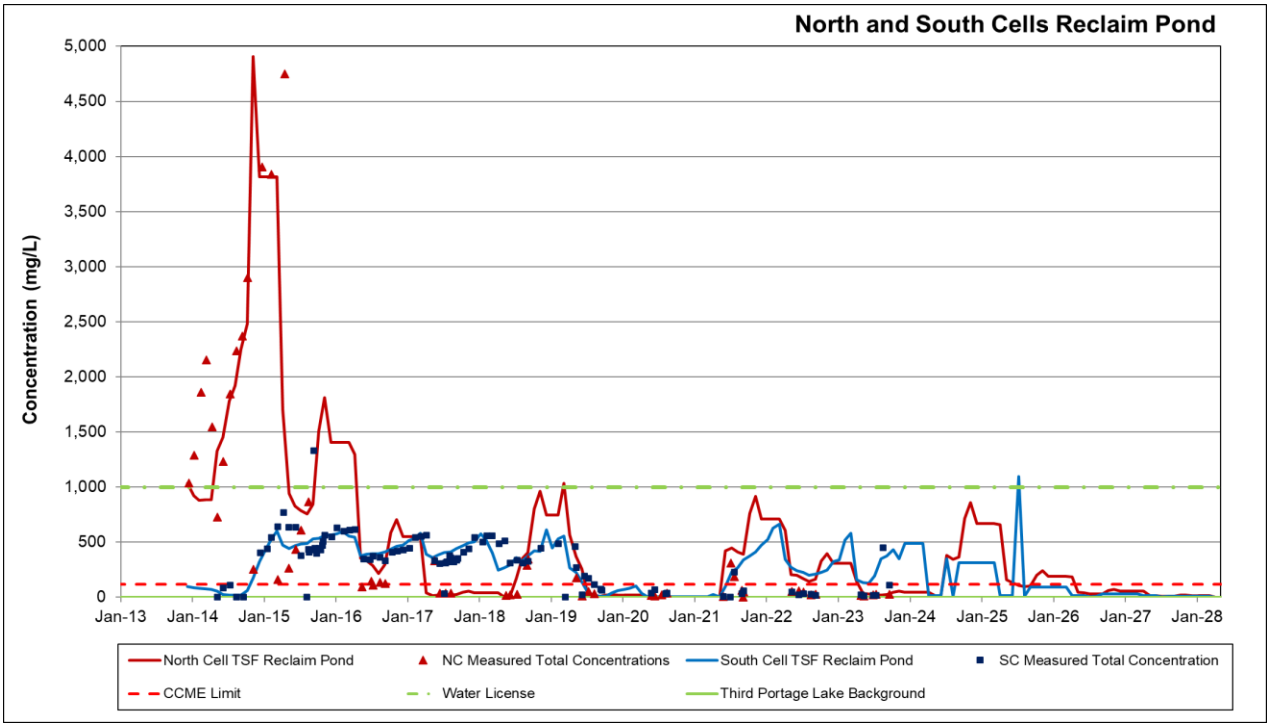


Figure 4-14: Total Dissolved Solids Forecasted Concentration



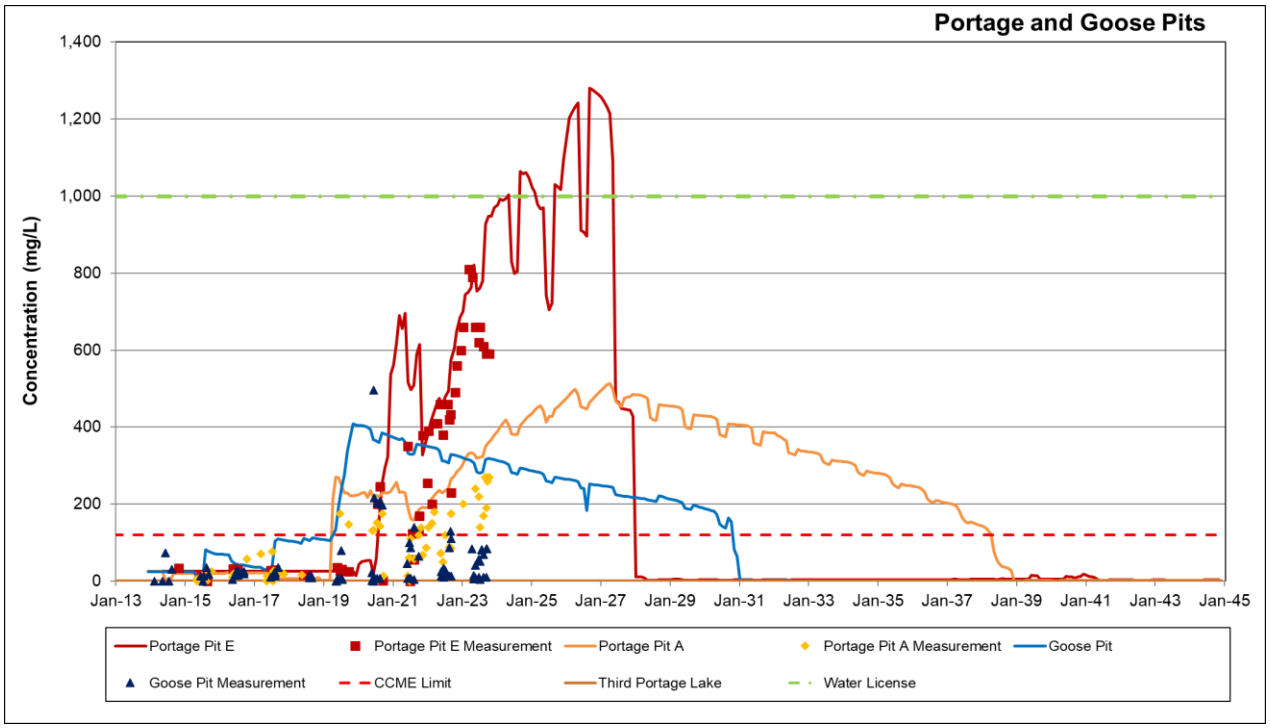
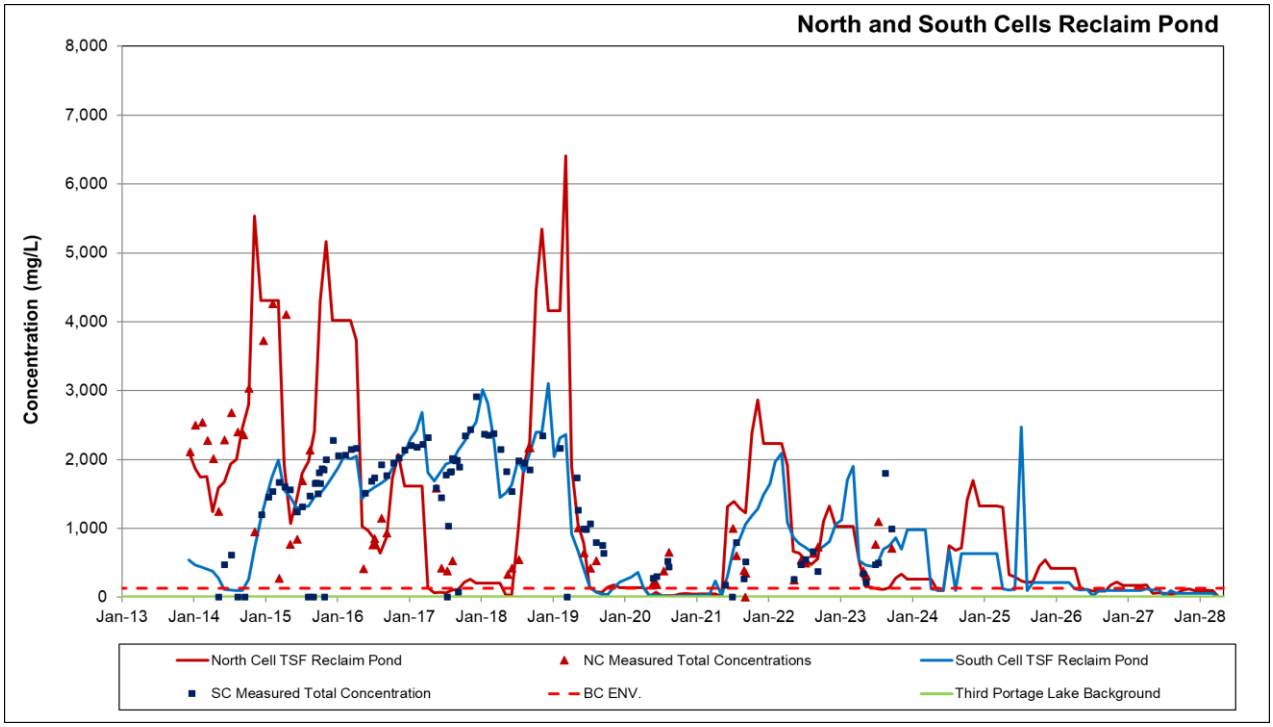


Figure 4-15: Chloride Forecasted Concentration



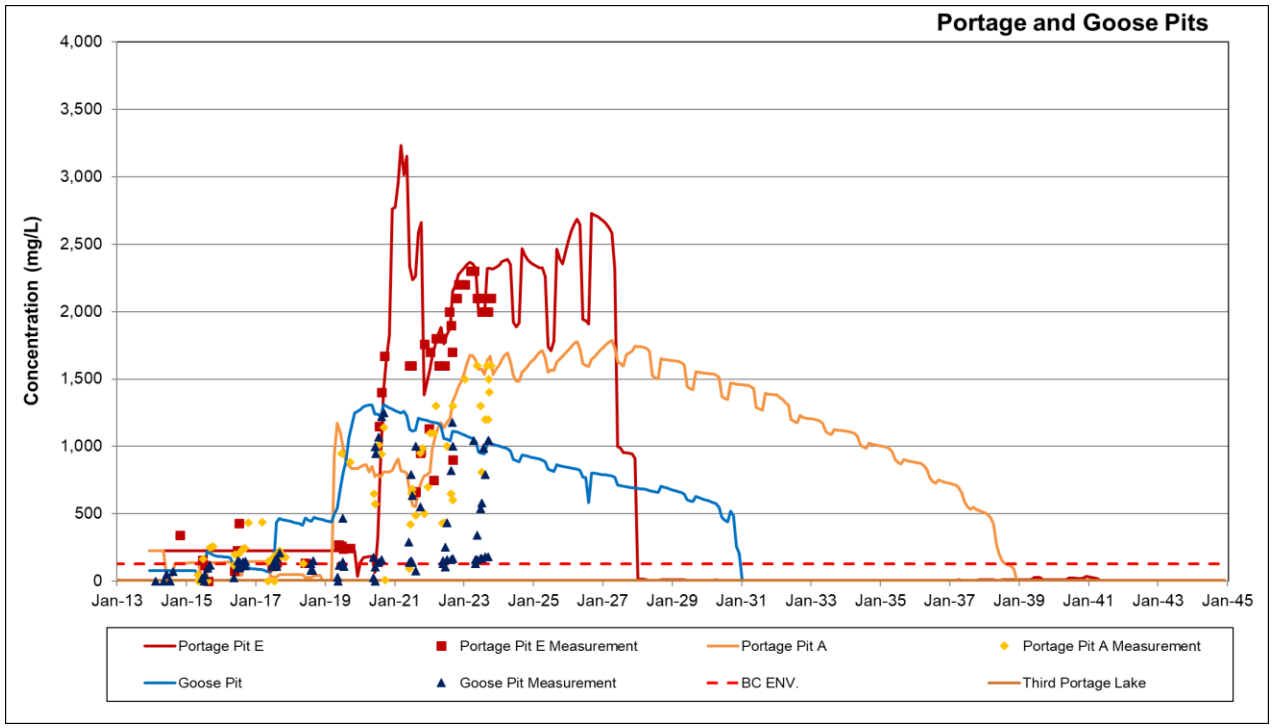
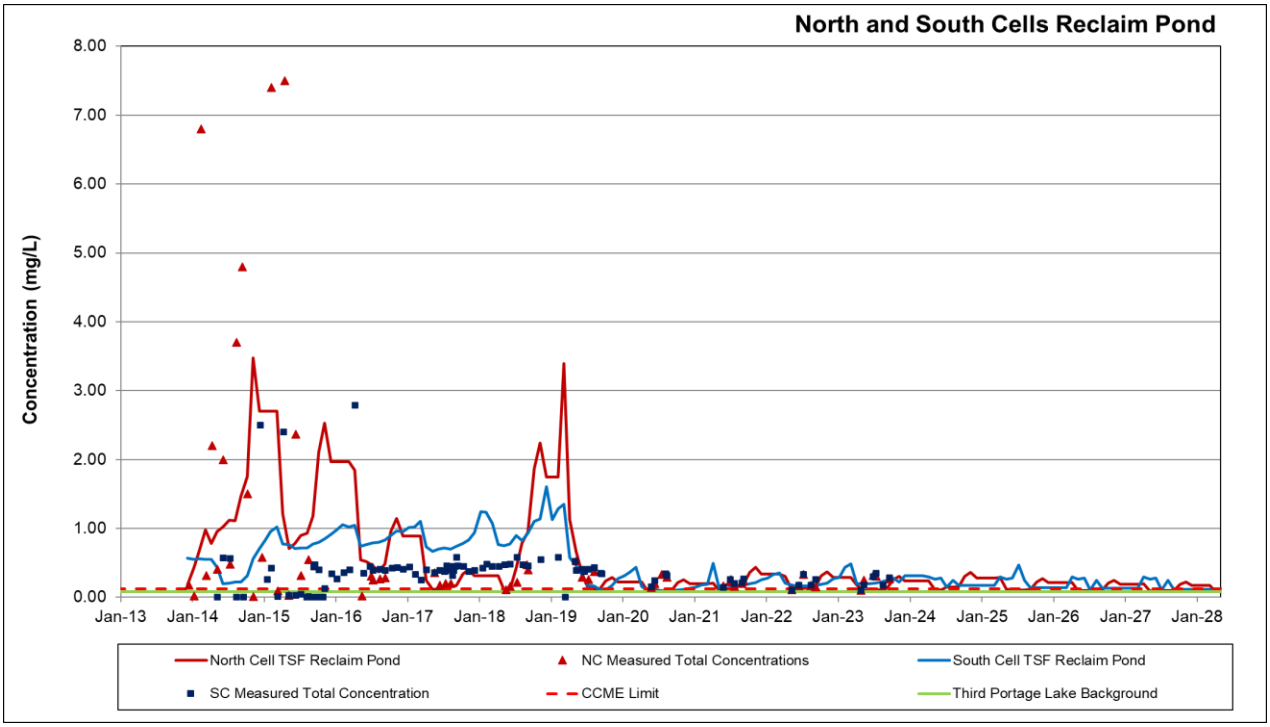


Figure 4-16: Sulphate Forecasted Concentration



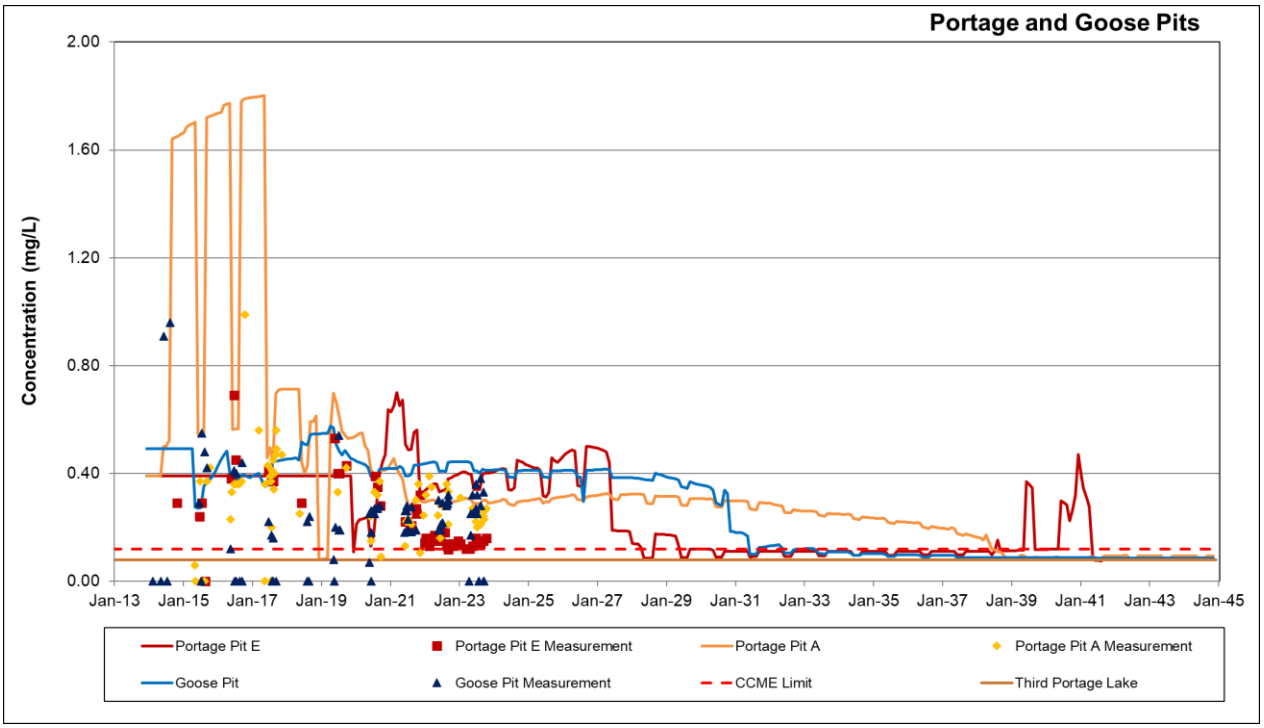


Figure 4-17: Fluoride Forecasted Concentration

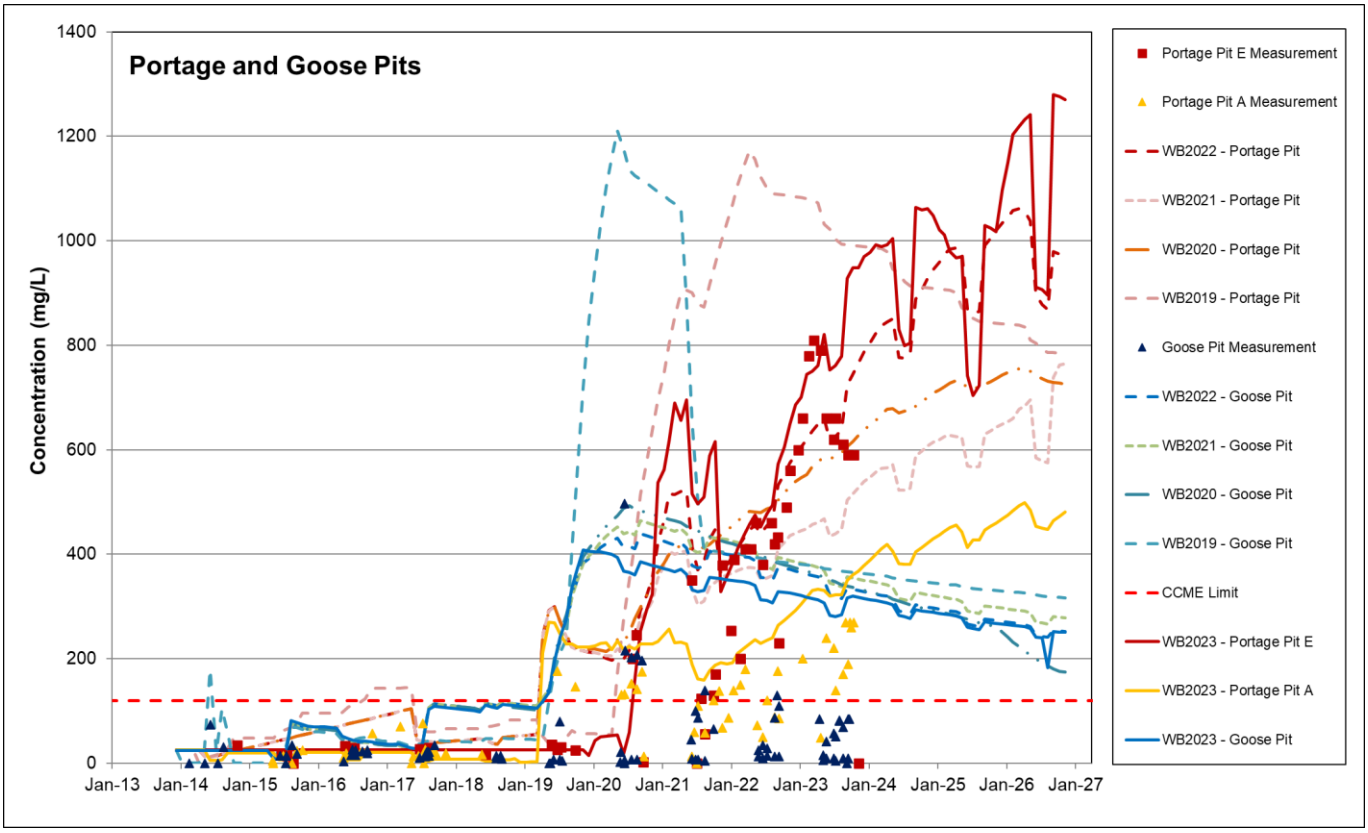


Figure 4-18: Comparison of Forecasted Chloride Concentration in Portage and Goose Pits

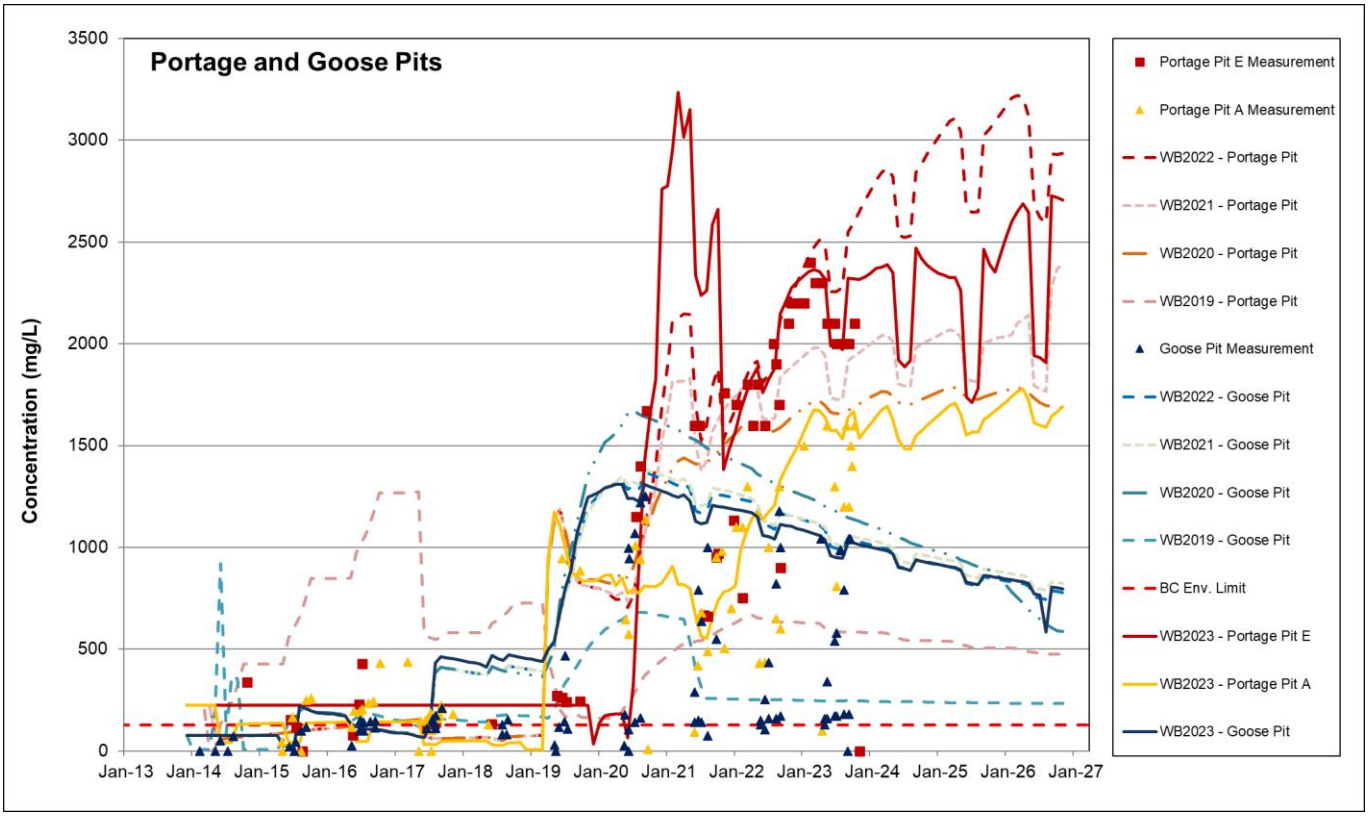


Figure 4-19: Comparison of Forecasted Sulphate Concentration in Portage and Goose Pits

4.2.5 Sensitivy Analysis

The water quality forecast model provides a high-level evaluation of the impact of Mill Effluent on the future water quality in the North and South Cell TSF Reclaim Pond and Portage and Goose Pits. The model provides only an order of magnitude forecast of the concentration trends in these areas.

For demonstration purposes only, a sensitivity analysis was conducted on Total Arsenic, Copper and Nickel in Portage Pit E for year 2023 to 2026 (end of deposition). A water quality forecast for each of these parameters was evaluated assuming a Mill Effluent concentration equal to the 25th and 95th percentile of the water quality data sampled in 2023. The following figures compare the forecasted concentration against the results based on the 25th and 95th percentile data.

It is important to note that every year, the water quality forecast input parameters are adjusted to match the measured values sampled on site in North and South Cell TSF and Portage and Goose Pits.

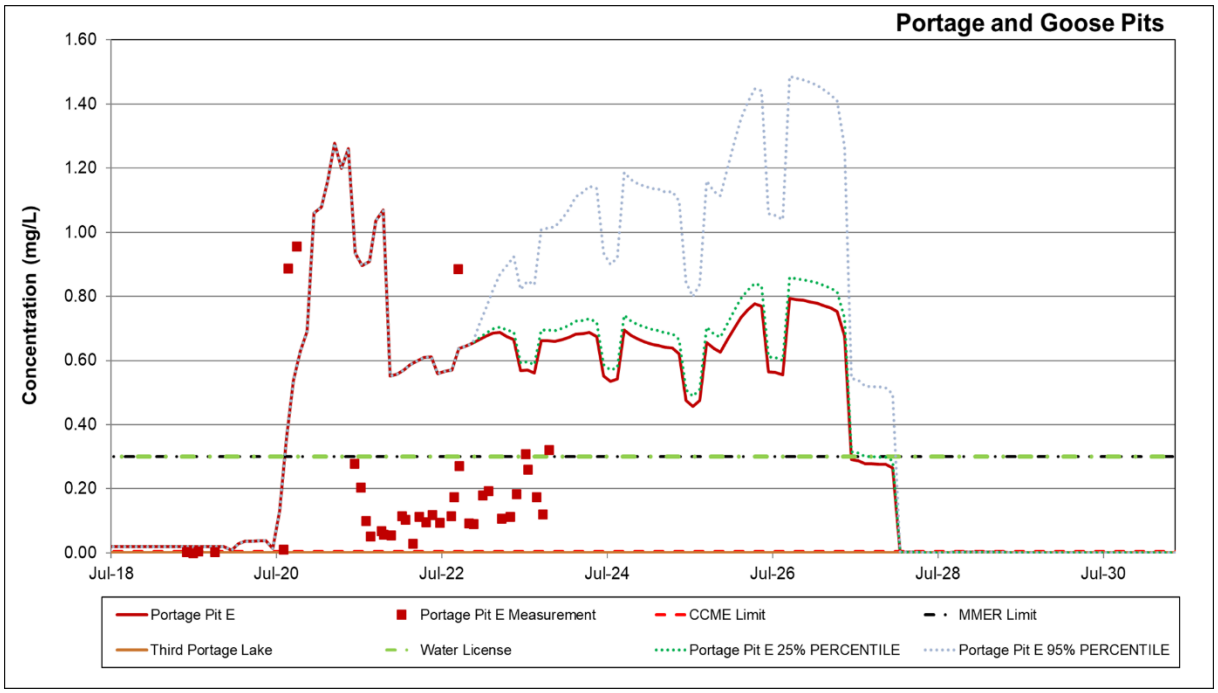


Figure 4-20: Sensitivity Analysis - Total Arsenic Forecasted Concentration in Portage Pit E

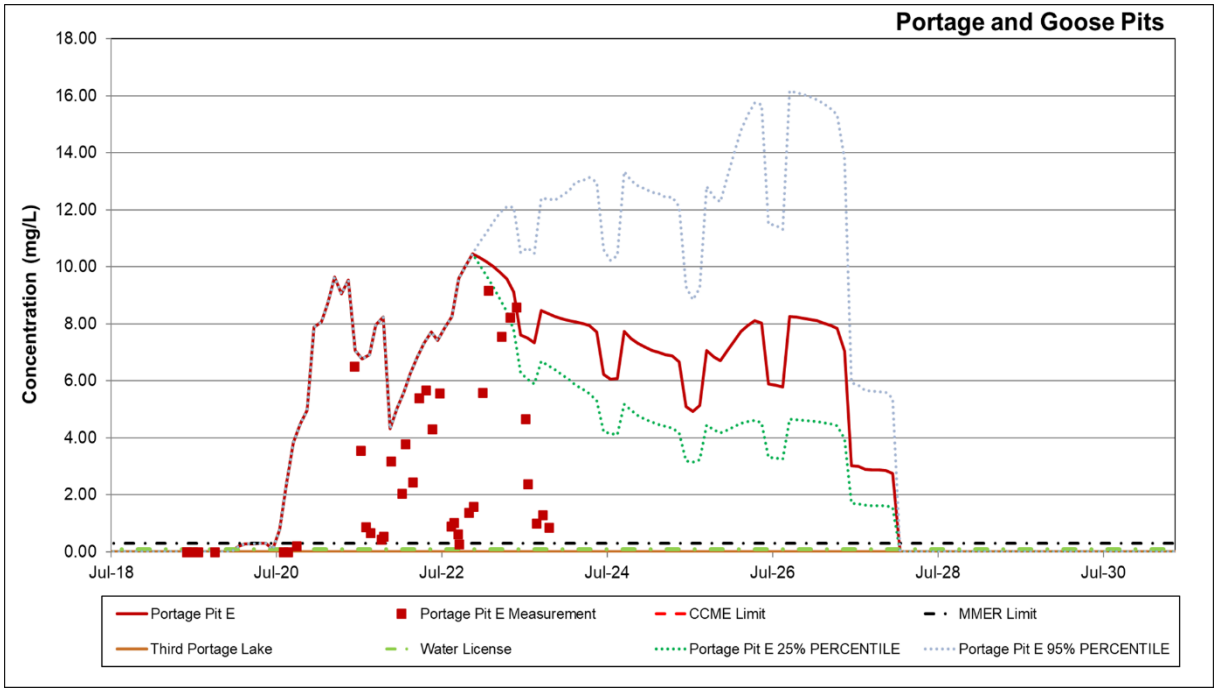


Figure 4-21: Sensitivity Analysis - Total Copper Forecasted Concentration in Portage Pit E

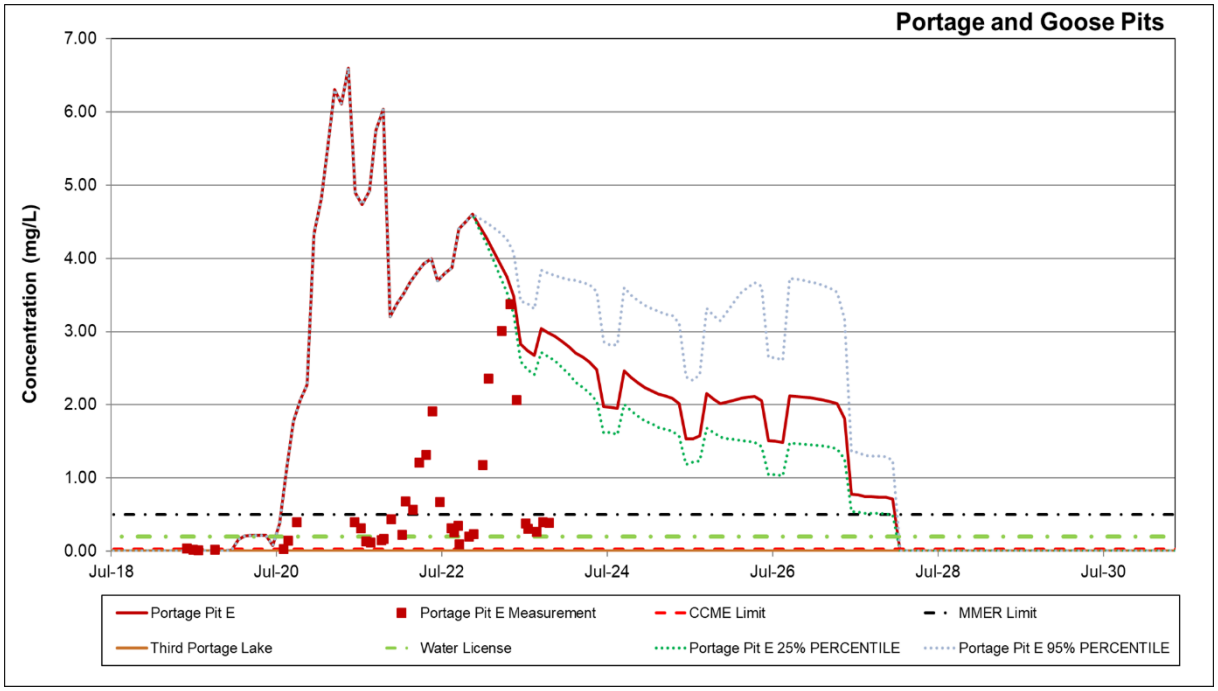


Figure 4-22: Sensitivity Analysis - Total Nickel Forecasted Concentration in Portage Pit E

4.3 Water Treatment Requirements

Based on the results of the water quality forecast mass balance presented in **Section 4.2**, following the end of in-pit tailings deposition, the reclaim water will need to be treated and discharged to Third Portage Lake to be in line with the ICRP updated in 2019. The assimilative capacity of Third Portage Lake will be assessed with the objective of maintaining a baseline or guideline/protective water quality in the lake. Treated effluent discharge water criteria will be assessed based on this objective. Based on the water quality forecast results, treatment may be required for the following parameters:

- Total metals, such as aluminum, arsenic, cadmium, copper, mercury, nickel, and lead.
- Total ammonia.
- Total cyanide.
- Total Dissolved Solids (TDS).
- Chloride and nitrate.

The water treatment plant will be designed to treat the specific parameters of concern and could consist of one or a combination of the following treatment approaches:

- If high metal concentrations persist, such as copper, nickel, and aluminum, they can be removed through the following process:
    - Hydroxide precipitation: Caustic soda (NaOH) or lime can be added to the effluent to increase the pH to 9, causing the formation of metal hydroxide precipitates, which settle out. The different treatment options that may be considered to implement the precipitation of heavy metals are listed below.
- A water treatment plant (WTP) will need to be installed close to Portage Pit, and it will be designed for metal precipitation with the addition of lime or caustic dosing system. The water from Portage Pit can be pumped to the WTP for treatment, with the treated water discharged to TPL via a diffuser.
- Treatment *in situ* at Portage Pit (i.e., batch lime treatment).
- A pH adjustment of the treated water will be required prior to its release.

If required, additional pre-treatment steps can be added, depending on the actual water quality to be treated, such as an oxidation step to help oxidize any metal complexes, or post-treatment such as media filter for final polishing, such as:

- Organosulfide precipitation: Organosulfide product can precipitate heavy metal into sulfide solids and with the aid of a typical coagulation/flocculation process, these precipitates can settle out from the water. It should be noted that this process may be combined with caustic/lime precipitation.
- Ion exchange: The heavy metal contaminants in form of cations can also be removed by ion exchange resin (IX). Prior to IX process, raw water needs to be filtered to remove suspended solids which may cause resin fouling.
- Membrane separation: Heavy metals can be removed by membrane techniques including nanofiltration and reverse osmosis. Prior to the membrane process, raw water needs to present very low suspended solids and turbidity and thus multimedia filtration or microfiltration is required.

- If arsenic concentrations are an issue, one of the most efficient techniques to reduce them is a coagulation-clarification/filtration process in order to co-precipitate the arsenic using an iron-based coagulant, such as ferric sulphate, to form a ferric-arsenate precipitate.
- For total dissolved salts, such as chloride and sulphate, membrane separation such as nanofiltration or reverse osmosis can be applied, if necessary.
- For total ammonia present in the Reclaim Water, more active treatment solutions could be implemented, such as:
    - Biological treatment (i.e., nitrification);
    - Ion exchange removal using zeolite;
    - Precipitation of ammonia using ettringite precipitation; or
    - A pH adjustment of the treated water near neutral pH, to ensure that most of the ammonia present is in the form of ammonium (NH_4^+) instead of un-ionized ammonia (NH_3).
- Sludge generated from the treatment process could be thickened and/or dewatered and stored in the North Cell or South Cell tailings storage facilities and capped with NPAG rockfill at closure.

A high-level closure water treatment strategy for the Meadowbank site was developed with the objectives of identifying conceptual treatment options to meet possible closure discharge criteria, identifying activities required for the development and implementation of the closure water treatment system, and establishing a preliminary schedule to develop and implement the closure water treatment system. The results of this study were presented in the technical note “Meadowbank Closure Water Treatment Strategy”, document 679254-7000-4KER-0001 (SNC Lavalin 2021). Studies are on going to assess water management strategies including water treatment option for closure. The results of these studies will be presented in the next versions of the Closure and Reclamation Plan.

5.0 Vault Water Quality Forecasting

5.1 Review of Water Quality Data

5.1.1 Review of Water Quality Discharged to Environment

A compilation of actual measured water quality data from the Vault Area sampled in 2023 was performed. The Vault Area includes Vault Pit (ST-26), Vault Attenuation Pond (ST-25), Vault Waste Rock Storage Facility (ST-24), Phaser Pit (ST-41), Phaser Attenuation Pond (ST-43), Discharge to Wally Lake and Exposure Area in Wally Lake. The average and maximum for each parameter monitored for the Meadowbank Water Quality Forecast Model are presented in **Table 5-1**. Total metals were used in this analysis. For measured values that were below the detection limit, a value equal to half of the detection limit was considered in the analysis.

The yellow cells represent the concentrations that are higher than CCME guidelines for Protection of Aquatic Life, which are used for comparison purposes only. The water discharged to Wally Lake is governed by the Water Licence and the MDMER requirements. Any parameters measured at the discharge to Wally Lake (ST-10) that have concentrations above the Water Licence discharge criteria would be highlighted in red, which is not the case based on the samples taken in 2023.

In 2023, no water was discharged to Wally Lake. All the water was contained within the Vault Attenuation Pond and surrounding pits. No sample collected was above Water Licence criteria. Furthermore, the concentrations of metals and chloride in the water sampled in the Vault Pit, the Vault Attenuation Pond, the Vault Waste Rock Storage Facility (WRSF), the Phaser Pits, and the Phaser Attenuation Pond are relatively low compared to the Water Licence requirements.

Some elements were above CCME limits in the water sampled in the Vault Pit, the Vault Waste Rock Storage Facility, the Phaser Pits, and the Phaser Attenuation Pond. More precisely the average and the maximum values of the elements were above CCME limits:

- Total aluminum: Maximum values in the Vault WRSF and in Phaser Pit (ST-41) were slightly higher than the CCME limit;
- Dissolved aluminum: Maximum value in the Phaser Pit (ST-41) is slightly higher than the CCME limit;
- Total chromium: Maximum values in the Vault Pit and in the Phaser Pit (ST-41) were slightly higher than the CCME limit;
- Total copper: Average and maximum values were higher than the CCME limit in Vault WRSF, Phaser Pit (ST-41), and Phaser Attenuation Pond;
- Total lead: Maximum value in the Vault Pit is slightly above the CCME limit;
- Fluoride: Maximum value is slightly higher than the CCME limit in Phaser Pit (ST-41).

As in 2022, in 2023 ammonia nitrogen in Vault Pit and Phaser Pit and in Vault and Phaser Attenuation Ponds was below the CCME limit, as were nitrate concentrations.

5.1.2 Ammonia Loading to the Environment

In 2023, no water was discharged to Wally Lake. Thus, for 2023, there is no ammonia loading discharged to the environment.

Table 5-1: Average and Maximum Concentrations Measured in the Vault Area for 2023

Parameters	Units	Vault Pit (ST-26)		Vault Attenuation Pond (ST-25)		Vault Waste Rock Storage Facility (ST-24)		Phaser Pits (ST-41/42)		Phaser Attenuation Pond (ST-43)		Discharge to Wally Lake (ST-10)	*CCME Guidelines*	*Water License Vault, Max. Avg. Conc. Part F of License*
		Avg. 2023	Max. 2023	Avg. 2023	Max. 2023	Avg. 2023	Max. 2023	Avg. 2023	Max. 2023	Avg. 2023	Max. 2023	No Discharge in 2023		
Alkalinity	mg $CaCO_3$/L	43.50	53.00	29.00	31.00	47.83	64.00	40.67	55.00	32.00	42.00		*n/a*	*n/a*
Hardness	mg $CaCO_3$/L	95.73	118.00	59.54	61.60	107.62	156.00	77.75	105.00	64.17	82.20		*n/a*	*n/a*
Total Aluminum (Al)	mg/L	0.05660	0.09590	0.01716	0.02460	0.06060	0.17000	0.05848	0.13800	0.03908	0.09090		*0.1*	*1.5*
Dissolved Aluminum (Al)	mg/L	0.01722	0.02890	0.00000	0.00000	0.00000	0.00000	0.03975	0.13700	0.01531	0.02630		*0.1*	*1*
Total Silver (Ag)	mg/L	0.00001	0.00004	0.00002	0.00002	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001		*0.00025*	*n/a*
Total Arsenic (As)	mg/L	0.00274	0.00331	0.00045	0.00051	0.00185	0.00228	0.00157	0.00183	0.00070	0.00084		*0.005*	*0.1*
Total Barium (Ba)	mg/L	0.01221	0.01360	0.01148	0.01280	0.01027	0.01330	0.01349	0.01860	0.01148	0.01410		*n/a*	*n/a*
Total Cadmium (Cd)	mg/L	0.00001	0.00002	0.00001	0.00001	0.00002	0.00002	0.00001	0.00002	0.00002	0.00003		*0.00004*	*0.002*
Total Chromium (Cr)	mg/L	0.00085	0.00349	0.00100	0.00100	0.00100	0.00100	0.00039	0.00134	0.00023	0.00070		*0.001*	*n/a*
Total Copper (Cu)	mg/L	0.00134	0.00168	0.00152	0.00164	0.00273	0.00296	0.00352	0.00608	0.00283	0.00335		*0.002*	*0.1*
Total Iron (Fe)	mg/L	0.09872	0.19900	0.02040	0.03800	0.10733	0.29700	0.10115	0.23800	0.15217	0.23100		*0.3*	*n/a*
Total Manganese (Mn)	mg/L	0.01186	0.02100	0.00466	0.00990	0.01240	0.02900	0.00749	0.02290	0.01372	0.03130		*n/a*	*n/a*
Total Mercury (Hg)	mg/L	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001		*0.000026*	*0.004*
Total Molybdenum (Mo)	mg/L	0.02009	0.02740	0.00360	0.00400	0.01723	0.02490	0.00768	0.01050	0.00161	0.00199		*0.073*	*n/a*
Total Nickel (Ni)	mg/L	0.00462	0.01610	0.00150	0.00220	0.00212	0.00300	0.00340	0.00704	0.00327	0.00514		*0.025*	*0.2*
Total Lead (Pb)	mg/L	0.00061	0.00197	0.00020	0.00020	0.00024	0.00036	0.00029	0.00075	0.00015	0.00026		*0.0010*	*0.1*
Total Selenium (Se)	mg/L	0.00022	0.00028	0.00010	0.00010	0.00025	0.00037	0.00014	0.00021	0.00007	0.00009		*0.0010*	*n/a*
Total Thallium (Ti)	mg/L	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001		*0.0008*	*n/a*
Total Zinc	mg/L	0.00144	0.00328	0.00500	0.00500	0.00500	0.00500	0.00093	0.00169	0.00221	0.00413		*0.03*	*0.2*
Ammonia (unionized NH_3)	mg N/L	-	-	-	-	-	-	-	-	-	-		*0.016*	*n/a*
Total Ammonia Nitrogen (NH_3-NH_4)	mg N/L	0.05317	0.06900	0.05100	0.05500	0.06167	0.12000	0.05000	0.05000	0.05050	0.05300		*1.83*	*20*
Chloride	mg/L	5.83333	8.40000	1.90000	3.10000	1.31667	2.10000	2.30000	3.80000	2.78333	4.40000		*120*	*500*
Fluoride (F)	mg/L	0.10167	0.11000	0.10400	0.11000	0.10333	0.11000	0.11000	0.13000	0.10333	0.11000		*0.12*	*n/a*

Parameters	Units	Vault Pit (ST-26)		Vault Attenuation Pond (ST-25)		Vault Waste Rock Storage Facility (ST-24)		Phaser Pits (ST-41/42)		Phaser Attenuation Pond (ST-43)		Discharge to Wally Lake (ST-10)	*CCME Guidelines*	*Water License Vault, Max. Avg. Conc.*
		Avg. 2023	Max. 2023	Avg. 2023	Max. 2023	Avg. 2023	Max. 2023	Avg. 2023	Max. 2023	Avg. 2023	Max. 2023	No Discharge in 2023		*Part F of License*
Nitrate (NO_3)	mg N/L	1.03167	1.47000	0.11600	0.18000	0.76500	1.05000	0.60500	0.86000	0.11667	0.15000		*2.94*	*50*
Total Cyanide (CNt)	mg/L	0.00050	0.00051	0.00050	0.00050	0.00051	0.00054	0.00051	0.00058	0.00050	0.00050		*0.005*	*n/a*
Sulphate (SO_4)	mg SO_4/L	49.00	61.00	40.80	41.00	69.17	100.00	36.17	51.00	34.17	41.00		*128*[1]	*n/a*
Total dissolved solids	mg/L	124.17	175.00	91.00	105.00	160.00	220.00	109.17	150.00	99.17	135.00		*n/a*	*1400*

Notes:

Measured concentration higher than Water License requirement.

Measured concentration higher than CCME guidelines. Value highlighted for comparison purposes only.

1. *Threshold value for sulfate based on BC Environment guideline for the protection of aquatic life for very soft water (0-30 mg/L) (April 2013).*

5.2 Vault Water Quality Forecast

5.2.1 Model Description

A mass balance model was developed to assess the water quality forecast trends in the Vault Attenuation Pond (ATP) for ammonia and nitrate. The starting date for the model was set for June 2014.

5.2.2 Assumptions

The assumptions used in the development of the mass balance model for the Vault ATP of Meadowbank were the following:

1. The Vault ATP is a combination of Pond A, B, C and D. The model does not take into consideration the transfers between Pond A, B, C and D, only transfers inside and outside the Vault Attenuation Pond.
2. The model considers water transfers to the Vault ATP from Vault Pit, Phaser Pit, Phaser Lake, and runoff from its catchment area.
3. The model does not take into consideration the variations of volume due to ice (no free volume, as well as ice ratio and water/ice entrapment).
4. The water quality from Vault Pit, Phaser Pit, and Phaser Lake is based on the yearly average measured values and is assumed to be constant over a given year for ammonia and nitrate.
5. The water mass balance is performed around the Vault ATP. The volume of water transferred out of the Vault ATP to the water treatment plant or Wally Lake is assumed to be completely discharged to the lake.
6. It is assumed that the primary source of ammonia and nitrate loading is from Vault Pit and Phaser Pit. All other inflow contaminant concentrations (Phaser Lake, runoffs, etc.) are assumed to have a negligible impact on ammonia and nitrate loadings.
7. For simplification of the model, ponds and pits are assumed to be completely mixed systems.
8. For simplification of the model, the parameters are assumed to be inert: they do not degrade or react with other elements in the system.
9. For this analysis, it is assumed that the water treatment plant between the Attenuation Pond and Wally Lake does not reduce the concentration of ammonia and nitrate.

5.2.3 Input to Model

The mass balance model is based on the assumptions above and on the following water quality sampled at:

- Vault Pit (ST-23 / ST-26);
- Phaser Pit (ST-41);
- Phaser Lake (ST-43);
- Vault Attenuation Pond (ST-25);
- Final Effluent to Wally Lake (ST-10).

The initial concentration of parameters in the Vault Attenuation Pond is assumed to be the average of 2014-2015 measurements (i.e., ammonia = 2.2 mg N/L; nitrate = 4.7 mg N/L).

Table 5-2 presents the average concentrations used to estimate the loadings from Vault Pit and Phaser Pit to Vault ATP. Transfer of runoff from the Vault Pit area occurred from 2014 to 2018, while runoff transfer from Phaser Pit occurred from 2017 to 2018. As of 2019, surface runoff was allowed to accumulate in the pits.

Table 5-2: Average Concentrations to Estimate Loading to Vault ATP

Year	General Basis	Vault Pit		Phaser Pit	
		Ammonia (mg N/L)	Nitrate (mg N/L)	Ammonia (mg N/L)	Nitrate (mg N/L)
2014	Avg. 2014-15 measured data	18	46	--	--
2015		18	46	--	--
2016	Average 2016 measured data	5	20	--	--
2017	Average 2017 measured data	3.8	4.2	4	30*
2018	Average 2018 measured data	3.1	4.9	7.96	15.8
2019	Average 2019 measured data	1.2	7.5	1.75	3.3
2020	Average 2020 measured data	0.15	2.2	0.06	1.5
2021	Average 2021 measured data	0.07	1.5	0.05	1.1
2022	Average 2022 measured data	0.07	1.4	0.05	0.7
2023	Average 2023 measured data	0.06	1.0	0.05	0.6

Notes:

** Value adjusted so that the forecasted value in Vault ATP is similar to the monitored data.*

Measurements taken at the final effluent to Wally Lake and in the Vault Attenuation Pond (ATP) were used to compare the forecasted results.

5.2.4 Forecasting Results

5.2.4.1 Ammonia

Ammonia concentrations sampled in Vault Pit and Phaser Pit are elevated because of the use of ammonium-nitrate explosives during the mining process. **Figure 5-1** presents the concentrations monitored in Vault Pit, Phaser Pit, Vault Attenuation Pond and at the final effluent to Wally Lake.

Two monitored values in Vault Pit exceeded the Water Licence limit in 2014 and 2015 and all values measured from 2016 to 2023 were below the limit. For Phaser Pit, there was one value higher than the limit in 2018. All of the samples taken in the Vault Attenuation Pond (ATP) and the final effluent towards Wally Lake were below the Water Licence discharge requirements. From 2020 to 2023, all ammonia concentrations were below the CCME Guidelines.

When forecasting the concentration of the water in the Vault ATP until closure, the forecasted concentration of ammonia reached a peak of about 3.7 mg-N/L in 2015 and then decreased to a concentration below 1 mg-N/L before closure.

Agnico is required to meet the criteria for discharge to Wally Lake as stated in the Type A Water Licence, which is set at 20 mg N/L. No exceedance occurred and is foreseen with the current Vault water quality forecasting model.

Figure 5-2 shows the forecasted concentration, the monthly loadings, and the cumulative loadings of ammonia in the treated effluent discharged to Wally Lake. As in previous years, forecasted and measured values in Vault ATP continue to decrease.

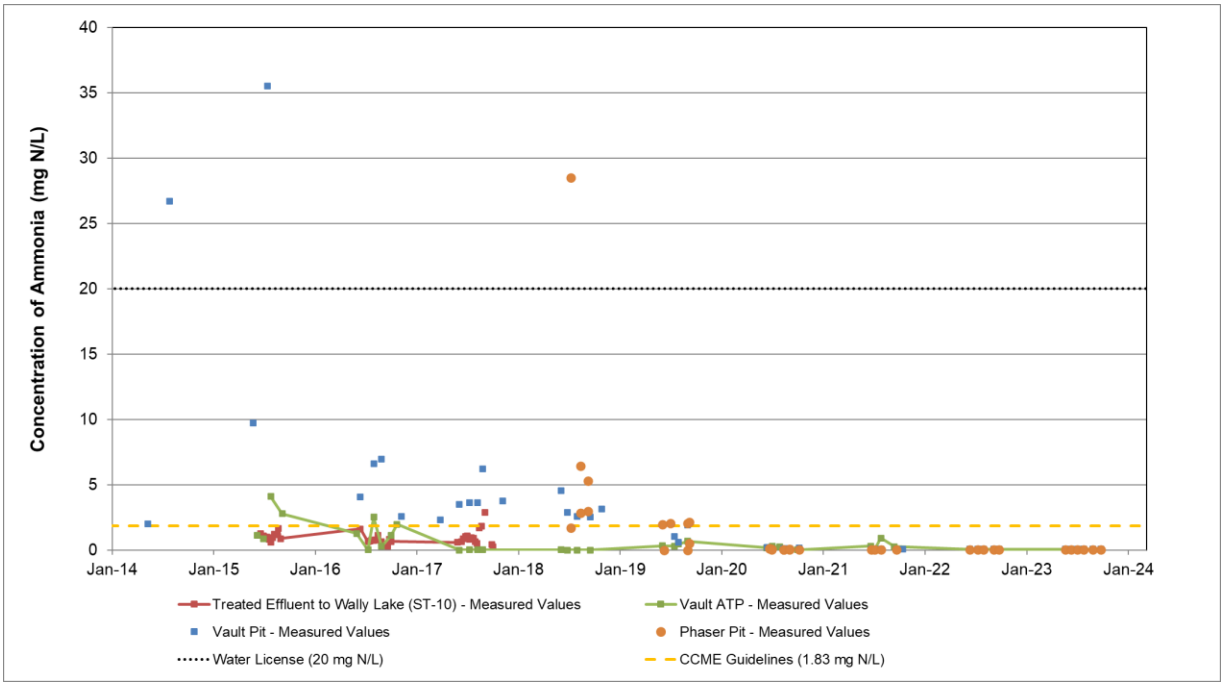


Figure 5-1: Measured Ammonia Concentration in Vault Area

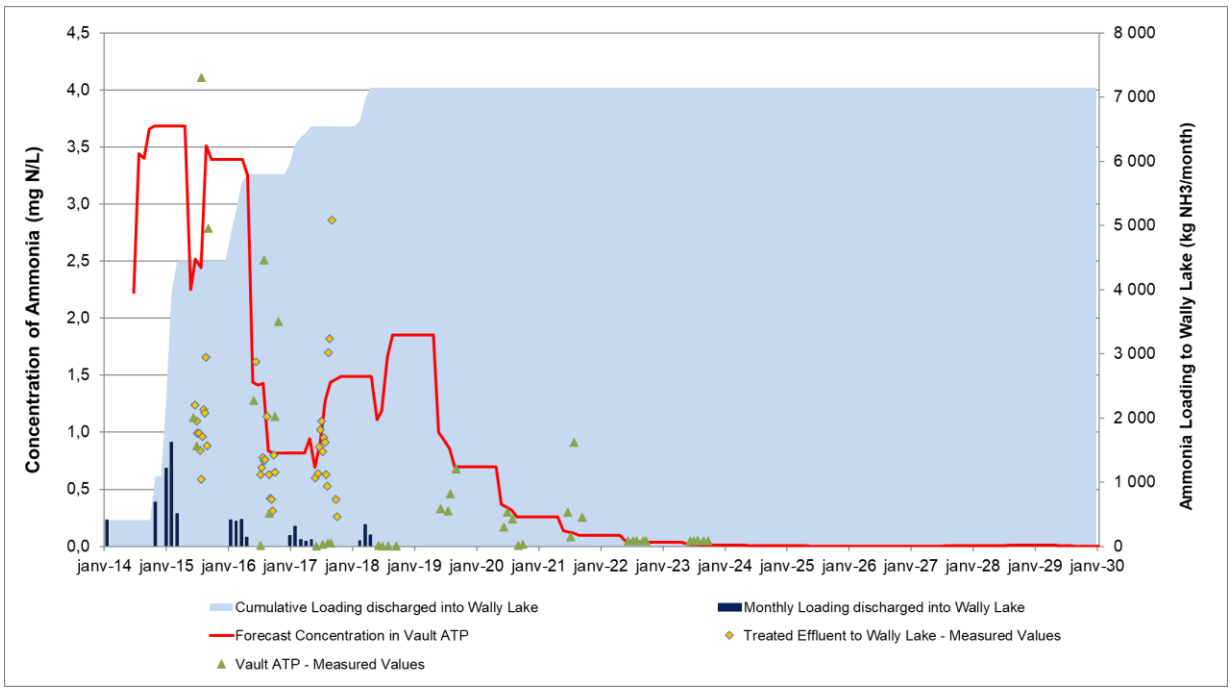


Figure 5-2: Forecasted Ammonia Concentration in Vault Area

5.2.4.2 Nitrate

Nitrate concentrations sampled in the Vault Pit and Phaser Pit are also found to be elevated because of the use of ammonium-nitrate explosives for the pit development. **Figure 5-3** presents the concentrations monitored in Vault Pit, Phaser Pit, Vault Attenuation Pond, and at the final effluent towards Wally Lake.

Measured nitrate concentrations in the Vault Pit and Phaser Pit were below the Water Licence limit of 50 mg N/L. The monitored values in Vault Attenuation Pond and in the final effluent are also well below the Water Licence requirements.

The forecasted trend of nitrate concentration in the effluent discharged to Wally Lake until closure is similar to that for ammonia. There is a rise of nitrate to about 8.6 mg-N/L in 2015, and then a decrease to a concentration of approximately 1 mg-N/L before closure. Since the Water Licence discharge limit for nitrate is 50 mg N/L, no exceedance is foreseen.

Figure 5-4 shows the forecasted concentration, the forecasted monthly loadings, and the cumulative loadings of nitrate in the treated effluent discharged to Wally Lake.

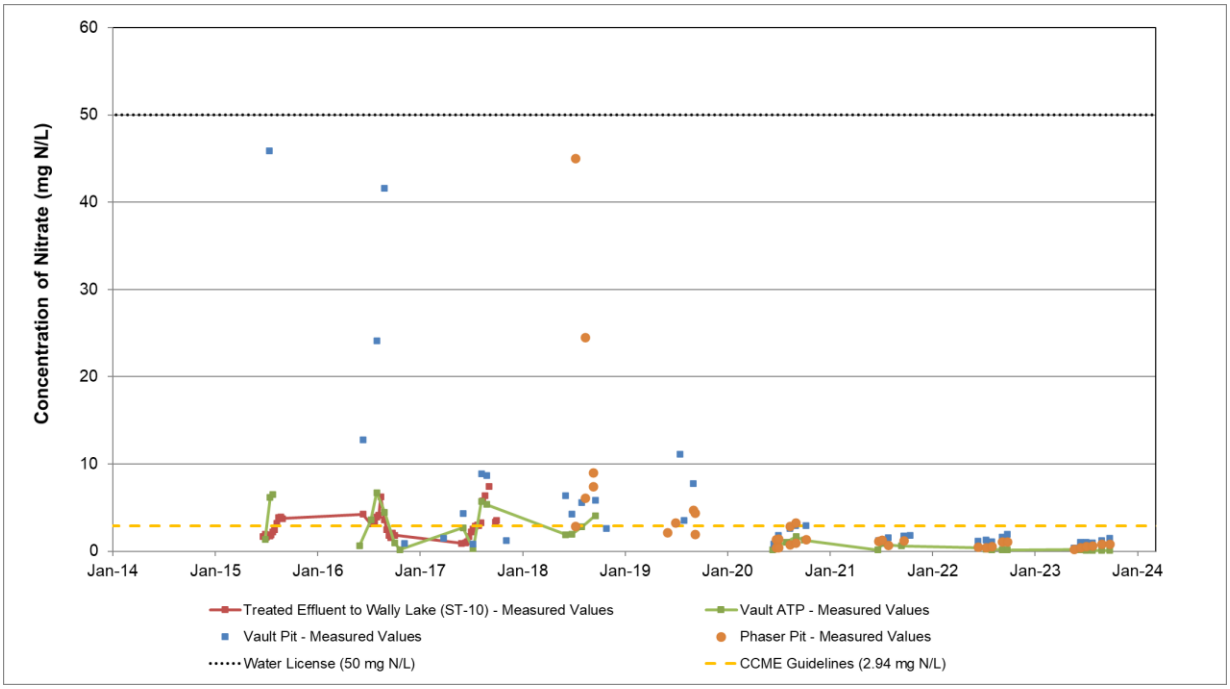


Figure 5-3: Measured Nitrate Concentration in Vault Area

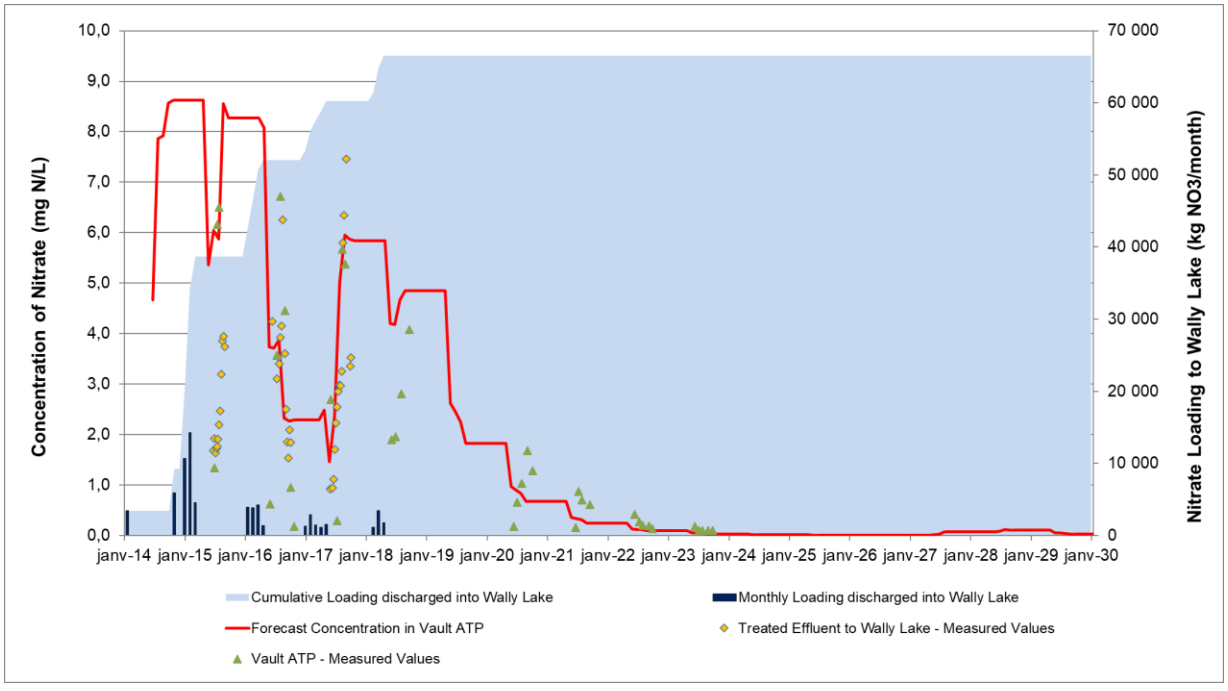


Figure 5-4: Forecasted Nitrate Concentration in Vault Area

5.2.4.3 Final Remarks

In conclusion, the forecasted concentrations of ammonia and nitrate in the Vault ATP are expected to remain below the discharge requirements as defined in the Type A Water Licence. The primary source of ammonia and nitrate in the water comes from the use of an ammonium-nitrate based explosive in the development of the Vault Pit and Phaser Pit. Note that the model results are quite conservative when compared to the monitored data since the end of mining operations at Vault and Phaser pits.

6.0 Conclusion

It is important to understand the limitations of the mass balance model and of this Technical Note. The limitations are presented in **Section 3.3** and are briefly summarized below:

- In order to simplify the model, the mass balance model assumes the following:
  - Ponds and pits are completely mixed systems;
  - No change in the water quality of the Mill Effluent;
  - A monthly time step.
- The mass balance model is based on a set of water quality analysis results provided by Agnico:
  - Water quality data collected at the surface of the North and South Cell TSF Reclaim Pond;
  - Water quality data available for the Mill Effluent;
  - Water quality data of various inflows and outflows of the North and South Cell TSF Reclaim Ponds;
  - Water quality data collected in Goose and Portage Pits;
  - Water quality data collected from pit seepages.

6.1 Results Summary and Treatment

This year's water quality forecast model ends at the end of in-pit deposition projected for June 2026 and at the end of pit reflooding projected for July 2041 based on the WB 2023. At the end of in-pit deposition, Reclaim Water stored in Goose Pit and Portage Pit shall then be treated and discharged to Third Portage Lake during closure. For the purpose of this study, parameters of concern were identified using the current Water Licence limits. However, final site-specific treated effluent discharge limits for closure will be developed through review of the closure plan by regulatory agencies.

Based on the results of the water quality forecast mass balance presented in **Section 4.2**, the following parameters of concern were detected at the end of deposition:

- Total Aluminum (in Portage Pit E and Pit A)
- **Total Arsenic** (all pits)
- Total Cadmium (in Goose Pit, close to Water Licence limit)
- **Total Copper** (all pits)
- **Total Nickel** (all pits)
- Total Lead (in Goose Pit, slightly higher than Water Licence limit)
- Chloride (in Portage Pit E only)
- **Total Dissolved Solids** (in all pits)
- **Total Ammonia** (in all pits)
- Nitrate (in Portage Pit E only)
- Total Cyanide (in Portage Pit E and Pit A)

Among the parameters listed above, five (5) parameters were identified in this year's water quality forecast report (bolded values). The increasing trend observed in Goose Pit and Portage Pit can be mainly attributed to the following:

- As of 2019, tailings are now being deposited in Goose Pit and Portage Pit. Reclaim water is allowed to accumulate in the pits and is pumped back to the mill for re-use.
- As of 2019, the main ore body processed at the Meadowbank site originates from the Whale Tail Pit ore body. The ore body from Whale Tail Pit has a different geochemical behavior than the ore extracted from Portage/Goose/Vault pits. This leads to higher forecasted concentrations of certain elements at the end of in-pit deposition, such as arsenic.
- The water quality forecast model was also adjusted based on the mill effluent sampled from 2019 to 2023. The quality of the mill effluent varies from year to year. The mill effluent is the main source terms for the identified parameters of concern.

Water treatment shall be undertaken at the end of in-pit tailings deposition. A potential treatment option for the removal of the metals in Reclaim Water prior to discharge is caustic or lime precipitation, while ammonia could be removed by ion exchange using a zeolite media. Coagulation with ferric sulphate could be used to co-precipitate the arsenic as a ferric arsenate precipitate. Additional treatment steps could be considered once the actual nature of the water to treat is known, such as the addition of an oxidation step to help oxidize metal complexes, additional polishing steps, like filtration or membrane treatment, and/or the addition of a biological treatment step to treat for ammonia. Studies are on going to assess water management strategies including water treatment option for closure. The results of these studies will be presented in the next versions of the Closure and Reclamation Plan.

Pit reflooding shall take place following the treatment of the Reclaim Water. The pits shall be reflooded with a combination of natural runoff and active transfer of water from Third Portage Lake. The forecasted water quality concentrations at the end of pit flooding are projected to be lower than the CCME limits. Note that the dikes will only be breached if the water quality within them meets the selected water quality criteria as per the water license requirement.

As for the Vault area, in 2023, the entire area is undergoing natural reflooding. No discharge to Wally Lake was reported in 2023. All the water sampled in the area did not exceed any of the Water Licence discharge limits. For comparison purposes only, copper concentrations were slightly higher than CCME guidelines. Ammonia and nitrate continue to show a decreasing trend as natural reflooding is progressing over time.

6.2 Recommendations

In order to improve the accuracy of the model so that it can better forecast the concentration of certain parameters in the Reclaim Ponds or Portage and Goose Pits, the following studies, tests and monitoring are recommended:

1. Continue the current monthly monitoring program of all inflows and outflows of the North and South Cells TSF Ponds for cyanide, a complete total and dissolved metal scan, ammonia, nitrate, fluoride, chloride, sulphates, TDS and TSS. This will provide an indication of the runoff quality that is accumulated in these ponds following the end of tailings deposition in these areas.
2. Considering that deposition of the tailings is now occurring in the pits, continue regularly monitor pit water quality (Portage and Goose) when the site can be safely accessed, and analyze for cyanide, total and dissolved metals, ammonia, nitrate, chloride, fluoride, sulphates, TDS and TSS. This information will be useful in developing and calibrating a water quality forecast model of the pit water quality based on loadings from the mill effluent, surface runoff and possible pit seepages. Continue measuring the conductivity of water in the pits at different depths to detect if there is any stratification occurring in the pit lakes.
3. Once Portage and Goose Pits are hydraulically connected, it is recommended to sample the water at different points in the pit area in order to evaluate the mixing efficiency over the entire area. The samples should be taken at different depths over the entire area of the flooded pits before and after the filling season.
4. Continue to sample and analyze, as per the Water Licence requirement, water from the Vault Pit, Vault Attenuation Pond, Phaser Pit, and Phaser Attenuation Pond.
5. Continue bench scale water treatment test to evaluate the contaminant removal efficiency using treatment approaches such as lime neutralization, coagulation/flocculation with aluminum sulphate or ferric sulphate, and coagulation/flocculation with proprietary coagulants designed for metal removal, as well as alternative treatment options such as biological treatment for ammonia.

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APPENDIX D – 2024 FRESHET ACTION PLAN



AGNICO EAGLE

MEADOWBANK COMPLEX

MEADOWBANK FRESHET ACTION PLAN

MARCH 2024

VERSION 12

1. EXECUTIVE SUMMARY

The purpose of this Freshet Action Plan is to identify areas of concern around the Meadowbank mine site and the AWAR that need to be managed in an organized and timely manner during the annual freshet period to prevent adverse environmental and operational impacts. The Plan outlines specified actions that will be taken by Agnico to manage and mitigate areas where environmental incidents could occur, as well as addressing historical incidents, specifically seepage on the north-east side of the Portage Waste Rock Storage area, known as sampling location ST-16 (2013) and seepage from the mill (inside) containment structures through the Assay Road southwest of the mill (Mill Seepage - 2013). Any future incidents that have the potential to affect off site water or land will be added and would include any specific mitigation and monitoring actions.

The freshet period is initiated during the annual snow and ice melt, around mid-May. During this period excess water is created and must be managed through additional pumping and management practices at vulnerable areas around the site. Mitigation techniques, timeframes and specified roles and responsibilities are outlined in this document for each area of concern.

The main areas of concern are the excavated pits (Pit A, Pit E, Goose Pit and Vault Pit), the North and South Cell TSF surrounding infrastructures (East and West diversion ditches, Northwest corner of the North Cell TSF, Saddle Dam 1 corner, Saddle Dam 2 sump, Saddle Dam 3 sump, Saddle Dam 4-5 downstream, Central Dike downstream pond (ST-S-5), Stormwater Dike), the areas around the Portage Waste Rock Storage Facility (RSF) (the northern portions of the NAG waste rock extension, the two collection ponds known as WEP1 and WEP2), Vault Road culverts, Vault Waste Rock Storage Facility, AWAR culverts near the site and along the road to Baker Lake, RSF – ST-16 Seepage, and the Assay Road (Mill) Seepage.

It is important for all water management and associated infrastructure to be in good working order and adequate to manage the expected water flows associated with the freshet period; this includes but is not limited to pumps, ditch, culvert and sump maintenance, critical piping system installation and inspection, as well as adequate resource allocation for preparative work. A concise summary of the 2024 preparation works and roles and responsibilities are presented in the attached Appendix 1 (2024 Freshet Action Plan Procedures). Appendix 1 will be updated yearly to reflect changes in conditions at the Meadowbank site. Appendix 2 contains diagrams depicting the areas of concern and incident response locations.

DOCUMENT CONTROL

Revision				Pages Revised	Remarks
#	Prep.	Rev.	Date		
01	Agnico	Internal	April 2014	All	
02	Agnico	Internal	May 2015	All	Comprehensive update from 2014 Plan
03	Agnico	Internal	October 2015	All	Comprehensive update from May 2015 Plan
04	Agnico	Internal	March 2016	All	2016 Comprehensive review
05	Agnico	Internal	March 2017	All	Comprehensive update from May 2016 Plan
06	Agnico	Internal	March 2018	All	Comprehensive update from 2017 Plan
07	Agnico	Internal	March 2019	All	Comprehensive update from 2018 Plan
08	Agnico	Internal	March 2020	All	Comprehensive update from 2019 Plan
09	Agnico	Internal	March 2021	All	Comprehensive update from 2020 Plan
10	Agnico	Internal	March 2022	All	Comprehensive update from 2021 Plan
11	Agnico	Internal	March 2023	3	2.1.3 Water transfers into Pit A were added
				2	Figure 2-1, Figure 2-2, Figure 2-3, Figure 2-4, Figure 2-6, Figure 2-7 were updated
				15	Section 2.9 was added
				Appendix 1	Section 2.9 was added
				Appendix 3	Snow management map was updated
				Appendix 4	Freshet flowchart and plan view was updated
12	Agnico	Internal	March 2024	8	Section 2.3.1.1 was updated
				11	Section 2.3.1.5 was updated
				15	Section 2.8 was updated
				15	Section 2.10 and Figure 2-10 were added
				Appendix 1	Section 2.10 was added
				Appendix 3	Snow management map was updated
				Appendix 4	Freshet flowchart and plan view were updated

Prepared By: Meadowbank Environment

Approved by:

Eric Haley, Environment and Critical Infrastructure Superintendent

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Appendix 3 – 2023-2024 Snow management
Appendix 4 – 2024 Freshet Flowchart and Plan View

1. INTRODUCTION

The purpose of this Freshet Action Plan is to ensure that Agnico can address and manage excess water associated with the freshet season at the Meadowbank site in a manner to minimize environmental risks, and to ensure Agnico has implemented specific management and mitigation measures in response to environmental incidents with potential for offsite impacts to water or land.

The freshet season is loosely defined as starting approximately May 15th and in some cases, actions and mitigation measures can extend into early fall when freezing re-occurs. There are many areas around the site that are vulnerable to excess water; the goal is to identify these areas and develop a clear plan with defined roles and responsibilities (amongst Agnico Eagle Departments), and to manage the freshet flows.

In addition, several guiding principles are applicable to the formation of this plan. The highest priority principles are:

1) to ensure that the health and safety of Agnico employees is protected, especially with respect to mining operations when excess water is present;
2) to ensure that mine contact water from runoff or seepage is managed to prevent adverse environmental impacts; and
3) to ensure the site is in compliance with the Nunavut Water Board (NWB) License, Part D, Item 19 and Part E, Item 10.

The plan will identify the areas of concern and discuss the potential risks as well as mitigation measures necessary to address the identified issues. Appendix 1 contains the actual defined 2023 procedures, the roles and responsibilities and associated timelines. Agnico's intent is to update the Procedural Appendix on a yearly basis. For example, there may be additional mitigation measures for a defined problem area or, in some cases, a previously defined issue may be permanently rectified.

The main areas of concern are:

- IPD pits and Vault area Pits;
- Area around the Portage Waste Rock Storage Facility (RSF) including the northern portions of the NAG waste rock extension, which include the collection ponds known as WEP 1 and WEP 2;
- Vault Waste Rock Storage Facility;
- North and South Cell TSF surrounding areas:
    - East and West diversion ditches;
    - Northwest corner of the North Cell TSF;
    - Saddle Dam 1 corner;
    - Saddle Dam 2 sump;
    - Saddle Dam 3 sump;
    - Saddle Dam 4-5 downstream;
    - North Cell Internal Structure
- East Dike Seepage
- Vault Road culverts;
- Stormwater Management Pond;

- Fuel Tank Farms;
- AWAR culverts near the site and along the road to Baker Lake;
- RSF – ST-16 Seepage;
- Assay Road (Mill) Seepage;
- Central Dike Seepage.
- Monitoring Station at KM87 (ST-44)
- Baker Lake Marshalling Facilities

Each area identified above will be discussed in detail below. All areas of concern are considered priorities based on the guiding principles.

2 AREAS OF CONCERN

2.1 IPD Pits, Vault Pits

All active ramps, and ditches must be cleared of all ice and snow before May in order to access the shoreline of the filling pits. All pumps must be checked and serviced to be in working order prior to May. In addition, a check must be completed confirming that all piping systems starting from the different pits are in working order (leak free).

2.1.1 *Goose Pit*

Mining in Goose Pit was completed in 2015. Tailings deposition began in July 2019. Water transfers from Goose Pit towards either Pit E or Pit A will be performed as required, as part of the deposition plan and water balance exercise. Water accumulating in the surface area around Goose Pit (Bay Goose Dike ring road, NPAG stockpile, Goose sump) will be pumped to Goose Pit as required.

2.1.2 *Pit E*

Mining in Pit E was completed in 2019. Tailings deposition began in August 2020. Runoff water accumulated at the Pit E crest will be pumped into Pit E as required. The Pit E3 ramp requires proper trenching and snow clearing to ensure safe condition for the planned operations of the tailing deposition and mill reclaim systems. Water accumulating in the pit is either transferred to Pit A or reclaimed for the mill process.

2.1.3 *Pit A*

Mining in Pit A was completed in 2018. The pit is now part of the in-pit deposition plan. The Pit A ramp requires proper trenching and snow clearing to ensure safe operations of the tailing deposition and mill reclaim systems.

Water from the South Cell, Central Dike seepage, East Dike Seepage (depending on water quality) and Stormwater Pond will be directed to Portage Pit A during freshet, where as accumulating water in Pit A will be reclaimed for mill process, as required.

2.1.4 *Vault & Phaser Pits*

Mining activities were completed in the Vault area (including Phaser and BB Phaser) in 2019. No further discharge to Wally Lake are expected. As a result of all mining activity of Vault area being completed, passive pit reflooding has begun, with natural runoff being the only inflow. No active water management is planned in that area at freshet. For safety concern the area is restricted. Procedures are in place to safely access the area for sampling purposes.

Figure 2-1: View of Vault area and the surrounding area



2.2 Waste Rock Storage Area

2.2.1 *Portage RSF*

The Portage Rock Storage Facility (RSF) will require weekly inspections around the perimeter beginning as soon as the freshet starts until freeze up to identify any seepage. As will be noted in the following section, seepage was identified in 2013 at location ST-16. In the event that additional seepage is observed from the RSF, it must be reported to the Environment Department and samples must be taken to determine the water quality and source. A mitigation plan will be prepared and implemented if necessary.

Active pumping at the Portage RSF towards the North Cell and Pit A is planned at ST-16 (Section 2.2.1.1), WEP1 (Section 2.3.1.2), and WEP 2 (Section 2.3.1.2).

2.2.1.1 ST-16 Seepage

In July 2013, a seepage from the Rock Storage Facility (RSF) was noted (see ST-16 on Figure 2-3). The seepage contained elevated copper, nickel, ammonia and cyanide. It was determined through investigation that the likely source of the contaminants was reclaim water from the North Cell TSF. Further details and discussion can be found in the Agnico Annual Report (Section 8.5.3.1.7).

Water ponding in ST-16 will be pumped to the North Cell Tailings Storage facility and Portage Pit A. Daily inspections will be undertaken in May until freshet is complete and after rain events to ensure water remains contained within ST-16. Water levels in ST-16 must remain below the till plug. Once the lake or seep area are ice free, the sample monitoring program will commence. If samples detect any concerns or elevated levels, Agnico will review the monitoring plan immediately, including downstream lakes. Pumped volumes will be documented and daily inspections of the area will be undertaken. In addition, snow will be removed from the ditches and culvert at the outlet of NP- 2 to NP-1 Lake to ensure freshet flows do not back up and overflow into the ST-16 seep location and that the north watershed non-contact runoff flows freely through to NP-1 Lake and further downstream (Dogleg Lake).

In the event that seepage water flows through the rockfill road reaching NP-2 Lake, the Environmental Department will notify authorities.

Figure 2-2. View ST-16 station and surrounding area.



2.2.1.2 Waste Extension Pool (WEP) sumps

WEP1 and WEP2 sumps were constructed in September 2015 to manage water around the northeast side of the RSF to ensure all water ponding is transferred to the North Cell TSF (see Figure 2-3). The WEP1 and WEP 2 sumps were replaced in 2016 with the WEP collection system. Water collected at WEP1 and WEP2 will be pumped to ST-16. Daily inspections will be undertaken in May until freshet is complete and after rain events to ensure water remains contained within

WEP1 and WEP2 and does not enter the East Diversion Ditch. Both sumps WEP1 (ST-30) and WEP2 (ST-31) will be sampled as per the monitoring plan.

2.2.1.3 North Portion of NAG Waste Rock Expansion

The northwestern area of the RSF, which consists entirely of NAG material, extends towards the East Diversion ditch as shown in Figure 2-3. Runoff from this area, while not anticipated to be contaminated, could, if significant, discharge to NP-2 lake after crossing the tundra. The Environmental Department will conduct daily visual inspections during freshet. Sample monitoring will be undertaken when water is observed in order to determine water quality. Contaminated water must be kept from reaching NP-2 Lake; and if required, water will be pumped or diverted.

2.2.2 *Vault RSF*

The Vault RSF requires monitoring during the freshet period to ensure adequate water management. Weekly inspections around the RSF perimeter will be conducted to identify any seepage as soon as the freshet starts. In the event that seepage is observed, the Environment Department must be notified and samples taken to determine water quality. The sample monitoring will be in accordance with the Water License requirements. No water quality issues are anticipated as primary drainage is towards the Vault Pit and the waste rock stored in the RSF is primarily NAG. No active pumping system is planned for that area.

2.3 North and South Cell Tailings Storage Facility

Water management around both the North and South Cell Tailings Storage Facility (TSF) is required to maintain integrity of the tailings management infrastructure and to prevent any adverse environmental impacts. Water from the North Cell will be transferred to the South Cell which will then be pumped toward Portage Pit A. This section describes the infrastructure in place to control runoff water and reduce possible impact on both the tailings storage facility and the receiving environment. Tailings were last discharged in the North Cell in 2021, while tailings were last discharged in the South Cell in 2023.

2.3.1 *Diversion Ditches*

The East and West Diversion ditches were constructed in 2012 around the North Cell TSF and the Portage RSF. The diversion ditches are designed to redirect the fresh water from the northern area watershed away from the tailings pond and RSF and direct it to Second and Third Portage Lakes. As seen in Figure 2-3, five zones associated with the diversion ditches have been identified where actions will be taken during or before freshet:

1. AWAR culvert – Discharge to Third Portage Lake (ST-6);
2. West Diversion Ditch elbow;
3. Northwest corner of North Cell TSF;
4. East Diversion Ditch Outlet to NP-2 Lake (ST-5);
5. Vault road culvert – NP-2 Lake exit to NP-1 Lake.

Figure 2-3: Location of the areas of interest for the 2023 Freshet Action Plan



2.3.1.1 AWAR culvert – discharge to Third Portage Lake

Ditch outflows are important to ensure proper flow of freshet drainage. The culvert under the AWAR (Figure 2-3) is a critical section of the West Diversion Ditch. Snow removal must be performed to avoid ponding and damage to the ditch/trench structure as well as to maintain the integrity of the AWAR which, in turn, is critical to transportation at the Meadowbank mine site. Figure 2-4 illustrates this culvert. Snow and/or ice must be removed on each side of the culvert to allow water to flow through to prevent upstream ponding prior to freshet to prevent any back up in the West Diversion ditch. If not completed, this could increase water levels upstream in the ditch causing problems discussed in Section 2.3.1.2. The culvert may need to be steamed if blocked by ice. Before starting the cleaning operation, it is important to ensure that the electrical cable (5kV) location has been visually identified.

Figure 2-4: West diversion ditch area of interest



Daily inspections will be conducted starting in May until Freshet is complete and after rain events. Sample monitoring will commence when open water is present in accordance with the Water License (ST-6). Sampling frequency of ST-6 may be increased if TSS results are near 30 mg/L (grab) and 15 mg/L (monthly average), or visually elevated. If a discharge of TSS occurs, the Environment Department will notify ECCC and NWB.

