APPENDIX 6-1: MOUNT POLLEY MINE SPRINGER EXPANSION PROJECT METAL LEACHING AND ACID ROCK DRAINAGE GEOCHEMICAL CHARACTERIZATION

Mount Polley Mine Springer Expansion Project Metal Leaching and Acid Rock Drainage Geochemical Characterization

Prepared for

Mount Polley Mining Corporation

Prepared by

SRK Consulting (Canada) Inc.
CAPR003074
February 2025

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Executive Summary

Mount Polley Mining Corporation (MPMC), a wholly owned subsidiary of Imperial Metals Corporation, has been operating the Mount Polley Mine (MPM) since 1996. MPMC recovers copper and gold from porphyry-style mineralization by open pit and underground mining. Ore will be processed at the onsite plant with concentration recovered by flotation. The plant is capable of processing 22,000 t/d of ore using standard mineral flotation technology.

MPMC prepared a Joint Mines Act and Environmental Management Act Permit Amendment Application to support the Springer Expansion Project (the Project), which was submitted to BC Ministry of Mining and Critical Minerals (MCM) (formerly the Ministry of Energy, Mines and Low Carbon Innovation) on July 5, 2024. The scope of the application includes an extension of the South East Rock Disposal Site (SERDS), an expansion of the Springer Pit (which includes Springer 5, Springer 6, C2, and WX), an extension to the duration of treated water discharge to Quesnel Lake throughout mining operations, and an extension of the period of waste rock placement at the Northwest Potentially Acid Generating (PAG) Stockpile. MPMC requested SRK Consulting (Canada) Inc. (SRK) to characterize the materials that will be mined as part of the Project, including an assessment outlining the estimated time to onset of acid rock drainage and how it relates to the proposed timeline extension of the Project. This report focuses on the metal leaching and acid rock drainage (ML/ARD) potential and geochemical characterization associated with the Springer Expansion, including the production of future waste rock and tailings.

The geochemical existing conditions study was designed with the primary objective of determining if the conceptual models described above can reasonably be applied to the Project. Sampling programs were designed to confirm that wastes would leach dominantly under neutral to slightly alkaline pH conditions, and that trace element distribution would lead to similar leaching characteristics as observed previously at the MPM. This objective was addressed through review of available supporting geochemical data of the different Project components (e.g., future waste rock, low grade ore (LGO), and ore) with comparison to characterization of existing waste and ore materials. The main conclusions of the geochemical characterization are as follows:

- General findings from existing and future waste rock, ore, and LGO geochemical characterization were that sulphur content was the primary control on ARD potential. For future rock, Springer 6 and WX had the highest sulphur content and therefore the highest proportions of PAG rock on the basis of both the mine plan and ARD classifications using ABA data.

- Existing and future waste rock, ore, and LGO rock had a similar list of elements that were enriched relative to the screening criteria. Copper and selenium concentrations were comparable for existing and future mining areas.

- HCT trends for samples representing existing mined rock and future waste rock were similar, as were leachate concentrations. .

- For existing mined rock, future waste rock, ore, and LGO, lithological classification was determined to not be a control on ML/ARD potential.

- Processing of ore mined during the Springer Expansion Project will be processed using the same standard flotation process currently used at MPM. As future ore and LGO characteristics are similar to previously mined ore and LGO, geochemical characteristics of future tailings are expected to be the same as historical tailings.

Recommendations for future sampling and geochemical characterization to address the current limitations of this study are also provided.

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1 Introduction

Mount Polley Mining Corporation (MPMC), a wholly owned subsidiary of Imperial Metals Corporation, has been operating the Mount Polley Mine (MPM), located approximately 56 km northeast of Williams Lake and approximately 15 km southwest of the community of Likely British Columbia, Canada, since 1996. MPMC recovers copper and gold from porphyry-style mineralization by open pit and underground mining. Ore will be processed at the onsite plant with concentration recovered by flotation. The plant is capable of processing 22,000 t/d of ore using standard mineral flotation technology.

MPMC prepared a Joint Mines Act and Environmental Management Act Permit Amendment Application to support the Springer Expansion Project (the Project), which was submitted to BC Ministry of Mining and Critical Minerals (MCM) (formerly the Ministry of Energy, Mines and Low Carbon Innovation) on July 5, 2024. The Application was prepared by MPMC and was submitted with respect to the Mines Act M-200 Permit for MPM. The scope of the application includes an extension of the South East Rock Disposal Site (SERDS), an expansion of the Springer Pit (which includes Springer 5, Springer 6, C2, and WX), an extension to the duration of treated water discharge to Quesnel Lake throughout mining operations, and an extension of the period of waste rock placement at the Northwest Potentially Acid Generating (PAG) Stockpile. MPMC requested SRK Consulting (Canada) Inc. (SRK) to update geochemical source terms and provide documentation to support a reduction in the Neutralization Potential Ratio (NPR) criterion from 2 to 1.5.

MCM reviewed the application and provided environmental geoscience review comments to MPMC on August 15, 2024. SRK provided responses in a technical memo that was submitted to MCM on December 17, 2024, which commits to address outstanding information requirements for the Project, which are summarized in Table 1 (SRK 2024b). The purpose of this report is to characterize the materials that will be mined as part of the Project, including an assessment outlining the estimated time to onset of acidic conditions for PAG materials and how it relates to the proposed timeline of the Project and forms Deliverable #2: Geochemical Characterization of Springer Expansion Project in Table 1. This report focuses on the ML/ARD potential and geochemical characterization associated with the Springer Expansion, including the production of future waste rock and tailings. The geochemical understanding of the site as a whole was used to inform definition of the overall site geochemical characteristics.

This application also involves modelling of water quality at the site and in the receiving environment. Inputs to this model are geochemical source terms which are estimations of the chemistry of water in contact with materials and surfaces exposed by mining activity. The source terms were developed with input from the site-wide geochemical characterization program. The derivation and use of source terms are described in a separate report (SRK, 2023b).

This document titled “Mount Polley Mine Springer Expansion Project Metal Leaching and Acid Rock Drainage Geochemical Characterization” has been prepared to meet requirements of Section 6.1 (Geochemical Characterization) of the Joint Application Information Requirements (JAIR) for Mines Act and Environmental Management Act Permits (MCM 2024).

Table 1: Summary of Expected Deliverables

Number	Deliverable/ Commitment	Author	Status	Comment
1	Geological Characterization of Springer Expansion Project	MPMC	New deliverable	Based on 2024 JAIR requirements. This deliverable will include descriptions of major rock units previously mined and planned to be mined as part of the Springer Pit Expansion Project. It will also include a detailed description of the ore deposit.
2	Geochemical Characterization of Springer Expansion Project	SRK	This deliverable	Based on 2024 JAIR and will expand on the characterization of ore and waste to be mined as per in SRK (2023a). The characterization will also include an assessment of monitoring data and geochemical source terms in consideration of operations, closure, and post-closure.
3	Mount Polley Mine Geochemical Source Terms	SRK	SRK (2023a) will be updated based on review comments (update details provided in respective comments)	Source terms described in SRK (2023a) will be reviewed and updated if needed. Updates will be informed by the geochemical characterization of Springer Expansion materials (Deliverable #2: Geochemical Characterization of the Springer Expansion Project).
4	ML/ARD Management and Monitoring Plan	SRK	New deliverable	The existing ML/ARD Management Procedure Manual will be superseded by a new ML/ARD Management and Monitoring Plan to align with 2024 JAIR.
5	Evaluation of Acid-Base Accounting Procedures and the Criterion for Classifying ARD Potential of Waste Rock	SRK	SRK (2023b) will be updated based on review comments (update details provided in respective comments)	Updated to include data not available at the time of issuing SRK (2023b), address comments as described EMLI Round 1 comments (August 15, 2024), and align text with other Application sections to improve clarity.

Source: SRK 2024

2 Background

2.1 General Information and History

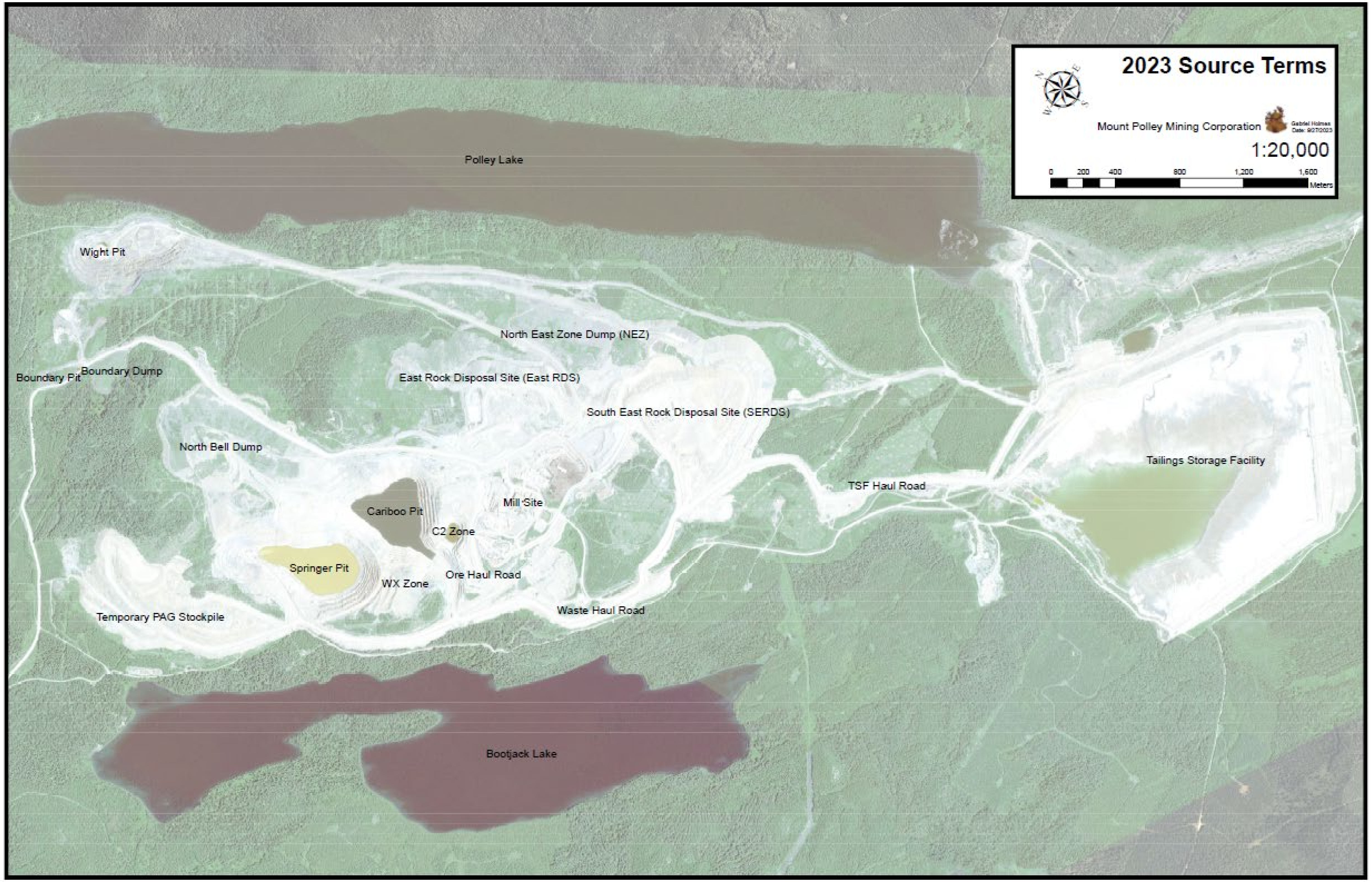
The MPM site layout showing open pits and waste rock dumps is shown in Figure 1. Full scale mining began in the Cariboo Pit in 1998 by mining high oxide and high gold parts of the ore body then transitioning to the Bell Pit in 1999. Mining was suspended in 2001 due to unfavorable market conditions. The mine re-opened in 2005 after a three-and-a-half-year care-and-maintenance period. The following zones have been mined since 2005:

- Completed mining and backfilling of the Bell Pit.
- Completed mining and backfilling of the small Southeast Zone and Pond Zone Pits.
- Completed mining and flooding of the Wight Pit (Northeast Zone).
- Completed mining of the Boundary Pit.
- Completed permitted mining and flooding of Northeast Zone underground (access from the Wight Pit).

In August 2014, mining was suspended due to the breach of the tailings dam. Mining restarted in 2015 with tailings being deposited in the Springer Pit. In 2016, tailings were deposited in the Tailings Storage Facility (TSF) following reconstruction of the dam.

In May 2019, mining was again suspended due to unfavourable market conditions, but mining operations restarted in November 2021 and milling operations resumed in June 2022. Active mining is currently focussed on the Cariboo and Springer Pits (which will merge to a single pit).

Figure 1 Mount Polley Mine Site Layout – Open Pits, Waste Rock Dumps, Major Haul Roads, and Tailings Storage Facility



Source: MPMC

2.2 Project Description

MPMC's current Life of Mine (LOM) plan is anticipated to run to 2025. MPMC is proposing to extend the existing pit infrastructure with the Springer Expansion Project (the Project). This extension will extend the mine life into the year 2032 and includes the following modifications:

- **Pit and waste rock dump extensions:** expansion of the Springer Pit in two phases (Phase 5 and Phase 6), as well as further mining of C2 Pit and pushback into the WX Zone, both near the current Cariboo Pit. PAG waste rock will be placed in the temporary Northwest PAG stockpile while non-PAG (referred to as NAG at MPM) waste rock will be placed in an extension of the existing Southeast Rock Disposal Site (SERDS). Magnetite will be continued to be temporarily stockpiled after separation from the tailings stream.
- **Disposal date of rehandled PAG waste rock in NW PAG Stockpile:** extension to the disposal timeframe of PAG waste rock into the completed Springer-Cariboo Pit.
- **Tailings storage expansion:** raise of the existing Tailings Storage Facility (TSF) to accommodate additional tailings from the extended mine life. No modifications in processing are proposed.
- **Treated water discharge to Quesnel Lake extension:** extend the discharge to Quesnel Lake to the end of mining operations in 2031.

2.3 Geological Setting

The Mount Polley deposit is classified as an alkalic porphyry copper gold deposit (BC MINFILE No. 093A 008). With the exception of the distinctive small Pond Zone, it has been mined from several mineralized zones which have the following common features:

- The host rock for porphyry mineralization is the Mount Polley Intrusive Complex (MPIC) which intruded into Nicola Group Volcanics (Figure 2). The MPIC is primarily monzonite to monzo-diorite in composition. Smaller phases vary in composition from diorite to syenite.
- Mineralization is associated with magmatic-hydrothermal breccias. Alteration and mineralization occur in the matrix of the breccias, and in veins and swarms distributed around the breccias. Distinct breccia units are subdivided by texture, composition, and alteration. Breccia 1 (BX1) is the main host for the bulk of the mineralization at MPM which is mined in the Cariboo and Springer Pits (Figure 2). BX1 is characterized by alteration which resulted in the strongest destruction of both primary and breccia textures. Breccia bodies BX2 host satellite mineralization in the Southeast Zone, Wight Pit, and Boundary Zone. BX2 is less intensively altered and original textures are more apparent. BX3 is unmineralized and has not been mined.
- Alteration at Mount Polley deposit is classified as potassic (sodic and calcic) with salmon-pink potassium feldspar as the main alteration mineral. Biotite is less common. Sodic alteration is defined by albite and calcic alteration (actinolite, diopside, epidote, clinozoisite, and sporadic andraditic garnet). Calcite is pervasive. Alteration is zoned with the strongest calcic-potassic

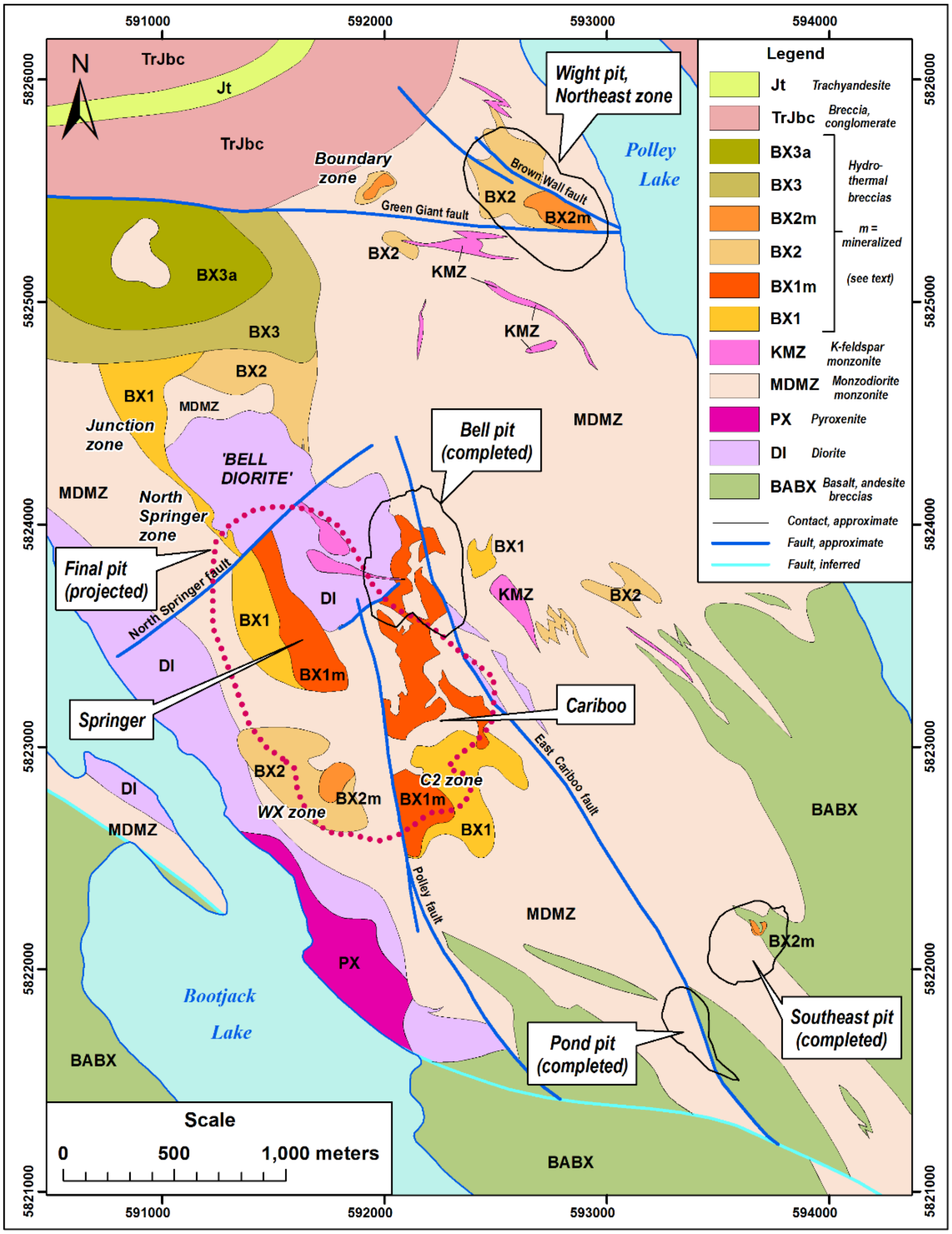
alteration in the core associated with BX1. Nicola Group rocks and fringing MPIC rocks are propylitically-altered and characterized by occurrence of epidote and pyrite.

- Like other alkalic porphyry deposits in BC (e.g., Copper Mountain, Brenda), MPM lacks the strong hydrothermal alteration zoning that is commonly observed in calc-alkalic porphyry deposits (e.g., Highland Valley Copper, Island Copper, Gibraltar). In particular, phyllic alteration is absent at MPM. A common feature of calc-alkalic porphyry deposits is often a pronounced pyritic halo that surrounds the copper mineralization and is associated with phyllic and propylitic alteration. At MPM, discontinuous pyritic zones are present. MPM geological staff identified a pyritic zone in the south wall of the Springer Pit which extends into the adjacent Cariboo Pit and into the WX zone. Samples from the Bell Pit blast holes collected in the early years of operations were identified as being from a pyritic zone but the location of this feature is not known.
- Sulphide mineralization consists mainly of chalcopyrite ($CuFeS_2$) and pyrite (FeS_2), with lesser bornite (Cu_5FeS_4), and minor covellite (CuS) and digenite (Cu_9S_5). Bornite is relatively more abundant in the Northeast and Boundary Zones in comparison to the other zones.
- Carbonate occurs principally as calcite, with occurrences of malachite ($Cu_2CO_3(OH)_2$) formed as a natural weathering product. Iron carbonates have not been identified.
- A significant portion of the copper mineralization at the MPM is not associated with sulphides (upwards of 50% in the upper portions of each pit). This fraction has been termed ‘copper oxide’ by MPM personnel and is associated primarily with chrysocolla ($(Cu,Al)_2H_2Si_2O_5(OH)_4 \cdot nH_2O$) and malachite ($Cu_2CO_3(OH)_2$) in equal proportions (Henry 2009). SRK (2015b) has shown that copper can be hosted within chlorite. It is assumed that chlorite formed hydrothermally and incorporated copper as part of the mineralizing event rather than due to weathering. Suarez et al. (2009) found that the form of copper in chlorite at the Aguablanca Ni-Cu-PGE sulphide deposit was native copper between silicate layers rather than as a substitution in the crystal lattice. It is not known whether this same form of copper is also present at MPM.

Copper mineralization at the small Pond Zone is classified as aandradite-clinopyroxene-magnetite skarn occurring at the contact between a diorite to monzodiorite intrusion and a localized occurrence of limesonte in the Nicola Group.

From an ML/ARD perspective, a significant feature of the Mount Polley mineralization is the lack of reported arsenic, lead, and zinc minerals. Since arsenic, zinc, and associated cadmium are relatively mobile under neutral to slightly alkaline conditions typical at the MPM, the lack of the minerals hosting these elements indicates that potential for leaching concerns is lower than other porphyries. Based on the copper sulphide and copper oxide dominated mineralogy, the primary metal leaching concern is expected to be copper. In addition, the lack of a distinctive pyrite halo means that pyrite abundance is lower than other porphyry deposits and ARD potential is expected to be lower.

Figure 2: Geological Map of the Mount Polley Mine



Sources: Rees (2013)

2.4 Climatic Setting

The current climate and hydrology characteristics near the Project location are described in the Baseline Climate Update Report (Golder 2022). The site is located on the eastern edge of the Fraser Plateau physiographic sub-division and within the Interior Cedar Hemlock bio-geoclimatic zone. The average annual precipitation is about 630 mm, typically falling during storm events in the summer months or as snowfall between November and March. Melt begins typically in mid-April, initiating freshet. Prevailing winds are from the southwest in the summer and from the northwest in the other seasons.

2.5 Operational Geochemical Monitoring Program

The ML/ARD Management Procedure Manual was developed by MPMC in 2016 with guidance by SRK. It was updated in 2022 to reflect requirement outlined in the current M-200 Permit and in 2023 to include the Springer Expansion. The objective of the ML/ARD Management Procedure Manual is to provide detail on how ML/ARD potential is considered in material management and outlines procedures for classifying and managing waste rock, tailings, LGO, and water treatment plant waste, as well as data collection and reporting (Table 2). Results of the program have been reported in annual ML/ARD monitoring reports (SRK 2023b, SRK 2024). An ML/ARD Monitoring Plan will be provided under separate cover, forming Deliverable #4 in Table 1

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Table 2: ML/ARD Monitoring Program

Material Type/Facility	Component	Purpose	Sampling Method	Total S	Total C	Element Scan	Shake Flask Extraction Test[1]	Water Sample[1]	Target Frequency
Waste Rock/In-Pit	Areas of known NAG waste rock	To confirm material is NAG and provide information for source terms	Composite sample of blasthole cuttings	X	X	-	-	-	1 in 40,000 t
Waste Rock/In-Pit	Areas of known PAG waste rock or suspected PAG/NAG waste rock boundaries	To define PAG/NAG boundaries and PAG material	Composite sample of blasthole cuttings	X	X	-	-	-	1 in 20,000 t
Waste Rock/In-Pit	Drill pulp samples	Additional source of data for site geochemical models	Random selection of an existing blasthole composite sample	-	-	X	-	-	Monthly
Waste Rock/Waste Rock Dump	NAG waste rock dump	As QA/QC to confirm waste is being appropriately characterized and handled	Composite sample of active crest	X	X	-	-	-	Weekly when NAG material is actively mined
Ore/In-Pit	Ore to be temporarily stockpiled rather than processed immediately	To classify material as NAG or PAG	Composite sample of blasthole cuttings	X	X	-	-	-	1 in 20,000 t
Tailings/TSF	Processed tailings	To classify material as NAG or PAG To support development of site geochemical models	Monthly composite sample of tailings produced from processing plant	X	X	X	-	-	Monthly when ore processing occurs
SERDS Co-Disposal Tailings	Tailings disposed in the SERDS co-disposal facility	To confirm material is NAG	Grab samples collected during deposition	X	X	-	-	-	Weekly when deposition occurs
SERDS Co-Disposal Tailings	Tailings disposed in the SERDS co-disposal facility	To characterize material from ML/ARD perspective	Grab samples collected during deposition	-	-	X	-	X	Monthly when deposition occurs
Water Treatment Plant Waste/WTP	Water Treatment Plant waste	To support development of site geochemical models To characterize material from ML/ARD perspective	Composite sample from wastewater exited the WTP prior to disposal to TSF	-	-	X	X	X	Quarterly

2.6 Springer Expansion Project Mine Plan

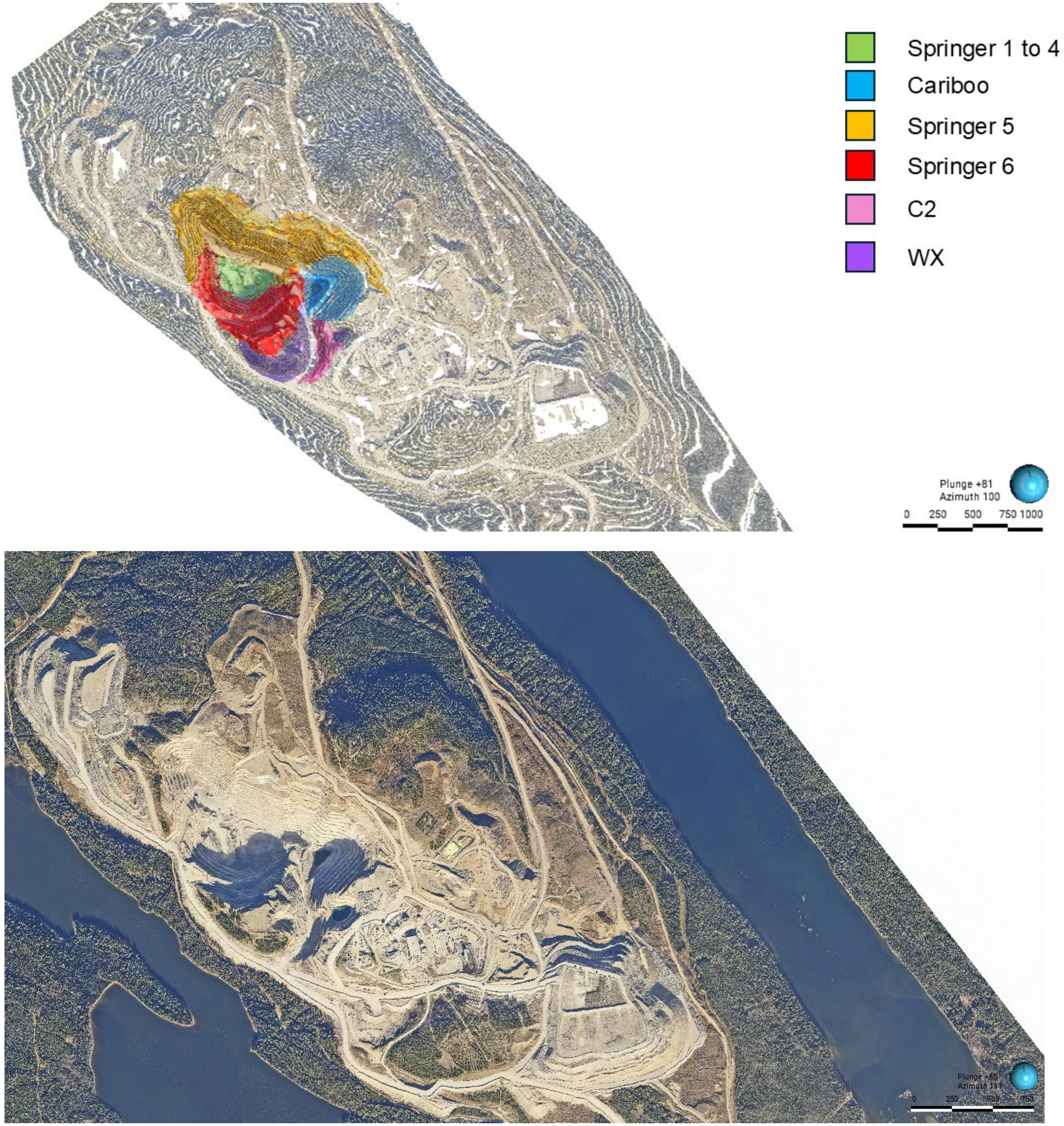
Figure 3 presents site orthophotos with and without the Springer Expansion pit shells included. The Project will use existing MPM ore processing infrastructure (e.g., the process plant, main power transmission infrastructure, water management structures, TSF, and site access roads).

Table 3 presents past produced and future tonnages of waste rock and ore while Table 4 presents forecasted proportions of NAG and PAG waste rock and ore according to the mine plan. Past produced rock tonnages were not partitioned into ore and waste rock for inventory, as this information was not provided to SRK. Table 5 presents future production of waste rock and ore by lithology.

Future waste rock and ore will be produced as part of the mine plan for the Springer Expansion Project. The mine plan identified five distinct mining zones that are planned to be produced from 2024 to 2032 (Figure 3 and Table 3). Note that Cariboo and Springer 1 to 3 have already been mined and Springer 4 is currently permitted and is being mined. The five zones that will be mined from 2024 to 2032 are summarized as follows:

- **Springer 4 to 6:**
    - Phased production will occur at the Springer Pit, continuing with the previously mined Springer 4, followed by Springer 5, then Springer 6 near the end of the mine life. Springer 4 comprises a minor proportion of the overall proportion of future waste rock and ore (0.15% and 8.4%, respectively), whereas Springer 5 and Springer 6 are major components of future production (>30 % for waste rock and ore).
    - Springer 4 and Springer 5 are dominantly NAG for both waste rock and ore (range of 87 to 98%) according to the mine plan mining schedule, whereas Springer 6 has a larger proportion of PAG waste rock and ore but is still primarily expected to be NAG (60% and 78% for NAG waste rock and ore, respectively).
- **C2:**
    - Produced early in the mine life (in 2025 and 2026) and comprises minor proportions of total future waste rock and ore production (1% and 4%, respectively).
    - C2 is expected to be dominantly NAG according to the mining schedule (88% of waste rock and 87% of ore are expected to be NAG).
- **WX:**
    - Produced at the end of the mine life (from 2029 until 2032) and comprises major proportions of overall future waste rock and ore production (33% and 18%, respectively).
    - WX has the highest proportion of PAG rock of all mining zones, with 55% of waste rock expected to be NAG and ore being mostly PAG (69%).

Figure 3: Site Orthophotos with the Springer Expansion Pit Shells (Above) and Without the Pit Shells (Below)



Source: MPMC

Table 3: Tonnage (Mt) of Waste and Ore Produced to 2024 and to Life-of-Mine in 2032 by Source

Mine Phase	Springer			Cariboo	C2	WX
	Springer 1 to 4	Springer 5	Springer 6			
Produced from 1998 to 2024						
Mined Rock - NAG	120	9.6	--	81	--	--
Mined Rock - PAG	23	0.32	--	21	--	--
Planned 2024 to 2032						
Waste - NAG	0.21	49	29	--	1.8	27
Waste - PAG	0.018	1.2	19	--	0.26	23
Ore - NAG	4.6	22	16	--	2	3.5
Ore - PAG	0.7	0.91	4.5	--	0.29	7.6

Table 4: NAG and PAG Proportions Produced to 2024 and to Life-of-Mine in 2032 by Source

Mine Phase	Springer			Cariboo	C2	WX
	Springer 1 to 4	Springer 5	Springer 6			
Produced from 1998 to 2024						
Mined Rock - NAG	84%	97%	--	79%	--	--
Mined Rock - PAG	16%	3%	--	21%	--	--
Planned 2024 to 2032						
Waste - NAG	92%	98%	60%	--	88%	55%
Waste - PAG	8%	2%	40%	--	12%	45%
Ore - NAG	87%	96%	78%	--	87%	31%
Ore - PAG	13%	4%	22%	--	13%	69%

Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

Production of future waste rock and ore by lithology was provided by MPMC geologists (Table 5). Only major lithologies (breccia, monzodiorite-monzonite, pseudo-breccia and monzonite-monzodiorite porphyry) were considered in the production data, which was based on the geological model described in MPMC (2025). Other minor units are present, but these were grouped into the major lithology domains.

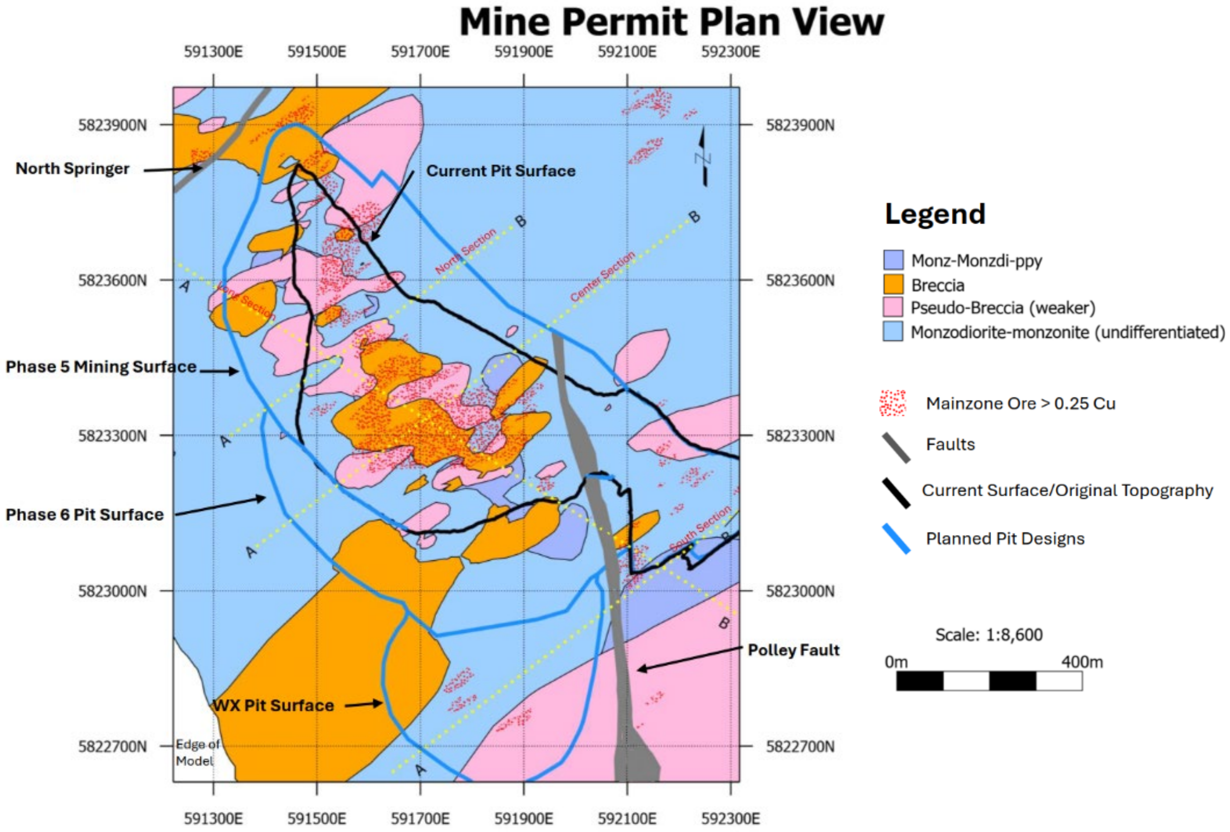
Monzodioirite-monzonite comprises the largest proportion of future production (53%), followed by breccia and pseudo-breccia (20% and 23%, respectively), with monzonite-monzodiorite porphyry comprising the lowest proportion (3.8%). As described in MPMC (2025), the geological framework at MPM is expected to be consistent throughout the deposit area and no significant changes to the main rock types and ore characteristics are expected. Figure 4 shows the geology plan view of the Springer Expansion Project. Geology cross sections provided by MPMC showing the planned pit designs are presented in Figure 5.

Table 5: Tonnage (Mt) of Future Waste and Ore Produced to Life-of-Mine in 2032 by Lithology

Lithology	Material Produced (Mt)				Proportion (by Lithology, %)
	NAG Waste Rock	PAG Waste Rock	Ore	Total (by Lithology, MT)	
Breccia	19	7.2	20	47	20%
Monzodiorite-monzonite	67	28	26	120	53%
Pseudo-Breccia	24	8.1	20	52	23%
Monzonite-Monzodiorite-porphyry	3.4	2.9	2.4	8.6	3.8%

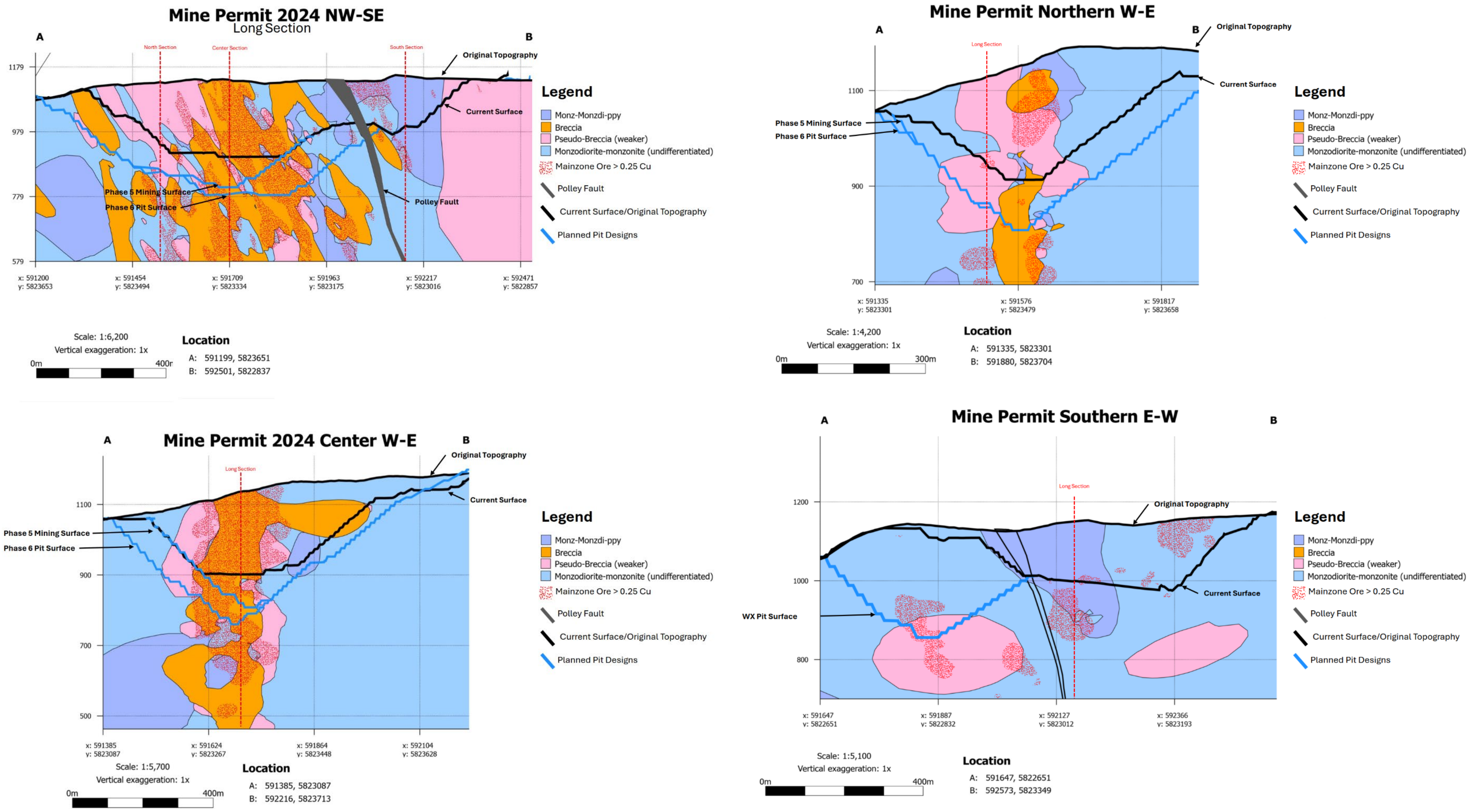
Source: MPMC, https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx

Figure 4: Geology Plan View of Springer Expansion Project (990 masl)



Source: MPMC 2025

Figure 5: Geological Cross Sections of the Springer Expansion Plan Permit Area: Long Section (Top Left), Northern Section (Top Right), Center Section (Bottom Left), and Southern Section (Bottom Right)



Source: MPMC 2025

3 Geochemical Characterization

3.1 Conceptual Geochemical Models

3.1.1 Overview

Conceptual geochemical models (CGMs) were developed to synthesize current understanding of the geochemical characteristics of mined materials thereby providing the basis for design of a site-specific geochemical characterization program for the proposed mining activities. The current understanding is based mainly on the geological setting and mine plan, and previous geochemical data collected as part of the on-going assessment of ML/ARD potential (e.g., SRK 2023ba, 2024a). The long-term weathering behavior is also established based on decades of extensive seepage monitoring.

