New Polaris Project – Geochemistry Baseline

Prepared for:

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Project No. 105451-01

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Executive Summary

Canagold Resources is proposing to develop and operate the New Polaris Gold Project (the Project), an underground mine producing up to 365,000 tonnes per year (tpy) of ore during a mine life of 10 years. The Project is located approximately 100 km south of Atlin, BC and 60 km northeast of Juneau, Alaska, United States (US) on the west bank of the Tulsequah River near the BC-Alaska border. As part of the Environmental Assessment, a geochemical characterization program is being conducted to evaluate the acid rock drainage (ARD) and metal leaching (ML) potential of materials produced from the Project construction and operations. These materials include ore, waste rock, tailings, and co-disposal wastes.

A previous ARD and metal leaching (ML) assessment of 15 drill core samples from the C-Vein indicated samples as being non-potentially acid generating (NPAG) but having ML potential for arsenic and antimony. The current ML/ARD assessment included 17 Low Grade Ore (LGO) samples, 25 drill waste rock samples, five legacy mine rock grab samples and one Flotation tailings sample. Samples underwent static testing: including acid base accounting (ABA), elemental analysis, shake flask extraction (SFE), and mineralogical analysis. Humidity cell tests (HCT) were conducted on a subset of samples based on ARD classification, bulk arsenic content, element concentrations and lithological descriptions. HCT testing was carried out on one flotation tailings sample (T1), one Co-disposal waste sample (T2), one legacy mine rock sample (T3), one construction rock sample (H1), and one Low-Grade Ore sample (H2). All the HC tests are currently ongoing at the time of reporting.

C-vein rocks from the previous assessment were considered as non-acid generating due to elevated carbonate content. The current ABA results show that all LGO samples are classified as NPAG. One out of 25 drill core waste rock sample was classified as potentially acid generating (PAG) and 3 out of 5 legacy mine rock samples were classified as PAG. Despite the legacy mine materials having the potential to generate ARD, the representativeness of these samples with respect to the reactivity of future development waste rock is unclear at the current time. Three out of the five legacy mine rock samples were considered to be susceptible to leaching arsenic, antimony, cadmium, copper, lead and zinc.

Humidity cell testing conducted on T1-flotation tailings indicated leaching of arsenic, molybdenum, cadmium, cobalt, copper, nickel, and zinc. The Flotation tailings and composite samples had the highest tendency for metal leaching, with arsenic and antimony being the contaminants of particular concern. Subsequent testing on co-disposal materials, and waste rock composites confirmed that samples are NPAG.

All mine materials tested contain elevated solid-phase arsenic and antimony concentrations. Arsenic and antimony will likely be constituents of primary concern as these are prone to leaching under circum-neutral pH conditions. This conclusion is supported by the presence of elevated arsenic, and to a lesser extent antimony, in portal water samples.

The humidity cell testing of a single composite rock sample representative of construction rock indicated a potential risk of elevated antimony and to a lesser extent, arsenic leaching. The solid phase antimony / arsenic content was relatively elevated in this sample which illustrates a likely future requirement to screen waste rock for antimony / arsenic ML risk when selecting development waste rock for site construction use.

Results from the HCTs are in general agreement with the ARD classification based on the Static ABA data for waste rock, tailings, co-disposal wastes and construction rock samples. Co-disposal of waste rock with tailings should help reduce water infiltration and limit oxygen diffusion (both required for sulphide oxidation), which should help control arsenic release.

Results from the humidity cell test can be used to calculate metal leach rates from all mine waste samples tested. Along with the leach tests results, the humidity test results will be used to generate geochemical source-terms that will be used as input to a site water quality model. The geochemistry characterization program can also be used to provide input and recommendations to engineering design, water management plans, and mitigation measures for the project.

A project-specific ML/ARD management plan will be developed during the mine permitting phase. The ML/ARD Management Plan will specify best practices to minimize the potential for ML/ARD generation from mine operation and closure. The management plan will consider geochemical reactivity of the historical mine materials based on further study.

Based on the results of the geochemical assessment, it is recommended that supplemental sampling and testing be conducted on drill core representative of development waste rock to better assess the spatial geochemical variability of future mine wastes. This supplemental geochemistry program should also include the following waste materials, as available:

- Fresh drill core samples.
- Overburden/borrow materials, if needed.
- Cemented back fill materials.
- Water treatment sludge.
- Additional testing of construction rock is recommended as samples tested during this study displayed a risk of neutral pH ML.

This Executive Summary is not intended to be a stand-alone document, but a summary of findings as described in the following Report. It is intended to be used in conjunction with the scope of services and limitations described, therein.

Disclaimer

This work was performed in accordance with the Professional Services Agreement between Ausenco Sustainability Inc. and Canagold Resources Ltd. (Client), dated November 17, 2020 (Contract). This report has been prepared by Ausenco, based on fieldwork conducted by Ausenco, for sole benefit and use by Canagold Resources Ltd.. In performing this work, Ausenco has relied in good faith on information provided by others and has assumed that the information provided by those individuals is both complete and accurate. This work was performed to current industry standard practice for similar environmental work, within the relevant jurisdiction and same locale. The findings presented, herein, should be considered within the context of the scope of work and project terms of reference; further, the findings are time sensitive and are considered valid only at the time the report was produced. The conclusions and recommendations contained in this report are based upon the applicable guidelines, regulations, and legislation existing at the time the report was produced; any changes in the regulatory regime may alter the conclusions and/or recommendations.

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Acronym / Abbreviation	Definition
AP	Acid Generation Potential
ABA	Modified Acid-Base Accounting
ABCC	Acid Buffering Characteristic Curve
ARD	Acid Rock Drainage
ASTER	Activated Sludge Tailings Effluent Remediation
BC	British Columbia
BCEAA	British Columbia Environmental Assessment Act
BCMEM	British Columbia Mine
BCMOE	British Columbia Ministry of Environment
BIOX	Bio-oxidation
$CaCO_3$	Calcite
$(Ca(Fe,Mg,Mn)(CO_3)_2)$	Ankerite
$(CaMg(CO_3)_2)$	Dolomite
Canagold	Canagold Resources Ltd.
CCAF	Conventional cut and fill
CDF	Co-Disposal Facility
CEAA	Canadian Environmental Assessment Act
CIL	Carbon-In-Leach
cm	Centimeter
CO	Carbon monoxide
CMR	Carbonate Molar Ratio
$CuFeS_2$	Chalcopyrite
EA	Environmental Assessment
EAC	Environmental Assessment Certificate
EAO	Environmental Assessment Office
ENV	BC Ministry of Environment and Climate Change
FeAsS	Arsenopyrite
FeS_2	Pyrite
$Fe_{1-x}S$	Pyrrhotite
GAI	Global Abundance Index
GARD	Global Acid Rock Drainage Guide
Ha	Hectare
HC	Humidity Cell
HC1	Pre-Composite 1 + 2 cell

Acronym / Abbreviation	Definition
HC2	Low-grade (LOG) cell
HCl	Hydrochloric acid
ICP-OES/MS	Inductively Coupled Plasma/Optical Emission Spectrometry/Mass Spectrometry
INAP	International Network for Acid Prevention
IPD	Initial Project Description
km	kilometer
LH	Long hole
LGO	Low grade ore
LOM	Life of mine
m	meter
MELP	Ministry of Environment Lands and Parks
MEND	Mine Environment Neutral Drainage
ML	Metal leaching
M tonnes	Metric tones
NNP	Net Neutralization Potential
NPAG	Non-Potentially Acid Generating
NP	Acid Neutralization Potential
NPR	Neutralization Potential Ratio
PAG	Potentially Acid Generating
PEA	Preliminary Economic Assessment
Project	New Polaris Gold Mine Project
QA/QC	Quality Assurance/Quality Control
QEP	Qualified Environmental Professional
RPD	Relative Percent Difference
S	Sulphur
S^{2-}	Sulphide
S(T)	Total Sulphur
$S(SO_4)$	Sulphate-Sulphur
SARA	Species at Risk Act
Sb_2S_3	Stibnite
SFE	Shake Flask Extraction
SO_2	Sulphur dioxide
T1	NP Tailings Flotation cell
T2	Co-disposal cell
T3	PAG cell

Acronym / Abbreviation	Definition
TIC	Total Inorganic Carbon
tpd	Tonnes per day
tpy	Tonnes per year
TRTFN	Taku River Tlingit First Nation
USA	United States of America
WQG	Water Quality Guidance
WQO	Water Quality Objective
WSA	Water Sustainability Act
wt	weight
XRD	X-Ray Diffraction

1.0 Introduction

Canagold Resources Ltd. (Canagold) proposes to open the New Polaris gold mine in northwestern British Columbia (BC) by re-developing a former mine and town site, previously known as the Polaris Taku Mine, which operated intermittently between 1937 and 1951. The mine is located approximately 100 km south of Atlin, BC and 60 km northeast of Juneau, Alaska, United States (US) on the west bank of the Tulsequah River. The Project is within the Taku River Tlingit First Nation (TRTFN) Traditional Territory.

The proposed Project is an underground gold mine with approximately 1,000 tonnes per day (tpd) mill throughput rate that would operate year-round, producing on average approximately 365,000 tonnes per year (tpy) of ore. Exploration at the site is ongoing, and current estimates suggest the mine will have an approximately 10-year production life, but this could be extended as the limits of the orebody are not fully defined.

The New Polaris Gold Mine Project (the "Project") is subject to a provincial environmental assessment under the *British Columbia Environmental Assessment Act* (BCEAA). Therefore, the purpose of the environmental baseline studies is to characterize existing environmental conditions required to support the environmental effects assessment. Ausenco has been retained to assist Canagold with their environmental baseline studies and to support the development of an Application for an Environmental Assessment Certificate under the BCEAA.

1.1 Project Description

The proposed New Polaris Gold Mine site is located in northwestern BC on the west bank of the Tulsequah River approximately 60 kilometres (km) northeast of Juneau, Alaska and 100 km south of Atlin, BC (see **Figure 1.1**). The Project is within the Taku River Tlingit First Nation (TRTFN) Traditional Territory. The Project is within the Coast Mountain Range and the New Polaris property spans across approximately 3,000 acres. The terrain is characterized by steep mountains and wide river valleys.

The Site is also the location of historic mine works, including the Polaris Taku Mine that operated from 1933 to 1951, with the exception of a period of closure during World War II. The Polaris Taku Mine (owned by Cominco Ltd.) leased the site's mill to process ores mined from nearby Big Bull mine (1952 to 1955) and Tulsequah Chief mine (1952 to 1957), both across the river. The mine has since changed hands a few times and Canagold Resource Corp. now owns the property. They have proposed an underground mine with ramp access operating at 1,000 tpd over an anticipated mine life of ten years. There will be an on-site camp for employees and an airstrip.

New Polaris Project

New Polaris Location Map

Legend

- Project Location
- International Border

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

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- Basemap: ESRI Topographic Map
- Inset Basemap: ESRI Topographic Map

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Canagold Resources Ltd

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The Project will utilize the historical mine site (brownfield) and infrastructure as much as possible. The mine infrastructure, will include (**Figure 1.2**):

- Underground workings
- A Waste Rock Storage Facility
- A Process Plant expected to process 1,000 tonnes of mill feed per day
- Tailings and Waste Rock Co-Disposal Facility (CDF)
- Haul Road to Barge Landing and Co-Disposal Facility.

Ore produced at the Mine Site will undergo crushing, grinding and flotation to produce a bulk flotation concentrate. The concentrate will be treated in a bio-oxidation (BIOX) and carbon in leach (CIL) plant, followed by carbon stripping, electrowinning, and refining. Leach tailings will be detoxified using Activated Sludge Tailings Effluent Remediation (ASTER) treatment.

1.1.1 Tailings and Waste Rock Co-Disposal Facility (CDF)

Waste rock from underground will be co-disposed with mill tailings at the CDF. Underground operations will generate approximately 800,000 tonnes of waste rock over life of mine. Total volume of co-disposed wastes is estimated at 1,320,000 m^3 at the end of mine life.

The mine will store and manage tailings by separating them into two streams:

- Approximately 58% of tailings will be thickened at the process plant using ceramic cyclone filters and filtered to a semi-dry state. The filtered tailings will be loaded into haul trucks and transported to the CDF for co-disposal with mine waste rock.
- Approximately 42% of tailings will be pumped underground to a paste plant, and then disposed of in mined-out voids (stopes) within the underground mine.
- The CDF will be an integrated co-placement disposal facility with little to no mixing between the tailings and waste rock. Co-placement of waste rock enveloped within tailings is anticipated to limit the acid-generating and metal leaching potential of waste rock by limiting oxygen diffusion (required for sulphide oxidation), as well as providing geotechnical stability to the facility while reducing tailings erodibility. Co-placement minimizes the footprint area of tailings and waste rock storage and allows for more simplified water management compared to disposing of tailings and waste rock separately. Tailings consolidation is anticipated to be accelerated due to co-placement, which can allow for earlier and less costly mine closure.
- The surface area of the CDF will be geotechnically prepared and lined. Geochemically inert waste rock will be used to buttress the impoundment with a final slope suitable for final reclamation. A series of disposal cells will be constructed to store layers of waste rock and filtered tailings. Layers will be sloped to manage runoff and perimeter berms will be permeable to prevent flooding and pore pressure build-up. Ditches will be excavated around the CDF and lined with impermeable material to direct water to a lined settling pond that feeds into a water treatment plant. During construction and at closure, a cover will be placed over the entire facility to encapsulate the co-disposed tailings and waste rock.

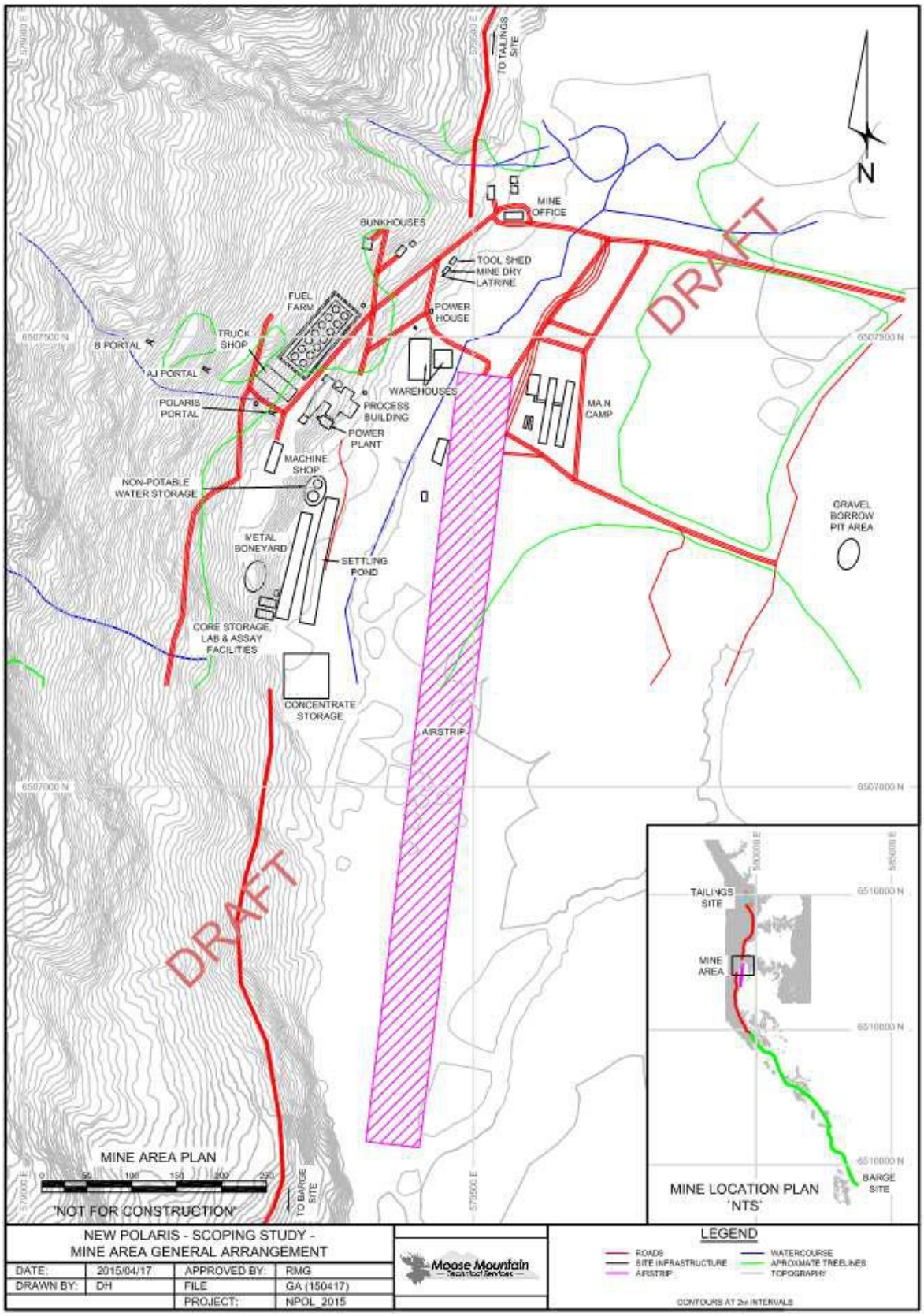

Figure 1.2 Map illustrating the Location of Major Project Components

1.2 Previous Geochemical Test Programs

Rock samples were collected at New Polaris for geochemical characterization, beginning in 2007, when URS Canada was retained by Canarc Resources Corp (Canarc). In fall 2006 and spring 2007, URS completed a Phase 1 geochemical characterization program on a total of twenty-seven (27) fresh drill core samples representing hanging wall, vein, and footwall of the C-Vein. URS (2007) reported on mineralogy, static and kinetic test results for the drill cores and tailings.

Preliminary geochemical test work indicated that waste rock had an elevated carbon content and was classified as Non-Potentially Acid Generating (NPAG), (URS, 2007). Tailings and ore (and low-grade ore) were classified as Potentially Acid Generating (PAG) due to elevated sulphide content (MMTS, 2019).

It is considered that historic tailings discharged by the legacy mining operations at New Polaris have been likely sources of contamination to the Tulsequah River Floodplain.

1.3 Scope and Objectives

As part of the BCEAA, a geochemical characterization program is being conducted to evaluate the acid rock drainage (ARD) and metal leaching (ML) potential of materials produced from Project construction and operations. These materials include ore, waste rock, tailings, and co-disposal wastes.

The deposit type is mesothermal lode-gold, similar to Archean lode gold deposits in Ontario. The deposit is signified by refractory gold present as finely disseminated sulphide grains in altered wall rock (quartz-carbonate) and stockwork veins (MMTS, 2019).

The main objective of the geochemical baseline study was to evaluate the environmental behaviour of waste rock, ore, and mine process materials that may be produced during life of mine. The outcome of the study can be used for mine planning and decision-making purposes, including development of environmental management and material handling strategies, and mitigation and/or treatment measures during construction, operations, and closure, as required. Additional objectives of this study included:

- Identification of mine materials that require further consideration regarding ARD/ML potential.
- Determining key factors that could influence water quality.
- Quantifying mass loading rates for use in future site water quality models.
- Development of geochemistry information and inputs to engineering design, mitigation measures, and environmental assessments for the Project.

The baseline geochemistry scope of work completed to date includes:

- Review of historical geochemical characterization data, local and regional geology, mine plan information, and the engineering strategy for the Project.
- Sample collection and analysis of rock core and tailings samples.
- Geochemical data assessment and evaluation of ARD/ML potentials of ore, waste rock, tailings, and Co-Disposal strategy.

1.4 Geochemistry Study Area

The geochemistry study area includes the underground mine, waste storage facility, and the co-disposal sites. Low-grade ore, waste rock, and historical underground waste rocks were samples across the geochemistry study area as defined in **Figure 1.3**.

New Polaris Project

Geochemistry Study Area

Inset 1

Whitewater Creek

Tuisequah River

See Inset 1

2021-10-24-19Y
2021-10-20-24W
2021-10-24-20Y
2021-10-24-22Y
2021-10-20-D-25W
2021-10-20-22W
2021-10-24-23Y
2021-10-24-21Y
2021-10-20-11WVENT
2021-10-20-19W
2021-10-20-9WDEC
2021-10-20-2C
2021-10-20-1C
2021-10-20-1W
2021-10-20-2W
2021-10-24-16Y
2021-10-20-7C
2021-10-20-5C
2021-10-20-6C
2021-10-20-14W
2021-10-20-3W
2021-10-20-8C
2021-10-20-12Y
2021-10-20-4W
2021-10-20-5W
2021-10-20-14Y
2021-10-24-18Y

0
100
200
Metres

Legend

- Drillhole Location
- Geochemistry Study
- Ore Deposit
- Tailing Pile
- Major Contour (100 m interval)
- Minor Contour (20 m interval)
- Watercourse
- Waterbody
- Wetland

Lithology

- Basalt and andesite/other
- C-Vein
- Y-Vein

Notes

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Metres

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1.5 Regulatory Framework

The scope of work completed by Ausenco followed the general requirements of the BC 'Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators' (BC MOE 2016), which outlines the recommended scope of geochemical testing programs for mining projects in BC with reference to:

- Policy for Metal Leaching and Acid Rock Drainage in British Columbia (BCMEM and Ministry of Environment, Lands and Parks (MELP), July 1998).
- Guidelines for Metal Leaching and Acid Rock Drainage at Mine sites in British Columbia (Price and Errington, August 1998).

Additional guidance documents referenced in the design of the geochemical baseline scope included:

- Prediction Manual for Drainage Chemistry from Sulphidic Geologic materials (MEND, 2009).
- Global Acid Rock Drainage (GARD) Guide (INAP, 2012).

2.0 Geological Setting

2.1 Regional Geology

The New Polaris Mine lies on the western edge of a large body of Upper Triassic Stuhini Group volcanic rocks, which has been intruded by a Jurassic-Cretaceous granodiorite body north of the mine. Older Triassic volcanic rocks and earlier sediments underlie the Stuhini volcanic rocks. The granodiorite is part of the Coast Plutonic Complex (**Figure 2.1**). On the western edge of the property, the Whitewater Suite consists of Paleozoic metamorphosed and deformed quartzite and quartz rich graphite schist and represents the oldest rocks of the area. To the east, the Whitewater suite grades into less metamorphosed metavolcanic and metasedimentary rocks of the Mount Stapler Suite. Still farther to the east, the Whitewater Suite is in fault contact with less deformed mid to upper greenschist facies metamorphosed rocks of the Mount Eaton Suite.

The structural trend in the area is northwest-southeast, paralleling major faults and folds to the east and intrusive alignment to the west. The Triassic volcanic rocks and older sedimentary rocks have been folded and sheared with the Stuhini Group rocks being deformed into broad to isoclinal, doubly plunging symmetrical folds with large amplitudes.

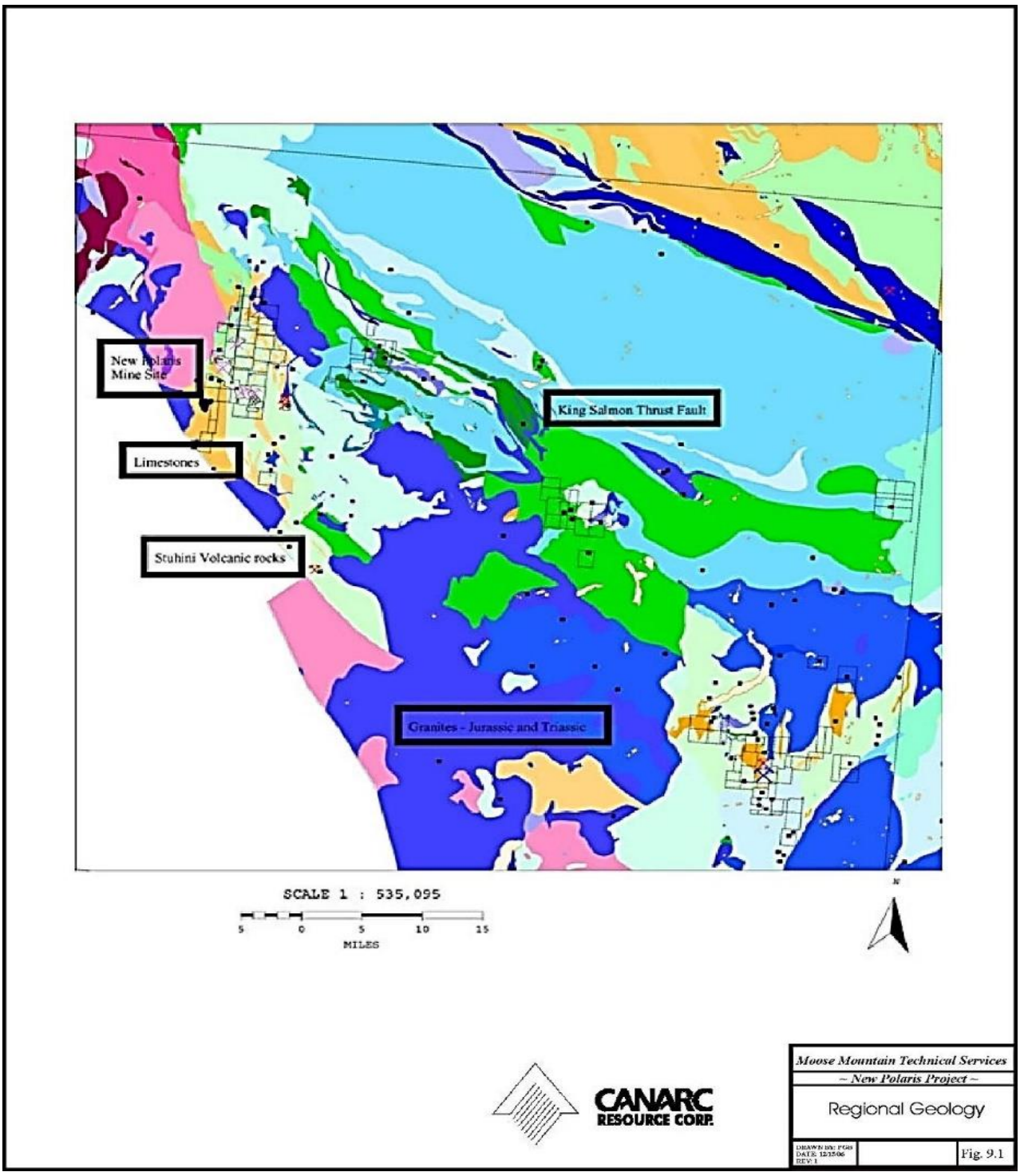


Figure 2.1 Regional geology of the site

2.2 Deposit Geology

The site geology is mainly characterized by weakly metamorphosed (mid to upper greenschist facies) volcanic and sediments of the Mount Eaton Suite in the Intermontane Province of the Western Cordillera of British Columbia (Fluor Daniel Wright 1996; Moors 2003). Mineralization of the ore body is described as vein mineralization consisting of gold-hosted sulphides in a gangue of quartz and carbonates (Moors, 2003). Gold-bearing ore is most associated with arsenopyrite but also occurs within pyrite to a lesser extent (Moors, 2003).

Figure 2.2 shows the deposit containing three main mineralized vein-shear open-ended structures. The predominant vein orientations are:

- A-B veins: north striking and east dipping
- Y veins: east to northeast striking and south dipping
- C veins: east to northeast striking and south dipping.

The deposit, in general, is quartz-vein-related, with associated carbonatized wall rocks. The deposits are characterized by a high gold/silver ratio, commonly associated with pyrite, arsenopyrite, tourmaline and molybdenite. Structures include great vertical continuity with little vertical zonation, and a broadly syn-tectonic time of emplacement. Mineralization may occur from veins to veinlet systems, to disseminated replacement zones. Most mineralized zones are often associated with steeply dipping reverse- or oblique-slip brittle-fracture to ductile-shear zones.

The AB vein was host to most of the earlier mine production. The Y vein was developed later. The C vein is the focus of recent exploration activities (**Figure 2.3**).

2.3 Stratigraphy

2.3.1 Geology and Mineralization

Mineralization at New Polaris consists of arsenopyrite (FeAsS), pyrite (FeS_2), stibnite (Sb_2S_3), and gold in a gangue[1] of quartz and carbonates. The sulphide content reaches up to 10%wt. Arsenopyrite is the most abundant sulphide mineral followed by pyrite. Stibnite is abundant in some intervals but overall comprises less than 0.1% of veins. Alteration minerals include fuchsite, silica, pyrite, sericite, carbonate, and albite.

Gold mineralization mode of occurrence is very fine grained in styolitic stringers in quartz and is primarily associated with arsenopyrite and to a lesser extent with pyrite. Alteration minerals within gangue include fuchsite (chrome containing mica), silica, pyrite, sericite, calcite ($CaCO_3$), dolomite ($CaMg(CO_3)_2$), ankerite ($Ca(Fe,Mg,Mn)(CO_3)_2$) and albite (feldspar).

Arsenopyrite is very-fine grained (<1 mm) and acicular (needle-like crystalline structure). The mode of occurrence is often referred to as 'replacement-type'. It is observed as pervasive and patchy disseminations in altered wall rocks proximal to, or as breccia fragments within quartz-ankerite veined shear zones. However, the quartz-ankerite veining is itself not mineralized. Historical and drill core evidence indicates that ore dilution is associated with an increase in veining. Ankerite veining is interpreted to represent a late-stage veining along the same conduits as earlier silica sulphide-gold mineralization. Throughout the deposit, angular wall rock fragments, altered and unaltered and mineralized and unmineralized, are suspended in an ankerite-quartz vein matrix.

[1] Commercially worthless material.

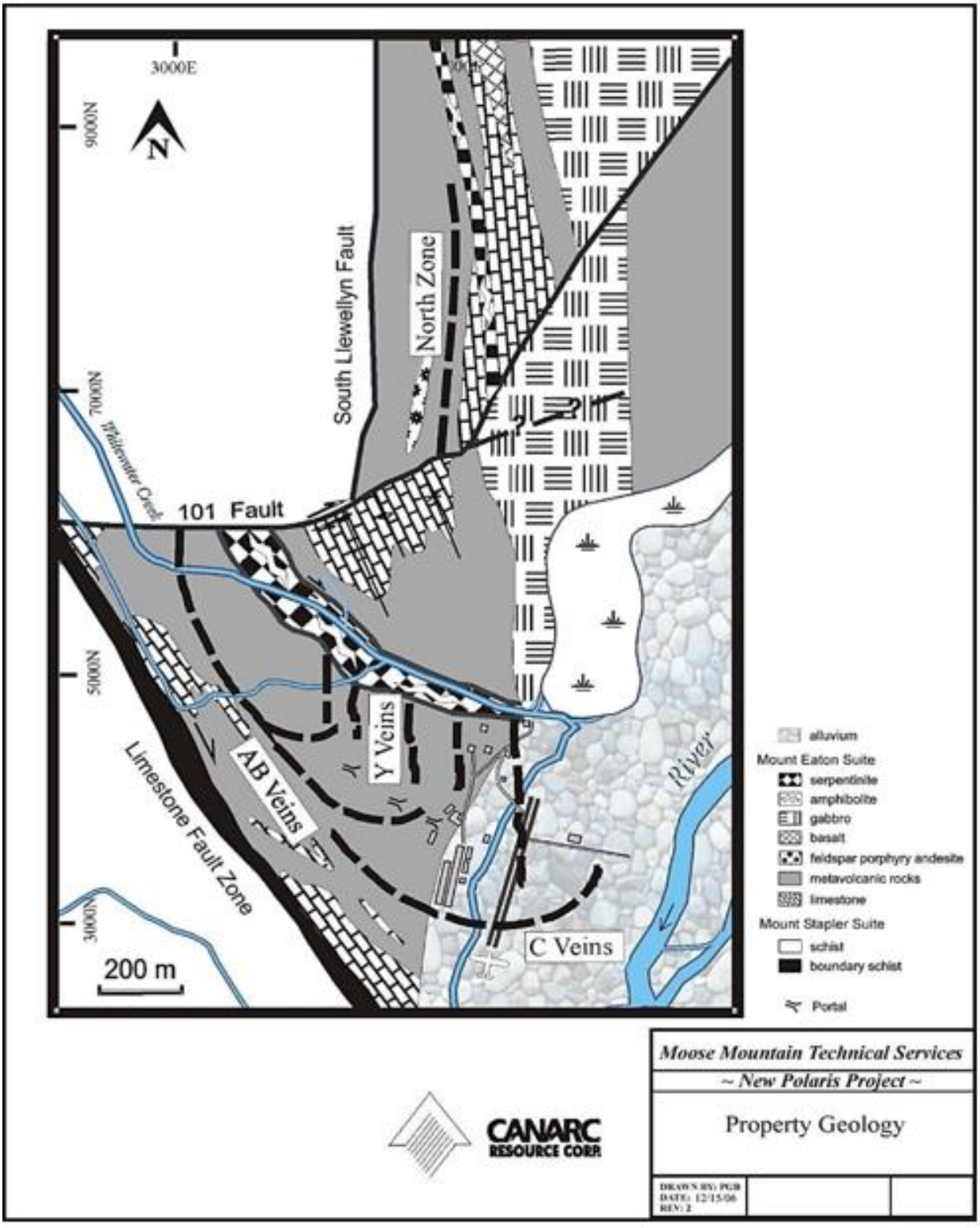


Figure 2.2 Deposit Geology

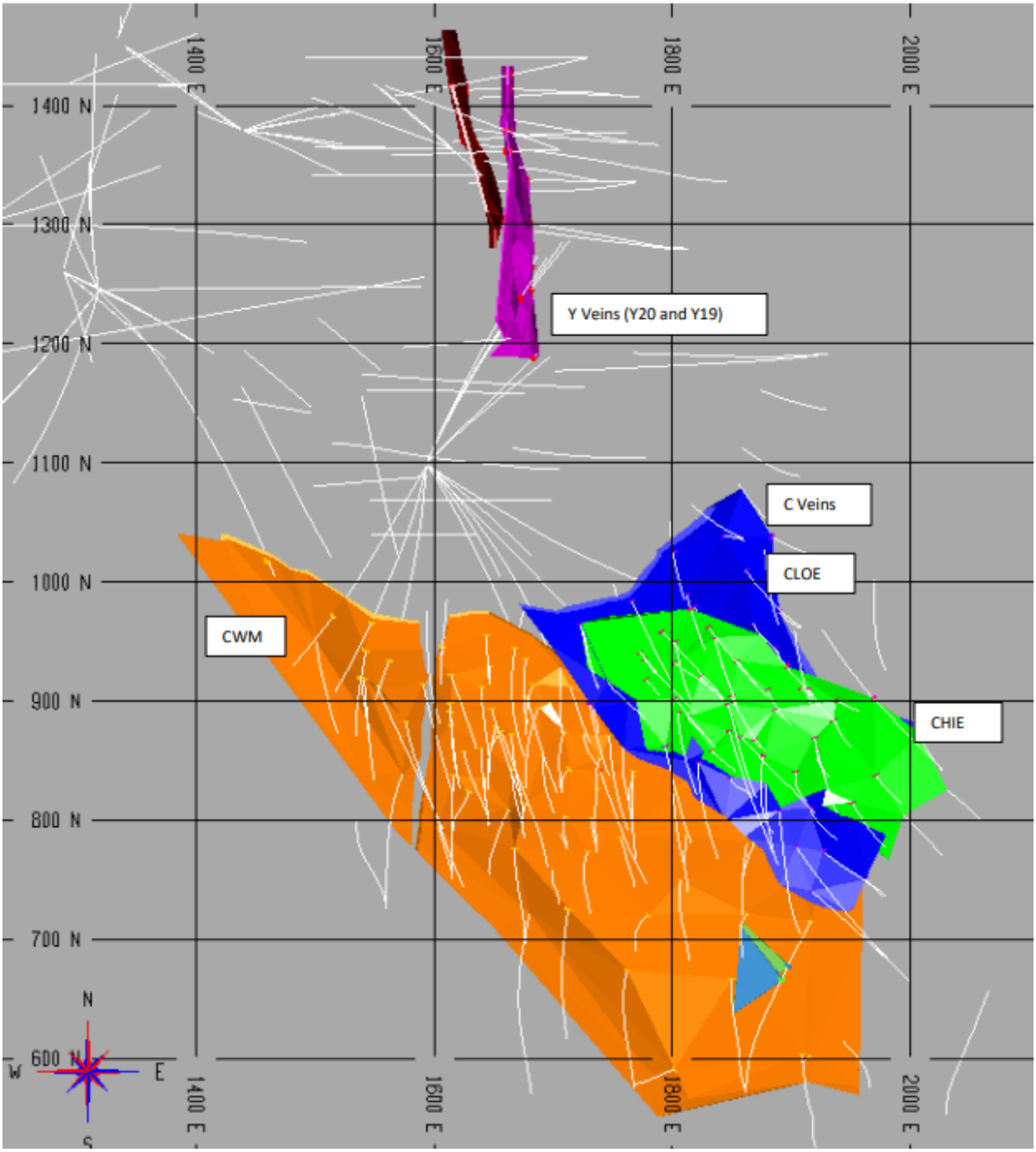


Figure 2.3 3D Model C Vein; plan view in mine specific space (Note: Shows only drillholes since 1988)

3.0 Mine Plan Information

The Mine Plan for the Project indicates a mine life of 10 years with a target production rate of 750 tpd throughout the year. Mining techniques will include a combination of longhole (LH) stoping and conventional cut and fill (CCAF) underground mining methods. LH stoping will account for about 58% of total production, CCAF will account for about 18% and ore development will account for the remaining 24%. LH stopping will be used in the steeper dipping areas of the ore zone, while CCAF will be utilized in the shallow dipping (less than 55°) and thinner areas. The CCAF stopes are generally located at the 'on strike' extremities of the LH stopping areas (**Figure 3.1**).

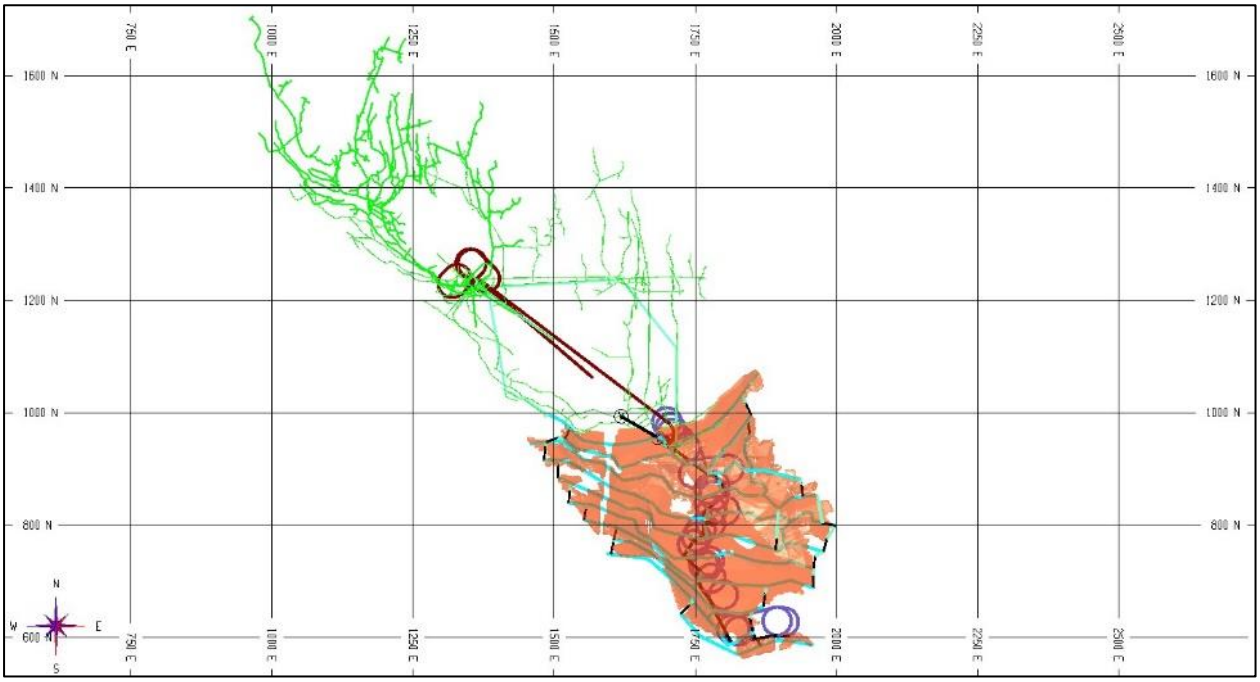


Figure 3.1 The planned mine development, Outlines of the 6 g/t target stopes.

In general, the project will include the following components.

3.1 Mine Development

- Underground workings, ore passes, and ventilation raises
- Tailings Paste Backfill Plant and Distribution System
- Total combined volume of tailings and waste rock is 1,320,000 m^3
- Limestone Quarry.

3.2 Mineral Processing

- Underground crusher
- Process plant (grinding, leaching, gold recovery, and cyanide destruction)
- Paste Back Fill plant.

3.3 Mine Waste Management facilities

- Lined Co-Disposal Facility (13.5 ha)
- Rock cover (200,000 m^3 of additional rock cover)
- Overburden and Topsoil Storage
- Lined Settling Ponds and drainage ditches
- Perimeter clean water diversion ditches.

The waste rock, ore, and tailings production schedule are presented in **Table 3.1**.

3.4 Mine water Treatment

The requirement for mine water treatment (e.g., pH adjustment to neutralise acidity and precipitate out metals) will be established based on the results of the baseline geochemistry program.

Table 3.1 Mine Development Plan

Item	LOM	PP	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Lateral Waste Development (m) (4.m X 4.0 m)	25,737	3,996	5,400	5,400	3,939	3,600	3,402					
Lateral Waste Development Volume – (M^3)	411,792	63,936	86,400	86,400	63,024	57,600	54,432					
Lateral Waste Development – (t)(assumed density of 2.75t/m^3)	1,132,428	175,824	237,600	237,600	173,316	158,400	149,688					
Raise Development (m) (2.0m x 3.0m)	1,598	284	269	172	339	330	204					
Raise Development Volume M3	9,588	1,704	1,614	1,032	2,034	1,980	1,224					
Raise Development - tonnes (assumed density of 2.75t/m^3)	26,367	4,686	4,439	2,838	5,594	5,445	3,366					
Stope Production, CaF & LH (t)	1,752,662	0	62,000	149,000	190,304	206,000	199,242	270,022	274,691	272,826	128,575	
Development Ore (t)	553,472	0	224,892	165,228	47,959	60,010	55,574	0	0	0	0	
Total Ore (t)	2,306,134	0	286,892	314,228	238,263	266,010	254,816	270,022	274,691	272,826	128,575	0
Grade (g/t Au)	10.32	0.00	10.46	10.33	10.32	11.42	10.10	10.62	9.56	9.67	10.47	
Mill Production (t)	2,306,134		208,050	273,750	273,750	273,750	273,750	273,750	273,750	273,750	181,834	
Grade (g/t Au)	10.32		10.01	10.35	10.32	11.43	10.15	10.63	9.56	9.68	10.80	
Au Produced (oz)	668,549		58,546	79,598	79,406	87,910	78,104	81,803	73,504	74,496	55,182	
Tailings	2,306,134		208,050	273,750	273,750	273,750	273,750	273,750	273,750	273,750	181,834	
Tailings to underground backfill 42% (t)	968,576		87,381	114,975	114,975	114,975	114,975	114,975	114,975	114,975	76,370	
Tailings to TSF - 58% (t)	1,337,558		120,669	158,775	158,775	158,775	158,775	158,775	158,775	158,775	105,464	
Tails + Waste to TSF (t)	2,496,353	180,510	362,708	399,213	337,685	322,620	311,829	158,775	158,775	158,775	105,464	

4.0 Methods and Analyses

4.1 Sample Collection

The principal waste rock units were considered to be based on the geological maps described in the PEA (MMTS, 2019):

- Metavolcanic rock (basalt-andesite).
- Limestone.
- Serpentinite.
- Amphibole.

The sampling methodology and justification for the preliminary geochemical data collection are described below. Sample distribution based on material type and ultimate tonnage is provided in **Table 4.1**.

Table 4.1 Material Types

Material Type	Lithology Group Type	Ultimate Tonnage (M tonnes)	Location	Samples
Tailings	Sulfide-quartz	2.3	From met lab	1
	Sulfide-Quartz	N/A	From legacy facility	3
Economic Ore / Low Grade Ore	C-vein	~1.8	Drill core	11
	Y-vein	~0.5	Drill core	6
Waste Rock	Mafic-Ultramafic or other	1.1	Drill core / surface grab samples	30 (25 from drill core, 5 grab samples)

Samples comprised drill core material collected by Canagold and legacy mines (grab samples) that were collected during a field investigation in 2021. Each sample comprised approximately 2 kg to ensure adequate sample mass for static and possible kinetic testing.

Composite drill core samples were collected over interval ranges greater than 0.5 m that did not show major changes in lithology, mineralogy, texture, veining or sulphide occurrence along the interval length. The samples were collected from economic ore/low grade ore from the C-vein and Y-vein, and from development areas (waste rock).

4.1.1 Low-Grade Ore

A total of 17 low-grade ore (LGO) samples were collected from the C-Vein and Y-Vein zones (**Table 4.2**).

Table 4.2 Low Grade Ore (LGO) Sample Summary

Sample ID	Lithology	Hole ID	From (m)	To (m)
2021-10-20-1C	C-Vein	06-1646E4	197	198
2021-10-20-2C	C-Vein	06-1646E4	210.5	213
2021-10-20-5C	C-Vein	06-1813E2	335.5	340
2021-10-20-6C	C-Vein	06-1813E2	330	335
2021-10-20-7C	C-Vein	06-300SW4	235	240
2021-10-20-8C	C-Vein	06-300SW8	336	340
2021-10-20-12Y	Y-Vein	06-1737E6	359	365
2021-10-20-14Y	Y-Vein	06-1859E2	430	445
2021-10-24-16Y	Y-Vein	06-1646E5	249	252
2021-10-24-18Y	Y-Vein	06-1768DE1	481	484
2021-10-24-19Y	Y-Vein	P91Y01	235	237
2021-10-24-20Y	Y-Vein	PC8916	219	221
2021-10-24-21Y	Y-Vein	PT9732	125	131
2021-10-24-22Y	Y-Vein	PC8916	223	224
2021-10-24-23Y	Y-Vein	P91Y04B	362	364

4.1.2 Waste Rock / Legacy Mine Rock

Sampling focused on selecting distinct rock types with varying degrees of alteration and mineralization which may influence the ML/ARD risk. A total of 28 waste rock samples were collected from 25 drill holes with an additional 5 grab samples of legacy mine rock (from the Mafic-Ultramafic (basalt-andesite) or other formations), (**Table 4.3**). The spatial distribution of samples will be assessed once a mine plan is completed, in accordance with the phased approach to waste rock characterisation.

Table 4.3 Drill Core and Grab Waste Rock Samples Summary

Sample ID	Lithology	Hole ID	From (m)	To (m)
2021-10-20-1W	Basalt and andesite/other	06-300SW4	269	274
2021-10-20-2W	Basalt and andesite/other	06-300SW4	274	299
2021-10-20-3W	Basalt and andesite/other	06-300SW8	344	365
2021-10-20-4W	Basalt and andesite/other	06-1737E6	365	390
2021-10-20-5W	Basalt and andesite/other	06-1859E2	442	460
2021-10-20-9WDec	Basalt and andesite/other	PT9744	215	220
2021-10-20-11Wvent	Basalt and andesite/other	PT9744	159	162
2021-10-20-14W	Basalt and andesite/other	06-1615E8	358	368
2021-10-20-19W	Basalt and andesite/other	06-1646E1	145	155
2021-10-20-22W	Basalt and andesite/other	PC8916	159	171

Sample ID	Lithology	Hole ID	From (m)	To (m)
2021-10-20-24W	Basalt and andesite/other	PC8916	141	152
2021-10-20-D-25W	Basalt and andesite/other	P91Y04B	167	405
2021-10-21-26WG	Basalt and andesite/other [i)]	Surface grab sample		
2021-10-21-27WG	Basalt and andesite/other [i)]	Surface grab sample		
2021-10-21-28WG	Basalt and andesite/other [i)]	Surface grab sample		
2021-10-21-29WG	Basalt and andesite/other [i)]	Surface grab sample		
2021-10-21-30WG	Basalt and andesite/other [i)]	Surface grab sample		

Notes:

Mafic-Ultramafic = basalt and andesite (MMTS, 2019).

[i)] Based on anecdotal information belatedly received from Canagold in 2025 it is understood that the legacy mine rock samples were most likely residual ore left over from milling of materials from the Tulsequah Chief Mine.

4.1.3 Tailings and Composite

One flotation tailings sample comprising around 1kg of wet filter cake was submitted for testing. A split of the filter cake was air-dried, and the remainder was left 'as is' and used to produce a co-disposal composite sample using 620 g of tailings and 380 g of waste. The basis of these amounts was based on 1,000 tpd of plant feed, 125 tpd of concentrate going through the BIOX and leaching. The total tailings solids will consist of three streams in the following proportion:

(A) Flotation Tails	875 tpd (76%)
(B) Neutralization Solids	160 tpd (14%)
(D) Leach Tails (Detox Solids)	120 tpd (10%)

4.2 Test Procedures

4.2.1 Static Test Work

'Static test' refers to analytical procedures that quantify the fundamental geochemical properties of materials. Static testing comprised:

4.2.1.1 Acid-Base Accounting

Modified acid-base accounting (ABA) is used to determine the acid generation potential (AP) and acid neutralisation potential (NP) of mine wastes, the ratio of which is used to predict the ARD risk. ABA analyses included:

- Fizz test
- Total sulphur and sulphur species to calculate acid potential (AP)
- Acid neutralization potential (NP) using the standard Sobek method
- Total Inorganic Carbon (TIC)
- Neutralization potential ratio.

Sulphide was calculated as the difference between total sulphur and sulphate sulphur. Acid potential (AP) was calculated based on Sulphide-Sulphur.

Sulphur Species

The most common sulphur species occur as sulphide-S or thiosalts (minerals containing S^{2-} or S^{2-}), other sulphur species, organic S, and sulphate-S. The predominant sulphur forms are sulphidic minerals such as pyrite (FeS_2), pyrrhotite ($Fe_{1-x}S$), chalcopyrite ($CuFeS_2$) and arsenopyrite (FeAsS) which can react with oxygen and water to generate ARD. Under acidic conditions at pH less than 3, ferric iron can act as the primary sulphide oxidant in an accelerated process catalysed by the presence of bacteria (e.g., *Thiobacillus ferrooxidans*).

Total sulphur was determined by Leco induction furnace. Sulphide-S and sulphate-S were determined by sequential extraction with hydrochloric acid (HCl).

4.2.2 Acid Buffering Characteristic Curve

Acid Buffering Characteristic Curve (ABCC) testing was conducted on three LGO samples and one waste rock sample. This method involves the titration of a sample with dilute HCl while monitoring the pH. This test assists in the determination of reactive NP in a sample that is capable of acid neutralization and pH buffering. Neutralization Potential may be provided by reactive carbonate minerals, as well as less reactive silicates.

4.2.3 Trace Metal Analysis

All waste rock and LGO samples were digested (aqua regia) and analysed with inductively coupled plasma, optical emission spectroscopy/mass spectroscopy (ICP-OES/MS) to determine trace element concentrations. If a sample contained elevated element concentrations, then this may indicate an increased ML risk.

The trace elemental concentrations were compared to the Global Abundance Index (GAI). The GAI is calculated to determine a material's enrichment relative to a reference (in this case, median continental crust concentrations; Lide, 2008). Assuming that C is the concentration in the sample and S is the concentration in the reference material, the GAI is estimated using the following equation:

$$GAI=\log_2(C/1.5*S)$$

As a general guide, a GAI value of 3 or above is considered significant, which represents 12 to 24 times median background concentration.

4.2.4 Shake Flask Extraction

Shake flask extraction (SFE) were conducted to assess the ML risk using deionised water and a 3:1 liquid to solid ratio (by wt.). Shake flask extraction was performed on 3 LGO (C-Vein), 4 LGO (Y-Vein), 11 Drill Core waste rock samples (Mafic-Ultramafic and others), and 5 Grab Waste rock samples.

4.3 Kinetic Testing

Kinetic tests are used to help confirm the ARD/ML risk predicted from static testing. Laboratory humidity cells are designed to accelerate sample oxidation and provide suitable data to estimate lag times to acid generation and metal loading rates for possible use in water quality modelling.

Kinetic humidity cell testing was carried out which involves repeated leaching of a sample via addition of de-ionized water and collection of resulting leachates on a weekly basis for analysis. Sulphide oxidation is promoted by air being periodically blown onto the sample. Rock samples are typically crushed to 6.3mm minus particle size, while tailings samples are used as-is.

Based on results of the ABA testing and waste materials management objective, five samples from drill core were selected for humidity cell testing. Humidity cell samples were selected to be representative of flotation tailings, and mine wastes that will be stored at the mine waste disposal facilities during mine construction and operations. A composite blend of waste rock was submitted for laboratory testing to be representative of construction materials, labelled as 'PRECOMP 1+2' (**Table 4.4**).

Table 4.4 Humidity Cell Sample Survey

Cell No.	Sample Name	Sample Description \ Representation	Cell Construction
T 1	NP Flotation tails	Tailings	1 kg of floatation tailings
T 2	Co-disposal	Co-disposal combined waste	Tailings and waste rock composite – 620 g tailings + 380 g waste rock (Pre-composite 1+2)
T 3	T3-PAG	Underground wall (reactive) and surficial deposits	1kg comprising 200g splits from the five legacy mine rock samples
HC 1	Pre-composite 1+2	Construction material	Waste rock composite – 1kg waste rock blend (Pre-composite 1+2)
HC 2	Cell 4 – LGO	Low grade ore stockpile	1 kg of low-grade ore

4.3.1 Carbonate Molar Ratio

The carbonate molar ratio (CMR) is used to examine the relationship between the rate of carbonate mineral dissolution and sulphide oxidation. The CMR indicates the effective site-specific NPR required to maintain neutral pH conditions on the basis of the following equation:

$$\text{Carbonate Molar Ratio:} \quad \frac{[\text{moles } Ca^{2+}] + [\text{moles } Mg^{2+}]}{[\text{moles } SO_4^{2-}]}$$

Carbonate Molar Ratio theory assumes that the primary acid-buffering phase comes from reactive carbonate minerals, that all calcium and magnesium is derived from carbonate dissolution and that all sulphate is derived from sulphide oxidation. CMR values between one and two indicate a sample is capable of neutralising acidity from sulphide oxidation, while a CMR value less than one indicates the reverse.

4.3.2 Mineralogical Testing

X-Ray Diffraction (XRD) with Rietveld Refinement was used to determine the mineralogy of mine samples. Samples are pulverized prior to the identification of various crystalline phases present, as well as their semi-quantitative abundances. Three LGO samples and seven waste rock samples were submitted for mineralogical analyses.

4.4 Quality Assurance and Quality Control

Quality assurance / quality control (QA/QC) of all analysed samples was completed during analysis by SGS Laboratory Services in Burnaby Canada.

The QA/QC procedures included:

- 1 duplicate sample was analysed for every 10 samples and the acceptable relative percent difference (RPD) was ±20. The RPD was only calculated provided that measured concentrations were five times higher than the detection limit.
- 1 method blank was analysed per batch of 20 samples.
- 1 liquid blank was analysed per day; and
- For crushed samples, particle size analysis of crushed material was checked every 20th sample.

All laboratory analytical test results were verified against the following QA/QC criteria:

- Sulphate-sulphur results should be less than or equal to total sulphur results within acceptable margin of 30%.
- As recommended in MEND (2009) for fizz rating, Neutralization potential results for each fizz test should not exceed the maximum indicated by acid strength and volume.
- Duplicate results should be within 20% RPD values for ABA and less than 30% for metals, for results more than 10 times the detection limit.
- Control reference materials were analysed in each batch and results should be with the tolerance ranges established by the laboratory.

5.0 Results and Discussion

5.1 Quality Assurance and Quality Control Results

All the analytical data presented in this report passed the QA/QC criteria described in **Section 4.4**. The laboratory certificates of analyses are provided at the end of the Appendices and includes results from the laboratory QA/QC process.

5.2 Guidelines

The BC Water quality objectives (WQOs) was used to set benchmarks for baseline characterizations. Kinetic test leachate and SFE concentrations were compared to the most stringent WQOs. The ML risk was assessed by comparing leachate concentrations to BC guidelines for protection of freshwater aquatic life (BCFAL, 2021). This was carried out for screening purposes to identify parameters that may be prone top leaching in the field. In the event that, Approved Water Quality Guideline is not available for certain constituents, the Working Water Quality Guideline was used.

5.2.1 Elemental Concentrations

All low-grade ore (LGO) and waste rock samples were analysed for trace element concentrations. Results were compared with median elemental concentrations in the continental crust (Lide, 2008), which followed a method outlined in the Global Acid Rock Drainage Guide (INAP, 2009). The method determined the geochemical abundance index (GAI) for which the following classifications are defined:

GAI=3 represents 12 to 24 times median continental crust content

GAI=4 represents 24 to 48 times median continental crust content

GAI=5 represents 48 to 96 times median continental crust content

GAI=6 represents more than 96 times median continental crust content

Based on the INAP (2009) classification, “a GAI of 3 or above is considered significant and such an enrichment may warrant further examination”.

5.2.2 Risk of ARD

The ARD risk was assessed based on the Neutralisation Potential Ratio (NPR) from the ABA results (MEND, 2009), (**Table 5.1**).

Table 5.1 Acid Generation Classification Criteria

Acid Generation Potential	Classification Criteria	Description
Potentially acid generating (PAG)	NPR < 1	Likely to generate acidity
Uncertain	1 < NPR < 2	Uncertain risk of acid generation
Not Potentially acid generating (NPAG)	NPR ≥ 2	Low risk of acid generation

NPR = neutralization potential ratio; NPR = NP/AP

5.2.3 Risk of Metal Leaching

The ML risk was assessed by comparing leachate concentrations to BC guidelines for protection of freshwater aquatic life (BCFAL, 2021). This was carried out for screening purposes to identify parameters that may be prone to leaching in the field. Laboratory test leachate concentrations may not mimic those in the field due to different climatic and hydrological conditions.

5.3 Mineralogical Testing

Results of the mineralogical analyses of mine waste from a previous and the current geochemical characterization program are discussed below.

5.3.1 Mineralogy of URS (2007) Kinetic Samples

Previous mineralogical analysis of ore samples indicated that gold mineralization is associated primarily with arsenopyrite (FeAsS), pyrite (FeS_2), and stibnite (Sb_2S_3). Approximately 10% of the ore material consisted of various sulphides. Stibnite represented less than 0.1% of sulphide minerals. Mineralogical analyses of ore sample by XRD indicated 32% Dolomite, 32% Mica/Illite, 23% Quartz, 5% Arsenopyrite, < 5% Pyrite, < 3% K-Feldspar, and < 5% "Unidentified" (possibly amorphous phase) by weight. Pyrite was the primary source of acid potential (AP) in grab waste rock samples.

5.3.2 Mineralogy of Ausenco (2021) LGO and waste rock Samples

Mineralogical results are displayed in **Table 5.2** and **Table 5.3** (humidity cell samples). Pyrite was detected in most samples; except in the LGO sample 2021-10-24-19Y (Y-vein) and the floatation tailings in which no sulphide minerals were detected. Other sulphide minerals such as chalcopyrite and sphalerite were detected in legacy mine rock sample 2021-10-21-27WG. Arsenopyrite and pyrrhotite were detected in multiple LGO (Low Grade Ore) and waste rock samples, including 2021-10-20-5C (C-vein), 2021-10-21-27WG, 2021-10-24-25Y, and 2021-10-24-41W (Andesite and basalt).

Ankerite ($CaFe(CO3)_2$) was measured in significant percentages in samples 2021-10-24-25Y, 2021-10-24-41W, and tailings samples.

Calcite was present in LGO sample 2021-10-24-19Y and in all humidity cell samples except for LGO samples. Dolomite at 30.8 wt.% and 14.3% were measured in the humidity cell LGO and NP Flotation Tailing samples respectively. All other humidity cell samples contained both carbonate and dolomite.

Table 5.2 Mineralogical analysis for LGO and waste rock samples.

Mineral/ Compound	Chemical Formula	2021-10-20-5C	2021-10-21-27WG	2021-10-24-19Y	2021-10-24-25Y	2021-10-24-41W
		LGO (C-vein)	Legacy Mine Rock	LGO (Y-vein)	LGO (Y-vein)	Waste-Drill Core
		(wt %)				
Quartz	SiO_2	31.4	22.2	0.36	27.4	37.9
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$	23.7	13.5	3.85	34.0	11.9
Arsenopyrite	FeAsS	2.58	0.77	-	0.87	1.51
Pyrite	FeS_2	9.15	1.88	-	2.27	2.25
Dolomite	$CaMg(CO_3)_2$	23.5	-	-	-	-
Jarosite	$KFe_3(SO_4)_2(OH)_6$	7.75	16.9	-	-	-
Biotite	$K(Mg,Fe)_3(AlSi_3O_{10})(OH)_2$	1.95	-	-	-	-
Chalcopyrite	$CuFeS_2$	-	5.85	-	-	-
Sphalerite	ZnS	-	8.26	-	-	-
Albite	$NaAlSi_3O_8$	-	10.3	7.47	4.05	3.01
Anhydrite	$CaSO_4$	-	1.85	-	-	-
Barite	$BaSO_4$	-	6.34	-	-	-
Hornblende	$(Ca,Na)_2$-$3(Mg,Fe,Al)_5Si_6(Si,Al)_2O_{22}(OH)_2$	-	3.33	-	-	-
Diopside	$CaMgSi_2O_6$	-	4.73	-	-	-
Pyrrhotite	Fe_7S_8	-	1.80	-	1.43	1.45
Chlorapatite	$Ca_5(PO_4)_3Cl$	-	2.24	-	-	-
Chlorite	$(Fe,(Mg,Mn)_5,Al)(Si_3Al)O_{10}(OH)_8$	-	-	23.5	9.17	13.4
Actinolite	$Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$	-	-	63.9	0.64	2.07
Calcite	$CaCO_3$	-	-	0.93	-	-
Ankerite	$CaFe(CO_3)_2$	-	-	-	20.1	26.5
Basaluminite	$Al_4(SO_4)(OH)_{10}$•$5(H_2O)$	-	-	-	-	-
Microcline	$KAlSi_3O_8$	-	-	-	-	-
TOTAL		**100**	**100**	**100**	**100**	**100**

5.3.3 Mineralogy of Ausenco (2021) Kinetic Test Samples

The dominant neutralization mineral in all of the five kinetic test samples was dolomite [$(Ca,Mg)(CO_3)_2$], **Table 5.3**.

Table 5.3 Humidity Cell Sample XRD Results

Mineral/ Compound	Chemical Formula	T2 Co-disposal	HC1 - Pre-composite	T3 - Legacy mine rock	HC2 - LGO	T1- Flotation Tails
		(wt %)				
Quartz	SiO_2	26.5	13.1	25.1	29	34.4
Muscovite	$KAl_2(AlSi_3O_{10})$ $(OH)_2$	9.8	5.5	23.7	13.5	21.7
Arsenopyrite	FeAsS	-	-	-	-	-
Pyrite	FeS_2	0.5	0.6	1.4	2.3	-
Dolomite	$CaMg(CO_3)_2$	24.6	10.8	7.3	30.8	14.3
Jarosite	$KFe_3(SO_4)_2$ $(OH)_6$	-	-	-	0.7	-
Biotite	$K(Mg,Fe)_3$ $(AlSi_3O_{10})(OH)_2$	4.7	9.4	0.9	5	1.2
Chalcopyrite	$CuFeS_2$	-	-	-	-	-
Sphalerite	ZnS	-	-	-	-	-
Albite	$NaAlSi_3O_8$	11.4	20.8	10.2	5.4	1.1
Anhydrite	$CaSO_4$	-	-	-	-	-
Barite	$BaSO_4$	-	-	7.4	-	-
Hornblende	$(Ca,Na)_2$- $3(Mg,Fe,Al)_5Si_6$ $(Si,Al)_2O_{22}(OH)_2$	6.6	17.1	7	3.9	-
Diopside	$CaMgSi_2O_6$	0.1	1	3.2	-	-
Pyrrhotite	Fe_7S_8	-	-	-	-	-
Chlorapatite	$Ca_5(PO_4)_3Cl$	-	-	-	-	-
Chlorite	$(Fe,(Mg,Mn)_5,Al)$ $(Si_3Al)O_{10}(OH)_8$	12.5	16.3	2.3	9.5	4.9
Actinolite	$Ca_2(Mg,Fe)_5$ $Si_8O_{22}(OH)_2$	-	-	2.5	-	-
Calcite	$CaCO_3$	3.3	5.4	4.4	-	1
Ankerite	$CaFe(CO_3)_2$	-	-	-		19.3
Basaluminite	$Al_4(SO_4)(OH)_{10}$• $5(H_2O)$	-	-	2.1	-	-
Microcline	$KAlSi_3O_8$	-	-	2.7	-	2
Total		**100**	**100**	**100**	**100**	**100**

5.4 Elemental Analysis

Table 5.4 summarizes the corresponding calculated GAI for the mean and median concentrations of elements in the waste rock and LGO samples. Compared to the GAI, As, Sb, Ag, Cd, Hg, Pb, and Se are enriched relative to the continental crust.

- As and Sb are enriched in LGO and waste samples,
- Ag, Cd, Hg, Pb, and Se are elevated in some waste samples.

The results were compared to three times average crustal abundance values (Lide, 2008) to screen for parameters that were anomalously high. **Table 5.4** shows summary of elements for which LGO and the mine waste materials exceed three times the average crustal abundance (shown in red).

Table 5.4 Geochemical abundance indices for LGO and waste rock samples

			Ag	Cu	Zn	As	Cd	Hg	Pb	Sb
Median continental crust concentrations: (mg/kg) *(Lide, 2008)*			0.075	60	70	1.8	0.15	0.09	14	0.2
Sample Type	Source		Geochemical Abundance Index							
LGO	C vein	Mean	1	0	0	6	0	0	0	6
		Median	0	0	0	6	0	0	0	6
	Y vein	Mean	1	0	0	6	0	0	0	6
		Median	1	0	0	6	0	0	0	6
Waste	Drill core	Mean	0	1	0	6	0	0	0	6
		Median	0	0	0	6	0	0	0	6
	Legacy mine rock sample	Mean	6	6	6	6	6	6	6	6
		Median	6	0	3	6	6	6	6	6

Calculated GAIs for the humidity cell samples are displayed in **Table 5.5**. The T3-PAG in Humidity Cell T3 showed the most enrichment relative to continental crust. All the humidity cell samples were significantly enriched in As, Sb, Se, and Te. The legacy mine rock sample (T3-PAG material) was enriched in a wide range of metals, including Ag, As, Bi, Cd, Cu, Hg, Pb, Sb, Se, Te, and Zn. **Appendix A** shows the complete solid phase elemental results for all mine material samples.

Table 5.5 Geochemical abundance indices for Humidity Cell Samples

Element	Median continental crust concentrations: (mg/kg) *(Lide 2008)*	Geochemical Abundance Index				
		T2 - Co-disposal	HC1- Precomposite1+2	T3 - PAG Material	HC2- LGO	T1- Flotation
		Tailings-Waste Co-disposal	Waste Composite	Legacy Mine Rock	Low Grade Ore	Tailings flotation
Ag	0.075	0	0	6	2	0
As	1.8	6	6	6	6	6
Bi	0.0085	0	0	6	1	0
Cd	0.15	0	0	6	0	0
Cr	102	0	1	0	1	0
Cu	60	0	1	6	0	0
Hg	0.09	0	0	6	0	0
Mo	1.2	0	0	2	0	0
Pb	14	0	0	6	1	0
Sb	0.2	6	6	6	6	6
Sc	22	0	0	0	0	0
Se	0.05	4	4	6	4	2
Te	0.001	6	6	6	6	5
Tl	0.85	0	0	1	0	0
Zn	70	0	0	6	0	0

5.5 Shake Flask Extraction

5.5.1 LGO SFE Results

The SFE results indicated that the legacy mine rock samples tended to exhibit more acidic pH and elevated metal concentrations compared to LGO and drill core waste rock samples. For example, leachate concentrations of Cd, Pb, Se, Ag, and Zn from legacy mine rock samples indicate these metals susceptibility to solubilization upon exposure of weathered waste material to water. The legacy mine rock sample represented distinct weathered material, most likely ore (from Tulsequah Chief), and hence, may not be representative of development waste rock stored in the co-disposal facility.

Measured parameters and metal concentrations in the SFE leachates are displayed in **Table 5.6** in comparison to BCFAL as a screening process to identify parameters that may be prone to leaching in the field.

Key results are summarized as follows:

- pH values ranged from 8.06 to 8.70 in LGO samples, 8.19 to 9.44 in drill core-waste rock samples, 3.28 to 8.22 grab waste rock samples, and 8.72 in tailings sample. Lower pH values than the WQO correspond with samples classified as PAG in either ABA pH testing or with elevated total sulfur content as in the legacy mine rock samples.
- Sulphate values ranged from 0.3 to 86.9 mg/L in LGO samples, 0.2 mg/L to 38.8 mg/L in drill core-waste rock samples, 0.8 to 100.9 mg/L in legacy mine rock samples. The highest sulphate concentrations were measured in samples with elevated sulphur content.
- Aluminum values ranged from 0.089 to 0.349 mg/L in LGO samples, 0.048 to 0.378 mg/L in drill core-waste rock samples, and 0.013 to 0.393 mg/L in the waste rock samples. The highest aluminum concentrations were measured in the legacy mine rock samples and exceeded BCFAL criteria.