2.3.1.2 West Diversion Ditch Elbow

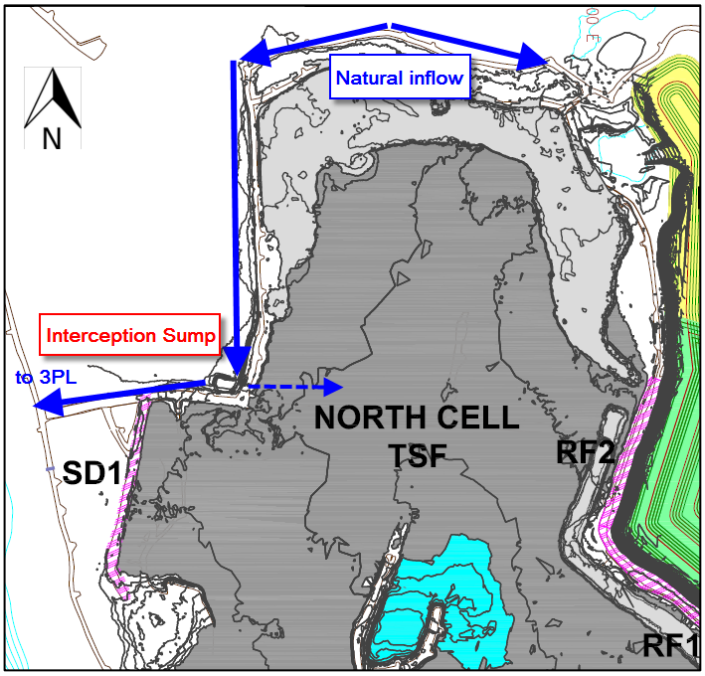
One of the deepest sections of the West Diversion ditch is located in the corner next to the Saddle Dam 1– see Figure 2-4 and Figure 2-5. In early May of each year, Agnico will remove the snow accumulation to allow the water to flow freely, preventing the water upstream from increasing in level and hydraulic head pressure. In addition, large flows can scour the ditch system causing sediment migration through the ditches which could impact Third Portage Lake.

As a precaution, Agnico constructed an interception sump located at the west diversion ditch elbow location in 2014. The sump has a capacity of 3,000 m³. These measures will prevent any

contaminated water from reaching Third Portage Lake. This sump will also act as a settling pond to prevent water with elevated TSS from reaching Third Portage Lake.

Daily inspections will be conducted from May until freshet is complete and after rain events. Sample monitoring will also be conducted. It is planned to let natural overflow to Third Portage Lake, if results are compliant. A pump will be installed preventively and ready to operate.

Figure 2-5. View of the Interception Sump in relation to the Diversion Ditches



2.3.1.3 Northwest Corner of North Cell TSF

The construction access road at the Northwest corner of the North Cell TSF (see Figure 2-4) was vulnerable to damage from the freshet water flow from the northern watershed (see watercourse flow in Figure 2-5 denoted by blue line). The start of the West Diversion ditch is also located in this area and is designed to collect the freshet. Ponding is limited in this area once the freshet is done.

Agnico will continue to monitor and conduct visual inspections of this area in May until freshet is complete and after rain events.

2.3.1.4 East Diversion ditch outlet to NP-2 Lake

This area of the East Diversion ditch, see Figure 2-6, acts as the outflow of the North part of the East Diversion ditch into NP-2 Lake. This outlet must be cleared of obstructions – snow and ice – in early May to promote drainage through the ditch and into NP-2 Lake. The presence of ice blocks could be mitigated using the steam machine to melt away the obstruction. Daily inspections will be conducted starting in May until freshet is complete and after rain events. Sample monitoring will be conducted monthly during open water in accordance with the Water License (location ST-5). Sampling frequency of ST-5 may be increased if TSS results are near 30 mg/L (grab) and 15 mg/L (monthly average), or visually elevated. Turbidity barriers have been installed at the ditch outlet into

NP-2 in 2013 to mitigate elevated TSS. If a discharge of TSS occurs, the Environmental Department will notify ECCC and NWB (CIRNAC water Inspector).

Figure 2-6: View of the East Diversion ditch outlet into NP-2 Lake



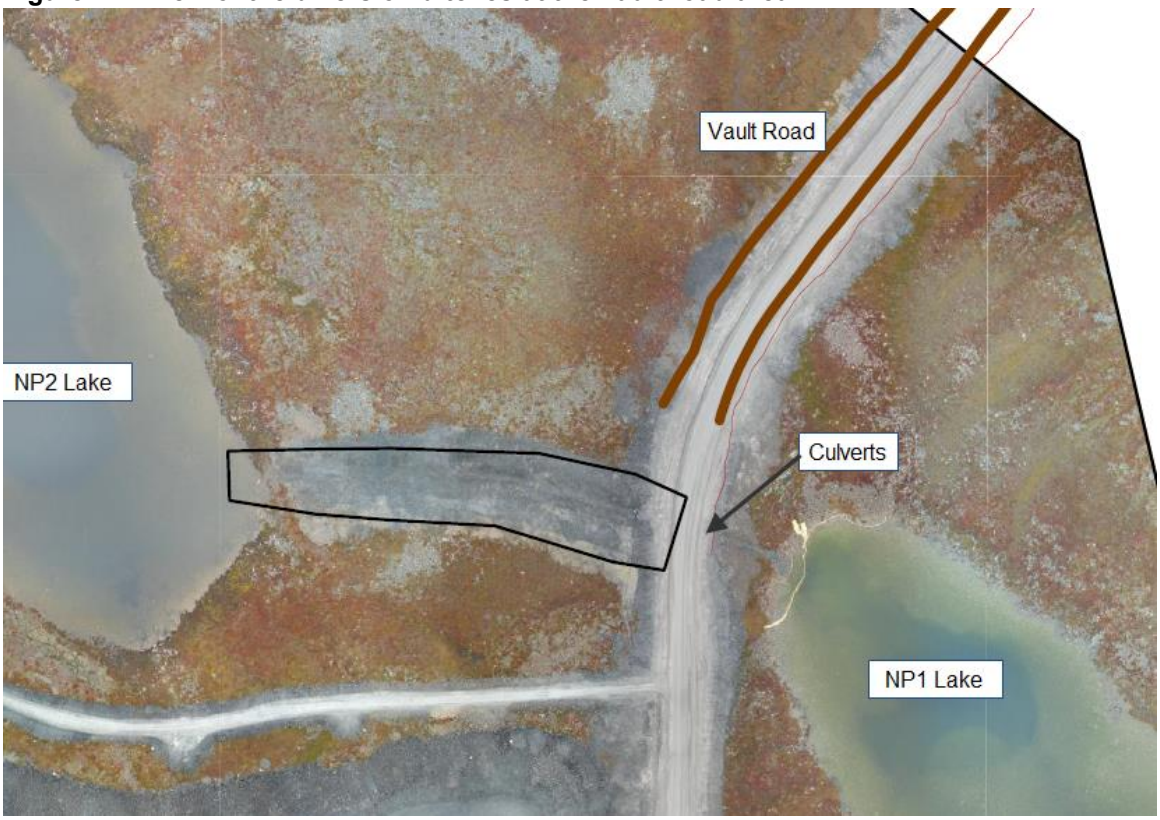
2.3.1.5 NP-2 Outlet, Vault Road Culvert and NP1

This area of the East Diversion ditch acts as the outflow of NP-2 Lake through the Vault Road culvert (see Figure 2-3). The culvert connects the East Diversion ditch from Lake NP-2 to NP-1. Snow and ice must be removed from the culvert area, including upstream at the exit of NP-2 Lake, in early May, to ensure that the outlet of NP-2 flows freely to NP-1 and ultimately to Dogleg Lake. Back up could cause an upstream water raise in Lake NP-2, which could cause overflow into the RSF ST-16 sump. First, snow from the ditch between NP1 and the road (1) will be removed in early May. Next, the culvert will be steamed, if necessary, to remove any ice/snow. If needed snow/ice around the outlet of NP2 Lake (4) would be removed to allow free flow of melt water. Daily inspections will commence in May until freshet is complete and after rain events. TSS sample monitoring will be conducted monthly and as needed for turbidity. Sampling frequency may be increased if TSS results are near 30 mg/L (grab) and 15 mg/L (monthly average), or visually

elevated. If a discharge of TSS occurs, the Environmental Department will notify ECCC and NWB (CIRNAC Water Inspector).

A snow management plan has been implemented, ensuring no large accumulations of stored snow in this area, to minimize runoff.

Figure 2-7: View of the diversion ditches at the Vault road area



2.3.2 Tailings and Dewatering Dikes

2.3.2.1 Saddle Dam 1

This peripheral dike of the North Cell TSF is required for tailings containment. Daily inspections, starting May until water freezes, will be required for Saddle Dam 1 (SD1) to ensure that runoff water does not pool against the toe of the dike due to low topography. A pumping station located along the toe of the dike is installed to pump water in the North Cell. This pumping station must be operational once water is observed at the toe to pump the water to the TSF. The pumping system will be checked in early May to ensure proper operation. Monthly sampling will be conducted at this station (ST-S-2) during open water conditions in accordance with the Water License.

2.3.2.2 Saddle Dam 2

This peripheral dike is located South of SD1, is required for tailings containment. Historically, this structure has not had any issues with water pooling at the toe, therefore monthly inspections starting May until water freezes will be required for Saddle Dam 2 (SD2) to ensure that water does

not pool against the toe of the dike. If water is observed at the toe it will be pumped back in the North Cell and a water sample could be taken.

2.3.2.3 Saddle Dam 3

This peripheral dike of the South Cell was built in 2015 for water and tailings containment. A permanent sump was established in 2017 at a low spot that facilitates water management at freshet. The downstream area of the SD3 embankment will be pumped to the South Cell TSF to avoid water ponding against the structure. This pumping station must be operational once water is observed at the toe to pump the water to the TSF. The pumping system will be checked in early May to ensure proper operation. Monthly sampling will be conducted at this station (ST-32) during open water conditions in accordance with the Water License.

2.3.2.4 Saddle Dam 4-5

Since their initial construction in 2015, ponding in the downstream area is minimal. Localized pooling ponds are sometimes present during the freshet period and will be pumped into the South Cell TSF footprint on their upstream side.

2.3.2.5 North Cell Internal Structure (NCIS)

This internal structure was built as an upstream raise in the North Cell in 2018 and allowed for increased tailings storage capacity. Additional sump (NC-A, NC-B, NC-C, NC-D, NC-E) were implemented within the footprint of the North Cell in strategic point at the downstream of this structure to ensure proper water management. Water reporting to these sumps is pumped in the North Cell to reach the main water management station in the North Cell.

2.3.2.6 Central Dike

Central Dike seepage, monitoring station ST-S-5, is located at the downstream area of the Central Dike embankment, a peripheral structure of the South Cell used for tailings retention. A permanent pumping system is in place to manage the seeping water beneath the dike by keeping the downstream pond at a constant elevation. More details to be found in the Meadowbank Water Management Plan. Water in this sump is pumped to Portage Pit A. Weekly inspections of the area will be held by environment. Environment department will also conduct monthly sample as per the Water License.

2.3.2.7 Stormwater Dike

The Stormwater dike separates the North Cell from the South Cell, and is required for tailings containment. A small pump is installed on the Western edge of the dike to collect water and pump it in the North Cell. This will prevent pooling of water against the toe of the dike. The pumping system will be installed and checked in early May to ensure proper operation.

2.3.2.8 East Dike

The water quality of the East Dike seepage is monitored throughout the year. When the criteria for discharge are met the water is send to Second Portage lake, otherwise it is sent to the Portage Pits. Historically, at freshet, the water quality of the East Dike seepage does not meet TSS requirement.

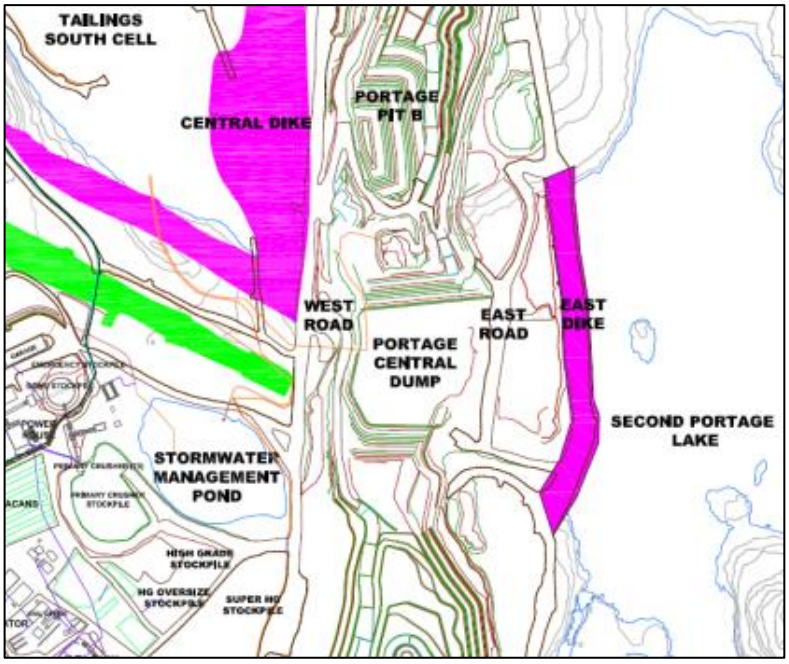
2.4 Vault Road Culvert

The Vault road crosses over a connection between two water bodies, Turn Lake and Drill Tail Lake, at approximately km 113. Beginning in May, until freshet is complete and after rain events, it will be important to complete daily inspections. In the case that excessive TSS is observed, samples will be taken and analyzed. In the case, where the TSS levels go beyond 30 mg/L (grab) and 15 mg/L (monthly average), a report will be made to the ECCC and NWB (CIRNAC Water Inspector). Turbidity barriers will be installed as a mitigation measure if needed.

2.5 Stormwater Management Pond

The Stormwater Management Pond (SWMP) is a small shallow and fishless water body that can be seen in Figure 2-8 adjacent to Portage Pit. Treated sewage is discharged into this pond before being transferred to one of the tailing storage facility. The quantity of water transferred each year is recorded. Weekly inspections in the spring and fall are undertaken to determine the commencement of pumping.

Figure 2-8: Portage Pit area with the Stormwater Management Pond



2.6 Bulk Fuel Storage Facilities

2.6.1 Meadowbank Tank Farm

Snow and ice accumulation within the fuel tank farm must be adequately managed to prevent overflow to the environment and/or damage to the fuel handling systems. The Energy and Infrastructure Department will advise the Environmental Department of their intent to pump the containment area once ice/snow begins to melt. Water samples will be taken in accordance with the Water License to ensure compliance prior to its release. A notice must be provided to the Inspector 10 days prior to this pumping activity. Once sample results have been obtained, the Environmental Department will advise the Energy and Infrastructure Department if pumping can

begin. If sample results permit, the pumping may begin; to direct water to the tundra/ground in a way to prevent erosion. In the event that the water sample results do not meet discharge criteria the water shall be sent to the Stormwater Management Pond.

2.6.2 Baker Lake Tank Farms

Snow and ice accumulation within the fuel tank farms at Baker Lake must be adequately managed to prevent overflow to the environment and/or damage to the fuel handling systems. The Energy and Infrastructure Department will advise the Environmental Department of their intent to pump the containment area once ice/snow begins to melt. Water samples will be taken in accordance with the Water License to ensure compliance prior to its release. A notice must be provided to the Inspector 10 days prior to this pumping activity. Once sample results have been obtained, the Environmental Department will advise the Energy and Infrastructure Department if pumping can begin. If sample results permit, water can be directed to the tundra but the flow rate shall be such to avoid erosion or damage to the tundra. Environmental inspection of the setup is required prior to starting the discharge. In the event that the water sample results do not meet discharge criteria the water cannot be pumped to the tundra. If this occurs the water will be pumped to a tanker and transported to the Meadowbank site to be disposed of in the TSF or placed in containers for shipment south as hazmat.

2.7 AWAR Culverts on the Baker Lake Portion

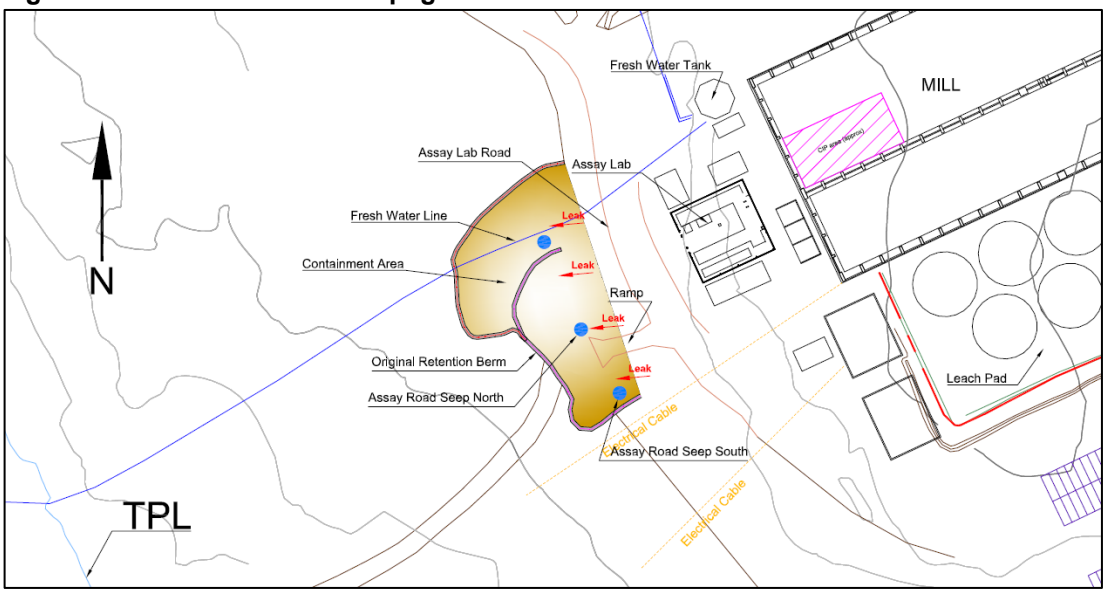
Weekly inspections will be undertaken starting in May at all culverts along the AWAR to ensure that water during freshet is flowing freely and no erosion is occurring. If elevated TSS/Turbidity levels are observed, sampling will occur and the results assessed. Turbidity barrier will be installed if required. The Energy and Infrastructure department will also be advised if severe erosion/scouring is observed. In addition, snow and ice removal may be required to allow the water to flow as per design specifications. Inspections will be performed during the freshet period by the Environment department.

2.8 Mill Seepage

In November 2013, Agnico observed seepage containing cyanide and copper at a location west of the access road in front of the Assay Lab (see Figure 2-9). An investigation determined the source was several containments areas within the mill. Repairs to seal all the mill sumps and containment areas were completed in 2014 thus stopping the source of the seep. An interception/collection trench between the mill and TPL was built in 2014. The seepage appears to have been effectively contained and the source area has been repaired. Additional information and discussion surrounding previous sample results are available in the Annual Report in Section 8.5.8.1.6.

On December 15 2023, Agnico observed water inflow within the Assay Road Seep South retention berm. An investigation was undertaken to identify potential sources of the water, to date the exact source of the water inflow has not been identified but no water inflow has been observed since December 26 2023. The water inflow was contained within the existing water management infrastructure that was built in 2014.

Figure 2-9. View of the mill seepage area and initial retention berm construction



As soon as the trench, monitoring wells and Third Portage Lake are unfrozen a comprehensive monitoring program is implemented. Regular inspections will be conducted of the pumping, collection systems and perimeter area and the pumped volumes will continue to be recorded.

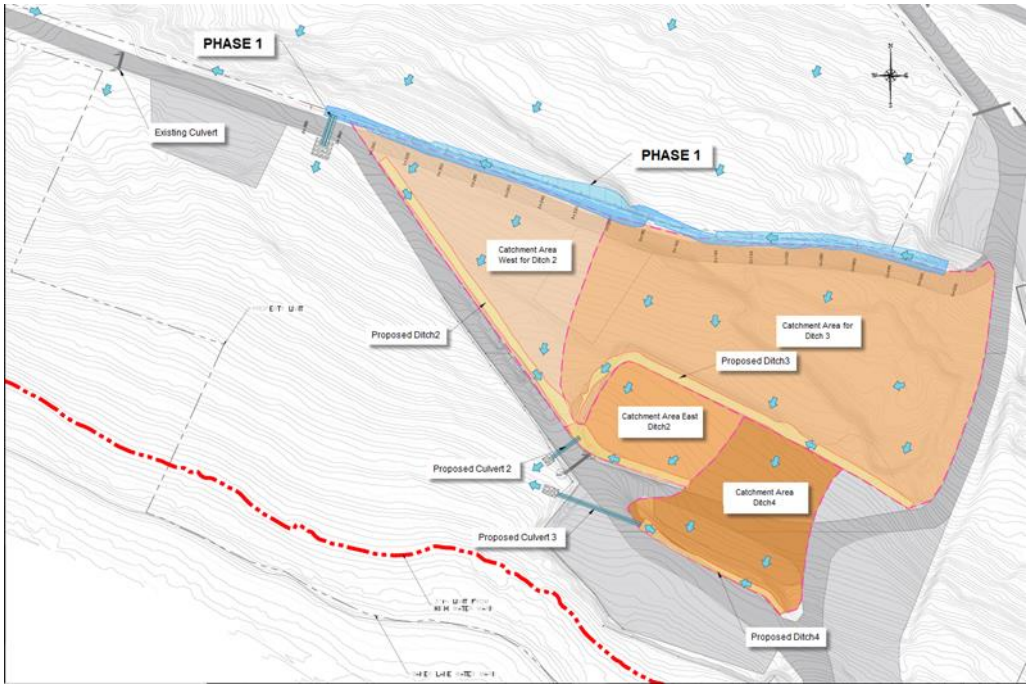
2.9 Monitoring Station at KM87 (ST-44)

In November 2022, a tractor trailer overturned at kilometer 87 on the AWAR resulting in a spill of diesel fuel. A downstream monitoring location, ST-44, will be sampled weekly during freshet and the results assessed. Additional internal sampling points may be identified during the monitoring. Routine visual inspections of the partially excavated contamination zone and collection sump(s) will occur. The inspections will include petroleum testing of any ponding water using test strips and PID. In the event of a positive result for petroleum or the presence of a visible sheen the collection sump(s) will be monitored daily, and contaminated water collected and sent to the Stormwater Management Pond or TSF.

2.10 Baker Lake Marshalling Facilities

In June 2022, a turbid flow of water was observed travelling through the Agnico Eagle facilities towards Baker Lake, resulting in a plume of total suspended solids (TSS) along the shore. Agnico Eagle received authorization to build a water diversion ditch in March of 2023 and construction of the first phase was completed in Fall 2023. Snow management practices at the marshalling facilities are in place to ensure manage snow melt reports to the diversion ditch. Weekly inspections will be undertaken starting in May of the Baker Lake Marshalling Facilities and the new water diversion ditch structure to ensure that water during freshet is being collected and flowing to the intended location. If elevated TSS/Turbidity levels are observed, sampling will occur and the results assessed. Turbidity barrier will be installed downstream of the diversion ditch outlet if required.

Figure 2-10. Design stages for the Water Management Improvement at Baker Lake Design Report



3. SNOW MANAGEMENT

The snow management procedure developed internally in 2015 and updated annually is illustrated in Appendix 3. Temporary snow storage dumps and snow accumulation areas of concern are identified on the map.

APPENDIX 1

2024 Freshet Action Plan Procedure

Section	Area of Concern	Role/Action	Responsibilities	Dates
2.1	**IPD Pits, Vault Pit and Pit Walls**			
2.1	IPD Pits, Vault Pit and Pit Walls – General	1) Clean all ice, mud and snow on all ramps, etc.	E&I	Before May
2.1.1	**Goose Pit**			
2.1.1	Goose Pit	1) Ensure pipes and pumps are serviced and ready to operate. 2) Give guidance as to when and where (Pit E or Pit A) water is to be pumped.	E&I ENV	Early May Early May
2.1.2	**Pit E**			
2.1.2	Pit E	1) Runoff water accumulated in ponds GP-4 and GP-5 will be pumped into Goose pit or Pit E;	E&I	During Freshet Early May
2.1.2	**Pit A**			
2.1.2	Pit A	1) Ensure pipes and pumps are serviced and ready to operate.	E&I	Early May
2.1.3	**Vault Pit Area**			

2.1.3 Vault & Phaser Pits	1) No further action in this area during the freshet period as mining is complete in Goose Pit. Water and/or ice will remain as part of the pit reflooding activity.	ENV	N/A
2.2 WASTE ROCK STORAGE FACILITY			
2.2.1 Portage RSF Inspection	1) Weekly inspection around the RSF perimeter to identify any seepage.	ENV	May - as soon as freshet starts until freeze up
	2) If seepage observed notify Eng and Env Department AND sample for CN and Water License Parameters – ST-16.	ENV	May - as soon as freshet starts until freeze up
2.2.1.1 ST-16	1) Check Piping from pump to discharge area at North Cell TSF.	ENV and E&I	Early May
	2) If the snow accumulation is judged to be too great, then snow must be removed.	ENV to coordinate with E&I	Early May
	3) Perform daily inspections or inspections as required, and keep records.	ENV	May - as soon as freshet starts until freeze
	4) Notify Eng. Dept and E&I when water present and pumping can start. **Water level to be maintained, as a minimum, below the till plug elevation. Water should not pond against the Till plug for extended**	ENV	May/early June - as soon as free water present and ice has melted until freeze

	5) **time periods - i.e. < 2 - 3 hours. For emergencies the water truck can be requested. Start pumping.**		
	6) Any seepage through rockfill road to NP-2 must immediately be reported to Env Dept and authorities.	ENV and E&I	May/early June - as soon as water is present until freeze
2.2.1.2 Waste Extension Pool sumps	1) Snow removal to allow free water flow.	ENV to coordinate with E&I	Early May
	2) Perform daily inspections or inspections as required, and keep records.	ENV	May - until Freshet complete and after rain events
	3) Sample monthly during open water as per Water License ST-30 (WEP1) and ST-31(WEP2)	ENV	May - until Freshet complete and after rain events
2.2.1.3 North portion of NAG Waste Rock Expansion	1) Perform daily inspections or inspections as required, and keep records.	ENV	May - until Freshet complete and after rain events
	2) Sample for ST-S-XX when water observed; sample upstream (background) in diversion ditch for same parameters and compare results (rush analysis). If results indicate potential for impact, i.e. results are > background, meet with engineering and determine necessity of ditching	ENV	May - as soon as freshet starts until freeze up

	3) Prevent **contaminated** contact water from reaching NP-2.	ENV	May - as soon as freshet starts until freeze up
2.2.2 Vault RSF Inspection	1) Weekly inspection around the RSF perimeter to identify any seepage.	ENV	May - as soon as freshet starts until freeze up
	2) If seepage observed notify Eng and Env Department AND sample for Water License Parameters – ST-24.	ENV	May - as soon as freshet starts until freeze up
2.3	**NORTH AND SOUTH CELL TAILINGS STORAGE FACILITY**		
2.3.1	**Diversion Ditch**		
2.3.1.1	AWAR Culvert - West Diversion ditch exit to TPL	1) Snow and/or ice must be removed with an excavator on each side of the culvert to allow water flow.	ENV to coordinate with E&I	Before May 20
		2) If needed, steam to free any ice blockage.	ENV to coordinate with E&I	Before May 20
		3) Before starting snow clearing operation, make sure the electrical cable location has been visually identified in the field.	ENV to coordinate with E&I	Before May 20
		4) Perform daily inspections or inspections as required, and keep records.	ENV	May - until Freshet complete and after rain events

		5) ST-6 sampling as per Water License and TSF weekly inspection (keep record).	ENV	Monthly as soon as freshet starts (open water) and continue until freeze
		6) Increase frequency of ST-6 sampling if TSS near 30 mg/L (grab) and 15 mg/L (monthly average), or visually elevated. Any extra samples to external lab.	ENV	TSS result dependent
		7) Have turbidity and silt barriers in place at TPL (2) and maintain.	ENV	May - before freshet starts and until water freezes
		8) Report any discharge of TSS to ECCC/NWB (grab > 30 mg/L).	ENV	May - as soon as freshet starts and until water freezes
2.3.1.2	West Diversion Ditch elbow near SD1	1) Snow and/or ice must be removed with an excavator to allow water flow and prevent ponding upstream.	ENV to coordinate with E&I	Early May
		2) Perform daily inspections or inspections as required, and keep records.	ENV	May - until Freshet complete and after rain events

		3) Sample for TSS monthly (external Lab) and as needed for Turbidity	ENV	May - until Freshet complete and after rain events
2.3.1.3	Northwest corner of North Cell TSF (West Diversion ditch)	1) Perform daily inspections or inspections as required, and keep records.	ENV	May - until Freshet complete and after rain events
2.3.1.4	East Diversion ditch outlet to NP-2 Lake	1) Snow and/or ice must be removed with an excavator on each side of the culvert to allow water flow.	ENV to coordinate with E&I	Early May
		2) If needed, steam to free any ice blockage.	ENV to coordinate with E&I	Before May 20
		3) Perform daily inspections or inspections as required, and keep records.	ENV	May - until Freshet complete and after rain events
		4) ST-5 sampling as per Water License and TSF Weekly inspection (keep record).	ENV	Monthly as soon as freshet starts and until water freezes
		5) Increase frequency of ST-5 sampling if TSS near 30 mg/L (grab) and 15 mg/L (monthly average). Extra samples to external lab if necessary.	ENV	TSS result dependent

		6) Install turbidity barriers in NP-2, if needed, and maintain.	ENV	May - before freshet starts and until freeze up or water clears
		7) Report any discharge of TSS to ECCC/NWB (if grab > 30 mg/L).	ENV	May - as soon as freshet starts and until water freezes
2.3.1.5	East Diversion Ditch - NP2 Outlet and Vault Road culvert.	1) Snow and/or ice must be removed with an excavator on each side of the culvert and upstream at the exit of NP-2 Lake to allow water flow.	ENV to coordinate with E&I	Early May
		2) If needed, steam culvert to free any ice/snow blockage.	ENV to coordinate with E&I	Before May 20
		3) Daily inspection - keep record.	ENV	May - until Freshet complete and after rain events
		4) Install turbidity barriers in NP-1, if needed, and maintain.	ENV	May - before freshet starts and until freeze
		5) Sample for TSS monthly (external lab) and as needed for Turbidity. Increase frequency of sampling if TSS near 30 mg/L (grab) and 15 mg/L (monthly average). Multi Lab for any increased sampling frequency.	ENV	May - until Freshet complete and after rain events

		6) Report any discharge of TSS to ECCCO/NWB (if grab > 30 mg/L).	ENV	May - as soon as freshet starts and until water freezes
2.3.2	**TSF Dikes**			
2.3.2.1	Saddle Dam 1	1) Inspect pumping system	E&I	Early May
		2) Perform daily inspections or inspections as required, and keep records.	ENV and E&I	May and until water freezes
		3) Start pumping to TSF when water observed. Keep volume pumped out.	ENV and E&I	May until water freezes
		4) ST-S-2 sampling as per Water License.	ENV	Monthly as soon as freshet starts and until water freezes
2.3.2.2	Saddle Dam 2	1) Prepare pumping system	E&I	Early May
		2) Weekly Inspection - keep record.	ENV	May and until water freezes
		3) Start pumping to TSF when water observed. Keep volume pumped out.	ENV and E&I	May until water freezes
2.3.2.3	Saddle Dam 3	1) Inspect pumping system	E&I	Early May

		2) Perform daily inspections or inspections as required, and keep records.	GENV and E&I	May and until water freezes
		3) Start pumping to TSF when water observed. Keep volume pumped out.	ENV and E&I	After May and until water freezes
		4) ST-32 sampling as per Water License.	ENV	Monthly as soon as freshet starts and until water freezes
2.3.2.4	Saddle Dam 4-5	1) Prepare pumping system	E&I	Early May
		2) Monthly Inspection - keep record.	ENV	May until water freezes
		3) Start pumping to TSF when water observed. Keep volume pumped out.	ENV and E&I	May until water freezes
2.3.2.5	North Cell Internal Structure	1) Prepare pumping system	E&I	Early May
		2) Weekly Inspection - keep record.	ENV	May and until water freezes
		3) Start pumping to TSF when water observed. Keep volume pumped out.	ENV and E&I	May until water freezes
2.3.2.6	Central Dike ST-S-5	1) Pump water to the South Cell TSF - volumes documented.	E&I and ENV	All year round

		2) Daily inspection of pumping, collection systems, bermed areas and perimeter area – keep record.	E&I & ENV	All year round
2.3.2.7	Stormwater Dike	1) Prepare pumping system	E&I	Early May
		2) Weekly Inspection - keep record.	ENV	May and until water freezes
		3) Start pumping to TSF when water observed. Keep volume pumped out.	ENV and E&I	May until water freezes
2.3.2.8	East Dike	1) Monitor East dike water quality & coordinate with E&I to stop SPL discharge	ENV & E&I	All year long
2.4	**VAULT ROAD CULVERT**			
2.4	Vault road culvert from Turn Lake to Drill Trail Lake (~km 2 on Vault road)	1) Perform daily inspections or inspections as required, and keep records.	ENV	May - until Freshet complete and after rain events
		2) Install turbidity barriers, if needed (elevated TSS observed), and maintain	ENV	May - until freshet complete and after rain events
		3) Sample monitoring for TSS, if excess turbidity observed - use external lab.	ENV	May - until freshet complete and after rain events

		4) Report any discharge of TSS to Drill Tail to ECCC/NWB (if grab > 30 mg/L).	ENV	May - until freshet complete and after rain events
2.5	**STORMWATER MANAGEMENT POND**			
2.5	Stormwater Management Pond	1) Pump Stormwater to applicable TSF in Spring/Fall - pumped volume must be kept.	E&I and ENV	When required in Spring and/or Fall
2.6	**FUEL TANK FARMS**			
2.6.1 Meadowbank Tank Farm		1) E&I Dept to advise Env Dept in advance of intent to pump once ice melts in containment area.	E&I and ENV	As required during summer
		2) Sample water in accordance with Water License to ensure compliance with limits prior to release.	ENV	As required during summer
		3) Provide notice to Inspector 10 days prior to pumping.	ENV	As required during summer
		4) Advise Energy and Infrastructure Dept if pumping can begin based on sample results.	ENV	As required during summer

		5) Pump to tundra/ground or Stormwater Mgmt Pond (note pumping to Stormwater Mgmt Pond does not require compliance with limits - at Meadowbank only). **NOTE: The water cannot be pumped out to the tundra if it does not meet the Water License criteria.**	E&I	Following ENV. Authorization & inspection
2.6.2	Baker Lake Tank Farms	1) E&I Dept to advise Env Dept in advance of intent to pump once ice melts in containment area.	E&I and ENV	As required during summer
		2) Sample water in accordance with Water License to ensure compliance with limits prior to release.	ENV	As required during summer
		3) Provide notice to Inspector 10 days prior to pumping.	ENV	As required during summer
		4) Advise Energy and Infrastructure Dept if pumping can begin based on sample results.	ENV	As required during summer
		5) Once approval given by Env Dept, E&I Dept can pump to tundra but must avoid erosion during pumping, i.e., low flow, the volume must also be determined by E&I Dept personnel. **NOTE: The water cannot be pumped out to the tundra if it does not meet the Water License criteria. Any wastewater unsuitable for discharge will be transported back to Meadowbank for disposal in the TSF or shipped south for disposal.**	E&I Dept ENV	Following ENV. Authorization & Inspection

2.7	**AWAR CULVERTS ON THE BAKER LAKE PORTION**			
2.7	AWAR Culverts on the Baker Lake Portion	1) Weekly inspection of culverts along AWAR to Baker Lake.	ENV	May
		2) Sample for TSS and Turbidity if elevated TSS observed.	ENV	May - until freeze
		3) Notify E&I Dept if severe erosion/scouring observed - for repair action.	ENV	May - until freeze
		4) Install turbidity barriers if required.	ENV	May - until freeze
2.8	**Mill Seepage**			
2.8	Mill Seepage	1) Pump water from the trench to the mill - volumes documented.	ENV and E&I	Start May/early June when water present until freeze
		2) Daily inspection of pumping, collection systems, bermed areas and perimeter area – keep record. **For emergencies the water truck can be requested.**	ENV	Start May/early June when water present until freeze
2.9	**Monitoring Station at KM87 (ST-44)**			

2.9 Monitoring Station at KM87 (ST-44)	1) Weekly sampling of downstream monitoring station ST-44	ENV	Start of May/early June when water present until freeze
	2) Pumping and removal of contaminated/contact water	E&I	As required during the summer
	3) Visual Inspection and testing of collection sump and contaminated area (Every second day)	ENV	Start of May/early June when water present until freeze or until location is deemed remediated
	4) Monthly soil sampling of spill location	ENV	Start of thaw until snow cover or until results are compliant
2.10	**Baker Lake Marshalling Facilities**		
2.10 Baker Lake Marshalling Facilities	1) Weekly inspection of Baker Lake Marshalling Facilities	ENV	May - until freeze
	2) Sample for TSS and Turbidity if elevated TSS observed.	ENV	May - until freeze
	3) Install turbidity barriers downstream of the diversion ditch outlet, if needed (elevated TSS observed), and maintain	ENV	May - until freeze

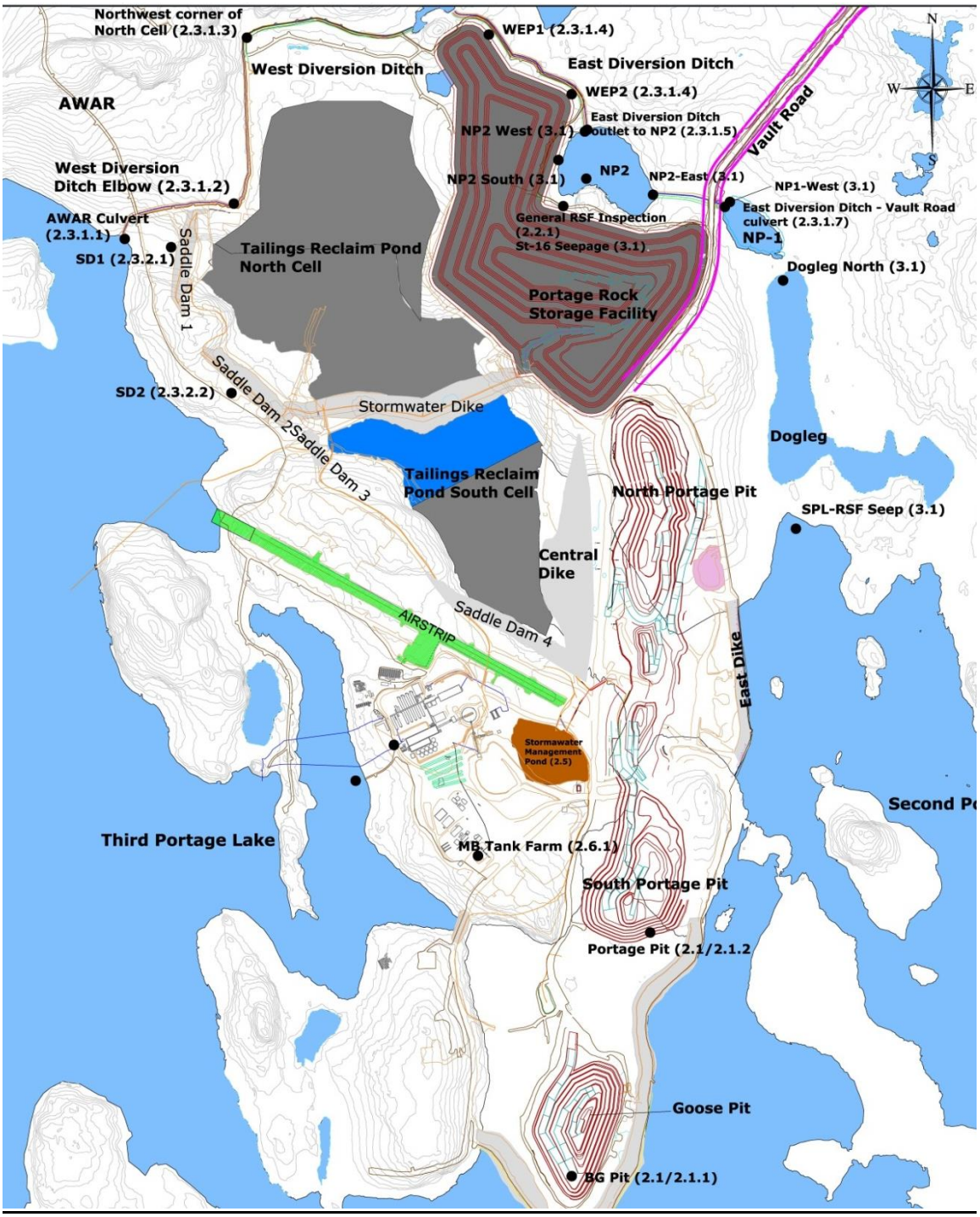
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APPENDIX 2

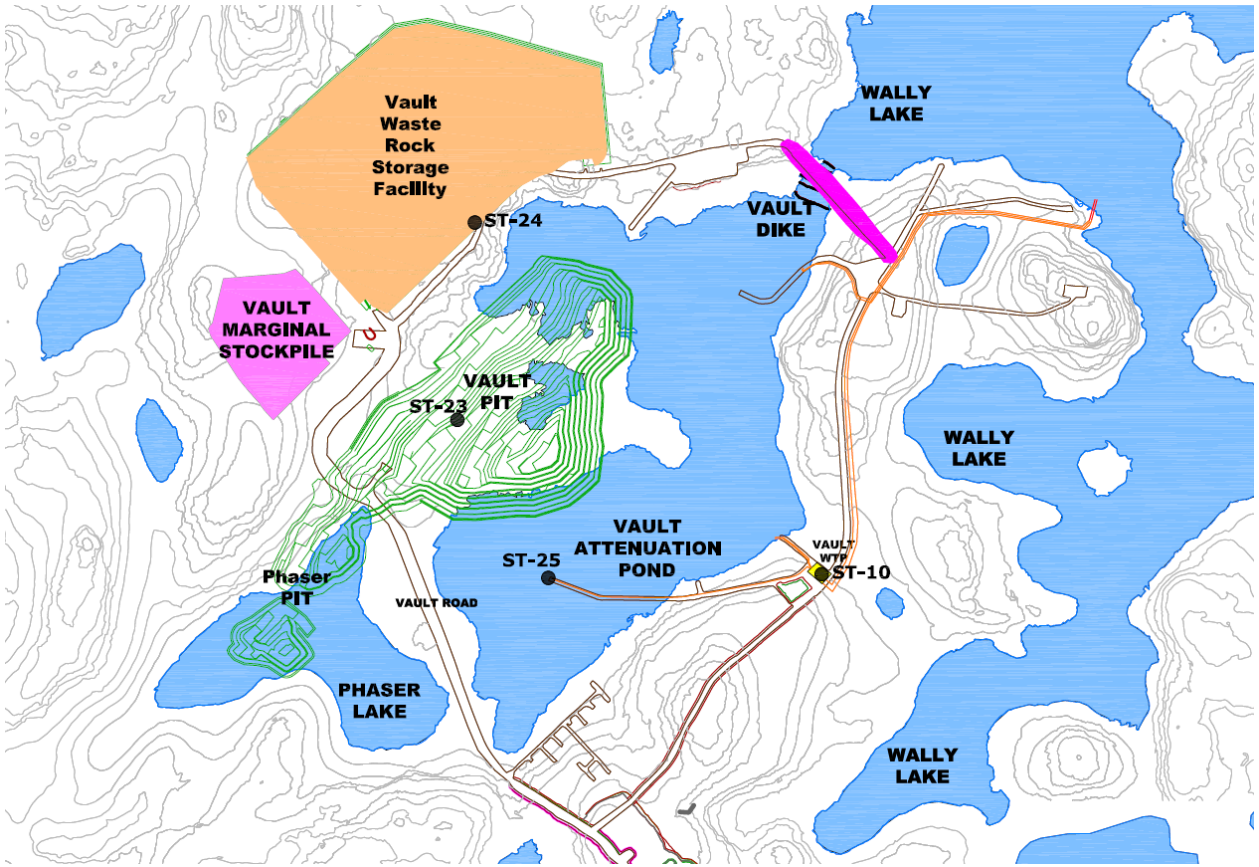
2024 Monitoring Locations and Areas of Concern for the Freshet Action

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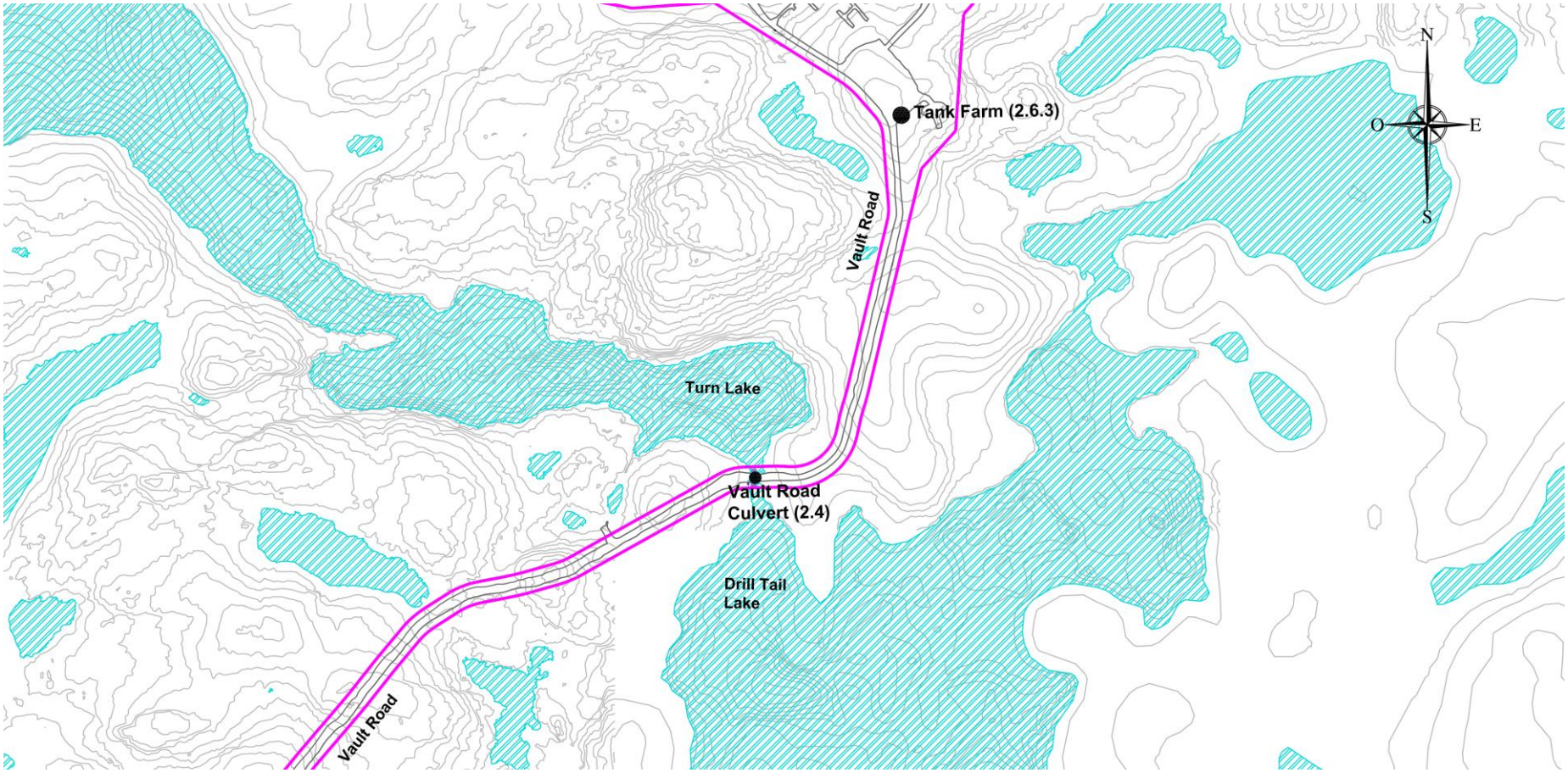
Meadowbank Areas of Concern and Monitoring Locations



Vault areas of concern



Vault Road areas of concern



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MEADOWBANK

APPENDIX 3

2023-2024 Snow management

FORMAT ANSI B–PORTRAIT

DO NOT TOUCH LINER WHILE REMOVING SNOW AND BEWARE OF INSTRUMENTS

EAST DIVERSION DITCHES

NCIS

WEST DIVERSION DITCHES

NPAG WASTE DUMP

ROAD TO VAULT

NP2 LAKE

EAST DIVERSION DITCHES

RF2

NP1 LAKE

SADDLE DAM 1

TAILINGS NORTH CELL

PORTAGE WASTE DUMP

DOG LEG LAKE

RF1

Landfill

SANA CRUSHER

RECLAIM ROAD

SADDLE DAM 2

BOOSTER PUMP

STORMWATER DIKE

SADDLE DAM 3

THIRD PORTAGE LAKE (3PL)

PORTAGE PIT A

TAILINGS SOUTH CELL

QUARRY 23

CENTRAL DIKE

AIRSTRIP

SADDLE DAM 4

DO NOT PUSH SNOW ONTO CENTRAL DIKE LINER

SADDLE DAM 5

MBK GATE HOUSE / AIRPORT CONTROL

NOVA CAMP

GEOTECH TENTS

CORE SHACK

GARAGE

SECONDARY CRUSHER

SITE SERVICES

POWER HOUSE

PRIMARY CRUSHER

SEACANS

INCINERATOR

FUEL FARM

COMM TOWER

FRESH WATER BARGE

EAST DIKE

SECOND PORTAGE LAKE (2PL)

DO NOT PUSH SNOW INTO DITCH

PORTAGE NPAG DUMP

PORTAGE PIT E

SOUTH CAMP DIKE

BAYGOOSE NPAG DUMP

ACCESS RESTRICTED SIGN

LAYDOWN AREA

GOOSE PIT

BAYGOOSE DIKE

RD PORTAGE LAKE (3PL)

VAULT DIKE

VAULT PIT

PHASER PIT

BB PHASER PIT

WTHR

D PORTAGE LAKE

LEGEND

Snow removal for Geotech

E & I

AUTHORIZED SNOW DUMP

NO SNOW DUMP

NO SNOW DUMP (CULVERT/DITCH)

TECHNICAL SPECIFICATION

None

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MEADOWBANK

DRAWN BY	DATE
SURVEY CHECK	DATE
GEOLOGY CHECK	DATE
ENGINEERING CHECK	DATE

MODIFIED BY	DATE
G.Baril/T. Dahm	2022-10-30
C. Pelletier	2023-10-13

MEADOWBANK DIVISION

GEOTECH REQUIREMENTS

MBK SNOW CLEARING MAP

2023-2024

SCALE | DATE | FILE .DWG

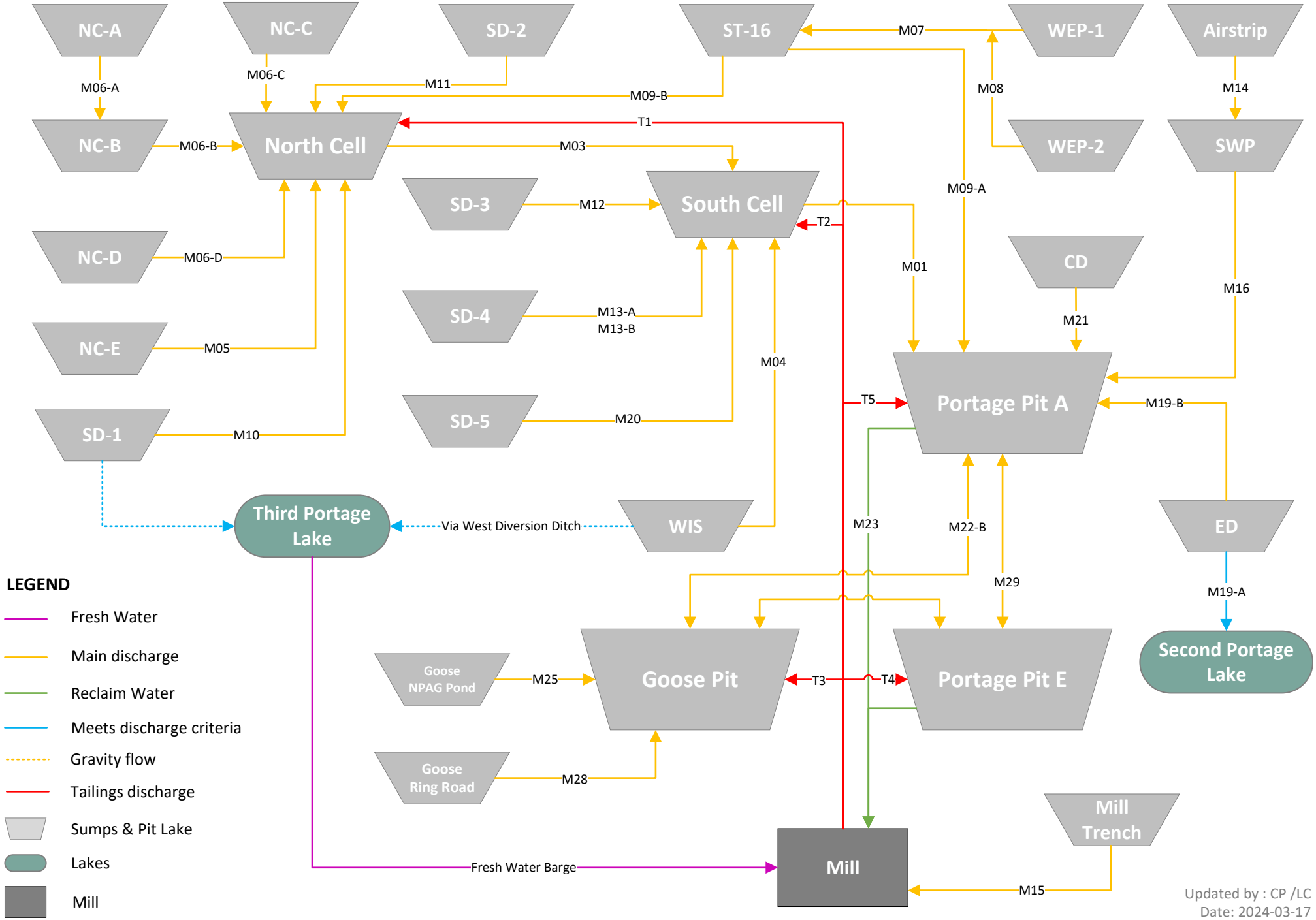
P:\Engineering\05-Geotechnic\05-WaterManagement\Snow Management\2023\MBK Snow Plowing Map for 2023.dwg, 13 Oct 2023

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MEADOWBANK

APPENDIX 4

2024 Freshet flowchart and plan view

Meadowbank Freshet Detailed Flowsheet - 2024



Updated by : CP /LC
Date: 2024-03-17

FORMAT ANSI B–PORTRAIT

N

EAST DIVERSION DITCHES
WEST DIVERSION DITCHES
NPAG WASTE DUMP
ROAD TO VAULT
WEST INTERCEPTION SUMP (CHINA)
NP2 LAKE
NP1 LAKE
3PL
SADDLE DAM 1
TAILINGS NORTH CELL
RF2
PORTAGE WASTE DUMP
VAULT ROAD
DOG LEG LAKE
RF1
SANA CRUSHER
RECLAIM ROAD
SADDLE DAM 2
BOOSTER PUMP
STORMWATER DIKE
SADDLE DAM 3
TAILINGS SOUTH CELL
PORTAGE PIT A
THIRD PORTAGE LAKE
QUARRY 23
CENTRAL DIKE
AIRSTRIP
WEST ROAD
EAST DIKE
SECOND PORTAGE LAKE
NOVA CAMP
SECONDARY CRUSHER
PRIMARY CRUSHER
SEACANS
INCINERATOR
FUEL FARM
COMM TOWER
PORTAGE NPAG DUMP
PORTAGE PIT E
SOUTH CAMP DIKE
FGL / SANA SHOP
BAYGOOSE NPAG DUMP
GOOSE NPAG POND
GOOSE TRANSFER
GOOSE RING ROAD
LAYDOWN AREA
THIRD PORTAGE LAKE

NC-C CD103 PWA12 · M06-C
NC-D CD103 PWA12 · M06-D
WEP1 CD103 PWA30 · M07
WEP2 CD80 PWA08 · M08
ST-16 CD150 PWA11 · M09-A · M09-B
NC-E (JAPAN) 40HP · M05
HL250M PWA33 · M04
CD103-Elec PWA29 · SD-1 · M10
NC-B CD80 PWA07 · M06-B
NC-A CD80 PWA07
NORTH CELL HL250M PWA05
SD-2 3HP · M11 · M09
SD-3 CD103-ELEC PWA27 · M12
SOUTH CELL HL250M PWA06
3HP · M27
CD/DS 150HP PWA19 · M01
SD-4 3HP · M13-A · M13-B
SD-5 3HP · M20
AIRSTRIP 3HP · M23 · M14
CD103-ELEC PWA26 STORMWATER POND · M16
MILL TRENCH 3HP · M15
140HP 04 · 140HP 05
EAST DIKE A 3HP · M18
EAST DIKE B 3HP · M19-A · M19-B
Reclaim 06
CD103M PWA46 · GOOSE SUMP · M25-A · M25-B
M22 · M22-B · M02-B · M03-A · M21 · M26 · M26-B
3HP

14" HDPE
10" HDPE
8" HDPE
6" HDPE
4" HDPE
LAYFLAT
NEW LINE

PUMP LOCATION
PUMP TYPE PUMP ID
Planned electrical hookup

TECHNICAL SPECIFICATION
None

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DRAWN BY	LC	DATE 4/22/2020
SURVEY CHECK		DATE
GEOLOGY CHECK		DATE
ENGINEERING CHECK		DATE

MODIFIED BY	DATE
C. Pelletier	02-29-2024

MEADOWBANK DIVISION
ENGINEERING - GEOTECH
MBK DEWATERING
Freshet Plan
Revision 9

SCALE 1:12500 | DATE | FILE .DWG

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APPENDIX E – 2024 AMMONIA MANAGEMENT PLAN



MEADOWBANK COMPLEX

AMMONIA MANAGEMENT PLAN

JANUARY 2024

VERSION 5

EXECUTIVE SUMMARY

In accordance with the Type A Water Licenses (2AM-MEA1530 & 2AM-WTP1830) Agnico Eagle is updating the Ammonia Management at the Meadowbank and Whale Tail sites (e.g., the Meadowbank Complex), which includes monitoring for ammonia in all mine pit sumps, storage pond, tailings storage facility, seeps, etc. Furthermore, Agnico Eagle has implemented a comprehensive, regular inspection program related to explosives management within the mine pits, conducts regular inspections at the explosives manufacturing facility (Dyno Nobel) to ensure all explosive products are stored in locked, sealed containers prior to use, and continues to perform continuous review of analysis results such that mitigation measures can be implemented when increasing trends of ammonia are determined. Agnico Eagle has not exceeded any ammonia discharge criteria (Water License or MDMER) to date.

This Ammonia Management Plan (AMP) is a companion document to the Spill Contingency Plan, the Water Management Plan and the Water Quality and Flow Monitoring Plan and has been updated to provide guidance for monitoring ammonia levels at the Meadowbank and Whale Tail mine sites, as part of the conditions applying to waste disposal and management listed in the Water Licenses.

DOCUMENT CONTROL

Revision				Pages Revised	Remarks
#	Prep.	Rev.	Date		
00	SNC		February 2013	All	
01	Agnico Eagle	1	March 2016	13	Table 1 update
				16	Add section 6
				Appendix 1	Add Memorandum to address comments made during water license renewal process
WT	Agnico Eagle	WT	June 2016		Included Whale Tail Pit operations in the updated plan
02_NIRB	Agnico Eagle	2	Dec 2018		For WT Expansion permitting process
02_NWB	Agnico Eagle	2	April 2019		For WT Expansion permitting process
02	Agnico Eagle	2	April 2020	All	Comprehensive review of the plan + incorporates WT
03	Agnico Eagle	3	March 2021	All	Comprehensive update to reflect the current operation
04	Agnico Eagle	4	December 2021	Appendix 5, p.27 Section 2.1.1, p.9	Update inspection sheet Update to reflect WT emulsion plan construction
05	Agnico Eagle	5	January 2024	Section 2.1.1 and 2.1.2, p.9 Appendix 1, p.21 Appendix 3, p.25 Appendix 4, p.26	Updated to reflect current operation Updated Figures Updated Emergency Response Plan Updated MSDS

Prepared By: Environmental Department

Approved by: Eric Haley
Environment and Critical Infrastructures Superintendent

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APPENDIX 4 MSDS FOR BULK EMULSION AND SENATEL

APPENDIX 5 EMULSION PLANT / BLAST AREA INSPECTION SHEET

ACRONYMNS

AGNICO EAGLE	AGNICO EAGLE MINES LIMITED
AMP	AMMONIA MANAGEMENT PLAN
AN	AMMONIUM NITRATE
ANFO	AMMONIUM NITRATE – FUEL OIL
AWAR	ALL-WEATHER ACCESS ROAD
CCME	CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT
CIRNAC	CROWN-INDIGENOUS RELATIONS AND NORTHERN AFFAIRS CANADA
CNO-	CYANATE
CREMP	CORE RECEIVING ENVIRONMENTAL MONITORING PROGRAM
KIVIA	KIVALLIQ INUIT ASSOCIATION
MDMER	METAL AND DIAMOND MINING EFFLUENT REGULATIONS
NIRB	NUNAVUT IMPACT REVIEW BOARD
NWB	NUNAVUT WATER BOARD
TSF	TAILINGS STORAGE FACILITY
WMP	WATER MANAGEMENT PLAN
WRSF	WASTE ROCK STORAGE FACILITY
WTHR	WHALE TAIL HAUL ROAD

1 INTRODUCTION

The Meadowbank Mine Water Management Plan (WMP) was first prepared in 2009. This version was subsequently updated in preparation for the Type-A Water License Application for the Meadowbank Mine. The WMP was then updated in 2011. In 2015 WMP update, a technical note was added as an appendix, which was the first iteration of the Ammonia Management Plan (AMP) for the Meadowbank Mine. As an extension of the Meadowbank Mine, the 2016 update of the AMP includes measures to manage and monitor ammonia at the Whale Tail satellite open pit operations. Other facilities that are part of the Meadowbank Mine are the Baker Lake facility, the All-weather Access Road (AWAR) between Baker Lake and the Meadowbank Mine, the Meadowbank Mine Camp, the Meadowbank Tailings Storage Facility, the Whale Tail Haul Road (WTHR) between the Whale Tail and the Meadowbank Mine sites.

The Ammonia Management Plan (AMP) was updated in March 2016 in response to concerns raised during the Water License renewal process (January, 2015 – NWB Technical Meetings – Baker Lake) and was re-issued as part of the management plans update process. These concerns from interveners centered on ammonia loading resulting from mine infrastructure in particular from cyanidation in the Tailings Storage Facility (TSF), the use and management of explosives, and the management of treated sewage. In addition, there was a request for loading calculations of ammonia to the receiving environment. These comments are addressed in the Ammonia Management Plan Version 2 March 2016 and specifically in the SNC 2016 Technical Memorandum – WGFU, which was appended to the revised plan. It should be noted that there is no further planned discharge of mine contact water into Third Portage Lake from the Portage Attenuation Pond. The onsite Core Receiving Environmental Monitoring Program (CREMP), takes into account the overall ammonia levels in Third Portage Lake and to date Agnico Eagle has not reached any level of concern (no trigger levels have been reached for ammonia).

Ammonia management at Whale Tail site follows the same practices as outlined in this approved plan and similarly includes conducting routine monitoring in the receiving environment at the Whale Tail site under the CREMP.

This AMP is a companion document to the Spill Contingency Plan, the Water Management Plan and the Water Quality and Flow Monitoring Plan and has been updated to provide guidance for monitoring ammonia levels at the Meadowbank and Whale Tail mine sites, as part of the conditions applying to waste disposal and management listed in the water license. This includes monitoring for ammonia in all mine pit sumps, attenuation ponds, TSF, seeps, etc. in accordance with the Type A Water Licenses. Furthermore, Agnico Eagle implemented a comprehensive, regular inspection program related to explosives management within the mine open pits, conduct regular inspections at the explosives manufacturing facility (Dyno Nobel) to ensure all explosive products are stored in locked, sealed containers prior to use, and continue to perform continuous review of analytical results such that mitigation measures can be implemented when increasing trends of ammonia are noted. Agnico Eagle has not exceeded any ammonia discharge criteria (Water License or MDMER) to date.

Ammonia is a naturally occurring nitrogen compound found in the environment. However, there are two sources at the mine site that can contribute to the mobilization of ammonia in the groundwater or surface runoff:

1. Blasting of ammonium-nitrate (AN) explosives is typically the primary source of ammonia in areas of mining operations. AN readily absorbs water and dissolves easily, thereby mobilizing ammonia in either groundwater or surface runoff.

2. In gold mine operations using a cyanidation process to extract the gold from the ore, the cyanide in solution is oxidized to cyanate (CNO^-) using a sulfur dioxide (SO_2) air process before discharge to the TSF. The cyanate can then hydrolyze to ammonia in the TSF reclaim pond.

Ammonia dissolved in water exists in equilibrium of interchanging un-ionized (NH_3) and ionized (NH_4^+) forms. The equilibrium is influenced by pH, temperature, and ionic strength (salinity) where the amount of un-ionized ammonia is favored as the pH becomes more basic or as the water temperature or salinity increases. Un-ionized ammonia can readily pass across the gill surface and enter into the bloodstream of fish, while ionized ammonia passes with greater difficulty. Once inside the fish, both forms of ammonia can cause toxic effects (CCME, 2010). Furthermore, it should be noted that ammonia oxidizes to nitrite (NO_2) and nitrate (NO_3), the former being particularly toxic to fish and humans. Both nitrite and nitrate have CCME guidelines to ensure the Protection of Aquatic Life.

In addition to ammonia, monitoring of nitrate and nitrite is also considered in the AMP, as both water quality parameters are signature compounds of AN explosives. NO_3 has a discharge criteria threshold specified in the conditions applying to waste disposal and management in the Meadowbank and Whale Tail Water Licenses. This AMP proposes monitoring of blasting practices for the assessment of explosive quantity used and blast performance, as well as monitoring of water quality to determine ammonia levels in waters within the mine sites. The monitoring results can be used to review and adjust blasting practices or water management if ammonia levels need to be reduced.

2 EXPLOSIVE MANAGEMENT AND BLASTING PRACTICES

2.1 SITE DESCRIPTION

2.1.1 Explosive Storage

The primary storage area of explosive products is located at the Whale Tail emulsion plant areas (see Appendix 1). The explosive products arrive by barge at the Baker Lake marshalling area. They are then transported by ground to the Whale Tail emulsion plant. There is no explosive storage at Meadowbank since the beginning of 2022.

Explosive products at the plant facilities are packaged in supplier provided containers, which limit the possibility of spillage into the environment. The products are only removed from these containers prior to use at the emulsion plant areas. Surface areas are graded to collect water runoff within the storage facilities.

The emulsion plant area at Meadowbank is located north of the Meadowbank mill, pits, and camp site and approximately 76 km from Whale Tail Mine. The storage area is accessible from the AWAR. Some ammonium nitrate prill containers are temporary stored at the Meadowbank emulsion plant (no longer in operation) and brought to Whale Tail as needed due to the limited storage capacity on Whale Tail site. The Whale Tail Emulsion Plant is located in a remote area of Whale Tail Mine, southwest of the pits and the main camp. The plant was commissioned in January 2022. The infrastructure presently consists of an emulsion plant for the preparation of bulk emulsion explosives, two buildings for the storage of AN, a nitrate pad and seven explosive magazines along the access road to the plant.

Similar to the previous Meadowbank operations, the emulsion is trucked to Whale Tail Pit, IVR Pit and Underground operation. The current plan for emulsion delivery is to directly deliver to the open pits and underground however, emulsion is also stored in a remote emulsion storage building located where the Whale Tail mine explosives magazines are stored. In the case of road closures, inclement weather or other operational constraints, the remote emulsion storage will supply emulsion to the Whale Tail Pit, IVR Pit and underground.

2.1.2 Roads

The AWAR and the WTHR are use to transport explosive products from the Baker Lake site facilities to Whale Tail Mine.

Agnico Eagle will continue to enforce restricted access from km 85 north to the Meadowbank Mine and will enforce the same restrictions along the WTHR (refer to the Whale Tail Haul Road Management Plan).

Spillage control protocols, procedures and handling of spilled material, and explosive management for both storage and transport have been established by Dyno Nobel Inc. (Dyno) and are provided in Appendix 2. Explosive products and spills on the AWAR/WTHR are referenced in the Spill Contingency Plan.

2.1.3 Pits and Underground Operations

The development sequence of the mine site is provided in the Meadowbank Mine Waste Rock and Tailings Management Plan and the Whale Tail Waste Rock Management Plan. Explosives are used for the excavation of waste rock and mining of the ore at the Portage, Goose and Vault pits at Meadowbank before depletion, and at the Whale Tail Pit, IVR Pit, and underground mines.

2.2 AMMONIA PATHWAYS

Emulsion not fully detonated in pit blasting operations provides several pathways for ammonia mobilization. Water from drainage runoff is the primary mechanism of mobilization for ammonia residuals remaining within open pits. This water, being at Meadowbank or Whale Tail, is collected at pit sumps and then is pumped to the associated Attenuation Ponds.

Blasting residuals are also expected to be attached to waste rock and ore materials, which are transported from the open pits to their respective storage and processing facilities. Residuals from waste rock may be washed off by precipitation and be ultimately conveyed to the attenuation ponds. Residuals from the ore may be carried in the tailings to the TSF. All these pathways (mine sumps, attenuation ponds, TSF) are monitored in accordance with the Water License.

At Whale Tail operations, if blasting residues on waste rock are mobilized, they will collect in the Waste Rock Storage Facility (WRSF) pond, which is downslope of the WRSF, or the IVR WRSF contact water collection system. For ore stored within the dewatered portion of Whale Tail Lake, drainage would flow to the attenuation pond. The locations of the WSRF and the storage ponds are shown in the figure for Whale Tail site in Appendix 1.

To avoid any case of poor or incomplete detonation, Agnico Eagle employs the following measures:

- inspection of drilling depth to ensure it is in accordance with blast design;
- inspection of quantity of explosives in each drillhole to ensure it is in accordance with blast design;
- inspection of blast tie-in execution; and
- reporting of any anomalies during loading and priming of explosives to correct situations prior to initiation.

These measures will be reviewed should ongoing cases of poor or incomplete detonation be encountered. This will be included in the next revision of the AMP.

2.3 EXPLOSIVES AND BLASTING

Based on experience at Meadowbank and at other open pit mines in the Canadian Arctic, the largest potential source of ammonia in mine water will be explosive residue from blasting. Depending on the wetness of the site, water may leach explosives from blastholes prior to the blast. Other forms of ammonia released from AN are explosives flowing into cracks and fissures in the rock and not detonating or leading to an incomplete detonation of the explosive column and misfired blastholes. An ammonium-nitrate based emulsion is used as a blasting agent at the Meadowbank

and Whale Tail sites. This material is designed to repel water thus minimizing the potential for ammonia to impact mine water.

Blasting operations on site include monitoring of explosive quantities, blast design, procedures, and practices. The results of this assessment are used to adjust blasting practices as needed to:

a) Optimize the use of explosives; and

b) Increase the completion and efficiency of explosive detonations.

Any modifications to blast design are intended to decrease the amount of ammonia that may become available for mobilization in mine water.

2.3.1 Explosive Products

Explosive products used at the mine site include bulk explosives (bulk emulsion), packaged explosives, cast boosters, detonating cords, non-electric delay detonators and non-electric lead lines. The material safety data sheets (MSDS) for these products are provided in Appendix 4. Of these products, the greatest potential for water contamination comes from the bulk explosives. Meadowbank and Whale Tail use emulsion as the primary bulk explosive for blasting operations.

Bulk emulsions typically contain some or all of the following components:

- Ammonium, sodium and/or calcium nitrate;
- Fuel and/or mineral oil;
- Methylamine nitrate;
- Emulsifiers; and
- Ethylene glycol.

Although bulk emulsions are water resistant, contaminants can be leached from the product if it is left in contact with standing or flowing water for extended periods of time. The performance of the explosive, and hence the potential for post-blast contaminations, deteriorates with the length of time that the emulsion remains in the blasthole after it has been loaded (i.e., sleep time). Blast procedures currently in use are designed to minimize sleep time so that standing or flowing water is not in contact with the bulk emulsion for extended periods of time.

2.3.2 Procedures and Practices

Quality control procedures are in place to verify AN content in bulk explosives. Quality control procedures for the emulsion occur at the plant and density tests are done at the blast site (on the trucks). Loading procedures specify that blastholes be loaded with emulsion from the bottom of the blastholes to provide a continuous explosive column. Details on the explosive quality control and loading procedures have been established by Dyno Nobel and are provided in Appendix 2.

The primary factors that may reduce the amount of ammonia available for mobilization in mine water are:

- Explosives handling; and
- Completeness of detonation

Bulk emulsion spillage during blasthole loading could (as bulk emulsion is resistant to water) be a source of ammonia that could be carried by water collected in the pits. Spillage control protocols, procedures and handling of spilled material, and explosive management for storage and transport, as well as the emergency response plan, have been established by Dyno and are provided in Appendix 2 and 3.

Incomplete detonation results in higher ammonia residue on the blasted rock. Evidence of incomplete detonation is often observed as an orange fume after a blast and sometimes an orange pigment on the blasted rock. Explosives that have failed to detonate may be observed in the muck pile. Muck piles are routinely inspected by Meadowbank and Whale Tail staff for signs of incomplete detonation.

3 MONITORING

Monitoring of explosive handling and blasting is as follows:

a) Explosive quantities: Records of explosive quantities used for in-pit blasting are kept for each blasting event and will be conserved throughout the mine life. Furthermore, a record of blast location (i.e., pit and elevation), blast date, and bulk explosive type and name used (emulsion, with the corresponding ratio of AN over emulsion) is kept for all events.

b) Design parameters: Blast design parameters, as well as changes in the blast design parameters from the standard are recorded and dated.

c) Loading instructions: Loading instruction forms are completed for each blast event and provide a record of the as-loaded parameters for all blastholes in the blast pattern including:
    - Hole depth
    - Collar height
    - Priming (single or double)
    - Other observations made by the blast crew (e.g., wetness of holes, use of liners, collapsing holes or difficulty loading)

d) Video footage: Videos are taken of each blast. This practice provides a visual, qualitative record of the results of each blast and provides insight into potential problems such as incomplete detonation (e.g., orange fumes) and misfires, as well as areas of poor muck pile heave and forward movement.

e) Blast audits: Blast audits are conducted on a monthly basis to ensure that best practices are being followed in the field (audits may be adjusted to a lesser frequency if low ammonia levels are consistently observed, or conversely may be adjusted to a higher frequency if high ammonia levels are consistently observed).

An additional monitoring technique commonly used is the measurement of the Velocity of Detonation (VOD), which has been shown to be directly related to the volumetric fraction of the explosive that has been consumed. This technique will be implemented if poor or incomplete detonation is consistently suspected.

4 MILL EFFLUENT

4.1 SITE DESCRIPTION

The mill effluent consists of tailings produced at the mill that is pumped as slurry and deposited in the TSF/in-pit disposal where the tailings particles can settle and consolidate. The reclaim water is pumped back to the mill for re-use. Prior to discharge of the mill effluent to the TSF, the effluent is sent to the cyanide destruction process. The cyanide destruction process at Meadowbank uses the sulfur dioxide (SO_2) and air process to oxidize weak acid dissociable cyanide (CN-WAD) to a less toxic form: cyanate (CNO^-) based on the following reactions:

$$SO_2 + O_2 + H_2O + \text{CN-WAD} \rightarrow CNO^- + H_2SO_4$$

The process can also use sodium metabisulfite ($Na_2S_2O_5$) instead of sulfur dioxide in case there are operating issues with the dosing of sulfur dioxide gas in the process. This ensures that chemicals required for the cyanide destruction process (either SO_2 or $Na_2S_2O_5$) are always available.

4.2 AMMONIA PATHWAY

Cyanate produced from the oxidation of CN-WAD can readily hydrolyze to ammonia (NH_3) and carbon dioxide (CO_2) based on the following reaction:

$$CNO^- + H^+ + H_2O \rightarrow NH_3 + CO_2$$

Thus, the mill effluent provides an ammonia loading to the TSF reclaim water.

During the operation of the TSF, the reclaim water will be pumped to the mill for re-use in a closed loop system. Consequently, there will be no discharge of reclaim water to the environment during this period. Furthermore, it is expected that the ammonia concentration will gradually increase in the TSF/in-pit reclaim pond over time, even though (1) there may be some slight attenuation of ammonia due to microbial/algae activity in the summer and (2) ammonia may oxidize to nitrite and nitrate, particularly near the top of the pond where oxygen is most present.

Annual Water Quality Forecasting provides a forecast of the concentration for ammonia in the TSF reclaim pond during the life of the mine. Furthermore, the report provides a forecast of the ammonia concentration in the Portage and Goose Pit flooding activities This modeling has been updated for Whale Tail operations to include predictions for Portage and Goose Pit end pit water quality and will be updated according to the Type A Water License requirements.

4.3 MONITORING

Concentrations of ammonia, nitrate and nitrite are parameters that are monitored on a monthly basis as part of this sampling campaign of the TSF/in-pit reclaim water.

In the Water Quality Forecasting, a maximum ammonia concentration in the TSF reclaim water is evaluated in order to meet the Type A Water License criteria which for benchmarking are compared to CCME guidelines for the Protection of Aquatic Life in the Portage and Goose Pits once in-pit disposal and flooding activities are completed. If this concentration is exceeded before the end of the flooding operation, measures could be undertaken to lower the ammonia concentration, as well

as nitrate and nitrite if required, in the TSF reclaim pond prior to the transfer of TSF reclaim water to the pits.

Ammonia treatment technologies that could be further investigated, if the need arises, include:

i) Biological nitrification / denitrification during the summer months.

ii) In-situ volatilization of ammonia during the summer months.

iii) Ammonia removal by snow making.

5 WATER MANAGEMENT

For details on the site wide water management, please refer to the Meadowbank Water Management Report and Plan and the Whale Tail Water Management Plan.

In addition to controlling contact water through design, the Meadowbank Water Quality and Flow Monitoring Plans and Type A Water License requires monitoring stations that are used for the monitoring of ammonia loadings around the mine site and waste rock storage areas from explosive residuals, as well as ammonia concentration found in the reclaim pond. These monitoring requirements ensure contact water that may contain elevated ammonia, nitrates or nitrites are managed, treated if necessary and do not impact the receiving environment. Monitoring at Whale Tail site is presented in the Whale Tail Water Quality and Flow Monitoring Plan and in the Type A Water License.

In addition to the monitoring listed in the Water Quality and Flow Monitoring Plan, the following actions are undertaken at Meadowbank and Whale Tail as part of the AMP:

- If runoff or seepage is detected at the rock storage facility, water samples collected at the Portage, Vault, Whale Tail, or IVR WRSFs during late operations will also be analyzed for nitrate and nitrite to complete the suite of signature compounds found in explosive residuals.
- Tailings slurry volumes and density from the mill pumping facility to the TSF are recorded on a monthly basis.
- The records of water volumes pumped from the Meadowbank and Whale Tail sumps or WRSF pond to the attenuation ponds are recorded on a monthly basis.
- The records of water volumes pumped from the attenuation or storage ponds to the receiving environment will be recorded on a monthly basis.

Sampling frequency at the pit sump will also be increased if high variability is identified in observed constituent concentrations as a result of the blasting schedule.

The WRSF ponds at Whale Tail will collect all drainage from the WRSFs. Any drainage from the ore storage area will collect in the Whale Tail/IVR Attenuation Ponds. The open pit, water storage ponds and the Attenuation Ponds at Whale Tail and IVR Pits are shown in Appendix 1.

6 REPORTING

Reporting of ammonia concentrations at the Type A sampling stations listed is included as part of the requirement of the Water License. The reporting frequency is prescribed by the Nunavut Impact Review Board (NIRB) Kivalliq Inuit Association (KivIA), and Nunavut Water Board (NWB) and include, but may not be limited to:

- Brief monthly reports of the compiled water quality monitoring results, sent to the NWB, the CIRNAC Water License Inspector and to the KivIA; and
- An annual report submitted to the NWB, KivIA, CIRNAC, NIRB, Government of Nunavut, and other interested parties. This report summarizes monitoring results for each sampling station, annual seep water chemistry results, annual groundwater monitoring results, receiving water monitoring results, spills and any accidental releases, measured flow volumes, effluent volumes and loadings, and results of QA/QC analytical data.

Mine operation personnel reviews on a monthly basis the data gathered from the sampling stations in the Type A Water License and from the monitoring action proposed under the AMP. If the data indicates that further studies and/or significant changes to the water management infrastructure are required to assess or control ammonia concentrations, Agnico Eagle will notify the NWB and KivIA as early as practical. Results of these further studies and/or changes to the AMP monitoring actions will be transmitted to the NWB for review.

7 INSPECTION

On a weekly basis, the environment department will conduct inspection in the blasting area to ensure that the Dyno Nobel loading procedures are being implemented (this will minimize blasting residues). In addition, inspections will be undertaken at explosive product storage facilities (Dyno Nobel) to ensure that explosives products are stored in sealed containers and there is no spillage. If any non-conformities are observed follow up action will be undertaken, and corrective measures will be put in place. See Appendix 5 for copy of the Emulsion plant inspection form.

8 REVIEW OF AMMONIA MANAGEMENT PLAN

Review of the results of the site water quality and AMP monitoring during the year may provide new information, and/or indications that changes to the AMP are necessary. When revisions are warranted, an updated AMP will be submitted to the NWB for review.

9 REFERENCES

Agnico Eagle (2020), Meadowbank Water Quality and Flow Monitoring Plan. July 2020.

Agnico Eagle (2016), Whale Tail Pit Project FEIS and Type A application documents. Volume 8 – Monitoring and Mitigation and Management Plans. June 2016.

CCME (2010), Canadian Water Quality Guidelines for the Protection of Aquatic Life, Ammonia.

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SLI (2012). Water Quality Forecasting for the Portage Area 2012-2025. Agnico-Eagle Mines. Document No. 610756-0000-40ER-0002, Rev. 01. March 2013

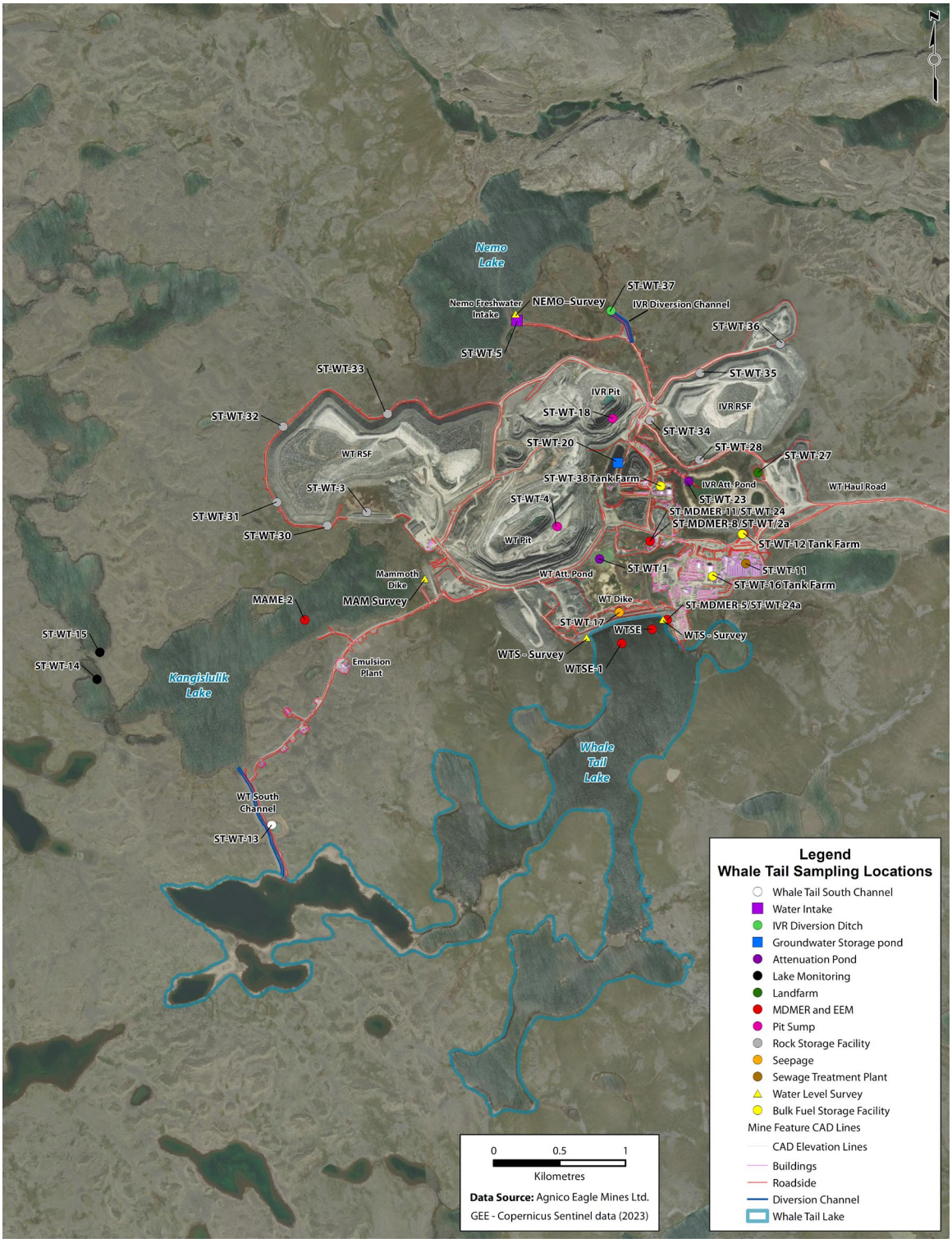
APPENDIX 1

ENVIRONMENT FIELD STATIONS – MINE SITE VIEW

Meadowbank Mine Site Layout Area



Whale Tail Mine Site Layout Area



APPENDIX 2

SPILL CONTROL AND LOADING PROCEDURE PLAN

Dyno Spill Control and Loading Procedure Plan

1) All trucks are washed inside shop to contain any residue that may have contacted trucks. The water from the washing of the trucks and or the shop floors themselves is then picked up by the AEM e vacuum and disposed of in the onsite Stormwater Management Pond.