3.1.2 General CGM for Waste Rock

The majority of waste rock and ore at MPM is NAG, as indicated by past geochemical characterization (SRK 2023b), forecasted NAG and PAG waste rock proportions in the mine plan (Table 4) and past geochemical characterization. Results of previous geochemical characterization studies on the MPM waste rock (including construction fills) indicate:

- Oxidation of sulphides (pyrite, chalcopyrite, and bornite) may release iron, acidity, sulphate, and trace elements contained in the sulphides. Copper is expected to be primarily released by oxidation of chalcopyrite and bornite. Iron released by oxidation of sulphides replaces pyrite and other sulphides as solid iron (III) oxyhydroxides. Iron concentrations in the drainage are expected to be at or near detection limits.

- The oxidation reaction is exothermic (releases heat) and is expected to result in average internal temperatures that are higher than ambient average temperatures. During winter, internal temperatures will be higher than ambient temperatures.

- Due to the temperature difference in winter, air will move by advection through the waste rock by convection. Cold air will be drawn in through coarser materials at the base formed by end-dumping. The heated air will exit the dump at a higher elevation. This process is expected to result in deep penetration of oxygen and generally an over-supply of oxygen for oxidation of sulphides.

- Neutralization of acidity produced by the oxidation reaction will be by reaction with calcite or mixing with alkaline waters resulting in neutral to slightly alkaline pHs. The pH of contact waters will be determined by the partial pressure of carbon dioxide in pore gases (lower pH with higher CO_2).

- For non-PAG waste rock the neutral to slightly alkaline pH weathering environment will result in precipitation of metals as various secondary minerals, including gypsum ($CaSO_4 \cdot 2H_2O$), metal oxides (tenorite - CuO), metal carbonates (malachite – $Cu_2CO_3(OH)_2$), and metal silicates (e.g., chrysocolla). Adsorption to secondary oxides will also occur. The resulting concentrations of metals (principally copper) in contact waters will be controlled by the relatively low solubility of the secondary minerals and the tendency to be adsorbed at these pHs.

- Selenium and molybdenum originate from oxidation of pyrite, but form oxyanions that are mobile at the expected pH. The concentrations of these trace elements are expected to increase.

- There is a hydraulic lag between when waste is placed, and its signature appears at seepage monitoring locations.

- Due to the solubility control exerted by secondary minerals, contact water chemistry is expected to be constrained so that chemical loadings are directly proportional to infiltrating water volume. Sulphate is expected to increase as new waste is added but will be constrained by gypsum solubility.

- Segregated and exposed ex-pit PAG waste rock is present in the Temporary NW PAG Stockpile located adjacent to the Springer Pit. PAG rock at MPM is not defined by a particular rock type but is associated with pyrite zone formed by hydrothermal alteration. Sulphide content is higher than NAG waste rock.

- Due to the higher sulphide content of PAG waste rock, the overall oxidation rate of PAG waste rock is expected to be greater than NAG waste rock. However, before acidification occurs, PAG and NAG weathering conditions are expected to be similar with secondary minerals exerting solubility controls. For example, the solubility of sulphate is expected to be controlled by gypsum which will be similar regardless of the sulphide oxidation rate.

- Due to the availability of carbonate to delay onset of acidic conditions of PAG waste rock, acidification is expected to take decades to progress with early contact waters remaining slightly alkaline and having metal concentrations controlled by the solubility of secondary minerals. The timeframe for development of acidic conditions for PAG waste rock is expected to be on the order of decades.

3.1.3 Existing Waste Rock

Existing waste rock at the site is composed of the major rock types indicated in Section 2.3. Overall, the weathering conditions have been dominantly basic. Seepage from non-PAG waste rock is neutral to slightly alkaline and is expected to remain neutral due to the abundance of acid neutralizing carbonate. Existing non-PAG rock disposal sites and constructions fills will remain in situ, but PAG waste rock in the Temporary NW PAG stockpile will be rehandled and placed into the completed Springer-Cariboo Pit at completion of mining.

Existing backfilled pits included the Bell Pit (completely full), the Southeast Zone Pit (completely full), the Pond Zone Pit (completely full), the Wight Pit (partially full), and Cariboo Pit (partially full). Backfilling of currently filled pits occurred during operation so that run-of mine waste rock was directed immediately to a backfill location. The water level has risen in most of these pits resulting in complete submergence of PAG rock and partial submergence of NAG rock. PAG rock in the Cariboo Pit remains subaerial due to drawdown of the water table as operations continue in these pits.

3.1.4 Future Waste Rock

Based on the geological setting, and existing sampling results, future waste rock is expected to have a similar composition as existing waste rock. The exception is that future ore-grade cut-offs will be lower than during previous mining resulting in lower copper concentrations in waste rock.

The main factor concerning future performance of waste rock and the need for active management, is in the case where PAG components of the waste rock are encountered. There is a higher proportion of PAG waste rock in Springer 6 and WX zones.

3.1.5 Pit Walls

Exposed pit walls will remain in the Springer-Cariboo Pit, Wight Pit and Boundary Pit. All other pits have been backfilled resulting in pit wall reactive surfaces becoming part of the backfill. Final pit walls can be expected to be composed of rock with similar characteristics to the future waste rock. Final development in Springer 6 and WX zones will also present the potential for PAG material remaining in the final pit walls.

3.1.6 Tailings

Tailings will have lower sulphide content than ore due to the removal of sulphide minerals during flotation. At MPM, the low iron sulphide content of ores results in tailings containing low sulphide concentrations and having low ARD potential (SRK 2023b).

3.2 Study Design

3.2.1 Overview

The geochemical existing conditions study was designed with the primary objective of determining if the conceptual models described above can reasonably be applied to the Project. Sampling programs were designed to confirm that wastes would leach dominantly neutral pH conditions, and that trace element distribution would lead to similar leaching characteristics as observed at MPM.

This objective was addressed through review of available supporting geochemical data of the different Project components (e.g., future waste rock, low grade ore (LGO), and ore) with comparison to results from historical geochemical characterization and ML/ARD monitoring programs.

Sampling of water management structures as well as cut and fill for roads and other infrastructure including fill for buildings and laydown areas was not required because the Project will use existing MPM infrastructure (see Section 2.6).

The ML/ARD characterization program for the Project was focused on:

- Review of available geochemical datasets for the Project.
- Characterizing the geochemical composition of future ore, LGO, waste rock, and tailings, with comparison of characteristics to existing waste materials from previous mining.
- Verifying that existing waste rock can be used as analogues for the long-term weathering behavior of future waste rock.
- Identify gaps in sample or study coverage.

The main assumption for this work is that there will be no fundamental differences between the geological and geochemical characteristics of wastes generated by past mining and projected to be generated by future mining as part of the Project. The assumption is supported by the strong geological understanding of the MPM deposits, and copper porphyry deposits in BC in general.

3.2.2 Limitations

Overburden has not been characterized as part of this study; however, it is expected be a small proportion of overall waste (less than 1%) as most of the overburden within the extents of the pit footprint has been previously mined.

The latest geological model (December 2024) provided by MPMC geologists contains select major lithologies (breccia, monzodiorite-monzonite, pseudo-breccia and monzonite-monzodiorite porphyry) and groups minor lithologies into the major lithologies. Accordingly, planned production of future waste rock and ore by lithology was presented only by the major lithologies in the geological model (Table 5). For the purposes of geochemical characterization, samples of select minor lithologies (e.g., diorite) were considered as separate lithologies.

Metallurgical tailings generated from testing of Springer 5, Springer 6, C2 and WX zones were also not available for geochemical testing at the time of reporting. Because the processing of the ore for the Project will use the same standard flotation technology that is currently being used, ore and LGO from these zones were initially compared to previously mined rock in this study to determine if similar characteristics of future ore and LGO are anticipated in these zones. Further testing of future tailings is still recommended.

3.3 Methods

3.3.1 Overview of Existing Datasets

Table 6 provides a summary of the available supporting data for geochemical characterization. More detail of available datasets is provided in the following subsections. SRK assumes that the data provided by MPMC has been evaluated using quality assurance and quality control procedures and is deemed acceptable for reporting purposes.

Table 6: Supporting Data for Geochemical Characterization

Waste Type	Facility	Mine Plan	Supporting Data	Section
Rock	Existing waste rock dumps, including waste rock	Remain as-is, or cover by new waste rock	- ML/ARD monitoring samples from production waste rock, including blast hole samples and samples of placed NAG waste rock (confirmatory samples). - Drill core samples from exploration geochemistry dataset. - Humidity cell tests completed on different rock types. - Extraction tests on placed NAG waste rock	3.3.2
	PAG waste rock in Temporary NW PAG Stockpile	Re-handle and place in Springer-Cariboo Pit backfill	- ML/ARD monitoring samples from production waste rock, including blast hole samples and placed NAG waste rock. - ML/ARD samples from drill hole dataset.	3.3.2
	Future waste rock – Springer 5, Springer 6, C2, WX	Placed in expanded SERDS (NAG rock) or Temporary NW PAG Stockpile (PAG rock)	- Drill core samples from exploration geochemistry dataset.	3.3.3
	Future pit walls – Springer 5, Springer 6, C2, WX	Pushbacks from current pit boundaries	- Drill core samples from exploration geochemistry dataset.	3.3.3
Tailings	Existing tailings in TSF	Disposed in TSF	- ML/ARD monitoring samples from production tailings. - Humidity cell tests completed on spilled tailings.	3.3.4
	Future tailings	Dispose in TSF	- Drill core samples of ore from exploration geochemistry dataset to understand future ore characteristics.	3.3.3

3.3.2 Existing Mined Rock Datasets

Static Testing Sample Set

Table 7 summarizes the sample inventory for the existing mined rock dataset.

Table 7: Sample Inventory by Area, Existing Mined Rock Dataset

Source	Drill Core	Blast Hole	Confirmatory[1]	Total
Boundary Zone	16	123	0	139
Bell Pit	0	78	25	103
Wight Zone	102	0	0	102
SE Zone	52	132	0	184
Pond Zone	27	174	0	201
Springer 1 to 4	2,210	925	9	3,144
Cariboo Pit	1,004	2,877	60	3,941
Total	**3,411**	**4,309**	**94**	**7,814**

Source:
https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/Source_Terms/[Compiled_Geochem_Data_CAPR002434_Rev02_SJL_KWJ.xlsm]

Notes:

[1] Includes blast muck and post-depositional samples where source of rock is known.

The existing mined rock dataset consists of 7,814 samples from previously mined areas and does not include any samples that are part of the Springer Expansion area. The sample set consists of static ABA potential data and trace element scans by aqua regia digestion followed by ICP-MS analysis (AR ICP), except for the Boundary Zone which only had ABA data. Trace element data only considered samples with aqua regia (AR) digestion and samples analyzed by other methods (e.g., four-acid digestion) were not considered as part of the dataset, as the difference in analytical methods materially affects results.

A subset of these samples were geologically logged (3,445 samples), most of which were from Springer 1 to 4 and only had AR ICP results (no ABA data). Lithological classifications were applied to the samples using Leapfrog, the most recent (December 2024) geological model provided by MPMC geologists, and a guide provided by MPMC geologists to group geological logging codes to the model solids. A summary of the sample set classified by lithology is presented in Table 8. Existing mined rock samples were not coded as ore, low grade ore, or waste rock as these classifications were not provided to SRK, and so were not grouped by material type.

Table 8: Sample Inventory by Lithology, Existing Mined Rock Dataset

Lithology	Number of Samples
Breccia	1,887
Monzodiorite-monzonite	869
Pseudo Breccia	51

Lithology	Number of Samples
Monz-Monzdi-ppy	511
Diorite	74
Intermediate	25
Skarn	128
Total	3,445

Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

Extraction Testing Sample Set

The Mines Act Permit M-200 amended on August 2, 2000, required that “oxidized” samples be tested for solubility using the Shake Flask Extraction (SFE) method of Price (2009). The definition of “oxidized” was not provided in the permit. Nine samples of the -2 mm fraction of blasted rock were submitted for the procedure in 2001. Eight samples of ore stockpile rock were also tested in 2015 as part of a Mines Act Permit M-200 requirement to evaluate closure requirements for the stockpiles (SRK 2015b).

Kinetic Testing Sample Set

Humidity cell tests (HCTs) were performed on 15 samples in support of geochemical characterization for permitting of mining of the Wight Pit (Northeast Zone), Southeast Zone, Boundary Zone, Springer Pit (Phases 1 – 4), and Pond Zone. The samples were generally selected to evaluate oxidation rates for typical and elevated sulphide concentrations. Samples from the Pond Zone were submitted for an acid-leaching procedure to remove carbonate and evaluate the reactivity of silicate minerals. All HCTs have been terminated.

Analytical Methods

Samples in the existing dataset were analyzed for total carbon and total sulphur by LECO induction furnace at the Mount Polley laboratory or an external laboratory. A small subset of samples was also analyzed for sulphate, total inorganic carbon (TIC) and Sobek neutralization potential at an external laboratory. Samples were also analyzed for trace elements (37 elements) by aqua regia digestion followed by ICP-ES or ICP-MS analysis at an external laboratory.

The samples submitted for SFE were screened to -2mm and followed the method described in Price (2009). Leachates were analyzed for the following parameters:

- Physical tests: moisture percent, pH, conductivity.
- Anions and nutrients: total alkalinity, chloride, nitrate, sulphate.
- 32 element scan by ICP-MS.
- Low-level mercury.

Leachates from the HCTs were analyzed for pH, total acidity, total alkalinity, sulphate, and 35 element scan by ICP-MS.

3.3.3 Future Waste Rock, Ore, and Low-Grade Ore Datasets

Exploration and AR ICP Sample Set

Table 9 summarizes the sample inventory for the exploration and AR ICP datasets.

Table 9: Sample Inventory, Future Exploration and Aqua Regia ICP Datasets

Source	Drill Core - Exploration	Drill Core – AR ICP
C2	2,396	90
Springer 5	7,683	1,438
Springer 6	8,758	1,590
WX	6,297	121
Total	25,134	3,239

Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

The complete exploration dataset consisted of 272,204 drill core samples, with 25,134 samples determined to be in the pit shell for the Springer Expansion Project area and geologically logged. Of the exploration samples in the Springer Expansion area, 3,239 samples were analyzed for trace elements by AR ICP. The AR ICP dataset comprised of samples that were collected in 2003, 2004, 2008, 2009, 2011, 2012, and 2020. Samples analyzed by other methods (e.g., four-acid digestion) were not considered as part of the dataset, as the difference in analytical methods materially affects results.

Lithological classifications were applied to the samples using Leapfrog 3D software, the most recent (December 2024) geological model provided by MPMC geologists, and a guide provided by MPMC geologists to group geological logging codes to the model solids. As instructed by MPMC engineers, economic classifications for ore and LGO were determined by applying copper cut-off grades of 0.2% and 0.1%, respectively, to the sample set, with samples under the LGO cut-off grade being classified as waste rock.

The distribution of lithologies in both datasets were similar (Table 10). Compared to the exploration dataset, the AR ICP dataset had proportionally fewer breccia and more pseudo breccia samples at the C2 zone, proportionally more breccia and fewer monzodiorite-monzonite samples at Springer 6, and fewer breccia and monzodiorite-monzonite samples and more pseudo-breccia samples at the WX zone. Compared to planned production of future waste rock and ore (Table 5), the major lithologies are well represented by the AR ICP dataset for all mining areas, although generally there are proportionally more breccia samples and fewer monzodiorite-monzonite samples.

Table 10: Summary of Future Exploration and Aqua Regia ICP Datasets by Lithology

Lithology	Exploration				AR ICP			
	C2	Springer 5	Springer 6	WX	C2	Springer 5	Springer 6	WX
Number of Samples	**2396**	**7683**	**8758**	**6297**	**90**	**1438**	**1590**	**121**
Breccia	57%	41%	37%	33%	27%	35%	51%	21%
Monzodiorite-monzonite	17%	34%	34%	35%	13%	28%	18%	18%
Pseudo-Breccia	8%	12%	15%	19%	29%	22%	14%	52%
Monz-Monzdi-ppy	14%	6%	8%	7%	12%	14%	17%	8%
Diorite	2%	7%	2%	2%	0%	0%	0%	0%
Mafic	0%	1%	2%	4%	0%	0%	0%	0%
Intermediate	1%	0%	0%	0%	0%	0%	0%	0%
Skarn	1%	0%	1%	0%	19%	0%	0%	0%

Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

ABA Sample Set

Table 11 summarizes the sample inventory for the future ABA sample set.

Table 11: Sample Inventory, Future ABA Dataset

Source	Drill Core	Drill Core (with Geology)
C2	198	19
Springer 5	117	117
Springer 6	2,388	2,388
WX	2,032	2,032
Total	4,735	4,556

Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

The future ABA dataset contains 4,735 samples in the Springer Expansion area (4,556 samples that were geologically logged). ABA samples were collected in 2004, 2006, 2007, 2009, 2010, 2011, and 2012.

Lithological classifications were applied to the samples using Leapfrog 3D software, the most recent (December 2024) geological model provided by MPMC geologists, and a guide provided by MPMC geologists to group geological logging codes to the model solids. As instructed by MPMC engineers, economic classifications for ore and low-grade ore (LGO) were determined by applying copper cut-off grades of 0.2% and 0.1%, respectively, to the sample set, with samples under the LGO cut-off grade being classified as waste rock.

Table 12 presents a summary of the ABA samples by lithology. Notably, there are limited samples in C2 and Springer 5 that were geologically logged. Springer 6 and WX had sufficient samples of the major lithologies found at MPM. Compared to planned production of future waste rock and ore (Table 5), there are gaps in the major lithologies at MPM in the C2 and Springer 5 areas. At C2, there are no breccia or pseudo-breccia samples and at Springer 5, there are no pseudo-breccia samples and only one sample of monzonite-monzodiorite porphyry.

Table 12: Summary of ABA Dataset by Lithology

Lithology	ABA Dataset			
	C2	Springer 5	Springer 6	WX
Number of Samples	**19**	**117**	**2,388**	**2,032**
Breccia	0%	25%	23%	42%
Monzodiorite-monzonite	58%	74%	42%	28%
Pseudo-Breccia	0%	0%	18%	16%
Monz-Monzdi-ppy	5%	1%	8%	7%

Lithology	ABA Dataset			
	C2	Springer 5	Springer 6	WX
Diorite	37%	1%	3%	2%
Mafic	0%	0%	5%	5%
Intermediate	0%	0%	0%	0%
Skarn	0%	0%	0%	0%

Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

Kinetic Testing Sample Set

HCTs were performed on four samples representing future waste rock (HCT IDs: HC-17 to HC-20) in support of geochemical characterization for permitting of mining of Springer Pit Phase 6 and WX. The samples were generally selected to evaluate oxidation rates and leachate characteristics from samples representing future waste rock with typical and elevated sulphide concentrations. All four HCTs are continuing.

Analytical Methods

Samples in the ICP dataset were analyzed for trace elements (37 elements) by aqua regia digestion followed by ICP-OES or ICP-MS analysis at an external laboratory.

Samples in the ABA dataset were analyzed for total carbon and total sulphur by LECO induction furnace at the Mount Polley laboratory or an external laboratory. A small subset of samples was also analyzed for TIC and Sobek neutralization potential at an external laboratory.

Leachates from the HCTs were analyzed for pH, total acidity, total alkalinity, sulphate, chloride, fluoride, hardness, and 35 element scan by ICP-MS.

3.3.4 Existing Tailings Dataset

Static Testing Sample Set

A summary of available data is presented in Table 13. Monthly composite samples of tailings have been collected in the mill when processing since 1997. Tailings samples were also collected from the banks of Hazeltine Creek in 2014 after the TSF breach (“spilled tailings”) along eighteen parallel transects oriented perpendicular to the course of Hazeltine Creek, as described in SRK (2015a). Two types of tailings-bearing samples were observed along Hazeltine Creek. They were classified in the field as ‘grey tailings’ and ‘magnetite sands’. This classification was based on physical and mineralogical characteristics as follows:

- Grey tailings were dominantly grey in colour and had a finer texture (silty sand) than the magnetite sands. They had a strong reaction (referred to as “fizz”) with 10% HCl and did not contain sulphide minerals that were visible by examination with a hand lens. Mineral identification was difficult due to small grain size, but the dominant minerals included potassium feldspar and plagioclase, with minor biotite mica and quartz.

- Magnetite sands were speckled pinkish-orange and black. They were strongly magnetic and coarser (sand) than the grey tailings. They had weak fizz and trace (less than 1%) sulphide minerals were infrequently noted. The dominant minerals identified included plagioclase feldspar and magnetite. Biotite mica and quartz appeared more abundant than in the grey tailings.

Table 13: Static Test Inventory for Tailings

Tailings Type	Number of Samples
Monthly Composite – Final Tailings	166
Grey Tailings	40
Magnetite Sand	20
Grey Tailings/Magnetite Sand Mix	8

Source: https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/Source_Terms/Compiled_Geochem_Data_CAPR002434_Rev02_SJL_KWJ.xlsm

Kinetic Testing Sample Set

Six samples of tailings collected from Hazeltine Creek following the dam failure were tested in humidity cells starting in 2015. Currently, two of these tests (HC-3 and HC-4) are continuing, while the rest were terminated after 64 weeks.

Three of the samples were also being tested in columns using a trickle leach applied at less than 0.1 L/kg/week (compared to flood leach of 0.5 L/kg/week for humidity cells). The samples were selected to represent visually distinctive tailings materials (magnetite sand and grey tailings). The samples were dominated by tailings solids but also contained native materials (mineral and organic soils, and glacial sediments entrained in the debris flow). The samples characterize weathering behaviour for a range of sulphur concentrations which align with typical characteristics of tailings in the impoundment. The columns have operated for over 400 weeks.

Analytical Methods

Samples in the AR ICP dataset were analyzed for trace elements (37 elements) by aqua regia digestion followed by ICP-MS analysis at an external laboratory.

Samples in the ABA dataset were analyzed for total carbon and total sulphur by LECO induction furnace at the Mount Polley laboratory or an external laboratory. A small subset of samples was also analyzed for total inorganic carbon (TIC) and Sobek neutralization potential at an external laboratory.

A split of the solids used for the HCTs and columns were analyzed for total sulphur, total carbon, sulphate sulphur by HCl leach, TIC, trace elements (37 elements) by aqua regia digestion, and mineralogy by XRD. Weekly analyses of leachate included volume recovered, pH, and conductivity. The following parameters were measured weekly for the first four weeks and then every two weeks thereafter:

- Acidity, alkalinity, oxidation-reduction potential (ORP), sulphate, nitrate, nitrite, ammonia.
- Bromide, chloride, fluoride, orthophosphate, total phosphorus.
- 35 element scan by ICP-MS.
- Low level mercury.

3.3.5 Data Interpretation

Sulphur Speciation and Acid Potential

As established in SRK (2023a) total sulphur is a proxy for sulphide sulphur in rock and tailings because other forms of sulphur (including sulphate) are not common at MPM. Accordingly, acid potential (AP) is calculated using total sulphur:

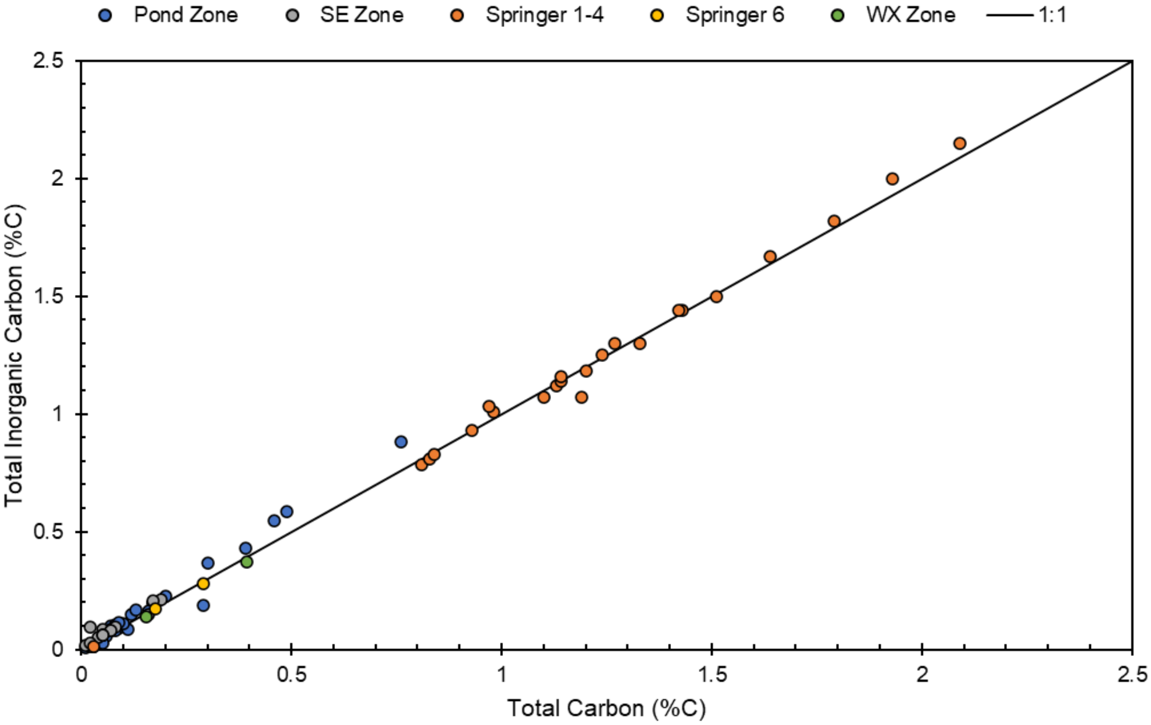
$$\text{AP [kg CaCO}_3\text{/t]} = 31.25 \times \text{Total Sulphur [\%]}$$

Carbon Speciation and Neutralization Potential

Total carbon (TC) was determined to be a proxy for reactive carbonate minerals (SRK 2023b). The assumption is supported by the observed dominance of calcite confirmed by detailed mineralogy, the lack of reported iron carbonate and the strong correlation and equivalence of total carbon and total inorganic carbon (TIC), presented in Figure 4. The dominant plutonic geological setting also supports the lack of non-carbonate carbon. As TC equals TIC, NP is represented by carbonate content as represented by TC (NP*). NP* is calculated as follows:

$$\text{NP* [kg CaCO}_3\text{/t]} = \text{TC(\%)} \text{ x } 83.33$$

Figure 6: Comparison of Total Carbon and Total Inorganic Carbon



Source:
https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/Source_Terms/[Compiled_Geochem_Data_CAPR002434_Rev02_SJL_KWJ.xlsm]

As detailed in SRK (2023b), NP is not represented by Sobek NP because Sobek NP typically exceeds NP* and reflects the digestion of reactive silicates which are found in some areas at MPM.

ARD Potential

According to the *Mines Act* Permit M-200, the ARD potential of MPM materials are classified using the following criteria for neutralization potential (NP) and acid generating potential (AP):

- NP/AP greater than 2 is classified as NAG.
- NP/AP less than 2 is classified as PAG.

Metal Leaching Potential

Enrichment of trace elements was evaluated by comparison with global average values in high calcium granite (Price 1997). Values an order of magnitude greater than (i.e., exceeding 10 times) the global average are considered “enriched”. Past geochemical characterization and monitoring has identified copper and selenium in particular as having a high metal leaching potential as MPM (SRK 2023b).

4 Results

4.1 Existing Mined Rock

4.1.1 Overview

Previous waste rock sampling programs consisted of diamond drill core tested prior to mining, blast hole cuttings to inform waste rock management operations in the pit during operations, and post-depositional monitoring. Sample inventory for existing mined rock is presented in Table 7. Results for core and blast hole cutting samples that were provided to SRK were not coded as waste rock, LGO, and ore. Therefore, the following subsection describes results for all rock samples and are grouped by area and/or geology where available.

Past geochemical characterization work (e.g., SRK 2023b) considered geochemical variability by mining area but did not present the geochemical characteristics of waste rock by lithology. The following subsections provide a complete assessment of waste rock geochemistry by both lithology and mining area.

4.1.2 ARD Potential

Figure 5 shows the distribution of total sulphur and sulphate by area and Figure 6 shows the distribution by lithology. Distributions by lithology were not grouped by area due to the overall limited number of ABA samples that were geologically logged (Section 3.3.2).

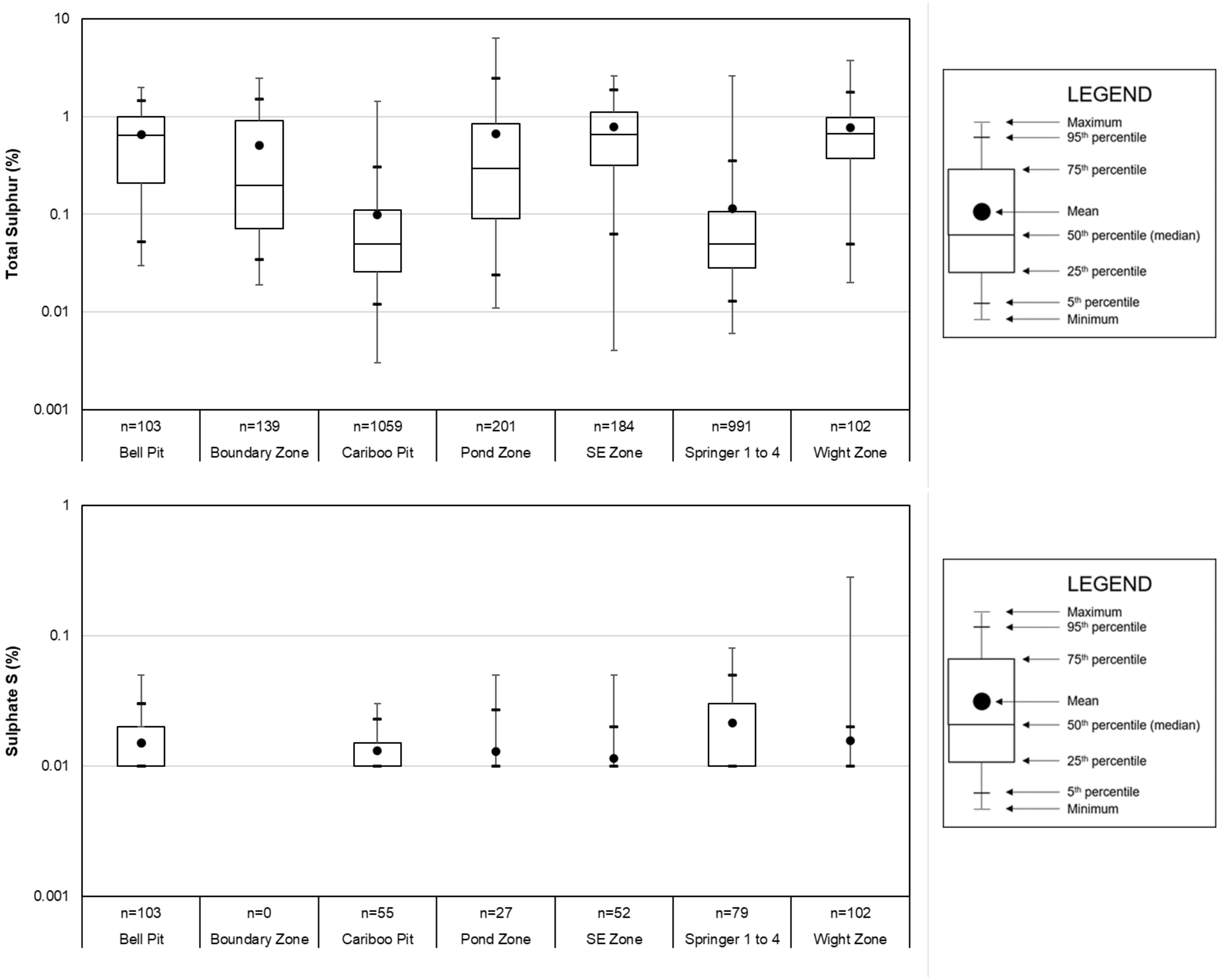
Sulphate concentrations were uniformly low, with mean concentrations near the detection limit of 0.01% and no substantial differences between areas or by lithology. No sulphate data were available for the Boundary Zone.

Most mining areas have similar statistical distributions for total sulphur concentrations (mean concentrations between 0.5% to 0.8%) except for the Cariboo and Springer 1 to 4 areas, which showed lower total sulphur concentrations (mean concentrations of 0.098% and 0.11%, respectively).

Total sulphur content by lithology was generally comparable, with all lithologies showing mean concentrations between 0.36% to 0.9% except for unclassified samples which had overall lower sulphur content (mean of 0.2%). Lower sulphur for unclassified samples may be due to the majority being Cariboo and Springer 1 to 4 samples, which have lower sulphur content compared to other areas (Figure 5).

Comparison of NP* and AP for existing mined rock showed that the Pond Zone and Southeast Zone are dominantly PAG whereas the Boundary Zone, Cariboo Pit, Springer 1 to 4, and the Wight Zone are dominantly NAG (Figure 7). These plots illustrate that PAG rock generally has higher sulphide content in comparison to NAG rock because NP* is relatively consistent regardless of sulphide content. No NP* and AP comparison trends were observed by lithology (Figure 8), indicating that lithology is not a control on waste rock ARD classifications at MPM, and ARD classifications are primarily dependant on sulphur content.

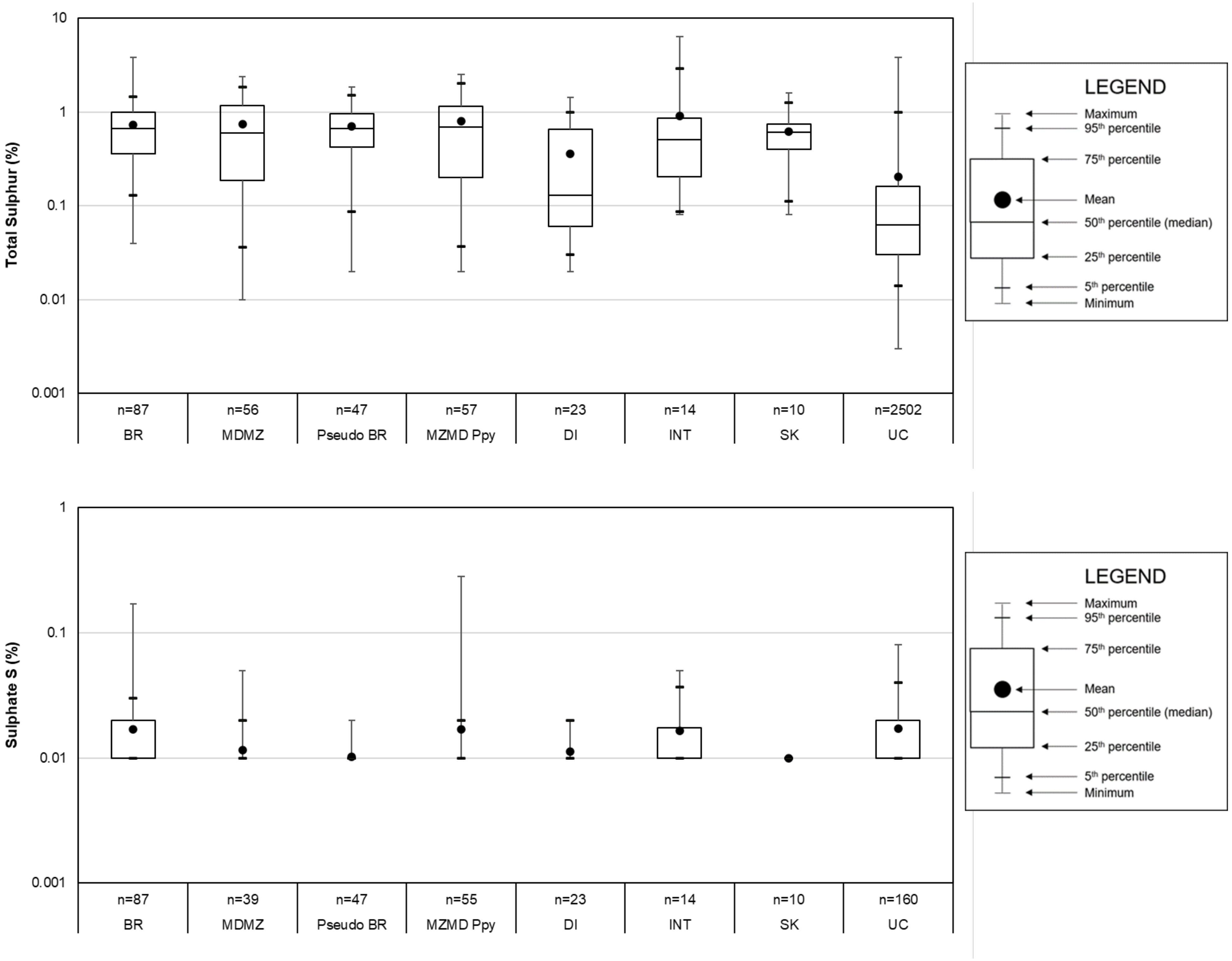
Figure 7: Existing Mined Rock Total Sulphur and Sulphate Statistical Distributions by Area



Source: https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/Source_Terms/[Compiled_Geochem_Data_CAPR002434_Rev02_SJL_KWJ_ForCharacterizationReport.xlsx]

Note : The absence of boxes in the sulphate plot above is due to low concentrations resulting in the 25th percentile value equaling the 75th percentile value.

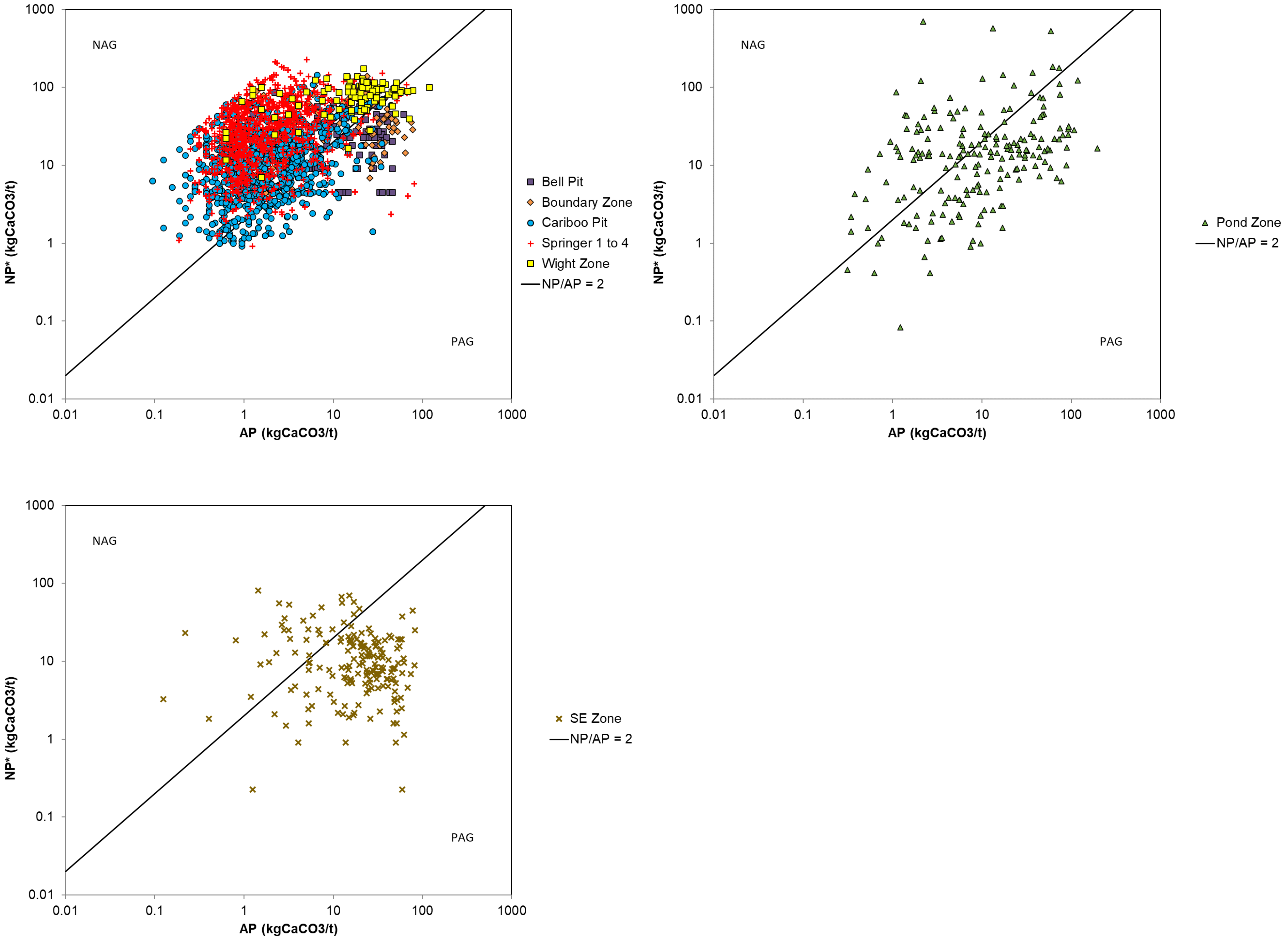
Figure 8: Existing Mined Rock Total Sulphur and Sulphate Statistical Distributions by Lithology



Source: https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/Source_Terms/[Compiled_Geochem_Data_CAPR002434_Rev02_SJL_KWJ_ForCharacterizationReport.xlsx]

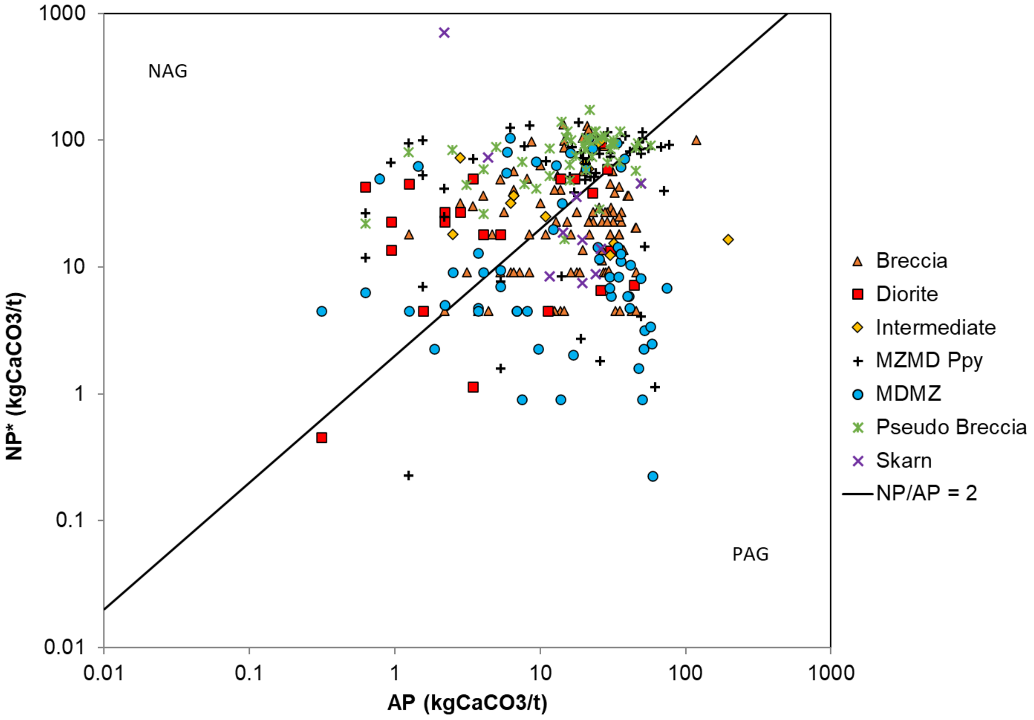
Note : The absence of boxes in the sulphate plot above is due to low concentrations resulting in the 25th percentile value equaling the 75th percentile value.