Table 5.6 SFE Results for LGO Samples

Sample ID		2021-10-20-1C	2021-10-20-5C	2021-10-20-8C	2021-10-24-16Y	2021-10-24-21Y	2021-10-24-23Y	2021-10-24-25Y	BC FAL
Parameter	Units	LGO (C-Vein)	LGO (C-Vein)	LGO (C-Vein)	LGO (Y-Vein)	LGO (Y-Vein)	LGO (Y-Vein)	LGO (Y-Vein)	
pH		8.46	8.06	8.40	8.72	8.41	8.48	8.67	6.5-9.0
Redox	mV	248	265	236	213	233	235	235	
Conductivity	µS/cm	125	310	130	152	206	103	163	
Acidity (to pH 4.5)	mg CaCO3/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Acidity (to pH 8.3)	mg CaCO3/L	0.2	1.3	0.5	0.0	0.5	0.0	0.0	
Alkalinity	mg CaCO3/L	48.6	41.4	54.1	55.0	52.8	46.5	63.7	
Sulphate	mg/L	0.5	86.9	5.5	13.6	27.0	0.3	15.2	128
Dissolved Metals									
Hardness CaCO3	mg/L	21	68	42	32	47	28	36	
Aluminum Al	mg/L	0.089	0.095	0.177	0.349	0.083	0.126	0.329	0.05
Antimony Sb	mg/L	0.567	0.469	1.79	0.169	0.514	0.358	0.244	0.009*
Arsenic As	mg/L	1.44	0.616	0.508	0.151	3.46	0.944	0.247	
Barium Ba	mg/L	0.0249	0.00306	0.00714	0.00312	0.00188	0.00769	0.00284	
Beryllium Be	mg/L	0.000007	0.0000035	0.0000035	0.0000035	0.0000035	0.0000035	0.0000035	
Boron B	mg/L	0.02	0.052	0.031	0.026	0.019	0.025	0.027	
Cadmium Cd	mg/L	0.0000015	0.00001	0.0000015	0.0000015	0.0000015	0.0000015	0.000005	0.00003
Calcium Ca	mg/L	4.49	13.2	9.5	7.84	9.6	6.31	8.02	
Chromium Cr	mg/L	0.00049	0.00004	0.00004	0.00004	0.00035	0.00036	0.00004	
Cobalt Co	mg/L	0.000096	0.00129	0.000234	0.00107	0.000874	0.00015	0.000457	0.10
Copper Cu	mg/L	0.0007	0.0044	0.0008	0.0009	0.001	0.0007	0.0021	
Iron Fe	mg/L	0.045	0.02	0.012	0.01	0.0035	0.0035	0.0035	0.35
Lead Pb	mg/L	0.000045	0.0003	0.000045	0.000045	0.000045	0.000045	0.000045	0.003
Lithium Li	mg/L	0.0018	0.0037	0.0035	0.0033	0.0026	0.0026	0.0039	
Magnesium Mg	mg/L	2.47	8.48	4.32	3.07	5.67	2.9	3.76	

Sample ID		2021-10-20-1C	2021-10-20-5C	2021-10-20-8C	2021-10-24-16Y	2021-10-24-21Y	2021-10-24-23Y	2021-10-24-25Y	BC FAL
Parameter	Units	LGO (C-Vein)	LGO (C-Vein)	LGO (C-Vein)	LGO (Y-Vein)	LGO (Y-Vein)	LGO (Y-Vein)	LGO (Y-Vein)	
Manganese Mn	mg/L	0.00089	0.0382	0.0042	0.00234	0.00348	0.00146	0.00606	0.68
Mercury Hg	ug/L	*0.005*	*0.005*	*0.005*	*0.005*	*0.005*	*0.005*	*0.005*	
Molybdenum Mo	mg/L	0.00038	0.00148	0.00017	0.00101	0.00328	0.00024	0.00043	
Nickel Ni	mg/L	0.0033	0.009	0.0047	0.0044	0.0321	0.0029	0.002	
Phosphorus P	mg/L	0.006	0.007	0.005	0.004	0.0015	0.0015	0.003	
Potassium K	mg/L	15.2	10.2	9.68	6.34	7.42	8.78	8.32	
Selenium Se	mg/L	0.00033	0.00024	0.00054	0.00021	0.00068	0.00016	0.00025	0.002
Silicon Si	mg/L	1.46	1.03	1.28	1.25	1.29	1.33	1.17	
Silver Ag	mg/L	0.00005	0.000025	0.000025	0.000025	0.000025	0.000025	0.000025	5.00E-05
Sodium Na	mg/L	6.84	23.6	2.37	14.7	17	2.87	12.8	
Stronium Sr	mg/L	0.0778	0.121	0.132	0.508	0.0996	0.111	0.0798	
Sulphur (S)	mg/L	3	31	3	7	12	2	6	
Thallium Tl	mg/L	0.000019	0.000035	0.000007	0.0000025	0.000019	0.000011	0.0000025	
Tin Sn	mg/L	*0.00003*	*0.00003*	*0.00003*	*0.00003*	*0.00003*	*0.00003*	*0.00003*	
Titanium Ti	mg/L	0.00017	0.00022	0.00006	0.00017	0.00009	0.00007	0.00007	
Uranium U	mg/L	0.000006	0.000045	0.000004	0.000011	0.000012	0.000006	0.000015	
Vanadium V	mg/L	0.00753	0.00202	0.00327	0.00367	0.0103	0.00682	0.00338	
Zinc Zn	mg/L	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	0.0075
Zirconium Zr	mg/L	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	

BCFAL: BC guidelines for protection of freshwater aquatic life (BCFAL, 2021).

Shaded values indicate concentration above screening criteria.

* Working BCFAL guideline.

0.0005 – Concentration below detection limit

5.5.2 Waste Rock SFE Results

- SFE results for waste rock samples are displayed in **Table 5.7** in comparison to BCFAL guidelines. Concentrations of arsenic, antimony, and aluminum were elevated above BCFAL in some or all samples.
- pH values ranged from 8.19 to 9.44 in drill core-waste rock samples just exceeding the BCFAL upper pH criterion of 9. Sulphate values ranged from 0.2 mg/L to 38.8 mg/L in waste rock samples.

Table 5.7 Waste Rock SFE Results

Parameter	Units	2021-10-20-1W	2021-10-20-9W	2021-10-20-24W	2021-10-24-31W	2021-10-24-35W	2021-10-24-36W	2021-10-24-37W	2021-10-24-38W	BCFAL, 2021 (Most conservative)
		Waste Rock	Waste Rock	Waste Rock	Waste Rock	Waste Rock	Waste Rock	Waste Rock	Waste Rock	
pH		8.65	8.40	8.40	8.19	8.81	8.96	8.73	9.44	6.5-9
Redox	mV	225	254	267	266	208	204	214	170	
Conductivity	µS/cm	138	100	87	209	104	108	141	184	
Acidity (to pH 4.5)	mg $CaCO_3$/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Acidity (to pH 8.3)	mg CaCO3/L	0.0	0.5	0.5	1.0	0.0	0.0	0.0	0.0	
Alkalinity	mg CaCO3/L	59.4	48.5	42.2	47.9	51.8	47.4	44.0	75.5	
Sulphate	mg/L	0.2	2.9	1.6	38.8	1.0	1.8	19.9	0.4	128.0
Dissolved Metals										
Hardness CaCO3	mg/L	32	36	28	70	11	11	17	6	
Aluminum Al	mg/L	0.212	0.281	0.141	0.048	0.138	0.378	0.107	0.227	0.05
Antimony Sb	mg/L	0.305	0.0443	0.0338	1.47	0.0165	0.0365	0.0141	0.227	0.009*
Arsenic As	mg/L	0.671	0.0525	0.101	0.712	0.0673	0.137	0.0498	0.966	0.005
Barium Ba	mg/L	0.00423	0.00414	0.00762	0.00851	0.00416	0.00117	0.00182	0.00403	
Beryllium Be	mg/L	0.0000035	0.0000035	0.0000035	0.0000035	0.0000035	0.0000035	0.0000035	0.0000035	
Boron B	mg/L	0.027	0.01	0.013	0.015	0.022	0.036	0.037	0.047	
Cadmium Cd	mg/L	0.0000015	0.0000015	0.0000015	0.000003	0.0000015	0.0000015	0.000004	0.000003	0.00003
Calcium Ca	mg/L	7	9.48	7.28	14.5	2.78	3.36	4.32	1.33	
Chromium Cr	mg/L	0.00029	0.00004	0.00024	0.00004	0.00071	0.0005	0.00048	0.00035	
Cobalt Co	mg/L	0.000327	0.000048	0.000068	0.000353	0.000057	0.000089	0.000089	0.000183	0.004
Copper Cu	mg/L	0.0006	0.0024	0.0009	0.0015	0.0018	0.0009	0.0018	0.0008	
Iron Fe	mg/L	0.0035	0.0035	0.0035	0.0035	0.032	0.03	0.011	0.0035	0.35
Lead Pb	mg/L	0.000045	0.00049	0.000045	0.000045	0.000045	0.00019	0.00017	0.000045	0.003
Lithium Li	mg/L	0.0028	0.001	0.0008	0.0022	0.0004	0.001	0.0009	0.0053	
Magnesium Mg	mg/L	3.65	2.93	2.38	8.09	1.04	0.622	1.62	0.589	
Manganese Mn	mg/L	0.00123	0.00411	0.00215	0.00667	0.00099	0.00102	0.00157	0.00037	0.68
Mercury Hg	ug/L	*0.005*	*0.005*	*0.005*	*0.005*	*0.005*	*0.005*	*0.005*	*0.005*	
Molybdenum Mo	mg/L	0.00091	0.00014	0.00036	0.00136	0.00069	0.0014	0.00047	0.00477	
Nickel Ni	mg/L	0.0056	0.0011	0.0004	0.0085	0.0004	0.0015	0.0057	0.0032	
Phosphorus P	mg/L	0.005	0.0015	0.0015	0.003	0.009	0.007	0.003	0.0015	
Potassium K	mg/L	6.29	4.91	4.03	8.5	4.57	6.52	5.34	5.55	
Selenium Se	mg/L	0.00033	0.0002	0.00012	0.00141	0.0003	0.00046	0.00103	0.00057	0.002
Silicon Si	mg/L	1.43	1.04	1.6	1.19	2.38	1.94	2.26	1.97	
Silver Ag	mg/L	*0.000025*	*0.000025*	*0.000025*	*0.000025*	*0.000025*	*0.000025*	*0.000025*	*0.000025*	5.00E-05

Parameter	Units	2021-10-20-1W	2021-10-20-9W	2021-10-20-24W	2021-10-24-31W	2021-10-24-35W	2021-10-24-36W	2021-10-24-37W	2021-10-24-38W	BCFAL, 2021 (Most conservative)
		Waste Rock	Waste Rock	Waste Rock	Waste Rock	Waste Rock	Waste Rock	Waste Rock	Waste Rock	
Sodium Na	mg/L	10.8	1.96	3.47	5.2	15.8	15.9	18.3	35.2	
Strontium Sr	mg/L	0.0866	0.0712	0.113	0.175	0.0326	0.0685	0.029	0.0288	
Sulphur (S)	mg/L	4	2	1	16	1	1	7	4	
Thallium Tl	mg/L	0.000008	0.000009	0.0000025	0.000019	0.000005	0.00001	0.000007	0.0000025	
Tin Sn	mg/L	*0.00003*	*0.00003*	*0.00003*	*0.00003*	*0.00003*	*0.00003*	*0.00003*	*0.00003*	
Titanium Ti	mg/L	0.000025	0.00015	0.00013	0.000025	0.00054	0.00102	0.00019	0.00017	
Uranium U	mg/L	0.000034	0.000018	0.000007	0.000079	0.000002	0.00001	0.000002	0.000004	
Vanadium V	mg/L	0.00642	0.00319	0.0132	0.00307	0.0174	0.0119	0.00614	0.041	
Zinc Zn	mg/L	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	0.0075
Zirconium Zr	mg/L	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	

BCFAL: BC guidelines for protection of freshwater aquatic life (BCFAL, 2021).
Shaded values indicate concentration above screening criteria.
* Working BCFAL guideline.
0.0005 – Values in Italics represent concentration below detect

5.5.3 Legacy Mine Rock SFE Results

SFE results for legacy mine rock samples are shown in **Table 5.8**. pH values ranged from 3.28 to 8.22 in comparison to the lower BCFAL pH limit of 6. Sulphate values ranged from 0.8 to 100.9 mg/L. Concentrations of antimony, aluminum, cadmium, iron, lead, selenium, silver, and zinc were elevated above BCFAL criteria for some or all samples.

Table 5.8 Legacy Mine Rock SFE Results

Parameter	Units	2021-10-21-26WG	2021-10-21-27WG	2021-10-21-28WG	2021-10-21-29WG	2021-10-21-30WG	(BCFAL, 2021 (Most conservative)
pH		6.02	3.28	7.36	8.22	3.86	6.5-9
Redox	mV	357	391	93	197	445	
Conductivity	µS/cm	30	417	129	116	92	
Acidity (to pH 4.5)	mg CaCO3/L	0.0	32.6	0.0	0.0	7.1	
Total Acidity (to pH 8.3)	mg CaCO3/L	3.7	87.3	1.7	0.7	11.5	
Alkalinity	mg CaCO3/L	3.5	0.0	42.8	50.3	0.0	
Sulphate	mg/L	6.2	100.9	10.2	0.8	14.5	128
Ion Balance							
Major Anions	meq/L	0.20	2.10	1.07	1.02	0.30	
Major Cations	meq/L	0.11	1.45	1.13	1.05	0.28	
Difference	meq/L	0.09	0.65	-0.06	-0.03	0.02	
Balance (%)	%	28.5%	18.3%	-2.8%	-1.2%	4.0%	
Dissolved Metals							
Hardness CaCO3	mg/L	1.7	8.5	50	44	2.2	
Aluminum Al	mg/L	0.013	0.393	0.016	0.103	0.047	0.05
Antimony Sb	mg/L	0.00045	0.0166	0.298	0.369	0.0016	0.009*
Arsenic As	mg/L	0.0004	0.0589	0.381	1.87	0.0035	0.005
Barium Ba	mg/L	0.284	0.0239	0.146	0.0221	0.145	
Beryllium Be	mg/L	0.0000035	0.00005	0.0000035	0.0000035	0.000007	
Bismuth Bi	mg/L	*0.000005*	*0.000005*	*0.000005*	*0.000005*	*0.000005*	
Boron B	mg/L	0.011	0.005	0.006	0.013	0.007	1.20
Cadmium Cd	mg/L	0.001453	0.0583	0.000717	0.000014	0.00092	0.000009
Calcium Ca	mg/L	0.38	1.59	14.6	12.6	0.51	
Chromium Cr	mg/L	0.00004	0.00054	0.00004	0.00014	0.00004	
Cobalt Co	mg/L	0.000058	0.00101	0.000153	0.000096	0.000338	0.004
Copper Cu	mg/L	0.0315	9.06	0.0072	0.0024	0.062	

Parameter	Units	2021-10-21-26WG	2021-10-21-27WG	2021-10-21-28WG	2021-10-21-29WG	2021-10-21-30WG	(BCFAL, 2021 (Most conservative)
Iron Fe	mg/L	0.0035	12.7	0.0035	0.011	0.089	0.35
Lead Pb	mg/L	0.253	5.89	0.0017	0.00013	0.146	0.003
Lithium Li	mg/L	0.0008	0.0018	0.0013	0.0012	0.0008	
Magnesium Mg	mg/L	0.184	1.11	3.36	2.98	0.215	
Manganese Mn	mg/L	0.00682	0.038	0.00908	0.00277	0.00951	0.56
Mercury Hg	ug/L	2.25	0.05	0.005	0.005	17.7	
Molybdenum Mo	mg/L	0.00002	0.00002	0.00136	0.00048	0.00002	7.60
Nickel Ni	mg/L	0.0002	0.0051	0.0008	0.0011	0.0012	
Phosphorus P	mg/L	0.0015	0.008	0.0015	0.0015	0.0015	
Potassium K	mg/L	0.55	0.505	3.85	5.53	0.747	
Selenium Se	mg/L	0.00033	0.0136	0.00035	0.00024	0.00149	0.002
Silicon Si	mg/L	3.82	2.83	1.25	1.08	3.64	
Silver Ag	mg/L	0.00009	0.0001	0.000025	0.000025	0.00025	0.00005
Sodium Na	mg/L	0.42	0.62	0.47	0.38	0.51	
Strontium Sr	mg/L	0.0164	0.0685	0.0958	0.0599	0.0402	
Sulphur (S)	mg/L	2	34	5	2	4	
Thallium Tl	mg/L	0.000591	0.0015	0.000028	0.000006	0.000529	
Tin Sn	mg/L	*0.00003*	*0.00003*	*0.00003*	*0.00003*	*0.00003*	
Titanium Ti	mg/L	0.00035	0.00088	0.00021	0.00029	0.0008	
Uranium U	mg/L	0.00001	0.000123	0.000037	0.000076	0.00002	
Vanadium V	mg/L	0.00002	0.00012	0.00043	0.00217	0.000005	
Zinc Zn	mg/L	0.323	13	0.046	0.001	0.204	0.0075
Zirconium Zr	mg/L	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	

BCFAL: BC guidelines for protection of freshwater aquatic life (BCFAL, 2021).

Shaded values indicate concentration above screening criteria.

* Working BCFAL guideline.

0.0005 – Values in Italics represent concentration below detection limit.

5.6 Modified Acid Base Accounting

5.6.1 Waste Rock and LGO

ABA results for LGO and waste rock samples are presented in **Table 5.9** and in **Table 5.10** and in **Figure 5.1**, **Figure 5.3**, **Figure 5.5**, and **Figure 5.7**. For the LGO and Co-disposal samples, the NP levels were higher and roughly equivalent (245.8 and 248.0 kgCaCO3/t, respectively). The mineralogy, in **Section 5.4** confirms the findings of the ABA data. Legacy mine rock samples were classified as PAG. All other samples were classified as NPAG.

Table 5.9 Acid Base Accounting Results

Sample ID	Source	Type	Paste pH	Total S %wt.	Sulphate %wt.	Sulphide %wt.	AP $tCaCO_3$/1000t	Modified NP	NNP $tCaCO_3$/1000t	NPR	ARD Classification
2021-10-20-1C	C-Vein	LGO	9.20	0.107	<0.01	0.08	2.5	253.5	251.0	101.4	NPAG
2021-10-20-2C	C-Vein	LGO	9.05	0.877	<0.01	0.82	25.6	296.0	270.4	11.6	NPAG
2021-10-20-5C	C-Vein	LGO	8.51	5.985	0.03	5.39	168.4	183.1	14.7	1.1	NPAG
2021-10-20-6C	C-Vein	LGO	9.27	0.098	<0.01	0.06	1.9	296.0	294.2	157.9	NPAG
2021-10-20-7C	C-Vein	LGO	9.06	1.510	<0.01	1.37	42.8	260.3	217.5	6.1	NPAG
2021-10-20-8C	C-Vein	LGO	9.18	0.439	<0.01	0.34	10.6	179.0	168.4	16.8	NPAG
2021-10-20-12Y	Y-Vein	LGO	9.03	0.064	<0.01	0.05	1.6	266.0	264.4	170.2	NPAG
2021-10-20-14Y	Y-Vein	LGO	8.74	0.072	<0.01	0.04	1.3	317.2	316.0	253.8	NPAG
2021-10-24-16Y	Y-Vein	LGO	9.12	0.707	0.01	0.53	16.6	200.4	183.8	12.1	NPAG
2021-10-24-18Y	Y-Vein	LGO	9.13	0.826	<0.01	0.66	20.6	146.3	125.6	7.1	NPAG
2021-10-24-19Y	Y-Vein	LGO	9.45	0.04	<0.01	<0.01	<0.3	24.6	24.6	164.2	NPAG
2021-10-24-20Y	Y-Vein	LGO	9.27	1.549	<0.01	1.33	41.6	287.7	246.1	6.9	NPAG
2021-10-24-21Y	Y-Vein	LGO	9.18	1.261	0.01	1.00	31.3	380.0	348.8	12.2	NPAG
2021-10-24-22Y	Y-Vein	LGO	9.31	1.563	<0.01	1.24	38.8	391.0	352.3	10.1	NPAG
2021-10-24-23Y	Y-Vein	LGO	9.37	0.159	<0.01	0.13	4.1	274.0	269.9	67.4	NPAG
2021-10-24-25Y	Y-Vein	LGO	9.15	1.771	<0.01	1.43	44.7	233.4	188.7	5.2	NPAG
2021-10-24-26Y	Y-Vein	LGO	9.17	0.084	<0.01	0.06	1.9	133.8	131.9	71.3	NPAG
2021-10-20-1W	Basalt and andesite/Other	Waste	8.98	0.263	<0.01	0.22	6.9	339.7	332.8	49.4	NPAG
2021-10-20-2W	Basalt and andesite/Other	Waste	8.97	0.100	<0.01	0.03	0.9	206.4	205.5	220.2	NPAG
2021-10-20-3W	Basalt and andesite/Other	Waste	9.30	0.059	<0.01	0.02	0.6	198.5	197.9	317.6	NPAG
2021-10-20-4W	Basalt and andesite/Other	Waste	9.35	0.071	<0.01	0.01	0.3	89.5	89.2	286.4	NPAG
2021-10-20-5W	Basalt and andesite/Other	Waste	9.40	0.161	<0.01	0.14	4.4	125.1	120.8	28.6	NPAG
2021-10-20-9W	Basalt and andesite/Other	Waste	9.03	0.299	<0.01	0.31	9.7	153.5	143.8	15.8	NPAG
2021-10-20-11W	Basalt and andesite/Other	Waste	9.41	0.294	<0.01	0.28	8.8	22.3	13.5	2.5	NPAG
2021-10-20-14W	Basalt and andesite/Other	Waste	9.28	0.309	<0.01	0.28	8.8	198.5	189.8	22.7	NPAG
2021-10-20-19W	Basalt and andesite/Other	Waste	9.30	0.113	<0.01	0.1	3.1	110.3	107.1	35.3	NPAG
2021-10-20-22W	Basalt and andesite/Other	Waste	9.11	0.127	<0.01	0.11	3.4	108.1	104.7	31.5	NPAG
2021-10-20-24W	Basalt and andesite/Other	Waste	9.08	0.031	<0.01	<0.01	<0.3	156.0	156.0	1040.0	NPAG
2021-10-24-31W	Basalt and andesite/Other	Waste	9.06	0.565	0.01	0.51	15.9	242.7	226.8	15.2	NPAG
2021-10-24-32W	Basalt and andesite/Other	Waste	9.28	0.165	<0.01	0.13	4.1	177.0	172.9	43.6	NPAG
2021-10-24-34W	Basalt and andesite/Other	Waste	9.45	0.262	<0.01	0.07	2.2	63.3	61.1	28.9	NPAG
2021-10-24-35W	Basalt and andesite/Other	Waste	9.34	0.029	<0.01	<0.01	<0.3	64.5	64.5	430.0	NPAG
2021-10-24-36W	Basalt and andesite/Other	Waste	9.77	0.087	<0.01	<0.01	<0.3	67.9	67.9	452.5	NPAG
2021-10-24-37W	Basalt and andesite/Other	Waste	9.43	0.105	<0.01	<0.01	<0.3	29.5	29.5	196.7	NPAG
2021-10-24-38W	Basalt and andesite/Other	Waste	9.43	0.069	<0.01	0.05	1.6	274.5	272.9	175.7	NPAG

Sample ID	Source	Type	Paste pH	Total S %wt.	Sulphate %wt.	Sulphide %wt.	AP $tCaCO_3$/1000t	Modified NP	NNP $tCaCO_3$/1000t	NPR	ARD Classification
2021-10-24-39W	Basalt and andesite/Other	Waste	9.38	0.129	<0.01	0.06	1.9	137.7	135.8	73.4	NPAG
2021-10-24-40W	Basalt and andesite/Other	Waste	9.75	0.182	<0.01	0.02	0.6	57.4	56.8	91.9	NPAG
2021-10-24-41W	Basalt and andesite/Other	Waste	9.00	2.183	<0.01	1.54	48.1	272.6	224.5	5.7	NPAG
2021-10-24-43W	Basalt and andesite/Other	Waste	9.19	1.302	<0.01	1.1	34.4	206.9	172.5	6.0	NPAG
2021-10-24-44W	Basalt and andesite/Other	Waste	9.31	0.206	<0.01	0.16	5.0	99.0	94.0	19.8	NPAG
2021-10-21-26WG	Legacy mine rock, grab sample	Waste	5.79	3.175	0.21	0.42	13.1	0.0	-13.1	0.0	PAG
2021-10-21-27WG	Legacy mine rock, grab sample	Waste	4.17	11.191	1.89	4.52	141.3	-11.4	-152.6	-0.1	PAG
2021-10-21-28WG	Legacy mine rock, grab sample	Waste	8.66	0.473	0.02	0.43	13.4	152.1	138.7	11.3	NPAG
2021-10-21-29WG	Legacy mine rock, grab sample	Waste	8.95	0.423	<0.01	0.4	12.5	194.4	181.9	15.6	NPAG
2021-10-21-30WG	Legacy mine rock, grab sample	Waste	5.79	3.832	0.31	0.47	14.7	-1.4	-16.1	-0.1	PAG

NP: neutralisation Potential.
AP: Acid Potential.
NPR: Neutralisation Potential Ratio (NP/AP).
NNP: Net Neutralisation Potential (NP-AP).

ABA Classification

Table 5.10 presents a statistical summary of the ABA results for LGO and Waste Rock samples.

Humidity cell sample ABA results are presented in **Table 5.11**. Based on the criteria, all humidity cell samples except the legacy mine rock sample (T3), predicted to be NPAG based on ABA results. Sample T3 was classified as having an uncertain ARD risk.

Table 5.10 ABA results for LGO and Waste Rock samples

Lithology	Statistic	Paste pH	TIC	$CaCO_3$	C(T)	S(T)	$S(SO_4)$	$S(S^{-2})$	Insoluble S	AP	Modified	Net Modified	NPR
			%	NP	%	%	%	%	%		NP	NP	
Low Grade Ore													
C-Vein (n=6)	min	8.51	2.20	183.33	2.49	0.10	0.03	0.06	0.03	1.88	179.00	14.66	1.09
	max	9.27	4.19	349.17	4.19	5.99	0.03	5.39	0.57	168.44	296.03	294.16	157.88
	avg	9.05	3.32	276.94	3.44	1.50	0.03	1.34	0.15	41.98	244.66	202.68	49.14
Y-Vein (n=11)	min	8.74	0.11	9.17	0.11	0.04	0.01	0.04	0.01	1.25	24.63	24.63	5.22
	max	9.45	5.25	437.50	5.47	1.77	0.01	1.43	0.34	44.69	391.00	352.25	253.78
	avg	9.17	3.27	272.80	3.44	0.74	0.01	0.65	0.15	20.22	241.30	222.92	70.96
Waste Rock													
Drill core (n=23)	min	8.97	0.12	10.00	0.13	0.03	0.01	0.01	-0.01	0.31	22.25	13.50	2.54
	max	9.77	4.55	379.17	4.67	2.18	0.01	1.54	0.64	48.13	339.70	332.83	1040.00
	avg	9.29	1.85	153.88	1.96	0.31	0.01	0.27	0.09	8.45	147.86	140.88	156.06
Legacy mine rock (grab sample) (n=5)	min	4.17	2.02	168.33	0.05	0.42	0.02	0.40	0.02	12.50	-11.38	-152.63	-0.09
	max	8.95	2.65	220.83	2.66	11.19	1.89	4.52	4.78	141.25	194.40	181.90	15.55
	avg	6.67	2.34	194.58	1.31	3.82	0.61	1.25	2.08	39.00	66.76	27.76	5.34

S(S-2) = Sulphide sulphur
AP = Acid Potential
NP = Neutralization Potential
NNP = Net Neutralization Potential
NPR = Neutralization Potential Ratio
TIC = Total Inorganic Carbon
S(T) = Total sulphur
S(SO4) = Sulphate sulphur

Table 5.11 Acid rock drainage classification of humidity cells samples

Sample ID	Paste pH	TIC	$CaCO_3$	S(T)	$S(SO_4)$	$S(S^{-2})$	Insoluble S	AP	Modified NP	NNP NP-AP	NPR NP/AP	ARD Classification (based on NPR)
	pH	%	NP	%	%	%	%	Kg $CaCO_3$/ tonne	Kg $CaCO_3$/ tonne	Kg $CaCO_3$/ tonne		
T2- Co-disposal	8.80	3.25	270.8	0.193	<0.01	0.11	0.08	3.4	248.9	245.5	72.4	NPAG
HC1-Precomp 1+2	9.3 0	1.76	146.7	0.267	<0.01	0.17	0.10	5.3	149.5	144.2	28.1	NPAG
T3- PAG	6.38	0.87	72.5	3.741	0.47	1.1	2.17	34.4	64.4	30.1	1.87	Uncertain
HC2- LGO	9.01	3.20	266.7	1.481	<0.01	1.35	0.13	42.2	245.8	203.6	5.83	NPAG
T1- Flotation Tails	8.72	4.51	375.8	0.145	<0.01	0.12	0.03	3.8	340.8	337.1	90.88	NPAG

5.6.2 Paste pH

The Paste pH values for all samples ranged from 4.17 to 9.77. The lowest pH value was associated with the PAG legacy mine rock samples.

The Flotation Tailings had a paste pH of 8.72. The circumneutral pH for the LGO, waste rock and Tailings samples suggest that there are potential buffering agents in these materials as supported by the alkalinity results. The acidic paste pH observed in the three legacy mine rock samples indicates acidity present from sulphide oxidation in the weathered samples (**Figure 5.1**).

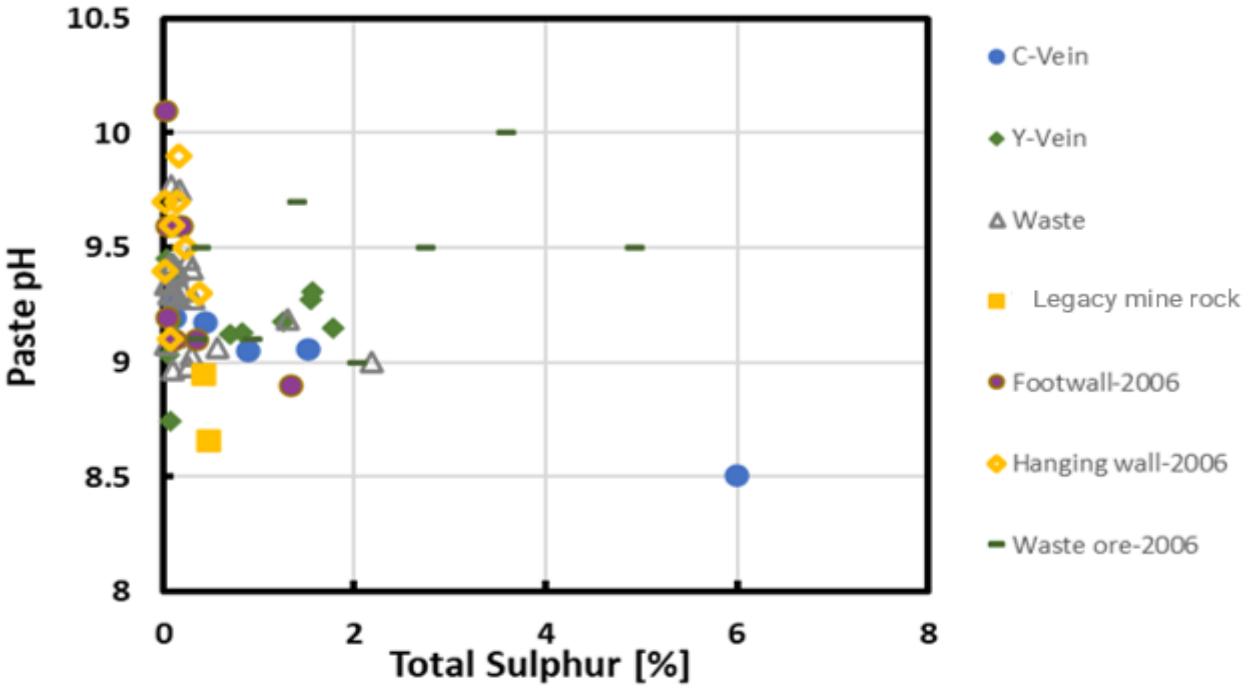


Figure 5.1 Paste pH vs Total Sulphur for Low Grade Ore and Waste Rock materials.

Comparison of the paste pH versus total sulphur has been presented for the T1-tailings, T2-Co-disposal, Waste rock samples, namely T3-PAG, H1-Pre-composite (H1), and Low-Grade Ore (H2) in **Figure 5.2**.

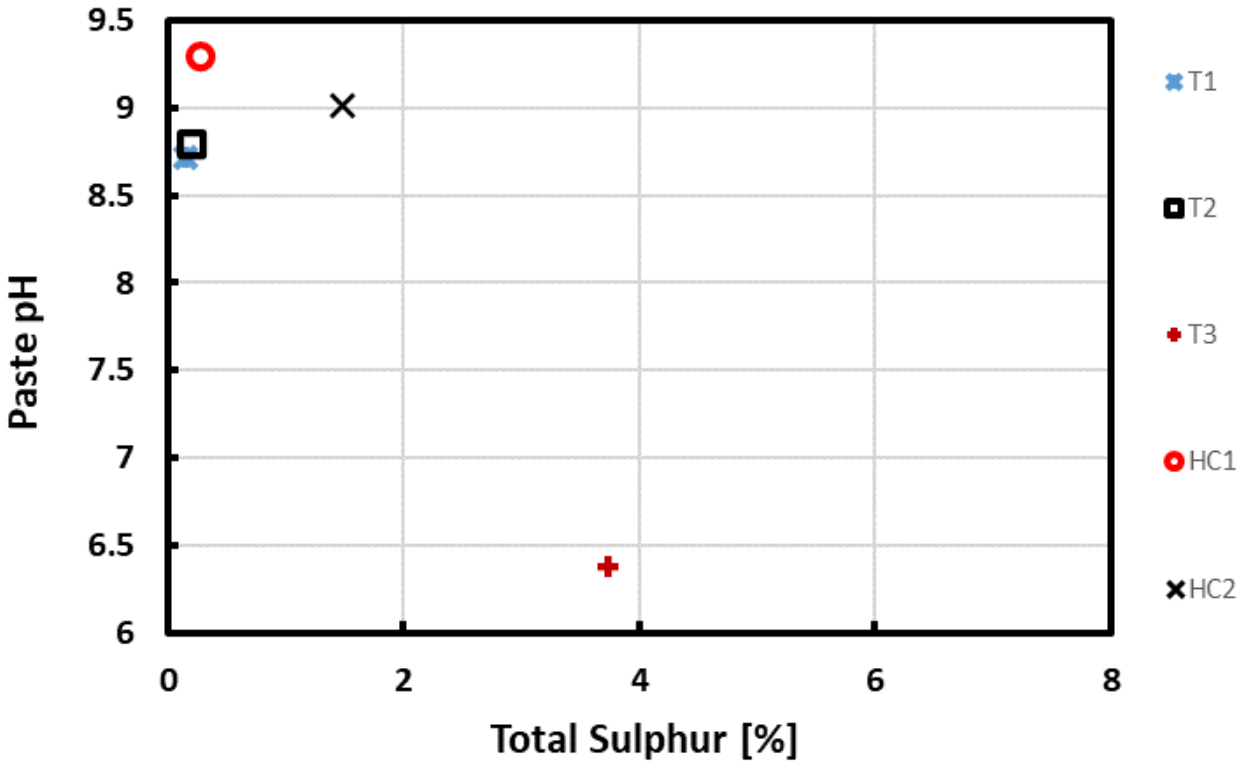


Figure 5.2 Paste pH vs Total Sulphur for Humidity Cell Samples

5.6.3 Sulphur Species

Total sulphur content ranged from 0.04 to 5.99 wt% in LGO samples and 0.04 to 11.19 wt% in legacy mine rock samples. On average, the total sulphur concentrations were the highest in the legacy mine rock samples (3.82 wt% as S), followed by the C-Vein-Low Grade Ore samples (1.5 wt% as S). The legacy mine rock samples contained total sulphur values an order of magnitude greater than the LGO (Y-vein) samples.

Sulphide-sulphur content ranged from 0.04 to 5.39 wt% in LGO samples and 0.04 to 4.52 wt% in waste rock samples. On average, the sulphide sulphur concentrations were the highest in the C-Vein LGO Samples (5.39 wt% as S), followed by the legacy mine rock samples (1.25 wt% as S), followed by Y-Vein LGO samples (0.65 wt% as S), and waste rock samples (0.27 wt% as S). The relation between sulphide-sulphur content and total sulphur content for waste rock material is shown in **Figure 5.3**.

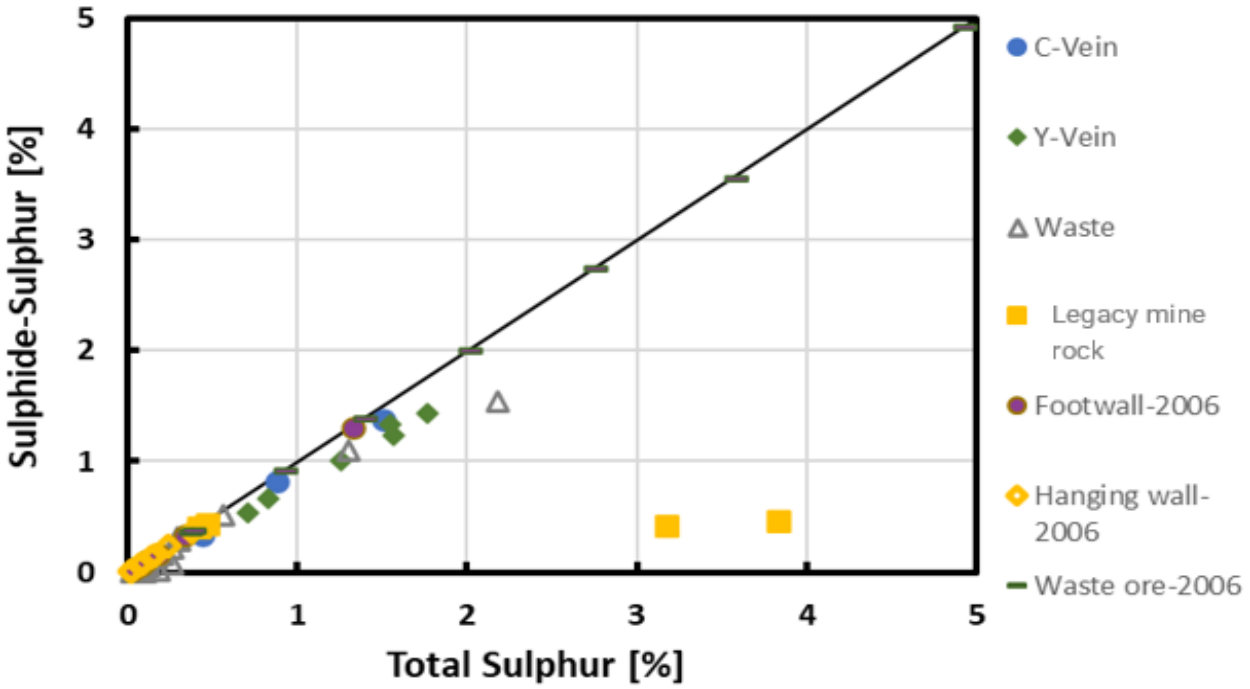


Figure 5.3 Sulphide-Sulphur vs Total Sulphur Waste Rock material

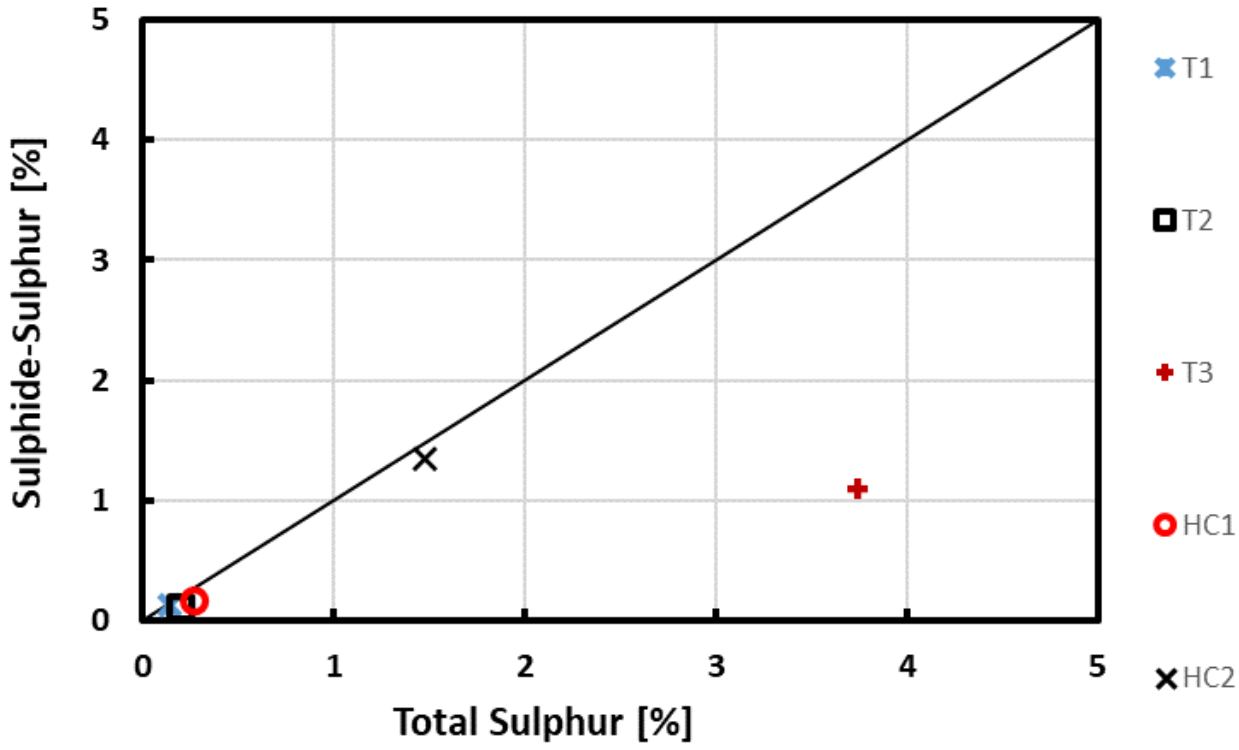


Figure 5.4 Sulphide-Sulphur vs Total Sulphur – Humidity Cell materials

Comparison of the sulphide sulphur versus total sulphur for the humidity cell samples is presented in **Figure 5.4**. Sulphide-sulphur content was generally low and similar to the total sulphur in all humidity cell samples except for the PAG legacy mine rock sample (T3) which had relatively elevated total sulphur (and sulphate) more typical of a weathered material.

5.6.4 Risk of Acid Generation

Carbonate neutralization potential (CaNP) calculated from total inorganic carbon (TIC) is a measure of the acid neutralization capacity attributable to reactive carbonates only. Neutralization potential (NP) provides a measure of available acid neutralization from carbonates and reactive silicates. Consequently, NP values are typically greater than CaNP values. NP Results (**Figure 5.5**) were as follows below:

- CaNP values (based on TIC) ranged from 9.2 to 437.5 $CaCO_3$/1000 tonnes in LGO samples, and 9.2 to 379.2 $CaCO_3$/1000 tonnes in waste rock samples.
- NP values ranged from 24.6 to 391 $CaCO_3$/1000 tonnes in LGO samples, and 24.6 to 339.7 $CaCO_3$/1000 tonnes in waste rock samples.

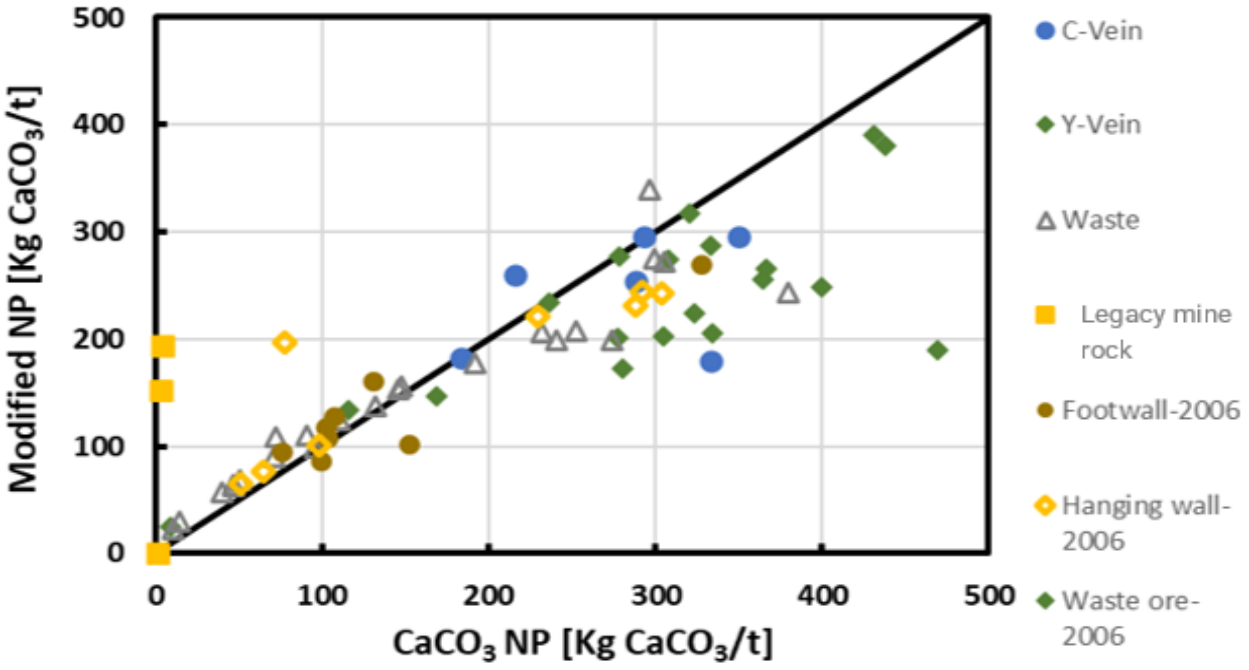


Figure 5.5 Modified Neutralisation Potential vs CaCO3 Neutralisation Potential for LGO and Waste Rock material.

Assessment of mineralogy of samples indicated the presence of iron carbonates (ankerite ($CaFe(CO_3)_2$)) in LGO: 2021-10-24-25Y, drill core waste: 2021-10-24-41W, and Tailings: T1, which may provide no net acid buffering capacity due to subsequent ferric iron hydrolysis (which generates acidity). This results in CaNP values being higher than NP values, as indicated in **Figure 5.6**.

Comparison of NP and CaNP is presented for T1-tailings(T1), T2-Co-disposal, T3-PAG, HC1-Precomposite, and Low-Grade Ore (H2) in **Figure 5.6**.

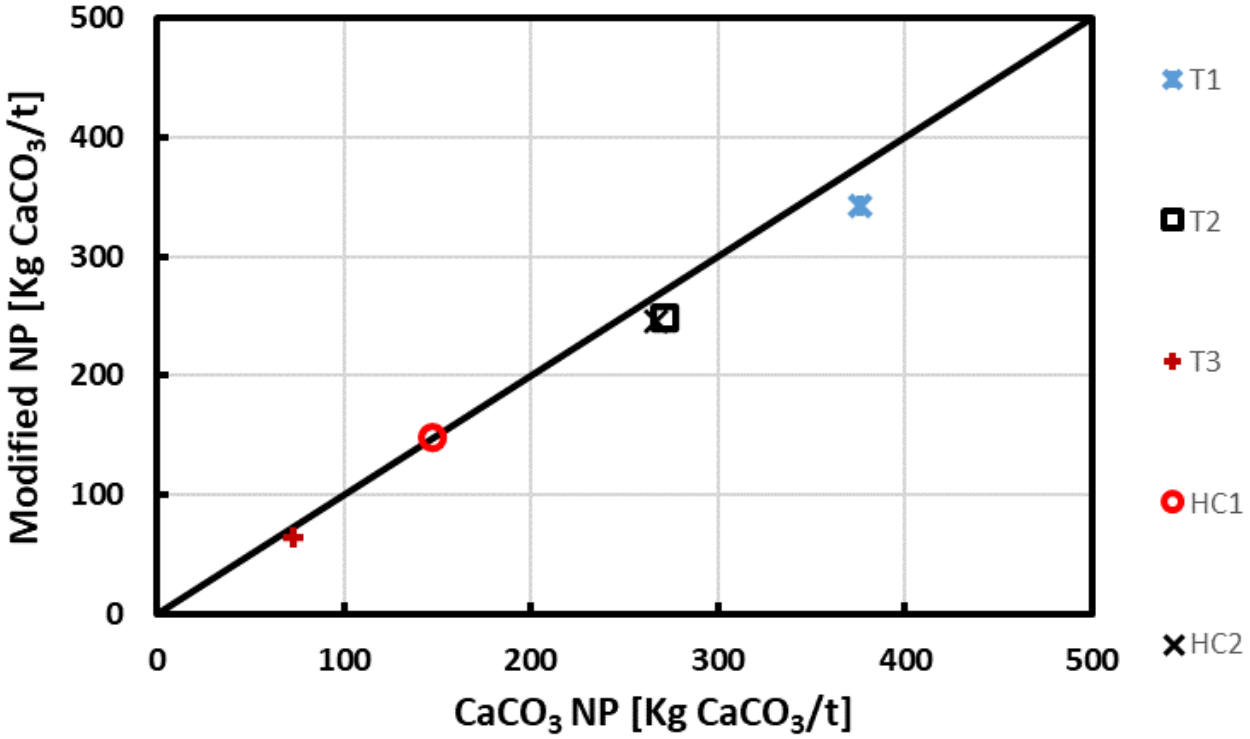


Figure 5.6 Modified Neutralisation Potential vs CaCO3 Neutralisation Potential for Humidity Cells

The acid potential and neutralization potentials for each sample type, including the kinetic cell samples are plotted in **Figure 5.7** and **Figure 5.8**. While the acid generation potential is low risk across the various samples, two sample outliers (one LGO and one legacy mine rock sample) showed the lowest AP values and were classified as PAG. Most of the waste and LGO samples (89%) were predicted to have a low risk of acid generation. One PAG legacy mine rock sample had already turned acidic.

For wall rock zone (URS 2006), more than half of the footwall samples were classified as NPAG and approximately 13% were classified as having uncertain ARD risk. All the hangingwall samples were classified as NPAG.

For waste rock from the C-vein (URS 2006), more than a quarter of the samples were classified as PAG. Almost three quarters of the waste ore zone samples were classified as NPAG.

Three out of five legacy mine rock samples were classified as PAG. This was distinct from the drill core waste rock samples which were all classified as NPAG and does suggest that these samples were likely ore, probably from Tulsequah Chief, as previously mentioned.

The LGO samples from C-vein, except 2021-10-20-5C, are currently not acid generating (NPAG), as indicated by the rinse pH values > 8. Sulphate levels for all LGO and waste rock samples tended to be near or below the level of analytical detection indicating very low rates of sulphide oxidation. The paste pH was alkaline for most waste samples.

The buffering capacity of all humidity cell samples were high except that of the legacy mine rock samples, and reached maximum Modified NP levels of 340.8 kgCaCO3/t. In the case of the legacy mine rock samples, Modified NP levels were relatively lower in 2021-10-21-26WG, 2021-10-21-27WG, and 2021-10-21-30WG.

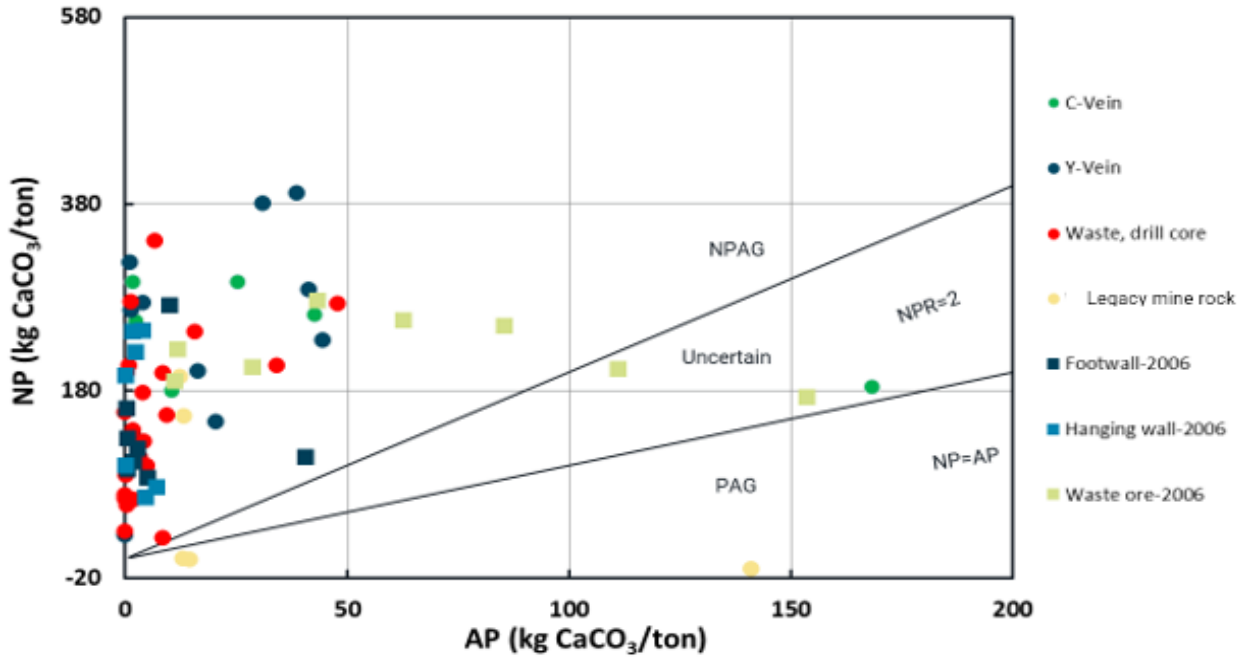


Figure 5.7 Comparison of NP vs AP for waste rock and LGO samples.

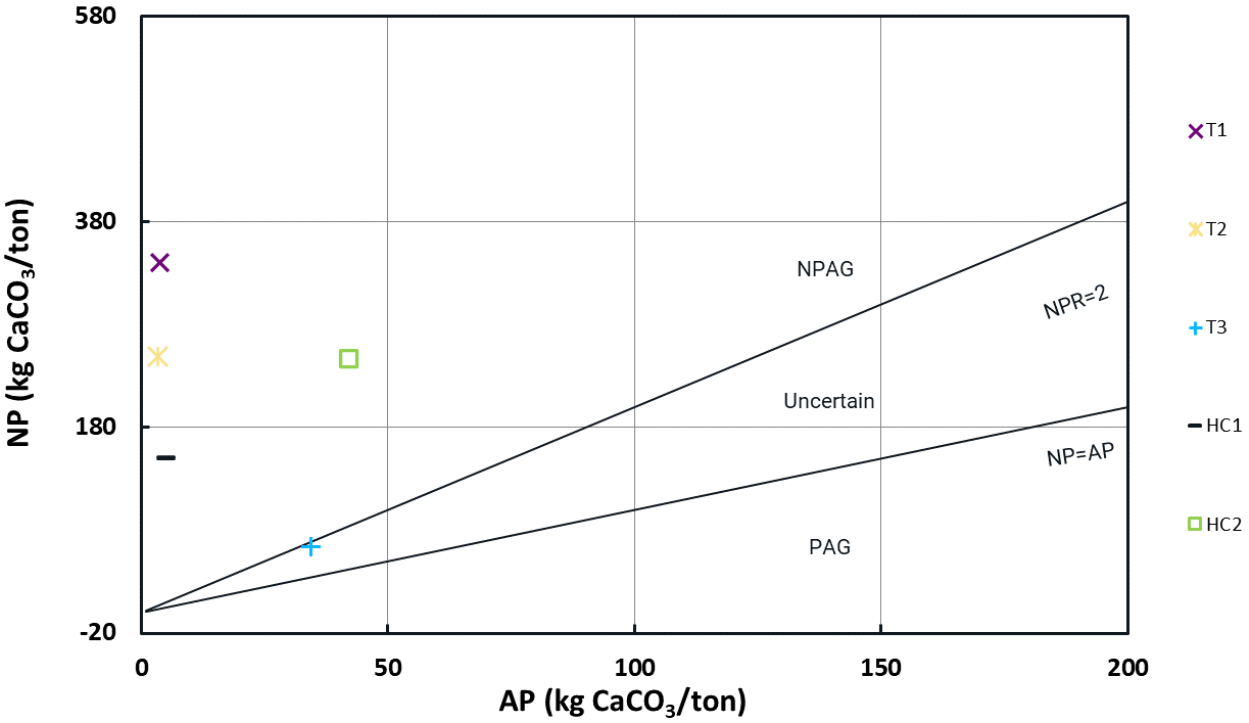


Figure 5.8 Comparison of Modified NP and CaCO3 NP for Humidity Cells.

5.7 Humidity Cell Testing

Humidity cell testing was conducted on T1-Floatation tailings, T2-Co-disposal, T3-PAG, HC1-Precomposite, and Low-Grade Ore (HC2). Arsenic and antimony were identified as primary parameters of concern based on the elevated trace element concentrations GAI Index, within H2-LGO and Waste Rock samples (**Section 5.5**).

Humidity cells T2, T3, HC 1 and HC 2 were started in March 2022, and are currently at 40 weeks. Humidity cell T1 was started in December 2022 and has been running for 52 weeks. Humidity cell results for selected parameter trends are compared to BCFAL in **Figure 5.9** to **Figure 5.17** and **Figure 5.18** to **Figure 5.25**. **Appendix B** provides figures for all parameters.

The humidity cell testing is currently undergoing, and data received until December 19, 2023, are presented, and discussed in this report. **Section 5.7.1** provides results of the humidity cell testing of T1 and T2 (Flotation Tails and co-disposal materials). **Section 5.7.2** presents results of the humidity cell testing for T3, H1 and H2. The laboratory certificate of analyses for the humidity leachates are included in the attached in **Appendix D**.

5.7.1 Flotation Tails (T1) and Co-disposal (T2)

- Leachate pH values ranged from 7.97 to 8.33 in T1-Flotation tails and 7.37 to 8.34 in T2-Co-disposal samples and remained as neutral pH for all cycles of the test (**Figure 5.9**). The paste pH for T1 and T2 were neutral.
- Sulphate levels typically showed an initial increase and then a decreasing trend, indicating an initial flush of oxidation products. Sulphate concentrations ranged from 34 to 619 mg/L in T1-Flotation tails and were below the WQO, 3 to 279 mg/L in T2-Co-disposal samples. (**Figure 5.10**).

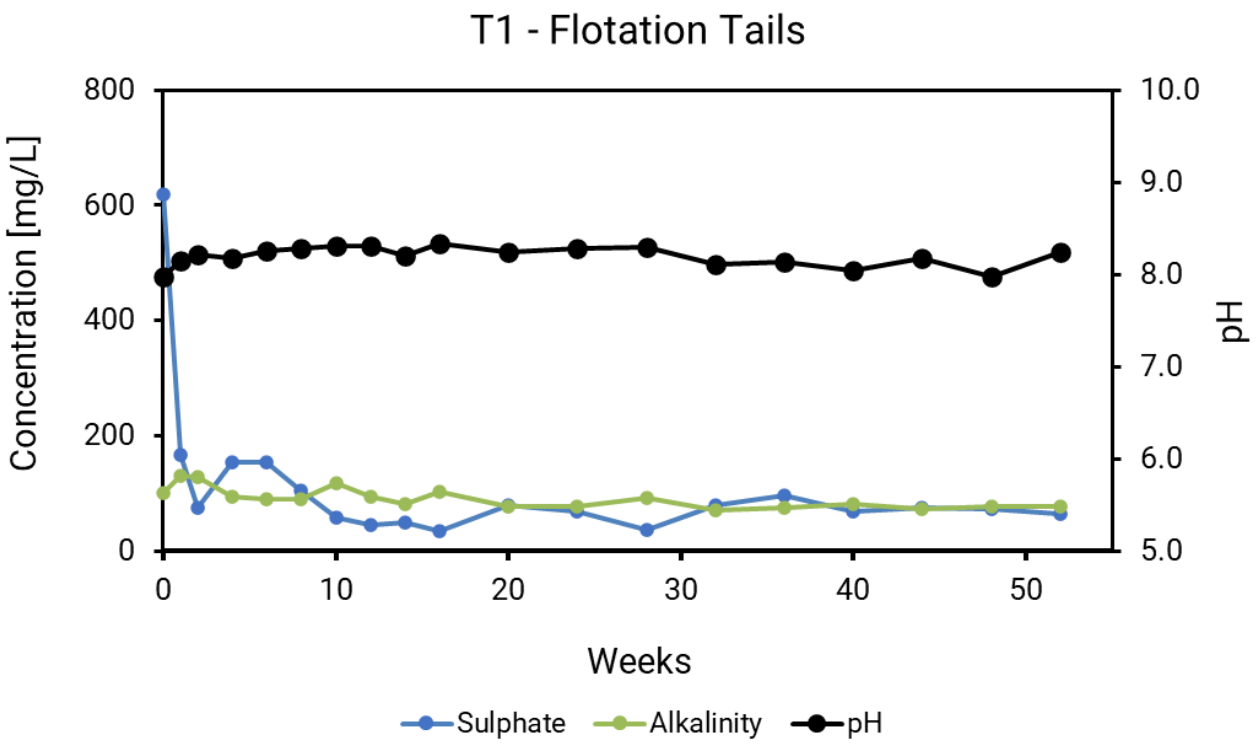


Figure 5.9 Comparison of sulphate, alkalinity and pH, Trends, T1-Tailings

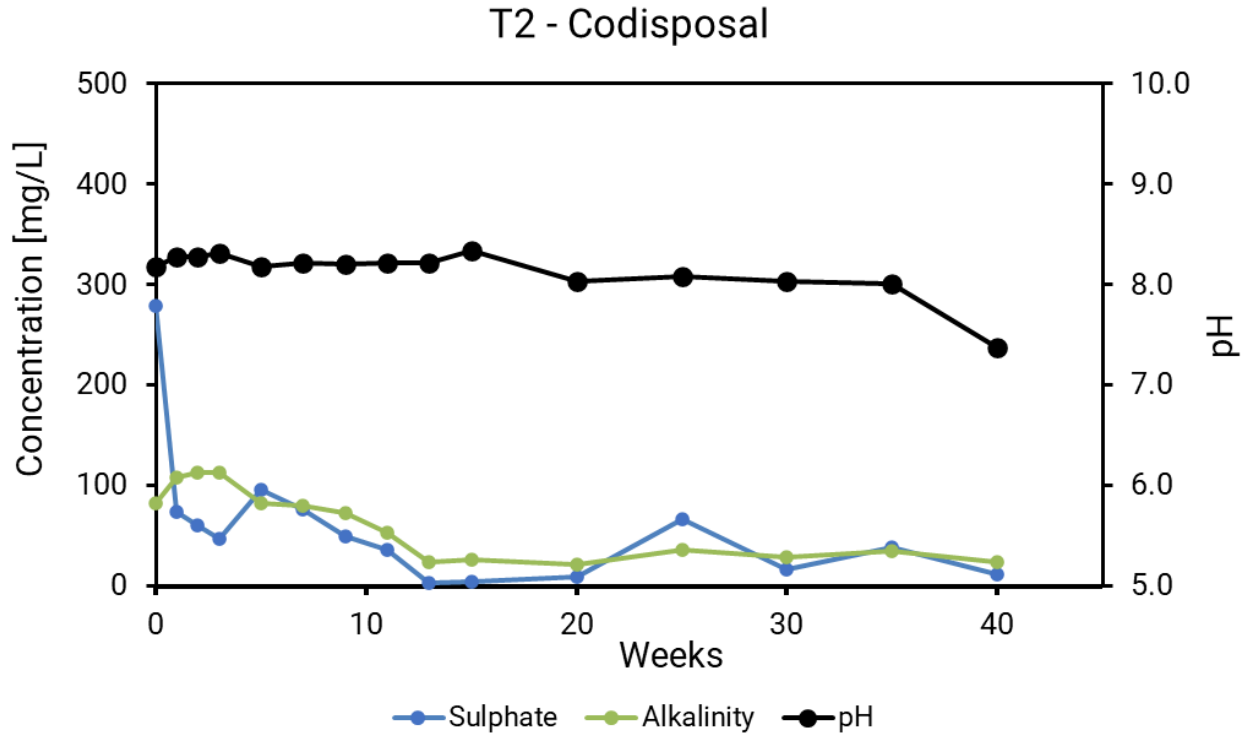


Figure 5.10 Comparison of sulphate, alkalinity and pH, Trends, T2-Co-disposal Humidity Cells

- Arsenic levels showed a decreasing trend until cycle 20 and showed relatively stable loading rates in the T1- Flotation tails and T2-Co-disposal samples. Arsenic values ranged from 1.73 to 4.37 mg/L in the Flotation tails and 0.41 to 3.15 mg/L in T2-Co-disposal sample. All values were above the BCFAL and at above 1mg/L were considered to be particularly elevated indicating it is likely that elevated arsenic leaching will be observed in the field.
- Antimony values ranged from 3.93 to 9.10 mg/L in T1-Flotation tails and from 0.50 to 9.34 mg/L in T2-Co-disposal and were slightly above the BC FAL guidelines of 9ug/L. Antimony-bearing (Stibnite Sb_2S_3) sulphide species was measured in the URS (2006) C-vein drill core sample and likely contributed the antimony values measured.
- Cadmium values ranged from 0.000003 to 0.000343 mg/L in T1-Flotation tails and from 0.000003 to 0.000133 mg/L in T2-Co-disposal and exceeded BCFAL during week 10, and between week 30 and 40.
- Copper concentrations were elevated during humidity cell first flush in T1-Flotation tails and T2-Co-disposal samples indicating potential issues with copper leaching in the field. Chalcopyrite ($CuFeS_2$) was measured only in the legacy mine rock sample and contributed the highest copper values measured.
- Iron values ranged from 0.0070 to 0.2780 mg/L in T1-Flotation tails and from 0.007 to 0.146 mg/L in T2-Co-disposal, and all values were below BCFAL criteria.
- Manganese values ranged from 0.008 to 0.105 mg/L in the T1- Flotation tails and were below BCFAL. Values ranged from 0.0066 to 0.0674 mg/L in the T2-Co-disposal and were just below BCFAL.
- Selenium values ranged from 0.00022 to 0.00443 mg/L in the T1-Flotation tails and from 0.0001 to 0.0038 mg/L in the T2-Co-disposal. Selenium was just above BCFAL in the first 10 weeks of the humidity cell test and remained below BCFAL until week 50.
- Zinc values ranged from <0.002 to 0.0330 mg/L in Flotation tails and from <0.002 to 0.0160 mg/L in T2-Co-disposal. The values in T2-Co-disposal were just under BCFAL except for week 5 and 35.

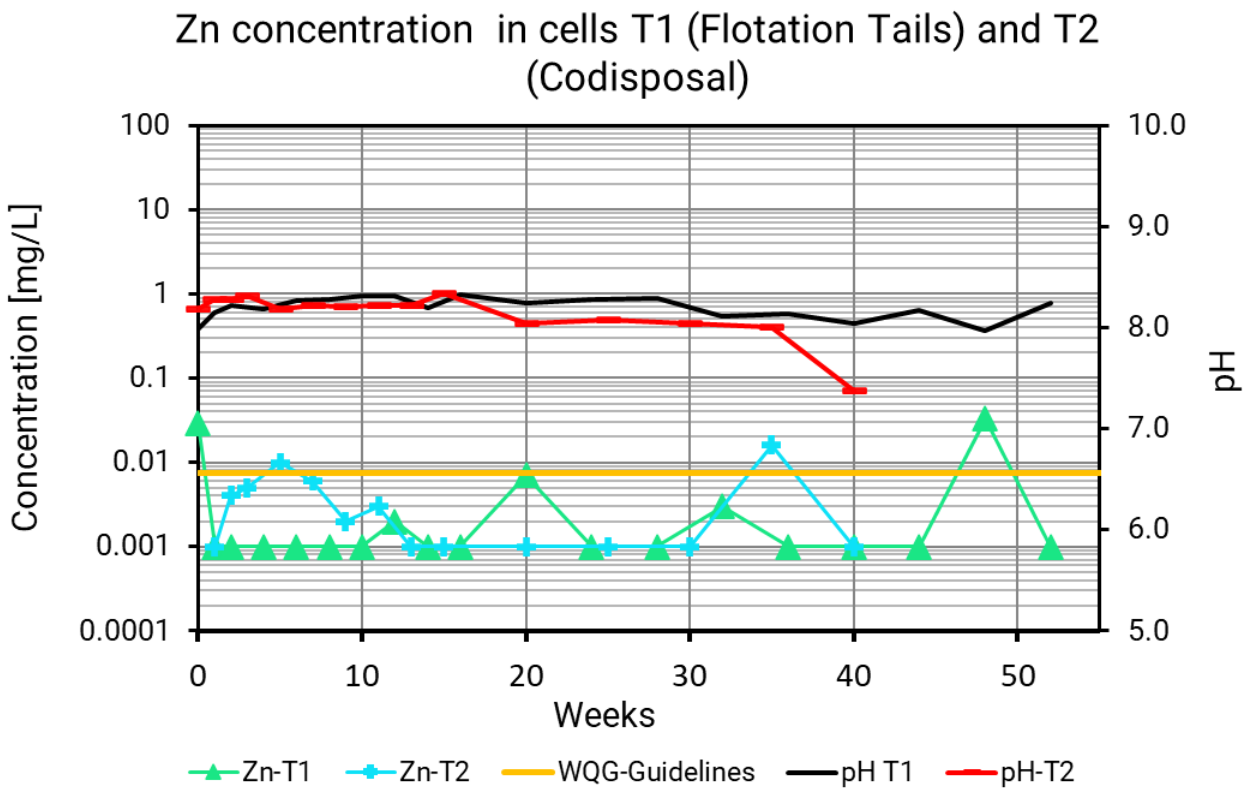


Figure 5.11 Comparison of Zn Concentration Trends, T1-Tailings and T2-Co-disposal Humidity Cells.

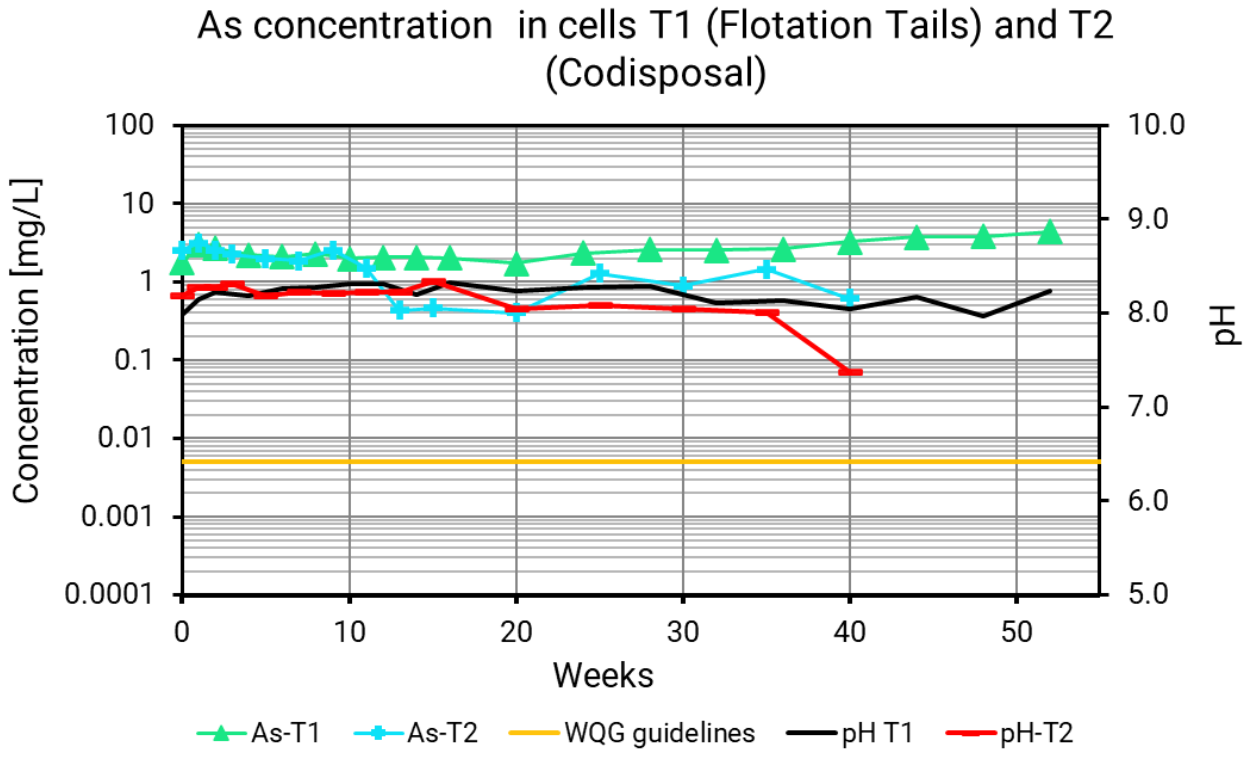


Figure 5.12 Comparison of As Concentration Trends, T1-Tailings and T2-Co-disposal Humidity Cells.