2) A.N. Prill is brought to the Emulsion Plant site in 20 ft Seacans and is stored in the Seacans on the A.N. Pad for the site till it is needed. It is then taken out of the Seacan /s and brought into the Plant for use. Sometimes enough product for the next batch is stored outside to speed up Batching time when it is necessary. A.N. Prill is not left outside if weather looks like it is going to be damp or raining to prevent the leaching of Prill through the Tote bags and on to the ground surface.

3) Any A.N. spills that occur are promptly cleaned up and disposed of in 1 of 2 ways:
    i. Any contaminated prill is put into containment barrels or buckets inside Plant, depending on amount, and put into the next Ansol batch to be made.
    ii. Any contaminated Prill is put in Barrels or Buckets (depending on amount) and then transferred from barrels to buckets for the Emulsion Truck Operators to take to the Blast Pattern and placed into the boreholes after they have been loaded (disposal via blast).

   Any spills that are too difficult (some of our drummed Products) to take care of in this manner are placed in Metal Drums or HAZMAT bins etc. with absorbing materials, sealed and sent to AEM HAZMAT AREA (for shipment south).

4) Emulsion waste (with contaminants) is also either contained in drums or bins until it can be transferred into buckets and taken to Blast patterns and placed into boreholes for disposal (disposal via blasting).
   Any non contaminated Emulsion is put back through the system and on to Trucks.
   When Trucks need to be de-contaminated or process lines of trucks or plant need to be cleaned out, the excess water is strained through a Sack (this allows the water to go through, but contains the Emulsion) to minimize nitrites in our plant sump containment.

5) When an Emulsion Truck has completed loading on a blast pattern the remaining emulsion is flushed out of the loading hose by running water through the hose (water holding tank on trucks) until water discharges out the end of the hose into the borehole.
   This does not completely remove all of the Emulsion out of the Hose; there is still a residue amount left in the hose. Thus, when the Truck operator starts up on the next blast pattern, the hose is put into the borehole and the Operator primes the hose and all the residue Emulsion is contained in borehole and disposed of when hole/s are blasted.

APPENDIX 3

DYNO NOBEL EMERGENCY RESPONSE PLAN

DYNO NOBEL CANADA

EMERGENCY RESPONSE PLAN

AMARUQ NUNAVUT

REVISION STATUS

Revision #	Date	Revision Description	By	Checked by	Approved by	Revision Due
1.0	July 31, 2019	New Standard	P.St-Georges	D. Wall; P. Piprell	T. Medak	
1.1	October 26, 2020	Site Manager change		P.Piprell a& Shanno Ryan	T.Medak	
1.2	October 26, 2021	Review ERP	PSt-G.			October 2022
1.3	October 26, 2022	Review ERP Mod. In Blue*	P.St-G.			October 2023
1.4	October 17, 2023	Review ERP Mod. In Blue*	P.St-G.			October 2024

* Modification done in the site ERP are in blue

Approved for release by:

Signature: Patrick Piprell _____ **Date: October 17, 2023**

Title: Site Supervisor

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External Reports

All incident involving the manufacturing, importation, exportation, sales or storage of explosives and restricted components, and the use of fireworks, must be reported to the Chief Inspector of Explosives as soon as circumstances permit. For accident involving fatality, serious injuries or major property damage, call 1-855-912-0012 as soon as possible. All other accident/incidents must be reported to 1-613-948-5200. The completed Explosive Incident Report form F07-01 should be sent by email to ERDmms@nrcan.gc.ca or by fax to 613-948-5195. The inspector of explosives responsible for your area should also be contacted.

1.0 SITE INFORMATION

The entrance to the site is south of AMARUQ mine site at the Explosive Manufacturing Road (EMR).
Latitude (North): 65° 23'43.45"N
Longitude (West): 96° 44'1.00"W
Office: +1 819 759-3555 ext 4606808

2.0 PURPOSE

The purpose of the 'Emergency Response Plan' is to provide guidelines for the protection of all employees and company property in the event of an emergency occurring on company premises. It outlines the setting up of emergency control within the site and the emergency procedures in place to ensure the safety and protection of people, property and the environment.

- Notifying all on-site personnel of emergencies.
- Organizing the site based emergency response, where applicable.
- Facilitating communications with Emergency Services.
- The plan provides procedures for:

    - Training of site personnel in emergency response.
    - Reviewing and updating emergency procedures.
    - Facilitating recovery operations.

To provide a management system for Dyno Nobel Canada and stakeholders, to deal with emergencies to protect people, property and the environment.

Objectives:

- To minimize adverse effects on people, property and the environment
- To control or limit the effects of an emergency
- To facilitate an emergency response and to provide appropriate assistance to the emergency services
- To communicate vital information to all relevant persons as soon as possible
- To provide for competency-based training so that a high level of preparedness can be continually maintained
- To provide a basis for updating and reviewing emergency procedures
- To provide a system to manage an emergency
- To link current site plans with the corporate plan
- To identify and utilize an effective communication system

3.0 SCOPE

This plan has been prepared for Dyno Nobel Canada Inc. The plan covers the emergency response requirements for Dyno Nobel's AMARUQ Operations.

SCOPE OF OPERATION

Bulk Explosives Factory Site includes;

Emulsion Manufacturing site
storage of emulsion, Ammonium Nitrate 182,500 NEQ
- 50,000 liters of diesel;

4.0 REFERENCES

- Site Emergency Response Plan (Template)
- Emergency Risk Assessment Worksheet
- IPL HSE MS Element 9.1, Emergency Response Planning
- CSA-Z731-03 Standard – Emergency Procedures
- Regulatory Agencies, Groups, Industry and Community
- Environmental Emergency Regulation – Environment Canada

The regulatory agencies administering explosives are:

- Transportation of Dangerous Goods (TDG)
- Natural Resource Canada (NRC)
- Explosives Regulatory Division (ERD)
- Environment Canada (EC)

5.0 EMERGENCIES COVERED UNDER THE PLAN

Based on a risk assessment conducted the following natural or man made disasters could impact our business:

On-site Emergencies

- White outs
- High Winds
- Explosion – equipment (boiler/fuel or other)
- Fire in plant
- Injury or illness
- Wildlife interaction (wolverine; bear; caribou; other)
- Environmental contamination
- Spills
- Severe weather
- Product shortage
- Raw ingredient shortage
- Critical replacement parts unavailable
- NOX gas release possible.

Off-site Emergencies (including transportation)

- Transportation incident rollover or collision
- Blast pattern incident with drill
- Blast pattern incident near highwall
- Blast patten incident – lightning
- Fire –threat to vehicle
- Fire – toxic fumes
- Explosion – product detonation
- Security
- Injury or illness
- Wildlife interaction (wolverine; bear; caribou; other)
- Spills
- Severe weather
- NOX gas release possible.

6.0 HAZARDOUS OPERATIONS

The following zones, activities and equipment are hazardous and may require an emergency response:
The following is a prioritized list of hazardous operations and storage areas.

	Operation	Comments / Instructions
1.	Manufacture Emulsion	Plant and emulsion storage with chemicals. Emulsion storage in ISO tank.
2.	Operating loader	Yard; site access road
3.	Fuel storage area (bulk)	Bulk tank in yard
4.	Product delivery to blast pattern	Plant; Site yard; Mine road; pit
5.	Driving on a pattern	Pit
6.	Transferring chemicals	Plant; Process vehicles
7.	PTW activities	Confined Space Entry; Working at Height; Hot Work; Loading and unloading (Emulsion, Traces, Fuel); Lockout/Tagout; Critical Lifts

7.0 HAZARD CHEMICALS AND MATERIALS

The following is a prioritized list of or hazardous chemicals, materials and intermediates of significant quanities on site or transported by site:

	Chemical / Material	Quanties	Location
1.	Fuel oil	50,000L	Outside plant
2.	Trace 1 (citric acid)	284 L	
3.	Trace 2 (sodium nitrite)	284 L	
4.	ANP	120,000 kg	Outside

8.0 EMERGENCY CONTACT INFORMATION

Dial 6-9-1-1 in an emergency or call CODE 1 – CODE 1 – CODE 1

Non-Emergency Police / Fire

- Baker Lake RCMP (867) 93-1111

Regulatory Contacts: (NRCan via H&S or Regulatory Compliance Manager)

- H&S: Seamus Kilcommons Cell: 403 815-4066
- Reg: Pierre St-Georges Cell: 613 677-1051

DN Title	Name	Cell Phone	Work Phone	Home Phone
Manager of the Site	Patrick Piprell & Shannon Ryan	NA	819 759-3555 EXT 4606608	
Operations Manager	Krisnar Cruz	587-839-0654	587-839-0654	
General Manager	Jim O'Brien	913-940-5170	913-940-5170	
HSEC Manager	Seamus Kilcommons	403-837-2685	403-723-7547	
Emergency Supervisor (ES)	Shannon Ryan Patrick Piprell		819-759-3555 EXT: 4606808	

Local Emergency Services may be required to take control of the emergency situation. Dyno Nobel personnel will assist the Local Emergency Services with information and advice and will ensure that the Emergency Services are briefed with all appropriate information when attempting to take control of the situation.

9.0 EMERGENCY FUNCTIONS AND RESPONSIBILITIES

The following people will participate in emergency planning and crisis management.

Name	Role / Responsibitlies
	Responsible for updating emergency response plan
Patrick Piprell & Shannon Ryan	Site Supervisors will be the EMERGENCY MANAGER, or in his/her absence the next most senior manager on site will assume this role. Responsibilities are to ensure ERP is site specific: Lead drills twice a year
Jim O'Brien	General Manager: Overall reviewer and sign off. General Manager; Media Liaison.
Krisnar Cruz	Operations Manager: responsible to review and ensure adequate: review of drills conducted; Bulk Site Operations Advisor
Seamus Kilcommons	HSEC Manager: responsible to review and ensure adequate: review of drills conducted; Liaison with regulatory authorities

Benoit Choquette	Environment Manager; Liaison with relevant regulatory authorities
Pierre St Georges	Regulatory Compliance Manager; Liaison with all relevant regulatory authorities

Emergency response responsibilities for all personnel on site are describe as follows:

Roles	Responsibilities
Emergency Manager (EM)	This position will usually be filled by the Site Supervisor / Acting Site Supervisor and will be responsible for: • Overall responsibility for management of the emergency. • Contact with other external organizations (e.g. Police) • Contact with employees and relatives • Declaration of "All clear" to approve re-entry • Implementation of the DNA Crisis Communication Plan
Emergency Supervisor (ES)	This position will usually be filled by the one of the operators or designate and will be responsible for: • Liaison with the EM. • Arrange the removal of equipment (e.g. truck explosives). • On-site security. • Collect visitors book during evacuation (if safe to do so) • Conducting head count of all personnel on site In the event that there is only 1 person on site then that person will assume responsibilities of both the EM & ES.
Other personnel on site	This position will usually be filled by any other employee on site. • If safe to do so, personnel holding appropriate licenses will attempt to remove all explosive trucks from the vicinity of the fire and shut down all equipment. • Follow the direction by EM to control the situation (e.g. extinguish fire) if directed • Make their way to the nearest designated evacuation point. • Visitors and contractors must proceed directly to the evacuation / muster point: The scale house.

10.0 ALARM COMMUNICATION SYSTEM

- Type of warning/alarm system (including back-up): Alarms tied into AMARUQ mine site Notified system to security / ERT
- The communication system used: Two way radios and phone
- Location of Alarms: Emulsion plant and office – Internal and external alarms

- We will communicate an on-site in an emergency situation to employees by:
- Alarm System Bell. In the event of a disaster we will communicate with employees by: Two way radio
- In case of an emergency the triggered alarm communicate with the bitshop, crusher pad, magazines pads. The employees will gather at the muster point where a head count will be performed.
- In event no one is on site, the alarm system will activate by: Automatic alarm: sensored for smoke and heat??
- We will test the warning system and record results at least __1___ time per year. Results are recorded by the mine. Mine owns the Dyno Nobel building

11.0 EMERGENCY RESPONSE EQUIPMENT

The following emergency response equipment is located on site:

Location	Equipment
Emulsion plant	**Spill Kits; Fire extinguishers; First Aid Kits**
Process Vehicles	**Spill Kits; Fire extinguishers; First Aid Kits**
Pickup trucks	**Fire extinguishers; First Aid Kits**

EMERGENCY RESPONSE KITS & MATERIAL

All DNCI worksites will maintain the following emergency response equipment, that is appropriately packaged, stored and easily loaded onto a pick-up truck and / or aircraft for immediate transfer to an accident scene:

VERIFY WHAT IS READILY AVAILABLE IN SPILL KITS AS PER LIST BELOW

I - Spill Recovery Material
1000 ft. of 3 inch fluorescent yellow security tape
3 explosion-proof lanterns / flashlights
1 roll (200 ft.) of 10 mil. clear plastic for ground or product cover
3 "explosives" signs plus assorted 1.1 / 1.5 "placards and labels"
4 polyethylene / non-ferrous 45 gal. drums with removable lids
1 doz. large heavy duty garbage bags (to line drums and for trash)
3 non-ferrous shovels
1 spill kit containing 1 - 25 lb. bag of granular absorbent material
30 ft. of 5 in. sorbent booms
10 ft of 3 in. sorbent socks

1 case of sorbent pads
1 - 3 ft. x 3 ft. neoprene sheet (drain seal)
6 heavy-duty cardboard boxes for repackaging broken boxes
2 rolls of 3″ duct tape
2 rolls of 3″ packing tape
1 push broom
6 blank (TDG) shipping documents

II – Personal Protective Equipment
6 reflective safety vests
6 safety "goggles"
6 particulate respirators (dust masks)
1 doz. disposable ear plugs
6 pr. nitrile gloves
6 pr. cotton gloves
Industrial First Aid Kit

(Note: all DNCI Emergency Responders must wear CSA approved protective footwear and Type II (lateral protection) hard hats when on the job. As well, a camera should be readily available to photograph the scene of an accident and remedial measures for inclusion in the accident investigation report).

An inventory list of the emergency response kit/material will be kept with the cache, which must be inspected quarterly, to ensure the contents are present and in good working order (note: Emergency response kit cache may be witness/lock-wired closed, in which case only an annual verification that the contents are present and in good working order is necessary, so long as the witness/lock-wire is present and unbroken).

12.0 EMERGENCY CONTROL CENTER

The Site Manager or Supervisor will nominate the most appropriate location of the Site Emergency Control Centre when all site personnel, contractors and visitors have mustered at the designed evacuation area. The Site Emergency Control Centre will depend upon type and location of the emergency.

In the event of an emergency that requires all personnel to be evacuated from the site, the Site Emergency Control Center will be located at the main gate.

13.0 EMERGENCY INSTRUCTIONS

- Ring the alarm.
- Evacuation Procedure.
- Evacuation of people includes alarms, designation of staging areas and alternative routes/assembly points, and a system of head counts to determine if all individuals have been evacuated.

- Activating the emergency plan.
- Activating the emergency services.
- Terminating the emergency.
- Health and safety functions, such as roll call and search and rescue.
- To identify those responsible for conducting this work and detail procedure to clean and contain spills.

13.1 EXTREME TEMPERATURES

Working in cold environments can be not only hazardous to your health but also life threatening. It is critical that the body be able to preserve core body temperature steady at + 37°C (+ 98.6°F). This thermal balance must be maintained to preserve normal body functioning as well as provide energy for activity (or work!). The body's mechanisms for generating heat (its metabolism) has to meet the challenge presented by low temperature, wind and wetness - the three major challenges of cold environments.

Uncomfortably cold working conditions can lead to lower work efficiency and higher accident rates. Cold impairs the performance of complex mental tasks. Manual tasks are also impaired because the sensitivity and dexterity of fingers are reduced in the cold. At even lower temperatures, the cold affects the deeper muscles resulting in reduced muscular strength and stiffened joints. Mental alertness is reduced due to cold-related discomfort. For all these reasons accidents are more likely to occur in very cold working conditions.

Protective clothing is needed for work at or below 4°C. Clothing should be selected to suit the temperature, weather conditions (e.g., wind speed, rain), the level and duration of activity, and job design. These factors are important to consider so that you can regulate the amount of heat and perspiration you generate while working. If the work pace is too fast or if the type and amount of clothing are not properly selected, excessive sweating may occur. The clothing next to body will become wet and the insulation value of the clothing will decrease dramatically. This increases the risk for cold injuries.

13.2 INJURY/ILLNESS

Medical emergencies may arise due to serious injury caused by machinery, entrapment, heart stoke. Limited first aid is available on site and casualties would likely be transferred by ambulance to nearess Hospital for treatment. A transport vehicle is always readily available on site for transportation needs. The site is accesible to local emergency services at all time.

A means of communication is mandatory for all employees working on site at all time. For emergencies requiring immediate medical attention, quickly assess the scene then call for assistance. Qualified Site First Aiders will assess the casualty, and if required, **call 6911** or CODE 1 – CODE 1 – CODE 1 on Two Way radio

The site has several trained first aid attendants and these people will be the first to assist in an emergency.

FIRST AID ATTENDANTS	EXPIRY DATE
Chris Paul	
Patrick Piprell	
Shannon Ryan	
Aubrey Chaulk	
Billy Harrison	

*** Report incident details in SHAERS database when the Emergency is over.**

13.3 EXPLOSION / FIRE CONTROL PROCEDURE

EXPLOSION

All site personnel should be evacuated as soon as possible. In the event of an explosion the Emergency Services should be contacted immediately and the evacuated personnel assembled at the Muster area. No personnel should enter the site until at least one hour after the explosion or until the resultant fire has burnt out.

Dyno Nobel personnel should restrict access to the plant and nearby area until the Police and emergency services arrive at which time all access roads should be blocked off at a suitable distance. Emergency services should be advised not to enter the site but if they choose to do so they should be fully briefed before entering.

The Dyno Nobel Compliance Manager shall be notified of any explosion immediately so as to inform Government authorities of any incident that has occurred. There should be no attempt made at clean up or repair of the site until authorisation from the appropriate authorities has been received.

13.3 EXPLOSION / FIRE CONTROL PROCEDURE (Continued)

FIRE CONTROL PROCEDURES

Fires will vary in location and the materials involved. Each kind of fire shall have inherent risks associated with them. In general the following guidelines should be adhered to:

- Do not fight a fire that has become established which involves explosives or precursors used in the manufacture of explosives;
- Proceed with extreme caution when fighting fires involving Oxidizing agents as toxic fumes may be evolved;
- Never fight a fire unless you are comfortable to do so and have the correct equipment;
- Always leave an escape route when approaching or fighting a fire; and
- Always fight a fire from upwind.

IF YOU ARE UNABLE TO CONTAIN THE FIRE WITH A FIRE EXTINGUISHER THEN YOU MUST EVACUATE THE AREA.

13.4 SECURITY

The Site can be secured by a locked gate at the main entrance (main emergency exit and gathering point) of the site. Due to 24 hour operation the gate is not locked to allow access for DYNO personell and mine blasters. A sign in, sign out book is located at the main entrance for visitor and employee manlimits as per the site ERD Factory License. Only Dyno Employee's have keys to the locked gate.

'A' & 'B'. Sign includes ; Danger - Explosives, No Trespassing, Penalty-Section 18, Canada Explosives Act, $ 5,000.00 fine. Man Limit. No smoking. A match/lighter box. PPE requirements, and a 24 hour Emergency Contact Number.

13.5 BOMB THREAT

In the event of a "Bomb" threat the telephone operator or other person receiving the call should obtain as much information as possible. Where practicable the person receiving the call should have access to the "Bomb Threat Checklist".

Action if bomb or other explosive device is found:
If object or parcel, suspected of being a "bomb" or other type of explosive device is found by anyone, the following action should be taken:

- Do not touch, tilt or otherwise tamper with the object, whether it is a bomb, improvised explosive device (IED) or other suspect object.
- Immediately evacuate the area surrounding the object.

13.5 BOMB THREAT (Continued)

- Consider the consequential damage and effect - both on site and off site -if process equipment, storages or pipelines are involved.

Use the following guidelines:

- Evacuate the area concerned.
- The possibility of shrapnel must be considered.
- Evacuate all persons to the emergency evacuation area. Safety perimeters must be maintained until the device is rendered safe.
- Quick detailed observations should be taken of a suspected IED. Time spent near an IED must be kept to absolute minimum.

Observations should include:

- Exact location and proximity to hazards such as dangerous chemicals or substances.
- Size, shape and colour of object.
- Any writings or labels appended to the device.
- Any other peculiarities.
- Notify Police simultaneously with the commencement of evacuation.
- approach police upon their arrival to supply all details of information.
- Police will, upon their arrival, coordinate and control all necessary procedures.

13.6 CHEMICAL SPILL/RELEASE

Spills of materials on site are most likely to originate from damaged containers and drums whilst unloading raw materials. The action taken to deal with a spill is dependent on the type of material spilt and the associated hazards with that material.

Environmental considerations should be taken into account when cleaning up a spill. To ensure that the appropriate action is taken to clean up a spill the MSDS (Material Safety Data Sheet) should always be consulted before any clean up attempt is made.

Care should also be taken that the spill does not mix with other raw materials as violent reactions or the generation of toxic fumes may be possible. In the case of reactions or fume generation the emergency services should be called and the area evacuated.

The Ministry of Environment is to be notified. Contact Dyno Nobel Canada Environmental Manager.

13.7 TRESPASSING/VANDALISM

If there has been a breech of security or obvious signs of trespassers, notify the police. Do not disturb scene.

Determine if there has been any damage or theft. Follow instructions of the mine security or police. If there has been a theft of explosive materials proceed to the appropriate section of this Plan.

Take temporary actions to prevent recurrence until permanent actions can be implemented.

13.8 LOSS/THEFT OF EXPLOSIVES

LOSS

Determine the nature of the loss. **Implement** the appropriate sections of the Notification Plan. **Retrace** all routes of travel. **Verify** security and inventory level with personnel at the place of origin and destination. **If material cannot** be accounted for, the HSE Advisor and Site Manager shall notify ERD & the RCMP.

THEFT OF EXPLOSIVES

Immediately call the police. **Implement** the Emergency Notification Plan.

The Site Manager, HSE Advisor or Regional Operations Manager will call, as soon as possible and within 24 hours, the RCMP & ERD. **Determine** exactly what product, how much and code date(s) was stolen from the magazine(s). **Be careful** not to disturb the magazine or its contents so as not to destroy evidence such as fingerprints, shoe marks, etc. **Do not** handle tools or equipment that may have been used to break in. **Allow** Police personnel access but protect the scene from others that may disturb the evidence.

Do not permit news media personnel or any other non-company personnel (excluding Police) to enter the site. **Do not** make any statements to the media or non-company personnel. Refer the media to the Company Spokesperson. **The** Site Manager shall be the direct liaison between the company and the police and regulatory agencies. **Keep a log,** (documentation), of all activities regarding the break-in investigation for the company record. **The** Regional Operations Manager, HSE Advisor, and Site Manager will review all information and determine prevention measures to be taken to deter future break-ins.

13.9 PROCESS LOSS/INTERRUPTION

The possibility of a power outage on the site is very thin. The site has a generator.

13.11 TRANSPORTATION VEHICLE ACCIDENT

Ensure the accident scene is safe. Check if there are injuries. Whether the victim is conscious. Ask someone to call emergency assistance. Provide First aid and take control of the scene of an accident. Take care of the victims until help arrives.

13.12 TRANSPORTATION VEHICLE BREAKDOWN

Call **911** and contact
Regulatory Manager Pierre St-Georges at (613) 677-1051.
Environment manager Benoit Choquette at (514) 249-6285

13.13 BLAST SITE INCIDENT

If the emergency involves a blasting incident, the crew at the blast site shall follow the emergency instructions outlined in the Blasting Guidelines and Procedures. This site shall implement the appropriate sections of the Notification Plan as directed. The site shall support the blasting crew with personnel and equipment as needed.

13.14 TRANSPORTATION CHEMICAL SPILL

Initiate the ERAP by calling 1-800-367-4629 and call 911. The Emergency Response Advisor will contact the authorities.

Determine what material(s) has spilled or leaked and secure the area. Do not walk through the spilled material. **Put** on appropriate Personal Protective Equipment.

Protect the area from ignition sources. If a vehicle is involved, engage the battery disconnect switch. **Keep** unauthorized persons away.

Make every effort to confine and contain the spill, using spill kit and all available resources. **Determine** the source of the spill, and stop the leak if possible. **Make** every attempt to see that the material does not reach any waterway. **Prevent** rain or water from coming in contact with the product. Diking may be possible with gravel, soil or any ground material. **Use** what resources you have to begin cleaning up the product, outside equipment may be required. **Return** uncontaminated product to the original containers.

If the material has spilled into a waterway, an outside clean-up contractor will be called to assist with the clean-up operation. Call the main office as soon as possible. Seek corporate counsel as soon as the situation is stable.

13.15 TRANSPORTATION FIRE/EXPLOSION INCIDENT

Should there be explosive detonations, or the risk of detonations due to the presence of fire or other detonating factors, advise the First Responders (or anyone within the immediate vicinity if First Responders are not at the scene) of the risk of an explosion. Help organize perimeter guards to prevent people from entering the evacuation zone. The minimal distance to evacuate for a 20,000 kg tanker is 1.2 km or 4000 feet.

14.0 AMMONIUM NITRATE (E2 REGULATION)

14.1 Physical and chemical properties

Ammonium nitrate in solid form (prill) is of a light or off-light color and is commercially available in small beads of various sizes. It gives off a light ammonia smell. It is considered an oxidizer (risk class 5.1). Its density varies between 0.72 and 1.0 g/cc. Its solubility in water is high at 192 g/100 ml at 20°C. Its boiling point (decomposition) varies between 177 and 210 °C and its fusion point is 170°C.

Ammonium nitrate is stable in normal conditions. However, when involved in a fire, it will give off toxic compounds of nitrogen oxides and may emit ammonia vapors in the air. When confined or exposed at high temperatures, it can explode. It becomes more sensitive to explosion when contaminated by organic matters or other combustible materials.

14.2 Potential environmental impact

Ammonium nitrate is a fertilizer composed of nitrate ion (NO_3^-) and ammonium nitrogen ion (NH_4^+). Nitrate is essential to life. Most crop requires a large quantity of nitrates to support growth. In moderate quantities, nitrate is a harmless component of food and water. The nitrate ions are very soluble in water. They are easily solubilized and transported by surface and groundwater. Ammonium nitrogen is a reduced form of nitrogen which has the potential in water to release ammonia gas and be toxic to aquatic life. This ion is not very mobile in soils. This ion normally stays attached to clay or humus soil particles. Ammonium nitrogen will normally be converted in nitrates by soil bacteria in a few weeks.

A high level of nutrients (nitrates) combined with the presence of phosphorus in water support the rapid growth of algae and aquatic plants in water. It may reduce dissolved oxygen level in water. Insufficient oxygen levels may create dead zones where fish species requiring cold and well oxygenated water could no longer live in. Nitrates can therefore contribute to the eutrophication phenomena of lakes and rivers. The closest water bodies that can be impacted by a spill are located within a kilometer of the plant site and testing is completed by Meadowbank environment regularly. No potable water wells are present at the site.

14.3 What to do in case of a spill

In case of a spill, the product must be recovered rapidly to avoid exposure to water. Protect it with tarp and build berms around it if necessary to avoid exposure to surface water and rain. Avoid any contact with a flame. The product can be recovered manually using plastic shovels or brooms and put into plastic bags or containers. A HEPA filter can also be used if desired. In case of a very large spill, the product can be recovered using a mechanical shovel or loader and put in a sealed steel (20 cubic yards) bin equipped with a cover. The bin must be clean and not contaminated by any organic material.

In low concentrations in water, nitrates will be absorbed by surrounding vegetation and will support their growth. If there are water wells nearby, there is a potential to contaminate the potable water. The drinking water standards for nitrates is 10 mg/l (as N). Therefore, prevent contaminated water to enter sanitary and surface water drains. Recovered product can be re-used if clean, recycled as a fertilizer or disposed off-site as an oxidizer to an approved waste disposal company. Do not fight fires involving ammonium nitrate because of the risks of explosion.

14.4 Maximum quantity planned during the year:

10,000,000 kg.

14.5 Location of the subtance :

In seacans at plant site (EMR)

14.6 Training required for emergency responders

- First aid
- Transportation of Dangerous Goods
- WHMIS
- Emergency Response Plan (this plan)

Emergency Response equipment

- Danger tape
- Tote bags with internal plastic liner
- Plastic shovels
- Drain cover
- Brooms
- Polyethylene tarps

Note: equipment must be readily available at the Quaatuq location.

14.7 Personnel Protective Equipment

- Reflective vests
- Safety Glasses
- Dust masks
- Plastic gloves
- Safety boots
- First aid kit

Note: equipment must be readily available at the Quaatuq site location.

15.0 TRAFFIC CONTROL

In the event of an emergency it is essential that the traffic movements to the site be limited to essential vehicles only. The control of traffic will be achieved by posting sentries at the evacuation point. The sentry shall use the company vehicles onsite so that they can stay in contact via cell phone with the Emergency Manager or Emergency Services Coordinator.

During an emergency the only vehicles that will be allowed to enter the site will be:

- Emergency Services;
- Any equipment providers which have been requested to attend to the emergency; and
- Dyno Nobel personnel that are directly involved in the response effort.

Any other entry to site will require the permission of the Emergency Manager after consultation with the Emergency Services Coordinator.

If an employee or visitor is injured and can safely be transported to the mine without incurring additional harm to the employee/worker, or posing any additional risk to the safety of the person, Dyno vehilces can be used to transport.
Where specific stabilization of an injured person is required, or where moving an injured person may result more serious injury or life threatening concerns, the injured person is to be stabilized as per first aid training and AMARUQ emergency services dispatched to site.

In the event that there is a chance of an explosion or release of toxic fumes roadblocks should be at least **1200m** from the scene.

The Mine security or local Police are the only personnel authorised to close any public roads, as a result, the need to close the road should be established early. The road would need to be closed at a distance of no less than **1200m** from the facility in order to prevent damage to vehicles or people outside the site.

16.0 PROTECTION OF VITAL ASSETS / EMERGENCY SHUTDOWN

Under no circumstance are lives to be put at unacceptable risk in order to preserve material assets or intellectual property.

To avoid knock on effects of an emergency such as escalated destruction or business disruption, consideration should be given to preserve critical company assets by shutdown or removal of equipment such as:

- Mobile Processing Units (MPU's)
- Raw Materials/Handling equipment

Materials handling equipment and energy sources should be shutdown or isolated by activating emergency stop buttons or closing valves on the following systems:

- Electrical

Isolation are clearly identified by color coded labeling. All personnel must know location and operation of these devices.

- Switches

The decision to isolate energy sources or remove assets may be made at the time of evacuation notification or post evacuation by the Emergency Manager or Supervisor. Either way, this action must not be made if it is considered that it will not delay the evacuation process or put personnel at an unacceptable level of risk in terms personal injury or health.

Energy Source / Equipment	Type of Isolation	Location
Electrical Systems & Equipment	Switch	

17.0 SEARCH AND RESCUE

Search and rescue shall be the responsibility of emergency services only as Dyno Nobel are not equipped to carry out search and rescue operations in a safe manner.

Search and rescue operations should only be conducted if it is safe to do so and if there is no potential of an explosion occurring. Very careful consideration should be made to limiting casualties.

Before attempting search and rescue, personnel must be knowledgeable of the following:

- Site layout;
- Hazardous effects from hazardous substances;
- Fumes/poisoning;
- Explosion;
- Burns;
- Use of proper PPE;
- Breathing apparatus;
- Fire extinguishers;
- Recovery gear;
- Practiced search and rescue techniques; and
- Possible casualties.

18.0 RECOVERY PLAN

The Emergency Manager has the responsibility to declare the emergency over after consultation and agreement with Local Emergency Services:

- When the damage is localised to the extent that normal operations could resume in unaffected areas;
- Work in unaffected areas will not contaminate the emergency scene and destroy causal evidence;
- Affected areas are secure with actual or potential energy sources neutralized and controlled; and
- The all clear / re-entry approval should be communicated to all personnel in consideration of any special conditions.

19.0 CLEAN UP

Environmental aspects and impacts need to be considered when dealing with chemical waste and approval for disposal of chemicals must be obtained before disposal.

20.0 RESUMPTION OF BUSINESS

The EM will carry out the following:

- Arrange for appropriate personnel to complete a risk assessment of the area and assess the impact of the emergency; and
- Provide DNA appropriate personnel with an update as soon as practicable.

In conjunction with Dyno Nobel's VP of HSEQ and VP of Operations, the Emergency Manager shall develop an action plan to ensure that:

- The site is secure and safe for all personnel;
- Pollution due to leaking storages and firewater run-off is minimised;
- Production facilities are re-established; and
- Supply contingencies are activated.

Senior Management shall be informed of any loss and they will ensure that the underwriters are informed. It is essential that all costs of recovery and increased costs due to the incident be identified.

21.0 CRISIS COMMUNICATION PLAN

The Site Media plan is only activated if the media has arrived at your site and is asking questions.

If the media is contacting you by phone, fax or email, refer them to Diana Roising, Crisis Media Advisor in Salt Lake City, cell: 801- 321 5338 or office: 801 328 6536

IF THE MEDIA HAS ARRIVED AT YOUR SITE

The First Critical Statement may be made by a trained spokesperson (generally the Manager on Site) who has received permission from a member of the DNA Crisis Management Team. ***In most cases Media contact will be referred to the General Manager, Mike Soter, or his designate.***

If permission is granted, the Supervisor of the Site should fill in the information in the First Critical Statement template

After the statement is presented to the media on site, it is important not to attempt to answer additional questions. All other information will be done at the direction of the DNA Crisis Management Team, unless otherwise directed.

If additional personnel are available, have an assistant to this spokesperson remain behind to gather business cards and write down questions while the spokesperson leaves. This person must NOT answer any questions

Fax/email a copy of the Statement to DNA Crisis Management Team member and wait for further instructions

When the Media Arrives at Your Site Say ONLY the following:

Site Media Statement

At approximately _____ am/pm on _____ we experienced

_____

_____

(Only obvious facts - No explanation - No elaboration)

This is all I can confirm at the present time. I am sure you understand that we are assessing the situation so we can provide the most accurate information.

Our company spokesperson will be in touch with you and other media representatives as soon as possible to provide more information. In the interim, we ask for your patience as we conduct our investigation.

(You are now free to turn and walk away.

(If you are asked additional questions, make the following statement:)

22.0 TRAINING

All Dyno Nobel employees will be trained to cope with an outbreak of fire in the site and MPU operation, at minimum all DNCI employees should be fully trained in the use of fire extinguishers.

All employees shall be trained in the roles they are expected to play during an emergency and/or an evacuation.

Regular evacuation and emergency drills shall be conducted in order to evaluate the effectiveness of the overall strategy and identify any deficiencies in the procedures. Emergency drills should be conducted every six months for DNCI internal drills with at least one of these involving local Emergency Service teams. Local Emergency Service providers shall be briefed on potential site emergencies by the Site Management team.

After conducting drills has a meeting shall be conducted to identify the gaps found during the emergency drill.

Training shall include:

- Fire extinguisher training;
- WHMIS;
- Transportation of Dangerous Goods,
- Emergency Response Training.

23.0 INFORMATION

Emergency procedures are posted on the Safety board. A copy of the Emergency Response Plan was provided to all employees during the Training.

Information on this Emergency Response Plan is recorded electronically on NEXUS.

APPENDIX I – BOMB THREAT

INITIAL INFORMATION:
Date :
Person receiving call:
Exact time of call:
Time of the call end:
Exact words of caller :

QUESTIONS TO ASK	
Where is the bomb?	
When is bomb going to explode?	
What does it look like?	
Did you place the bomb?	
Why?	
Where are you calling from?	
Are you an employee?	
Caller Gender : F / M	Age :

CALLER'S VOICE (circle)				
Calm	Fast	Distinct	Joker	Throat clearing
Angry	Soft	Lisp	Disguised	Deep breathing
Excited	Mocking	Nasal	Loud	Stuttering
Slow	Crying	Irregular	Deep	Mumble

LANGUAGE OF THE CALLER				
Articulate	Educated	Coarse	Irrational	Incoherent
Recorded	Message read by the author of the threat			

BACKGROUND NOISES					
Traffic	Telephone booth	House sound	Music	Motor	Dishes
Soft	Long Distance/Local call	Machinery	Static	None	Animal
Others :					

APPENDIX II – EMPLOYEE ACKNOWLEDGEMENT, REVIEW & TRAINING CERTIFICATION RECORD

Signature indicates that person has been given an opportunity to review and make comments regarding this safe work instruction and revisions. Signature indicates that person has received training about and understands the information contained in this document, related operating procedures, and requirements imposed by this program.

PRINT NAME	SIGNATURE	DATE

APPENDIX 4

MSDS FOR BULK EMULSION AND SENATEL

1. MSDS – Dyno Bulk Emulsion

2. MSDS – Senatel

Safety Data Sheet

SECTION 1 – IDENTIFICATION

Name, Address, and Telephone of the Responsible Party

Dyno Nobel Inc.
2795 East Cottonwood Parkway, Suite 500
Salt Lake City, Utah 84121
Phone: 801-364-4800 Fax 801-321-6703
E-Mail: dnna.hse@am.dynonobel.com www.dynonobel.com

SDS #: 1052
Date: 10/02/2018
Supersedes: 06/10/2016

Product Identifier
Product Form: Mixture
Product Name: Bulk Emulsion

Other Means of Identification
Synonyms:

DYNO GOLD®	TITAN® 2000
DYNO GOLD® LITE	TITAN® 2000G
EXTRAMITE 1000	TITAN® PB 1000
RUG-1 (Canada Only)	TITAN® PB 2000
TITAN® 1000	TITAN® PB 2000 HF
TITAN® 1000 GREEN	TITAN® SME 1000
TITAN® 1000G	TITAN® SME 1000 GREEN
TITAN® 1000G GREEN	TITAN® XL1000 GREEN
TITAN® XL1000	TITAN® HD
SMS 1116, 1116A, 1126P, 1136P, 1146P	TITAN® SME 2000
DX5037	TITAN® 5000
	TITAN® 5000 G

Intended Use of the Product
Industrial blasting applications as emulsion explosive precursor

Emergency Telephone Number
FOR 24 HOUR EMERGENCY, CALL CHEMTREC (USA) 800-424-9300
CANUTEC (CANADA) 613-996-6666

SECTION 2 – HAZARD(S) IDENTIFICATION

Classification of the Substance or Mixture
Classification (GHS-US)

Ox. Liq. 2	H272
Acute Tox. 4 (Oral)	H302
Skin Irrit. 2	H315
Carc. 2	H351
STOT RE 2	H373
Asp. Tox. 1	H304
Eye Irrit. 2B	H320

Label Elements
GHS-US Labeling
Hazard Pictograms (GHS-US) :



GHS03 GHS07 GHS08

Signal Word (GHS-US) : Danger

DYNO Dyno Nobel
Groundbreaking Performance

Hazard Statements (GHS-US) : H272 - May intensify fire; oxidizer
H302 - Harmful if swallowed
H304 – May be fatal if swallowed and enters airways
H315 - Causes skin irritation
H320 – Causes eye irritation
H351 - Suspected of causing cancer
H373 - May cause damage to organs through prolonged or repeated exposure

Precautionary Statements (GHS-US) : P201 - Obtain special instructions before use
P202 - Do not handle until all safety precautions have been read and understood
P210 - Keep away from heat, hot surfaces, open flames, sparks. - No smoking
P220 - Keep/Store away from clothing, combustible materials, combustibles
P221 - Take any precaution to avoid mixing with combustible materials, clothing, combustibles
P233 - Keep container tightly closed
P260 - Do not breathe dust, fume, mist, spray, vapors
P264 - Wash exposed areas thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P273 - Avoid release to the environment
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
P302+P352 - IF ON SKIN: Wash with plenty of soap and water
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P308+P313 - If exposed or concerned: Get medical advice/attention
P332+P313 - If skin irritation occurs: Get medical advice/attention
P362 - Take off contaminated clothing and wash before reuse
P370+P378 - In case of fire: Use appropriate media to extinguish
P403+P235 - Store in a well-ventilated place. Keep cool
P405 - Store locked up
P501 - Dispose of contents/container according to local, regional, national, and international regulations

Other Hazards

Hazards Not Otherwise Classified (HNOC): Not available

Other Hazards: Exposure may aggravate those with pre-existing eye, skin, or respiratory conditions.

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

Mixture

Name	Product identifier	% (w/w)	Ingredient Classification (GHS-US)
Ammonium nitrate	(CAS No) 6484-52-2	45 - 80	Ox. Sol. 3, H272 Eye Irrit. 2A, H319
Calcium nitrate	(CAS No) 10124-37-5	0.1 - 35	Ox. Sol. 3, H272 Acute Tox. 4 (Oral), H302 Eye Dam. 1, H318
Sodium nitrate	(CAS No) 7631-99-4	0.1 - 18	Ox. Sol. 3, H272

			Acute Tox. 4 (Oral), H302 Eye Irrit. 2A, H319
*Methylamine nitrate	(CAS No) 22113-87-7	0.1 – 3	Expl. 1.5, H205 Skin Corr. 1A, H314 Eye Dam. 1 – H318
**Fuels, diesel, no. 2	(CAS No) 68476-34-6	0.1 - 10	Flam. Liq. 4, H227 Acute Tox. 4 (Inhalation), H332 Skin Irrit. 2, H315 Carc. 2, H351 STOT RE 2, H373 Asp. Tox. 1, H304
Distillates, petroleum, chemically neutralized light naphthenic	(CAS No) 64742-35-4	0.1 - 6	Asp. Tox. 1, H304

* This ingredient is not used in most products, including in GREEN-named products.
** This ingredient is not used in GREEN-named products.
Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations or are present in deminimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).
Full text of H-phrases: see section 16

SECTION 4 - FIRST AID MEASURES

Description of First Aid Measures

General: Never give anything orally to an unconscious person. If you feel unwell, seek medical advice (provide this Safety Data Sheet to medical personnel).

Inhalation: If symptoms occur, go into fresh air and ventilate suspected area. Seek medical attention.

Skin Contact: Remove contaminated clothing. Wash with soap and water followed by rinsing with water. Seek medical attention if irritation develops or persists. Wash contaminated clothing before reuse.

Eye Contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing for at least 15 minutes. Obtain medical attention if irritation develops or persists.

Ingestion: Rinse mouth. Do NOT induce vomiting. Seek medical attention immediately.

Most Important Symptoms and Effects Both Acute and Delayed

General: May be harmful if swallowed. May cause eye or skin irritation.

Inhalation: May cause respiratory irritation.

Skin Contact: May cause skin irritation.

Eye Contact: May cause eye irritation.

Ingestion: Likely to be harmful if swallowed.

Chronic Symptoms: Contains an ingredient which may cause cancer. Causes damage to organs through prolonged or repeated exposure.

Indication of Any Immediate Medical Attention and Special Treatment Needed

If symptoms occur, seek medical attention.

SECTION 5 - FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media: Do not attempt to fight fires involving explosive materials or emulsion explosive precursors. Evacuate all personnel to a predetermined safe location, no less than 1/2 mile (800 meters) in all directions.

Unusual Fire and Explosion Hazards: May explode or detonate under fire conditions. Burning material may produce toxic vapors.

Unsuitable Extinguishing Media: Not available

Special Hazards Arising from the Substance or Mixture

In large, intense fires the emulsion can behave more like an explosive and detonate from confinement or strong shocks. Evacuation of at least 1 mile is recommended if a largeamount of emulsion is involved in a large fire.

Fire Hazard: May intensify fire; oxidizer. Will burn if exposed to heat, and in addition, will accelerate the burning of other combustibles, resulting in more rapid spread of fire.
Explosion Hazard: Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries. May explode when subjected to fire, supersonic shock or high-energy projectile impact, especially when confined or in large quantities.
Reactivity: May cause or intensify fire; oxidizer. May accelerate the burning of other combustible materials.
Advice for Firefighters
Precautionary Measures Fire: DO NOT ATTEMPT TO FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS. Evacuate all personnel to a predetermined safe location, no less than 1/2 mile (800 meters) in all directions. Can explode or detonate under fire conditions. Burning material may produce toxic vapors.

Firefighting Instructions: DO NOT ATTEMPT TO FIGHT FIRE. Immediately evacuate all personnel from the area to a safe distance. Guard against re-entry. Thermal decomposition can lead to release of irritating gases and vapors.
Protection During Firefighting: When controlling fire before involvement of explosives or explosive precursors, fire-fighters should wear positive pressure self-containing breathing apparatus (SCBA) and full turnout gear.
Hazardous Combustion Products: Nitrogen oxides. Carbon oxides (CO, CO_2). Ammonia.
Other information: Do not attempt to fight fires involving explosive materials or emulsion explosive precursors. Evacuate all personnel to a predetermined safe location, no less than 1/2 mile (800 meters) in all directions.
Reference to Other Sections: Refer to section 9 for flammability properties.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures
General Measures: Avoid all contact with skin, eyes, or clothing. Avoid breathing dust, mist, or spray. Keep away from heat/sparks/open flames/hot surfaces. No smoking. Eliminate every possible source of ignition. Evacuate danger area.
For Non-Emergency Personnel
Protective Equipment: Use appropriate personal protection equipment (PPE).
Emergency Procedures: Evacuate unnecessary personnel.
For Emergency Personnel
Protective Equipment: Use appropriate personal protection equipment (PPE).
Emergency Procedures: Ventilate area.

Environmental Precautions
Prevent entry to sewers and public waters.

Methods and Material for Containment and Cleaning Up
For Containment: Contain any spills with dikes as necessary to prevent migration and entry into sewers or streams. Do not take up in combustible material such as: saw dust or cellulosic material.
Methods for Cleaning Up: Collect spillage for possible reuse. Clean up spills immediately and dispose of waste in accordance with appropriate state, federal and local regulations.
Reference to Other Sections
See heading 8, Exposure Controls and Personal Protection

SECTION 7 - HANDLING AND STORAGE

Precautions for Safe Handling
It is recommended that users of explosives material be familiar with the Institute of Makers of Explosives Safety Library publications.
Additional Hazards When Processed: When heated to decomposition, emits toxic fumes. Do not puncture or incinerate containers.
Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work.
Conditions for Safe Storage, Including Any Incompatibilities

Storage Conditions: Store in a dry, cool and well-ventilated place. Keep container closed when not in use. Keep /store away from combustible materials, extremely high or low temperatures, direct sunlight, ignition sources, incompatible materials.
Incompatible Materials: Corrosives, strong acids, strong bases and alkalis.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

Occupational Exposure Limits

Ingredients:	Product identifier:	ACGIH TLV-TWA	OSHA PEL-TWA
Ammonium nitrate	(CAS No) 6484-52-2	None	None
Sodium nitrate	(CAS No) 7631-99-4	None	None
Calcium nitrate	(CAS No) 10124-37-5	None	None
Methylamine nitrate	(CAS No) 22113-87-7	None	None
Fuels, diesel, no. 2	(CAS No) 68476-34-6	100 ppm	None
Distillates, petroleum, chemically neutralized light naphthenic	(CAS No) 64742-35-4	5 mg/m^3 (mist)	None

Exposure Controls
Under normal conditions of use, over-exposure is not expected to occur.
Appropriate Engineering Controls: Ensure all national/local regulations are observed. Ensure adequate ventilation, especially in confined areas. Keep containers tightly sealed.
Personal Protective Equipment: Protective goggles. Gloves. Protective clothing.



Materials for Protective Clothing: Chemically resistant materials and fabrics.
Hand Protection: Wear chemically resistant protective gloves.
Eye Protection: Chemical goggles or face shield.
Skin and Body Protection: Not available.
Respiratory Protection: Use NIOSH-approved air-purifying or supplied-air respirator where airborne concentrations of vapor or mist are expected to exceed exposure limits. Under normal conditions of use and handling there is minimal likelihood for the this exposure limit to be reached.
Other Information: When using or handling, do not eat, drink or smoke.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

Physical State	:	Liquid
Appearance	:	Translucent to opaque viscous liquid.
Odor	:	Fuel
Odor Threshold	:	Not available
pH	:	Not available
Relative Evaporation Rate (butylacetate=1)	:	< 1
Melting Point	:	Not available
Freezing Point	:	Not available
Boiling Point	:	Not available
Flash Point	:	Not available
Auto-ignition Temperature	:	Not available

DYNO
Dyno Nobel
Groundbreaking Performance

Decomposition Temperature	:	Not available
Flammability (solid, gas)	:	Not available
Lower Flammable Limit	:	Not available
Upper Flammable Limit	:	Not available
Vapor Pressure	:	Not available
Relative Vapor Density at 20 °C	:	Not available
Relative Density	:	Not available
Specific Gravity	:	0.8 - 1.5 g/cc
Solubility	:	Water: Nitrate salts are completely soluble, but emulsion dissolution is very slow.
Partition coefficient: n-octanol/water	:	Not available
Viscosity	:	Not available
Explosion Data – Sensitivity to Mechanical Impact	:	Not sensitive to mechanical impact. May be sensitive to supersonic explosively driven projectile impacts.
Explosion Data – Sensitivity to Static Discharge	:	Not sensitive to static discharge.

SECTION 10 - STABILITY AND REACTIVITY

Reactivity: May cause or intensify fire. May accelerate the burning of other combustible materials.

Chemical Stability: May intensify fire. May explode when subjected to fire, supersonic shock or high-energy projectile impact, especially when confined or in large quantities.

Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

Conditions to Avoid: Direct sunlight. Extremely high temperatures. Heat. Sparks. Overheating. Open flame. Combustible materials. Sources of ignition. Incompatible materials.

Incompatible Materials: Corrosives, strong acids, strong bases and alkalis.

Hazardous Decomposition Products: Does not decompose when used and stored as recommended. Thermal decomposition or combustion products may include the following substances: Nitrogen oxides. Toxic vapors. Ammonia. Carbon monoxide.

SECTION 11 - TOXICOLOGICAL INFORMATION

Under normal conditions of use, over-exposure is not expected to occur. Minor skin exposure is most likely.

Information on Toxicological Effects - Product

Acute Toxicity: Harmful if swallowed.

LD50 and LC50 Data: ATE Oral 1,510 (mg/kg)

Skin Corrosion/Irritation: Causes skin irritation.

Serious Eye Damage/Irritation: May cause eye irritation

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: Not classified

Teratogenicity: Not available

Carcinogenicity: Contains a substance which has been shown to cause cancer in laboratory animals. IARC Group 2A Probably carcinogenic to humans.

Specific Target Organ Toxicity (Repeated Exposure): May cause damage to organs through prolonged or repeated exposure.

Reproductive Toxicity: Not classified
Specific Target Organ Toxicity (Single Exposure): Not classified
Aspiration Hazard: May be fatal if swallowed and enters airways.
Symptoms/Injuries After Inhalation: May cause respiratory irritation.
Symptoms/Injuries After Skin Contact: May cause skin irritation.
Symptoms/Injuries After Eye Contact: May cause eye irritation.
Symptoms/Injuries After Ingestion: May be harmful if swallowed. May be harmful if swallowed and enters airways. Aspiration into the lungs can occur during ingestion or vomiting and may cause lung injury.
Chronic Symptoms: May cause cancer. May cause damage to organs through prolonged or repeated exposure.
Information on Toxicological Effects - Ingredient(s)
LD50 and LC50 Data:

Ammonium nitrate (6484-52-2)	
LD50 Oral Rat	2217 mg/kg (REACH dossier 2950 mg/kg)
LC50 Inhalation Rat	> 88.8 mg/l/4h
ATE CLP (oral)	2217.000 mg/kg body weight

Sodium nitrate (7631-99-4)	
LD50 Oral Rat	1267 mg/kg (REACH dossier 3430 mg/kg)
ATE CLP (oral)	1267.000 mg/kg body weight

Fuels, diesel, no. 2 (68476-34-6)	
ATE CLP (vapors)	11.000 mg/l/4h

Distillates, petroleum, chemically neutralized light naphthenic (64742-35-4)	
LD50 Oral Rat	> 5000 mg/kg
LD50 Dermal Rabbit	> 2000 mg/kg

SECTION 12: ECOLOGICAL INFORMATION

Toxicity Harmful to aquatic life with long lasting effects.

Ammonium nitrate (6484-52-2)	
LC50 Fish 1	95-102 mg/l (Exposure time: 48 h - Cyprinus carpio (Common carp))
EC 50 Aquatic Invertebrates	490 mg/l (Exposure time 48 h - Daphnia magna)

Sodium nitrate (7631-99-4)	
LC50 Fish 1	2000 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static])
LC 50 Fish 2	994.4 - 1107 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [static])

Fuels, diesel, no. 2 (68476-34-6)	
LC50 Fish 1	35 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])

Calcium nitrate (10124-37-5)	
LC50 Fish 1	10000 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static])

Persistence and Degradability

Bulk Emulsion	
Persistence and Degradability	Not established.

Sodium nitrate (7631-99-4)	
Persistence and Degradability	**Readily biodegradable in water.**

DYNO Dyno Nobel
Groundbreaking Performance

Bioaccumulative Potential	
Bulk Emulsion	
Bioaccumulative Potential	Not established.
Ammonium nitrate (6484-52-2)	
BCF fish 1	(no bioaccumulation expected)
Log Pow	-3.1 (at 25 °C)
Sodium nitrate (7631-99-4)	
Log Pow	-3.8 (at 25 °C)
Bioaccumulative Potential	Not expected to bioaccumulate.

Mobility in Soil Not available
Other Adverse Effects
Other Information: Avoid release to the environment.

SECTION 13 – DISPOSAL CONSIDERATIONS

Waste Treatment Methods: Contact manufacturer for advice on proper disposal methods.
Waste Disposal Recommendations: Collect spillage for possible reuse. Dispose of waste material in accordance with all local, regional, national, provincial, territorial and international regulations.
Additional Information: Clean up even minor leaks or spills if possible without unnecessary risk.

SECTION 14 - TRANSPORT INFORMATION

14.1 In Accordance with DOT

Proper Shipping Name : AMMONIUM NITRATE EMULSION
Hazard Class : 5.1
Identification Number : UN3375
Label Codes : 5.1



Packing Group : II
ERG Number : 140

14.2 In Accordance with IMDG

Proper Shipping Name : AMMONIUM NITRATE EMULSION
Hazard Class : 5.1
Identification Number : UN3375
Packing Group : II
Label Codes : 5.1
EmS-No. (Fire) : F-H
EmS-No. (Spillage) : S-Q



14.3 In Accordance with IATA

Proper Shipping Name : AMMONIUM NITRATE EMULSION
Identification Number : UN3375
Hazard Class : 5
Label Codes : 5.1



ERG Code (IATA) : 5L

14.4 In Accordance with TDG

No UN number exists for blasting intermediates for Transport Canada (use the following for Canadian shipments)
Proper Shipping Name : EXPLOSIVE, BLASTING, TYPE E
Packing Group : II
Hazard Class : 1.5D
Identification Number : UN0332

DYNO
Dyno Nobel
Groundbreaking Performance

Label Codes	: 1.5D	

SECTION 15 - REGULATORY INFORMATION

US Federal Regulations

Bulk Emulsion

SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard Reactive hazard Delayed (chronic) health hazard Fire hazard

Ammonium nitrate (6484-52-2)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Sodium nitrate (7631-99-4)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Fuels, diesel, no. 2 (68476-34-6)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Calcium nitrate (10124-37-5)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Distillates, petroleum, chemically neutralized light naphthenic (64742-35-4)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

US State Regulations

Ammonium nitrate (6484-52-2)

U.S. – California – Air Toxics “Hot Spots” (A-I)
U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
U.S. - Pennsylvania - RTK (Right to Know) List
U.S. – Rhode Island – RTK (Right to Know) List

Sodium nitrate (7631-99-4)

U.S. - Massachusetts - Right To Know List
U.S. - Pennsylvania - RTK (Right to Know) List
U.S. – Rhode Island – RTK (Right to Know) List

Fuels, diesel, no. 2 (68476-34-6)

U.S. - New Jersey - Right to Know Hazardous Substance List

Calcium nitrate (10124-37-5)

U.S. - New Jersey - Right to Know Hazardous Substance List

Canadian Regulations

Bulk Emulsion

WHMIS Classification	**Note: Explosives are not regulated under WHMIS. They are subject to the regulations of the Explosives Act of Canada.**

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all of the information required by CPR.

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Revision date	:	10/02/2018
Other Information	:	This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

GHS Full Text Phrases:

Acute Tox. 4 (Inhalation)	Acute toxicity (inhalation) Category 4
Acute Tox. 4 (Oral)	Acute toxicity (oral) Category 4
Asp. Tox. 1	Aspiration hazard Category 1
Carc. 2	Carcinogenicity Category 2
Eye Dam. 1	Serious eye damage/eye irritation Category 1
Eye Irrit. 2A	Serious eye damage/eye irritation Category 2A
Flam. Liq. 3	Flammable liquids Category 3
Ox. Liq. 2	Oxidizing liquids Category 2
Ox. Sol. 3	Oxidizing solids Category 3
Skin Irrit. 2	Skin corrosion/irritation Category 2
STOT RE 2	Specific target organ toxicity (repeated exposure) Category 2
H205	May mass explode in fire
H227	Combustible liquid
H272	May intensify fire; oxidizer
H302	Harmful if swallowed
H304	May be fatal if swallowed and enters airways
H314	Causes severe skin burns and eye damage
H315	Causes skin irritation
H318	Causes serious eye damage
H319	Causes serious eye irritation
H332	Harmful if inhaled
H351	Suspected of causing cancer
H373	May cause damage to organs through prolonged or repeated exposure
H373	May cause damage to organs (Thymus, Liver, bone marrow) through prolonged or repeated exposure

Party Responsible for the Preparation of This Document

Dyno Nobel Inc.
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Salt Lake City, Utah 84121
Phone: 801-364-4800

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Dyno Nobel SDS

Safety Data Sheet

SECTION 1 – IDENTIFICATION

Name, Address, and Telephone of the Responsible Party

Dyno Nobel Inc.
6440 S. Millrock Drive, Suite 150
Salt Lake City, Utah 84121
Phone: 801-364-4800 Fax 801-321-6703
E-Mail: dnna.hse@am.dynonobel.com www.dynonobel.com

SDS #: 1062
Date: 07/20/2020
Supersedes: 11/01/2018

Product Identifier
Product Form: Mixture
Product Name: Bulk Emulsion Explosive

Other Means of Identification
Synonyms:

DYNO® RU	TITAN® 2000 LD
DYNO® RU Alaska	TITAN® 2000 SD
DYNO® RU SX	TITAN® PB 2000 LD
DYNO® RU Uphole	TITAN® PB 2000 SD
EXTRAMITE 2000	TITAN® 7000 RU
FRAGMITE	TITAN® 7000 RU-A
TITAN® 1000 LD-E2	TITAN® 7000 RU-SX
TITAN® 1000 LD	TITAN® 5000 LD
TITAN® 1000 LD GREEN	TITAN® 7000
TITAN® 1000 SD	TITAN® 7000 A
TITAN® 1000 SD GREEN	TITAN® 7000 SX
TITAN® PB 1000 LD	DX5103
TITAN® PB 1000 SD	DX5108

Intended Use of the Product
Industrial applications

Emergency Telephone Number
FOR 24 HOUR EMERGENCY, CALL CHEMTREC (USA) 800-424-9300
CANUTEC (CANADA) 613-996-6666

SECTION 2 – HAZARD(S) IDENTIFICATION

Classification of the Substance or Mixture
Classification (GHS-US)

Expl. 1.5	H205
Acute Tox. 4 (Oral)	H302
Skin Irrit. 2	H315
Eye Irrit. 2B	H320
Carc. 2	H351
STOT RE 2	H373
Asp. Tox. 1	H304

Label Elements
GHS-US Labeling
Hazard Pictograms (GHS-US) :


GHS07 GHS08

Signal Word (GHS-US) : Danger
Hazard Statements (GHS-US) : H205 - May mass explode in fire
H302 - Harmful if swallowed

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H304 - May be fatal if swallowed and enters airways
H315 - Causes skin irritation
H320 - Causes eye irritation
H351 - Suspected of causing cancer
H373 - May cause damage to organs through prolonged or repeated exposure

Precautionary Statements (GHS-US) : P201 - Obtain special instructions before use
P202 - Do not handle until all safety precautions have been read and understood
P210 - Keep away from heat, hot surfaces, open flames, sparks. - No smoking
P220 - Keep/Store away from clothing, combustible materials, combustibles
P221 - Take any precaution to avoid mixing with combustible materials, clothing, combustibles
P233 - Keep container tightly closed
P260 - Do not breathe dust, fume, mist, spray, vapors
P264 - Wash exposed areas thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P273 - Avoid release to the environment
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
P302+P352 - IF ON SKIN: Wash with plenty of soap and water
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P370+P380 - In case of fire: Evacuate area
P372 - Explosion risk in case of fire
P373 - DO NOT fight fire when fire reaches explosives
P401 - Store local, regional, national, and international regulations
P403+P235 - Store in a well-ventilated place. Keep cool
P405 - Store locked up
P501 - Dispose of contents/container according to local, regional, national, and international regulations

Other Hazards

Hazards Not Otherwise Classified (HNOC): Not available

Other Hazards: Exposure may aggravate those with pre-existing eye, skin, or respiratory conditions.

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

Mixture

Name	Product identifier	% (w/w)	Ingredient Classification (GHS-US)
Ammonium nitrate	(CAS No) 6484-52-2	30 - 80	Ox. Sol. 3, H272 Eye Irrit. 2A, H319
Calcium nitrate	(CAS No) 10124-37-5	0.1 - 35	Ox. Sol. 3, H272 Acute Tox. 4 (Oral), H302 Eye Dam. 1, H318
Sodium nitrate	(CAS No) 7631-99-4	0.1 - 18	Ox. Sol. 3, H272 Acute Tox. 4 (Oral), H302 Eye Irrit. 2A, H319
*Fuels, diesel, no. 2	(CAS No) 68476-34-6	0.1 - 8	Flam. Liq. 3, H226 Acute Tox. 4 (Inhalation), H332

			Skin Irrit. 2, H315 Carc. 2, H351 STOT RE 2, H373 Asp. Tox. 1, H304
Distillates, petroleum, chemically neutralized light naphthenic	(CAS No) 64742-35-4	0.1 - 6	Asp. Tox. 1, H304

* This ingredient is not used in GREEN-named products.
Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations, or are present in deminimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).

Full text of H-phrases: see section 16

SECTION 4 - FIRST AID MEASURES

Description of First Aid Measures

General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

Inhalation: If symptoms occur, go into fresh air and ventilate suspected area. Seek medical attention.

Skin Contact: Remove contaminated clothing. Wash with soap and water followed by rinsing with water. Seek medical attention if irritation develops or persists. Wash contaminated clothing before reuse.

Eye Contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if irritation develops or persists.

Ingestion: Rinse mouth. Do NOT induce vomiting. Seek medical attention immediately.

Most Important Symptoms and Effects Both Acute and Delayed

General: May be harmful if swallowed. Causes serious eye damage. Skin irritation.

Inhalation: May cause respiratory irritation.

Skin Contact: May cause skin irritation.

Eye Contact: Causes eye irritation.

Ingestion: May be harmful if swallowed. May be harmful if swallowed and enters airways.

Chronic Symptoms: Contains an ingredient that may cause cancer. Causes damage to organs through prolonged or repeated exposure.

Indication of Any Immediate Medical Attention and Special Treatment Needed

If symptoms occur, seek medical attention.

SECTION 5 - FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media: DO NOT FIGHT FIRES INVOLVING EXPLOSIVES.

Unsuitable Extinguishing Media: Not available

Special Hazards Arising from the Substance or Mixture

Fire Hazard: In case of fire involving explosives: Evacuate area. DO NOT fight fires involving explosives. Consult the most current Emergency Response Guidebook (ERG), Guide 112 for additional information. Extreme risk of explosion from shock, friction, fire or other sources of ignition.

Explosion Hazard: Extreme risk of explosion by shock, friction, fire, impact, heat or other sources of ignition.

Reactivity: Accelerates the rate of burning materials.

Advice for Firefighters

Precautionary Measures Fire: DO NOT ATTEMPT TO FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS. Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions. Can explode or detonate under fire conditions. Burning material may produce toxic vapors. It is recommended that users of explosives material be familiar with the Institute of Makers of Explosives Safety Library publications.

Hazardous Combustion Products: Nitrogen oxides. Carbon oxides (CO, CO_2). Ammonia.

Other information: Do not attempt to fight fires involving explosive materials. Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions.

Reference to Other Sections: Refer to section 9 for flammability properties.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures
General Measures: Evacuate all non-essential personnel from immediate area and establish a "regulated zone" with site control and security.
For Non-Emergency Personnel
Protective Equipment: Use appropriate personal protection equipment (PPE).
Emergency Procedures: Evacuate unnecessary personnel.
For Emergency Personnel
Protective Equipment: Use appropriate personal protection equipment (PPE).
Emergency Procedures: Ventilate area.

Environmental Precautions
Prevent entry to sewers and public waters.

Methods and Material for Containment and Cleaning Up
For Containment: Contain any spills with dikes as necessary to prevent migration and entry into sewers or streams. Do not take up in combustible material such as: saw dust or cellulosic material.
Methods for Cleaning Up: Collect spillage for possible reuse. Clean up spills immediately and dispose of waste in accordance with appropriate State, Federal and local regulations.
Reference to Other Sections
See heading 8, Exposure Controls and Personal Protection

SECTION 7 - HANDLING AND STORAGE

Precautions for Safe Handling: It is recommended that users of explosives material be familiar with the Institute of Makers of Explosives Safety Library publications.
Additional Hazards When Processed: When heated to decomposition, emits toxic fumes. Do not puncture or incinerate container.
Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work.
Conditions for Safe Storage, Including Any Incompatibilities
Storage Conditions: Store in a dry, cool and well-ventilated place. Keep container closed when not in use. Keep/Store away from combustible materials, extremely high temperatures, direct sunlight, ignition sources, incompatible materials.
Incompatible Materials: Corrosives, strong acids, strong bases and alkalis.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

Fuels, diesel, no. 2 (68476-34-6)

USA ACGIH	ACGIH TWA (mg/m³)	100 mg/m³
Alberta	OEL TWA (mg/m³)	100 mg/m³
British Columbia	OEL TWA (mg/m³)	100 mg/m³
Manitoba	OEL TWA (mg/m³)	100 mg/m³
Newfoundland & Labrador	OEL TWA (mg/m³)	100 mg/m³
Nova Scotia	OEL TWA (mg/m³)	100 mg/m³
Ontario	OEL TWA (mg/m³)	100 mg/m³
Prince Edward Island	OEL TWA (mg/m³)	100 mg/m³
Saskatchewan	OEL STEL (mg/m³)	150 mg/m³
Saskatchewan	OEL TWA (mg/m³)	100 mg/m³

Exposure Controls
Appropriate Engineering Controls: Ensure all national/local regulations are observed. Ensure adequate ventilation,

especially in confined areas.
Personal Protective Equipment: Protective goggles. Gloves. Insufficient ventilation: wear respiratory protection. Protective clothing.



Materials for Protective Clothing: Chemically resistant materials and fabrics.
Hand Protection: Wear chemically resistant protective gloves.
Eye Protection: Chemical goggles or face shield.
Skin and Body Protection: Not available
Respiratory Protection: Use NIOSH-approved air-purifying or supplied-air respirator where airborne concentrations of vapor or mist are expected to exceed exposure limits.
Other Information: When using, do not eat, drink or smoke.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

Physical State	:	Liquid
Appearance	:	White, yellow or pink opaque viscous liquid.
Odor	:	Slight fuel oil odor.
Odor Threshold	:	Not available
pH	:	Not available
Relative Evaporation Rate (butylacetate=1)	:	< 1
Melting Point	:	Not available
Freezing Point	:	Not available
Boiling Point	:	Not available
Flash Point	:	Not available
Auto-ignition Temperature	:	Not available
Decomposition Temperature	:	Not available
Flammability (solid, gas)	:	Not available
Lower Flammable Limit	:	Not available
Upper Flammable Limit	:	Not available
Vapor Pressure	:	Not available
Relative Vapor Density at 20 °C	:	Not available
Relative Density	:	Not available
Specific Gravity	:	1.00 - 1.45 g/cc
Solubility	:	Water: Nitrate salts are completely soluble, but emulsion dissolution is very slow.
Partition coefficient: n-octanol/water	:	Not available
Viscosity	:	Not available
Explosion Data – Sensitivity to Mechanical Impact	:	Not sensitive to mechanical impact. May be sensitive to supersonic explosively driven projectile impacts.
Explosion Data – Sensitivity to Static Discharge	:	Not sensitive to static discharge.

SECTION 10 - STABILITY AND REACTIVITY

Reactivity: Accelerates the rate of burning materials. Oxidizer. May react violently with strong acids, strong oxidizing and reducing agents.

Chemical Stability: May intensify fire; oxidizer. May explode when subjected to fire, supersonic shock or high-energy projectile impact, especially when confined or in large quantities.

Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

Conditions to Avoid: Direct sunlight. Extremely high temperatures. Heat. Sparks. Overheating. Open flame. Combustible materials. Sources of ignition. Incompatible materials.

Incompatible Materials: Corrosives, strong acids, strong bases and alkalis.

Hazardous Decomposition Products: Nitrogen oxides. Toxic vapors. Ammonia. Carbon monoxide.

SECTION 11 - TOXICOLOGICAL INFORMATION

Information on Toxicological Effects - Product

Acute Toxicity: Harmful if swallowed.

LD50 and LC50 Data: Not available

Skin Corrosion/Irritation: Not classified

Serious Eye Damage/Irritation: Causes serious eye irritation.

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: Not classified

Teratogenicity: Not available

Carcinogenicity: Contains an ingredient suspected of causing cancer.

Specific Target Organ Toxicity (Repeated Exposure): May cause damage to organs through prolonged or repeated exposure.

Reproductive Toxicity: Not classified

Specific Target Organ Toxicity (Single Exposure): Not classified

Aspiration Hazard: May be fatal if swallowed and enters airways.

Symptoms/Injuries After Inhalation: May cause respiratory irritation.

Symptoms/Injuries After Skin Contact: May cause skin irritation.

Symptoms/Injuries After Eye Contact: Causes eye irritation.

Symptoms/Injuries After Ingestion: May be harmful if swallowed. May be harmful if swallowed and enters airways. Aspiration into the lungs can occur during ingestion or vomiting and may cause lung injury.

Chronic Symptoms: Contains an ingredient that may cause cancer. Causes damage to organs through prolonged or repeated exposure.

Information on Toxicological Effects - Ingredient(s)

LD50 and LC50 Data:

Ammonium nitrate (6484-52-2)	
LD50 Oral Rat	2217 mg/kg
LC50 Inhalation Rat	> 88.8 mg/l/4h
ATE CLP (oral)	2217.000 mg/kg body weight

Sodium nitrate (7631-99-4)	
LD50 Oral Rat	1267 mg/kg
ATE CLP (oral)	1267.000 mg/kg body weight

Fuels, diesel, no. 2 (68476-34-6)	
ATE CLP (vapors)	11.000 mg/l/4h

Distillates, petroleum, chemically neutralized light naphthenic (64742-35-4)	
LD50 Oral Rat	> 5000 mg/kg
LD50 Dermal Rabbit	> 2000 mg/kg

SECTION 12: ECOLOGICAL INFORMATION

Toxicity Not classified

Sodium nitrate (7631-99-4)	
LC50 Fish 1	2000 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static])
LC 50 Fish 2	994.4 - 1107 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [static])

Calcium nitrate (10124-37-5)	
LC50 Fish 1	10000 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static])

Fuels, diesel, no. 2 (68476-34-6)	
LC50 Fish 1	35 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])

Persistence and Degradability

Bulk Emulsion	
Persistence and Degradability	Not established.

Sodium nitrate (7631-99-4)	
Persistence and Degradability	**Readily biodegradable in water.**

Bioaccumulative Potential

Bulk Emulsion	
Bioaccumulative Potential	Not established.

Ammonium nitrate (6484-52-2)	
BCF fish 1	(no bioaccumulation expected)
Log Pow	-3.1 (at 25 °C)

Sodium nitrate (7631-99-4)	
Log Pow	-3.8 (at 25 °C)
Bioaccumulative Potential	Not expected to bioaccumulate.

Mobility in Soil Not available

Other Adverse Effects

Other Information: Avoid release to the environment.

SECTION 13 – DISPOSAL CONSIDERATIONS

Waste Treatment Methods: Contact manufacturer for advice on proper disposal methods.

Waste Disposal Recommendations: Collect spillage for possible reuse. Dispose of waste material in accordance with all local, regional, national, provincial, territorial and international regulations.

Additional Information: Clean up even minor leaks or spills if possible without unnecessary risk.

SECTION 14 - TRANSPORT INFORMATION

14.1 In Accordance with DOT

Proper Shipping Name : EXPLOSIVE, BLASTING, TYPE Eor Agent blasting, Type E
Hazard Class : 1.5D
Identification Number : UN0332
Label Codes : 1.5D



Packing Group : II
ERG Number : 140

14.2 In Accordance with IMDG

Proper Shipping Name : EXPLOSIVE, BLASTING, TYPE E (AGENT, BLASTING, TYPE E)
Hazard Class : 1.5D
Identification Number : UN0332
Label Codes : 1.5D
EmS-No. (Fire) : F-B
EmS-No. (Spillage) : S-Y



14.3 In Accordance with IATA

Proper Shipping Name	:	AGENT, BLASTING TYPE E
Identification Number	:	UN0332
Hazard Class	:	1
Label Codes	:	1.5D
ERG Code (IATA)	:	1L



14.4 In Accordance with TDG

Proper Shipping Name	:	EXPLOSIVE, BLASTING, TYPE E
Packing Group	:	II
Hazard Class	:	1.5D
Identification Number	:	UN0332
Label Codes	:	1.5D



SECTION 15 - REGULATORY INFORMATION

US Federal Regulations

Bulk Emulsion

SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard Reactive hazard Delayed (chronic) health hazard Fire hazard

Ammonium nitrate (6484-52-2)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Sodium nitrate (7631-99-4)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Calcium nitrate (10124-37-5)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Fuels, diesel, no. 2 (68476-34-6)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Distillates, petroleum, chemically neutralized light naphthenic (64742-35-4)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

US State Regulations

Ammonium nitrate (6484-52-2)

U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
U.S. - Pennsylvania - RTK (Right to Know) List

Sodium nitrate (7631-99-4)

U.S. - Massachusetts - Right To Know List
U.S. - Pennsylvania - RTK (Right to Know) List

Calcium nitrate (10124-37-5)

U.S. - New Jersey - Right to Know Hazardous Substance List

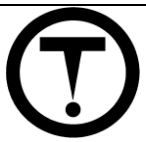
Fuels, diesel, no. 2 (68476-34-6)

U.S. - New Jersey - Right to Know Hazardous Substance List

Canadian Regulations

Bulk Emulsion

WHMIS Classification	Class C - Oxidizing Material Class D Division 2 Subdivision B - Toxic material causing other toxic effects

Ammonium nitrate (6484-52-2)	
Listed on the Canadian DSL (Domestic Substances List) inventory.	
WHMIS Classification	Class C - Oxidizing Material Class D Division 2 Subdivision B - Toxic material causing other toxic effects

Sodium nitrate (7631-99-4)	
Listed on the Canadian DSL (Domestic Substances List) inventory. Listed on the Canadian Ingredient Disclosure List	
WHMIS Classification	Class C - Oxidizing Material Class D Division 2 Subdivision B - Toxic material causing other toxic effects

Calcium nitrate (10124-37-5)
Listed on the Canadian DSL (Domestic Substances List) inventory.

Fuels, diesel, no. 2 (68476-34-6)
Listed on the Canadian DSL (Domestic Substances List) inventory.

Distillates, petroleum, chemically neutralized light naphthenic (64742-35-4)
Listed on the Canadian DSL (Domestic Substances List) inventory.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all of the information required by CPR.

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Revision date : 07/20/2020

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

GHS Full Text Phrases:

Acute Tox. 4 (Inhalation)	Acute toxicity (inhalation) Category 4
Acute Tox. 4 (Oral)	Acute toxicity (oral) Category 4
Asp. Tox. 1	Aspiration hazard Category 1
Carc. 2	Carcinogenicity Category 2
Expl. 1.5	Explosive Category 1.5
Eye Dam. 1	Serious eye damage/eye irritation Category 1
Eye Irrit. 2A	Serious eye damage/eye irritation Category 2A
Skin Corr. 1A	Skin corrosion/irritation Category 1A
Skin Irrit. 2	Skin corrosion/irritation Category 2
STOT RE 2	Specific target organ toxicity (repeated exposure) Category 2
H205	May mass explode in fire
H302	Harmful if swallowed
H304	May be fatal if swallowed and enters airways
H315	Causes skin irritation
H320	Causes eye irritation
H332	Harmful if inhaled
H351	Suspected of causing cancer
H373	May cause damage to organs through prolonged or repeated exposure

Party Responsible for the Preparation of This Document

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Dyno Nobel SDS

Senatel Powersplit

Safety Data Sheet

According To Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules And Regulations And According To The Hazardous Products Regulation (February 11, 2015).
Revision Date: 02/08/2017 Date of Issue: 06/15/2011 Supersedes Date: 11/12/2013 Version: 2.0

SECTION 1: IDENTIFICATION

Product Identifier

Product Form: Mixture

Product Name: Senatel Powersplit

Product Code: 3020

Synonyms: Magnum Powersplit

Intended Use of the Product

A detonator sensitive emulsion explosive. For professional use only.

Name, Address, and Telephone of the Responsible Party

USA:
Orica USA Inc.
33101 E. Quincy Avenue
Watkins, CO 80137-9406
For SDS Requests: 1-855-26-ORICA (1-855-266-7422)
sds.na@orica.com

Canada:
Orica Canada Inc.
301 Rue Hotel-de-Ville
Brownsburg-Chatham, QC
J8G 3B5
For SDS Requests:
1-855-26-ORICA (1-855-266-7422)
sds.na@orica.com
www.oricaminingservices.com

Emergency Telephone Number

Emergency Number : **Canada:** 1-877-561-3636 (Orica Transportation Emergency Response)
USA: 1-800-424-9300 (CHEMTREC)

FOR CHEMICAL EMERGENCIES (24 HOUR) INVOLVING TRANSPORTATION, SPILL, LEAK, RELEASE, FIRE OR ACCIDENTS: **IN CANADA CALL:** THE ORICA TRANSPORTATION EMERGENCY RESPONSE SYSTEM AT **1-877-561-3636. IN THE U.S. CALL: CHEMTREC 1-800-424-9300. IN THE U.S.:** FOR LOST, STOLEN, OR MISPLACED EXPLOSIVES CALL: BATF **1-800-800-3855.** FORM ATF F 5400.5 MUST BE COMPLETED AND LOCAL AUTHORITIES (STATE/MUNICIPAL POLICE, ETC.) MUST BE ADVISED.

SECTION 2: HAZARDS IDENTIFICATION

Classification of the Substance or Mixture

GHS-US/CA Classification

The explosive classification below only applies to US 29 CFR 1910.1200 (HCS/HazCom 2012). The explosive classification is excluded from Canada Hazardous Products Regulations (HPR, SOR/2015-17), it is regulated under the Canada Explosives Act (R.S.C., 1985, c. E-17).

Explosives, Division 1.1	H201
Ox. Liq. 3	H272
Acute Tox. 4 (Oral)	H302
Eye Irrit. 2A	H319
Carc. 1B	H350
STOT RE 2	H373
Aquatic Acute 3	H402
Aquatic Chronic 3	H412

Full text of hazard classes and H-statements : see section 16

Label Elements

GHS-US/CA Labeling

Any labeling elements (pictograms, signal word, hazard, and precautionary statements) related to explosive classifications apply to the OSHA Hazard Communication Standard (HCS, 29 CFR 1910.1200) only and are excluded from Canada's Hazardous Products Regulations (HPR, SOR/2015-17).

Hazard Pictograms (GHS-US/CA) :



Signal Word (GHS-US/CA) : Danger

Hazard Statements (GHS-US/CA) :
H201 - Explosive; mass explosion hazard.
H272 - May intensify fire; oxidizer.
H302 - Harmful if swallowed.
H319 - Causes serious eye irritation.
H350 - May cause cancer.
H373 - May cause damage to organs through prolonged or repeated exposure.
H402 - Harmful to aquatic life.
H412 - Harmful to aquatic life with long lasting effects.

Precautionary Statements (GHS-US/CA) :
P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P220 - Keep away from clothing and other combustible materials.
P260 - Do not breathe fumes, vapors, mist, or spray.
P264 - Wash hands, forearms, and other exposed areas thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P273 - Avoid release to the environment.
P280 - Wear protective gloves, protective clothing, and eye protection.
P301+P312 - IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313 - If exposed or concerned: Get medical advice/attention.
P314 - Get medical advice/attention if you feel unwell.
P330 - Rinse mouth.
P337+P313 - If eye irritation persists: Get medical advice/attention.
P405 - Store locked up.
P501 - Dispose of contents/container in accordance with the Explosives Act of Canada and the provisions of the Bureau of Alcohol, Tobacco and Firearms regulations contained in 27 CFR part 555.
P240 - Ground/bond container and receiving equipment.
P250 - Do not subject to friction, grinding, shock.
P370+P380 - In case of fire: Evacuate area.
P372 - Explosion risk in case of fire.
P373 - DO NOT fight fire when fire reaches explosives.
P401 - Store in accordance with the Explosives Act of Canada and the provisions of the Bureau of Alcohol, Tobacco and Firearms regulations contained in 27 CFR part 555.

Other Hazards

Exposure may aggravate pre-existing eye, skin, or respiratory conditions. Overexposure may cause methemoglobinemia. Initial manifestation of methemoglobinemia is cyanosis, characterized by navy lips, tongue and mucous membranes, with skin color being slate grey. Further manifestation is characterized by headache, weakness, dyspnea, dizziness, stupor, respiratory distress and death due to anoxia.

Unknown Acute Toxicity (GHS-US/CA)

No data available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Mixture

Name	Product Identifier	% *
Ammonium nitrate	(CAS No) 6484-52-2	70 - 80

Sodium nitrate	(CAS No) 7631-99-4	7 - 13
Sodium perchlorate	(CAS No) 7601-89-0	5 - 10
Petroleum	(CAS No) 8002-05-9	3 - 7
Pentaerythrite tetranitrate	(CAS No) 78-11-5	0.5 - 2

*Percentages are listed in weight by weight percentage (w/w%) for liquid and solid ingredients. Gas ingredients are listed in volume by volume percentage (v/v%).

SECTION 4: FIRST AID MEASURES

Description of First-aid Measures

General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

Inhalation: When symptoms occur: go into open air and ventilate suspected area. Obtain medical attention if breathing difficulty persists.

Skin Contact: Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Obtain medical attention if irritation develops or persists.

Eye Contact: Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention.

Ingestion: Rinse mouth. Do NOT induce vomiting. Obtain medical attention.

Most Important Symptoms and Effects Both Acute and Delayed

General: Causes serious eye irritation. Harmful if swallowed. There are potential chronic health effects to consider. Overexposure to this material may result in methemoglobinemia. Methemoglobinemia decreases the blood's ability to carry oxygen and results in symptoms such as dizziness, drowsiness, headache, shortness of breath, blue skin and lips, rapid heart rate, unconsciousness, and possibly death.

Inhalation: Prolonged exposure may cause irritation.

Skin Contact: Prolonged exposure may cause skin irritation.

Eye Contact: Contact causes severe irritation with redness and swelling of the conjunctiva.

Ingestion: This material is harmful orally and can cause adverse health effects or death in significant amounts.

Chronic Symptoms: May cause cancer. May cause damage to organs through prolonged or repeated exposure.

Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention. If medical advice is needed, have product container or label at hand.

SECTION 5: FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media: DO NOT FIGHT FIRES INVOLVING EXPLOSIVES. Water may be applied through fixed extinguishing system (sprinklers) as long as people need not be present for the system to operate.

Unsuitable Extinguishing Media: DO NOT fight fires involving explosives.

Special Hazards Arising From the Substance or Mixture

Fire Hazard: Explosive, could cause fire and secondary explosions. May intensify fire; oxidizer.

Explosion Hazard: Explosives, Division 1.1 - Chemicals and items which have a mass explosion hazard (a mass explosion is one which affects almost the entire quantity present virtually instantaneously). Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.

Reactivity: Extreme risk of explosion by shock, friction, fire or other sources of ignition. Oxidizer: increases the burning rate of combustible materials.

Advice for Firefighters

Precautionary Measures Fire: Exercise caution when fighting any chemical fire. This product is an explosive with mass detonation hazard. DO NOT FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS.

Firefighting Instructions: DO NOT ATTEMPT TO FIGHT FIRE. Immediately evacuate all personnel from the area to a safe distance. Guard against re-entry. Thermal decomposition can lead to release of irritating gases and vapors. In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.

Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.

Hazardous Combustion Products: Carbon oxides (CO, CO_2), hydrocarbons, nitrogen oxides. At temperatures above 210 °C (410 °F), decomposition may be explosive, especially if confined.

Other Information: Do not allow run-off from fire fighting to enter drains or water courses.

Reference to Other Sections

Refer to Section 9 for flammability properties.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Keep away from heat, sparks, open flames, hot surfaces. – No smoking. Do not get in eyes, on skin, or on clothing. Do not breathe vapor, mist or spray. Evacuate danger area. Keep away from heat, hot surfaces, sparks, open flames, and other ignition sources. No smoking. Keep away from combustible material. Avoid all contact with skin, eyes, or clothing.

For Non-Emergency Personnel

Protective Equipment: Use appropriate personal protective equipment (PPE).

Emergency Procedures: Evacuate unnecessary personnel. Evacuate danger area.

For Emergency Personnel

Protective Equipment: Equip cleanup crew with proper protection.

Emergency Procedures: Upon arrival at the scene, a first responder is expected to recognize the presence of dangerous goods, protect oneself and the public, secure the area, and call for the assistance of trained personnel as soon as conditions permit. Ventilate area. Eliminate ignition sources.

Environmental Precautions

Prevent entry to sewers and public waters. Avoid release to the environment.

Methods and Materials for Containment and Cleaning Up

For Containment: Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams. Absorb and contain with inert material. Place contents in suitable container for disposal. Use only non-sparking tools.

Methods for Cleaning Up: Use only non-sparking tools. Be careful to avoid shock, friction, and contact with grit. Collect product for recovery or disposal. For release to land, contain discharge by constructing dykes or applying inert absorbent; for release to water, utilize damming and/or water diversion to minimize the spread of contamination. Collect contaminated soil and water, and absorbent for proper disposal. Notify applicable government authority if release is reportable or could adversely affect the environment. Absorb and/or contain spill with inert material, then place in suitable container. Do not take up in combustible material such as: saw dust or cellulosic material.

Reference to Other Sections

See Section 8 for exposure controls and personal protection and Section 13 for disposal considerations.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

Additional Hazards When Processed: May cause or intensify fire; oxidizer.

Precautions for Safe Handling: Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Keep away from sources of ignition - No smoking. Keep away from extremely high or low temperatures, ignition sources, and incompatible materials. - No smoking. Handle empty containers with care because they may still present a hazard. Do not get in eyes, on skin, or on clothing. Do not handle until all safety precautions have been read and understood. Do not breathe fumes, vapors, mist, spray. Avoid contact with skin, eyes and clothing.

Hygiene Measures: This product is an explosive and should only be used under the supervision of trained and licensed personnel. Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work.

Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Comply with applicable regulations. Proper grounding procedures to avoid static electricity should be followed. Ground/bond container and receiving equipment.

Storage Conditions: Store under moderate temperatures recommended by competent authority. Store under dry conditions in a well ventilated magazine that has been approved for either detonator storage or explosive storage. Do NOT store explosives in a detonator magazine or detonators in an explosive magazine. Keep away from heat, spark and flames. Keep containers closed. Explosives should be kept well away from initiating explosives; protected from physical damage; separated from oxidizing materials, combustibles, and sources of heat. Isolate from incompatibles. . Keep/Store away from combustible materials, organic material, ignition sources, incompatible materials. Keep in fireproof place.

Incompatible Materials: Oxidizable materials, metal powder, bronze & copper alloys, fuels (e.g. lubricants, machine oils), fluorocarbon lubricants, acids, corrosive liquids, chlorate, sulphur, sodium nitrite, charcoal, coke and other finely divided combustibles. Strong oxidizing and reducing agents.

Special Rules on Packaging: Keep only in the original container.

Specific End Use(s)

A detonator sensitive emulsion explosive. For professional use only.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

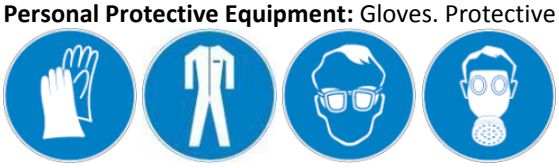
For substances listed in section 3 that are not listed here, there are no established Exposure limits from the manufacturer, supplier, importer, or the appropriate advisory agency including: ACGIH (TLV), AIHA (WEEL), NIOSH (REL), OSHA (PEL), or Canadian provincial governments.

Petroleum (8002-05-9)		
USA OSHA	OSHA PEL (TWA) (mg/m³)	2000 mg/m³
USA OSHA	OSHA PEL (TWA) (ppm)	500 ppm
USA NIOSH	NIOSH REL (TWA) (mg/m³)	350 mg/m³
USA NIOSH	NIOSH REL (ceiling) (mg/m³)	1800 mg/m³ (15 min)
USA IDLH	US IDLH (ppm)	1100 ppm (10% LEL)

Exposure Controls

Appropriate Engineering Controls: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Ensure adequate ventilation, especially in confined areas. Ensure all national/local regulations are observed. Proper grounding procedures to avoid static electricity should be followed. Product to be handled in a closed system and under strictly controlled conditions. Use explosion-proof equipment. Gas detectors should be used when flammable gases or vapors may be released.

Personal Protective Equipment: Gloves. Protective clothing. Protective goggles. Insufficient ventilation: wear respiratory protection.



Materials for Protective Clothing: Chemically resistant materials and fabrics. Wear fire/flame resistant/retardant clothing.

Hand Protection: Wear protective gloves.

Eye Protection: Chemical safety goggles.

Skin and Body Protection: Wear suitable protective clothing.

Respiratory Protection: If exposure limits are exceeded or irritation is experienced, approved respiratory protection should be worn. In case of inadequate ventilation, oxygen deficient atmosphere, or where exposure levels are not known wear approved respiratory protection.

Other Information: When using, do not eat, drink or smoke

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

Physical State	:	Liquid
Appearance	:	Viscous. String of plastic wrapped material traced internally with detonating cord. If the outer plastic is perforated, the exposed product appears putty-like.
Odor	:	Odorless
Odor Threshold	:	Not available
pH	:	Not available
Evaporation Rate	:	Not available
Melting Point	:	Not available
Freezing Point	:	Not available
Boiling Point	:	Not available
Flash Point	:	Not available
Auto-ignition Temperature	:	Not available
Decomposition Temperature	:	Detonating Cord 70 °C (158 °F) / Ammonium Nitrate 210 °C (410 °F)
Flammability (solid, gas)	:	Not available
Lower Flammable Limit	:	Not available

Upper Flammable Limit	:	Not available
Vapor Pressure	:	0 mm Hg @ 20 °C (68 °F)
Relative Vapor Density at 20°C	:	Not available
Relative Density	:	1.2 - 1.3
Density	:	1.2 - 1.3 g/cc
Specific Gravity	:	1.2 - 1.3
Solubility	:	Slightly soluble in standard organic solvents. Insoluble in water.
Partition Coefficient: N-Octanol/Water	:	Not available
Viscosity	:	Not available
Explosive Properties	:	Explosives, Division 1.1 - Chemicals and items which have a mass explosion hazard (a mass explosion is one which affects almost the entire quantity present virtually instantaneously)

SECTION 10: STABILITY AND REACTIVITY

Reactivity: Extreme risk of explosion by shock, friction, fire or other sources of ignition. Oxidizer: increases the burning rate of combustible materials.

Chemical Stability: Extreme risk of explosion by shock, friction, fire or other sources of ignition. May intensify fire; oxidizer.

Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

Conditions to Avoid: Keep away from open flames, hot surfaces and sources of ignition. Incompatible materials. Direct sunlight, extremely high or low temperatures, ignition sources, combustible materials, incompatible materials.

Incompatible Materials: Oxidizable materials, metal powder, bronze & copper alloys, fuels (e.g. lubricants, machine oils), fluorocarbon lubricants, acids, corrosive liquids, chlorate, sulphur, sodium nitrite, charcoal, coke and other finely divided combustibles. Strong oxidizing and reducing agents.

Hazardous Decomposition Products: None expected under normal conditions of use.

SECTION 11: TOXICOLOGICAL INFORMATION

Information on Toxicological Effects - Product

Acute Toxicity (Oral): Oral: Harmful if swallowed.

Acute Toxicity (Dermal): Not classified

Acute Toxicity (Inhalation): Not classified

LD50 and LC50 Data:

Senatel Powersplit	
ATE US/CA (oral)	1,733.41 mg/kg body weight

Skin Corrosion/Irritation: Not classified

Eye Damage/Irritation: Causes serious eye irritation.

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: Not classified

Carcinogenicity: May cause cancer.

Specific Target Organ Toxicity (Repeated Exposure): May cause damage to organs through prolonged or repeated exposure.

Reproductive Toxicity: Not classified

Specific Target Organ Toxicity (Single Exposure): Not classified

Aspiration Hazard: Not classified

Symptoms/Injuries After Inhalation: Prolonged exposure may cause irritation.

Symptoms/Injuries After Skin Contact: Prolonged exposure may cause skin irritation.

Symptoms/Injuries After Eye Contact: Contact causes severe irritation with redness and swelling of the conjunctiva.

Symptoms/Injuries After Ingestion: This material is harmful orally and can cause adverse health effects or death in significant amounts.

Chronic Symptoms: May cause cancer. May cause damage to organs through prolonged or repeated exposure.

Information on Toxicological Effects - Ingredient(s)

LD50 and LC50 Data:

Ammonium nitrate (6484-52-2)	
LD50 Oral Rat	2217 mg/kg

LC50 Inhalation Rat	> 88.8 mg/l/4h

Petroleum (8002-05-9)	
LD50 Oral Rat	> 4300 mg/kg
LD50 Dermal Rabbit	> 2000 mg/kg
LC50 Inhalation Rat	2.18 mg/l/4h

Sodium nitrate (7631-99-4)	
LD50 Oral Rat	> 2000 mg/kg

Sodium perchlorate (7601-89-0)	
LD50 Oral Rat	2100 mg/kg
ATE US/CA (oral)	500.00 mg/kg body weight

Pentaerythrite tetranitrate (78-11-5)	
LD50 Oral Rat	1660 mg/kg

Petroleum (8002-05-9)	
IARC Group	3

SECTION 12: ECOLOGICAL INFORMATION

Toxicity

Ecology - General: Harmful to aquatic life with long lasting effects.

Ammonium nitrate (6484-52-2)	
LC50 Fish 1	542 mg/l
EC50 Daphnia 1	555 mg/l

Petroleum (8002-05-9)	
LC50 Fish 1	< 7.1 mg/l (Species: Pimephales promelas, Exposure time 96 h)
LC50 Other Aquatic Organisms 1	2.7 mg/l LL50 96 hr (Kelp forest mysid shrimp)
EC50 Daphnia 1	6.9 mg/l (Exposure time: 48 h)

Sodium nitrate (7631-99-4)	
LC50 Fish 1	2000 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static])
LC50 Fish 2	994.4 - 1107 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [static])

Persistence and Degradability

Senatel Powersplit	
Persistence and Degradability	May cause long-term adverse effects in the environment.

Sodium nitrate (7631-99-4)	
Persistence and Degradability	Readily biodegradable in water.

Bioaccumulative Potential

Senatel Powersplit	
Bioaccumulative Potential	Not established.

Ammonium nitrate (6484-52-2)	
BCF Fish 1	(no bioaccumulation expected)
Log Pow	-3.1 (at 25 °C)

Sodium nitrate (7631-99-4)	
Log Pow	-3.8 (at 25 °C)
Bioaccumulative Potential	Not expected to bioaccumulate.

Mobility in Soil Not available

Other Adverse Effects

Other Information: Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Recommendations: Dispose of contents/container in accordance with the Explosives Act of Canada and the provisions of the Bureau of Alcohol, Tobacco and Firearms regulations contained in 27 CFR part 555

Additional Information: Container may remain hazardous when empty. Continue to observe all precautions.

Ecology - Waste Materials: Avoid release to the environment. This material is hazardous to the aquatic environment. Keep out of sewers and waterways.

SECTION 14: TRANSPORT INFORMATION

The shipping description(s) stated herein were prepared in accordance with certain assumptions at the time the SDS was authored, and can vary based on a number of variables that may or may not have been known at the time the SDS was issued.

In Accordance with DOT

Proper Shipping Name : EXPLOSIVE, BLASTING, TYPE E
Hazard Class : 1.1D
Identification Number : UN0241
Label Codes : 1.1D



Packing Group : II
ERG Number : 112

In Accordance with IMDG

Proper Shipping Name : EXPLOSIVE, BLASTING, TYPE E
Hazard Class : 1.1D
Identification Number : UN0241
Label Codes : 1.1D



EmS-No. (Fire) : F-B
EmS-No. (Spillage) : S-X
MFAG Number : 112

In Accordance with IATA

Proper Shipping Name : EXPLOSIVE, BLASTING, TYPE E
Identification Number : 1.1D
Hazard Class : UN0241
ERG Code (IATA) : 1L

In Accordance with TDG

Proper Shipping Name : EXPLOSIVE, BLASTING, TYPE E
Hazard Class : 1.1D
Identification Number : UN0241
Label Codes : 1.1D



Packing Group : II

SECTION 15: REGULATORY INFORMATION

US Federal Regulations

Senatel Powersplit	
SARA Section 311/312 Hazard Classes	Sudden release of pressure hazard Fire hazard Immediate (acute) health hazard Delayed (chronic) health hazard

Ammonium nitrate (6484-52-2)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Petroleum (8002-05-9)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Sodium nitrate (7631-99-4)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Sodium perchlorate (7601-89-0)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Pentaerythrite tetranitrate (78-11-5)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
EPA TSCA Regulatory Flag	T - T - indicates a substance that is the subject of a Section 4 test rule under TSCA

US State Regulations

Ammonium nitrate (6484-52-2)
U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
U.S. - Pennsylvania - RTK (Right to Know) List

Petroleum (8002-05-9)
U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

Sodium nitrate (7631-99-4)
U.S. - Massachusetts - Right To Know List
U.S. - Pennsylvania - RTK (Right to Know) List

Sodium perchlorate (7601-89-0)
U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

Pentaerythrite tetranitrate (78-11-5)
U.S. - New Jersey - Right to Know Hazardous Substance List

Canadian Regulations

Ammonium nitrate (6484-52-2)
Listed on the Canadian DSL (Domestic Substances List)

Petroleum (8002-05-9)
Listed on the Canadian DSL (Domestic Substances List)

Sodium nitrate (7631-99-4)
Listed on the Canadian DSL (Domestic Substances List)

Sodium perchlorate (7601-89-0)
Listed on the Canadian DSL (Domestic Substances List)

Pentaerythrite tetranitrate (78-11-5)
Listed on the Canadian DSL (Domestic Substances List)

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Revision Date : 02/08/2017

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200 and Canada's Hazardous Products Regulations (HPR).

GHS Full Text Phrases:

Acute Tox. 4 (Oral)	Acute toxicity (oral) Category 4
Aquatic Acute 3	Hazardous to the aquatic environment - Acute Hazard Category 3
Aquatic Chronic 3	Hazardous to the aquatic environment - Chronic Hazard Category 3
Carc. 1B	Carcinogenicity Category 1B
Expl. 1.1	Explosive Category 1.1
Eye Irrit. 2A	Serious eye damage/eye irritation Category 2A
Ox. Liq. 3	Oxidizing liquids Category 3
STOT RE 2	Specific target organ toxicity (repeated exposure) Category 2
H201	Explosive; mass explosion hazard
H272	May intensify fire; oxidizer
H302	Harmful if swallowed
H319	Causes serious eye irritation

H350	May cause cancer
H373	May cause damage to organs through prolonged or repeated exposure
H402	Harmful to aquatic life
H412	Harmful to aquatic life with long lasting effects

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NA GHS SDS 2015 (Can, US)

APPENDIX 5

EMULSION PLAN / BLAST AREA INSPECTION SHEET

Environmental Inspection Report for the Emulsion Plant Area and the Loading of Blast Holes

---

Date: **Inspected By:**
Time:

Location: Emulsion Plant

Weekly Inspection

In Compliance with	Subject	Conform	Non-conform	N/A	Comments
NWB Part B Item 10	Sign posted to inform of a waste disposal facility				
NWB Part D Item 17 MBK SCP MBK NIRB Condition 26	Are there any visual spills?				
NWB Part F Item 10	All Hazardous Waste disposal is located 30m from the ordinary high water mark.				
NWB Part H Item 2	Resources in place to prevent any chemicals, petroleum products, or unauthorized Wastes from entering a water body.				
NWB Part H Item 3 Ammonia Management Plan	Is secondary containment for chemical storage provided.				
NWB Part I Item 7	Monitoring signs are posted in English, French, and Inuktitut.				
MBK SCP	Spill Kits Present				
MBK NIRB Condition 26	Ensure that spills, if any, are cleaned up immediately and that the site is kept clean of debris, including wind-blown debris.				
MBK NIRB Condition 25	Management and control waste in a manner that reduces or eliminates the attraction to carnivores and/or raptors.				

MBK NIRB Condition 27 Ammonia Management Plan	Ensure the hazardous material are contained using environmentally protective methods based on practical best management practices				
Hazardous Management Plan	Are storage containers clearly labelled to identify Hazardous substance?				
Ammonia Management Plan	Are storage containers in good condition? Is there any visible damage or leaks? Can the doors be sealed shut?				
Ammonia Management Plan	Where necessary – Are containers with product stored in an upright position?				
Ammonia Management Plan	Do you see any potential environmental hazards posed by these HAZARDOUS containers/materials?				
BMP	Are there any additional environmental hazards/potential impacts that require attention?				
MINE ACT	Are there any Health and Safety issues that should be addressed to prevent injury to workers?				

Pit Location: **Blast Pattern:**

In Compliance with	Subject	Conform	Non-conform	N/A	Comments
NWB Part D Item 17 MBK SCP MBK NIRB Condition 26	Are there any visual spills, including emulsion?				
Ammonia Management Plan	Is there presence of Emulsion outside of the holes that are being loaded?				
NWB Part F Item 10	All Hazardous Waste disposals are located 30m from the ordinary high water mark.				

NWB Part H Item 2	Resources in place to prevent any chemicals, petroleum products, or unauthorized Wastes from entering a water body.				
NWB Part H Item 3 Ammonia Management Plan	Is secondary containment for chemical storage provided?				
MBK NIRB Condition 27 Ammonia Management Plan	Ensure the hazardous material are contained using environmentally protective methods based on practical best management practices				

Comments/Recommendations:

Environmental Personnel Name:

Actions Corrected: None

_____
_____
_____
_____
_____

Dyno Nobel Supervisor Name: _____

Signature: _____

APPENDIX F – TDS-SITE-SPECIFIC WATER QUALITY PROGRAM TECHNICAL MEMORANDUM

TECHNICAL MEMORANDUM

DATE August 15, 2024 **Reference No.** CA0031499.3639-MBK2024_020-TM-Rev0

TO Lisa Ramilo, Permitting Lead Water & Waste
Agnico Eagle Mines Limited

CC Sarah Crabbe

FROM Breda Rahmanian; Chelsea Grimard; Connor Pettem; Gary Lawrence **EMAIL breda.rahmanian@wsp.com**

SITE SPECIFIC BENCHMARKS FOR TOTAL DISSOLVED SOLIDS IN SUPPORT OF WATER LICENSE SUBMISSION AND FINAL CLOSURE AND RECLAMATION PLAN FOR MEADOWBANK MINE COMPLEX

1.0 INTRODUCTION

This technical memorandum presents the proposed benchmark for total dissolved solids (TDS) for application to future discharge conditions at Meadowbank Mine Complex (the Mine) located in the Kivalliq Region of Nunavut. The benchmark was derived to support the Human Health and Ecological Risk Assessment under the Final Closure and Reclamation Plan (FCRP) for the Mine and to support a Water License amendment.

TDS was identified as an acute and chronic constituent of concern for benchmark[1] development under:

- Meadowbank Mine Type A Water License 2AMMEA1530 per Items 7[2] and 9[3].
- Human Health and Ecological Risk Assessment, in the absence of a promulgated water quality guideline for screening of TDS.

Within this document, two types of site-specific benchmarks for TDS were developed:

- Effluent Quality Criterion (EQC)—to apply at the end-of-pipe at the point of discharge for treated effluent.
- Site-Specific Water Quality Objective (SSWQO)—to apply at the edge of the mixing zone in the receiving environment.

[1] The term benchmark is used in this document as a general term for science-based numerical values for water quality screening, including effluent quality criteria and site-specific water quality objectives; benchmarks are intended to support water management, are candidate values for regulatory consideration for both Water License approvals, and are recommended for use in initial screening of water quality predictions.

[2] The Licensee shall submit a Water Management Plan on an annual basis to the Board for review following the commencement of Operations. The Plan must include an updated Water Balance. The Water Management Plan shall include an action plan to be implemented if predicted re-flooded pit water quality indicates that treatment is necessary. The Licensee shall not breach dikes until the water quality in the re flooded area meets CCME Water Quality Guidelines for the Protection of Aquatic Life, baseline concentrations, or appropriate site-specific water quality objectives. Subject to the Board approval, if water quality parameters are above CCME Guidelines, a site-specific risk assessment must be conducted to identify water quality objectives that are protective of the aquatic environment.

[3] The Licensee shall, on an annual basis during Operations and Closure, compare the predicted water quantity and quality within the pits to the measured water quantity and quality. Should the difference between the predicted and measured values be 20% or greater, then the cause(s) of the difference(s) shall be identified, and the implications of the difference shall be assessed and reported to the Board.

The guiding principles for developing benchmarks are that they should be developed to be protective of the environment, satisfy regulatory requirements, be based on science (rather than strictly on considerations of policy or precedent), and be customized to the site-specific conditions of water quality and quantity. Adoption of fixed numerical benchmarks across sites or for all water compositions, either as static effluent limits or generic water quality guidelines, is unlikely to satisfy some parts of the guiding principle. Site-specific benchmarks can, however, be developed using a toxicity-based approach that satisfies all the above conditions.

The development of site-specific benchmarks has three main components for acceptability as stipulated in the Water License (Part F, Item 6):

- no acute toxicity at the point of discharge
- no unacceptable chronic toxicity at the edge of the mixing zone
- suitable assimilation capacity in the receiving environment

Rather than promulgate uncertain generic numerical values for TDS, site-specific benchmarks were developed to manage TDS in the effluent and receiving environment (to apply at the edge of the mixing zone) that meet the above conditions through incorporation of site-specific exposure conditions and confirmation through site-specific toxicity testing. Evaluation of assimilative capacity in the receiving environment is ongoing, and therefore, a single definitive numerical EQC could not be derived herein. Rather, a potential range for EQC is presented and will be refined once the assimilative capacity evaluation is complete.

This memo presents a summary of the methods (Section 2.0, results (Section 3.0), and conclusions (Section 4.0) for the proposed TDS benchmarks for acute (EQC) and chronic (SSWQO) toxicity. Supplementary desktop-based literature and site-specific information are presented in Attachment 1, and site-specific toxicological study methodology and results are presented in Attachment 2.

2.0 METHODS

Literature and site-specific toxicity data were compiled, evaluated, and used to derive interim benchmarks for effluent at the end-of-pipe (EQC) and at the edge of the mixing zone within the receiving environment (SSWQO). Detailed methods and results for the desktop-based supplementary information (including literature review) are presented in Attachment 1 and for the site-specific toxicity testing in Attachment 2. The literature and site-specific data were considered as lines of evidence in deriving proposed benchmarks as follows:

1) Characterization of the total dissolved solids composition in effluent and in the receiving environment under future effluent discharge conditions. The ionic composition has relevance to toxic potency and was evaluated based on water quality characteristics for modelled and measured pit chemistry and draft modelled effluent chemistry (Attachment 1, Section 1-2).

2) Compilation of acute and chronic thresholds for TDS toxicity to sensitive, site-relevant aquatic test species obtained from the literature; test results were screening for relevance to exposure conditions (e.g., balance of ions, sulphate proportion, hardness) reflective of Meadowbank Mine (Attachment 1, Sections 1-3 and 1-4).

3) Compilation of TDS EQC and SSWQO values derived for other northern mines sites that have a similar TDS composition to Meadowbank Mine (Attachment 1, Sections 1-3 and 1-4).

4) Evaluation of site-specific toxicity of TDS for controlled studies in the laboratory using samples prepared to simulate future exposure conditions. Toxicological studies to support development of the proposed benchmarks were undertaken to validate literature-based data (Table 1; Attachment 2). The objectives of the site-specific toxicological studies were to:

   a. Evaluate the acute toxicity of synthesized site effluent blends of TDS to the acute regulatory test species *Daphnia magna* (48-hr exposure) and Rainbow Trout (*Oncorhynchus mykiss*; 96-hr exposure).

   b. Evaluate the chronic toxicity of TDS, under future exposure conditions simulating the edge of the mixing zone during effluent discharge, using a battery of sensitive, surrogate laboratory test species: the water flea *Ceriodaphnia dubia*, an algae *Raphidocelis subcapitata*, and early life stage Rainbow Trout.

Table 1: Overview of Toxicity Testing Programs for Total Dissolved Solids

Toxicity Testing Program	Dilution Water	Laboratory Toxicity Test			
		Daphnia magna Survival Test (48-h)	Rainbow Trout Survival Test (96-h)	*Raphidocelis subcapitata* Growth (72-h)	*Ceriodaphnia dubia* Survival and Reproduction (7 to 8-d)
Acute TDS	Pit E cryo-concentrated water	☑	☑	—	—
Chronic TDS	Site-collected water	—	—	☑	☑
	Synthetic laboratory water	—	—	—	—

Notes: TDS = total dissolved solids; ☑ = toxicity test performed; — = not tested or not applicable.

The information gathered from the site-specific toxicity program was integrated with literature data for comparable TDS mixtures to establish proposed benchmarks that are protective of aquatic life under acute (EQC) and chronic (SSWQO) exposure conditions. Site-specific data were used as the primary line of evidence to establish the benchmarks, with supplementary literature data providing additional evidence to evaluate concurrence or divergence in toxicity benchmarks for TDS under comparable exposure scenarios.

3.0 RESULTS

3.1 Interim Effluent Quality Criteria Range

The interim proposed EQC for TDS at Meadowbank Mine ranges from 4,000 to ~10,200 mg/L (as calculated TDS[4]). Refinement of the EQC to a single numerical value for both the maximum average concentration (MAC) and maximum allowable grab sample concentration (MAGC) will be informed by evaluation of assimilation capacity in the receiving environment (i.e., confirmations that the proposed SSWQO that can be met at the edge of the mixing zone given a specified EQC and that the lake can assimilate TDS discharged at the EQC). The collective lines of evidence presented below provide high confidence that no acute lethality is expected at the point of discharge at TDS concentrations below 4,000 mg/L. Given the conservatism of the assessment, the results could support an extension of the EQC above 4,000 mg/L, providing assimilative capacity conditions are met. However, at this stage, the lower end of the proposed range has been advanced as the interim benchmark, providing a margin of safety for management. The evidence in support of a confident determination of no acute toxicity comes from the following sources:

- Information from other mine sites with comparable TDS mixtures indicated no acute toxicity (i.e., 100% survival) at maximum evaluated TDS concentrations of ~4,000 mg/L.
  - At Faro Mine site, no acute toxicity to *D. magna* and Rainbow Trout was observed with maximum tested calculated TDS ranging from 3,870 to 3,960 mg/L for calcium-sulphate dominant TDS mixtures (Attachment 1, Section 1-3).
  - At Meliadine Mine site, no acute toxicity to the cladoceran *Ceriodaphnia dubia* was observed (LC_{50} >4,250 mg/L TDS) with exposure to a sodium-sulphate-chloride dominant TDS mixture (Attachment 1, Section 1-3). The *C. dubia* survival endpoint is not routinely applied as a measure of acute toxicity under effluent discharge regulations, as it is a chronic test and more sensitive than the standard tests used to evaluate acute toxicity in undiluted effluent (i.e., Rainbow Trout and *D. magna*). As such, confirmation of an LC_{50} for *C. dubia* for a TDS mixture broadly comparable to Meadowbank Mine, and for a sensitive aquatic species, provides an additional line of evidence indicating no acute toxicity at calculated TDS concentrations of ~4,000 mg/L.
- Site-specific acute toxicity data indicated no acute lethality[5] to regulatory test species *D. magna* and Rainbow Trout at calculated TDS concentrations ranging from 2,480 up to 4,050 mg/L with exposure to Pit E water collected from Meadowbank Mine (8 rounds of testing). Pit E water is predicted to have the highest TDS concentrations on average relative to the other pits (Attachment 1; Section 1-3).
- Acute toxicity data from the site-specific toxicological study indicated no acute lethality to *D. magna* and Rainbow Trout exposed to cryo-concentrated Pit E waters (sodium-sulphate dominant) with calculated TDS concentrations ranging from 4,577 to 10,233 mg/L. Minor immobility effects (12 to 20% immobility) were observed in the *D. magna* tests with calculated TDS >8,793 mg/L, but this response did not reach the threshold of a 50% effect level (Attachment 2).

[4] TDS (mg/L) is calculated as the sum of calcium, chloride, fluoride, magnesium, potassium, sodium, sulphate, alkalinity as carbonate (calculated 0.6 × total alkalinity as $CaCO_3$), and nitrate as NO_3 (calculated 4.427 × nitrate as N; APHA 2012).

[5] Acute lethality is defined as more than 50% mortality in a test population during exposure over a defined period (e.g., 48 hours for *D. magna* and 96 hours for Rainbow Trout).

3.2 Chronic Site-Specific Water Quality Objectives

3.2.1 Literature Data Compilation

The detailed literature review is presented in Attachment 1 (Section 1-4), and a summary of key findings is as follows:

- There are no federal, provincial, and territorial water quality guidelines for TDS in Canada. However, several other sites have developed chronic benchmarks applicable for Meadowbank (i.e., sulphate-dominant TDS mixtures); these benchmarks range from 500 mg/L to 1,500 mg/L calculated TDS.
- Effect concentrations for sensitive, aquatic receptors (phytoplankton, benthic invertebrates and zooplankton, and fish) from the literature for comparable TDS mixtures (sulphate-dominant) were generally above 1,000 mg/L as calculated TDS.

3.2.2 Site-Specific Chronic Toxicity Testing

- The detailed methods and results of the site-specific chronic TDS toxicity test program are presented in Attachment 2, and a summary of key findings is presented in the bullets below. Overall, the magnitude of effect to the tested species observed was negligible (*R. subcapitata*) or small (*C. dubia*).No statistically significant reduction in *R. subcapitata* growth was observed with exposure to calculated TDS concentrations up to 2,217 mg/L (unbounded no observable effect concentration; NOEC).
- No statistically significant reduction in *C. dubia* survival was observed with exposure to calculated TDS concentrations up to 2,226 mg/L (unbounded NOEC). A statistically significant reduction in *C. dubia* reproduction was observed in the 2,296 mg/L TDS treatments, with a NOEC of 1,745 mg/L TDS and LOEC of 1,745 mg/L TDS. The IC_{20} estimate was 1,354 mg/L, which aligns with expectations based on the review of literature data (i.e., negligible chronic toxicity of TDS at concentrations ≤1,000 mg/L; Section 3.2.1).
- At this time, early life stage Rainbow Trout data are not yet available for the exposure conditions expected for future discharges (i.e., relevant to the SSWQO) and will be provided in the fall once data are available.

3.2.3 Proposed Chronic Site-Specific Water Quality Objective

A proposed (interim) SSWQO for TDS of 1,000 mg/L (as calculated TDS) to apply in the receiving environment of Third Portage Lake (North Basin) or Wally Lake at the edge of the mixing zone[6] is proposed for protection against chronic toxicity to representative aquatic species. This proposed SSWQO is an interim value pending confirmation of: (1) no chronic toxicity to Rainbow Trout in the planned fall 2024 toxicity test program, and (2) confirmation of assimilative capacity in the receiving environment.

[6] The mixing zones for Third Portage Lake and Wally Lake were as defined in WSP (2023a,b).

The proposed (interim) SSWQO of 1,000 mg/L is supported by the following considerations:

- Favourable ionic balance— Effect concentrations reported in the compiled dataset were derived from exposures using a balanced TDS mixture. Meadowbank Mine TDS ionic composition broadly resembles the ionic composition evaluated during the validation of site-specific TDS/sulphate benchmarks for other sites with either TDS limits of ~1,000 mg/L (or benchmarks for sulphate with corresponding TDS of ~1,000 mg/L). Meadowbank Mine TDS during treated effluent discharge is expected to contain primarily calcium and sodium cations; these dominant ions are among the least toxic according to Mount et al. (1997) and have been identified as key components of TDS that ameliorate toxicity of other ions (Mount et al. 2016; Mount et al. 2019). The information from the ionic composition analysis and comparison to the TDS toxicity dataset for comparable mixtures (Attachment 1; Section 1-2) suggests that the Meadowbank Mine TDS mixture would not exhibit chronic toxicity from TDS components at concentrations of TDS below approximately 1,000 mg/L.
- Comparability to validated benchmarks at other sites and the literature—Effect concentrations derived from validation of site-specific benchmarks at other mine sites and reported in the literature generally indicate negligible chronic effects to surrogate species at TDS concentrations below 1,000 mg/L for comparable mixtures (Attachment 1; Section 1-4).
- Site-specific toxicity study with negligible chronic toxicity—Effect concentrations for *R. subcapitata* and *C. dubia* (sensitive invertebrate and algae species) from the site-specific chronic TDS study were similar to or higher than the chronic benchmarks from other sites that are applicable for Meadowbank Mine. The effect concentrations were also higher than the corresponding effect concentrations reported in the literature for phytoplankton and benthic invertebrates (Attachment 2; Section 2-5).
- Conservatism of test endpoints—Effect concentrations for *C. dubia* (sensitive invertebrate) tend to be among the lowest chronic benchmark values from standardized testing of total dissolved solids. Mount et al. (2019) have used this species and endpoint as a model species for the evaluation of chronic toxicity to mixtures of ions in chronic exposures, and Teck Coal Ltd. (2014) has based environmental effects concentrations for sulphate (in a similar mine-related ionic composition) on *C. dubia* reproduction.

The proposed (interim) TDS SSWQO relies on the following assumptions:

- Confirmation of negligible chronic toxicity to Rainbow Trout survival and development at TDS concentrations ≤1,000 mg/L. Testing with Rainbow Trout is ongoing, and results will be presented and used to evaluate the proposed (interim) SSWQO in the final iteration of this report.
- Ionic composition will reflect the composition estimated based on current modelling and measured chemistry data available at the time of this review; it is further assumed the composition will remain relatively stable over time. The benchmark was derived from the anticipated ionic composition for Meadowbank Mine based on monitoring data in the receiving environment and a conservative (upper bound) modelling scenario for effluent. Modelling data are subject to change pending revisions to the mine management plan, requiring confirmation that ionic mixtures will remain consistent in terms of proportions of major ions. If future effluent quality with respect to TDS constituents is markedly different, then re-evaluation of the dataset underlying the proposed TDS benchmark may be warranted.

4.0 CONCLUSION

The review completed herein provides an indication of the proposed ranges of benchmarks for TDS, including the EQC (4,000 to 10,010 mg/L) and SSWQO (1,000 mg/L). Future iterations of this report will address remaining data gaps related to site-specific chronic toxicity to Rainbow Trout exposed to a modelledTDS mixture, assimilative capacity of the receiving environment, and path forward for benchmark finalization.

WSP Canada Inc.

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https://wsponlinecan.sharepoint.com/sites/ca-ca00314993639/shared documents/06. deliverables/2024-07-09 tds sswqo revb/ca0031499.3639-mbk2024_020-tm-tds_sswqo-rev0.docx

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ATTACHMENT 1

Supplementary Information to Support Proposed Total Dissolved Solids Site-Specific Water Quality Objectives

This attachment presents the supporting technical information for proposed benchmarks for total dissolved solids (TDS), including for the effluent at the end-of-pipe (EQC; Section 3.0 of the main report) and at the edge of the mixing zone (SSWQO; Section 4.0 of the main report).

1-1.0 CHARACTERISTICS OF TDS

1-1.1 Definition

The TDS parameter is defined as the sum of the concentrations of all common dissolved ions in freshwaters (e.g., sodium [Na^+], calcium [Ca^{2+}], magnesium [Mg^+], potassium [K^+], sulphate [SO_4^{2-}], bicarbonate [HCO^{3-}], chloride [Cl^-], nitrate [NO^{3-}], fluoride [F^-], and silicate [SiO_3^{2-}]), and is essentially an expression of salinity. TDS can be calculated using the following equation (APHA 2005):

$$TDS_{calculated\ (mg/L)} = \sum[Na^+, K^+, Ca^{2+}, Mg^{2+}, Cl^-, F^-, SO_4^{2-}, SiO_3^{2-}, 4.42 \times NO_3^-\ (as\ N), 0.6 \times total\ alkalinity\ (as\ CaCO_3)]$$

Concentrations of TDS may also be measured gravimetrically by analytical laboratories (i.e., measured TDS). However, calculated TDS is used herein as the primary basis for derivation of interim targets for TDS and screening because:

- Laboratory interference can reduce the accuracy of measured TDS (Evaristo-Cordero 2011). In particular, waters with high calcium, magnesium, and chloride concentrations can form hydroscopic residues that absorb water under normal laboratory conditions, potentially biasing the measured TDS higher than actual concentrations (APHA 2005; Evaristo-Cordero 2011). In contrast, calculated TDS is based on the major ions that can measurably contribute to TDS and is therefore not influenced by any changes that may occur from those ions being taken out of solution.
- Calculated TDS incorporates explicit consideration of the ionic composition, which is important for evaluating the toxicity of the TDS mixture (as discussed below).

1-1.2 General Fate and Effects

Dissolved solids occur naturally in water, with the composition and concentration of individual ion constituents varying by location based on natural factors, such as the geology and soil in the watershed, atmospheric precipitation, and the water balance (evaporation-precipitation) (Weber-Scannell and Duffy 2007). Anthropogenic activities can alter the concentration of TDS in the aquatic environment, with effluent from mining or industrial treatment of water identified as common sources of elevated TDS (Soucek 2007; Weber-Scannell and Duffy 2007). Differences in the ratios of calcium to magnesium (Ca:Mg) or relative contribution of sulphate or chloride to the total TDS concentration are common indicators of anthropogenic influence. A review of the literature indicates that when accounting for toxicity for TDS the following observations apply as summarized by Chapman and McPherson (2015):

- TDS toxicity is lower with the presence of more than one cation (i.e., balanced mixtures tend to be less toxic relative to individual ions in isolation).
- Hardness may ameliorate TDS toxicity and the toxicity of individual ions (e.g., chloride and sulphate)
- The relative ratios of ions within the TDS mixture may affect TDS toxicity (e.g., Ca^{2+}:Mg^{2+})

More recent research by Mount et al. (2016) supports the conclusions by Chapman and McPherson (2015). Following extensive toxicity testing exposing *C. dubia* to different salt mixtures, Mount et al. (2016) concluded that inferring toxicity from individual ions is difficult due in part to interdependence among ions. Buchwalter (2013) concluded that TDS toxicity is complicated by the findings that:

- individual ions vary in toxicity
- some ions in solution can modify the toxicity of other ions
- relative toxicities of ions are not consistent across species

The results from Mount et al. (2016) also support the conclusion that toxicity of TDS mixtures varies by ionic composition, and that the characteristics of the TDS mixture influence the toxicity of other ions in the mixture.

1-2.0 SITE-SPECIFIC TDS COMPOSITION

The following general attributes are anticipated to influence toxicity of TDS for the site-specific mixture:

- **Balance of ions**—the predicted concentrations of ions of the TDS mixture were estimated using several datasets:
  - For treated effluent (at end-of-pipe)[1], the composition of major ions was predicted to be dominated by sulphate (49%), chloride (16%), calcium (10%), sodium (10%), and potassium (4%), with a smaller relative proportion of alkalinity, nitrate, fluoride, and magnesium (Table 1-1; Figure 1-1). This composition represented the modelled “base waters” for the snapshot year 2040 during active closure and was selected as a conservative upper bound of modelled major ion conditions.
  - For receiving environment without discharge, measured chemistry in Wally Lake and TPL (Figure 1-2) was reviewed and the dominant cations were identified calcium and sodium with dominant anions of sulphate and total alkalinity. Total alkalinity is predominant under the baseline TDS composition in Wally Lake and TPL, but this applies under conditions of calculated TDS <40 mg/L; with treated mine effluent discharge, it is expected that the relative proportion of total alkalinity would decline with corresponding increases of calcium, sodium, and sulphate.
  - For future conditions at the edge of the mixing zone, the concentrations of ions and ionic composition were estimated by applying a 0.75 dilution factor to the effluent predictions to target an upper bound for edge of mixing zone as a simulated scenario of 2,000 mg/L TDS (Table 1-1) with an ionic composition dominated by sulphate (49%), chloride (16%), sodium (10%), calcium (10%), nitrate (10%), and potassium (4%), with a smaller relative proportion of alkalinity, fluoride, and magnesium (Figure 1-1). It is expected that the edge of mixing zone conditions will be between the measured conditions for the receiving environments without effluent discharge and this simulated scenario.[2]

[1] Draft treated effluent predictions modelled by Lorax Environmental Services Ltd. for the Vault Pit (base waters; active closure, October 2040) were provided to WSP by Agnico on 30 March 2024 (V0.4.3).

[2] Edge of mixing zone predictions generated from assimilative capacity modelling results are anticipated to be available in summer or fall 2024.

- The primary exposure and toxicity modifying factor (ETMF) for TDS is ionic composition, reflecting the fact that individual ionic components exhibit different potential to exert toxicity. In general, a balanced mixture of ions results in lower toxicity than strong dominance by an individual ion, particularly dominance by an individual ion with relatively high toxicity. Mount et al. (1997) reported that the relative ion toxicity to freshwater biota was generally potassium > carbonate ≈ magnesium > chloride > sulphate, with calcium and sodium exhibiting relatively low toxicity. Therefore, the toxicity of a TDS mixture depends largely on the composition of ions within the mixture, rather than the total TDS concentration, which on its own is not an accurate predictor of toxicity.

- **Sulphate proportion**—sulphate is one of the dominant individual ions, based on review of model predictions and measured pit chemistry. This is broadly similar to site water composition at several other northern mining projects in Canada, including effluent at Faro Mine and in the Elk Valley, which have sulphate-dominant TDS compositions.

- **Hardness**—Hardness may modify ion-specific toxicity, thereby ameliorating the toxicity of a mixture by reducing the toxicity of individual ions (Kennedy et al. 2005). For example, calcium has been identified as a specific component of hardness that ameliorates sulphate toxicity (Davies and Hall 2007; Mount et al. 2016). Hardness is not considered a ETMF in the case of TDS, because hardness is a component of the TDS mixture and is therefore not an independent factor distinct from ionic composition. However, hardness can be considered for the evaluation of ion-specific toxicity, given that some ions (e.g., sulphate, chloride) are less toxic in hard water. Water hardness was calculated as calcium carbonate ($CaCO_3$) using the following equation:

$$[CaCO_3] = 2.5 \times [Ca^{2+}] + 4.1 \times [Mg^{2+}]$$

Table 1-1: Simulated ion concentrations in effluent and estimated ion concentrations at the edge of the mixing zone

Constituent	Units	Effluent Predictions (Vault Pit)[(a)]	Simulated Scenario Edge of Mixing Zone[(b)]
TDS (calculated)	mg/L	2,655	2,000
Sulphate	mg/L	1,303	982
Chloride	mg/L	415	313
Calcium	mg/L	260	196
Magnesium	mg/L	21	16
Sodium	mg/L	276	208
Total Alkalinity	mg/L as $CaCO_3$	27	20
Potassium	mg/L	107	81
Fluoride	mg/L	0.28	0.21
Nitrate (as N)	mg/L as N	58	43
Hardness	mg/L as $CaCO_3$	737	555

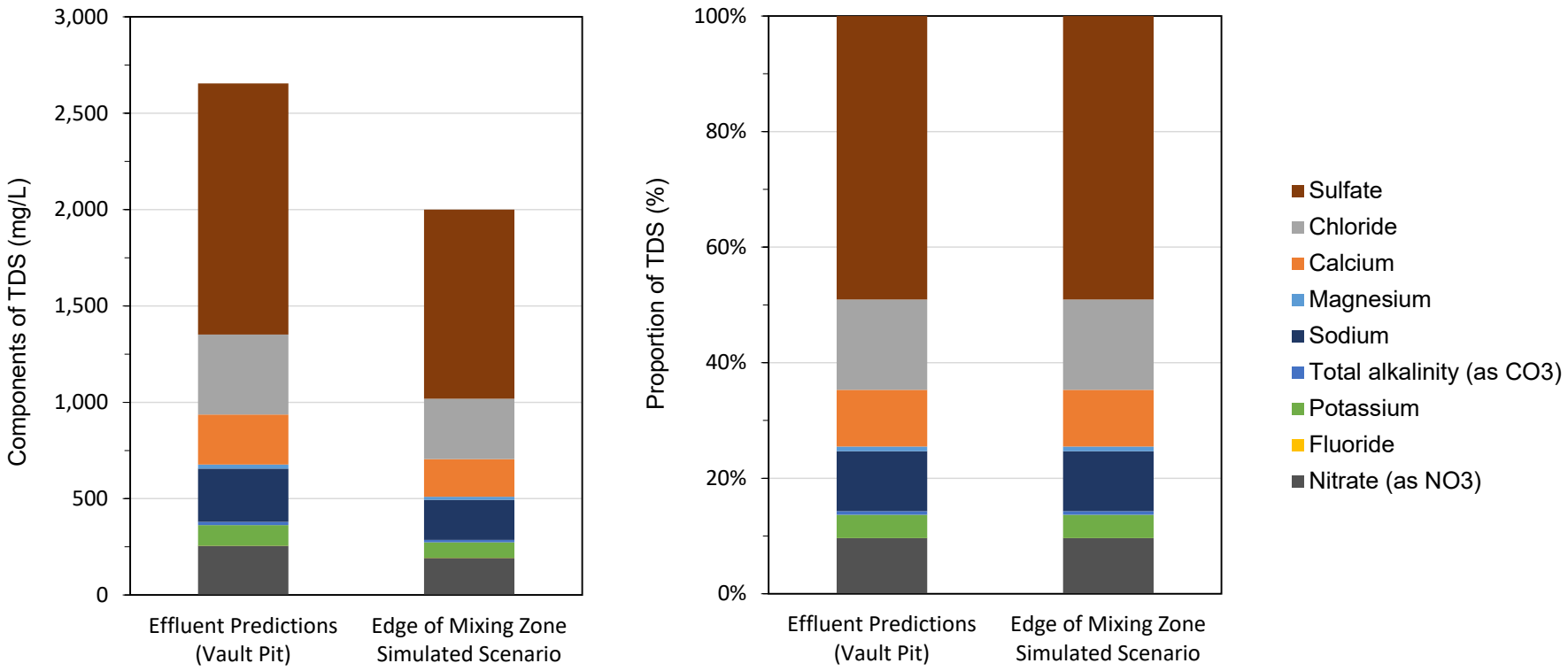
Note: TDS (mg/L) is calculated as the sum of calcium, chloride, fluoride, magnesium, potassium, sodium, sulphate, alkalinity as carbonate (calculated 0.6 × total alkalinity as $CaCO_3$), and nitrate as NO_3 (calculated 4.427 x nitrate as N; APHA 2012).

TDS = total dissolved solids; mg/L = milligrams per litre; N = nitrogen; $CaCO_3$ = calcium carbonate.

(a) Draft treated effluent predictions were provided by Lorax for the Vault Pit to WSP by Agnico on March 30 2024.

(b) The simulated edge of mixing zone scenario was generated by applying a dilution factor of 0.75 to the effluent predictions to reach TDS of 2,000 mg/L.

Figure 1-1: Total dissolved solid concentration (left) and composition (right) in simulated effluent and estimated edge of the mixing zone

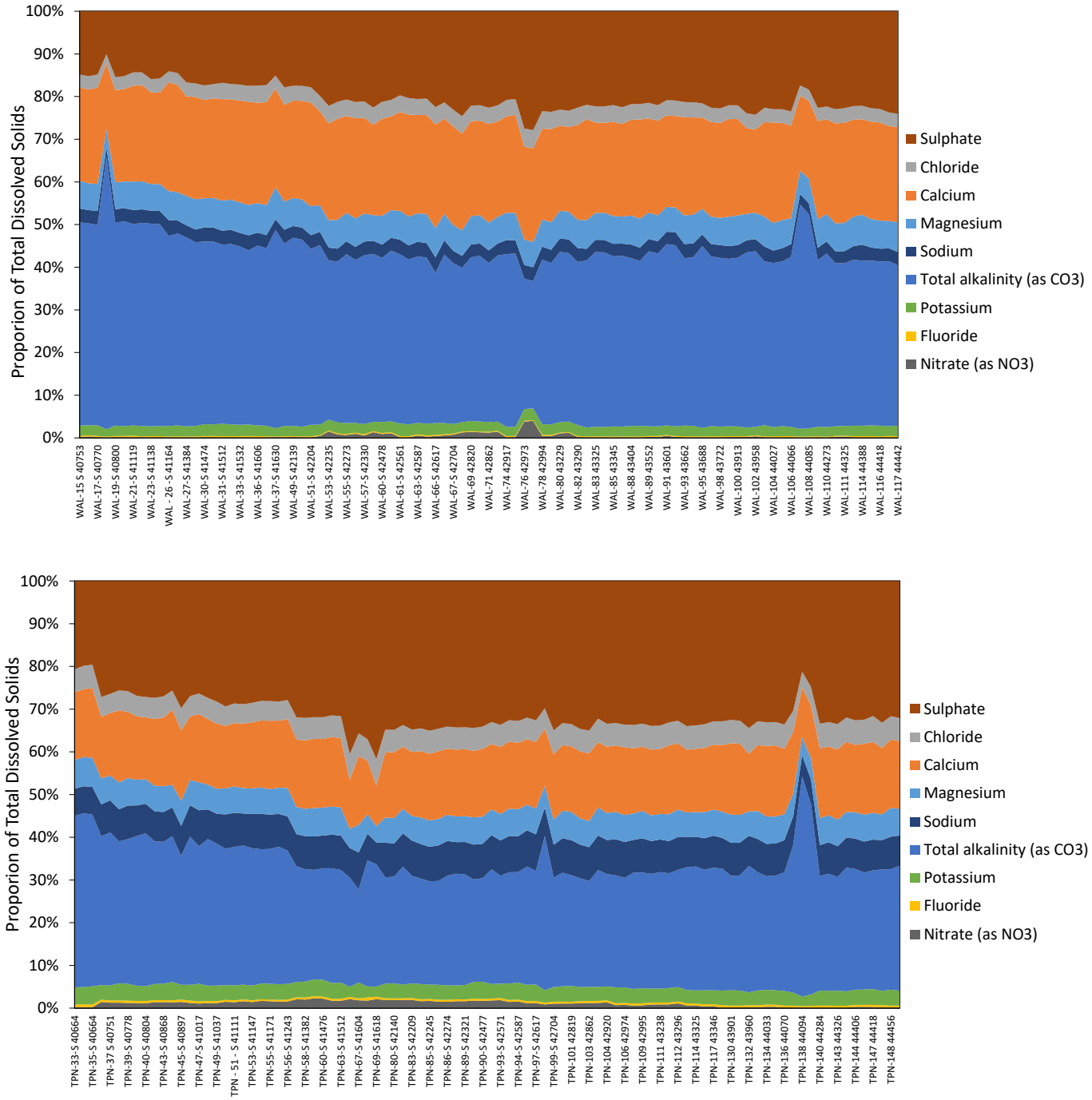


Notes: The simulated edge of mixing zone scenario was generated by applying a dilution factor of 0.75 to the effluent predictions to reach TDS of 2,000 mg/L.

TDS (mg/L) is calculated as the sum of calcium, chloride, fluoride, magnesium, potassium, sodium, sulphate, alkalinity as carbonate (calculated 0.6 × total alkalinity as $CaCO_3$), and nitrate as NO_3 (calculated 4.427 x nitrate as N; APHA 2012).

TDS = total dissolved solids; CO_3 = carbonate ion; NO_3 = nitrate ion; mg/L = milligrams per litre.

Figure 1-2: Measured total dissolved solid composition in Wally Lake (top) and Third Portage Lake (north basin; bottom), 2010 to 2021



Notes: Monitoring data was obtained from Azimuth (2022) CREMP environmental monitoring database. Data were included for all stations sampled within Wally Lake and Third Portage Lake (north basin) from 2010 to 2021. Data collected prior to 2010 either did not measure the full suite of major ions or had atypically high detection limits relative to the bulk of the dataset.

Data on the x-axis represent samples collected at each station within a year from 2010 to 2021.

1-3.0 ACUTE TOXICITY DATA FOR TDS

Acute toxicity testing data and corresponding water chemistry data were collected by Veolia (2022) and Agnico Eagle as part of an evaluation of the treatment efficiency in ameliorating acute lethality in Pit E water (ST-19). Pit E water is predicted to have the highest TDS concentrations on average relative to the other pits. Acute toxicity tests performed were:

- Biological Test Method: Reference Method for Determining Acute Lethality of Effluent to *Daphnia magna* (ECCC 2000a).
- Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout (ECCC 2000b).

Acute toxicity test species include the standard protocols (*D. magna* and Rainbow Trout) used to assess compliance for acute lethality under the Metal and Diamond Mining Effluent Regulations (MDMER; Government of Canada 2002). Acute toxicity test results and corresponding water chemistry data for TDS (measured and calculated) and sulphate are presented in Table 1-2, while ionic composition are presented in Figure 1-3.

Acute toxicity testing conducted from 2022 to 2023 with treated Pit E water has indicated no acute toxicity per regulatory definition (i.e., LC_{50} >100% vol/vol) to *D. magna* or Rainbow Trout survival with TDS concentrations up to and including 4,050 mg/L (measured TDS concentrations of 4,000 mg/L). Reduced survival in *D. magna* (40% in full-strength sample) and Rainbow Trout (20% in full-strength sample) was observed in a sample collected November 7, 2022 at TDS concentration of 2,834 mg/L. Additionally, reduced survival in Rainbow Trout (20% in full-strength sample) was observed in a sample collected December 7, 2022 at TDS concentration of 2,382 mg/L. However, in both cases, mortality did not exceed 50%, and several other samples have been tested with measured TDS concentrations greater than 2,812 mg/L, all of which indicated no acutely toxic effects to Rainbow Trout and *D. magna*. Collectively, this review of available acute toxicity data for Meadowbank Mine indicates that acute lethality to regulatory test species *D. magna* and Rainbow Trout is not expected at end-of-pipe with TDS concentrations of less than or equal to 4,000 mg/L.

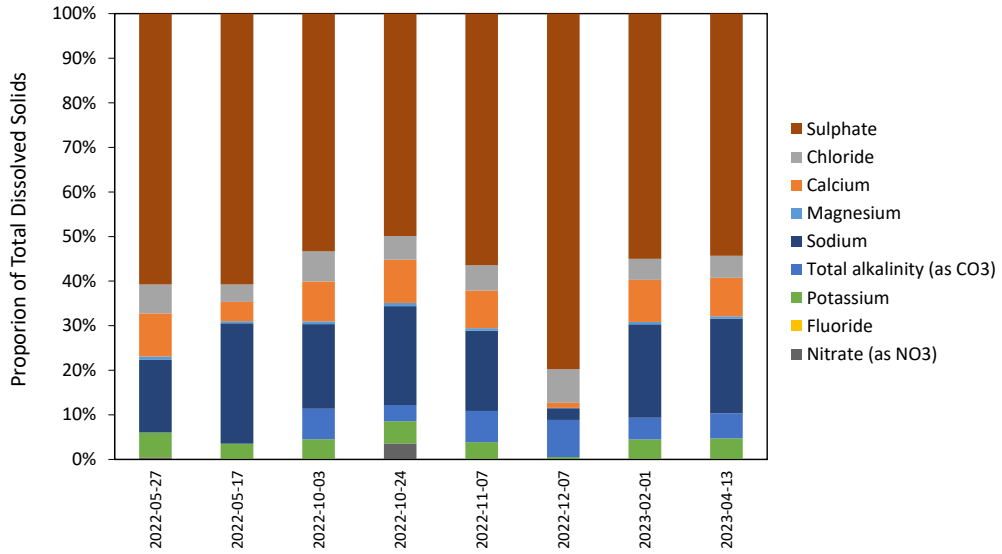
Table 1-2: Acute toxicity data for Mock Treated Effluent (Pit E, ST-19), Meadowbank Mine

Sample Date	Acute Toxicity		Water Chemistry (mg/L)			
	Daphnia magna	Rainbow Trout *Oncorhynchus mykiss*	Measured TDS	Calculated TDS	Sulphate	Total Hardness
	48-hour Survival LC_{50} (% vol/vol)	96-hour Survival LC_{50} (% vol/vol)				
May 17 2022	>100	>100	2,490	3,079	1,870	395
May 27 2022	>100	>100	2,480	2,963	1,800	819
October 3 2022	>100	>100	3,200	2,812	1,500	707
October 24 2022	>100	>100	3,500	3,606	1,800	992
November 7 2022	>100	>100	2,900	2,834	1,600	672
December 2 2022	>100	>100	3,500	2,382	1,900	75
January 2 2023	>100	>100	3,900	3,817	2,100	990
April 13 2023	>100	>100	4,000	4,050	2,200	970

Notes: Hardness is reported as calcium carbonate.

TDS = total dissolved solids; mg/L = milligrams per litre; LC_X = lethal concentration causing a lethal effect to x% of the test population; vol/vol = volume per volume.

Figure 1-3: Measured total dissolved solid composition in Mock Treated Effluent Blends of Pit E water, 2022 to 2023



Note: Total dissolved solid composition from treated Pit E water (ST-19) collected by Veoila (2022) and Agnico (T. Gentry) between 2022 to 2023 using benchtop-scale treatment

Additional lines of evidence compiled from the literature to support evaluation of acute lethality to these test species for comparable TDS mixtures are:

- **Meliadine Mine (Golder 2021)**— a series of toxicity tests were conducted to support validation of the TDS EQC and SSWQO established for Meliadine Mine. As part of this work, toxicity identification evaluation (TIE) testing was conducted with the cladoceran *C. dubia* to evaluate if effects on the survival endpoint changed with a shift in the ionic composition while the TDS concentration was held constant. Meliadine Mine TDS composition is chloride-dominant, but one of the mixtures evaluated in the TIE involved reduction of the relative proportion of chloride by replacing with increased relative proportion of sulphate. The 7-d LC_{50} for *C. dubia* shifted from 3,581 mg/L TDS in the chloride-dominant TDS mixtures (~50% chloride as TDS; ~8% sulphate as TDS) to no effect (i.e., 100% survival) with an unbounded LC_{50} of >4,250 mg/L in a sulphate-dominant TDS mixture (~35% sulphate as TDS; ~23% chloride as TDS). It is important to acknowledge that *C. dubia* survival endpoint is not routinely applied as a measure of acute toxicity under the MDMER or other effluent discharge regulations, as it is a chronic test, and more sensitive than the standard tests used to evaluate acute toxicity in undiluted effluent (i.e., Rainbow Trout and *D. magna*). Confirmation of an LC_{50} for *C. dubia* for a TDS mixture broadly comparable to Meadowbank Mine, for a highly sensitive aquatic species, and for a longer test duration relative to *D. magna*, provides an additional margin of safety confirming no expectation of acute toxicity at TDS concentrations ~4,000 mg/L.

- **Faro Mine (CIRNAC 2020)**— Site-specific testing programs were conducted using mock treated effluent waters for the Faro Mine Site to evaluate short-term sulphate effluent quality criteria (as a surrogate for TDS) developed for the site. The ionic composition of site waters used in testing was calcium-sulphate dominant. Acute toxicity testing was conducted with Rainbow Trout (96-hr exposure) and *D. magna* (48-hr exposure). Testing was conducted under high water hardness conditions (>250 mg/L as $CaCO_3$). No acute toxicity was observed to either test species at the highest tested sulphate concentration of 2,890 mg/L, corresponding to a TDS concentration ranging from 3,870 to 3,960 mg/L.

1-4.0 CHRONIC TOXICITY DATA FOR TDS

This review of chronic toxicity data from the literature and other sites was drawn from recent work completed for other projects. The dataset was screened to reflect exposure conditions broadly representative of the expected TDS composition at Meadowbank as informed by the current modelled predictions and measured chemistry data:

- Ionic composition—as ionic composition is the most important factor for evaluating TDS toxicity, data were retained from the literature and other sites with a broadly comparable (i.e., sulphate-dominant) ionic composition to Meadowbank Mine. Based on review of calcium and magnesium concentrations in the pit lakes and receiving environment lakes for Meadowbank Mine, it is expected that the calcium to magnesium (Ca:Mg) ratio will be greater than 1.0. Therefore, only data from the literature and other sites evaluating a Ca:Mg ratio of >1.0 were retained herein. If the ionic composition was not reported or could not be discerned from the information provided by the authors, then the study was excluded.
- Hardness—although hardness is not the primary exposure toxicity modifying factor for TDS toxicity, it is important for evaluating individual ion toxicity for sulphate. Therefore, the dataset was also tailored based on hardness conditions. Data were retained where the nominal hardness levels were ≥100 mg/L as $CaCO_3$.

Currently, there are no federal, Provincial, or Territorial water quality guidelines for TDS in Canada. Several other sites have developed criteria/benchmarks/SSWQO that are applicable for Meadowbank (i.e., sulphate-dominant TDS mixtures):

- **Alaska Criteria (ADEC 2009; Brix et al. 2010)**—TDS criteria range from 500 to 1,500 mg/L (ADEC 2009), depending on the TDS composition and whether the receiving environment is potential salmon spawning habitat. Permits are required for discharges to receiving water that result in an increase in TDS concentration in the waterbody between 500 and 1,000 mg/L. Chapman et al. (2000) reported that studies conducted for Coeur Alaska's Kensington Mine site resulted in the first site-specific TDS permit in Alaska. The permit states that TDS may not exceed 1,000 mg/L in Sherman Creek, the receiving waterbody of Kensington Mine effluent (ADEC 2017). Alaska also granted a site-specific permit for Red Dog Mine effluent (ADEC 2013; Brix et al. 2010). Concentrations of TDS up to 1,500 mg/L are permitted during periods when salmonids are not spawning, provided calcium is greater than 50% by weight of the total cations (ADEC 2013; Brix et al. 2010). During spawning periods, the limit was set at 500 mg/L (Brix et al. 2010). The studies used to establish the Alaskan TDS water quality criterion were based on ionic compositions dominated by calcium sulphate, which is relevant for Meadowbank Mine.

- **IDNR Criteria (IDNR 2009)**—In 2004, the Iowa Department of Natural Resources (IDNR) adopted an interim TDS standard of 1,000 mg/L in receiving streams; the standard was used as a screening value to determine whether site-specific toxicity testing was required (IDNR 2009). However, IDNR since recommended replacing the TDS standard with numerical sulphate and chloride criteria (IDNR 2009) under the assumption that the individual ions provide a more defensible basis for evaluating toxicity relative to the sum of the ions.

- **Faro Mine (CIRNAC 2020)**—Site-specific testing programs were conducted using waters from the Faro Mine Site in the Yukon, Canada to evaluate a long-term sulphate SSWQO (as a surrogate for TDS) developed for the site. The ionic composition of site waters used in testing was calcium-sulphate dominant. Chronic toxicity testing was conducted with early lifestage Fathead Minnow (*Pimephales promelas*; 7-d exposure), *C. dubia* neonates (<24-hr old, 3 brood exposure), and alga *Pseudokirchneriella subcapitata* (72-hr growth inhibition). Testing was conducted under high water hardness conditions (>250 mg/L as $CaCO_3$). No chronic toxicity to Fathead Minnow was observed with a NOEC of 2,106 mg/L TDS (1,480 mg/L sulphate). The most sensitive endpoint was *C. dubia* reproduction (EC_{20} = 1,744 mg/L TDS; 1,154 mg/L sulphate), followed by *P. subcapitata* growth (EC_{20} = 1,796 mg/L TDS; 1,211 mg/L sulphate). Based on this, Faro Mine established an SSWQO of sulphate of up to 800 mg/L at hardness of 432 mg/L (as $CaCO_3$), which corresponds to a TDS composition of ~1,143 to 1,212 mg/L (assuming 66% to 70% SO_4 as TDS).

- **Elk Valley Coal Mining Operations (Teck 2014)**—Site-specific testing programs were conducted using waters from the Elk Valley in southeastern British Columbia in support of the Elk Valley Water Quality Plan (Teck 2014). Testing programs evaluated the sensitivity of sulphate to crustaceans and other invertebrates, and to fish. Site-specific toxicity testing conducted in support of the Elk Valley Water Quality Plan consisted of two programs: the Phase 1 Mixture Toxicity Study (Golder and Nautilus 2013) and the Fall 2013 testing program (Teck 2014). The ionic composition of the exposure waters in all of these studies was calcium sulphate dominant.

  - The Phase 1 Mixture Toxicity Study evaluated sulphate toxicity under high hardness conditions (>500 mg/L as $CaCO_3$) to Rainbow Trout (*Oncorhynchus mykiss*) embryo-alevin (28-d exposure), *C. dubia* neonates (<24-hr old, 7-d exposure), and mayfly *Centroptilum triangulifer* (28-d exposure). The most sensitive endpoint was for Rainbow Trout development with an IC_{20} of 530 mg/L at a hardness concentration of 830 mg/L. The next most sensitive endpoint reported by Golder and Nautilus (2013) was for *C. dubia* reproduction with an IC_{20} of 595 mg/L at a hardness concentration of 910 mg/L. Based on the lowest reported chronic endpoints, Golder and Nautilus (2013) concluded that the benchmark for chronic toxic effects from sulphate in the very hard site-specific water was between 500 and 600 mg/L, with associated total dissolved solids concentrations approximately equal to or greater than 1,000 mg/L.

  - The Fall 2013 testing program evaluated sulphate toxicity under high hardness conditions (>100 mg/L as $CaCO_3$) to Rainbow Trout swim-up fry (28-d exposure), early life stage Fathead Minnow (7-d exposure), *C. dubia* neonates (<24-hr old, 3 brood exposure), and the amphipod *Hyalella azteca* (14-d exposure). Sulphate was not toxic to *C. dubia*, *H. azteca*, Fathead Minnow, or Rainbow Trout up to the maximum sulphate concentrations tested (approximately 1,100 to 1,200 mg/L) corresponding to TDS of >1,000 mg/L. Individual replicates for some tests exhibited performance for survival, growth, or reproduction that were below reference responses, but overall patterns indicated weak or non-existent concentration responses across the range of sulphate concentrations.

In addition to the derived benchmarks for other sites, literature data were compiled from studies that met the screening criteria presented earlier (Table 1-3). The following trends were identified for generic TDS mixtures based on the other sites and literature data:

- Phytoplankton—effect concentrations for phytoplankton are generally higher than 1,000 mg/L. One study indicated lower tolerance of phytoplankton below 1,000 mg/L (LeBlond and Duffy 2001), but this was with a TDS composition of 70% sulphate as TDS. For TDS mixtures with composition closer to Meadowbank Mine, the TDS effect concentrations were higher than 1,000 mg/L.
- Benthic invertebrates and zooplankton—in general, adverse effect concentrations were above 1,000 mg/L, with the following exceptions. Kunz et al. (2013) reported lower (estimated) TDS effect concentrations for the amphipod *H. azteca* (MATC ~787 mg/L TDS) and the cladoceran *C. dubia* (MATC ~790 mg/L TDS) relative to the rest of the dataset. This study reported hypothesis-based endpoints from a limited number (n=4) of treatments; the significant reduction in the test endpoints occurred between two treatments with a more than 4-fold difference in test concentrations. In the absence of regression-based endpoints, the maximum allowable toxicant concentration (MATC) was calculated as the geometric mean of the no observed effect concentration (NOEC)[3] and lowest observed effect concentration (LOEC)[4] reported in the study; the MATC is a more preferred endpoint for benchmark derivation than a NOEC or LOEC (CCME 2007). Because of the study design (i.e., wide concentration series), the MATC for these two species is highly uncertain. Data from two other studies for *H. azteca* and five other studies for *C. dubia* reported TDS effect concentration greater than 1,000 mg/L.
- Fish—Fish were similarly or less sensitive to TDS toxicity than zooplankton and plants, with effect concentrations for ranging from 1,116 mg/L to 2,039 mg/L TDS (geometric means).

Lower effect concentrations have been reported for individual ions for select species, but these tests reflect exposure conditions accounting for a single ion, and not a balanced TDS mixture representative of most field conditions. As discussed earlier, TDS toxicity is dependent on the characteristics of the mixture and therefore, inferring toxicity from individual ions is difficult due in part to interdependence among ions.

[3] Highest test concentration with no significant difference in test endpoint relative to control.

[4] Lowest test concentration with a significant difference in test endpoint relative to control.

Table 1-3: Chronic toxicity test dataset for sulphate-dominant total dissolved solid mixtures

Receptor	Test Species	Common Name	Life Stage	Test Duration	Endpoint	Test Statistic	Geomean TDS (mg/L)[a]	Result (mg/L)		Hardness (mg/L as $CaCO_3$)	Ca:Mg Ratio	TDS Composition	Reference
								TDS[b]	Sulphate				
Fish	*Oncorhynchus mykiss*	Rainbow Trout	fry	7 d	mortality and growth	NOEC	2,039	>1,999	>1,399	1,412	13	Calcium-sulphate dominant (70% SO_4 as TDS)	Chapman et al. 2000 (Red Dog mine)
Fish	*Oncorhynchus mykiss*	Rainbow Trout	fry	7 d	mortality and growth	NOEC		>2,080	>1,040	1,256	14	Calcium-sulphate dominant (50% SO_4 as TDS)	Chapman et al. 2000 (Kensington mine)
Fish	*Oncorhynchus mykiss*	Rainbow Trout	embryos	7 d	viability	NOEC	>1,999	>1,999	>1,399	1,261	13	Calcium-sulphate dominant (70% SO_4 as TDS)	Chapman et al. 2000 (Red Dog mine)
Fish	*Oncorhynchus mykiss*	Rainbow Trout	embryo-alevin	7 d	survival, growth, and biomass	EC_{10}	>1,214	>1,113	>945	206	3.3	Bicarbonate-calcium-sulphate dominant	Teck 2014 (Fall 2013)
Fish	*Oncorhynchus mykiss*	Rainbow Trout	embryo-alevin	7 d	survival, growth, and biomass	EC_{10}		>1,058	>905	161	4.5	Bicarbonate-calcium-sulphate dominant	Teck 2014 (Fall 2013)
Fish	*Oncorhynchus mykiss*	Rainbow Trout	embryo-alevin	7 d	survival, growth, and biomass	EC_{10}		>1,430	>1,140	480	2.1	Bicarbonate-calcium-sulphate dominant	Teck 2014 (Fall 2013)
Fish	*Oncorhynchus mykiss*	Rainbow Trout	embryo-alevin	7 d	survival, growth, and biomass	EC_{10}		>1,289	>1,050	364	2.5	Bicarbonate-calcium-sulphate dominant	Teck 2014 (Fall 2013)
Fish	*Oncorhynchus mykiss*	Rainbow Trout	<24 h old gametes	29 d	survival	EC_{25}	1,437	2,316	1,621	54 to ~1,900	2.5	Calcium-sulphate dominant[c]	Van Geest et al. 2018a[d]
Fish	*Oncorhynchus mykiss*	Rainbow Trout	<24 h old gametes	29 d	survival	EC_{25}		1,895	1,232	54 to ~1,900	2.5	Calcium-sulphate dominant[c]	Van Geest et al. 2018a[d]
Fish	*Oncorhynchus mykiss*	Rainbow Trout	embryo-alevin	28 d	survival, growth, and biomass	IC_{20}		923	530	830	2.6	Bicarbonate-calcium-sulphate dominant	Teck 2014 (PI MTS)
Fish	*Oncorhynchus mykiss*	Rainbow Trout	embryo-alevin	28 d	survival, growth, and biomass	IC_{20}		1,052	622	946	2.6	Bicarbonate-calcium-sulphate dominant	Teck 2014 (PI MTS)
Fish	*Oncorhynchus mykiss*	Rainbow Trout	embryo-alevin	28 d	normal alevins	EC_{10}	1,802	1,802	1,187	1,559	5.1	Calcium-sulphate dominant	CIRNAC 2020
Fish	*Pimephales promelas*	Fathead Minnow	<24 h post-hatch	7 d	survival and growth	EC_{10}	1,454	2,106	1,480	1,559	4.8	Calcium-sulphate dominant	CIRNAC 2020
Fish	*Pimephales promelas*	Fathead Minnow	<24 h post-hatch	7 d	survival	EC_{10}		>1,096	>947	161	4.5	Bicarbonate-calcium-sulphate dominant	Teck 2014
Fish	*Pimephales promelas*	Fathead Minnow	<24 h post-hatch	7 d	survival	EC_{10}		>1,440	>1,150	485	2.1	Bicarbonate-calcium-sulphate dominant	Teck 2014
Fish	*Pimephales promelas*	Fathead Minnow	<24 h post-hatch	7 d	survival	EC_{10}		>1,346	>1,100	378	2.5	Bicarbonate-calcium-sulphate dominant	Teck 2014
Fish	*Pimephales promelas*	Fathead Minnow	<24 h post-hatch	7 d	survival	EC_{20}	>1,116	>1,116	>948	245	3.3	Bicarbonate-calcium-sulphate dominant	Teck 2014
Invertebrate	*Ceriodaphnia dubia*	water flea	<24 h old neonates	8 d	reproduction	EC_{25}	1,511	2,193	>1,535	54 to ~1,900	2.5	Calcium-sulphate dominant[c]	Van Geest et al. 2018a[d]
Invertebrate	*Ceriodaphnia dubia*	water flea	<24 h old neonates	8 d	reproduction	EC_{25}		2,286	>1,600	54 to ~1,900	2.5	Calcium-sulphate dominant[c]	Van Geest et al. 2018a[d]
Invertebrate	*Ceriodaphnia dubia*	water flea	<24 h neonate	3-brood	reproduction	EC_{20}		1,744	1,154	1,481	4.7	Calcium-sulphate dominant	CIRNAC 2020
Invertebrate	*Ceriodaphnia dubia*	water flea	<24 h old neonates	7 d	reproduction	EC_{20}		1,019	452	779	75	Calcium-chloride-sulphate dominant	Mount et al. 2019
Invertebrate	*Ceriodaphnia dubia*	water flea	<24h neonate	8 d	reproduction	IC_{20}		1,012	595	910	2.6	Bicarbonate-calcium-sulphate dominant	Teck 2014 (PI MTS)
Invertebrate	*Ceriodaphnia dubia*	water flea	<24h neonate	8 d	reproduction	IC_{20}		1,322	840	1,189	2.3	Bicarbonate-calcium-sulphate dominant	Teck 2014 (PI MTS)
Invertebrate	*Ceriodaphnia dubia*	water flea	<24h neonate	8 d	reproduction	EC_{10}	1,222	>1,092	>894	245	3.3	Bicarbonate-calcium-sulphate dominant	Teck 2014 (Fall 2013)
Invertebrate	*Ceriodaphnia dubia*	water flea	<24h neonate	8 d	reproduction	EC_{10}		>1,100	>951	245	3.3	Bicarbonate-calcium-sulphate dominant	Teck 2014 (Fall 2013)
Invertebrate	*Ceriodaphnia dubia*	water flea	<24h neonate	8 d	reproduction	EC_{10}		>1,455	>1,165	245	3.3	Bicarbonate-calcium-sulphate dominant	Teck 2014 (Fall 2013)
Invertebrate	*Ceriodaphnia dubia*	water flea	<24h neonate	8 d	reproduction	EC_{10}		>1,276	>1,030	245	3.3	Bicarbonate-calcium-sulphate dominant	Teck 2014 (Fall 2013)

Table 1-3: Chronic toxicity test dataset for sulphate-dominant total dissolved solid mixtures

Receptor	Test Species	Common Name	Life Stage	Test Duration	Endpoint	Test Statistic	Geomean TDS (mg/L)[a]	Result (mg/L)		Hardness (mg/L as $CaCO_3$)	Ca:Mg Ratio	TDS Composition	Reference
								TDS[b]	Sulphate				
Invertebrate	*Ceriodaphnia dubia*	water flea	<24 h old neonates	7 d	reproduction (mean offspring per female)	MATC[e]	790	790	411	235 to 1,461	1.7	Sodium-sulphate dominant	Kunz et al. 2013
Invertebrate	*Hyalella azteca*	amphipod	2 to 9 d old	14 d	growth (average dry weight)	EC_{25}	1,527	868	564	54 to ~1,900	2.5	Calcium-sulphate dominant[c]	Van Geest et al. 2018a[d]
Invertebrate	*Hyalella azteca*	amphipod	2 to 9 d old	14 d	growth (average dry weight)	EC_{25}		2,685	>1,745	54 to ~1,900	2.5	Calcium-sulphate dominant[c]	Van Geest et al. 2018a[d]
Invertebrate	*Hyalella azteca*	amphipod	-	14 d	survival, growth, and biomass	EC_{10}	1,250	>1,148	>950	245	3.3	Bicarbonate-calcium-sulphate dominant	Teck 2014 (Fall 2013)
Invertebrate	*Hyalella azteca*	amphipod	-	14 d	survival, growth, and biomass	EC_{10}		>1,096	>947	161	4.5	Bicarbonate-calcium-sulphate dominant	Teck 2014 (Fall 2013)
Invertebrate	*Hyalella azteca*	amphipod	-	14 d	survival, growth, and biomass	EC_{10}		>1,440	>1,150	485	2.1	Bicarbonate-calcium-sulphate dominant	Teck 2014 (Fall 2013)
Invertebrate	*Hyalella azteca*	amphipod	-	14 d	survival, growth, and biomass	EC_{10}		>1,346	>1,100	378	2.5	Bicarbonate-calcium-sulphate dominant	Teck 2014 (Fall 2013)
Invertebrate	*Hyalella azteca*	amphipod	~7 d old	28 d	biomass (mean dry weight of survivors)	MATC[e]	787	787	346	193 to 1,495	1.6	Sodium-sulphate dominant	Kunz et al. 2013
Invertebrate	*Centroptilum triangulifer*	mayfly	-	28 d	survival and biomass	IC_{20}	1,427	1,398	885	1,257	2.5	Bicarbonate-calcium-sulphate dominant	Teck 2014 (PI MTS)
Invertebrate	*Centroptilum triangulifer*	mayfly	larvae to subimago stage	life cycle	survival (as% emergence)	EC_{25}^{c}		2,025	1,439	87 to 1,605	2.7	Calcium-sulphate dominant	Buchwalter et al. 2018[d]
Invertebrate	*Centroptilum triangulifer*	mayfly	larvae to subimago stage	life cycle	survival (as% emergence)	EC_{25}^{c}		1,168	841	55 to 1,574	2.7	Calcium-sulphate dominant	Buchwalter et al. 2018[d]
Invertebrate	*Centroptilum triangulifer*	mayfly	first instar; ≤48 hr old	~35 d	survival and biomass	NOEC[e][f]		1,255	~>640	NR	NR	Sodium-sulphate dominant	Kunz et al. 2013
Invertebrate	*Chironomus dilutus*	midge	larvae	10 d	mortality	MATC	1,499	1,461	~731	~1,145	17	Calcium-sulphate dominant (50% SO_4 as TDS)	Chapman et al. 2000 (Kensington mine)
Invertebrate	*Chironomus dilutus*	midge	larvae	10 d	growth	MATC		1,539	~1,077	~1,414	13	Calcium-sulphate dominant (70% SO_4 as TDS)	Chapman et al. 2000 (Red Dog mine)
Invertebrate	*Lampsilis siliquoidea*	fatmucket clam	~2 months old	28 d	individual length	NOEC[e]	1,245	1,265	>645	217 to 1,461	1.6	Sodium-sulphate dominant	Kunz et al. 2013
Invertebrate	*Villosa iris*	rainbow mussel	juvenile (>3.5 months)	55 d	survival	NOEC	>645	>441[g]	>118	205	2.5	Bicarbonate-sulphate dominant	Ciparis et al. 2015
Invertebrate	*Villosa iris*	rainbow mussel	juvenile (>3.5 months)	55 d	survival	NOEC		>944[g]	>434	381	1.7	Bicarbonate-sulphate dominant	Ciparis et al. 2015
Plant	*Pseudokirchneriella subcapitata*	green algae	-	96 h	growth	NOEC	>2,000	>2,000	~>1,000	—	—	Calcium-sulphate dominant (50% SO_4 as TDS)	Chapman et al. 2000 (Kensington mine)
Plant	*Pseudokirchneriella subcapitata*	green algae	-	72 h	growth	EC_{20}	995	551	~385	—	—	Calcium-sulphate dominant (70% SO_4 as TDS)	LeBlond and Duffy 2001 (Red Dog Mine)
Plant	*Pseudokirchneriella subcapitata*	green algae	-	72 h	growth	EC_{20}		1,796	1,211	1,461	4.5	Calcium-sulphate dominant	CIRNAC 2020

Notes:

(a) The geometric mean was calculated for each species for comparable biological endpoints and test statistics per Chapman (2015).

(b) Most studies reported effect concentrations in terms of sulphate. The effect concentration in terms of TDS was calculated herein if not reported by the author(s). Calculation used measured water chemistry reported during the test in the treatment corresponding to the test statistic to calculate TDS or estimate the percent sulphate as TDS in the treatments bounding the test statistic and then dividing the reported result as sulphate by percent sulphate as total dissolved solids to obtain the estimated test statistic as TDS.

(c) Ionic composition estimated from TDS composition figures for *Ceriodaphnia dubia*. The same mixture was evaluated across test species and therefore, the ionic composition for *C. dubia* was assumed to apply to the other test species.

(d) Regression based endpoints were not reported by Buchwalter et al. (2018) but were estimated from figures presented in Van Geest et al. (2018a).

(e) NOEC and LOEC values are reported by the authors as volumetric concentration (% v/v) of the dilution series used for the exposure. Therefore, NOEC and LOEC for sulphate were determined by cross-referencing volumetric exposure concentration for the NOEC and LOEC with measured sulphate concentrations presented in Table S4.

(f) The survival NOEC for *Centroptilum triangulifer* (now *Neocloeon triangulifer*) was extracted from discussion in Soucek and Dickinson (2015) paper.

(g) Survival at this unbounded NOEC was greater than 95%.

TDS = total dissolved solids; Ca:Mg = calcium to magnesium mass ratio; mg/L = milligrams per litre; $CaCO_3$ = calcium carbonate; NOEC = no observable effects concentration; LOEC = lowest observable effects concentration; IC_X = inhibitory concentration that results in x% reduction in sublethal endpoint; LC_X = lethal concentration that results in x% lethality to test population; EC_X = effects concentration that results in x% effect in test population; ~ = approximately.

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ATTACHMENT 2

Site-Specific Toxicological Studies for Total Dissolved Solids Using Mine-Impacted Waters

This attachment summarizes the methods and results of the 2024 total dissolved solids (TDS) toxicity testing program, which focused on the characterization of adverse effects of TDS in short-term and long-term aqueous exposures to aquatic organisms. These tests were conducted to support development of site-specific effluent quality criteria (EQC) to apply at the end-of-pipe at the point of discharge and site-specific water quality objectives (SSWQO) to apply at the edge of the mixing zone in the receiving environment. The memorandum presents the background and objectives for the study (Section 2-1.0), followed by the methods (Section 2-2.0) and results (Section 2-3.0). Uncertainties associated with study outcomes are discussed in Section 2-4.0. A summary of key findings is discussed in Section 2-5.0.