Figure 9: NP* versus Acid Potential of Samples by Area from Bell, Boundary, Cariboo, Springer 1-4 and Wight (top left), Pond (top right) and SE (bottom)



Source: https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/Source_Terms/[Compiled_Geochem_Data_CAPR002434_Rev02_SJL_KWJ_ForCharacterizationReport.xlsx]

Figure 10: NP* versus Acid Potential of Samples by Lithology



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4.1.3 Trace Element Content

When compared to the global average for high calcium granite (Price 1997), a subset of the existing mined rock at MPM have concentrations for regulated parameters an order of magnitude higher for antimony, arsenic, cadmium, copper, molybdenum, selenium, silver, sulphur, and zinc.

Notably, median copper concentrations in the Bell, Cariboo, and Springer 1 to 4 areas exceeded the screening criteria for enrichment (represented by a dashed line in Figure 9). The median copper concentration at the Wight Zone was comparable to the screening criteria and medians at the Pond Zone and SE Zone were lower than the screening criteria. Overall, copper concentrations were highest at the Cariboo and Springer 1 to 4 areas, followed by the Bell Pit, which was higher than the Wight, Pond, and SE areas. The Boundary Zone did not have trace element data and therefore trace element enrichment could not be assessed.

Copper concentrations were highest for breccia and unclassified samples, followed by intermediate rocks and monzodiorite-monzonite, which were higher than monzonite-monzodiorite porphyries, skarns, and diorites. Pseudo breccias could not be assessed due to limited sample quantities (n=6) (Figure 10).

Median selenium concentrations at all mining areas except the Wight Zone exceeded the screening criteria for enrichment and were highest at the Springer 1 to 4 and Cariboo areas (Figure 11). Selenium concentrations were lower in pseudo breccia and monzonite-monzodiorite porphyries compared to all other lithologies and were highest in breccia (Figure 12).

Selenium-to-sulphur ratios were examined because selenium is typically released by oxidation of sulphide and the ratios can be indicative of differences in selenium release. The ratio is highest for the Springer 1 to 4 and Cariboo areas, followed by the Bell, Pond and SE areas, then the Wight Zone (Figure 13). The lithological trends for selenium-to-sulphur were equivalent to selenium (Figure 14).

Figure 11: Existing Mined Rock Copper Statistical Distribution by Area

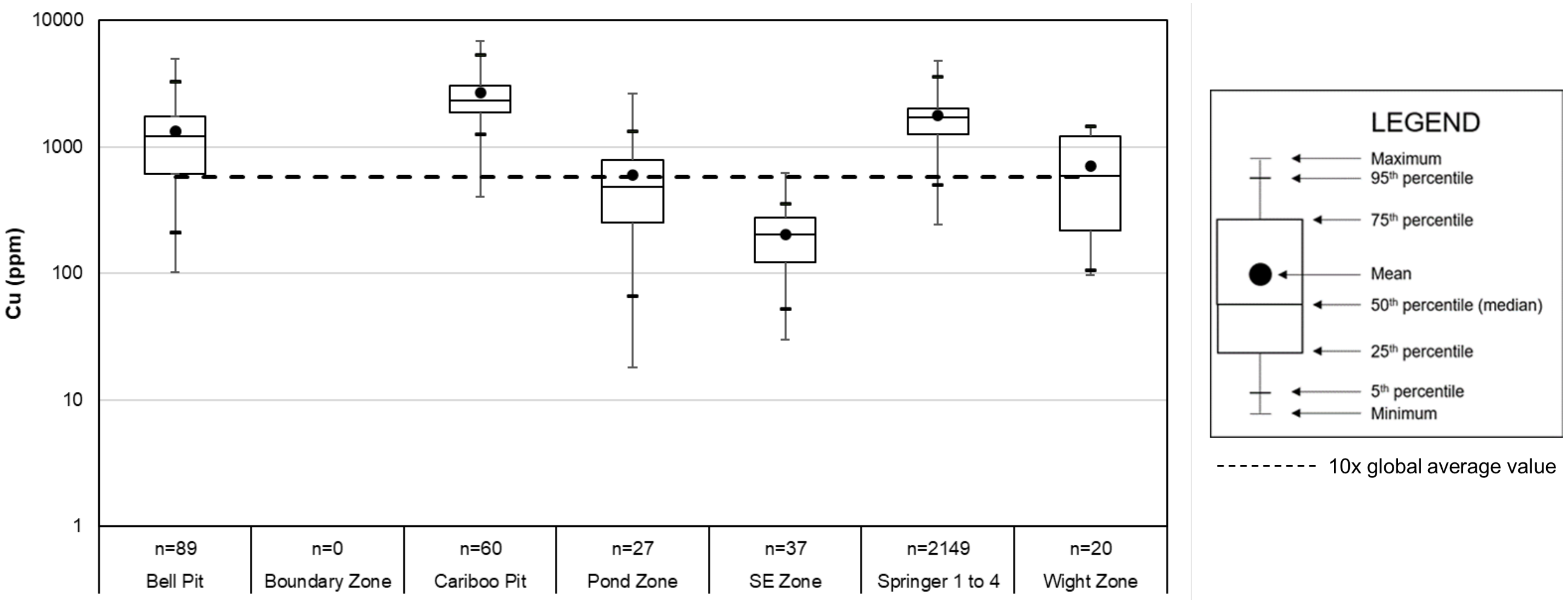

Figure 12: Existing Mined Rock Copper Statistical Distribution by Lithology

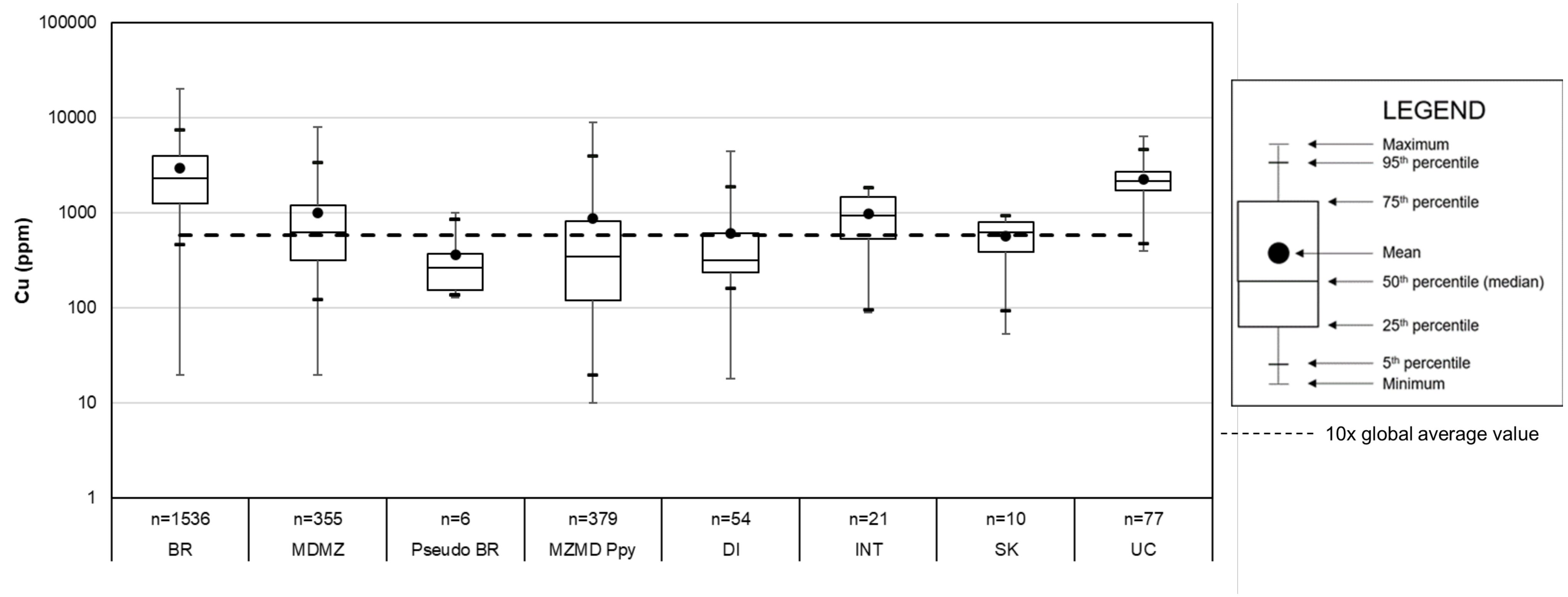

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Figure 13: Existing Mined Rock Selenium Statistical Distribution by Area

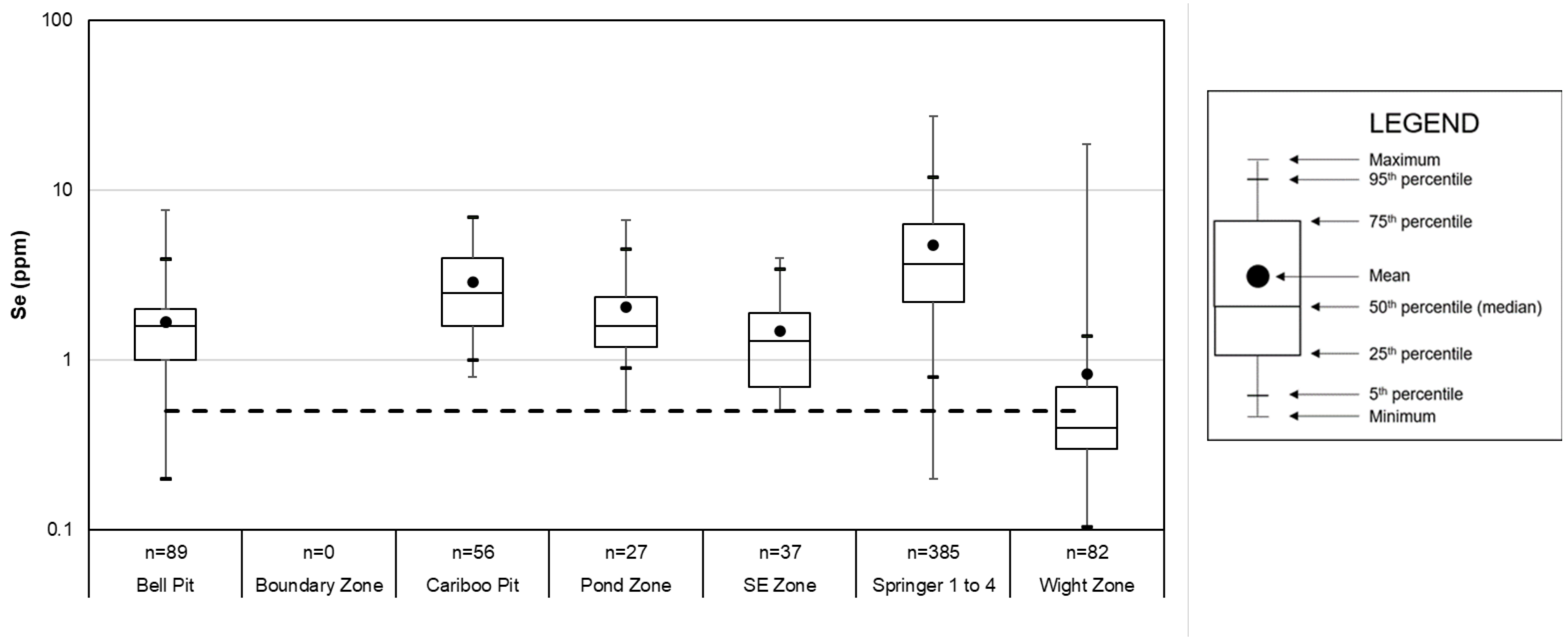

Figure 14: Existing Mined Rock Selenium Statistical Distribution by Lithology

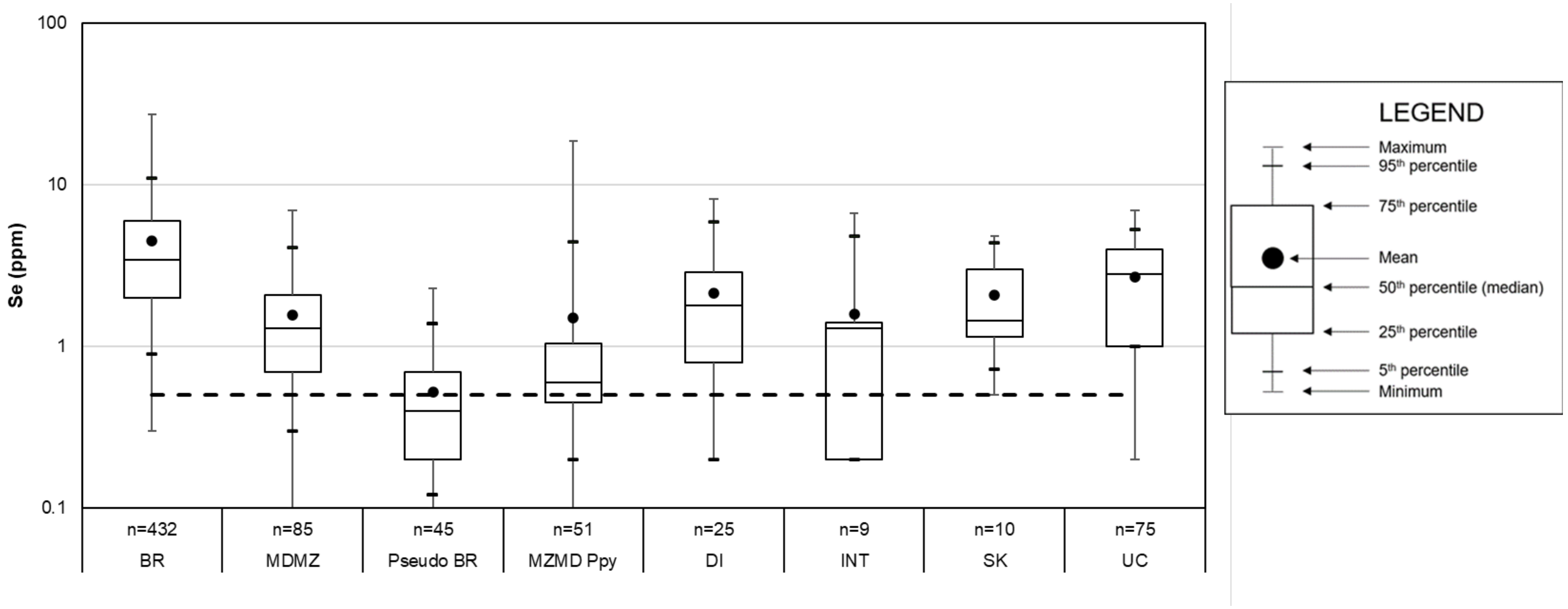

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Figure 15: Existing Mined Rock Selenium-to-Sulphur Statistical Distribution by Area

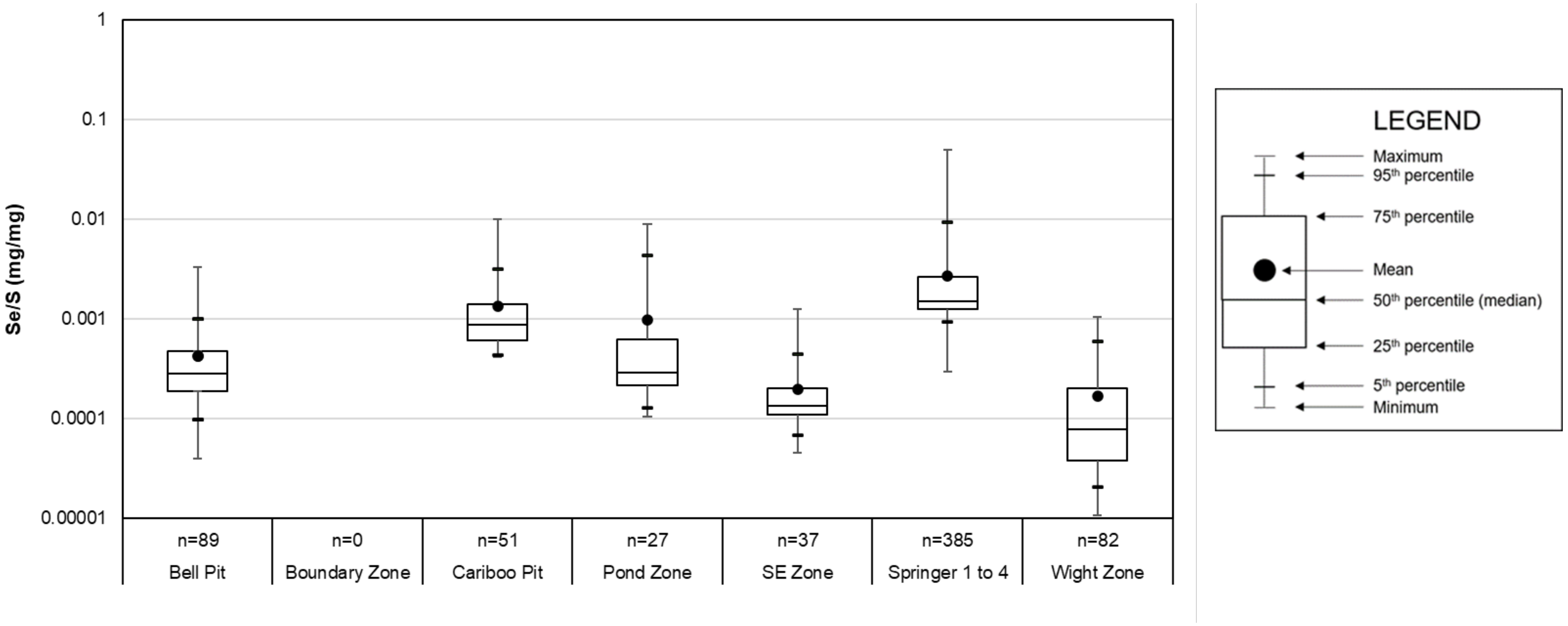
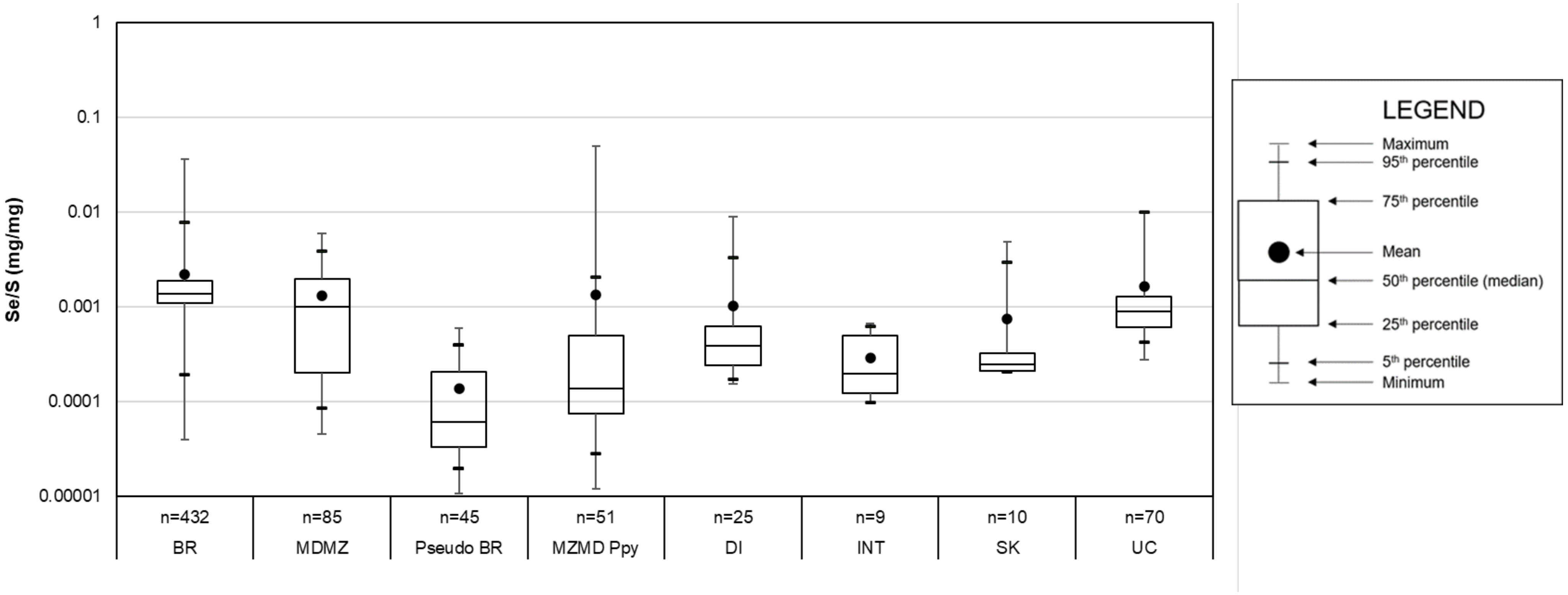


Figure 16: Existing Mined Rock Selenium-to-Sulphur Statistical Distribution by Lithology



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4.1.4 Extraction Tests

Leachates from all extraction tests were neutral pH with leachate chemistry dominated by sulphate, alkalinity, and calcium. The 2015 tests were more useful than the 2001 tests for understanding trace element leachability due to the use of lower detection limits and better sample representivity from testing of stockpiled waste rock. Average arsenic, copper, molybdenum and selenium concentrations were 4, 5, 29 and 15 µg/L, respectively. Several trace elements were not detected or yielded concentrations close to detection limits including cadmium (0.05 µg/L), chromium (0.5 µg/L), cobalt (0.1 µg/L), lead (0.1 µg/L), mercury (0.05 µg/L), nickel (0.5 µg/L) and zinc (10 µg/L).

4.1.5 Kinetic Testing

Static results of HCTs are summarized in Table 14. Kinetic results from HCTs have been reported annually as part of Mines Act Permit M-200 requirements. As mentioned in Section 3.3.2, samples from the Pond Zone were submitted for an acid-leaching procedure to remove carbonate and evaluate the reactivity of silicate minerals. The HCT sample set comprises the main lithologies of the previously mined areas.

Sample areas and lithological classifications for the HCT sample set were updated according to the revised mine plan and geological model. The sample set has sufficient coverage of previously mined areas and comprises the main lithologies at MPM based on the geological model.

One Pond Zone test is continuing. All tests ran for 1 to 9 years, except for one Pond Zone test, which ran for 15 years. General findings as reported in SRK (2023b) were as follows:

- Except for the Pond Zone tests which were artificially depleted of carbonate to induce acidification, no other tests generated acid. Six samples were classified as PAG but carbonate content prevented acid generation for the duration of the test.
- Sulphate release was strongly correlated with sulphur content regardless of the mine zone represented by the sample.
- There was a lack of correlation between trace element content and trace element release rates, and sulphide content and trace element content.
- Comparison of relative utilization of carbonate minerals to oxidation rates indicated that an NP/AP ratio of 2 or lower is appropriate for classification of ARD potential.

Table 14: HCT Inventory and Static Geochemical Characteristics

HCT ID	Sample ID	Area	Lithology	Date Started	Date Stopped	Paste pH	TIC	Total S	SO4-S	AP	NP	NP/AP	TIC/AP	Ag	As	Ca	Cd	Co	Cu	Hg	Mg	Mn	Mo	Ni	Pb	Sb	Se	V	Zn
							%C	%	%S	kg CaCO$_3$/t	kg CaCO$_3$/t			ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
HC2	31576	Wight	MZMD Ppy	7/21/2004	1/7/2013	8	0.79	1.4	<0.01	44	83	1.9	1.5	0.4	19	3	1.1	8.7	330	0.57	0.6	1400	13	1.2	38	0.3	0.7	85	170
HC3	32491	Wight	Breccia	7/21/2004	8/11/2008	8.3	1.1	0.45	<0.01	14	140	10	6.4	1.1	12	4.4	0.6	19	1700	0.39	1.3	1900	5.8	3.3	17	0.2	1	260	150
HC4	31943	Wight	Breccia	7/21/2004	8/11/2008	8.4	1.1	0.99	<0.01	31	130	4.1	2.9	1.2	10	4.2	0.9	20	1300	0.25	0.7	2000	7.6	4.2	21	0.3	1.4	210	170
HC5	32519	Wight	MZMD Ppy	7/21/2004	8/11/2008	8.6	0.62	0.54	<0.01	17	88	5.2	3.1	0.7	18	3.4	0.1	14	1700	0.19	1.2	1400	1.9	4.1	13	0.5	1.3	200	100
HC6	SE-05-17 Comp #1	SE	MDMZ	9/26/2005	1/7/2013	8.4	0.12	0.72	<0.01	23	21	0.91	0.43	0.3	17	0.87	<0.1	8.1	710	0.1	0.6	420	170	1.7	7.6	0.7	0.9	88	34
HC7	SE-05-30 Comp #1	SE	MDMZ	9/26/2005	1/7/2013	8.7	0.12	0.37	<0.01	12	40	3.5	0.85	<0.1	15	1.7	0.1	11	180	0.02	0.9	480	6.1	12	10	0.4	0.5	110	30
HC8	SE-07-66-72.5-75.13	SE	-	8/11/2008	1/7/2013	9.2	0.082	1	0.01	32	19	0.59	0.21	0.12	10	1.3	0.1	7.9	160	0.02	0.9	460	6	2.7	7.5	0.92	1.5	100	40
HC9	476111	Springer 1 to 4	-	8/11/2008	10/6/2009	7.9	0.011	0.04	0.01	0.94	18	19	0.97	0.34	11	1.7	0.42	21	710	0.08	1.3	1100	1.1	9.3	7.8	0.21	0.5	160	89
HC10	146677	Boundary	-	8/11/2008	10/6/2009	8.4	2	0.1	0.01	2.8	150	53	59	0.13	14	6.3	0.21	30	510	0.04	1.5	2800	1.4	12	7.8	0.64	0.7	160	110
HC11	146794	Boundary	-	8/11/2008	10/6/2009	8.4	1.4	0.15	0.01	4.4	160	35	27	0.17	17	4.7	0.37	23	250	0.12	1.2	2300	3	9.2	10	0.54	1.3	150	110
HC12	50033-1; Composite-4	Pond	MDMZ	4/20/2009	6/8/2009	6.6	<0.01	0.51	<0.01	16	8.4	0.53	<0.03	0.48	14	1.2	0.15	10	340	0.02	0.7	610	4.9	4.7	5.7	0.37	1.9	66	47
HC13	50033-1; Composite-5	Pond	Diorite	4/20/2009	7/24/2024	7.7	<0.01	0.19	<0.01	5.9	7.9	1.3	<0.08	0.25	12	0.89	0.11	8.8	250	0.01	0.6	520	3.5	4.1	6	0.4	1.2	65	49
HC14	465240; SD-07-23	Springer 1 to 4	Breccia	10/12/2009	1/7/2013	8.1	0.48	0.39	-	12	96	7.9	3.3	0.62	34	2.6	0.98	14	720	0.4	1	1500	6	2.8	10	0.28	4.3	130	86
HC15	475695; SD-07-48	Springer 1 to 4	Diorite	10/12/2009	1/7/2013	8.1	0.27	2.5	-	79	94	1.2	0.29	0.88	18	2.3	0.09	20	780	0.02	1	500	18	5	11	0.07	8.2	150	41
HC16	480684; SD-07-57	Springer 1 to 4	MDMZ	10/12/2009	1/7/2013	8.9	0.14	0.06	-	1.9	69	37	6.4	0.52	13	2.2	0.43	14	360	0.14	0.7	730	3.5	2.4	10	0.16	0.5	130	92

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4.2 Future Waste Rock

4.2.1 Overview

Sampling programs for future waste rock consisted of diamond drill core tested prior to mining. Laboratory analytical programs conducted at the on-site and off-site external laboratories have generated aqua regia ICP and ABA datasets for the Springer Expansion Project area. Table 15 summarizes the static test inventory for waste rock for the ICP and ABA datasets. Drill core samples were primarily analyzed for static ABA data (total carbon and total sulphur) and trace elements by ICP, whereas confirmatory samples were only analyzed for total carbon and total sulphur. A minor proportion of samples were analyzed for TIC, sulphate, and Sobek neutralization potential.

Table 15: Future Waste Rock Sample Inventory

Source	AR ICP[1]	ABA[2]	ABA (with Geology)[3]
C2	39	175	7
Springer 5	645	99	99
Springer 6	669	1,996	1,996
WX	21	1,867	1,867
Total	1,374	4,137	3,969

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Notes:

[1] Future waste rock aqua regia ICP dataset

[2] Future waste rock ABA dataset with and without geological logging

[3] Future waste rock ABA dataset with geological logging

4.2.2 ARD Potential

Total sulphur showed variation between areas (Figure 15) but was similar between lithologies at each respective area (Figure 16). The Springer 6 and WX areas had the highest sulphur content and were comparable (mean concentrations of 0.81 and 0.57 %, respectively), whereas C2 and Springer 5 had similar and lower sulphur content (mean concentrations of 0.026% and 0.062%, respectively; Figure 15).

Only ABA samples from the Springer 6 and WX areas had sufficient geological logging across a variety of lithologies. For these areas, total sulphur content was similar between lithologies (Figure 16). For the geologically logged samples from C2 and Springer 5, sulphur content is lower than Springer 6 and WX. Samples that were unclassified geologically (labelled as “UC”) at the C2 area had similar sulphur content as the geologically logged samples.

Figure 17: Waste Rock Total Sulphur Statistical Distribution by Area

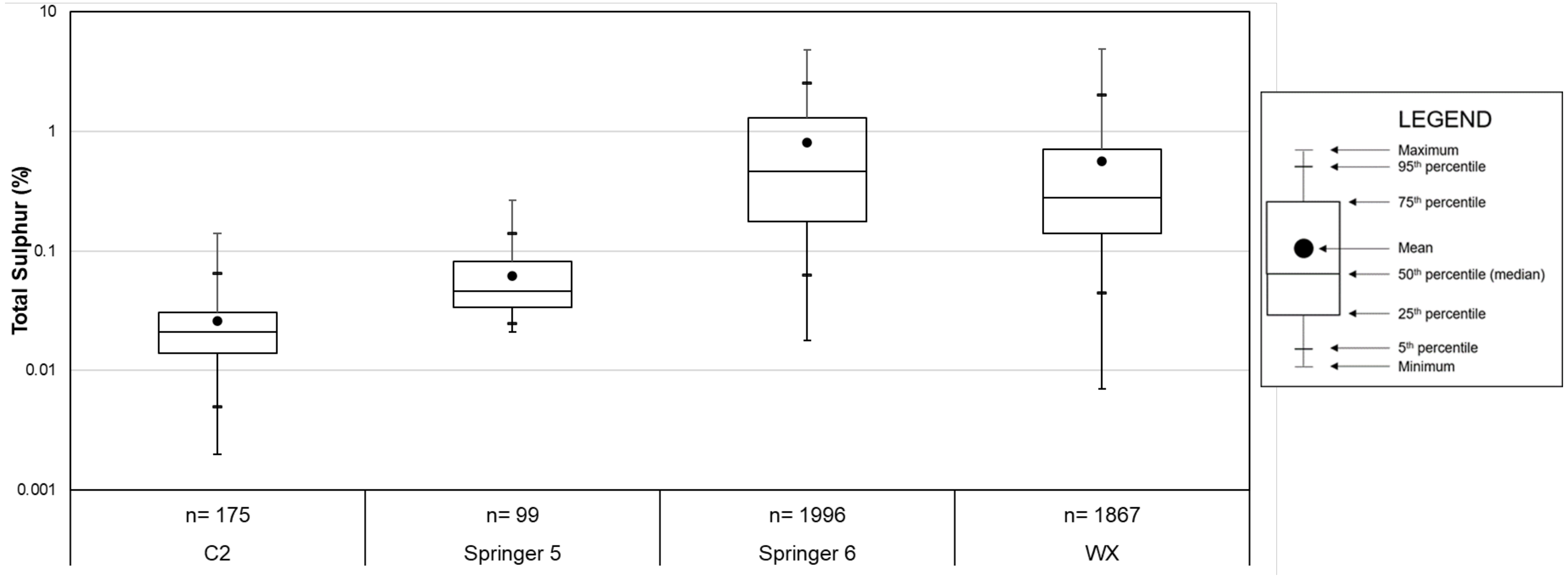

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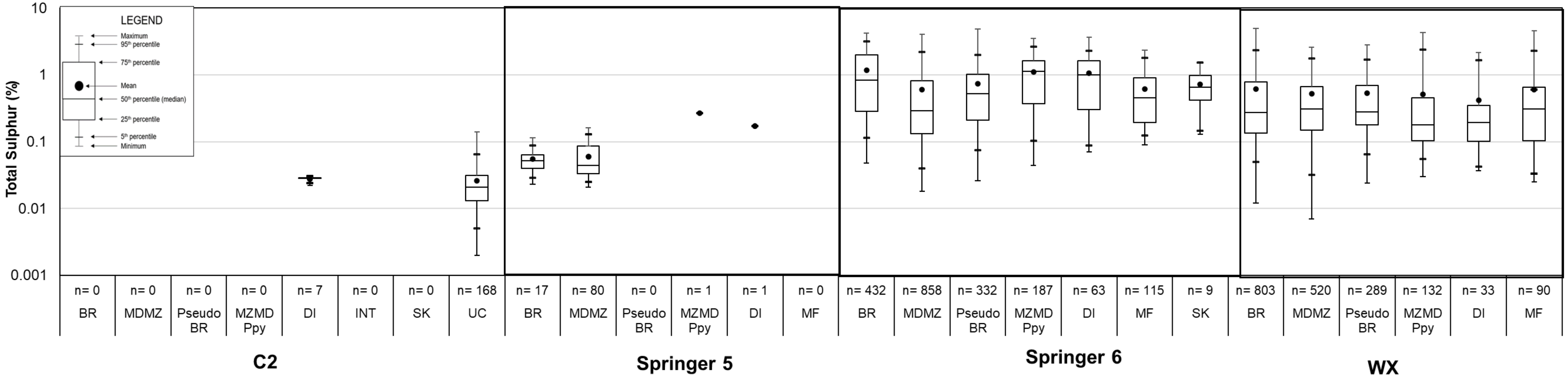
Figure 18: Waste Rock Total Sulphur Statistical Distribution by Lithology and Area



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Comparisons of NP* and AP for samples by area showed that C2 and Springer 5 have similar distributions of NAG and PAG samples (about 95% and 5%, respectively). The Springer 6 and WX areas had similar and proportionally greater PAG proportions (about 50%) compared to other areas, due to higher sulphur content (Figure 17).

No NP* and AP comparison trends were observed by lithology in Springer 5, Springer 6, and WX areas (Figure 18). Limited data by lithology were available for the C2 area so trends by lithology could not be assessed. For Springer 6 and WX, each lithology had similar NAG and PAG proportions as the overall sample set. This indicates that lithology is not a control on waste rock ARD classifications at MPM, and ARD classification is primarily dependant on sulphur content.

Figure 19: NP* versus Acid Potential of Samples by Area from C2 and Springer 5 (top left), Springer 6 (top right) and WX (bottom)

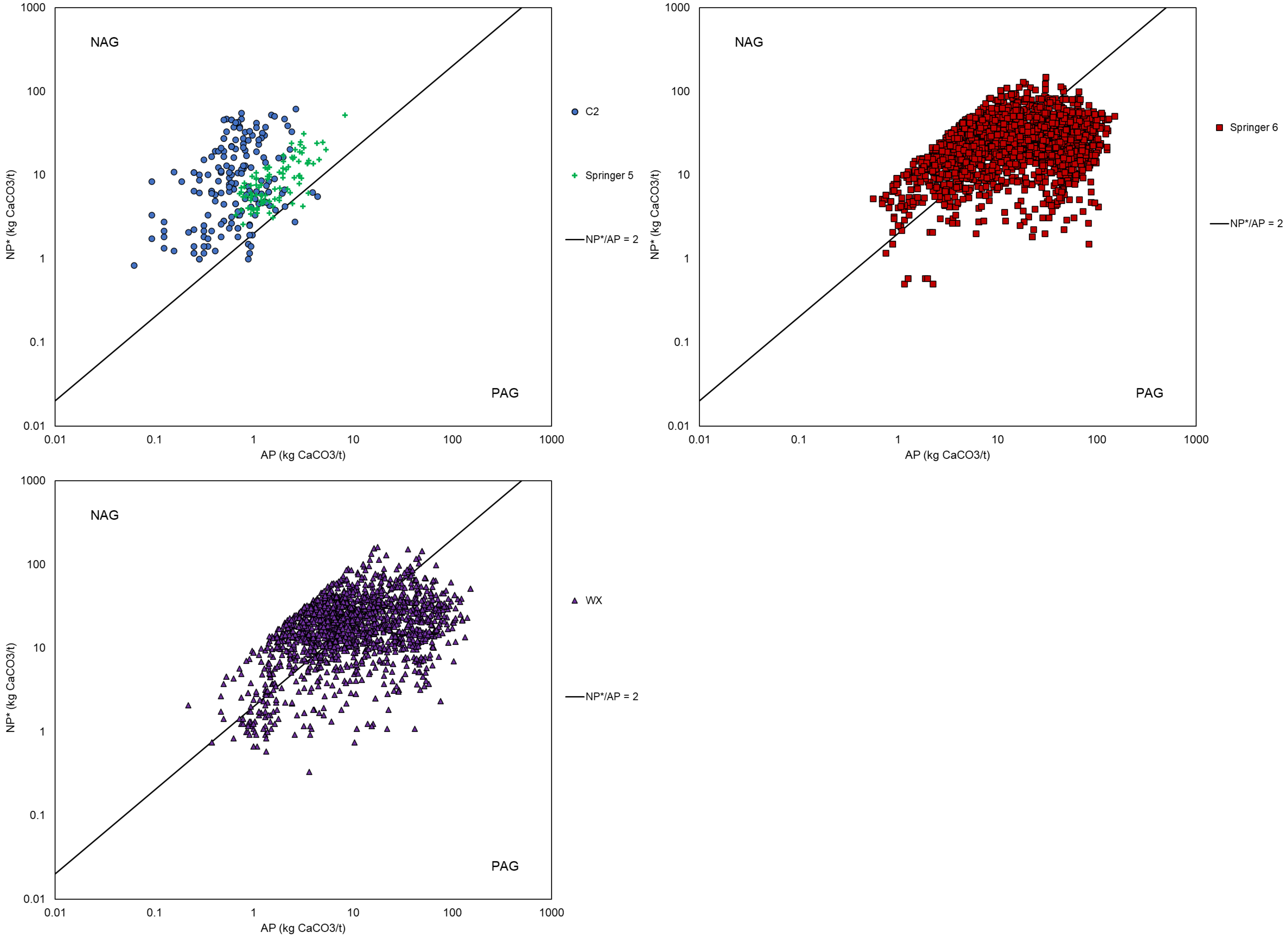

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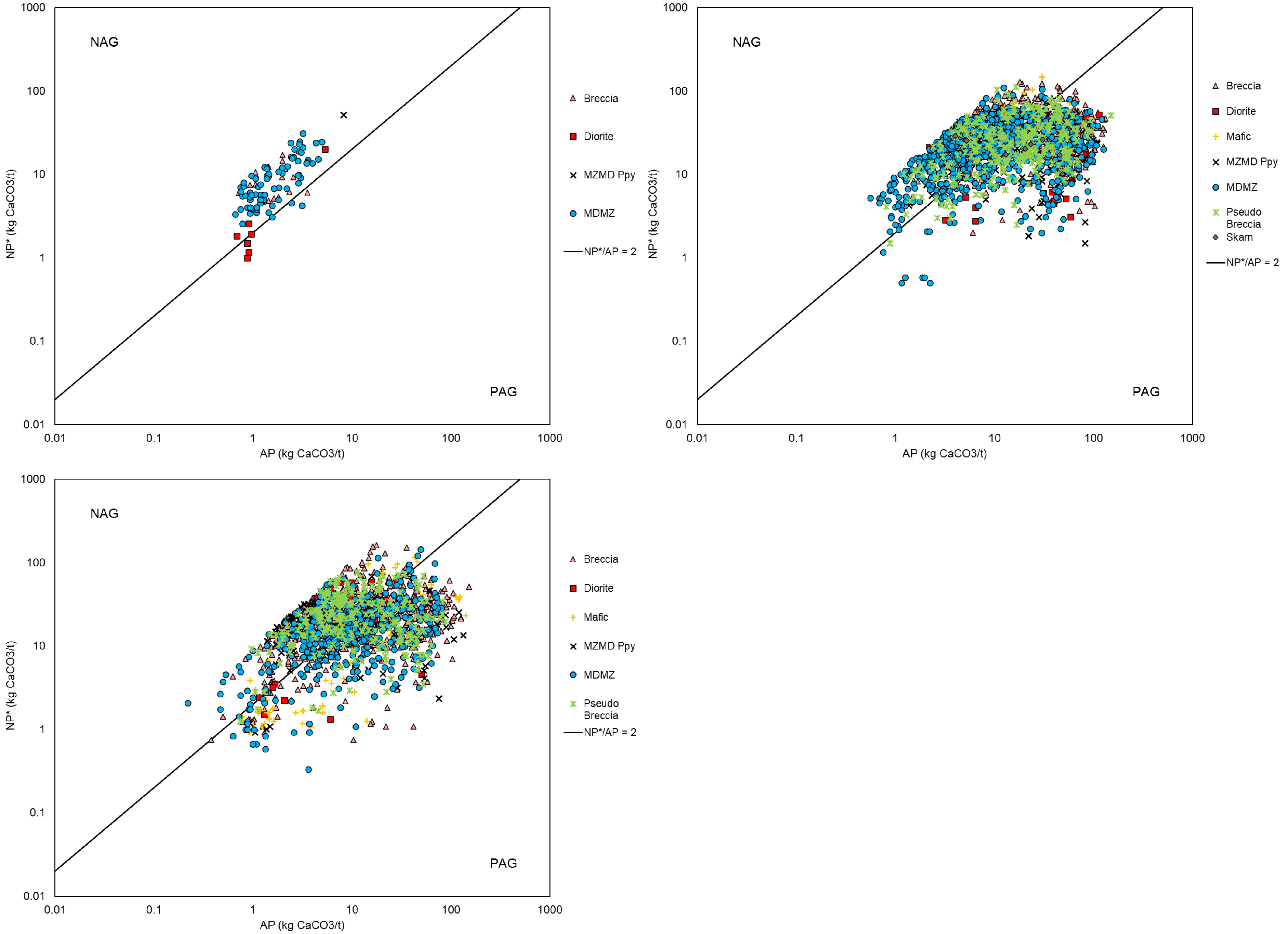
Figure 20: NP* versus Acid Potential of Samples by Lithology from C2 and Springer 5 (top left), Springer 6 (top right) and WX (bottom)



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4.2.3 Trace Element Content

Appendix A presents a summary of future waste rock statistics by zone compared to global average values for high calcium granite.