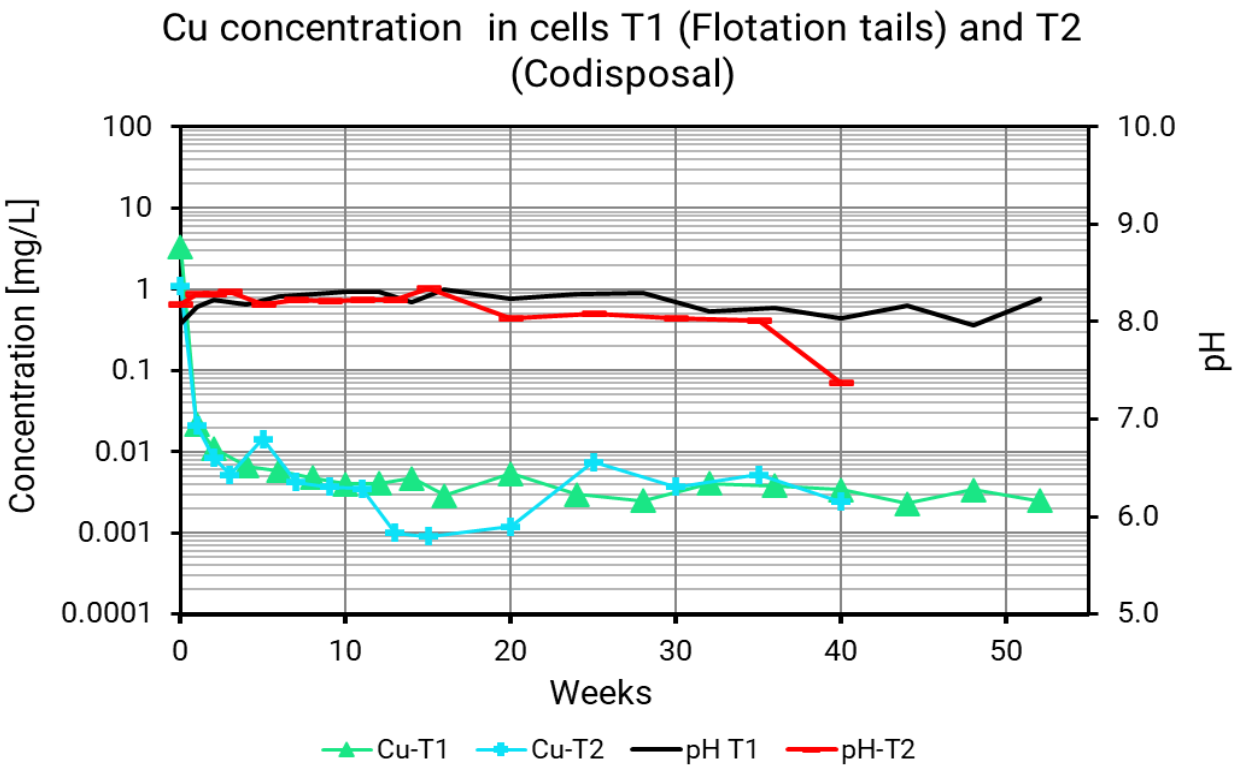


Figure 5.13 Comparison of Cu Concentration Trends, T1-Tailings and T2-Co-disposal Humidity Cells.

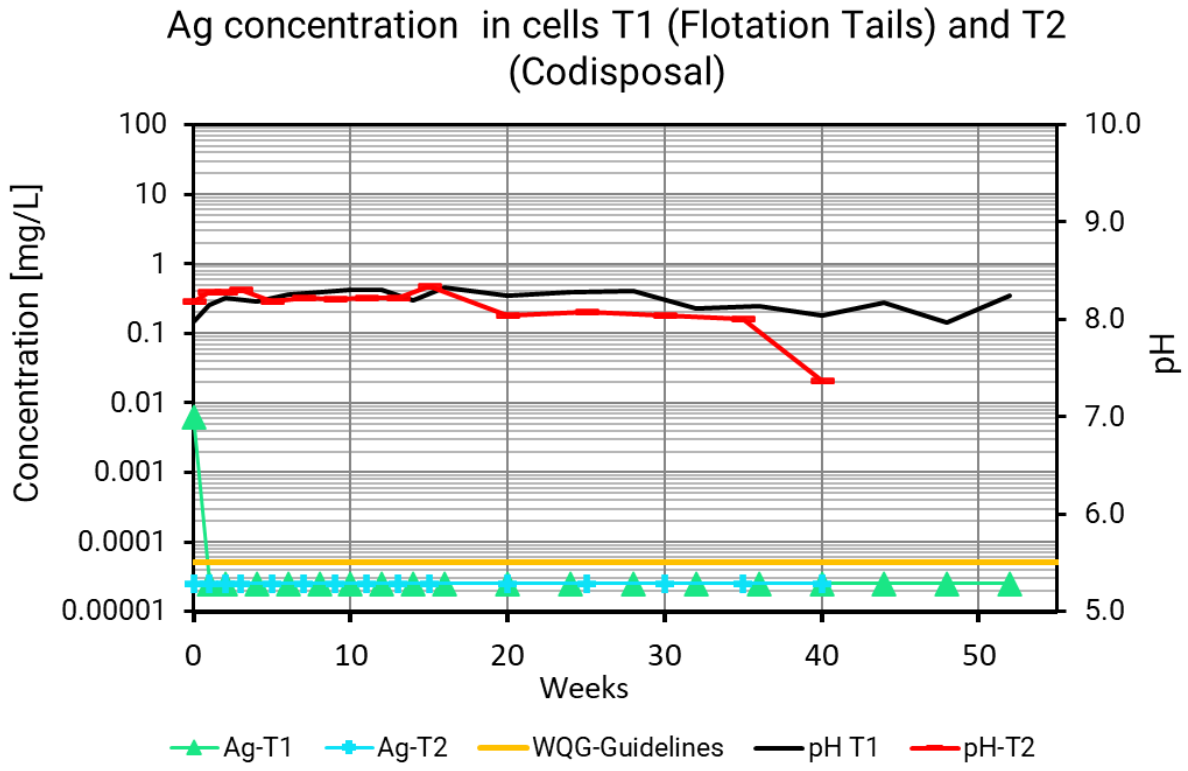


Figure 5.14 Comparison of Ag Concentration Trends, T1-Tailings and T2-Co-disposal Humidity Cells.

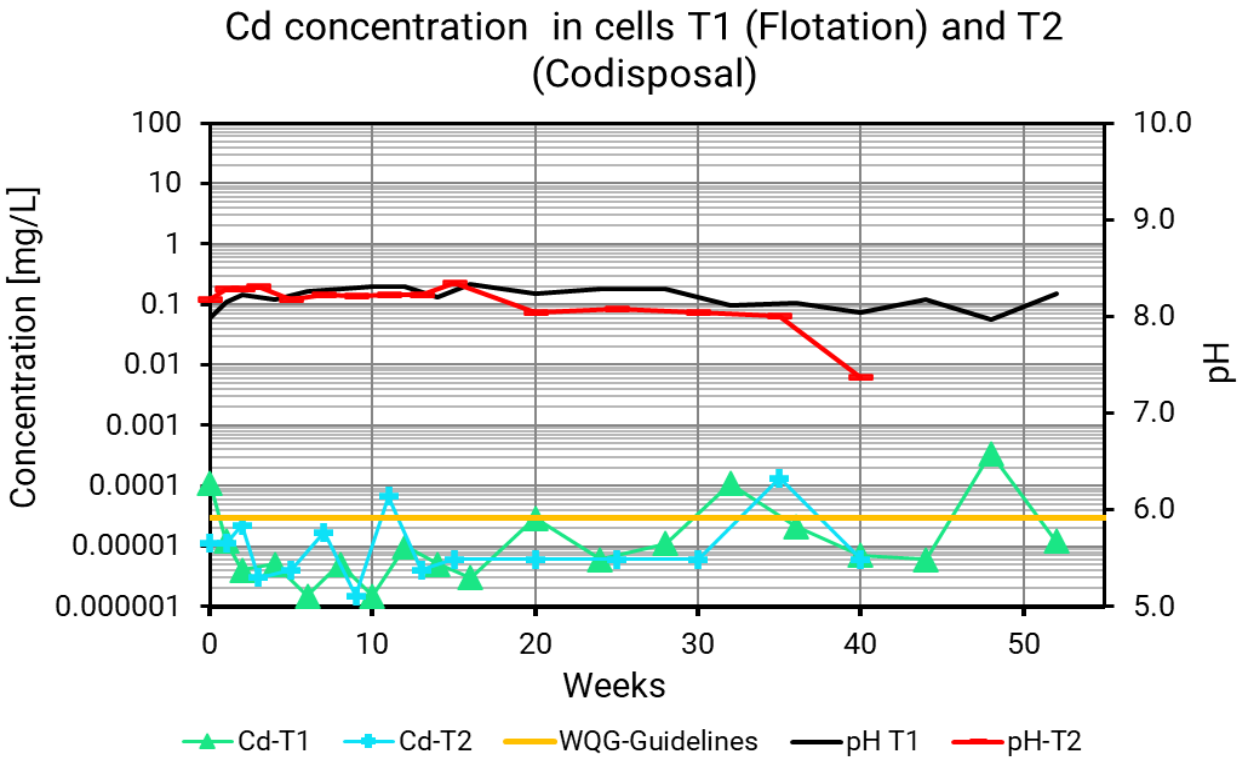


Figure 5.15 Comparison of Cd Concentration Trends, T1-Tailings and T2-Co-disposal Humidity Cells.

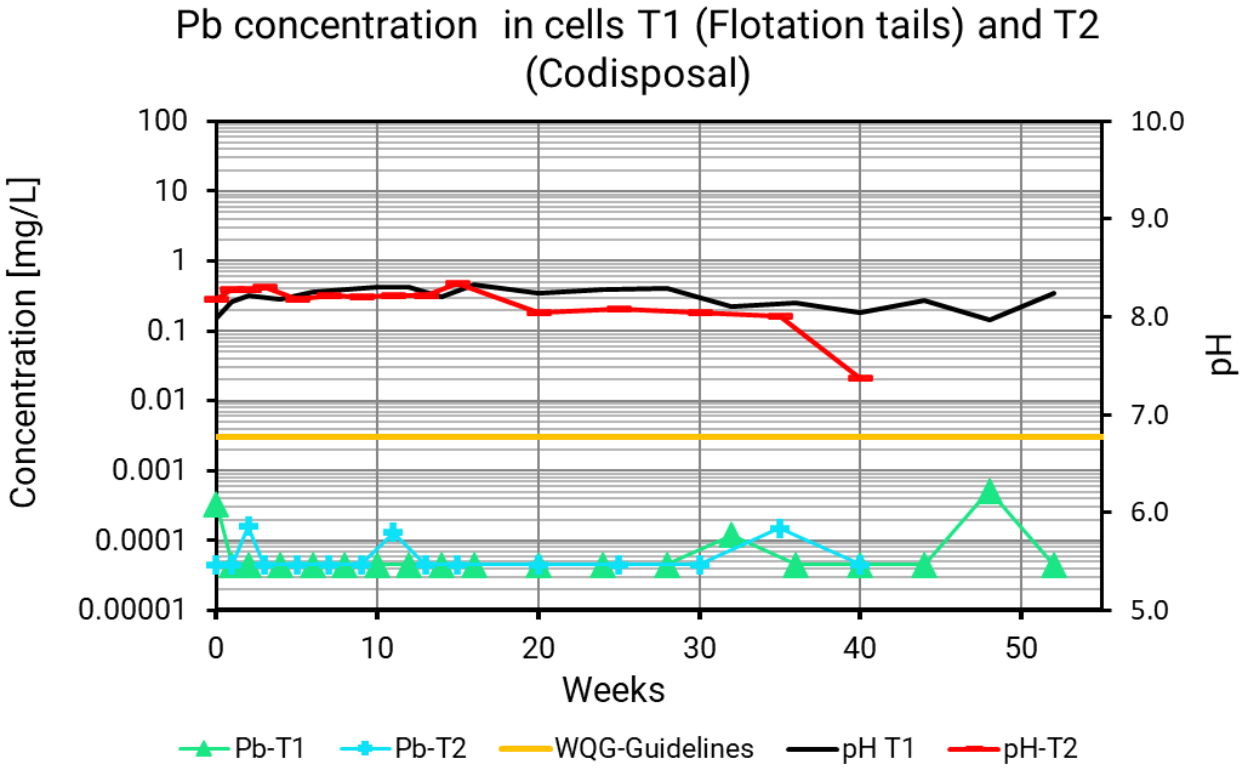


Figure 5.16 Comparison of Pb Concentration Trends, T1-Tailings and T2-Co-disposal Humidity Cells.

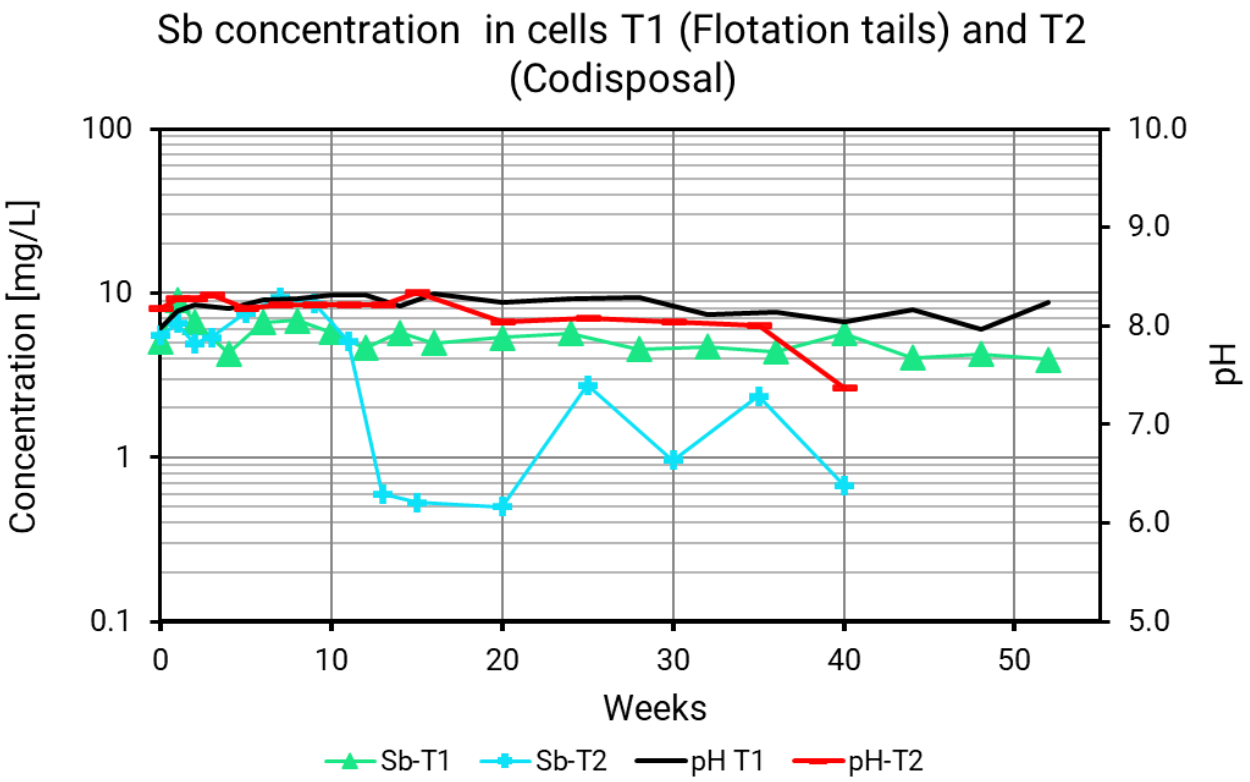


Figure 5.17 Comparison of Sb Concentration Trends, T1-Tailings and T2-Co-disposal Humidity Cells.

5.7.2 Legacy mine rock (T3-PAG), Pre-composite 1+2 (HC1), and Low-Grade Ore (HC2)

- Leachate pH values ranged from 7.65 to 8.96 in HC1-Precomposite, 7.68 to 8.54 in H2-LGO samples and, 6.33 to 7.59 in the legacy mine rock sample (T3-PAG), **Figure 5.18**.
- Sulphate mass loadings values ranged from 17 to 49 mg/L in HC1-Precomposite, 26 to 104 mg/L in H2-LGO samples and 28 to 798 mg/L in the legacy mine rock. The highest sulphate concentrations correspond to similar results measured in SFE testing (86.9 for H2-LGO and 100.9 mg/L for the legacy mine rock samples), with elevated sulphur content.
- Arsenic values ranged from 0.62 to 5.38 mg/L in H2-LGO samples, 0.31 to 1.37 mg/L in HC1-Precomposite, and 0.04 to 0.37 mg/L in legacy mine rock sample. The highest arsenic concentrations were measured in H2-LGO samples.
- Antimony values ranged from 0.75 to 2.94 mg/L in HC2-LGO and 0.02 to 0.16 mg/L in T3-PAG samples, which below the BC FAL guidelines of 9ug/L limit. Antimony values ranged from 0.69 to 9.02 mg/L in HC1-Pre-composite and were slightly above the BC FAL guidelines. The highest antimony concentrations in SFE tests were measured in HC2-LGO samples. For the legacy rock, HC1-Precomposite and HC2-LGO samples, arsenic values consistently exceeded the WQO throughout the humidity test period, indicating that arsenic will likely be environmental concern.
- Antimony concentrations ranged from 0.75 to 2.94 mg/L in HC2-LGO samples, 0.69 to 9.02 mg/L in HC1-Precomposite, and 0.02 to 0.16 mg/L in legacy mine rock samples. This compares to the BCFAL working guideline of 0.009 mg/L.

- Cadmium values were below the WQO and ranged from 0.000004 to 0.000017 mg/L in HC2-LGO samples, 0.000003 to 0.000022 mg/L in HC1-Precompositesamples. The highest soluble cadmium concentrations were measured in the legacy mine rock samples.
- Copper concentrations were elevated during humidity cell first flush in T3-PAG, HC1-Pre-composite, and HC2-LGO samples indicating potential issues with copper leaching in the field. Copper in T3-PAG showed an increasing trend in the first 15 weeks and stabilized at elevated concentrations between week 15 and 40. Although no copper sulphide minerals were measured in any of the pre-kinetic tests samples, T3-PAG sample showed the highest copper values.
- Lead values ranged from 0.0001 to 0.0008 mg/L in HC2-LGO samples, 0.007 to 0.016 mg/L in HC1-Precomposite, and 0.145 to 1.26 mg/L in the legacy mine rock samples. The highest soluble lead concentrations as measured in SFE tests were in the legacy mine rock samples.

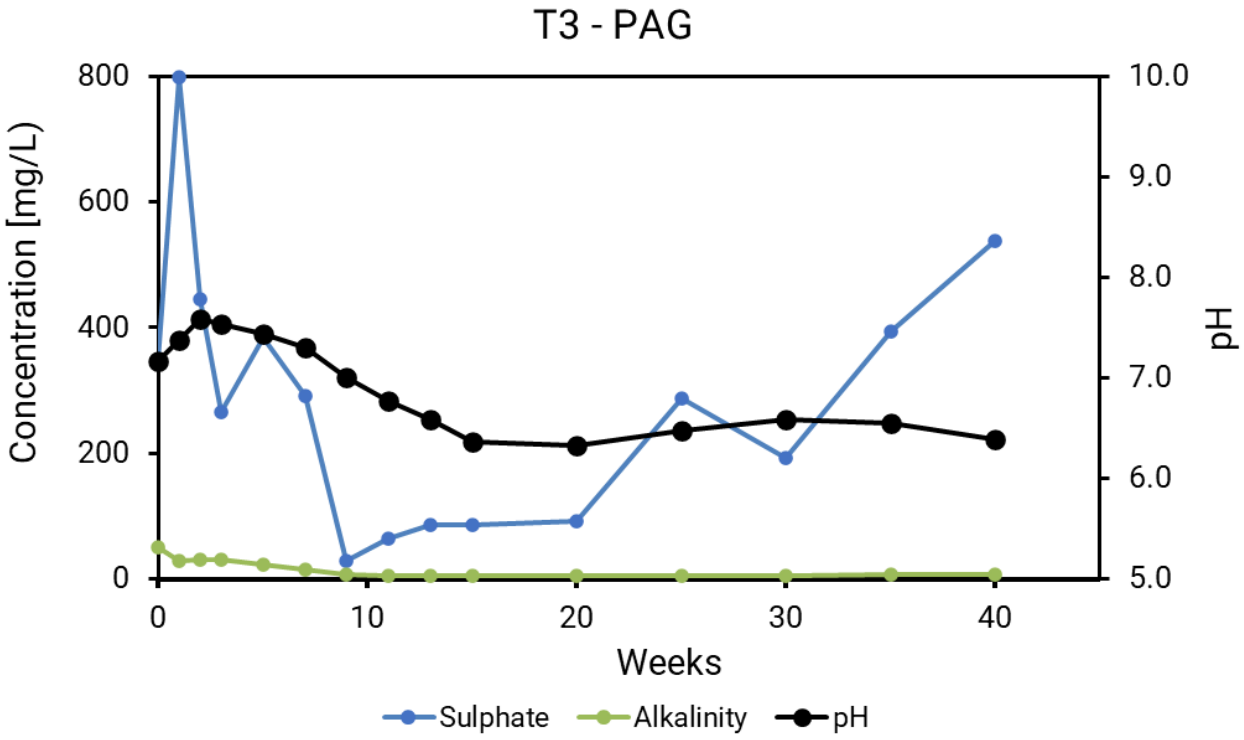


Figure 5.18 Comparison of pH, Sulphate and Alkalinity Trends, in PAG Humidity Cells

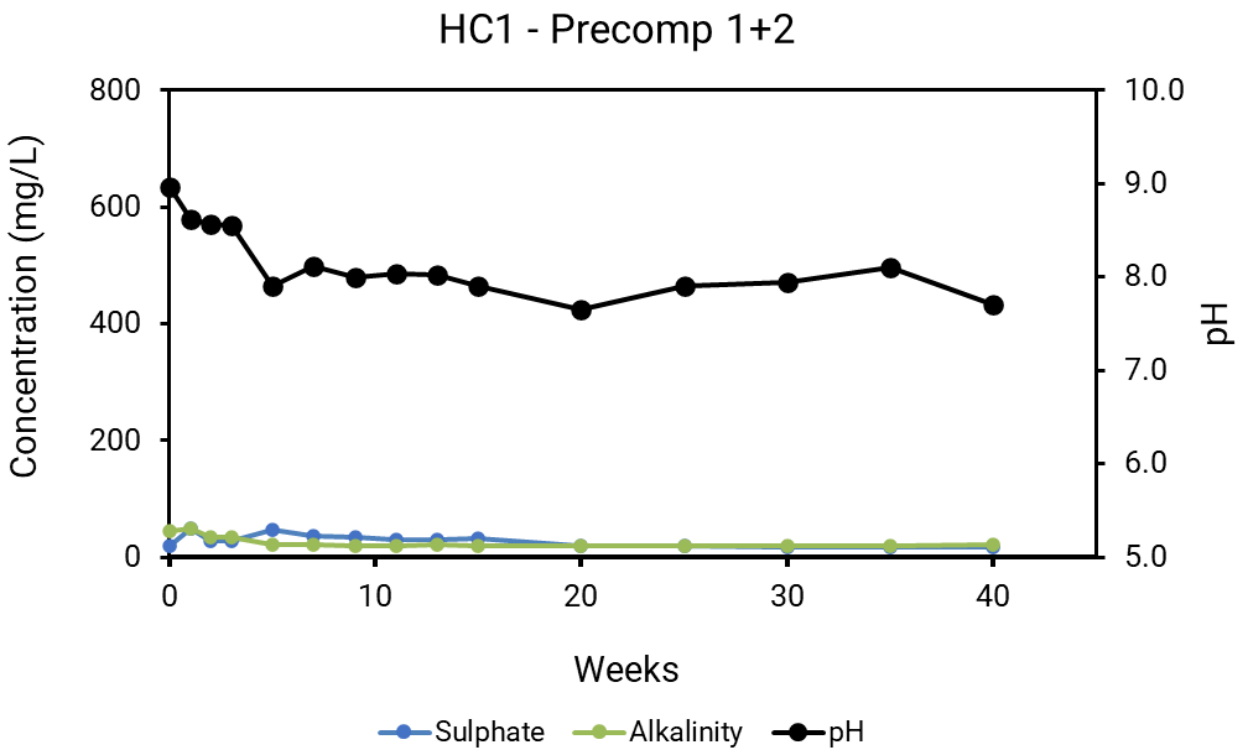


Figure 5.19 Comparison of pH, Sulphate and Alkalinity Trends, in Humidity Cells Samples

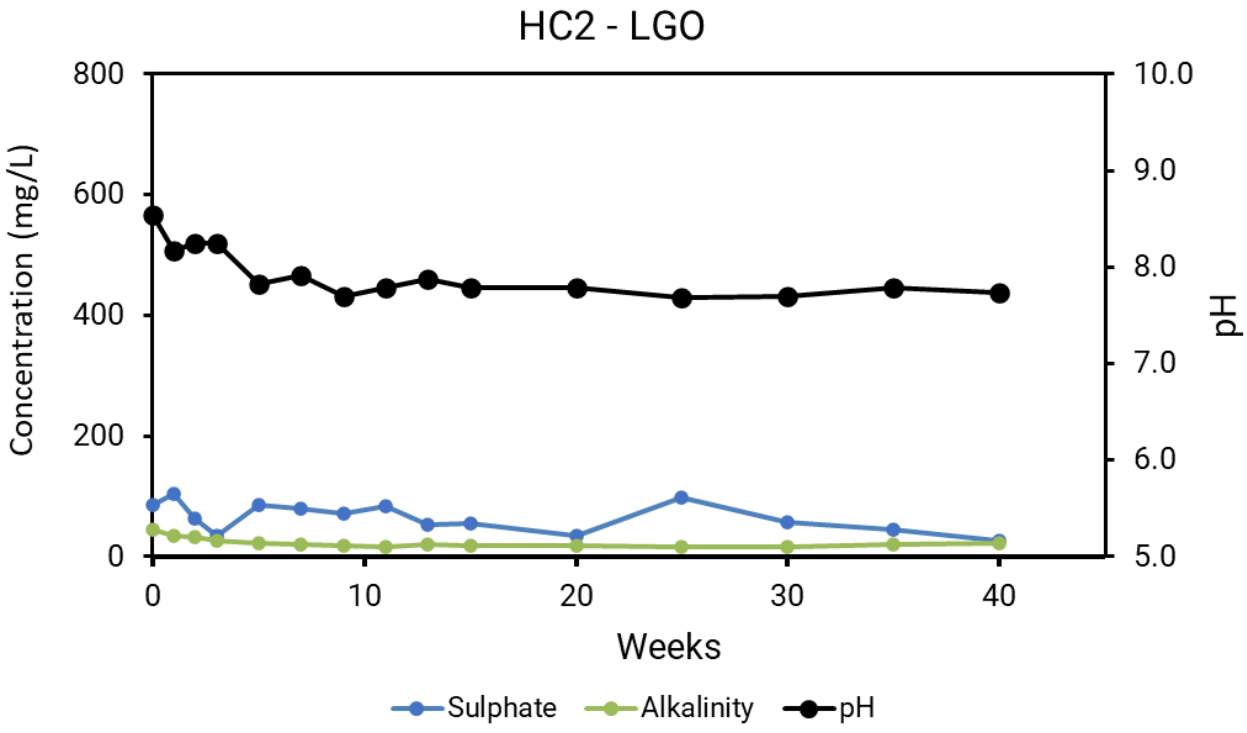


Figure 5.20 Comparison of pH, Sulphate and Alkalinity Trends, in HC2 LGO Humidity Cells

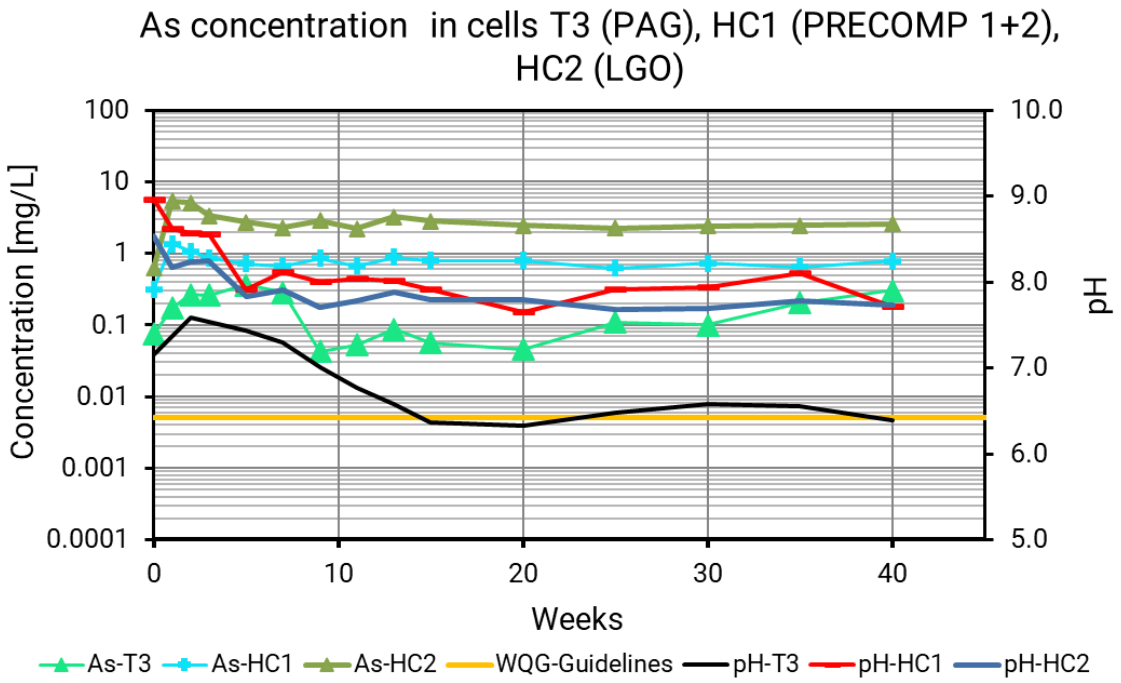


Figure 5.21 Comparison of As Concentration Trends, in PAG, HC1-Precomposite, and HC2-LGO Humidity Cells

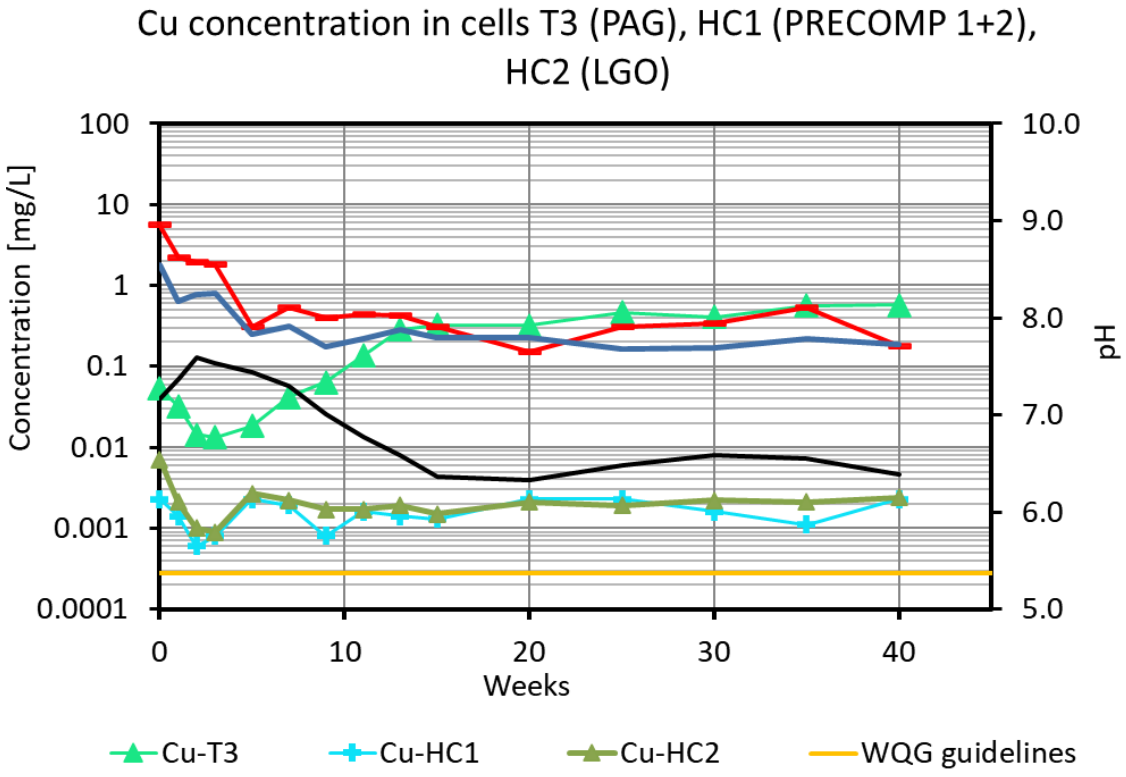


Figure 5.22 Comparison of Cu Concentration Trends, in PAG, HC1-Precomposite, and HC2-LGO Humidity Cells

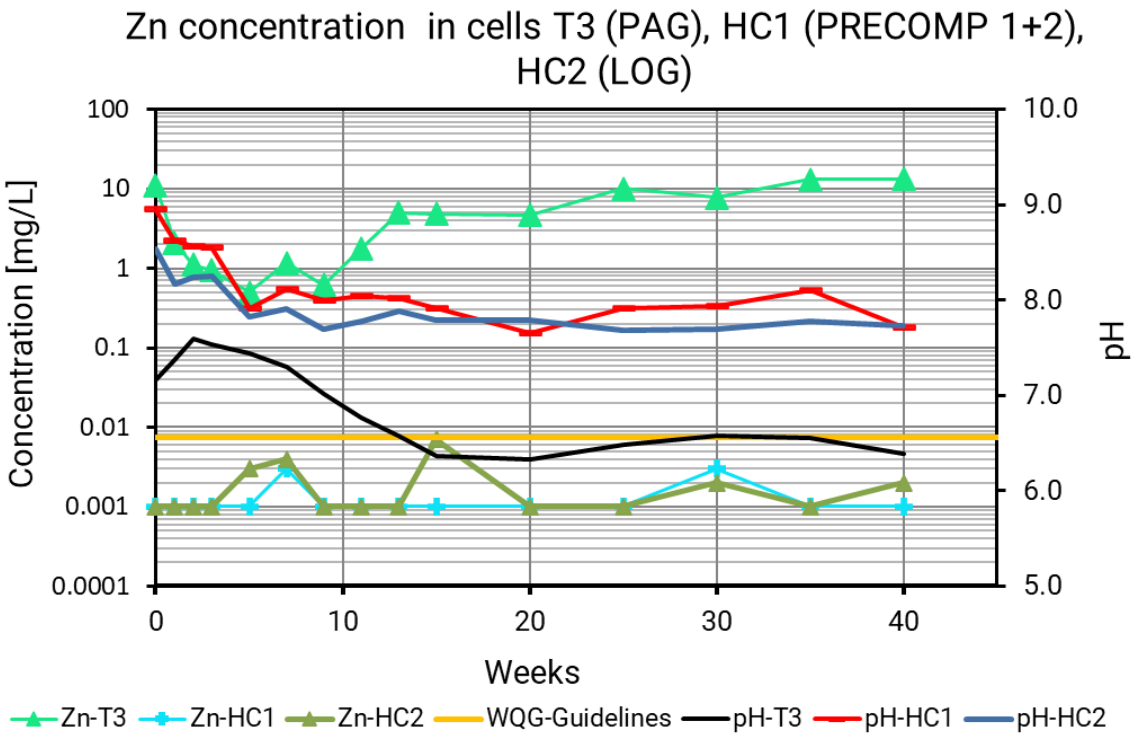


Figure 5.23 Comparison of T3 Concentration Trends, in PAG, HC1-Precomposite, and HC2-LGO Humidity Cells

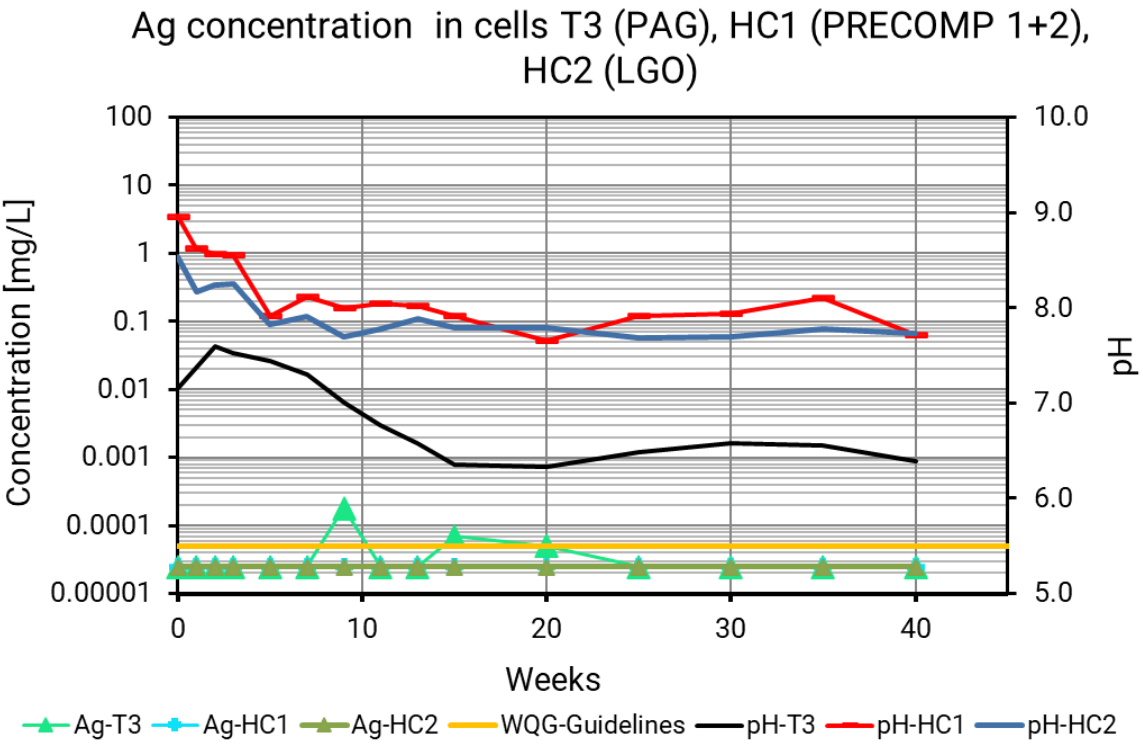


Figure 5.24 Comparison of Ag Concentration Trends, in PAG, HC1-Precomposite, and HC2-LGO Humidity Cells

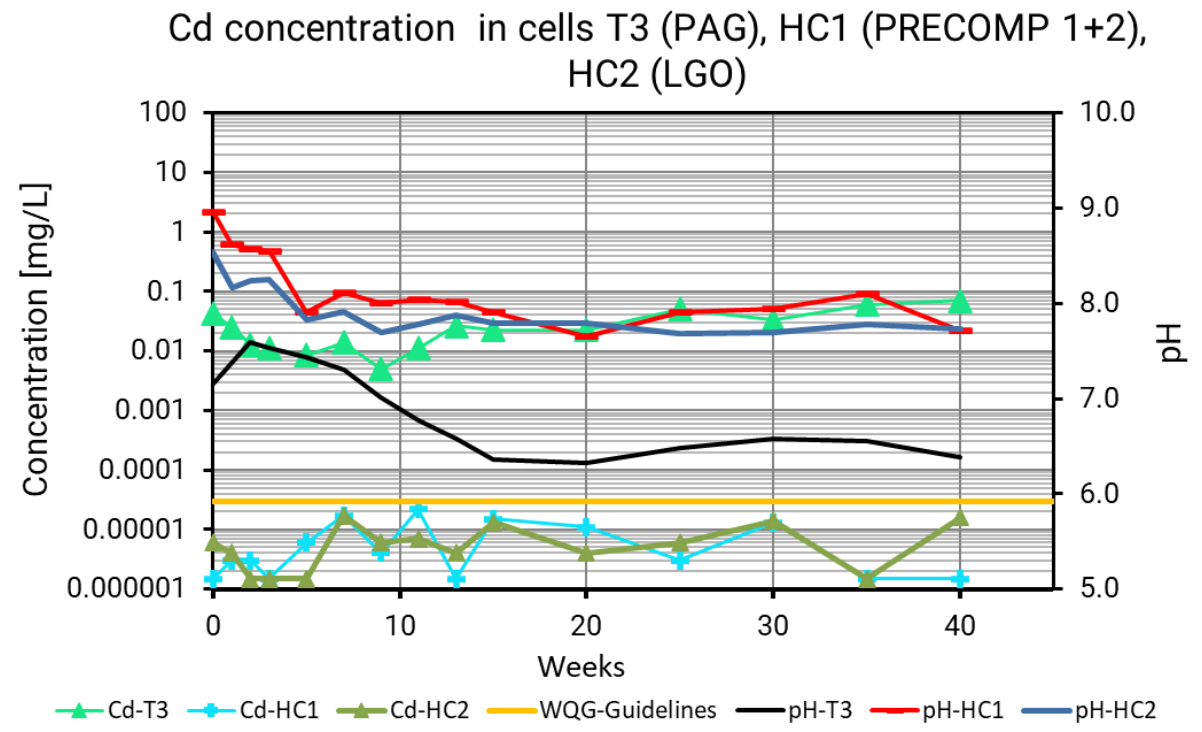


Figure 5.25 Comparison of Cd Concentration Trends, in PAG, HC1-Precomposite, and HC2-LGO Humidity Cells

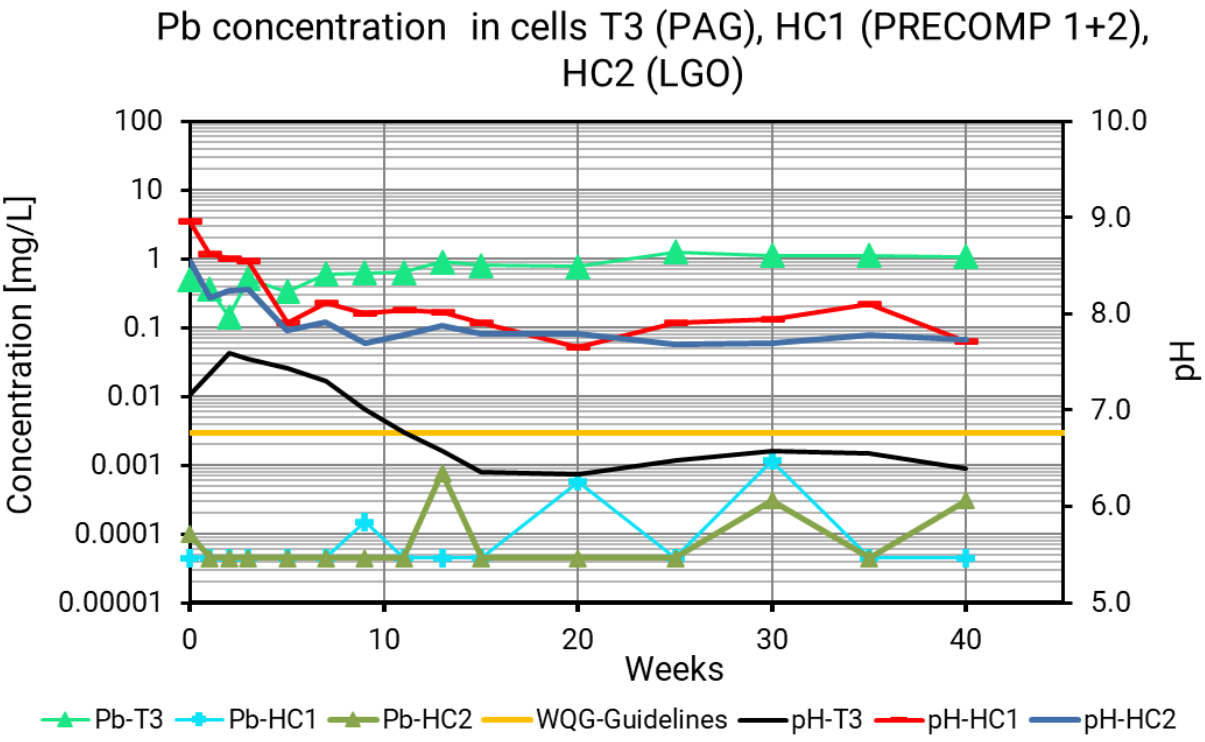


Figure 5.26 Comparison of T3 Concentration Trends, in PAG, HC1-Precomposite, and HC2-LGO Humidity Cells

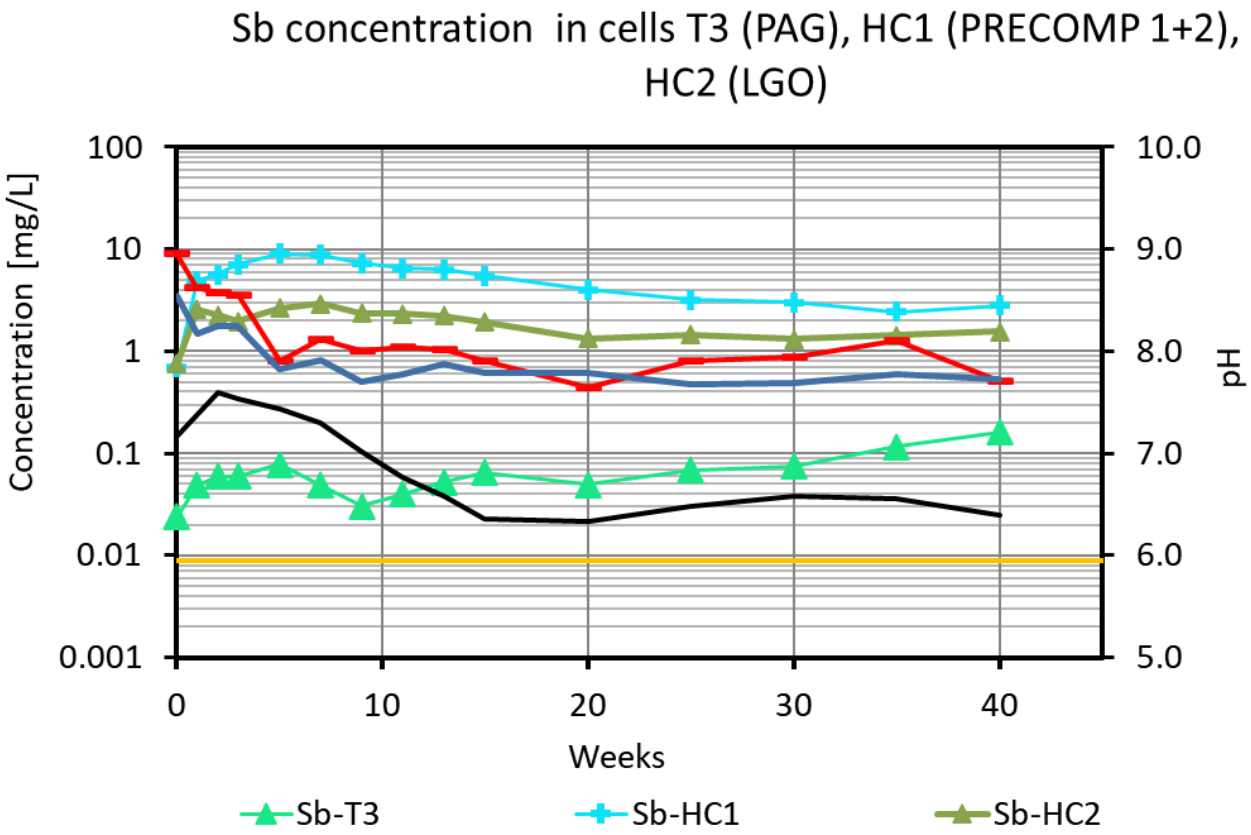


Figure 5.27 Comparison of Sb Concentration Trends, in PAG, HC1-Precomposite, and HC2-LGO Humidity Cells

The results and observations from all the HCT (T1, T2, T3, HC1 and HC2) loading rates are presented in **Appendix C**. The loading rates for the cells are summarized as follows:

- For Flotation tails samples, sulphate release rates ranged between 5 to 75 mg/kg/week and between 0.7 to 34 mg/kg/week for T2-Co-disposal (**Figure 5.18**). No apparent correlation has been observed between sulphate release rates and total sulphur content for tests producing non-acidic leachate in Flotation tails and T2-Co-disposal samples.
- For the legacy mine rock (T3), sulphate release rates ranged between 29 to 363 mg/kg/week. For HC1-Precomposite, sulphate release rates ranged between 1.5 to 23.86 mg/kg/week and for Low-Grade Ore (HC2) between 2.25 to 47.32 mg/kg/week (**Figure 5.19** and **Figure 5.20**, respectively). There was observed apparent correlation between sulphate release rates and total sulphur content for the legacy mine rock producing a slightly acidic leachate, however high alkalinity level buffered acidity and caused a stable sulphate trend.
- Based on the INAP (2009) classification, calculated GAI for the mean and median concentrations of arsenic and antimony were enriched in the waste and HC2-LGO samples. Silver, Cd, Hg, Pb, and Se are elevated in some waste samples.

- It was observed that the legacy mine rock samples exhibited more acidic pH and elevated metal loadings compared to the HC2-LGO and drill core waste samples. As shown in the leach tests, Cd, Pb, Se, Ag, and Zn are susceptible to immediate solubilization upon wetting of weathered waste material.
- Loading rates in T1- *Flotation Tails and T2-Co-disposal humidity cells* showed As, Sb, Zn, Cu, Cd, Pb concentrations above BCFAL compared to the other humidity cell samples. Elements that are significantly enriched in all cells are As, Sb, Se, and Te, but As and Sb frequently leached from the humidity cells and will likely be a concern for the environment.
- Sulphate loading rate values ranged from 0.63 to 75.15 mg/kg/w in both humidity cells. The highest sulphate load was observed in T1, which contrast with the highest total sulphur concentration (0.193%) in cell T2. Sulphate loadings generally displayed a first flush trend in the first 1o weeks because of the dissolution of soluble minerals during the initial wetting of the cells. The first flush was followed by a steady state trend.

5.7.3 Carbonate Molar ratio

The calculated carbonate molar ratios for the humidity cell sample are presented in **Figure 5.28** and **Figure 5.29.**

The Carbonate Mole Ratio (CMR) is defined as the mole ratio of the rate of NP consumption to the rate of acid generation as defined by sulphate production. Based on principles of aqueous geochemistry, the value of the CMR should lie between 1.0 and 2.0 in carbonate-bearing rock and tailings that are actively, and effectively neutralizing acidity created by sulphide oxidation. CMR values can define the effective NPR required to maintain circum-neutral pH conditions in perpetuity. For example, if a rock unit's CMR is 1.8, then all samples with NPR values greater than 1.8 are predicted to remain at near neutral pH.

Wall rock sample (T3) was classified as having an uncertain ARD risk based on ABA with an NPR value of 1.9. At the end of HCT testing, sample T3 had a CMR value of around one indicating it will likely turn acidic at a future date. This conclusion is supported by the trend in sulphate concentrations which increased from week 10 to around 600 mg/L by test end.

All other humidity cell samples were predicted to be NPAG based on ABA NPR data, with HC2-LGO sample (HC-2) having the lowest NPR value of 5.8. CMR values for these samples were all above around one to three at test end, confirming the NPAG classification of these samples.

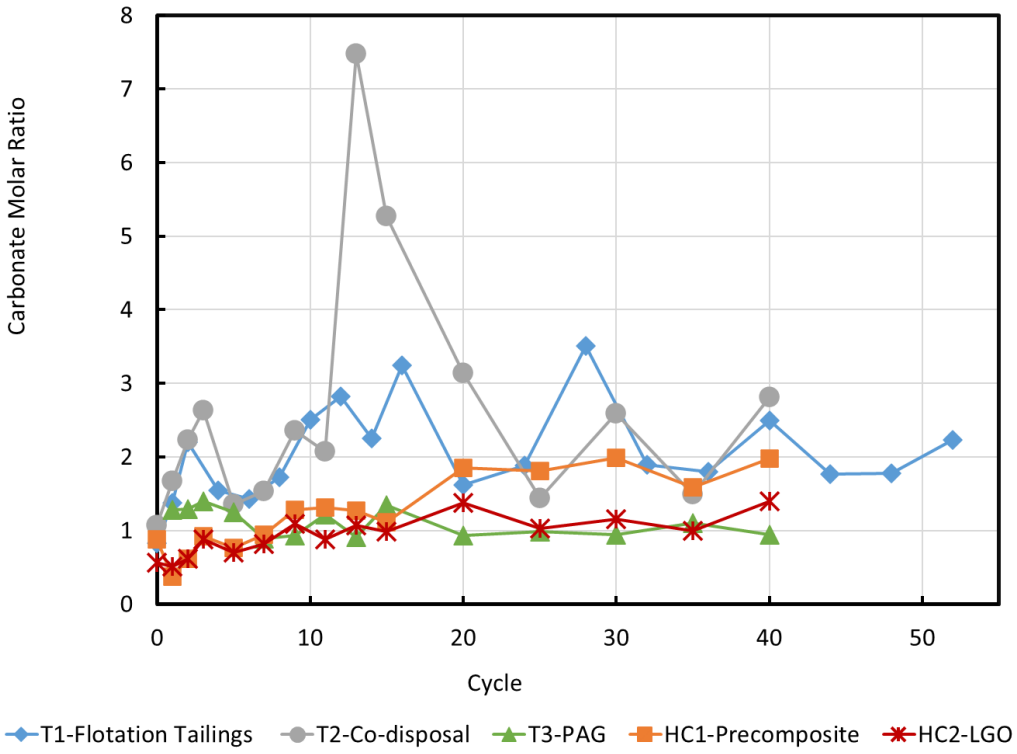


Figure 5.28 Humidity Cell Testing Carbonate Molar Ratio vs Time.

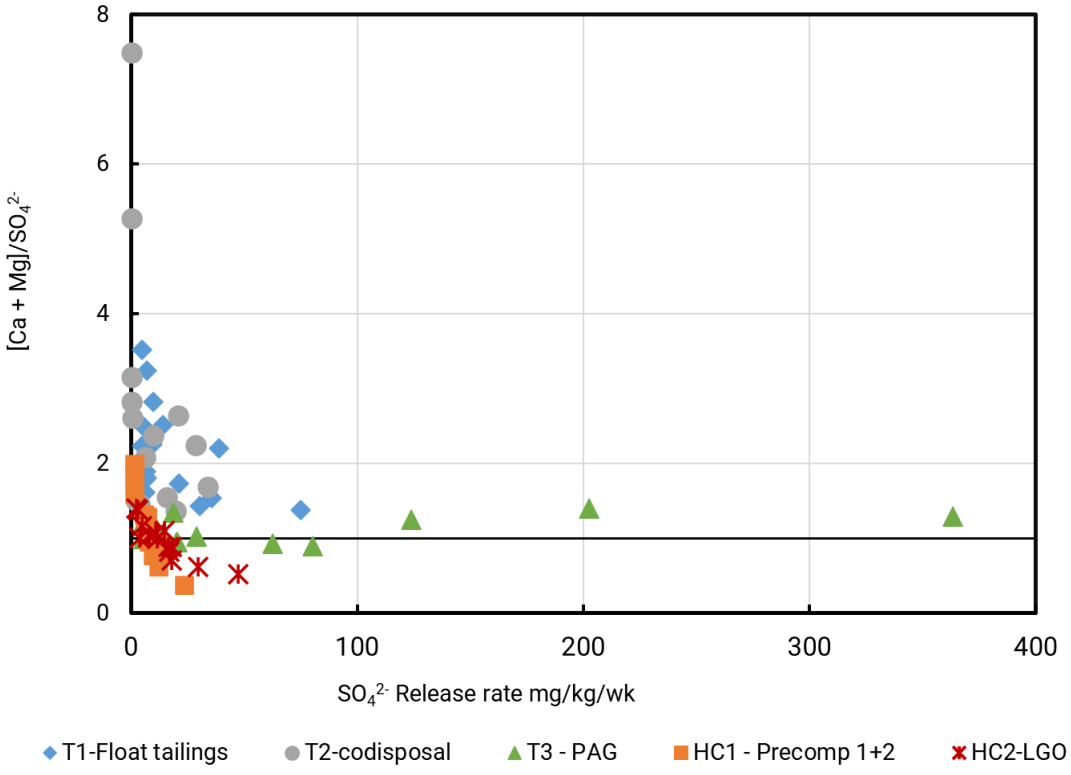


Figure 5.29 Humidity Cell Testing Carbonate Molar Ratio vs Sulfate release rate

5.8 Site Water Quality Monitoring

Water sampled from the New Polaris portal consistently exceeds the CCME-FAL guideline for total arsenic. Dissolved arsenic is also highly elevated in water discharging from the portal. In comparison with the sample taken in 2007, it appears total arsenic values have decreased but dissolved arsenic has remained stable. The arsenic leaching risk was confirmed in the humidity cell test results. In addition, total chromium, total iron, and total silver previously exceeded the CCME-FAL guideline in 2007 but are now near or below the detection limit.

Seepage from the mine dewatering discharge pipe (SS1) has been monitored between 2007-02-14 to 2007-08-21 for chloride and sulphate (**Figure 5.30**), and total antimony and total arsenic, as presented in **Figure 5.31**. Concentrations of arsenic and antimony were routinely elevated above BCFAL guidelines.

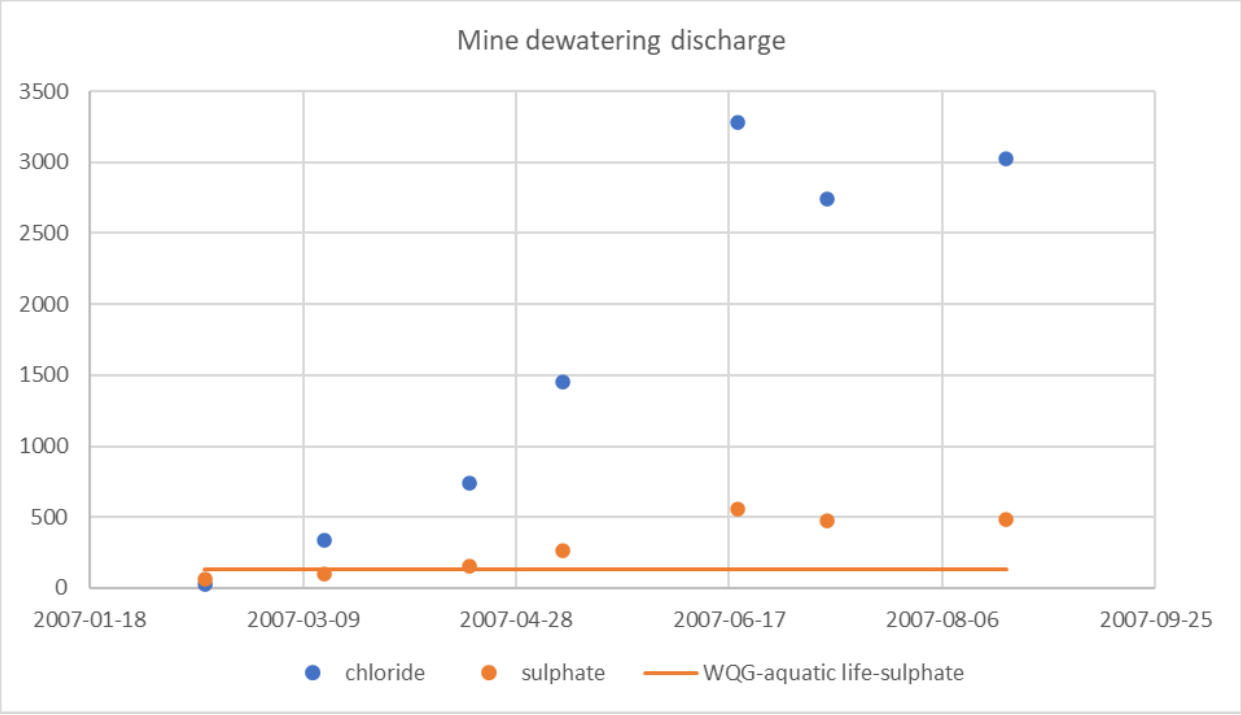


Figure 5.30 Chloride and sulphate in the mine dewatering discharge.

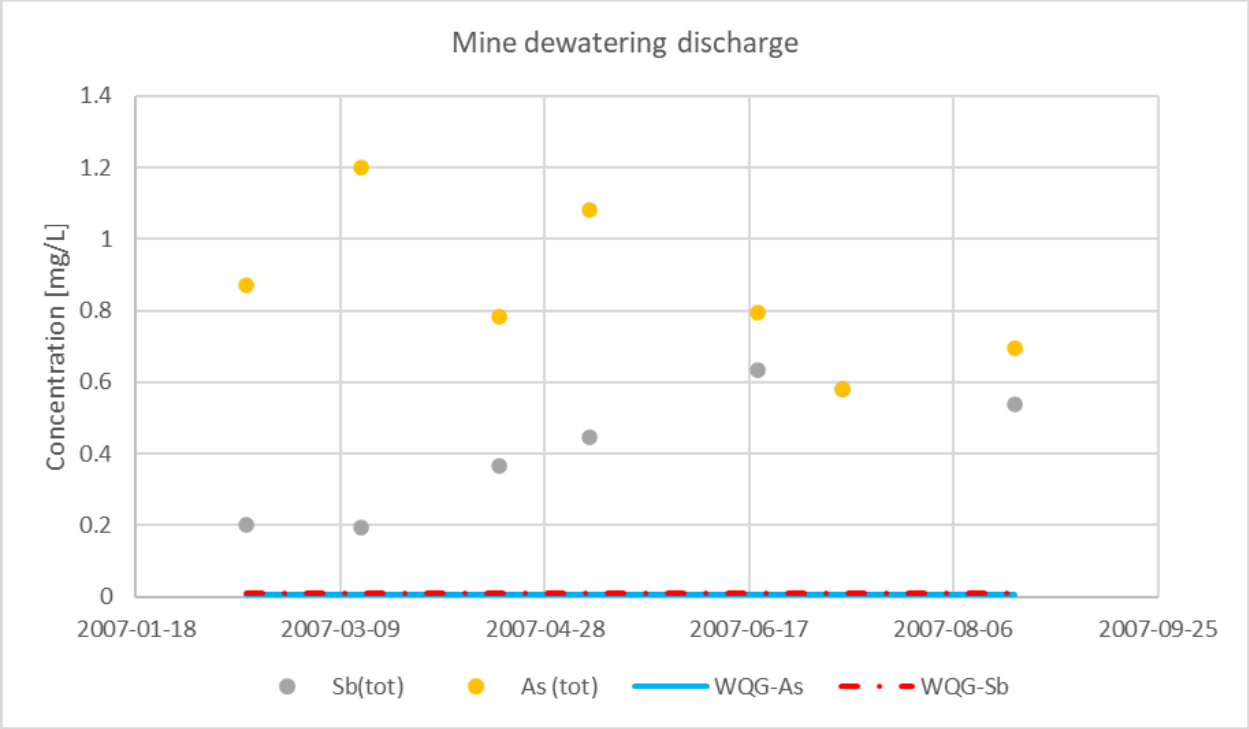


Figure 5.31 Total antimony and arsenic in the mine dewatering discharge.

5.9 Implications for Management of Mine Leaching and Drainage

Tailings discharged by the legacy mining operations at New Polaris likely present sources of contamination to the Tulsequah River Floodplain. Previous analysis of grab sample of old tailings material (Personal communication, 2022) indicated elevated sulphur content. The extent of legacy tailings and their geochemistry and effects on water quality will be described in the project specific environmental effects assessment.

Other potential sources of acid generation and metal leaching in the floodplain are buried tailings that have less exposure to oxygen. Perturbation of the flood plain would likely change the existing geochemical condition and re-mobilize arsenic to the proposed mine site.

The cumulative effects of the old tailings on the proposed New Polaris mine, quality of surface water and groundwater components will be addressed throughout the environmental assessments during construction, operation closure and post-closure phases of the mine.

Exposure of mine wastes, HC2-LGO and construction rock to water poses some risk of arsenic and antimony leaching under near-neutral pH conditions. Tailings are expected to be at risk of leaching copper (first flush), and arsenic and antimony under the same conditions. T2-Co-disposal of filtered tailings within waste rock bermed cells within the Combined Storage Facility (CSF) should help reduce volumes of impacted contact water compared to conventional slurry tailings with its higher water content.

As tailings are placed into the CSF, the deposited tailings and waste rock will be compacted which will further help reduce infiltration and quantities of impacted seepage. Rainwater that falls inside the facility will be collected and directed to the water treatment plant to remove any suspended solids and other contaminants prior to recycling to the process plant or discharged.

6.0 Conclusions

Conclusions arising out of the baseline geochemistry study included:

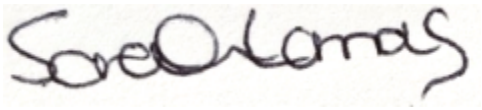
1. Waste rock (mafic/ultramafic (basalt and andesite)) was classified as NPAG, except for three samples of legacy mine rock which were considered to likely be residual ore from Tulsequah Chief mine. C-vein rocks from the previous assessment were considered likely NPAG due to an elevated carbonate content.
2. Three out of the five legacy mine rock samples were classified as PAG. Humidity cell test results confirmed this with declining pH values, elevated sulphate concentrations, and leaching of arsenic, antimony, cadmium, copper, lead and zinc above the BCFAL screening criteria.
3. All but one HC2-LGO samples were classified as NPAG. NPAG HC2-LGO samples contained sulphide-sulphur up to 1.4%wt. and were considered to be at risk of generating neutral pH mine drainage containing elevated arsenic and antimony concentrations above the BCFAL screening criteria. HC2-LGO should be stockpiled separately, and longer-term contact water management may be required if the material will be stored permanently on surface.
4. Humidity cell testing conducted on flotation tails indicated leaching of arsenic, molybdenum, cadmium, cobalt, copper, nickel, and zinc. Subsequent testing on T2-Co-disposal materials, and waste rock composites confirmed that waste rock was NPAG. The T1-tailings and HC1-precomposite samples showed highest tendency for metal leaching, with arsenic and antimony being the contaminants of particular concern.
5. The HC1-precomposite sample was selected to represent waste rock suitable for construction use. The solid phase antimony / arsenic content was relatively elevated in this sample which illustrates a likely future requirement to screen waste rock for antimony / arsenic ML risk when selecting development waste rock for site construction use.
6. Arsenopyrite has been analysed in HC2-LGO, waste rock, and legacy mine rock samples. The Flotation tail and T2-Co-disposal samples didn't identify arsenopyrite, although test method detection limits were elevated. T2-Co-disposal of waste rock with tailings should help reduce water infiltration and limit oxygen diffusion (both required for sulphide oxidation), which should help control arsenic release.
7. Stibnite, a sulphidic antimony mineral was identified in mineralogy testing of ore samples and is likely responsible for the elevated antimony leaching observed from mine materials.
8. All mine materials tested contained elevated solid-phase and leachable arsenic and antimony concentrations. Arsenic and antimony will likely be constituents of primary concern as these are prone to leaching under circum-neutral pH conditions. This conclusion is supported by the presence of elevated arsenic, and to a lesser extent antimony, in portal water samples.
9. Calcite as primary neutralization agent has been measured in HC2-LGO sample 2021-10-24-19Y and in all humidity cell samples. High concentration of dolomite (30.8 wt.%) were measured in HC2-LGO as sole carbonate source of neutralization potential. All other kinetic cell samples contain both carbonate and dolomite as source of neutralization potential.

10. Results from the humidity cell test can be used to calculate metal leaching rates from all mine waste samples tested. Along with the leach tests results, the humidity test results will be used to generate geochemical source-terms that will be used as input to a site water quality model. The geochemistry characterization program can also be used to provide input and recommendations to engineering design, water management plans, and mitigation measures for the project.
11. A project-specific ML/ARD management plan will be developed during the mine permitting phase. The ML/ARD Management Plan will specify best practices to minimize the potential for ML/ARD generation from mine operation and closure. The management plan will consider geochemical reactivity of the historical mine materials based on further study.

7.0 Closure

This report has been prepared by Ausenco, based on fieldwork conducted by Ausenco, for sole benefit and use by Canagold Resources Ltd. In performing this work, Ausenco has relied in good faith on information provided by others and has assumed that the information provided by those individuals is both complete and accurate. This work was performed to current industry standard practice for similar environmental work, within the relevant jurisdiction and same locale. The findings presented herein should be considered within the context of the scope of work and project terms of reference; further, the findings are time sensitive and are considered valid only at the time the report was produced. The conclusions and recommendations contained in this report are based upon the applicable guidelines, regulations, and legislation existing at the time the report was produced; any changes in the regulatory regime may alter the conclusions and/or recommendations.