Table 2-1: Overview of Toxicity Testing Programs for Total Dissolved Solids

Toxicity Testing Program	Dilution Water	Laboratory Toxicity Test				
		***Daphnia magna* Survival Test (48-h)**	**Rainbow Trout Survival Test (96-h)**	***Raphidocelis subcapitata* Growth (72-h)**	***Ceriodaphnia dubia* Survival and Reproduction (7 to 8-d)**	***Oncorhynchus mykiss* Embryo-Alevin Survival and Normal Development (30-d)**
Acute TDS	Pit E Cryo-concentrated Water	☑	☑	—	—	—
Chronic TDS	Site-collected Water	—	—	☑	☑	—
	Synthetic Laboratory Water	—	—	—	—	Fall 2024[(a)]

Notes: TDS = total dissolved solids; ☑ = toxicity test performed; — = not tested or not applicable.

(a) Rainbow Trout embryo-alevin survival and viability testing for predicted discharge composition will be integrated in Fall 2024 (dependent on timing of available and viable gametes).

2-1.0 INTRODUCTION

Acute and chronic site-specific toxicity testing programs were initiated to inform development of site-specific benchmarks for the Meadowbank Mine site (Meadowbank; MBK) located in the Kivalliq Region of Nunavut. This attachment presents the acute and chronic study objectives (Section 2-1.1), methodology, (Section 2-2.0), results (Section 2-3.0), uncertainty (Section 2-4.0), and key findings (Section 2-5.0). The key findings from this study were used as lines-of-evidence in deriving site-specific effluent quality criteria (EQC) to apply at the end-of-pipe at the point of discharge and site-specific water quality objective (SSWQO) to apply at the edge of the mixing zone in the receiving environment. This information was considered alongside supplementary information obtained from the literature and other mining sites for comparable ionic compositions as Meadowbank Mine (Attachment 1).

2-1.1 Objectives

The objectives of the TDS study were to:

1) Evaluate site-specific acute TDS toxicity to regulatory test species the water flea *Daphnia magna* and the fish Rainbow Trout (*Oncorhynchus mykiss*) using waters with ionic compositions representative of future effluent discharge conditions (end-of-pipe) at Meadowbank Mine Complex (acute study).

2) Evaluate site-specific chronic TDS toxicity to sensitive, surrogate aquatic test species using waters with ionic compositions representative of receiving environment conditions in Third Portage Lake or Wally Lake at the edge of the regulated mixing zone under a future effluent discharge scenario (chronic study).

2-2.0 METHODS

2-2.1 Acute Toxicity Program

2-2.1.1 Source Water for Testing

Site water was collected and processed for use in acute toxicity testing by Agnico as follows:

- Collection—raw water was collected from a mine-impacted settling pond at the Meadowbank Mine Complex named Pit E.
- Preparation—raw water was treated by Agnico staff to remove metals and nutrients to below a level of concern for acute toxicity.
- Cryo-concentration—prepared water was cryo-concentrated by Agnico staff and shipped to Nautilus Environmental Inc. (Nautilus, Guelph, Ontario).

Although synthesizing high TDS solutions in the laboratory to simulate major ion compositions of mine-impacted waters can be completed for some ionic compositions, it is WSP's experience that generating super-saturated synthetic waters of the nature required for this acute program (i.e., >5000 mg/L TDS with ~50% proportion sulphate as TDS) using laboratory waters is subject to solubility constraints. Therefore, Agnico staff cryo-concentrated the prepared Pit E water to a target TDS. This process was conducted by reducing the water temperature, removing the upper (partially) frozen layer that contains little-to-no solutes, and then repeating the process until target TDS concentrations were obtained.

2-2.1.2 Laboratory Methods

2-2.1.2.1 Toxicity Testing Protocols

Cryo-concentrated waters were shipped to Nautilus Environmental laboratory in Guelph, Ontario for toxicity testing (Table 2-2). Upon receipt at the laboratory, samples were stored in the dark at 4 ± 2°C prior to testing.

Table 2-2: Pit E Toxicity Test Sample Information

TDS Treatment (Measured; mg/L)	Toxicity Test Initiation Date
4,590	12-Mar-2024
6,350	12-Mar-2024
6,920	12-Mar-2024
8,710	19-Mar-2024
10,100	27-Mar-2024

The acute toxicity testing study included two species (one invertebrate and one fish) commonly used in regulatory toxicity testing programs for effluent per the Metal and Diamond Mining Effluent Regulations (Government of Canada 2002; Appendix A):

- **48-hour *Daphnia magna* acute lethality**—Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to *D. magna*, Environment Canada, Environmental Protection Series 1/RM/13, December 2000, as amended (ECCC 2000a).
- **96-hour Rainbow Trout (*Oncorhynchus mykiss*) acute lethality**—Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout. Method and Development and Applications Unit. Environment Canada. EPS1/RM/13. Amended May 2007 and February 2016 (ECCC 2000b).

All tests were run as a pass-fail (full-strength 100% sample) with a negative laboratory control[1] and a cryo-concentrated sample at five different TDS concentrations (4,590, 6,350, 6,920, 8,710, and 10,100 mg/L [measured]). Prior to test initiation, the sample was allowed to settle overnight. The following day, the sample was carefully decanted so that no settled solids from the bottom of the sample were included in the test solutions.

2-2.1.2.2 Analytical Chemistry

Nautilus subsampled each TDS treatment at test initiation and submitted to Bureau Veritas Laboratories (BV Labs) in Guelph, ON. Samples were analyzed for standard routine parameters (i.e., pH, hardness, specific conductivity, total alkalinity), major ions (e.g., Ca^{2+}, Mg^{2+}, Na^{+}, K^{+}, SO_4^{2-}, NO_3^{-}, Cl^{-}, F^{-}, and HCO_3^{-}), total/dissolved metals, total cyanide (including Strong-Acid Digestion [SAD], Weak-Acid Digestion [WAD], free cyanide), and thiocyanate (Appendix B).

[1] The negative laboratory control contains clean dilution water prepared using a standard laboratory recipe and not amended by the Nautilus. The negative control is used as a quality assurance and quality control standard for test validity (i.e., it is used to assess organism health and test reliability).

2-2.1.3 Toxicity Data Analysis

2-2.1.3.1 Quality Assurance and Quality Control

Quality assurance information from the Nautilus Toxicity Report (Appendix A) was reviewed and summarized to establish that organism performance in the laboratory control water met acceptability criteria for the protocol as it pertains to the health histories and sensitivity of the organisms, and that no unplanned deviations from test procedures occurred that would influence the reliability of the data.

2-2.2 Chronic Toxicity Program

2-2.2.1 Source Water for Testing

For chronic toxicity testing, it is desirable to evaluate samples that have water quality (including exposure and toxicity modifying factors) representative of the edge of the regulated mixing zone. To evaluate toxicity under site-specific conditions, it is often preferable to use site water samples (surface water), but this must be balanced against the feasibility and practicality of sampling the desired conditions (issues related to sample volumes, accessibility, health and safety), along with the ability to control for concentrations of specific constituents and exposure and toxicity modifying factors during handling and transport. As this study evaluated future exposure conditions in the receiving environment during effluent discharge, it was not feasible to directly collect fully representative source waters for testing from the field. Therefore, laboratory amendment of site waters and laboratory-prepared synthetic waters were selected as the two viable options.

The source water used for chronic toxicity testing varied by test species. Amended site water was used for testing with the cladoceran *Ceriodaphnia dubia* and the algae *Raphidocelis* subcapitata.

Site water was collected from a raw drinking water intake pipe connected to Third Portage Lake (station DW-RAW-KIA) by Agnico on 27 March 2024. Water was collected from the pipe rather than directly from the lake due to site access issues (i.e., ice cover and adverse, unsafe weather conditions). The site water was shipped to Nautilus Environmental laboratory (Nautilus) in Calgary, Alberta. Upon receipt at the laboratory, Nautilus subsampled for analytical chemistry (Section 2-2.2.2.3). Samples were then stored in the dark at 4 ± 2°C prior to use in toxicity tests. Following receipt of analytical chemistry (Section 2-2.2.2.3) for the site water, samples were brought to test temperature, amended with ion salts as described in Section 2-2.2.2.2, and a dilution series was created to evaluate range of TDS.

Table 2-3: Site Reference Chemistry for Major Ions

Constituent	Concentration (mg/L)	Proportion of TDS (%)
Sulphate	74	60
Chloride	0.94	0.77
Calcium	33	27
Magnesium	1.2	1.0
Sodium	1.3	1.1
Alkalinity (as CO_3)	11	8.9
Potassium	0.68	0.56
Fluoride	0.081	0.07
Nitrate (as NO_3)	0.020	0.07
Calculated TDS	122	100

TDS = total dissolved solids; CO_3 = carbonate; NO_3 = nitrate ion; mg/L = milligrams per litre.

2-2.2.2 Laboratory Methods

2-2.2.2.1 Toxicity Testing Protocols

The chronic TDS study presented in this report included two test species (one plant and one invertebrate). An additional chronic TDS study with a fish (embryo-alevin Rainbow Trout) is ongoing and the results will be integrated in Fall 2024 report. The selected test species are commonly used in environmental effects monito.ring programs, including evaluation of the chronic effects of mine discharges to receiving environments. The test protocols are highly standardized and have exhibited sensitivity to the chronic effects of major ion mixtures.

The toxicity test protocols for the chronic TDS study presented in this report were:

- ***Raphidocelis subcapitata*[2] growth inhibition**—Biological Test Method: Growth inhibition test using a freshwater alga, Environment Canada, Environmental Protection Series 1/RM/25, March 2007, as amended (ECCC 2007a).
- **Three-brood *Ceriodaphnia dubia* survival and reproduction**— Biological Test Method: Test of reproduction and survival using the cladoceran *Ceriodaphnia dubia*, Environment Canada, Environmental Protection Series 1/RM/21, February 2007 (ECCC 2007b).
  - The *C. dubia* test was run to a maximum of eight days, or production of three broods in all synthetic base water replicates (whichever is shorter), such that the potential effect of early termination can be evaluated further. The standard Environment Canada protocol specifies termination when 60% of negative control replicates have reached a third brood, which in some cases can lead to premature termination due to minor differences in brood timing. This change did not require a protocol deviation for standard reporting, rather it allowed for additional information on reproduction timing and output.

[2] Formerly known *as Pseudokirchneriella subcapitata* and is still referred to as such in the Nautilus laboratory report (Appendix C).

2-2.2.2.2 Water Amendments

The toxicity tests for the chronic TDS study presented in this report were conducted with three water types, as follows:

1) **Negative Laboratory Control**—This water type was clean dilution water prepared using a standard recipe and not customized to site-specific ionic composition. The negative control was used as a quality assurance and quality control standard for test validity (i.e., it is used to assess organism health and test reliability).

2) **Site Reference**—This water type was unamended site water. This water type was used to evaluate baseline water responses in site water or simulated site water, as the dilution water in the test, and as the control for pairwise statistical comparisons (if test validity criteria was met; Section 2-2.1.3.1).

1) **TDS Treatments**—This water type was unamended site water amended with major ion salts to reach target TDS concentration and ion composition. This water was amended to the highest target concentration of approximately 2,296 mg/L TDS and then volumetric dilutions with proportions of the TDS-amended- water and the unamended site references were prepared to target a range of concentrations for TDS that bound and extend beyond the maximum expected TDS at the edge of the mixing zone in Third Portage Lake under future discharge conditions. The site reference and TDS treatments were combined at a ratio of 23:77 (site reference: TDS-amended treatment water) to achieve a gradient of TDS concentrations (Table 2-4). The target ion composition was derived from a conservative modelled scenario for treated effluent (Vault Pit base waters; Attachment 1, Section 1-2) with a slight adjustment to the proportion of cations to balance the mixture. The target ion composition in the high treatment was approximately 43% sulphate, 15% chloride, 15% sodium, 13% calcium, 8% nitrate, 3% potassium, and negligible contributions of magnesium and fluoride.

Table 2-4: Concentration Series for the Chronic TDS Toxicity Testing Program

Water Type	Target TDS Treatment (mg/L)	Amendment
Negative laboratory control	~122	None
Site reference	~122	None
TDS Treatments	713	Amended with $CaSO_4$, KCl, $MgSO_4$, Na_2SO_4, $NaHCO_3$, $CaCl_2$, and $NaNO_3$ salts with Ca:Mg ratio of 9.5:1 to 11:1
	889	
	1,117	
	1,414	
	1,799	
	2,296	

TDS = total dissolved solids; Ca = calcium; Mg = magnesium; NaCl = sodium chloride; $CaSO_4$ = calcium sulphate; KCl = potassium chloride; $MgSO_4$ = magnesium sulphate; Na_2SO_4 = sodium sulphate; $NaNO_3$ = sodium nitrate; $CaCO_3$ = calcium carbonate; $NaHCO_3$ = sodium bicarbonate; $CaCl_2$ = calcium chloride; mg/L = milligrams per litre; ~ = approximately.

2-2.2.2.3 Analytical Chemistry

Measurements of water quality were conducted to document changes to the partitioning of the major ion salts throughout the tests, as follows:

- **Site Reference**—Upon receipt of the site reference sample, Nautilus collected as subsample and submitted to ALS Canada Ltd. (ALS) in Calgary, Alberta for analysis of standard routine parameters (i.e., pH, hardness, specific conductivity, total alkalinity), total dissolved solids, total and dissolved organic carbon, major ions (e.g., Ca^{2+}, Mg^{2+}, Na^{+}, K^{+}, SO_4^{2-}, Cl^{-}, F^{-}, and HCO_3^{-}), total ammonia as nitrogen, nitrate as nitrogen, total cyanide (including Strong-Acid Digestion, Weak-Acid Digestion, free cyanide), thiocyanate, and total and dissolved metals.
- ***R. subcapitata***—Nautilus subsampled the site reference, and the low, moderate, and high TDS treatments at test initiation[3] and submitted for analysis of pH, hardness, specific conductivity, dissolved major ions (calcium, magnesium, potassium, sodium, sulphate, chloride, nitrate, fluoride), total alkalinity (as calcium carbonate [$CaCO_3$]), and measured TDS.
- ***C. dubia***—Nautilus subsampled the site reference, and the low, moderate, and high TDS treatments at test initiation and termination, and submitted for analysis of pH, hardness, specific conductivity, dissolved major ions (calcium, magnesium, potassium, sodium, sulphate, chloride, nitrate, fluoride), total alkalinity (as $CaCO_3$), and measured TDS.

Analytical chemistry was used to confirm target test concentrations were obtained (i.e., volumetric dilutions applied effectively). Remaining water quality parameters measured in the site reference upon sample receipt were not remeasured in individual treatments as they were not meaningfully influenced by the introduction of the major ion salts used to amend the site references. The ratio of 23:77 site reference to TDS-amended treatment water was applied to measured values to estimate TDS component concentrations for treatments not submitted for confirmatory chemistry (Appendix C).

2-2.2.3 Toxicity Data Analysis

2-2.2.3.1 Quality Assurance and Quality Control

Quality Assurance and Quality Control (QAQC) information from the laboratory report (Appendix C) was reviewed per Section 2-2.1.3.1.

2-2.2.3.2 Concentration-Response Analysis

Nautilus conducted pairwise statistical comparisons for each test species and endpoint between the laboratory control and site reference and the site reference and each TDS treatment. Statistical analyses were performed using CETIS™ (Tidepool Scientific Software 2013). Methods and results of statistical analyses are presented in the Nautilus Toxicity Report (Appendix C).

Response data for TDS treatments were normalized to the site reference before performing subsequent data analyses. Normalized responses were calculated as the replicate response divided by the mean response in the site reference multiplied by 100 to provide a response on a percentage basis. Normalization is conducted to estimate percent effect relative to the site reference, rather than the absolute value of the biological response.

[3] Insufficient volume is available at test termination to subsample chemistry for *R. subcapitata*.

Concentration-response analysis was conducted to examine the relationship between normalized test responses of test endpoints and the corresponding TDS concentrations. Concentration-response curves were fit using the US EPA Toxicity Relationship Analysis Program (TRAP; version 1.30a) to estimate 10%, 20%, and 50% effect concentrations (±95% confidence limits [CLs]). Data were log-transformed prior to analyses because the characteristics of the exposures had multiplicative exposure intervals and were skewed to the left. Per TRAP's User Guide, "log-transformation of the exposure variable can often make the toxicity relationship more symmetric and thus make the models more accurate." Data were evaluated using a logistic model with least-squares nonlinear regression analysis. The following logistic equation was fit to concentration-response data:

$$y = \frac{y_0}{1 + e^{(4S(X - X_{50}))}}$$

Where: y_0 is the background response level at a concentration of zero
S is the slope at X_{50}, which is the concentration associated with a 50% reduction in y, the response level, relative to y_0

Model parameters, as well as the statistical significance of the regression, are reported herein for each curve estimated by TRAP. For a subset of curves fit, TRAP estimated the y_0 parameter to appreciably deviate from the expected no-effect value of 1 (deviation is defined herein as outside of 1 ± 0.02). This condition is an artifact of the spacing of the treatment levels and is more pronounced when endpoint variance is high at the lower end of the exposure series. When this occurred, the model was re-run with y_0 constrained to 1. It was important to have a reliable fit at the top of the curve because this forms the basis for effect concentration calculations. Otherwise, effects concentrations will be biased and not accurately reflect the adverse effect size implied by the x in LC_X/IC_X.[4]

2-2.2.3.3 Relevance and Reliability of Effect Concentrations

The following information was reviewed to inform an overall interpretation of the relevance and reliability of LC/IC_X estimates. The purpose of this step is to avoid undue emphasis on a predefined and somewhat arbitrary effect size (e.g., 10% effect, which may not be detectable within the statistical power constraints of the study) and appropriately consider the statistical properties of the underlying data. The rationale for this consideration is outlined in de Bruyn and Elphick (2013), who explain why the interpretation of effect concentrations must recognize the limitations of either the statistical significance approach (i.e., NOECs/LOECs) or effect size approach (i.e., IC_X estimates). The respective limitations of NOECs/LOECs and IC_X estimates propagate through their application to set toxicological screening values. Screening values based on compiled NOECs/LOECs represent a blend of varying effect sizes, whereas screening values based on ICx values represent a blend of high-confidence and low-confidence values with varying statistical properties (de Bruyn and Elphick 2013):

- Percent minimum significant difference (PMSD). The PMSD represents the minimum effect size that can be distinguished with statistical confidence from natural test variability in site reference performance.
- No observed effect concentration (NOEC). The NOEC represents the highest treatment concentration associated with no statistically significant effects. LC/IC_X estimates below the NOEC have increased uncertainty because they represent a concentration that, in the actual toxicity test, did not result in a statistically significant departure from base water performance.

[4] LC/IC_X is defined as the lethal or inhibition concentration associated with an X% reduction in the respective lethal or sublethal endpoint.

- Concentration-response model and variability in those data. Within-treatment variability was visually assessed by reviewing figures with replicate results and by reviewing standard deviation of the mean. High within-treatment variability is reflected in wide confidence intervals around model parameters.
- Width of confidence intervals around LC/IC_X estimates. LC/IC_X estimates with wide confidence intervals have elevated uncertainty.
- Attribution of effects to TDS. As discussed in Section 2-2.2.2.2, TDS amended waters were prepared to match target TDS concentrations and compositions; this matching was designed to evaluate the toxicity of TDS in site-relevant waters. It is prudent to consider whether observed effects were due to the balanced TDS mixture representative of site conditions or an individual ion within the mixture. To assess the potential for confoundment by an individual ion, effect concentrations estimated for TDS were compared to the expected range of effect concentrations for TDS for the species of interest. If the effect concentrations were outside the expected range, then individual ion concentrations were compared to effect concentrations for individual ions for the species of interest to determine if an individual ion is driving the unexpected response.

2-3.0 RESULTS

2-3.1 Quality Assurance and Quality Control

Laboratory QAQC information is provided in the Nautilus laboratory reports (Appendix A and Appendix C). The QAQC checks confirmed that all criteria were met for acute and chronic toxicity tests (Section 2-2.1.3.1), with the following exception:

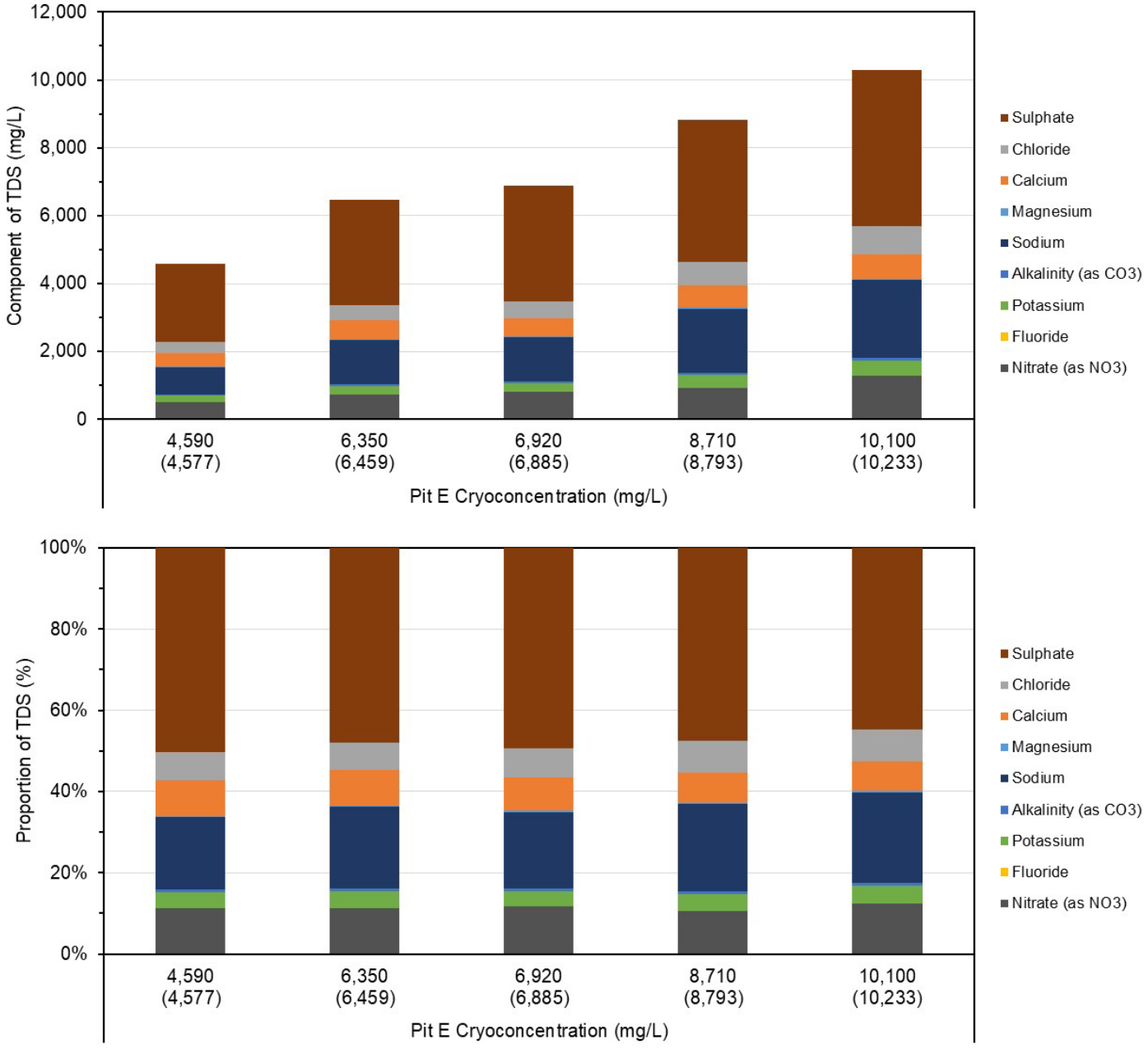
- Site water used in tests exceeded the protocol-stipulated three-day holding time due to the nature of the study design. The study design required that water chemistry analysis be conducted prior to test initiation to characterize base water prior to amendment. Based on experience with similar testing programs, it is anticipated that major ions would be relatively stable during storage. Any change in sample composition during storage was predicted to have negligible effects on the test results; therefore, exceedance of the hold time was not anticipated to have affected the results of the study.

2-3.2 Acute Toxicity Program

2-3.2.1 Analytical Chemistry

Measured TDS concentrations ranged from 4,590 to 10,100 mg/L (Appendix B). The cryo-concentration was successful in increasing overall TDS concentrations, while maintaining steady compositions across the five treatments. The mixtures were sodium-sulphate dominant with roughly 55% of the TDS dominated by sulphate (Figure 2-1).

Figure 2-1: Individual Ion Concentrations (top panel) and Percentage of TDS Composition (bottom panel) in Site-Specific Acute Toxicity Tests for TDS



Notes: The measured TDS concentration corresponding with each treatment are shown on the x-axis. The calculated TDS concentration corresponding with each treatment are shown on the x-axis in brackets.

TDS (mg/L) is calculated as the sum of calcium, chloride, fluoride, magnesium, potassium, sodium, sulphate, alkalinity as carbonate (calculated 0.6 × total alkalinity as $CaCO_3$), and nitrate as NO_3 (calculated 4.427 x nitrate as N; APHA 2012).

TDS = total dissolved solids; CO_3 = carbonate ion; NO_3 = nitrate ion; mg/L = milligrams per litre.

2-3.2.2 Acute Testing Results

Ten to twenty percent immobility was seen in the *D. magna* treatments with >8,793 mg/L calculated TDS, while negligible effects to survival were observed for both test species (survival ≥97%) up to the highest tested TDS of 10,233 mg/L (calculated; Table 2-5, Appendix A).

Table 2-5: Summary of Results for Acute TDS Toxicity Tests

Calculated TDS (mg/L)	*D. magna* Mean Survival (%)	*D. magna* Mean Immobility (%)	Rainbow Trout Survival (%)
4,577 (4,590)	100	0	100
6,459 (6,350)	100	3	100
6,885 (6,920)	100	3	100
8,793 (8,710)	100	20	100
10,233 (10,100)	97	13	100

Notes: The measured TDS concentration corresponding with each treatment are shown in brackets.

Total dissolved solids (TDS in mg/L) was calculated as the sum of calcium, chloride, fluoride, magnesium, potassium, sodium, sulphate, alkalinity as carbonate (calculated 0.6 × total alkalinity as $CaCO_3$), and nitrate as NO_3 (calculated 4.427 x nitrate as N; APHA 2012).

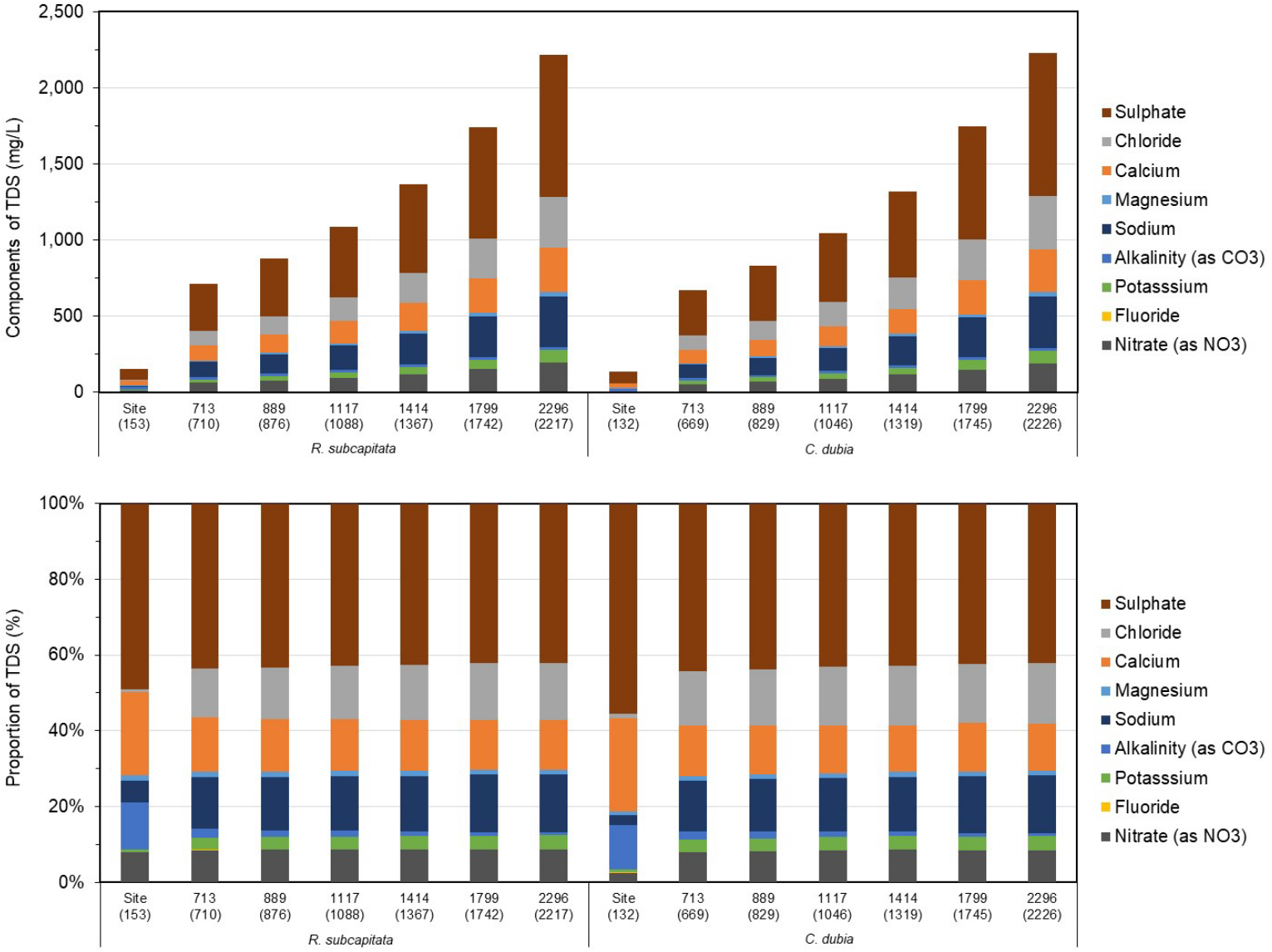
TDS = Total Dissolved Solids; % = percentage

2-3.3 Chronic Toxicity Program

2-3.3.1 Analytical Chemistry

The analytical results are presented in Appendix C. On average, measured TDS ranged was 104% (*R. subcapitata*) and 96% (*C. dubia*) of nominal. Small discrepancies between the measured and nominal TDS concentrations may result from additional dissolution of salts or laboratory errors in treatment preparation (i.e., incorrect measuring and/or mixing of salts in solution). The site collected and simulated site reference waters were comprised of approximately 52% sulphate, 23% calcium, 12% alkalinity, 4% sodium, 5% nitrate, and negligible contributions of magnesium, potassium, and fluoride. The TDS treatments were comprised of approximately 43% sulphate, 15% chloride, 14% sodium, 13% calcium, 8% nitrate, 3% potassium, and negligible contributions of magnesium and fluoride (Figure 2-2).

Figure 2-2: Individual Ion Concentrations (top panel) and Percentage of TDS Composition (bottom panel) in Site-Specific Chronic Toxicity Tests for TDS



Notes: Nominal TDS concentration corresponding with each treatment are presented on the x-axis with calculated TDS concentration corresponding with each treatment shown in brackets. “Site” is the site collected reference.

TDS (mg/L) is calculated as the sum of calcium, chloride, fluoride, magnesium, potassium, sodium, sulphate, alkalinity as carbonate (calculated 0.6 × total alkalinity as $CaCO_3$), and nitrate as NO_3 (calculated 4.427 × nitrate as N; APHA 2012).

TDS = total dissolved solids; CO_3 = carbonate ion; NO_3 = nitrate ion; mg/L = milligrams per litre.

2-3.3.2 Concentration-Response Analysis

Results for each test species and endpoint are discussed below and summarized in Table 2-6

- ***R. subcapitata* growth**—There was no statistically significant reduction in *R. subcapitata* growth relative to the site reference. The NOEC was >2,217 mg/L TDS (Panel A of Figure 2-3) and was considered reliable for TDS.
- ***C. dubia* survival**—There was no statistically significant reduction in *C. dubia* survival relative to the site reference. The NOEC was >2,226 mg/L TDS (Panel B of Figure 2-3) and was considered reliable for TDS.
- ***C. dubia* reproduction**—*C. dubia* reproduction was significantly reduced in the 2,296 mg/L TDS treatments, with a NOEC of 1,745 mg/L TDS and LOEC of 1,745 mg/L TDS. A concentration-response curve was fit to the data with IC_{10} of 976 mg/L TDS, IC_{20} of 1,354 mg/L TDS, and IC_{50} of 1,520 mg/L TDS (Panel C of Figure 2-3). There is elevated uncertainty in the IC_{10} and IC_{20} effects estimates because the estimated effects are below the NOEC and because the PMSD relative to the site-collected reference (34%) was greater than the estimated effect sizes (i.e., 10% and 20%; Section 2-2.2.3.3). Therefore, IC_{10} and IC_{20} estimates have low statistical reliability and should be used and interpreted with caution. The magnitude of effect on reproduction aligns with TDS thresholds for this species and endpoint from the literature; (i.e., negligible effect on reproductions at TDS > 1,000 mg/L; Attachment 1, Section 1-4).

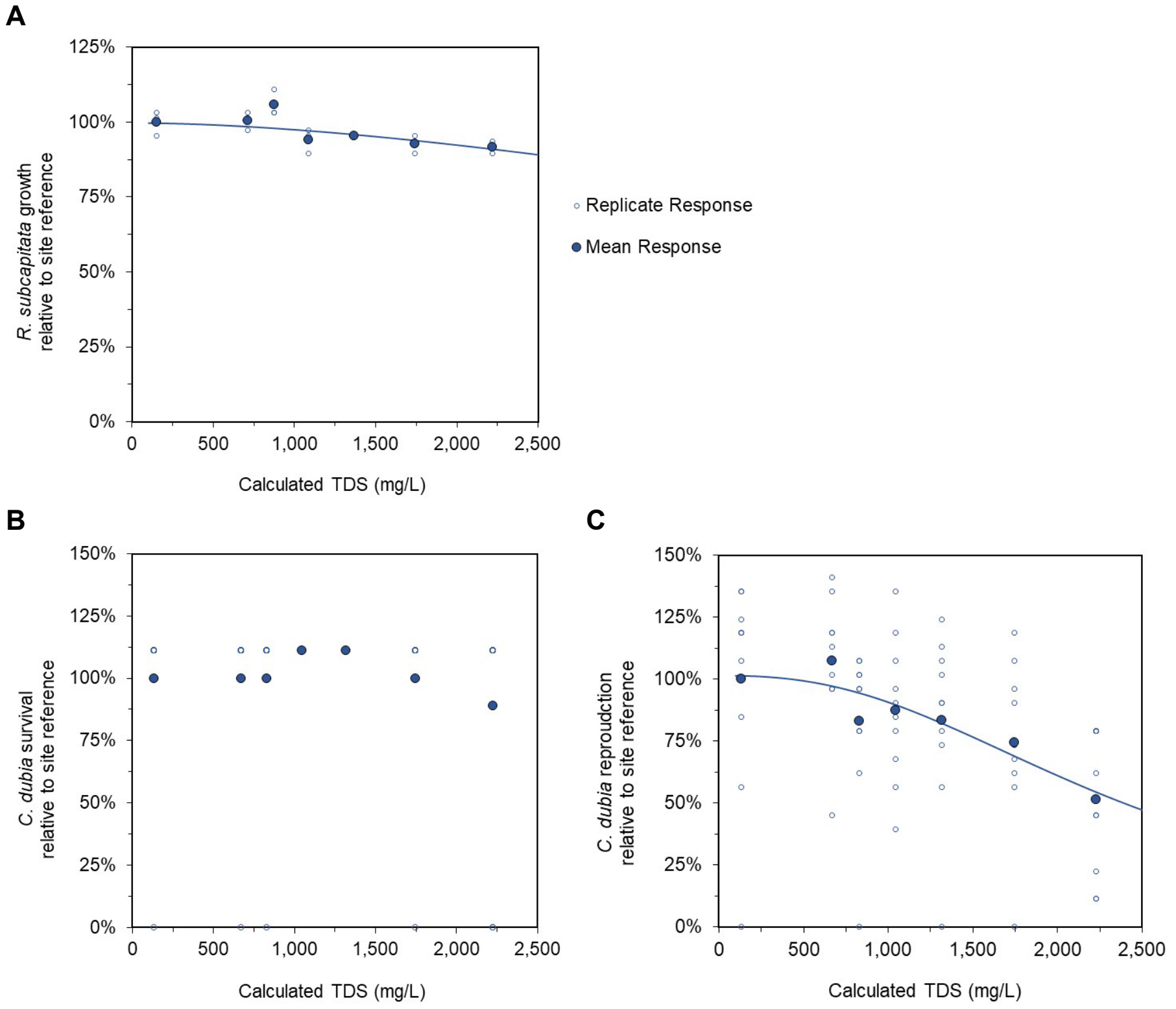
Table 2-6: Summary of Model Parameters and Effect Concentration Estimates for the Chronic TDS Toxicity Tests

Species Endpoint	Endpoint	Statistical NOEC for TDS (mg/L)	Statistical LOEC for TDS (mg/L)	Relative to Site Reference								
				PMSD (%)	Model Parameters				Estimated Effect Concentration for TDS (mg/L)			Effect Statistics Reliable for TDS?
					p-value	Y_0	Slope (95% CL)	Log X50 (95% CL)	LC/IC_{10} (95% CL)	LC/IC_{20} (95% CL)	LC/IC_{50} (95% CL)	
R. subcapitata	Growth	>2,217	>2,217	NA	<0.05	1.0	1.0 (-0.49-2.5)	3.9 (3.1-4.7)	>2,217	>2,217	>2,217	Yes
C. dubia	Survival	>2,226	>2,226	NA	No significant model fit[(a)]							Yes
	Reproduction	1,745	2,226	34	<0.05	1.0	1.4 (-0.10-3.0)	3.4 (3.2-3.5)	976 (409-2,331)	1,354 (778-2,356)	>2,226	Yes, with moderate uncertainty for IC_{10} and IC_{20} (<NOEC, <PMSD)

(a) A significant effect on the test endpoint was not observed (p>0.05). Therefore, a concentration-analysis model (i.e., concentration-response curve) was not fit to the dataset using TRAP.

TDS = total dissolved solids; NOEC = no observed effect concentration; LOEC = lowest observed effect concentration; PMSD = percent minimum statistical difference; LC_X = lethal concentration associated with X% lethality in the sample population; IC_X = inhibition concentration associated with X% effect for the non-lethal endpoint in the sample population; CL = confidence limit; NA = not applicable; TRAP =Toxicity Relationship Analysis Program; > = greater than; < = less than.

Figure 2-3: Concentration-Response Curves for *Raphidocelis subcapitata* Growth (A), and *Ceriodaphnia dubia* Survival (B) and Reproduction (C) versus Calculated Total Dissolved Solids (mg/L)



Notes: Concentration-response models were fit to the site collected reference. Solid lines are reliable concentration-response curves. Model parameters and LC/IC_X estimates are summarized in Table 2-6.

TDS = total dissolved solids; LC_X = lethal concentration associated with X% lethality in the sample population; IC_X = inhibition concentration associated with X% effect for the non-lethal endpoint in the sample population; mg/L = milligram per litre.

2-4.0 UNCERTAINTY

The toxicity testing programs were conducted with standardized and sensitive representative test organisms; combined with the use of site-collected waters and synthetically prepared site waters, these test results provide an improved understanding of TDS-driven toxicity in mine-influenced waters for Meadowbank Mine Complex. These findings, when combined with the literature-based evaluation of species sensitivity, provide important evidence for the prediction of potential effects in mine-influenced waters for Meadowbank Mine Complex. As with any scientific investigation, the uncertainties associated with this study must be acknowledged.

Key areas of uncertainty in this study include the following:

- **TDS as a surrogate for ion toxicity**—the toxicity of TDS varies by ionic composition and the relative proportion of ions in the mixture. Low effect concentrations for acute endpoints (e.g., survival) have been reported in the literature for individual ions for select species, but these tests reflect exposure conditions accounting for a single ion, and not a balanced TDS mixture representative of most field conditions. The ionic compositions evaluated herein assume a sodium-sulphate-chloride dominant mixture. Should future ion mixtures shift away from the current sodium-calcium-sulphate-chloride dominant composition a revaluation of the applicability of the toxicity data presented in this report should be evaluated.
- **Use of representative test organisms**— The use of the water flea *D. magna* and fish Rainbow Trout for acute testing, and use of the green algae *R. subcapitata* and the cladoceran *C. dubia* for chronic testing provides a standardized assessment of toxicity, conducted under the assumption that these taxa will be representative of organisms native to the Meadow Bank Mine Complex. The test protocols for the chosen species were selected to provide representation of taxa and endpoints that are commonly observed to be sensitive to environmental contaminants (e.g., crustacean reproduction), and the test battery also included species demonstrated to be among the most sensitive taxa in the literature. However, there is uncertainty regarding the extrapolation of laboratory tests using site-relevant surrogate species to field conditions. This uncertainty is mitigated by using surrogate species that have been demonstrated in the literature to be sensitive to TDS exposure.

2-5.0 SUMMARY OF KEY FINDINGS

The objective of the acute and chronic TDS studies was to evaluate site-specific acute and chronic TDS toxicity to sensitive, surrogate aquatic test species using waters with ionic compositions representative of future effluent discharge conditions (end-of-pipe) at Meadowbank Mine Complex (acute study) and receiving environment conditions at the edge of the regulated mixing zone under a future effluent discharge scenario (chronic study).

A summary of key findings for the acute program is presented below:

- Negligible effects to *D. magna* and Rainbow Trout survival were observed at TDS concentrations up to 10,233 mg/L (calculated).
- Ten to twenty percent immobility was observed in *D. magna* with exposure to TDS concentrations of >8,793 mg/L (calculated).

A summary of key findings for the chronic program is presented below:

- Negligible chronic toxicity was observed to *R. subcapitata* growth and *C. dubia* survival and reproduction at TDS concentrations below 1,000 mg/L.
- No significant reduction in *R. subcapitata* growth was observed with exposure to TDS concentrations up to 2,217 mg/L (unbounded NOEC).
- No statistically significant reduction in *C. dubia* survival was observed with exposure to TDS concentrations up to 2,226 mg/L (unbounded NOEC). *C. dubia* reproduction was significantly reduced but not until concentrations of TDS exceeding 1,000 mg/L (IC_{20} of 1,354 mg/L).
- Rainbow Trout embryo-alevin survival and viability testing is ongoing and results will be integrated in Fall 2024 iteration of this report. Based on review TDS literature data for comparable mixtures, chronic effects to embryo-aelven Rainbow Trout are not expected at TDS concentrations below 1,000 mg/L.

2-6.0 REFERENCES

APHA. 2012. Standard Methods for the Examination of Water and Wastewater, 22nd Edition, with updates to 2015. Washington, DC, USA.

ECCC (Environment and Climate Change Canada). 2000a. Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*. Method and Development and Applications Unit. Environment Canada. EPS1/RM/14. Amended February 2016.

ECCC. 2000b. Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout. Method and Development and Applications Unit. Environment Canada. EPS1/RM/13. Amended May 2007 and February 2016.

ECCC. 2007a. Biological test method: growth inhibition test using the freshwater alga. EPS 1/RM/25, Second Edition, March 2007.

ECCC. 2007b. Biological test method: test of reproduction and survival using the cladoceran *Ceriodaphnia dubia*. EPS 1/RM/21, Second Edition, February 2007.

APPENDIX A

Acute Toxicity Testing Reports

NAUTILUS ENVIRONMENTAL
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Daphnia magna
EPS 1/RM/14

Work Order : 254185
Sample Number : 81599

SAMPLE IDENTIFICATION

Company :	Agnico Eagle Mines Limited - Meadowbank Division	Sampling Date :	2024-03-07
Location :	Baker Lake NU	Sampling Time :	14:00
Substance :	Pit E (Baseline - TDS SSWQO)	Date Received :	2024-03-11
Sampling Method :	Grab	Time Received :	12:15
Sampled By :	T. Genty	Temperature at Receipt :	6 °C
Sample Description :	Clear, orange.	Date Tested :	2024-03-12

Test Method : Toxicity Investigations

48-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	3.3 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Species :	*Daphnia magna*	Time to First Brood :	7.6 days
Organism Batch :	Dm24-04	Average Brood Size :	37.8
Culture Mortality :	2.0% (previous 7 days)		

TEST CONDITIONS

Sample Treatment :	See 'COMMENTS' section below	Number of Replicates :	3
pH Adjustment :	None	Organisms per Replicate :	10
Pre-aeration Rate :	~30 mL/min/L	Organisms per Test Level :	30
Duration of Pre-Aeration :	30 minutes	Organism Loading Rate :	15.0 mL/organism
Test Aeration :	None	Impaired Control Organisms :	0.0%
Hardness Adjustment :	None		

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride		
Date Tested :	2024-03-11	LC50 :	6.2 g/L
Organism Batch :	Dm24-04	95% Confidence Limits :	6.2 - 6.3 g/L
Analyst(s) :	AA	Historical Mean LC50 :	6.3 g/L
Statistical Method :	Trimmed Spearman-Kärber	Warning Limits (± 2SD) :	5.8 - 6.8 g/L

COMMENTS

Prior to test initiation, the sample was allowed to settle overnight at 15°C. The following day, the sample was carefully decanted so that no settled solids from the bottom of the sample were included in the test solution.

Approved By : _____
Project Manager

Work Order : 254185
Sample Number : 81599

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*	Hardness (as $CaCO_3$)
Initial Chemistry (100%) :	7.2	9.2	8127	20	109	>1000 mg/L

0 HOURS

Date & Time : 2024-03-12 10:30
Analyst(s) : FM (JGR)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation*	Hardness
100	A	0	0	7.5	8.7	8073	20	103	>1000
100	B	0	0	7.5	8.7	8073	20	103	>1000
100	C	0	0	7.5	8.7	8073	20	103	>1000
Control	A	0	0	8.3	8.6	491	20	100	140
Control	B	0	0	8.3	8.6	491	20	100	140
Control	C	0	0	8.3	8.6	491	20	100	140

Notes: The 100% test solution is clear and light yellow.

24 HOURS

Date & Time : 2024-03-13 9:50
Analyst(s) : FM (JGR)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	–	0	–	–	–	21
100	B	–	0	–	–	–	21
100	C	–	0	–	–	–	21
Control	A	–	0	–	–	–	21
Control	B	–	0	–	–	–	21
Control	C	–	0	–	–	–	21

Notes: The 100% test solution is clear and light yellow. Test organisms appear normal.

48 HOURS

Date & Time : 2024-03-14 10:10
Analyst(s) : AA (PG)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	0	0	8.0	8.1	8166	20
100	B	0	0	8.0	8.1	8189	20
100	C	0	1	8.0	8.1	8117	20
Control	A	0	0	8.3	8.4	500	20
Control	B	0	0	8.3	8.5	501	20
Control	C	0	0	8.3	8.6	502	20

Notes: The 100% test solution is clear and pale yellow. Mobile test organisms appear normal.

Number immobile does not include number dead.

"–" = not measured/not required
* adjusted for temperature and barometric pressure

Test Data Reviewed By : EM
Date : 2024-03-19

NAUTILUS ENVIRONMENTAL
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT
Rainbow Trout
EPS 1/RM/13

Work Order : 254185
Sample Number : 81599

SAMPLE IDENTIFICATION

Company :	Agnico Eagle Mines Limited - Meadowbank Division	Sampling Date :	2024-03-07
Location :	Baker Lake NU	Sampling Time :	14:00
Substance :	Pit E (Baseline - TDS SSWQO)	Date Received :	2024-03-11
Sampling Method :	Grab	Time Received :	12:15
Sampled By :	T. Genty	Temperature at Receipt :	6 °C
Sample Description :	Clear, orange.	Date Tested :	2024-03-12

Test Method(s) : Toxicity Investigation

96-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Impairment	0.0 %
	Mean Mortality	0.0 %
100%	Mean Impairment	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Test Organism :	*Oncorhynchus mykiss*	Mean Fork Length :	47.5 mm
Organism Batch :	T24-03	Range of Fork Lengths :	46 - 50 mm
Control Sample Size :	10	Mean Wet Weight :	1.1 g
Cumulative stock tank mortality rate :	0% (previous 7 days)	Organism Loading Rate :	0.5 g/L
Control organisms showing stress :	0 (at test completion)		

TEST CONDITIONS

Sample Treatment :	See 'COMMENTS' section below	Volume Tested (L) :	20
pH Adjustment :	None	Number of Replicates :	1
Test Aeration :	Yes	Organisms Per Replicate :	10
Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Organisms Per Test Level :	10
Duration of Pre-Aeration :	30 minutes		

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride		
Organism Batch :	T24-03	LC50 :	4476 mg/L
Date Tested :	2024-03-01	95% Confidence Limits :	4070 - 4903 mg/L
Analyst(s) :	AJS, KR, PC, NWP	Historical Mean LC50 :	3967 mg/L
Statistical Method :	Linear Regression (MLE)	Warning Limits (± 2SD) :	2944 - 5345 mg/L

COMMENTS

Prior to test initiation, the sample was allowed to settle overnight at 15°C. The following day, the sample was carefully decanted so that no settled solids from the bottom of the sample were included in the 100% test solution.

Approved By : _____

Project Manager

NAUTILUS ENVIRONMENTAL

TOXICITY TEST REPORT

Rainbow Trout
EPS 1/RM/13

Work Order : 254185
Sample Number : 81599

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)[3]
Initial Water Chemistry (100%) :	7.4	9.3	7930	15	100
After 30 min pre-aeration :	7.4	8.8	7572	15	97

0 HOURS

Date & Time 2024-03-12 11:35
Analyst(s) : JW

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation[3]
100%	0	0	7.4	8.8	7572	15	97
Control	0	0	8.3	9.8	651	14	100

Notes:

24 HOURS

Date & Time 2024-03-13 12:00
Analyst(s) : NM

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.8	8.7	7649	15
Control	0	0	8.4	9.2	665	15

Notes: The 100% test solution is clear and light brown. Test organisms appear normal.

48 HOURS

Date & Time 2024-03-14 10:20
Analyst(s) : JGR

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.8	9.2	7659	15
Control	0	0	8.4	9.3	663	15

Notes: The 100% test solution is clear and light orange. Test organisms appear normal.

72 HOURS

Date & Time 2024-03-15 10:20
Analyst(s) : NWP (NM)

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.7	9.1	7633	15
Control	0	0	8.3	9.2	651	15

Notes: The 100% test solution is clear and light orange. Test organisms appear normal.

96 HOURS

Date & Time 2024-03-16 10:45
Analyst(s) : NWP (NM)

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.8	9.2	7654	15
Control	0	0	8.3	9.0	647	15

Notes: The 100% test solution is clear and light orange. Test organisms appear normal.

"–" = not measured/not required
Number impaired does not include number dead.
[3] adjusted for temperature and barometric pressure

Test Data Reviewed By : EM
Date : 2024-03-19

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Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Daphnia magna
EPS 1/RM/14

Work Order : 254185
Sample Number : 81600

SAMPLE IDENTIFICATION

Company :	Agnico Eagle Mines Limited - Meadowbank Division	Sampling Date :	2024-03-07
Location :	Baker Lake NU	Sampling Time :	14:00
Substance :	Pit E (4000 TDS - 5100uS/cm)	Date Received :	2024-03-11
Sampling Method :	Grab	Time Received :	12:15
Sampled By :	T. Genty	Temperature at Receipt :	6 °C
Sample Description :	Clear, orange.	Date Tested :	2024-03-12
Test Method :	Toxicity Investigations		

48-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Species :	*Daphnia magna*	Time to First Brood :	7.6 days
Organism Batch :	Dm24-04	Average Brood Size :	37.8
Culture Mortality :	2.0% (previous 7 days)		

TEST CONDITIONS

Sample Treatment :	See 'COMMENTS' section below	Number of Replicates :	3
pH Adjustment :	None	Organisms per Replicate :	10
Pre-aeration Rate :	~30 mL/min/L	Organisms per Test Level :	30
Duration of Pre-Aeration :	30 minutes	Organism Loading Rate :	15.0 mL/organism
Test Aeration :	None	Impaired Control Organisms :	0.0%
Hardness Adjustment :	None		

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride		
Date Tested :	2024-03-11	LC50 :	6.2 g/L
Organism Batch :	Dm24-04	95% Confidence Limits :	6.2 - 6.3 g/L
Analyst(s) :	AA	Historical Mean LC50 :	6.3 g/L
Statistical Method :	Trimmed Spearman-Kärber	Warning Limits (± 2SD) :	5.8 - 6.8 g/L

COMMENTS

Prior to test initiation, the sample was allowed to settle overnight at 15°C. The following day, the sample was carefully decanted so that no settled solids from the bottom of the sample were included in the test solution. The decanted test solution was then diluted with R.O. water at a ratio of ~2 L sample: ~1 L R.O to acheive a target conductivity of ~5100 µS/cm.

Approved By : _____

Project Manager

Work Order : 254185
Sample Number : 81600

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*	Hardness (as $CaCO_3$)
Initial Chemistry (100%) :	7.2	8.7	5529	20	102	>1000 mg/L

0 HOURS

Date & Time : 2024-03-12 13:35
Analyst(s) : FM (JGR)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation*	Hardness
100	A	0	0	7.4	8.3	5507	20	99	>1000
100	B	0	0	7.4	8.3	5507	20	99	>1000
100	C	0	0	7.4	8.3	5507	20	99	>1000
Control	A	0	0	8.3	8.6	491	20	100	140
Control	B	0	0	8.3	8.6	491	20	100	140
Control	C	0	0	8.3	8.6	491	20	100	140

Notes: The 100% test solution is clear and light yellow.

24 HOURS

Date & Time : 2024-03-13 13:05
Analyst(s) : FM (JGR)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	–	0	–	–	–	21
100	B	–	0	–	–	–	21
100	C	–	0	–	–	–	21
Control	A	–	0	–	–	–	21
Control	B	–	0	–	–	–	21
Control	C	–	0	–	–	–	21

Notes: The 100% test solution is clear and light yellow. Test organisms appear normal.

48 HOURS

Date & Time : 2024-03-14 13:10
Analyst(s) : FM (PG)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	0	0	7.8	8.2	5525	21
100	B	0	0	7.8	8.2	5541	21
100	C	0	0	7.8	8.2	5561	21
Control	A	0	0	8.3	8.4	500	21
Control	B	0	0	8.3	8.4	498	21
Control	C	0	0	8.3	8.4	500	21

Notes: The 100% test solution is clear and light yellow. Test organisms are mobile, but very quiet and swimming slowly in the 100% test solution.

Number immobile does not include number dead.

"–" = not measured/not required
* adjusted for temperature and barometric pressure

Test Data Reviewed By : EM
Date : 2024-03-19

NAUTILUS ENVIRONMENTAL
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TOXICITY TEST REPORT
Rainbow Trout
EPS 1/RM/13

Work Order : 254185
Sample Number : 81600

SAMPLE IDENTIFICATION

Company :	Agnico Eagle Mines Limited - Meadowbank Division	Sampling Date :	2024-03-07
Location :	Baker Lake NU	Sampling Time :	14:00
Substance :	Pit E (4000 TDS - 5100uS/cm)	Date Received :	2024-03-11
Sampling Method :	Grab	Time Received :	12:15
Sampled By :	T. Genty	Temperature at Receipt :	6 °C
Sample Description :	Clear, orange.	Date Tested :	2024-03-12

Test Method(s) : Toxicity Investigations

96-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Impairment	0.0 %
	Mean Mortality	0.0 %
100%	Mean Impairment	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Test Organism :	*Oncorhynchus mykiss*	Mean Fork Length :	46.4 mm
Organism Batch :	T24-03	Range of Fork Lengths :	42 - 51 mm
Control Sample Size :	10	Mean Wet Weight :	1.0 g
Cumulative stock tank mortality rate :	0% (previous 7 days)	Organism Loading Rate :	0.6 g/L
Control organisms showing stress :	0 (at test completion)		

TEST CONDITIONS

Sample Treatment :	See 'COMMENTS' section below	Volume Tested (L) :	16
pH Adjustment :	None	Number of Replicates :	1
Test Aeration :	Yes	Organisms Per Replicate :	10
Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Organisms Per Test Level :	10
Duration of Pre-Aeration :	30 minutes		

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride		
Organism Batch :	T24-03	LC50 :	4476 mg/L
Date Tested :	2024-03-01	95% Confidence Limits :	4070 - 4903 mg/L
Analyst(s) :	AJS, KR, PC, NWP	Historical Mean LC50 :	3967 mg/L
Statistical Method :	Linear Regression (MLE)	Warning Limits (± 2SD) :	2944 - 5345 mg/L

COMMENTS

Prior to test initiation, the sample was allowed to settle overnight at 15°C. The following day, the sample was carefully decanted so that no settled solids from the bottom of the sample were included in the test solution. The decanted test solution was then diluted with R.O. water at a ratio of ~2 L sample: ~1 L R.O to acheive a target conductivity of ~5100 µS/cm.

Approved By : _____

Project Manager

Work Order : 254185
Sample Number : 81600

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)[3]
Initial Water Chemistry (100%) :	7.3	8.7	5182	15	95
After 30 min pre-aeration :	7.5	8.7	5211	15	95

0 HOURS

Date & Time 2024-03-12 11:35
Analyst(s) : JW

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation[3]
100%	0	0	7.5	8.7	5211	15	95
Control	0	0	8.3	9.8	651	14	100

Notes: See 'COMMENTS' section on page 1.

24 HOURS

Date & Time 2024-03-13 12:00
Analyst(s) : NM

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.6	8.9	5226	15
Control	0	0	8.3	9.0	670	15

Notes: The 100% test solution is clear and light brown. Test organisms appear normal.

48 HOURS

Date & Time 2024-03-14 10:25
Analyst(s) : JGR

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.6	9.2	5221	15
Control	0	0	8.3	9.3	667	15

Notes: The 100% test solution is clear and yellow. Test organisms appear normal.

72 HOURS

Date & Time 2024-03-15 10:25
Analyst(s) : NWP (NM)

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.6	9.2	5211	15
Control	0	0	8.3	9.4	663	15

Notes: The 100% test solution is clear and light brown. Test organisms appear normal.

96 HOURS

Date & Time 2024-03-16 10:55
Analyst(s) : NWP (NM)

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.7	9.3	5222	15
Control	0	0	8.3	9.5	660	15

Notes: The 100% test solution is clear and light brown. Test organisms appear normal.

"–" = not measured/not required

Number impaired does not include number dead.

[3] adjusted for temperature and barometric pressure

Test Data Reviewed By : EM

Date : 2024-03-19

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TOXICITY TEST REPORT

Daphnia magna
EPS 1/RM/14

Work Order : 254185
Sample Number : 81601

SAMPLE IDENTIFICATION

Company :	Agnico Eagle Mines Limited - Meadowbank Division	Sampling Date :	2024-03-07
Location :	Baker Lake NU	Sampling Time :	14:00
Substance :	Pit E (5000 TDS - 6925 uS/cm)	Date Received :	2024-03-11
Sampling Method :	Grab	Time Received :	12:15
Sampled By :	T. Genty	Temperature at Receipt :	6 °C
Sample Description :	Clear, orange.	Date Tested :	2024-03-12
Test Method :	Toxicity Investigations		

48-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	3.3 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Species :	*Daphnia magna*	Time to First Brood :	7.6 days
Organism Batch :	Dm24-04	Average Brood Size :	37.8
Culture Mortality :	2.0% (previous 7 days)		

TEST CONDITIONS

Sample Treatment :	See 'COMMENTS' section below	Number of Replicates :	3
pH Adjustment :	None	Organisms per Replicate :	10
Pre-aeration Rate :	~30 mL/min/L	Organisms per Test Level :	30
Duration of Pre-Aeration :	30 minutes	Organism Loading Rate :	15.0 mL/organism
Test Aeration :	None	Impaired Control Organisms :	0.0%
Hardness Adjustment :	None		

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride		
Date Tested :	2024-03-11	LC50 :	6.2 g/L
Organism Batch :	Dm24-04	95% Confidence Limits :	6.2 - 6.3 g/L
Analyst(s) :	AA	Historical Mean LC50 :	6.3 g/L
Statistical Method :	Trimmed Spearman-Kärber	Warning Limits (± 2SD) :	5.8 - 6.8 g/L

COMMENTS

Prior to test initiation, the sample was allowed to settle overnight at 15°C. The following day, the sample was carefully decanted so that no settled solids from the bottom of the sample were included in the test solution. The decanted test solution was then diluted with R.O. water at a ratio of ~9 L sample: ~1 L R.O to acheive a target conductivity of ~6925 µS/cm.

Approved By : _____

Project Manager

Work Order : 254185
Sample Number : 81601

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*	Hardness (as $CaCO_3$)
Initial Chemistry (100%) :	7.3	9.0	7482	20	105	>1000 mg/L

0 HOURS

Date & Time : 2024-03-12 13:45
Analyst(s) : FM (JGR)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation*	Hardness
100	A	0	0	7.7	8.4	7435	20	100	>1000
100	B	0	0	7.7	8.4	7435	20	100	>1000
100	C	0	0	7.7	8.4	7435	20	100	>1000
Control	A	0	0	8.3	8.6	491	20	100	140
Control	B	0	0	8.3	8.6	491	20	100	140
Control	C	0	0	8.3	8.6	491	20	100	140

Notes: The 100% test solution is clear and light yellow.

24 HOURS

Date & Time : 2024-03-13 13:15
Analyst(s) : FM (JGR)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	–	0	–	–	–	21
100	B	–	0	–	–	–	21
100	C	–	1	–	–	–	21
Control	A	–	0	–	–	–	21
Control	B	–	0	–	–	–	21
Control	C	–	0	–	–	–	21

Notes: The 100% test solution is clear and light yellow. Mobile test organisms appear normal.

48 HOURS

Date & Time : 2024-03-14 13:15
Analyst(s) : FM (PG)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	0	0	7.9	8.0	7421	21
100	B	0	1	7.8	8.0	7280	21
100	C	0	0	7.9	8.1	7434	21
Control	A	0	0	8.3	8.4	499	21
Control	B	0	0	8.3	8.4	496	21
Control	C	0	0	8.3	8.5	490	21

Notes: The 100% test solution is clear and light yellow. Test organisms are mobile, but very quiet and swimming slowly in the 100% test solution.

Number immobile does not include number dead.

"–" = not measured/not required
* adjusted for temperature and barometric pressure

Test Data Reviewed By : EM
Date : 2024-03-19

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TOXICITY TEST REPORT
Rainbow Trout
EPS 1/RM/13

Work Order : 254185
Sample Number : 81601

SAMPLE IDENTIFICATION

Company :	Agnico Eagle Mines Limited - Meadowbank Division	Sampling Date :	2024-03-07
Location :	Baker Lake NU	Sampling Time :	14:00
Substance :	Pit E (5000 TDS - 6925 uS/cm)	Date Received :	2024-03-11
Sampling Method :	Grab	Time Received :	12:15
Sampled By :	T. Genty	Temperature at Receipt :	6 °C
Sample Description :	Clear, orange.	Date Tested :	2024-03-12

Test Method(s) : Toxicity Investigations

96-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Impairment	0.0 %
	Mean Mortality	0.0 %
100%	Mean Impairment	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Test Organism :	*Oncorhynchus mykiss*	Mean Fork Length :	47.5 mm
Organism Batch :	T24-03	Range of Fork Lengths :	43 - 52 mm
Control Sample Size :	10	Mean Wet Weight :	1.1 g
Cumulative stock tank mortality rate :	0% (previous 7 days)	Organism Loading Rate :	0.7 g/L
Control organisms showing stress :	0 (at test completion)		

TEST CONDITIONS

Sample Treatment :	See 'COMMENTS' section below	Volume Tested (L) :	16
pH Adjustment :	None	Number of Replicates :	1
Test Aeration :	Yes	Organisms Per Replicate :	10
Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Organisms Per Test Level :	10
Duration of Pre-Aeration :	30 minutes		

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride		
Organism Batch :	T24-03	LC50 :	4476 mg/L
Date Tested :	2024-03-01	95% Confidence Limits :	4070 - 4903 mg/L
Analyst(s) :	AJS, KR, PC, NWP	Historical Mean LC50 :	3967 mg/L
Statistical Method :	Linear Regression (MLE)	Warning Limits (± 2SD) :	2944 - 5345 mg/L

COMMENTS

Prior to test initiation, the sample was allowed to settle overnight at 15°C. The following day, the sample was carefully decanted so that no settled solids from the bottom of the sample were included in the test solution. The decanted test solution was then diluted with R.O. water at a ratio of ~9 L sample: ~1 L R.O to acheive a target conductivity of ~6925 µS/cm.

Approved By : _____

Project Manager

Work Order : 254185
Sample Number : 81601

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)[3]
Initial Water Chemistry (100%) :	7.4	8.7	7039	15	95
After 30 min pre-aeration :	7.4	8.8	7008	15	95

0 HOURS

Date & Time 2024-03-12 11:35
Analyst(s) : JW

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation[3]
100%	0	0	7.4	8.8	7008	15	95
Control	0	0	8.3	9.8	651	14	100

Notes: See 'COMMENTS' section on page 1.

24 HOURS

Date & Time 2024-03-13 12:00
Analyst(s) : NM

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.8	8.9	7021	15
Control	0	0	8.4	9.1	669	15

Notes: The 100% test solution is clear and light brown. Test organisms appear normal.

48 HOURS

Date & Time 2024-03-14 10:30
Analyst(s) : JGR

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.8	9.3	7018	15
Control	0	0	8.4	9.5	660	15

Notes: The 100% test solution is clear and light brown. Test organisms appear normal.

72 HOURS

Date & Time 2024-03-15 10:30
Analyst(s) : NWP (NM)

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.8	9.3	7020	15
Control	0	0	8.4	9.4	654	15

Notes: The 100% test solution is clear and light brown. Test organisms appear normal.

96 HOURS

Date & Time 2024-03-16 11:00
Analyst(s) : NWP (NM)

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.8	9.3	7021	15
Control	0	0	8.4	9.5	645	15

Notes: The 100% test solution is clear and light brown. Test organisms appear normal.

"–" = not measured/not required
Number impaired does not include number dead.
[3] adjusted for temperature and barometric pressure

Test Data Reviewed By : EM
Date : 2024-03-19

CHAIN OF CUSTODY RECORD

NAUTILUS ENVIRONMENTAL

Nautilus Work Order No: 254185

Shipping Address: Nautilus Environmental Guelph.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number: TBD

Field Sampler Name (print): Thomas Genty

Signature:

Affiliation: Agnico Eagle

Sample Storage (prior to shipping): Room

Custody Relinquished by: TG

Date/Time Shipped: 7/03/24

Client: Agnico Eagle Mines Ltd.
11600, rue Louis Bisson
Mirabel, Quebec J7N 1G9

Phone: (519) 820-9156

Fax:

Contact: Lisa Ramilo lisa.ramilo@agnicoeagle.com

Sample Identification					Analyses Requested										Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	Nautilus Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)		Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2024-03-07	14:00	Pit E (Baseline - TDS SSWQO) *	81599	6	✔		✔								✔		6 x 20 L
		* : raw water - no cryoconcentration															
		Treatement done on the sample					Sample name :										
		1-Métal precipitation : ferric sulfate, caustic soda						STG treated.									
		Hydres 6909, polymer anionique Hydrex 6105					conductivity ≈ 8,95 mS										
		2-MBBR: add H3PO4, air, bacteria for SCN and						TDS → 6,1 g/L.									
		NH4 rempoval															
		3-TSS treatment: ferric sulfate & Hydrex 6105			1 points for the 4g/L (5,1 mS/cm) → dilution												
		tracking numer with GLS :			1 point for the 5g/L (6,9 mS/cm) → dilution												
		F19 196 660 and F19 196 656			1 point for the 6,1g/L (current sample)												
					+ 3 points for a 5mg (current sample).												

For Lab Use Only

Received By: MP / AW

Date: 2024-03-11

Time: 12:15

Storage Location:

Storage Temp.(°C)

Please list any special requests or instructions:

Please collect 1 water sample for detailed analytical chemistry at the start of testing; list of parameters provided to L.Novak; please request Rush analysis - 3 Day turnaround time for results and CC results to:lisa.ramilo@agnicoeagle.com

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TOXICITY TEST REPORT

Daphnia magna

Work Order : 254241
Sample Number : 81676

SAMPLE IDENTIFICATION

Company :	Agnico Eagle Mines Limited - Meadowbank Division		
Location :	Baker Lake NU	Sampling Date :	2024-03-12
Substance :	Pit E (TDS SSWQO) - ST19 treated cyocencentrated to 7 g/L TDS	Sampling Time :	13:00
		Date Received :	2024-03-14
Sampling Method :	Grab	Time Received :	14:50
Sampled By :	T. Genty	Temperature at Receipt :	9 °C
Sample Description :	Clear, light brown.	Date Tested :	2024-03-19
Test Method :	Toxicity Investigations		

48-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	20.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Species :	*Daphnia magna*	Time to First Brood :	7.6 days
Organism Batch :	Dm24-04	Average Brood Size :	36.3
Culture Mortality :	2.0% (previous 7 days)		

TEST CONDITIONS

Sample Treatment :	See 'COMMENTS' section below	Number of Replicates :	3
pH Adjustment :	None	Organisms per Replicate :	10
Pre-aeration Rate :	~30 mL/min/L	Organisms per Test Level :	30
Duration of Pre-Aeration :	30 minutes	Organism Loading Rate :	15.0 mL/organism
Test Aeration :	None	Impaired Control Organisms :	0.0%
Hardness Adjustment :	None		

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride		
Date Tested :	2024-03-11	LC50 :	6.2 g/L
Organism Batch :	Dm24-04	95% Confidence Limits :	6.2 - 6.3 g/L
Analyst(s) :	AA	Historical Mean LC50 :	6.3 g/L
Statistical Method :	Trimmed Spearman-Kärber	Warning Limits (± 2SD) :	5.8 - 6.8 g/L

COMMENTS

Prior to test initiation, the sample was allowed to settle overnight at ~15°C. The following day, the sample was carefully decanted using an appropriate siphon hose so that no settled solids from the bottom of the sample were included in the test solution. The decanted test solution was then used for testing.

Approved By : _____

Project Manager

Work Order : 254241
Sample Number : 81676

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*	Hardness (as $CaCO_3$)
Initial Chemistry (100%) :	7.3	8.6	10560	21	110	>1000 mg/L

0 HOURS

Date & Time : 2024-03-19 12:10
Analyst(s) : FM (SV)/JW

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation*	Hardness
100	A	0	0	7.5	8.4	10610	21	105	>1000
100	B	0	0	7.5	8.4	10610	21	105	>1000
100	C	0	0	7.5	8.4	10610	21	105	>1000
Control	A	0	0	8.2	8.6	472	21	100	130
Control	B	0	0	8.2	8.6	472	21	100	130
Control	C	0	0	8.2	8.6	472	21	100	130

Notes: See 'COMMENTS' section on page 1. Test solutions are yellow and clear.

24 HOURS

Date & Time : 2024-03-20 11:20
Analyst(s) : JW

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	–	0	–	–	–	21
100	B	–	0	–	–	–	21
100	C	–	0	–	–	–	21
Control	A	–	0	–	–	–	21
Control	B	–	0	–	–	–	21
Control	C	–	0	–	–	–	21

Notes: Test solutions are yellow and clear. Organisms appear normal. In control rep A, 4 organisms are floating, in control rep C, 1 organism is floating.

48 HOURS

Date & Time : 2024-03-21 11:45
Analyst(s) : JW/FM (JGR)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	0	1	8.0	7.8	10630	20
100	B	0	1	8.0	7.9	10670	20
100	C	0	4	8.0	7.9	10700	20
Control	A	0	0	8.2	8.1	486	20
Control	B	0	0	8.2	8.1	485	20
Control	C	0	0	8.2	8.1	487	20

Notes: Test solutions are yellow and clear. Organisms appear normal.In control rep A, 3 organisms are floating. In control rep C, 1 organism is floating.

Number immobile does not include number dead.

"–" = not measured/not required
* adjusted for temperature and barometric pressure

Test Data Reviewed By : EM
Date : 2024-03-26

NAUTILUS ENVIRONMENTAL
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT
Rainbow Trout

Work Order : 254241
Sample Number : 81676

SAMPLE IDENTIFICATION

Company :	Agnico Eagle Mines Limited - Meadowbank Division		
Location :	Baker Lake NU	Sampling Date :	2024-03-12
Substance :	Pit E (TDS SSWQO) - ST19 treated cyocencentrated to 7 g/L TDS	Sampling Time :	13:00
		Date Received :	2024-03-14
Sampling Method :	Grab	Time Received :	14:50
Sampled By :	T. Genty	Temperature at Receipt :	9 °C
Sample Description :	Clear, light brown.	Date Tested :	2024-03-19

Test Method(s) : Toxicity Investigations

96-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Impairment	0.0 %
	Mean Mortality	0.0 %
100%	Mean Impairment	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Test Organism :	*Oncorhynchus mykiss*	Mean Fork Length :	40.9 mm
Organism Batch :	T24-03	Range of Fork Lengths :	35 - 44 mm
Control Sample Size :	10	Mean Wet Weight :	0.7 g
Cumulative stock tank mortality rate :	0% (previous 7 days)	Organism Loading Rate :	0.4 g/L
Control organisms showing stress :	0 (at test completion)		

TEST CONDITIONS

Sample Treatment :	See 'COMMENTS' section below	Volume Tested (L) :	16
pH Adjustment :	None	Number of Replicates :	1
Test Aeration :	Yes	Organisms Per Replicate :	10
Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Organisms Per Test Level :	10
Duration of Pre-Aeration :	30 minutes		

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride		
Organism Batch :	T24-03	LC50 :	4476 mg/L
Date Tested :	2024-03-01	95% Confidence Limits :	4070 - 4903 mg/L
Analyst(s) :	AJS, KR, PC, NWP	Historical Mean LC50 :	3967 mg/L
Statistical Method :	Linear Regression (MLE)	Warning Limits (± 2SD) :	2944 - 5345 mg/L

COMMENTS

Prior to test initiation, the sample was allowed to settle overnight at ~15°C. The following day, the sample was carefully decanted using an appropriate siphon hose so that no settled solids from the bottom of the sample were included in the test solution. The decanted test solution was then used for testing.

Approved By : _____
Project Manager

Work Order : 254241
Sample Number : 81676

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)[3]
Initial Water Chemistry (100%) :	7.4	8.8	9974	15	99
After 30 min pre-aeration :	7.5	8.8	9903	15	97

0 HOURS

Date & Time 2024-03-19 11:55
Analyst(s) : NWP (NM)

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation[3]
100%	0	0	7.5	8.8	9903	15	97
Control	0	0	8.3	9.3	656	16	100

Notes: See 'COMMENTS' section on page 1.

24 HOURS

Date & Time 2024-03-20 10:00
Analyst(s) : NWP (PG)

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.7	8.4	9987	15
Control	0	0	8.4	9.3	653	15

Notes: 100% solution is clear and light brown. Test organisms appear normal.

48 HOURS

Date & Time 2024-03-21 10:45
Analyst(s) : NP (JGR)

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.9	8.9	9957	15
Control	0	0	8.4	9.0	639	15

Notes: 100% solution is light brown. Test organisms are swimming normally and appear healthy.

72 HOURS

Date & Time 2024-03-22 11:25
Analyst(s) : JGR

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.9	9.2	9982	
Control	0	0	8.3	9.1	628	15

Notes: 100% solution is clear and light brown. Test organisms appear normal.

96 HOURS

Date & Time 2024-03-23 11:30
Analyst(s) : JW

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.9	9.0	9960	16
Control	0	0	8.3	8.9	618	16

Notes: 100% solution is clear and light brown. Test organisms appear normal.

"–" = not measured/not required
Number impaired does not include number dead.
[3] adjusted for temperature and barometric pressure

Test Data Reviewed By : EM
Date : 2024-03-25

CHAIN OF CUSTODY RECORD

NAUTILUS ENVIRONMENTAL

Nautilus Work Order No: 254241

Shipping Address: Nautilus Environmental Guelph.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number: TBD

Field Sampler Name (print): Thomas Genty

Signature:

Affiliation: Agnico Eagle

Sample Storage (prior to shipping):

Custody Relinquished by:

Date/Time Shipped:

Client: Agnico Eagle Mines Ltd.
11600, rue Louis Bisson
Mirabel, Quebec J7N 1G9

Phone: (519) 820-9156

Fax:

Contact: Lisa Ramilo lisa.ramilo@agnicoeagle.com

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	Nautilus Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2024-03-12	13:00	Pit E (TDS SSWQO) -	81676	9°C	✔		✔							✔		1 x 20 L
		ST19 treated cyocencentrated to 7 g/L TDS														

For Lab Use Only

Received By: NM
Date: 2024-03-14
Time: 14:50
Storage Location:
Storage Temp.(°C)

Please list any special requests or instructions:

Please collect 1 water sample for detailed analytical chemistry at the start of testing; list of parameters provided to L.Novak; please request Rush analysis - 3 Day turnaround time for results and CC results to:lisa.ramilo@agnicoeagle.com

NAUTILUS ENVIRONMENTAL
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Daphnia magna

Work Order : 254313
Sample Number : 81788

SAMPLE IDENTIFICATION

Company :	Agnico Eagle Mines Limited - Meadowbank Division		
Location :	Baker Lake NU	Sampling Date :	2024-03-19
Substance :	Pit E (TDS SSWQO) - ST19 treated cyocencentrated to 8 g/L TDS	Sampling Time :	13:30
		Date Received :	2024-03-26
Sampling Method :	Grab	Time Received :	15:40
Sampled By :	T. Genty	Temperature at Receipt :	9 °C
Sample Description :	Clear, orange.	Date Tested :	2024-03-27
Test Method :	Toxicity Investigations		

48-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	13.3 %
	Mean Mortality	3.3 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Species :	*Daphnia magna*	Time to First Brood :	7.8 days
Organism Batch :	Dm24-05	Average Brood Size :	34.9
Culture Mortality :	0.3% (previous 7 days)		

TEST CONDITIONS

Sample Treatment :	See 'COMMENTS' section below	Number of Replicates :	3
pH Adjustment :	None	Organisms per Replicate :	10
Pre-aeration Rate :	~30 mL/min/L	Organisms per Test Level :	30
Duration of Pre-Aeration :	30 minutes	Organism Loading Rate :	15.0 mL/organism
Test Aeration :	None	Impaired Control Organisms :	0.0%
Hardness Adjustment :	None		

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride		
Date Tested :	2024-03-26	LC50 :	6.5 g/L
Organism Batch :	Dm24-05	95% Confidence Limits :	6.2 - 6.8 g/L
Analyst(s) :	AA	Historical Mean LC50 :	6.3 g/L
Statistical Method :	Spearman-Kärber	Warning Limits (± 2SD) :	5.8 - 6.8 g/L

COMMENTS

Prior to test initiation, the sample was allowed to settle overnight. The following day, the sample was carefully decanted using an appropriate siphon hose so that no settled solids from the bottom of the sample were included in the test solution. The decanted test solution was then used for testing.

Approved By : _____

Project Manager

Work Order : 254313
Sample Number : 81788

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*	Hardness (as $CaCO_3$)
Initial Chemistry (100%) :	7.5	9.8	11410	20	116	>1000 mg/L

0 HOURS

Date & Time : 2024-03-27 14:45
Analyst(s) : FM (SF)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation*	Hardness
100	A	0	0	7.6	9.0	11410	20	108	>1000
100	B	0	0	7.6	9.0	11410	20	108	>1000
100	C	0	0	7.6	9.0	11410	20	108	>1000
Control	A	0	0	8.2	8.8	470	20	100	150
Control	B	0	0	8.2	8.8	470	20	100	150
Control	C	0	0	8.2	8.8	470	20	100	150

Notes: See 'COMMENTS' section on page 1.

24 HOURS

Date & Time : 2024-03-28 13:55
Analyst(s) : FM (NM)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	–	0	–	–	–	21
100	B	–	0	–	–	–	21
100	C	–	0	–	–	–	21
Control	A	–	0	–	–	–	21
Control	B	–	0	–	–	–	21
Control	C	–	0	–	–	–	21

Notes: Test solutions are clear and yellow. Organisms appear normal.

48 HOURS

Date & Time : 2024-03-29 15:25
Analyst(s) : VC

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	1	1	8.1	7.6	11330	21
100	B	0	2	8.1	7.7	11370	21
100	C	0	1	8.1	7.8	11410	21
Control	A	0	0	8.3	8.3	482	21
Control	B	0	0	8.3	8.2	482	21
Control	C	0	0	8.3	8.2	482	21

Notes: Test organisms appear smaller in size and agitated (some erratic swimming behavours like swimming in cirles and quick forward/backward motions). Test solutions are clear, slightly cloudy and light yellow.

Number immobile does not include number dead.

"–" = not measured/not required
* adjusted for temperature and barometric pressure

Test Data Reviewed By : EM
Date : 2024-04-02

NAUTILUS ENVIRONMENTAL
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT
Rainbow Trout

Work Order : 254313
Sample Number : 81788

SAMPLE IDENTIFICATION

Company :	Agnico Eagle Mines Limited - Meadowbank Division		
Location :	Baker Lake NU	Sampling Date :	2024-03-19
Substance :	Pit E (TDS SSWQO) - ST19 treated cyocencentrated to 8 g/L TDS	Sampling Time :	13:30
		Date Received :	2024-03-26
Sampling Method :	Grab	Time Received :	15:40
Sampled By :	T. Genty	Temperature at Receipt :	9 °C
Sample Description :	Clear, orange.	Date Tested :	2024-03-27

Test Method(s) : Toxicity Investigations

96-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Impairment	0.0 %
	Mean Mortality	0.0 %
100%	Mean Impairment	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Test Organism :	*Oncorhynchus mykiss*	Mean Fork Length :	38.6 mm
Organism Batch :	T24-04	Range of Fork Lengths :	33 - 45 mm
Control Sample Size :	10	Mean Wet Weight :	0.5 g
Cumulative stock tank mortality rate :	0% (previous 7 days)	Organism Loading Rate :	0.3 g/L
Control organisms showing stress :	0 (at test completion)		

TEST CONDITIONS

Sample Treatment :	See 'COMMENTS' section below	Volume Tested (L) :	16
pH Adjustment :	None	Number of Replicates :	1
Test Aeration :	Yes	Organisms Per Replicate :	10
Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Organisms Per Test Level :	10
Duration of Pre-Aeration :	30 minutes		

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride		
Organism Batch :	T24-04	LC50 :	4437 mg/L
Date Tested :	2024-03-14	95% Confidence Limits :	4204 - 4682 mg/L
Analyst(s) :	AJS, NM, NWP, PG	Historical Mean LC50 :	4024 mg/L
Statistical Method :	Spearman-Kärber	Warning Limits (± 2SD) :	3003 - 5391 mg/L

COMMENTS

Prior to test initiation, the sample was allowed to settle overnight. The following day, the sample was carefully decanted using an appropriate siphon hose so that no settled solids from the bottom of the sample were included in the test solution. The decanted test solution was then used for testing.

Approved By : _____

Project Manager

Work Order : 254313
Sample Number : 81788

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)[3]
Initial Water Chemistry (100%) :	7.5	9.7	10860	15	103
After 30 min pre-aeration :	7.7	8.9	10720	15	97

0 HOURS

Date & Time 2024-03-27 14:00
Analyst(s) : PG

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation[3]
100%	0	0	7.7	8.9	10720	15	97
Control	0	0	8.3	9.6	658	15	100

Notes: See 'COMMENTS' section on page 1.

24 HOURS

Date & Time 2024-03-28 14:00
Analyst(s) : AJS

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.9	9.7	10760	16
Control	0	0	8.3	9.6	652	16

Notes: Test organisms appear healthy and mobile. Solution is clear and orange.

48 HOURS

Date & Time 2024-03-29 13:30
Analyst(s) : AJS

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	8.0	9.2	10600	14
Control	0	0	8.3	9.4	648	14

Notes: Test organisms appear healthy and mobile. Solution is clear and orange.

72 HOURS

Date & Time 2024-03-30 14:30
Analyst(s) : AJS

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	8.0	8.6	10750	14
Control	0	0	8.3	9.3	639	14

Notes: Test organisms appear healthy and mobile. Solution is clear and orange.

96 HOURS

Date & Time 2024-03-31 14:30
Analyst(s) : AJS

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	8.1	8.2	10710	15
Control	0	0	8.3	9.4	638	15

Notes: Test organisms appear healthy and mobile. Solution is clear and orange.