When compared to the global average for high calcium granite (Price 1997), a subset of the future waste rock at MPM have concentrations for regulated parameters an order of magnitude higher for antimony, arsenic, cadmium, chromium, copper, molybdenum, nickel, selenium, silver, sulphur, and zinc.

Except for WX, median copper concentrations at all other mining areas exceeded the screening criteria for enrichment (Figure 19). Copper concentrations were similar between all other areas in the Springer Expansion Project and the screening criteria for copper was within the 25th and 75th percentile concentrations. No trends were observed by lithology within each mining area. Copper concentrations were shown to be generally similar for all lithologies with the exception of the WX area, which had a relatively limited sample set (Figure 20).

Median selenium concentrations at the C2 and Springer 5 areas exceeded the screening criteria for enrichment, whereas Springer 6 and WX had lower median selenium concentrations (Figure 21). However, Springer 5 has limited samples.

No selenium concentration trends were observed by lithology within each mining area. Like copper, selenium concentrations were shown to be generally similar for all lithologies for each area. The selenium-to-sulphur ratio is overall highest for C2 and Springer 6, and lower for the WX area (Figure 23). There are no lithological trends of the selenium-to-sulphur ratio observed within each mining area (Figure 24).

Figure 21: Waste Rock Copper Statistical Distribution by Area

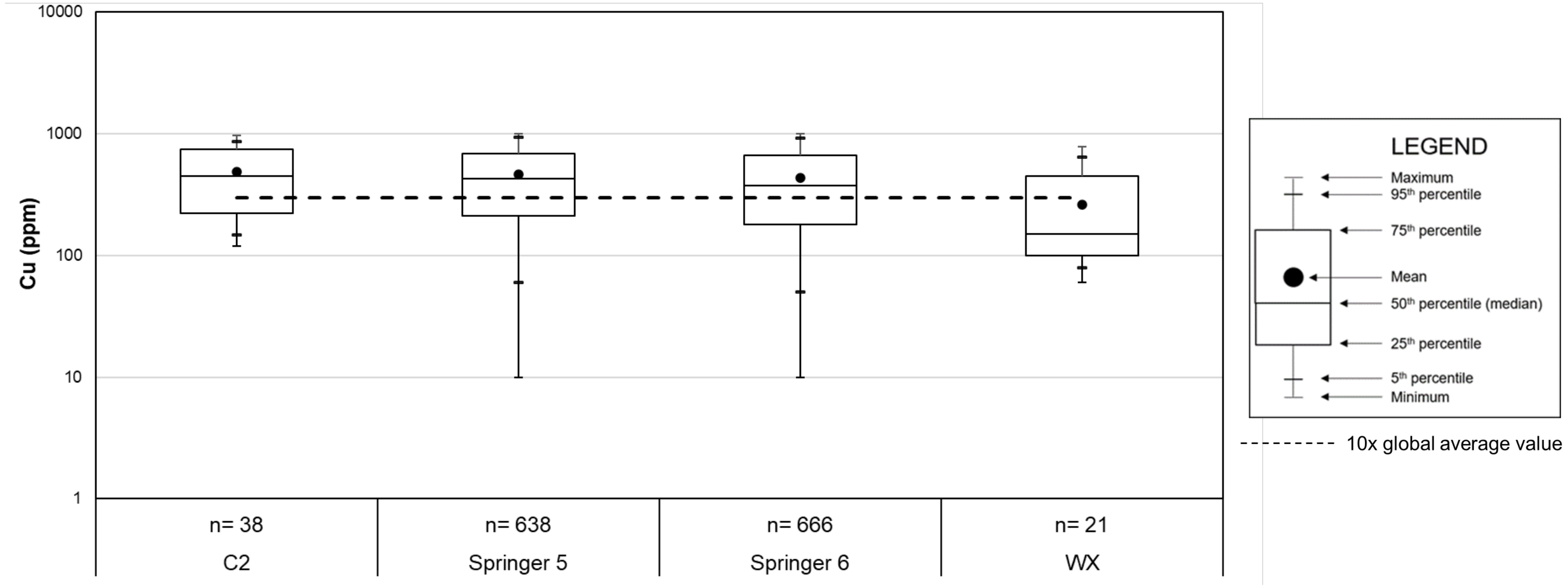

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Figure 22: Waste Rock Copper Statistical Distribution by Lithology and Area

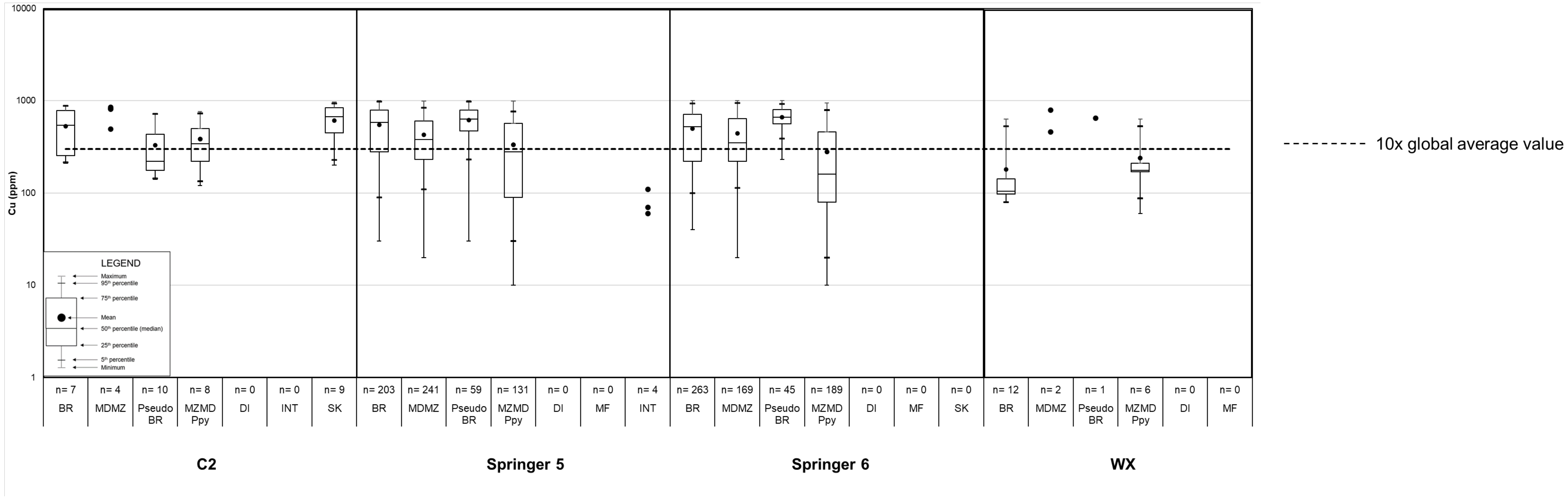

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Figure 23: Waste Rock Selenium Statistical Distribution by Area

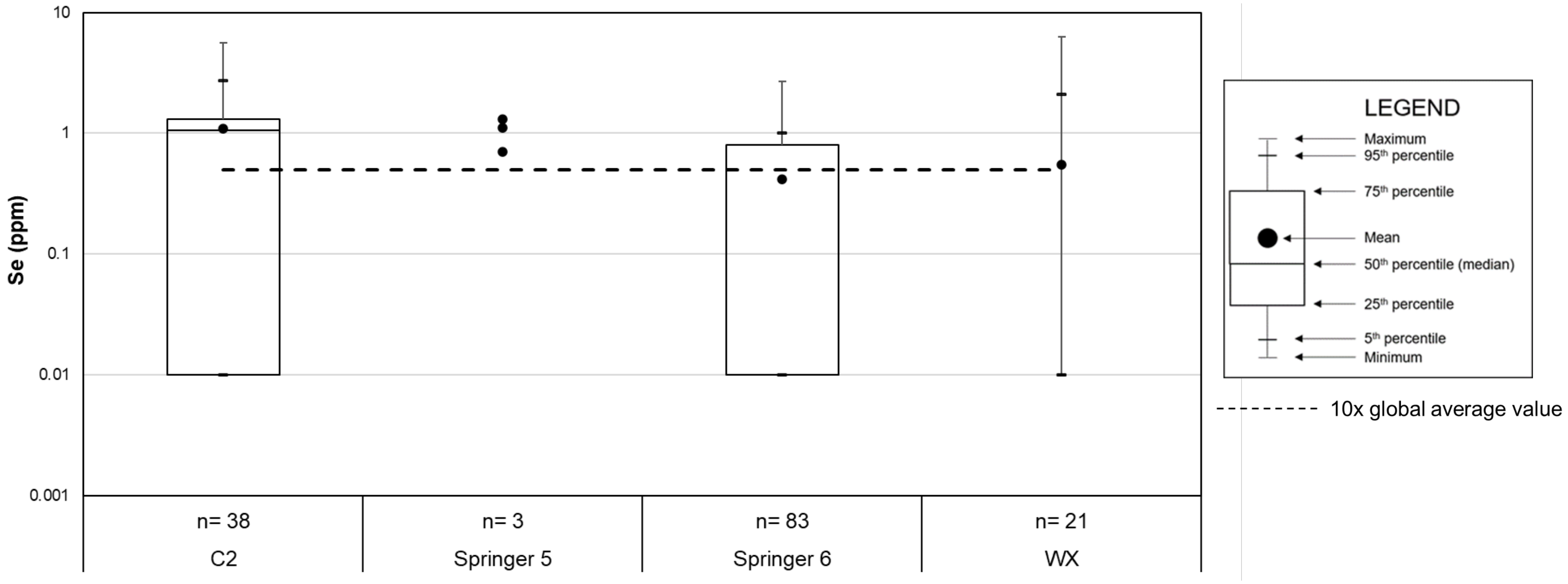

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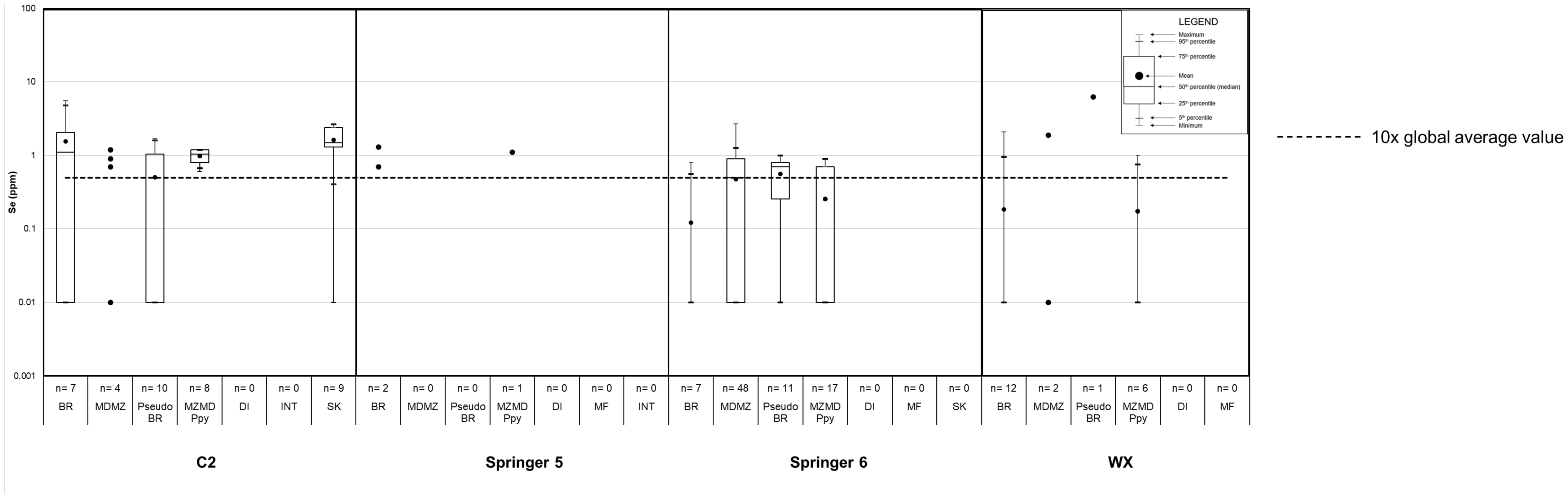
Figure 24: Waste Rock Selenium Statistical Distribution by Lithology and Area



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Note : The absence of boxes in the plots above is due to low concentrations resulting in the 25th percentile value equaling the 75th percentile value.

Figure 25: Waste Rock Selenium-to-Sulphur-Ratio Statistical Distribution by Area

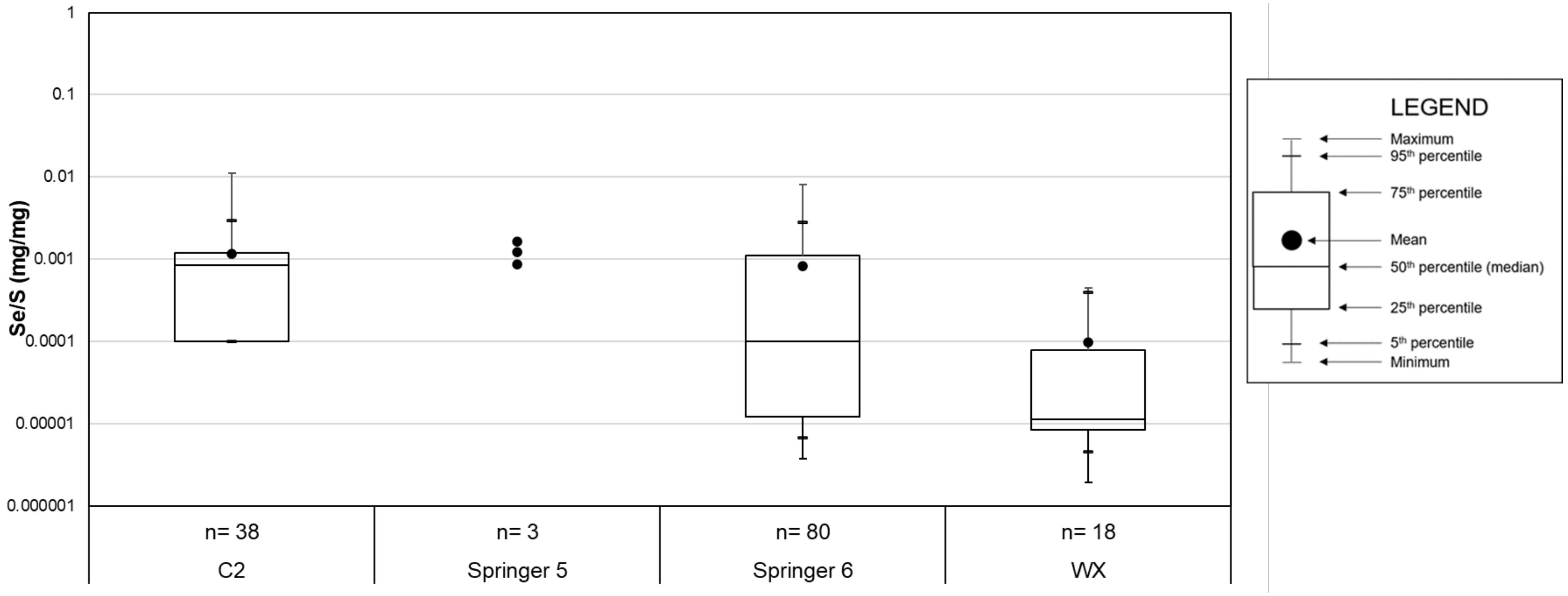

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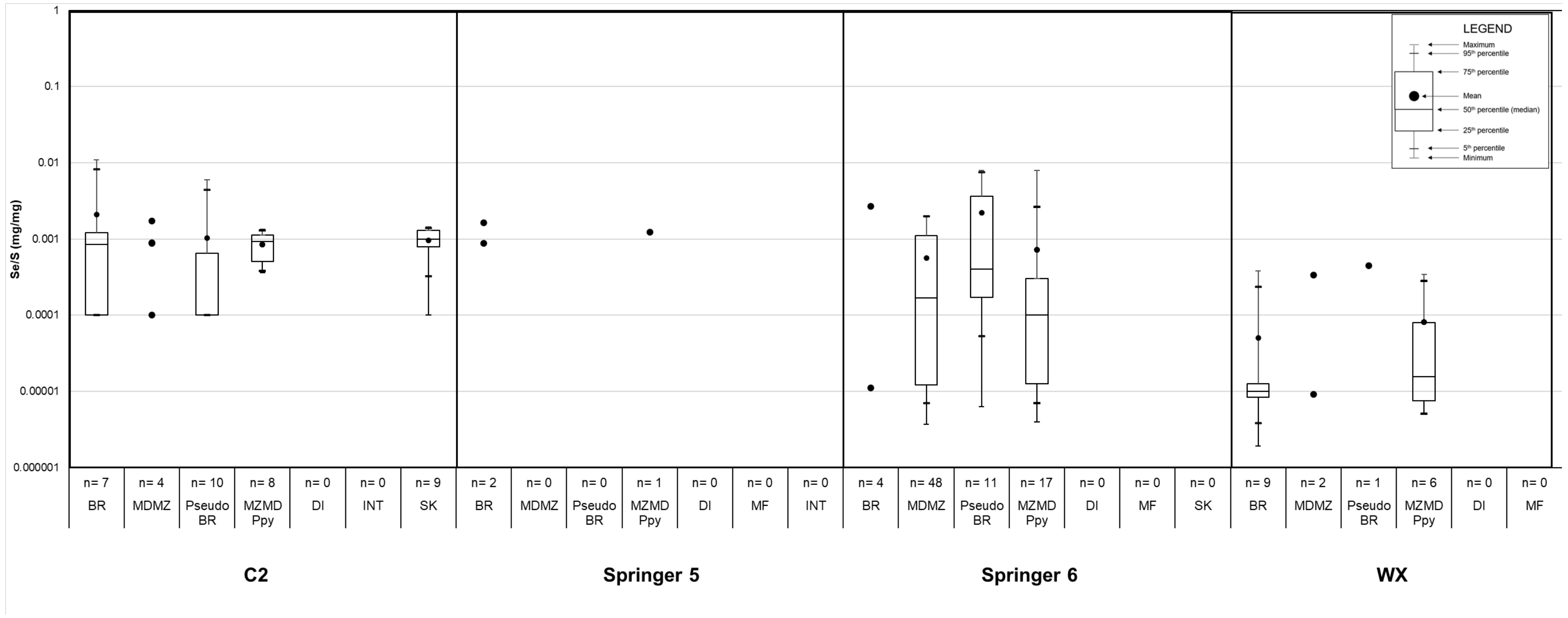
Figure 26: Waste Rock Selenium-to-Sulphur-Ratio Statistical Distribution by Lithology and Area



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4.2.4 Kinetic Testing

Future waste rock HCT results (HC-17 to HC-20) are presented in Section 4.1.4. Overall, future waste rock HCTs showed similar trends in leachate chemistry to the HCTs representing.

Sample areas and lithological classifications for the HCT sample set were updated according to the updated mine plan and geological model. The sample set has sufficient coverage of the Springer Expansion area, except for the Cariboo, C2, and Springer 5 areas. However, Cariboo and Springer 5 were determined to have similar total sulphur content, ARD classifications, and trace element content as Springer 1 to 4, which can therefore act as a proxy to these areas (Sections 4.1.2, 4.1.3, and 5.1). C2 was also found to be similar to Cariboo on the basis of ARD potential and trace element content (Section 5.1), so Springer 1 to 4 can also act as a proxy for C2. The HCT sample set comprises the main lithologies of the Springer Expansion area. The lithologies not represented by HCTs (e.g., mafic and intermediate rocks and skarns) are volumetrically minor based on the known deposit geology at MPM (Section 2.3).

Table 16: HCT Inventory and Static Geochemical Characteristics for Future Waste Rock HCTs

HCT ID	Sample ID	Area	Lithology	Date Started	Date Stopped	Paste pH	TIC	Total S	SO4-S	AP	NP	NP/AP	TIC/AP	Ag	As	Ca	Cd	Co	Cu	Hg	Mg	Mn	Mo	Ni	Pb	Sb	Se	V	Zn
							%C	%	%S	kg $CaCO_3$/t	kg $CaCO_3$/t			ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
HC17	HC-17 SD MZ	Springer 6	MDMZ	8/5/2022	Ongoing	8.8	0.28	1.4	0.03	43	32	0.75	0.55	0.41	18	3.2	0.28	17	519	0.1	0.86	556	39	4	15	0.3	6	146	53
HC18	HC-18 SD FBXm	Springer 6	Pseudo Breccia	8/5/2022	Ongoing	8.8	0.17	2	0.02	61	36	0.59	0.23	0.61	20	1.5	0.19	28	1368	0.1	1.6	626	47	5	5.9	0.5	8	205	49
HC19	HC-19 WX MZ	WX	MDMZ	8/5/2022	Ongoing	8.6	0.14	2	0.03	63	23	0.36	0.19	0.36	11	2.3	0.3	12	577	0	0.82	430	36	1	14	0.1	5	152	53
HC20	HC-20 WX FBXm	WX	Pseudo Breccia	8/5/2022	Ongoing	8.5	0.37	2.5	0.02	78	40	0.51	0.39	0.43	15	2.7	0.17	14	830	0.2	0.89	611	44	2	11	0.4	7	144	45

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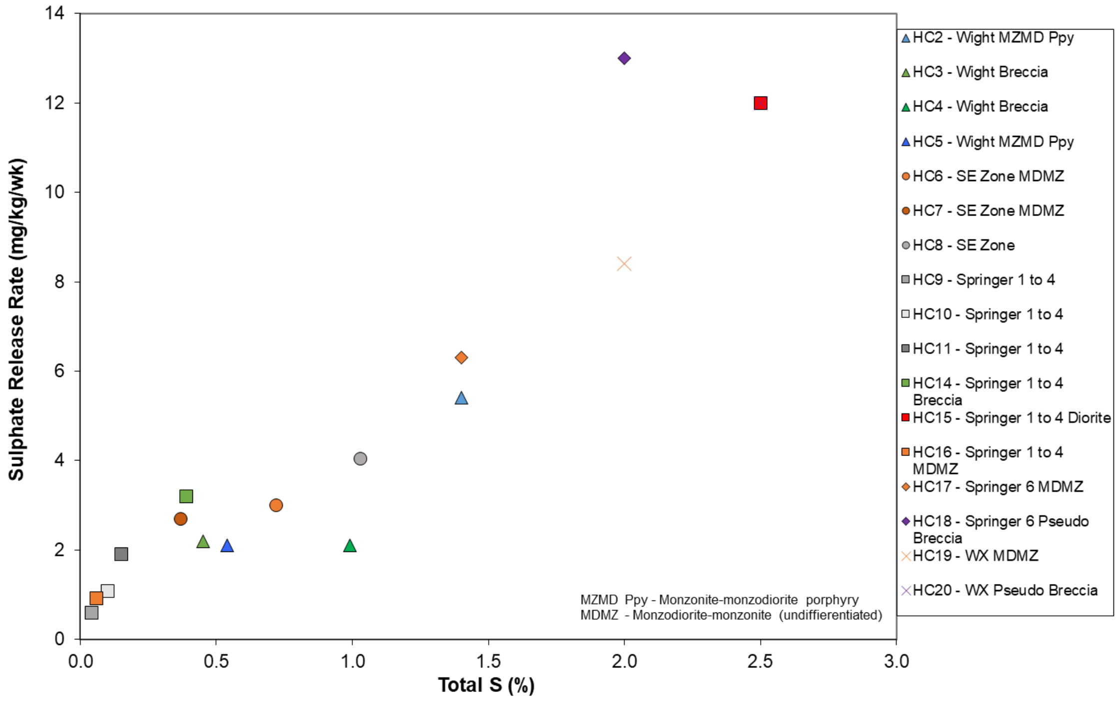
All HCTs for future waste rock from Springer 6 and WX are continuing. General findings are as follows:

- Future waste rock HCTs for Springer 6 and WX Zone were classified as PAG but pH remains near neutral as of 125 weeks. Similar to previous HCTs from other previously mined zones, carbonate content has so far prevented acid generation.
- Like previous HCTs, sulphate release was strongly correlated with sulphur content regardless of zone or lithology (Figure 25).
- There was a lack of correlation between trace element content and trace element release rates, and sulphide content and trace element content.
- Trace element release rates were relatively similar between existing mined HCTs and future waste rock HCTs.
- A comparison of carbonate depletion rates to oxidation rates indicated that an NP/AP ratio of 2 or lower is appropriate for classification of ARD potential. More detail is provided in Section 5.3.

Figure 27: Correlation of Sulphur Content with Oxidation Rate for Waste Rock Humidity Cells



Sources: https://srk.sharepoint.com/sites/NA1CM017.011/Internal/!020_Project_Data/030_Lab Data/Kinetic Data/Calculations/[Mt_Polley_HCT_WR_Outcomes_1CM017.011_rtc_rev00.xlsx]

4.3 Future Ore

4.3.1 Overview

Sampling programs for future ore consisted of diamond drill core tested prior to mining. Laboratory analytical programs conducted at the on-site and off-site laboratories have generated aqua regia ICP and ABA datasets for the Springer Expansion Project area. Table 17 summarizes the static test inventory for waste rock for the ICP and ABA datasets. Drill core samples were primarily analyzed for static ABA data (total carbon and total sulphur) and trace elements by ICP. A minor proportion of samples were analyzed for TIC, sulphate, and Sobek neutralization potential.

Table 17: Future Ore Sample Inventory

Source	AR ICP[1]	ABA[2]	ABA (with Geology)[3]
C2	16	12	12
Springer 5	409	1	1
Springer 6	606	126	126
WX	77	39	39
Total	1,108	178	178

Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

Notes:

[1] Future ore aqua regia ICP dataset

[2] Future ore ABA dataset with and without geological logging

[3] Future ore ABA dataset with geological logging

4.3.2 ARD Potential

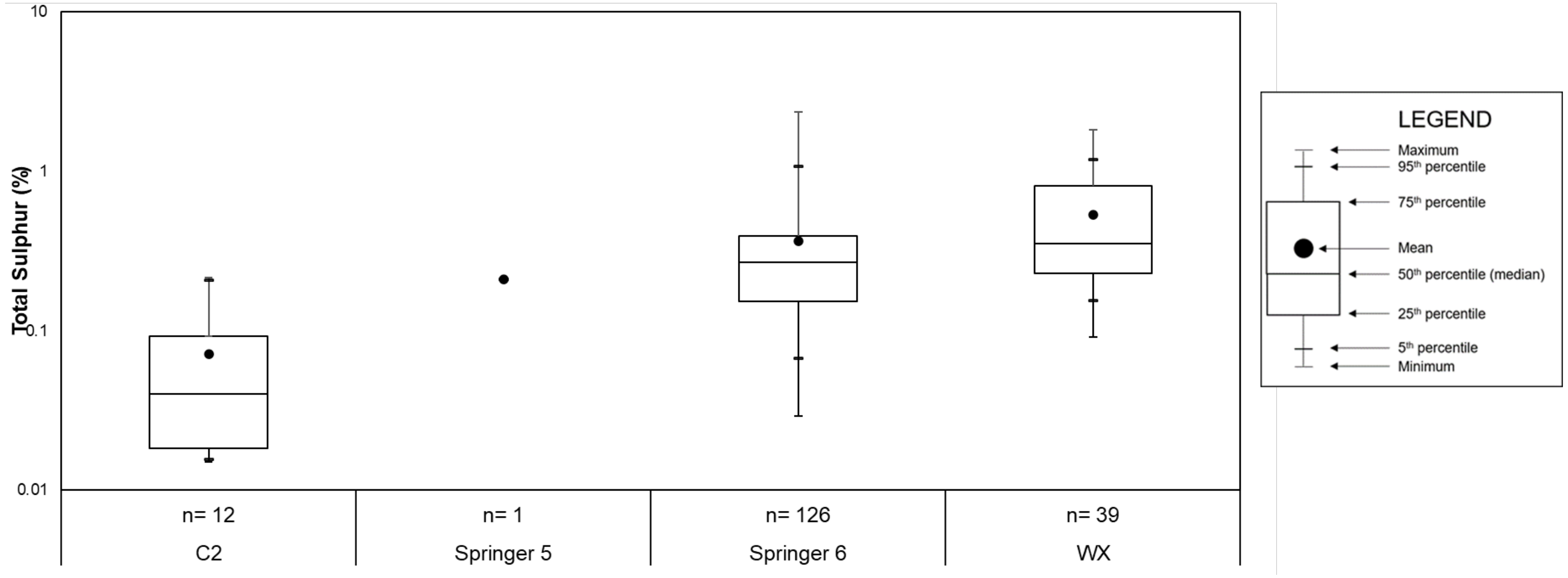
Total sulphur showed variability between the mining areas (Figure 26) but was similar between lithologies at each respective area (Figure 27). The Springer 6 and WX areas had the highest sulphur content and were comparable (mean concentrations of 0.37 and 0.54 %, respectively), whereas C2 had lower sulphur content (mean concentration of 0.071%). Springer 5 could not be assessed due to the limited sample set (n=1).

Only ABA samples from the Springer 6 and WX areas had sufficient geological logging across multiple lithologies. For these areas, total sulphur content was relatively similar between lithologies (Figure 27). For the geologically logged samples from C2, sulphur content is lower than Springer 6 and WX.

Comparisons of NP* and AP for samples by area showed that C2 was dominantly NAG (92%), whereas Springer 6 and WX had greater proportions of PAG ore (NAG proportions of 42% and 0%, respectively) (Figure 28). Like the waste rock materials, ARD classification is primarily a function of sulphur content. Springer 5 had a single ore sample classified as PAG. Select samples from 2007 and 2011 with a high detection limit for total carbon (1%) were not plotted.

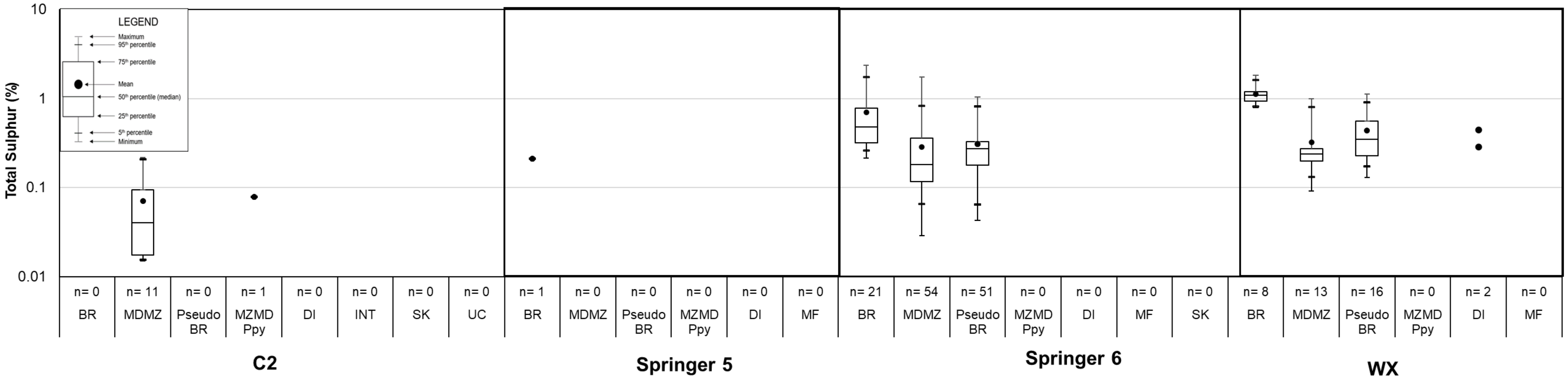
A review of the results sorted by lithology showed that the breccia had the highest proportion of PAG samples and monzodiorite-monzonite had approximately similar proportions of NAG and PAG samples (Figure 29). However, this may be due to most breccia samples being from WX, where all ore samples classified as PAG. Limited data were available for the diorite and breccia lithologies and therefore the distribution of ARD classification could not be assessed. No data were available for the C2 area with lithology so trends by lithology could not be assessed.

Figure 28: Ore Total Sulphur Statistical Distribution by Area



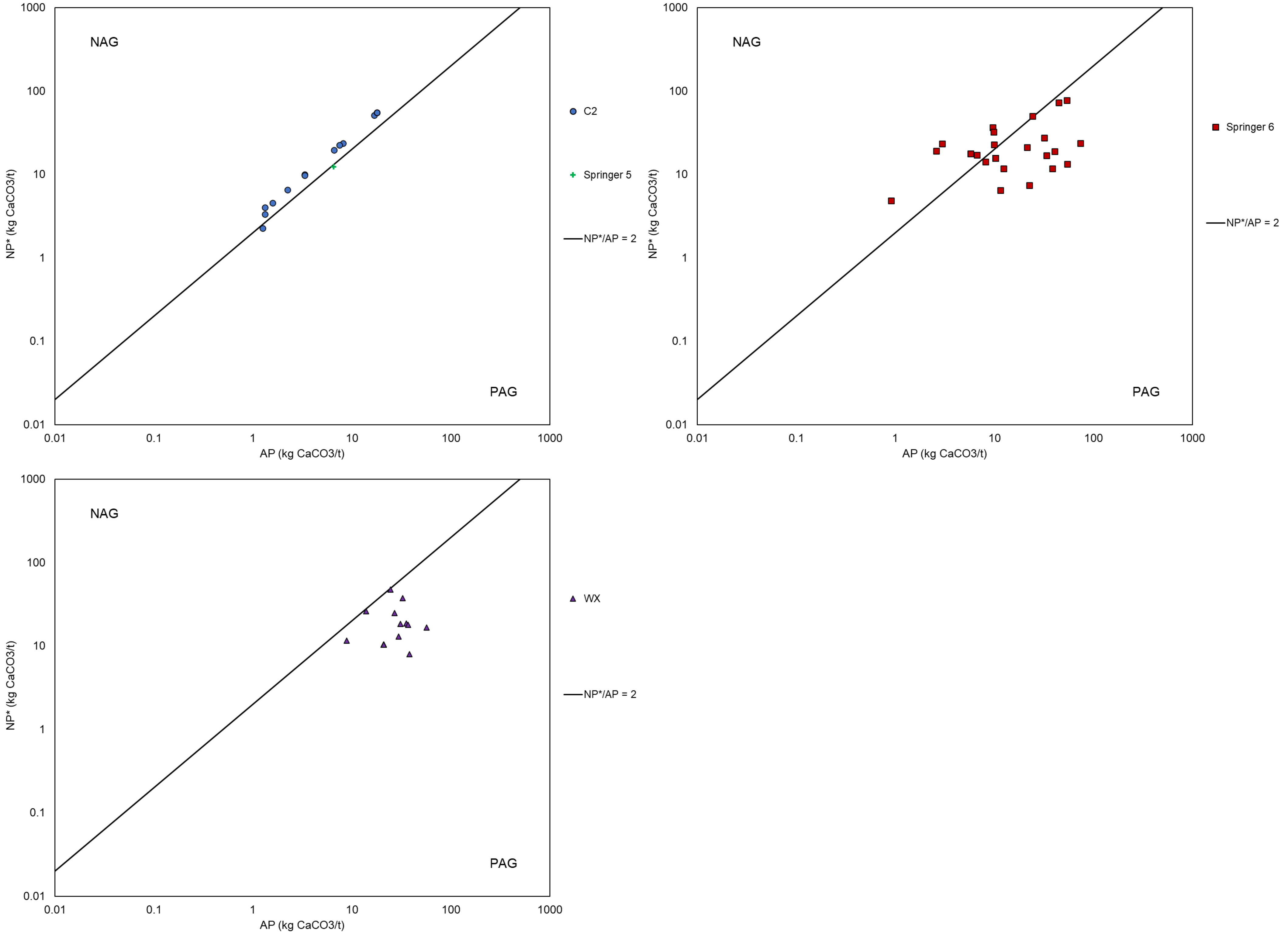
Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

Figure 29: Ore Total Sulphur Statistical Distribution by Lithology and Area



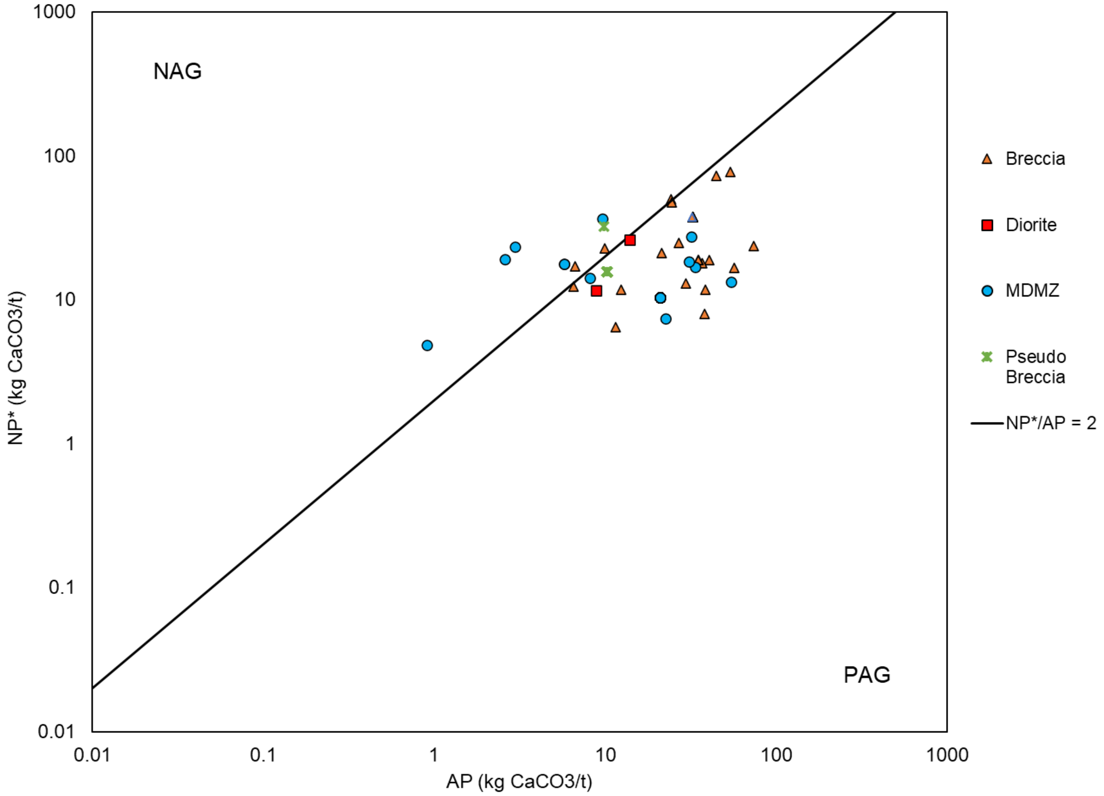
Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

Figure 30: NP* versus Acid Potential of Samples by Area from C2 and Springer 5 (top left), Springer 6 (top right) and WX (bottom)



Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

Figure 31: NP* versus Acid Potential of Samples by Lithology of Future Ore



Source: Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

4.3.3 Trace Element Content

Appendix B presents a summary of future ore statistics compared to global average values for high calcium granite.