Report prepared by:
Ausenco Sustainability ULC



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Appendix A

Trace and Metal Analysis

Appendix A Trace Metal Analysis

Test: Metals by Aqua Regia Digestion with ICP-MS/ AES Finish
Date: December 28/2021

Sample ID	Ag ppm	Al %	Ba ppm	Ca %	Cr ppm	Cu ppm	Fe %	K %	Li ppm	Mg %	Mn ppm	Na %	Ni ppm	P %	S %	Sr ppm	Ti %	V ppm	Zn ppm	Zr ppm	As ppm	Be ppm	Bi ppm	Cd ppm	Ce ppm
Method Code	ICM21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20
LOD	0.01	0.01	5	0.01	1	0.5	0.01	0.01	1	0.01	2	0.01	0.5	0.005	0.01	0.5	0.01	1	1	0.5	1	0.1	0.02	0.01	0.05
2021-10-20-1C	0.10	3.98	50	5.5	765	99.3	6.03	1.21	39	8.59	1042	0.02	359	0.09	0.15	429	0.1	168	89	<0.5	466	0.5	<0.02	0.23	6.2
2021-10-20-2C	0.15	2.65	23	7.64	546	95.2	5.56	0.2	28	6.59	1070	0.02	293	0.07	0.99	467	0.01	123	53	0.6	5523	0.4	<0.02	0.15	3.3
2021-10-20-5C	0.74	0.55	25	4.69	9	165	7.19	0.36	1	2.03	978	0.03	31	0.15	>5.00	246	<0.01	28	66	<0.5	>10000	0.3	0.03	0.25	4.31
2021-10-20-6C	0.17	3.81	32	6.57	609	86.7	6.28	0.9	45	7.57	1275	0.02	312	0.07	0.14	393	0.08	157	72	<0.5	564	0.5	<0.02	0.17	3.87
2021-10-20-7C	0.19	2.01	27	5.07	93	189	6.13	0.46	12	3.12	1112	0.03	49	0.13	1.51	307	0.02	112	64	<0.5	4461	0.4	0.07	0.12	5.4
2021-10-20-8C	0.12	2.47	47	7.08	184	159	5.69	1.04	21	4.59	1159	0.02	107	0.14	0.5	435	0.09	126	88	<0.5	718	0.5	0.03	0.18	4.52
2021-10-20-12Y	0.11	2.42	20	8.02	275	78.5	5.25	0.21	20	6.07	1206	0.02	119	0.08	0.09	429	<0.01	113	54	<0.5	104	0.3	<0.02	0.11	4.85
2021-10-20-14Y	0.07	3.01	22	11.14	233	86.6	5.2	0.11	23	4.97	1563	0.03	79	0.09	0.09	505	0.02	192	37	0.6	39	0.3	<0.02	0.04	5.98
2021-10-20-1W	0.08	3.04	42	6.85	237	126	5.94	0.52	42	5.61	1124	0.02	131	0.11	0.3	263	0.03	122	67	<0.5	669	0.5	0.03	0.1	5.45
2021-10-20-2W	0.05	3.77	127	7.53	401	109	5.93	0.18	46	5.87	1177	0.04	156	0.11	0.12	324	0.05	236	66	0.9	55	0.3	<0.02	0.1	6.47
2021-10-20-3W	0.04	3.57	72	6.2	619	102	6.92	1.26	46	6.88	1032	0.04	404	0.06	0.07	221	0.11	171	74	0.9	322	0.5	0.02	0.07	5.28
2021-10-20-4W	0.07	3.14	41	3.78	204	162	5.05	0.56	25	3.31	841	0.06	99	0.13	0.07	147	0.2	159	62	2.3	35	0.2	<0.02	0.08	4.41
2021-10-20-5W	0.06	3.7	44	4.88	568	118	5.2	0.5	32	5.19	904	0.05	192	0.1	0.19	197	0.2	180	49	1.8	57	0.3	0.04	0.07	3.5
2021-10-20-9W	0.09	3.14	72	5.97	61	212	7.19	0.57	21	3.06	1317	0.06	35	0.15	0.32	166	0.16	278	93	1.6	19	0.3	0.06	0.12	7.47
2021-10-20-11W	0.09	2.22	106	1.32	80	187	3.83	0.65	15	1.73	494	0.07	52	0.1	0.32	61.2	0.21	93	48	1.8	166	<0.1	0.02	0.07	1.26
2021-10-20-14W	0.05	3.51	81	5.14	497	125	6.18	1.67	40	6.4	929	0.02	238	0.09	0.36	411	0.15	172	63	<0.5	286	0.5	0.03	0.08	3.77
2021-10-20-19W	0.05	3.47	65	4.38	601	124	4.66	0.66	30	4.93	786	0.04	210	0.08	0.13	174	0.18	150	45	2.1	56	0.2	0.02	0.06	1.87
2021-10-20-22W	0.09	2.98	50	3.68	171	199	4.9	0.39	26	3.23	814	0.07	82	0.11	0.13	75.6	0.19	191	55	2	31	0.1	0.02	0.06	4.85
2021-10-20-24W	0.04	2.53	40	6.61	228	113	3.49	0.25	22	3.53	792	0.04	99	0.08	0.03	191	0.11	102	39	2	51	0.2	0.02	0.06	3.96
2021-10-21-26WG	21.25	0.9	1438	0.02	2	90.7	1.39	0.17	13	0.93	238	0.03	1	<0.01	0.26	69.1	0.02	8	861	10.9	76	<0.1	1.25	3.57	12.1
2021-10-21-27WG	>100	0.35	21	0.03	6	>10000	6.67	0.16	4	0.28	83	0.03	2	0.02	>5.00	55.4	0.02	13	>10000	7.8	5070	<0.1	9.23	321	4.86
2021-10-21-28WG	2.49	1.99	497	4.28	208	288	4.51	0.42	20	3.8	831	0.05	111	0.09	0.56	232	0.09	94	2273	1.9	1184	0.3	0.17	9.23	9.21
2021-10-21-29WG	0.24	2.35	106	5.44	369	91.8	4.8	0.53	21	4.56	955	0.02	153	0.09	0.44	263	0.08	110	99	0.9	1775	0.3	0.03	0.34	4.62
2021-10-21-30WG	25.55	0.53	1026	0.03	7	148	1.43	0.2	5	0.44	65	0.03	2	<0.01	0.35	78.5	0.02	8	920	14.4	174	<0.1	1.2	3.93	14.45
2021-10-24-16Y	0.27	1.56	107	5.54	23	179	6.71	0.54	9	2.92	1434	0.03	33	0.14	0.78	311	0.02	100	77	<0.5	1346	0.7	0.03	0.09	8.58
2021-10-24-18Y	0.12	2.41	46	4.12	17	254	6.32	0.71	11	2.79	1159	0.04	24	0.16	0.89	205	0.1	150	85	<0.5	461	0.4	0.04	0.1	10.65
2021-10-24-19Y	0.05	3.08	45	1.02	680	81.5	3.56	0.33	31	3.92	514	0.04	239	0.08	0.03	16.9	0.18	66	41	1.9	9	<0.1	<0.02	0.06	0.83
2021-10-24-20Y	1.1	1.86	33	7.23	307	80.8	5.61	0.81	21	4.77	1207	0.02	198	0.07	1.53	457	0.07	97	76	<0.5	>10000	0.4	0.03	0.9	2.45
2021-10-24-21Y	0.28	1.4	16	9.26	253	52.2	5.27	0.24	20	5.96	1457	0.02	194	0.06	1.21	913	<0.01	76	49	<0.5	>10000	0.3	<0.02	0.12	5.61
2021-10-24-22Y	0.86	1.73	22	8.4	390	71.5	4.99	0.6	13	6.16	1029	0.01	282	0.05	1.44	597	0.04	89	51	<0.5	>10000	0.4	<0.02	0.17	1.88
2021-10-24-23Y	0.25	3.19	38	6.89	681	88.2	5.76	1.14	27	6.44	1141	0.02	247	0.07	0.17	325	0.11	164	68	<0.5	362	0.4	<0.02	0.08	3.5
2021-10-24-25Y	0.31	1.59	35	5.71	8	300	6.33	0.69	10	2.37	1509	0.02	15	0.2	1.78	238	0.03	94	100	<0.5	6257	0.6	<0.02	0.13	10.31
2021-10-24-26Y	0.06	2.83	97	5.61	221	115	4.24	0.4	20	3.66	917	0.05	95	0.08	0.1	128	0.19	135	46	4	115	0.2	0.02	0.1	2.74
2021-10-24-31W	0.12	2.49	40	8.67	438	87.9	5.05	0.56	28	6.89	1081	0.02	189	0.06	0.64	649	0.06	118	51	<0.5	2257	0.3	<0.02	0.15	2.92
2021-10-24-32W	0.06	2.58	83	5.59	256	109	5.91	0.58	21	3.9	1024	0.05	89	0.1	0.17	149	0.14	195	57	2	42	0.4	0.02	0.07	5.01
2021-10-24-34W	0.29	2.77	78	2.76	140	473	5.56	0.65	24	2.53	825	0.07	61	0.12	0.21	74	0.25	175	77	2.1	54	0.2	0.04	0.19	4.09
2021-10-24-35W	0.06	3.3	45	2.58	542	102	3.85	0.23	27	4.55	627	0.03	211	0.09	0.03	74.6	0.2	89	43	2.3	9	<0.1	0.02	0.07	2.37
2021-10-24-36W	0.08	2.66	91	2.57	202	130	4.4	1.19	21	2.53	672	0.07	83	0.11	0.09	93.1	0.19	132	56	1.3	26	0.1	<0.02	0.08	2.44
2021-10-24-37W	0.05	2.57	46	1.27	608	106	3.24	0.35	23	3.18	440	0.05	237	0.08	0.11	23.7	0.17	65	36	1.6	9	<0.1	<0.02	0.05	0.57
2021-10-24-38W	0.05	3.21	58	7.08	730	72.2	5.7	0.34	42	6.75	1030	0.03	262	0.07	0.09	471	0.03	166	57	0.9	112	0.3	<0.02	0.06	3.55
2021-10-24-39W	0.10	2.45	44	4.28	133	206	5.48	0.45	17	3.21	949	0.05	69	0.15	0.12	272	0.16	172	69	1.5	39	0.2	<0.02	0.05	8.57
2021-10-24-40W	0.07	2.59	156	2.25	159	134	4.54	1.01	25	2.4	680	0.08	64	0.11	0.18	86.9	0.2	156	56	1.7	25	0.2	0.02	0.08	3.32
2021-10-24-41W	0.85	1.81	62	6.89	288	93.2	5.37	0.94	17	4.85	845	0.02	160	0.07	2.19	509	0.07	83	70	<0.5	6299	0.3	0.02	0.38	2.29
2021-10-24-43W	0.10	1.49	54	5.71	106	157	5.85	0.43	12	3.22	1285	0.04	106	0.13	1.25	298	0.05	101	75	0.7	8110	0.3	<0.02	0.23	7.46
2021-10-24-44W	0.09	3.28	50	4.14	23	218	6.55	0.46	27	2.9	1123	0.06	23	0.17	0.19	263	0.09	247	94	1.4	64	0.4	0.02	0.09	14.08

Appendix A Trace Metal Analysis

Test: Metals by Aqua
Date: December 28/2(

Sample ID	Co ppm	Cs ppm	Ga ppm	Ge ppm	Hf ppm	Hg ppm	In ppm	La ppm	Lu ppm	Mo ppm	Nb ppm	Pb ppm	Rb ppm	Sb ppm	Sc ppm	Se ppm	Sn ppm	Ta ppm	Tb ppm	Te ppm	Th ppm	Tl ppm	U ppm	W ppm	Y ppm	Yb ppm
Method Code	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20	IMS21B20
LOD	0.1	0.05	0.1	0.1	0.05	0.01	0.02	0.1	0.01	0.05	0.05	0.2	0.2	0.05	0.1	1	0.3	0.05	0.02	0.05	0.1	0.02	0.05	0.1	0.05	0.1
2021-10-20-1C	59.4	3.41	11.5	0.2	<0.05	0.07	0.03	2.7	0.06	0.6	<0.05	3.9	34.1	89.22	31.8	<1	<0.3	<0.05	0.17	<0.05	0.3	0.19	<0.05	0.2	4.06	0.4
2021-10-20-2C	50.4	1.48	7.2	<0.1	<0.05	0.14	0.04	1.3	0.07	0.35	<0.05	4.1	6.6	88.15	25.1	<1	<0.3	<0.05	0.19	0.09	0.1	0.04	<0.05	0.7	5.2	0.5
2021-10-20-5C	29.8	1.11	1.5	<0.1	<0.05	0.11	0.05	1.8	0.05	0.61	<0.05	8.2	9.3	105	8	<1	<0.3	<0.05	0.24	0.06	0.4	0.14	0.08	0.6	5.06	0.4
2021-10-20-6C	65	3.4	10.2	0.2	<0.05	0.05	0.03	1.6	0.06	0.21	<0.05	1.2	30	83.59	33	<1	<0.3	<0.05	0.16	<0.05	0.1	0.21	<0.05	<0.1	4.02	0.4
2021-10-20-7C	32.6	1.3	7.4	<0.1	<0.05	0.04	0.05	2.3	0.08	0.87	<0.05	4	14.8	59.82	17.7	<1	<0.3	<0.05	0.25	0.1	0.3	0.12	0.06	1.7	4.92	0.5
2021-10-20-8C	38.7	2.33	6.6	0.1	<0.05	0.15	0.04	1.9	0.07	0.34	<0.05	5.8	34.6	310	21.9	<1	<0.3	<0.05	0.22	<0.05	0.2	0.22	<0.05	5.6	5.5	0.5
2021-10-20-12Y	45.8	0.61	6.4	<0.1	<0.05	0.18	0.03	2.2	0.07	0.25	<0.05	2.7	5.6	47.05	28.6	<1	<0.3	<0.05	0.2	<0.05	0.1	0.03	<0.05	0.2	5.22	0.5
2021-10-20-14Y	36.3	1.14	9.7	0.1	<0.05	0.3	0.04	2.7	0.1	0.31	<0.05	2.3	3.9	48.72	27	<1	<0.3	<0.05	0.26	<0.05	0.2	0.05	<0.05	0.1	7.34	0.7
2021-10-20-1W	45	2.61	7.7	<0.1	<0.05	0.04	0.03	2.3	0.06	0.55	<0.05	1.9	19.1	74.48	24.8	<1	<0.3	<0.05	0.21	<0.05	0.2	0.17	<0.05	0.3	4.71	0.5
2021-10-20-2W	46.1	1.43	12.5	0.1	<0.05	0.09	0.04	2.8	0.11	0.17	<0.05	4.4	5.2	15.8	32.4	<1	<0.3	<0.05	0.27	<0.05	0.2	0.03	0.06	<0.1	7.84	0.8
2021-10-20-3W	78.5	6.15	8.6	0.1	<0.05	0.04	0.04	2.1	0.07	0.21	<0.05	1	42	185	38.8	<1	<0.3	<0.05	0.19	<0.05	0.2	0.26	<0.05	0.1	4.51	0.4
2021-10-20-4W	35.5	2.2	10.1	0.2	0.06	0.02	0.02	1.8	0.08	0.51	<0.05	1.5	23.8	4.4	13.9	<1	<0.3	<0.05	0.19	0.05	0.2	0.15	0.06	0.1	5.99	0.6
2021-10-20-5W	50.2	2.65	11.6	0.2	0.08	0.01	0.03	1.4	0.1	0.22	<0.05	2.9	17.5	9.19	19.1	<1	<0.3	<0.05	0.25	0.05	0.1	0.1	<0.05	<0.1	7.7	0.7
2021-10-20-9W	38.2	3.07	12.9	0.2	0.08	<0.01	0.03	3.4	0.11	0.54	<0.05	3.4	23	3.52	24.1	1	<0.3	<0.05	0.25	<0.05	0.4	0.16	0.14	0.1	7.64	0.8
2021-10-20-11W	27.6	1.04	6.4	0.2	0.08	0.01	<0.02	0.5	0.04	0.51	0.05	1.5	17.9	2.83	4.6	1	<0.3	<0.05	0.07	0.06	<0.1	0.11	<0.05	0.1	2.36	0.3
2021-10-20-14W	51	6.33	9.3	0.1	<0.05	0.03	0.04	1.6	0.05	0.42	<0.05	1.7	52.7	113	29.2	1	<0.3	<0.05	0.18	0.09	0.1	0.41	<0.05	0.4	3.93	0.4
2021-10-20-19W	43.5	4.43	10.7	0.2	0.1	0.01	0.02	0.8	0.09	0.39	<0.05	2	28.6	9.29	13.8	<1	<0.3	<0.05	0.18	<0.05	<0.1	0.21	0.09	<0.1	6.11	0.6
2021-10-20-22W	33.4	1.29	11	0.2	0.09	0.07	0.02	2	0.11	0.27	<0.05	1.3	12.2	1.34	12.2	<1	<0.3	<0.05	0.24	<0.05	0.2	0.06	0.09	0.2	7.21	0.7
2021-10-20-24W	33.3	1.48	7.5	0.2	0.09	0.04	0.02	1.9	0.08	0.31	<0.05	1.4	8.2	1.8	11.1	<1	<0.3	<0.05	0.18	<0.05	0.2	0.04	0.11	<0.1	5.46	0.5
2021-10-21-26WG	0.4	0.44	2.9	<0.1	0.25	3.79	0.13	6.3	0.01	14.48	0.1	2401	3.8	27.61	1.3	3	0.4	<0.05	0.07	0.85	0.9	2.27	0.27	2.6	1	<0.1
2021-10-21-27WG	0.9	0.45	8.1	0.2	0.23	>100	4.59	1.9	0.01	38.85	0.25	>10000	4.6	2011	1.3	21	1.9	<0.05	0.04	7.19	0.3	4.87	0.4	5.6	0.79	<0.1
2021-10-21-28WG	28.1	1.73	6.8	<0.1	0.07	0.76	0.08	4.3	0.08	0.87	0.12	523	15.1	91.14	13.6	1	3.4	<0.05	0.22	0.11	1.5	0.17	0.44	0.4	5.38	0.6
2021-10-21-29WG	32.9	2.06	7.1	0.1	<0.05	0.33	0.03	2	0.08	0.46	<0.05	20.5	18.6	35.33	15.1	<1	<0.3	<0.05	0.2	<0.05	0.3	0.12	0.11	0.3	5.22	0.5
2021-10-21-30WG	0.3	0.83	2.2	0.1	0.34	4.25	0.11	7.8	0.01	11.1	0.1	3274	5.1	38.22	1.2	3	0.5	<0.05	0.08	1.41	1.3	4.89	0.35	5.5	1.04	<0.1
2021-10-24-16Y	33.1	3.15	4.5	<0.1	<0.05	0.15	0.04	3.8	0.1	0.62	<0.05	8.9	19.7	64.78	15.6	<1	<0.3	<0.05	0.29	<0.05	0.5	0.21	0.11	2	6.36	0.7
2021-10-24-18Y	27.8	3.78	7.6	<0.1	<0.05	0.13	0.04	4.6	0.07	0.47	<0.05	4.9	29.8	108	14.4	1	<0.3	<0.05	0.27	<0.05	0.6	0.29	0.12	1.1	5.3	0.5
2021-10-24-19Y	33.8	0.96	7.3	0.1	0.06	0.05	<0.02	0.3	0.05	0.18	<0.05	1.7	13.9	1.67	3.9	<1	<0.3	<0.05	0.1	<0.05	<0.1	0.08	<0.05	<0.1	3.53	0.4
2021-10-24-20Y	44.4	4.49	4.9	<0.1	<0.05	0.07	0.06	1.1	0.06	0.64	<0.05	47.8	35.1	3306	20.3	1	<0.3	<0.05	0.19	0.13	<0.1	0.49	<0.05	1.4	4.42	0.4
2021-10-24-21Y	38.7	1.01	4.4	<0.1	<0.05	0.07	0.06	2.3	0.07	0.28	<0.05	3.8	7.7	75.92	19.2	<1	<0.3	<0.05	0.24	<0.05	0.3	0.08	<0.05	0.5	6.19	0.5
2021-10-24-22Y	42	2.06	4.8	<0.1	<0.05	0.06	0.04	0.8	0.06	0.29	<0.05	4.2	19.4	3044	21	1	<0.3	<0.05	0.16	<0.05	<0.1	0.16	<0.05	0.5	4.28	0.4
2021-10-24-23Y	47	4.51	8.6	0.1	<0.05	0.07	0.03	1.4	0.07	0.41	<0.05	1.9	35.5	95.47	28.2	<1	<0.3	<0.05	0.19	0.05	<0.1	0.31	<0.05	0.6	4.75	0.5
2021-10-24-25Y	27.4	3.65	4.1	<0.1	<0.05	0.12	0.04	4.4	0.11	0.57	<0.05	3.2	28.2	61.49	12.8	2	<0.3	<0.05	0.36	<0.05	0.4	0.31	0.11	2.9	8.74	0.8
2021-10-24-26Y	33.5	2.57	9.1	0.2	0.14	0.04	0.02	1.2	0.09	0.35	<0.05	2	14.5	5.35	11.9	1	<0.3	<0.05	0.18	<0.05	0.2	0.1	0.11	<0.1	5.59	0.6
2021-10-24-31W	37.2	2.31	6.9	<0.1	<0.05	0.03	0.04	1.1	0.08	0.2	<0.05	6.3	21	297	21.8	<1	<0.3	<0.05	0.22	0.06	0.1	0.15	0.09	0.2	6.36	0.6
2021-10-24-32W	38.1	3.32	10.7	0.2	0.09	0.03	0.04	2	0.11	0.17	<0.05	2.8	20.6	8.33	26	1	<0.3	<0.05	0.25	<0.05	0.2	0.14	0.06	<0.1	7	0.8
2021-10-24-34W	30.5	1.95	10.5	0.2	0.1	0.08	0.03	1.6	0.1	3.63	<0.05	2.1	25.2	7.54	13	1	0.3	<0.05	0.22	0.17	0.1	0.17	0.06	0.2	6.62	0.7
2021-10-24-35W	38.5	0.99	8.8	0.1	0.09	0.01	<0.02	1	0.06	0.19	<0.05	1.9	8.4	0.72	6	<1	<0.3	<0.05	0.19	<0.05	0.2	0.05	0.06	<0.1	5.32	0.5
2021-10-24-36W	26.4	2.91	8.6	0.1	0.06	0.02	<0.02	1	0.06	0.7	<0.05	2.4	52.7	13.28	10.2	<1	<0.3	<0.05	0.12	0.06	0.1	0.3	<0.05	0.2	3.68	0.4
2021-10-24-37W	34.2	0.96	6.2	0.1	0.07	0.01	<0.02	0.2	0.04	0.48	<0.05	1.9	15	0.87	4	<1	<0.3	<0.05	0.08	<0.05	<0.1	0.08	<0.05	<0.1	2.79	0.3
2021-10-24-38W	49.7	2.23	9	0.1	<0.05	0.03	0.03	1.4	0.06	0.36	<0.05	2.2	10.3	16.44	26.1	<1	<0.3	<0.05	0.18	<0.05	<0.1	0.07	<0.05	0.1	4.43	0.4
2021-10-24-39W	31.3	1.38	9.2	0.2	0.07	0.02	<0.02	3.7	0.1	0.4	<0.05	1.4	16.6	15.05	13.3	<1	<0.3	<0.05	0.27	<0.05	0.3	0.07	0.11	0.2	7.34	0.7
2021-10-24-40W	28.5	1.8	8.7	0.1	0.06	0.02	<0.02	1.3	0.06	0.69	<0.05	1.6	36	2.18	10.2	<1	<0.3	<0.05	0.14	<0.05	0.2	0.21	0.05	<0.1	4.03	0.4
2021-10-24-41W	36.6	3.21	4.8	<0.1	<0.05	0.06	0.04	1.2	0.05	0.39	<0.05	15.1	27.8	>10000	19	2	<0.3	<0.05	0.17	0.09	0.1	0.29	<0.05	0.4	4.08	0.4
2021-10-24-43W	35.5	2.3	5.4	<0.1	0.06	0.13	0.05	3.2	0.09	0.86	<0.05	4.4	14.4	72.72	14.1	<1	<0.3	<0.05	0.25	<0.05	0.4	0.12	0.11	0.2	6.54	0.6
2021-10-24-44W	29.2	1.9	12.7	0.2	0.05	0.05	0.04	6.2	0.11	0.71	<0.05	3.3	12.8	16.54	19.8	<1	<0.3	<0.05	0.36	<0.05	0.6	0.06	0.15	0.1	8.79	0.8

Appendix B1

Leachate Concentrations of Humidity Cells (Excel Data)

Appendix B1 Leachate Concentrations of Humidity Cells

T1 Flotation tails

Date	Cycle	Volume mL Input	Volume mL Output	pH	Cond.	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Hardness CaCO$_3$	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu
					µs/cm	mgCaCO3/L	mg CaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
28-Dec-21	0	600	300	7.98	1604	7.0	101.5	619	73	0.46	534	0.010	5.06	1.76	0.0245	0.000090	< 0.00001	0.179	0.000110	96.6	0.00021	0.006100	3.38
04-Jan-22	1	500	450	8.15	649	4.5	130.6	167	23	0.41	240	0.009	9.10	3.04	0.00927	< 0.000007	< 0.00001	0.118	0.000012	43.8	< 0.00008	0.00256	0.0217
11-Jan-22	2	500	520	8.22	455	1.4	128.2	75	8	0.40	172	0.006	6.69	2.67	0.00755	< 0.000007	< 0.00001	0.070	0.000004	34.5	< 0.00008	0.00198	0.0110
25-Jan-22	4	500	465	8.18	550	1.7	95.3	154	< 1	0.25	247	0.009	4.29	2.22	0.0112	< 0.000007	< 0.00001	0.073	0.000005	49.1	< 0.00008	0.00206	0.0066
08-Feb-22	6	500	390	8.26	540	1.0	90.8	155	< 1	0.26	230	0.008	6.64	2.09	0.0107	< 0.000007	< 0.00001	0.049	< 0.000003	45.0	< 0.00008	0.00168	0.0058
22-Feb-22	8	500	400	8.28	433	0.8	90.5	106	< 1	2.32	190	0.011	6.80	2.28	0.00851	0.000007	< 0.00001	0.048	0.000005	38.2	< 0.00008	0.00116	0.0048
08-Mar-22	10	500	490	8.31	385	#N/A	117.3	58	< 1	0.22	151	0.006	5.80	2.00	0.00872	0.000011	< 0.00001	0.042	< 0.000003	31.8	0.00009	0.00132	0.0040
22-Mar-22	12	500	435	8.31	311	#N/A	93.5	45	< 1	0.22	133	0.012	4.64	2.06	0.00692	< 0.000007	< 0.00001	0.034	0.00001	28	< 0.00008	0.000832	0.0041
05-Apr-22	14	500	380	8.20	301	1.1	81.7	50	< 1	0.19	117	0.008	5.76	2.08	0.00851	< 0.000007	< 0.00001	0.028	0.000005	25.4	< 0.00008	0.000715	0.0047
19-Apr-22	16	500	420	8.33	304	#N/A	102.9	34	< 1	0	115	0.008	4.9600	2.0300	0.0077	< 0.000007	< 0.00001	0.030	0.000003	26	< 0.00008	0.00084	0.00290
17-May-22	20	500	325	8.24	338	0.8	77.3	79	< 1	0.15	133	0.011	5.36	1.73	0.00909	< 0.000007	< 0.00001	0.031	0.000029	25.1	0.0001	0.000701	0.0054
14-Jun-22	24	500	400	8.28	317	0.6	78.2	68	< 1	0	134	0.009	5.7200	2.3500	0.0089	< 0.000007	< 0.00001	0.034	0.000006	28	< 0.00008	0.00064	0.00300
12-Jul-22	28	500	515	8.29	288	1.1	92.1	37	< 1	0	135.0	0.0080	4.5800	2.6000	0.0096	< 0.000007	< 0.00001	0.0290	0.000011	29.50	0.00016	0.000656	0.00250
09-Aug-22	32	500	290	8.11	368	1.8	71.2	79	< 1	0	156	0.011	4.7400	2.5500	0.0085	< 0.000007	< 0.00001	0.033	0.000109	32.3	< 0.00008	0.00060	0.00410
06-Sep-22	36	500	290	8.14	395	1.6	75.4	96	< 1	0	180.0	0.0110	4.4100	2.6500	0.0088	< 0.000007	< 0.00001	0.0400	0.000021	34.70	0.00056	0.000570	0.00380
04-Oct-22	40	500	330	8.04	357	2.5	81.3	68	< 1	0.12	177	0.007	5.69	3.24	0.00895	< 0.000007	< 0.00001	0.046	0.000007	35.5	< 0.00008	0.000507	0.0034
01-Nov-22	44	500	310	8.17	339	1.4	73.8	75	< 1	0	138.0	0.0090	4.0400	3.7300	0.0070	< 0.000007	< 0.00001	0.0280	0.000006	29.20	< 0.00008	0.000390	0.00230
29-Nov-22	48	500	315	7.97	367	2.4	76.8	74	< 1	0	137	0.028	4.2500	3.8000	0.0069	< 0.000007	< 0.00001	0.027	0.000343	28.0	0.00029	0.00050	0.00340
27-Dec-22	52	500	295	8.24	355	0.9	77.0	65	< 1	0	151	0.009	3.9300	4.3700	0.0076	0.000013	< 0.00001	0.031	0.000012	31.5	0.00015	0.00034	0.00250
24-Jan-23	56	500	360	8.26	333	1.5	84.4	53	< 1	0	145	0.009	3.7200	5.4700	0.0075	< 0.000007	< 0.00001	0.029	0.000021	31.7	< 0.00008	0.00031	0.00210
21-Feb-23	60	500	315	8.22	327	1.1	74.1	71	< 1	< 0.06	137	0.009	4.0500	5.7500	0.0072	< 0.000007	< 0.00001	0.030	< 0.000003	28.0	< 0.00008	0.00028	0.00200
21-Mar-23	64	500	385	8.22	330	1.2	78.0	67	< 1	< 0.06	154	0.008	3.8300	5.9100	0.0064	< 0.000007	< 0.00001	0.030	0.000007	31.7	< 0.00008	0.00024	0.00170
18-Apr-23	68	500	290	8.24	324	1.0	73.8	65	< 1	0	138	0.009	3.9100	6.0800	0.0065	< 0.000007	< 0.00001	0.024	0.000005	29.1	0.00017	0.00021	0.00210
16-May-23	72	500	495	8.36	354	#N/A	103.1	53	< 1	< 0.06	157	0.007	3.9800	5.4300	0.0074	< 0.000007	< 0.00001	0.033	< 0.000003	33.1	< 0.00008	0.00030	0.00170

Date	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
28-Dec-21	0.030	0.00033	0.0186	71.0	0.105	0.01	0.217	0.180	0.270	89.1	0.00362	290	0.00631	57.3	0.908	256	0.000140	0.0197	0.00079	0.000240	0.00151	0.029	< 0.002
04-Jan-22	0.012	< 0.00009	0.0117	31.8	0.0546	< 0.01	0.103	0.0391	0.003	46.2	0.00336	26.9	< 0.00005	12.8	0.360	69	0.000103	0.0268	< 0.00005	0.000234	0.00169	< 0.002	< 0.002
11-Jan-22	< 0.007	< 0.00009	0.0079	20.8	0.0452	< 0.01	0.0247	0.0279	< 0.003	27.4	0.00210	19.9	< 0.00005	3.39	0.277	31	0.000060	0.0379	< 0.00005	0.000155	0.00159	< 0.002	< 0.002
25-Jan-22	< 0.007	< 0.00009	0.0104	30.3	0.0434	< 0.01	0.0138	0.0241	< 0.003	24.2	0.00443	16.2	< 0.00005	1.89	0.365	65	0.000078	0.0503	0.00007	0.000175	0.00146	< 0.002	< 0.002
08-Feb-22	< 0.007	< 0.00009	0.0059	28.6	0.0432	< 0.01	0.0143	0.0176	< 0.003	21.1	0.00418	13.7	< 0.00005	1.28	0.317	58	0.000061	0.0364	< 0.00005	0.000166	0.00127	< 0.002	< 0.002
22-Feb-22	< 0.007	< 0.00009	0.0063	23.1	0.0356	< 0.01	0.00873	0.0106	< 0.003	19.3	0.00231	19.4	< 0.00005	0.89	0.275	43	0.000062	0.0413	< 0.00005	0.000159	0.00128	< 0.002	< 0.002
08-Mar-22	< 0.007	< 0.00009	0.0058	17.5	0.0377	< 0.01	0.00389	0.0124	< 0.003	16.7	0.00093	16.6	< 0.00005	0.62	0.234	20	0.000063	0.05990	0.00006	0.000232	0.00122	< 0.002	< 0.002
22-Mar-22	0.007	< 0.00009	0.0051	15.2	0.0292	< 0.01	0.00377	0.0077	< 0.003	16	0.00066	16.9	< 0.00005	0.54	0.178	19	0.00005	0.08076	< 0.00005	0.00032	0.00131	0.002	< 0.002
05-Apr-22	< 0.007	< 0.00009	0.0033	13.1	0.0265	< 0.01	0.00489	0.0058	< 0.003	13.5	0.00046	12.8	< 0.00005	0.52	0.173	18	0.000048	0.0521	0.00005	0.000115	0.00141	< 0.002	< 0.002
19-Apr-22	< 0.007	< 0.00009	0.0033	12.2	0.029	< 0.01	0.00371	0.0065	< 0.003	13.10	0.00049	14.70	< 0.00005	0.33	0.181	12	0.000050	0.0551	< 0.00005	0.000105	0.00123	< 0.002	< 0.002
17-May-22	< 0.007	< 0.00009	0.0039	17.10	0.02890	< 0.01	0.00648	0.0053	< 0.003	15.10	0.00043	20.60	< 0.00005	0.71	0.1920	25	0.000038	0.0444	< 0.00005	0.000113	0.00141	0.007	< 0.002
14-Jun-22	< 0.007	< 0.00009	0.0040	15.4	0.025	< 0.01	0.00413	0.0047	< 0.003	13.90	0.00033	26.20	< 0.00005	0.49	0.174	21	0.000048	0.0556	< 0.00005	0.000096	0.00139	< 0.002	< 0.002
12-Jul-22	< 0.007	< 0.00009	0.003500	15.00	0.02670	< 0.01	0.0047	0.0047	< 0.003	15.1	0.00043	25.70	< 0.00005	0.39	0.171	19.0	0.000057	0.05720	0.00007	0.000130	0.00165	< 0.002	< 0.002
09-Aug-22	< 0.007	0.00012	0.0043	18.2	0.027	< 0.01	0.01140	0.0040	< 0.003	14.40	0.00038	22.30	< 0.00005	0.58	0.186	33.0	0.000048	0.02770	0.00011	0.000116	0.00169	0.003	< 0.002
06-Sep-22	< 0.007	< 0.00009	0.004100	22.70	0.02120	< 0.01	0.0135	0.0040	< 0.003	15.3	0.00056	26.30	< 0.00005	0.59	0.197	36.0	0.000044	0.02590	0.00027	0.000129	0.00182	< 0.002	< 0.002
04-Oct-22	0.024	< 0.00009	0.0051	21.40	0.01770	< 0.01	0.01720	0.0040	< 0.003	14.70	0.00034	32.70	< 0.00005	0.45	0.2220	29	0.00003	0.0604	0.00293	0.000092	0.00174	< 0.002	< 0.002
01-Nov-22	< 0.007	< 0.00009	0.003800	15.90	0.01220	< 0.01	0.0118	0.0033	0.005	13.4	0.00023	30.40	< 0.00005	0.35	0.183	25.0	0.000043	0.03620	0.00010	0.000120	0.00181	< 0.002	< 0.002
29-Nov-22	0.278	0.00052	0.0029	16.3	0.023	< 0.01	0.01610	0.0031	< 0.003	11.90	0.00031	41.70	< 0.00005	0.31	0.194	26.0	< 0.000005	0.04900	0.00007	0.000149	0.00177	0.033	< 0.002
27-Dec-22	0.007	< 0.00009	0.0034	17.6	0.008	< 0.01	0.01380	0.0039	0.008	12.80	0.00022	28.50	< 0.00005	0.45	0.195	30.0	0.000029	0.02710	< 0.00005	0.000137	0.00202	< 0.002	< 0.002
24-Jan-23	< 0.007	< 0.00009	0.0027	16.0	0.007	< 0.01	0.00991	0.0030	0.048	14.20	0.00008	28.00	< 0.00005	0.54	0.177	24.0	0.000027	0.03150	0.00023	0.000143	0.00213	< 0.002	< 0.002
21-Feb-23	< 0.007	< 0.00009	0.0037	16.2	0.006	< 0.01	0.01100	0.0028	< 0.003	10.80	0.00018	25.10	< 0.00005	0.26	0.184	23.0	0.000040	0.02590	0.00008	0.000125	0.00230	< 0.002	< 0.002
21-Mar-23	< 0.007	< 0.00009	0.0035	18.2	0.006	< 0.01	0.00954	0.0027	< 0.003	12.70	0.00033	31.30	< 0.00005	0.35	0.172	24.0	0.000036	0.04350	0.00007	0.000104	0.00228	< 0.002	< 0.002
18-Apr-23	< 0.007	< 0.00009	0.0029	15.9	0.004	< 0.01	0.00884	0.0024	< 0.003	11.00	0.00024	23.50	< 0.00005	0.27	0.171	28.0	0.000036	0.02870	0.00013	0.000127	0.00223	< 0.002	< 0.002
16-May-23	< 0.007	< 0.00009	0.0044	18.0	0.007	< 0.01	0.00758	0.0033	< 0.003	11.80	0.00028	30.20	< 0.00005	0.27	0.201	20.0	0.000045	0.06530	0.00014	0.000112	0.00226	< 0.002	< 0.002

T2 Co-disposal

Date	Cycle	Volume mL Input	Volume mL Output	pH	Cond.	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Hardness CaCO$_3$	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu
					µs/cm	mg CaCO$_3$/L	mg CaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
29-Mar-22	0	750	495	8.18	888	1.4	82.3	279	29	0.53	311	0.013	5.50	2.54	0.0132	0.000039	< 0.00001	0.119	0.000011	58.7	< 0.00008	0.002730	1.10
05-Apr-22	1	500	465	8.28	453	0.8	107.5	74	18	0.35	129	0.011	6.51	3.15	0.01340	< 0.000007	< 0.00001	0.080	0.000011	25.6	0.00009	0.00114	0.0212
12-Apr-22	2	500	475	8.28	395	0.9	113.2	61	3	0.28	145	0.034	4.91	2.56	0.01250	< 0.000007	< 0.00001	0.067	0.000022	29.4	0.00009	0.00138	0.0085
19-Apr-22	3	500	450	8.31	362	#N/A	113.4	47	< 1	0.21	129	0.009	5.37	2.26	0.0132	< 0.000007	< 0.00001	0.045	0.000003	27.5	< 0.00008	0.00125	0.0052
03-May-22	5	500	420	8.18	389	1.8	82.5	96	< 1	0.21	135	0.011	7.57	2.00	0.0165	< 0.000007	< 0.00001	0.037	0.000004	27.8	0.00009	0.00103	0.0143
17-May-22	7	500	430	8.22	334	0.8	79.9	76	< 1	0.25	121	0.015	9.34	1.85	0.01700	< 0.000007	< 0.00001	0.040	0.000017	21.9	< 0.00008	0.00091	0.0042
31-May-22	9	500	405	8.21	277	0.7	72.2	50	< 1	0.17	123	0.015	8.65	2.57	0.01240	< 0.000007	< 0.00001	0.035	< 0.000003	26.4	< 0.00008	0.00064	0.0037
14-Jun-22	11	500	375	8.22	199	0.7	52.9	36	< 1	0.06	77.8	0.02	5.1	1.5	0.00958	< 0.000007	< 0.00001	0.021	0.000066	17.1	< 0.00008	0.000453	0.0035
28-Jun-22	13	500	420	8.22	58	0.6	23.6	3	< 1	< 0.06	23.4	0.039	0.6	0.436	0.00176	< 0.000007	< 0.00001	0.005	0.000004	6.33	< 0.00008	0.000078	0.001
12-Jul-22	15	500	380	8.34	53	#N/A	26.3	4	< 1	< 0.06	22	0.054	0.5300	0.4670	0.0018	< 0.000007	< 0.00001	0.006	0.000006	6	0.00020	0.00007	0.00090
16-Aug-22	20	500	375	8.04	69	1.8	21.0	9	< 1	< 0.06	29	0.031	0.501	0.405	0.00158	< 0.000007	< 0.00001	0.006	0.000006	8.3	< 0.00008	0.000071	0.0012
20-Sep-22	25	500	320	8.08	246	1.1	35.9	67	< 1	< 0.06	101	0.031	2.7400	1.2900	0.0098	< 0.000007	< 0.00001	0.026	0.000006	23	0.00008	0.00042	0.00740
25-Oct-22	30	500	315	8.04	116	0.9	28.5	17	< 1	< 0.06	46.0	0.0460	0.9630	0.8900	0.0033	< 0.000007	< 0.00001	0.0130	0.000006	11.40	< 0.00008	0.000200	0.00370
29-Nov-22	35	500	310	8.01	178	1.0	35.1	39	< 1	< 0.06	61	0.066	2.3600	1.4500	0.0051	< 0.000007	< 0.00001	0.014	0.000133	13.8	0.00015	0.00033	0.00520
03-Jan-23	40	500	320	7.37	89	2.6	23.7	12	< 1	< 0.06	35	0.036	0.6750	0.6160	0.0021	0.000022	< 0.00001	0.009	0.000006	9.3	< 0.00008	0.00012	0.00240
07-Feb-23	45	500	305	8.01	132	1.5	28.0	24	< 1	< 0.06	47	0.029	1.1300	0.9290	0.0030	< 0.000007	< 0.00001	0.013	< 0.000003	10.6	0.00029	0.00019	0.00290
14-Mar-23	50	500	305	7.92	173	1.3	31.6	38	< 1	< 0.06	70	0.037	1.8300	1.3800	0.0053	0.000014	< 0.00001	0.022	0.000037	16.4	0.00019	0.00028	0.00460
21-Mar-23	51	500	485	8.11	116	1.0	34.0	21	< 1	< 0.06	49	0.029	1.2300	1.1500	0.0030	< 0.000007	< 0.00001	0.015	0.000003	11.5	< 0.00008	0.00014	0.00120
28-Mar-23	52	500	445	8.01	115	1.3	32.0	16	< 1	< 0.06	49	0.029	1.6300	1.2000	0.0030	< 0.000007	< 0.00001	0.012	0.000005	11.5	< 0.00008	0.00013	0.00110
25-Apr-23	56	500	325	8.07	148	0.8	33.0	27	< 1	< 0.06	57	0.027	1.3200	1.5500	0.0041	< 0.000007	< 0.00001	0.016	0.000015	13.3	< 0.00008	0.00015	0.00250

Date	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
29-Mar-22	< 0.007	< 0.00009	0.0137	39.9	0.067	< 0.01	0.119	0.065	0.014	54.7	0.00378	15	< 0.00005	58.0	0.533	145	0.000101	0.0437	0.00016	0.000145	0.00216	0.000	< 0.002
05-Apr-22	< 0.007	< 0.00009	0.0075	15.8	0.0288	< 0.01	0.036	0.0180	< 0.003	25.0	0.00309	19.9	< 0.00005	15.9	0.262	36	0.000062	0.0672	0.0001	0.000142	0.00244	< 0.002	< 0.002
12-Apr-22	< 0.007	0.00016	0.0084	16.6	0.0340	< 0.01	0.0113	0.0183	< 0.003	20.3	0.00252	16.9	< 0.00005	5.66	0.268	24	0.000081	0.0832	< 0.00005	0.000184	0.00273	0.004	< 0.002
19-Apr-22	< 0.007	< 0.00009	0.0057	14.6	0.0328	< 0.01	0.0065	0.0141	< 0.003	16.8	0.00262	13.9	< 0.00005	2.39	0.257	17	0.000062	0.0620	< 0.00005	0.000127	0.00184	0.005	< 0.002
03-May-22	0.146	< 0.00009	0.0052	16.0	0.0299	< 0.01	0.0073	0.0495	< 0.003	16.0	0.00269	12.7	< 0.00005	2.03	0.258	26	0.000051	0.0324	0.0001	0.000144	0.00181	0.01	< 0.002
17-May-22	< 0.007	< 0.00009	0.0054	16.2	0.0285	< 0.01	0.00450	0.0081	< 0.003	17.6	0.00208	13.8	< 0.00005	1.82	0.240	23	0.000049	0.0339	< 0.00005	0.000085	0.00224	0.006	< 0.002
31-May-22	< 0.007	< 0.00009	0.0052	13.8	0.0222	< 0.01	0.00386	0.0058	< 0.003	16.0	0.00172	12.6	< 0.00005	1.27	0.199	21	0.000042	0.02720	0.00009	0.000092	0.00220	0.002	< 0.002
14-Jun-22	< 0.007	0.00013	0.0029	8.53	0.0231	< 0.01	0.00249	0.0027	< 0.003	8.76	0.00115	11.3	< 0.00005	0.83	0.13	12	0.000027	0.0267	< 0.00005	0.000062	0.0015	0.003	< 0.002
28-Jun-22	0.007	< 0.00009	0.0007	1.84	0.00925	< 0.01	0.00037	0.0001	< 0.003	1.74	0.00015	1.9	< 0.00005	0.12	0.0391	1	0.000008	0.00433	0.00011	0.000012	0.00094	< 0.002	< 0.002
12-Jul-22	0.014	< 0.00009	0.0002	1.6	0.007	< 0.01	0.00038	0.0004	< 0.003	1.58	0.00013	1.16	< 0.00005	0.17	0.032	4	0.000005	0.00288	0.00023	0.000015	0.00112	< 0.002	< 0.002
16-Aug-22	< 0.007	< 0.00009	0.0005	2.14	0.01450	< 0.01	0.00057	0.0005	< 0.003	1.74	0.00021	1.72	< 0.00005	0.21	0.0444	4	< 0.000005	0.0019	0.00022	0.000007	0.00083	< 0.002	< 0.002
20-Sep-22	< 0.007	< 0.00009	0.0032	10.4	0.032	< 0.01	0.00692	0.0022	< 0.003	7.32	0.00078	20.30	< 0.00005	0.91	0.175	25	0.000031	0.00899	0.00012	0.000056	0.00135	< 0.002	< 0.002
25-Oct-22	< 0.007	< 0.00009	0.001300	4.25	0.02410	< 0.01	0.0015	0.0001	< 0.003	4.2	0.00018	12.00	< 0.00005	0.37	0.072	7.0	0.000010	0.00167	0.00006	0.000016	0.00138	< 0.002	< 0.002
29-Nov-22	0.106	0.00015	0.0020	6.4	0.029	< 0.01	0.00398	0.0011	< 0.003	6.06	0.00034	46.00	< 0.00005	0.63	0.107	11.0	< 0.000005	0.00414	0.00013	0.000052	0.00171	0.016	< 0.002
03-Jan-23	< 0.007	< 0.00009	0.0010	2.9	0.021	< 0.01	0.00129	0.0006	< 0.003	3.14	0.00014	9.12	< 0.00005	0.28	0.058	5.0	0.000008	0.00144	0.00005	0.000011	0.00096	< 0.002	< 0.002
07-Feb-23	0.021	0.00023	0.0011	5.0	0.018	< 0.01	0.00286	0.0008	< 0.003	3.80	0.00026	10.70	< 0.00005	0.53	0.074	9.0	0.000012	0.00200	0.00013	0.000030	0.00113	< 0.002	< 0.002
14-Mar-23	< 0.007	0.00054	0.0025	7.1	0.026	< 0.01	0.00411	0.0012	< 0.003	5.97	0.00075	18.40	< 0.00005	0.72	0.114	14.0	0.000018	0.00409	0.00043	0.000080	0.00146	< 0.002	< 0.002
21-Mar-23	< 0.007	< 0.00009	0.0017	4.8	0.011	< 0.01	0.00704	0.0006	< 0.003	5.20	0.00023	17.00	< 0.00005	0.56	0.071	8.0	0.000009	0.00726	0.00011	0.000030	0.00150	< 0.002	< 0.002
28-Mar-23	0.019	< 0.00009	0.0016	5.0	0.008	< 0.01	0.00209	0.0007	< 0.003	5.08	0.00004	13.10	< 0.00005	0.49	0.075	6.0	0.000011	0.00942	0.00015	0.000042	0.00144	< 0.002	< 0.002
25-Apr-23	< 0.007	< 0.00009	0.0018	5.8	0.008	< 0.01	0.00295	0.0009	< 0.003	5.51	0.00016	13.50	< 0.00005	0.50	0.094	9.0	0.000014	0.00625	0.00012	0.000035	0.00181	< 0.002	< 0.002

T3 PAG

Date	Cycle	Volume mL Input	Volume mL Output	pH	Cond.	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Hardness CaCO$_3$	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu
					µs/cm	mg CaCO$_3$/L	mg CaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
29-Mar-22	0	750	520	7.16	1077	22.7	50.0	349	3	< 0.06	465	< 0.001	0.02	0.08	0.0303	< 0.000007	< 0.00001	0.021	0.043600	134.0	< 0.00008	0.026300	0.05
05-Apr-22	1	500	455	7.37	1891	7.5	29.3	798	2	0.18	1070	< 0.001	0.05	0.17	0.02860	< 0.000007	< 0.00001	0.003	0.024700	340.0	< 0.00008	0.02350	0.0322
12-Apr-22	2	500	455	7.59	1171	6.0	31.2	445	< 1	0.21	651	0.002	0.06	0.27	0.03400	< 0.000007	< 0.00001	0.003	0.013100	206.0	< 0.00008	0.01360	0.0145
19-Apr-22	3	500	465	7.53	767	5.7	30.5	266	< 1	0.15	347	0.002	0.06	0.26	0.0506	< 0.000007	< 0.00001	0.009	0.011200	110.0	< 0.00008	0.01010	0.0134
03-May-22	5	500	420	7.44	845	5.0	23.4	383	< 1	0.21	357	< 0.001	0.08	0.37	0.0454	< 0.000007	< 0.00001	0.002	0.00844	111.0	0.00009	0.00553	0.0184
17-May-22	7	500	430	7.30	682	3.4	14.6	291	< 1	< 0.06	282	0.002	0.05	0.28	0.08060	< 0.000007	< 0.00001	0.003	0.013800	77.6	< 0.00008	0.01090	0.0419
31-May-22	9	500	405	7.01	90	1.6	7.4	28	< 1	< 0.06	35	0.014	0.03	0.04	0.10600	< 0.000007	< 0.00001	0.006	0.004951	10.4	< 0.00008	0.00213	0.0641
14-Jun-22	11	500	385	6.77	166	2.7	5.8	64	< 1	< 0.06	60.8	< 0.001	0.04	0.0528	0.063	< 0.000007	< 0.00001	0.003	0.0111	16.7	< 0.00008	0.0061	0.136
28-Jun-22	13	500	440	6.58	302	7.5	4.5	85	< 1	< 0.06	120	0.003	0.0527	0.0877	0.0561	< 0.000007	< 0.00001	0.003	0.0262	32.8	< 0.00008	0.0139	0.286
12-Jul-22	15	500	390	6.36	210	8.1	4.3	85	< 1	< 0.06	82	0.008	0.0650	0.0563	0.0702	< 0.000007	< 0.00001	0.003	0.022400	22	0.00009	0.01061	0.32600
16-Aug-22	20	500	310	6.33	235	9.0	4.4	91	< 1	< 0.06	94	0.002	0.0496	0.0457	0.03540	< 0.000007	< 0.00001	0.006	0.022500	25.2	< 0.00008	0.010800	0.3210
20-Sep-22	25	500	350	6.48	624	16.7	5.6	287	< 1	< 0.06	282	0.001	0.0690	0.1090	0.0527	< 0.000007	< 0.00001	0.007	0.050500	70	< 0.00008	0.02920	0.46300
25-Oct-22	30	500	305	6.58	504	10.4	5.2	192	< 1	< 0.06	221.0	0.0010	0.0747	0.0999	0.0426	< 0.000007	< 0.00001	0.0270	0.033200	43.10	< 0.00008	0.026300	0.40800
29-Nov-22	35	500	260	6.55	885	20.9	6.6	394	< 1	< 0.06	387	0.004	0.1170	0.2040	0.0353	< 0.000007	< 0.00001	0.005	0.060800	85.0	0.00008	0.04270	0.56200
03-Jan-23	40	500	270	6.39	1153	25.7	7.4	537	< 1	< 0.06	575	< 0.001	0.1620	0.3070	0.0374	< 0.000007	< 0.00001	0.006	0.070300	150.0	< 0.00008	0.04580	0.57200
07-Feb-23	45	500	325	6.32	487	8.8	2.7	195	< 1	< 0.06	201	< 0.001	0.0671	0.1070	0.0579	< 0.000007	< 0.00001	0.004	0.024400	49.7	< 0.00008	0.01670	0.19400
14-Mar-23	50	500	270	6.48	833	16.6	5.2	370	< 1	< 0.06	402	0.001	0.1480	0.2530	0.0628	0.000019	< 0.00001	0.008	0.055700	110.0	0.00012	0.03050	0.44200
21-Mar-23	51	500	455	6.59	467	8.7	3.8	190	< 1	< 0.06	218	< 0.001	0.0696	0.1030	0.0597	< 0.000007	< 0.00001	< 0.002	0.030000	66.0	< 0.00008	0.01460	0.22900
28-Mar-23	52	500	460	6.55	380	7.8	4.2	152	< 1	< 0.06	177	0.001	0.0898	0.0949	0.0687	< 0.000007	< 0.00001	0.002	0.023400	51.1	0.00480	0.01140	0.20500
25-Apr-23	56	500	370	6.67	340	7.0	3.7	120	< 1	< 0.06	136	< 0.001	0.0672	0.0854	0.0826	< 0.000007	< 0.00001	0.004	0.024300	40.9	< 0.00008	0.00996	0.25500

Date	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
29-Mar-22	0.009	0.50100	0.0061	31.9	1.180	0.04	0.001	0.081	0.015	6.0	0.01390	25	< 0.00005	1.7	0.580	181	0.002830	0.0051	0.00009	0.000009	0.00004	11.000	< 0.002
05-Apr-22	< 0.007	0.363	0.0024	54.4	1.7400	0.48	0.005	0.0576	0.008	7.3	0.04980	50.9	< 0.00005	1.2	1.550	365	0.002120	0.0101	0.00027	0.000004	0.00004	2.11	< 0.002
12-Apr-22	< 0.007	0.145	0.0025	33.0	1.0700	0.06	0.0052	0.0317	0.011	6.3	0.00894	44.9	< 0.00005	0.78	1.270	214	0.002290	0.0059	0.00011	0.000002	0.00085	1.11	< 0.002
19-Apr-22	< 0.007	0.511	0.0013	17.5	0.6850	0.04	0.0035	0.0244	0.01	3.5	0.00486	36.7	< 0.00005	0.42	0.863	115	0.001700	0.0112	0.00009	0.000006	0.00009	0.94	< 0.002
03-May-22	0.077	0.335	0.0010	19.5	0.4440	0.08	0.0060	0.0360	0.006	2.1	0.00491	34.6	< 0.00005	0.37	0.771	103	0.001010	0.0181	0.00013	0.000015	0.00010	0.498	< 0.002
17-May-22	< 0.007	0.605	0.0011	21.5	0.6770	0.05	0.00278	0.0288	< 0.003	1.8	0.00199	27.7	< 0.00005	0.49	0.747	103	0.000641	0.0074	0.00015	0.000002	0.00017	1.16	< 0.002
31-May-22	0.021	0.624	0.0002	2.3	0.0937	0.1	0.00041	0.0063	< 0.003	0.4	0.00039	3.1	0.00018	0.08	0.072	12	0.000157	0.00086	0.00088	0.000006	0.00005	0.614	< 0.002
14-Jun-22	< 0.007	0.634	0.0004	4.62	0.226	0.03	0.00013	0.015	< 0.003	0.771	0.00038	3.82	< 0.00005	0.13	0.0927	20	0.000117	0.00074	0.00005	< 0.000002	0.00002	1.79	< 0.002
28-Jun-22	< 0.007	0.906	0.0008	9.11	0.547	0.05	0.00009	0.0329	< 0.003	1.89	0.00048	9.16	< 0.00005	0.14	0.132	42	0.000214	0.00075	0.0002	0.000002	< 0.00001	4.98	< 0.002
12-Jul-22	< 0.007	0.79800	0.0003	6.6	0.382	0.05	0.00013	0.0227	< 0.003	1.78	0.00051	5.42	0.00007	0.16	0.050	31	0.000176	0.00081	0.00024	0.000015	0.00003	4.84	< 0.002
16-Aug-22	< 0.007	0.772	0.0004	7.45	0.35300	1.65	0.00009	0.0205	< 0.003	1.86	0.00064	2.07	0.00005	0.22	0.0295	34	0.000156	0.0007	0.00019	0.000002	0.00002	4.68	< 0.002
20-Sep-22	< 0.007	1.26000	0.0019	26.0	1.190	0.02	0.00042	0.0485	< 0.003	3.95	0.00109	15.50	< 0.00005	0.42	0.117	103	0.000295	0.00181	0.0001	0.000002	0.00003	10.1	< 0.002
25-Oct-22	< 0.007	1.12000	0.002300	27.60	1.13000	0.65	0.0003	0.0382	< 0.003	4.2	0.00120	5.31	< 0.00005	0.34	0.071	81.0	0.000362	0.00041	< 0.00005	0.000009	0.00004	7.82	< 0.002
29-Nov-22	0.056	1.13000	0.0019	42.5	1.820	0.82	0.00054	0.0588	< 0.003	7.64	0.00207	14.30	< 0.00005	0.46	0.191	131.0	0.000556	0.00390	< 0.00005	0.000004	0.00003	13.2	< 0.002
03-Jan-23	< 0.007	1.07000	0.0024	48.7	2.060	0.16	0.00023	0.0644	0.010	11.30	0.00310	18.80	< 0.00005	0.63	0.418	217.0	0.000774	0.00575	0.00008	0.000004	< 0.00001	13.3	< 0.002
07-Feb-23	0.02	0.62600	0.0010	18.8	0.735	0.03	0.00014	0.0226	< 0.003	3.82	0.00156	10.30	< 0.00005	0.32	0.160	71.0	0.000279	0.00293	0.00006	0.000028	0.00002	4.66	< 0.002
14-Mar-23	< 0.007	0.89400	0.0024	31.0	1.310	0.44	0.00030	0.0411	0.005	8.24	0.00287	12.90	< 0.00005	0.43	0.399	151.0	0.000653	0.00674	0.00037	0.000026	0.00003	9.44	< 0.002
21-Mar-23	< 0.007	0.64500	0.0010	13.0	0.642	< 0.01	0.00017	0.0209	< 0.003	4.53	0.00124	16.40	< 0.00005	0.25	0.245	71.0	0.000276	0.00128	< 0.00005	0.000108	< 0.00001	5.57	< 0.002
28-Mar-23	4.77	0.54000	0.0010	10.2	0.512	< 0.01	0.00071	0.0418	< 0.003	3.98	0.00102	19.50	< 0.00005	0.25	0.224	54.0	0.000275	0.00270	0.00009	0.000006	0.00010	4.17	< 0.002
25-Apr-23	< 0.007	0.71500	0.0009	8.2	0.438	< 0.01	0.00032	0.0141	< 0.003	3.20	0.00084	16.70	< 0.00005	0.22	0.205	46.0	0.000237	0.00282	0.0002	0.000006	0.00003	4.51	< 0.002

HC1 Pre-comp 1+2

Date	Cycle	Volume mL Input	Volume mL Output	pH	Cond.	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Hardness CaCO$_3$	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu
					µs/cm	mgCaCO$_3$/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
29-Mar-22	0	500	385	8.96	180	#N/A	45.8	19	4	0.07	17	0.206	0.69	0.31	0.0032	< 0.000007	< 0.00001	0.048	< 0.000003	4.8	< 0.00008	0.001400	0.00
05-Apr-22	1	500	485	8.62	246	#N/A	49.2	49	3	0.09	19	0.118	4.88	1.37	0.00726	< 0.000007	< 0.00001	0.067	0.000003	4.3	0.00013	0.00065	0.0014
12-Apr-22	2	500	450	8.57	157	#N/A	33.5	27	< 1	< 0.06	18	0.044	5.63	1.07	0.00363	< 0.000007	0.00001	0.036	0.000003	4.0	< 0.00008	0.00015	0.0006
19-Apr-22	3	500	470	8.55	154	#N/A	34.1	28	< 1	< 0.06	27	0.100	7.06	0.86	0.0095	< 0.000007	< 0.00001	0.039	< 0.000003	6.7	0.00015	0.00019	0.0008
03-May-22	5	500	420	7.91	176	1.6	22.4	47	< 1	< 0.06	37	0.074	9.02	0.71	0.0107	< 0.000007	< 0.00001	0.022	0.000006	9.0	0.00015	0.00021	0.0023
17-May-22	7	500	445	8.11	145	0.5	20.9	36	< 1	< 0.06	36	0.080	8.73	0.66	0.00997	< 0.000007	< 0.00001	0.026	0.000017	7.5	0.0001	0.00027	0.0019
31-May-22	9	500	440	8.00	139	0.6	19.9	34	< 1	< 0.06	45	0.068	7.23	0.85	0.00708	< 0.000007	< 0.00001	0.024	0.000004	11.9	< 0.00008	0.00024	0.0008
14-Jun-22	11	500	420	8.04	128	0.6	18.4	29	< 1	< 0.06	39.6	0.056	6.54	0.673	0.00814	< 0.000007	< 0.00001	0.019	0.000022	9.62	< 0.00008	0.000226	0.0016
28-Jun-22	13	500	430	8.02	127	0.7	20.6	29	< 1	< 0.06	38.5	0.066	6.27	0.881	0.00808	< 0.000007	< 0.00001	0.021	< 0.000003	9.49	< 0.00008	0.000185	0.0014
12-Jul-22	15	500	430	7.91	115	1.1	19.1	32	< 1	< 0.06	37	0.063	5.4500	0.7920	0.0096	< 0.000007	< 0.00001	0.019	0.000015	9	0.00011	0.00020	0.00130
16-Aug-22	20	500	435	7.65	114	1.8	20.1	20	< 1	< 0.06	39	0.060	4.02	0.801	0.00483	< 0.000007	< 0.00001	0.019	0.000011	10.6	< 0.00008	0.000174	0.0023
20-Sep-22	25	500	435	7.91	112	0.9	19.0	20	< 1	< 0.06	38	0.052	3.1700	0.6220	0.0048	< 0.000007	< 0.00001	0.019	0.000003	10	< 0.00008	0.00022	0.00230
25-Oct-22	30	500	445	7.94	106	0.8	19.7	18	< 1	< 0.06	37.2	0.0470	3.0100	0.7330	0.0054	0.000007	< 0.00001	0.0260	0.000013	10.50	< 0.00008	0.000212	0.00160
29-Nov-22	35	500	440	8.10	94	2.3	19.2	17	< 1	< 0.06	28	0.036	2.4300	0.6430	0.0042	< 0.000007	< 0.00001	0.013	< 0.000003	7.9	< 0.00008	0.00014	0.00110
03-Jan-23	40	500	430	7.71	107	2.6	20.5	18	< 1	< 0.06	37.0	0.0400	2.7900	0.7800	0.0047	0.000016	< 0.00001	0.0170	< 0.000003	10.50	< 0.00008	0.000210	0.00230
07-Feb-23	45	500	470	8.26	106	0.9	17.6	19	< 1	< 0.06	35	0.041	3.6000	0.7070	0.0044	< 0.000007	< 0.00001	0.014	< 0.000003	9.8	0.00010	0.00013	0.00110
14-Mar-23	50	500	435	7.90	122	1.1	16.5	27	< 1	< 0.06	47	0.047	3.2500	0.8010	0.0056	< 0.000007	< 0.00001	0.019	< 0.000003	12.9	< 0.00008	0.00021	0.00210
21-Mar-23	51	500	460	7.76	76	1.3	17.2	11	< 1	< 0.06	30	0.040	2.7600	0.7020	0.0033	< 0.000007	< 0.00001	0.010	< 0.000003	8.2	< 0.00008	0.00011	0.00140
28-Mar-23	52	500	490	7.63	71	1.5	20.5	8	< 1	< 0.06	28	0.047	3.0700	0.6490	0.0032	< 0.000007	< 0.00001	0.010	0.000009	8.0	0.00188	0.00018	0.00180
25-Apr-23	56	500	445	7.71	107	1.2	14.4	25	< 1	< 0.06	38	0.035	2.2400	0.5740	0.0048	< 0.000007	< 0.00001	0.010	0.000017	10.6	< 0.00008	0.00014	0.00110

Date	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
29-Mar-22	0.008	< 0.00009	0.0022	1.3	0.002	< 0.01	0.002	0.034	0.023	6.5	0.00100	1	< 0.00005	29.3	0.050	10	0.000008	0.0001	0.00029	0.000017	0.01310	< 0.002	< 0.002
05-Apr-22	< 0.007	< 0.00009	0.0029	2.0	0.0042	< 0.01	0.004	0.0340	< 0.003	7.9	0.00119	1.6	< 0.00005	34.0	0.075	16	0.000006	0.0002	0.00013	0.000058	0.02003	< 0.002	< 0.002
12-Apr-22	< 0.007	< 0.00009	0.0025	1.8	0.0021	< 0.01	0.0026	0.0018	< 0.003	5.6	0.00057	1.0	< 0.00005	16.30	0.065	10	0.000008	< 0.00006	< 0.00005	0.000033	0.01210	< 0.002	< 0.002
19-Apr-22	0.007	< 0.00009	0.0025	2.5	0.0046	< 0.01	0.0010	0.0014	< 0.003	5.8	0.00044	1.0	< 0.00005	11.20	0.109	10	0.000009	0.0001	0.00030	0.000060	0.01030	< 0.002	< 0.002
03-May-22	0.016	< 0.00009	0.0027	3.6	0.0054	< 0.01	0.0012	0.0048	< 0.003	6.5	0.00055	0.7	< 0.00005	8.53	0.156	12	0.000010	< 0.00006	0.00014	0.000046	0.00900	< 0.002	< 0.002
17-May-22	< 0.007	< 0.00009	0.0031	4.1	0.0067	< 0.01	0.00132	0.0019	< 0.003	7.2	0.00055	0.9	< 0.00005	7.71	0.146	13	< 0.000005	0.0001	< 0.00005	0.000038	0.01040	0.003	< 0.002
31-May-22	< 0.007	0.00015	0.0036	3.8	0.0052	< 0.01	0.00162	0.0018	< 0.003	6.6	0.00043	1.0	< 0.00005	5.56	0.160	13	0.000008	0.00015	0.00009	0.000043	0.01010	< 0.002	< 0.002
14-Jun-22	< 0.007	< 0.00009	0.003	3.79	0.00549	< 0.01	0.00209	0.0015	< 0.003	5.98	0.00055	0.79	< 0.00005	3.74	0.129	11	0.000006	< 0.00006	< 0.00005	0.000035	0.00777	< 0.002	< 0.002
28-Jun-22	< 0.007	< 0.00009	0.0037	3.59	0.00548	< 0.01	0.00146	0.001	< 0.003	6.29	0.00044	1.09	< 0.00005	3.25	0.136	10	0.00001	< 0.00006	0.00008	0.000035	0.00965	< 0.002	< 0.002
12-Jul-22	< 0.007	< 0.00009	0.0029	3.3	0.006	< 0.01	0.00252	0.0012	< 0.003	6.31	0.00046	1.00	< 0.00005	2.40	0.115	12	0.000008	< 0.00006	< 0.00005	0.000043	0.00927	< 0.002	< 0.002
16-Aug-22	< 0.007	0.00058	0.0036	2.94	0.00653	< 0.01	0.00129	0.0012	< 0.003	5.66	0.00051	0.95	< 0.00005	2.38	0.1190	9	0.000006	0.0002	0.00016	0.000036	0.00938	< 0.002	< 0.002
20-Sep-22	0.007	< 0.00009	0.0037	2.9	0.007	< 0.01	0.00378	0.0015	< 0.003	4.85	0.00066	0.92	< 0.00005	1.87	0.117	9	0.000007	0.00013	< 0.00005	0.000028	0.00803	< 0.002	< 0.002
25-Oct-22	< 0.007	0.00117	0.003800	2.69	0.00743	< 0.01	0.0010	0.0002	< 0.003	5.2	0.00042	1.08	< 0.00005	1.64	0.108	8.0	0.000009	< 0.00006	< 0.00005	0.000034	0.00919	0.003	< 0.002
29-Nov-22	< 0.007	< 0.00009	0.0031	2.1	0.004	< 0.01	0.00117	0.0007	< 0.003	3.80	0.00026	0.95	< 0.00005	1.15	0.090	6.0	< 0.000005	0.00022	< 0.00005	0.000042	0.00855	< 0.002	< 0.002
03-Jan-23	< 0.007	< 0.00009	0.003900	2.63	0.00704	< 0.01	0.0010	0.0015	< 0.003	5.1	0.00067	1.16	< 0.00005	1.11	0.109	8.0	0.000007	0.00008	< 0.00005	0.000053	0.00874	< 0.002	< 0.002
07-Feb-23	0.013	< 0.00009	0.0027	2.6	0.001	< 0.01	0.00096	0.0009	< 0.003	3.77	0.00043	1.08	< 0.00005	1.01	0.102	7.0	0.000007	0.00040	0.00006	0.000087	0.00859	< 0.002	< 0.002
14-Mar-23	< 0.007	0.00026	0.0044	3.5	0.004	< 0.01	0.00148	0.0009	< 0.003	5.27	0.00039	0.96	< 0.00005	1.13	0.120	11.0	0.000007	0.00027	< 0.00005	0.000056	0.00933	< 0.002	< 0.002
21-Mar-23	< 0.007	< 0.00009	0.0022	2.2	0.003	< 0.01	0.00134	0.0007	< 0.003	3.97	0.00029	0.81	< 0.00005	0.93	0.069	5.0	0.000005	< 0.00006	< 0.00005	0.000036	0.00811	< 0.002	< 0.002
28-Mar-23	1.93	0.00016	0.0027	2.0	0.015	< 0.01	0.00074	0.0097	< 0.003	3.81	< 0.00004	1.09	< 0.00005	0.75	0.069	3.0	< 0.000005	0.00018	0.00011	0.000039	0.00817	< 0.002	< 0.002
25-Apr-23	< 0.007	< 0.00009	0.0025	2.9	0.004	< 0.01	0.00177	0.0008	< 0.003	3.88	0.00029	0.82	< 0.00005	0.72	0.105	9.0	0.000005	< 0.00006	< 0.00005	0.000030	0.00724	< 0.002	< 0.002