"–" = not measured/not required
Number impaired does not include number dead.
[3] adjusted for temperature and barometric pressure

Test Data Reviewed By : JJ
Date : 2024-04-03

CHAIN OF CUSTODY RECORD

NAUTILUS ENVIRONMENTAL

Nautilus Work Order No: 254313

Shipping Address: Nautilus Environmental Guelph.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number: TBD
Field Sampler Name (print): Thomas Genty
Signature:
Affiliation: Agnico Eagle
Sample Storage (prior to shipping):
Custody Relinquished by:
Date/Time Shipped:

Client: Agnico Eagle Mines Ltd.
11600, rue Louis Bisson
Mirabel, Quebec J7N 1G9

Phone: (519) 820-9156
Fax:
Contact: Lisa Ramilo lisa.ramilo@agnicoeagle.com

Sample Identification					Analyses Requested										Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	Nautilus Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2024-03-19*		Pit E (TDS SSWQO) - ST19 treated cyocencentrated to 8 g/L TDS	81788	9°C	✔		✔							✔		1 x 20 L

For Lab Use Only
Received By: JGR
Date: 2024-03-26
Time: 15:40
Storage Location:
Storage Temp.(°C)

Please list any special requests or instructions:

Please collect 1 water sample for detailed analytical chemistry at the start of testing; list of parameters provided to L.Novak; please request Rush analysis - 3 Day turnaround time for results and CC results to:lisa.ramilo@agnicoeagle.com
*Pail label says Sampled at 13:30 on 2024-03-18

APPENDIX B

Acute Analytical Chemistry Results

Your P.O. #: 2324-196PG
Your Project #: 162706256
Your C.O.C. #: N/A

Attention: Adam Wartman

Nautilus Environmental Company Inc.
B-11 Nicholas Beaver Rd
Puslinch, ON
CANADA N0B 2J0

Report Date: 2024/03/19
Report #: R8072798
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C474240
Received: 2024/03/12, 15:53

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	3	N/A	2024/03/13	CAM SOP-00448	SM 24 2320 B m
Carbonate, Bicarbonate and Hydroxide	3	N/A	2024/03/13	CAM SOP-00102	APHA 4500-CO2 D
Anions	3	N/A	2024/03/13	CAM SOP-00435	SM 23 4110 B m
Conductivity	3	N/A	2024/03/13	CAM SOP-00414	SM 24 2510 m
Cyanate (2)	3	N/A	2024/03/13	CAM SOP-00471	SM 24 4500-CN L
Dissolved Organic Carbon (DOC) (3)	3	N/A	2024/03/13	CAM SOP-00446	SM 24 5310 B m
Fluoride	3	2024/03/12	2024/03/13	CAM SOP-00449	SM 24 4500-F C m
Hardness (calculated as CaCO3)	3	N/A	2024/03/13	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Metals by ICPMS	1	N/A	2024/03/13	CAM SOP-00447	EPA 6020B m
Dissolved Metals by ICPMS	2	N/A	2024/03/14	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS	3	2024/03/13	2024/03/13	CAM SOP-00447	EPA 6020B m
Cyanide (Free) (1)	3	N/A	2024/03/19	CAL SOP-00266	EPA 9016d R0 m
Cyanide, Strong Acid Dissociable (SAD) (1)	3	2024/03/15	2024/03/15	CAL SOP-00270	SM 24 4500-CN m
Cyanide WAD (weak acid dissociable) (1)	3	N/A	2024/03/15	CAL SOP-00270	SM 24 4500-CN m
Total Ammonia-N	3	N/A	2024/03/13	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (4)	3	N/A	2024/03/13	CAM SOP-00440	SM 24 4500-NO3I/NO2B
pH (5)	3	2024/03/12	2024/03/13	CAM SOP-00413	SM 24th - 4500H+ B
Orthophosphate	1	N/A	2024/03/13	CAM SOP-00461	SM 24 4500-P E
Orthophosphate	2	N/A	2024/03/14	CAM SOP-00461	SM 24 4500-P E
Thiocyanate	3	N/A	2024/03/13	CAM SOP-00473	SM 24 4500-CN M m
Total Dissolved Solids	3	2024/03/12	2024/03/13	CAM SOP-00428	SM 24 2540C m
Low Level Total Suspended Solids	3	2024/03/12	2024/03/13	CAM SOP-00428	SM 24 2540D m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement

Your P.O. #: 2324-196PG
Your Project #: 162706256
Your C.O.C. #: N/A

Attention: Adam Wartman

Nautilus Environmental Company Inc.
B-11 Nicholas Beaver Rd
Puslinch, ON
CANADA N0B 2J0

Report Date: 2024/03/19
Report #: R8072798
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C474240
Received: 2024/03/12, 15:53

Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Calgary (19th), 4000 19th Street NE , Calgary, AB, T2E 6P8
(2) Sample(s) analyzed using methodologies that have been subjected to Bureau Veritas' standard validation process for the submitted matrix however it is not an accredited method.
(3) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(4) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(5) "The CCME method and Analytical Protocol (O. Reg 153/04, O. Reg. 406/19) requires pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME and Analytical Protocol (O. Reg 153/04, O. Reg. 406/19) holding time. Bureau Veritas endeavors to analyze samples as soon as possible after receipt."

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Jolanta Goralczyk, Project Manager
Email: Jolanta.Goralczyk@bureauveritas.com
Phone# (905)817-5751

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Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Nautilus Environmental Company Inc.
Client Project #: 162706256
Your P.O. #: 2324-196PG
Sampler Initials: AQU

ANION SCAN IN WATER (WATER)

Bureau Veritas ID		YPL701			YPL701			YPL702		
Sampling Date		2024/03/12 09:00			2024/03/12 09:00			2024/03/12 10:30		
COC Number		N/A			N/A			N/A		
	UNITS	81599	RDL	QC Batch	81599 Lab-Dup	RDL	QC Batch	81600	RDL	QC Batch
Inorganics										
Fluoride (F-)	mg/L	0.22	0.10	9270614				0.15	0.10	9270614
Orthophosphate (P)	mg/L	0.62	0.010	9271757				0.42	0.010	9269468
Nitrite (N)	mg/L	1.49	0.010	9270591	1.50	0.010	9270591	0.962	0.010	9270591
Dissolved Chloride (Cl-)	mg/L	500	10	9270589	500	10	9270589	320	5.0	9270589
Nitrate (N)	mg/L	181	2.0	9270591	183	2.0	9270591	117	1.0	9270591
Nitrate + Nitrite (N)	mg/L	182	2.0	9270591	185	2.0	9270591	118	1.0	9270591
Dissolved Bromide (Br-)	mg/L	<10	10	9270589	<10	10	9270589	<5.0	5.0	9270589
Dissolved Sulphate (SO4)	mg/L	3400	10	9270589	3500	10	9270589	2300	5.0	9270589

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Bureau Veritas ID		YPL703		
Sampling Date		2024/03/12 10:45		
COC Number		N/A		
	UNITS	8161	RDL	QC Batch
Inorganics				
Fluoride (F-)	mg/L	0.19	0.10	9270614
Orthophosphate (P)	mg/L	0.56	0.010	9271757
Nitrite (N)	mg/L	1.34	0.010	9270591
Dissolved Chloride (Cl-)	mg/L	440	10	9270589
Nitrate (N)	mg/L	163	2.0	9270591
Nitrate + Nitrite (N)	mg/L	165	2.0	9270591
Dissolved Bromide (Br-)	mg/L	<10	10	9270589
Dissolved Sulphate (SO4)	mg/L	3100	10	9270589

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C474240
Report Date: 2024/03/19

Nautilus Environmental Company Inc.
Client Project #: 162706256
Your P.O. #: 2324-196PG
Sampler Initials: AQU

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		YPL701			YPL701			YPL702		
Sampling Date		2024/03/12 09:00			2024/03/12 09:00			2024/03/12 10:30		
COC Number		N/A			N/A			N/A		
	UNITS	**81599**	**RDL**	**QC Batch**	**81599 Lab-Dup**	**RDL**	**QC Batch**	**81600**	**RDL**	**QC Batch**
Calculated Parameters										
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	81	1.0	9268847				53	1.0	9268847
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	9268847				<1.0	1.0	9268847
Total Cyanate (CNO-)	mg/L	0.41	0.050	9270425				0.26	0.050	9270425
Hardness (CaCO3)	mg/L	1700	1.0	9268849				1000	1.0	9268849
Inorganics										
Total Ammonia-N	mg/L	1.60	0.050	9270996	1.59	0.050	9270996	1.03	0.050	9270996
Conductivity	umho/cm	8200	1.0	9270600				5700	1.0	9270600
Free Cyanide (CN)	ug/L	6.0	2.0	9284253				5.7	2.0	9284253
Strong Acid Dissoc. Cyanide (CN)	mg/L	0.0263	0.00050	9284252	0.0262	0.00050	9284252	0.0183	0.00050	9284252
Weak Acid Dissoc. Cyanide (CN)	mg/L	0.013	0.00050	9284251	0.013	0.00050	9284251	0.011	0.00050	9284251
Total Dissolved Solids	mg/L	6920	20	9270556	6960	20	9270556	4590	10	9270556
Dissolved Organic Carbon	mg/L	12	0.40	9271013				7.3	0.40	9271013
pH	pH	7.49		9270615				7.39		9270615
Total Suspended Solids	mg/L	11	1	9268434				4	1	9268434
Thiocyanate	mg/L	0.13	0.05	9270587	0.12	0.05	9270587	0.07	0.05	9270587
Alkalinity (Total as CaCO3)	mg/L	81	1.0	9270593				53	1.0	9270593

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C474240
Report Date: 2024/03/19

Nautilus Environmental Company Inc.
Client Project #: 162706256
Your P.O. #: 2324-196PG
Sampler Initials: AQU

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		YPL703		
Sampling Date		2024/03/12 10:45		
COC Number		N/A		
	UNITS	**8161**	**RDL**	**QC Batch**
Calculated Parameters				
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	73	1.0	9268847
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	9268847
Total Cyanate (CNO-)	mg/L	0.34	0.050	9270425
Hardness (CaCO3)	mg/L	1500	1.0	9268849
Inorganics				
Total Ammonia-N	mg/L	1.43	0.050	9270996
Conductivity	umho/cm	7600	1.0	9270600
Free Cyanide (CN)	ug/L	5.5	2.0	9284253
Strong Acid Dissoc. Cyanide (CN)	mg/L	0.0249	0.00050	9284252
Weak Acid Dissoc. Cyanide (CN)	mg/L	0.014	0.00050	9284251
Total Dissolved Solids	mg/L	6350	20	9270556
Dissolved Organic Carbon	mg/L	11	0.40	9271013
pH	pH	7.50		9270615
Total Suspended Solids	mg/L	7	1	9268434
Thiocyanate	mg/L	0.13	0.05	9270587
Alkalinity (Total as CaCO3)	mg/L	74	1.0	9270593

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		YPL701			YPL702			YPL703		
Sampling Date		2024/03/12 09:00			2024/03/12 10:30			2024/03/12 10:45		
COC Number		N/A			N/A			N/A		
	UNITS	81599	RDL	QC Batch	81600	RDL	QC Batch	8161	RDL	QC Batch
Metals										
Dissolved Aluminum (Al)	mg/L	0.014	0.0049	9273625	0.0092	0.0049	9271234	0.015	0.0049	9273625
Total Aluminum (Al)	mg/L	0.041	0.0049	9270872	0.027	0.0049	9270872	0.044	0.0049	9270872
Dissolved Antimony (Sb)	mg/L	0.0095	0.00050	9273625	0.0054	0.00050	9271234	0.0084	0.00050	9273625
Total Antimony (Sb)	mg/L	0.011	0.00050	9270872	0.0067	0.00050	9270872	0.0096	0.00050	9270872
Dissolved Arsenic (As)	mg/L	0.0017	0.0010	9273625	0.0012	0.0010	9271234	0.0016	0.0010	9273625
Total Arsenic (As)	mg/L	0.0019	0.0010	9270872	0.0014	0.0010	9270872	0.0018	0.0010	9270872
Dissolved Barium (Ba)	mg/L	0.041	0.0020	9273625	0.025	0.0020	9271234	0.037	0.0020	9273625
Total Barium (Ba)	mg/L	0.043	0.0020	9270872	0.028	0.0020	9270872	0.040	0.0020	9270872
Dissolved Beryllium (Be)	mg/L	<0.00040	0.00040	9273625	<0.00040	0.00040	9271234	<0.00040	0.00040	9273625
Total Beryllium (Be)	mg/L	<0.00040	0.00040	9270872	<0.00040	0.00040	9270872	<0.00040	0.00040	9270872
Dissolved Bismuth (Bi)	mg/L	<0.0010	0.0010	9273625	<0.0010	0.0010	9271234	<0.0010	0.0010	9273625
Total Bismuth (Bi)	mg/L	<0.0010	0.0010	9270872	<0.0010	0.0010	9270872	<0.0010	0.0010	9270872
Dissolved Boron (B)	mg/L	0.35	0.010	9273625	0.24	0.010	9271234	0.32	0.010	9273625
Total Boron (B)	mg/L	0.36	0.010	9270872	0.25	0.010	9270872	0.35	0.010	9270872
Dissolved Cadmium (Cd)	mg/L	<0.000090	0.000090	9273625	<0.000090	0.000090	9271234	<0.000090	0.000090	9273625
Total Cadmium (Cd)	mg/L	<0.000090	0.000090	9270872	<0.000090	0.000090	9270872	<0.000090	0.000090	9270872
Dissolved Calcium (Ca)	mg/L	620	1.0	9273625	380	0.20	9271234	560	1.0	9273625
Total Calcium (Ca)	mg/L	550	1.0	9270872	400	0.20	9270872	560	1.0	9270872
Dissolved Chromium (Cr)	mg/L	<0.0050	0.0050	9273625	<0.0050	0.0050	9271234	<0.0050	0.0050	9273625
Total Chromium (Cr)	mg/L	<0.0050	0.0050	9270872	<0.0050	0.0050	9270872	<0.0050	0.0050	9270872
Dissolved Cobalt (Co)	mg/L	0.68	0.00050	9273625	0.43	0.00050	9271234	0.61	0.00050	9273625
Total Cobalt (Co)	mg/L	0.69	0.00050	9270872	0.43	0.00050	9270872	0.66	0.00050	9270872
Dissolved Copper (Cu)	mg/L	0.10	0.00090	9273625	0.058	0.00090	9271234	0.095	0.00090	9273625
Total Copper (Cu)	mg/L	0.18	0.00090	9270872	0.12	0.00090	9270872	0.17	0.00090	9270872
Dissolved Iron (Fe)	mg/L	2.4	0.10	9273625	1.5	0.10	9271234	2.4	0.10	9273625
Total Iron (Fe)	mg/L	6.1	0.10	9270872	4.1	0.10	9270872	5.9	0.10	9270872
Dissolved Lead (Pb)	mg/L	<0.00050	0.00050	9273625	<0.00050	0.00050	9271234	<0.00050	0.00050	9273625
Total Lead (Pb)	mg/L	<0.00050	0.00050	9270872	<0.00050	0.00050	9270872	<0.00050	0.00050	9270872
Dissolved Lithium (Li)	mg/L	0.0062	0.0050	9273625	<0.0050	0.0050	9271234	0.0056	0.0050	9273625
Total Lithium (Li)	mg/L	0.0062	0.0050	9270872	<0.0050	0.0050	9270872	0.0061	0.0050	9270872
Dissolved Magnesium (Mg)	mg/L	28	0.050	9273625	16	0.050	9271234	24	0.050	9273625
Total Magnesium (Mg)	mg/L	26	0.050	9270872	17	0.050	9270872	24	0.050	9270872
Dissolved Manganese (Mn)	mg/L	0.098	0.0020	9273625	0.060	0.0020	9271234	0.086	0.0020	9273625
Total Manganese (Mn)	mg/L	0.097	0.0020	9270872	0.064	0.0020	9270872	0.094	0.0020	9270872

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C474240
Report Date: 2024/03/19

Nautilus Environmental Company Inc.
Client Project #: 162706256
Your P.O. #: 2324-196PG
Sampler Initials: AQU

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		YPL701			YPL702			YPL703		
Sampling Date		2024/03/12 09:00			2024/03/12 10:30			2024/03/12 10:45		
COC Number		N/A			N/A			N/A		
	UNITS	81599	RDL	QC Batch	81600	RDL	QC Batch	8161	RDL	QC Batch
Dissolved Molybdenum (Mo)	mg/L	0.094	0.00050	9273625	0.058	0.00050	9271234	0.084	0.00050	9273625
Total Molybdenum (Mo)	mg/L	0.090	0.00050	9270872	0.058	0.00050	9270872	0.087	0.00050	9270872
Dissolved Nickel (Ni)	mg/L	0.23	0.0010	9273625	0.15	0.0010	9271234	0.20	0.0010	9273625
Total Nickel (Ni)	mg/L	0.23	0.0010	9270872	0.15	0.0010	9270872	0.22	0.0010	9270872
Dissolved Phosphorus (P)	mg/L	0.37	0.10	9273625	0.23	0.10	9271234	0.36	0.10	9273625
Total Phosphorus (P)	mg/L	0.87	0.10	9270872	0.58	0.10	9270872	0.81	0.10	9270872
Dissolved Potassium (K)	mg/L	280	1.0	9273625	170	0.20	9271234	250	1.0	9273625
Total Potassium (K)	mg/L	260	1.0	9270872	180	0.20	9270872	270	1.0	9270872
Dissolved Selenium (Se)	mg/L	0.24	0.0020	9273625	0.15	0.0020	9271234	0.21	0.0020	9273625
Total Selenium (Se)	mg/L	0.23	0.0020	9270872	0.16	0.0020	9270872	0.22	0.0020	9270872
Dissolved Silicon (Si)	mg/L	2.5	0.050	9273625	1.6	0.050	9271234	2.4	0.050	9273625
Total Silicon (Si)	mg/L	2.5	0.050	9270872	1.6	0.050	9270872	2.3	0.050	9270872
Dissolved Silver (Ag)	mg/L	<0.000090	0.000090	9273625	<0.000090	0.000090	9271234	<0.000090	0.000090	9273625
Total Silver (Ag)	mg/L	0.00010	0.000090	9270872	<0.000090	0.000090	9270872	0.00013	0.000090	9270872
Dissolved Sodium (Na)	mg/L	1400	0.50	9273625	850	0.50	9271234	1300	0.50	9273625
Total Sodium (Na)	mg/L	1300	0.50	9270872	810	0.50	9270872	1300	0.50	9270872
Dissolved Strontium (Sr)	mg/L	3.0	0.0010	9273625	1.9	0.0010	9271234	2.6	0.0010	9273625
Total Strontium (Sr)	mg/L	3.2	0.0010	9270872	2.1	0.0010	9270872	3.0	0.0010	9270872
Dissolved Tellurium (Te)	mg/L	<0.0010	0.0010	9273625	<0.0010	0.0010	9271234	<0.0010	0.0010	9273625
Total Tellurium (Te)	mg/L	<0.0010	0.0010	9270872	<0.0010	0.0010	9270872	<0.0010	0.0010	9270872
Dissolved Thallium (Tl)	mg/L	0.00016	0.000050	9273625	0.00011	0.000050	9271234	0.00014	0.000050	9273625
Total Thallium (Tl)	mg/L	0.00016	0.000050	9270872	0.00011	0.000050	9270872	0.00013	0.000050	9270872
Dissolved Tin (Sn)	mg/L	<0.0010	0.0010	9273625	<0.0010	0.0010	9271234	<0.0010	0.0010	9273625
Total Tin (Sn)	mg/L	<0.0010	0.0010	9270872	<0.0010	0.0010	9270872	<0.0010	0.0010	9270872
Dissolved Titanium (Ti)	mg/L	0.0052	0.0050	9273625	<0.0050	0.0050	9271234	<0.0050	0.0050	9273625
Total Titanium (Ti)	mg/L	0.012	0.0050	9270872	0.0074	0.0050	9270872	0.011	0.0050	9270872
Dissolved Tungsten (W)	mg/L	0.0010	0.0010	9273625	<0.0010	0.0010	9271234	0.0010	0.0010	9273625
Total Tungsten (W)	mg/L	0.0014	0.0010	9270872	<0.0010	0.0010	9270872	0.0013	0.0010	9270872
Dissolved Uranium (U)	mg/L	0.0010	0.00010	9273625	0.00073	0.00010	9271234	0.00095	0.00010	9273625
Total Uranium (U)	mg/L	0.0011	0.00010	9270872	0.00071	0.00010	9270872	0.0010	0.00010	9270872
Dissolved Vanadium (V)	mg/L	<0.00050	0.00050	9273625	<0.00050	0.00050	9271234	<0.00050	0.00050	9273625
Total Vanadium (V)	mg/L	0.00069	0.00050	9270872	0.00050	0.00050	9270872	0.00069	0.00050	9270872
Dissolved Zinc (Zn)	mg/L	0.016	0.0050	9273625	0.0079	0.0050	9271234	0.014	0.0050	9273625
Total Zinc (Zn)	mg/L	0.023	0.0050	9270872	0.017	0.0050	9270872	0.022	0.0050	9270872
Dissolved Zirconium (Zr)	mg/L	<0.0010	0.0010	9273625	<0.0010	0.0010	9271234	<0.0010	0.0010	9273625

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C474240
Report Date: 2024/03/19

Nautilus Environmental Company Inc.
Client Project #: 162706256
Your P.O. #: 2324-196PG
Sampler Initials: AQU

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		YPL701			YPL702			YPL703		
Sampling Date		2024/03/12 09:00			2024/03/12 10:30			2024/03/12 10:45		
COC Number		N/A			N/A			N/A		
	UNITS	**81599**	**RDL**	**QC Batch**	**81600**	**RDL**	**QC Batch**	**8161**	**RDL**	**QC Batch**
Total Zirconium (Zr)	mg/L	<0.0010	0.0010	9270872	<0.0010	0.0010	9270872	<0.0010	0.0010	9270872

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	12.3°C

Bromide Analysis:Due to high concentrations of the target analyte (Cl), sample required dilution. Detection limits were adjusted accordingly.

Sample YPL701 [81599] : PO4>Dissolved Phosphorous. Results have been confirmed by reanalysis.

Sample YPL702 [81600] : Total Phosphorus < ortho-Phosphate: Both values fall within the method uncertainty for duplicates and are likely equivalent.

Sample YPL703 [8161] : PO4>Dissolved Phosphorous. Results have been confirmed by reanalysis.

Results relate only to the items tested.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9268434	Total Suspended Solids	2024/03/13			94	80 - 120	<1	mg/L	13	20
9269468	Orthophosphate (P)	2024/03/13	96	75 - 125	98	80 - 120	<0.010	mg/L	0.21	20
9270556	Total Dissolved Solids	2024/03/13			100	80 - 120	<10	mg/L	0.58	20
9270587	Thiocyanate	2024/03/13	90	80 - 120	97	80 - 120	<0.05	mg/L	5.2	20
9270589	Dissolved Bromide (Br-)	2024/03/13	97	80 - 120	98	80 - 120	<1.0	mg/L	NC	20
9270589	Dissolved Chloride (Cl-)	2024/03/13	NC	80 - 120	100	70 - 130	<1.0	mg/L	0.39	20
9270589	Dissolved Sulphate (SO4)	2024/03/13	NC	80 - 120	97	80 - 120	<1.0	mg/L	0.65	20
9270591	Nitrate (N)	2024/03/13	NC	80 - 120	97	80 - 120	<0.10	mg/L	1.5	20
9270591	Nitrite (N)	2024/03/13	NC	80 - 120	101	80 - 120	<0.010	mg/L	0.49	20
9270593	Alkalinity (Total as CaCO3)	2024/03/13			94	85 - 115	<1.0	mg/L	0.70	20
9270600	Conductivity	2024/03/13			101	85 - 115	<1.0	umho/cm	0.12	10
9270614	Fluoride (F-)	2024/03/13	95	80 - 120	99	80 - 120	<0.10	mg/L	13	20
9270615	pH	2024/03/13			102	98 - 103			1.5	N/A
9270872	Total Aluminum (Al)	2024/03/13	103	80 - 120	97	80 - 120	<0.0049	mg/L	3.3	20
9270872	Total Antimony (Sb)	2024/03/13	110	80 - 120	103	80 - 120	<0.00050	mg/L	12	20
9270872	Total Arsenic (As)	2024/03/13	102	80 - 120	100	80 - 120	<0.0010	mg/L	NC	20
9270872	Total Barium (Ba)	2024/03/13	100	80 - 120	98	80 - 120	<0.0020	mg/L		
9270872	Total Beryllium (Be)	2024/03/13	102	80 - 120	100	80 - 120	<0.00040	mg/L		
9270872	Total Bismuth (Bi)	2024/03/13	92	80 - 120	95	80 - 120	<0.0010	mg/L		
9270872	Total Boron (B)	2024/03/13	NC	80 - 120	97	80 - 120	<0.010	mg/L		
9270872	Total Cadmium (Cd)	2024/03/13	98	80 - 120	98	80 - 120	<0.000090	mg/L	15	20
9270872	Total Calcium (Ca)	2024/03/13	NC	80 - 120	97	80 - 120	<0.20	mg/L		
9270872	Total Chromium (Cr)	2024/03/13	95	80 - 120	98	80 - 120	<0.0050	mg/L	NC	20
9270872	Total Cobalt (Co)	2024/03/13	95	80 - 120	101	80 - 120	<0.00050	mg/L	4.5	20
9270872	Total Copper (Cu)	2024/03/13	NC	80 - 120	98	80 - 120	<0.00090	mg/L	8.5	20
9270872	Total Iron (Fe)	2024/03/13	97	80 - 120	102	80 - 120	<0.10	mg/L	2.3	20
9270872	Total Lead (Pb)	2024/03/13	92	80 - 120	95	80 - 120	<0.00050	mg/L	0	20
9270872	Total Lithium (Li)	2024/03/13	109	80 - 120	104	80 - 120	<0.0050	mg/L		
9270872	Total Magnesium (Mg)	2024/03/13	NC	80 - 120	106	80 - 120	<0.050	mg/L		
9270872	Total Manganese (Mn)	2024/03/13	98	80 - 120	100	80 - 120	<0.0020	mg/L	2.5	20

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9270872	Total Molybdenum (Mo)	2024/03/13	104	80 - 120	100	80 - 120	<0.00050	mg/L	1.3	20
9270872	Total Nickel (Ni)	2024/03/13	91	80 - 120	99	80 - 120	<0.0010	mg/L	6.0	20
9270872	Total Phosphorus (P)	2024/03/13	NC	80 - 120	96	80 - 120	<0.10	mg/L		
9270872	Total Potassium (K)	2024/03/13	NC	80 - 120	106	80 - 120	<0.20	mg/L		
9270872	Total Selenium (Se)	2024/03/13	95	80 - 120	100	80 - 120	<0.0020	mg/L	NC	20
9270872	Total Silicon (Si)	2024/03/13	106	80 - 120	96	80 - 120	<0.050	mg/L		
9270872	Total Silver (Ag)	2024/03/13	87	80 - 120	91	80 - 120	<0.000090	mg/L		
9270872	Total Sodium (Na)	2024/03/13	NC	80 - 120	101	80 - 120	<0.10	mg/L		
9270872	Total Strontium (Sr)	2024/03/13	NC	80 - 120	98	80 - 120	<0.0010	mg/L		
9270872	Total Tellurium (Te)	2024/03/13	107	80 - 120	104	80 - 120	<0.0010	mg/L		
9270872	Total Thallium (Tl)	2024/03/13	97	80 - 120	100	80 - 120	<0.000050	mg/L		
9270872	Total Tin (Sn)	2024/03/13	106	80 - 120	99	80 - 120	<0.0010	mg/L		
9270872	Total Titanium (Ti)	2024/03/13	103	80 - 120	97	80 - 120	<0.0050	mg/L		
9270872	Total Tungsten (W)	2024/03/13	94	80 - 120	95	80 - 120	<0.0010	mg/L		
9270872	Total Uranium (U)	2024/03/13	97	80 - 120	98	80 - 120	<0.00010	mg/L		
9270872	Total Vanadium (V)	2024/03/13	100	80 - 120	99	80 - 120	<0.00050	mg/L		
9270872	Total Zinc (Zn)	2024/03/13	96	80 - 120	102	80 - 120	<0.0050	mg/L	1.9	20
9270872	Total Zirconium (Zr)	2024/03/13	77 (1)	80 - 120	102	80 - 120	<0.0010	mg/L		
9270996	Total Ammonia-N	2024/03/13	93	75 - 125	99	80 - 120	<0.050	mg/L	0.24	20
9271013	Dissolved Organic Carbon	2024/03/13	92	80 - 120	96	80 - 120	<0.40	mg/L	8.5	20
9271234	Dissolved Aluminum (Al)	2024/03/13	99	80 - 120	95	80 - 120	<0.0049	mg/L		
9271234	Dissolved Antimony (Sb)	2024/03/13	104	80 - 120	102	80 - 120	<0.00050	mg/L		
9271234	Dissolved Arsenic (As)	2024/03/13	101	80 - 120	97	80 - 120	<0.0010	mg/L		
9271234	Dissolved Barium (Ba)	2024/03/13	96	80 - 120	97	80 - 120	<0.0020	mg/L		
9271234	Dissolved Beryllium (Be)	2024/03/13	91	80 - 120	98	80 - 120	<0.00040	mg/L		
9271234	Dissolved Bismuth (Bi)	2024/03/13	90	80 - 120	99	80 - 120	<0.0010	mg/L		
9271234	Dissolved Boron (B)	2024/03/13	98	80 - 120	98	80 - 120	<0.010	mg/L		
9271234	Dissolved Cadmium (Cd)	2024/03/13	96	80 - 120	99	80 - 120	<0.000090	mg/L		
9271234	Dissolved Calcium (Ca)	2024/03/13	NC	80 - 120	96	80 - 120	<0.20	mg/L		
9271234	Dissolved Chromium (Cr)	2024/03/13	97	80 - 120	96	80 - 120	<0.0050	mg/L		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9271234	Dissolved Cobalt (Co)	2024/03/13	NC	80 - 120	95	80 - 120	<0.00050	mg/L		
9271234	Dissolved Copper (Cu)	2024/03/13	98	80 - 120	94	80 - 120	<0.00090	mg/L		
9271234	Dissolved Iron (Fe)	2024/03/13	96	80 - 120	96	80 - 120	<0.10	mg/L		
9271234	Dissolved Lead (Pb)	2024/03/13	91	80 - 120	97	80 - 120	<0.00050	mg/L		
9271234	Dissolved Lithium (Li)	2024/03/13	98	80 - 120	100	80 - 120	<0.0050	mg/L		
9271234	Dissolved Magnesium (Mg)	2024/03/13	98	80 - 120	96	80 - 120	<0.050	mg/L		
9271234	Dissolved Manganese (Mn)	2024/03/13	95	80 - 120	96	80 - 120	<0.0020	mg/L		
9271234	Dissolved Molybdenum (Mo)	2024/03/13	109	80 - 120	98	80 - 120	<0.00050	mg/L		
9271234	Dissolved Nickel (Ni)	2024/03/13	94	80 - 120	95	80 - 120	<0.0010	mg/L		
9271234	Dissolved Phosphorus (P)	2024/03/13	105	80 - 120	100	80 - 120	<0.10	mg/L		
9271234	Dissolved Potassium (K)	2024/03/13	NC	80 - 120	98	80 - 120	<0.20	mg/L		
9271234	Dissolved Selenium (Se)	2024/03/13	98	80 - 120	96	80 - 120	<0.0020	mg/L		
9271234	Dissolved Silicon (Si)	2024/03/13	98	80 - 120	95	80 - 120	<0.050	mg/L		
9271234	Dissolved Silver (Ag)	2024/03/13	93	80 - 120	97	80 - 120	<0.000090	mg/L		
9271234	Dissolved Sodium (Na)	2024/03/13	NC	80 - 120	97	80 - 120	<0.10	mg/L		
9271234	Dissolved Strontium (Sr)	2024/03/13	NC	80 - 120	100	80 - 120	<0.0010	mg/L		
9271234	Dissolved Tellurium (Te)	2024/03/13	93	80 - 120	100	80 - 120	<0.0010	mg/L		
9271234	Dissolved Thallium (Tl)	2024/03/13	91	80 - 120	97	80 - 120	<0.000050	mg/L		
9271234	Dissolved Tin (Sn)	2024/03/13	103	80 - 120	102	80 - 120	<0.0010	mg/L		
9271234	Dissolved Titanium (Ti)	2024/03/13	98	80 - 120	98	80 - 120	<0.0050	mg/L		
9271234	Dissolved Tungsten (W)	2024/03/13	104	80 - 120	99	80 - 120	<0.0010	mg/L		
9271234	Dissolved Uranium (U)	2024/03/13	104	80 - 120	105	80 - 120	<0.00010	mg/L		
9271234	Dissolved Vanadium (V)	2024/03/13	102	80 - 120	96	80 - 120	<0.00050	mg/L		
9271234	Dissolved Zinc (Zn)	2024/03/13	91	80 - 120	98	80 - 120	<0.0050	mg/L		
9271234	Dissolved Zirconium (Zr)	2024/03/13	109	80 - 120	100	80 - 120	<0.0010	mg/L		
9271757	Orthophosphate (P)	2024/03/14	96	75 - 125	92	80 - 120	<0.010	mg/L	NC	20
9273625	Dissolved Aluminum (Al)	2024/03/14	98	80 - 120	98	80 - 120	<0.0049	mg/L		
9273625	Dissolved Antimony (Sb)	2024/03/14	108	80 - 120	102	80 - 120	<0.00050	mg/L	NC	20
9273625	Dissolved Arsenic (As)	2024/03/14	102	80 - 120	99	80 - 120	<0.0010	mg/L	NC	20
9273625	Dissolved Barium (Ba)	2024/03/14	102	80 - 120	100	80 - 120	<0.0020	mg/L	3.6	20

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9273625	Dissolved Beryllium (Be)	2024/03/14	104	80 - 120	100	80 - 120	<0.00040	mg/L	NC	20
9273625	Dissolved Bismuth (Bi)	2024/03/14	100	80 - 120	95	80 - 120	<0.0010	mg/L		
9273625	Dissolved Boron (B)	2024/03/14	100	80 - 120	97	80 - 120	<0.010	mg/L	2.1	20
9273625	Dissolved Cadmium (Cd)	2024/03/14	103	80 - 120	98	80 - 120	<0.000090	mg/L	NC	20
9273625	Dissolved Calcium (Ca)	2024/03/14	NC	80 - 120	103	80 - 120	<0.20	mg/L		
9273625	Dissolved Chromium (Cr)	2024/03/14	98	80 - 120	95	80 - 120	<0.0050	mg/L	NC	20
9273625	Dissolved Cobalt (Co)	2024/03/14	98	80 - 120	97	80 - 120	<0.00050	mg/L	NC	20
9273625	Dissolved Copper (Cu)	2024/03/14	100	80 - 120	97	80 - 120	<0.00090	mg/L	NC	20
9273625	Dissolved Iron (Fe)	2024/03/14	101	80 - 120	99	80 - 120	<0.10	mg/L	NC	20
9273625	Dissolved Lead (Pb)	2024/03/14	102	80 - 120	96	80 - 120	<0.00050	mg/L	NC	20
9273625	Dissolved Lithium (Li)	2024/03/14	111	80 - 120	111	80 - 120	<0.0050	mg/L		
9273625	Dissolved Magnesium (Mg)	2024/03/14	NC	80 - 120	96	80 - 120	<0.050	mg/L		
9273625	Dissolved Manganese (Mn)	2024/03/14	98	80 - 120	96	80 - 120	<0.0020	mg/L	3.1	20
9273625	Dissolved Molybdenum (Mo)	2024/03/14	107	80 - 120	100	80 - 120	<0.00050	mg/L	2.2	20
9273625	Dissolved Nickel (Ni)	2024/03/14	98	80 - 120	96	80 - 120	<0.0010	mg/L	14	20
9273625	Dissolved Phosphorus (P)	2024/03/14	104	80 - 120	97	80 - 120	<0.10	mg/L		
9273625	Dissolved Potassium (K)	2024/03/14	101	80 - 120	97	80 - 120	<0.20	mg/L		
9273625	Dissolved Selenium (Se)	2024/03/14	103	80 - 120	101	80 - 120	<0.0020	mg/L	NC	20
9273625	Dissolved Silicon (Si)	2024/03/14	96	80 - 120	99	80 - 120	<0.050	mg/L		
9273625	Dissolved Silver (Ag)	2024/03/14	101	80 - 120	100	80 - 120	<0.000090	mg/L	NC	20
9273625	Dissolved Sodium (Na)	2024/03/14	98	80 - 120	96	80 - 120	<0.10	mg/L		
9273625	Dissolved Strontium (Sr)	2024/03/14	NC	80 - 120	98	80 - 120	<0.0010	mg/L		
9273625	Dissolved Tellurium (Te)	2024/03/14	105	80 - 120	101	80 - 120	<0.0010	mg/L		
9273625	Dissolved Thallium (Tl)	2024/03/14	104	80 - 120	97	80 - 120	<0.000050	mg/L	NC	20
9273625	Dissolved Tin (Sn)	2024/03/14	105	80 - 120	100	80 - 120	<0.0010	mg/L		
9273625	Dissolved Titanium (Ti)	2024/03/14	97	80 - 120	97	80 - 120	<0.0050	mg/L		
9273625	Dissolved Tungsten (W)	2024/03/14	107	80 - 120	101	80 - 120	<0.0010	mg/L	NC	20
9273625	Dissolved Uranium (U)	2024/03/14	104	80 - 120	98	80 - 120	<0.00010	mg/L	2.1	20
9273625	Dissolved Vanadium (V)	2024/03/14	98	80 - 120	94	80 - 120	<0.00050	mg/L	NC	20
9273625	Dissolved Zinc (Zn)	2024/03/14	99	80 - 120	103	80 - 120	<0.0050	mg/L	9.2	20

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9273625	Dissolved Zirconium (Zr)	2024/03/14	104	80 - 120	99	80 - 120	<0.0010	mg/L		
9284251	Weak Acid Dissoc. Cyanide (CN)	2024/03/15	106	80 - 120	99	80 - 120	<0.00050	mg/L	1.2	20
9284252	Strong Acid Dissoc. Cyanide (CN)	2024/03/15	98	80 - 120	95	80 - 120	<0.00050	mg/L	0.27	20
9284253	Free Cyanide (CN)	2024/03/19	98	80 - 120	95	80 - 120	<2.0	ug/L		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C474240
Report Date: 2024/03/19

Nautilus Environmental Company Inc.
Client Project #: 162706256
Your P.O. #: 2324-196PG
Sampler Initials: AQU

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Cristina Carriere, Senior Scientific Specialist

Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

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MaxxamAnalytics
A Bureau Veritas Group Company

6740 Campobello Road, Mississauga, Ontario L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5779 Toll Free: 800-563-6266
CAM FCD-01191/2

Rush

CHAIN OF CUSTODY RECORD

Invoice Information	Report Information (if differs from invoice)	Project Information (where applicable)	Turnaround Time (TAT) Required
Company Name: Nautilus Environmental Company Inc.	Company Name: Nautilus Environmental Company Inc.	Quotation #: C41237	☐ Regular TAT (5-7 days) Most analyses
Contact Name: Adam Wartman	Contact Name: Adam Wartman / Lesley Novak	P.O. #/ AFE#: 2324-196PG	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address: 11B Nicholas Beaver Rd. Puslinch, ON N0B 2J0	Address: B-11 Nicholas Beaver Rd Puslinch, ON N0B2J0	Project #: 162706256	Rush TAT (Surcharges will be applied)
	awartman@aquatox.ca;pantunes@aquatox.ca; lnovak@aquatox.ca; lisa.ramilo@agnicoeagle.com;	Site Location:	☐ 1 Day ☐ 2 Days ☒ 3-4 Days
Email: accounting@nautilusenvironmental.ca	Email: connor.pettem@wsp.com	Sampled By: AquaTox	Date Required: 3/15/2024

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Rush Confirmation #: JG20240311-02

Regulation 153: ☐ Table 1 ☐ Table 2 ☐ Table 3 ☐ Table ____ ☐ Res/Park ☐ Ind/Comm ☐ Agri/ Other ☐ Med/ Fine ☐ Coarse
FOR RSC (PLEASE CIRCLE) Y / N

Other Regulations: ☐ CCME ☐ MISA ☐ PWQO ☐ Other (Specify) ☐ Sanitary Sewer Bylaw ☐ Storm Sewer Bylaw ☐ Region ☐ REG 558 (MIN. 3 DAY TAT REQUIRED)

Include Criteria on Certificate of Analysis: Y / N

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

LABORATORY USE ONLY

CUSTODY SEAL Y / N: Present N, Intact N

COOLER TEMPERATURES: 13/11/13

COOLING MEDIA PRESENT: Y / (N)

	SAMPLE IDENTIFICATION	DATE SAMPLED (YYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED (CIRCLE) Metals / Hg / CrVI	pH, Specific Conductivity	Total, Carbonate and Bicarbonate Alkalinity	Hardness	TSS (TSS low level)	Total ammonia	TDS	Anions Scan	Total Metals by ICP-MS/OES	Dissolved Metals by ICP-MS/OES (already filtered)	Total Cyanide (WAD, SAD and Free)	DOC	Cyanate	Thiocyanate			HOLD- DO NOT ANALYZE
1	81599	2024-03-12	09:00	water	10	Y	x	x	x	x	x	x	x	x	x	x	x	x	x			
2	81600	2024-03-12	10:30	water	10	Y	x	x	x	x	x	x	x	x	x	x	x	x	x			
3	81601	2024-03-12	10:45	water	10	Y	x	x	x	x	x	x	x	x	x	x	x	x	x			
4																						
5																						
6																						
7																						
8																						
9																						
10																						

COMMENTS: Please report ammonia values to 2 decimal places

NONT-2024-03-854

RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	MAXXAM JOB #
Adam Wartman	2024-03-12	14:30	NIRAL PATEL	2024/03/12	15:53	

Your P.O. #: 2324-196PG
Your Project #: 162706256
Your C.O.C. #: N/A

Attention: Adam Wartman

Nautilus Environmental Company Inc.
B-11 Nicholas Beaver Rd
Puslinch, ON
CANADA N0B 2J0

Report Date: 2024/03/26
Report #: R8082337
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C482313
Received: 2024/03/19, 15:58

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	1	N/A	2024/03/20	CAM SOP-00448	SM 24 2320 B m
Carbonate, Bicarbonate and Hydroxide	1	N/A	2024/03/20	CAM SOP-00102	APHA 4500-CO2 D
Anions	1	N/A	2024/03/21	CAM SOP-00435	SM 23 4110 B m
Conductivity	1	N/A	2024/03/20	CAM SOP-00414	SM 24 2510 m
Cyanate (2)	1	N/A	2024/03/22	CAM SOP-00471	SM 24 4500-CN L
Dissolved Organic Carbon (DOC) (3)	1	N/A	2024/03/20	CAM SOP-00446	SM 24 5310 B m
Fluoride	1	2024/03/20	2024/03/20	CAM SOP-00449	SM 24 4500-F C m
Hardness (calculated as CaCO3)	1	N/A	2024/03/22	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Metals by ICPMS	1	N/A	2024/03/22	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS	1	2024/03/20	2024/03/21	CAM SOP-00447	EPA 6020B m
Cyanide (Free) (1)	1	N/A	2024/03/26	CAL SOP-00266	EPA 9016d R0 m
Cyanide, Strong Acid Dissociable (SAD) (1)	1	2024/03/22	2024/03/22	CAL SOP-00270	SM 24 4500-CN m
Cyanide WAD (weak acid dissociable) (1)	1	N/A	2024/03/22	CAL SOP-00270	SM 24 4500-CN m
Total Ammonia-N	1	N/A	2024/03/21	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (4)	1	N/A	2024/03/20	CAM SOP-00440	SM 24 4500-NO3I/NO2B
pH (5)	1	2024/03/20	2024/03/20	CAM SOP-00413	SM 24th - 4500H+ B
Orthophosphate	1	N/A	2024/03/20	CAM SOP-00461	SM 24 4500-P E
Thiocyanate	1	N/A	2024/03/22	CAM SOP-00473	SM 24 4500-CN M m
Total Dissolved Solids	1	2024/03/21	2024/03/22	CAM SOP-00428	SM 24 2540C m
Low Level Total Suspended Solids	1	2024/03/21	2024/03/22	CAM SOP-00428	SM 24 2540D m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Your P.O. #: 2324-196PG
Your Project #: 162706256
Your C.O.C. #: N/A

Attention: Adam Wartman

Nautilus Environmental Company Inc.
B-11 Nicholas Beaver Rd
Puslinch, ON
CANADA N0B 2J0

Report Date: 2024/03/26
Report #: R8082337
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C482313
Received: 2024/03/19, 15:58

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Calgary (19th), 4000 19th Street NE , Calgary, AB, T2E 6P8
(2) Sample(s) analyzed using methodologies that have been subjected to Bureau Veritas' standard validation process for the submitted matrix however it is not an accredited method.
(3) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(4) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(5) "The CCME method and Analytical Protocol (O. Reg 153/04, O. Reg. 406/19) requires pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME and Analytical Protocol (O. Reg 153/04, O. Reg. 406/19) holding time. Bureau Veritas endeavors to analyze samples as soon as possible after receipt."

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Jolanta Goralczyk, Project Manager
Email: Jolanta.Goralczyk@bureauveritas.com
Phone# (905)817-5751

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Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Nautilus Environmental Company Inc.
Client Project #: 162706256
Your P.O. #: 2324-196PG
Sampler Initials: AQU

ANION SCAN IN WATER (WATER)

Bureau Veritas ID		YRD640			YRD640		
Sampling Date		2024/03/19 11:00			2024/03/19 11:00		
COC Number		N/A			N/A		
	UNITS	81676	RDL	QC Batch	81676 Lab-Dup	RDL	QC Batch
Inorganics							
Fluoride (F-)	mg/L	0.32	0.10	9285280	0.31	0.10	9285280
Orthophosphate (P)	mg/L	0.72	0.010	9285137			
Nitrite (N)	mg/L	2.18	0.010	9285243			
Dissolved Chloride (Cl-)	mg/L	690	10	9287063	700	10	9287063
Nitrate (N)	mg/L	210	2.0	9285243			
Nitrate + Nitrite (N)	mg/L	212	2.0	9285243			
Dissolved Bromide (Br-)	mg/L	<10	10	9287063	<10	10	9287063
Dissolved Sulphate (SO4)	mg/L	4200	10	9287063	4300	10	9287063

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C482313
Report Date: 2024/03/26

Nautilus Environmental Company Inc.
Client Project #: 162706256
Your P.O. #: 2324-196PG
Sampler Initials: AQU

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		YRD640			YRD640		
Sampling Date		2024/03/19 11:00			2024/03/19 11:00		
COC Number		N/A			N/A		
	UNITS	**81676**	**RDL**	**QC Batch**	**81676 Lab-Dup**	**RDL**	**QC Batch**
Calculated Parameters							
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	100	1.0	9282884			
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	9282884			
Total Cyanate (CNO-)	mg/L	0.62	0.050	9284263			
Hardness (CaCO3)	mg/L	1700	1.0	9282881			
Inorganics							
Total Ammonia-N	mg/L	2.46	0.050	9283581	2.48	0.050	9283581
Conductivity	umho/cm	11000	1.0	9285279	11000	1.0	9285279
Free Cyanide (CN)	ug/L	4.9	2.0	9298895			
Strong Acid Dissoc. Cyanide (CN)	mg/L	0.0465	0.00050	9296151			
Weak Acid Dissoc. Cyanide (CN)	mg/L	0.020	0.00050	9298894			
Total Dissolved Solids	mg/L	8710	20	9289077			
Dissolved Organic Carbon	mg/L	15	0.40	9285492			
pH	pH	7.47		9285278	7.54		9285278
Total Suspended Solids	mg/L	11	1	9288421			
Thiocyanate	mg/L	0.16	0.05	9290772	0.15	0.05	9290772
Alkalinity (Total as CaCO3)	mg/L	100	1.0	9285262	110	1.0	9285262

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ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		YRD640	YRD640		
Sampling Date		2024/03/19 11:00	2024/03/19 11:00		
COC Number		N/A	N/A		
	UNITS	81676	81676 Lab-Dup	RDL	QC Batch
Metals					
Dissolved Aluminum (Al)	mg/L	<0.025	<0.025	0.025	9285171
Total Aluminum (Al)	mg/L	0.050	0.048	0.0049	9286189
Dissolved Antimony (Sb)	mg/L	0.011	0.012	0.0025	9285171
Total Antimony (Sb)	mg/L	0.014	0.013	0.00050	9286189
Dissolved Arsenic (As)	mg/L	<0.0050	<0.0050	0.0050	9285171
Total Arsenic (As)	mg/L	0.0029	0.0030	0.0010	9286189
Dissolved Barium (Ba)	mg/L	0.051	0.056	0.010	9285171
Total Barium (Ba)	mg/L	0.057	0.057	0.0020	9286189
Dissolved Beryllium (Be)	mg/L	<0.0020	<0.0020	0.0020	9285171
Total Beryllium (Be)	mg/L	<0.00040	<0.00040	0.00040	9286189
Dissolved Bismuth (Bi)	mg/L	<0.0050	<0.0050	0.0050	9285171
Total Bismuth (Bi)	mg/L	<0.0010	<0.0010	0.0010	9286189
Dissolved Boron (B)	mg/L	0.48	0.49	0.050	9285171
Total Boron (B)	mg/L	0.48	0.48	0.010	9286189
Dissolved Cadmium (Cd)	mg/L	<0.00045	<0.00045	0.00045	9285171
Total Cadmium (Cd)	mg/L	0.00012	<0.000090	0.000090	9286189
Dissolved Calcium (Ca)	mg/L	610	620	1.0	9285171
Total Calcium (Ca)	mg/L	650	660	1.0	9286189
Dissolved Chromium (Cr)	mg/L	<0.025	<0.025	0.025	9285171
Total Chromium (Cr)	mg/L	<0.0050	<0.0050	0.0050	9286189
Dissolved Cobalt (Co)	mg/L	0.91	0.89	0.0025	9285171
Total Cobalt (Co)	mg/L	0.97	0.96	0.00050	9286189
Dissolved Copper (Cu)	mg/L	0.11	0.11	0.0045	9285171
Total Copper (Cu)	mg/L	0.22	0.21	0.00090	9286189
Dissolved Iron (Fe)	mg/L	2.7	2.8	0.50	9285171
Total Iron (Fe)	mg/L	7.0	7.0	0.10	9286189
Dissolved Lead (Pb)	mg/L	<0.0025	<0.0025	0.0025	9285171
Total Lead (Pb)	mg/L	0.00055	0.00054	0.00050	9286189
Dissolved Lithium (Li)	mg/L	<0.025	<0.025	0.025	9285171
Total Lithium (Li)	mg/L	0.0086	0.0090	0.0050	9286189
Dissolved Magnesium (Mg)	mg/L	33	33	0.25	9285171
Total Magnesium (Mg)	mg/L	36	36	0.050	9286189
Dissolved Manganese (Mn)	mg/L	0.13	0.12	0.010	9285171

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Nautilus Environmental Company Inc.
Client Project #: 162706256
Your P.O. #: 2324-196PG
Sampler Initials: AQU

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		YRD640	YRD640		
Sampling Date		2024/03/19 11:00	2024/03/19 11:00		
COC Number		N/A	N/A		
	UNITS	81676	81676 Lab-Dup	RDL	QC Batch
Total Manganese (Mn)	mg/L	0.13	0.14	0.0020	9286189
Dissolved Molybdenum (Mo)	mg/L	0.12	0.12	0.0025	9285171
Total Molybdenum (Mo)	mg/L	0.13	0.13	0.00050	9286189
Dissolved Nickel (Ni)	mg/L	0.30	0.30	0.0050	9285171
Total Nickel (Ni)	mg/L	0.33	0.33	0.0010	9286189
Dissolved Phosphorus (P)	mg/L	<0.50	0.50	0.50	9285171
Total Phosphorus (P)	mg/L	0.92	0.90	0.10	9286189
Dissolved Potassium (K)	mg/L	360	360	1.0	9285171
Total Potassium (K)	mg/L	370	380	1.0	9286189
Dissolved Selenium (Se)	mg/L	0.31	0.31	0.010	9285171
Total Selenium (Se)	mg/L	0.33	0.33	0.0020	9286189
Dissolved Silicon (Si)	mg/L	3.1	3.1	0.25	9285171
Total Silicon (Si)	mg/L	3.5	3.4	0.050	9286189
Dissolved Silver (Ag)	mg/L	<0.00045	<0.00045	0.00045	9285171
Total Silver (Ag)	mg/L	0.00013	0.00013	0.000090	9286189
Dissolved Sodium (Na)	mg/L	1800	1900	0.50	9285171
Total Sodium (Na)	mg/L	1900	2000	0.50	9286189
Dissolved Strontium (Sr)	mg/L	3.8	3.8	0.0050	9285171
Total Strontium (Sr)	mg/L	4.3	4.1	0.0010	9286189
Dissolved Tellurium (Te)	mg/L	<0.0050	<0.0050	0.0050	9285171
Total Tellurium (Te)	mg/L	<0.0010	<0.0010	0.0010	9286189
Dissolved Thallium (Tl)	mg/L	<0.00025	<0.00025	0.00025	9285171
Total Thallium (Tl)	mg/L	0.00023	0.00023	0.000050	9286189
Dissolved Tin (Sn)	mg/L	<0.0050	<0.0050	0.0050	9285171
Total Tin (Sn)	mg/L	<0.0010	<0.0010	0.0010	9286189
Dissolved Titanium (Ti)	mg/L	<0.025	<0.025	0.025	9285171
Total Titanium (Ti)	mg/L	0.013	0.013	0.0050	9286189
Dissolved Tungsten (W)	mg/L	<0.0050	<0.0050	0.0050	9285171
Total Tungsten (W)	mg/L	0.0018	0.0018	0.0010	9286189
Dissolved Uranium (U)	mg/L	0.0014	0.0014	0.00050	9285171
Total Uranium (U)	mg/L	0.0014	0.0014	0.00010	9286189
Dissolved Vanadium (V)	mg/L	<0.0025	<0.0025	0.0025	9285171
Total Vanadium (V)	mg/L	0.00082	0.00081	0.00050	9286189
Dissolved Zinc (Zn)	mg/L	<0.025	<0.025	0.025	9285171

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		YRD640	YRD640		
Sampling Date		2024/03/19 11:00	2024/03/19 11:00		
COC Number		N/A	N/A		
	UNITS	**81676**	**81676 Lab-Dup**	**RDL**	**QC Batch**
Total Zinc (Zn)	mg/L	0.038	0.037	0.0050	9286189
Dissolved Zirconium (Zr)	mg/L	<0.0050	<0.0050	0.0050	9285171
Total Zirconium (Zr)	mg/L	<0.0010	<0.0010	0.0010	9286189

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	12.3°C

Sample YRD640 [81676] : Metal Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.
Total Phosphorus < ortho-Phosphate: Both values fall within the method uncertainty for duplicates and are likely equivalent.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		Reagent Blank	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	Value	UNITS
9283581	Total Ammonia-N	2024/03/21	94	75 - 125	98	80 - 120	<0.050	mg/L	1.1	20		
9285137	Orthophosphate (P)	2024/03/20	103	75 - 125	100	80 - 120	<0.010	mg/L	NC	20		
9285171	Dissolved Aluminum (Al)	2024/03/22	97	80 - 120	96	80 - 120	<0.0049	mg/L	NC	20		
9285171	Dissolved Antimony (Sb)	2024/03/22	107	80 - 120	103	80 - 120	<0.00050	mg/L	4.4	20		
9285171	Dissolved Arsenic (As)	2024/03/22	100	80 - 120	99	80 - 120	<0.0010	mg/L	NC	20		
9285171	Dissolved Barium (Ba)	2024/03/22	100	80 - 120	97	80 - 120	<0.0020	mg/L	8.4	20		
9285171	Dissolved Beryllium (Be)	2024/03/22	97	80 - 120	101	80 - 120	<0.00040	mg/L	NC	20		
9285171	Dissolved Bismuth (Bi)	2024/03/22	94	80 - 120	98	80 - 120	<0.0010	mg/L	NC	20		
9285171	Dissolved Boron (B)	2024/03/22	102	80 - 120	98	80 - 120	<0.010	mg/L	1.8	20		
9285171	Dissolved Cadmium (Cd)	2024/03/22	100	80 - 120	99	80 - 120	<0.000090	mg/L	NC	20		
9285171	Dissolved Calcium (Ca)	2024/03/22	NC	80 - 120	98	80 - 120	<0.20	mg/L	0.25	20		
9285171	Dissolved Chromium (Cr)	2024/03/22	99	80 - 120	96	80 - 120	<0.0050	mg/L	NC	20		
9285171	Dissolved Cobalt (Co)	2024/03/22	NC	80 - 120	95	80 - 120	<0.00050	mg/L	1.4	20		
9285171	Dissolved Copper (Cu)	2024/03/22	99	80 - 120	96	80 - 120	<0.00090	mg/L	1.0	20		
9285171	Dissolved Iron (Fe)	2024/03/22	100	80 - 120	98	80 - 120	<0.10	mg/L	0.96	20		
9285171	Dissolved Lead (Pb)	2024/03/22	96	80 - 120	98	80 - 120	<0.00050	mg/L	NC	20		
9285171	Dissolved Lithium (Li)	2024/03/22	103	80 - 120	105	80 - 120	<0.0050	mg/L	NC	20		
9285171	Dissolved Magnesium (Mg)	2024/03/22	NC	80 - 120	96	80 - 120	<0.050	mg/L	0.30	20		
9285171	Dissolved Manganese (Mn)	2024/03/22	98	80 - 120	97	80 - 120	<0.0020	mg/L	3.9	20		
9285171	Dissolved Molybdenum (Mo)	2024/03/22	106	80 - 120	100	80 - 120	<0.00050	mg/L	1.5	20		
9285171	Dissolved Nickel (Ni)	2024/03/22	96	80 - 120	94	80 - 120	<0.0010	mg/L	0.96	20		
9285171	Dissolved Phosphorus (P)	2024/03/22	105	80 - 120	100	80 - 120	<0.10	mg/L	0.25	20		
9285171	Dissolved Potassium (K)	2024/03/22	NC	80 - 120	95	80 - 120	<0.20	mg/L	0.24	20		
9285171	Dissolved Selenium (Se)	2024/03/22	NC	80 - 120	99	80 - 120	<0.0020	mg/L	0.040	20		
9285171	Dissolved Silicon (Si)	2024/03/22	99	80 - 120	99	80 - 120	<0.050	mg/L	1.3	20		
9285171	Dissolved Silver (Ag)	2024/03/22	98	80 - 120	98	80 - 120	<0.000090	mg/L	NC	20		
9285171	Dissolved Sodium (Na)	2024/03/22	NC	80 - 120	98	80 - 120	<0.10	mg/L	1.2	20		
9285171	Dissolved Strontium (Sr)	2024/03/22	NC	80 - 120	98	80 - 120	<0.0010	mg/L	0.33	20		
9285171	Dissolved Tellurium (Te)	2024/03/22	98	80 - 120	98	80 - 120	<0.0010	mg/L	NC	20		
9285171	Dissolved Thallium (Tl)	2024/03/22	96	80 - 120	96	80 - 120	<0.000050	mg/L	NC	20		

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		Reagent Blank	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	Value	UNITS
9285171	Dissolved Tin (Sn)	2024/03/22	104	80 - 120	102	80 - 120	<0.0010	mg/L	NC	20		
9285171	Dissolved Titanium (Ti)	2024/03/22	101	80 - 120	99	80 - 120	<0.0050	mg/L	NC	20		
9285171	Dissolved Tungsten (W)	2024/03/22	101	80 - 120	98	80 - 120	<0.0010	mg/L	NC	20		
9285171	Dissolved Uranium (U)	2024/03/22	99	80 - 120	98	80 - 120	<0.00010	mg/L	1.5	20		
9285171	Dissolved Vanadium (V)	2024/03/22	102	80 - 120	97	80 - 120	<0.00050	mg/L	NC	20		
9285171	Dissolved Zinc (Zn)	2024/03/22	97	80 - 120	98	80 - 120	<0.0050	mg/L	NC	20		
9285171	Dissolved Zirconium (Zr)	2024/03/22	107	80 - 120	102	80 - 120	<0.0010	mg/L	NC	20		
9285243	Nitrate (N)	2024/03/20	96	80 - 120	97	80 - 120	<0.10	mg/L	NC	20		
9285243	Nitrite (N)	2024/03/20	105	80 - 120	105	80 - 120	<0.010	mg/L	6.9	20		
9285262	Alkalinity (Total as CaCO3)	2024/03/20			96	85 - 115	<1.0	mg/L	0.95	20		
9285278	pH	2024/03/20			102	98 - 103			0.93	N/A		
9285279	Conductivity	2024/03/20			102	85 - 115	<1.0	umho/cm	0.39	10		
9285280	Fluoride (F-)	2024/03/20	95	80 - 120	103	80 - 120	<0.10	mg/L	4.3	20		
9285492	Dissolved Organic Carbon	2024/03/20	95	80 - 120	98	80 - 120	<0.40	mg/L	0.059	20		
9286189	Total Aluminum (Al)	2024/03/21	109	80 - 120	103	80 - 120	<0.0049	mg/L	2.3	20	<0.0049	mg/L
9286189	Total Antimony (Sb)	2024/03/21	105	80 - 120	102	80 - 120	<0.00050	mg/L	5.3	20	<0.00050	mg/L
9286189	Total Arsenic (As)	2024/03/21	100	80 - 120	100	80 - 120	<0.0010	mg/L	1.5	20	<0.0010	mg/L
9286189	Total Barium (Ba)	2024/03/21	97	80 - 120	99	80 - 120	<0.0020	mg/L	0.43	20	<0.0020	mg/L
9286189	Total Beryllium (Be)	2024/03/21	97	80 - 120	97	80 - 120	<0.00040	mg/L	NC	20	<0.00040	mg/L
9286189	Total Bismuth (Bi)	2024/03/21	91	80 - 120	99	80 - 120	<0.0010	mg/L	NC	20	<0.0010	mg/L
9286189	Total Boron (B)	2024/03/21	85	80 - 120	93	80 - 120	<0.010	mg/L	1.4	20	<0.010	mg/L
9286189	Total Cadmium (Cd)	2024/03/21	98	80 - 120	98	80 - 120	<0.000090	mg/L	NC	20	<0.000090	mg/L
9286189	Total Calcium (Ca)	2024/03/21	NC	80 - 120	102	80 - 120	<0.20	mg/L	1.7	20	<0.20	mg/L
9286189	Total Chromium (Cr)	2024/03/21	96	80 - 120	96	80 - 120	<0.0050	mg/L	NC	20	<0.0050	mg/L
9286189	Total Cobalt (Co)	2024/03/21	NC	80 - 120	100	80 - 120	<0.00050	mg/L	1.2	20	<0.00050	mg/L
9286189	Total Copper (Cu)	2024/03/21	106	80 - 120	102	80 - 120	0.011, RDL=0.00090	mg/L	3.0	20	<0.00090	mg/L
9286189	Total Iron (Fe)	2024/03/21	99	80 - 120	100	80 - 120	<0.10	mg/L	0.60	20	<0.10	mg/L
9286189	Total Lead (Pb)	2024/03/21	89	80 - 120	94	80 - 120	<0.00050	mg/L	2.2	20	<0.00050	mg/L

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		Reagent Blank	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	Value	UNITS
9286189	Total Lithium (Li)	2024/03/21	100	80 - 120	102	80 - 120	<0.0050	mg/L	4.2	20	<0.0050	mg/L
9286189	Total Magnesium (Mg)	2024/03/21	NC	80 - 120	101	80 - 120	<0.050	mg/L	1.2	20	<0.050	mg/L
9286189	Total Manganese (Mn)	2024/03/21	96	80 - 120	97	80 - 120	<0.0020	mg/L	1.2	20	<0.0020	mg/L
9286189	Total Molybdenum (Mo)	2024/03/21	117	80 - 120	101	80 - 120	<0.00050	mg/L	1.8	20	<0.00050	mg/L
9286189	Total Nickel (Ni)	2024/03/21	92	80 - 120	99	80 - 120	<0.0010	mg/L	0.70	20	<0.0010	mg/L
9286189	Total Phosphorus (P)	2024/03/21	NC	80 - 120	97	80 - 120	<0.10	mg/L	2.1	20	<0.10	mg/L
9286189	Total Potassium (K)	2024/03/21	NC	80 - 120	104	80 - 120	<0.20	mg/L	2.5	20	<0.20	mg/L
9286189	Total Selenium (Se)	2024/03/21	NC	80 - 120	102	80 - 120	<0.0020	mg/L	0.49	20	<0.0020	mg/L
9286189	Total Silicon (Si)	2024/03/21	106	80 - 120	100	80 - 120	<0.050	mg/L	2.9	20	<0.050	mg/L
9286189	Total Silver (Ag)	2024/03/21	93	80 - 120	94	80 - 120	<0.000090	mg/L	2.4	20	<0.000090	mg/L
9286189	Total Sodium (Na)	2024/03/21	NC	80 - 120	106	80 - 120	<0.10	mg/L	1.2	20	<0.10	mg/L
9286189	Total Strontium (Sr)	2024/03/21	NC	80 - 120	96	80 - 120	<0.0010	mg/L	5.5	20	<0.0010	mg/L
9286189	Total Tellurium (Te)	2024/03/21	94	80 - 120	96	80 - 120	<0.0010	mg/L	NC	20	<0.0010	mg/L
9286189	Total Thallium (Tl)	2024/03/21	96	80 - 120	101	80 - 120	<0.000050	mg/L	0.44	20	<0.000050	mg/L
9286189	Total Tin (Sn)	2024/03/21	102	80 - 120	98	80 - 120	<0.0010	mg/L	NC	20	<0.0010	mg/L
9286189	Total Titanium (Ti)	2024/03/21	103	80 - 120	101	80 - 120	<0.0050	mg/L	0.66	20	<0.0050	mg/L
9286189	Total Tungsten (W)	2024/03/21	101	80 - 120	99	80 - 120	<0.0010	mg/L	3.5	20	<0.0010	mg/L
9286189	Total Uranium (U)	2024/03/21	98	80 - 120	97	80 - 120	<0.00010	mg/L	4.1	20	<0.00010	mg/L
9286189	Total Vanadium (V)	2024/03/21	100	80 - 120	97	80 - 120	<0.00050	mg/L	1.5	20	<0.00050	mg/L
9286189	Total Zinc (Zn)	2024/03/21	91	80 - 120	100	80 - 120	<0.0050	mg/L	1.6	20	<0.0050	mg/L
9286189	Total Zirconium (Zr)	2024/03/21	114	80 - 120	102	80 - 120	<0.0010	mg/L	NC	20	<0.0010	mg/L
9287063	Dissolved Bromide (Br-)	2024/03/21	100	80 - 120	99	80 - 120	<1.0	mg/L	NC	20		
9287063	Dissolved Chloride (Cl-)	2024/03/21	NC	80 - 120	97	70 - 130	<1.0	mg/L	0.43	20		
9287063	Dissolved Sulphate (SO4)	2024/03/21	NC	80 - 120	95	80 - 120	<1.0	mg/L	0.45	20		
9288421	Total Suspended Solids	2024/03/22			95	80 - 120	<1	mg/L	13	20		
9289077	Total Dissolved Solids	2024/03/22			98	80 - 120	<10	mg/L	0.93	20		
9290772	Thiocyanate	2024/03/22	87	80 - 120	98	80 - 120	<0.05	mg/L	8.5	20		
9296151	Strong Acid Dissoc. Cyanide (CN)	2024/03/22	107	80 - 120	107	80 - 120	<0.00050	mg/L				
9298894	Weak Acid Dissoc. Cyanide (CN)	2024/03/22	107	80 - 120	106	80 - 120	<0.00050	mg/L				

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		Reagent Blank	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	Value	UNITS
9298895	Free Cyanide (CN)	2024/03/26	88	80 - 120	93	80 - 120	<2.0	ug/L	NC	20		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Reagent Blank: A blank matrix containing all reagents used in the analytical procedure. Used to determine any analytical contamination.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

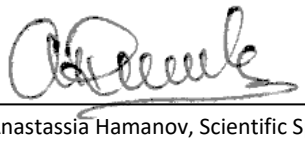
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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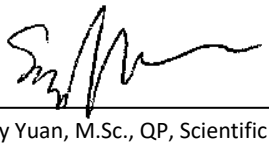
Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist



Sandy Yuan, M.Sc., QP, Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

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Maxxam
A Bureau Veritas Group Company
6740 Campobello Road, Mississauga, Ontario L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5779 Toll Free: 800-563-6266
CAM FCD-01191/2

CHAIN OF CUSTODY RECORD

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required
Company Name:	Nautilus Environmental Company Inc.	Company Name:	Nautilus Environmental Company Inc.	Quotation #:	C41237	☐ Regular TAT (5-7 days) Most analyses
Contact Name:	Adam Wartman	Contact Name:	Adam Wartman / Lesley Novak	P.O. #/ AFE#:	2324-196PG	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address:	11B Nicholas Beaver Rd. Puslinch, ON N0B 2J0	Address:	B-11 Nicholas Beaver Rd Puslinch, ON N0B2J0	Project #:	162706256	Rush TAT (Surcharges will be applied)
				Site Location:		☐ 1 Day ☐ 2 Days ☒ 3-4 Days
Email:	accounting@nautilusenvironmental.ca	Email:	awartman@aquatox.ca;pantunes@aquatox.ca; lnovak@aquatox.ca; lisa.ramilo@agnicoeagle.com; connor.pettem@wsp.com	Sampled By:	AquaTox	Date Required: 3/22/2024

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Rush Confirmation #: JG2023031805

Regulation 153

☐ Table 1 ☐ Res/Park ☐ Med/ Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/ Other
☐ Table ____
FOR RSC (PLEASE CIRCLE) Y / N

Other Regulations

☐ CCME ☐ Sanitary Sewer Bylaw
☐ MISA ☐ Storm Sewer Bylaw
☐ PWQO Region
☐ Other (Specify)
☐ REG 558 (MIN. 3 DAY TAT REQUIRED)

Include Criteria on Certificate of Analysis: Y / N

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

Analysis Requested

	SAMPLE IDENTIFICATION	DATE SAMPLED (YYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED (CIRCLE) Metals / Hg / CrVI	pH, Specific Conductivity	Total, Carbonate and Bicarbonate Alkalinity	Hardness	TSS (TSS low level)	Total ammonia	TDS	Anions Scan	Total Metals by ICP-MS/OES	Dissolved Metals by ICP-MS/OES (already filtered)	Total Cyanide (WAD, SAD and Free)	DOC	Cyanate	Thiocyanate			HOLD- DO NOT ANALYZE
1	81676	2024-03-19	11:00	water	10	Y	x	x	x	x	x	x	x	x	x	x	x	x	x			
2																						
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						

LABORATORY USE ONLY

CUSTODY SEAL Y / N		COOLER TEMPERATURES
Present	Intact	
		12/13/12

COOLING MEDIA PRESENT: Y / N

COMMENTS

Please report ammonia values to 2 decimal places

NONT-2024-03-1502

RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	MAXXAM JOB #
Adam Wartman	2024-03-19	14:30	JACQUELINE HALE	2024/03/19	15:58	

Your P.O. #: 2324-196PG
Your Project #: 162706256
Your C.O.C. #: n/a

Attention: Adam Wartman

Nautilus Environmental Company Inc.
B-11 Nicholas Beaver Rd
Puslinch, ON
CANADA N0B 2J0

Report Date: 2024/04/02
Report #: R8090754
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C491986
Received: 2024/03/27, 15:50

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	1	N/A	2024/03/28	CAM SOP-00448	SM 24 2320 B m
Carbonate, Bicarbonate and Hydroxide	1	N/A	2024/04/01	CAM SOP-00102	APHA 4500-CO2 D
Anions	1	N/A	2024/04/02	CAM SOP-00435	SM 23 4110 B m
Conductivity	1	N/A	2024/03/28	CAM SOP-00414	SM 24 2510 m
Cyanate (2)	1	N/A	2024/04/02	CAM SOP-00471	SM 24 4500-CN L
Dissolved Organic Carbon (DOC) (3)	1	N/A	2024/03/28	CAM SOP-00446	SM 24 5310 B m
Fluoride	1	2024/03/28	2024/03/28	CAM SOP-00449	SM 24 4500-F C m
Hardness (calculated as CaCO3)	1	N/A	2024/04/01	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Metals by ICPMS	1	N/A	2024/04/01	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS	1	2024/03/28	2024/03/28	CAM SOP-00447	EPA 6020B m
Cyanide (Free) (1)	1	N/A	2024/04/02	CAL SOP-00266	EPA 9016d R0 m
Cyanide, Strong Acid Dissociable (SAD) (1)	1	2024/04/02	2024/04/02	CAL SOP-00270	SM 24 4500-CN m
Cyanide WAD (weak acid dissociable) (1)	1	N/A	2024/04/02	CAL SOP-00270	SM 24 4500-CN m
Total Ammonia-N	1	N/A	2024/03/28	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (4)	1	N/A	2024/03/28	CAM SOP-00440	SM 24 4500-NO3I/NO2B
pH (5)	1	2024/03/28	2024/03/28	CAM SOP-00413	SM 24th - 4500H+ B
Orthophosphate	1	N/A	2024/03/31	CAM SOP-00461	SM 24 4500-P E
Thiocyanate	1	N/A	2024/03/28	CAM SOP-00473	SM 24 4500-CN M m
Total Dissolved Solids	1	2024/04/01	2024/04/02	CAM SOP-00428	SM 24 2540C m
Low Level Total Suspended Solids	1	2024/04/01	2024/04/02	CAM SOP-00428	SM 24 2540D m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Your P.O. #: 2324-196PG
Your Project #: 162706256
Your C.O.C. #: n/a

Attention: Adam Wartman

Nautilus Environmental Company Inc.
B-11 Nicholas Beaver Rd
Puslinch, ON
CANADA N0B 2J0

Report Date: 2024/04/02
Report #: R8090754
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C491986
Received: 2024/03/27, 15:50

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Calgary (19th), 4000 19th Street NE , Calgary, AB, T2E 6P8
(2) Sample(s) analyzed using methodologies that have been subjected to Bureau Veritas' standard validation process for the submitted matrix however it is not an accredited method.
(3) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(4) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(5) "The CCME method and Analytical Protocol (O. Reg 153/04, O. Reg. 406/19) requires pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME and Analytical Protocol (O. Reg 153/04, O. Reg. 406/19) holding time. Bureau Veritas endeavors to analyze samples as soon as possible after receipt."

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Jolanta Goralczyk, Project Manager
Email: Jolanta.Goralczyk@bureauveritas.com
Phone# (905)817-5751

==========

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Nautilus Environmental Company Inc.
Client Project #: 162706256
Your P.O. #: 2324-196PG
Sampler Initials: AW

ANION SCAN IN WATER (WATER)

Bureau Veritas ID		YTD487			YTD487		
Sampling Date		2024/03/27 12:50			2024/03/27 12:50		
COC Number		n/a			n/a		
	UNITS	81788	RDL	QC Batch	81788 Lab-Dup	RDL	QC Batch
Inorganics							
Fluoride (F-)	mg/L	0.31	0.10	9303009	0.30	0.10	9303009
Orthophosphate (P)	mg/L	0.82	0.010	9302937			
Nitrite (N)	mg/L	2.29	0.010	9302430			
Dissolved Chloride (Cl-)	mg/L	820	10	9304800			
Nitrate (N)	mg/L	290	2.0	9302430			
Nitrate + Nitrite (N)	mg/L	292	2.0	9302430			
Dissolved Bromide (Br-)	mg/L	<10 (1)	10	9304800			
Dissolved Sulphate (SO4)	mg/L	4600	50	9304800			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
(1) Due to high concentrations of the target analytes (Cl,SO4), sample required dilution. Detection limits were adjusted accordingly.