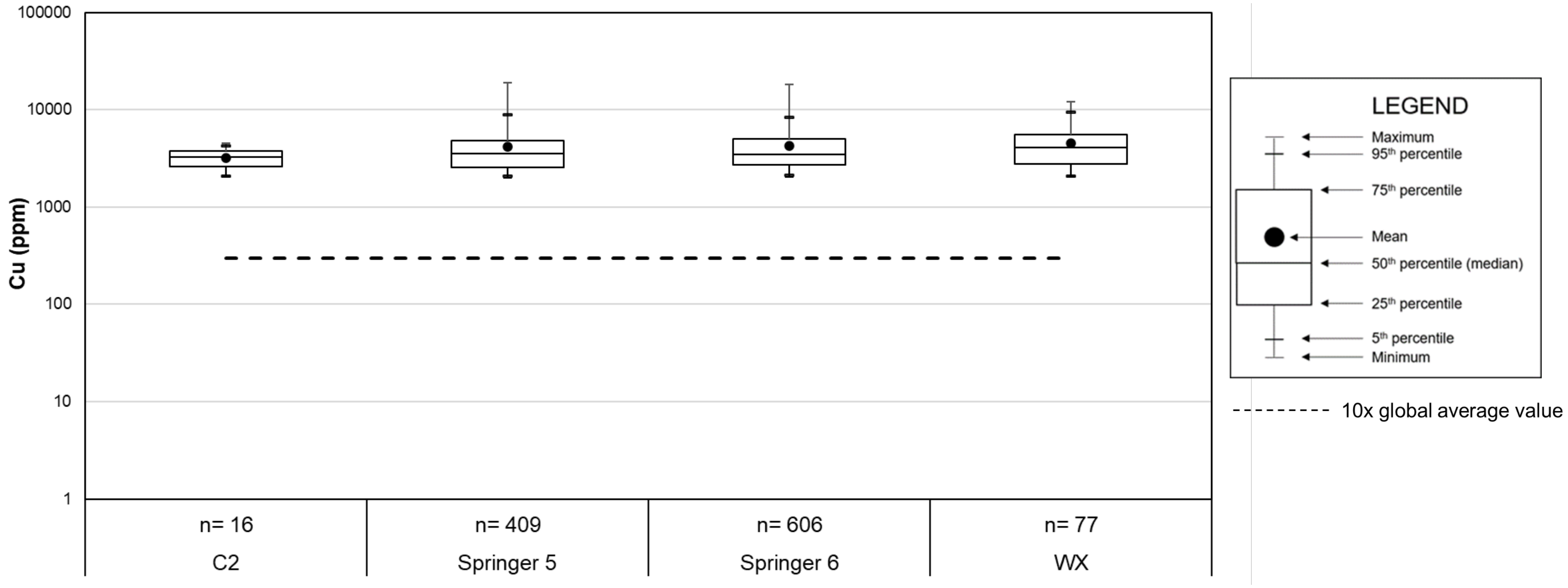
When compared to the global average for high calcium granite (Price 1997), a subset of the future ore at MPM have concentrations for regulated parameters an order of magnitude higher for antimony, arsenic, cadmium, chromium, copper, mercury, molybdenum, nickel, selenium, silver, sulphur, and zinc.

All copper concentrations for ore exceeded the screening criteria for enrichment due to the ore cut-off grade of 0.2% (Section 3.3.3), which is above the screening criteria for copper (300 ppm, represented by a dashed line in the figure). Copper concentrations for ore were comparable for samples from all mining areas within the Springer Expansion. Copper concentrations by lithology were comparable within each mining area (Figure 30 and Figure 31).

Similar to copper, all selenium concentrations for ore exceeded the screening criteria for enrichment (Figure 32). Selenium concentrations for ore were comparable at all mining areas within the Springer Expansion and no trends were observed by lithology within each mining area (Figure 33).

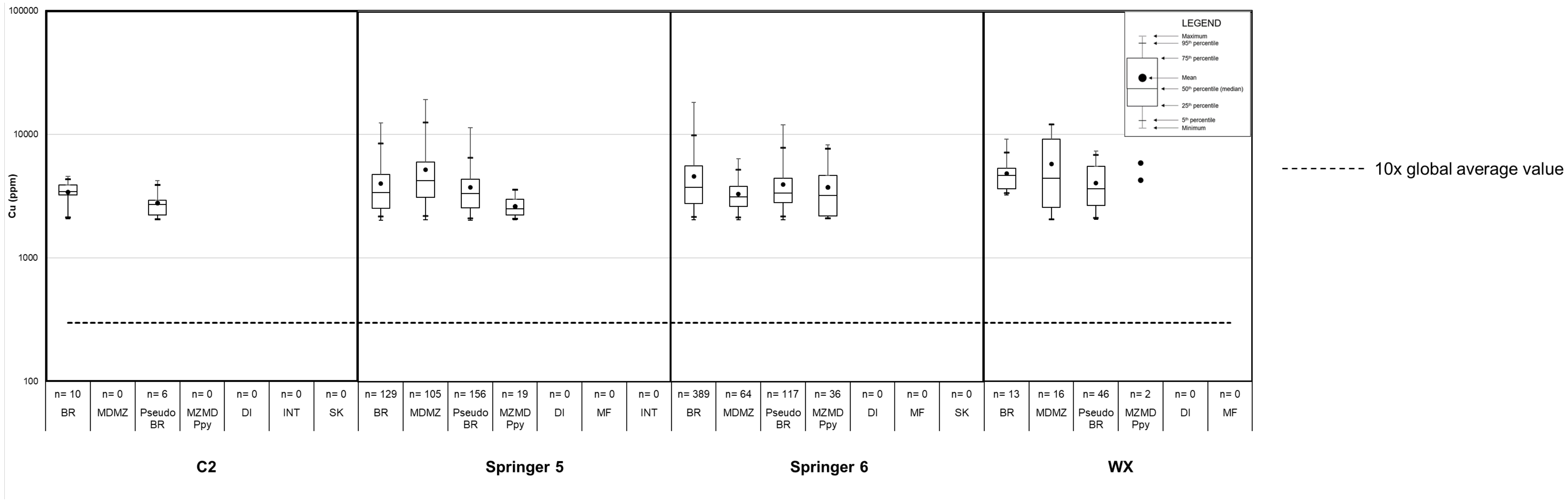
The selenium to sulphur ratio is overall highest for Springer 5, followed by C2 and Springer 6, and lowest for the WX area (Figure 34). There are no lithological trends observed within each mining area (Figure 35), however limited data are available for samples with geological logging.

Figure 32: Ore Copper Statistical Distribution by Area



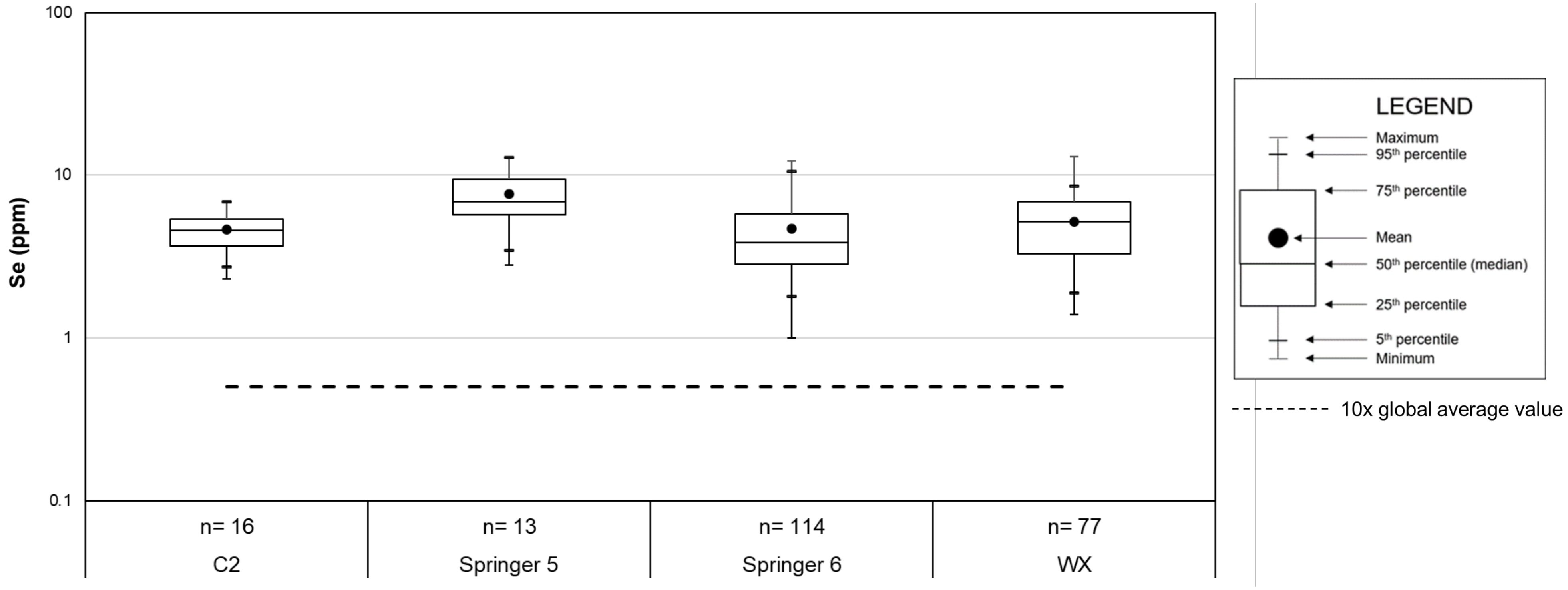
Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

Figure 33: Ore Copper Statistical Distribution by Lithology and Area



Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

Figure 34: Ore Selenium Statistical Distribution by Area



Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

Figure 35: Ore Selenium Statistical Distribution by Lithology and Area

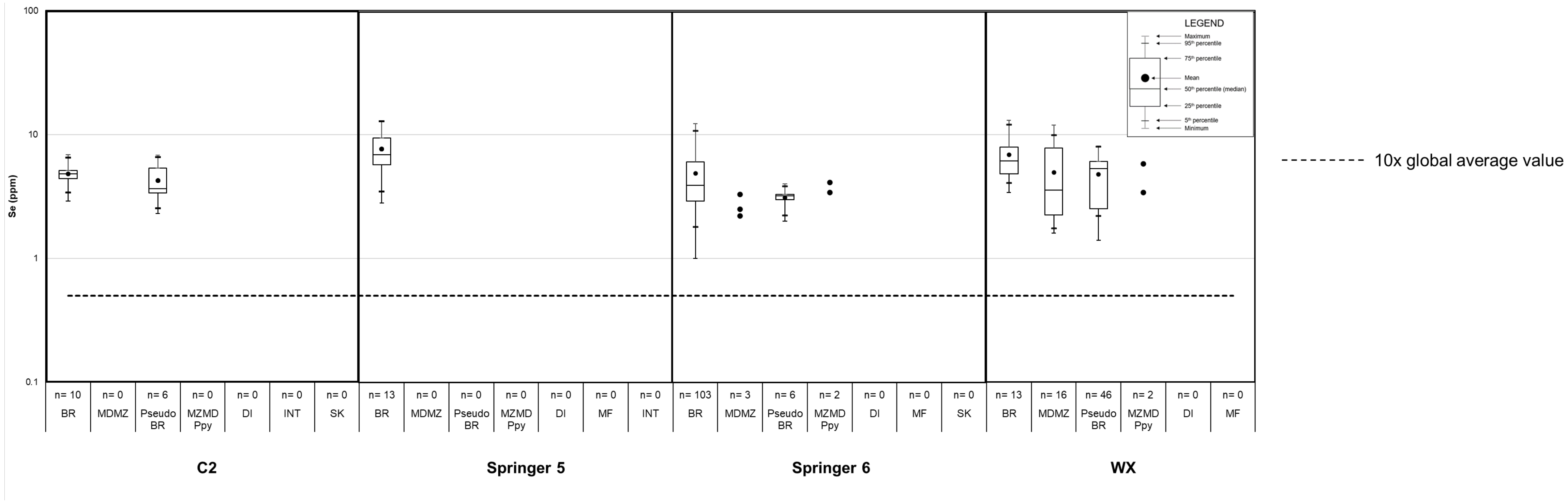


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Figure 36: Ore Selenium-to-Sulphur-Ratio Statistical Distribution by Area

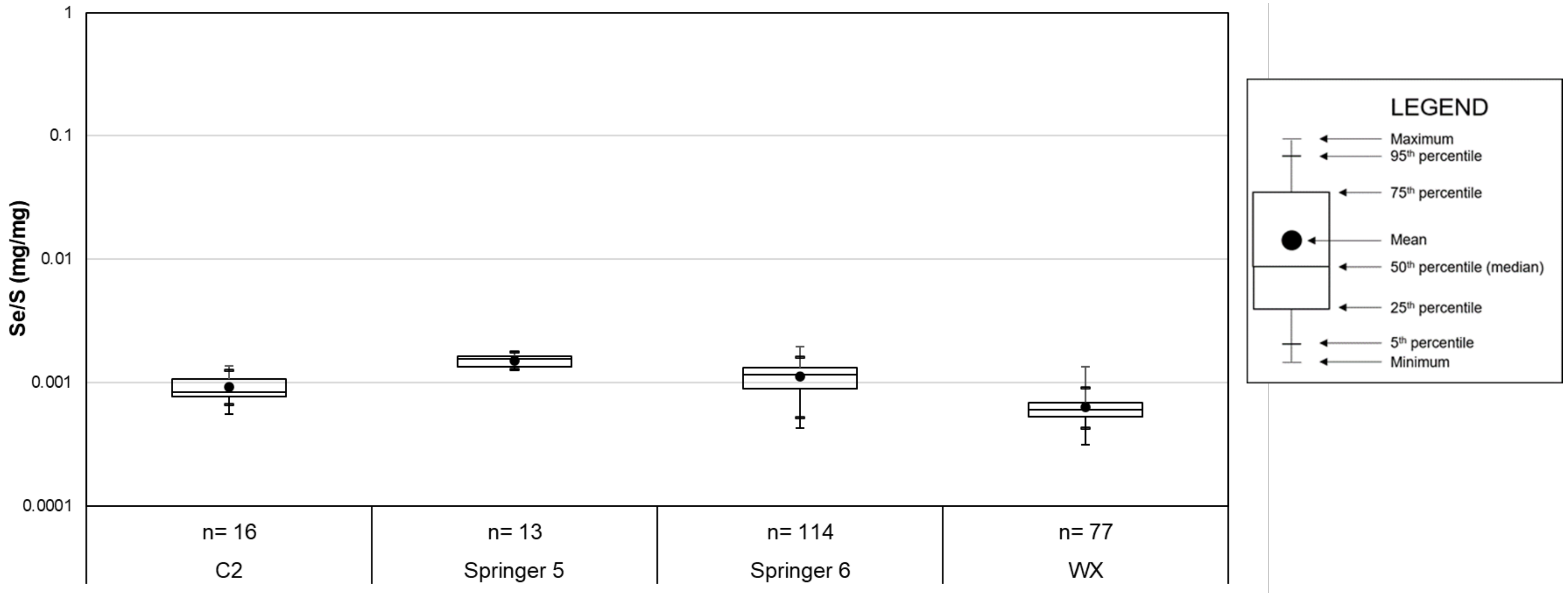

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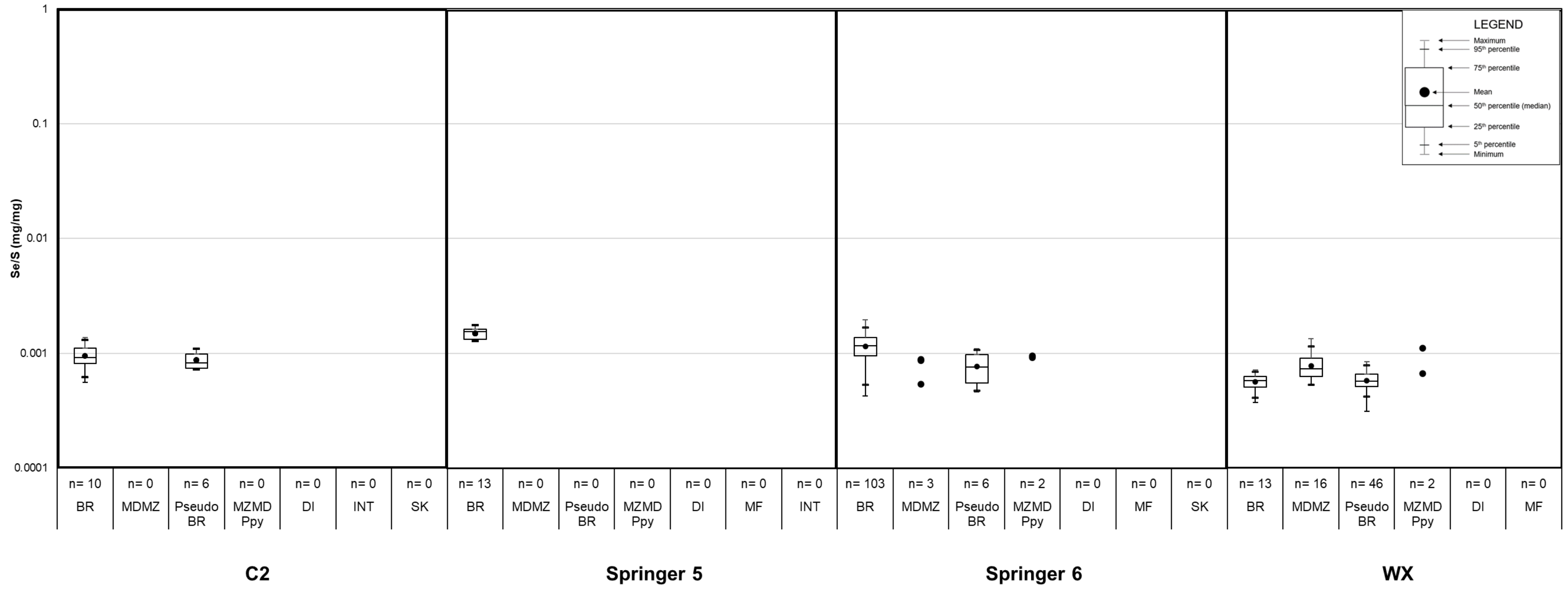
Figure 37: Ore Selenium-to-Sulphur-Ratio Statistical Distribution by Lithology and Area



Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

4.4 Future Low-Grade Ore

4.4.1 Overview

Sampling programs for future low-grade ore (LGO) consisted of diamond drill core tested prior to mining. Laboratory analytical programs conducted at the on-site and off-site external laboratories have generated aqua regia ICP and ABA datasets for the Springer Expansion Project area. Table 18 summarizes the static test inventory for waste rock for the ICP and ABA datasets. Drill core samples were primarily analyzed for static ABA data (total carbon and total sulphur) and trace elements by ICP. Samples with copper content between 0.1% and 0.2% from the drill core data set were classified as LGO with results presented in this section.

A minor proportion of samples were analyzed for TIC, sulphate, and Sobek neutralization potential.

Table 18: Future Low-Grade Ore Sample Inventory

Source	AR ICP[1]	ABA[2]	ABA (with Geology)[3]
C2	35	11	0
Springer 5	384	17	17
Springer 6	315	266	266
WX	23	126	126
Total	757	420	409

Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

Notes:

[1] Future LGO aqua regia ICP dataset

[2] Future LGO ABA dataset with and without geological logging

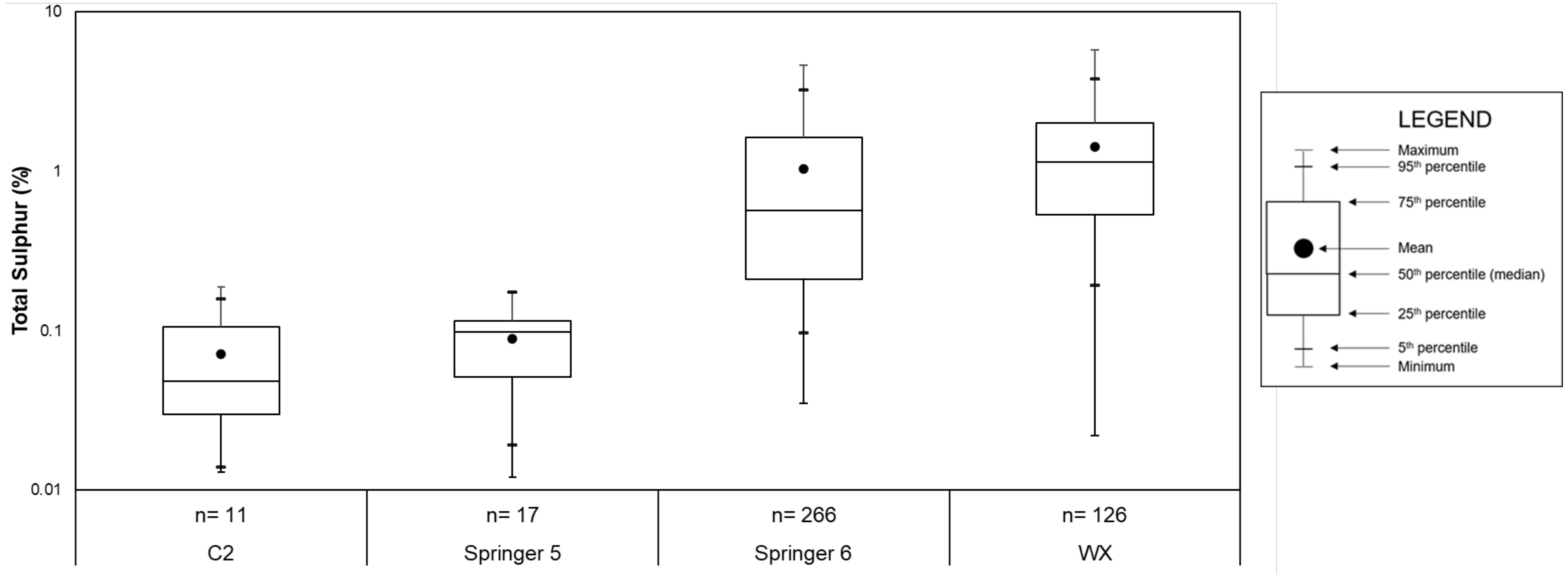
[3] Future LGO ABA dataset with geological logging

4.4.2 ARD Potential

Total sulphur showed variation between areas (Figure 26) but was comparable between lithologies at each respective mine area (Figure 27). The Springer 6 and WX areas had the highest sulphur content and were similar (mean concentrations of 1% and 1.4 %, respectively), whereas C2 and Springer 5 had lower sulphur content (mean concentrations of 0.071% and 0.089%, respectively) (Figure 36).

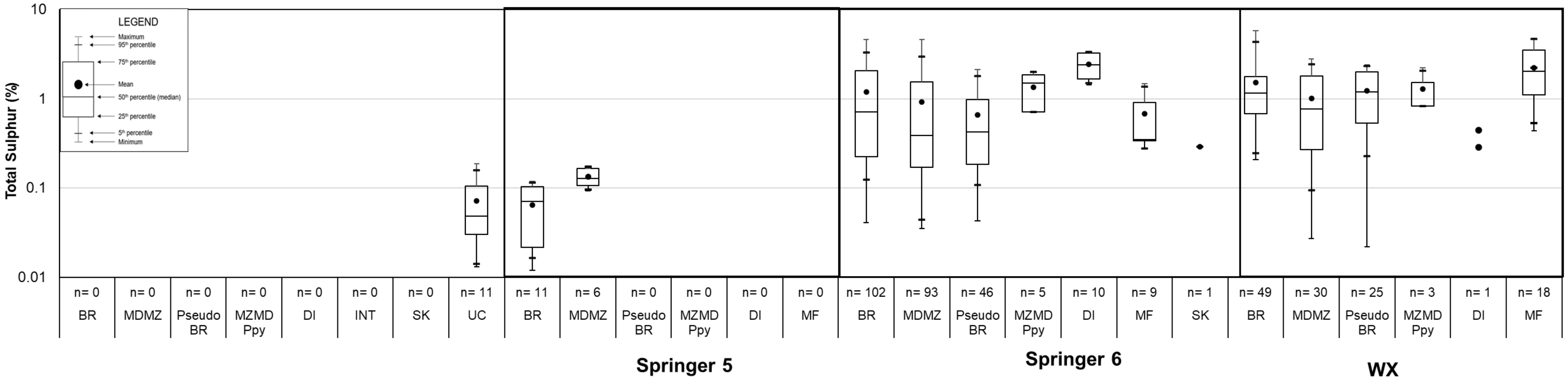
Only ABA samples from the Springer 6 and WX areas had sufficient geological logging across multiple lithologies. For these areas, total sulphur content was relatively similar between lithologies (Figure 37). For the geologically logged samples from Springer 5 and unclassified samples from C2, total sulphur content is lower than Springer 6 and WX.

Figure 38: LGO Total Sulphur Statistical Distribution by Area



Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

Figure 39: LGO Total Sulphur Statistical Distribution by Lithology and Area

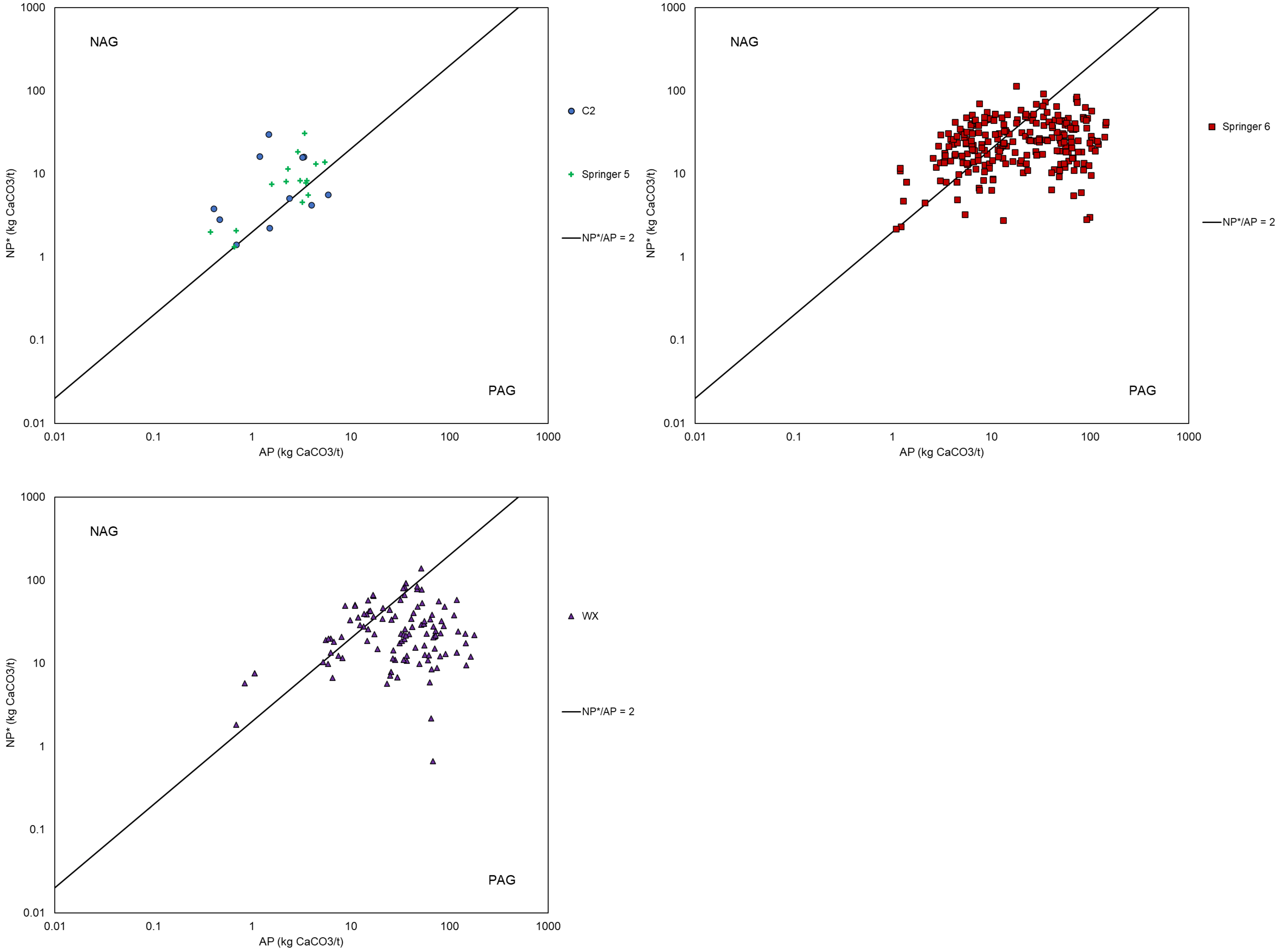


Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

The NPR based on NP*/AP showed that C2 and Springer 5 were dominantly NAG (72% and 88%, respectively), and Springer 6 and WX had higher proportions of PAG LGO (NAG proportions of 41% and 26%, respectively). Figure 38 due to higher sulphur content. Select samples from 2011 with a high detection limit for total carbon (1%) were not plotted.

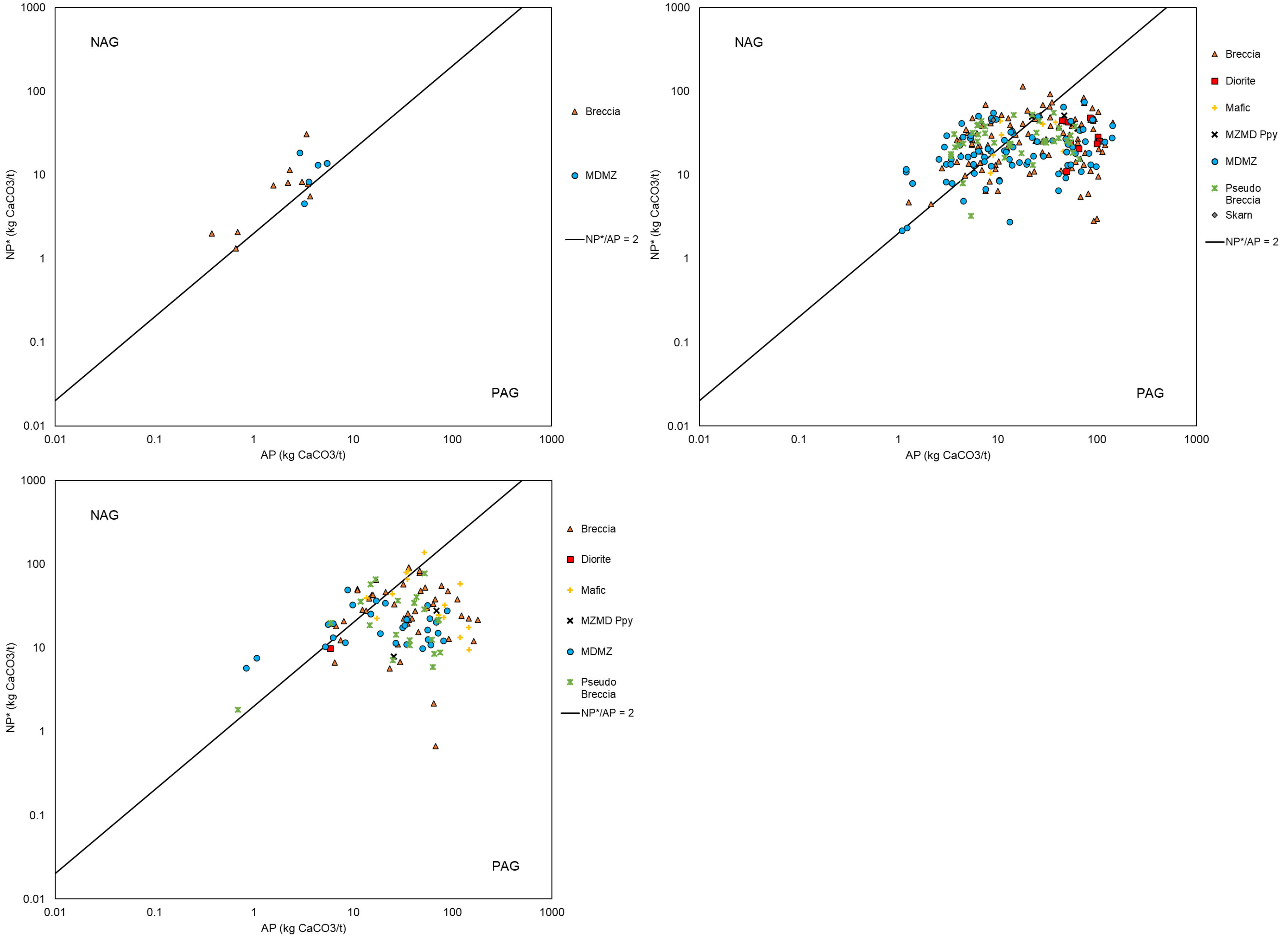
The ARD classification by lithology showed PAG and non-PAG materials in all lithologies (Figure 39).

Figure 40: NP* versus Acid Potential of Samples by Area from C2 and Springer 5 (top left), Springer 6 (top right) and WX (bottom)



Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

Figure 41: NP* versus Acid Potential of Samples by Lithology from Springer 5 (top left), Springer 6 (top right) and WX (bottom)



Source: Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

4.4.3 Trace Element Content

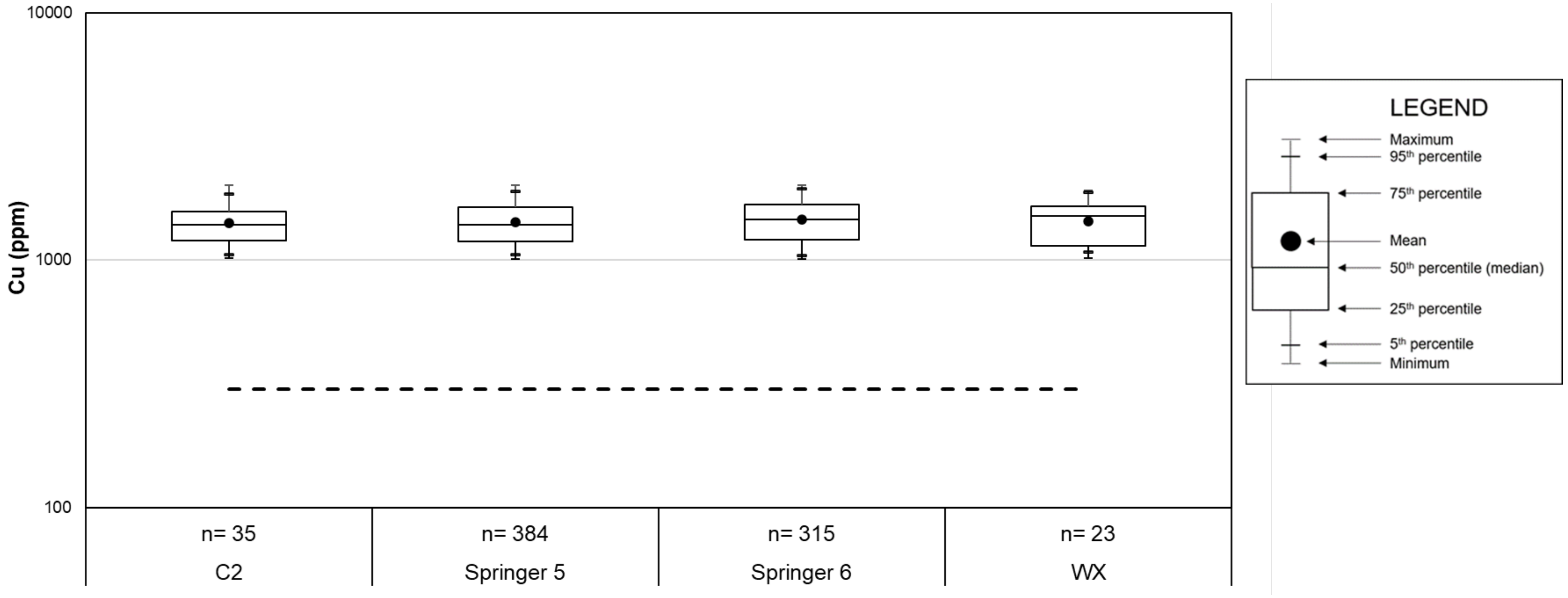
Appendix C presents a summary of future LGO statistics compared to global average values for high calcium granite.

When compared to the global average for high calcium granite (Price 1997), a subset of the future LGO at MPM have concentrations for regulated parameters an order of magnitude higher for antimony, arsenic, cadmium, copper, mercury, molybdenum, selenium, silver, and sulphur. There was a lower number of elements that showed enrichment in LGO compared to waste rock and ore.

All copper concentrations for LGO exceeded the screening criteria(Figure 40 and Figure 41). All selenium concentrations for ore exceeded the screening criteria for enrichment, except for a small proportion of samples from Springer 6 (Figure 42). Selenium concentrations were comparable at all mining areas within the Springer Expansion and no trends were observed by lithology within each mining area (Figure 43).

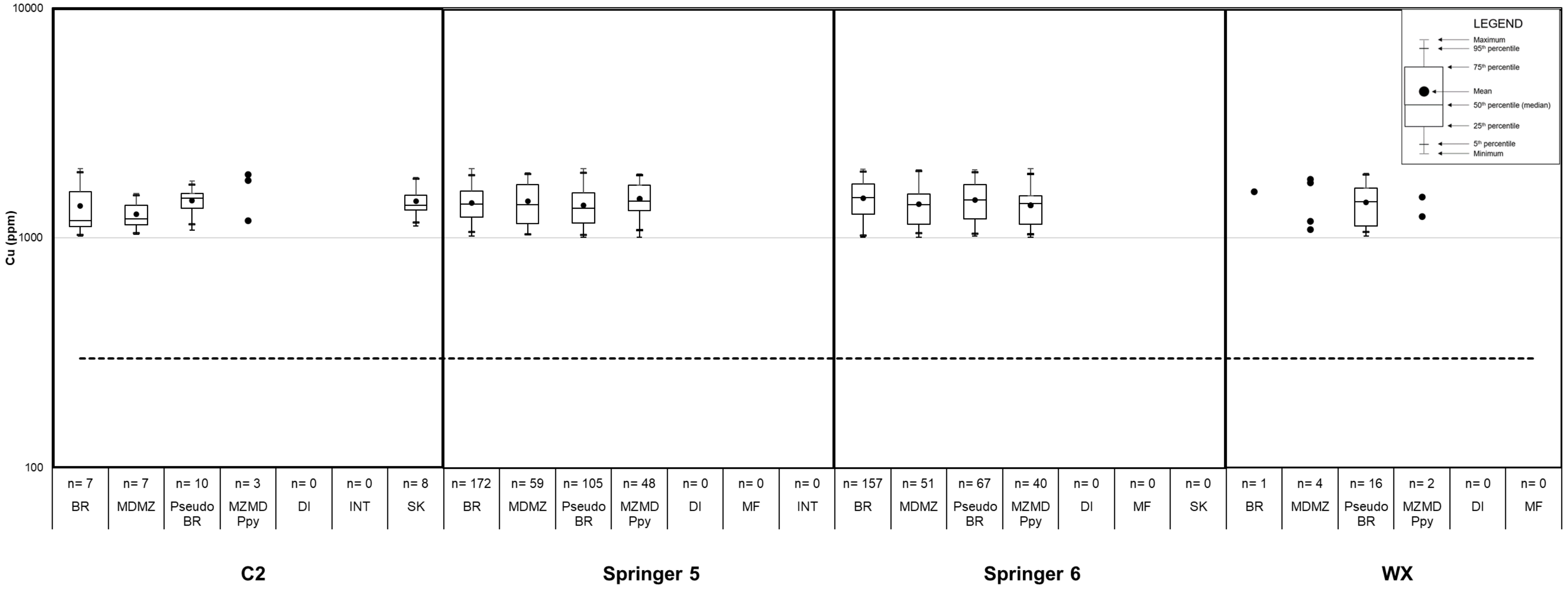
The selenium-to-sulphur ratio is overall similar for C2, Springer 5, and Springer 6 and lower for WX (Figure 44). There are no lithological trends observed within each mining area (Figure 45).