HC2 Low grade ore

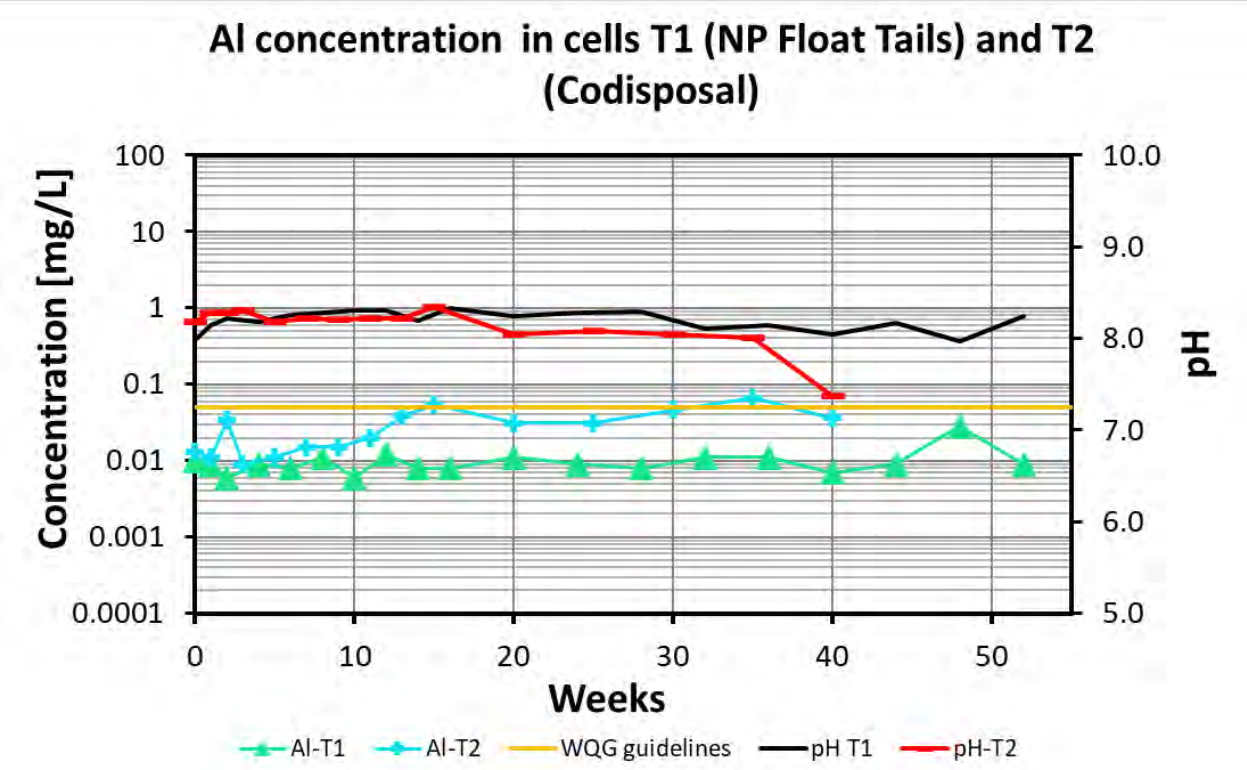
Date	Cycle	Volume mL Input	Volume mL Output	pH	Cond.	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Hardness CaCO$_3$	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu
					µs/cm	mgCaCO$_3$/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
29-Mar-22	0	500	400	8.54	357	#N/A	44.0	86	9	0.12	51	0.144	0.75	0.62	0.0069	< 0.000007	< 0.00001	0.070	0.000006	11.4	0.00019	0.003760	0.01
05-Apr-22	1	500	455	8.17	385	0.7	34.6	104	4	0.10	56	0.057	2.56	5.38	0.00698	< 0.000007	< 0.00001	0.070	0.000004	11.0	0.00011	0.00139	0.0021
12-Apr-22	2	500	470	8.24	258	0.5	32.1	63	< 1	0.08	41	0.020	2.25	5.12	0.00330	< 0.000007	0.00001	0.064	< 0.000003	7.9	< 0.00008	0.00037	0.0010
19-Apr-22	3	500	475	8.25	167	0.8	26.8	35	< 1	< 0.06	32	0.057	1.96	3.35	0.0047	< 0.000007	< 0.00001	0.055	< 0.000003	6.7	0.00009	0.00043	0.0009
03-May-22	5	500	420	7.83	267	1.7	21.7	85	< 1	< 0.06	62	0.043	2.64	2.72	0.0078	< 0.000007	< 0.00001	0.033	< 0.000003	13.1	< 0.00008	0.00047	0.0027
17-May-22	7	500	430	7.91	249	0.8	20.0	79	< 1	< 0.06	67	0.041	2.94	2.30	0.00805	< 0.000007	< 0.00001	0.043	0.000017	12.5	0.00009	0.00061	0.0022
31-May-22	9	500	415	7.70	225	1.0	18.0	71	< 1	< 0.06	81	0.035	2.36	2.89	0.00685	< 0.000007	< 0.00001	0.036	0.000006	18.9	< 0.00008	0.00075	0.0017
14-Jun-22	11	500	425	7.78	239	0.9	16.2	84	< 1	< 0.06	76.8	0.027	2.34	2.2	0.00761	< 0.000007	< 0.00001	0.03	0.000007	16.5	< 0.00008	0.000586	0.0017
28-Jun-22	13	500	420	7.88	199	1.1	20.7	52	< 1	< 0.06	57.9	0.034	2.22	3.26	0.00674	< 0.000007	< 0.00001	0.033	0.000004	12.4	< 0.00008	0.000431	0.0019
12-Jul-22	15	500	415	7.79	184	1.6	18.3	55	< 1	< 0.06	56	0.031	1.9200	2.8300	0.0070	< 0.000007	< 0.00001	0.030	0.000013	12	< 0.00008	0.00041	0.00150
16-Aug-22	20	500	430	7.79	164	2.1	18.8	35	< 1	< 0.06	50	0.027	1.34	2.44	0.00431	< 0.000007	< 0.00001	0.027	0.000004	12.2	< 0.00008	0.000399	0.0021
20-Sep-22	25	500	415	7.68	301	1.4	16.3	98	< 1	< 0.06	105	0.014	1.4500	2.2500	0.0081	< 0.000007	< 0.00001	0.027	0.000006	24	< 0.00008	0.00093	0.00190
25-Oct-22	30	500	420	7.69	206	1.2	16.2	56	< 1	< 0.06	67.5	0.0170	1.3200	2.4100	0.0075	< 0.000007	< 0.00001	0.0310	0.000014	16.70	< 0.00008	0.000544	0.00220
29-Nov-22	35	500	430	7.78	165	2.6	19.3	44	< 1	< 0.06	46	0.015	1.4300	2.4700	0.0046	< 0.000007	< 0.00001	0.022	< 0.000003	10.1	< 0.00008	0.00042	0.00210
03-Jan-23	40	500	430	7.73	132	2.7	21.0	26	< 1	< 0.06	38	0.017	1.5600	2.6100	0.0038	0.000024	< 0.00001	0.024	0.000016	8.6	0.00012	0.00047	0.00240
07-Feb-23	45	500	415	7.61	168	1.6	12.8	40	< 1	< 0.06	48	0.018	1.6100	2.2700	0.0046	< 0.000007	0.00003	0.022	< 0.000003	10.9	0.00017	0.00043	0.00220
14-Mar-23	50	500	415	7.76	166	1.5	15.8	45	< 1	< 0.06	56	0.021	1.4500	2.4700	0.0056	0.000012	< 0.00001	0.027	0.000039	13.5	0.00024	0.00052	0.00230
21-Mar-23	51	500	450	7.62	99	1.6	15.3	19	< 1	< 0.06	32	0.018	0.9980	2.5600	0.0027	< 0.000007	< 0.00001	0.018	0.000008	7.0	< 0.00008	0.00029	0.00140
28-Mar-23	52	500	440	7.70	97	1.7	16.7	17	< 1	< 0.06	31	0.017	1.0900	2.2300	0.0027	< 0.000007	< 0.00001	0.014	0.000007	7.0	< 0.00008	0.00030	0.00070
25-Apr-23	56	500	420	7.57	223	1.4	13.2	64	< 1	< 0.06	77	0.013	0.8190	2.1400	0.0071	< 0.000007	< 0.00001	0.015	0.000026	18.4	< 0.00008	0.00062	0.00140

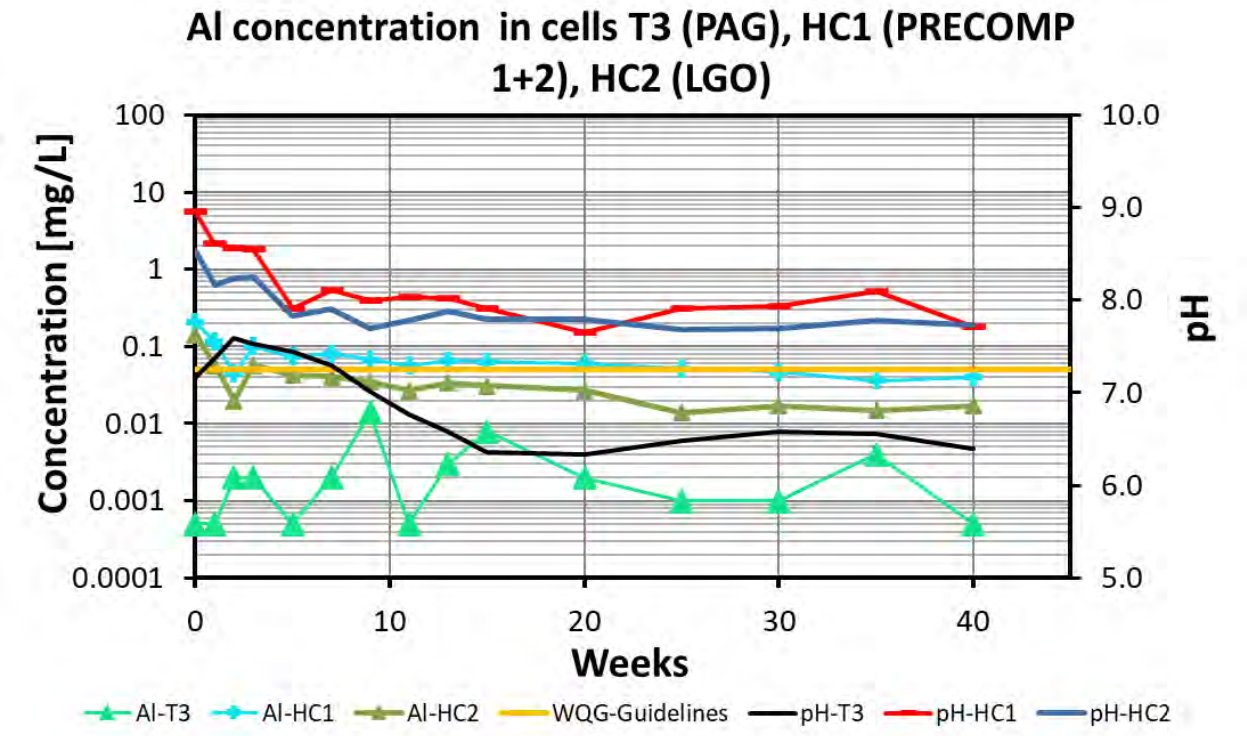
Date	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
29-Mar-22	< 0.007	0.00010	0.0043	5.5	0.005	< 0.01	0.003	0.120	0.003	19.4	0.00068	2	< 0.00005	44.7	0.143	36	0.000025	0.0006	< 0.00005	0.000028	0.00754	< 0.002	< 0.002
05-Apr-22	< 0.007	< 0.00009	0.0045	6.9	0.0067	< 0.01	0.004	0.0669	< 0.003	18.5	0.00079	2.1	< 0.00005	35.9	0.195	39	0.000022	0.0009	< 0.00005	0.000060	0.01397	< 0.002	< 0.002
12-Apr-22	< 0.007	< 0.00009	0.0043	5.1	0.0031	< 0.01	0.0026	0.0081	< 0.003	14.4	0.00055	1.2	< 0.00005	19.20	0.137	23	0.000021	< 0.00006	< 0.00005	0.000023	0.01220	< 0.002	< 0.002
19-Apr-22	< 0.007	< 0.00009	0.0029	3.7	0.0059	< 0.01	0.0012	0.0055	< 0.003	10.4	0.00032	1.0	< 0.00005	8.50	0.109	12	0.000018	0.0001	0.00023	0.000028	0.00864	< 0.002	< 0.002
03-May-22	0.01	< 0.00009	0.0032	7.2	0.0055	< 0.01	0.0011	0.0079	< 0.003	14.9	0.00044	0.8	< 0.00005	6.72	0.218	23	0.000026	0.0002	0.0001	0.000029	0.00749	0.003	< 0.002
17-May-22	< 0.007	< 0.00009	0.0041	8.8	0.0051	< 0.01	0.00096	0.0069	< 0.003	18.7	0.00036	0.9	< 0.00005	5.32	0.240	27	0.000017	< 0.00006	< 0.00005	0.000023	0.00834	0.004	< 0.002
31-May-22	< 0.007	< 0.00009	0.0045	8.2	0.0080	0.01	0.00097	0.0087	< 0.003	18.0	0.00028	0.9	< 0.00005	3.40	0.233	29	0.000024	0.00010	0.00018	0.000020	0.00716	< 0.002	< 0.002
14-Jun-22	< 0.007	< 0.00009	0.0041	8.68	0.00637	< 0.01	0.00131	0.0063	< 0.003	16	0.00024	0.82	< 0.00005	2.36	0.21	28	0.00002	< 0.00006	< 0.00005	0.000019	0.006	< 0.002	< 0.002
28-Jun-22	< 0.007	0.00078	0.0049	6.56	0.0054	< 0.01	0.00105	0.0048	< 0.003	14.8	0.00033	1.07	< 0.00005	1.78	0.177	18	0.000027	< 0.00006	0.00008	0.000023	0.00767	< 0.002	< 0.002
12-Jul-22	< 0.007	< 0.00009	0.0039	6.4	0.006	< 0.01	0.00209	0.0048	< 0.003	15.60	0.00027	1.00	< 0.00005	1.31	0.156	22	0.000023	< 0.00006	0.00005	0.000022	0.00710	0.007	< 0.002
16-Aug-22	< 0.007	< 0.00009	0.0038	4.80	0.00554	0.01	0.00093	0.0042	< 0.003	12.90	0.00035	0.77	< 0.00005	1.22	0.1350	16	0.000020	0.0002	0.00011	0.000017	0.00716	< 0.002	< 0.002
20-Sep-22	< 0.007	< 0.00009	0.0048	11.1	0.008	< 0.01	0.00370	0.0097	< 0.003	15.40	0.00044	0.81	< 0.00005	1.25	0.279	38	0.000026	0.00013	0.00006	0.000015	0.00558	< 0.002	< 0.002
25-Oct-22	< 0.007	0.00031	0.004300	6.27	0.00596	< 0.01	0.0016	0.0045	< 0.003	13.3	0.00029	0.80	< 0.00005	0.90	0.172	22.0	0.000017	< 0.00006	< 0.00005	0.000013	0.00574	0.002	< 0.002
29-Nov-22	< 0.007	< 0.00009	0.0041	5.0	0.004	< 0.01	0.00291	0.0040	< 0.003	11.00	0.00034	1.00	< 0.00005	0.74	0.127	13.0	< 0.000005	0.00088	< 0.00005	0.000059	0.00558	< 0.002	< 0.002
03-Jan-23	0.007	0.00031	0.0044	4.0	0.005	< 0.01	0.00102	0.0045	< 0.003	11.30	0.00043	0.83	< 0.00005	0.65	0.099	11.0	0.000021	0.00065	< 0.00005	0.000022	0.00568	0.002	< 0.002
07-Feb-23	0.053	0.00069	0.0032	5.1	0.005	< 0.01	0.00103	0.0039	< 0.003	10.60	0.00030	0.79	< 0.00005	0.64	0.122	16.0	0.000018	0.00013	0.00008	0.000050	0.00597	< 0.002	< 0.002
14-Mar-23	0.068	< 0.00009	0.0058	5.5	0.006	< 0.01	0.00100	0.0051	< 0.003	11.50	0.00075	0.76	< 0.00005	0.59	0.131	17.0	0.000025	0.00025	0.00034	0.000025	0.00595	< 0.002	< 0.002
21-Mar-23	< 0.007	0.00056	0.0038	3.5	0.003	< 0.01	0.00095	0.0029	< 0.003	9.60	0.00022	0.87	< 0.00005	0.54	0.065	8.0	0.000013	0.00018	0.0001	0.000145	0.00624	< 0.002	< 0.002
28-Mar-23	0.028	< 0.00009	0.0031	3.3	0.003	< 0.01	0.00042	0.0036	< 0.003	8.96	0.00028	0.79	< 0.00005	0.39	0.066	6.0	0.000012	0.00008	0.00016	0.000016	0.00639	< 0.002	< 0.002
25-Apr-23	< 0.007	< 0.00009	0.0037	7.6	0.006	< 0.01	0.00123	0.0060	< 0.003	11.50	0.00032	0.73	< 0.00005	0.42	0.182	25.0	0.000017	< 0.00006	0.00006	0.000016	0.00516	< 0.002	< 0.002

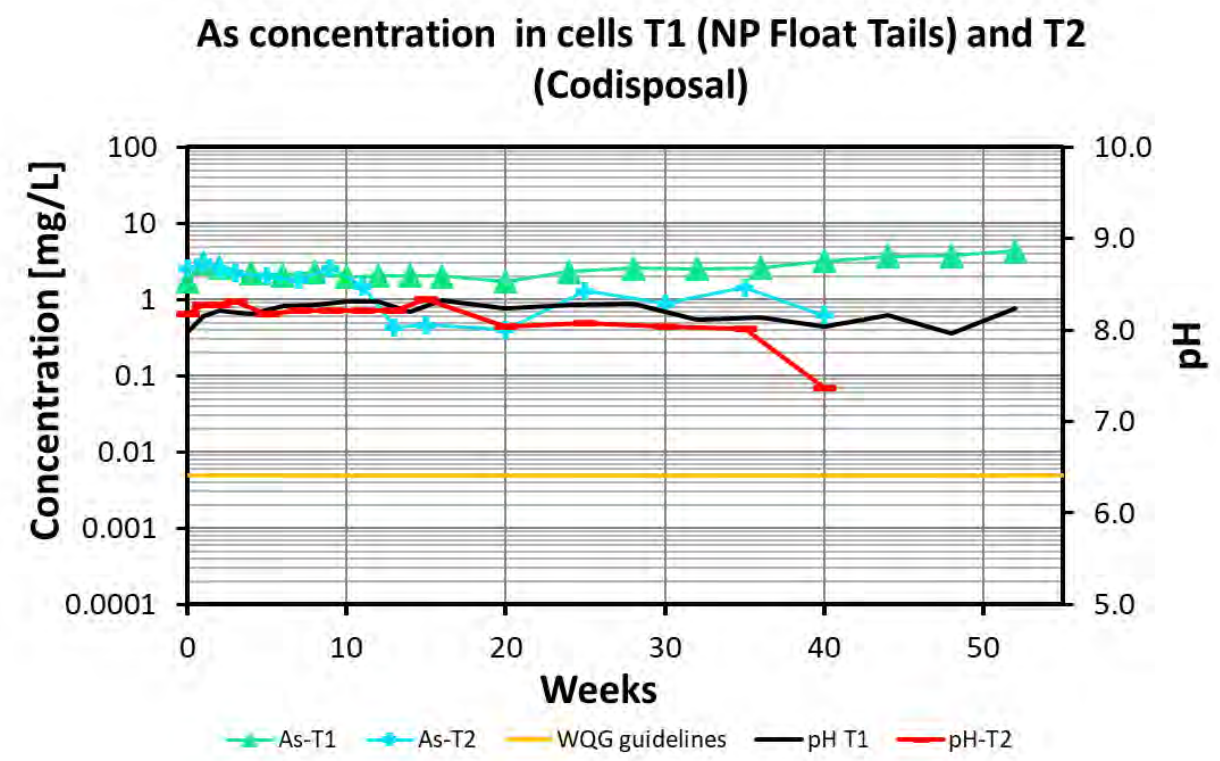
Appendix B2

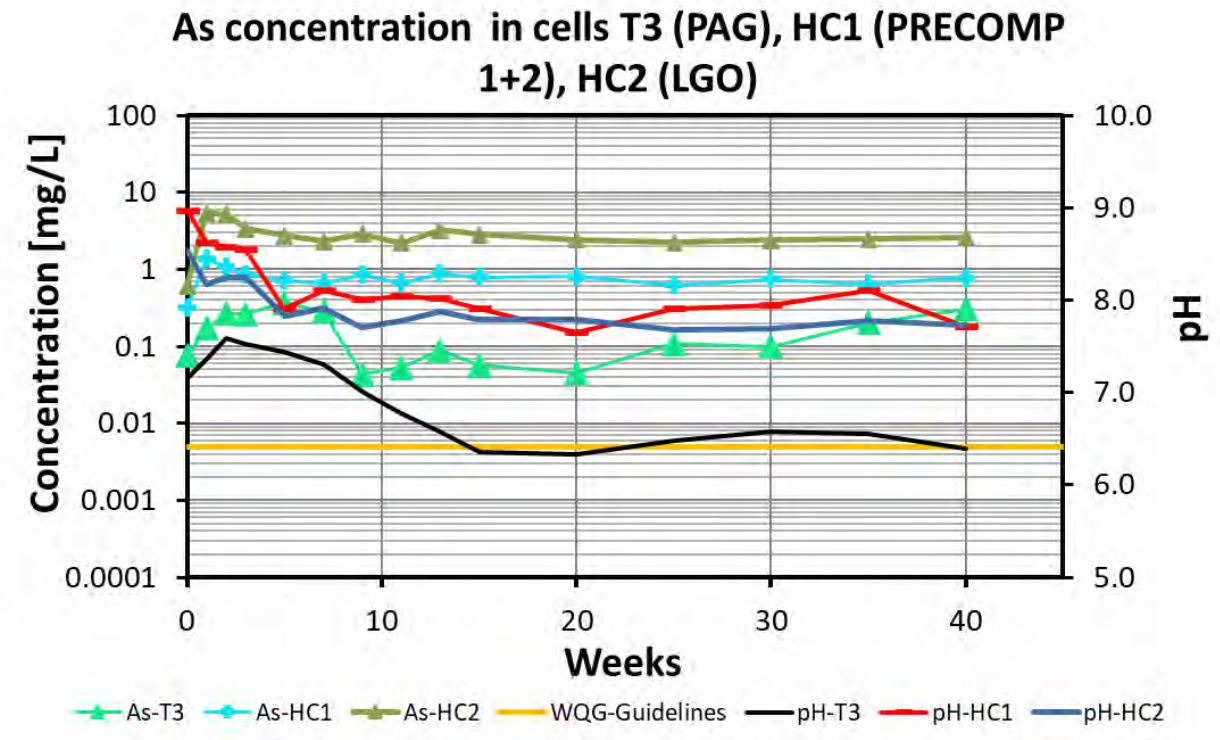
Leachate Concentrations of Humidity Cells (Charts)

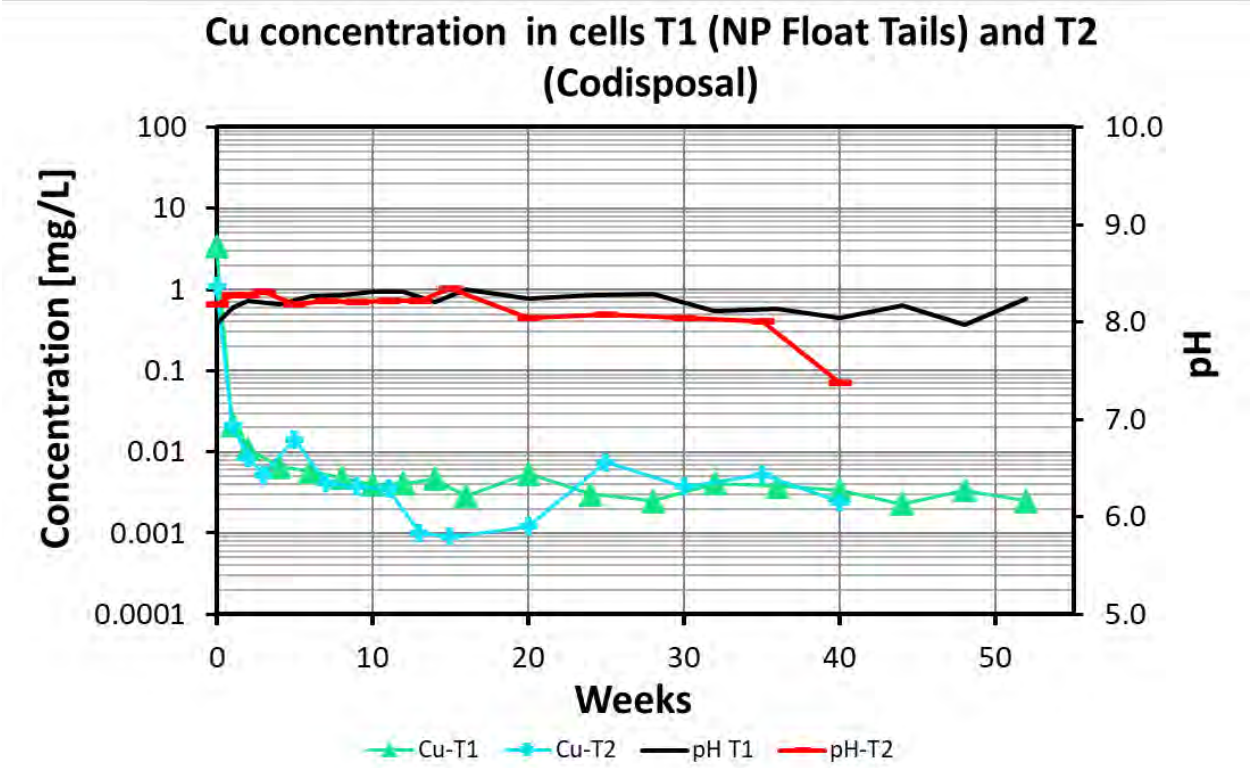
APPENDIX B2 - Leachate Concentrations of Humidity Cells

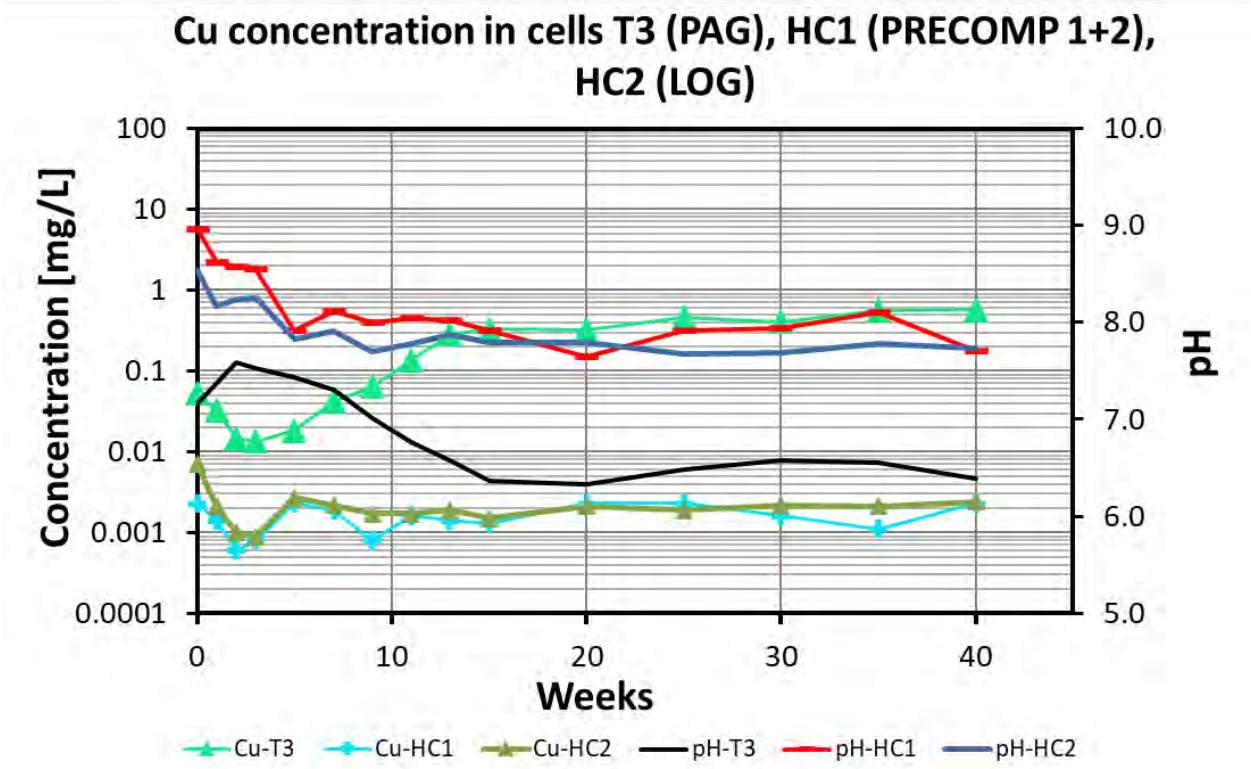


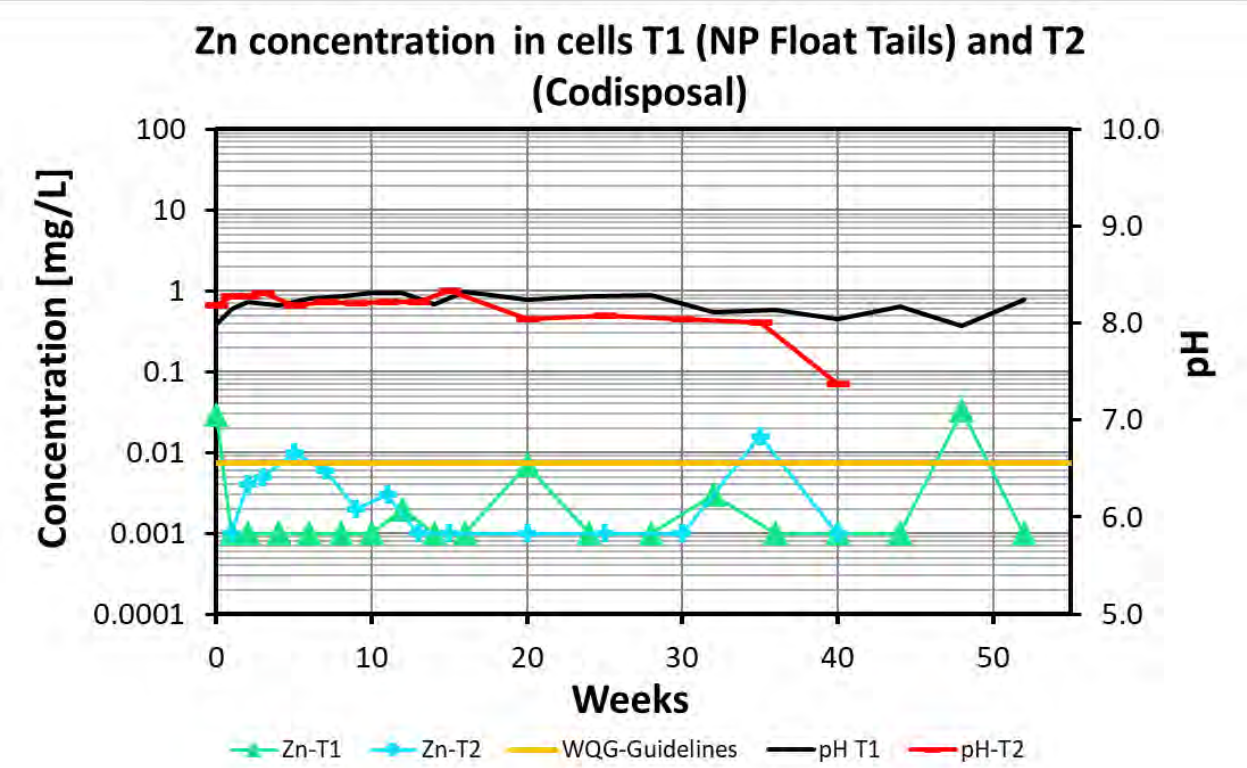


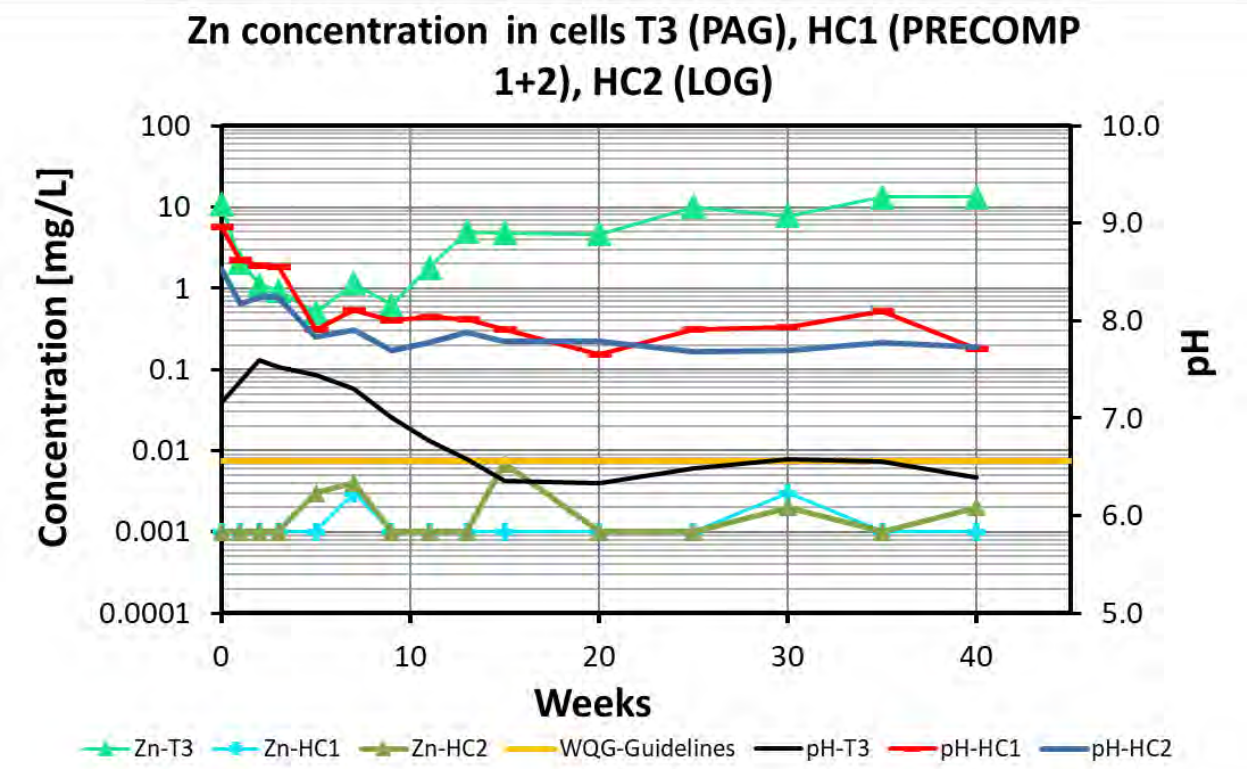

As concentration in cells T1 (NP Float Tails) and T2 (Codisposal)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
50
Weeks
As-T1
As-T2
WQG guidelines
pH T1
pH-T2

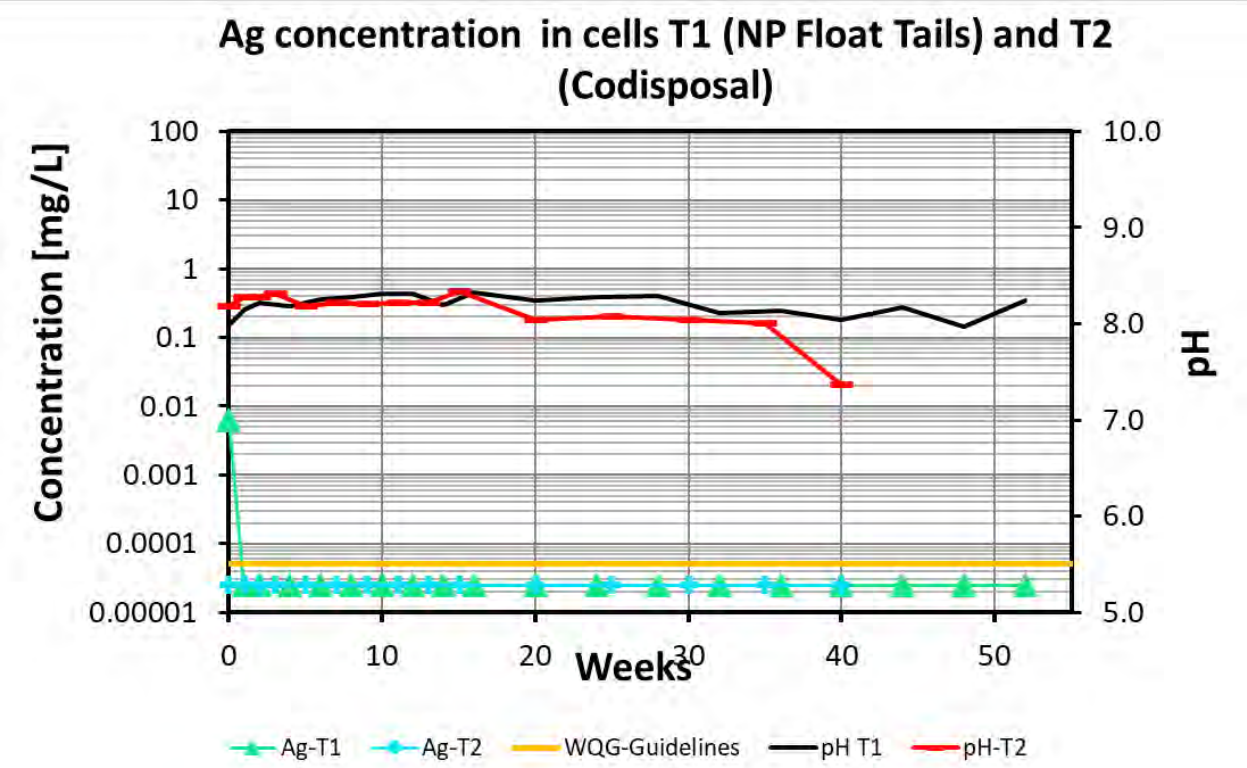

As concentration in cells T3 (PAG), HC1 (PRECOMP 1+2), HC2 (LGO)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
Weeks
As-T3
As-HC1
As-HC2
WQG-Guidelines
pH-T3
pH-HC1
pH-HC2

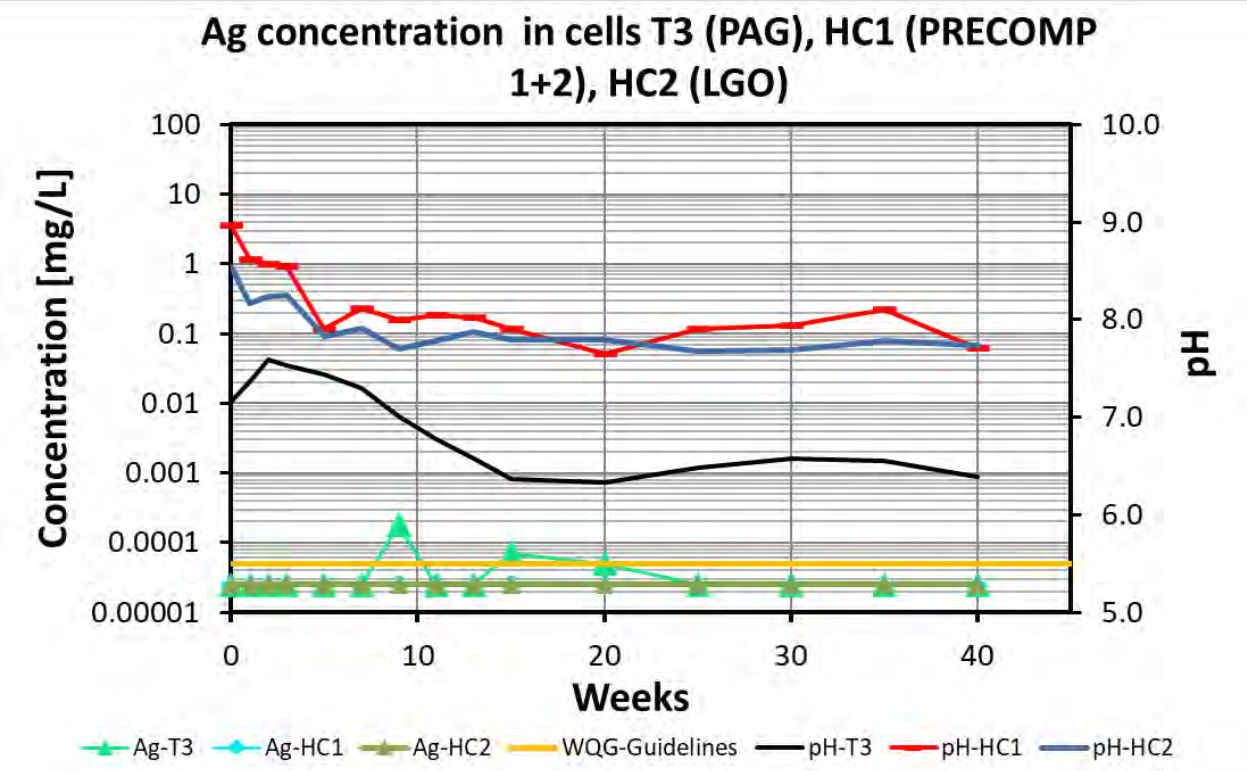

Cu concentration in cells T1 (NP Float Tails) and T2 (Codisposal)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
pH
10.0
9.0
8.0
7.0
6.0
5.0
0
10
20
30
40
50
Weeks
Cu-T1
Cu-T2
pH T1
pH-T2

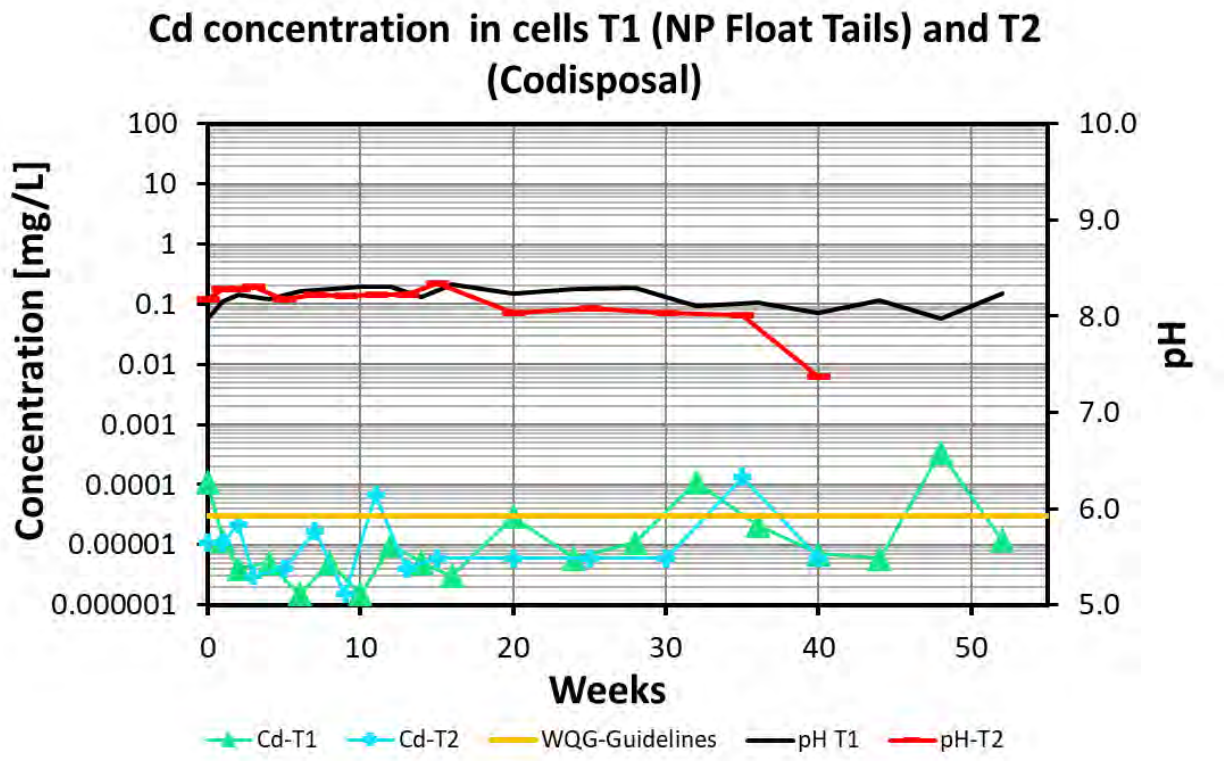

Cu concentration in cells T3 (PAG), HC1 (PRECOMP 1+2), HC2 (LOG)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
pH
10.0
9.0
8.0
7.0
6.0
5.0
0
10
20
30
40
Weeks
Cu-T3
Cu-HC1
Cu-HC2
pH-T3
pH-HC1
pH-HC2

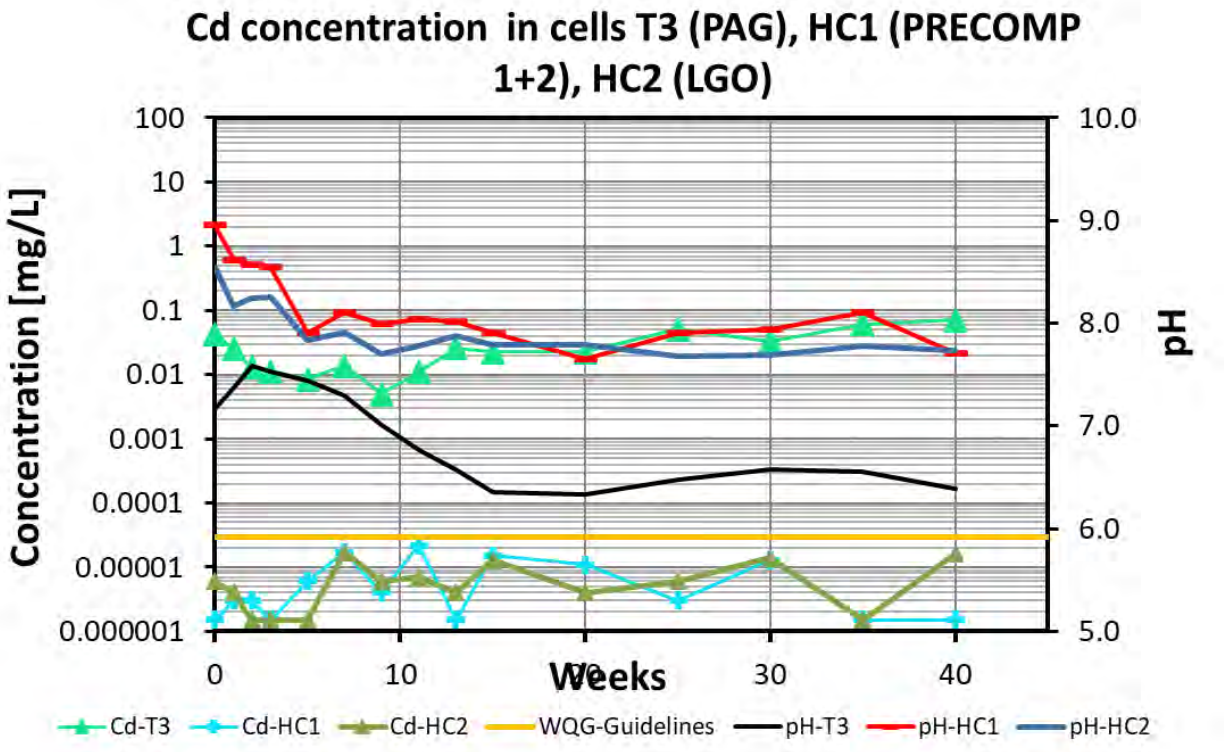

Zn concentration in cells T1 (NP Float Tails) and T2 (Codisposal)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
pH
10.0
9.0
8.0
7.0
6.0
5.0
0
10
20
30
40
50
Weeks
Zn-T1
Zn-T2
WQG-Guidelines
pH T1
pH-T2

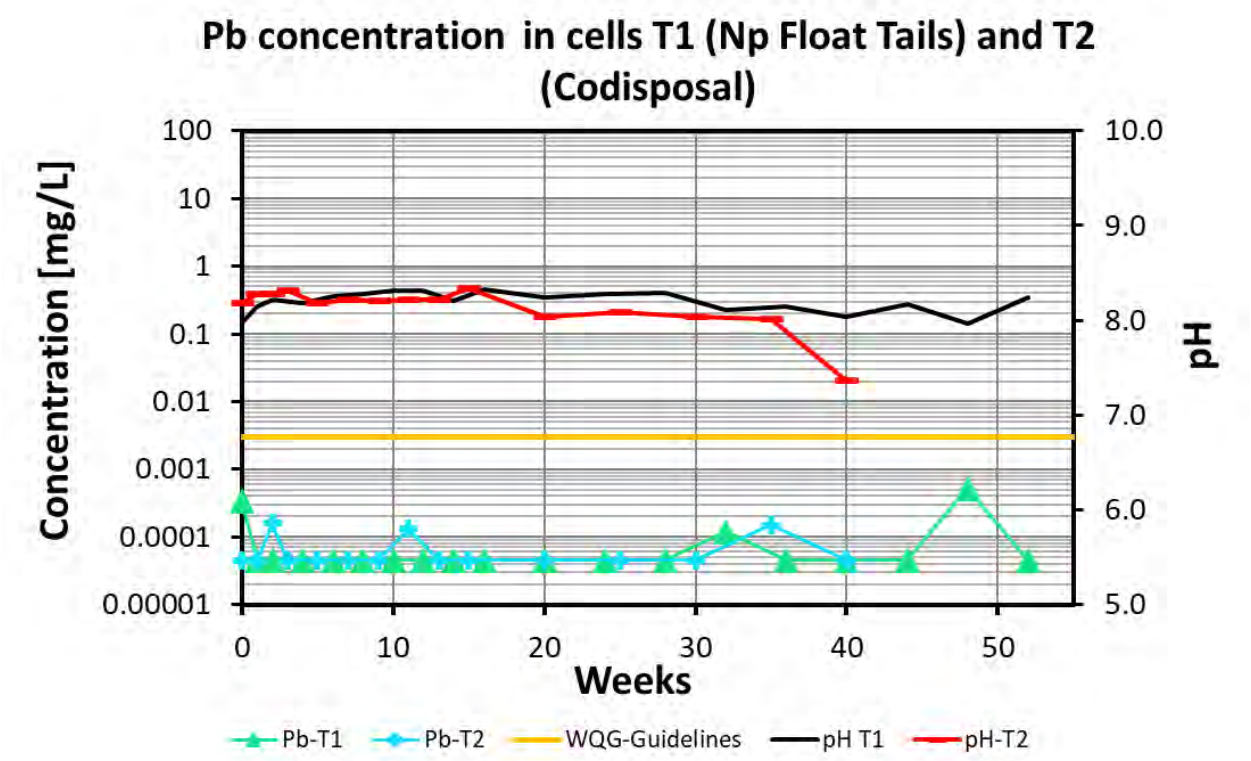

Zn concentration in cells T3 (PAG), HC1 (PRECOMP 1+2), HC2 (LOG)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
pH
10.0
9.0
8.0
7.0
6.0
5.0
0
10
20
30
40
Weeks
Zn-T3
Zn-HC1
Zn-HC2
WQG-Guidelines
pH-T3
pH-HC1
pH-HC2

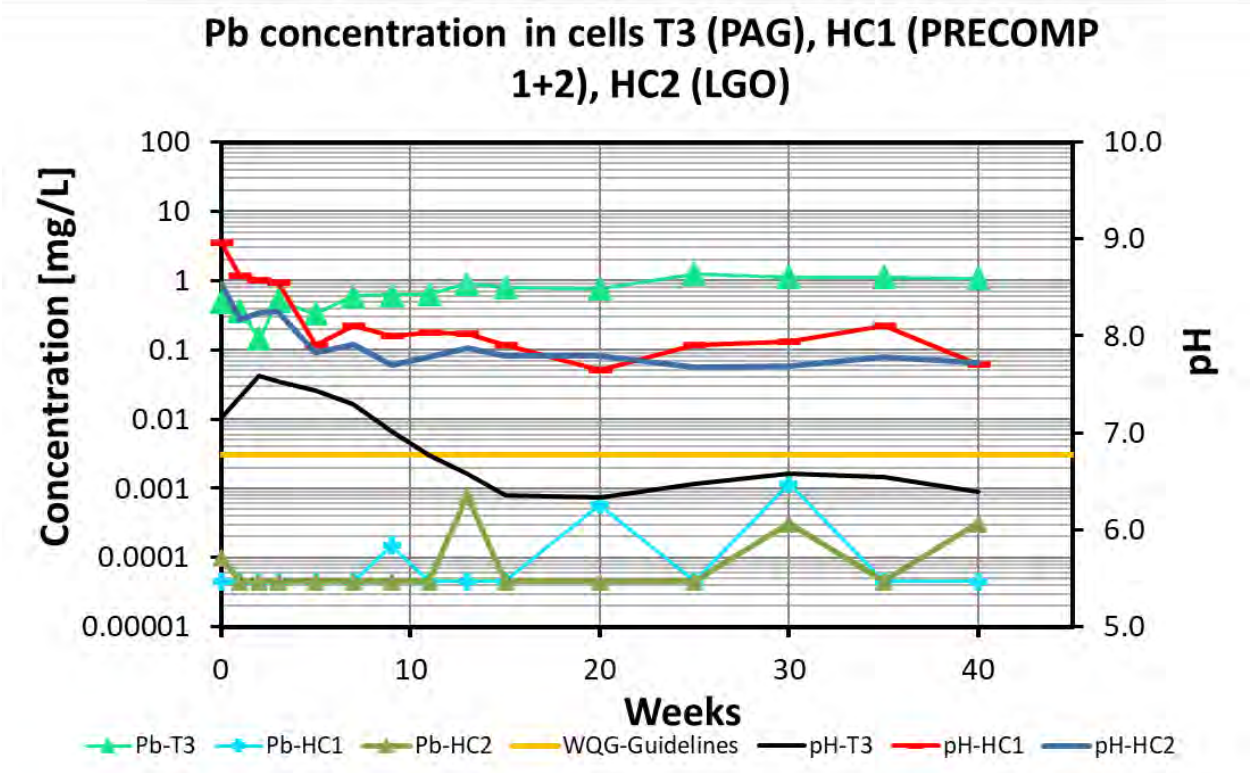

Ag concentration in cells T1 (NP Float Tails) and T2 (Codisposal)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
0.00001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
50
Weeks
Ag-T1
Ag-T2
WQG-Guidelines
pH T1
pH-T2

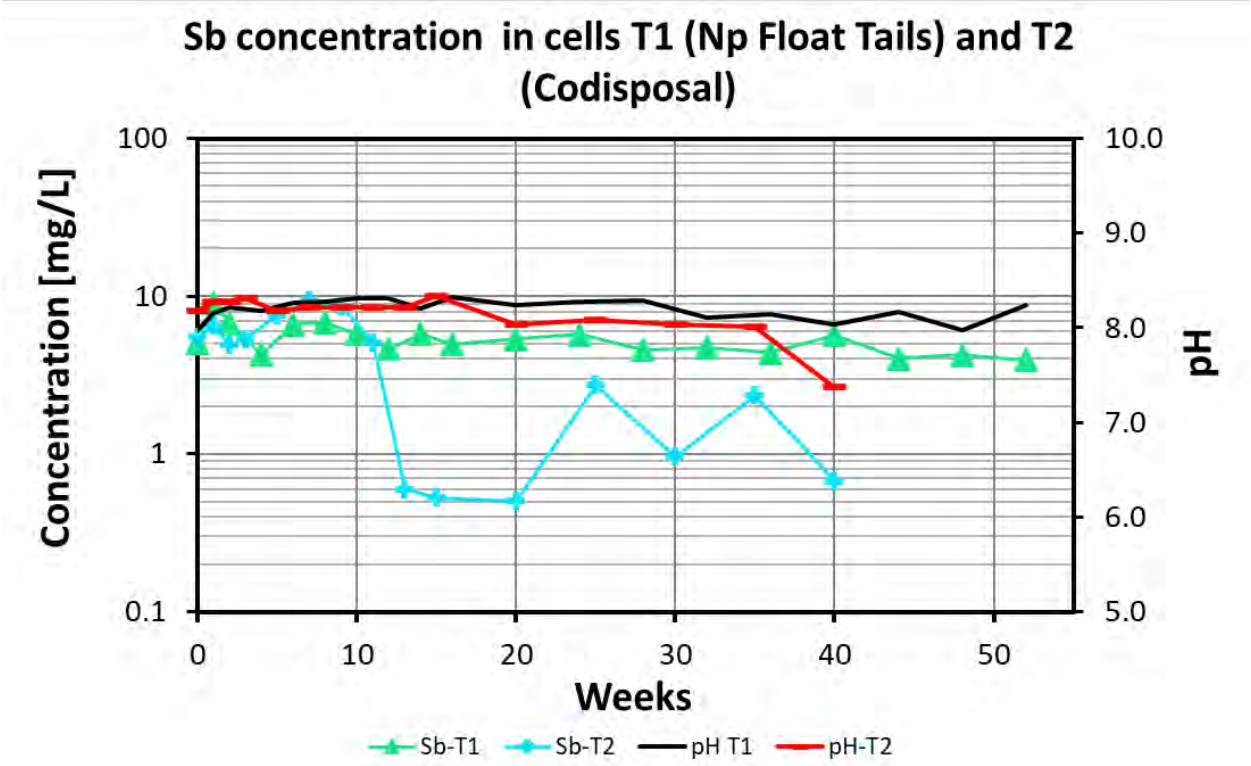

Ag concentration in cells T3 (PAG), HC1 (PRECOMP 1+2), HC2 (LGO)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
0.00001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
Weeks
Ag-T3
Ag-HC1
Ag-HC2
WQG-Guidelines
pH-T3
pH-HC1
pH-HC2

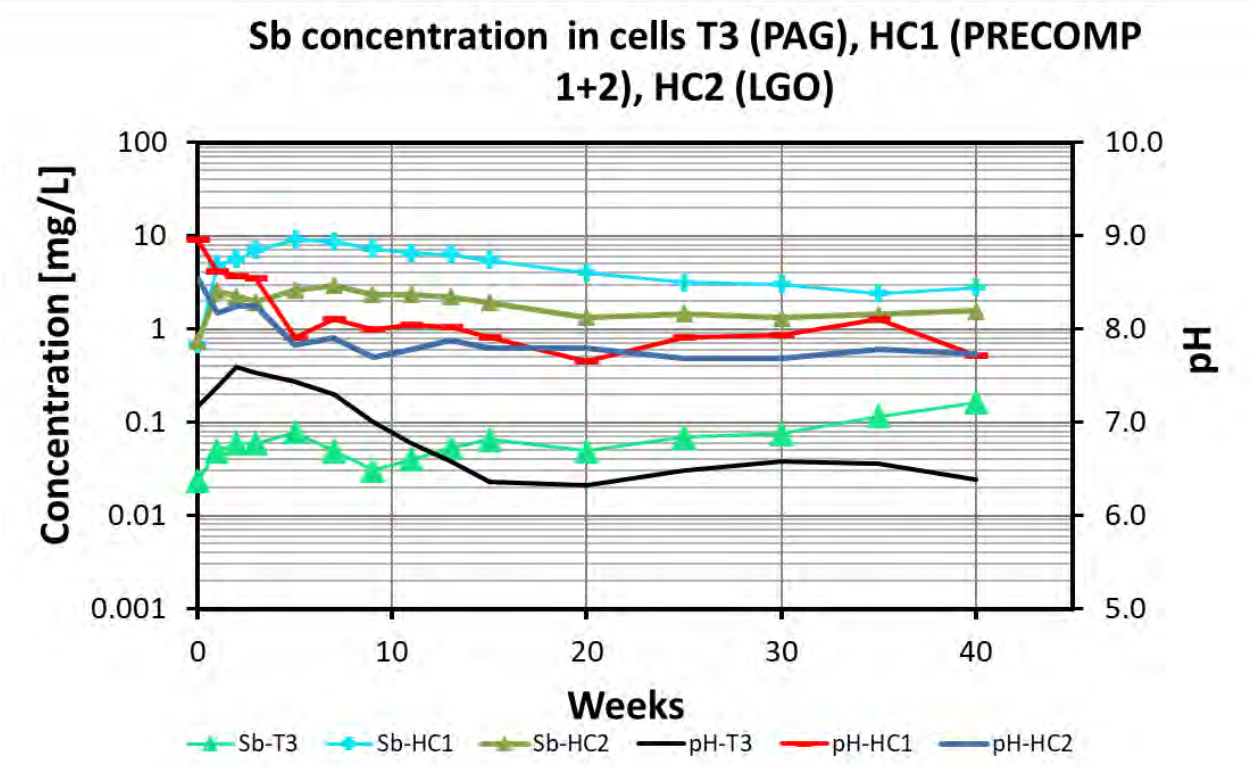

Cd concentration in cells T1 (NP Float Tails) and T2 (Codisposal)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
0.00001
0.000001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
50
Weeks
Cd-T1
Cd-T2
WQG-Guidelines
pH T1
pH-T2

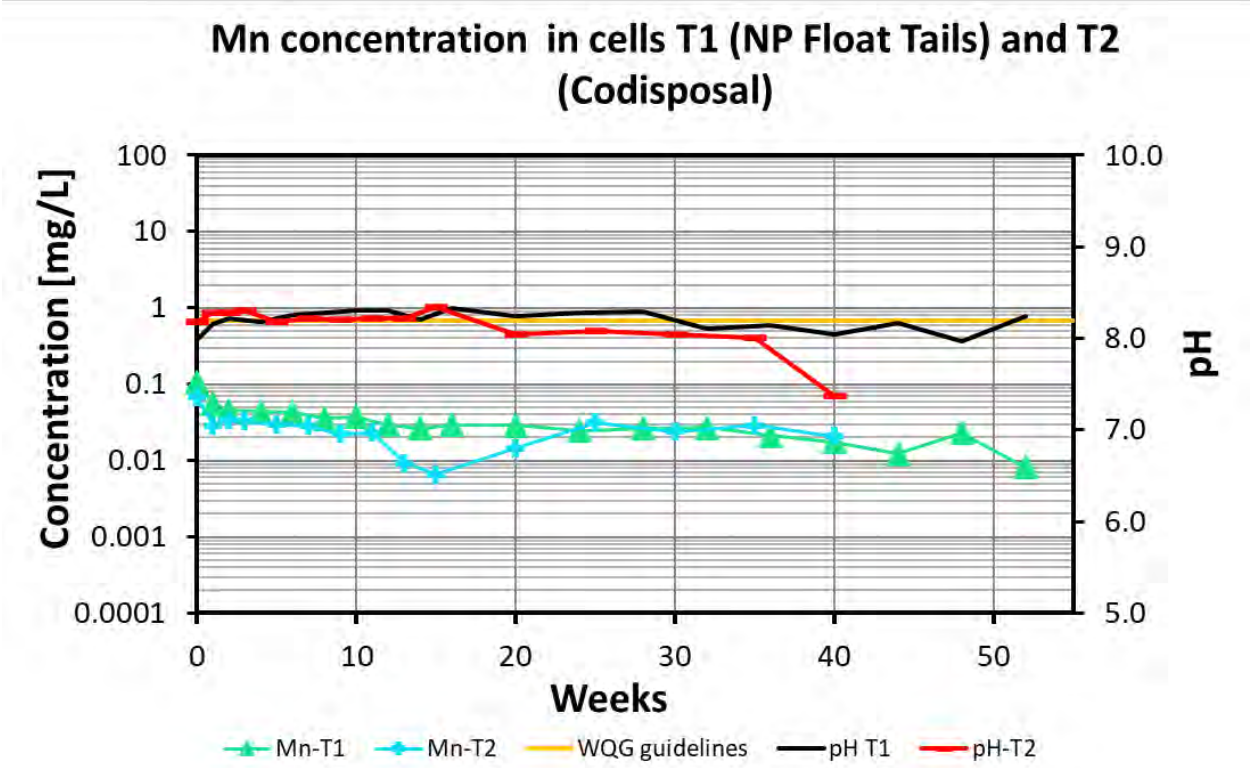

Cd concentration in cells T3 (PAG), HC1 (PRECOMP 1+2), HC2 (LGO)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
0.00001
0.000001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
30
40
Weeks
Cd-T3
Cd-HC1
Cd-HC2
WQG-Guidelines
pH-T3
pH-HC1
pH-HC2

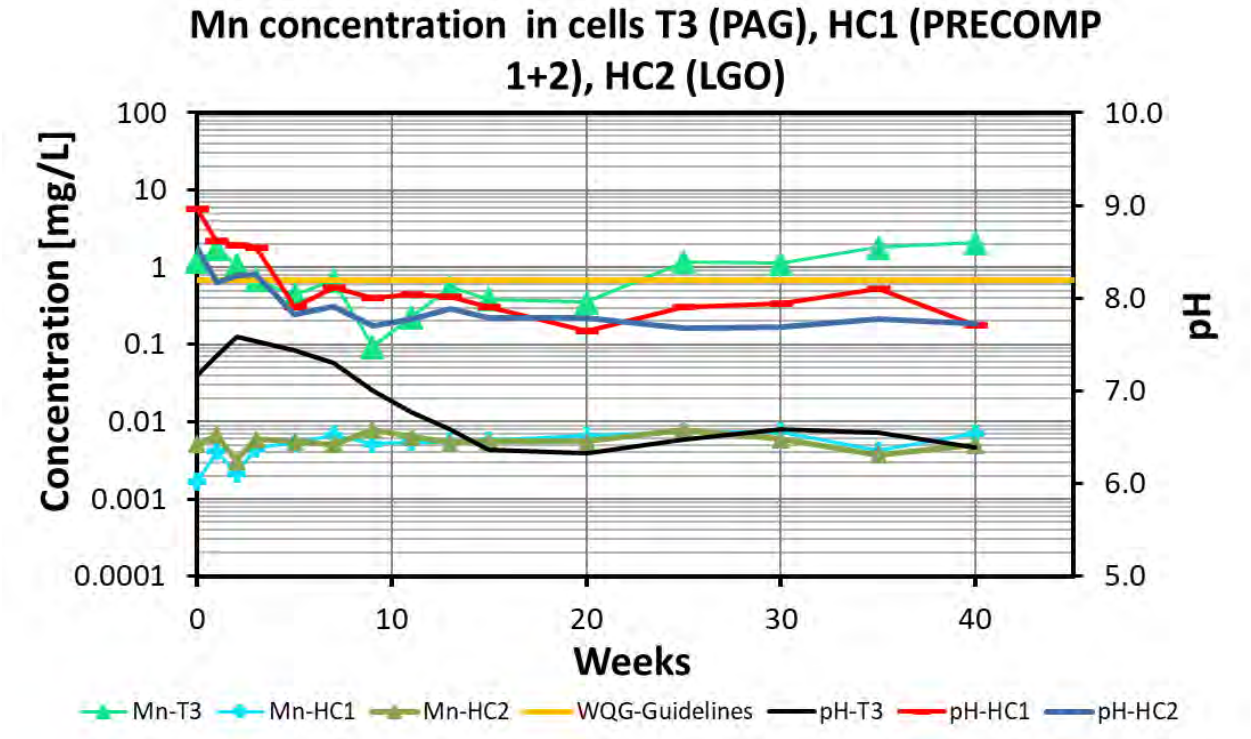

Pb concentration in cells T1 (Np Float Tails) and T2 (Codisposal)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
0.00001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
50
Weeks
Pb-T1
Pb-T2
WQG-Guidelines
pH T1
pH-T2

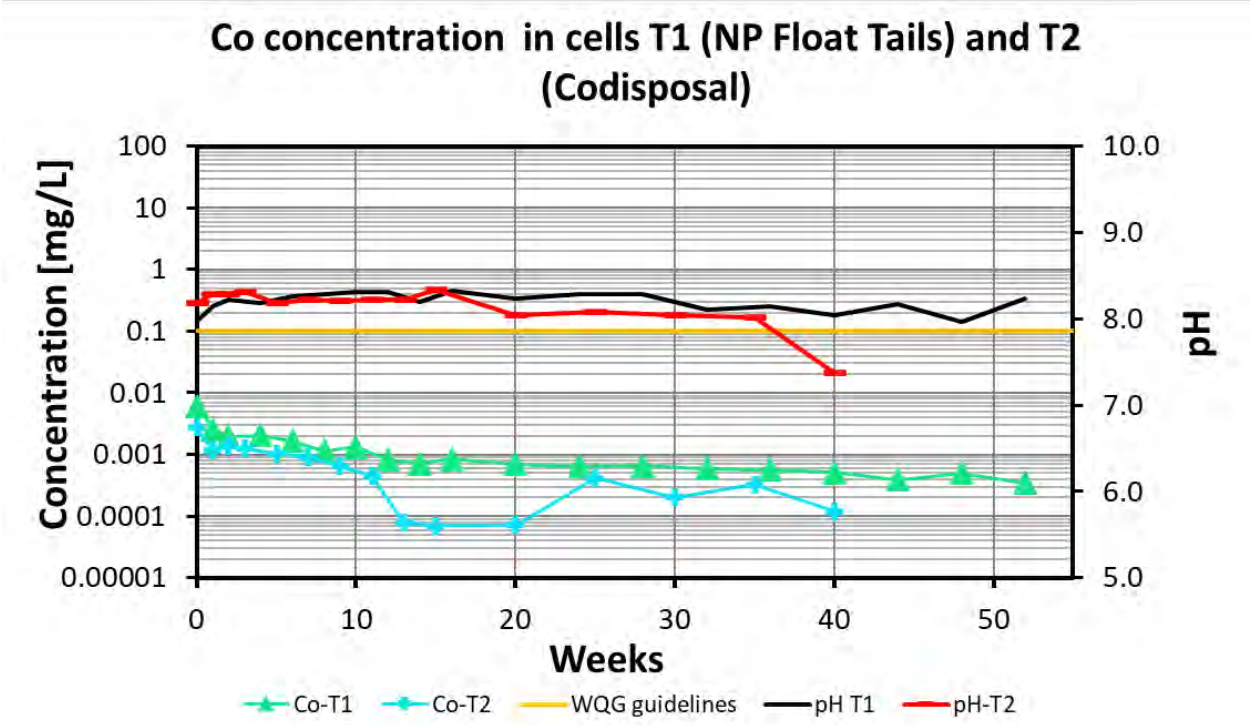

Pb concentration in cells T3 (PAG), HC1 (PRECOMP 1+2), HC2 (LGO)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
0.00001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
Weeks
Pb-T3
Pb-HC1
Pb-HC2
WQG-Guidelines
pH-T3
pH-HC1
pH-HC2

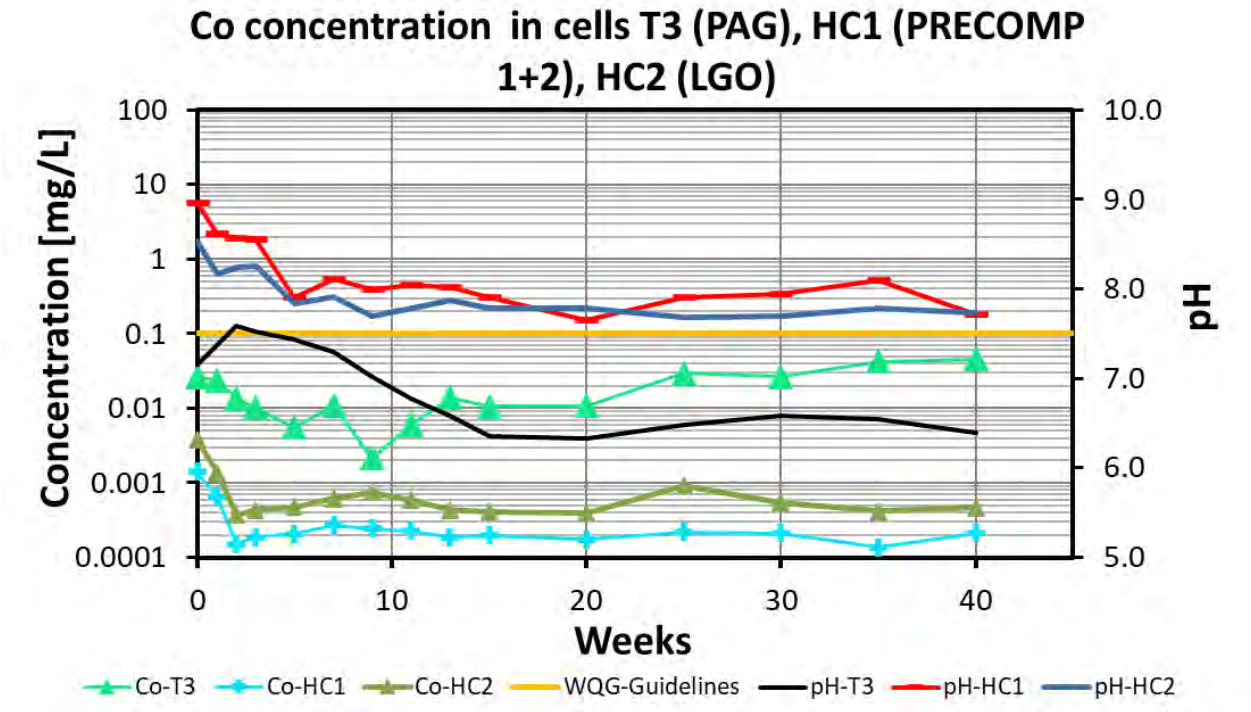

Sb concentration in cells T1 (Np Float Tails) and T2 (Codisposal)
Concentration [mg/L]
100
10
1
0.1
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
50
Weeks
Sb-T1
Sb-T2
pH T1
pH-T2