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Bureau Veritas Job #: C491986
Report Date: 2024/04/02

Nautilus Environmental Company Inc.
Client Project #: 162706256
Your P.O. #: 2324-196PG
Sampler Initials: AW

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		YTD487			YTD487		
Sampling Date		2024/03/27 12:50			2024/03/27 12:50		
COC Number		n/a			n/a		
	UNITS	81788	RDL	QC Batch	81788 Lab-Dup	RDL	QC Batch
Calculated Parameters							
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	130	1.0	9300413			
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	9300413			
Total Cyanate (CNO-)	mg/L	0.83	0.050	9301525			
Hardness (CaCO3)	mg/L	1900	1.0	9300896			
Inorganics							
Total Ammonia-N	mg/L	2.87	0.050	9301137			
Conductivity	umho/cm	12000	1.0	9303013	12000	1.0	9303013
Free Cyanide (CN)	ug/L	5.8	2.0	9310353			
Strong Acid Dissoc. Cyanide (CN)	mg/L	0.0504	0.00050	9310624			
Weak Acid Dissoc. Cyanide (CN)	mg/L	0.030	0.00050	9310625			
Total Dissolved Solids	mg/L	10100	20	9306800			
Dissolved Organic Carbon	mg/L	16	0.40	9302702			
pH	pH	7.62		9303014	7.67		9303014
Total Suspended Solids	mg/L	28	1	9306590			
Thiocyanate	mg/L	0.14	0.05	9302368	0.13	0.05	9302368
Alkalinity (Total as CaCO3)	mg/L	130	1.0	9303012	140	1.0	9303012

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		YTD487		
Sampling Date		2024/03/27 12:50		
COC Number		n/a		
	UNITS	81788	RDL	QC Batch
Metals				
Dissolved Aluminum (Al)	mg/L	0.041	0.0049	9301589
Total Aluminum (Al)	mg/L	0.063	0.025	9302202
Dissolved Antimony (Sb)	mg/L	0.014	0.00050	9301589
Total Antimony (Sb)	mg/L	0.015	0.0025	9302202
Dissolved Arsenic (As)	mg/L	0.0027	0.0010	9301589
Total Arsenic (As)	mg/L	<0.0050	0.0050	9302202
Dissolved Barium (Ba)	mg/L	0.063	0.0020	9301589
Total Barium (Ba)	mg/L	0.066	0.010	9302202
Dissolved Beryllium (Be)	mg/L	<0.00040	0.00040	9301589
Total Beryllium (Be)	mg/L	<0.0020	0.0020	9302202
Dissolved Bismuth (Bi)	mg/L	<0.0010	0.0010	9301589
Total Bismuth (Bi)	mg/L	<0.0050	0.0050	9302202
Dissolved Boron (B)	mg/L	0.55	0.010	9301589
Total Boron (B)	mg/L	0.58	0.050	9302202
Dissolved Cadmium (Cd)	mg/L	0.000097	0.000090	9301589
Total Cadmium (Cd)	mg/L	<0.00045	0.00045	9302202
Dissolved Calcium (Ca)	mg/L	680	1.0	9301589
Total Calcium (Ca)	mg/L	730	1.0	9302202
Dissolved Chromium (Cr)	mg/L	<0.0050	0.0050	9301589
Total Chromium (Cr)	mg/L	<0.025	0.025	9302202
Dissolved Cobalt (Co)	mg/L	1.0	0.00050	9301589
Total Cobalt (Co)	mg/L	1.0	0.0025	9302202
Dissolved Copper (Cu)	mg/L	0.18	0.00090	9301589
Total Copper (Cu)	mg/L	0.25	0.0045	9302202
Dissolved Iron (Fe)	mg/L	5.5	0.10	9301589
Total Iron (Fe)	mg/L	7.6	0.50	9302202
Dissolved Lead (Pb)	mg/L	<0.00050	0.00050	9301589
Total Lead (Pb)	mg/L	<0.0025	0.0025	9302202
Dissolved Lithium (Li)	mg/L	0.0095	0.0050	9301589
Total Lithium (Li)	mg/L	<0.025	0.025	9302202
Dissolved Magnesium (Mg)	mg/L	40	0.050	9301589
Total Magnesium (Mg)	mg/L	41	0.25	9302202
Dissolved Manganese (Mn)	mg/L	0.14	0.0020	9301589
Total Manganese (Mn)	mg/L	0.15	0.010	9302202

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		YTD487		
Sampling Date		2024/03/27 12:50		
COC Number		n/a		
	UNITS	81788	RDL	QC Batch
Dissolved Molybdenum (Mo)	mg/L	0.15	0.00050	9301589
Total Molybdenum (Mo)	mg/L	0.15	0.0025	9302202
Dissolved Nickel (Ni)	mg/L	0.34	0.0010	9301589
Total Nickel (Ni)	mg/L	0.36	0.0050	9302202
Dissolved Phosphorus (P)	mg/L	0.83	0.10	9301589
Total Phosphorus (P)	mg/L	1.1	0.50	9302202
Dissolved Potassium (K)	mg/L	420	1.0	9301589
Total Potassium (K)	mg/L	440	1.0	9302202
Dissolved Selenium (Se)	mg/L	0.36	0.0020	9301589
Total Selenium (Se)	mg/L	0.37	0.010	9302202
Dissolved Silicon (Si)	mg/L	3.8	0.050	9301589
Total Silicon (Si)	mg/L	3.9	0.25	9302202
Dissolved Silver (Ag)	mg/L	0.00011	0.000090	9301589
Total Silver (Ag)	mg/L	<0.00045	0.00045	9302202
Dissolved Sodium (Na)	mg/L	2100	0.50	9301589
Total Sodium (Na)	mg/L	2300	0.50	9302202
Dissolved Strontium (Sr)	mg/L	4.4	0.0010	9301589
Total Strontium (Sr)	mg/L	4.2	0.0050	9302202
Dissolved Tellurium (Te)	mg/L	<0.0010	0.0010	9301589
Total Tellurium (Te)	mg/L	<0.0050	0.0050	9302202
Dissolved Thallium (Tl)	mg/L	0.00024	0.000050	9301589
Total Thallium (Tl)	mg/L	<0.00025	0.00025	9302202
Dissolved Tin (Sn)	mg/L	<0.0010	0.0010	9301589
Total Tin (Sn)	mg/L	<0.0050	0.0050	9302202
Dissolved Titanium (Ti)	mg/L	0.0091	0.0050	9301589
Total Titanium (Ti)	mg/L	<0.025	0.025	9302202
Dissolved Tungsten (W)	mg/L	0.0018	0.0010	9301589
Total Tungsten (W)	mg/L	<0.0050	0.0050	9302202
Dissolved Uranium (U)	mg/L	0.0018	0.00010	9301589
Total Uranium (U)	mg/L	0.0018	0.00050	9302202
Dissolved Vanadium (V)	mg/L	0.00061	0.00050	9301589
Total Vanadium (V)	mg/L	<0.0025	0.0025	9302202
Dissolved Zinc (Zn)	mg/L	0.039	0.0050	9301589
Total Zinc (Zn)	mg/L	0.060	0.025	9302202
Dissolved Zirconium (Zr)	mg/L	<0.0010	0.0010	9301589

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C491986
Report Date: 2024/04/02

Nautilus Environmental Company Inc.
Client Project #: 162706256
Your P.O. #: 2324-196PG
Sampler Initials: AW

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		YTD487		
Sampling Date		2024/03/27 12:50		
COC Number		n/a		
	UNITS	**81788**	**RDL**	**QC Batch**
Total Zirconium (Zr)	mg/L	<0.0050	0.0050	9302202

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	10.7°C

Sample YTD487 [81788] : Metals: Due to the sample matrix, the sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C491986
Report Date: 2024/04/02

QUALITY ASSURANCE REPORT

Nautilus Environmental Company Inc.
Client Project #: 162706256
Your P.O. #: 2324-196PG
Sampler Initials: AW

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9301137	Total Ammonia-N	2024/03/28	92	75 - 125	96	80 - 120	<0.050	mg/L	9.3	20
9301589	Dissolved Aluminum (Al)	2024/03/28	104	80 - 120	104	80 - 120	<0.0049	mg/L		
9301589	Dissolved Antimony (Sb)	2024/03/28	110	80 - 120	106	80 - 120	<0.00050	mg/L	15	20
9301589	Dissolved Arsenic (As)	2024/03/28	104	80 - 120	101	80 - 120	<0.0010	mg/L	0	20
9301589	Dissolved Barium (Ba)	2024/03/28	101	80 - 120	99	80 - 120	<0.0020	mg/L	5.2	20
9301589	Dissolved Beryllium (Be)	2024/03/28	105	80 - 120	103	80 - 120	<0.00040	mg/L	NC	20
9301589	Dissolved Bismuth (Bi)	2024/03/28	96	80 - 120	97	80 - 120	<0.0010	mg/L		
9301589	Dissolved Boron (B)	2024/03/28	103	80 - 120	98	80 - 120	<0.010	mg/L	1.7	20
9301589	Dissolved Cadmium (Cd)	2024/03/28	103	80 - 120	101	80 - 120	<0.000090	mg/L	0.96	20
9301589	Dissolved Calcium (Ca)	2024/03/28	NC	80 - 120	102	80 - 120	<0.20	mg/L		
9301589	Dissolved Chromium (Cr)	2024/03/28	99	80 - 120	97	80 - 120	<0.0050	mg/L	NC	20
9301589	Dissolved Cobalt (Co)	2024/03/28	98	80 - 120	96	80 - 120	<0.00050	mg/L	0.99	20
9301589	Dissolved Copper (Cu)	2024/03/28	100	80 - 120	99	80 - 120	<0.00090	mg/L	5.3	20
9301589	Dissolved Iron (Fe)	2024/03/28	103	80 - 120	99	80 - 120	<0.10	mg/L		
9301589	Dissolved Lead (Pb)	2024/03/28	97	80 - 120	99	80 - 120	<0.00050	mg/L	NC	20
9301589	Dissolved Lithium (Li)	2024/03/28	99	80 - 120	104	80 - 120	<0.0050	mg/L		
9301589	Dissolved Magnesium (Mg)	2024/03/28	NC	80 - 120	100	80 - 120	<0.050	mg/L		
9301589	Dissolved Manganese (Mn)	2024/03/28	101	80 - 120	100	80 - 120	<0.0020	mg/L		
9301589	Dissolved Molybdenum (Mo)	2024/03/28	108	80 - 120	102	80 - 120	<0.00050	mg/L	3.7	20
9301589	Dissolved Nickel (Ni)	2024/03/28	97	80 - 120	97	80 - 120	<0.0010	mg/L	2.0	20
9301589	Dissolved Phosphorus (P)	2024/03/28	106	80 - 120	105	80 - 120	<0.10	mg/L		
9301589	Dissolved Potassium (K)	2024/03/28	104	80 - 120	102	80 - 120	<0.20	mg/L		
9301589	Dissolved Selenium (Se)	2024/03/28	105	80 - 120	102	80 - 120	<0.0020	mg/L	0.40	20
9301589	Dissolved Silicon (Si)	2024/03/28	102	80 - 120	101	80 - 120	<0.050	mg/L		
9301589	Dissolved Silver (Ag)	2024/03/28	93	80 - 120	100	80 - 120	<0.000090	mg/L	NC	20
9301589	Dissolved Sodium (Na)	2024/03/28	NC	80 - 120	101	80 - 120	<0.10	mg/L	1.4	20
9301589	Dissolved Strontium (Sr)	2024/03/28	NC	80 - 120	101	80 - 120	<0.0010	mg/L		
9301589	Dissolved Tellurium (Te)	2024/03/28	103	80 - 120	103	80 - 120	<0.0010	mg/L		
9301589	Dissolved Thallium (Tl)	2024/03/28	99	80 - 120	99	80 - 120	<0.000050	mg/L	NC	20
9301589	Dissolved Tin (Sn)	2024/03/28	106	80 - 120	104	80 - 120	<0.0010	mg/L		

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9301589	Dissolved Titanium (Ti)	2024/03/28	104	80 - 120	102	80 - 120	<0.0050	mg/L		
9301589	Dissolved Tungsten (W)	2024/03/28	104	80 - 120	99	80 - 120	<0.0010	mg/L		
9301589	Dissolved Uranium (U)	2024/03/28	100	80 - 120	99	80 - 120	<0.00010	mg/L	2.5	20
9301589	Dissolved Vanadium (V)	2024/03/28	102	80 - 120	99	80 - 120	<0.00050	mg/L	5.3	20
9301589	Dissolved Zinc (Zn)	2024/03/28	101	80 - 120	98	80 - 120	<0.0050	mg/L	1.3	20
9301589	Dissolved Zirconium (Zr)	2024/03/28	111	80 - 120	104	80 - 120	<0.0010	mg/L		
9302202	Total Aluminum (Al)	2024/03/28	106	80 - 120	95	80 - 120	<0.0049	mg/L		
9302202	Total Antimony (Sb)	2024/03/28	109	80 - 120	106	80 - 120	<0.00050	mg/L		
9302202	Total Arsenic (As)	2024/03/28	101	80 - 120	98	80 - 120	<0.0010	mg/L		
9302202	Total Barium (Ba)	2024/03/28	97	80 - 120	94	80 - 120	<0.0020	mg/L		
9302202	Total Beryllium (Be)	2024/03/28	NC	80 - 120	108	80 - 120	<0.00040	mg/L		
9302202	Total Bismuth (Bi)	2024/03/28	93	80 - 120	96	80 - 120	<0.0010	mg/L		
9302202	Total Boron (B)	2024/03/28	95	80 - 120	99	80 - 120	<0.010	mg/L		
9302202	Total Cadmium (Cd)	2024/03/28	102	80 - 120	101	80 - 120	<0.000090	mg/L	NC	20
9302202	Total Calcium (Ca)	2024/03/28	NC	80 - 120	97	80 - 120	<0.20	mg/L		
9302202	Total Chromium (Cr)	2024/03/28	96	80 - 120	91	80 - 120	<0.0050	mg/L	NC	20
9302202	Total Cobalt (Co)	2024/03/28	96	80 - 120	95	80 - 120	<0.00050	mg/L		
9302202	Total Copper (Cu)	2024/03/28	103	80 - 120	98	80 - 120	<0.00090	mg/L	3.3	20
9302202	Total Iron (Fe)	2024/03/28	96	80 - 120	96	80 - 120	<0.10	mg/L		
9302202	Total Lead (Pb)	2024/03/28	97	80 - 120	99	80 - 120	<0.00050	mg/L	0.049	20
9302202	Total Lithium (Li)	2024/03/28	103	80 - 120	104	80 - 120	<0.0050	mg/L		
9302202	Total Magnesium (Mg)	2024/03/28	91	80 - 120	93	80 - 120	<0.050	mg/L		
9302202	Total Manganese (Mn)	2024/03/28	92	80 - 120	93	80 - 120	<0.0020	mg/L		
9302202	Total Molybdenum (Mo)	2024/03/28	108	80 - 120	103	80 - 120	<0.00050	mg/L		
9302202	Total Nickel (Ni)	2024/03/28	94	80 - 120	93	80 - 120	<0.0010	mg/L	4.6	20
9302202	Total Phosphorus (P)	2024/03/28	99	80 - 120	94	80 - 120	<0.10	mg/L	15	20
9302202	Total Potassium (K)	2024/03/28	96	80 - 120	94	80 - 120	<0.20	mg/L		
9302202	Total Selenium (Se)	2024/03/28	105	80 - 120	106	80 - 120	<0.0020	mg/L		
9302202	Total Silicon (Si)	2024/03/28	98	80 - 120	95	80 - 120	<0.050	mg/L		
9302202	Total Silver (Ag)	2024/03/28	99	80 - 120	99	80 - 120	<0.000090	mg/L		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9302202	Total Sodium (Na)	2024/03/28	NC	80 - 120	94	80 - 120	<0.10	mg/L		
9302202	Total Strontium (Sr)	2024/03/28	NC	80 - 120	94	80 - 120	<0.0010	mg/L		
9302202	Total Tellurium (Te)	2024/03/28	100	80 - 120	103	80 - 120	<0.0010	mg/L		
9302202	Total Thallium (Tl)	2024/03/28	96	80 - 120	99	80 - 120	<0.000050	mg/L		
9302202	Total Tin (Sn)	2024/03/28	105	80 - 120	103	80 - 120	<0.0010	mg/L		
9302202	Total Titanium (Ti)	2024/03/28	97	80 - 120	95	80 - 120	<0.0050	mg/L		
9302202	Total Tungsten (W)	2024/03/28	103	80 - 120	104	80 - 120	<0.0010	mg/L		
9302202	Total Uranium (U)	2024/03/28	99	80 - 120	102	80 - 120	<0.00010	mg/L		
9302202	Total Vanadium (V)	2024/03/28	94	80 - 120	91	80 - 120	<0.00050	mg/L		
9302202	Total Zinc (Zn)	2024/03/28	99	80 - 120	100	80 - 120	<0.0050	mg/L	2.1	20
9302202	Total Zirconium (Zr)	2024/03/28	103	80 - 120	98	80 - 120	<0.0010	mg/L		
9302368	Thiocyanate	2024/03/28	81	80 - 120	99	80 - 120	<0.05	mg/L	2.2	20
9302430	Nitrate (N)	2024/03/28	96	80 - 120	97	80 - 120	<0.10	mg/L	NC	20
9302430	Nitrite (N)	2024/03/28	105	80 - 120	105	80 - 120	<0.010	mg/L	2.5	20
9302702	Dissolved Organic Carbon	2024/03/28	92	80 - 120	96	80 - 120	<0.40	mg/L	1.1	20
9302937	Orthophosphate (P)	2024/03/31	98	75 - 125	100	80 - 120	<0.010	mg/L	NC	20
9303009	Fluoride (F-)	2024/03/28	90	80 - 120	99	80 - 120	<0.10	mg/L	2.8	20
9303012	Alkalinity (Total as CaCO3)	2024/03/28			95	85 - 115	<1.0	mg/L	2.3	20
9303013	Conductivity	2024/03/28			101	85 - 115	<1.0	umho/cm	0	10
9303014	pH	2024/03/28			101	98 - 103			0.64	N/A
9304800	Dissolved Bromide (Br-)	2024/04/02	95	80 - 120	102	80 - 120	<1.0	mg/L	1.5	20
9304800	Dissolved Chloride (Cl-)	2024/04/02	NC	80 - 120	98	70 - 130	<1.0	mg/L	0.28	20
9304800	Dissolved Sulphate (SO4)	2024/04/02	NC	80 - 120	97	80 - 120	<1.0	mg/L	0.31	20
9306590	Total Suspended Solids	2024/04/02			95	80 - 120	<1	mg/L	15	20
9306800	Total Dissolved Solids	2024/04/02			100	80 - 120	<10	mg/L	19	20
9310353	Free Cyanide (CN)	2024/04/02	104	80 - 120	93	80 - 120	<2.0	ug/L		
9310624	Strong Acid Dissoc. Cyanide (CN)	2024/04/02	105	80 - 120	104	80 - 120	<0.00050	mg/L		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9310625	Weak Acid Dissoc. Cyanide (CN)	2024/04/02	102	80 - 120	103	80 - 120	<0.00050	mg/L		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

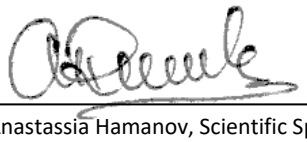
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist



Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

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Maxxam
A Bureau Veritas Group Company

6740 Campobello Road, Mississauga, Ontario L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5779 Toll Free: 800-563-6266
CAM FCD-01191/2

CHAIN OF CUSTODY RECORD

Invoice Information	Report Information (if differs from invoice)	Project Information (where applicable)	Turnaround Time (TAT) Required
Company Name: Nautilus Environmental Company Inc.	Company Name: Nautilus Environmental Company Inc.	Quotation #: C41237	☐ Regular TAT (5-7 days) Most analyses
Contact Name: Adam Wartman	Contact Name: Adam Wartman / Lesley Novak	P.O. #/ AFE#: 2324-196PG	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address: 11B Nicholas Beaver Rd. Puslinch, ON N0B 2J0	Address: B-11 Nicholas Beaver Rd Puslinch, ON N0B2J0	Project #: 162706256	Rush TAT (Surcharges will be applied)
	awartman@aquatox.ca;pantunes@aquatox.ca; lnovak@aquatox.ca; lisa.ramilo@agnicoeagle.com;	Site Location:	☐ 1 Day ☐ 2 Days ☒ 3-4 Days
Email: accounting@nautilusenvironmental.ca	Email: connor.pettem@wsp.com	Sampled By: AquaTox	Date Required: 3/30/2024

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Rush Confirmation #: JG2023031805

Regulation 153

☐ Table 1 ☐ Res/Park ☐ Med/ Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/ Other
☐ Table ____

FOR RSC (PLEASE CIRCLE) Y / N

Other Regulations

☐ CCME ☐ Sanitary Sewer Bylaw
☐ MISA ☐ Storm Sewer Bylaw
☐ PWQO Region
☐ Other (Specify)
☐ REG 558 (MIN. 3 DAY TAT REQUIRED)

Include Criteria on Certificate of Analysis: Y / N

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

LABORATORY USE ONLY

CUSTODY SEAL Y / (N) Present / (Intact)

COOLER TEMPERATURES: 10 | 10 | 12

COOLING MEDIA PRESENT: Y / (N)

	SAMPLE IDENTIFICATION	DATE SAMPLED (YYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED (CIRCLE) Metals / Hg / CrVI	pH, Specific Conductivity	Total, Carbonate and Bicarbonate Alkalinity	Hardness	TSS (TSS low level)	Total ammonia	TDS	Anions Scan	Total Metals by ICP-MS/OES	Dissolved Metals by ICP-MS/OES (already filtered)	Total Cyanide (WAD, SAD and Free)	DOC	Cyanate	Thiocyanate			HOLD- DO NOT ANALYZE
1	81788	2024-03-27	12:50	water	10	Y	x	x	x	x	x	x	x	x	x	x	x	x	x			
2																						
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						

COMMENTS

Please report ammonia values to 2 decimal places

RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)
Adam Wartman	2024-03-27	14:30	Raman RAMAN	2024/03/27	15:50

27-Mar-24 15:50
Jolanta Goralczyk
C491986
AN4 ENV-1320

APPENDIX C

Chronic Toxicity Testing Report and Analytical Chemistry Results

Program 3: Total Dissolved Solids (TDS) Toxicity Test Results for *P. subcapitata* and *C. dubia*

Final Report

July 8, 2024

Submitted to: **Agnico Eagle Mines**
Rouyn-Noranda, QC

10823 27 Street SE, Calgary, AB T2Z 3V9

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APPENDIX C – Analytical Chemistry

SIGNATURE PAGE

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This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

SUMMARY

Nautilus Environmental (Nautilus) conducted chronic toxicity tests for Agnico Eagle Mines (Agnico) to evaluate the effect of total dissolved solids (TDS) in site water amended to replicate potential mine-impacted water scenarios. Volumetric dilutions for the *Pseudokirchneriella subcapitata*[1]and *Ceriodaphnia dubia* tests were prepared to target a gradient of 713, 889, 1,117, 1,414, 1,799, and 2,296 mg/L TDS.

No statistically significant differences for cell yield in *P. subcapitata* were observed between the site water control and the TDS concentrations. However, cell yield was significantly different between the site water control and the laboratory control.

Reproduction of *C. dubia* was significantly lower in the 2,296 mg/L TDS concentration when compared to the site water control. No other statistically significant differences for survival or reproduction were observed between the site water control and the TDS concentrations or the site water control and the laboratory control.

[1] *Pseudokirchneriella subcapitata* (Korschikov) Hindák (OECD, 2011) has recently been renamed *Raphidocelis subcapitata* (Guiry and Guiry, 2018) and was formerly known as *Selenastrum capricornutum*. *P. subcapitata* is used throughout this document because it is being used in the EPS 1/RM/25 (EC, 2007) and OECD 201 (2011) test methods. *P. subcapitata* is currently regarded as a synonym of *R. subcapitata*.

1.0 INTRODUCTION

Nautilus Environmental (Nautilus) conducted toxicity tests for Agnico Eagle Mines (Agnico) to evaluate the effect of total dissolved solids (TDS) in site water amended to replicate potential mine-impacted water scenarios for both *Pseudokirchneriella subcapitata* and *Ceriodaphnia dubia*. Testing was initiated on May 2, 2024 for *C. dubia* and May 6, 2024 for *P. subcapitata*. All waters were stored in the dark at 4 ± 2°C prior to testing.

This report describes the results of these toxicity tests. Copies of raw laboratory data sheets and statistical analyses for each test species are provided in Appendices A to B. The analytical chemistry data is provided in Appendix C.

2.0 METHODS

2.1 Toxicity Testing

Each toxicity test included a laboratory control, a site water control, and six different TDS concentrations. Methods for the toxicity tests are summarized in Tables 1 and 2. Testing for *P. subcapitata* and *C. dubia* were conducted according to the procedures described by the Environment Canada protocols (2007a and 2007b, respectively).

There was a planned modification to the *C. dubia* method, as requested by Agnico. Rather than terminating the test when a minimum of 60% of the laboratory control organisms produced a third brood, test termination took place on day 8 or when 60% of organisms in all treatments and control(s) have reached three broods.

2.2 Water Preparation

2.2.1 *P. subcapitata* Water Preparation

As required by the method, an adequate volume of unamended site water was filtered through a 45 µm filter to be used as the dilution water and site control.

The top TDS concentration was prepared by dissolving predetermined quantities of reagent grade salts ($CaSO_4 \cdot 2H_2O$, KCl, $MgSO_4 \cdot 7H_2O$, Na_2SO_4, $NaHCO_3$, $CaCl_2 \cdot 2H_2O$, $NaNO_3$) in the filtered site water to target a concentration of 2,296 mg/L TDS. Once the salts were dissolved, volumetric dilutions were performed with the unamended, filtered site water and the top concentration to achieve the target TDS gradient of 713, 889, 1,117, 1,414, and 1,799mg/L TDS. Once made, mine nutrients were added to all controls and test concentrations.

2.2.2 *C. dubia* Water Preparation

The top TDS concentration was prepared by dissolving predetermined quantities of reagent grade salts ($CaSO_4 \cdot 2H_2O$, KCl, $MgSO_4 \cdot 7H_2O$, Na_2SO_4, $NaHCO_3$, $CaCl_2 \cdot 2H_2O$, $NaNO_3$) in the site water to target a concentration of 2,296 mg/L TDS. Once the salts were dissolved, volumetric dilutions were performed with the unamended site water and the top concentration to achieve the target TDS gradient of 713, 889, 1,117, 1,414, 1,799, and 2,296 mg/L TDS. Throughout testing, the site water and each treatment were monitored for the formation of precipitate.

2.3 Analytical Subsampling

Analytical subsampling for routine parameters (i.e. pH, total hardness, conductivity, total alkalinity), measured TDS, total and dissolved organic carbon, major ions, total ammonia as nitrogen, nitrate as nitrogen, total cyanide, thiocyanate, and total and dissolved metals were collected from the client-provided site water and submitted for 1-day rush analytical analysis.

At test initiation for *P. subcapitata* and *C. dubia*, analytical subsamples for routine parameters (i.e. pH, total hardness, conductivity, total alkalinity as calcium carbonate), dissolved major ions, nitrate as nitrogen, and measured TDS were collected from the unamended site water and the 889, 1,414, and 2,296 mg/L TDS concentrations. The same subset of analytical chemistries was collected at test termination for *C. dubia*. For the *P. subcapitata* test initiation analytical, samples were collected post-filtration and nutrient addition and were submitted for 3-day rush analytical analysis.

2.4 Statistical Analyses

Statistical analyses were performed using CETIS (Tidepool Scientific Software, version 2.1.5.5). For all toxicity tests, the laboratory control was used to establish test validity. Comparisons were performed between the site water and the laboratory control for the *P. subcapitata* and *C. dubia* tests. Treatments were also compared to the site water control using pairwise comparisons across each test.

Table 1. Summary of test conditions: *Pseudokirchneriella subcapitata* growth inhibition test.

Test species	*Pseudokirchneriella subcapitata*, strain UTCC# 37
Organism source	In-house axenic culture, obtained from Canadian Phycological Culture Center
Organism age	3-to 7-day old culture in logarithmic growth phase
Test type	Static
Test duration	72 hours
Test vessel	Microplate
Test volume	220 µL
Test solution depth	11 mm
Test concentrations	6 TDS concentrations, plus laboratory control and site control
Test replicates	5 per treatment, at least 3 enumerated; 8 for laboratory control
Number of organisms	10,000 +/- 1000 cells/mL
Laboratory control water	85% deionized water; 15% City of Calgary dechlorinated tap water supplemented with nutrients
Dilution water	Filtered, unamended site water provided by Agnico
Test solution renewal	None
Test temperature	24 ± 2°C
Feeding	None
Light intensity	3600 to 4400 lux
Photoperiod	24 hours light
Aeration	None
Test measurements	pH of top concentration and control at test initiation and test completion; light levels and temperature measured daily
Test protocol	Environment Canada (2007), EPS 1/RM/25
Statistical software	CETIS version 2.1.5.5
Test endpoints	Algal cell growth inhibition
Test acceptability criteria for controls	>16-fold increase in number of algal cells; CV ≤ 20%; no trend when analyzed using Mann-Kendall test
Reference toxicant	Zinc (added as $ZnSO_4$)

Table 2. Summary of test conditions: *Ceriodaphnia dubia* survival and reproduction test.

Test species	*Ceriodaphnia dubia*
Organism source	In-house culture
Organism age	<24-hour old neonates, produced within a 12-hour window
Test type	Static renewal
Test duration	8 days
Test vessel	16 x 135 mm glass test tube
Test volume	15 mL
Test solution depth	10 cm
Test concentrations	6 TDS concentrations, plus laboratory control and site control
Test replicates	10 per treatment
Number of organisms	1 per replicate
Laboratory control water	20% Perrier water and 80% deionized water supplemented with vitamin B12 (2 µg/L) and Na_2SeO_4 (5 µg Se/L)
Dilution water	Filtered, unamended site water provided by Agnico
Test solution renewal	Daily (100% renewal)
Test temperature	25 ± 1°C
Feeding	Daily with *Pseudokirchneriella subcapitata* and YCT
Light intensity	100 to 600 lux at water surface
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test measurements	pH, conductivity, dissolved oxygen, and temperature measured daily; evaluated for survival and reproduction daily
Test protocol	Environment Canada (2007), EPS 1/RM/21
Statistical software	CETIS version 2.1.5.5
Test endpoints	Survival and reproduction
Test acceptability criteria for controls	≥80% survival; ≥15 young per surviving control producing three broods; ≥60% of controls producing three or more broods, no ephippia present
Reference toxicant	Sodium chloride (NaCl)

3.0 RESULTS

3.1 *P. subcapitata* Results

Results of the toxicity test conducted with *P. subcapitata*, and the accompanying analytical chemistry results are provided in Table 3. Measured TDS concentrations (mg/L) at test initiation were between 98-103% of the target values.

The site water control was significantly different from the laboratory control for cell yield. No statistically significant differences for cell yield were found between the site water control and the TDS concentrations.

3.2 *C. dubia* Results

Results of the toxicity test conducted with *C. dubia,* and the accompanying analytical chemistry results are provided in Table 4. Measured TDS concentrations (mg/L) at test initiation were between 91-92% of the target values and between 86-104% of the target values at test termination. No precipitate was observed in any of the concentrations or test vessels throughout testing.

Neither survival nor reproduction were significantly different between the site water control and laboratory control. Reproduction of *C. dubia* was significantly lower in the 2,296 mg/L TDS treatment when compared to the site water control. No other statistically significant differences for survival or reproduction were observed between the site water control and the TDS concentrations.

Table 3. Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Nominal TDS Concentration (mg/L)	Measured TDS Concentration at Initiation (mg/L)	Cell Yield (x 10^3 cells/mL) (Mean ± SD)
Laboratory Control	-	235.0 ± 7.2
Site Water Control	145	309.0 ± 12.5*
713	-	311.0 ± 9.2
889	916	327.0 ± 13.9
1,117	-	291.0 ± 12.5
1,414	1,410	295.0 ± 0.0
1,799	-	287.0 ± 9.2
2,296	2,240	283.0 ± 6.0

SD = Standard Deviation

* Result is significantly different between the laboratory control and the site water control

Table 4. Results: *Ceriodaphnia dubia* survival and reproduction test.

Nominal TDS Concentration (mg/L)	Measured TDS Concentration (mg/L)		Survival (%)	Reproduction (Mean ± SD)
	Initiation	Termination		
Laboratory Control	-	-	100	22.5 ± 4.6
Site Water Control	131	180	90	17.7 ± 7.5
713	-	-	90	19.0 ± 4.7
889	816	785	90	14.7 ± 5.8
1,117	-	-	100	15.5 ± 5.1
1,414	1,290	1,210	100	14.8 ± 6.3
1,799	-	-	90	13.2 ± 5.8
2,296	2,090	2,390	80	9.1 ± 5.0*

SD = Standard Deviation

* Result is significantly lower than the site water control

4.0 QA/QC

The health histories of the test organisms used in the exposures were acceptable and met the requirements of the Environment Canada protocols. The tests met all control acceptability criteria and water quality parameters remained within ranges specified in the protocols throughout testing. There were no deviations from the test methodologies unless already noted in section 2.0 of this report. Uncertainty associated with these tests is best described by the standard deviations around the means.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 5. The reference toxicant tests were performed under the same conditions as those used during testing. Results for these tests fell within the acceptable range for organism performance of two standard deviations of the mean, based on historical results obtained by the laboratory with these tests. Thus, the sensitivity of the organisms used in these tests was appropriate.

Table 5. Reference Toxicant Test Results

Test Species	Endpoint (95% CL)	Historical Mean (2 SD Range)	CV (%)	Test Date
P. subcapitata	Growth (IC25): 21.9 (19.8-24.0) µg/L Zn	32.1 (16.2-63.4)	22.7	2024-05-15
C. dubia	Survival (LC50): 2.0 (1.9-2.2) g/L NaCl	2.0 (1.7-2.3)	4.9	2024-04-25
	Reproduction (IC50): 1.8 (1.7-1.9) g/L NaCl	1.7 (1.5-2.0)	5.0	

SD = Standard Deviation, CV = Coefficient of Variation, LC = Lethal Concentration, IC = Inhibition Concentration, CL=Confidence Limit

5.0 REFERENCES

Environment Canada. 2007a. Biological test method: growth inhibition test using the freshwater alga. EPS 1/RM/25, Second Edition, March 2007.

Environment Canada. 2007b. Biological test method: test of reproduction and survival using the cladoceran *Ceriodaphnia dubia*. EPS 1/RM/21, Second Edition, February 2007.

Guiry, M.D. & Guiry, G.M. 2018. AlgaeBase. World-wide electronic publication, National University of Ireland, Galway.

OECD. 2011. Guideline 201, "Freshwater Alga and Cyanobacteria, Growth Inhibition Test". OECD Guidelines for the Testing of Chemicals.

Tidepool Scientific Software. 2022. CETIS comprehensive environmental toxicity information system, version 2.1.5.5 Tidepool Scientific Software, McKinleyville, CA. 275 pp.

APPENDIX A – *Pseudokirchneriella subcapitata* Toxicity Test Data

NAUTILUS ENVIRONMENTAL

Algae Bench Sheet

Method: AGD-Mod Client: AGN108 (TDS) Reference: PJ2324-004

Test log

Day	Date	Init	Time	Rotate Y/N	Rotate Time*	Threshold Size (µm)	Daily Data Review
0	2024/05/06	AI	1115	Y/N	Time*	4.00	cc
1	2024/05/07	AO	0905	Y	**0800**	N/A	ZC
2	2024/05/08	KNIAPIBH	0840	Y	**0800**	N/A	AI
3	2024/05/09	AI	1000	-	**0800**	4.00	-

Sample Information

AI

Initial pH:
Initial EC (µS/cm):
Initial DO (mg/L):
Initial Temp (°C):

*recommended rotation times

Inoculum - Physical Counts (must read between **981** and **1198** cells per 0.5 mL)		
	1	1075
	2	1075
	3	1103

Inoculum - Cell Yield	9956

(must be 10,000 +/- 1000 cells/mL)

Nutrients used:	normal	mine

pH Measurements:

Concentration	Initial Value	Final Value
100%	6.5	-
control (well D6)	6.5	-
control (well D7)	-	6.5

***pH range: 6.5-8.5; must be <1.5 units difference between control initial and final**

Quality Assurance - Test Initiation	
Algae Culture Name:	FRI-APR-20230926AG
Age of Algae (must be 3-7 days):	3 days
Test organisms appeared healthy before use (yes/no)	yes
Turnover Date:	2024/05/03
Start time of inoculum prep (must be <3hrs to loading):	1100
Volume filtered through the 45 µm membrane:	—
Appearance before filtration:	clear/colourless
Appearance after filtration:	clear/colourless

Light Levels (**must be 3600 - 4400 lux**)

Day 0:	4060	Day 2:	4030
Day 1:	4030	Day 3:	3980

Temperature (**must be 22-26°C**)

Day 0:	24	Day 2:	24
Day 1:	24	Day 3:	24

Average Temperature: 24

Quality Assurance - Test Termination	
Control Fold Growth (must be >16):	25
CV of standard Control Wells (must be ≤20%):	3
Mann-Kendall p value (must be >0.05) if CV is >10%:	—

Reviewed By: ID Date Reviewed: 2024/05/09

NAUTILUS ENVIRONMENTAL

Algae Bench Sheet

Method: AGD-Mod Client: AGN108 (TDS) Reference: PJ2324-004

Complete Plate Physical Counts												
		2296	1799	1414	1117	889	713	~~base~~ Site				
A	X	X	X	X	X	X	X	X	X	X	X	X
B	X	2400	2400	2600	2600	3000	2600	2600	X	X	X	X
	X	2400	2400	2500	2600	2900	2600	2500	X	X	X	X
	X								X	X	X	X
C	X	2400	2500	2600	2400	2700	2700	2800	X	X	X	X
	X	2500	2600	2500	2400	2800	2800	2700	X	X	X	X
	X								X	X	X	X
D / CTL	X	2200	2000	2000	2100	X	X	2000	2000	2000	2100	X
	X	2100	2000	2000	2100	X	X	2000	2000	2100	2000	X
	X					X	X					X
E	X	2500	2500	2500	2500	2800	2700	2700	X	X	X	X
	X	2500	2500	2600	2600	2700	2700	2700	X	X	X	X
	X								X	X	X	X
F	X								X	X	X	X
	X								X	X	X	X
	X								X	X	X	X
G	X								X	X	X	X
	X								X	X	X	X
	X								X	X	X	X
H	X	X	X	X	X	X	X	X	X	X	X	X

Only three replicates are enumerated if the CV is ≤20% within a concentration. If the CV is >20%, the additional two replicates will also be enumerated

Reviewed By: JW Date Reviewed: 2024/05/09

NAUTILUS

Standard Control Well Final Cell Densities (D Row):

Column	Final Cell Density ($x10^3$ cells/mL)	Cell Yield ($x10^3$ cells/mL)
2	257	247
3	239	229
4	239	229
5	251	241
8	239	229
9	239	229
10	251	241
11	245	235
Average	245	235
SD	7	7
CV (%)	2.9	3.0
Fold Growth (x)	25	-

Test Well Final Cell Densities:

Concen. (%) mg/L	Calculated Final Cell Density ($x10^3$ cells/ mL) Row B	C	E	F	G
11	-	-	-	-	-
14	-	-	-	-	-
18	-	-	-	-	-
Site 23	305	329	323	-	-
713 29	311	329	323	-	-
889 36	353	329	329	-	-
1117 46	311	287	305	-	-
1414 57	305	305	305	-	-
1799 72	287	305	299	-	-
2256 91	287	293	299	-	-

Cell Yield Results:

Concentration (%) mg/L	Cell Yield ($x10^3$ cells/ mL) Row B	C	E	F	G	Mean	SD	CV (%)
11	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-
Site 23	295	319	313	-	-	309	12	4
713 29	301	319	313	-	-	311	9	3
889 36	343	319	319	-	-	327	14	4
1117 46	301	277	295	-	-	291	12	4
1414 57	295	295	295	-	-	295	0	0
1799 72	277	295	289	-	-	287	9	3
2256 91	277	283	289	-	-	283	6	2

Reviewed by: LO

Date Reviewed: 2016/08/09

CETIS Summary Report

Selenastrum Growth Test **Nautilus Environmental Calgary**

Batch ID:	00-1899-3966	**Test Type:**	Cell Growth	**Analyst:**	Lab Tech		
Start Date:	06 May-24	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water		
Ending Date:	09 May-24	**Species:**	Pseudokirchneriella subcapitata	**Brine:**			
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture	**Age:**	3d
Sample ID:	02-5215-6504	**Code:**	PJ2324-004	**Project:**	Program 3 - Total Dissolved Solids		
Sample Date:		**Material:**	Total dissolved Solids	**Source:**	Agnico Eagle		
Receipt Date:		**CAS (PC):**		**Station:**			
Sample Age:	---	**Client:**	Agnico Eagle				

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
09-9564-3955	Cell Density	Equal Variance t Two-Sample Test	<1.0E-05	Site Control failed cell density

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	PMSD
00-3251-2320	Cell Density	Nemenyi-Damico-Wolfe Test	2296	>2296	---	---

Cell Density Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	8	235	229	241	229	247	2.535	7.171	3.05%	0.00%
0	XC	3	309	278	340	295	319	7.211	12.49	4.04%	-31.49%
713		3	311	288.2	333.8	301	319	5.292	9.165	2.95%	-32.34%
889		3	327	292.6	361.4	319	343	8	13.86	4.24%	-39.15%
1117		3	291	260	322	277	301	7.211	12.49	4.29%	-23.83%
1414		3	295	295	295	295	295	0	0	0.00%	-25.53%
1799		3	287	264.2	309.8	277	295	5.292	9.165	3.19%	-22.13%
2296		3	283	268.1	297.9	277	289	3.464	6	2.12%	-20.43%

Cell Density Detail MD5: 0FCD87C4F60800C5567B1567ED914B9C

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	LC	247	229	229	241	229	229	241	235
0	XC	295	319	313					
713		301	319	313					
889		343	319	319					
1117		301	277	295					
1414		295	295	295					
1799		277	295	289					
2296		277	283	289					

Selenastrum Growth Test — **Nautilus Environmental Calgary**

Analysis ID:	09-9564-3955	**Endpoint:**	Cell Density	**CETIS Version:**	CETIS v2.1.5
Analyzed:	25 May-24 13:41	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	16 May-24 0:00	**MD5 Hash:**	15AB8C132E5B78607233BB99EA9B907A	**Editor ID:**	009-313-022-5
Batch ID:	00-1899-3966	**Test Type:**	Cell Growth	**Analyst:**	Lab Tech
Start Date:	06 May-24	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water
Ending Date:	09 May-24	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 3d
Sample ID:	02-5215-6504	**Code:**	PJ2324-004	**Project:**	Program 3 - Total Dissolved Solids
Sample Date:		**Material:**	Total dissolved Solids	**Source:**	Agnico Eagle
Receipt Date:		**CAS (PC):**		**Station:**	
Sample Age:	---	**Client:**	Agnico Eagle		

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C <> T	Site Control failed cell density endpoint	5.63%

Equal Variance t Two-Sample Test

Control I	vs	Control II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		Site Control*	9	12.65	2.262	13.23	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.708	2.355	0.7619	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	11947.6	11947.6	1	160	<1.0E-05	Significant Effect
Error	672	74.6667	9			
Total	12619.6		10			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Variance	Variance Ratio F Test	3.033	6.542	0.2251	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9296	0.7876	0.4069	Normal Distribution

Cell Density Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	8	235	229	241	232	229	247	2.535	3.05%	0.00%
0	XC	3	309	278	340	313	295	319	7.211	4.04%	-31.49%

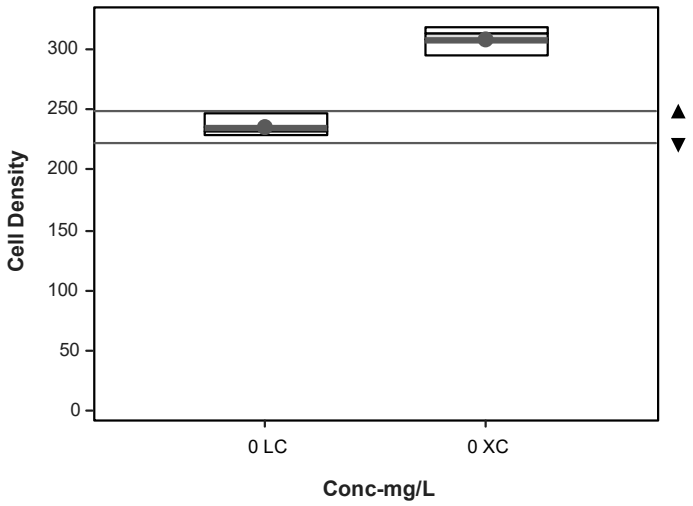
Cell Density Detail

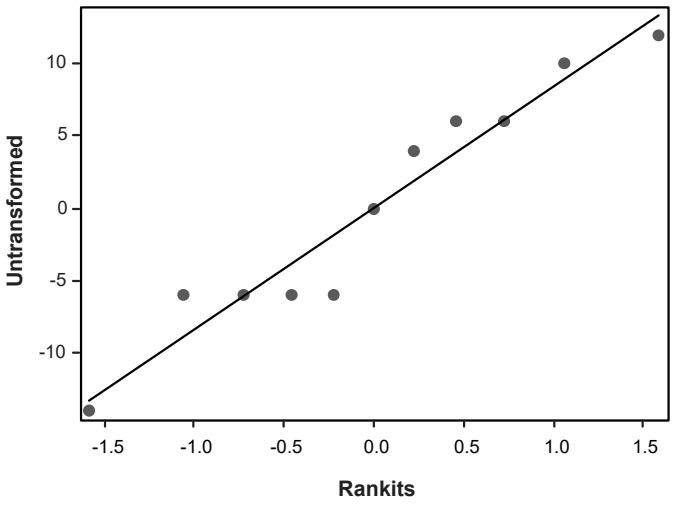
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	LC	247	229	229	241	229	229	241	235
0	XC	295	319	313					

Selenastrum Growth Test **Nautilus Environmental Calgary**

Analysis ID:	09-9564-3955	**Endpoint:**	Cell Density	**CETIS Version:**	CETIS v2.1.5
Analyzed:	25 May-24 13:41	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	16 May-24 0:00	**MD5 Hash:**	15AB8C132E5B78607233BB99EA9B907A	**Editor ID:**	009-313-022-5

Graphics





Selenastrum Growth Test — **Nautilus Environmental Calgary**

Analysis ID:	00-3251-2320	**Endpoint:**	Cell Density	**CETIS Version:**	CETIS v2.1.5
Analyzed:	16 May-24 9:24	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	16 May-24 0:00	**MD5 Hash:**	45340AE4263C0F82F962FD1E1B4927B9	**Editor ID:**	009-313-022-5
Batch ID:	00-1899-3966	**Test Type:**	Cell Growth	**Analyst:**	Lab Tech
Start Date:	06 May-24	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water
Ending Date:	09 May-24	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 3d
Sample ID:	02-5215-6504	**Code:**	PJ2324-004	**Project:**	Program 3 - Total Dissolved Solids
Sample Date:		**Material:**	Total dissolved Solids	**Source:**	Agnico Eagle
Receipt Date:		**CAS (PC):**		**Station:**	
Sample Age:	---	**Client:**	Agnico Eagle		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units
Untransformed	C <> T	2296	>2296	---	---

Nemenyi-Damico-Wolfe Test

Control	vs	Conc-mg/L	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Site Control		713	4	39.02	6	CDF	0.9998	Non-Significant Effect
		889	14.5	39.02	6	CDF	0.8492	Non-Significant Effect
		1117	18.5	39.02	6	CDF	0.6715	Non-Significant Effect
		1414	15	39.02	6	CDF	0.8297	Non-Significant Effect
		1799	26.5	39.02	6	CDF	0.3124	Non-Significant Effect
		2296	32	39.02	6	CDF	0.1529	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.902	2.734	1.0000	No Outliers Detected
Overall Effect	Fligner-Wolfe Omnibus Test	208.5		0.3398	Non-Significant Overall Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4481.14	746.857	6	7.384	0.0010	Significant Effect
Error	1416	101.143	14			
Total	5897.14		20			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Variance	Bartlett Equality of Variance Test				Indeterminate
Distribution	Shapiro-Wilk W Normality Test	0.958	0.9079	0.4766	Normal Distribution

Cell Density Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	XC	3	309	278	340	313	295	319	7.211	4.04%	0.00%
713		3	311	288.2	333.8	313	301	319	5.292	2.95%	-0.65%
889		3	327	292.6	361.4	319	319	343	8	4.24%	-5.83%
1117		3	291	260	322	295	277	301	7.211	4.29%	5.83%
1414		3	295	295	295	295	295	295	0	0.00%	4.53%
1799		3	287	264.2	309.8	289	277	295	5.292	3.19%	7.12%
2296		3	283	268.1	297.9	283	277	289	3.464	2.12%	8.41%

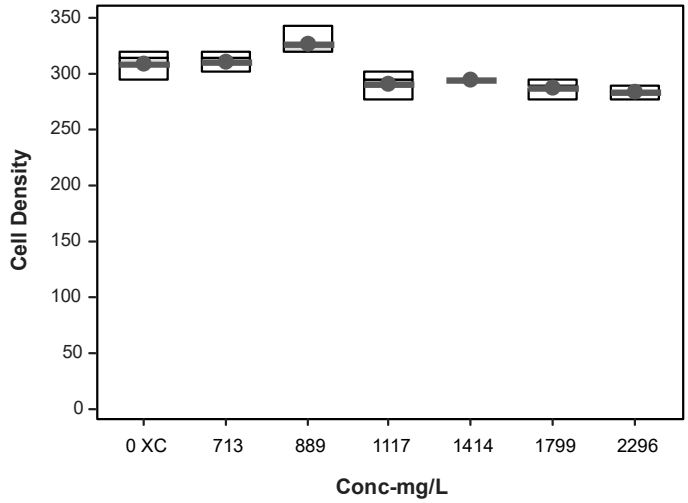
Selenastrum Growth Test **Nautilus Environmental Calgary**

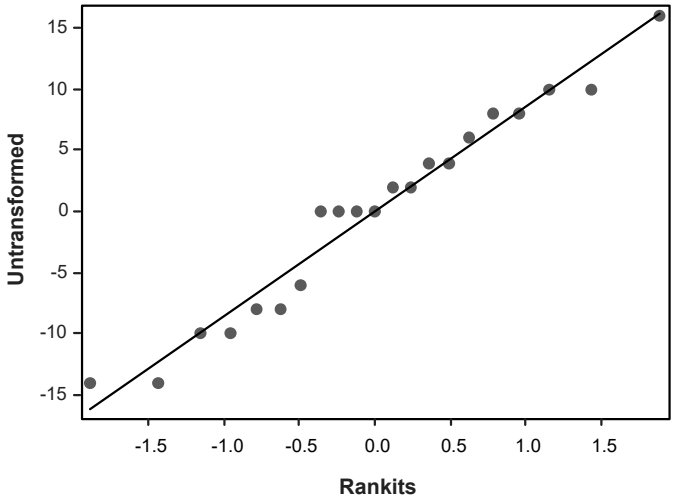
Analysis ID:	00-3251-2320	**Endpoint:**	Cell Density	**CETIS Version:**	CETIS v2.1.5
Analyzed:	16 May-24 9:24	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	16 May-24 0:00	**MD5 Hash:**	45340AE4263C0F82F962FD1E1B4927B9	**Editor ID:**	009-313-022-5

Cell Density Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	XC	295	319	313
713		301	319	313
889		343	319	319
1117		301	277	295
1414		295	295	295
1799		277	295	289
2296		277	283	289

Graphics





APPENDIX B – *Ceriodaphnia dubia* Toxicity Test Data

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Method CDD-mod Client AGN 108 (TDS) Reference PJ2324-004 (2324-1704)

Test Log

Date	Day	Time	Technician	Chem. Cart Used	Subsample Fed (✓)	Daily Data Review	Subsample Used	
2024/05/02	0	1140	KO	2	✓	YC	Day 0	✓
24/05/03	1	0740	YC	2	✓	NA	Day 1	✓
24/05/04	2	0830	YC	2	✓	EP	Day 2	✓
24/05/05	3	1100	KO	2	✓	AI	Day 3	✓
24/05/06	4	0800	KO	2	✓	KM	Day 4	✓
24/05/07	5	0800	KO	2	✓	YC	Day 5	✓
24/05/08	6	1330	KO	2	✓	YC	Day 6	✓
24/05/09	7	1130	KO	2	✓	YC	Day 7	✓
24/05/10	8	0740	YC	2	-	NA	-	-

Sample Information

Initial pH: _____
Initial EC (µS/cm): _____
Initial DO (mg/L): _____
Initial Temp (°C): _____
Filtered with 60 µm nitex screen Yes/No — no
Sample pre-aerated/hardness/pH adjust: Yes/No
*if yes, describe procedure, rate and duration

Test Specifics

Food expiration: 05/18:24

Dilution water vessel and preparation date: 7:04/20 ; 1:04/20 ; 4:04/23 ; 9:04/26 ; 8:04/28 ; 1:05/03

Control Validity Day 8

Cup	Number of Young	Number of Broods
1	21	3
2	21	1
3	24	
4	32	
5	15	
6	25	
7	24	
8	22	
9	24	
10	17	

Average # of Young: 23

% with ≥ 3 Broods: 100%

Control Mortality: 0%
(must be ≤20%)

Reproduction Validity Criteria: the average number of young produced in first three broods is ≥ 15, when 60% of control organsims had 3 or more broods: (Yes) / No

Reviewed By: W Date Reviewed: May/05/13

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Method CDD-mod Client AGN 108 Reference PJ2324-004 (2324-1704)

Chemistry

pH (units) (range: 6.5-8.5)

Conc. TDS (mg/L)	New Solutions								Old Solutions							
Day	CTL	SITE	713	889	1117	1414	1799	2296	CTL	SITE	713	889	1117	1414	1799	2296
0	7.7	7.2	7.1	7.1	7.0	7.0	7.0	7.0								
1	7.8	7.3	7.2	7.2	7.1	7.1	7.1	7.1	7.8	7.3	7.1	7.2	7.1	7.1	7.1	7.1
2	7.7	7.3	7.1	7.1	7.0	7.1	7.1	7.1	7.7	7.3	7.1	7.1	7.1	7.1	7.1	7.1
3	7.8	7.3	7.1	7.1	7.1	7.1	7.1	7.1	7.8	7.3	7.0	7.0	7.1	7.1	7.1	7.1
4	7.9	7.4	7.1	7.2	7.2	7.2	7.2	7.1	7.8	7.4	7.0	7.1	7.1	7.1	7.1	7.1
5	7.8	7.2	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.1	6.9	6.9	6.9	6.9	6.9	6.9
6	7.8	7.3	7.1	7.1	7.2	7.0	7.0	7.0	7.7	7.3	6.9	6.9	6.9	6.9	6.9	7.0
7	7.9	7.3	7.1	7.1	7.1	7.1	7.1	7.1	7.6	7.2	6.9	6.9	6.9	6.9	6.9	6.9
8									7.5	7.0	6.9	6.9	6.9	6.9	6.9	6.9

Conductance (µS/cm)

0	208	223	1016	1273	1559	1904	2460	3030								
1	216	231	1032	1281	1565	1936	2490	3110	217	234	1028	1258	1544	1899	2440	3020
2	212	232	1036	1283	1590	1939	2510	3130	224	233	1034	1268	1558	1908	2470	3070
3	208	224	1010	1274	1563	1911	2470	3080	214	229	991	1247	1557	1898	2460	3040
4	224	229	1034	1269	1556	1907	2480	3090	220	221	969	1225	1542	1875	2410	2950
5	203	226	968	1274	1564	1931	2480	3170	218	224	977	1239	1527	1869	2390	3030
6	204	225	1006	1280	1587	1934	2470	3130	226	226	983	1237	1539	1873	2440	3030
7	200	222	989	1251	1574	1923	2480	3170	236	226	1015	1264	1552	1895	2450	3100
8									256	236	1069	1253	1563	1894	2480	3110

Dissolved Oxygen (mg/L) (40-100% saturation)

0	7.3	7.2	7.2	7.1	7.1	7.1	7.2	7.1								
1	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.2	7.2	7.2	7.2	7.2	7.2	7.2
2	7.3	7.3	7.2	7.2	7.3	7.3	7.2	7.2	6.5	6.9	6.9	7.2	6.9	7.2	7.2	7.2
3	7.3	7.3	7.3	7.3	7.3	7.3	7.2	7.2	6.7	6.9	6.5	6.5	6.5	6.4	6.5	6.5
4	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	6.3	6.6	6.5	6.3	6.4	6.4	6.4	6.5
5	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	5.9	6.4	6.3	5.8	5.8	5.8	5.9	6.0
6	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	6.1	6.3	6.2	5.9	5.8	5.8	5.9	5.9
7	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	6.1	6.3	6.0	5.6	5.5	5.4	5.6	5.6
8									5.9	5.0	4.7	4.7	4.3	4.6	4.7	4.8

Temperature 24 - 26 (°C)

0	24	25	25	26	26	26	25	26								
1	24	24	24	24	24	24	24	24	24	25	25	25	25	25	25	25
2	24	24	25	25	24	24	25	25	25	25	25	25	25	25	25	25
3	24	24	24	24	24	24	25	25	25	25	25	25	25	25	25	25
4	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
5	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
6	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
7	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
8									24	24	24	24	24	24	24	24

DO Levels (40-100% saturation)* -
2.9 to 7.3 mg/L at 24°C
2.9 to 7.2 mg/L at 25°C
2.8 to 7.1 mg/L at 26°C

*corrected for altitude

Reviewed By: [illegible] Date Reviewed: 2024/05/13

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Method CDD-mod Client AGN 108 Reference PJ2324-004 (2324-1704)

Biology

(#, young produced; 0, no young; X, dead; X#, young produced-dead; —,young produced after 3rd brood)

Brood organisms produced during an organism's 4th or subsequent brood are not included in brood counts

CTL

Day	1	2	3	4	5	6	7	8
Cup								
1	0	0	0	2	7	0	12	—
2				3	6	12	—	
3				4	8	0	13	—
4				4	9	0	19	—
5				4	6	0	9	—
6				4	6	0	15	—
7				3	5	6	16	—
8				3	6	7	14	—
9				3	7	5	12	—
10				3	5	0	9	—

1117

Day	1	2	3	4	5	6	7	8
Cup								
1	0	0	0	2	6	0	14	—
2				2	6	0	12	—
3				2	6	0	11	—
4				2	5	0	8	—
5				2	5	0	10	0
6				4	5	0	11	—
7				3	3	0	13	—
8				3	4	0	9	—
9				3	5	0	9	0
10				3	5	0	9	—

SITE

Day	1	2	3	4	5	6	7	8
Cup								
1	0	0	0	0	2	7	12	—
2				0	3	0	10	—
3				0	4	0	6	0
4				0	5	0	13	0
5				0	4	0	13	—
6				0	4	0	10	—
7				0	X			
8				0	4	9	11	—
9				0	2	7	11	—
10				0	2	0	13	9

1414

Day	1	2	3	4	5	6	7	8
Cup								
1	0	0	0	0	0	7	15	0
2				0	0	0	0	0
3				0	0	0	11	0
4				0	0	0	10	—
5				0	0	0	7	—
6				0	3	0	10	12
7				0	4	0	3	—
8				0	3	0	8	—
9				0	2	0	11	—
10				0	2	0	9	—

713

Day	1	2	3	4	5	6	7	8
Cup								
1	0	0	0	3	8	0	13	—
2				3	6	0	9	—
3				3	6	0	10	—
4				3	8	0	12	—
5				3	8	0	9	—
6				3	5	0	7	—
7				3	5	0	X	—
8				3	6	0	8	—
9				3	6	0	9	—
10				2	5	0	8	—

1799

Day	1	2	3	4	5	6	7	8
Cup								
1	0	0	0	2	4	7	—	
2				0	4	0	8	0
3				0	3	7	12	0
4				0	2	0	4	10
5				0	4	0	8	9
6				0	3	0	6	—
7				0	2	0	9	2
8				0	0	0	X	
9				0	0	0	7	0
10				0	2	0	0	12

889

Day	1	2	3	4	5	6	7	8
Cup								
1	0	0	0	0	3	0	8	0
2				0	3	0	8	0
3				0	3	0	13	—
4				0	3	0	10	—
5				0	3	0	6	—
6				0	4	0	9	—
7				2	0	6	9	—
8		X						
9		0	0	0	3	5	9	—
10		0	0	2	0	9	8	—

2296

Day	1	2	3	4	5	6	7	8
Cup								
1	0	0	0	2	0	2	10	—
2				2	0	3	9	—
3				2	0	X		
4				2	0	0	10	—
5				2	0	3	5	0
6				2	0	2	12	0
7				2	0	X		
8				2	0	2	4	0
9				2	0	2	4	0
10				2	0	0	7	—

Reviewed By: [illegible] Date Reviewed: 2024/05/13

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Test Organism Information

Client: AGN 108

Culture history for adults used in the test for sample reference: 2324-1704 (PJ2324-004)

Day Used: 2024/05/02

Test organisms appeared healthy before use: (Yes) No

Number of young produced per brood adult within first three broods:

Brood	row/replicate											
		E4	D1	E2	A1	B1	A2	E1	D3	D5	D4	D2
	number of young	4	10	4	12	9	8	6	6	3	5	7
	number of young	10	15	9	18	18	19	14	9	8	8	11
	number of young	12	9	17	9	10	13	16	13	11	11	14
	number of young	12	9	17	9	10	13	16	13	11	11	14

Culture(s) Used for Testing: Thursday A

Number of Adults Alive in Culture

7 days prior:	day used:
25	23

Notes: all cups have 1 adult

Average No. of young in first 3 broods: 32
(must be ≥15)

Culture % mortality (7-days prior to testing): 8%
(must be ≤20%)

Number of young produced by each brood organism in last complete brood is ≥8: yes (12)
Yes (Y) or No (N)

Reviewed By: [signature]

Date Reviewed: 2024/05/13

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental Calgary**

Batch ID:	12-0931-3203	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Lab Tech		
Start Date:	02 May-24	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	MHRW		
Ending Date:	10 May-24	**Species:**	Ceriodaphnia dubia	**Brine:**			
Test Length:	8d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	05-3270-8097	**Code:**	1FC07B01	**Project:**			
Sample Date:		**Material:**	Total dissolved Solids	**Source:**	Agnico Eagle		
Receipt Date:	19 Mar-24	**CAS (PC):**		**Station:**	Program 3 TDS - CD		
Sample Age:	---	**Client:**	Agnico Eagle				

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
19-1943-2300	7d Survival Rate	Fisher Exact Test	1.0000	Site Control passed 7d survival rate
03-9971-1135	Reproduction	Equal Variance t Two-Sample Test	0.1039	Site Control passed reproduction

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	PMSD	TU
02-4643-4777	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	2296	>2296	---	---	0
10-1672-1431	Reproduction	Steel Many-One Rank Sum Test	1799	2296	2032	34.5%	0.1

7d Survival Rate Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
0	XC	10	0.9000	0.6738	1.1260	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
713		10	0.9000	0.6738	1.1260	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
889		10	0.9000	0.6738	1.1260	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
1117		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
1414		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
1799		10	0.9000	0.6738	1.1260	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
2296		10	0.8000	0.4984	1.1020	0.0000	1.0000	0.1333	0.4216	52.70%	20.00%

Reproduction Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	10	22.5	19.17	25.83	15	32	1.47	4.649	20.66%	0.00%
0	XC	10	17.7	12.3	23.1	0	24	2.385	7.543	42.62%	21.33%
713		10	19	15.63	22.37	8	25	1.491	4.714	24.81%	15.56%
889		10	14.7	10.57	18.83	0	19	1.826	5.774	39.28%	34.67%
1117		10	15.5	11.85	19.15	7	24	1.614	5.104	32.93%	31.11%
1414		10	14.8	10.3	19.3	0	22	1.988	6.286	42.47%	34.22%
1799		10	13.2	9.018	17.38	0	21	1.849	5.846	44.29%	41.33%
2296		10	9.1	5.492	12.71	2	14	1.595	5.043	55.42%	59.56%

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental Calgary**

7d Survival Rate Detail MD5: F524A2C4BFD97542E6B026A0D992EAA2

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	LC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
0	XC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
713		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
889		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
1117		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1414		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1799		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
2296		1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000

Reproduction Detail MD5: 679303CC66F5B62872ED20125655448E

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	LC	21	21	24	32	15	25	24	22	24	17
0	XC	21	15	10	19	24	21	0	22	21	24
713		24	17	21	25	20	19	8	17	18	21
889		11	14	18	18	14	19	17	0	17	19
1117		12	16	19	15	10	24	7	21	14	17
1414		22	0	13	14	19	20	10	18	16	16
1799		13	12	19	16	21	11	13	0	10	17
2296		14	14	4	14	8	14	2	8	2	11

7d Survival Rate Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	LC	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0	XC	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
713		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
889		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
1117		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1414		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1799		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
2296		1/1	1/1	0/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental Calgary**

Analysis ID:	19-1943-2300	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETIS v2.1.5		
Analyzed:	22 May-24 16:22	**Analysis:**	Single 2x2 Contingency Table	**Status Level:**	1		
Edit Date:	22 May-24 15:47	**MD5 Hash:**	95F907219249D7FA795E1A00051C78CB	**Editor ID:**			
Batch ID:	12-0931-3203	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Lab Tech		
Start Date:	02 May-24	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	MHRW		
Ending Date:	10 May-24	**Species:**	Ceriodaphnia dubia	**Brine:**			
Test Length:	8d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	05-3270-8097	**Code:**	1FC07B01	**Project:**			
Sample Date:		**Material:**	Total dissolved Solids	**Source:**	Agnico Eagle		
Receipt Date:	19 Mar-24	**CAS (PC):**		**Station:**	Program 3 TDS - CD		
Sample Age:	---	**Client:**	Agnico Eagle				

Data Transform	Alt Hyp	Comparison Result
Untransformed	C <> T	Site Control passed 7d survival rate endpoint

Fisher Exact Test

Control I	vs	Control II	Test Stat	P-Type	P-Value	Decision(α:5%)
Lab Control		Site Control	1.0000	Exact	1.0000	Non-Significant Effect

7d Survival Rate Frequencies

Conc-mg/L	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
0	LC	10	0	10	1.0000	0.0000	0.00%
0	XC	9	1	10	0.9000	0.1000	10.00%

7d Survival Rate Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
0	XC	10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	10.00%

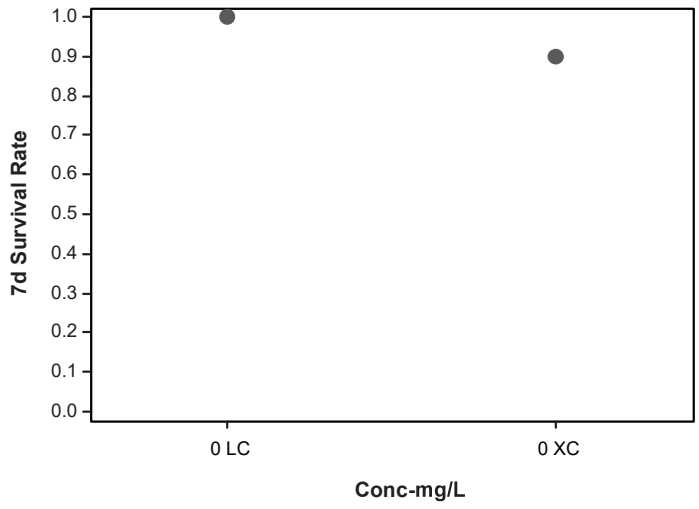
7d Survival Rate Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	LC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
0	XC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000

7d Survival Rate Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	LC	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0	XC	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental Calgary**

Analysis ID:	02-4643-4777	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETIS v2.1.5
Analyzed:	22 May-24 16:34	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Edit Date:	22 May-24 15:47	**MD5 Hash:**	3F9B0A6F00BCBBFBFA67F4D96124DF6A	**Editor ID:**	
Batch ID:	12-0931-3203	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Lab Tech
Start Date:	02 May-24	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	MHRW
Ending Date:	10 May-24	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24
Sample ID:	05-3270-8097	**Code:**	1FC07B01	**Project:**	
Sample Date:		**Material:**	Total dissolved Soilds	**Source:**	Agnico Eagle
Receipt Date:	19 Mar-24	**CAS (PC):**		**Station:**	Program 3 TDS - CD
Sample Age:	---	**Client:**	Agnico Eagle		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units
Untransformed	C > T	2296	>2296	---	0

Fisher Exact/Bonferroni-Holm Test

Control	vs	Conc-mg/L	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		713	0.7632	Exact	1.0000	Non-Significant Effect
		889	0.7632	Exact	1.0000	Non-Significant Effect
		1117	1.0000	Exact	1.0000	Non-Significant Effect
		1414	1.0000	Exact	1.0000	Non-Significant Effect
		1799	0.7632	Exact	1.0000	Non-Significant Effect
		2296	0.5000	Exact	1.0000	Non-Significant Effect

7d Survival Rate Frequencies

Conc-mg/L	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
0	XC	9	1	10	0.9000	0.1000	0.00%
713		9	1	10	0.9000	0.1000	0.00%
889		9	1	10	0.9000	0.1000	0.00%
1117		10	0	10	1.0000	0.0000	-11.11%
1414		10	0	10	1.0000	0.0000	-11.11%
1799		9	1	10	0.9000	0.1000	0.00%
2296		8	2	10	0.8000	0.2000	11.11%

7d Survival Rate Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	XC	10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	0.00%
713		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	0.00%
889		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	0.00%
1117		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-11.11%
1414		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-11.11%
1799		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	0.00%
2296		10	0.8000	0.4984	1.0000	1.0000	0.0000	1.0000	0.1333	52.70%	11.11%

7d Survival Rate Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	XC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
713		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
889		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
1117		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1414		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1799		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
2296		1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000

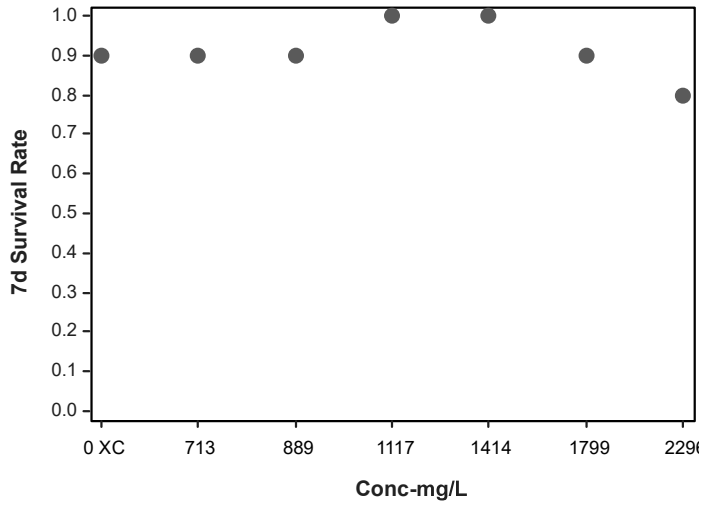
Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental Calgary**

Analysis ID:	02-4643-4777	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETIS v2.1.5
Analyzed:	22 May-24 16:34	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Edit Date:	22 May-24 15:47	**MD5 Hash:**	3F9B0A6F00BCBBFBFA67F4D96124DF6A	**Editor ID:**	

7d Survival Rate Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	XC	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
713		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
889		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
1117		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1414		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1799		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
2296		1/1	1/1	0/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental Calgary**

Analysis ID:	03-9971-1135	**Endpoint:**	Reproduction	**CETIS Version:**	CETIS v2.1.5		
Analyzed:	22 May-24 16:27	**Analysis:**	Parametric-Two Sample	**Status Level:**	1		
Edit Date:	22 May-24 15:47	**MD5 Hash:**	63CE1349575709922AF6A4C1886551DF	**Editor ID:**			
Batch ID:	12-0931-3203	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Lab Tech		
Start Date:	02 May-24	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	MHRW		
Ending Date:	10 May-24	**Species:**	Ceriodaphnia dubia	**Brine:**			
Test Length:	8d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	05-3270-8097	**Code:**	1FC07B01	**Project:**			
Sample Date:		**Material:**	Total dissolved Solids	**Source:**	Agnico Eagle		
Receipt Date:	19 Mar-24	**CAS (PC):**		**Station:**	Program 3 TDS - CD		
Sample Age:	---	**Client:**	Agnico Eagle				

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C <> T	Site Control passed reproduction endpoint	26.16%

Equal Variance t Two-Sample Test

Control I	vs	Control II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		Site Control	18	1.713	2.101	5.887	CDF	0.1039	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.902	2.708	0.0180	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	115.2	115.2	1	2.935	0.1039	Non-Significant Effect
Error	706.6	39.2556	18			
Total	821.8		19			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Variance	Variance Ratio F Test	2.633	4.026	0.1654	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9067	0.9044	0.0552	Normal Distribution

Reproduction Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	10	22.5	19.17	25.83	23	15	32	1.47	20.66%	0.00%
0	XC	10	17.7	12.3	23.1	21	0	24	2.385	42.62%	21.33%

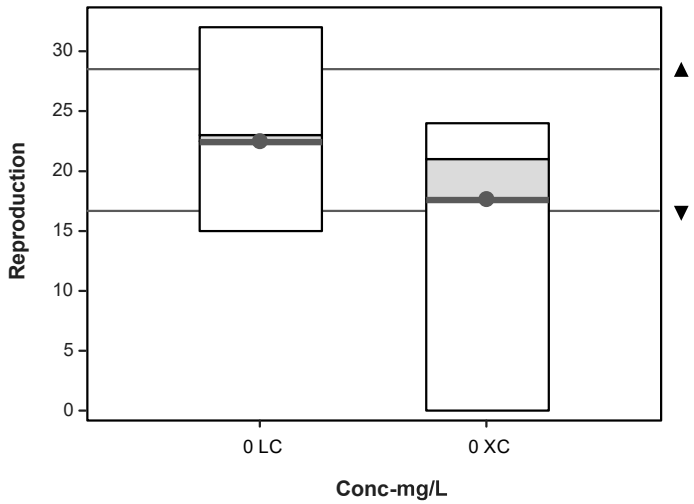
Reproduction Detail

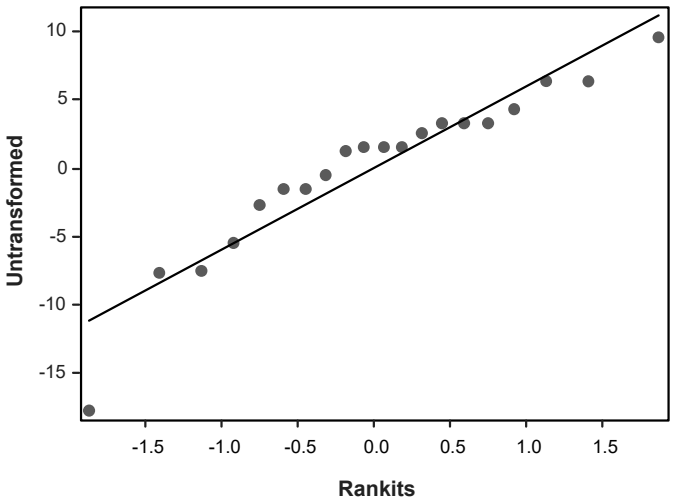
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	LC	21	21	24	32	15	25	24	22	24	17
0	XC	21	15	10	19	24	21	0	22	21	24

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental Calgary**

Analysis ID:	03-9971-1135	**Endpoint:**	Reproduction	**CETIS Version:**	CETIS v2.1.5
Analyzed:	22 May-24 16:27	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	22 May-24 15:47	**MD5 Hash:**	63CE1349575709922AF6A4C1886551DF	**Editor ID:**	

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental Calgary**

Analysis ID:	10-1672-1431	**Endpoint:**	Reproduction	**CETIS Version:**	CETIS v2.1.5
Analyzed:	23 May-24 13:19	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	22 May-24 15:47	**MD5 Hash:**	E7AA57F386BD798DB0513A902B734784	**Editor ID:**	
Batch ID:	12-0931-3203	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Lab Tech
Start Date:	02 May-24	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	MHRW
Ending Date:	10 May-24	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24
Sample ID:	05-3270-8097	**Code:**	1FC07B01	**Project:**	
Sample Date:		**Material:**	Total dissolved Solids	**Source:**	Agnico Eagle
Receipt Date:	19 Mar-24	**CAS (PC):**		**Station:**	Program 3 TDS - CD
Sample Age:	---	**Client:**	Agnico Eagle		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Untransformed	C > T	1799	2296	2032	0.1	6.103	34.48%

Steel Many-One Rank Sum Test

Control	vs	Conc-mg/L	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Site Control		713	18	102.5	74	4	CDF	0.7993	Non-Significant Effect
		889	18	80.5	74	2	CDF	0.1282	Non-Significant Effect
		1117	18	88	74	6	CDF	0.3191	Non-Significant Effect
		1414	18	85	74	4	CDF	0.2305	Non-Significant Effect
		1799	18	80	74	4	CDF	0.1192	Non-Significant Effect
		2296*	18	70	74	0	CDF	0.0202	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	3.179	3.258	0.0688	No Outliers Detected
Overall Effect	Fligner-Wolfe Omnibus Test	2.084	1.645	0.0186	Significant Overall Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	615.771	102.629	6	3.023	0.0116	Significant Effect
Error	2138.8	33.9492	63			
Total	2754.57		69			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Variance	Bartlett Equality of Variance Test	2.766	12.59	0.8376	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9077	0.9654	7.9E-05	Non-Normal Distribution

Reproduction Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	XC	10	17.7	12.3	23.1	21	0	24	2.385	42.62%	0.00%
713		10	19	15.63	22.37	19.5	8	25	1.491	24.81%	-7.34%
889		10	14.7	10.57	18.83	17	0	19	1.826	39.28%	16.95%
1117		10	15.5	11.85	19.15	15.5	7	24	1.614	32.93%	12.43%
1414		10	14.8	10.3	19.3	16	0	22	1.988	42.47%	16.38%
1799		10	13.2	9.018	17.38	13	0	21	1.849	44.29%	25.42%
2296		10	9.1	5.492	12.71	9.5	2	14	1.595	55.42%	48.59%

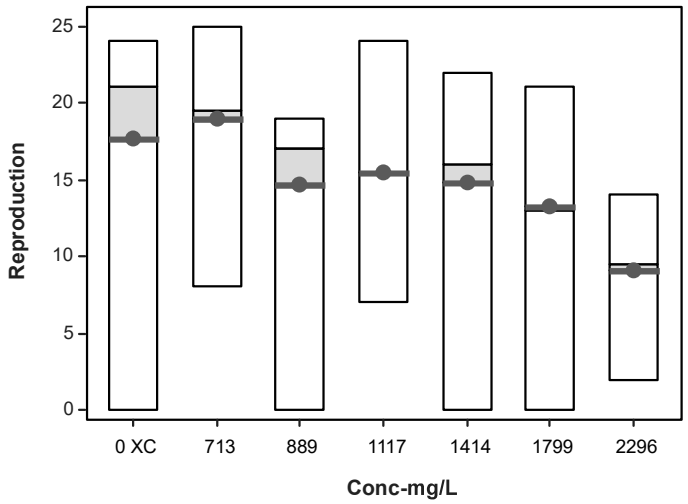
Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental Calgary**

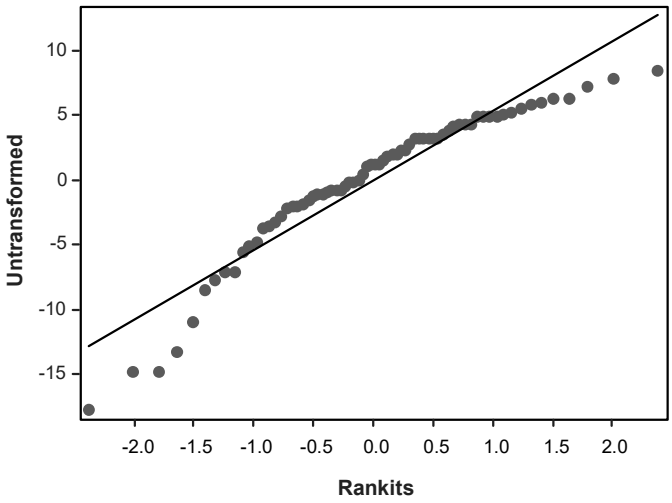
Analysis ID:	10-1672-1431	**Endpoint:**	Reproduction	**CETIS Version:**	CETIS v2.1.5
Analyzed:	23 May-24 13:19	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	22 May-24 15:47	**MD5 Hash:**	E7AA57F386BD798DB0513A902B734784	**Editor ID:**	

Reproduction Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	XC	21	15	10	19	24	21	0	22	21	24
713		24	17	21	25	20	19	8	17	18	21
889		11	14	18	18	14	19	17	0	17	19
1117		12	16	19	15	10	24	7	21	14	17
1414		22	0	13	14	19	20	10	18	16	16
1799		13	12	19	16	21	11	13	0	10	17
2296		14	14	4	14	8	14	2	8	2	11

Graphics





APPENDIX C – Analytical Chemistry

CERTIFICATE OF ANALYSIS

Work Order	: **CG2403741**	Page	: 1 of 7
Client	: **Nautilus Environmental Company Inc.**	Laboratory	: ALS Environmental - Calgary
Contact	: Leila Oosterbroek	Account Manager	: Patryk Wojciak
Address	: 10823 27th Street SE Calgary AB Canada T2Z 3V9	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 253 7121	Telephone	: +1 403 407 1800
Project	: ----	Date Samples Received	: 27-Mar-2024 14:05
PO	: 2324-273AB	Date Analysis Commenced	: 27-Mar-2024
C-O-C number	: ----	Issue Date	: 28-Mar-2024 16:48
Sampler	: ----		
Site	: ----		
Quote number	: CG24-NECI100-00001 Nautilus Calgary General		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Archana Neupane	Lab Assistant	Metals, Calgary, Alberta
George Huang	Supervisor - Inorganic	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Metals, Calgary, Alberta
Jon Fisher	Production Manager, Environmental	Inorganics, Waterloo, Ontario
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kim Jensen	Department Manager - Metals	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
µS/cm	microsiemens per centimetre
meq/L	milliequivalents per litre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID: Baseline PJ2324-004; 2324-1704	----	----	----	----
					Client sampling date / time: 27-Mar-2024 10:00	----	----	----	----
					CG2403741-001	--------	--------	--------	--------
					Result	----	----	----	----
Physical Tests									
Hardness (as CaCO3), dissolved	----	EC100/CG	0.50	mg/L	88.4	----	----	----	----
Solids, total dissolved [TDS]	----	E162/CG	10	mg/L	164	----	----	----	----
Conductivity	----	E100/CG	2.0	µS/cm	213	----	----	----	----
pH	----	E108/CG	0.10	pH units	7.32	----	----	----	----
Alkalinity, bicarbonate (as HCO3)	71-52-3	E290/CG	1.0	mg/L	22.2	----	----	----	----
Alkalinity, carbonate (as CO3)	3812-32-6	E290/CG	1.0	mg/L	<1.0	----	----	----	----
Alkalinity, hydroxide (as OH)	14280-30-9	E290/CG	1.0	mg/L	<1.0	----	----	----	----
Alkalinity, total (as CaCO3)	----	E290/CG	2.0	mg/L	18.2	----	----	----	----
Solids, total dissolved [TDS], calculated	----	EC103/CG	1.0	mg/L	125	----	----	----	----
Anions and Nutrients									
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	0.0378	----	----	----	----
Chloride	16887-00-6	E235.Cl/CG	0.50	mg/L	0.94	----	----	----	----
Fluoride	16984-48-8	E235.F/CG	0.020	mg/L	0.081	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3/CG	0.020	mg/L	<0.020	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2/CG	0.010	mg/L	0.012	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/CG	0.30	mg/L	73.7	----	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/CG	0.0500	mg/L	<0.0500	----	----	----	----
Cyanides									
Thiocyanate	302-04-5	E344/VA	0.50	mg/L	<0.50	----	----	----	----
Cyanide, free	----	E339/WT	0.0020	mg/L	<0.0020	----	----	----	----
Cyanide, strong acid dissociable (Total)	----	E333/WT	0.0020	mg/L	<0.0020	----	----	----	----
Cyanide, weak acid dissociable	----	E336/WT	0.0020	mg/L	<0.0020	----	----	----	----
Organic / Inorganic Carbon									
Carbon, dissolved organic [DOC]	----	E358-L/CG	0.50	mg/L	1.94	----	----	----	----
Carbon, total organic [TOC]	----	E355-L/CG	0.50	mg/L	1.87	----	----	----	----
Ion Balance									
Anion sum	----	EC101/CG	0.10	meq/L	1.93	----	----	----	----
Cation sum	----	EC101/CG	0.10	meq/L	1.85	----	----	----	----

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Baseline PJ2324-004; 2324-1704	----	----	----	----
					Client sampling date / time	27-Mar-2024 10:00	----	----	----	----
						CG2403741-001	--------	--------	--------	--------
						Result	----	----	----	----
Ion Balance										
Ion balance (APHA)	----	EC101/CG	0.01	%		-2.12	----	----	----	----
Ion balance (cations/anions)	----	EC101/CG	0.010	%		95.8	----	----	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/CG	0.0030	mg/L		0.0064	----	----	----	----
Antimony, total	7440-36-0	E420/CG	0.00010	mg/L		0.00022	----	----	----	----
Arsenic, total	7440-38-2	E420/CG	0.00010	mg/L		0.0159	----	----	----	----
Barium, total	7440-39-3	E420/CG	0.00010	mg/L		0.0156	----	----	----	----
Beryllium, total	7440-41-7	E420/CG	0.000020	mg/L		<0.000020	----	----	----	----
Bismuth, total	7440-69-9	E420/CG	0.000050	mg/L		<0.000050	----	----	----	----
Boron, total	7440-42-8	E420/CG	0.010	mg/L		<0.010	----	----	----	----
Cadmium, total	7440-43-9	E420/CG	0.0000050	mg/L		<0.0000050	----	----	----	----
Calcium, total	7440-70-2	E420/CG	0.050	mg/L		32.4	----	----	----	----
Cesium, total	7440-46-2	E420/CG	0.000010	mg/L		<0.000010	----	----	----	----
Chromium, total	7440-47-3	E420/CG	0.00050	mg/L		<0.00050	----	----	----	----
Cobalt, total	7440-48-4	E420/CG	0.00010	mg/L		0.00292	----	----	----	----
Copper, total	7440-50-8	E420/CG	0.00050	mg/L		0.00368	----	----	----	----
Iron, total	7439-89-6	E420/CG	0.010	mg/L		0.057	----	----	----	----
Lead, total	7439-92-1	E420/CG	0.000050	mg/L		<0.000050	----	----	----	----
Lithium, total	7439-93-2	E420/CG	0.0010	mg/L		<0.0010	----	----	----	----
Magnesium, total	7439-95-4	E420/CG	0.0050	mg/L		1.20	----	----	----	----
Manganese, total	7439-96-5	E420/CG	0.00010	mg/L		0.0111	----	----	----	----
Molybdenum, total	7439-98-7	E420/CG	0.000050	mg/L		0.000502	----	----	----	----
Nickel, total	7440-02-0	E420/CG	0.00050	mg/L		0.00447	----	----	----	----
Phosphorus, total	7723-14-0	E420/CG	0.050	mg/L		<0.050	----	----	----	----
Potassium, total	7440-09-7	E420/CG	0.050	mg/L		0.667	----	----	----	----
Rubidium, total	7440-17-7	E420/CG	0.00020	mg/L		0.00093	----	----	----	----
Selenium, total	7782-49-2	E420/CG	0.000050	mg/L		0.000389	----	----	----	----
Silicon, total	7440-21-3	E420/CG	0.10	mg/L		0.17	----	----	----	----
Silver, total	7440-22-4	E420/CG	0.000010	mg/L		<0.000010	----	----	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID: Baseline PJ2324-004; 2324-1704	----	----	----	----
					Client sampling date / time: 27-Mar-2024 10:00	----	----	----	----
					CG2403741-001	--------	--------	--------	--------
					Result	----	----	----	----
Total Metals									
Sodium, total	7440-23-5	E420/CG	0.050	mg/L	1.30	----	----	----	----
Strontium, total	7440-24-6	E420/CG	0.00020	mg/L	0.0817	----	----	----	----
Sulfur, total	7704-34-9	E420/CG	0.50	mg/L	25.8	----	----	----	----
Tellurium, total	13494-80-9	E420/CG	0.00020	mg/L	<0.00020	----	----	----	----
Thallium, total	7440-28-0	E420/CG	0.000010	mg/L	<0.000010	----	----	----	----
Thorium, total	7440-29-1	E420/CG	0.00010	mg/L	<0.00010	----	----	----	----
Tin, total	7440-31-5	E420/CG	0.00010	mg/L	<0.00010	----	----	----	----
Titanium, total	7440-32-6	E420/CG	0.00030	mg/L	<0.00030	----	----	----	----
Tungsten, total	7440-33-7	E420/CG	0.00010	mg/L	0.00018	----	----	----	----
Uranium, total	7440-61-1	E420/CG	0.000010	mg/L	0.000270	----	----	----	----
Vanadium, total	7440-62-2	E420/CG	0.00050	mg/L	<0.00050	----	----	----	----
Zinc, total	7440-66-6	E420/CG	0.0030	mg/L	<0.0030	----	----	----	----
Zirconium, total	7440-67-7	E420/CG	0.00020	mg/L	<0.00020	----	----	----	----
Dissolved Metals									
Aluminum, dissolved	7429-90-5	E421/CG	0.0010	mg/L	0.0020	----	----	----	----
Antimony, dissolved	7440-36-0	E421/CG	0.00010	mg/L	0.00020	----	----	----	----
Arsenic, dissolved	7440-38-2	E421/CG	0.00010	mg/L	0.0156	----	----	----	----
Barium, dissolved	7440-39-3	E421/CG	0.00010	mg/L	0.0160	----	----	----	----
Beryllium, dissolved	7440-41-7	E421/CG	0.000020	mg/L	<0.000020	----	----	----	----
Bismuth, dissolved	7440-69-9	E421/CG	0.000050	mg/L	<0.000050	----	----	----	----
Boron, dissolved	7440-42-8	E421/CG	0.010	mg/L	<0.010	----	----	----	----
Cadmium, dissolved	7440-43-9	E421/CG	0.0000050	mg/L	<0.0000050	----	----	----	----
Calcium, dissolved	7440-70-2	E421/CG	0.050	mg/L	33.4	----	----	----	----
Cesium, dissolved	7440-46-2	E421/CG	0.000010	mg/L	<0.000010	----	----	----	----
Chromium, dissolved	7440-47-3	E421/CG	0.00050	mg/L	<0.00050	----	----	----	----
Cobalt, dissolved	7440-48-4	E421/CG	0.00010	mg/L	0.00278	----	----	----	----
Copper, dissolved	7440-50-8	E421/CG	0.00020	mg/L	0.00304	----	----	----	----
Iron, dissolved	7439-89-6	E421/CG	0.010	mg/L	0.016	----	----	----	----
Lead, dissolved	7439-92-1	E421/CG	0.000050	mg/L	<0.000050	----	----	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID: Baseline PJ2324-004; 2324-1704	----	----	----	----
Client sampling date / time					27-Mar-2024 10:00	----	----	----	----
					CG2403741-001	--------	--------	--------	--------
					Result	----	----	----	----
Dissolved Metals									
Lithium, dissolved	7439-93-2	E421/CG	0.0010	mg/L	<0.0010	----	----	----	----
Magnesium, dissolved	7439-95-4	E421/CG	0.0050	mg/L	1.22	----	----	----	----
Manganese, dissolved	7439-96-5	E421/CG	0.00010	mg/L	0.0107	----	----	----	----
Molybdenum, dissolved	7439-98-7	E421/CG	0.000050	mg/L	0.000508	----	----	----	----
Nickel, dissolved	7440-02-0	E421/CG	0.00050	mg/L	0.00434	----	----	----	----
Phosphorus, dissolved	7723-14-0	E421/CG	0.050	mg/L	<0.050	----	----	----	----
Potassium, dissolved	7440-09-7	E421/CG	0.050	mg/L	0.683	----	----	----	----
Rubidium, dissolved	7440-17-7	E421/CG	0.00020	mg/L	0.00091	----	----	----	----
Selenium, dissolved	7782-49-2	E421/CG	0.000050	mg/L	0.000411	----	----	----	----
Silicon, dissolved	7440-21-3	E421/CG	0.050	mg/L	0.126	----	----	----	----
Silver, dissolved	7440-22-4	E421/CG	0.000010	mg/L	<0.000010	----	----	----	----
Sodium, dissolved	7440-23-5	E421/CG	0.050	mg/L	1.34	----	----	----	----
Strontium, dissolved	7440-24-6	E421/CG	0.00020	mg/L	0.0831	----	----	----	----
Sulfur, dissolved	7704-34-9	E421/CG	0.50	mg/L	25.7	----	----	----	----
Tellurium, dissolved	13494-80-9	E421/CG	0.00020	mg/L	<0.00020	----	----	----	----
Thallium, dissolved	7440-28-0	E421/CG	0.000010	mg/L	<0.000010	----	----	----	----
Thorium, dissolved	7440-29-1	E421/CG	0.00010	mg/L	<0.00010	----	----	----	----
Tin, dissolved	7440-31-5	E421/CG	0.00010	mg/L	<0.00010	----	----	----	----
Titanium, dissolved	7440-32-6	E421/CG	0.00030	mg/L	<0.00030	----	----	----	----
Tungsten, dissolved	7440-33-7	E421/CG	0.00010	mg/L	0.00017	----	----	----	----
Uranium, dissolved	7440-61-1	E421/CG	0.000010	mg/L	0.000251	----	----	----	----
Vanadium, dissolved	7440-62-2	E421/CG	0.00050	mg/L	<0.00050	----	----	----	----
Zinc, dissolved	7440-66-6	E421/CG	0.0010	mg/L	0.0023	----	----	----	----
Zirconium, dissolved	7440-67-7	E421/CG	0.00030	mg/L	<0.00030	----	----	----	----
Dissolved metals filtration location	----	EP421/CG	-	-	Field	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

right solutions.
right partner.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **CG2403741**	Page	: 1 of 10
Client	: **Nautilus Environmental Company Inc.**	Laboratory	: ALS Environmental - Calgary
Contact	: Leila Oosterbroek	Account Manager	: Patryk Wojciak
Address	: 10823 27th Street SE Calgary AB Canada T2Z 3V9	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 253 7121	Telephone	: +1 403 407 1800
Project	: ----	Date Samples Received	: 27-Mar-2024 14:05
PO	: 2324-273AB	Issue Date	: 28-Mar-2024 16:48
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: CG24-NECI100-00001 Nautilus Calgary General		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Baseline PJ2324-004; 2324-1704	E298	27-Mar-2024	27-Mar-2024	28 days	0 days	✓	27-Mar-2024	28 days	0 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Baseline PJ2324-004; 2324-1704	E235.Cl	27-Mar-2024	27-Mar-2024	28 days	0 days	✓	27-Mar-2024	28 days	0 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Baseline PJ2324-004; 2324-1704	E235.F	27-Mar-2024	27-Mar-2024	28 days	0 days	✓	27-Mar-2024	28 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE Baseline PJ2324-004; 2324-1704	E235.NO3	27-Mar-2024	27-Mar-2024	3 days	0 days	✓	27-Mar-2024	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE Baseline PJ2324-004; 2324-1704	E235.NO2	27-Mar-2024	27-Mar-2024	3 days	0 days	✓	27-Mar-2024	3 days	0 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Baseline PJ2324-004; 2324-1704	E235.SO4	27-Mar-2024	27-Mar-2024	28 days	0 days	✓	27-Mar-2024	28 days	0 days	✓
Cyanides : Free Cyanide										
UV-inhibited HDPE - total (sodium hydroxide) Baseline PJ2324-004; 2324-1704	E339	27-Mar-2024	28-Mar-2024	14 days	1 days	✓	28-Mar-2024	14 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Cyanides : Thiocyanate by Colourimetry										
HDPE (nitric acid)										
Baseline PJ2324-004; 2324-1704	E344	27-Mar-2024	----	----	----		28-Mar-2024	14 days	1 days	✓
Cyanides : Total Cyanide										
UV-inhibited HDPE - total (sodium hydroxide)										
Baseline PJ2324-004; 2324-1704	E333	27-Mar-2024	28-Mar-2024	14 days	1 days	✓	28-Mar-2024	14 days	1 days	✓
Cyanides : WAD Cyanide										
UV-inhibited HDPE - total (sodium hydroxide)										
Baseline PJ2324-004; 2324-1704	E336	27-Mar-2024	28-Mar-2024	14 days	1 days	✓	28-Mar-2024	14 days	1 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
Baseline PJ2324-004; 2324-1704	E421	27-Mar-2024	27-Mar-2024	180 days	0 days	✓	28-Mar-2024	180 days	1 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
Baseline PJ2324-004; 2324-1704	E358-L	27-Mar-2024	27-Mar-2024	28 days	0 days	✓	27-Mar-2024	28 days	0 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
Baseline PJ2324-004; 2324-1704	E355-L	27-Mar-2024	27-Mar-2024	28 days	0 days	✓	27-Mar-2024	28 days	0 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Baseline PJ2324-004; 2324-1704	E290	27-Mar-2024	27-Mar-2024	14 days	0 days	✓	27-Mar-2024	14 days	0 days	✓
Physical Tests : Conductivity in Water										
HDPE										
Baseline PJ2324-004; 2324-1704	E100	27-Mar-2024	27-Mar-2024	28 days	0 days	✓	27-Mar-2024	28 days	0 days	✓
Physical Tests : pH by Meter										
HDPE										
Baseline PJ2324-004; 2324-1704	E108	27-Mar-2024	27-Mar-2024	0.25 hrs	4 hrs	× EHTR-FM	27-Mar-2024	0.25 hrs	4 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TDS by Gravimetry										
HDPE										
Baseline PJ2324-004; 2324-1704	E162	27-Mar-2024	----	----	----		27-Mar-2024	7 days	0 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Baseline PJ2324-004; 2324-1704	E420	27-Mar-2024	28-Mar-2024	180 days	1 days	✓	28-Mar-2024	180 days	1 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1382518	1	7	14.2	5.0	✓
Ammonia by Fluorescence	E298	1382593	1	3	33.3	5.0	✓
Chloride in Water by IC	E235.Cl	1382636	1	1	100.0	5.0	✓
Conductivity in Water	E100	1382517	1	7	14.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1382844	1	1	100.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1382762	1	7	14.2	5.0	✓
Fluoride in Water by IC	E235.F	1382633	1	19	5.2	5.0	✓
Free Cyanide	E339	1383433	1	1	100.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1382635	1	1	100.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1382637	1	1	100.0	5.0	✓
pH by Meter	E108	1382516	1	7	14.2	5.0	✓
Sulfate in Water by IC	E235.SO4	1382628	1	19	5.2	5.0	✓
TDS by Gravimetry	E162	1382548	1	7	14.2	5.0	✓
Thiocyanate by Colourimetry	E344	1384283	1	5	20.0	5.0	✓
Total Cyanide	E333	1383434	1	1	100.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1382843	1	1	100.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1382763	1	7	14.2	5.0	✓
WAD Cyanide	E336	1383432	1	1	100.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1382518	1	7	14.2	5.0	✓
Ammonia by Fluorescence	E298	1382593	1	3	33.3	5.0	✓
Chloride in Water by IC	E235.Cl	1382636	1	1	100.0	5.0	✓
Conductivity in Water	E100	1382517	1	7	14.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1382844	1	1	100.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1382762	1	7	14.2	5.0	✓
Fluoride in Water by IC	E235.F	1382633	1	19	5.2	5.0	✓
Free Cyanide	E339	1383433	1	1	100.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1382635	1	1	100.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1382637	1	1	100.0	5.0	✓
pH by Meter	E108	1382516	1	7	14.2	5.0	✓
Sulfate in Water by IC	E235.SO4	1382628	1	19	5.2	5.0	✓
TDS by Gravimetry	E162	1382548	1	7	14.2	5.0	✓
Thiocyanate by Colourimetry	E344	1384283	1	5	20.0	5.0	✓
Total Cyanide	E333	1383434	1	1	100.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1382843	1	1	100.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1382763	1	7	14.2	5.0	✓