Figure 42: LGO Copper Statistical Distribution by Area



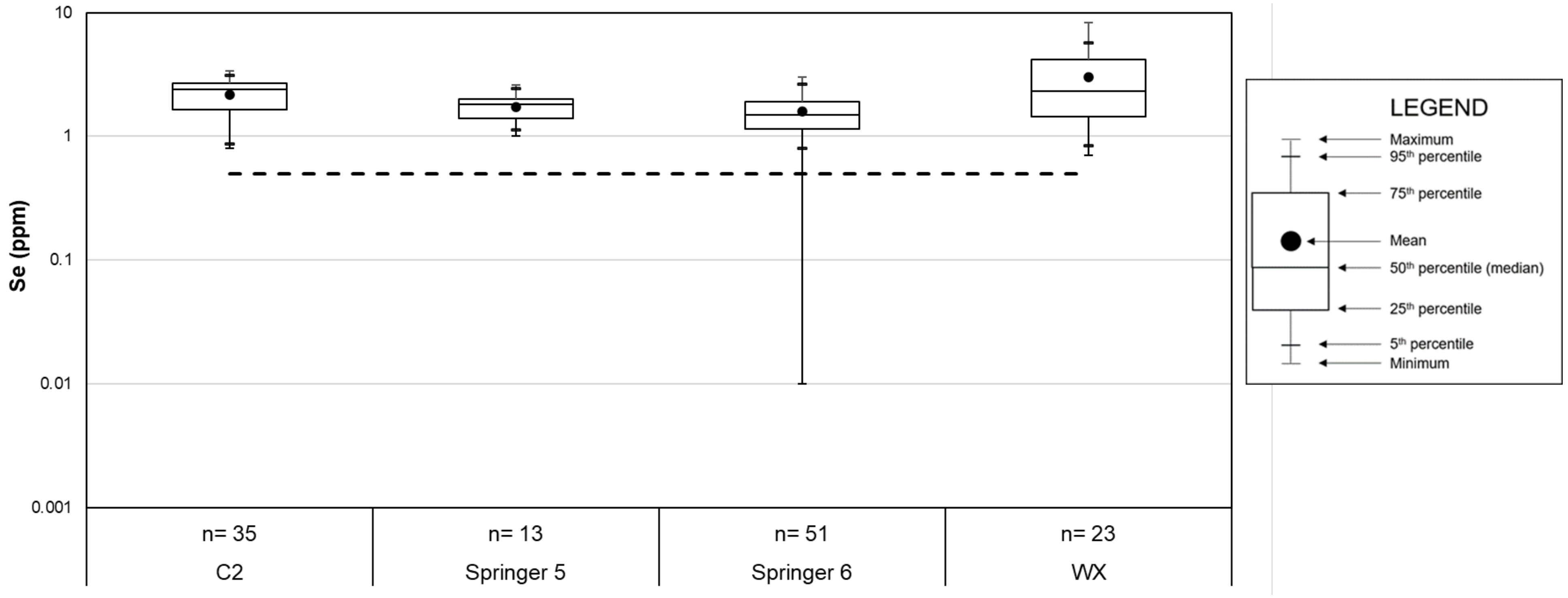
Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

Figure 43: LGO Copper Statistical Distribution by Lithology and Area



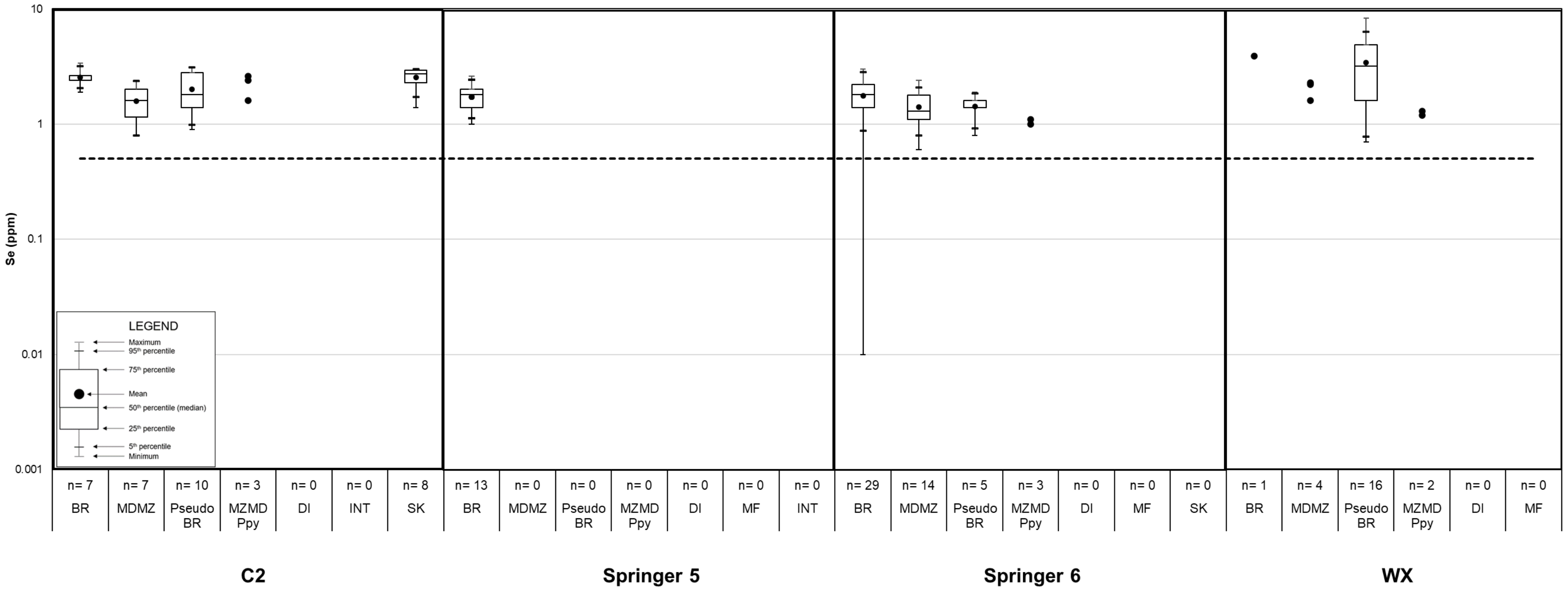
Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

Figure 44: LGO Selenium Statistical Distribution by Area



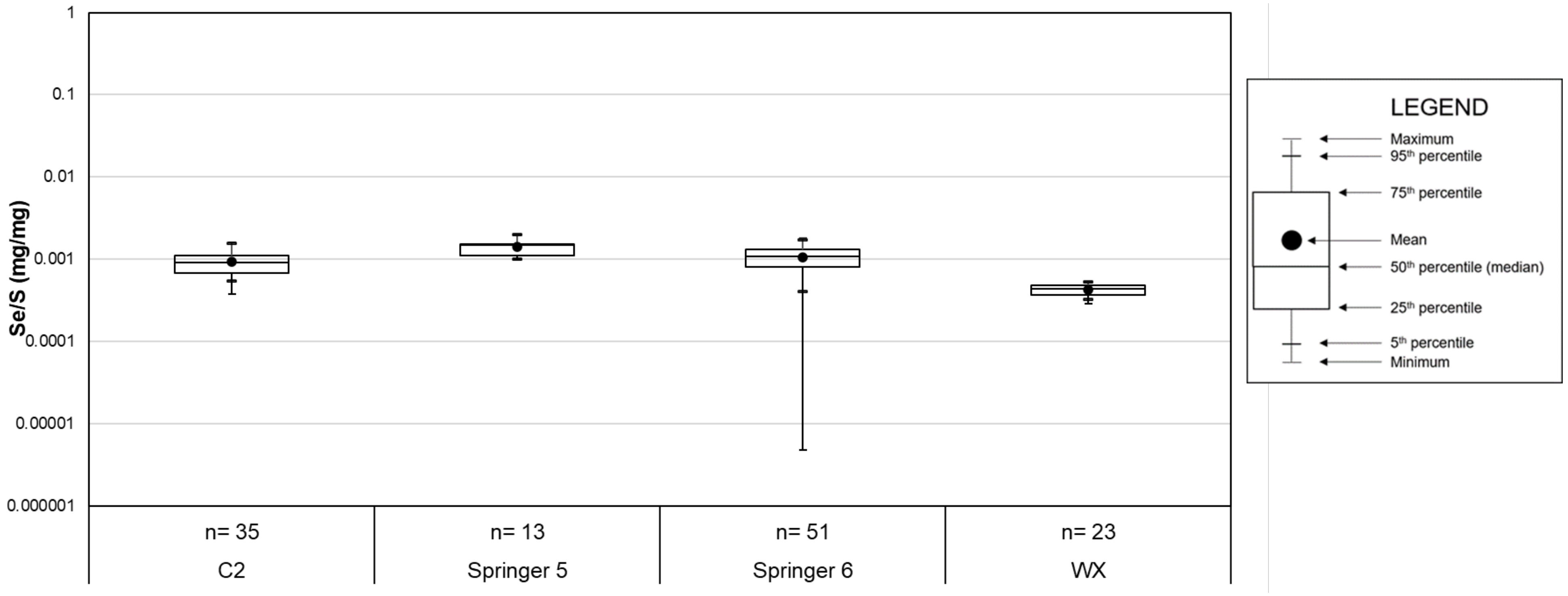
Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

Figure 45: LGO Selenium Statistical Distribution by Lithology and Area



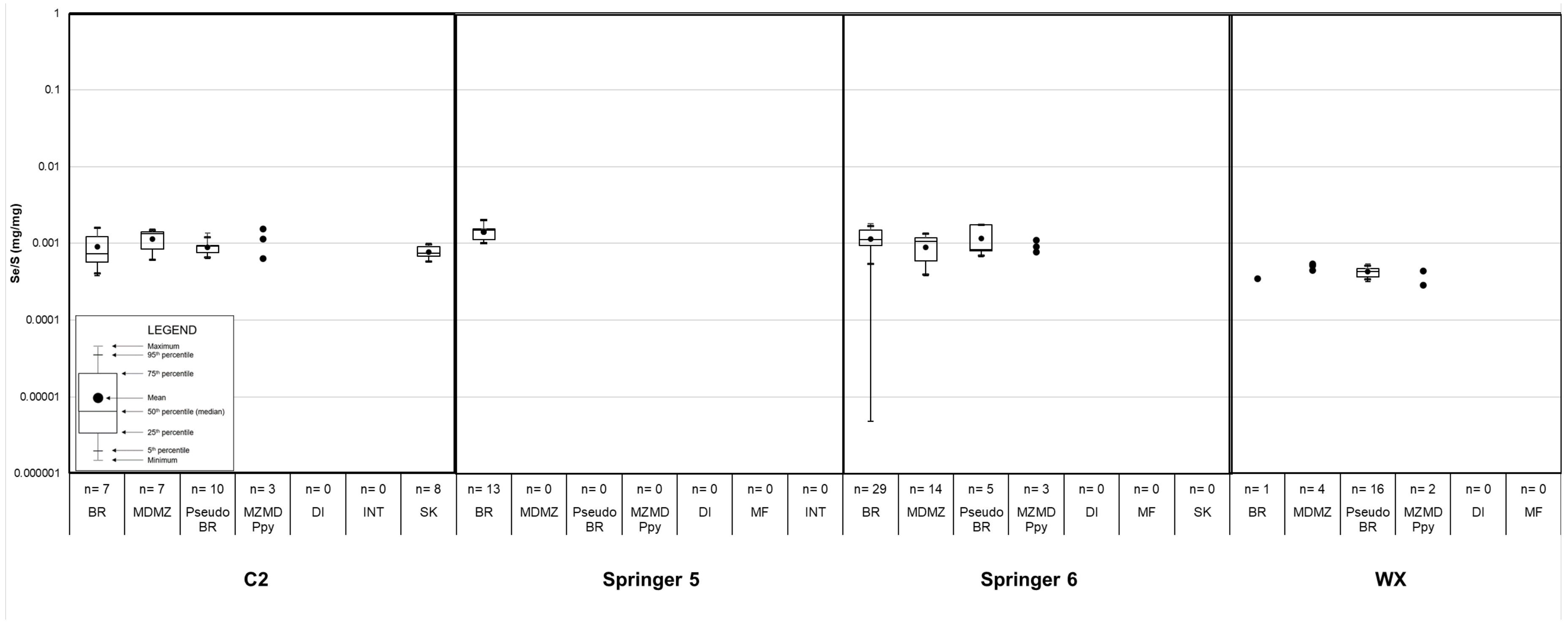
Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

Figure 46: LGO Selenium-to-Sulphur-Ratio Statistical Distribution by Area



Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

Figure 47: LGO Selenium-to-Sulphur-Ratio Statistical Distribution by Lithology and Area



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4.5 Tailings

4.5.1 Overview

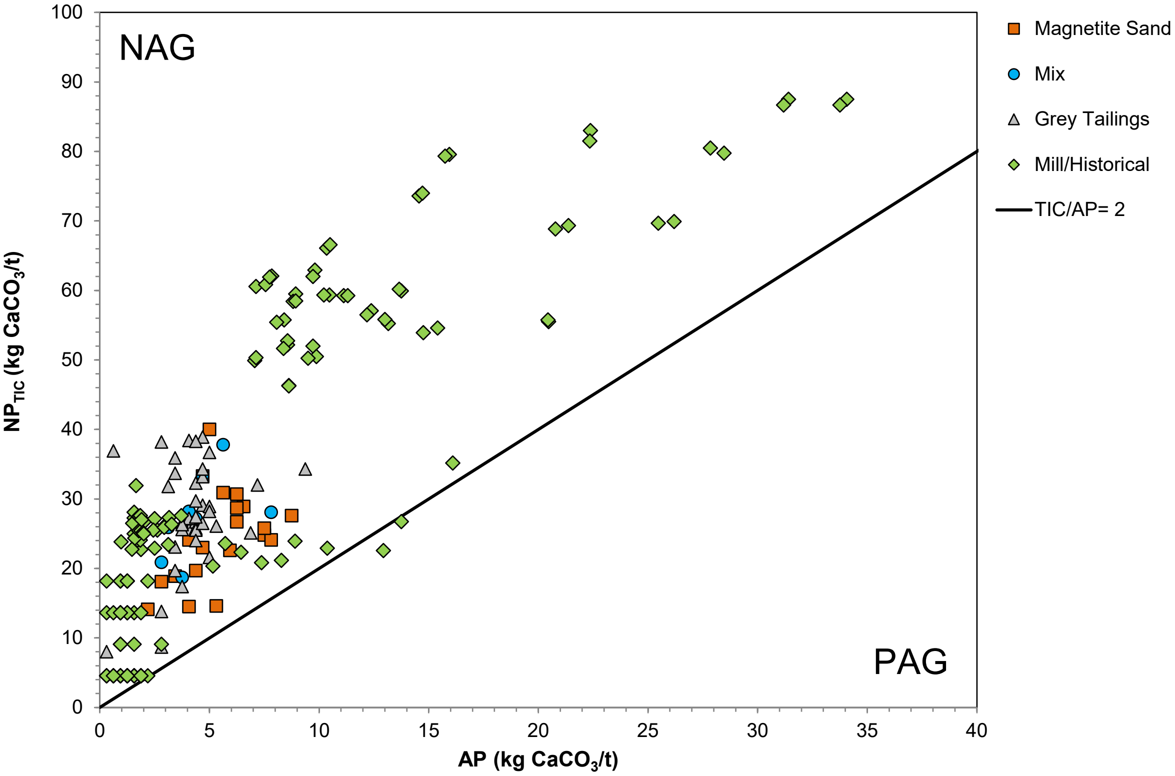
All available tailings data described in Section 3.3.4 were included in the tailings geochemical characterization assessment.

4.5.2 ARD Potential

ARD potential of tailings is assessed based on sulphide content (approximated from total sulphur) and NP derived from TIC. The resulting TIC/AP is used to classify Mount Polley tailings as PAG (TIC/AP ≤ 2) or NAG (TIC/AP< 2).

Sulphur concentrations in Mount Polley tailings are uniformly low, with total sulphur ranging from 0.01% to 1.1% (median concentration of 0.10%). The majority of tailings samples (99%) were found to be NAG based on their TIC/AP values (Figure 46).

Figure 48: Total Inorganic Carbon versus Acid Potential of Mount Polley Mine Tailings



Sources: https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/Source_Terms/Compiled_Geochem_Data_CAPR002434_Rev02_SJL_KWJ.xlsm

4.5.3 Trace Element Content

Median concentrations of copper and selenium were present in the tailings at an order of magnitude higher concentrations compared to average crustal concentrations for low calcium granite. Copper is partially deported in silicate minerals. Selenium is associated with the sulphide component of the tailings and is also correlated with copper content. Kinetic testing on tailings samples has to-date confirmed they are non-acid generating.

4.5.4 Kinetic Testing

Geochemical properties and mineralogy of the kinetic test samples were provided in SRK (2015), but for ease of reference key properties are provided in Table 19. All tailings kinetic tests were classified as NAG.

Table 19: Geochemical Properties of Tailings Kinetic Tests

Kinetic Test	Tailings Type	TIC kg $CaCO_3$/t	Total S %	SO_4 %	AP kg $CaCO_3$/t	TIC/AP ratio	Cu mg/kg	Se mg/kg
HC-1/COL-1	Magnetite Sand	25	0.26	<0.01	8.4	3.0	1200	1.5
HC-1D	Magnetite Sand	-	0.27	<0.01	8.4	-	1200	1.7
HC-2/COL-2	Magnetite Sand	18	0.16	<0.01	4.7	3.8	950	1.3
HC-3/COL-3	Grey Tailings	33	0.16	<0.01	4.7	7.0	940	1.6
HC-4	Grey Tailings	26	0.17	<0.01	2.8	9.3	320	0.9
HC-5	Magnetite Sand	15	0.18	<0.01	4.1	3.6	720	1.2
HC-6	Grey Tailings	32	0.21	<0.01	7.2	4.5	1300	1.8

Source:
https://srk.sharepoint.com/sites/NA1CI008.003/Internal/500_Reporting/5.Kinetic+CuOxide_UpdateReport/Tables/Kt+Cu_Memo_tables_1CI008.003_REV00_CBK.xlsx

Sample mineralogy by QEMSCAN was dominated by silicates (88 to 95%) including feldspars, chlorite, and quartz, with lesser iron oxides (2.8 to 7.0%), calcite (0.72 to 4.5%), pyrite and chalcopyrite (0.10 to 0.63%) (SRK 2017). Malachite was detected in four of the six samples at less than 0.1%. Magnetite was indistinguishable from other iron oxides analyzed by QEMSCAN but was found to account for approximately 75% of the iron oxide detected in the magnetite sands sample, HC-1/COL-1, by X-ray diffraction (SRK 2015).

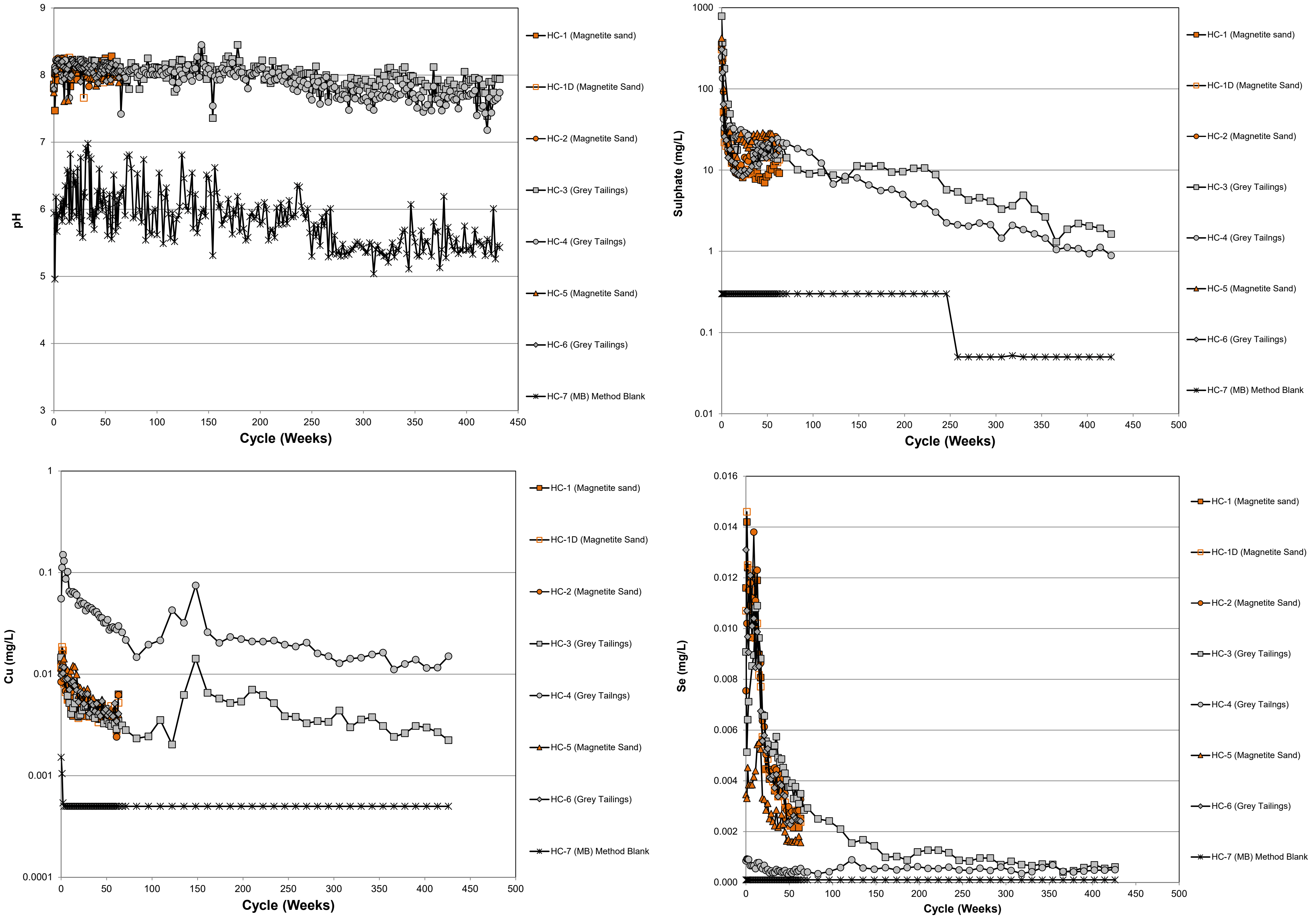
HC-3 has relatively high sulphide content (0.33% pyrite) and elevated copper and selenium concentrations. HC-4 has lower copper and selenium concentrations, but copper is leaching at higher concentrations than in HC-3 (Figure 47), which is thought to be attributed to higher dissolved organic carbon (DOC) leaching from HC-4 (2 mg/L) compared to HC-3 (1 mg/L) which may form humic complexes with copper increasing it solubility. The tests are continuing with the purpose of evaluating the role of breakdown of organic matter on metal mobility.

All HCT and column tests (Figure 48) have yielded leachate pHs typically between 7.7 and 8.3. Sulphate concentrations were initially near 1000 mg/L for humidity cells and above 1000 mg/L for columns. Both types of tests showed decreasing sulphate concentrations which have stabilized at lower concentrations. They have also showed decreasing metals concentrations, including those originally enriched (copper and selenium), which have stabilized at low concentrations. Maximum copper and selenium concentrations in both tests were as follows:

- The highest copper concentration in one HCT was 0.15 mg/L, but typical maximum copper concentrations were 0.02 mg/L in HCT leachates and 0.05 mg/L in column test leachates.
- The highest selenium concentrations were 0.01 mg/L in HCT leachates and 0.06 mg/L in column test leachates.

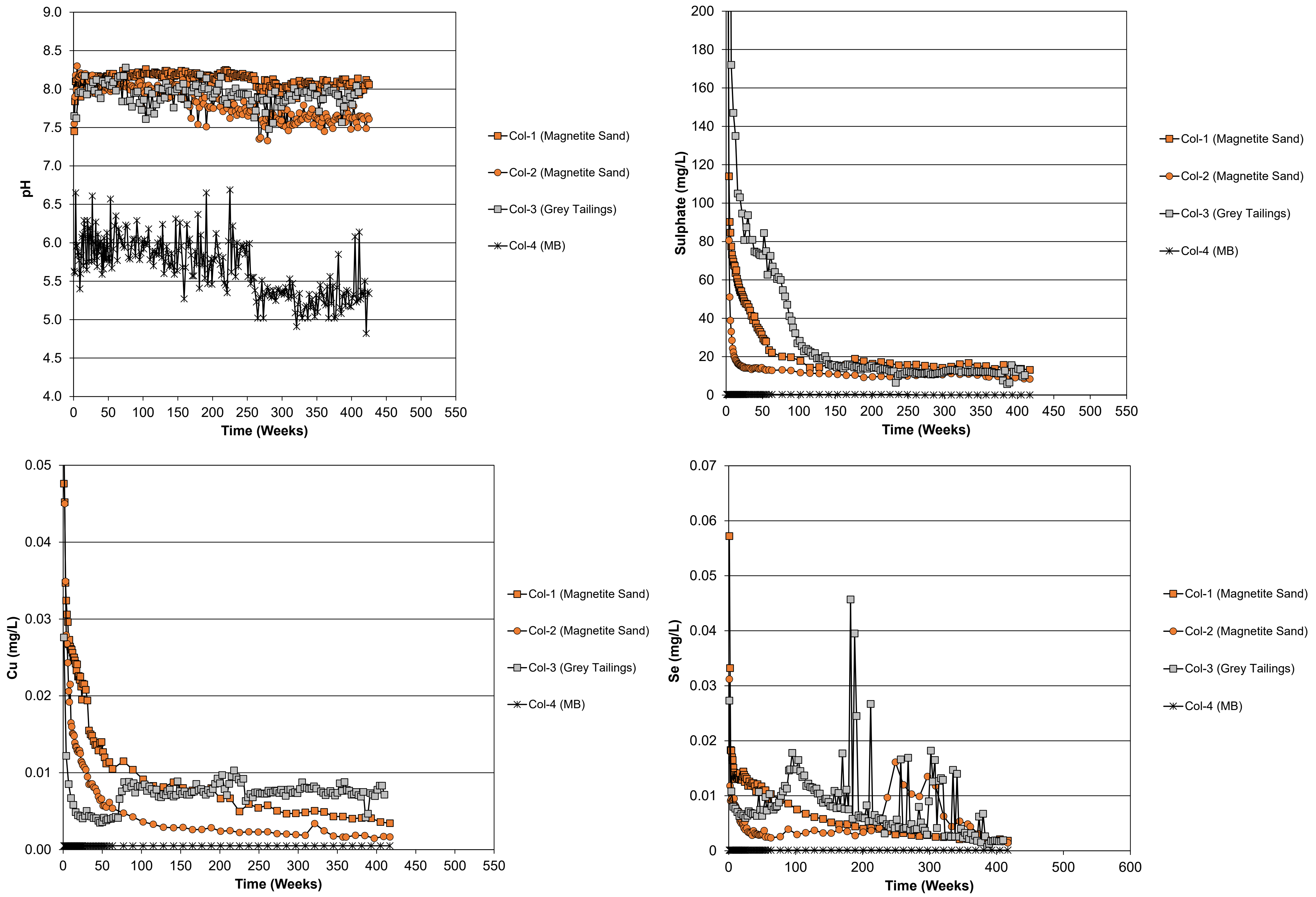
For other parameters, notable results were initial molybdenum concentrations between 2 and 3 mg/L in column leachates. These have since stabilized to concentrations between 0.01 and 0.02 mg/L.

Figure 49: Selected Leachate Chemistry for Tailings Humidity Cells



Sources: https://srk.sharepoint.com/sites/NA1CI008.003/Internal/410_Kinetic_Tests/Calculations+Charts/HCTs/Mt.%20Polley_HCT_Conc%20Charts%20_1CI008-003_rtc_rev02.xlsx

Figure 50: Selected Leachate Chemistry for Tailings Columns



Sources: https://srk.sharepoint.com/sites/NA1CI008.003/Internal/410_Kinetic_Tests/Calculations+Charts/COLs/Mt.%20Polley_Col_Conc%20Charts_1CI008-003_rtc_rev02.xlsx

5 Interpretation

5.1 Spatial and Geological Coverage of Future Mining Areas

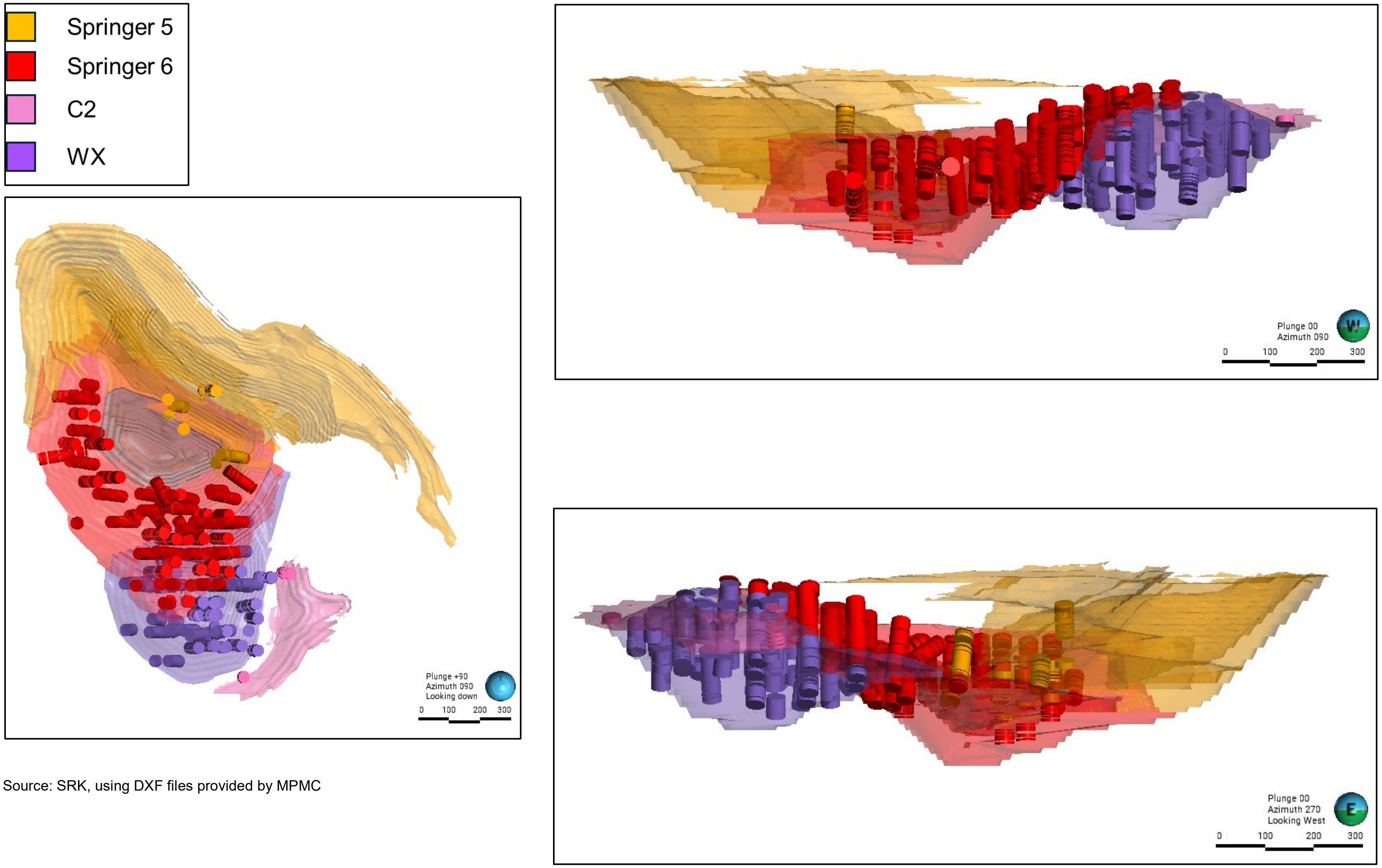
Sample spatial coverage of future mining areas was assessed by comparing the distribution sampled drillholes within the extents of the Springer Expansion pit shells using Leapfrog 3D software (Figure 49 and Figure 50, respectively). The assessment of spatial coverage for both datasets is summarized as follows:

- The ABA dataset has sufficient spatial coverage of the Springer 6 and WX areas.
- The ABA dataset has sparse spatial coverage of the Springer 5 and C2 areas, particularly in the northwest and northeast extents of Springer 5.
- The AR ICP dataset has no coverage in the northeast and eastern extents of Springer 5 and little coverage of C2 and WX.
- The AR ICP dataset has sufficient spatial coverage of the western extent of Springer 5 and most of Springer 6.

Geological coverage was assessed using the distribution of lithologies in each mining area for the ABA and AR ICP datasets (Section 3.3.3). The assessment for both datasets is summarized as follows:

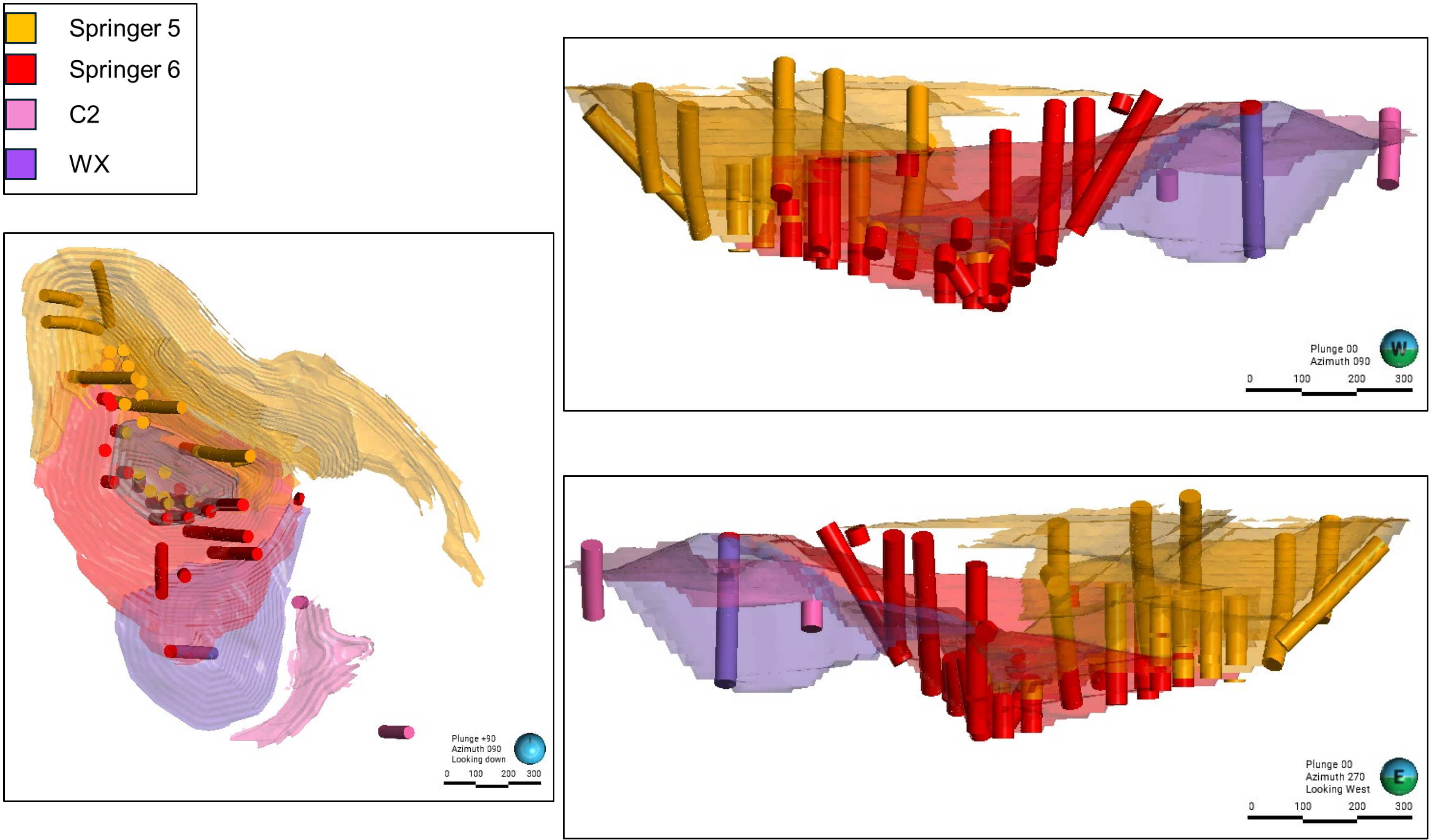
- There were few geologically logged samples for C2 in both the ABA and AR ICP datasets, few logged samples for WX in the AR ICP dataset, and few logged samples for Springer 5 in the ABA dataset. This resulted in insufficient coverage of some geological units in the Springer Expansion area.
- The available datasets did not provide coverage of diorite in Springer 5, which is known to occur in the northern extent of Springer 5 (Figure 2).
- The Springer 6 and WX areas had sufficient coverage of major geological units in the ABA dataset.
- The Springer 5 and Springer 6 areas had sufficient coverage of major geological units in the AR ICP dataset.

Figure 51: Spatial Coverage of ABA Dataset



Source: SRK, using DXF files provided by MPMC

Figure 52: Spatial Coverage of AR ICP Dataset



Source: SRK, using DXF files provided by MPMC

5.2 Comparison to Existing Mined Rock

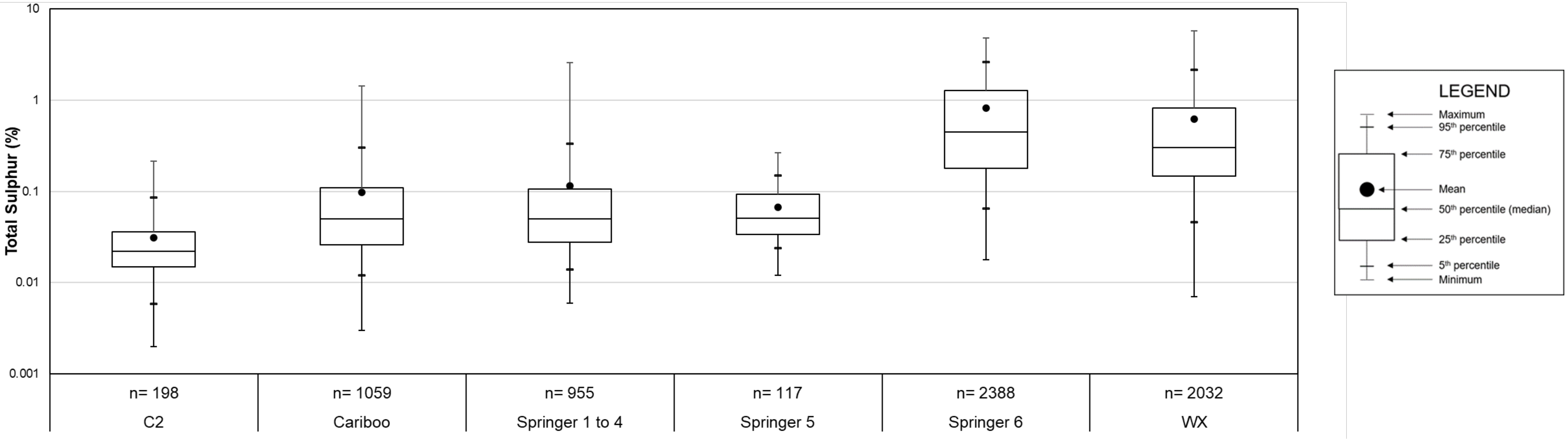
5.2.1 ARD Potential

NAG and PAG proportions from past and planned production for the Project show that most mining areas are dominantly NAG, with waste rock and ore from Springer 1 to 4, Springer 5, Cariboo, and C2 having NAG proportions ranging from 79% to 98%. Springer 6 and WX have lower NAG proportions ranging from 31% to 78% (Table 4). This demonstrates that there is spatial zonation of ARD potential, with the previously mined Cariboo and Springer 1 to 4 areas having similarly low ARD potential as the future Springer 5 and C2 areas.

General findings from existing and future waste rock, ore, and LGO geochemical characterization were that sulphur content was the primary control on ARD potential. Future waste rock and ore from the Springer 6 and WX areas had the highest sulphur content and therefore the highest proportions of PAG(Sections 4.1.2, 4.2.2, 4.3.2, and 4.4.2). Figure 51 presents the statistical distribution of total sulphur for existing mined rock and all future rock (waste rock, ore, and LGO). The figure shows that C2, Cariboo, Springer 1 to 4, and Springer 5 have comparable sulphur content that is notably lower than Springer 6 and WX. Sulphur content did not show any notable trends by lithology for future rock, which is consistent with the distribution of ARD classification in existing waste rock and ore.

Processing of ore mined during the Springer Expansion Project will use the same standard flotation process currently used at MPM, which includes sulphide separation. Therefore, the geochemical characteristics of future tailings are expected to be similar as historical tailings which have been handled as part of development to date.

Figure 53: Existing and Future Rock Total Sulphur Statistical Distribution by Area



Source: Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

5.2.2 Metal Leaching Potential

Geochemical characterization of trace elements found that existing and future rock had a similar list of elements that were enriched relative to the screening criteria (Sections 4.1.3, 4.2.3, 4.3.3, and 4.4.3). Copper concentrations were comparable for existing and future mining areas, with median concentrations for all areas exceeding the screening criteria (Figure 52). Selenium concentrations were also similar for existing and future mining areas and all median concentrations exceeded the screening criteria (Figure 53).

HCT trends for samples representing existing mined rock and future waste rock were similar, as were leachate concentrations (Section 4.2.4).

Because processing of ore mined during the Springer Expansion Project will use the same standard flotation process currently used at MPM, and future ore and LGO characteristics are similar to previously mined rock, geochemical characteristics of future tailings are expected to be the same as historical tailings. Geochemical test work on metallurgical tailings of expansion areas is recommended to confirm this preliminary assessment.