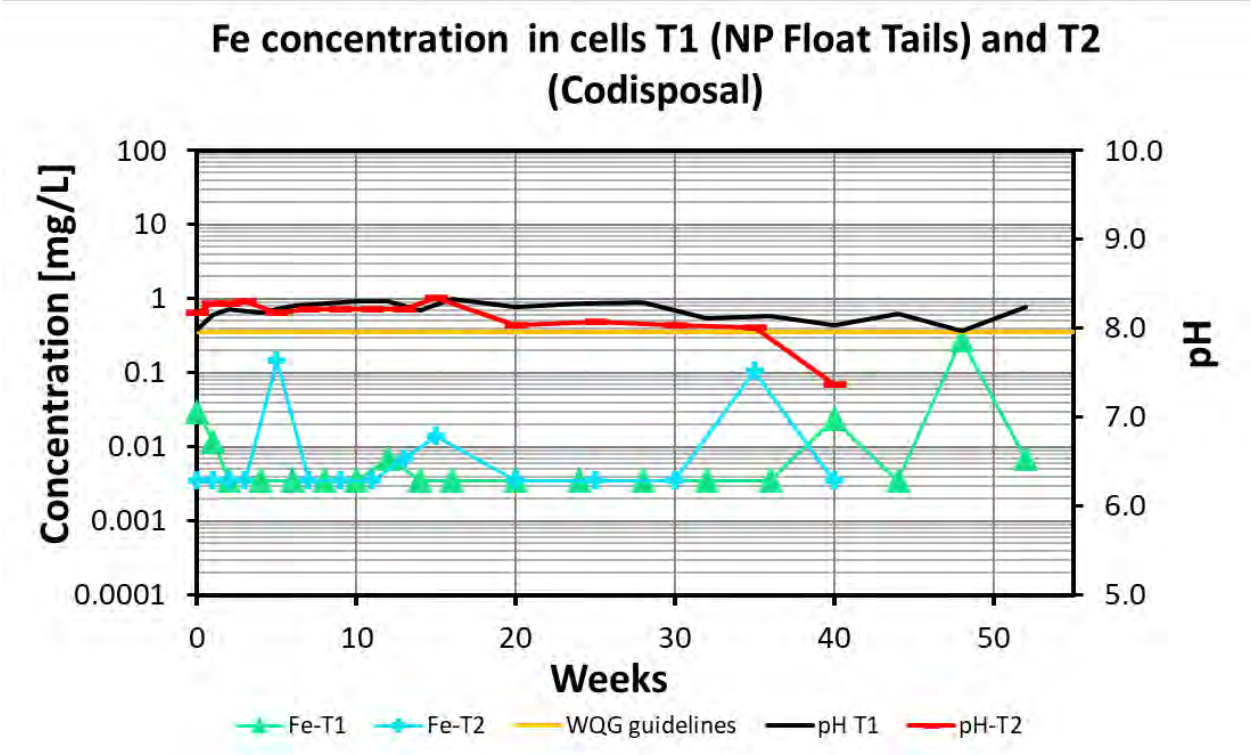

Sb concentration in cells T3 (PAG), HC1 (PRECOMP 1+2), HC2 (LGO)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
Weeks
Sb-T3
Sb-HC1
Sb-HC2
pH-T3
pH-HC1
pH-HC2

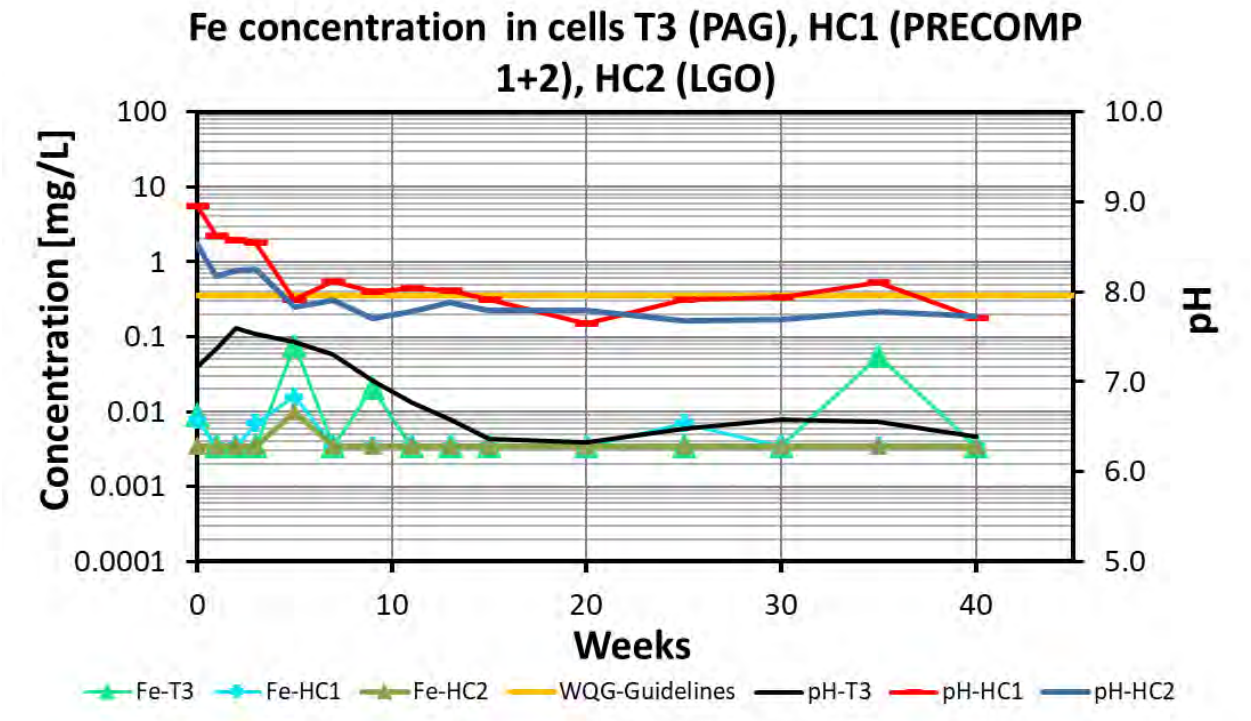

Mn concentration in cells T1 (NP Float Tails) and T2 (Codisposal)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
50
Weeks
Mn-T1
Mn-T2
WQG guidelines
pH T1
pH-T2

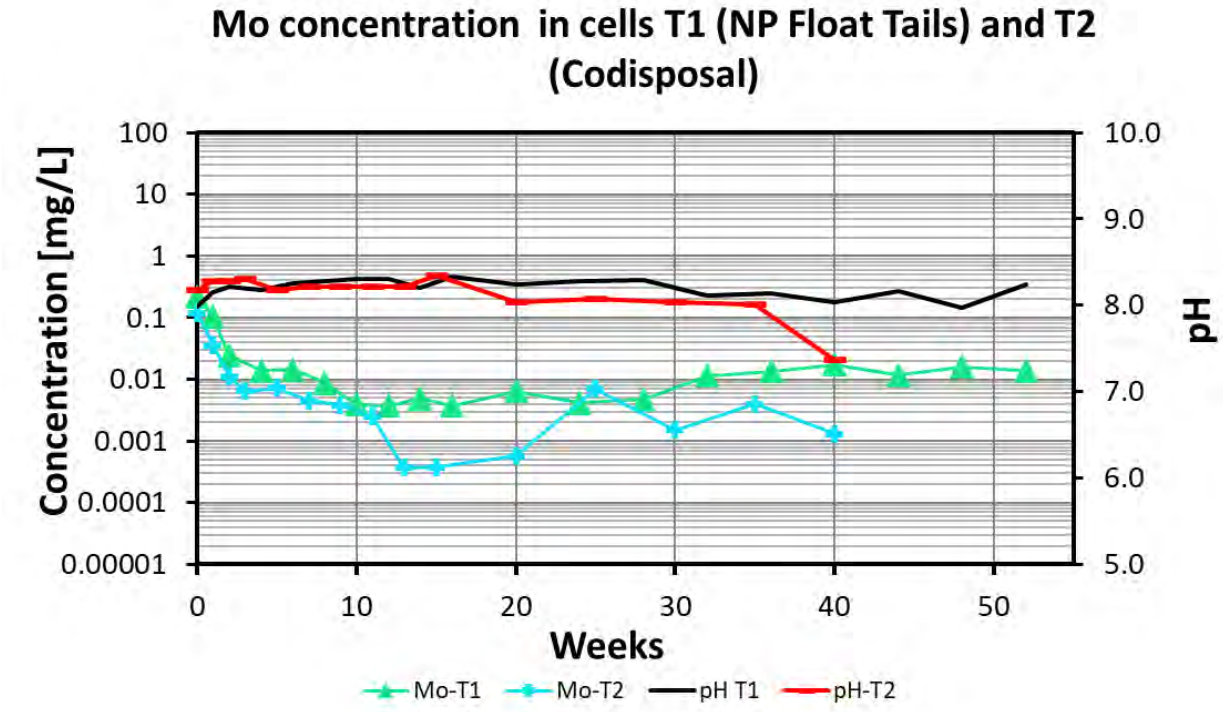

Mn concentration in cells T3 (PAG), HC1 (PRECOMP 1+2), HC2 (LGO)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
Weeks
Mn-T3
Mn-HC1
Mn-HC2
WQG-Guidelines
pH-T3
pH-HC1
pH-HC2

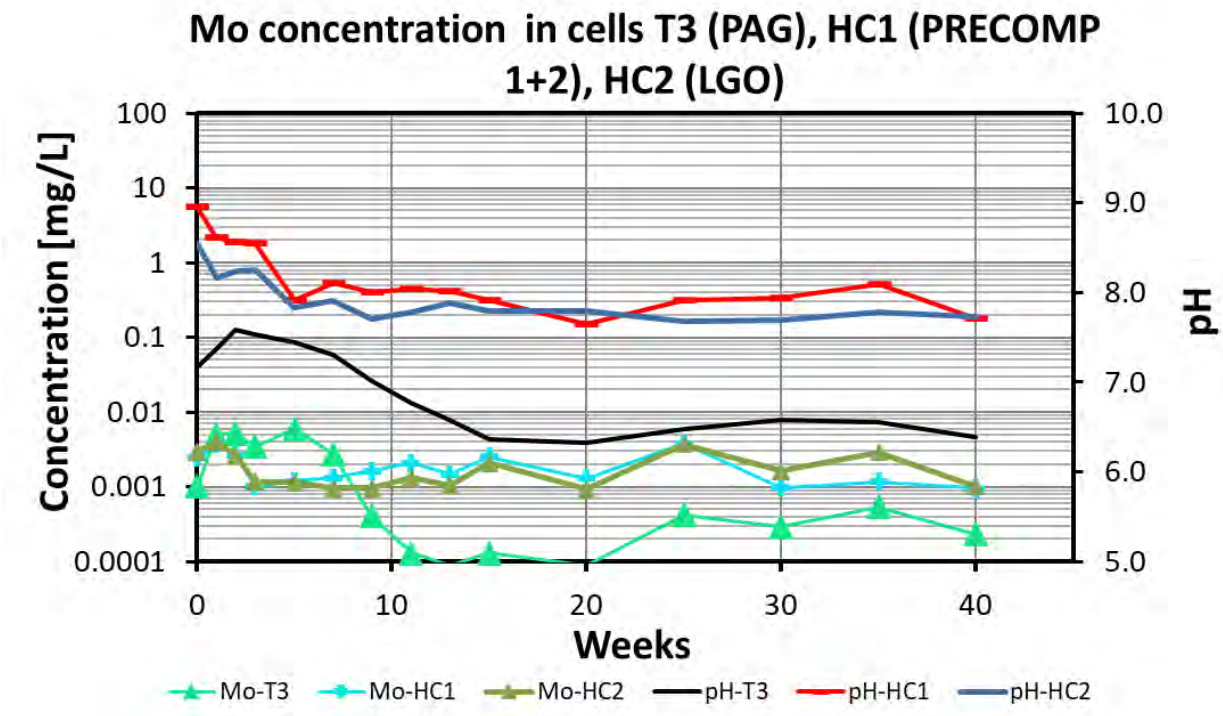

Co concentration in cells T1 (NP Float Tails) and T2 (Codisposal)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
0.00001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
50
Weeks
Co-T1
Co-T2
WQG guidelines
pH T1
pH-T2

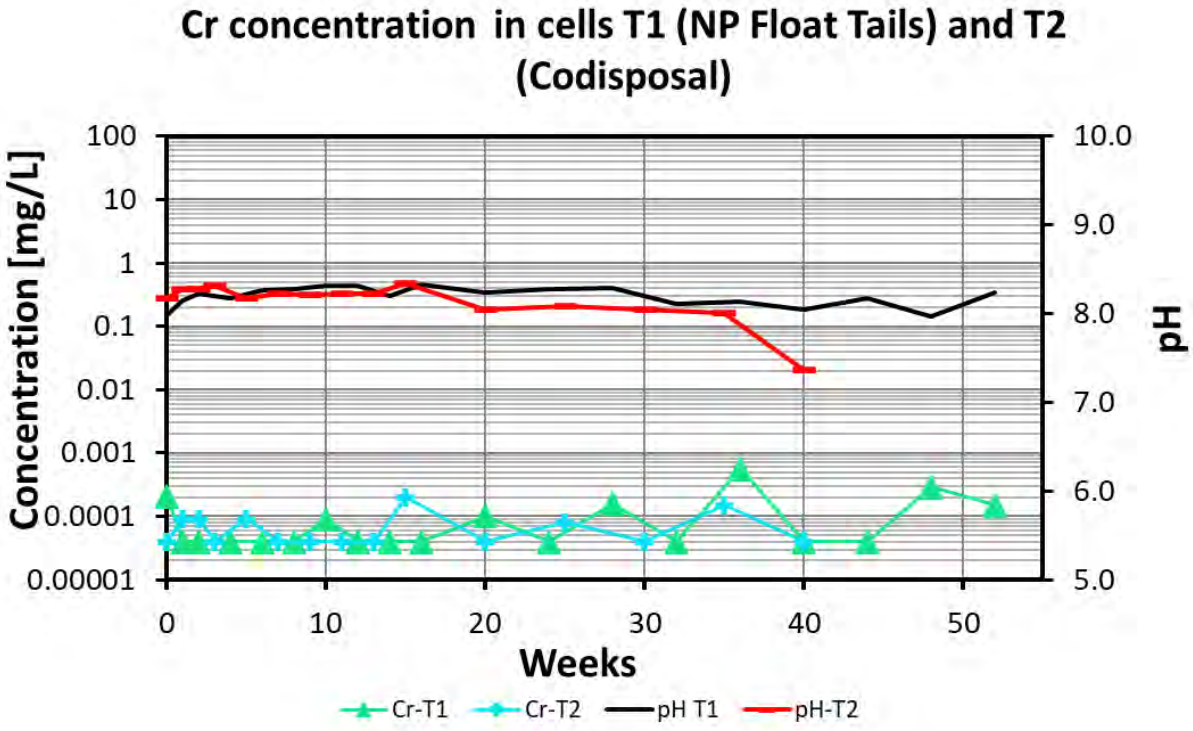

Co concentration in cells T3 (PAG), HC1 (PRECOMP 1+2), HC2 (LGO)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
Weeks
Co-T3
Co-HC1
Co-HC2
WQG-Guidelines
pH-T3
pH-HC1
pH-HC2

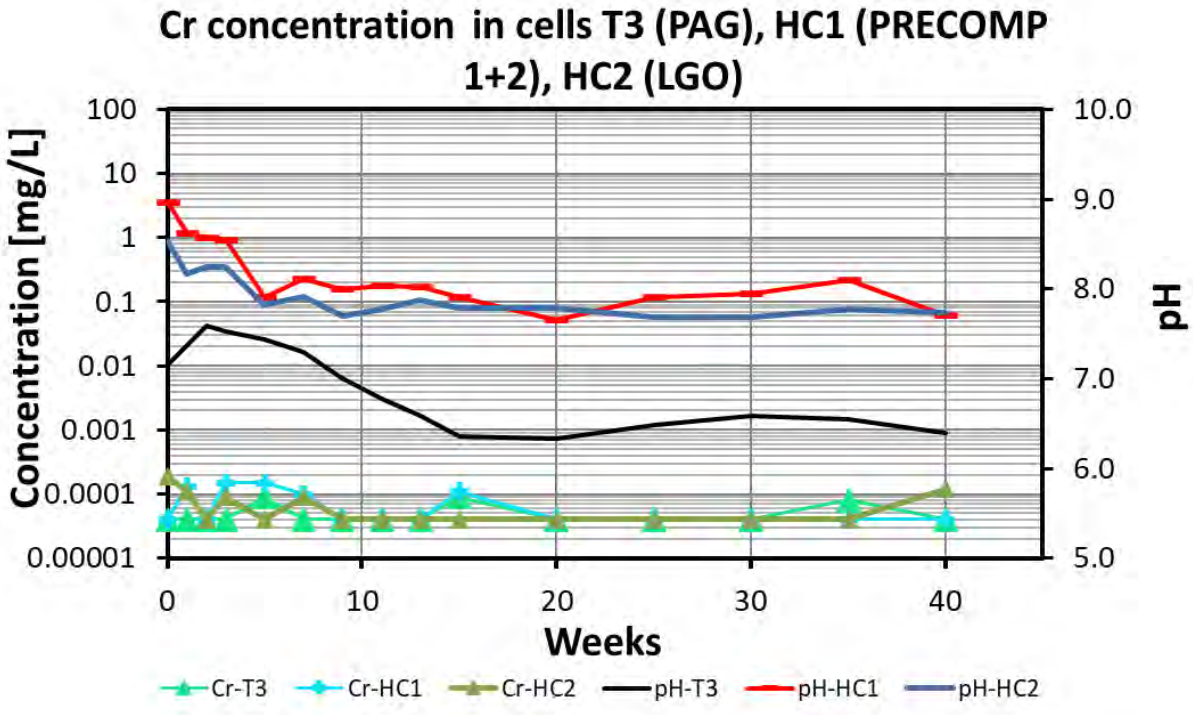

Fe concentration in cells T1 (NP Float Tails) and T2 (Codisposal)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
50
Weeks
Fe-T1
Fe-T2
WQG guidelines
pH T1
pH-T2

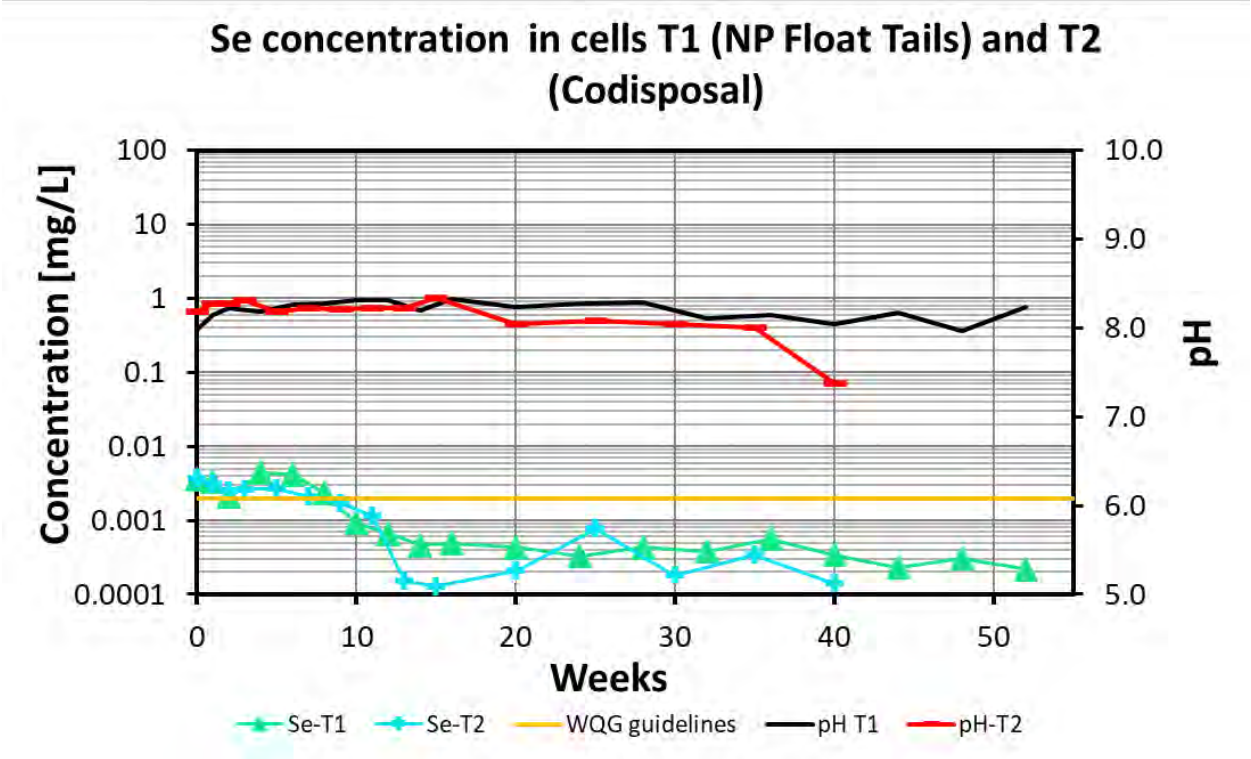

Fe concentration in cells T3 (PAG), HC1 (PRECOMP 1+2), HC2 (LGO)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
Weeks
Fe-T3
Fe-HC1
Fe-HC2
WQG-Guidelines
pH-T3
pH-HC1
pH-HC2

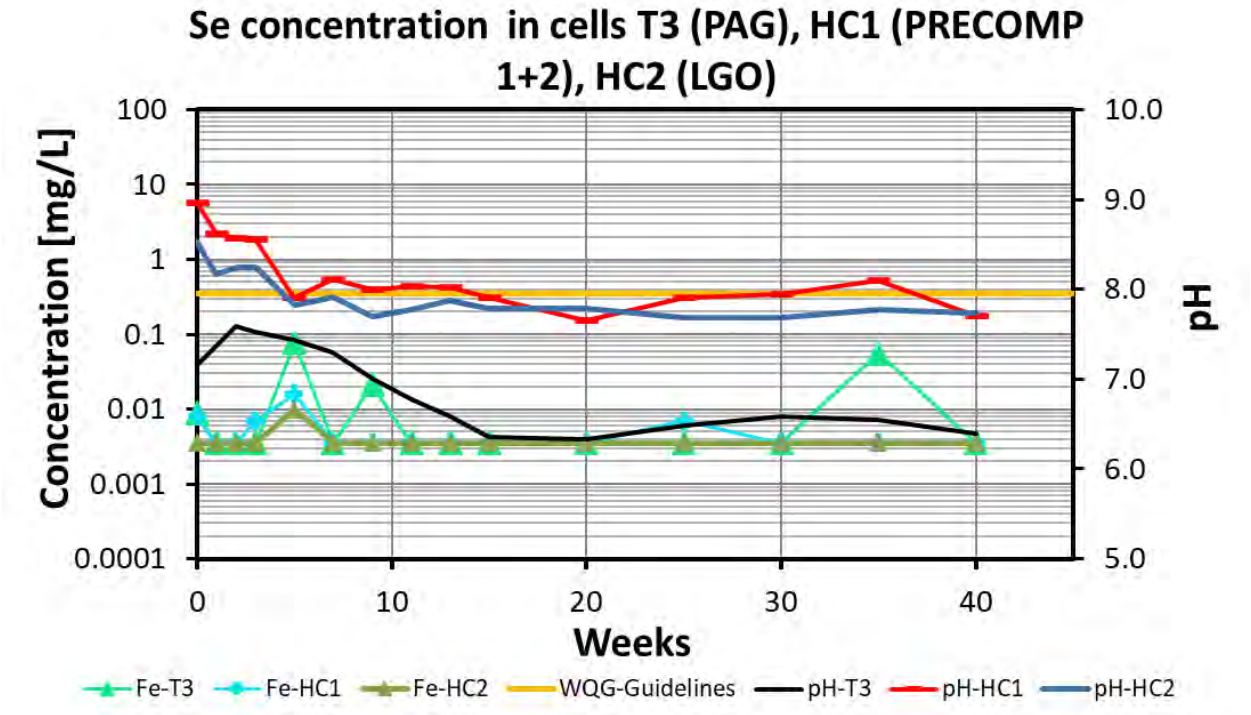

Mo concentration in cells T1 (NP Float Tails) and T2 (Codisposal)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
0.00001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
50
Weeks
Mo-T1
Mo-T2
pH T1
pH-T2

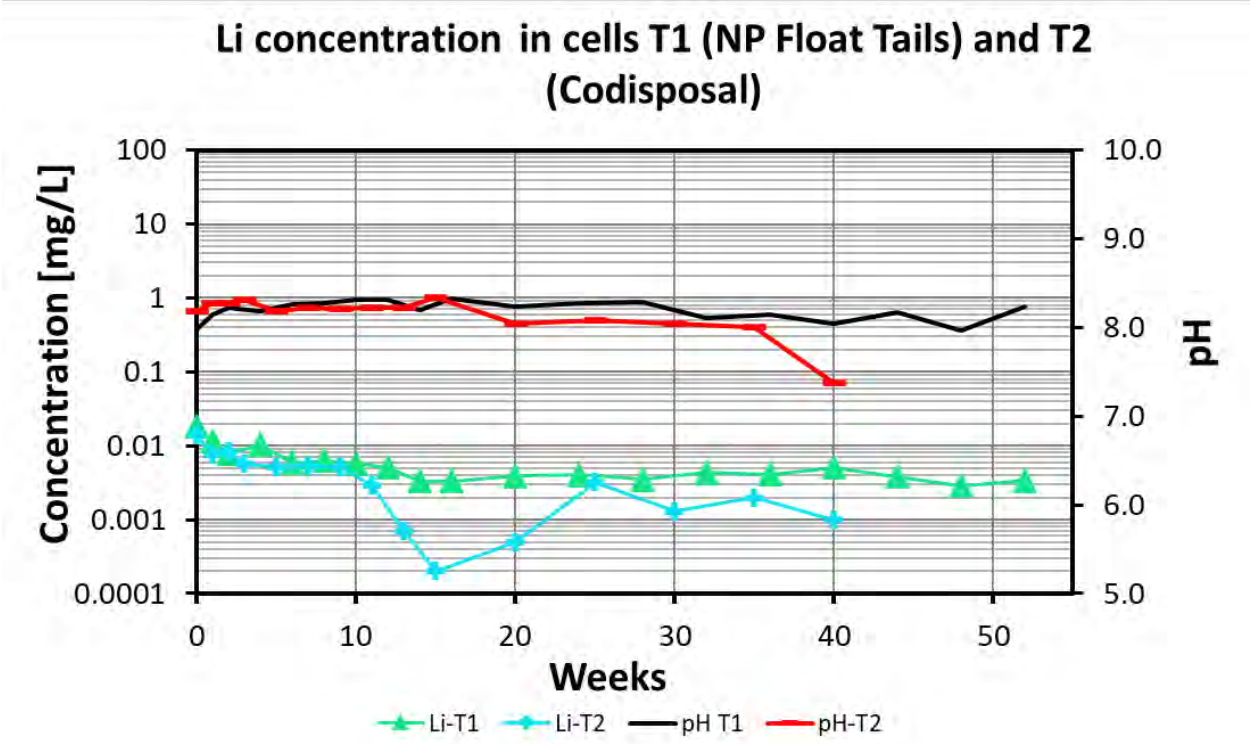

Mo concentration in cells T3 (PAG), HC1 (PRECOMP 1+2), HC2 (LGO)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
Weeks
Mo-T3
Mo-HC1
Mo-HC2
pH-T3
pH-HC1
pH-HC2

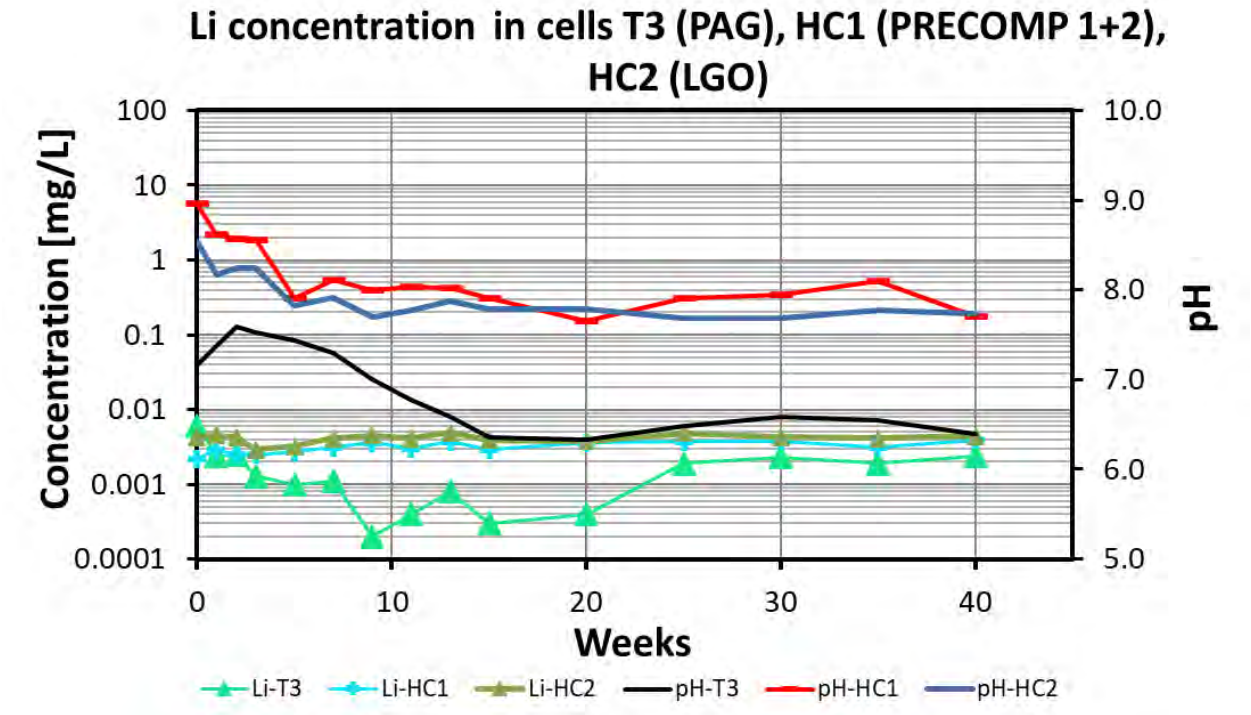

Cr concentration in cells T1 (NP Float Tails) and T2 (Codisposal)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
0.00001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
50
Weeks
Cr-T1
Cr-T2
pH T1
pH-T2

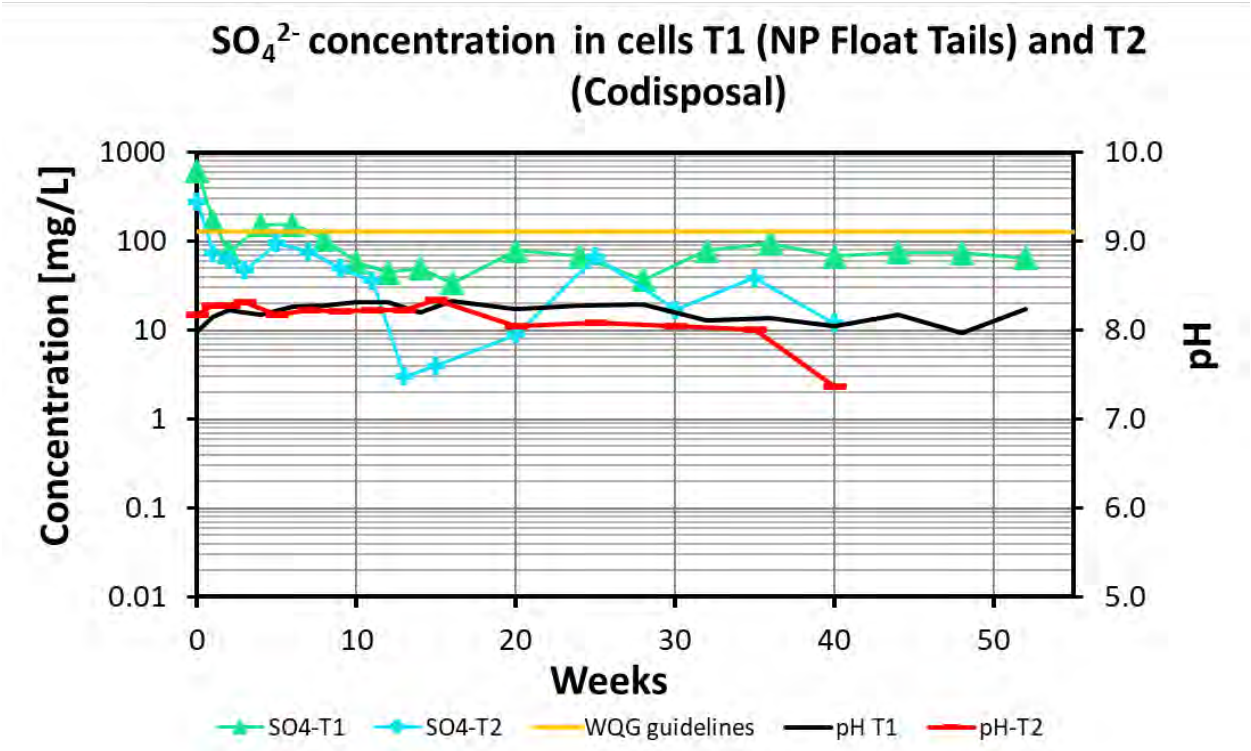

Cr concentration in cells T3 (PAG), HC1 (PRECOMP 1+2), HC2 (LGO)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
0.00001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
Weeks
Cr-T3
Cr-HC1
Cr-HC2
pH-T3
pH-HC1
pH-HC2

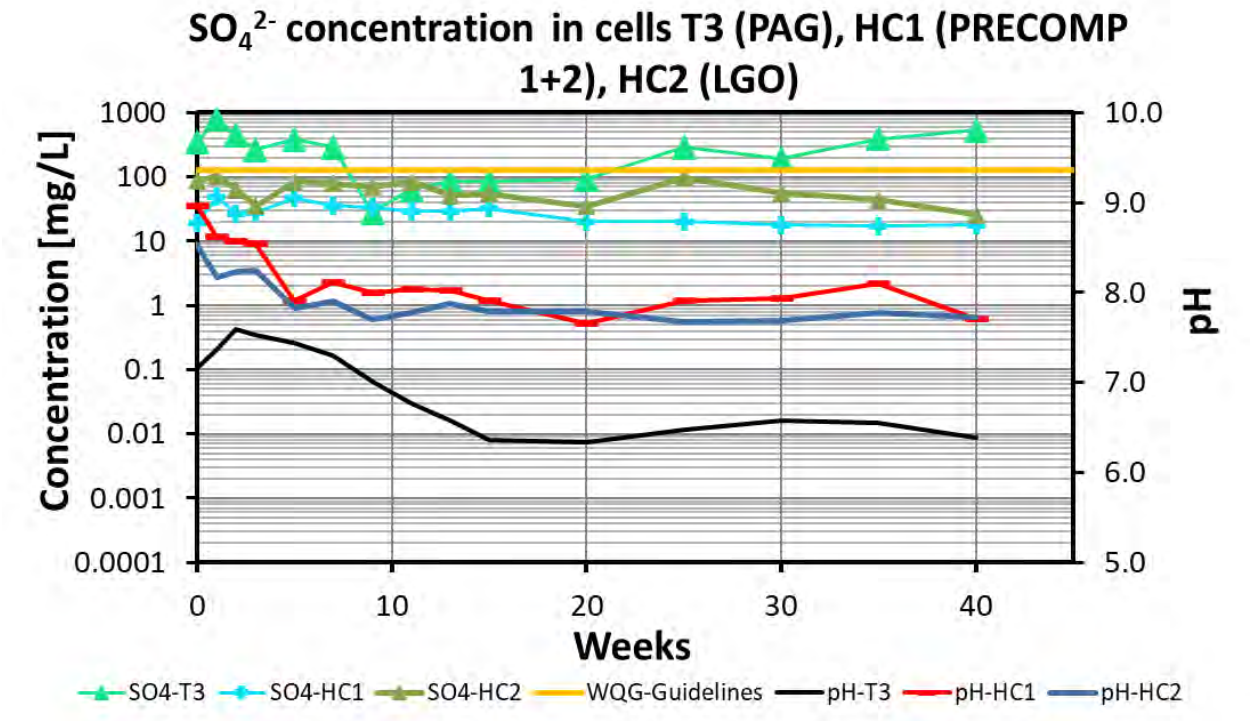

Se concentration in cells T1 (NP Float Tails) and T2 (Codisposal)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
50
Weeks
Se-T1
Se-T2
WQG guidelines
pH T1
pH-T2


Se concentration in cells T3 (PAG), HC1 (PRECOMP 1+2), HC2 (LGO)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
Weeks
Fe-T3
Fe-HC1
Fe-HC2
WQG-Guidelines
pH-T3
pH-HC1
pH-HC2


Li concentration in cells T1 (NP Float Tails) and T2 (Codisposal)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
50
Weeks
Li-T1
Li-T2
pH T1
pH-T2


Li concentration in cells T3 (PAG), HC1 (PRECOMP 1+2), HC2 (LGO)
Concentration [mg/L]
100
10
1
0.1
0.01
0.001
0.0001
10.0
9.0
8.0
7.0
6.0
5.0
pH
0
10
20
30
40
Weeks
Li-T3
Li-HC1
Li-HC2
pH-T3
pH-HC1
pH-HC2


SO4 2- concentration in cells T1 (NP Float Tails) and T2 (Codisposal)
Concentration [mg/L]
1000
100
10
1
0.1
0.01
pH
10.0
9.0
8.0
7.0
6.0
5.0
0
10
20
30
40
50
Weeks
SO4-T1
SO4-T2
WQG guidelines
pH T1
pH-T2

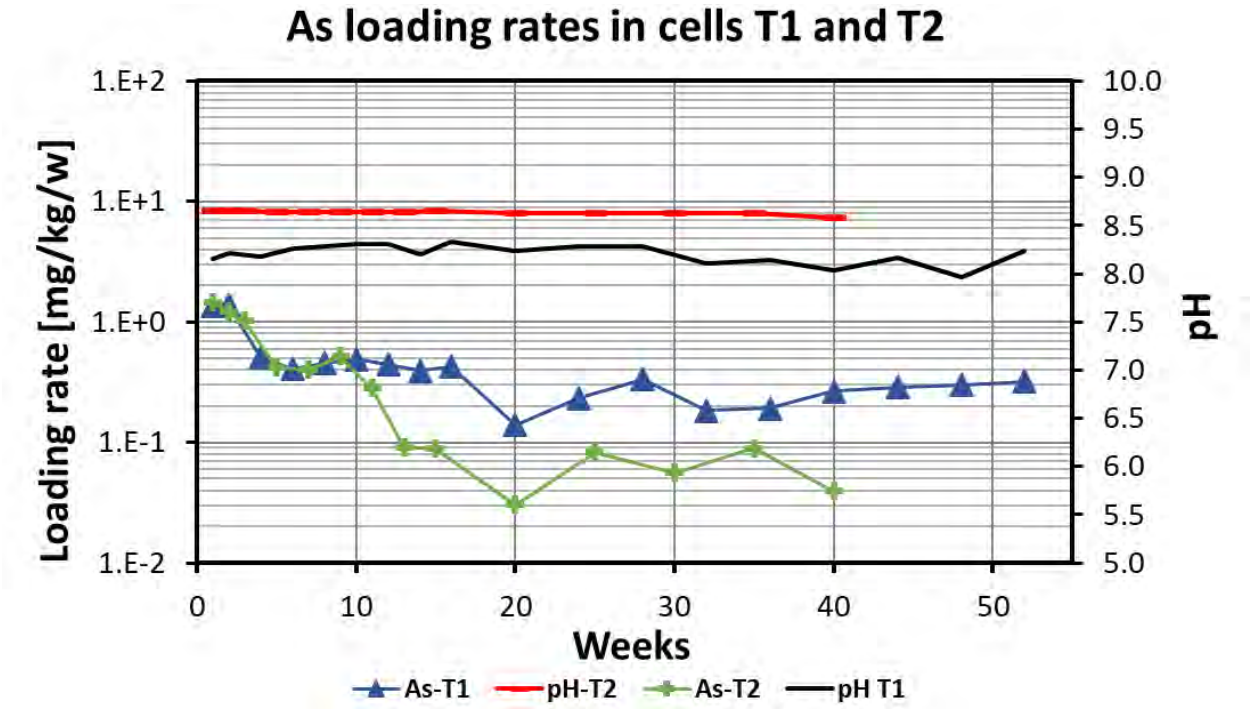

SO4 2- concentration in cells T3 (PAG), HC1 (PRECOMP 1+2), HC2 (LGO)
Concentration [mg/L]
1000
100
10
1
0.1
0.01
0.001
0.0001
pH
10.0
9.0
8.0
7.0
6.0
5.0
0
10
20
30
40
Weeks
SO4-T3
SO4-HC1
SO4-HC2
WQG-Guidelines
pH-T3
pH-HC1
pH-HC2

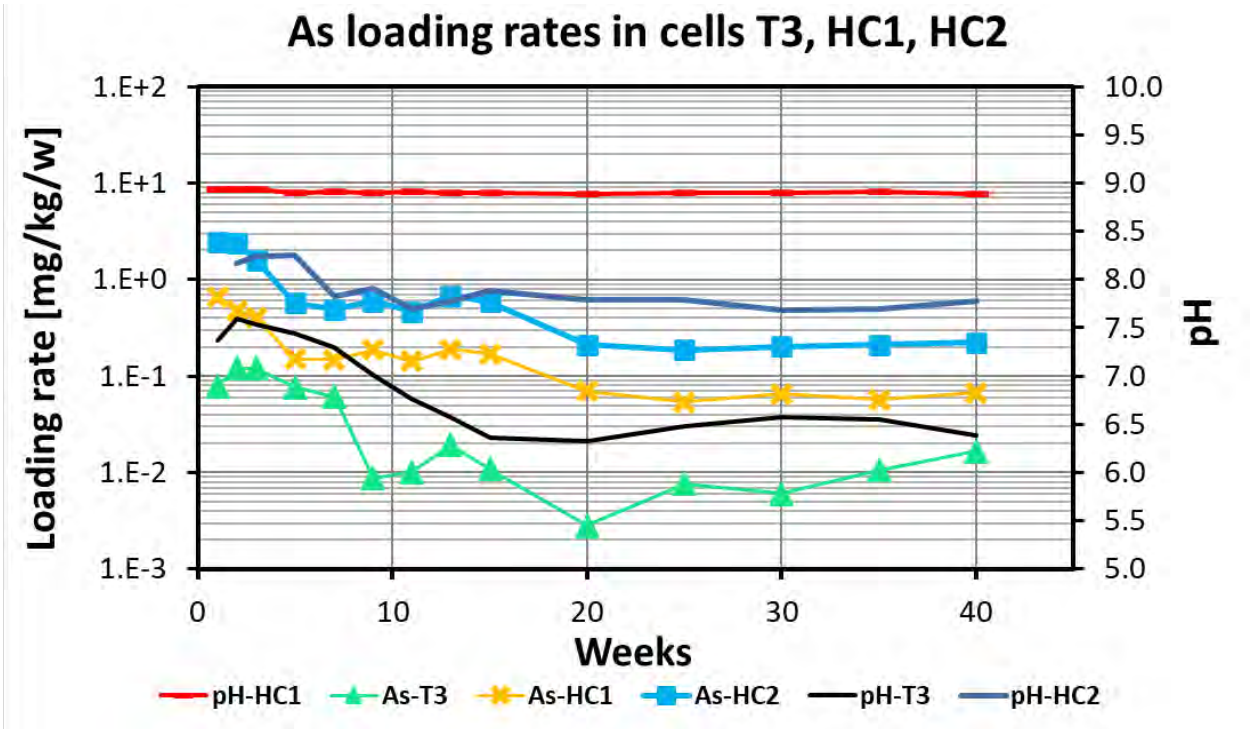
Appendix C

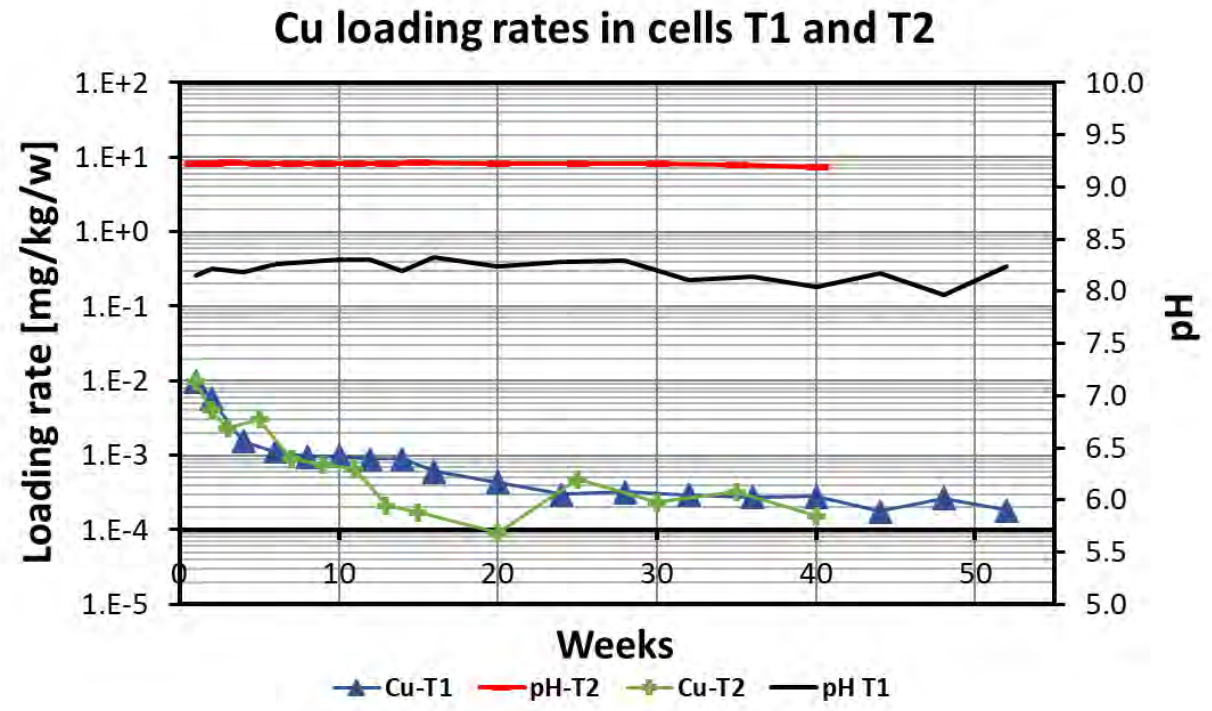
Loading Rates for Metals in Humidity Cells

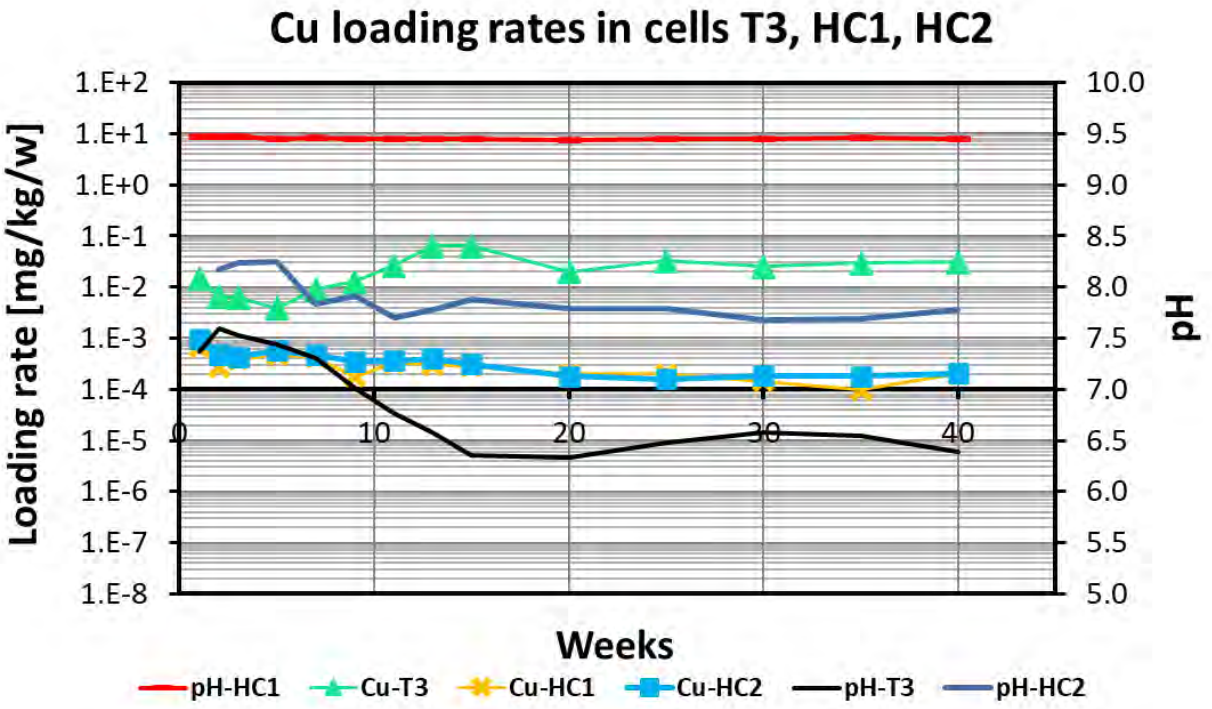
APPENDIX C - LOADING RATES FOR METALS IN HUMIDITY CELLS

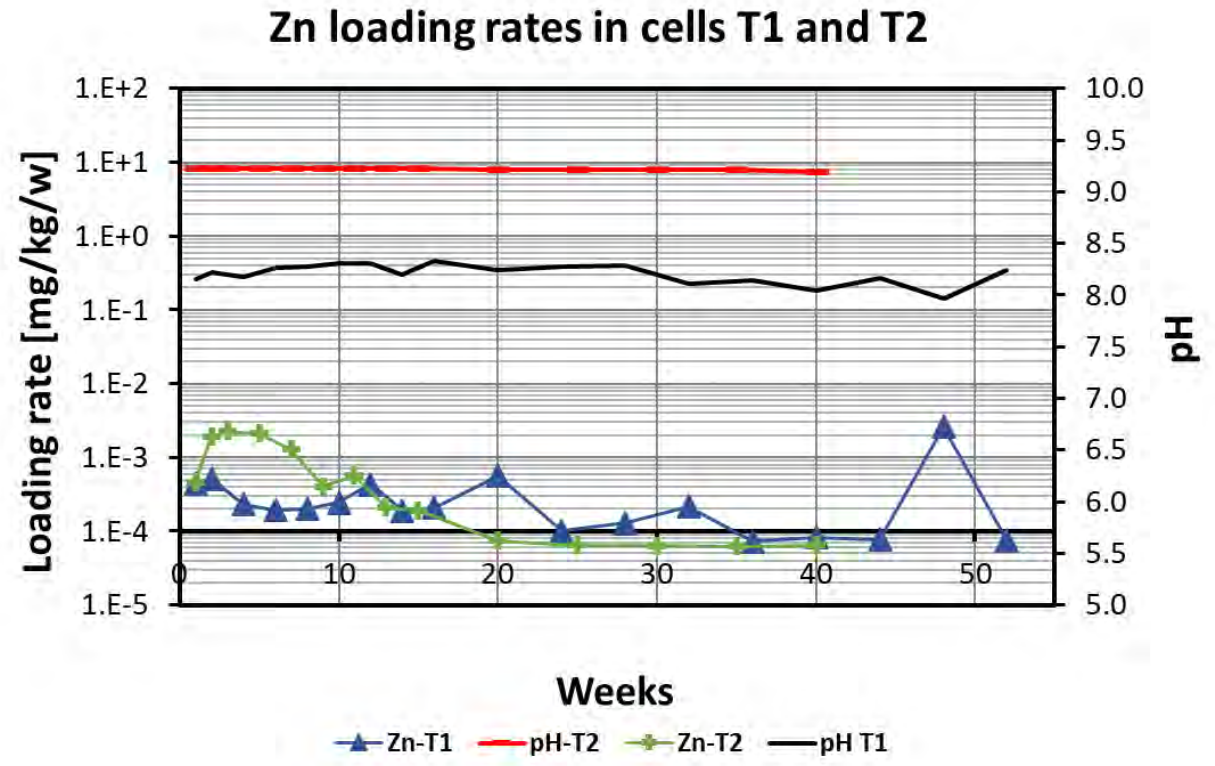
Flotation Tailings (T1), Co-disposal sample (T2), Waste rock samples, namely PAG Material (T3), Pre-composite 1+2 (H1), and Low-Grade Ore (H2)

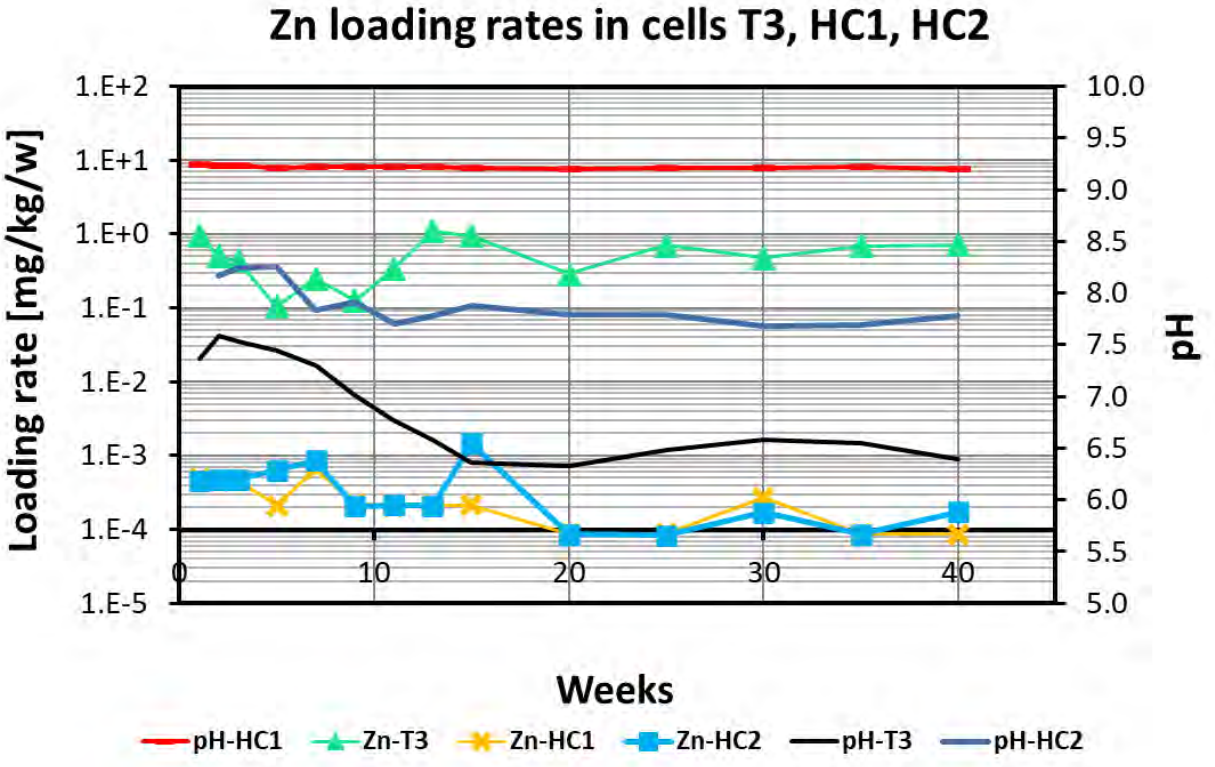


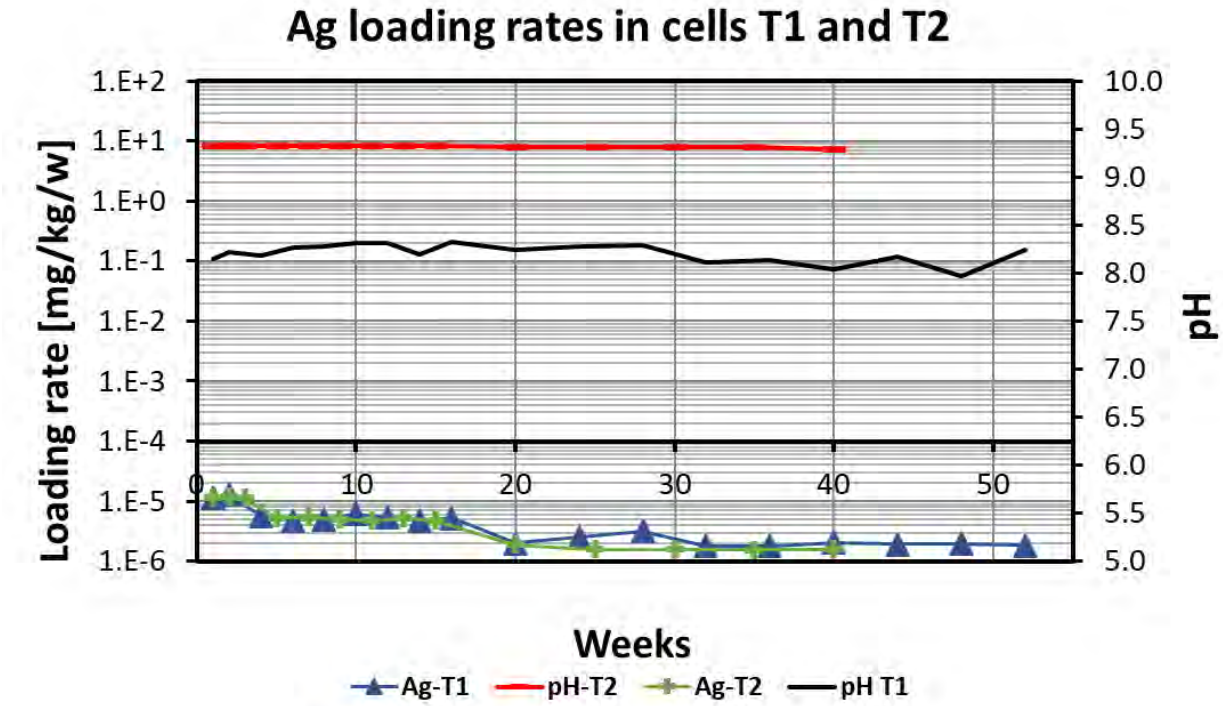


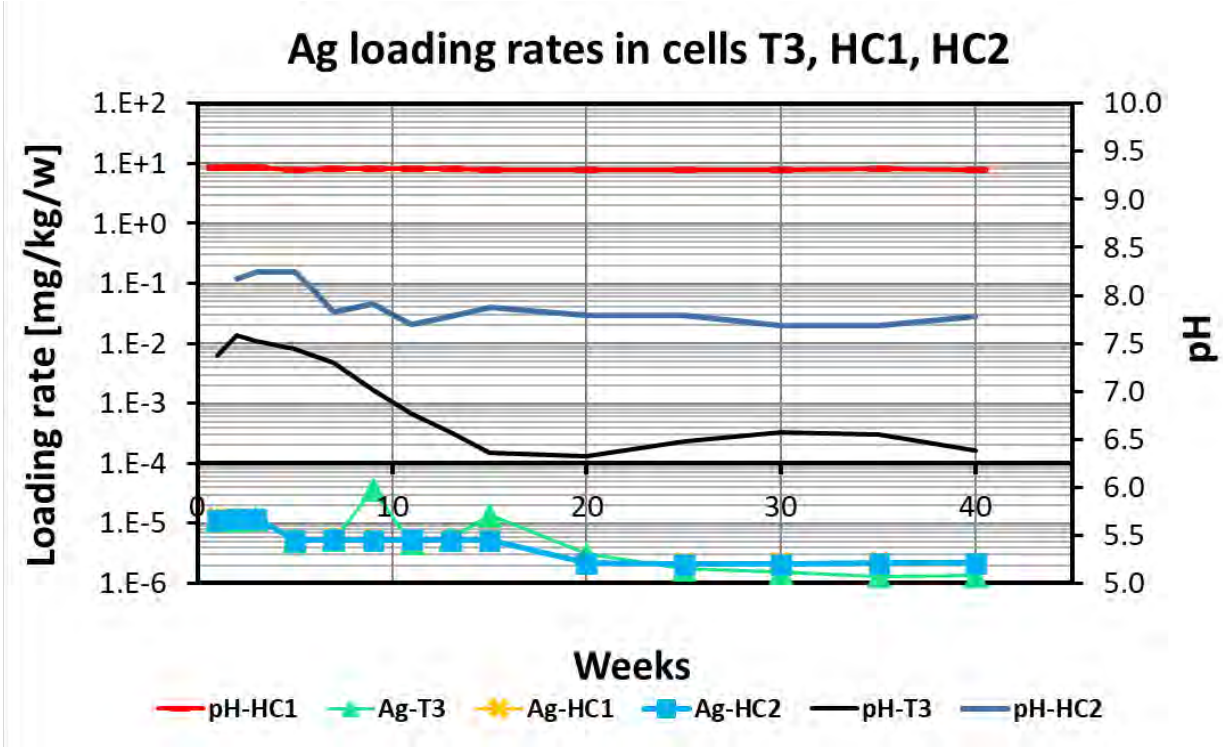

Cu loading rates in cells T1 and T2
Loading rate [mg/kg/w]
1.E+2
1.E+1
1.E+0
1.E-1
1.E-2
1.E-3
1.E-4
1.E-5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
pH
0
10
20
30
40
50
Weeks
Cu-T1
pH-T2
Cu-T2
pH T1

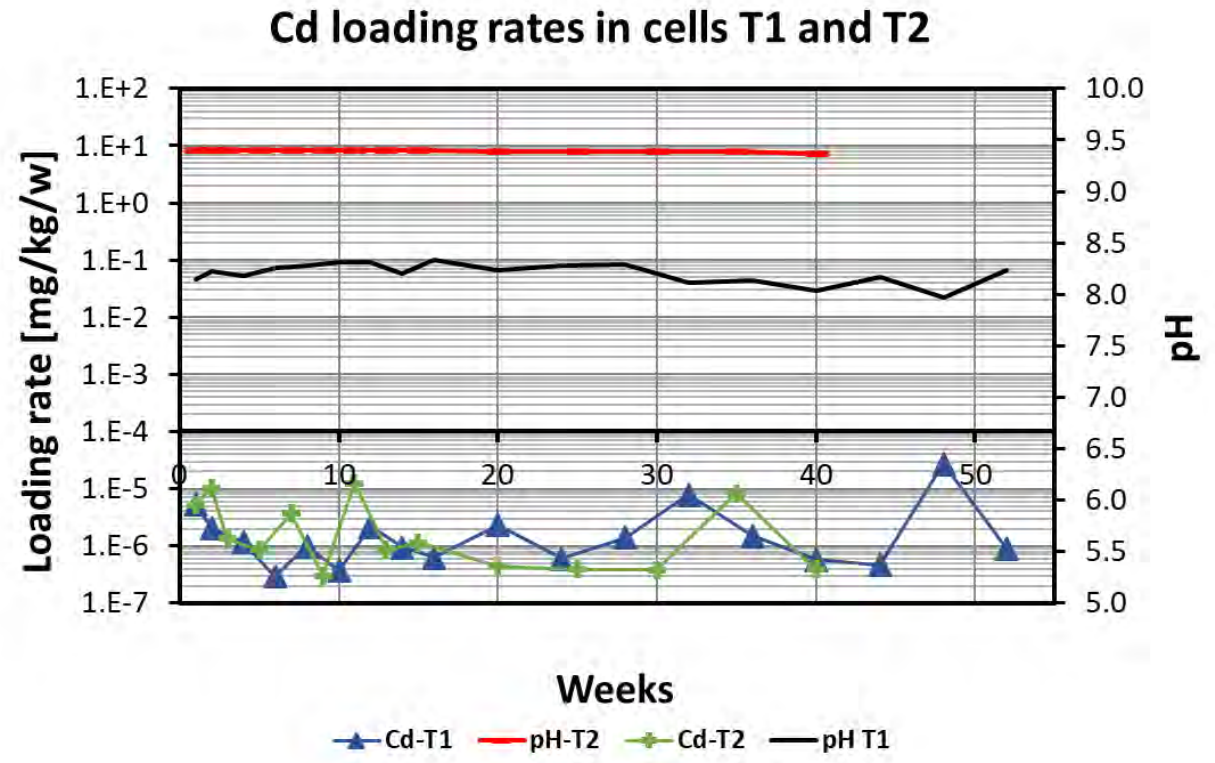

Cu loading rates in cells T3, HC1, HC2
Loading rate [mg/kg/w]
1.E+2
1.E+1
1.E+0
1.E-1
1.E-2
1.E-3
1.E-4
1.E-5
1.E-6
1.E-7
1.E-8
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
pH
0
10
20
30
40
Weeks
pH-HC1
Cu-T3
Cu-HC1
Cu-HC2
pH-T3
pH-HC2

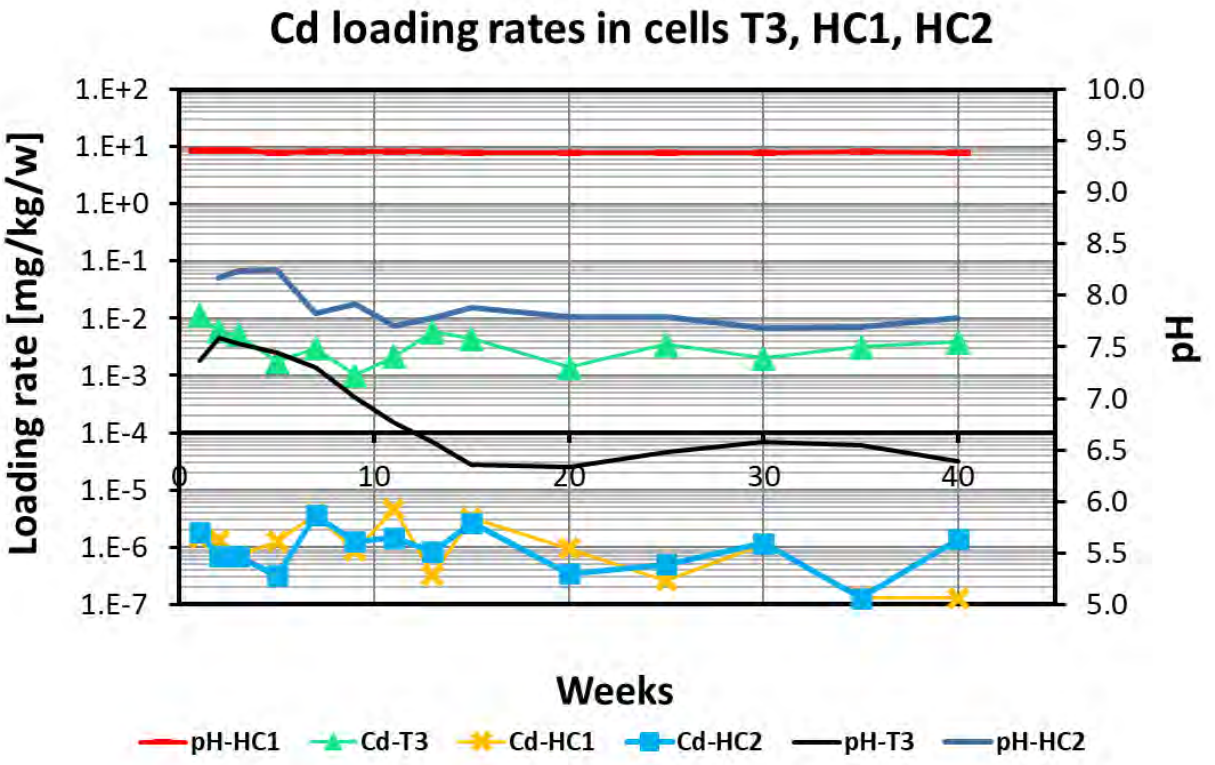

Zn loading rates in cells T1 and T2
Loading rate [mg/kg/w]
1.E+2
1.E+1
1.E+0
1.E-1
1.E-2
1.E-3
1.E-4
1.E-5
0
10
20
30
40
50
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
pH
Weeks
Zn-T1
pH-T2
Zn-T2
pH T1