Matrix: **Water**

Evaluation: ✗ = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
WAD Cyanide	E336	1383432	1	1	100.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1382518	1	7	14.2	5.0	✓
Ammonia by Fluorescence	E298	1382593	1	3	33.3	5.0	✓
Chloride in Water by IC	E235.Cl	1382636	1	1	100.0	5.0	✓
Conductivity in Water	E100	1382517	1	7	14.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1382844	1	1	100.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1382762	1	7	14.2	5.0	✓
Fluoride in Water by IC	E235.F	1382633	1	19	5.2	5.0	✓
Free Cyanide	E339	1383433	1	1	100.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1382635	1	1	100.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1382637	1	1	100.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1382628	1	19	5.2	5.0	✓
TDS by Gravimetry	E162	1382548	1	7	14.2	5.0	✓
Thiocyanate by Colourimetry	E344	1384283	1	5	20.0	5.0	✓
Total Cyanide	E333	1383434	1	1	100.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1382843	1	1	100.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1382763	1	7	14.2	5.0	✓
WAD Cyanide	E336	1383432	1	1	100.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1382593	1	3	33.3	5.0	✓
Chloride in Water by IC	E235.Cl	1382636	0	1	0.0	5.0	✗
Dissolved Metals in Water by CRC ICPMS	E421	1382844	0	1	0.0	5.0	✗
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1382762	1	7	14.2	5.0	✓
Fluoride in Water by IC	E235.F	1382633	1	19	5.2	5.0	✓
Free Cyanide	E339	1383433	1	1	100.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1382635	0	1	0.0	5.0	✗
Nitrite in Water by IC	E235.NO2	1382637	0	1	0.0	5.0	✗
Sulfate in Water by IC	E235.SO4	1382628	1	19	5.2	5.0	✓
Thiocyanate by Colourimetry	E344	1384283	1	5	20.0	5.0	✓
Total Cyanide	E333	1383434	1	1	100.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1382843	0	1	0.0	5.0	✗
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1382763	1	7	14.2	5.0	✓
WAD Cyanide	E336	1383432	1	1	100.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Calgary	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TDS by Gravimetry	E162 ALS Environmental - Calgary	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Calgary	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Cyanide	E333 ALS Environmental - Waterloo	Water	ISO 14403 (mod)	Total or Strong Acid Dissociable (SAD) Cyanide is determined by Continuous Flow Analyzer (CFA) with in-line UV digestion followed by colourmetric analysis. Method Limitation: High levels of thiocyanate (SCN) may cause positive interference (up to 0.5% of SCN concentration).
WAD Cyanide	E336 ALS Environmental - Waterloo	Water	APHA 4500-CN I (mod)	Weak Acid Dissociable (WAD) cyanide is determined by Continuous Flow Analyzer (CFA) with in-line distillation followed by colourmetric analysis.
Free Cyanide	E339 ALS Environmental - Waterloo	Water	ASTM D7237 (mod)	Free Cyanide is determined by Continuous Flow Analyzer (CFA) with in-line gas diffusion followed by colourmetric analysis.
Thiocyanate by Colourimetry	E344 ALS Environmental - Vancouver	Water	APHA 4500-CN M (mod)	Thiocyanate is determined by the ferric nitrate colourimetric method. Water samples containing high levels of hexavalent chromium, cyanide (together with sulfide), reducing agents, or hydrocarbons may cause negative or positive interferences with this method.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L ALS Environmental - Calgary	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Calgary	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Calgary	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Calgary	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Calgary	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 ALS Environmental - Calgary	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
TDS in Water (Calculation)	EC103 ALS Environmental - Calgary	Water	APHA 1030E (mod)	Total Dissolved Solids is calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Total Organic Carbon by Combustion	EP355 ALS Environmental - Calgary	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Calgary	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Dissolved Metals Water Filtration	EP421 ALS Environmental - Calgary	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

QUALITY CONTROL REPORT

Work Order	: **CG2403741**	Page	: 1 of 15
Client	: Nautilus Environmental Company Inc.	Laboratory	: ALS Environmental - Calgary
Contact	: Leila Oosterbroek	Account Manager	: Patryk Wojciak
Address	: 10823 27th Street SE Calgary AB Canada T2Z 3V9	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	:	Telephone	: +1 403 407 1800
Project	: ----	Date Samples Received	: 27-Mar-2024 14:05
PO	: 2324-273AB	Date Analysis Commenced	: 27-Mar-2024
C-O-C number	: ----	Issue Date	: 28-Mar-2024 16:48
Sampler	: ---- 403 253 7121		
Site	: ----		
Quote number	: CG24-NECI100-00001 Nautilus Calgary General		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
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Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
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Kim Jensen	Department Manager - Metals	Vancouver Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 1382516)											
CG2403733-002	Anonymous	pH	----	E108	0.10	pH units	8.30	8.31	0.120%	4%	----
Physical Tests (QC Lot: 1382517)											
CG2403733-002	Anonymous	Conductivity	----	E100	2.0	µS/cm	647	648	0.154%	10%	----
Physical Tests (QC Lot: 1382518)											
CG2403733-002	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	189	177	6.77%	20%	----
Physical Tests (QC Lot: 1382548)											
CG2403733-002	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	448	466	3.83%	20%	----
Anions and Nutrients (QC Lot: 1382593)											
CG2403733-006	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0135	0.0125	0.0010	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1382628)											
CG2403412-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	175	176	0.227%	20%	----
Anions and Nutrients (QC Lot: 1382633)											
CG2403412-001	Anonymous	Fluoride	16984-48-8	E235.F	0.100	mg/L	0.190	0.191	0.0009	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1382635)											
CG2403741-001	Baseline PJ2324-004; 2324-1704	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1382636)											
CG2403741-001	Baseline PJ2324-004; 2324-1704	Chloride	16887-00-6	E235.Cl	0.50	mg/L	0.94	0.94	0.00010	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1382637)											
CG2403741-001	Baseline PJ2324-004; 2324-1704	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	0.012	0.012	0.0001	Diff <2x LOR	----
Cyanides (QC Lot: 1383432)											
CG2403741-001	Baseline PJ2324-004; 2324-1704	Cyanide, weak acid dissociable	----	E336	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Cyanides (QC Lot: 1383433)											
CG2403741-001	Baseline PJ2324-004; 2324-1704	Cyanide, free	----	E339	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Cyanides (QC Lot: 1383434)											
CG2403741-001	Baseline PJ2324-004; 2324-1704	Cyanide, strong acid dissociable (Total)	----	E333	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Cyanides (QC Lot: 1384283)											
CG2403741-001	Baseline PJ2324-004; 2324-1704	Thiocyanate	302-04-5	E344	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Organic / Inorganic Carbon (QC Lot: 1382762)											
CG2403733-002	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	0.63	0.65	0.02	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 1382763)											
CG2403733-002	Anonymous	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.73	0.65	0.08	Diff <2x LOR	----
Total Metals (QC Lot: 1382843)											
CG2403741-001	Baseline PJ2324-004; 2324-1704	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0064	0.0063	0.0001	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	0.00022	0.00021	0.00001	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.0159	0.0159	0.0434%	20%	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.0156	0.0160	1.93%	20%	----
		Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	0.0000050	0.00000003	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	32.4	32.6	0.465%	20%	----
		Cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00292	0.00296	1.42%	20%	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.00368	0.00376	0.00008	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	0.057	0.058	0.002	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	1.20	1.21	0.989%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.0111	0.0112	1.14%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000502	0.000517	2.96%	20%	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.00447	0.00454	0.00006	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	0.667	0.666	0.129%	20%	----
		Rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00093	0.00096	0.00003	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000389	0.000389	0.0000002	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	0.17	0.18	0.01	Diff <2x LOR	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	1.30	1.31	0.942%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.0817	0.0836	2.20%	20%	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	25.8	25.7	0.366%	20%	----
		Tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 1382843) - continued											
CG2403741-001	Baseline PJ2324-004; 2324-1704	Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00010	mg/L	0.00018	0.00018	0.0000005	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.000270	0.000281	3.85%	20%	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1382844)											
CG2403741-001	Baseline PJ2324-004; 2324-1704	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0020	0.0020	0.00004	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00020	0.00019	0.000005	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.0156	0.0155	0.534%	20%	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0160	0.0162	1.18%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	33.4	32.3	3.45%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00278	0.00280	0.769%	20%	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00304	0.00305	0.355%	20%	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.016	0.016	0.0002	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	1.22	1.20	1.39%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0107	0.0110	2.57%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000508	0.000525	3.20%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00434	0.00435	0.00002	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.683	0.681	0.266%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00091	0.00093	0.00002	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 1382844) - continued											
CG2403741-001	Baseline PJ2324-004; 2324-1704	Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000411	0.000404	0.000007	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	0.126	0.123	0.004	Diff <2x LOR	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	1.34	1.34	0.562%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0831	0.0831	0.0232%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	25.7	25.4	1.25%	20%	----
		Tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	0.00017	0.00017	0.000002	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000251	0.000256	1.91%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0023	0.0022	0.00006	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1382517)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 1382518)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1382548)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 1382593)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1382628)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1382633)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1382635)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1382636)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1382637)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Cyanides (QCLot: 1383432)						
Cyanide, weak acid dissociable	----	E336	0.002	mg/L	<0.0020	----
Cyanides (QCLot: 1383433)						
Cyanide, free	----	E339	0.002	mg/L	<0.0020	----
Cyanides (QCLot: 1383434)						
Cyanide, strong acid dissociable (Total)	----	E333	0.002	mg/L	<0.0020	----
Cyanides (QCLot: 1384283)						
Thiocyanate	302-04-5	E344	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 1382762)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 1382763)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 1382843)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1382843) - continued						
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1382843) - continued						
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 1382844)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1382844) - continued						
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1382516)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1382517)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	105	90.0	110	----
Physical Tests (QCLot: 1382518)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	102	85.0	115	----
Physical Tests (QCLot: 1382548)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	109	85.0	115	----
Anions and Nutrients (QCLot: 1382593)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	97.1	85.0	115	----
Anions and Nutrients (QCLot: 1382628)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	99.5	90.0	110	----
Anions and Nutrients (QCLot: 1382633)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1382635)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1382636)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.0	90.0	110	----
Anions and Nutrients (QCLot: 1382637)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	101	90.0	110	----
Cyanides (QCLot: 1383432)									
Cyanide, weak acid dissociable	----	E336	0.002	mg/L	0.125 mg/L	94.8	80.0	120	----
Cyanides (QCLot: 1383433)									
Cyanide, free	----	E339	0.002	mg/L	0.125 mg/L	95.5	80.0	120	----
Cyanides (QCLot: 1383434)									
Cyanide, strong acid dissociable (Total)	----	E333	0.002	mg/L	0.25 mg/L	86.7	80.0	120	----
Cyanides (QCLot: 1384283)									
Thiocyanate	302-04-5	E344	0.5	mg/L	10 mg/L	100	85.0	115	----
Organic / Inorganic Carbon (QCLot: 1382762)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	99.2	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Organic / Inorganic Carbon (QCLot: 1382763)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	104	80.0	120	----
Total Metals (QCLot: 1382843)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	98.6	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	99.3	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	101	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	98.1	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	91.9	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	95.2	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	94.6	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	94.7	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	94.5	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	94.8	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	97.4	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	95.4	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	93.3	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	100	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	95.5	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	94.1	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	102	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	97.5	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	97.2	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	95.4	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	98.4	70.0	130	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	98.5	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	97.0	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	94.3	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	106	60.0	140	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	90.8	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	98.4	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	97.6	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	98.6	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	94.4	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	95.0	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	98.1	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	98.2	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1382843) - continued									
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	97.8	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	95.0	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	92.5	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	98.7	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	93.4	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	98.4	80.0	120	----
Dissolved Metals (QCLot: 1382844)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	102	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	99.2	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	103	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	97.1	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	98.1	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	96.7	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	96.8	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	98.2	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	96.0	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	97.3	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	95.2	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	102	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	98.8	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	98.9	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	102	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	99.4	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	97.4	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	97.6	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	101	70.0	130	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	100	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	98.8	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	96.4	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	109	60.0	140	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	91.7	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	100	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	99.2	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1382844) - continued									
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	101	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	95.4	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	97.1	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	100	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	99.2	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	98.5	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	97.4	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	95.9	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	96.6	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	98.7	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1382593)										
CG2403735-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.115 mg/L	0.1 mg/L	115	75.0	125	----
Anions and Nutrients (QCLot: 1382628)										
CG2403723-004	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	102 mg/L	100 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1382633)										
CG2403723-004	Anonymous	Fluoride	16984-48-8	E235.F	1.05 mg/L	1 mg/L	105	75.0	125	----
Cyanides (QCLot: 1383432)										
CG2403741-001	Baseline PJ2324-004; 2324-1704	Cyanide, weak acid dissociable	----	E336	0.111 mg/L	0.125 mg/L	88.6	75.0	125	----
Cyanides (QCLot: 1383433)										
CG2403741-001	Baseline PJ2324-004; 2324-1704	Cyanide, free	----	E339	0.109 mg/L	0.125 mg/L	87.1	75.0	125	----
Cyanides (QCLot: 1383434)										
CG2403741-001	Baseline PJ2324-004; 2324-1704	Cyanide, strong acid dissociable (Total)	----	E333	0.199 mg/L	0.25 mg/L	79.8	75.0	125	----
Cyanides (QCLot: 1384283)										
VA24A6415-001	Anonymous	Thiocyanate	302-04-5	E344	10.2 mg/L	10 mg/L	102	75.0	125	----
Organic / Inorganic Carbon (QCLot: 1382762)										
CG2403733-002	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	4.76 mg/L	5 mg/L	95.3	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1382763)										
CG2403733-002	Anonymous	Carbon, total organic [TOC]	----	E355-L	5.13 mg/L	5 mg/L	102	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 22 -

Page 1 of 1

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Canada Toll Free: 1 800 668 9878

Report To	Contact and company name below will appear on the final report
Company:	Nautilus Environmental
Contact:	Leila Oosterbroek
Phone:	403-253-7121
	Company address below will appear on the final report
Street:	10823 27 St SE
City/Province:	Calgary, AB
Postal Code:	T2Z 3V9
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Nautilus Environmental
Contact:	Leila Oosterbroek

Reports / Recipients	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Merge QC/QCI Reports with COA	☑ YES ☐ NO ☐ N/A
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	leila@nautilusenvironmental.ca; melanie@nautiluse
Email 2	lisa.ramilo@agnicoeagle.com
Email 3	breda.rahmanian@wsp.com
Invoice Recipients	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	accounting@nautilusenvironmental.ca
Email 2	leila@nautilusenvironmental.ca

Turnaround Time (TAT) Requested
☐ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☑ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	2324-273AB	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (ALS use only):		ALS Contact:	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Routine	Measured TDS	Total Metals	Dissolved Metals	Total ammonia as N	TOC	DOC	Total Cyanide (strong acid digestion)	Total Cyanide (weak acid digestion)	Free Cyanide	Thiocyanate	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
									F		P	F/P	P	P	P	P			
	Baseline PJ2324-004; 2324-1704	27-Mar-24	10:00	water	7	E	E	E	E	E	E	E	E	E	E	E			

Environmental Division Calgary
Work Order Reference
CG2403741

Telephone : +1 403 407 1800

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
11							

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
	2024/03/27	1050		3/27	14:05			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

FEB 2022 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

CERTIFICATE OF ANALYSIS

Work Order	: **CG2405756**	Page	: 1 of 4
Client	: **Nautilus Environmental Company Inc.**	Laboratory	: ALS Environmental - Calgary
Contact	: Leila Oosterbroek	Account Manager	: Patryk Wojciak
Address	: 10823 27th Street SE Calgary AB Canada T2Z 3V9	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 253 7121	Telephone	: +1 403 407 1800
Project	: ----	Date Samples Received	: 06-May-2024 11:10
PO	: 2324-325AB	Date Analysis Commenced	: 06-May-2024
C-O-C number	: ----	Issue Date	: 09-May-2024 16:10
Sampler	: ----		
Site	: ----		
Quote number	: CG24-NECI100-00001 Nautilus Calgary General		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Gurvinder Kour	Lab Assistant	Metals, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Metals, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
µS/cm	microsiemens per centimetre
meq/L	milliequivalents per litre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
DLDS	*Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.*

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Site Reference (122mg/L TDS) PJ2324-004 Intiation AG	889 mg/L TDS PJ2324-004 Initiation AG	1,414 mg/L TDS PJ2324-004 Initiation AG	2,296 mg/L TDS PJ2324-004 Initiation AG	----
					Client sampling date / time	06-May-2024 10:00	06-May-2024 10:00	06-May-2024 10:00	06-May-2024 10:00	----
						CG2405756-001	CG2405756-002	CG2405756-003	CG2405756-004	--------
						Result	Result	Result	Result	----
Physical Tests										
Hardness (as CaCO3), dissolved	----	EC100/CG	0.50	mg/L		93.5	353	533	842	----
Solids, total dissolved [TDS]	----	E162/CG	10	mg/L		145	916	1410	2240	----
Conductivity	----	E100/CG	2.0	µS/cm		274	1320	2000	3120	----
pH	----	E108/CG	0.10	pH units		7.68	7.54	7.52	7.50	----
Alkalinity, bicarbonate (as HCO3)	71-52-3	E290/CG	1.0	mg/L		39.3	32.3	35.1	35.6	----
Alkalinity, carbonate (as CO3)	3812-32-6	E290/CG	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	----
Alkalinity, hydroxide (as OH)	14280-30-9	E290/CG	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	----
Alkalinity, total (as CaCO3)	----	E290/CG	2.0	mg/L		32.2	26.5	28.8	29.2	----
Solids, total dissolved [TDS], calculated	----	EC103/CG	1.0	mg/L		154	877	1370	2220	----
Anions and Nutrients										
Chloride	16887-00-6	E235.Cl/CG	0.50	mg/L		0.98	118	199	337	----
Fluoride	16984-48-8	E235.F/CG	0.020	mg/L		0.086	<0.100 DLDS	<0.100 DLDS	<0.100 DLDS	----
Nitrate (as N)	14797-55-8	E235.NO3/CG	0.020	mg/L		2.72	17.0	26.6	43.1	----
Nitrite (as N)	14797-65-0	E235.NO2/CG	0.010	mg/L		0.131	0.135	0.129	0.129	----
Sulfate (as SO4)	14808-79-8	E235.SO4/CG	0.30	mg/L		75.1	380	583	932	----
Nitrate + Nitrite (as N)	----	EC235.N+N/CG	0.0500	mg/L		2.85	17.1	26.7	43.2	----
Ion Balance										
Anion sum	----	EC101/CG	0.10	meq/L		2.44	13.0	20.2	32.6	----
Cation sum	----	EC101/CG	0.10	meq/L		2.27	13.2	20.6	33.7	----
Ion balance (APHA)	----	EC101/CG	0.01	%		-3.61	0.76	0.98	1.66	----
Ion balance (cations/anions)	----	EC101/CG	0.010	%		93.0	102	102	103	----
Dissolved Metals										
Calcium, dissolved	7440-70-2	E421/CG	0.050	mg/L		33.8	122	183	288	----
Iron, dissolved	7439-89-6	E421/CG	0.010	mg/L		0.021	0.018	<0.050 DLDS	<0.050 DLDS	----
Magnesium, dissolved	7439-95-4	E421/CG	0.0050	mg/L		2.22	11.8	18.4	29.9	----
Manganese, dissolved	7439-96-5	E421/CG	0.00010	mg/L		0.0115	0.0114	0.0125	0.0119	----
Potassium, dissolved	7440-09-7	E421/CG	0.050	mg/L		0.992	29.2	48.4	83.6	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Site Reference (122mg/L TDS) PJ2324-004 Intiation AG	889 mg/L TDS PJ2324-004 Initiation AG	1,414 mg/L TDS PJ2324-004 Initiation AG	2,296 mg/L TDS PJ2324-004 Initiation AG	----
					Client sampling date / time	06-May-2024 10:00	06-May-2024 10:00	06-May-2024 10:00	06-May-2024 10:00	----
						CG2405756-001	CG2405756-002	CG2405756-003	CG2405756-004	--------
						Result	Result	Result	Result	----
Dissolved Metals										
Sodium, dissolved	7440-23-5	E421/CG	0.050	mg/L		8.60	124	200	338	----
Dissolved metals filtration location	----	EP421/CG	-	-		Field	Field	Field	Field	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **CG2405756**	Page	: 1 of 11
Client	: **Nautilus Environmental Company Inc.**	Laboratory	: ALS Environmental - Calgary
Contact	: Leila Oosterbroek	Account Manager	: Patryk Wojciak
Address	: 10823 27th Street SE Calgary AB Canada T2Z 3V9	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 253 7121	Telephone	: +1 403 407 1800
Project	: ----	Date Samples Received	: 06-May-2024 11:10
PO	: 2324-325AB	Issue Date	: 09-May-2024 16:12
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: CG24-NECI100-00001 Nautilus Calgary General		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE 1,414 mg/L TDS PJ2324-004 Initiation AG	E235.Cl	06-May-2024	06-May-2024	28 days	0 days	✓	06-May-2024	28 days	0 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE 2,296 mg/L TDS PJ2324-004 Initiation AG	E235.Cl	06-May-2024	06-May-2024	28 days	0 days	✓	06-May-2024	28 days	0 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE 889 mg/L TDS PJ2324-004 Initiation AG	E235.Cl	06-May-2024	06-May-2024	28 days	0 days	✓	06-May-2024	28 days	0 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Site Reference (122mg/L TDS) PJ2324-004 Intiation AG	E235.Cl	06-May-2024	06-May-2024	28 days	0 days	✓	06-May-2024	28 days	0 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE 1,414 mg/L TDS PJ2324-004 Initiation AG	E235.F	06-May-2024	06-May-2024	28 days	0 days	✓	06-May-2024	28 days	0 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE 2,296 mg/L TDS PJ2324-004 Initiation AG	E235.F	06-May-2024	06-May-2024	28 days	0 days	✓	06-May-2024	28 days	0 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE 889 mg/L TDS PJ2324-004 Initiation AG	E235.F	06-May-2024	06-May-2024	28 days	0 days	✓	06-May-2024	28 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Site Reference (122mg/L TDS) PJ2324-004 Intiation AG	E235.F	06-May-2024	06-May-2024	28 days	0 days	✓	06-May-2024	28 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
1,414 mg/L TDS PJ2324-004 Initiation AG	E235.NO3	06-May-2024	06-May-2024	3 days	0 days	✓	06-May-2024	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
2,296 mg/L TDS PJ2324-004 Initiation AG	E235.NO3	06-May-2024	06-May-2024	3 days	0 days	✓	06-May-2024	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
889 mg/L TDS PJ2324-004 Initiation AG	E235.NO3	06-May-2024	06-May-2024	3 days	0 days	✓	06-May-2024	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Site Reference (122mg/L TDS) PJ2324-004 Intiation AG	E235.NO3	06-May-2024	06-May-2024	3 days	0 days	✓	06-May-2024	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
1,414 mg/L TDS PJ2324-004 Initiation AG	E235.NO2	06-May-2024	06-May-2024	3 days	0 days	✓	06-May-2024	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
2,296 mg/L TDS PJ2324-004 Initiation AG	E235.NO2	06-May-2024	06-May-2024	3 days	0 days	✓	06-May-2024	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
889 mg/L TDS PJ2324-004 Initiation AG	E235.NO2	06-May-2024	06-May-2024	3 days	0 days	✓	06-May-2024	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Site Reference (122mg/L TDS) PJ2324-004 Intiation AG	E235.NO2	06-May-2024	06-May-2024	3 days	0 days	✓	06-May-2024	3 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
1,414 mg/L TDS PJ2324-004 Initiation AG	E235.SO4	06-May-2024	06-May-2024	28 days	0 days	✓	06-May-2024	28 days	0 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
2,296 mg/L TDS PJ2324-004 Initiation AG	E235.SO4	06-May-2024	06-May-2024	28 days	0 days	✓	06-May-2024	28 days	0 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
889 mg/L TDS PJ2324-004 Initiation AG	E235.SO4	06-May-2024	06-May-2024	28 days	0 days	✓	06-May-2024	28 days	0 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Site Reference (122mg/L TDS) PJ2324-004 Intiation AG	E235.SO4	06-May-2024	06-May-2024	28 days	0 days	✓	06-May-2024	28 days	0 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
1,414 mg/L TDS PJ2324-004 Initiation AG	E421	06-May-2024	06-May-2024	180 days	0 days	✓	07-May-2024	180 days	1 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
2,296 mg/L TDS PJ2324-004 Initiation AG	E421	06-May-2024	06-May-2024	180 days	0 days	✓	07-May-2024	180 days	1 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
889 mg/L TDS PJ2324-004 Initiation AG	E421	06-May-2024	06-May-2024	180 days	0 days	✓	07-May-2024	180 days	1 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
Site Reference (122mg/L TDS) PJ2324-004 Intiation AG	E421	06-May-2024	06-May-2024	180 days	0 days	✓	07-May-2024	180 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
1,414 mg/L TDS PJ2324-004 Initiation AG	E290	06-May-2024	07-May-2024	14 days	1 days	✓	07-May-2024	14 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE 2,296 mg/L TDS PJ2324-004 Initiation AG	E290	06-May-2024	07-May-2024	14 days	1 days	✓	07-May-2024	14 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 889 mg/L TDS PJ2324-004 Initiation AG	E290	06-May-2024	07-May-2024	14 days	1 days	✓	07-May-2024	14 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Site Reference (122mg/L TDS) PJ2324-004 Intiation AG	E290	06-May-2024	07-May-2024	14 days	1 days	✓	07-May-2024	14 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE 1,414 mg/L TDS PJ2324-004 Initiation AG	E100	06-May-2024	07-May-2024	28 days	1 days	✓	07-May-2024	28 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE 2,296 mg/L TDS PJ2324-004 Initiation AG	E100	06-May-2024	07-May-2024	28 days	1 days	✓	07-May-2024	28 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE 889 mg/L TDS PJ2324-004 Initiation AG	E100	06-May-2024	07-May-2024	28 days	1 days	✓	07-May-2024	28 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE Site Reference (122mg/L TDS) PJ2324-004 Intiation AG	E100	06-May-2024	07-May-2024	28 days	1 days	✓	07-May-2024	28 days	1 days	✓
Physical Tests : pH by Meter										
HDPE 1,414 mg/L TDS PJ2324-004 Initiation AG	E108	06-May-2024	07-May-2024	0.25 hrs	24 hrs	× EHTR-FM	07-May-2024	0.25 hrs	24 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE 2,296 mg/L TDS PJ2324-004 Initiation AG	E108	06-May-2024	07-May-2024	0.25 hrs	24 hrs	× EHTR-FM	07-May-2024	0.25 hrs	24 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE 889 mg/L TDS PJ2324-004 Initiation AG	E108	06-May-2024	07-May-2024	0.25 hrs	24 hrs	× EHTR-FM	07-May-2024	0.25 hrs	24 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Site Reference (122mg/L TDS) PJ2324-004 Intiation AG	E108	06-May-2024	07-May-2024	0.25 hrs	24 hrs	× EHTR-FM	07-May-2024	0.25 hrs	24 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE 1,414 mg/L TDS PJ2324-004 Initiation AG	E162	06-May-2024	----	----	----		08-May-2024	7 days	2 days	✓
Physical Tests : TDS by Gravimetry										
HDPE 2,296 mg/L TDS PJ2324-004 Initiation AG	E162	06-May-2024	----	----	----		08-May-2024	7 days	2 days	✓
Physical Tests : TDS by Gravimetry										
HDPE 889 mg/L TDS PJ2324-004 Initiation AG	E162	06-May-2024	----	----	----		08-May-2024	7 days	2 days	✓
Physical Tests : TDS by Gravimetry										
HDPE Site Reference (122mg/L TDS) PJ2324-004 Intiation AG	E162	06-May-2024	----	----	----		08-May-2024	7 days	2 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1431243	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1430359	1	8	12.5	5.0	✓
Conductivity in Water	E100	1431242	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1430187	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	1430356	1	20	5.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1430357	1	8	12.5	5.0	✓
Nitrite in Water by IC	E235.NO2	1430360	1	8	12.5	5.0	✓
pH by Meter	E108	1431241	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1430358	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	1432205	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1431243	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1430359	1	8	12.5	5.0	✓
Conductivity in Water	E100	1431242	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1430187	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	1430356	1	20	5.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1430357	1	8	12.5	5.0	✓
Nitrite in Water by IC	E235.NO2	1430360	1	8	12.5	5.0	✓
pH by Meter	E108	1431241	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1430358	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	1432205	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1431243	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1430359	1	8	12.5	5.0	✓
Conductivity in Water	E100	1431242	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1430187	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	1430356	1	20	5.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1430357	1	8	12.5	5.0	✓
Nitrite in Water by IC	E235.NO2	1430360	1	8	12.5	5.0	✓
Sulfate in Water by IC	E235.SO4	1430358	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	1432205	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Chloride in Water by IC	E235.Cl	1430359	1	8	12.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1430187	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	1430356	1	20	5.0	5.0	✓

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Matrix Spikes (MS) - Continued							
Nitrate in Water by IC	E235.NO3	1430357	1	8	12.5	5.0	✓
Nitrite in Water by IC	E235.NO2	1430360	1	8	12.5	5.0	✓
Sulfate in Water by IC	E235.SO4	1430358	1	20	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Calgary	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TDS by Gravimetry	E162 ALS Environmental - Calgary	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Calgary	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Calgary	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Calgary	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 ALS Environmental - Calgary	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
TDS in Water (Calculation)	EC103 ALS Environmental - Calgary	Water	APHA 1030E (mod)	Total Dissolved Solids is calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals Water Filtration	EP421 ALS Environmental - Calgary	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

QUALITY CONTROL REPORT

Work Order	: **CG2405756**	Page	: 1 of 6
Client	: Nautilus Environmental Company Inc.	Laboratory	: ALS Environmental - Calgary
Contact	: Leila Oosterbroek	Account Manager	: Patryk Wojciak
Address	: 10823 27th Street SE Calgary AB Canada T2Z 3V9	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 253 7121	Telephone	: +1 403 407 1800
Project	: ----	Date Samples Received	: 06-May-2024 11:10
PO	: 2324-325AB	Date Analysis Commenced	: 06-May-2024
C-O-C number	: ----	Issue Date	: 09-May-2024 16:11
Sampler	: ----		
Site	: ----		
Quote number	: CG24-NECI100-00001 Nautilus Calgary General		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Gurvinder Kour	Lab Assistant	Calgary Metals, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Metals, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 1431241)											
CG2405749-001	Anonymous	pH	----	E108	0.10	pH units	7.99	7.97	0.251%	4%	----
Physical Tests (QC Lot: 1431242)											
CG2405749-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	1870	1870	0.107%	10%	----
Physical Tests (QC Lot: 1431243)											
CG2405749-001	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	479	506	5.42%	20%	----
Physical Tests (QC Lot: 1432205)											
CG2405715-001	Anonymous	Solids, total dissolved [TDS]	----	E162	40	mg/L	1660	1550	6.59%	20%	----
Anions and Nutrients (QC Lot: 1430356)											
CG2405745-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.056	0.052	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1430357)											
CG2405745-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	0.102	0.102	0.0004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1430358)											
CG2405745-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	2.44	2.37	0.06	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1430359)											
CG2405745-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	3.17	3.15	0.02	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1430360)											
CG2405745-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1430187)											
CG2405595-001	Anonymous	Calcium, dissolved	7440-70-2	E421	0.100	mg/L	294	297	1.04%	20%	----
		Iron, dissolved	7439-89-6	E421	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0100	mg/L	204	201	1.46%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00020	mg/L	0.00061	0.00063	0.00001	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.100	mg/L	7.70	7.62	1.04%	20%	----
		Sodium, dissolved	7440-23-5	E421	0.100	mg/L	43.1	41.8	2.90%	20%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1431242)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 1431243)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1432205)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 1430356)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1430357)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1430358)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1430359)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1430360)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Dissolved Metals (QCLot: 1430187)						
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1431241)									
pH	----	E108	----	pH units	7 pH units	99.6	98.0	102	----
Physical Tests (QCLot: 1431242)									
Conductivity	----	E100	1	µS/cm	147 µS/cm	100	90.0	110	----
Physical Tests (QCLot: 1431243)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	106	85.0	115	----
Physical Tests (QCLot: 1432205)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	104	85.0	115	----
Anions and Nutrients (QCLot: 1430356)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 1430357)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1430358)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1430359)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1430360)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	101	90.0	110	----
Dissolved Metals (QCLot: 1430187)									
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	102	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	103	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	105	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	99.6	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	105	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	104	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1430356)										
CG2405752-006	Anonymous	Fluoride	16984-48-8	E235.F	1.05 mg/L	1 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 1430357)										
CG2405756-001	Site Reference (122mg/L TDS) PJ2324-004 Intiation AG	Nitrate (as N)	14797-55-8	E235.NO3	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1430358)										
CG2405752-006	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	101 mg/L	100 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1430359)										
CG2405756-001	Site Reference (122mg/L TDS) PJ2324-004 Intiation AG	Chloride	16887-00-6	E235.Cl	101 mg/L	100 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1430360)										
CG2405756-001	Site Reference (122mg/L TDS) PJ2324-004 Intiation AG	Nitrite (as N)	14797-65-0	E235.NO2	0.510 mg/L	0.5 mg/L	102	75.0	125	----
Dissolved Metals (QCLot: 1430187)										
CG2405595-002	Anonymous	Calcium, dissolved	7440-70-2	E421	ND mg/L	----	ND	70.0	130	----
		Iron, dissolved	7439-89-6	E421	19.1 mg/L	20 mg/L	95.5	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	----	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.195 mg/L	0.2 mg/L	97.7	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	39.9 mg/L	40 mg/L	99.8	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	----	ND	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 22 -

Page 1 of 1

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Canada Toll Free: 1 800 668 9878

Environmental Division Calgary

Work Order Reference CG2405756

Telephone : +1 403 407 1800

Report To	Contact and company name below will appear on the final report
Company:	Nautilus Environmental
Contact:	Leila Oosterbroek
Phone:	403-253-7121
	Company address below will appear on the final report
Street:	10823 27 St SE
City/Province:	Calgary, AB
Postal Code:	T2Z 3V9
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Nautilus Environmental
Contact:	Leila Oosterbroek

Reports / Recipients	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Merge QC/QCI Reports with COA	☑ YES ☐ NO ☐ N/A
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	leila@nautilusenvironmental.ca; melanie@nautiluse
Email 2	lisa.ramilo@agnicoeagle.com
Email 3	breda.rahmanian@wsp.com
Invoice Recipients	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	accounting@nautilusenvironmental.ca
Email 2	leila@nautilusenvironmental.ca

Turnaround Time (TAT) Requested
☐ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minim
☑ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minim
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minim
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minim
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge
Additional fees may apply to rush requests on weekends
Date and Time Required for all E&P TATs:
For all tests with rush TATs requested, please co

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#:
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	2324-325AB	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (ALS use only):		ALS Contact:	Sampler:

Analysis Request

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below: E162 - measured TDS	PR01 - Routine	PR01 - Routine (dissolved metals bc	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	Site Reference (122 mg/L TDS) PJ2324-004 - Initiation AG	06-May-24	1000	water	2	P3	P3	P3			
	889 mg/L TDS PJ2324-004 - Initiation AG	↓	↓	water	2	P3	P3	P3			
	1,414mg/L TDS PJ2324-004 - Initiation AG			water	2	P3	P3	P3			
	2,296 mg/L TDS PJ2324-004 - Initiation AG			water	2	P3	P3	P3			

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human consumption/ use? ☐ YES ☑ NO	13.6

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
	2024/05/06	1015	FG	06-05-24	11:10			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

FEB 2022 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

CERTIFICATE OF ANALYSIS

Work Order	: **CG2405623**	Page	: 1 of 4
Client	: **Nautilus Environmental Company Inc.**	Laboratory	: ALS Environmental - Calgary
Contact	: Leila Oosterbroek	Account Manager	: Patryk Wojciak
Address	: 10823 27th Street SE Calgary AB Canada T2Z 3V9	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 253 7121	Telephone	: +1 403 407 1800
Project	: ----	Date Samples Received	: 02-May-2024 14:45
PO	: 2324-323AB	Date Analysis Commenced	: 03-May-2024
C-O-C number	: ----	Issue Date	: 08-May-2024 12:04
Sampler	: ----		
Site	: ----		
Quote number	: CG24-NECI100-00001 Nautilus Calgary General		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Gurvinder Kour	Lab Assistant	Metals, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Metals, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
µS/cm	microsiemens per centimetre
meq/L	milliequivalents per litre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
DLDS	*Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.*

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

					Client sample ID	Site Reference (122mg/L TDS) PJ2324-004 - Initiation CD	889 mg/L TDS PJ2324-004 - Initiation CD	1,414mg/L TDS PJ2324-004 - Initiation CD	2,296 mg/L TDS PJ2324-004 - Initiation CD	----
					Client sampling date / time	02-May-2024 11:30	02-May-2024 11:30	02-May-2024 11:30	02-May-2024 11:30	----
Analyte	CAS Number	Method/Lab	LOR	Unit		CG2405623-001	CG2405623-002	CG2405623-003	CG2405623-004	--------
						Result	Result	Result	Result	----
Physical Tests										
Hardness (as CaCO3), dissolved	----	EC100/CG	0.50	mg/L		93.4	341	523	817	----
Solids, total dissolved [TDS]	----	E162/CG	10	mg/L		131	816	1290	2090	----
Conductivity	----	E100/CG	2.0	µS/cm		223	1280	1950	3010	----
pH	----	E108/CG	0.10	pH units		7.44	7.42	7.36	7.37	----
Alkalinity, bicarbonate (as HCO3)	71-52-3	E290/CG	1.0	mg/L		29.3	29.9	30.6	30.6	----
Alkalinity, carbonate (as CO3)	3812-32-6	E290/CG	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	----
Alkalinity, hydroxide (as OH)	14280-30-9	E290/CG	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	----
Alkalinity, total (as CaCO3)	----	E290/CG	2.0	mg/L		24.0	24.5	25.1	25.1	----
Solids, total dissolved [TDS], calculated	----	EC103/CG	1.0	mg/L		134	853	1370	2190	----
Anions and Nutrients										
Chloride	16887-00-6	E235.Cl/CG	0.50	mg/L		1.40	126	212	354	----
Fluoride	16984-48-8	E235.F/CG	0.020	mg/L		0.095	<0.100 DLDS	<0.100 DLDS	<0.100 DLDS	----
Nitrate (as N)	14797-55-8	E235.NO3/CG	0.020	mg/L		0.729	15.5	25.6	42.2	----
Nitrite (as N)	14797-65-0	E235.NO2/CG	0.010	mg/L		0.132	0.119	0.114	0.107	----
Sulfate (as SO4)	14808-79-8	E235.SO4/CG	0.30	mg/L		73.0	360	564	899	----
Nitrate + Nitrite (as N)	----	EC235.N+N/CG	0.0500	mg/L		0.861	15.6	25.7	42.3	----
Ion Balance										
Anion sum	----	EC101/CG	0.10	meq/L		2.10	12.6	20.0	32.2	----
Cation sum	----	EC101/CG	0.10	meq/L		2.06	12.9	20.9	33.4	----
Ion balance (APHA)	----	EC101/CG	0.01	%		-0.96	1.18	2.20	1.83	----
Ion balance (cations/anions)	----	EC101/CG	0.010	%		98.1	102	104	104	----
Dissolved Metals										
Calcium, dissolved	7440-70-2	E421/CG	0.050	mg/L		35.3	118	180	278	----
Iron, dissolved	7439-89-6	E421/CG	0.010	mg/L		0.062	0.062	0.061	0.069	----
Magnesium, dissolved	7439-95-4	E421/CG	0.0050	mg/L		1.29	11.2	17.9	29.8	----
Manganese, dissolved	7439-96-5	E421/CG	0.00010	mg/L		0.0164	0.0166	0.0171	0.0166	----
Potassium, dissolved	7440-09-7	E421/CG	0.050	mg/L		1.13	30.3	52.9	85.4	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Site Reference (122mg/L TDS) PJ2324-004 - Initiation CD	889 mg/L TDS PJ2324-004 - Initiation CD	1,414mg/L TDS PJ2324-004 - Initiation CD	2,296 mg/L TDS PJ2324-004 - Initiation CD	----
					Client sampling date / time	02-May-2024 11:30	02-May-2024 11:30	02-May-2024 11:30	02-May-2024 11:30	----
						CG2405623-001	CG2405623-002	CG2405623-003	CG2405623-004	--------
						Result	Result	Result	Result	----
Dissolved Metals										
Sodium, dissolved	7440-23-5	E421/CG	0.050	mg/L		3.60	123	210	343	----
Dissolved metals filtration location	----	EP421/CG	-	-		Field	Field	Field	Field	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **CG2405623**	Page	: 1 of 11
Client	: **Nautilus Environmental Company Inc.**	Laboratory	: ALS Environmental - Calgary
Contact	: Leila Oosterbroek	Account Manager	: Patryk Wojciak
Address	: 10823 27th Street SE Calgary AB Canada T2Z 3V9	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 253 7121	Telephone	: +1 403 407 1800
Project	: ----	Date Samples Received	: 02-May-2024 14:45
PO	: 2324-323AB	Issue Date	: 08-May-2024 12:06
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: CG24-NECI100-00001 Nautilus Calgary General		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE 1,414mg/L TDS PJ2324-004 - Initiation CD	E235.Cl	02-May-2024	03-May-2024	28 days	1 days	✓	03-May-2024	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE 2,296 mg/L TDS PJ2324-004 - Initiation CD	E235.Cl	02-May-2024	03-May-2024	28 days	1 days	✓	03-May-2024	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE 889 mg/L TDS PJ2324-004 - Initiation CD	E235.Cl	02-May-2024	03-May-2024	28 days	1 days	✓	03-May-2024	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Site Reference (122mg/L TDS) PJ2324-004 - Initiation CD	E235.Cl	02-May-2024	03-May-2024	28 days	1 days	✓	03-May-2024	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE 1,414mg/L TDS PJ2324-004 - Initiation CD	E235.F	02-May-2024	03-May-2024	28 days	1 days	✓	03-May-2024	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE 2,296 mg/L TDS PJ2324-004 - Initiation CD	E235.F	02-May-2024	03-May-2024	28 days	1 days	✓	03-May-2024	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE 889 mg/L TDS PJ2324-004 - Initiation CD	E235.F	02-May-2024	03-May-2024	28 days	1 days	✓	03-May-2024	28 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Site Reference (122mg/L TDS) PJ2324-004 - Initiation CD	E235.F	02-May-2024	03-May-2024	28 days	1 days	✓	03-May-2024	28 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
1,414mg/L TDS PJ2324-004 - Initiation CD	E235.NO3	02-May-2024	03-May-2024	3 days	1 days	✓	03-May-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
2,296 mg/L TDS PJ2324-004 - Initiation CD	E235.NO3	02-May-2024	03-May-2024	3 days	1 days	✓	03-May-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
889 mg/L TDS PJ2324-004 - Initiation CD	E235.NO3	02-May-2024	03-May-2024	3 days	1 days	✓	03-May-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Site Reference (122mg/L TDS) PJ2324-004 - Initiation CD	E235.NO3	02-May-2024	03-May-2024	3 days	1 days	✓	03-May-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
1,414mg/L TDS PJ2324-004 - Initiation CD	E235.NO2	02-May-2024	03-May-2024	3 days	1 days	✓	03-May-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
2,296 mg/L TDS PJ2324-004 - Initiation CD	E235.NO2	02-May-2024	03-May-2024	3 days	1 days	✓	03-May-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
889 mg/L TDS PJ2324-004 - Initiation CD	E235.NO2	02-May-2024	03-May-2024	3 days	1 days	✓	03-May-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Site Reference (122mg/L TDS) PJ2324-004 - Initiation CD	E235.NO2	02-May-2024	03-May-2024	3 days	1 days	✓	03-May-2024	3 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
1,414mg/L TDS PJ2324-004 - Initiation CD	E235.SO4	02-May-2024	03-May-2024	28 days	1 days	✓	03-May-2024	28 days	1 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
2,296 mg/L TDS PJ2324-004 - Initiation CD	E235.SO4	02-May-2024	03-May-2024	28 days	1 days	✓	03-May-2024	28 days	1 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
889 mg/L TDS PJ2324-004 - Initiation CD	E235.SO4	02-May-2024	03-May-2024	28 days	1 days	✓	03-May-2024	28 days	1 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Site Reference (122mg/L TDS) PJ2324-004 - Initiation CD	E235.SO4	02-May-2024	03-May-2024	28 days	1 days	✓	03-May-2024	28 days	1 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
1,414mg/L TDS PJ2324-004 - Initiation CD	E421	02-May-2024	06-May-2024	180 days	4 days	✓	07-May-2024	180 days	5 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
2,296 mg/L TDS PJ2324-004 - Initiation CD	E421	02-May-2024	06-May-2024	180 days	4 days	✓	07-May-2024	180 days	5 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
889 mg/L TDS PJ2324-004 - Initiation CD	E421	02-May-2024	06-May-2024	180 days	4 days	✓	07-May-2024	180 days	5 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
Site Reference (122mg/L TDS) PJ2324-004 - Initiation CD	E421	02-May-2024	06-May-2024	180 days	4 days	✓	07-May-2024	180 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
1,414mg/L TDS PJ2324-004 - Initiation CD	E290	02-May-2024	03-May-2024	14 days	1 days	✓	03-May-2024	14 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE 2,296 mg/L TDS PJ2324-004 - Initiation CD	E290	02-May-2024	03-May-2024	14 days	1 days	✓	03-May-2024	14 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 889 mg/L TDS PJ2324-004 - Initiation CD	E290	02-May-2024	03-May-2024	14 days	1 days	✓	03-May-2024	14 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Site Reference (122mg/L TDS) PJ2324-004 - Initiation CD	E290	02-May-2024	03-May-2024	14 days	1 days	✓	03-May-2024	14 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE 1,414mg/L TDS PJ2324-004 - Initiation CD	E100	02-May-2024	03-May-2024	28 days	1 days	✓	03-May-2024	28 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE 2,296 mg/L TDS PJ2324-004 - Initiation CD	E100	02-May-2024	03-May-2024	28 days	1 days	✓	03-May-2024	28 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE 889 mg/L TDS PJ2324-004 - Initiation CD	E100	02-May-2024	03-May-2024	28 days	1 days	✓	03-May-2024	28 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE Site Reference (122mg/L TDS) PJ2324-004 - Initiation CD	E100	02-May-2024	03-May-2024	28 days	1 days	✓	03-May-2024	28 days	1 days	✓
Physical Tests : pH by Meter										
HDPE 1,414mg/L TDS PJ2324-004 - Initiation CD	E108	02-May-2024	03-May-2024	0.25 hrs	27 hrs	× EHTR-FM	03-May-2024	0.25 hrs	27 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE 2,296 mg/L TDS PJ2324-004 - Initiation CD	E108	02-May-2024	03-May-2024	0.25 hrs	27 hrs	× EHTR-FM	03-May-2024	0.25 hrs	27 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Physical Tests : pH by Meter										
HDPE 889 mg/L TDS PJ2324-004 - Initiation CD	E108	02-May-2024	03-May-2024	0.25 hrs	27 hrs	× EHTR-FM	03-May-2024	0.25 hrs	27 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Site Reference (122mg/L TDS) PJ2324-004 - Initiation CD	E108	02-May-2024	03-May-2024	0.25 hrs	27 hrs	× EHTR-FM	03-May-2024	0.25 hrs	27 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE 1,414mg/L TDS PJ2324-004 - Initiation CD	E162	02-May-2024	----	----	----		07-May-2024	7 days	5 days	✓
Physical Tests : TDS by Gravimetry										
HDPE 2,296 mg/L TDS PJ2324-004 - Initiation CD	E162	02-May-2024	----	----	----		07-May-2024	7 days	5 days	✓
Physical Tests : TDS by Gravimetry										
HDPE 889 mg/L TDS PJ2324-004 - Initiation CD	E162	02-May-2024	----	----	----		07-May-2024	7 days	5 days	✓
Physical Tests : TDS by Gravimetry										
HDPE Site Reference (122mg/L TDS) PJ2324-004 - Initiation CD	E162	02-May-2024	----	----	----		07-May-2024	7 days	5 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1427866	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1427998	1	15	6.6	5.0	✓
Conductivity in Water	E100	1427868	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1430187	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	1427995	1	8	12.5	5.0	✓
Nitrate in Water by IC	E235.NO3	1427996	1	15	6.6	5.0	✓
Nitrite in Water by IC	E235.NO2	1427999	1	14	7.1	5.0	✓
pH by Meter	E108	1427867	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1427997	1	8	12.5	5.0	✓
TDS by Gravimetry	E162	1429472	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1427866	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1427998	1	15	6.6	5.0	✓
Conductivity in Water	E100	1427868	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1430187	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	1427995	1	8	12.5	5.0	✓
Nitrate in Water by IC	E235.NO3	1427996	1	15	6.6	5.0	✓
Nitrite in Water by IC	E235.NO2	1427999	1	14	7.1	5.0	✓
pH by Meter	E108	1427867	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1427997	1	8	12.5	5.0	✓
TDS by Gravimetry	E162	1429472	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1427866	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1427998	1	15	6.6	5.0	✓
Conductivity in Water	E100	1427868	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1430187	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	1427995	1	8	12.5	5.0	✓
Nitrate in Water by IC	E235.NO3	1427996	1	15	6.6	5.0	✓
Nitrite in Water by IC	E235.NO2	1427999	1	14	7.1	5.0	✓
Sulfate in Water by IC	E235.SO4	1427997	1	8	12.5	5.0	✓
TDS by Gravimetry	E162	1429472	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Chloride in Water by IC	E235.Cl	1427998	1	15	6.6	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1430187	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	1427995	1	8	12.5	5.0	✓

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Matrix Spikes (MS) - Continued							
Nitrate in Water by IC	E235.NO3	1427996	1	15	6.6	5.0	✓
Nitrite in Water by IC	E235.NO2	1427999	1	14	7.1	5.0	✓
Sulfate in Water by IC	E235.SO4	1427997	1	8	12.5	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Calgary	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TDS by Gravimetry	E162 ALS Environmental - Calgary	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Calgary	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Calgary	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Calgary	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 ALS Environmental - Calgary	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
TDS in Water (Calculation)	EC103 ALS Environmental - Calgary	Water	APHA 1030E (mod)	Total Dissolved Solids is calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals Water Filtration	EP421 ALS Environmental - Calgary	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

QUALITY CONTROL REPORT

Work Order	: **CG2405623**	Page	: 1 of 6
Client	: Nautilus Environmental Company Inc.	Laboratory	: ALS Environmental - Calgary
Contact	: Leila Oosterbroek	Account Manager	: Patryk Wojciak
Address	: 10823 27th Street SE Calgary AB Canada T2Z 3V9	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 253 7121	Telephone	: +1 403 407 1800
Project	: ----	Date Samples Received	: 02-May-2024 14:45
PO	: 2324-323AB	Date Analysis Commenced	: 03-May-2024
C-O-C number	: ----	Issue Date	: 08-May-2024 12:05
Sampler	: ----		
Site	: ----		
Quote number	: CG24-NECI100-00001 Nautilus Calgary General		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Gurvinder Kour	Lab Assistant	Calgary Metals, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Metals, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 1427866)											
CG2405622-002	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	1260	1170	7.50%	20%	----
Physical Tests (QC Lot: 1427867)											
CG2405622-002	Anonymous	pH	----	E108	0.10	pH units	7.16	7.14	0.280%	4%	----
Physical Tests (QC Lot: 1427868)											
CG2405622-002	Anonymous	Conductivity	----	E100	1.0	µS/cm	2350	2340	0.426%	10%	----
Physical Tests (QC Lot: 1429472)											
CG2405601-012	Anonymous	Solids, total dissolved [TDS]	----	E162	40	mg/L	1390	1360	2.55%	20%	----
Anions and Nutrients (QC Lot: 1427995)											
CG2405623-001	Site Reference (122mg/L TDS) PJ2324-004 - Initiation CD	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.095	0.095	0.0005	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1427996)											
CG2405623-001	Site Reference (122mg/L TDS) PJ2324-004 - Initiation CD	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	0.729	0.728	0.0824%	20%	----
Anions and Nutrients (QC Lot: 1427997)											
CG2405623-001	Site Reference (122mg/L TDS) PJ2324-004 - Initiation CD	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	73.0	72.7	0.424%	20%	----
Anions and Nutrients (QC Lot: 1427998)											
CG2405623-001	Site Reference (122mg/L TDS) PJ2324-004 - Initiation CD	Chloride	16887-00-6	E235.Cl	0.50	mg/L	1.40	1.41	0.002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1427999)											
CG2405623-001	Site Reference (122mg/L TDS) PJ2324-004 - Initiation CD	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	0.132	0.132	0.152%	20%	----
Dissolved Metals (QC Lot: 1430187)											
CG2405595-001	Anonymous	Calcium, dissolved	7440-70-2	E421	0.100	mg/L	294	297	1.04%	20%	----
		Iron, dissolved	7439-89-6	E421	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0100	mg/L	204	201	1.46%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00020	mg/L	0.00061	0.00063	0.00001	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.100	mg/L	7.70	7.62	1.04%	20%	----
		Sodium, dissolved	7440-23-5	E421	0.100	mg/L	43.1	41.8	2.90%	20%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1427866)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1427868)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 1429472)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 1427995)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1427996)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1427997)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1427998)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1427999)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Dissolved Metals (QCLot: 1430187)						
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1427866)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	100	85.0	115	----
Physical Tests (QCLot: 1427867)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1427868)									
Conductivity	----	E100	1	µS/cm	147 µS/cm	101	90.0	110	----
Physical Tests (QCLot: 1429472)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	95.5	85.0	115	----
Anions and Nutrients (QCLot: 1427995)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1427996)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	99.2	90.0	110	----
Anions and Nutrients (QCLot: 1427997)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1427998)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1427999)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	99.4	90.0	110	----
Dissolved Metals (QCLot: 1430187)									
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	102	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	103	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	105	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	99.6	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	105	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	104	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1427995)										
CG2405623-002	889 mg/L TDS PJ2324-004 - Initiation CD	Fluoride	16984-48-8	E235.F	1.06 mg/L	1 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 1427996)										
CG2405623-002	889 mg/L TDS PJ2324-004 - Initiation CD	Nitrate (as N)	14797-55-8	E235.NO3	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1427997)										
CG2405623-002	889 mg/L TDS PJ2324-004 - Initiation CD	Sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1427998)										
CG2405623-002	889 mg/L TDS PJ2324-004 - Initiation CD	Chloride	16887-00-6	E235.Cl	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1427999)										
CG2405623-002	889 mg/L TDS PJ2324-004 - Initiation CD	Nitrite (as N)	14797-65-0	E235.NO2	0.518 mg/L	0.5 mg/L	104	75.0	125	----
Dissolved Metals (QCLot: 1430187)										
CG2405595-002	Anonymous	Calcium, dissolved	7440-70-2	E421	ND mg/L	----	ND	70.0	130	----
		Iron, dissolved	7439-89-6	E421	19.1 mg/L	20 mg/L	95.5	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	----	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.195 mg/L	0.2 mg/L	97.7	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	39.9 mg/L	40 mg/L	99.8	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	----	ND	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 22 -

Page 1 of 1

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Canada Toll Free: 1 800 668 9878

Report To	Contact and company name below will appear on the final report
Company:	Nautilus Environmental
Contact:	Leila Oosterbroek
Phone:	403-253-7121
	Company address below will appear on the final report
Street:	10823 27 St SE
City/Province:	Calgary, AB
Postal Code:	T2Z 3V9
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Nautilus Environmental
Contact:	Leila Oosterbroek

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: leila@nautilusenvironmental.ca; melanie@nautilusenvironmental.ca

Email 2: lisa.ramilo@agnicoeagle.com

Email 3: breda.rahmanian@wsp.com

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: accounting@nautilusenvironmental.ca

Email 2: leila@nautilusenvironmental.ca

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge.

Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Project Information

ALS Account # / Quote #:	
Job #:	
PO / AFE:	2324-323AB
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only):	ALS Contact:	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	E162 - measured TDS	PR01 - Routine	PR01 - Routine (dissolved metals bot F	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	Site Reference (122 mg/L TDS) PJ2324-004 - Initiation CD	02-May-24	1130	water	2	R	R	R			
	889 mg/L TDS PJ2324-004 - Initiation CD	↓	↓	water	2	R	R	R			
	1,414mg/L TDS PJ2324-004 - Initiation CD			water	2	R	R	R			
	2,296 mg/L TDS PJ2324-004 - Initiation CD			water	2	R	R	R			

Environmental Division
Calgary
Work Order Reference
CG2405623

Telephone : +1 403 407 1800

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☑ NO

Are samples for human consumption/ use?
☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
							12

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
	2024/05/02	1300					5/2	1445

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

FEB 2022 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

CERTIFICATE OF ANALYSIS

Work Order	: **CG2406209**	Page	: 1 of 4
Client	: **Nautilus Environmental Company Inc.**	Laboratory	: ALS Environmental - Calgary
Contact	: Leila Oosterbroek	Account Manager	: Patryk Wojciak
Address	: 10823 27th Street SE Calgary AB Canada T2Z 3V9	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 253 7121	Telephone	: +1 403 407 1800
Project	: ----	Date Samples Received	: 13-May-2024 15:10
PO	: 2324-324AB	Date Analysis Commenced	: 13-May-2024
C-O-C number	: ----	Issue Date	: 20-May-2024 19:20
Sampler	: ----		
Site	: ----		
Quote number	: CG24-NECI100-00001 Nautilus Calgary General		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Anthony Calero	Supervisor - Inorganic	Inorganics, Calgary, Alberta
Gurvinder Kour	Lab Assistant	Metals, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Metals, Calgary, Alberta

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
µS/cm	microsiemens per centimetre
meq/L	milliequivalents per litre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
DLDS	*Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.*
IB:INT	*Ion Balance Reviewed: Imbalance is due to interference or non-measured component.*

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID: Site Reference (122 mg/L TDS) PJ2324-004 - Termination CD	889 mg/L TDS PJ2324-004 - Termination CD	1,414 mg/L TDS PJ2324-004 - Termination CD	2,296 mg/L TDS PJ2324-004 - Termination CD	----
Client sampling date / time					09-May-2024 08:00	09-May-2024 08:05	09-May-2024 08:10	09-May-2024 08:15	----
					CG2406209-001	CG2406209-002	CG2406209-003	CG2406209-004	--------
					Result	Result	Result	Result	----
Physical Tests									
Hardness (as CaCO3), dissolved	----	EC100/CG	0.50	mg/L	77.8	280	420	812	----
Solids, total dissolved [TDS]	----	E162/CG	10	mg/L	180	785	1210	2390	----
Conductivity	----	E100/CG	2.0	µS/cm	229	1280	1920	3110	----
pH	----	E108/CG	0.10	pH units	7.50	7.40	7.46	7.46	----
Alkalinity, bicarbonate (as HCO3)	71-52-3	E290/CG	1.0	mg/L	33.4	33.3	32.7	34.5	----
Alkalinity, carbonate (as CO3)	3812-32-6	E290/CG	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
Alkalinity, hydroxide (as OH)	14280-30-9	E290/CG	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
Alkalinity, total (as CaCO3)	----	E290/CG	2.0	mg/L	27.4	27.3	26.8	28.3	----
Solids, total dissolved [TDS], calculated	----	EC103/CG	1.0	mg/L	131	810	1280	2260	----
Anions and Nutrients									
Chloride	16887-00-6	E235.Cl/CG	0.50	mg/L	1.71	123	208	353	----
Fluoride	16984-48-8	E235.F/CG	0.020	mg/L	0.095	<0.100 DLDS	<0.100 DLDS	<0.100 DLDS	----
Nitrate (as N)	14797-55-8	E235.NO3/CG	0.020	mg/L	0.796	15.6	25.7	42.9	----
Nitrite (as N)	14797-65-0	E235.NO2/CG	0.010	mg/L	0.134	0.135	0.146	0.139	----
Sulfate (as SO4)	14808-79-8	E235.SO4/CG	0.30	mg/L	73.4	365	564	979	----
Nitrate + Nitrite (as N)	----	EC235.N+N/CG	0.0500	mg/L	0.930	15.7	25.8	43.0	----
Ion Balance									
Anion sum	----	EC101/CG	0.10	meq/L	2.20	12.7	20.0	34.0	----
Cation sum	----	EC101/CG	0.10	meq/L	1.73	10.8	17.1	32.9	----
Ion balance (APHA)	----	EC101/CG	0.01	%	-12.0 IB:INT	-8.08	-7.82	-1.64	----
Ion balance (cations/anions)	----	EC101/CG	0.010	%	78.6 IB:INT	85.0	85.5	96.8	----
Dissolved Metals									
Calcium, dissolved	7440-70-2	E421/CG	0.050	mg/L	29.3	96.1	143	278	----
Iron, dissolved	7439-89-6	E421/CG	0.010	mg/L	0.063	0.060	0.062	0.057	----
Magnesium, dissolved	7439-95-4	E421/CG	0.0050	mg/L	1.13	9.72	15.4	28.6	----
Manganese, dissolved	7439-96-5	E421/CG	0.00010	mg/L	0.00205	0.00680	0.0108	0.0159	----
Potassium, dissolved	7440-09-7	E421/CG	0.050	mg/L	1.01	24.8	41.2	83.7	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Site Reference (122 mg/L TDS) PJ2324-004 - Termination CD	889 mg/L TDS PJ2324-004 - Termination CD	1,414 mg/L TDS PJ2324-004 - Termination CD	2,296 mg/L TDS PJ2324-004 - Termination CD	----
					Client sampling date / time	09-May-2024 08:00	09-May-2024 08:05	09-May-2024 08:10	09-May-2024 08:15	----
						CG2406209-001	CG2406209-002	CG2406209-003	CG2406209-004	--------
						Result	Result	Result	Result	----
Dissolved Metals										
Sodium, dissolved	7440-23-5	E421/CG	0.050	mg/L		3.41	105	175	334	----
Dissolved metals filtration location	----	EP421/CG	-	-		Field	Field	Field	Field	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

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right partner.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **CG2406209**	Page	: 1 of 11
Client	: **Nautilus Environmental Company Inc.**	Laboratory	: ALS Environmental - Calgary
Contact	: Leila Oosterbroek	Account Manager	: Patryk Wojciak
Address	: 10823 27th Street SE Calgary AB Canada T2Z 3V9	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 253 7121	Telephone	: +1 403 407 1800
Project	: ----	Date Samples Received	: 13-May-2024 15:10
PO	: 2324-324AB	Issue Date	: 20-May-2024 19:20
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: CG24-NECI100-00001 Nautilus Calgary General		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE 1,414 mg/L TDS PJ2324-004 - Termination CD	E235.Cl	09-May-2024	13-May-2024	28 days	4 days	✓	13-May-2024	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE 2,296 mg/L TDS PJ2324-004 - Termination CD	E235.Cl	09-May-2024	13-May-2024	28 days	4 days	✓	13-May-2024	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE 889 mg/L TDS PJ2324-004 - Termination CD	E235.Cl	09-May-2024	13-May-2024	28 days	4 days	✓	13-May-2024	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Site Reference (122 mg/L TDS) PJ2324-004 - Termination CD	E235.Cl	09-May-2024	13-May-2024	28 days	4 days	✓	13-May-2024	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE 1,414 mg/L TDS PJ2324-004 - Termination CD	E235.F	09-May-2024	13-May-2024	28 days	4 days	✓	13-May-2024	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE 2,296 mg/L TDS PJ2324-004 - Termination CD	E235.F	09-May-2024	13-May-2024	28 days	4 days	✓	13-May-2024	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE 889 mg/L TDS PJ2324-004 - Termination CD	E235.F	09-May-2024	13-May-2024	28 days	4 days	✓	13-May-2024	28 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE Site Reference (122 mg/L TDS) PJ2324-004 - Termination CD	E235.F	09-May-2024	13-May-2024	28 days	4 days	✓	13-May-2024	28 days	4 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE 1,414 mg/L TDS PJ2324-004 - Termination CD	E235.NO3	09-May-2024	13-May-2024	3 days	4 days	× EHTR	13-May-2024	3 days	4 days	× EHTR
Anions and Nutrients : Nitrate in Water by IC										
HDPE 2,296 mg/L TDS PJ2324-004 - Termination CD	E235.NO3	09-May-2024	13-May-2024	3 days	4 days	× EHTR	13-May-2024	3 days	4 days	× EHTR
Anions and Nutrients : Nitrate in Water by IC										
HDPE 889 mg/L TDS PJ2324-004 - Termination CD	E235.NO3	09-May-2024	13-May-2024	3 days	4 days	× EHTR	13-May-2024	3 days	4 days	× EHTR
Anions and Nutrients : Nitrate in Water by IC										
HDPE Site Reference (122 mg/L TDS) PJ2324-004 - Termination CD	E235.NO3	09-May-2024	13-May-2024	3 days	4 days	× EHTR	13-May-2024	3 days	4 days	× EHTR
Anions and Nutrients : Nitrite in Water by IC										
HDPE 1,414 mg/L TDS PJ2324-004 - Termination CD	E235.NO2	09-May-2024	13-May-2024	3 days	4 days	× EHTR	13-May-2024	3 days	4 days	× EHTR
Anions and Nutrients : Nitrite in Water by IC										
HDPE 2,296 mg/L TDS PJ2324-004 - Termination CD	E235.NO2	09-May-2024	13-May-2024	3 days	4 days	× EHTR	13-May-2024	3 days	4 days	× EHTR
Anions and Nutrients : Nitrite in Water by IC										
HDPE 889 mg/L TDS PJ2324-004 - Termination CD	E235.NO2	09-May-2024	13-May-2024	3 days	4 days	× EHTR	13-May-2024	3 days	4 days	× EHTR
Anions and Nutrients : Nitrite in Water by IC										
HDPE Site Reference (122 mg/L TDS) PJ2324-004 - Termination CD	E235.NO2	09-May-2024	13-May-2024	3 days	4 days	× EHTR	13-May-2024	3 days	4 days	× EHTR

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
1,414 mg/L TDS PJ2324-004 - Termination CD	E235.SO4	09-May-2024	13-May-2024	28 days	4 days	✓	13-May-2024	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
2,296 mg/L TDS PJ2324-004 - Termination CD	E235.SO4	09-May-2024	13-May-2024	28 days	4 days	✓	13-May-2024	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
889 mg/L TDS PJ2324-004 - Termination CD	E235.SO4	09-May-2024	13-May-2024	28 days	4 days	✓	13-May-2024	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Site Reference (122 mg/L TDS) PJ2324-004 - Termination CD	E235.SO4	09-May-2024	13-May-2024	28 days	4 days	✓	13-May-2024	28 days	4 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
1,414 mg/L TDS PJ2324-004 - Termination CD	E421	09-May-2024	14-May-2024	180 days	5 days	✓	16-May-2024	180 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
2,296 mg/L TDS PJ2324-004 - Termination CD	E421	09-May-2024	14-May-2024	180 days	5 days	✓	16-May-2024	180 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
889 mg/L TDS PJ2324-004 - Termination CD	E421	09-May-2024	14-May-2024	180 days	5 days	✓	16-May-2024	180 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
Site Reference (122 mg/L TDS) PJ2324-004 - Termination CD	E421	09-May-2024	14-May-2024	180 days	5 days	✓	16-May-2024	180 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
1,414 mg/L TDS PJ2324-004 - Termination CD	E290	09-May-2024	14-May-2024	14 days	5 days	✓	14-May-2024	14 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE										
2,296 mg/L TDS PJ2324-004 - Termination CD	E290	09-May-2024	14-May-2024	14 days	5 days	✓	14-May-2024	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
889 mg/L TDS PJ2324-004 - Termination CD	E290	09-May-2024	14-May-2024	14 days	5 days	✓	14-May-2024	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Site Reference (122 mg/L TDS) PJ2324-004 - Termination CD	E290	09-May-2024	14-May-2024	14 days	5 days	✓	14-May-2024	14 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE										
1,414 mg/L TDS PJ2324-004 - Termination CD	E100	09-May-2024	14-May-2024	28 days	5 days	✓	14-May-2024	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE										
2,296 mg/L TDS PJ2324-004 - Termination CD	E100	09-May-2024	14-May-2024	28 days	5 days	✓	14-May-2024	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE										
889 mg/L TDS PJ2324-004 - Termination CD	E100	09-May-2024	14-May-2024	28 days	5 days	✓	14-May-2024	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE										
Site Reference (122 mg/L TDS) PJ2324-004 - Termination CD	E100	09-May-2024	14-May-2024	28 days	5 days	✓	14-May-2024	28 days	5 days	✓
Physical Tests : pH by Meter										
HDPE										
1,414 mg/L TDS PJ2324-004 - Termination CD	E108	09-May-2024	14-May-2024	0.25 hrs	123 hrs	× EHTR-FM	14-May-2024	0.25 hrs	123 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE										
2,296 mg/L TDS PJ2324-004 - Termination CD	E108	09-May-2024	14-May-2024	0.25 hrs	123 hrs	× EHTR-FM	14-May-2024	0.25 hrs	123 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE										
889 mg/L TDS PJ2324-004 - Termination CD	E108	09-May-2024	14-May-2024	0.25 hrs	123 hrs	× EHTR-FM	14-May-2024	0.25 hrs	123 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE										
Site Reference (122 mg/L TDS) PJ2324-004 - Termination CD	E108	09-May-2024	14-May-2024	0.25 hrs	123 hrs	× EHTR-FM	14-May-2024	0.25 hrs	123 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE										
1,414 mg/L TDS PJ2324-004 - Termination CD	E162	09-May-2024	----	----	----		16-May-2024	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE										
2,296 mg/L TDS PJ2324-004 - Termination CD	E162	09-May-2024	----	----	----		16-May-2024	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE										
889 mg/L TDS PJ2324-004 - Termination CD	E162	09-May-2024	----	----	----		16-May-2024	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE										
Site Reference (122 mg/L TDS) PJ2324-004 - Termination CD	E162	09-May-2024	----	----	----		16-May-2024	7 days	7 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1441751	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	1440445	1	7	14.2	5.0	✓
Conductivity in Water	E100	1441749	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1442711	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1440437	1	17	5.8	5.0	✓
Nitrate in Water by IC	E235.NO3	1440443	1	5	20.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1440444	1	5	20.0	5.0	✓
pH by Meter	E108	1441750	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1440442	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	1444190	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1441751	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	1440445	1	7	14.2	5.0	✓
Conductivity in Water	E100	1441749	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1442711	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1440437	1	17	5.8	5.0	✓
Nitrate in Water by IC	E235.NO3	1440443	1	5	20.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1440444	1	5	20.0	5.0	✓
pH by Meter	E108	1441750	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1440442	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	1444190	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1441751	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	1440445	1	7	14.2	5.0	✓
Conductivity in Water	E100	1441749	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1442711	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1440437	1	17	5.8	5.0	✓
Nitrate in Water by IC	E235.NO3	1440443	1	5	20.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1440444	1	5	20.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1440442	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	1444190	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Chloride in Water by IC	E235.Cl	1440445	1	7	14.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1442711	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1440437	1	17	5.8	5.0	✓

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Matrix Spikes (MS) - Continued							
Nitrate in Water by IC	E235.NO3	1440443	1	5	20.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1440444	1	5	20.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1440442	1	17	5.8	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Calgary	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TDS by Gravimetry	E162 ALS Environmental - Calgary	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Calgary	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Calgary	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Calgary	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 ALS Environmental - Calgary	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
TDS in Water (Calculation)	EC103 ALS Environmental - Calgary	Water	APHA 1030E (mod)	Total Dissolved Solids is calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals Water Filtration	EP421 ALS Environmental - Calgary	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

QUALITY CONTROL REPORT

Work Order	: **CG2406209**	Page	: 1 of 6
Client	: Nautilus Environmental Company Inc.	Laboratory	: ALS Environmental - Calgary
Contact	: Leila Oosterbroek	Account Manager	: Patryk Wojciak
Address	: 10823 27th Street SE Calgary AB Canada T2Z 3V9	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 253 7121	Telephone	: +1 403 407 1800
Project	: ----	Date Samples Received	: 13-May-2024 15:10
PO	: 2324-324AB	Date Analysis Commenced	: 13-May-2024
C-O-C number	: ----	Issue Date	: 20-May-2024 19:20
Sampler	: ----		
Site	: ----		
Quote number	: CG24-NECI100-00001 Nautilus Calgary General		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Anthony Calero	Supervisor - Inorganic	Calgary Inorganics, Calgary, Alberta
Gurvinder Kour	Lab Assistant	Calgary Metals, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Metals, Calgary, Alberta

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 1441749)											
CG2406185-019	Anonymous	Conductivity	----	E100	2.0	µS/cm	1850	1850	0.108%	10%	----
Physical Tests (QC Lot: 1441750)											
CG2406185-019	Anonymous	pH	----	E108	0.10	pH units	7.75	7.73	0.258%	4%	----
Physical Tests (QC Lot: 1441751)											
CG2406185-019	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	505	506	0.198%	20%	----
Physical Tests (QC Lot: 1444190)											
CG2406156-010	Anonymous	Solids, total dissolved [TDS]	----	E162	40	mg/L	1690	1750	3.66%	20%	----
Anions and Nutrients (QC Lot: 1440437)											
CG2406192-001	Anonymous	Fluoride	16984-48-8	E235.F	0.100	mg/L	0.252	0.252	0.0001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1440442)											
CG2406192-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	916	916	0.0209%	20%	----
Anions and Nutrients (QC Lot: 1440443)											
CG2406209-001	Site Reference (122 mg/L TDS) PJ2324-004 - Termination CD	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	0.796	0.797	0.0879%	20%	----
Anions and Nutrients (QC Lot: 1440444)											
CG2406209-001	Site Reference (122 mg/L TDS) PJ2324-004 - Termination CD	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	0.134	0.134	0.298%	20%	----
Anions and Nutrients (QC Lot: 1440445)											
CG2406209-001	Site Reference (122 mg/L TDS) PJ2324-004 - Termination CD	Chloride	16887-00-6	E235.Cl	0.50	mg/L	1.71	1.73	0.02	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1442711)											
CG2406152-001	Anonymous	Calcium, dissolved	7440-70-2	E421	0.100	mg/L	106	102	3.87%	20%	----
		Iron, dissolved	7439-89-6	E421	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0100	mg/L	150	144	4.30%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00020	mg/L	1.00	0.956	4.94%	20%	----
		Potassium, dissolved	7440-09-7	E421	0.100	mg/L	4.58	4.42	3.72%	20%	----
		Sodium, dissolved	7440-23-5	E421	0.100	mg/L	171	164	4.04%	20%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1441749)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 1441751)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1444190)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 1440437)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1440442)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1440443)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1440444)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1440445)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 1442711)						
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1441749)									
Conductivity	----	E100	1	µS/cm	147 µS/cm	91.8	90.0	110	----
Physical Tests (QCLot: 1441750)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1441751)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	97.3	85.0	115	----
Physical Tests (QCLot: 1444190)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	94.5	85.0	115	----
Anions and Nutrients (QCLot: 1440437)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 1440442)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1440443)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1440444)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 1440445)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Dissolved Metals (QCLot: 1442711)									
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	95.2	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	113	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	98.8	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	92.8	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	97.9	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	96.2	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1440437)										
CG2406194-006	Anonymous	Fluoride	16984-48-8	E235.F	1.05 mg/L	1 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 1440442)										
CG2406194-006	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	102 mg/L	100 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1440443)										
CG2406209-002	889 mg/L TDS PJ2324-004 - Termination CD	Nitrate (as N)	14797-55-8	E235.NO3	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1440444)										
CG2406209-002	889 mg/L TDS PJ2324-004 - Termination CD	Nitrite (as N)	14797-65-0	E235.NO2	0.528 mg/L	0.5 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 1440445)										
CG2406209-002	889 mg/L TDS PJ2324-004 - Termination CD	Chloride	16887-00-6	E235.Cl	ND mg/L	----	ND	75.0	125	----
Dissolved Metals (QCLot: 1442711)										
CG2406163-001	Anonymous	Calcium, dissolved	7440-70-2	E421	ND mg/L	----	ND	70.0	130	----
		Iron, dissolved	7439-89-6	E421	19.1 mg/L	20 mg/L	95.6	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	----	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.183 mg/L	0.2 mg/L	91.7	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	38.9 mg/L	40 mg/L	97.2	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	----	ND	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 22 -

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www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Environmental Division Calgary
Work Order Reference
CG2406209

Telephone : +1 403 407 1800

Report To	Contact and company name below will appear on the final report
Company:	Nautilus Environmental
Contact:	Leila Oosterbroek
Phone:	403-253-7121
	Company address below will appear on the final report
Street:	10823 27 St SE
City/Province:	Calgary, AB
Postal Code:	T2Z 3V9
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Nautilus Environmental
Contact:	Leila Oosterbroek

Project Information

ALS Account # / Quote #:	
Job #:	
PO / AFE:	2324-324AB
LSD:	

Reports / Recipients

Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Merge QC/QCI Reports with COA	☑ YES ☐ NO ☐ N/A
	☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	leila@nautilusenvironmental.ca; melanie@nautiluse
Email 2	lisa.ramilo@agnicoeagle.com
Email 3	breda.rahmanian@wsp.com

Invoice Recipients

Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	accounting@nautilusenvironmental.ca
Email 2	leila@nautilusenvironmental.ca

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

Turnaround Time (TAT) Requested

- ☑ Routine [R] if received by 3pm M-F - no surcharges apply
- ☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge mini
- ☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge min
- ☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge min
- ☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge mir
- ☐ Same day [E2] if received by 10am M-S - 200% rush surcha

Additional fees may apply to rush requests on weeke

Date and Time Required for all E&P TATs: dd-mmm-yy

For all tests with rush TATs requested, please contact your AM to confirm availability.

ALS Lab Work Order # (ALS use only):

ALS Contact:

Sampler:

Analysis Request

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	E162 - measured TDS	PR01 - Routine	PR01 - Routine (dissolved metals bot	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	Site Reference (122 mg/L TDS) PJ2324-004 - Termination CD	9-May-24	0800	water	2	R	R	R			
	889 mg/L TDS PJ2324-004 - Termination CD	9-May-24	0805	water	2	R	R	R			
	1,414mg/L TDS PJ2324-004 - Termination CD	9-May-24	0810	water	2	R	R	R			
	2,296 mg/L TDS PJ2324-004 - Termination CD	9-May-24	0815	water	2	R	R	R			

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below: F

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☑ NO

Are samples for human consumption/ use?
☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
13.8							

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
[signature]	24/05/10	0830

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
[signature]	24/05/13	15:10

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

FEB 2022 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

END OF REPORT