Figure 54: Existing and Future Rock Copper Statistical Distribution by Area

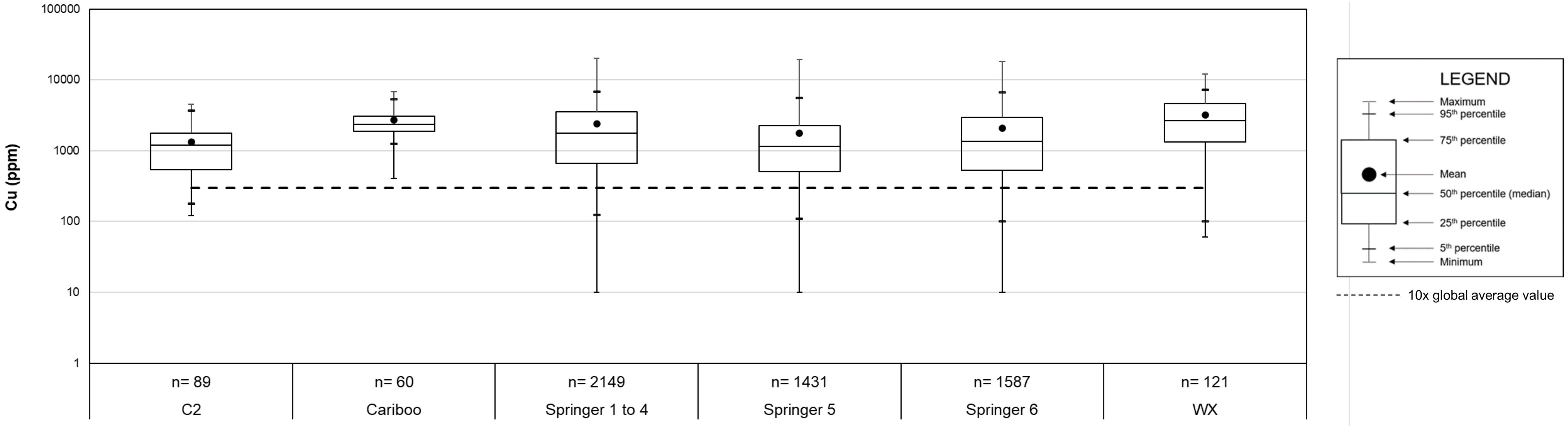
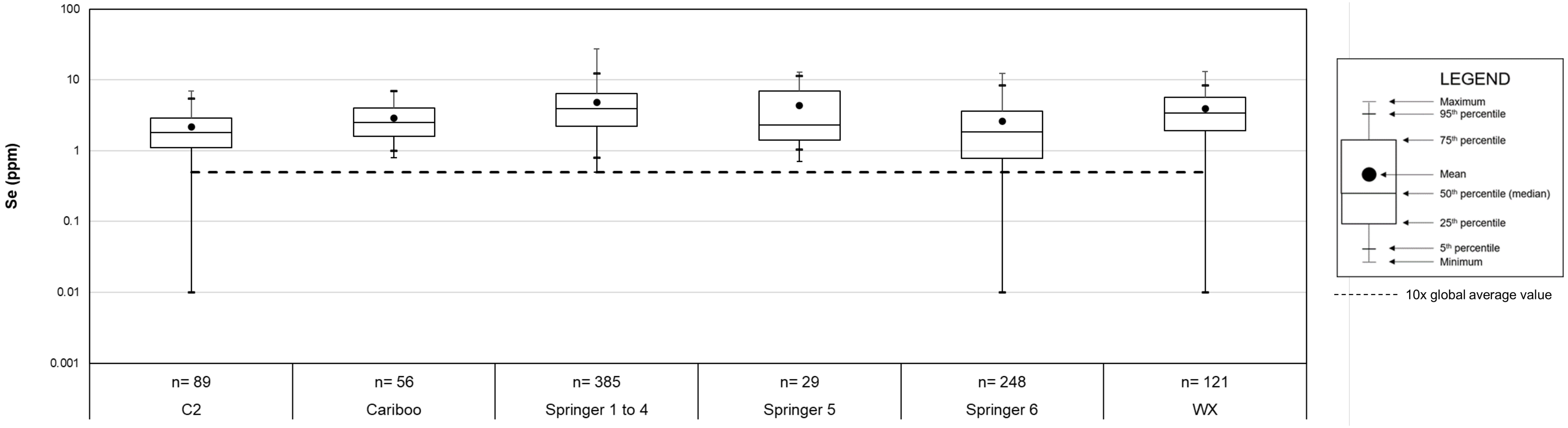


Figure 55: Existing and Future Rock Selenium Statistical Distribution by Area



Source: Source: https://srk.sharepoint.com/sites/NACAPR003074/Internal/!020_Project_Data/010_SRK/2025 Amendment Application/4_Working File/[MPMC_Permit_Amendment_Compiled_KWJ_Rev01.xlsx]

5.3 Delay to Onset of Acid Generation

5.3.1 Determination of Critical NP/AP

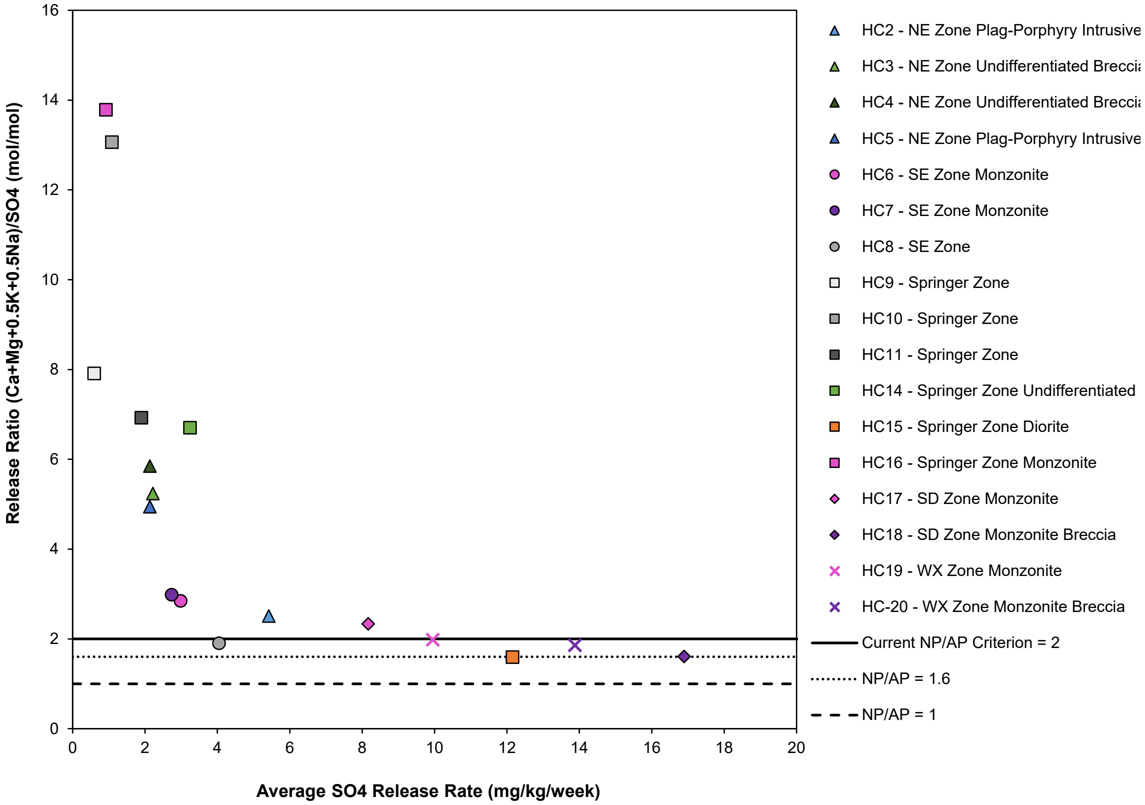
The current operational NP*/AP for classifying waste rock as NAG (or non-PAG) is specified in the Permit as 2. However, the critical NP/AP ratio (NP/AP$_{crit}$) can be developed using data from humidity cell tests. NP/AP$_{crit}$ was derived from the comparison of cation release ratios and sulphate release rates (Figure 54).

Cation release ratios reflect carbonate dissolution, while sulphate release rates reflect sulphide oxidation. The trend of these data approaches a cation release ratio value between 1 and 2 and none of these cells have generated acid thus far. Relative rates expressed as the molar ratio of the stable release rates of the four cations to sulphate [(Ca+Mg+0.5Na+0.5K)/SO4] mol/mol were used directly to estimate the NP/AP$_{crit}$ for the waste rock. These ratios were compared to sulphate release rates from the HCTs to differentiate between dissolution of carbonates by sulphuric acid (from pyrite oxidation) and by carbonic acid (formed by carbon dioxide dissolved in the deionized water). The consideration of Na and K reflects the potential for Ca and Mg liberated by carbonate dissolution to exchange with Na and K in phyllosilicates. The release rate for Na and K are halved to account for their lower charge. Inclusion of Na and K also limits the possibility of under-stating carbonate mineral utilization thereby resulting in a lower NP/AP$_{crit}$.

At low oxidation rates (lower sulphate release), the dominant process in the test is assumed to be dissolution of carbonates by carbonic acid and the (Ca+Mg+0.5Na+0.5K)/SO_4 ratio is high. As the influence of sulphide oxidation increases (shown by increase in sulphate release), the (Ca+Mg+0.5Na+0.5K)/SO_4 ratio greater reflects the interaction of sulphuric acid with carbonates which is the expected dominant process at full scale in waste rock dumps.

A lack of testing on samples with high oxidation rates hampered previous estimations of NP/AP$_{crit}$ (SRK 2016). The initiation of the four HCTs in 2022, which have run for 48 weeks thus far, all have higher oxidation rates than previous HCTs and were used to define NP/AP$_{crit}$. SRK recommends defining NP/AP$_{crit}$ of 1.6 based on the new HCTs.

Figure 56: Cation Release Ratio versus Oxidation Rate



Sources: https://srk.sharepoint.com/sites/NA1CM017.011/Internal/!020_Project_Data/030_Lab Data/Kinetic Data/Calculations/[Mt_Polley_HCT_WR_Outcomes_1CM017.011_rtc_rev00.xlsx]

5.3.2 Determination of Time to Onset

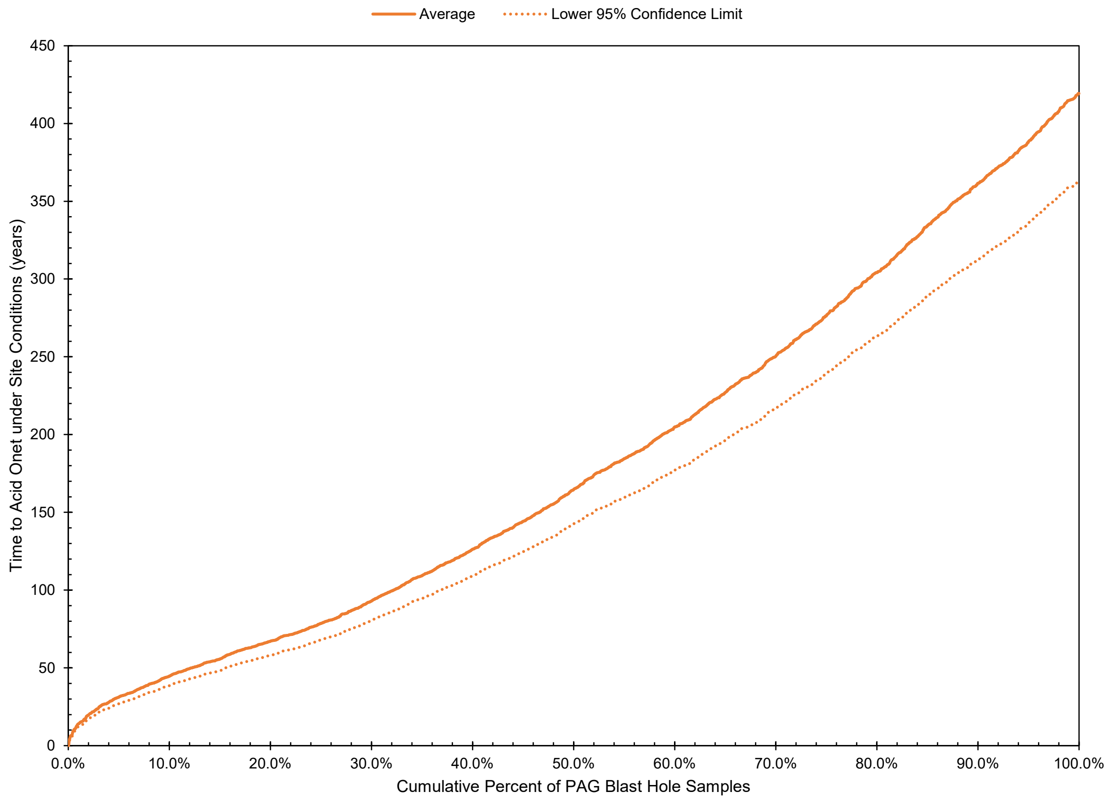
Following the same method used in SRK (2016) and SRK (2010), the straight-line average of the correlation between initial NP/AP (i.e., at time = 0, NP/AP_0) and calculated time for the onset of acidification (t_{onset}, in years) for all humidity cells from MPM was updated using an NP/AP_{crit} of 1.6:

$$t_{onset} = 63 \times \left(\frac{NP}{AP}\right)_0$$

The equation indicates that a sample with NP/AP of 1 might be expected to generate acid in 63 years. The calculated lower 95% confidence on the 63 years coefficient was 55 years.

To estimate the exposure time PAG waste rock can be stored sub-aerially before the onset of acidification, t_{onset} (average and lower 95% confidence limit) was calculated for samples classified as PAG from the MPM blast hole database. A temperature correction of 0.3 to reflect slower reaction rates under cooler site conditions was included in the calculation.

Figure 57: Distribution of t_{onset} for PAG Waste Rock at Mount Polley Mine



Sources: https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/Source_Terms/TimeOnset_CAPR002434_Rev00_SJL.xlsx

The distribution for faster-reacting components represented by the lower dashed line indicates that about 2% of the rock might become acidic in 20 years, and 10% after 40 years. The majority of the rock with higher NP/AP might take over 100 years to become acidic A number of factors complicate the actual estimate for higher NP/AP materials. Increasing acidification along with heating would result in accelerated oxidation and NP depletion though decreasing oxidation rates due to sulphide depletion and formation of secondary mineral coatings would result in lower oxidation rates and greater time to onset of acidic conditions.

The general finding from the kinetic testing is that acidification of PAG materials at MPM will take on the order of decades to centuries to develop. This is consistent with the widespread pH neutral weathering conditions at MPM in both natural and mined materials. Initial mining at Mount Polley was 25 years ago but waste rock has not acidified.

The Temporary NW PAG Stockpile contains less than 0.1% of rehandled PAG waste rock that was mined between 2001 – 2007 and initial construction of the NAG/PAG Pad began in 2011 (14 years ago). The Springer Pit Expansion Project proposes to rehandle PAG waste rock stored in the Temporary NW PAG Stockpile starting in 2032 and finishing by the end of 2034. Based on the assessment above, the risk of developing widespread acidic conditions within this timeframe is low (24 years after initial construction of the Temporary NW PAG Stockpile).

5.4 Limitations

The following limitations were identified through an assessment of the existing and future datasets generated from previous geochemical sampling:

- There were limited future ABA samples with logged geology in the C2 and Springer 5 areas. For future waste rock, only Springer 6 and WX areas had sufficient geological logging. Sample numbers for ore are limited for all areas except for Springer 6.
    - There were no breccia and pseudo-breccia ABA samples at C2 and no pseudo-breccia and only one sample of monzonite-monzodiorite porphyry at Springer 5.
- The future AR ICP sample sets are limited for the C2 and WX areas (n=90 and n=121, respectively) compared to Springer 5 and 6. Springer 5 has limited sample coverage in its eastern extent.
- Limited numbers of existing and future samples with static geochemical data (ABA and AR ICP) were geologically logged as diorite. Diorite is a major geological component in the northern extent of the Springer Expansion area.
- Past drill core samples collected from previously mined pits have not been classified as ore, LGO, or waste. Therefore, future waste rock, ore and LGO were compared to all past results.
- Future tailings have not been sampled or analyzed.

6 Conclusions and Recommendations

This report presents geochemical characterization of existing and future waste rock, ore, and LGO according to MPMC's updated mine plan and geological model. The main conclusions of the geochemical characterization are as follows:

- General findings from existing and future waste rock, ore, and LGO geochemical characterization were that sulphur content was the primary control on ARD potential. For future rock, Springer 6 and WX had the highest sulphur content and therefore the highest proportions of PAG rock on the basis of both the mine plan and ARD classifications using ABA data.

- Existing and future waste rock, ore, and LGO had a similar list of elements that were enriched relative to the screening criteria. Copper and selenium concentrations were comparable for existing and future mining areas.

- HCT trends for samples representing existing mined rock and future waste rock were similar, as were leachate concentrations. For existing mined rock, future waste rock, ore, and LGO, lithological classification was determined to not be a control on ML/ARD potential.

- Processing of ore mined during the Springer Expansion Project will be processed using the same standard flotation process currently used at MPM. As future ore and LGO characteristics are similar to previously mined ore and LGO, geochemical characteristics of future tailings are expected to be the same as historical tailings.

Recommendations for future sampling and geochemical characterization to address the current limitations of this study are as follows:

- There were limited samples with logged geology in the C2, Springer 5, and WX areas for future waste rock, LGO, and ore analyzed for complete static geochemical analyses (i.e., ABA and AR ICP). Further sampling that includes geological logging in these areas is recommended to improve the representativity of the sample sets and geochemical understanding of these areas.

    - In particular, SRK recommends to sample breccia and pseudo-breccia lithologies at C2 and pseudo-breccia and monzonite-monzodiorite porphyry lithologies at Springer 5.

- Springer 5 has limited sampling coverage in its eastern extent. Further sampling and analysis are recommended to improve the representativity of the sample sets and geochemical understanding of these areas.

- Limited numbers of existing and future samples with static geochemical data (ABA and AR ICP) were geologically logged as diorite. Available data of diorite samples indicate diorite is geochemically similar to other lithologies, however further sampling is recommended to confirm this.

- Geochemical characterization of tailings from metallurgical test work is recommended be completed on samples from Springer 5, Springer 6, WX, and C2 areas.

This report, Mount Polley Mine Springer Expansion Project Metal Leaching and Acid Rock Drainage Geochemical Characterization, was prepared by

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Feb 28, 2025

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Appendix A Future Waste Rock Statistics Compared to Screening Criteria

Appendix A: Future Waste Rock Statistics Compared to 10 Times Global Average Values for High Calcium Granite

		Au_ppm	Ag_ppm	Al_%	As_ppm	Ca_%	Cd_ppm	Co_ppm	Cr_ppm	Cu_ppm	Ga_ppm	Fe_%	Hg_ppm	K_%	La_ppm	Mg_ppm	Mo_ppm	Na_%	Ni_ppm	P_ppm	Pb_ppm	S_%	Sb_ppm	Sc_ppm	Se_ppm	Sr_ppm	Th_ppm	Tl_ppm	U_ppm	W_ppm	Zn_ppm
	10x ACA- High Ca Granite	*0.04*	*0.51*	*82*	*19*	*25.3*	*1.3*	*70*	*220*	*300*	*170*	*29.6*	*0.8*	*25*	*450*	*94000*	*10*	*28.4*	*150*	*9200*	*150*	*0.3*	*2*	*140*	*0.5*	*4400*	*85*	*7.2*	*30*	*13*	*600*
C2	Count	38	38	38	39	38	31	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	37	38	26	27	38
	Min	0.01	0.05	0.45	-1	1.1	0.1	4	2	120	3	1.15	0.01	0.03	4	0.27	1	0.04	1	600	1	0.01	0.01	1	0.01	37	1	0.05	1	1	17
	P05	0.01	0.0925	0.8315	5.26	1.2435	0.1	4.85	2	148.5	4.85	1.957	0.01	0.0385	4.85	0.2885	1	0.04	1	662.5	1	0.01	0.1	1	0.01	57.05	1	0.09	1	1	28.2
	P25	0.0325	0.125	1.255	9.65	1.4625	0.2	10	2	222.5	6	2.8125	0.05	0.07	6	0.46	2	0.05	2	912.5	3	0.01	0.2	2	0.01	165	1	0.11	1	1	49
	P50	0.06	0.2	1.705	11.9	1.79	0.2	12	4	450	7	3.42	0.11	0.14	7	0.6	3	0.1	3	1425	4.5	0.085	0.2	3	1.05	202.5	1	0.13	1	1	76.5
	Average	0.101316	0.271053	1.681842	12.54103	2.419474	0.23871	12.71053	6.131579	488.1579	6.605263	3.44	0.112368	0.130263	7.026316	0.666842	3.421053	0.177895	3.342105	1296.053	4.947368	0.120526	0.234474	3.947368	1.084474	226.6316	1.027027	0.132105	1.192308	1.111111	76.52632
	P75	0.155	0.4	2.0475	16.45	2.3875	0.3	15.5	8	745	7	4.0175	0.1375	0.16	8	0.8675	4	0.265	4.75	1610	7	0.1775	0.3	5	1.3	303	1	0.14	1	1	97.25
	P95	0.36	0.53	2.666	18.78	5.3415	0.45	21.15	15.45	873	9	5.149	0.2345	0.233	9	1.11	7	0.536	6.15	1816	9.45	0.3515	0.4	8.3	2.745	410.65	1	0.1845	2.75	2	121.3
	Max	0.39	0.8	2.75	24.8	9.21	0.5	25	20	970	9	6.02	0.44	0.29	10	1.31	12	0.69	7	1890	13	0.66	0.5	10	5.6	661	2	0.22	3	2	221
Springer 5	Count	614	149	567	645	645	645	645	645	638	151	645	151	567	567	567	644	566	645	645	645	151	645	151	3	567	565	560	0	642	645
	Min	0.01	0.15	0.41	1	0.46	0.1	3	1	10	2.5	0.88	0.01	0.02	2	0.12	1	0.01	1	140	2	0.03	0.3	2	0.7	17	1	0.01	#NUM!	1	13
	P05	0.01	0.15	0.66	1	1.02	0.3	6	2	60	2.5	1.772	0.5	0.07	4	0.303	1	0.03	2	562	2	0.03	1.5	3	0.74	32	1	0.0495	#NUM!	1	24
	P25	0.02	0.3	1.335	5	1.73	0.3	10	5	212.5	2.5	3.58	0.5	0.11	6	0.67	1	0.05	3	910	2	0.03	1.5	3	0.9	49	1	0.1	#NUM!	1	35
	P50	0.05	0.4	1.7	7	2.24	0.3	15	13	430	7	4.62	0.5	0.16	7	0.9	2	0.08	4	1190	4	0.03	1.5	3	1.1	82	1	0.13	#NUM!	1	47
	Average	0.0793	0.440268	1.705044	8.635039	2.387612	0.404651	15.08682	24.17209	462.2571	6.768212	4.515209	0.487682	0.17515	7.589065	1.026949	3.017081	0.143905	13.42481	1170.326	5.275969	0.053311	1.662016	3.97351	1.033333	121.5556	1.185841	0.130714	#DIV/0!	1.095016	68.47442
	P75	0.1	0.5	2.05	11	2.73	0.3	18	27	690	10	5.47	0.5	0.22	8	1.21	3	0.13	6	1390	6	0.07	1.5	5	1.2	135	1	0.16	#NUM!	1	77
	P95	0.2435	0.9	2.727	19.8	4.228	0.88	26	102.8	941.5	13.5	7.004	0.5	0.357	16	2.104	9	0.55	71	1758	12.8	0.09	3	7.5	1.28	295.6	2	0.21	#NUM!	2	183.2
	Max	0.58	1.3	3.84	35	10.17	4.9	51	245	1000	17	9.65	0.5	0.48	68	5.19	74	1.82	329	3180	53	0.41	7	13	1.3	2034	3	0.31	#NUM!	4	544
Springer 6	Count	664	399	669	669	669	635	669	669	666	154	669	154	669	669	669	664	669	669	669	669	151	668	154	83	669	655	668	56	626	669
	Min	0.01	0.05	0.48	0.8	0.55	0.1	4	1	10	2.5	0.69	0.01	0.02	3	0.11	1	0.03	1	290	2	0.01	0.01	2	0.01	24	1	0.01	1	1	13
	P05	0.01	0.1	0.7	3.32	0.93	0.1	7	1	50	2.5	2.158	0.01	0.06	4	0.434	1	0.04	2	660	2	0.01	0.2	3	0.01	34	1	0.08	1	1	17.4
	P25	0.02	0.3	1.28	8	1.45	0.3	12	4	180	6	3.67	0.04	0.1	6	0.71	3	0.07	3	930	3	0.03	1.5	3	0.01	71	1	0.11	1	1	29
	P50	0.04	0.4	1.9	13	2.11	0.3	16	8	375	8	4.53	0.09	0.15	8	1.03	14	0.11	5	1270	6	0.07	1.5	4	0.01	135	1	0.13	1	1	45
	Average	0.062877	0.483208	1.896338	13.74215	2.227549	0.406142	16.61734	27.34978	433.8288	7.701299	4.533617	0.244935	0.183229	8.088191	1.144155	25.0994	0.33846	20.00897	1285.142	8.926756	0.092185	1.595704	4.441558	0.41253	226.8146	1.148092	0.143024	1.053571	1.469649	74.04783
	P75	0.08	0.6	2.46	18	2.67	0.4	20	29	670	9	5.3	0.5	0.23	10	1.34	32	0.45	12	1570	10	0.09	1.5	6	0.8	290	1	0.17	1	2	82
	P95	0.18	1.01	3.226	26	3.792	1	27.6	105	920	12	6.814	0.5	0.38	14	2.124	84	1.3	80	1952	27	0.265	3.65	8	1	692.2	2	0.23	1.25	3	231.4
	Max	0.53	2	4.21	70	11.55	4.3	54	631	1000	18	10.67	0.5	1.13	22	8.34	375	2.66	757	2550	119	0.51	18	13	2.7	1712	4	0.37	2	6	887
WX	Count	21	21	21	21	21	20	21	21	21	21	21	21	21	21	21	21	21	21	21	21	18	20	21	21	21	21	21	8	18	21
	Min	0.01	0.1	1.24	3.4	1.66	0.1	6	1	60	6	1.61	0.03	0.08	4	0.44	2	0.04	1	680	5	0.01	0.1	1	0.01	105	1	0.1	1	1	23
	P05	0.01	0.1	1.53	5.8	2.02	0.1	10	1	80	6	2.67	0.03	0.08	5	0.58	2	0.05	1	730	7	0.0525	0.1	2	0.01	118	1	0.1	1	1	37
	P25	0.01	0.1	1.71	7.7	2.9	0.2	16	2	100	9	4.16	0.05	0.12	5	1.04	3	0.06	2	1180	9	0.085	0.2	5	0.01	132	1	0.15	1	1	64
	P50	0.03	0.2	1.85	9.1	3.17	0.2	17	5	150	9	4.7	0.1	0.15	6	1.13	14	0.11	5	1220	12	0.12	0.25	6	0.01	203	1	0.16	1	1	74
	Average	0.059048	0.266667	2.335714	9.580952	3.171905	0.36	17.66667	9.809524	260.9524	8.904762	4.45619	0.165714	0.191905	6.857143	1.251429	27.33333	0.264286	10.14286	1246.19	13.80952	0.261111	0.285	5.904762	0.54619	285	1.285714	0.179048	1.375	1.166667	91.85714
	P75	0.08	0.4	2.87	11	3.73	0.525	20	7	450	10	4.93	0.2	0.21	8	1.55	47	0.44	6	1310	19	0.2675	0.4	7	0.01	255	1	0.23	2	1	105
	P95	0.12	0.5	4.02	15.1	4.08	0.81	25	9	650	10	5.75	0.49	0.41	10	2.02	90	0.76	7	1390	22	0.6875	0.42	10	2.1	318	3	0.28	2	2	225
	Max	0.3	1.1	4.49	15.7	4.24	1	26	113	790	11	5.87	0.73	0.5	19	2.67	101	0.95	131	2440	38	1.41	0.8	12	6.3	2100	3	0.3	2	2	266

Note: Red highlights denote values that exceeded 10x global average values of high calcium granite

Appendix B Future Ore Statistics Compared to Screening Criteria

Appendix B: Future Ore Statistics Compared to 10 Times Global Average Values for High Calcium Granite

	10x ACA- High Ca Granite	0.04	0.51	82	19	25.3	1.3	70	220	300	170	29.6	0.8	25	450	94000	10	28.4	150	9200	150	0.3	2	140	0.5	4400	85	7.2	30	13	600
		Au_ppm	Ag_ppm	Al_%	As_ppm	Ca_%	Cd_ppm	Co_ppm	Cr_ppm	Cu_ppm	Ga_ppm	Fe_%	Hg_ppm	K_%	La_ppm	Mg_ppm	Mo_ppm	Na_%	Ni_ppm	P_ppm	Pb_ppm	S_%	Sb_ppm	Sc_ppm	Se_ppm	Sr_ppm	Th_ppm	Tl_ppm	U_ppm	W_ppm	Zn_ppm
C2	Count	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	13	8	16
	Min	0.17	0.6	1	5.2	1.27	0.2	8	1	2030	5	2.56	0.01	0.1	5	0.13	3	0.1	1	870	4	0.32	0.01	1	2.3	164	1	0.09	1	1	36
	P05	0.2	0.675	1.015	5.65	1.27	0.2	8.75	1.75	2075	5	2.6575	0.0175	0.1225	5.75	0.145	3	0.115	1	900	4	0.3425	0.0775	1	2.75	169.25	1	0.0975	1	1	41.25
	P25	0.365	0.8	1.255	6.85	1.415	0.275	12.75	2	2592.5	5	3.0125	0.03	0.14	6.75	0.225	3	0.1775	2	1305	4.75	0.4125	0.1	1	3.675	210	1	0.11	1	1	60.25
	P50	0.475	1.1	1.44	9.8	1.635	0.3	15.5	2	3260	6	4.005	0.07	0.17	7	0.32	4	0.205	2	1430	5	0.505	0.2	1	4.6	272	1	0.115	1	1	74
	Average	0.475	1.14375	1.4575	9.425	1.766875	0.36875	16.375	4.6875	3195.625	6	3.87125	0.091875	0.181875	7.375	0.3475	4.25	0.23125	2.9375	1351.25	5.375	0.510625	0.163125	1.5625	4.61875	305.5625	1	0.12125	1	1	83.6875
	P75	0.6025	1.35	1.59	10.475	1.8225	0.425	20	3.25	3790	7	4.3275	0.0925	0.2	8	0.5125	5	0.2625	4	1492.5	6	0.6025	0.2	2	5.375	314.25	1	0.14	1	1	92
	P95	0.735	1.8	1.975	15.175	2.7775	0.75	26.5	13.75	4297.5	7	5.3875	0.2575	0.2975	9.25	0.5825	6.25	0.4475	6.5	1582.5	7.25	0.72	0.225	3.25	6.825	646	1	0.15	1	1	154.5
	Max	0.87	1.8	2.02	16.3	2.8	0.9	34	34	4560	7	5.95	0.4	0.32	10	0.59	7	0.53	8	1620	8	0.81	0.3	4	6.9	727	1	0.15	1	1	198
Springer 5	Count	409	226	388	409	409	409	409	409	409	268	409	268	388	388	388	409	388	409	409	409	268	409	268	13	388	386	388	0	400	409
	Min	0.05	0.15	0.5	1	0.66	0.1	6	1	2010	2.5	1.68	0.03	0.05	3	0.09	1	0.02	1	580	2	0.03	0.4	2	2.8	21	1	0.01	#NUM!	1	14
	P05	0.13	0.3	0.66	3	1.144	0.3	9	4	2100	2.5	3.13	0.5	0.09	4	0.24	1	0.03	3	800	2	0.14	1.5	3	3.46	33	1	0.09	#NUM!	1	21
	P25	0.21	0.5	1	5	1.64	0.3	13	13	2560	6	4.36	0.5	0.14	5	0.48	3	0.07	4	970	3	0.2	1.5	3	5.7	48	1	0.12	#NUM!	1	29
	P50	0.3	0.7	1.305	7	2.04	0.3	17	28	3540	8	5.4	0.5	0.19	6	0.65	4	0.1	5	1110	5	0.25	1.5	3	6.9	66	1	0.14	#NUM!	1	36
	Average	0.396528	0.851991	1.388222	8.319071	2.115061	0.427873	17.68215	26.66015	4148.411	8.085821	5.570171	0.499515	0.201985	6.412371	0.724974	8.98533	0.14634	6.017115	1148.386	5.814181	0.301604	1.571883	3.544776	7.630769	80.45619	1.044041	0.147732	#DIV/0!	1.0425	51.6846
	P75	0.47	1	1.79	10	2.46	0.5	21	36	4780	10	6.68	0.5	0.25	7	0.91	8	0.17	6	1280	7	0.35	1.5	3	9.4	91	1	0.17	#NUM!	1	49
	P95	0.89	1.7	2.193	18	3.32	0.9	28.6	48	8848	14	8.7	0.5	0.37	10	1.453	28.2	0.4365	9	1566	12	0.5965	1.5	6.65	12.8	171	1	0.24	#NUM!	1	130
	Max	3.27	5	3.06	29	5.44	2.6	54	316	19110	19	11.81	2	0.65	15	4.14	212	0.97	359	3660	46	1.18	4	10	12.8	610	3	0.32	#NUM!	3	466
Springer 6	Count	606	444	606	606	606	590	606	606	606	264	606	264	606	606	606	606	606	606	606	606	264	606	264	114	606	606	606	60	543	606
	Min	0.03	0.15	0.4	1	0.52	0.1	5	1	2040	2.5	1.64	0.02	0.04	3	0.1	1	0.02	1	370	2	0.14	0.01	1	1	28	1	0.01	1	1	11
	P05	0.12	0.3	0.675	4	1.0325	0.1	10	2	2130	2.5	3.0825	0.03	0.09	5	0.28	2	0.04	1	790	2	0.2	0.2	2	1.8	39	1	0.09	1	1	17
	P25	0.19	0.5	1.0525	8	1.52	0.3	13	4	2692.5	7	4.1625	0.1	0.1425	7	0.52	4	0.06	3	1000	3.25	0.25	1.5	3	2.825	60	1	0.11	1	1	26
	P50	0.27	0.7	1.36	11	1.99	0.3	16.5	7	3470	8	4.995	0.5	0.19	8	0.75	7	0.09	4	1180	6	0.34	1.5	3	3.85	89	1	0.13	1	1	35
	Average	0.324505	0.861261	1.553036	12.16865	2.126254	0.347119	17.5264	14.05611	4214.736	8.393939	5.330116	0.33572	0.208251	8.40264	0.834472	14.87624	0.21363	6.193069	1227.343	10.09571	0.390606	2.476749	4.159091	4.686842	195.8779	1.145215	0.136073	1.15	1.165746	41.37459
	P75	0.37	1.025	1.92	15.975	2.6	0.3	20	23.75	5060	10	6.205	0.5	0.25	10	1.08	12	0.2	5	1360	9	0.45	1.5	6	5.8	182	1	0.16	1	1	47
	P95	0.6975	1.9	3.07	22	3.69	0.7	30	37	8380	13	8.6825	0.5	0.39	14	1.545	41.75	0.8725	10	1950	41.75	0.7455	5	9	10.54	798.5	2	0.2	2	2	82
	Max	3.33	3.9	4.72	50	6.82	4.9	58	168	18070	18	14.7	1.01	0.69	21	5.67	376	2.67	400	2690	58	2.45	77	13	12.2	1845	5	0.32	2	6	507
WX	Count	77	77	77	77	77	77	77	49	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	73	77
	Min	0.25	0.6	0.75	4.9	1.46	0.2	7	1	2050	4	1.51	0.05	0.1	6	0.37	10	0.02	1	630	7	0.27	0.1	1	1.4	74	1	0.01	1	1	37
	P05	0.3	0.7	0.854	6.54	1.68	0.3	8	1	2096	5	1.69	0.08	0.118	7	0.408	11.8	0.03	1	664	8	0.342	0.1	1	1.9	139	1	0.03	1	1	42.6
	P25	0.52	1.2	1.18	7.7	2.07	0.4	10	1	2790	6	2.17	0.16	0.14	8	0.56	17	0.05	1	880	10	0.54	0.2	2	3.3	201	2	0.09	1	1	57
	P50	0.84	1.7	1.47	10.2	2.27	0.9	12	2	4070	7	2.48	0.31	0.15	10	0.68	22	0.11	2	960	13	0.83	0.4	2	5.2	272	3	0.11	2	1	102
	Average	1.029351	2.666234	1.487922	11.32468	2.467532	2.180519	13.93506	2.040816	4516.104	6.753247	2.593506	0.562208	0.165195	10.11688	0.765455	35.55844	0.18987	2.376623	995.0649	19.06494	0.839481	0.602597	2.675325	5.157143	289.7273	2.454545	0.105714	1.636364	1.09589	226.3636
	P75	1.53	3.4	1.74	14.5	2.76	4.2	17	2	5500	7	2.85	0.91	0.18	12	0.87	31	0.23	3	1150	20	0.97	0.8	3	6.9	342	3	0.13	2	1	400
	P95	2.442	7.5	2.168	19.62	3.766	6.1	23	4	9358	9.2	3.84	1.48	0.224	16.2	1.378	108	0.668	6	1374	51	1.618	1.88	6	8.56	556	3.2	0.162	3	1.4	629
	Max	2.78	13.6	2.38	25.4	4.75	6.1	29	11	12050	11	4.76	1.85	0.4	20	1.92	142	0.92	16	1700	141	2.98	2.5	9	13	729	4	0.2	3	4	723

Note: Red highlights denote values that exceeded 10x global average values of high calcium granite

Appendix C Future Low-Grade Ore Statistics Compared to Screening Criteria

Appendix C: Future Low-Grade Ore Statistics Compared to 10 Times Global Average Values for High Calcium Granite

	10x ACA- High Ca Granite	0.04	0.51	82	19	25.3	1.3	70	220	300	170	29.6	0.8	25	450	94000	10	28.4	150	9200	150	0.3	2	140	0.5	4400	85	7.2	30	13	600
		Au_ppm	Ag_ppm	Al_%	As_ppm	Ca_%	Cd_ppm	Co_ppm	Cr_ppm	Cu_ppm	Ga_ppm	Fe_%	Hg_ppm	K_%	La_ppm	Mg_ppm	Mo_ppm	Na_%	Ni_ppm	P_ppm	Pb_ppm	S_%	Sb_ppm	Sc_ppm	Se_ppm	Sr_ppm	Th_ppm	Tl_ppm	U_ppm	W_ppm	Zn_ppm
C2	Count	35	35	35	35	35	31	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	29	17	35
	Min	0.07	0.05	0.48	2.1	1.02	0.1	4	1	1020	4	1.17	0.01	0.01	4	0.14	2	0.03	1	630	2	0.11	0.01	1	0.8	61	1	0.09	1	1	14
	P05	0.07	0.17	0.788	5.29	1.122	0.1	4	1.7	1054	5	1.587	0.02	0.048	4	0.168	2.7	0.047	1	796	2	0.12	0.01	1	0.87	68.3	1	0.097	1	1	27.1
	P25	0.12	0.3	1.005	8.85	1.395	0.1	7	3	1200	5	2.515	0.02	0.12	6	0.385	3	0.06	2	945	3	0.145	0.1	2	1.65	107.5	1	0.11	1	1	35
	P50	0.22	0.5	1.5	11	1.78	0.2	11	3	1390	6	3.52	0.04	0.18	7	0.53	4	0.18	3	1290	4	0.24	0.2	3	2.4	191	1	0.14	1	1	54
	Average	0.225429	0.547143	1.508286	12.55429	1.914857	0.251613	13.05714	9.885714	1414	6.228571	3.254286	0.12	0.162	7.028571	0.602286	4.914286	0.207143	3.885714	1302.571	4	0.260857	0.164	3.028571	2.174286	204.3429	1.028571	0.137143	1	1	71.6
	P75	0.3	0.8	2.02	15.85	2.185	0.3	19	6.5	1565	7	4.02	0.185	0.205	8	0.855	6	0.275	5	1580	5	0.33	0.2	4	2.7	255.5	1	0.16	1	1	95.5
	P95	0.378	1	2.389	22.97	3.2	0.55	24	45.8	1848	8	4.549	0.453	0.253	10	1.073	11	0.61	8.6	1917	6	0.433	0.3	6	3.1	387.1	1	0.19	1	1	173.6
	Max	0.43	1.4	2.55	34.7	3.65	0.6	25	103	2000	10	5.43	0.53	0.28	10	1.42	13	0.72	14	2450	6	0.69	0.5	7	3.4	413	2	0.22	1	1	189
Springer 5	Count	384	134	337	384	384	384	384	384	384	186	384	186	337	337	337	384	337	384	384	384	186	384	186	13	337	336	337	0	374	384
	Min	0.01	0.15	0.42	1	0.42	0.1	4	1	1010	2.5	1.58	0.02	0.04	3	0.14	1	0.01	1	340	2	0.03	0.2	1	1	29	1	0.02	#NUM!	1	12
	P05	0.06	0.15	0.706	3	1.0915	0.3	8	3.15	1050	2.5	2.7015	0.11	0.09	4	0.328	1	0.03	3	723	2	0.0725	1.5	3	1.12	35	1	0.07	#NUM!	1	21.15
	P25	0.1	0.3	1.21	5	1.6975	0.3	12	9	1187.5	5	4.2175	0.5	0.14	5	0.59	2	0.06	3.75	970	2	0.1	1.5	3	1.4	53	1	0.11	#NUM!	1	29
	P50	0.15	0.4	1.56	8	2.11	0.3	16	23	1390	7.5	5.385	0.5	0.19	6	0.86	3	0.1	5	1160	4	0.12	1.5	3	1.8	73	1	0.14	#NUM!	1	40
	Average	0.177188	0.46306	1.571098	8.685417	2.266719	0.399479	15.85417	22.10677	1425.99	7.784946	5.301536	0.469785	0.20816	6.744807	0.883383	4.020833	0.164184	5.083333	1191.224	5.325521	0.122366	1.547396	3.725806	1.730769	111.8813	1.104167	0.151335	#DIV/0!	1.048128	59.03125
	P75	0.22	0.5	1.93	11	2.655	0.3	19	31	1632.5	10	6.3875	0.5	0.26	8	1.13	4	0.18	6	1380	7	0.14	1.5	3	2	119	1	0.19	#NUM!	1	61.5
	P95	0.4	0.9	2.432	17.6	3.878	1	24	42.85	1900	14	7.74	0.5	0.4	10	1.6	10	0.582	9	1660	11.85	0.18	1.5	7	2.42	334	2	0.24	#NUM!	1	170.55
	Max	1.01	2.4	3.47	44.4	7.58	2.3	57	84	2000	16	12.57	0.5	0.62	15	2.44	68	1.05	29	4060	49	0.34	5	11	2.6	803	3	0.31	#NUM!	3	461
Springer 6	Count	315	163	315	315	315	310	315	315	315	144	315	144	315	315	315	315	315	315	315	315	144	315	144	51	315	310	313	20	278	315
	Min	0.01	0.15	0.47	1	0.65	0.1	5	1	1010	2.5	1.23	0.01	0.05	4	0.09	1	0.03	1	460	2	0.03	0.01	1	0.01	25	1	0.02	1	1	12
	P05	0.05	0.2	0.707	3	1.092	0.1	8	2	1040	2.5	2.308	0.02	0.09	5	0.32	2	0.04	2	707	2	0.1	0.3	2	0.8	38	1	0.08	1	1	15
	P25	0.09	0.3	1.24	7	1.69	0.3	11.5	5	1210	6	3.75	0.05	0.14	7	0.61	4	0.065	3	1020	2	0.12	1.5	3	1.15	62	1	0.11	1	1	23.5
	P50	0.12	0.5	1.76	10	2.15	0.3	14	8	1460	8	4.62	0.5	0.19	8	0.86	8	0.11	4	1220	5	0.15	1.5	3	1.5	121	1	0.13	1	1	32
	Average	0.150317	0.546626	1.772349	11.24635	2.236889	0.388387	15.09206	14.87302	1456.667	8.010417	4.639619	0.33875	0.221556	8.44127	0.917873	20.43175	0.326889	4.707937	1243.968	7.688889	0.167639	1.416254	3.979167	1.590392	203.746	1.051613	0.140224	1.2	1.158273	44.06032
	P75	0.17	0.6	2.19	15	2.755	0.3	18	23.5	1680	9.25	5.525	0.5	0.27	10	1.23	24	0.42	5	1440	8	0.19	1.5	5	1.9	228	1	0.17	1	1	49
	P95	0.33	1.2	3.04	22	3.7	1.1	25.3	37.3	1940	14	6.76	0.5	0.46	13	1.579	72.9	1.21	8	1843	25.3	0.3085	1.5	7	2.65	713.1	1.55	0.21	2	2	106.3
	Max	0.84	2.8	4.22	29	4.38	1.7	31	94	2000	17	10.59	0.5	0.9	20	2.35	383	3.08	59	3110	46	0.5	6	9	3	1959	2	0.25	2	3	319
WX	Count	23	23	23	23	23	22	23	20	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
	Min	0.06	0.3	0.63	5.1	1.42	0.1	7	1	1020	5	1.73	0.06	0.1	6	0.44	13	0.03	1	520	6	0.19	0.2	1	0.7	85	1	0.01	1	1	36
	P05	0.061	0.31	0.73	5.11	1.47	0.2	8.1	1	1081	5	2.061	0.071	0.112	7	0.46	13.2	0.031	1	650	7.1	0.255	0.2	1	0.84	94.1	1	0.034	1	1	38.1
	P25	0.115	0.5	0.86	6.5	1.81	0.3	9	1	1140	6	2.32	0.12	0.15	7	0.505	18	0.045	1	680	9.5	0.345	0.2	1.5	1.45	111	2	0.08	1	1	46.5
	P50	0.18	0.8	1.11	8.4	2.26	0.55	12	1	1510	7	2.59	0.21	0.16	9	0.58	21	0.05	1	830	12	0.52	0.4	2	2.3	177	3	0.09	1	1	94
	Average	0.2	0.734783	1.416522	9.921739	2.359565	0.613636	12.17391	2.85	1436.087	6.913043	2.828261	0.32	0.178696	8.869565	0.734348	32.43478	0.154348	2.217391	870.8696	14	0.711739	0.634783	2.652174	3.026087	208.3478	2.608696	0.105217	1.478261	1.130435	89.13043
	P75	0.235	0.95	1.625	10.45	2.555	0.775	14	2.25	1655	7.5	3.02	0.35	0.19	10	0.775	45.5	0.16	3	975	16	1.065	0.9	2.5	4.15	267	3	0.11	2	1	109
	P95	0.388	1.09	3.456	15.01	3.702	1.385	20	5.95	1875	9.9	4.59	0.87	0.284	10.9	1.528	67.9	0.533	3.9	1239	25.8	1.302	1.86	5.9	5.7	411.4	4	0.205	2	1.9	175.3
	Max	0.62	1.4	4.11	34	5.22	1.8	23	24	1910	13	4.88	1.13	0.41	15	2	101	0.93	15	1390	30	2.13	2.4	12	8.3	586	4	0.3	3	3	206

Note: Red highlights denote values that exceeded 10x global average values of high calcium granite

APPENDIX 6-2: STATIC GEOCHEMICAL CHARACTERIZATION OF MOUNT POLLEY SPRINGER EXPANSION METALLURGICAL TAILINGS AND HEAD SAMPLES FROM THE SPRINGER 5 AND SPRINGER 6 AREAS

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FINAL

Technical Memo

To	Shane Flynn, Gabriel Holmes (MPMC)	**Client**	Mount Polley Mining Corporation
From	Kyle Jang, Shauna Litke (SRK)	**Project**	CAPR003709
Cc	Art Frye (MPMC) Stephen Day (SRK)	**Date**	November 17, 2025

Subject Static Geochemical Characterization of Mount Polley Springer Expansion Metallurgical Tailings and Head Samples from the Springer 5 and Springer 6 Areas

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File name: MountPolley_MetTailings_SP5_SP6_GeochemicalCharacterization_CAPR003709_FINAL_20251117.docx

1 Introduction

Mount Polley Mining Corporation (MPMC) has retained SRK Consulting (Canada) Inc. (SRK) for geochemical support of its permit application for the Springer Expansion Project and subsequent work that is required as part of the *Mines Act* Permit M-200, last amended August 28, 2025 (Ministry of Mining and Critical Minerals, 2025). SRK (2025a) identified gaps in geochemical data for metallurgical tailings from all areas of the Springer Expansion. To address these gaps, geochemical characterization of the metallurgical tailings is being conducted as samples become available for geochemical testing, with the first available samples being from the Springer 5 and Springer 6 areas.