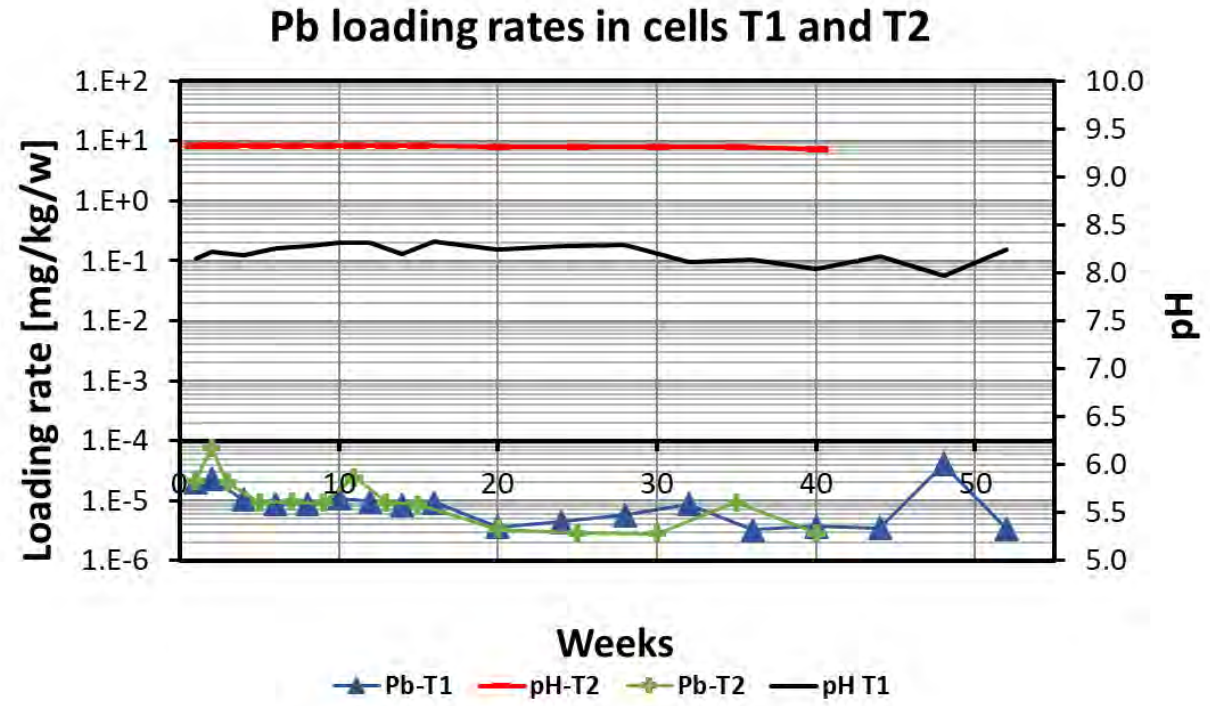

Zn loading rates in cells T3, HC1, HC2
Loading rate [mg/kg/w]
1.E+2
1.E+1
1.E+0
1.E-1
1.E-2
1.E-3
1.E-4
1.E-5
0
10
20
30
40
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
pH
Weeks
pH-HC1
Zn-T3
Zn-HC1
Zn-HC2
pH-T3
pH-HC2

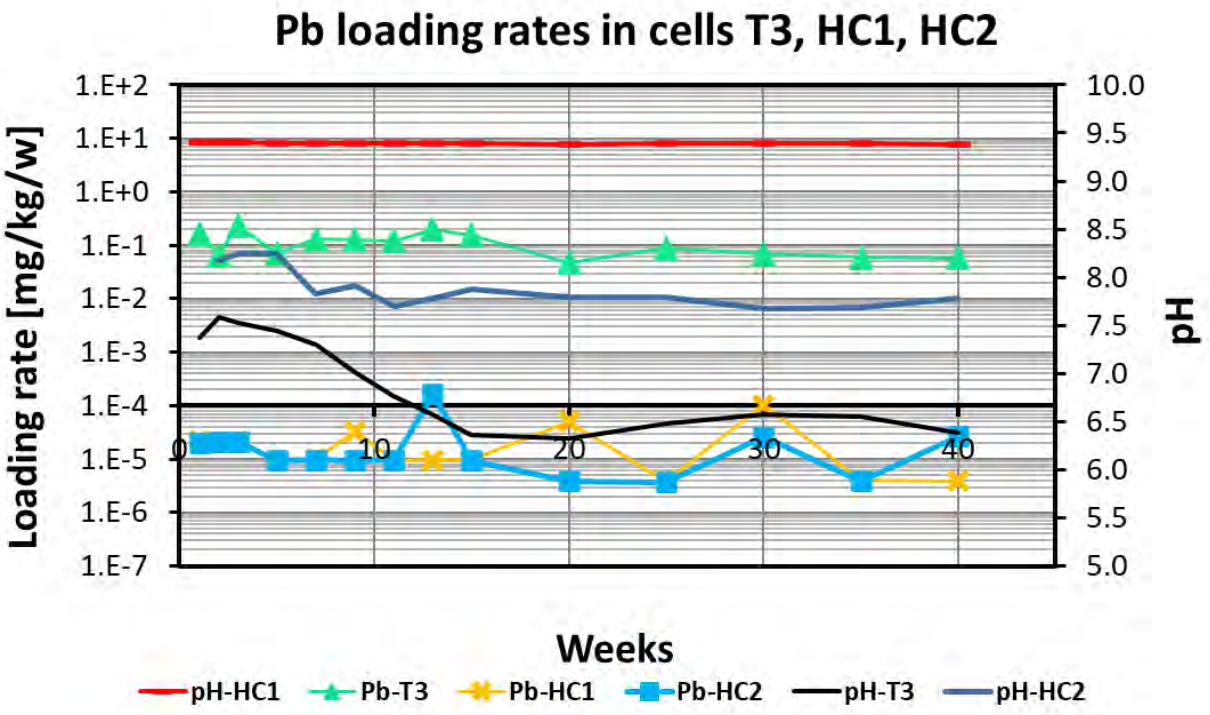

Ag loading rates in cells T1 and T2
Loading rate [mg/kg/w]
1.E+2
1.E+1
1.E+0
1.E-1
1.E-2
1.E-3
1.E-4
1.E-5
1.E-6
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
pH
0
10
20
30
40
50
Weeks
Ag-T1
pH-T2
Ag-T2
pH T1

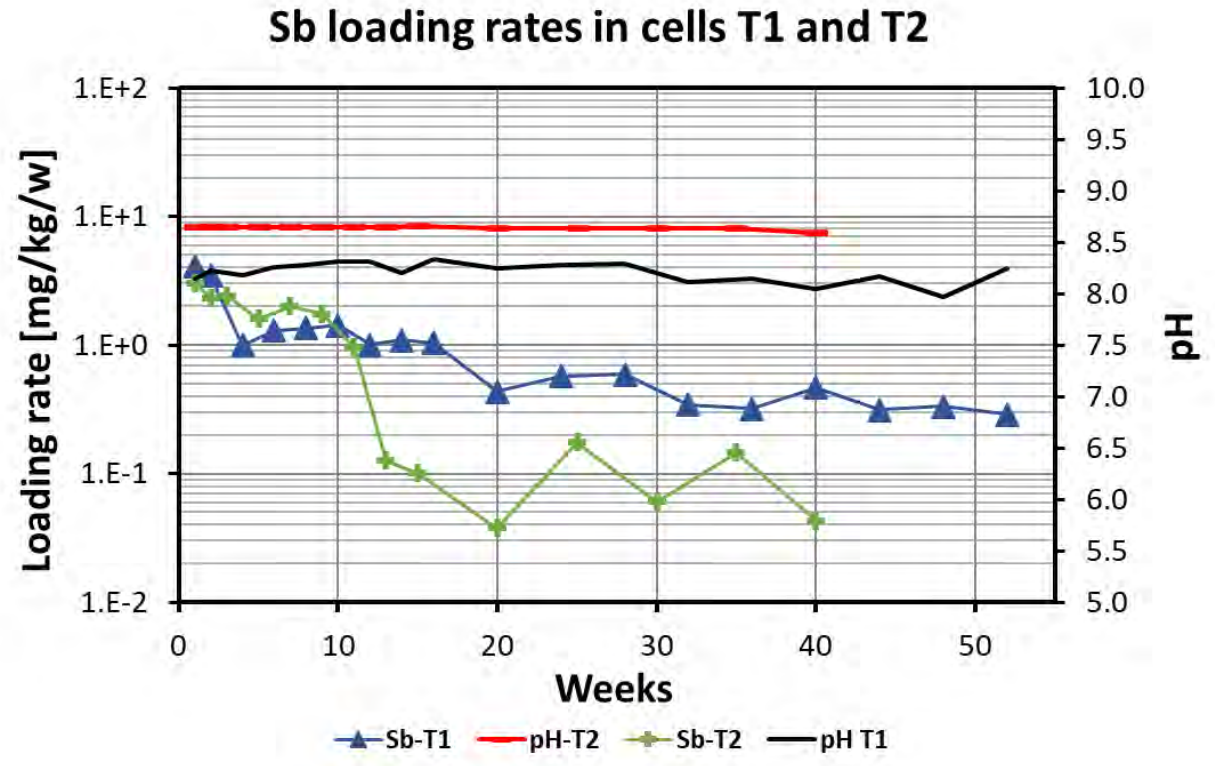

Ag loading rates in cells T3, HC1, HC2
Loading rate [mg/kg/w]
1.E+2
1.E+1
1.E+0
1.E-1
1.E-2
1.E-3
1.E-4
1.E-5
1.E-6
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
pH
0
10
20
30
40
Weeks
pH-HC1
Ag-T3
Ag-HC1
Ag-HC2
pH-T3
pH-HC2

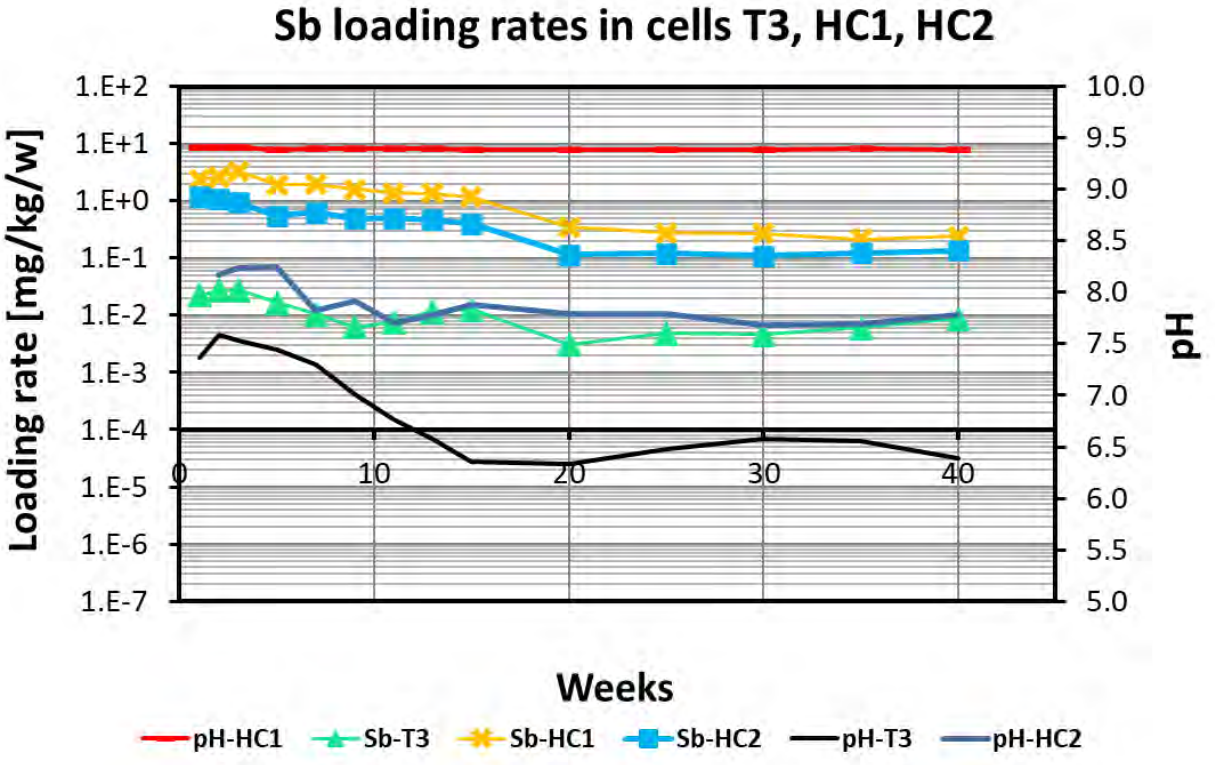

Cd loading rates in cells T1 and T2
Loading rate [mg/kg/w]
1.E+2
1.E+1
1.E+0
1.E-1
1.E-2
1.E-3
1.E-4
1.E-5
1.E-6
1.E-7
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
pH
0
10
20
30
40
50
Weeks
Cd-T1
pH-T2
Cd-T2
pH T1

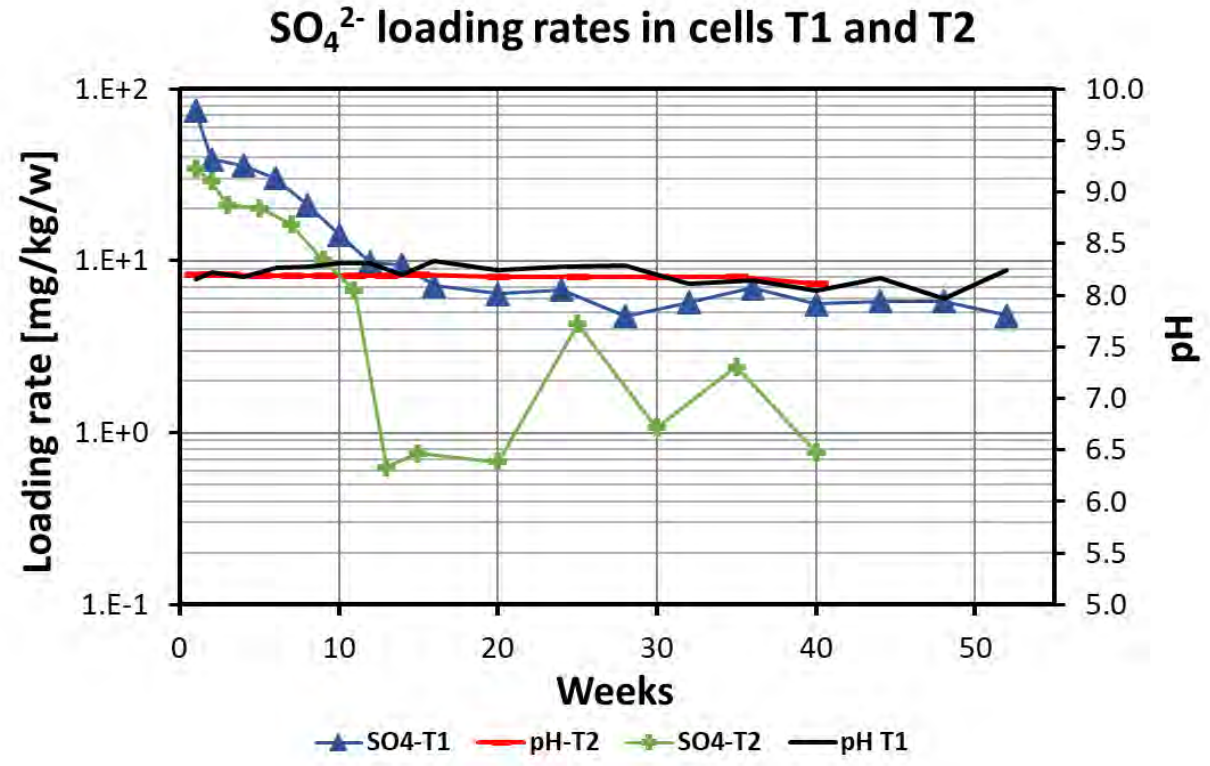

Cd loading rates in cells T3, HC1, HC2
Loading rate [mg/kg/w]
1.E+2
1.E+1
1.E+0
1.E-1
1.E-2
1.E-3
1.E-4
1.E-5
1.E-6
1.E-7
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
pH
0
10
20
30
40
Weeks
pH-HC1
Cd-T3
Cd-HC1
Cd-HC2
pH-T3
pH-HC2

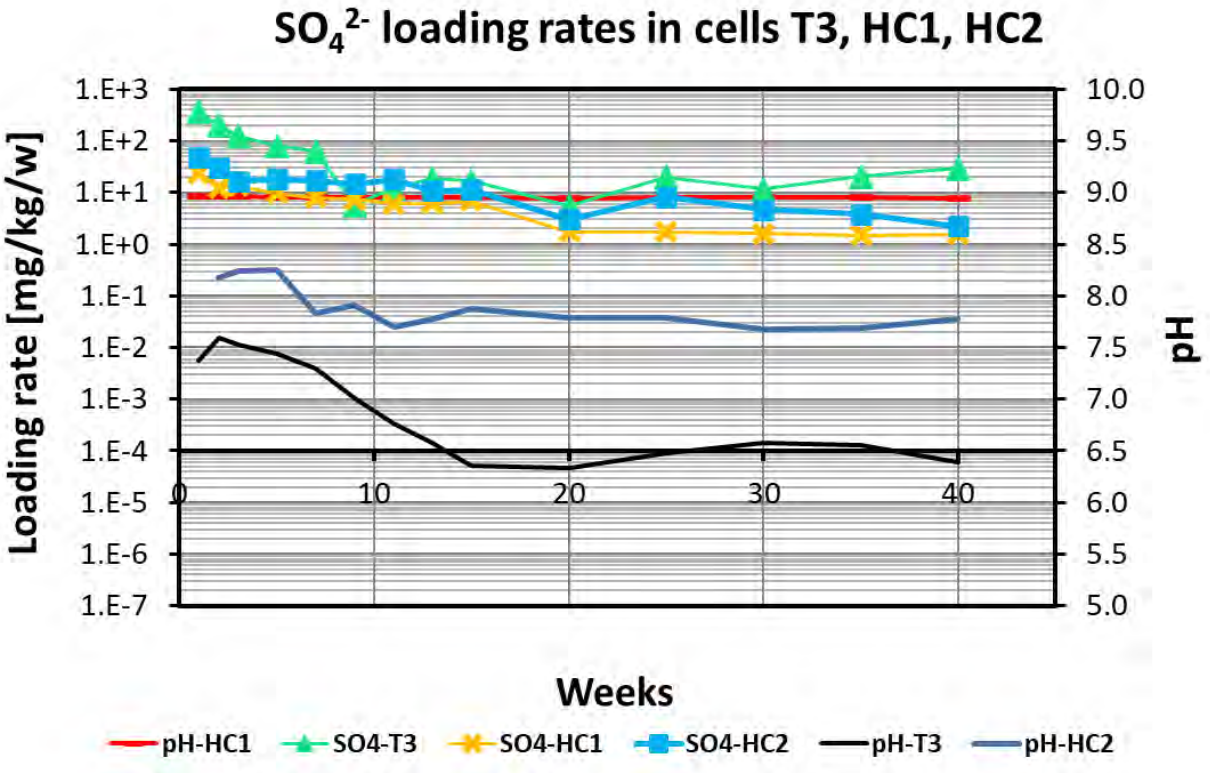

Pb loading rates in cells T1 and T2
Loading rate [mg/kg/w]
1.E+2
1.E+1
1.E+0
1.E-1
1.E-2
1.E-3
1.E-4
1.E-5
1.E-6
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
pH
0
10
20
30
40
50
Weeks
Pb-T1
pH-T2
Pb-T2
pH T1


Pb loading rates in cells T3, HC1, HC2
Loading rate [mg/kg/w]
1.E+2
1.E+1
1.E+0
1.E-1
1.E-2
1.E-3
1.E-4
1.E-5
1.E-6
1.E-7
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
pH
0
10
20
30
40
Weeks
pH-HC1
Pb-T3
Pb-HC1
Pb-HC2
pH-T3
pH-HC2


Sb loading rates in cells T1 and T2
Loading rate [mg/kg/w]
1.E+2
1.E+1
1.E+0
1.E-1
1.E-2
pH
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
0
10
20
30
40
50
Weeks
Sb-T1
pH-T2
Sb-T2
pH T1


Sb loading rates in cells T3, HC1, HC2
Loading rate [mg/kg/w]
1.E+2
1.E+1
1.E+0
1.E-1
1.E-2
1.E-3
1.E-4
1.E-5
1.E-6
1.E-7
pH
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
0
10
20
30
40
Weeks
pH-HC1
Sb-T3
Sb-HC1
Sb-HC2
pH-T3
pH-HC2


SO4 2- loading rates in cells T1 and T2
Loading rate [mg/kg/w]
1.E+2
1.E+1
1.E+0
1.E-1
0
10
20
30
40
50
Weeks
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
pH
SO4-T1
pH-T2
SO4-T2
pH T1


SO4 2- loading rates in cells T3, HC1, HC2
Loading rate [mg/kg/w]
1.E+3
1.E+2
1.E+1
1.E+0
1.E-1
1.E-2
1.E-3
1.E-4
1.E-5
1.E-6
1.E-7
0
10
20
30
40
Weeks
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
pH
pH-HC1
SO4-T3
SO4-HC1
SO4-HC2
pH-T3
pH-HC2

Appendix D

SGS Certificate of Analysis

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

SGS Canada Inc.
Attn : Sakina Massani

Suite F, 3260 Production Way
Burnaby, BC
V5A 4W4, Canada

Phone: 604-638-2349
Fax:604-444-5486

Project : CEMI

05-November-2021

Date Rec. : 27 October 2021
LR Report: **CA15798-OCT21**
Reference: Project: Wasamac Tailing (Hemmera) - PO# 11363

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 1	7: T2 Cycle 1	8: T3 Cycle 1	9: T4 Cycle 1	10: T1 Cycle 2	11: T2 Cycle 2	12: T3 Cycle 2	13: T4 Cycle 2
Sample Date & Time				21-Oct-21	21-Oct-21	21-Oct-21	21-Oct-21	26-Oct-21	26-Oct-21	26-Oct-21	26-Oct-21
Temperature Upon Receipt [°C]	---	---	---	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
Bromide [mg/L]	28-Oct-21	29-Oct-21	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Chloride [mg/L]	01-Nov-21	02-Nov-21	1	23	23	23	37	18	15	11	30
Nitrite (as N) [mg/L]	28-Oct-21	29-Oct-21	0.03	1.23	0.86	0.90	1.94	0.24	0.14	0.11	0.33
Nitrate (as N) [mg/L]	28-Oct-21	29-Oct-21	0.06	0.51	0.22	0.18	0.19	0.16	< 0.06	< 0.06	0.08
Phosphorus (total reactive) [mg/L]	29-Oct-21	03-Nov-21	0.03	0.03	0.03	0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Thiosulphate [mg/L]	28-Oct-21	03-Nov-21	0.2	< 1	1.3	< 1	1.6	2.2	2.3	2.0	6.7
Tetrathionate [mg/L]	28-Oct-21	03-Nov-21	0.2	2.3	0.2	< 0.2	0.6	5.5	3.3	0.2	0.8
Ammonia+Ammonium (N) [as N mg/L]	03-Nov-21	04-Nov-21	0.1	16.7	16.3	19.8	13.1	6.3	5.3	4.9	4.3
Hardness [mg/L as CaCO3]	28-Oct-21	01-Nov-21	0.05	1410	1420	1450	355	1750	1620	1720	133
Aluminum [mg/L]	28-Oct-21	01-Nov-21	0.001	0.031	0.042	0.103	0.051	0.016	0.027	0.033	0.043
Antimony [mg/L]	28-Oct-21	01-Nov-21	0.0009	< 0.0009	0.0027	0.0017	0.0012	< 0.0009	0.0018	0.0012	0.0010
Arsenic [mg/L]	28-Oct-21	01-Nov-21	0.0002	0.0008	0.0015	0.0020	0.0008	0.0005	0.0009	0.0004	0.0004
Barium [mg/L]	28-Oct-21	01-Nov-21	0.00002	0.0195	0.0222	0.0201	0.0230	0.0171	0.0207	0.0135	0.0122
Beryllium [mg/L]	28-Oct-21	01-Nov-21	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth [mg/L]	28-Oct-21	01-Nov-21	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001

OnLine LIMS

0002702631

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Project : CEMI
LR Report : **CA15798-OCT21**

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 1	7: T2 Cycle 1	8: T3 Cycle 1	9: T4 Cycle 1	10: T1 Cycle 2	11: T2 Cycle 2	12: T3 Cycle 2	13: T4 Cycle 2
Boron [mg/L]	28-Oct-21	01-Nov-21	0.002	0.387	0.088	0.054	0.069	0.061	0.027	0.025	0.025
Cadmium [mg/L]	28-Oct-21	01-Nov-21	0.000003	0.000028	0.000020	0.000020	0.000021	0.000017	0.000035	0.000009	0.000014
Calcium [mg/L]	28-Oct-21	01-Nov-21	0.01	535	545	556	128	637	599	636	39.1
Chromium [mg/L]	28-Oct-21	01-Nov-21	0.00008	0.00033	0.00010	0.00027	0.00022	0.00012	0.00008	0.00009	0.00018
Cobalt [mg/L]	28-Oct-21	01-Nov-21	0.000004	0.00803	0.0141	0.0144	0.00476	0.00429	0.00572	0.00467	0.00162
Copper [mg/L]	28-Oct-21	01-Nov-21	0.0002	0.0354	0.0282	0.0132	0.0398	0.0024	0.0046	0.0052	0.0041
Iron [mg/L]	28-Oct-21	01-Nov-21	0.007	0.398	2.24	5.47	0.434	0.109	0.691	2.01	0.193
Lead [mg/L]	28-Oct-21	01-Nov-21	0.00009	0.00041	0.00099	0.00091	0.00067	< 0.00009	0.00043	0.00021	0.00011
Lithium [mg/L]	28-Oct-21	01-Nov-21	0.0001	0.0033	0.0080	0.0022	0.0008	0.0052	0.0068	0.0020	0.0005
Magnesium [mg/L]	28-Oct-21	01-Nov-21	0.001	17.5	14.8	14.8	8.71	38.5	29.9	31.2	8.49
Manganese [mg/L]	28-Oct-21	01-Nov-21	0.00001	0.0720	0.0445	0.0161	0.0176	0.154	0.119	0.0496	0.00998
Mercury (total) [ug/L]	28-Oct-21	29-Oct-21	0.01	< 0.01	< 0.01	0.01	0.02	< 0.01	< 0.01	0.02	0.17
Molybdenum [mg/L]	28-Oct-21	01-Nov-21	0.00004	0.0412	0.0211	0.0331	0.0236	0.0330	0.0114	0.00989	0.0212
Nickel [mg/L]	28-Oct-21	01-Nov-21	0.0001	0.0016	0.0007	0.0006	0.0009	0.0008	0.0004	0.0003	0.0002
Phosphorus [mg/L]	28-Oct-21	01-Nov-21	0.003	0.034	0.040	0.030	0.022	< 0.003	< 0.003	0.006	< 0.003
Potassium [mg/L]	28-Oct-21	01-Nov-21	0.003	56.2	63.8	38.0	29.8	28.3	28.9	13.8	11.4
Selenium [mg/L]	28-Oct-21	01-Nov-21	0.00004	0.00161	0.00111	0.00062	0.00118	0.00111	0.00039	0.00022	0.00085
Silicon [mg/L]	28-Oct-21	01-Nov-21	0.02	1.95	3.09	3.29	2.10	3.44	4.39	4.74	3.12
Silver [mg/L]	28-Oct-21	01-Nov-21	0.00005	0.00142	0.00404	0.0345	0.00336	0.00087	0.00311	0.0194	0.0180
Sodium [mg/L]	28-Oct-21	01-Nov-21	0.01	819	823	699	740	141	115	77.4	97.0
Strontium [mg/L]	28-Oct-21	01-Nov-21	0.00002	8.09	4.69	4.87	0.600	9.34	5.38	5.77	0.235
Sulfur [mg/L]	28-Oct-21	02-Nov-21	1	1050	1100	979	699	656	634	625	107
Thallium [mg/L]	28-Oct-21	01-Nov-21	0.000005	0.000042	< 0.000005	0.000010	0.000007	0.000013	0.000005	0.000005	< 0.000005
Tin [mg/L]	28-Oct-21	01-Nov-21	0.00006	0.00404	0.00964	0.0163	0.0103	0.0101	0.0171	0.0274	0.0134
Titanium [mg/L]	28-Oct-21	01-Nov-21	0.00005	0.00007	0.00018	0.00026	0.00006	< 0.00005	0.00006	0.00006	0.00005
Uranium [mg/L]	28-Oct-21	01-Nov-21	0.000002	0.00104	0.00137	0.00138	0.000743	0.000654	0.000913	0.000889	0.000141
Vanadium [mg/L]	28-Oct-21	01-Nov-21	0.00001	0.00011	0.00047	0.00042	0.00025	0.00007	0.00038	0.00027	0.00022
Zinc [mg/L]	28-Oct-21	01-Nov-21	0.002	0.006	0.008	0.008	0.006	< 0.002	< 0.002	< 0.002	< 0.002
Zirconium [mg/L]	28-Oct-21	01-Nov-21	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002

Note: Reporting limit for Thiosulphate was elevated.

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Project : CEMI
LR Report : **CA15798-OCT21**

Patti Stark
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0002702631

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Project : CEMI

11-November-2021

SGS Canada Inc.
Attn : Sakina Massani

Suite F, 3260 Production Way
Burnaby, BC
V5A 4W4, Canada

Phone: 604-638-2349
Fax:604-444-5486

Date Rec. : 03 November 2021
LR Report: **CA15055-NOV21**
Reference: Project: Wasamac Tailing (Hemmera) - PO#: 11392

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 3	7: T2 Cycle 3	8: T3 Cycle 3	9: T4 Cycle 3
Sample Date & Time				02-Nov-21	02-Nov-21	02-Nov-21	02-Nov-21
Temperature Upon Receipt [°C]	---	---	---	16.0	16.0	16.0	16.0
Bromide [mg/L]	03-Nov-21	04-Nov-21	0.3	< 0.3	< 0.3	< 0.3	< 0.3
Chloride [mg/L]	05-Nov-21	10-Nov-21	1	6	4	8	25
Nitrite (as N) [mg/L]	03-Nov-21	04-Nov-21	0.03	0.12	0.11	0.07	0.18
Nitrate (as N) [mg/L]	03-Nov-21	04-Nov-21	0.06	0.26	0.09	< 0.06	0.08
Thiosulphate [mg/L]	09-Nov-21	11-Nov-21	< 1	< 1	< 1	1.5	3.4
Tetrathionate [mg/L]	09-Nov-21	11-Nov-21	0.2	0.3	< 0.2	2.4	1.5
Ammonia+Ammonium (N) [as N mg/L]	08-Nov-21	09-Nov-21	0.1	2.9	2.7	2.1	2.6
Phosphorus (total reactive) [mg/L]	09-Nov-21	10-Nov-21	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Hardness [mg/L as CaCO3]	05-Nov-21	09-Nov-21	0.05	1630	1250	1270	158
Aluminum [mg/L]	05-Nov-21	09-Nov-21	0.001	0.012	0.027	0.023	0.023
Antimony [mg/L]	05-Nov-21	09-Nov-21	0.0009	< 0.0009	0.0013	< 0.0009	< 0.0009
Arsenic [mg/L]	05-Nov-21	09-Nov-21	0.0002	0.0004	0.0006	0.0002	0.0003
Barium [mg/L]	05-Nov-21	09-Nov-21	0.00002	0.0165	0.0162	0.0111	0.0130
Beryllium [mg/L]	05-Nov-21	09-Nov-21	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth [mg/L]	05-Nov-21	09-Nov-21	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron [mg/L]	05-Nov-21	09-Nov-21	0.002	0.038	0.023	0.019	0.018
Cadmium [mg/L]	05-Nov-21	09-Nov-21	0.000003	0.000007	< 0.000003	0.000007	0.000007
Calcium [mg/L]	05-Nov-21	09-Nov-21	0.01	583	445	454	41.6
Chromium [mg/L]	05-Nov-21	09-Nov-21	0.00008	< 0.00008	< 0.00008	< 0.00008	0.00016
Cobalt [mg/L]	05-Nov-21	09-Nov-21	0.000004	0.00276	0.00309	0.00236	0.00103
Copper [mg/L]	05-Nov-21	09-Nov-21	0.0002	0.0021	0.0035	0.0022	0.0026
Iron [mg/L]	05-Nov-21	09-Nov-21	0.007	0.051	0.234	0.764	0.105
Lead [mg/L]	05-Nov-21	09-Nov-21	0.00009	< 0.00009	0.00062	0.00046	0.00011
Lithium [mg/L]	05-Nov-21	09-Nov-21	0.0001	0.0078	0.0086	0.0021	0.0008
Magnesium [mg/L]	05-Nov-21	09-Nov-21	0.001	42.0	33.0	31.9	13.0
Manganese [mg/L]	05-Nov-21	09-Nov-21	0.00001	0.195	0.143	0.0596	0.0145
Mercury (total) [ug/L]	05-Nov-21	10-Nov-21	0.01	< 0.01	< 0.01	< 0.01	0.02
Molybdenum [mg/L]	05-Nov-21	09-Nov-21	0.00004	0.02267	0.00956	0.00556	0.0135

OnLine LIMS

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Project : CEMI
LR Report : **CA15055-NOV21**

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 3	7: T2 Cycle 3	8: T3 Cycle 3	9: T4 Cycle 3
Nickel [mg/L]	05-Nov-21	09-Nov-21	0.0001	0.0008	0.0002	0.0001	0.0002
Phosphorus [mg/L]	05-Nov-21	09-Nov-21	0.003	0.006	0.009	0.007	< 0.003
Potassium [mg/L]	05-Nov-21	09-Nov-21	0.003	16.2	15.8	5.95	6.80
Selenium [mg/L]	05-Nov-21	09-Nov-21	0.00004	0.00113	0.00031	0.00027	0.00083
Silicon [mg/L]	05-Nov-21	09-Nov-21	0.02	4.05	4.56	4.46	3.42
Silver [mg/L]	05-Nov-21	09-Nov-21	0.00005	0.00006	0.00018	0.00592	0.00326
Sodium [mg/L]	05-Nov-21	09-Nov-21	0.01	37.8	30.6	18.9	28.8
Strontium [mg/L]	05-Nov-21	09-Nov-21	0.00002	11.9	5.68	5.47	0.270
Sulfur [mg/L]	05-Nov-21	09-Nov-21	1	501	413	402	60
Thallium [mg/L]	05-Nov-21	09-Nov-21	0.000005	0.000006	< 0.000005	< 0.000005	< 0.000005
Tin [mg/L]	05-Nov-21	09-Nov-21	0.00006	0.0120	0.0149	0.0190	0.00912
Titanium [mg/L]	05-Nov-21	09-Nov-21	0.00005	0.00010	< 0.00005	< 0.00005	< 0.00005
Uranium [mg/L]	05-Nov-21	09-Nov-21	0.000002	0.000897	0.000888	0.000636	0.000139
Vanadium [mg/L]	05-Nov-21	09-Nov-21	0.00001	0.00009	0.00023	0.00015	0.00008
Zinc [mg/L]	05-Nov-21	09-Nov-21	0.002	< 0.002	< 0.002	< 0.002	< 0.002
Zirconium [mg/L]	05-Nov-21	09-Nov-21	0.002	< 0.002	< 0.002	< 0.002	< 0.002

Patti Stark
Project Specialist,
Environment, Health & Safety

OnLine LIMS

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Project : CEMI

29-November-2021

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Date Rec. : 10 November 2021
LR Report: **CA15174-NOV21**
Reference: Project: Wasamac Tailing (Hemmera) 2117 - PO#: 11410

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 4	7: T2 Cycle 4	8: T3 Cycle 4	9: T4 Cycle 4
Sample Date & Time				09-Nov-21	09-Nov-21	09-Nov-21	09-Nov-21
Temperature Upon Receipt [°C]	---	---	---	10.0	10.0	10.0	10.0
Bromide [mg/L]	11-Nov-21	12-Nov-21	0.3	< 0.3	< 0.3	< 0.3	< 0.3
Chloride [mg/L]	17-Nov-21	18-Nov-21	1	5	3	3	17
Nitrite (as N) [mg/L]	11-Nov-21	12-Nov-21	0.03	0.11	0.07	0.11	0.08
Nitrate (as N) [mg/L]	11-Nov-21	12-Nov-21	0.06	0.17	0.08	0.07	< 0.06
Thiosulphate [mg/L]	12-Nov-21	16-Nov-21	0.2	< 1	< 1	< 1	3.4
Tetrathionate [mg/L]	12-Nov-21	16-Nov-21	0.2	< 0.2	< 0.2	< 0.2	1.5
Phosphorus (total reactive) [mg/L]	16-Nov-21	17-Nov-21	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Ammonia+Ammonium (N) [as N mg/L]	15-Nov-21	16-Nov-21	0.1	1.5	1.5	1.2	1.6
Hardness [mg/L as CaCO3]	18-Nov-21	22-Nov-21	0.05	1670	1170	1210	233
Aluminum [mg/L]	18-Nov-21	22-Nov-21	0.001	0.016	0.032	0.039	0.029
Antimony [mg/L]	18-Nov-21	22-Nov-21	0.0009	< 0.0009	0.0011	< 0.0009	< 0.0009
Arsenic [mg/L]	18-Nov-21	22-Nov-21	0.0002	0.0004	0.0004	0.0003	0.0002
Barium [mg/L]	18-Nov-21	22-Nov-21	0.00002	0.0158	0.0149	0.0113	0.0141
Beryllium [mg/L]	18-Nov-21	22-Nov-21	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth [mg/L]	18-Nov-21	22-Nov-21	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron [mg/L]	18-Nov-21	22-Nov-21	0.002	0.037	0.023	0.026	0.021
Cadmium [mg/L]	18-Nov-21	22-Nov-21	0.000003	0.000021	0.000008	0.000007	0.000007
Calcium [mg/L]	18-Nov-21	22-Nov-21	0.01	591	411	417	61.2
Chromium [mg/L]	18-Nov-21	22-Nov-21	0.00008	< 0.00008	< 0.00008	< 0.00008	0.00010
Cobalt [mg/L]	18-Nov-21	22-Nov-21	0.000004	0.00265	0.00254	0.00220	0.00101
Copper [mg/L]	18-Nov-21	22-Nov-21	0.0002	0.0027	0.0042	0.0028	0.0031
Iron [mg/L]	18-Nov-21	22-Nov-21	0.007	0.037	0.097	0.604	0.088
Lead [mg/L]	18-Nov-21	22-Nov-21	0.00009	< 0.00009	0.00034	0.00009	< 0.00009
Lithium [mg/L]	18-Nov-21	22-Nov-21	0.0001	0.0074	0.0071	0.0014	0.0007
Magnesium [mg/L]	18-Nov-21	22-Nov-21	0.001	47.5	35.9	40.0	19.5
Manganese [mg/L]	18-Nov-21	22-Nov-21	0.00001	0.260	0.191	0.0850	0.0205
Mercury (total) [ug/L]	15-Nov-21	16-Nov-21	0.01	< 0.01	< 0.01	< 0.01	0.05

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Project : CEMI
LR Report : **CA15174-NOV21**

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 4	7: T2 Cycle 4	8: T3 Cycle 4	9: T4 Cycle 4
Molybdenum [mg/L]	18-Nov-21	22-Nov-21	0.00004	0.0212	0.00717	0.00516	0.00961
Nickel [mg/L]	18-Nov-21	22-Nov-21	0.0001	0.0015	0.0003	0.0002	0.0002
Phosphorus [mg/L]	18-Nov-21	22-Nov-21	0.003	0.003	< 0.003	< 0.003	0.003
Potassium [mg/L]	18-Nov-21	22-Nov-21	0.003	16.7	13.0	4.88	5.78
Selenium [mg/L]	18-Nov-21	22-Nov-21	0.00004	0.00196	0.00071	0.00035	0.00086
Silicon [mg/L]	18-Nov-21	22-Nov-21	0.02	4.46	5.20	5.25	4.31
Silver [mg/L]	18-Nov-21	22-Nov-21	0.00005	< 0.00005	< 0.00005	0.00043	0.00556
Sodium [mg/L]	18-Nov-21	22-Nov-21	0.01	17.2	11.0	8.74	12.8
Strontium [mg/L]	18-Nov-21	26-Nov-21	0.00002	12.6	4.11	4.16	0.308
Sulfur [mg/L]	18-Nov-21	22-Nov-21	1	456	325	333	62
Thallium [mg/L]	18-Nov-21	22-Nov-21	0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin [mg/L]	18-Nov-21	22-Nov-21	0.00006	0.0112	0.0186	0.0219	0.0134
Titanium [mg/L]	18-Nov-21	22-Nov-21	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Uranium [mg/L]	18-Nov-21	22-Nov-21	0.000002	0.000770	0.000631	0.000416	0.000170
Vanadium [mg/L]	18-Nov-21	22-Nov-21	0.00001	0.00008	0.00032	0.00020	0.00016
Zinc [mg/L]	18-Nov-21	22-Nov-21	0.002	< 0.002	< 0.002	< 0.002	< 0.002
Zirconium [mg/L]	18-Nov-21	22-Nov-21	0.002	< 0.002	< 0.002	< 0.002	< 0.002

Note: Reporting limit for Thiosulphate was elevated.

Patti Stark
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0002727724

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Project : CEMI

29-November-2021

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Date Rec. : 19 November 2021
LR Report: **CA15395-NOV21**
Reference: Project:Wasamac Tailing {Hemmera} 2117 - PO# 11430

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CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 5	7: T2 Cycle 5	8: T3 Cycle 5	9: T4 Cycle 5
Sample Date & Time				16-Nov-21	16-Nov-21	16-Nov-21	16-Nov-21
Temperature Upon Receipt [°C]	---	---	---	15.0	15.0	15.0	15.0
Bromide [mg/L]	23-Nov-21	25-Nov-21	0.3	< 0.3	< 0.3	< 0.3	< 0.3
Chloride [mg/L]	25-Nov-21	26-Nov-21	1	2	< 1	2	9
Nitrite (as N) [mg/L]	23-Nov-21	25-Nov-21	0.03	0.07	0.06	0.05	0.09
Nitrate (as N) [mg/L]	23-Nov-21	25-Nov-21	0.06	0.11	0.08	< 0.06	< 0.06
Ammonia+Ammonium (N) [as N mg/L]	23-Nov-21	23-Nov-21	0.1	1.1	1.3	0.6	1.0
Phosphorus (total reactive) [mg/L]	23-Nov-21	24-Nov-21	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Thiosulphate [mg/L]	22-Nov-21	23-Nov-21		< 0.2	< 0.2	< 0.2	4.6
Tetrathionate [mg/L]	22-Nov-21	23-Nov-21		< 0.2	< 0.2	< 0.2	< 0.2
Hardness [mg/L as CaCO3]	24-Nov-21	25-Nov-21	0.05	1460	924	768	244
Aluminum [mg/L]	24-Nov-21	25-Nov-21	0.001	0.014	0.023	0.032	0.023
Antimony [mg/L]	24-Nov-21	25-Nov-21	0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Arsenic [mg/L]	24-Nov-21	25-Nov-21	0.0002	0.0003	0.0004	0.0005	0.0003
Barium [mg/L]	24-Nov-21	25-Nov-21	0.00002	0.0184	0.0190	0.0129	0.0169
Beryllium [mg/L]	24-Nov-21	25-Nov-21	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth [mg/L]	24-Nov-21	25-Nov-21	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron [mg/L]	24-Nov-21	25-Nov-21	0.002	0.028	0.021	0.018	0.019
Cadmium [mg/L]	24-Nov-21	25-Nov-21	0.000003	0.000008	0.000003	0.000197	< 0.000003
Calcium [mg/L]	24-Nov-21	25-Nov-21	0.01	506	308	249	65.1
Chromium [mg/L]	24-Nov-21	25-Nov-21	0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008
Cobalt [mg/L]	24-Nov-21	25-Nov-21	0.000004	0.00238	0.00220	0.00143	0.000879
Copper [mg/L]	24-Nov-21	25-Nov-21	0.0002	0.0019	0.0030	0.0024	0.0028
Iron [mg/L]	24-Nov-21	25-Nov-21	0.007	0.034	0.094	0.324	0.071
Lead [mg/L]	24-Nov-21	25-Nov-21	0.00009	< 0.00009	0.00029	0.00017	< 0.00009
Lithium [mg/L]	24-Nov-21	25-Nov-21	0.0001	0.0076	0.0069	0.0014	0.0009
Magnesium [mg/L]	24-Nov-21	25-Nov-21	0.001	46.6	37.8	35.6	19.7
Manganese [mg/L]	24-Nov-21	25-Nov-21	0.00001	0.277	0.187	0.0756	0.0260
Mercury (total) [ug/L]	24-Nov-21	24-Nov-21	0.01	< 0.01	< 0.01	< 0.01	0.01

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Project : CEMI
LR Report : **CA15395-NOV21**

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 5	7: T2 Cycle 5	8: T3 Cycle 5	9: T4 Cycle 5
Molybdenum [mg/L]	24-Nov-21	25-Nov-21	0.00004	0.0211	0.00675	0.00343	0.00692
Nickel [mg/L]	24-Nov-21	25-Nov-21	0.0001	0.0011	0.0002	< 0.0001	< 0.0001
Phosphorus [mg/L]	24-Nov-21	25-Nov-21	0.003	< 0.003	< 0.003	< 0.003	< 0.003
Potassium [mg/L]	24-Nov-21	25-Nov-21	0.003	14.4	9.37	3.06	3.87
Selenium [mg/L]	24-Nov-21	25-Nov-21	0.00004	0.00224	0.00097	0.00041	0.00096
Silicon [mg/L]	24-Nov-21	25-Nov-21	0.02	3.50	3.43	3.70	3.29
Silver [mg/L]	24-Nov-21	25-Nov-21	0.00005	< 0.00005	0.00006	0.00016	0.00305
Sodium [mg/L]	24-Nov-21	25-Nov-21	0.01	10.2	6.06	4.24	7.10
Strontium [mg/L]	24-Nov-21	25-Nov-21	0.00002	11.3	4.37	3.86	0.314
Sulfur [mg/L]	24-Nov-21	25-Nov-21	1	460	311	248	75
Thallium [mg/L]	24-Nov-21	25-Nov-21	0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin [mg/L]	24-Nov-21	25-Nov-21	0.00006	0.0122	0.0215	0.0234	0.0131
Titanium [mg/L]	24-Nov-21	25-Nov-21	0.00005	< 0.00005	< 0.00005	0.00007	< 0.00005
Uranium [mg/L]	24-Nov-21	25-Nov-21	0.000002	0.000664	0.000461	0.000254	0.000210
Vanadium [mg/L]	24-Nov-21	25-Nov-21	0.00001	0.00009	0.00028	0.00017	0.00013
Zinc [mg/L]	24-Nov-21	25-Nov-21	0.002	< 0.002	< 0.002	0.004	< 0.002
Zirconium [mg/L]	24-Nov-21	25-Nov-21	0.002	< 0.002	< 0.002	< 0.002	< 0.002

Patti Stark
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0002727759

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Project : CEMI

14-December-2021

SGS Canada Inc.
Attn : Sakina Massani

Suite F, 3260 Production Way
Burnaby, BC
V5A 4W4, Canada

Phone: 604-638-2349
Fax:604-444-5486

Date Rec. : 29 November 2021
LR Report: **CA15549-NOV21**
Reference: Project: Wasamac Tailing (Hemmera) 2117 - PO#: 11451

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 6	7: T2 Cycle 6	8: T3 Cycle 6	9: T4 Cycle 6
Sample Date & Time				23-Nov-21	23-Nov-21	23-Nov-21	23-Nov-21
Temperature Upon Receipt [°C]	---	---	---	15.0	15.0	15.0	15.0
Bromide [mg/L]	29-Nov-21	30-Nov-21	0.3	< 0.3	< 0.3	< 0.3	< 0.3
Chloride [mg/L]	06-Dec-21	07-Dec-21	1	< 1	< 1	2	2
Nitrite (as N) [mg/L]	29-Nov-21	30-Nov-21	0.03	0.06	0.09	0.07	0.08
Nitrate (as N) [mg/L]	29-Nov-21	30-Nov-21	0.06	0.07	0.06	< 0.06	< 0.06
Thiosulphate [mg/L]	30-Nov-21	14-Dec-21	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tetrathionate [mg/L]	30-Nov-21	14-Dec-21	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ammonia+Ammonium (N) [as N mg/L]	03-Dec-21	06-Dec-21	0.1	0.9	0.9	0.4	0.8
Phosphorus (total reactive) [mg/L]	30-Nov-21	01-Dec-21	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Hardness [mg/L as CaCO3]	30-Nov-21	01-Dec-21	0.05	1370	775	621	286
Aluminum [mg/L]	30-Nov-21	01-Dec-21	0.001	0.016	0.030	0.042	0.030
Antimony [mg/L]	30-Nov-21	01-Dec-21	0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Arsenic [mg/L]	30-Nov-21	01-Dec-21	0.0002	0.0003	< 0.0002	0.0002	< 0.0002
Barium [mg/L]	30-Nov-21	01-Dec-21	0.00002	0.0186	0.0192	0.0124	0.0154
Beryllium [mg/L]	30-Nov-21	01-Dec-21	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth [mg/L]	30-Nov-21	01-Dec-21	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron [mg/L]	30-Nov-21	01-Dec-21	0.002	0.018	0.013	0.013	0.013
Cadmium [mg/L]	30-Nov-21	01-Dec-21	0.000003	0.000011	0.000019	0.000048	0.000023
Calcium [mg/L]	30-Nov-21	01-Dec-21	0.01	486	260	198	81.7
Chromium [mg/L]	30-Nov-21	01-Dec-21	0.00008	< 0.00008	0.00009	< 0.00008	0.00016
Cobalt [mg/L]	30-Nov-21	01-Dec-21	0.000004	0.00167	0.00150	0.00105	0.000911
Copper [mg/L]	30-Nov-21	01-Dec-21	0.0002	0.0013	0.0018	0.0021	0.0022
Iron [mg/L]	30-Nov-21	01-Dec-21	0.007	0.030	0.083	0.241	0.091
Lead [mg/L]	30-Nov-21	01-Dec-21	0.00009	< 0.00009	0.00023	< 0.00009	< 0.00009
Lithium [mg/L]	30-Nov-21	01-Dec-21	0.0001	0.0082	0.0064	0.0015	0.0011
Magnesium [mg/L]	30-Nov-21	01-Dec-21	0.001	37.0	30.7	30.8	20.0
Manganese [mg/L]	30-Nov-21	01-Dec-21	0.00001	0.268	0.157	0.0685	0.0305
Mercury (total) [ug/L]	30-Nov-21	01-Dec-21	0.01	< 0.01	< 0.01	< 0.01	< 0.01

OnLine LIMS

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Project : CEMI
LR Report : **CA15549-NOV21**

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 6	7: T2 Cycle 6	8: T3 Cycle 6	9: T4 Cycle 6
Molybdenum [mg/L]	30-Nov-21	01-Dec-21	0.00004	0.0146	0.00491	0.00285	0.00485
Nickel [mg/L]	30-Nov-21	01-Dec-21	0.0001	0.0009	< 0.0001	< 0.0001	0.0001
Phosphorus [mg/L]	30-Nov-21	01-Dec-21	0.003	< 0.003	< 0.003	< 0.003	< 0.003
Potassium [mg/L]	30-Nov-21	01-Dec-21	0.003	12.8	7.48	2.32	3.22
Selenium [mg/L]	30-Nov-21	01-Dec-21	0.00004	0.00194	0.00129	0.00042	0.00107
Silicon [mg/L]	30-Nov-21	01-Dec-21	0.02	4.87	5.09	4.54	4.40
Silver [mg/L]	30-Nov-21	01-Dec-21	0.00005	< 0.00005	< 0.00005	0.00014	< 0.00005
Sodium [mg/L]	30-Nov-21	01-Dec-21	0.01	5.25	2.87	2.07	4.02
Strontium [mg/L]	30-Nov-21	01-Dec-21	0.00002	11.6	4.12	3.79	0.389
Sulfur [mg/L]	30-Nov-21	01-Dec-21	1	404	240	182	77
Thallium [mg/L]	30-Nov-21	01-Dec-21	0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin [mg/L]	30-Nov-21	01-Dec-21	0.00006	0.0125	0.0230	0.0250	0.0155
Titanium [mg/L]	30-Nov-21	01-Dec-21	0.00005	< 0.00005	< 0.00005	< 0.00005	0.00005
Uranium [mg/L]	30-Nov-21	01-Dec-21	0.000002	0.000668	0.000351	0.000207	0.000247
Vanadium [mg/L]	30-Nov-21	01-Dec-21	0.00001	0.00007	0.00017	0.00014	0.00014
Zinc [mg/L]	30-Nov-21	01-Dec-21	0.002	< 0.002	< 0.002	< 0.002	< 0.002
Zirconium [mg/L]	30-Nov-21	01-Dec-21	0.002	< 0.002	< 0.002	< 0.002	< 0.002

Patti Stark
Project Specialist,
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OnLine LIMS

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Project : CEMI

21-December-2021

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V5A 4W4, Canada

Phone: 604-638-2349
Fax:604-444-5486

Date Rec. : 08 December 2021
LR Report: **CA15247-DEC21**
Reference: Project: Wasamac Tailing (Hemmera) 2117 - PO#: 11491

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CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 8	7: T2 Cycle 8	8: T3 Cycle 8	9: T4 Cycle 8
Sample Date & Time				07-Dec-21	07-Dec-21	07-Dec-21	07-Dec-21
Temperature Upon Receipt [°C]	---	---	---	13.0	13.0	13.0	13.0
Bromide [mg/L]	10-Dec-21	15-Dec-21	0.3	< 0.3	< 0.3	< 0.3	< 0.3
Chloride [mg/L]	15-Dec-21	16-Dec-21	1	< 1	< 1	2	< 1
Nitrite (as N) [mg/L]	10-Dec-21	15-Dec-21	0.03	0.05	0.05	0.05	0.05
Nitrate (as N) [mg/L]	10-Dec-21	15-Dec-21	0.06	0.06	< 0.06	< 0.06	< 0.06
Thiosulphate [mg/L]	09-Dec-21	17-Dec-21	0.2	< 1	< 1	< 1	< 1
Tetrathionate [mg/L]	09-Dec-21	17-Dec-21	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ammonia+Ammonium (N) [as N mg/L]	15-Dec-21	17-Dec-21	0.1	0.6	0.6	0.2	0.5
Phosphorus (total reactive) [mg/L]	10-Dec-21	13-Dec-21	0.03	< 0.03	0.04	< 0.03	< 0.03
Hardness [mg/L as CaCO3]	13-Dec-21	16-Dec-21	0.05	991	334	269	195
Aluminum [mg/L]	13-Dec-21	16-Dec-21	0.001	0.012	0.026	0.034	0.021
Antimony [mg/L]	13-Dec-21	16-Dec-21	0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Arsenic [mg/L]	13-Dec-21	16-Dec-21	0.0002	0.0002	0.0003	0.0002	< 0.0002
Barium [mg/L]	13-Dec-21	16-Dec-21	0.00002	0.0314	0.0211	0.0216	0.0118
Beryllium [mg/L]	13-Dec-21	16-Dec-21	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth [mg/L]	13-Dec-21	16-Dec-21	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron [mg/L]	13-Dec-21	16-Dec-21	0.002	0.013	0.009	0.009	0.010
Cadmium [mg/L]	13-Dec-21	16-Dec-21	0.000003	0.000011	< 0.000003	0.000035	0.000003
Calcium [mg/L]	13-Dec-21	16-Dec-21	0.01	339	99.2	71.7	52.7
Chromium [mg/L]	13-Dec-21	16-Dec-21	0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008
Cobalt [mg/L]	13-Dec-21	16-Dec-21	0.000004	0.00111	0.000778	0.000647	0.000574
Copper [mg/L]	13-Dec-21	16-Dec-21	0.0002	0.0011	0.0010	0.0018	0.0011
Iron [mg/L]	13-Dec-21	16-Dec-21	0.007	0.012	0.079	0.211	0.047
Lead [mg/L]	13-Dec-21	16-Dec-21	0.00009	< 0.00009	0.00014	0.00013	< 0.00009
Lithium [mg/L]	13-Dec-21	16-Dec-21	0.0001	0.0050	0.0039	0.0008	0.0009
Magnesium [mg/L]	13-Dec-21	16-Dec-21	0.001	35.2	21.0	21.9	15.4
Manganese [mg/L]	13-Dec-21	16-Dec-21	0.00001	0.219	0.0733	0.0337	0.0239
Mercury (total) [ug/L]	14-Dec-21	15-Dec-21	0.01	< 0.01	< 0.01	< 0.01	< 0.01

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Project : CEMI
LR Report : **CA15247-DEC21**

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 8	7: T2 Cycle 8	8: T3 Cycle 8	9: T4 Cycle 8
Molybdenum [mg/L]	13-Dec-21	16-Dec-21	0.00004	0.0122	0.00333	0.00251	0.00311
Nickel [mg/L]	13-Dec-21	16-Dec-21	0.0001	0.0009	< 0.0001	< 0.0001	< 0.0001
Phosphorus [mg/L]	13-Dec-21	16-Dec-21	0.003	0.007	< 0.003	< 0.003	< 0.003
Potassium [mg/L]	13-Dec-21	16-Dec-21	0.003	11.2	4.41	1.45	1.92
Selenium [mg/L]	13-Dec-21	16-Dec-21	0.00004	0.00104	0.00103	0.00053	0.00082
Silicon [mg/L]	13-Dec-21	16-Dec-21	0.02	4.12	3.48	3.34	3.06
Silver [mg/L]	13-Dec-21	16-Dec-21	0.00005	< 0.00005	< 0.00005	0.00011	< 0.00005
Sodium [mg/L]	13-Dec-21	16-Dec-21	0.01	3.41	1.43	1.26	2.24
Strontium [mg/L]	13-Dec-21	16-Dec-21	0.00002	9.15	1.87	1.56	0.202
Sulfur [mg/L]	13-Dec-21	16-Dec-21	1	287	100	69	49
Thallium [mg/L]	13-Dec-21	16-Dec-21	0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin [mg/L]	13-Dec-21	16-Dec-21	0.00006	0.0144	0.0226	0.0258	0.0161
Titanium [mg/L]	13-Dec-21	16-Dec-21	0.00005	< 0.00005	0.00031	0.00024	0.00011
Uranium [mg/L]	13-Dec-21	16-Dec-21	0.000002	0.000331	0.000175	0.000107	0.000205
Vanadium [mg/L]	13-Dec-21	16-Dec-21	0.00001	0.00024	0.00030	0.00017	0.00018
Zinc [mg/L]	13-Dec-21	16-Dec-21	0.002	0.002	< 0.002	< 0.002	< 0.002
Zirconium [mg/L]	13-Dec-21	16-Dec-21	0.002	< 0.002	< 0.002	< 0.002	< 0.002

Kimberley Didsbury
Project Specialist,
Environment, Health & Safety

OnLine LIMS

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Project : CEMI

11-January-2022

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Phone: 604-638-2349
Fax:604-444-5486

Date Rec. : 23 December 2021
LR Report: **CA15568-DEC21**
Reference: Project: Wasamac Taling (Hemmera) 2117 - PO# 11539

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CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 10	7: T2 Cycle 10	8: T3 Cycle 10	9: T4 Cycle 10
Sample Date & Time				21-Dec-21	21-Dec-21	21-Dec-21	21-Dec-21
Temperature Upon Receipt [°C]	---	---	---	11.0	11.0	11.0	11.0
Bromide [mg/L]	24-Dec-21	30-Dec-21	0.3	< 0.3	< 0.3	< 0.3	< 0.3
Chloride [mg/L]	29-Dec-21	31-Dec-21	1	< 1	< 1	2	< 1
Nitrite (as N) [mg/L]	24-Dec-21	30-Dec-21	0.03	0.03	0.03	0.03	0.04
Nitrate (as N) [mg/L]	24-Dec-21	30-Dec-21	0.06	< 0.06	< 0.06	< 0.06	< 0.06
Ammonia+Ammonium (N) [as N mg/L]	29-Dec-21	30-Dec-21	0.1	0.4	0.4	0.1	0.4
Phosphorus (total reactive) [mg/L]	24-Dec-21	29-Dec-21	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Thiosulphate [mg/L]	24-Dec-21	30-Dec-21	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tetrathionate [mg/L]	24-Dec-21	30-Dec-21	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Hardness [mg/L as CaCO3]	06-Jan-22	07-Jan-22	0.05	706	313	246	234
Aluminum [mg/L]	06-Jan-22	07-Jan-22	0.001	0.016	0.043	0.062	0.024
Antimony [mg/L]	06-Jan-22	07-Jan-22	0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Arsenic [mg/L]	06-Jan-22	07-Jan-22	0.0002	0.0003	0.0003	0.0003	< 0.0002
Barium [mg/L]	06-Jan-22	07-Jan-22	0.00002	0.0439	0.0300	0.0432	0.0114
Beryllium [mg/L]	06-Jan-22	07-Jan-22	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth [mg/L]	06-Jan-22	07-Jan-22	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron [mg/L]	06-Jan-22	07-Jan-22	0.002	0.010	0.007	0.007	0.009
Cadmium [mg/L]	06-Jan-22	07-Jan-22	0.000003	0.000010	< 0.000003	0.000009	< 0.000003
Calcium [mg/L]	06-Jan-22	07-Jan-22	0.01	236	89.5	64.6	66.4
Chromium [mg/L]	06-Jan-22	07-Jan-22	0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008
Cobalt [mg/L]	06-Jan-22	07-Jan-22	0.000004	0.000696	0.000691	0.000606	0.000544
Copper [mg/L]	06-Jan-22	07-Jan-22	0.0002	0.0019	0.0012	0.0013	0.0010
Iron [mg/L]	06-Jan-22	07-Jan-22	0.007	0.011	0.074	0.161	0.035
Lead [mg/L]	06-Jan-22	07-Jan-22	0.00009	< 0.00009	0.00010	< 0.00009	< 0.00009
Lithium [mg/L]	06-Jan-22	07-Jan-22	0.0001	0.0081	0.0070	0.0032	0.0027
Magnesium [mg/L]	06-Jan-22	07-Jan-22	0.001	28.1	21.8	20.6	16.6
Manganese [mg/L]	06-Jan-22	07-Jan-22	0.00001	0.125	0.0667	0.0334	0.0311
Mercury (total) [ug/L]	05-Jan-22	05-Jan-22	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Molybdenum [mg/L]	06-Jan-22	07-Jan-22	0.00004	0.0113	0.00323	0.00384	0.00293
Nickel [mg/L]	06-Jan-22	07-Jan-22	0.0001	0.0005	< 0.0001	< 0.0001	0.0001
Phosphorus [mg/L]	06-Jan-22	07-Jan-22	0.003	< 0.003	< 0.003	< 0.003	< 0.003
Potassium [mg/L]	06-Jan-22	07-Jan-22	0.003	8.44	4.58	1.64	1.96
Selenium [mg/L]	06-Jan-22	07-Jan-22	0.00004	0.00072	0.00057	0.00039	0.00049

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Project : CEMI
LR Report : **CA15568-DEC21**

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 10	7: T2 Cycle 10	8: T3 Cycle 10	9: T4 Cycle 10
Silicon [mg/L]	06-Jan-22	07-Jan-22	0.02	3.97	4.29	4.13	3.76
Silver [mg/L]	06-Jan-22	07-Jan-22	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium [mg/L]	06-Jan-22	07-Jan-22	0.01	2.30	1.18	1.08	1.95
Strontium [mg/L]	06-Jan-22	07-Jan-22	0.00002	7.71	1.55	1.32	0.235
Sulfur [mg/L]	06-Jan-22	07-Jan-22	1	164	67	40	50
Thallium [mg/L]	06-Jan-22	07-Jan-22	0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin [mg/L]	06-Jan-22	07-Jan-22	0.00006	0.0128	0.0210	0.0267	0.0164
Titanium [mg/L]	06-Jan-22	07-Jan-22	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Uranium [mg/L]	06-Jan-22	07-Jan-22	0.000002	0.000187	0.000104	0.000070	0.000149
Vanadium [mg/L]	06-Jan-22	07-Jan-22	0.00001	0.00007	0.00021	0.00009	0.00009
Zinc [mg/L]	06-Jan-22	07-Jan-22	0.002	< 0.002	< 0.002	< 0.002	< 0.002
Zirconium [mg/L]	06-Jan-22	07-Jan-22	0.002	< 0.002	< 0.002	< 0.002	< 0.002

Patti Stark
Project Specialist,
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OnLine LIMS

00027679995

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Project : CEMI

18-January-2022

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Date Rec. : 06 January 2022
LR Report: **CA15022-JAN22**
Reference: Project:Wasamac Tailing (Hemmera) 2117 - PO#11570

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 12	7: T2 Cycle 12	8: T3 Cycle 12	9: T4 Cycle 12
Sample Date & Time				04-Jan-22	04-Jan-22	04-Jan-22	04-Jan-22
Temperature Upon Receipt [°C]	---	---	---	11.0	11.0	11.0	11.0
Bromide [mg/L]	07-Jan-22	11-Jan-22	0.3	< 0.3	< 0.3	< 0.3	< 0.3
Chloride [mg/L]	10-Jan-22	13-Jan-22	1	9	< 1	2	< 1
Nitrite (as N) [mg/L]	07-Jan-22	11-Jan-22	0.03	0.03	< 0.03	0.03	0.03
Nitrate (as N) [mg/L]	07-Jan-22	11-Jan-22	0.06	< 0.06	< 0.06	< 0.06	< 0.06
Thiosulphate [mg/L]	11-Jan-22	14-Jan-22	0.2	< 1	< 1	< 1	< 1
Tetrathionate [mg/L]	11-Jan-22	14-Jan-22	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ammonia+Ammonium (N) [as N mg/L]	10-Jan-22	12-Jan-22	0.1	0.3	0.3	< 0.1	0.3
Phosphorus (total reactive) [mg/L]	12-Jan-22	12-Jan-22	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Hardness [mg/L as CaCO3]	10-Jan-22	12-Jan-22	0.05	499	341	204	210
Aluminum [mg/L]	10-Jan-22	12-Jan-22	0.001	0.013	0.021	0.039	0.026
Antimony [mg/L]	10-Jan-22	12-Jan-22	0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Arsenic [mg/L]	10-Jan-22	12-Jan-22	0.0002	0.0002	0.0003	0.0002	< 0.0002
Barium [mg/L]	10-Jan-22	12-Jan-22	0.00002	0.0639	0.0448	0.0605	0.0105
Beryllium [mg/L]	10-Jan-22	12-Jan-22	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth [mg/L]	10-Jan-22	12-Jan-22	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron [mg/L]	10-Jan-22	12-Jan-22	0.002	0.008	0.007	0.006	0.006
Cadmium [mg/L]	10-Jan-22	12-Jan-22	0.000003	0.000012	0.000003	0.000010	0.000004
Calcium [mg/L]	10-Jan-22	12-Jan-22	0.01	162	94.9	50.5	60.2
Chromium [mg/L]	10-Jan-22	12-Jan-22	0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008
Cobalt [mg/L]	10-Jan-22	12-Jan-22	0.000004	0.000567	0.000633	0.000575	0.000417
Copper [mg/L]	10-Jan-22	12-Jan-22	0.0002	0.0013	0.0010	0.0013	0.0009
Iron [mg/L]	10-Jan-22	12-Jan-22	0.007	0.009	0.039	0.202	0.021
Lead [mg/L]	10-Jan-22	12-Jan-22	0.00009	< 0.00009	< 0.00009	< 0.00009	0.00009
Lithium [mg/L]	10-Jan-22	12-Jan-22	0.0001	0.0039	0.0038	0.0007	0.0013
Magnesium [mg/L]	10-Jan-22	12-Jan-22	0.001	22.8	25.3	18.8	14.5
Manganese [mg/L]	10-Jan-22	12-Jan-22	0.00001	0.104	0.113	0.0320	0.0365
Mercury (total) [ug/L]	10-Jan-22	11-Jan-22	0.01	< 0.01	< 0.01	< 0.01	< 0.01

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Project : CEMI
LR Report : **CA15022-JAN22**

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 12	7: T2 Cycle 12	8: T3 Cycle 12	9: T4 Cycle 12
Molybdenum [mg/L]	10-Jan-22	12-Jan-22	0.00004	0.00902	0.00217	0.00221	0.00173
Nickel [mg/L]	10-Jan-22	12-Jan-22	0.0001	0.0005	0.0002	0.0001	0.0005
Phosphorus [mg/L]	10-Jan-22	12-Jan-22	0.003	< 0.003	< 0.003	0.004	0.003
Potassium [mg/L]	10-Jan-22	12-Jan-22	0.003	7.17	4.92	1.52	1.61
Selenium [mg/L]	10-Jan-22	12-Jan-22	0.00004	0.00067	0.00032	0.00030	0.00036
Silicon [mg/L]	10-Jan-22	12-Jan-22	0.02	3.73	4.15	3.69	3.62
Silver [mg/L]	10-Jan-22	12-Jan-22	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium [mg/L]	10-Jan-22	12-Jan-22	0.01	1.78	1.02	0.94	1.48
Strontium [mg/L]	10-Jan-22	12-Jan-22	0.00002	6.16	1.40	0.991	0.186
Sulfur [mg/L]	10-Jan-22	12-Jan-22	1	90	63	24	37
Thallium [mg/L]	10-Jan-22	12-Jan-22	0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin [mg/L]	10-Jan-22	12-Jan-22	0.00006	0.0138	0.0234	0.0265	0.0199
Titanium [mg/L]	10-Jan-22	12-Jan-22	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Uranium [mg/L]	10-Jan-22	12-Jan-22	0.000002	0.000167	0.000093	0.000067	0.000143
Vanadium [mg/L]	10-Jan-22	12-Jan-22	0.00001	0.00006	0.00014	0.00008	0.00006
Zinc [mg/L]	10-Jan-22	12-Jan-22	0.002	< 0.002	< 0.002	< 0.002	0.003
Zirconium [mg/L]	10-Jan-22	12-Jan-22	0.002	< 0.002	< 0.002	< 0.002	< 0.002

Note:
- Results for analyses performed outside of standard holding times may be unreliable. Due to a lab oversight, the samples were processed past the standard holding time for Phosphorus (total reactive) analysis.
- Reporting limit for Thiosulphate was elevated.

Patti Stark
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0002775427

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Project : CEMI

28-January-2022

SGS Canada Inc.
Attn : Noelene Ahern

Suite F, 3260 Production Way
Burnaby, BC
V5A 4W4, Canada

Phone: 604-638-2349
Fax:604-444-5486

Date Rec. : 19 January 2022
LR Report: **CA15226-JAN22**
Reference: Project:Wasamac Tailing (Hemmera) - PO#11601

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CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 14	7: T2 Cycle 14	8: T3 Cycle 14	9: T4 Cycle 14
Sample Date & Time				18-Jan-22	18-Jan-22	18-Jan-22	18-Jan-22
Temperature Upon Receipt [°C]	---	---	---	12.0	12.0	12.0	12.0
Thiosulphate [mg/L]	24-Jan-22	27-Jan-22	1	< 1	< 1	< 1	< 1
Tetrathionate [mg/L]	24-Jan-22	27-Jan-22	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bromide [mg/L]	20-Jan-22	24-Jan-22	0.3	< 0.3	< 0.3	< 0.3	< 0.3
Chloride [mg/L]	25-Jan-22	25-Jan-22	1	< 1	< 1	< 1	< 1
Nitrite (as N) [mg/L]	20-Jan-22	24-Jan-22	0.03	< 0.03	< 0.03	< 0.03	0.05
Nitrate (as N) [mg/L]	20-Jan-22	24-Jan-22	0.06	< 0.06	< 0.06	< 0.06	< 0.06
Ammonia+Ammonium (N) [as N mg/L]	26-Jan-22	27-Jan-22	0.1	0.4	0.3	0.1	0.3
Phosphorus (total reactive) [mg/L]	24-Jan-22	25-Jan-22	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Hardness [mg/L as CaCO3]	27-Jan-22	28-Jan-22	0.05	465	336	185	216
Aluminum [mg/L]	27-Jan-22	28-Jan-22	0.001	0.017	0.025	0.046	0.025
Antimony [mg/L]	27-Jan-22	28-Jan-22	0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Arsenic [mg/L]	27-Jan-22	28-Jan-22	0.0002	0.0003	0.0003	0.0002	< 0.0002
Barium [mg/L]	27-Jan-22	28-Jan-22	0.00002	0.0664	0.0522	0.0857	0.0114
Beryllium [mg/L]	27-Jan-22	28-Jan-22	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth [mg/L]	27-Jan-22	28-Jan-22	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron [mg/L]	27-Jan-22	28-Jan-22	0.002	0.008	0.006	0.005	0.007
Cadmium [mg/L]	27-Jan-22	28-Jan-22	0.000003	0.000070	0.000011	0.000285	0.000003
Calcium [mg/L]	27-Jan-22	28-Jan-22	0.01	139	85.8	41.2	60.4
Chromium [mg/L]	27-Jan-22	28-Jan-22	0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008
Cobalt [mg/L]	27-Jan-22	28-Jan-22	0.000004	0.000464	0.000495	0.000409	0.000384
Copper [mg/L]	27-Jan-22	28-Jan-22	0.0002	0.0009	0.0009	0.0013	0.0010
Iron [mg/L]	27-Jan-22	28-Jan-22	0.007	0.016	0.084	0.250	0.060
Lead [mg/L]	27-Jan-22	28-Jan-22	0.00009	< 0.00009	0.00012	< 0.00009	< 0.00009
Lithium [mg/L]	27-Jan-22	28-Jan-22	0.0001	0.0041	0.0040	0.0010	0.0011
Magnesium [mg/L]	27-Jan-22	28-Jan-22	0.001	28.7	29.6	20.0	15.8
Manganese [mg/L]	27-Jan-22	28-Jan-22	0.00001	0.0964	0.110	0.0299	0.0352
Mercury (total) [ug/L]	26-Jan-22	28-Jan-22	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Molybdenum [mg/L]	27-Jan-22	28-Jan-22	0.00004	0.00925	0.00237	0.00157	0.00219

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Project : CEMI
LR Report : **CA15226-JAN22**

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 14	7: T2 Cycle 14	8: T3 Cycle 14	9: T4 Cycle 14
Nickel [mg/L]	27-Jan-22	28-Jan-22	0.0001	0.0004	< 0.0001	< 0.0001	0.0001
Phosphorus [mg/L]	27-Jan-22	28-Jan-22	0.003	< 0.003	< 0.003	< 0.003	< 0.003
Potassium [mg/L]	27-Jan-22	28-Jan-22	0.003	7.88	5.57	1.47	1.57
Selenium [mg/L]	27-Jan-22	28-Jan-22	0.00004	0.00069	0.00033	0.00029	0.00065
Silicon [mg/L]	27-Jan-22	28-Jan-22	0.02	3.90	5.03	3.64	4.42
Silver [mg/L]	27-Jan-22	28-Jan-22	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium [mg/L]	27-Jan-22	28-Jan-22	0.01	1.69	0.96	0.89	1.39
Strontium [mg/L]	27-Jan-22	28-Jan-22	0.00002	7.47	1.20	0.922	0.199
Sulfur [mg/L]	27-Jan-22	28-Jan-22	1	112	86	25	49
Thallium [mg/L]	27-Jan-22	28-Jan-22	0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin [mg/L]	27-Jan-22	28-Jan-22	0.00006	0.0151	0.0242	0.0219	0.0223
Titanium [mg/L]	27-Jan-22	28-Jan-22	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Uranium [mg/L]	27-Jan-22	28-Jan-22	0.000002	0.000188	0.000136	0.000061	0.000201
Vanadium [mg/L]	27-Jan-22	28-Jan-22	0.00001	0.00007	0.00013	0.00009	0.00013
Zinc [mg/L]	27-Jan-22	28-Jan-22	0.002	< 0.002	< 0.002	0.003	< 0.002
Zirconium [mg/L]	27-Jan-22	28-Jan-22	0.002	< 0.002	< 0.002	< 0.002	< 0.002

Note: Reporting limit for Thiosulphate was elevated.

Patti Stark
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0002785798

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Project : CEMI

02-March-2022

SGS Canada Inc.
Attn : Noelene Ahern

Suite F, 3260 Production Way
Burnaby, BC
V5A 4W4, Canada

Phone: 604-638-2349
Fax:604-444-5486

Date Rec. : 18 February 2022
LR Report: **CA15328-FEB22**
Reference: Project:Wasamac Tailing {Hemmera} 2117 - PO#11684

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CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 18	7: T2 Cycle 18	8: T3 Cycle 18	9: T4 Cycle 18
Sample Date & Time				15-Feb-22	15-Feb-22	15-Feb-22	15-Feb-22
Temperature Upon Receipt [°C]	---	---	---	15.0	15.0	15.0	15.0
Bromide [mg/L]	22-Feb-22	25-Feb-22	0.3	< 0.3	< 0.3	< 0.3	< 0.3
Chloride [mg/L]	28-Feb-22	28-Feb-22	1	< 1	< 1	< 1	< 1
Nitrite (as N) [mg/L]	22-Feb-22	25-Feb-22	0.03	< 0.03	< 0.03	0.04	< 0.03
Nitrate (as N) [mg/L]	22-Feb-22	25-Feb-22	0.06	< 0.06	< 0.06	< 0.06	< 0.06
Ammonia+Ammonium (N) [as N mg/L]	22-Feb-22	23-Feb-22	0.1	0.2	0.2	< 0.1	< 0.1
Phosphorus (total reactive) [mg/L]	22-Feb-22	23-Feb-22	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Thiosulphate [mg/L]	22-Feb-22	26-Feb-22		< 0.2	< 0.2	< 0.2	< 0.2
Tetrathionate [mg/L]	22-Feb-22	26-Feb-22		< 0.2	< 0.2	< 0.2	< 0.2
Hardness [mg/L as CaCO3]	24-Feb-22	01-Mar-22	0.05	327	176	182	247
Aluminum [mg/L]	24-Feb-22	01-Mar-22	0.001	0.015	0.034	0.042	0.020
Antimony [mg/L]	24-Feb-22	01-Mar-22	0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Arsenic [mg/L]	24-Feb-22	01-Mar-22	0.0002	0.0003	0.0003	0.0003	0.0003
Barium [mg/L]	24-Feb-22	01-Mar-22	0.00002	0.0591	0.0369	0.0806	0.0120
Beryllium [mg/L]	24-Feb-22	01-Mar-22	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth [mg/L]	24-Feb-22	01-Mar-22	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron [mg/L]	24-Feb-22	01-Mar-22	0.002	0.005	0.004	0.004	0.006
Cadmium [mg/L]	24-Feb-22	01-Mar-22	0.000003	0.000005	0.000008	0.000017	0.000095
Calcium [mg/L]	24-Feb-22	01-Mar-22	0.01	92.4	43.7	39.3	70.1
Chromium [mg/L]	24-Feb-22	01-Mar-22	0.00008	0.00011	0.00009	0.00008	0.00011
Cobalt [mg/L]	24-Feb-22	01-Mar-22	0.000004	0.000427	0.000403	0.000542	0.000371
Copper [mg/L]	24-Feb-22	01-Mar-22	0.0002	0.0006	0.0007	0.0011	0.0007
Iron [mg/L]	24-Feb-22	01-Mar-22	0.007	0.011	0.130	0.198	0.021
Lead [mg/L]	24-Feb-22	01-Mar-22	0.00009	0.00041	0.00009	< 0.00009	< 0.00009
Lithium [mg/L]	24-Feb-22	01-Mar-22	0.0001	0.0022	0.0018	0.0004	0.0008
Magnesium [mg/L]	24-Feb-22	01-Mar-22	0.001	23.3	16.3	20.4	17.6
Manganese [mg/L]	24-Feb-22	01-Mar-22	0.00001	0.0855	0.0546	0.0337	0.0457
Mercury (total) [ug/L]	28-Feb-22	01-Mar-22	0.01	< 0.01	< 0.01	< 0.01	< 0.01

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Project : CEMI
LR Report : **CA15328-FEB22**

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 18	7: T2 Cycle 18	8: T3 Cycle 18	9: T4 Cycle 18
Molybdenum [mg/L]	24-Feb-22	01-Mar-22	0.00004	0.0130	0.00251	0.00317	0.00189
Nickel [mg/L]	24-Feb-22	01-Mar-22	0.0001	0.0003	< 0.0001	< 0.0001	0.0002
Phosphorus [mg/L]	24-Feb-22	01-Mar-22	0.003	< 0.003	< 0.003	< 0.003	< 0.003
Potassium [mg/L]	24-Feb-22	01-Mar-22	0.003	8.78	4.70	1.33	1.43
Selenium [mg/L]	24-Feb-22	01-Mar-22	0.00004	0.00103	0.00065	0.00029	0.00145
Silicon [mg/L]	24-Feb-22	01-Mar-22	0.02	3.33	3.55	3.47	2.91
Silver [mg/L]	24-Feb-22	01-Mar-22	0.00005	< 0.00005	< 0.00005	< 0.00005	0.00006
Sodium [mg/L]	24-Feb-22	01-Mar-22	0.01	1.55	0.80	0.92	1.39
Strontium [mg/L]	24-Feb-22	01-Mar-22	0.00002	4.04	0.547	0.640	0.190
Sulfur [mg/L]	24-Feb-22	01-Mar-22	1	65	24	23	49
Thallium [mg/L]	24-Feb-22	01-Mar-22	0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin [mg/L]	24-Feb-22	01-Mar-22	0.00006	0.0135	0.0191	0.0229	0.0200
Titanium [mg/L]	24-Feb-22	01-Mar-22	0.00005	< 0.00005	0.00005	< 0.00005	< 0.00005
Uranium [mg/L]	24-Feb-22	01-Mar-22	0.000002	0.000107	0.000062	0.000055	0.000139
Vanadium [mg/L]	24-Feb-22	01-Mar-22	0.00001	0.00009	0.00015	0.00007	0.00009
Zinc [mg/L]	24-Feb-22	01-Mar-22	0.002	< 0.002	< 0.002	< 0.002	< 0.002
Zirconium [mg/L]	24-Feb-22	01-Mar-22	0.002	< 0.002	< 0.002	< 0.002	< 0.002

Patti Stark
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0002815767

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Project : CEMI

28-March-2022

SGS Canada Inc.
Attn : Noelene Ahern

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V5A 4W4, Canada

Phone: 604-638-2349
Fax:604-444-5486

Date Rec. : 16 March 2022
LR Report: **CA15345-MAR22**
Reference: Project: Wasamac Tailing {Hemmera} 2117 - PO# 11763

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CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 22	7: T2 Cycle 22	8: T3 Cycle 22	9: T4 Cycle 22
Sample Date & Time				15-Mar-22	15-Mar-22	15-Mar-22	15-Mar-22
Temperature Upon Receipt [°C]	---	---	---	15.0	15.0	15.0	15.0
Bromide [mg/L]	17-Mar-22	21-Mar-22	0.3	< 0.3	< 0.3	< 0.3	< 0.3
Chloride [mg/L]	22-Mar-22	22-Mar-22	1	< 1	< 1	1	< 1
Nitrite (as N) [mg/L]	17-Mar-22	21-Mar-22	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N) [mg/L]	17-Mar-22	21-Mar-22	0.06	< 0.06	< 0.06	< 0.06	< 0.06
Thiosulphate [mg/L]	22-Mar-22	28-Mar-22	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tetrathionate [mg/L]	22-Mar-22	28-Mar-22	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Phosphorus (total reactive) [mg/L]	18-Mar-22	21-Mar-22	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Ammonia+Ammonium (N) [as N mg/L]	21-Mar-22	22-Mar-22	0.1	0.2	0.2	< 0.1	< 0.1
Hardness [mg/L as CaCO3]	21-Mar-22	23-Mar-22	0.05	244	144	154	203
Aluminum [mg/L]	21-Mar-22	23-Mar-22	0.001	0.018	0.040	0.041	0.024
Antimony [mg/L]	21-Mar-22	23-Mar-22	0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Arsenic [mg/L]	21-Mar-22	23-Mar-22	0.0002	0.0003	0.0002	< 0.0002	0.0003
Barium [mg/L]	21-Mar-22	23-Mar-22	0.00002	0.0657	0.0425	0.0796	0.00883
Beryllium [mg/L]	21-Mar-22	23-Mar-22	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth [mg/L]	21-Mar-22	23-Mar-22	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron [mg/L]	21-Mar-22	23-Mar-22	0.002	0.004	0.004	0.003	0.004
Cadmium [mg/L]	21-Mar-22	23-Mar-22	0.000003	0.000030	0.000003	0.000005	0.000010
Calcium [mg/L]	21-Mar-22	23-Mar-22	0.01	67.8	34.7	32.2	55.5
Chromium [mg/L]	21-Mar-22	23-Mar-22	0.00008	< 0.00008	< 0.00008	< 0.00008	0.00010
Cobalt [mg/L]	21-Mar-22	23-Mar-22	0.000004	0.000336	0.000499	0.000494	0.000355
Copper [mg/L]	21-Mar-22	23-Mar-22	0.0002	0.0011	0.0012	0.0011	0.0008
Iron [mg/L]	21-Mar-22	23-Mar-22	0.007	0.032	0.332	0.440	0.067
Lead [mg/L]	21-Mar-22	23-Mar-22	0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Lithium [mg/L]	21-Mar-22	23-Mar-22	0.0001	0.0021	0.0019	0.0005	0.0009
Magnesium [mg/L]	21-Mar-22	23-Mar-22	0.001	18.2	13.8	17.8	15.8
Manganese [mg/L]	21-Mar-22	23-Mar-22	0.00001	0.0502	0.0379	0.0275	0.0345
Mercury (total) [ug/L]	21-Mar-22	21-Mar-22	0.01	< 0.01	< 0.01	< 0.01	< 0.01

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Project : CEMI
LR Report : **CA15345-MAR22**

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 22	7: T2 Cycle 22	8: T3 Cycle 22	9: T4 Cycle 22
Molybdenum [mg/L]	21-Mar-22	23-Mar-22	0.00004	0.0165	0.00220	0.00212	0.0206
Nickel [mg/L]	21-Mar-22	23-Mar-22	0.0001	0.0002	< 0.0001	< 0.0001	0.0001
Phosphorus [mg/L]	21-Mar-22	23-Mar-22	0.003	< 0.003	< 0.003	< 0.003	< 0.003
Potassium [mg/L]	21-Mar-22	23-Mar-22	0.003	7.95	4.21	1.26	1.27
Selenium [mg/L]	21-Mar-22	23-Mar-22	0.00004	0.00046	0.00031	0.00021	0.00153
Silicon [mg/L]	21-Mar-22	23-Mar-22	0.02	3.70	3.98	3.47	3.57
Silver [mg/L]	21-Mar-22	23-Mar-22	0.00005	< 0.00005	< 0.00005	< 0.00005	0.00010
Sodium [mg/L]	21-Mar-22	23-Mar-22	0.01	1.27	0.68	0.80	1.08
Strontium [mg/L]	21-Mar-22	23-Mar-22	0.00002	3.22	0.434	0.488	0.133
Sulfur [mg/L]	21-Mar-22	23-Mar-22	1	44	17	15	38
Thallium [mg/L]	21-Mar-22	23-Mar-22	0.000005	0.000005	< 0.000005	< 0.000005	< 0.000005
Tin [mg/L]	21-Mar-22	23-Mar-22	0.00006	0.0133	0.0211	0.0177	0.0176
Titanium [mg/L]	21-Mar-22	23-Mar-22	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Uranium [mg/L]	21-Mar-22	23-Mar-22	0.000002	0.000092	0.000067	0.000042	0.000129
Vanadium [mg/L]	21-Mar-22	23-Mar-22	0.00001	0.00005	0.00016	0.00006	0.00008
Zinc [mg/L]	21-Mar-22	23-Mar-22	0.002	< 0.002	< 0.002	< 0.002	0.002
Zirconium [mg/L]	21-Mar-22	23-Mar-22	0.002	< 0.002	< 0.002	< 0.002	< 0.002

Patti Stark
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0002843483

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Project : CEMI

11-May-2022

SGS Canada Inc.
Attn : Noelene Ahern

Suite F, 3260 Production Way
Burnaby, BC
V5A 4W4, Canada

Phone: 604-638-2349
Fax:604-444-5486

Date Rec. : 14 April 2022
LR Report: **CA15273-APR22**
Reference: Project: Wasamac Tailing {Hemmera} 2117 - PO# 11847

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 26	7: T2 Cycle 26	8: T3 Cycle 26	9: T4 Cycle 26
Sample Date & Time				12-Apr-22	12-Apr-22	12-Apr-22	12-Apr-22
Temperature Upon Receipt [°C]	---	---	---	16.0	16.0	16.0	16.0
Bromide [mg/L]	19-Apr-22	22-Apr-22	0.3	< 0.3	< 0.3	< 0.3	< 0.3
Chloride [mg/L]	28-Apr-22	28-Apr-22	1	< 1	< 1	< 1	< 1
Nitrite (as N) [mg/L]	19-Apr-22	22-Apr-22	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N) [mg/L]	19-Apr-22	22-Apr-22	0.06	< 0.06	< 0.06	< 0.06	< 0.06
Ammonia+Ammonium (N) [as N mg/L]	20-Apr-22	21-Apr-22	0.1	0.2	0.2	0.1	< 0.1
Phosphorus (total reactive) [mg/L]	18-Apr-22	19-Apr-22	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Thiosulphate [mg/L]	27-Apr-22	04-May-22	0.2	< 1	< 1	< 1	< 1
Tetrathionate [mg/L]	27-Apr-22	04-May-22	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Hardness [mg/L as CaCO3]	27-Apr-22	11-May-22	0.05	163	126	120	187
Aluminum [mg/L]	27-Apr-22	28-Apr-22	0.001	0.023	0.044	0.041	0.031
Antimony [mg/L]	27-Apr-22	28-Apr-22	0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Arsenic [mg/L]	27-Apr-22	28-Apr-22	0.0002	0.0003	0.0003	< 0.0002	0.0002
Barium [mg/L]	27-Apr-22	28-Apr-22	0.00002	0.0680	0.0500	0.112	0.0090
Beryllium [mg/L]	27-Apr-22	28-Apr-22	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth [mg/L]	27-Apr-22	28-Apr-22	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron [mg/L]	27-Apr-22	28-Apr-22	0.002	0.003	0.005	0.004	0.003
Cadmium [mg/L]	27-Apr-22	28-Apr-22	0.000003	0.000040	0.000018	0.000035	0.000011
Calcium [mg/L]	27-Apr-22	28-Apr-22	0.01	42.4	30.8	23.6	48.1
Chromium [mg/L]	27-Apr-22	28-Apr-22	0.00008	< 0.00008	< 0.00008	< 0.00008	0.00010
Cobalt [mg/L]	27-Apr-22	28-Apr-22	0.000004	0.000315	0.000507	0.000456	0.000367
Copper [mg/L]	27-Apr-22	28-Apr-22	0.0002	0.0009	0.0015	0.0014	0.0010
Iron [mg/L]	27-Apr-22	28-Apr-22	0.007	0.086	0.393	0.506	0.306
Lead [mg/L]	27-Apr-22	28-Apr-22	0.00009	0.00010	< 0.00009	< 0.00009	< 0.00009
Lithium [mg/L]	27-Apr-22	28-Apr-22	0.0001	0.0015	0.0018	0.0005	0.0011
Magnesium [mg/L]	27-Apr-22	11-May-22	0.001	13.9	12.1	14.7	16.2
Manganese [mg/L]	27-Apr-22	28-Apr-22	0.00001	0.0359	0.0371	0.0222	0.0281
Mercury (total) [ug/L]	22-Apr-22	22-Apr-22	0.01	< 0.01	< 0.01	< 0.01	< 0.01

OnLine LIMS

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Project : CEMI
LR Report : **CA15273-APR22**

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 26	7: T2 Cycle 26	8: T3 Cycle 26	9: T4 Cycle 26
Molybdenum [mg/L]	27-Apr-22	28-Apr-22	0.00004	0.0153	0.00118	0.00126	0.0431
Nickel [mg/L]	27-Apr-22	28-Apr-22	0.0001	0.0002	0.0001	< 0.0001	0.0001
Phosphorus [mg/L]	27-Apr-22	28-Apr-22	0.003	< 0.003	< 0.003	< 0.003	< 0.003
Potassium [mg/L]	27-Apr-22	28-Apr-22	0.003	5.75	3.60	0.915	0.994
Selenium [mg/L]	27-Apr-22	28-Apr-22	0.00004	0.00046	0.00098	0.00037	0.00109
Silicon [mg/L]	27-Apr-22	28-Apr-22	0.02	3.03	3.33	2.89	3.26
Silver [mg/L]	27-Apr-22	28-Apr-22	0.00005	< 0.00005	< 0.00005	< 0.00005	0.00019
Sodium [mg/L]	27-Apr-22	28-Apr-22	0.01	0.88	0.59	0.66	0.87
Strontium [mg/L]	27-Apr-22	28-Apr-22	0.00002	2.45	0.435	0.420	0.136
Sulfur [mg/L]	27-Apr-22	28-Apr-22	1	31	17	11	41
Thallium [mg/L]	27-Apr-22	28-Apr-22	0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin [mg/L]	27-Apr-22	28-Apr-22	0.00006	0.0112	0.0175	0.0164	0.0169
Titanium [mg/L]	27-Apr-22	28-Apr-22	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Uranium [mg/L]	27-Apr-22	28-Apr-22	0.000002	0.000083	0.000069	0.000035	0.000143
Vanadium [mg/L]	27-Apr-22	28-Apr-22	0.00001	0.00007	0.00020	0.00004	0.00009
Zinc [mg/L]	27-Apr-22	28-Apr-22	0.002	< 0.002	< 0.002	< 0.002	< 0.002
Zirconium [mg/L]	27-Apr-22	28-Apr-22	0.002	< 0.002	< 0.002	< 0.002	< 0.002

Patti Stark
Project Specialist,
Environment, Health & Safety

OnLine LIMS

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Project : CEMI

20-May-2022

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Phone: 604-638-2349
Fax:604-444-5486

Date Rec. : 11 May 2022
LR Report: **CA15143-MAY22**
Reference: Project: Wasamac Tailing {Hemmera} 2117 - PO# 11929

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 30	7: T2 Cycle 30	8: T3 Cycle 30	9: T4 Cycle 30
Sample Date & Time				10-May-22	10-May-22	10-May-22	10-May-22
Temperature Upon Receipt [°C]	---	---	---	16.0	16.0	16.0	16.0
Bromide [mg/L]	13-May-22	16-May-22	0.3	< 0.3	< 0.3	< 0.3	< 0.3
Chloride [mg/L]	20-May-22	20-May-22	1	< 1	< 1	< 1	< 1
Nitrite (as N) [mg/L]	13-May-22	16-May-22	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N) [mg/L]	13-May-22	16-May-22	0.06	< 0.06	< 0.06	< 0.06	< 0.06
Ammonia+Ammonium (N) [as N mg/L]	17-May-22	18-May-22	0.1	0.2	0.2	< 0.1	< 0.1
Phosphorus (total reactive) [mg/L]	16-May-22	17-May-22	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Hardness [mg/L as CaCO3]	15-May 22	18-May-22	0.05	177	175	128	224
Aluminum [mg/L]	15-May 22	18-May-22	0.001	0.027	0.042	0.045	0.025
Antimony [mg/L]	15-May 22	18-May-22	0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Arsenic [mg/L]	15-May 22	18-May-22	0.0002	0.0003	< 0.0002	< 0.0002	< 0.0002
Barium [mg/L]	15-May 22	18-May-22	0.00002	0.0847	0.0710	0.157	0.0120
Beryllium [mg/L]	15-May 22	18-May-22	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth [mg/L]	15-May 22	18-May-22	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron [mg/L]	15-May 22	18-May-22	0.002	0.007	0.007	0.006	0.007
Cadmium [mg/L]	15-May 22	18-May-22	0.000003	0.000018	0.000180	0.000033	0.000127
Calcium [mg/L]	15-May 22	18-May-22	0.01	47.2	43.8	25.3	57.6
Chromium [mg/L]	15-May 22	18-May-22	0.00008	0.00015	0.00012	0.00010	0.00019
Cobalt [mg/L]	15-May 22	18-May-22	0.000004	0.000296	0.000466	0.000355	0.000319
Copper [mg/L]	15-May 22	18-May-22	0.0002	0.0009	0.0007	0.0019	0.0010
Iron [mg/L]	15-May 22	18-May-22	0.007	0.100	0.238	0.348	0.333
Lead [mg/L]	15-May 22	18-May-22	0.00009	< 0.00009	0.00022	< 0.00009	0.00019
Lithium [mg/L]	15-May 22	18-May-22	0.0001	0.0041	0.0049	0.0012	0.0035
Magnesium [mg/L]	15-May 22	18-May-22	0.001	14.5	16.1	15.7	19.5
Manganese [mg/L]	15-May 22	18-May-22	0.00001	0.0398	0.0525	0.0229	0.0294
Mercury (total) [ug/L]	15-May-22	16-May-22	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Molybdenum [mg/L]	15-May 22	18-May-22	0.00004	0.0127	0.00354	0.00147	0.0437
Nickel [mg/L]	15-May 22	18-May-22	0.0001	0.0002	< 0.0001	< 0.0001	0.0002

OnLine LIMS

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Project : CEMI
LR Report : **CA15143-MAY22**

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 30	7: T2 Cycle 30	8: T3 Cycle 30	9: T4 Cycle 30
Phosphorus [mg/L]	15-May 22	18-May-22	0.003	< 0.003	< 0.003	< 0.003	< 0.003
Potassium [mg/L]	15-May 22	18-May-22	0.003	6.87	4.86	1.04	1.22
Selenium [mg/L]	15-May 22	18-May-22	0.00004	0.00030	0.00023	0.00019	0.00034
Silicon [mg/L]	15-May 22	18-May-22	0.02	4.57	4.71	4.15	4.66
Silver [mg/L]	15-May 22	18-May-22	0.00005	< 0.00005	< 0.00005	< 0.00005	0.00006
Sodium [mg/L]	15-May 22	18-May-22	0.01	0.94	0.55	0.64	0.77
Strontium [mg/L]	15-May 22	18-May-22	0.00002	2.02	0.456	0.367	0.145
Sulfur [mg/L]	15-May 22	18-May-22	1	38	38	13	47
Thallium [mg/L]	15-May 22	18-May-22	0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin [mg/L]	15-May 22	18-May-22	0.00006	0.0143	0.0182	0.0169	0.0171
Titanium [mg/L]	15-May 22	18-May-22	0.00005	0.00005	0.00005	< 0.00005	0.00007
Uranium [mg/L]	15-May 22	18-May-22	0.000002	0.000103	0.000078	0.000037	0.000146
Vanadium [mg/L]	15-May 22	18-May-22	0.00001	0.00010	0.00021	0.00006	0.00011
Zinc [mg/L]	15-May 22	18-May-22	0.002	< 0.002	0.004	< 0.002	0.003
Zirconium [mg/L]	15-May 22	18-May-22	0.002	< 0.002	< 0.002	< 0.002	< 0.002
Thiosulphate [mg/L]	12-May-22	16-May-22	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tetrathionate [mg/L]	12-May-22	16-May-22	0.2	< 0.2	< 0.2	< 0.2	< 0.2

Patti Stark
Project Specialist,
Environment, Health & Safety

OnLine LIMS

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Project : CEMI

22-June-2022

Date Rec. : 08 June 2022
LR Report: **CA15172-JUN22**
Reference: Project: Wasamac Tailing (Hemmera)
2117 - PO#: 12002

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 34	7: T2 Cycle 34	8: T3 Cycle 34	9: T4 Cycle 34
Sample Date & Time				07-Jun-22	07-Jun-22	07-Jun-22	07-Jun-22
Temperature Upon Receipt [°C]	---	---	---	20.0	20.0	20.0	20.0
Bromide [mg/L]	13-Jun-22	20-Jun-22	0.3	< 0.3	< 0.3	< 0.3	< 0.3
Chloride [mg/L]	10-Jun-22	20-Jun-22	1	< 1	1	< 1	< 1
Nitrite (as N) [mg/L]	13-Jun-22	20-Jun-22	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N) [mg/L]	13-Jun-22	20-Jun-22	0.06	< 0.06	< 0.06	< 0.06	< 0.06
Thiosulphate [mg/L]	14-Jun-22	21-Jun-22	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tetrathionate [mg/L]	14-Jun-22	21-Jun-22	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Phosphorus (total reactive) [mg/L]	14-Jun-22	15-Jun-22	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Ammonia+Ammonium (N) [as N mg/L]	14-Jun-22	15-Jun-22	0.1	0.2	0.1	< 0.1	< 0.1
Hardness [mg/L as CaCO3]	14-Jun-22	21-Jun-22	0.05	180	307	130	206
Aluminum [mg/L]	14-Jun-22	21-Jun-22	0.001	0.027	0.034	0.037	0.028
Antimony [mg/L]	14-Jun-22	21-Jun-22	0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Arsenic [mg/L]	14-Jun-22	21-Jun-22	0.0002	0.0002	0.0004	< 0.0002	< 0.0002
Barium [mg/L]	14-Jun-22	21-Jun-22	0.00002	0.0722	0.115	0.123	0.00931
Beryllium [mg/L]	14-Jun-22	21-Jun-22	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007

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Project : CEMI
LR Report : **CA15172-JUN22**

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 34	7: T2 Cycle 34	8: T3 Cycle 34	9: T4 Cycle 34
Bismuth [mg/L]	14-Jun-22	21-Jun-22	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron [mg/L]	14-Jun-22	21-Jun-22	0.002	0.011	0.012	0.010	0.009
Cadmium [mg/L]	14-Jun-22	21-Jun-22	0.000003	0.000060	0.000177	0.000014	0.000022
Calcium [mg/L]	14-Jun-22	21-Jun-22	0.01	45.2	64.4	22.5	47.7
Chromium [mg/L]	14-Jun-22	21-Jun-22	0.00008	< 0.00008	0.00024	0.00012	0.00032
Cobalt [mg/L]	14-Jun-22	21-Jun-22	0.000004	0.000410	0.000649	0.000433	0.000344
Copper [mg/L]	14-Jun-22	21-Jun-22	0.0002	0.0009	0.0023	0.0011	0.0015
Iron [mg/L]	14-Jun-22	21-Jun-22	0.007	0.212	1.07	0.615	0.885
Lead [mg/L]	14-Jun-22	21-Jun-22	0.00009	0.00028	0.00049	< 0.00009	0.00012
Lithium [mg/L]	14-Jun-22	21-Jun-22	0.0001	0.0018	0.0048	0.0005	0.0015
Magnesium [mg/L]	14-Jun-22	21-Jun-22	0.001	16.3	35.4	18.0	21.1
Manganese [mg/L]	14-Jun-22	21-Jun-22	0.00001	0.0436	0.0609	0.0213	0.0140
Mercury (total) [ug/L]	13-Jun-22	13-Jun-22	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Molybdenum [mg/L]	14-Jun-22	21-Jun-22	0.00004	0.0163	0.0196	0.00540	0.0784
Nickel [mg/L]	14-Jun-22	21-Jun-22	0.0001	0.0002	< 0.0001	< 0.0001	0.0001
Phosphorus [mg/L]	14-Jun-22	21-Jun-22	0.003	< 0.003	< 0.003	< 0.003	< 0.003
Potassium [mg/L]	14-Jun-22	21-Jun-22	0.003	5.94	9.14	0.839	0.886
Selenium [mg/L]	14-Jun-22	21-Jun-22	0.00004	0.00046	0.00027	0.00020	0.00059
Silicon [mg/L]	14-Jun-22	21-Jun-22	0.02	2.95	3.02	2.60	2.98
Silver [mg/L]	14-Jun-22	21-Jun-22	0.00005	< 0.00005	0.00007	0.00006	0.00012
Sodium [mg/L]	14-Jun-22	21-Jun-22	0.01	0.97	0.63	0.68	0.90
Strontium [mg/L]	14-Jun-22	21-Jun-22	0.00002	1.58	0.558	0.278	0.128
Sulfur [mg/L]	14-Jun-22	21-Jun-22	1	34	73	11	42
Thallium [mg/L]	14-Jun-22	21-Jun-22	0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin [mg/L]	14-Jun-22	21-Jun-22	0.00006	0.0121	0.0162	0.0144	0.0166
Titanium [mg/L]	14-Jun-22	21-Jun-22	0.00005	< 0.00005	< 0.00005	< 0.00005	0.00018
Uranium [mg/L]	14-Jun-22	21-Jun-22	0.000002	0.000127	0.000114	0.000041	0.000179
Vanadium [mg/L]	14-Jun-22	21-Jun-22	0.00001	0.00006	0.00013	0.00004	0.00009
Zinc [mg/L]	14-Jun-22	21-Jun-22	0.002	0.002	0.014	< 0.002	< 0.002
Zirconium [mg/L]	14-Jun-22	21-Jun-22	0.002	< 0.002	< 0.002	< 0.002	< 0.002

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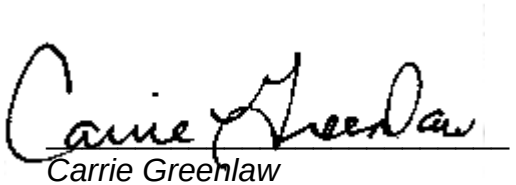
Project : CEMI
LR Report : **CA15172-JUN22**



Carrie Greenlaw
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0002946501

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Project : CEMI

18-July-2022

SGS Canada Inc.
Attn : Noelene Ahern

Suite F, 3260 Production Way
Burnaby, BC
V5A 4W4, Canada

Phone: 604-638-2349
Fax:604-444-5486

Date Rec. : 06 July 2022
LR Report: **CA15048-JUL22**
Reference: Project: Wasamac Tailing (Hemmera)- PO# 12086

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 38	7: T2 Cycle 38	8: T3 Cycle 38	9: T4 Cycle 38
Sample Date & Time				05-Jul-22	05-Jul-22	05-Jul-22	05-Jul-22
Temperature Upon Receipt [°C]	---	---	---	16.0	16.0	16.0	16.0
Bromide [mg/L]	12-Jul-22	16-Jul-22	0.3	< 0.3	< 0.3	< 0.3	< 0.3
Chloride [mg/L]	08-Jul-22	13-Jul-22	1	< 1	< 1	< 1	< 1
Nitrite (as N) [mg/L]	12-Jul-22	16-Jul-22	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N) [mg/L]	12-Jul-22	16-Jul-22	0.06	< 0.06	< 0.06	< 0.06	< 0.06
Ammonia+Ammonium (N) [as N mg/L]	11-Jul-22	12-Jul-22	0.1	0.2	< 0.1	< 0.1	< 0.1
Phosphorus (total reactive) [mg/L]	12-Jul-22	13-Jul-22		< 0.03	< 0.03	< 0.03	< 0.03
Thiosulphate [mg/L]	06-Jul-22	08-Jul-22	0.2	< 2	< 2	< 2	< 2
Tetrathionate [mg/L]	06-Jul-22	08-Jul-22	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Hardness [mg/L as CaCO3]	07-Jul-22	11-Jul-22	0.05	180	221	137	189
Aluminum [mg/L]	07-Jul-22	11-Jul-22	0.001	0.020	0.028	0.029	0.023
Antimony [mg/L]	07-Jul-22	11-Jul-22	0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Arsenic [mg/L]	07-Jul-22	11-Jul-22	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Barium [mg/L]	07-Jul-22	11-Jul-22	0.00008	0.0646	0.0768	0.0917	0.00842
Beryllium [mg/L]	07-Jul-22	11-Jul-22	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth [mg/L]	07-Jul-22	11-Jul-22	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron [mg/L]	07-Jul-22	11-Jul-22	0.002	0.004	0.005	0.004	0.004
Cadmium [mg/L]	07-Jul-22	11-Jul-22	0.000003	0.000020	0.000006	0.000008	0.000014
Calcium [mg/L]	07-Jul-22	11-Jul-22	0.01	44.7	42.3	20.4	42.6
Chromium [mg/L]	07-Jul-22	11-Jul-22	0.00008	< 0.00008	0.00024	< 0.00008	0.00017
Cobalt [mg/L]	07-Jul-22	11-Jul-22	0.000004	0.000292	0.000374	0.000326	0.000311
Copper [mg/L]	07-Jul-22	11-Jul-22	0.0002	0.0006	0.0014	0.0012	0.0011
Iron [mg/L]	07-Jul-22	11-Jul-22	0.007	0.114	0.838	0.454	0.707
Lead [mg/L]	07-Jul-22	11-Jul-22	0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Lithium [mg/L]	07-Jul-22	11-Jul-22	0.0001	0.0015	0.0043	0.0002	0.0010
Magnesium [mg/L]	07-Jul-22	11-Jul-22	0.001	16.6	28.1	20.8	20.2
Manganese [mg/L]	07-Jul-22	11-Jul-22	0.00001	0.0445	0.0204	0.0138	0.00740
Mercury (total) [ug/L]	08-Jul-22	08-Jul-22	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Molybdenum [mg/L]	07-Jul-22	11-Jul-22	0.00004	0.0550	0.0185	0.0150	0.0592

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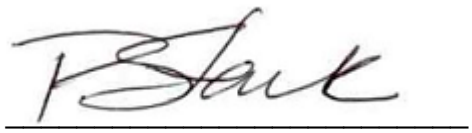
Project : CEMI
LR Report : **CA15048-JUL22**

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 38	7: T2 Cycle 38	8: T3 Cycle 38	9: T4 Cycle 38
Nickel [mg/L]	13-Jul-22	13-Jul-22		0.0002	< 0.0001	< 0.0001	0.0011
Phosphorus [mg/L]	07-Jul-22	11-Jul-22	0.003	< 0.003	< 0.003	< 0.003	< 0.003
Potassium [mg/L]	07-Jul-22	11-Jul-22	0.003	6.04	9.36	0.869	0.773
Selenium [mg/L]	07-Jul-22	11-Jul-22	0.00004	0.00035	0.00021	0.00015	0.00070
Silicon [mg/L]	07-Jul-22	11-Jul-22	0.02	3.72	3.60	3.04	3.58
Silver [mg/L]	07-Jul-22	11-Jul-22	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium [mg/L]	07-Jul-22	11-Jul-22	0.01	0.87	0.44	0.61	0.65
Strontium [mg/L]	07-Jul-22	11-Jul-22	0.00002	1.42	0.334	0.207	0.121
Sulfur [mg/L]	07-Jul-22	11-Jul-22	1	36	45	13	36
Thallium [mg/L]	07-Jul-22	11-Jul-22	0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin [mg/L]	07-Jul-22	11-Jul-22	0.00006	0.0113	0.0150	0.0127	0.0154
Titanium [mg/L]	07-Jul-22	11-Jul-22	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Uranium [mg/L]	07-Jul-22	11-Jul-22	0.000002	0.000130	0.000064	0.000033	0.000151
Vanadium [mg/L]	07-Jul-22	11-Jul-22	0.00001	0.00007	0.00013	0.00006	0.00009
Zinc [mg/L]	07-Jul-22	11-Jul-22	0.002	< 0.002	< 0.002	< 0.002	< 0.002
Zirconium [mg/L]	07-Jul-22	11-Jul-22	0.002	< 0.002	< 0.002	< 0.002	< 0.002



Patti Stark
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0002979030

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Project : CEMI

23-August-2022

SGS Canada Inc.
Attn : Noelene Ahern

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V5A 4W4, Canada

Phone: 604-638-2349
Fax:604-444-5486

Date Rec. : 05 August 2022
LR Report: **CA15096-AUG22**
Reference: Project: Wasamac Tailing {Hemmera} 2117 - PO# 12177

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 42	7: T2 Cycle 42	8: T3 Cycle 42	9: T4 Cycle 42
Sample Date & Time				02-Aug-22	02-Aug-22	02-Aug-22	02-Aug-22
Temperature Upon Receipt [°C]	---	---	---	22.0	22.0	22.0	22.0
Bromide [mg/L]	08-Aug-22	08-Aug-22	0.3	< 0.3	< 0.3	< 0.3	< 0.3
Chloride [mg/L]	10-Aug-22	12-Aug-22	1	< 1	2	2	2
Nitrite (as N) [mg/L]	08-Aug-22	08-Aug-22	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N) [mg/L]	08-Aug-22	08-Aug-22	0.06	< 0.06	< 0.06	< 0.06	< 0.06
Ammonia+Ammonium (N) [as N mg/L]	15-Aug-22	16-Aug-22	0.1	0.2	< 0.1	6.6	< 0.1
Hardness [mg/L as CaCO3]	20-Aug-22	22-Aug-22	0.05	358	269	191	246
Aluminum [mg/L]	20-Aug-22	22-Aug-22	0.001	0.023	0.049	0.047	0.039
Antimony [mg/L]	20-Aug-22	22-Aug-22	0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Arsenic [mg/L]	20-Aug-22	22-Aug-22	0.0002	0.0009	0.0007	0.0004	0.0003
Barium [mg/L]	20-Aug-22	22-Aug-22	0.00008	0.0620	0.0728	0.0716	0.0100
Beryllium [mg/L]	20-Aug-22	22-Aug-22	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth [mg/L]	20-Aug-22	22-Aug-22	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron [mg/L]	20-Aug-22	22-Aug-22	0.002	0.010	0.008	0.006	0.007
Cadmium [mg/L]	20-Aug-22	22-Aug-22	0.000003	0.000460	0.000107	0.000049	0.000119
Calcium [mg/L]	20-Aug-22	22-Aug-22	0.01	89.0	49.3	25.6	56.3
Chromium [mg/L]	20-Aug-22	22-Aug-22	0.00008	0.00012	0.00028	0.00022	0.00043
Cobalt [mg/L]	20-Aug-22	22-Aug-22	0.000004	0.000586	0.000519	0.000488	0.000465
Copper [mg/L]	20-Aug-22	22-Aug-22	0.0002	0.0013	0.0015	0.0008	0.0018
Iron [mg/L]	20-Aug-22	22-Aug-22	0.007	0.190	1.29	1.26	1.19
Lead [mg/L]	20-Aug-22	22-Aug-22	0.00009	0.0108	0.00052	< 0.00009	0.00014
Lithium [mg/L]	20-Aug-22	22-Aug-22	0.0001	0.0037	0.0049	0.0005	0.0013
Magnesium [mg/L]	20-Aug-22	22-Aug-22	0.001	32.9	35.4	31.0	25.7
Manganese [mg/L]	20-Aug-22	22-Aug-22	0.00001	0.115	0.0157	0.0164	0.00691
Mercury (total) [ug/L]	15-Aug-22	15-Aug-22	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Molybdenum [mg/L]	20-Aug-22	22-Aug-22	0.00004	0.534	0.0294	0.0387	0.0834
Nickel [mg/L]	20-Aug-22	22-Aug-22	0.0001	0.0007	0.0004	0.0002	0.0003
Phosphorus [mg/L]	20-Aug-22	22-Aug-22	0.003	< 0.003	< 0.003	< 0.003	< 0.003

OnLine LIMS

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Project : CEMI
LR Report : **CA15096-AUG22**

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 42	7: T2 Cycle 42	8: T3 Cycle 42	9: T4 Cycle 42
Potassium [mg/L]	20-Aug-22	22-Aug-22	0.009	12.6	11.4	1.24	1.02
Selenium [mg/L]	20-Aug-22	22-Aug-22	0.00004	0.00037	0.00031	0.00023	0.00143
Silicon [mg/L]	20-Aug-22	22-Aug-22	0.02	5.75	4.68	4.85	5.13
Silver [mg/L]	20-Aug-22	22-Aug-22	0.00005	0.00012	< 0.00005	< 0.00005	0.00007
Sodium [mg/L]	20-Aug-22	22-Aug-22	0.01	1.38	0.58	0.95	0.86
Strontium [mg/L]	20-Aug-22	22-Aug-22	0.00002	1.73	0.346	0.181	0.151
Sulfur [mg/L]	20-Aug-22	22-Aug-22	1	80	64	29	57
Thallium [mg/L]	20-Aug-22	22-Aug-22	0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin [mg/L]	20-Aug-22	22-Aug-22	0.00006	0.0219	0.0181	0.0215	0.0182
Titanium [mg/L]	20-Aug-22	22-Aug-22	0.00005	0.00011	< 0.00005	< 0.00005	< 0.00005
Uranium [mg/L]	20-Aug-22	22-Aug-22	0.000002	0.000246	0.000053	0.000021	0.000149
Vanadium [mg/L]	20-Aug-22	22-Aug-22	0.00001	0.00010	0.00017	0.00007	0.00012
Zinc [mg/L]	20-Aug-22	22-Aug-22	0.002	0.007	0.004	0.002	0.002
Zirconium [mg/L]	20-Aug-22	22-Aug-22	0.002	< 0.002	< 0.002	< 0.002	< 0.002
Phosphorus (total reactive) [mg/L]	09-Aug-22	10-Aug-22	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Thiosulphate [mg/L]	08-Aug-22	18-Aug-22	2	< 20	< 20	< 20	< 20
Tetrathionate [mg/L]	08-Aug-22	18-Aug-22	0.2	< 2	< 2	< 2	< 2

Note: Reporting limits for Thiosulphate and Tetrathionate were elevated.

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Project Specialist,
Environment, Health & Safety

OnLine LIMS

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Project : CEMI

20-September-2022

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Fax:604-444-5486

Date Rec. : 31 August 2022
LR Report: **CA15711-AUG22**
Reference: Project: Wasamac Tailing (Hemmera) 2117 - PO# 12274

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 46	7: T2 Cycle 46	8: T3 Cycle 46	9: T4 Cycle 46
Sample Date & Time				30-Aug-22	30-Aug-22	30-Aug-22	30-Aug-22
Temperature Upon Receipt [°C]	---	---	---	21.0	21.0	21.0	21.0
Bromide [mg/L]	05-Sep-22	15-Sep-22	0.3	< 0.3	< 0.3	< 0.3	< 0.3
Chloride [mg/L]	06-Sep-22	13-Sep-22	1	< 1	< 1	< 1	< 1
Nitrite (as N) [mg/L]	05-Sep-22	15-Sep-22	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N) [mg/L]	05-Sep-22	15-Sep-22	0.06	< 0.06	< 0.06	< 0.06	< 0.06
Ammonia+Ammonium (N) [as N mg/L]	02-Sep-22	06-Sep-22	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Thiosulphate [mg/L]	06-Sep-22	19-Sep-22	1	< 10	< 10	< 10	< 10
Tetrathionate [mg/L]	06-Sep-22	19-Sep-22	0.2	< 2	< 2	< 2	< 2
Phosphorus (total reactive) [mg/L]	01-Sep-22	02-Sep-22	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Hardness [mg/L as CaCO3]	02-Sep-22	06-Sep-22	0.05	331	204	193	191
Aluminum [mg/L]	02-Sep-22	06-Sep-22	0.001	0.018	0.034	0.032	0.027
Antimony [mg/L]	02-Sep-22	06-Sep-22	0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Arsenic [mg/L]	02-Sep-22	06-Sep-22	0.0002	0.0004	0.0002	< 0.0002	< 0.0002
Barium [mg/L]	02-Sep-22	06-Sep-22	0.00008	0.0424	0.0522	0.0892	0.00727
Beryllium [mg/L]	02-Sep-22	06-Sep-22	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth [mg/L]	02-Sep-22	06-Sep-22	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron [mg/L]	02-Sep-22	06-Sep-22	0.002	0.006	0.007	0.007	0.008
Cadmium [mg/L]	02-Sep-22	06-Sep-22	0.000003	0.000126	0.000007	0.000009	0.000010
Calcium [mg/L]	02-Sep-22	06-Sep-22	0.01	77.4	35.7	25.7	41.8
Chromium [mg/L]	02-Sep-22	06-Sep-22	0.00008	< 0.00008	0.00021	0.00008	0.00031
Cobalt [mg/L]	02-Sep-22	06-Sep-22	0.000004	0.000272	0.000253	0.000212	0.000206
Copper [mg/L]	02-Sep-22	06-Sep-22	0.0002	0.0009	0.0010	0.0009	0.0011
Iron [mg/L]	02-Sep-22	06-Sep-22	0.007	0.187	0.532	0.291	0.538
Lead [mg/L]	02-Sep-22	06-Sep-22	0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Lithium [mg/L]	02-Sep-22	06-Sep-22	0.0001	0.0036	0.0038	0.0006	0.0012
Magnesium [mg/L]	02-Sep-22	06-Sep-22	0.001	33.4	28.0	31.3	21.1
Manganese [mg/L]	02-Sep-22	06-Sep-22	0.00001	0.0587	0.00987	0.0132	0.00373
Mercury (total) [ug/L]	07-Sep-22	08-Sep-22	0.01	< 0.01	< 0.01	< 0.01	< 0.01

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Project : CEMI
LR Report : **CA15711-AUG22**

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 46	7: T2 Cycle 46	8: T3 Cycle 46	9: T4 Cycle 46
Molybdenum [mg/L]	02-Sep-22	06-Sep-22	0.00004	0.634	0.0171	0.0160	0.0493
Nickel [mg/L]	02-Sep-22	06-Sep-22	0.0001	0.0002	< 0.0001	0.0001	0.0001
Phosphorus [mg/L]	02-Sep-22	06-Sep-22	0.003	< 0.003	< 0.003	< 0.003	< 0.003
Potassium [mg/L]	02-Sep-22	06-Sep-22	0.009	13.7	8.09	0.970	0.796
Selenium [mg/L]	02-Sep-22	06-Sep-22	0.00004	0.00027	0.00018	0.00010	0.00025
Silicon [mg/L]	02-Sep-22	06-Sep-22	0.02	3.46	3.51	2.94	3.37
Silver [mg/L]	02-Sep-22	06-Sep-22	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium [mg/L]	02-Sep-22	06-Sep-22	0.01	0.90	0.43	0.74	0.71
Strontium [mg/L]	02-Sep-22	06-Sep-22	0.00002	0.901	0.210	0.120	0.0958
Sulfur [mg/L]	02-Sep-22	06-Sep-22	1	73	32	15	32
Thallium [mg/L]	02-Sep-22	06-Sep-22	0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin [mg/L]	02-Sep-22	06-Sep-22	0.00006	0.0130	0.0198	0.0158	0.0184
Titanium [mg/L]	02-Sep-22	06-Sep-22	0.00005	0.00089	0.00007	0.00006	0.00015
Uranium [mg/L]	02-Sep-22	06-Sep-22	0.000002	0.000121	0.000030	0.000010	0.000075
Vanadium [mg/L]	02-Sep-22	06-Sep-22	0.00001	0.00005	0.00010	0.00002	0.00006
Zinc [mg/L]	02-Sep-22	06-Sep-22	0.002	< 0.002	< 0.002	< 0.002	< 0.002
Zirconium [mg/L]	02-Sep-22	06-Sep-22	0.002	< 0.002	< 0.002	< 0.002	< 0.002

Note: Reporting limits for Thiosulphate and Tetrathionate were elevated due to sample matrix interferences.

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Project : CEMI
LR Report : **CA15711-AUG22**

Method Descriptions

Parameter	Description	SGS Method Code	Reference Method Code
Aluminum	Aluminum by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Ammonia+Ammonium (N)	NH3+NH4 by Skalar - solution	ME-CA-[ENV]SFA-LAK-AN-007	SM 4500
Antimony	Antimony by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Arsenic	Arsenic by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	Niosh7300/EPA 200.8
Barium	Barium by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Beryllium	Beryllium by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Bismuth	Bismuth by ICP-MS Leach	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Boron	Boron by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Bromide	Bromide by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001	EPA300/MA300-Ions1.3
Cadmium	Cadmium by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Calcium	Calcium by ICP-MS Leachates	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Chloride	Chloride by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026	US EPA 325.2
Chromium	Chromium by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Cobalt	Cobalt by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Copper	Copper by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Hardness	Hardness (CaCO3) by ICP-MS	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Iron	Iron by ICP-MS Leachates	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Lead	Lead by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Lithium	Lithium by ICP-MS Leachates	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Magnesium	Magnesium by ICP-MS Leachates	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Manganese	Manganese by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Mercury (total)	Hg solutions by CVAAS	ME-CA-[ENV]SPE-LAK-AN-004	SM 3112/SM 3112B
Molybdenum	Molybdenum by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Nickel	Nickel by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Nitrate (as N)	Nitrate by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001	EPA300/MA300-Ions1.3
Nitrite (as N)	Nitrite by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001	EPA300/MA300-Ions1.3
Phosphorus	Phosphorus by ICP-MS Leachates	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Phosphorus (total reactive)	Tot. Reactive Phos. by Skalar or Spec.- no reagents or he	ME-CA-[ENV]SFA-LAK-AN-004	SM 4500-P F
Potassium	Potassium by ICP-MS Leachates	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Selenium	Selenium by ICP-MS Leachates	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Silicon	Silicon by ICP-MS Leachates	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Silver	Silver by ICP-MS Leachates	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Sodium	Sodium by ICP-MS Leachates	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Strontium	Strontium by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Sulfur	Sulfur by ICP-MS Leachates	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Tetrathionate	Tetrathionate by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-004	In-house
Thallium	Thallium by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Thiosulphate	Thiosulphate by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-004	In-house
Tin	Tin by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Titanium	Titanium by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Uranium	Uranium by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Vanadium	Vanadium by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Zinc	Zinc by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Zirconium	Zirconium by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8

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Project : CEMI
LR Report : **CA15711-AUG22**

Quality Control Report

Inorganic Analysis													
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material		
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
							%		Low	High		Low	High
Ammonia by SFA - QCBatchID: SKA0022-SEP22													
Ammonia+Ammonium (N)	0.1	as N mg/L	<0.1			0	10	101	90	110	106	75	125
Anions by discrete analyzer - QCBatchID: DIO5004-SEP22													
Chloride	1	mg/L	<1			ND	20	99	80	120	103	75	125
Anions by IC - QCBatchID: DIO0087-SEP22													
Bromide	0.3	mg/L	<0.3			ND	20	93	90	110	91	75	125
Nitrate (as N)	0.06	mg/L	<0.06			ND	20	100	90	110	102	75	125
Nitrite (as N)	0.03	mg/L	<0.03			ND	20	97	90	110	97	75	125
Mercury by CVAAS - QCBatchID: EHG0003-SEP22													
Mercury (total)	0.01	ug/L	< 0.01			ND	20	98	80	120	109	70	130
Metals - QCBatchID: EMS0012-SEP22													
Cobalt	0.000004	mg/L	<0.000004			0	20	93	90	110	102	70	130
Metals in aqueous samples - ICP-MS - QCBatchID: EMS0012-SEP22													
Aluminum	0.001	mg/L	<0.001			4	20	97	90	110	116	70	130
Antimony	0.0009	mg/L	<0.0009			1	20	96	90	110	116	70	130
Arsenic	0.0002	mg/L	<0.0002			4	20	94	90	110	104	70	130
Barium	0.00008	mg/L	<0.00002			2	20	102	90	110	96	70	130
Beryllium	0.000007	mg/L	<0.000007			ND	20	97	90	110	99	70	130
Bismuth	0.00001	mg/L	<0.00001			ND	20	92	90	110	95	70	130
Boron	0.002	mg/L	<0.002			1	20	101	90	110	97	70	130
Cadmium	0.000003	mg/L	<0.000003			ND	20	94	90	110	107	70	130
Calcium	0.01	mg/L	<0.01			1	20	108	90	110	109	70	130
Chromium	0.00008	mg/L	<0.00008			ND	20	93	90	110	105	70	130
Copper	0.0002	mg/L	<0.0002			ND	20	91	90	110	103	70	130
Iron	0.007	mg/L	<0.007			ND	20	107	90	110	102	70	130
Lead	0.00009	mg/L	<0.00001			18	20	103	90	110	91	70	130
Lithium	0.0001	mg/L	<0.0001			1	20	100	90	110	94	70	130
Magnesium	0.001	mg/L	<0.001			1	20	109	90	110	123	70	130
Manganese	0.00001	mg/L	<0.00001			0	20	96	90	110	111	70	130
Molybdenum	0.00004	mg/L	<0.00004			ND	20	106	90	110	108	70	130
Nickel	0.0001	mg/L	<0.0001			ND	20	94	90	110	100	70	130
Phosphorus	0.003	mg/L	<0.003			ND	20	108	90	110	NV	70	130
Potassium	0.009	mg/L	<0.009			3	20	108	90	110	98	70	130
Selenium	0.00004	mg/L	<0.00004			11	20	103	90	110	114	70	130
Silicon	0.02	mg/L	<0.02			4	20	107	90	110	NV	70	130
Silver	0.00005	mg/L	<0.00005			ND	20	93	90	110	71	70	130

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Project : CEMI
LR Report : **CA15711-AUG22**

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
							%		Low	High		Low	High
Sodium	0.01	mg/L	<0.01			2	20	108	90	110	119	70	130
Strontium	0.00008	mg/L	<0.00002			0	20	93	90	110	115	70	130
Sulfur	1	mg/L	<1			ND	20	101	90	110	NV	70	130
Thallium	0.000005	mg/L	<0.000005			ND	20	102	90	110	100	70	130
Tin	0.00006	mg/L	<0.00006			18	20	99	90	110	NV	70	130
Titanium	0.00005	mg/L	<0.00005			4	20	96	90	110	NV	70	130
Uranium	0.000002	mg/L	<0.000002			ND	20	101	90	110	121	70	130
Vanadium	0.00001	mg/L	<0.00001			2	20	93	90	110	116	70	130
Zinc	0.002	mg/L	<0.002			ND	20	97	90	110	126	70	130
Zirconium	0.002	mg/L	<0.002			ND	20	99	90	110	NV	70	130
Reactive Phosphorus by SFA - QCBatchID: SKA0017-SEP22													
Phosphorus (total reactive)	0.03	mg/L	<0.03			4	10	94	90	110	NV	75	125
Tetrathionate - QCBatchID: DIO0109-SEP22													
Tetrathionate	0.2	mg/L	<0.2			ND	10	104	90	110	102	75	125
Thiosulphate - QCBatchID: DIO0109-SEP22													
Thiosulphate	0.2	mg/L	< 1			ND	10	102	90	110	107	75	125

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Project : CEMI

14-October-2022

SGS Canada Inc.
Attn : Noelene Ahern

Suite F, 3260 Production Way
Burnaby, BC
V5A 4W4, Canada

Phone: 604-638-2349
Fax:604-444-5486

Date Rec. : 28 September 2022
LR Report: **CA15488-SEP22**
Reference: Project: Wasamac Tailing {Hemmera} 2117 - PO# 12363

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 50	7: T2 Cycle 50	8: T3 Cycle 50	9: T4 Cycle 50
Sample Date & Time				27-Sep-22	27-Sep-22	27-Sep-22	27-Sep-22
Temperature Upon Receipt [°C]	---	---	---	20.0	20.0	20.0	20.0
Thiosulphate [mg/L]	05-Oct-22	11-Oct-22	0.2	< 20	< 20	< 20	< 20
Tetrathionate [mg/L]	05-Oct-22	11-Oct-22	0.2	< 2	< 2	< 2	< 2
Bromide [mg/L]	05-Oct-22	13-Oct-22	0.3	< 0.3	< 0.3	< 0.3	< 0.3
Chloride [mg/L]	11-Oct-22	13-Oct-22	1	< 1	< 1	< 1	< 1
Nitrite (as N) [mg/L]	04-Oct-22	13-Oct-22	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N) [mg/L]	04-Oct-22	13-Oct-22	0.06	< 0.06	< 0.06	< 0.06	< 0.06
Phosphorus (total reactive) [mg/L]	04-Oct-22	04-Oct-22	0.03	0.04	< 0.03	< 0.03	< 0.03
Ammonia+Ammonium (N) [as N mg/L]	04-Oct-22	05-Oct-22	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hardness [mg/L as CaCO3]	01-Oct-22	03-Oct-22	0.05	226	164	136	146
Aluminum [mg/L]	01-Oct-22	03-Oct-22	0.001	0.023	0.033	0.025	0.031
Antimony [mg/L]	01-Oct-22	03-Oct-22	0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Arsenic [mg/L]	01-Oct-22	03-Oct-22	0.0002	0.0006	0.0003	0.0003	< 0.0002
Barium [mg/L]	01-Oct-22	03-Oct-22	0.00008	0.0433	0.0490	0.0863	0.00670
Beryllium [mg/L]	01-Oct-22	03-Oct-22	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth [mg/L]	01-Oct-22	03-Oct-22	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron [mg/L]	01-Oct-22	03-Oct-22	0.002	0.005	0.006	0.007	0.009
Cadmium [mg/L]	01-Oct-22	03-Oct-22	0.000003	0.000349	0.000029	0.000021	0.000039
Calcium [mg/L]	01-Oct-22	03-Oct-22	0.01	52.4	27.6	17.4	31.6
Chromium [mg/L]	01-Oct-22	03-Oct-22	0.00008	0.00035	0.00051	0.00081	0.00071
Cobalt [mg/L]	01-Oct-22	03-Oct-22	0.000004	0.000328	0.000316	0.000292	0.000255
Copper [mg/L]	01-Oct-22	03-Oct-22	0.0002	0.0010	0.0008	0.0010	0.0011
Iron [mg/L]	01-Oct-22	03-Oct-22	0.007	0.393	0.953	0.618	0.935
Lead [mg/L]	01-Oct-22	03-Oct-22	0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Lithium [mg/L]	01-Oct-22	03-Oct-22	0.0001	0.0035	0.0040	0.0008	0.0015
Magnesium [mg/L]	01-Oct-22	03-Oct-22	0.001	23.2	23.2	22.4	16.2
Manganese [mg/L]	01-Oct-22	03-Oct-22	0.00001	0.0291	0.00950	0.0110	0.00310
Mercury (total) [ug/L]	04-Oct-22	05-Oct-22	0.01	< 0.01	< 0.01	< 0.01	< 0.01

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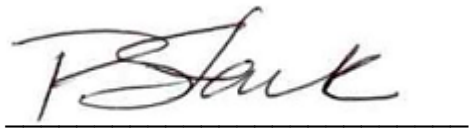
Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: T1 Cycle 50	7: T2 Cycle 50	8: T3 Cycle 50	9: T4 Cycle 50
Molybdenum [mg/L]	01-Oct-22	03-Oct-22	0.00004	0.495	0.0239	0.0200	0.0489
Nickel [mg/L]	01-Oct-22	03-Oct-22	0.0001	0.0004	0.0003	0.0003	0.0004
Phosphorus [mg/L]	01-Oct-22	03-Oct-22	0.003	0.013	0.008	0.107	0.011
Potassium [mg/L]	01-Oct-22	03-Oct-22	0.009	10.9	6.77	0.728	0.657
Selenium [mg/L]	01-Oct-22	03-Oct-22	0.00004	0.00055	0.00028	0.00019	0.00051
Silicon [mg/L]	01-Oct-22	03-Oct-22	0.02	2.72	2.88	2.60	2.74
Silver [mg/L]	01-Oct-22	03-Oct-22	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium [mg/L]	01-Oct-22	03-Oct-22	0.01	0.68	0.40	0.72	0.68
Strontium [mg/L]	01-Oct-22	03-Oct-22	0.00002	0.653	0.205	0.0900	0.0943
Sulfur [mg/L]	01-Oct-22	03-Oct-22	1	420	292	268	468
Thallium [mg/L]	01-Oct-22	03-Oct-22	0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin [mg/L]	01-Oct-22	03-Oct-22	0.00006	0.0103	0.0144	0.0126	0.0152
Titanium [mg/L]	01-Oct-22	03-Oct-22	0.00005	0.00025	0.00006	0.00015	0.00008
Uranium [mg/L]	01-Oct-22	03-Oct-22	0.000002	0.000125	0.000042	0.000024	0.000096
Vanadium [mg/L]	01-Oct-22	03-Oct-22	0.00001	0.00010	0.00014	0.00012	0.00012
Zinc [mg/L]	01-Oct-22	03-Oct-22	0.002	< 0.002	< 0.002	< 0.002	< 0.002
Zirconium [mg/L]	01-Oct-22	03-Oct-22	0.002	< 0.002	< 0.002	< 0.002	< 0.002

Note: Reporting limits for Thiosulphate and Tetrathionate were elevated due to sample matrix.



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Project : CEMI
LR Report : **CA15488-SEP22**

Method Descriptions

Parameter	Description	SGS Method Code	Reference Method Code
Aluminum	Aluminum by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Ammonia+Ammonium (N)	NH3+NH4 by Skalar - solution	ME-CA-[ENV]SFA-LAK-AN-007	SM 4500
Antimony	Antimony by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Arsenic	Arsenic by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	Niosh7300/EPA 200.8
Barium	Barium by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Beryllium	Beryllium by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Bismuth	Bismuth by ICP-MS Leach	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Boron	Boron by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Bromide	Bromide by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001	EPA300/MA300-Ions1.3
Cadmium	Cadmium by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Calcium	Calcium by ICP-MS Leachates	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Chloride	Chloride by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026	US EPA 325.2
Chromium	Chromium by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Cobalt	Cobalt by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Copper	Copper by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Hardness	Hardness (CaCO3) by ICP-MS	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Iron	Iron by ICP-MS Leachates	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Lead	Lead by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Lithium	Lithium by ICP-MS Leachates	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Magnesium	Magnesium by ICP-MS Leachates	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Manganese	Manganese by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Mercury (total)	Hg solutions by CVAAS	ME-CA-[ENV]SPE-LAK-AN-004	SM 3112/SM 3112B
Molybdenum	Molybdenum by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Nickel	Nickel by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Nitrate (as N)	Nitrate by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001	EPA300/MA300-Ions1.3
Nitrite (as N)	Nitrite by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001	EPA300/MA300-Ions1.3
Phosphorus	Phosphorus by ICP-MS Leachates	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Phosphorus (total reactive)	Tot. Reactive Phos. by Skalar or Spec.- no reagents or he	ME-CA-[ENV]SFA-LAK-AN-004	SM 4500-P F
Potassium	Potassium by ICP-MS Leachates	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Selenium	Selenium by ICP-MS Leachates	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Silicon	Silicon by ICP-MS Leachates	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Silver	Silver by ICP-MS Leachates	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Sodium	Sodium by ICP-MS Leachates	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Strontium	Strontium by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Sulfur	Sulfur by ICP-MS Leachates	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Tetrathionate	Tetrathionate by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-004	In-house
Thallium	Thallium by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Thiosulphate	Thiosulphate by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-004	In-house
Tin	Tin by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Titanium	Titanium by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Uranium	Uranium by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Vanadium	Vanadium by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Zinc	Zinc by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8
Zirconium	Zirconium by ICP-MS Leachates 10x cut	ME-CA-[ENV]SPE-LAK-AN-006	SM 3030/EPA 200.8

SGS Canada Inc.
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Project : CEMI
LR Report : **CA15488-SEP22**

Quality Control Report

Inorganic Analysis													
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material		
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
							%		Low	High		Low	High
Ammonia by SFA - QCBatchID: SKA0038-OCT22													
Ammonia+Ammonium (N)	0.1	as N mg/L	<0.1			ND	10	99	90	110	93	75	125
Anions by discrete analyzer - QCBatchID: DIO5033-OCT22													
Chloride	1	mg/L	<1			ND	20	100	80	120	106	75	125
Anions by IC - QCBatchID: DIO0053-OCT22													
Nitrate (as N)	0.06	mg/L	<0.06			ND	20	103	90	110	98	75	125
Nitrite (as N)	0.03	mg/L	<0.03			ND	20	97	90	110	115	75	125
Anions by IC - QCBatchID: DIO0070-OCT22													
Bromide	0.3	mg/L	<0.3			ND	20	92	90	110	78	75	125
Mercury by CVAAS - QCBatchID: EHG0062-SEP22													
Mercury (total)	0.01	ug/L	< 0.01			0	20	118	80	120	129	70	130
Metals - QCBatchID: EMS0272-SEP22													
Cobalt	0.000004	mg/L	<0.000004			10	20	98	90	110	97	70	130
Metals in aqueous samples - ICP-MS - QCBatchID: EMS0272-SEP22													
Aluminum	0.001	mg/L	<0.001			4	20	100	90	110	96	70	130
Antimony	0.0009	mg/L	<0.0009			1	20	105	90	110	90	70	130
Arsenic	0.0002	mg/L	<0.0002			6	20	99	90	110	102	70	130
Barium	0.00008	mg/L	<0.00002			0	20	97	90	110	100	70	130
Beryllium	0.000007	mg/L	<0.000007			ND	20	100	90	110	106	70	130
Bismuth	0.00001	mg/L	<0.00001			ND	20	96	90	110	100	70	130
Boron	0.002	mg/L	<0.002			0	20	98	90	110	101	70	130
Cadmium	0.000003	mg/L	<0.000003			ND	20	99	90	110	103	70	130
Calcium	0.01	mg/L	<0.01			6	20	97	90	110	92	70	130
Chromium	0.00008	mg/L	<0.00008			ND	20	97	90	110	102	70	130
Copper	0.0002	mg/L	<0.0002			4	20	98	90	110	92	70	130
Iron	0.007	mg/L	<0.007			3	20	97	90	110	100	70	130
Lead	0.00009	mg/L	<0.00001			6	20	99	90	110	99	70	130
Lithium	0.0001	mg/L	<0.0001			1	20	104	90	110	94	70	130
Magnesium	0.001	mg/L	<0.001			3	20	100	90	110	83	70	130
Manganese	0.00001	mg/L	<0.00001			5	20	101	90	110	102	70	130
Molybdenum	0.00004	mg/L	<0.00004			11	20	91	90	110	83	70	130
Nickel	0.0001	mg/L	<0.0001			9	20	99	90	110	96	70	130
Phosphorus	0.003	mg/L	<0.003			ND	20	97	90	110	NV	70	130
Potassium	0.009	mg/L	<0.009			8	20	103	90	110	72	70	130
Selenium	0.00004	mg/L	<0.00004			9	20	102	90	110	108	70	130
Silicon	0.02	mg/L	<0.02			1	20	94	90	110	NV	70	130

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Inorganic Analysis													
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material		
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
							%		Low	High		Low	High
Silver	0.00005	mg/L	<0.00005			ND	20	99	90	110	96	70	130
Sodium	0.01	mg/L	<0.01			2	20	96	90	110	90	70	130
Strontium	0.00008	mg/L	<0.00002			5	20	97	90	110	85	70	130
Sulfur	1	mg/L	<1			13	20	105	90	110	NV	70	130
Thallium	0.000005	mg/L	<0.000005			10	20	98	90	110	108	70	130
Tin	0.00006	mg/L	<0.00006			ND	20	94	90	110	NV	70	130
Titanium	0.00005	mg/L	<0.00005			4	20	94	90	110	NV	70	130
Uranium	0.000002	mg/L	<0.000002			19	20	94	90	110	94	70	130
Vanadium	0.00001	mg/L	<0.00001			10	20	98	90	110	99	70	130
Zinc	0.002	mg/L	<0.002			6	20	97	90	110	92	70	130
Zirconium	0.002	mg/L	<0.002			ND	20	94	90	110	NV	70	130
Reactive Phosphorus by SFA - QCBatchID: SKA0027-OCT22													
Phosphorus (total reactive)	0.03	mg/L	<0.03			7	10	95	90	110	NV	75	125
Tetrathionate - QCBatchID: DIO0084-OCT22													
Tetrathionate	0.2	mg/L	<0.2			0	10	107	90	110	100	75	125
Thiosulphate - QCBatchID: DIO0084-OCT22													
Thiosulphate	0.2	mg/L	< 2			2	10	83	90	110	112	75	125

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