SRK has directed static geochemical characterization of ore (head) and metallurgical tailings samples from the Springer 5 and Springer 6 areas to assess their metal leaching and acid rock drainage (ML/ARD) potential. This memorandum presents the laboratory methods and results of acid-base accounting, and elemental analyses for the Springer 5 and Springer 6 areas. Results of mineralogical analysis are pending, and humidity cell test (HCT) samples will be selected following the receipt of mineralogy results (SRK 2025b). This memorandum was prepared as part of Task 320 of SRK Project CAPR003709.

2 Background

The Springer Expansion Project is an expansion of the mineral resource at the Mount Polley Mine. Its spatial extent is comprised of four areas proximal to the existing Springer-Cariboo Pit, Springer 5, Springer 6, C2, and WX (Figure 1). Exploration is ongoing at these areas to define the extent of the resource, with one drilling program completed at C2 in summer 2025 and another that is ongoing at Springer 5 and C2. Drill core intervals classified as ore are composited as head material that is used for metallurgical testing to evaluate recovery of commodities.

The metallurgical testing is conducted according to the processing flow sheet (Attachment 1), which is the same process that has been used in the past at the site. The head material is subject to grinding then flotation occurring in three general stages:

- Rougher flotation yields rougher sulphide concentrates and rougher tailings.
- The rougher sulphide concentrates then undergo cleaner flotation which results in the copper concentrate and cleaner tailings, which are then scavenged.

The rougher tailings and the remaining cleaner scavenger tailings are combined into a single stream for deposition in the tailings storage facility (TSF). The proportions of the combined stream are 97.5% rougher tailings and 2.5% cleaner tailings.

To date, head material and metallurgical tailings have been produced for the Springer 5 and Springer 6 areas. Figure 2 presents the spatial distribution of the drill core intervals that were selected by MPMC to represent head ore feed. Table 1 presents a list of the head samples and their respective metallurgical tailings samples that were available for testing, as well as the permit area they were sampled from and the major rock types the samples are comprised of. All samples are dominantly comprised of breccia except for DC3 (pseudo-breccia) and DC7 (breccia and monzodioirite-monzonite (undifferentiated)).

Figure 1: Map of the Springer Expansion Permit Area

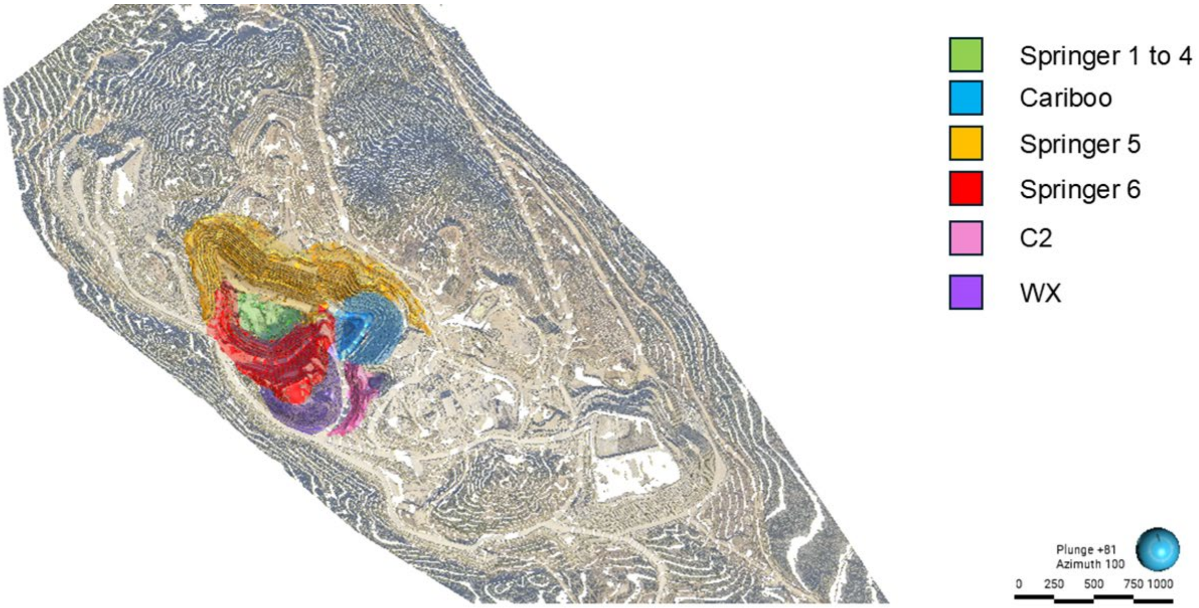

Figure 2: Spatial Distribution of the Springer 5 and Springer 6 Samples

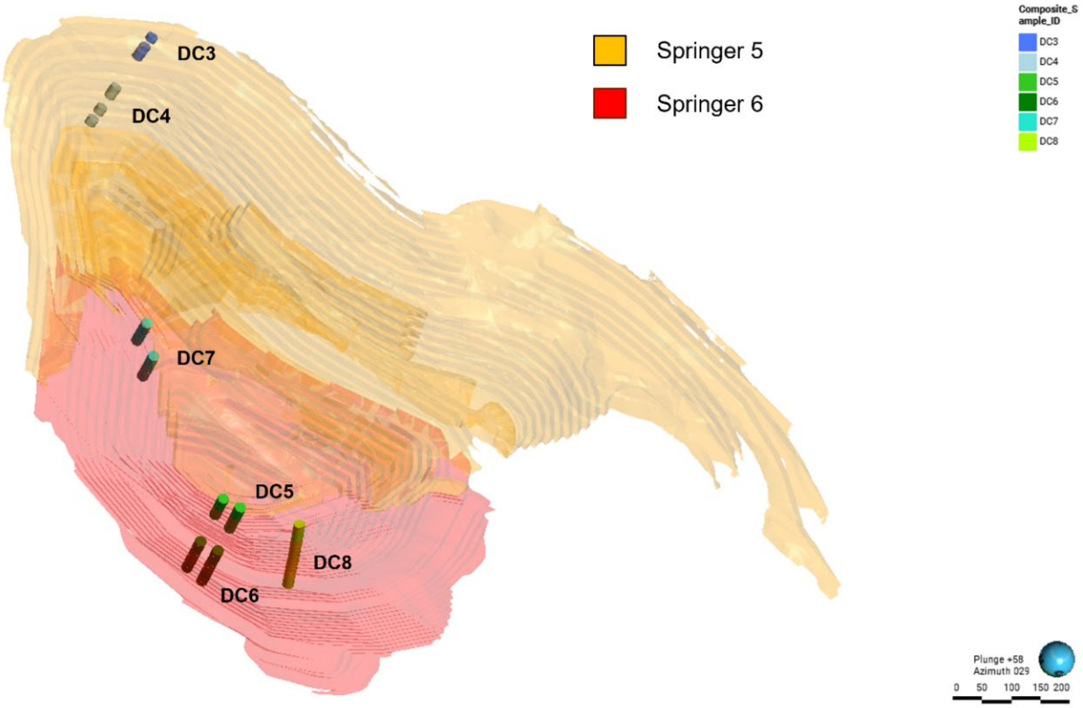

Table 1: Springer 5 and Springer 6 Head and Tailings Sample List

Composite Sample ID	Permit Area	Primary Rock Types (>10% Abundance)	SRK Sample ID (Head)	SRK Sample ID (Rougher Tailings)	SRK Sample ID (Cleaner Tailings)
DC3	Springer 5	Pseudo-Breccia (weaker) (100%)	MP-HEAD-SRK-1	MP-ROUGHER-SRK-1	--[1]
DC4	Springer 5	Breccia (91%)	MP-HEAD-SRK-2	MP-ROUGHER-SRK-2	--[1]
DC5	Springer 6	Breccia (65%), Skarn (28%)	MP-HEAD-SRK-3	MP-ROUGHER-SRK-3	MP-CLEANER-SRK-3
DC6	Springer 6	Breccia (55%), Pseudo-Breccia (weaker) (30%), Mafic (11%)	MP-HEAD-SRK-4	MP-ROUGHER-SRK-4	MP-CLEANER-SRK-4
DC7	Springer 5 and 6[2]	Breccia (44%), Monzodiorite-monzonite (undifferentiated) (27%), Pseudo-Breccia (weaker) (18%), Skarn (12%)	MP-HEAD-SRK-5	MP-ROUGHER-SRK-5	MP-CLEANER-SRK-5
DC8	Springer 6	Breccia (97%)	MP-HEAD-SRK-6	MP-ROUGHER-SRK-6	MP-CLEANER-SRK-6

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Notes:

1. There was no remaining cleaner tailings sample material for DC3 and DC4.
2. DC7 is comprised of approximately equal proportions of Springer 5 and Springer 6.

3 Methods

3.1 Sample Selection and Preparation

The drill core intervals that were composited as head material were selected by MPMC based on assay results and the calculated cut-off grade for ore. Assay reject material for the selected intervals was shipped from Activation Laboratories (ActLabs) to Base Metallurgical Laboratories (BaseMet), both in Kamloops, BC, for sample preparation.

The reject material was composited to produce the head sample, which was then subjected to the metallurgical testing method described in Section 2. The remaining head, and rougher and cleaner tailings materials were retained and shipped to SGS Laboratories (SGS) in Burnaby, BC for geochemical analyses.

3.2 Analytical Program

Table 2 and Table 3 present summaries of the analytical programs for head and tailings samples, respectively.

Sample material received by SGS was split for static analysis with the remaining material refrigerated for upcoming HCT analysis following the receipt of all static testing results. As 1 kg of material is needed for the HCTs, all materials not used for the static testing were retained.

Static testing included the following analyses:

- Acid-base accounting (ABA) for all samples:
    - Total sulphur and total carbon by LECO combustion furnace
    - Modified neutralization potential (MEND 1991)
    - Sulphur as sulphate following HCl leach
    - Total inorganic carbon (TIC) by coulometry following a perchloric acid leach
- Trace element analysis by aqua regia digestion followed by an ICP-MS finish for all samples.
- Low level mercury by CVAA for all samples
- Mineralogical analyses by quantitative (Rietveld) x-ray diffraction (QXRD) and Tescan Integrated Mineral Analyzer (TIMA-X) for head samples only

The static test data will be reviewed to determine the HCT program. The HCTs will be operated using the MEND (2009) method and will be leached weekly, with the collected leachate samples analyzed as follows:

- Cycles 0 to 12: weekly analysis of pH, EC, SO_4, alkalinity, acidity, trace elements by ICP-MS, mercury by CVAA, other ions (F, Cl), and nutrients (NO_2, NO_3, and NH_3).
- Cycles 12 to 40: weekly analysis of pH, EC, SO_4, alkalinity, and acidity. The other parameters will be analyzed every 4 weeks.

The HCTs will be operated for an initial period of 40 weeks, at which point they will be assessed for completeness on the basis of leachate trends. Following the assessment, recommendations on continuation or termination of the HCTs will be provided to MPMC.

Table 2: Summary of Head Sample Analytical Program

SRK Sample ID	Composite Sample ID	Permit Area	ABA	Trace Element	Mineralogy	HCT[1]
MP-HEAD-SRK-1	DC3	Springer 5	x	x	x	TBD
MP-HEAD-SRK-2	DC4	Springer 5	x	x	x	TBD
MP-HEAD-SRK-3	DC5	Springer 6	x	x	x	TBD
MP-HEAD-SRK-4	DC6	Springer 6	x	x	x	TBD
MP-HEAD-SRK-5	DC7	Springer 5 and 6	x	x	x	TBD
MP-HEAD-SRK-6	DC8	Springer 6	x	x	x	TBD

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Notes:

1. The HCT program will be determined following receipt of all static testing results.

Table 3: Summary of Tailings Sample Analytical Program

SRK Sample ID	Composite Sample ID	Permit Area	ABA	Trace Element	HCT[1]
MP-ROUGHER-SRK-1	DC3	Springer 5	x	x	TBD
MP-ROUGHER-SRK-2	DC4	Springer 5	x	x	TBD
MP-ROUGHER-SRK-3	DC5	Springer 6	x	x	TBD
MP-ROUGHER-SRK-4	DC6	Springer 6	x	x	TBD
MP-ROUGHER-SRK-5	DC7	Springer 5 and 6	x	x	TBD
MP-ROUGHER-SRK-6	DC8	Springer 6	x	x	TBD
MP-CLEANER-SRK-3	DC5	Springer 6	x	x	TBD
MP-CLEANER-SRK-4	DC6	Springer 6	x	x	TBD
MP-CLEANER-SRK-5	DC7	Springer 5 and 6	x	x	TBD
MP-CLEANER-SRK-6	DC8	Springer 6	x	x	TBD

Source: https://srk.sharepoint.com/sites/NACAPR003709/Internal/Task321_PermitApplicationSupport/4_MetallurgicalTailings/2_WorkingFiles/[MPMC_MetallurgicalTailings_CAPR003709_KWJ_Rev00.xlsx]

Notes:

1. The HCT program will be determined following receipt of all static testing results. Where possible, HCTs will be conducted on combined tailings according to the proportions of the disposal stream (Section 2). For samples where this is not possible, HCTs may be conducted on the rougher tailings only.

3.3 Data Quality Assurance and Quality Control

SRK reviewed data quality for all results received from SGS. A summary of QA/QC performed according to test is presented in Attachment 2.

All data passed QA/QC checks and were deemed by SRK as acceptable.

3.4 Data Interpretation

As established in previous geochemical characterization reports (e.g., SRK 2025a), total sulphur is a proxy for sulphide sulphur in rock and tailings because other forms of sulphur (including sulphate) are not common at the Mount Polley site. Accordingly, acid potential (AP) is calculated using total sulphur as follows:

$$\text{AP [kg CaCO}_3\text{/t]} = 31.25 \times \text{Total Sulphur [\%]}$$

Total carbon was also determined to be a proxy for reactive carbonate materials (SRK 2025a). The assumption is supported by the observed dominance of calcite confirmed by detailed mineralogy, the lack of reported iron carbonate, the strong correlation and equivalence of total carbon and total inorganic carbon (TIC), and the dominant plutonic geological setting (SRK 2025a). As total carbon equals TIC, NP is represented by carbonate content and is presented as NP*, calculated using total carbon as follows:

$$\text{NP* [kg CaCO3/t]} = \text{TC(\%)} \text{ x } 83.33$$

Modified NP and TIC analyses were also conducted (Section 3.2), with results presented in Section 4.1.

According to the *Mines Act* Permit M-200, the ARD potential of MPM materials are classified using the following criteria for neutralization potential (NP*) and acid generating potential (AP):

- NP*/AP greater than 2 is classified as not potentially acid-generating (non-PAG).
- NP*/AP less than 2 is classified as potentially acid-generating (PAG).

For completeness, ARD potential was also evaluated using analytical TIC and modified NP results with the same criteria.

Enrichment of trace elements was evaluated by comparison with global average values in high calcium granite (Price 1997). Values an order of magnitude greater than (i.e., exceeding 10 times) the global average are considered “enriched”. Past geochemical characterization and monitoring has identified copper and selenium in particular as having a high metal leaching potential at the Mount Polley site (SRK 2025a).

Data interpretation was also conducted for a hypothetical combined tailings comprised of 97.5% rougher tailings and 2.5% cleaner tailings (Section 2). A weighted average was calculated for the two tailings streams to assess the ML/ARD potential of the combined tailings.

4 Results

4.1 Acid-Base Accounting

Attachment 3 presents complete ABA results and Table 2 presents a summary of ABA results.

4.1.1 Paste pH and Sulphur Content

Paste pH for all samples ranged from slightly alkaline to alkaline (pH 8.4 to 11.4). Head and rougher tailings samples had similar pH values (range of pH 8.4 to 9.5) whereas cleaner tailings samples had higher pHs (range of pH 8.8 to 11.4). The higher pHs in the cleaner tailings is from lime addition, which is added in the process to depress pyrite flotation.

Total sulphur was higher in head and tailings samples from Springer 6 compared to Springer 5, which is consistent with previous geochemical characterization results from waste rock, low-grade ore, and ore (SRK 2025a). Head samples from Springer 5 had total sulphur ranging from 0.04 to 0.15 %S, whereas Springer 6 ranged 0.35 to 0.62 %S and the mixed Springer 5 and Springer 6 sample had total sulphur content of 0.28 %S. The same relationship was observed in rougher tailings samples except total sulphur content was overall lower than the head samples (ranges of 0.036 to 0.099 %S, 0.074 to 0.11 %S, and 0.087 %S, respectively, for Springer 5, Springer 6, and the mixed sample). For cleaner tailings samples, total sulphur was higher than head samples (range of 0.33 to 0.7 %S for the cleaner tailings) and the lowest total sulphur was observed in the mixed sample (0.33 %S).

Sulphate sulphur was near the analytical detection limit (0.01 %S) for all samples (range of <0.01 to 0.04 %S). Accordingly, total sulphur and sulphide sulphur are roughly equivalent, which is consistent with previous geochemical characterization and supports the utilization of total sulphur as a proxy for sulphide sulphur (Section 3.4).

4.1.2 Neutralization Potential

NP* results varied by sample material and permit area. For head samples, NP* was relatively similar for all samples (median of 22 kg $CaCO_3$/t) except for a sample from Springer 5 that had notably higher NP* and a sample from Springer 6 that had notably lower NP* (49 kg $CaCO_3$/t and 10 kg $CaCO_3$/t, respectively). For rougher tailings samples, similar relationships and NP* content was observed. The median NP* for all rougher tailings samples was 23 kg CaCO3/t and the same samples from Springer 5 and 6 had notably high and low NP* (37 kg $CaCO_3$/t and 12 kg $CaCO_3$/t, respectively).

Cleaner tailings samples had higher NP* than the head and rougher tailings samples, with the highest NP* observed in the mixed Springer 5 and Springer 6 sample (77 kg $CaCO_3$/t).

NP* was observed to be either similar to or higher than TIC by analytical methods, and both NP* and TIC were slightly lower than modified NP for all samples (Figure 3). This indicates the contribution of silicates to NP determined by the modified method and probably also low concentrations of iron carbonates both of which are consistent with previous geochemical characterization results (SRK 2025a).

4.1.3 ARD Potential

ARD classifications for the samples were presented for NP*/AP and TIC/AP (Figure 4). All samples had equivalent classifications for both values except for cleaner tailings sample MP-CLEANER-SRK-6, which was non-PAG for NP*/AP but PAG for TIC/AP due to higher NP* content.

Based on NP*/AP, the majority of head samples were classified as PAG except for MP-HEAD-SRK-1 and MP-HEAD-SRK-2, which had the lowest sulphur content. Rougher tailings and combined tailings were uniformly non-PAG as they had lower sulphur content than the head samples (Section 4.1.1). The cleaner tailings were dominantly non-PAG, except for MP-CLEANER-SRK-3, due to the addition of lime at the cleaner stage of the metallurgical process (Section 4.1.1).

Table 4: Summary of ABA Results

Sample ID	Permit Area	Paste pH	Total C	Total S	Sulphate S	Sulphide S	AP	NP*	TIC	Mod NP	Fizz Test Rating	NP*/AP	TIC/AP	NP/AP	ARD Classification (NP*)	ARD Classification (TIC)	ARD Classification (NP)
			%C	%S	%S	%S	kg CaCO3/t	kgCaCO3/t	kgCaCO3/t	kgCaCO3/t							
MP-HEAD-SRK-1	Springer 5	8.9	0.59	0.04	0.01	0.04	1.3	49	34	53	Slight	40	27	42	Non-PAG	Non-PAG	Non-PAG
MP-HEAD-SRK-2	Springer 5	9	0.24	0.15	0.01	0.14	4.5	20	21	29	Slight	4.5	4.6	6.3	Non-PAG	Non-PAG	Non-PAG
MP-HEAD-SRK-3	Springer 6	8.5	0.31	0.62	0.02	0.6	19	26	27	38	Slight	1.3	1.4	2	PAG	PAG	Non-PAG
MP-HEAD-SRK-4	Springer 6	8.4	0.3	0.62	0.04	0.58	19	25	26	34	Slight	1.3	1.3	1.8	PAG	PAG	PAG
MP-HEAD-SRK-5	Springer 5 and 6	8.6	0.16	0.28	0.04	0.24	8.7	13	13	22	Slight	1.5	1.5	2.5	PAG	PAG	Non-PAG
MP-HEAD-SRK-6	Springer 6	9	0.12	0.35	0.01	0.34	11	9.9	11	16	Slight	0.9	0.98	1.5	PAG	PAG	PAG
MP-ROUGHER-SRK-1	Springer 5	8.6	0.45	0.036	0.02	0.016	1.1	37	37	44	Slight	33	33	39	Non-PAG	Non-PAG	Non-PAG
MP-ROUGHER-SRK-2	Springer 5	8.9	0.25	0.099	0.02	0.079	3.1	21	21	28	Slight	6.7	6.7	9.1	Non-PAG	Non-PAG	Non-PAG
MP-ROUGHER-SRK-3	Springer 6	9.1	0.33	0.11	0.01	0.1	3.4	27	27	41	Slight	7.9	7.8	12	Non-PAG	Non-PAG	Non-PAG
MP-ROUGHER-SRK-4	Springer 6	9	0.31	0.097	0.01	0.087	3	25	27	35	Slight	8.4	8.8	11	Non-PAG	Non-PAG	Non-PAG
MP-ROUGHER-SRK-5	Springer 5 and 6	9.5	0.17	0.087	0.01	0.077	2.7	14	12	23	Slight	5.3	4.3	8.4	Non-PAG	Non-PAG	Non-PAG
MP-ROUGHER-SRK-6	Springer 6	9.4	0.14	0.074	0.01	0.074	2.3	12	12	17	Slight	5.1	5	7.4	Non-PAG	Non-PAG	Non-PAG
MP-CLEANER-SRK-3	Springer 6	8.8	0.42	0.7	0.02	0.68	22	35	34	46	Moderate	1.6	1.6	2.1	PAG	PAG	Non-PAG
MP-CLEANER-SRK-4	Springer 6	8.8	0.59	0.61	0.03	0.58	19	49	47	58	Moderate	2.5	2.4	3	Non-PAG	Non-PAG	Non-PAG
MP-CLEANER-SRK-5	Springer 5 and 6	11	0.92	0.33	0.02	0.31	10	77	56	87	Moderate	7.4	5.4	8.4	Non-PAG	Non-PAG	Non-PAG
MP-CLEANER-SRK-6	Springer 6	9.1	0.27	0.33	0.01	0.32	10	22	19	29	Slight	2.1	1.9	2.8	Non-PAG	PAG	Non-PAG
MP-COMBINED-SRK-3[1]	Springer 6	9.1	0.33	0.12	0.01	0.11	3.9	27	27	41	--	7	6.9	11	Non-PAG	Non-PAG	Non-PAG
MP-COMBINED-SRK-4[1]	Springer 6	9	0.31	0.11	0.011	0.099	3.4	26	27	35	--	7.6	7.9	10	Non-PAG	Non-PAG	Non-PAG
MP-COMBINED-SRK-5[1]	Springer 5 and 6	9.5	0.19	0.093	0.01	0.083	2.9	16	13	24	--	5.5	4.4	8.4	Non-PAG	Non-PAG	Non-PAG
MP-COMBINED-SRK-6[1]	Springer 6	9.4	0.14	0.08	0.01	0.08	2.5	12	12	17	--	4.8	4.7	6.9	Non-PAG	Non-PAG	Non-PAG

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Notes:

1. These samples represent hypothetical combined tailings comprised of 97.5% rougher tailings and 2.5% cleaner tailings (Section 2).

Figure 3: Comparison of NP* and TIC* with Modified NP

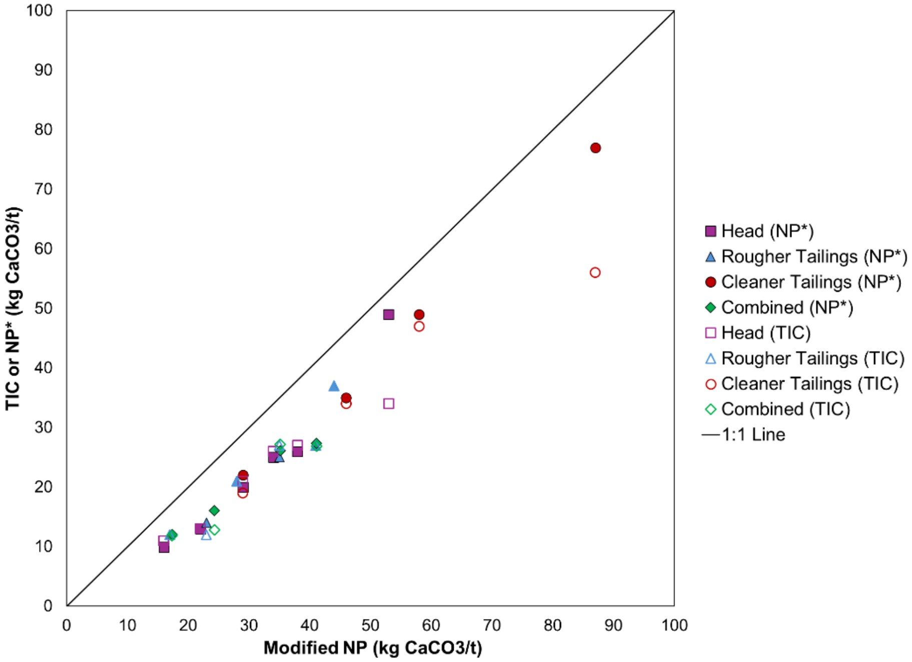
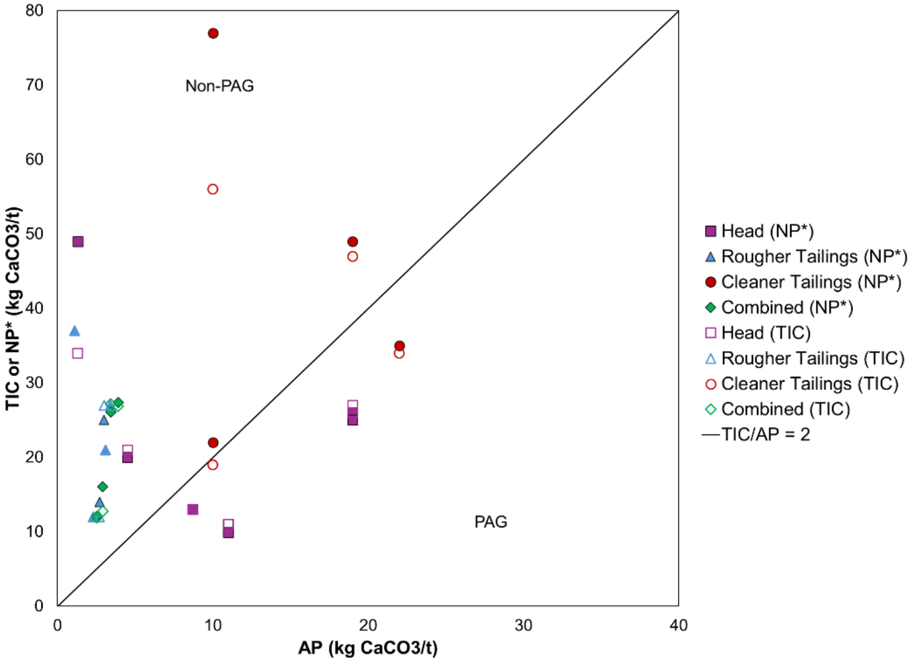


Figure 4: Sample ARD Classifications using NP* and TIC



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4.2 Elemental Composition

Attachment 4 presents complete elemental results and Table 5 presents a summary of elemental results in relation to the screening criteria (Section 3.4).

For at least one sample, silver, arsenic, copper, molybdenum, and selenium exceeded the screening criteria and were considered enriched. Details are as follows:

- Silver was found to be enriched in all head and cleaner tailings samples, with the highest concentrations observed in cleaner tailings samples (range of 0.78 to 2.3 ppm). One rougher tailings sample was enriched in silver.
- Arsenic was enriched in one cleaner tailings sample (MP-CLEANER-SRK-6; 22 ppm).
- Copper was enriched in all head, rougher, and cleaner tailings samples, and accordingly, all combined samples. Copper was highest in head samples (range of 2,200 to 7,300 ppm) and lower in the rougher and cleaner tailings samples (ranges of 780 to 2,000 ppm and 3,500 to 6,000 ppm, respectively), indicating removal of copper through metallurgical processing.
- Molybdenum was found to be enriched in a single head sample (MP-HEAD-SRK-3; 14 ppm) and three of four cleaner tailings samples (range of 10 to 15 ppm).
- Selenium was found to be enriched in all head, rougher, cleaner, and combined tailings samples except for one head sample and two rougher tailings samples (MP-HEAD-SRK-1, MP-ROUGHER-SRK-1, and MP-ROUGHER-SRK-2) that had selenium below the detection limit of 1 ppm. Selenium was higher in head and cleaner tailings samples compared to rougher tailings samples (ranges of <1 to 9 ppm, 4 to 8 ppm, and <1 to 2 ppm, respectively).

All other elements did not have appreciable enrichment in any of the samples.

Table 5: Summary of Trace Element Results

Sample ID	Permit Area	Ag	As	Ca	Cd	Co	Cu	Mn	Mo	Ni	Pb	Sb	Se	Zn
		Ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
MP-HEAD-SRK-1	Springer 5	0.53	9	2.9	0.46	16	2200	680	0.97	4	5.7	0.33	1	120
MP-HEAD-SRK-2	Springer 5	0.93	7	2.9	0.23	19	2400	780	1.9	7	4.7	0.38	1	110
MP-HEAD-SRK-3	Springer 6	1.3	11	2.7	0.25	20	6300	420	14	5	7.5	0.52	9	53
MP-HEAD-SRK-4	Springer 6	1.7	6	2.9	0.24	22	7300	430	6.8	8	5.2	0.17	8	45
MP-HEAD-SRK-5	Springer 5 and 6	0.61	7	1.8	0.07	12	3400	280	7.5	3	3	0.18	4	20
MP-HEAD-SRK-6	Springer 6	0.66	15	1.6	0.27	18	4200	340	4.6	3	4.2	0.38	5	34
MP-ROUGHER-SRK-1	Springer 5	0.33	9	2.6	0.39	16	2000	660	1	5	5.6	0.31	1	120
MP-ROUGHER-SRK-2	Springer 5	0.66	7	3	0.17	20	1400	790	1.8	8	4.6	0.4	1	110
MP-ROUGHER-SRK-3	Springer 6	0.32	10	2.8	0.11	17	1100	440	6	7	3.6	0.38	2	47
MP-ROUGHER-SRK-4	Springer 6	0.43	5	3	0.13	22	1100	450	4.6	9	2.8	0.18	1	44
MP-ROUGHER-SRK-5	Springer 5 and 6	0.2	6	1.8	0.06	11	1000	280	4.7	4	2.1	0.16	1	20
MP-ROUGHER-SRK-6	Springer 6	0.2	14	1.7	0.08	17	780	340	3.3	4	2	0.37	1	35
MP-CLEANER-SRK-3	Springer 6	1.2	19	3.3	0.32	31	4100	500	10	35	15	0.65	8	77
MP-CLEANER-SRK-4	Springer 6	2.3	13	4	0.48	34	6000	500	12	56	21	0.57	8	80
MP-CLEANER-SRK-5	Springer 5 and 6	0.8	13	4.5	0.18	17	3900	390	15	50	12	0.44	5	52
MP-CLEANER-SRK-6	Springer 6	0.78	22	2.3	0.22	23	3500	440	11	67	10	0.81	4	58
MP-COMBINED-SRK-3[1]	Springer 6	0.34	10	2.8	0.12	17	1200	440	6.1	7.7	3.9	0.39	2.2	48
MP-COMBINED-SRK-4[1]	Springer 6	0.48	5.2	3	0.14	22	1200	460	4.8	10	3.2	0.19	1.2	45
MP-COMBINED-SRK-5[1]	Springer 5 and 6	0.22	6.2	1.9	0.063	11	1100	280	4.9	5.2	2.4	0.17	1.1	21
MP-COMBINED-SRK-6[1]	Springer 6	0.21	14	1.7	0.084	17	850	340	3.5	5.6	2.2	0.38	1.1	36
10x ACA (High Ca Granite)		*0.51*	*19*	*25*	*1.3*	*70*	*300*	*5400*	*10*	*150*	*150*	*2*	*0.5*	*600*

Source: https://srk.sharepoint.com/sites/NACAPR003709/Internal/Task320_PermitApplicationSupport/4_Metallurgical Tailings/2_Working Files/[MPMC_MetallurgicalTailings_CAPR003709_KWJ_Rev00.xlsx]

Notes: Red values indicate concentrations that exceed the screening criteria and blue values indicate concentrations lower than the analytical detection limit

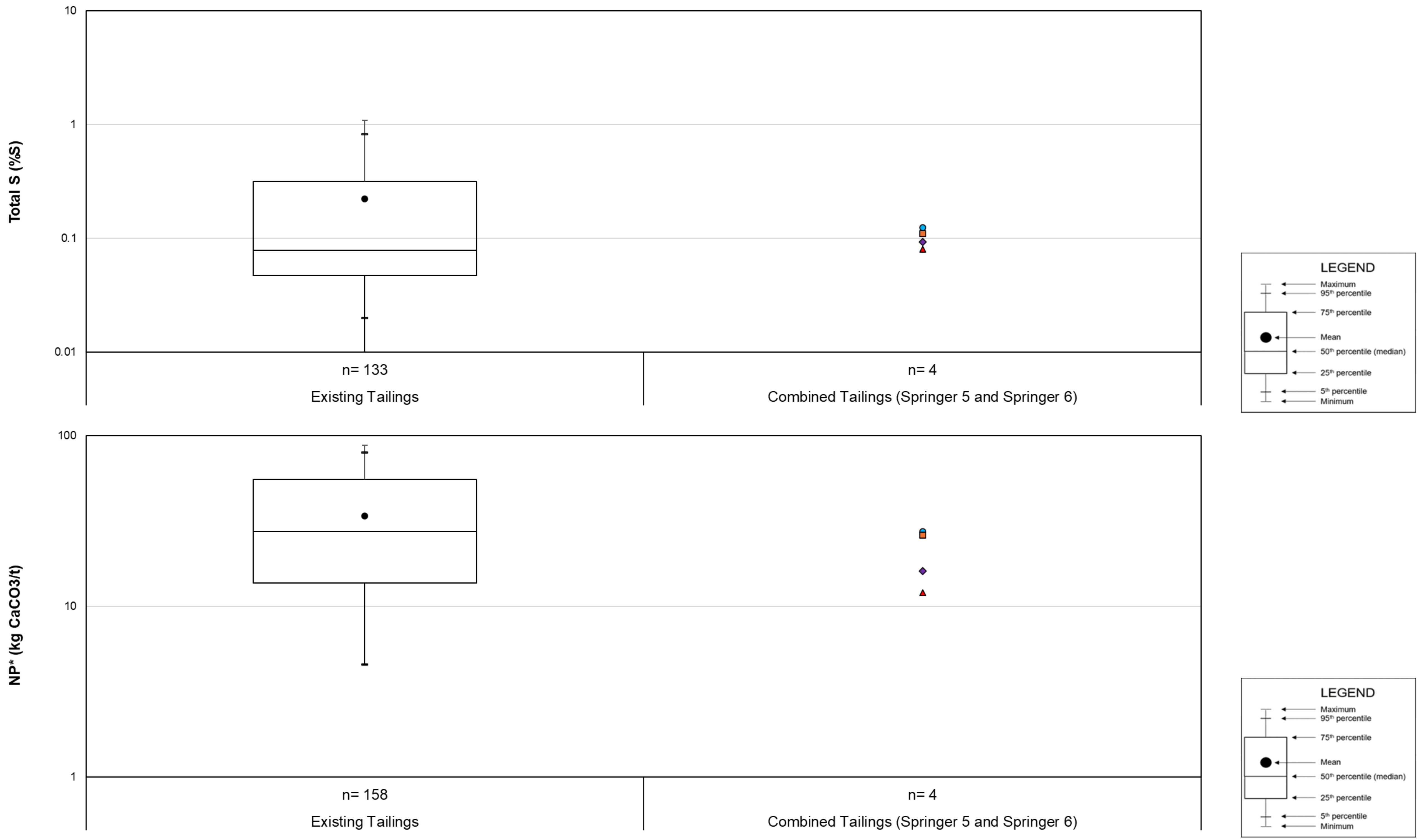
1. These samples represent hypothetical combined tailings comprised of 97.5% rougher tailings and 2.5% cleaner tailings (Section 2)

5 Interpretation

Figure 5 to Figure 7 **p**resent comparisons of the statistical distributions for key parameters (total sulphur, NP*, NP*/AP, copper, and selenium) between existing combined rougher and cleaner tailings collected from the processing plant between 1997 to 2024 and the combined rougher and cleaner tailings samples from Springer 5 and Springer 6 representing future tailings from these areas.

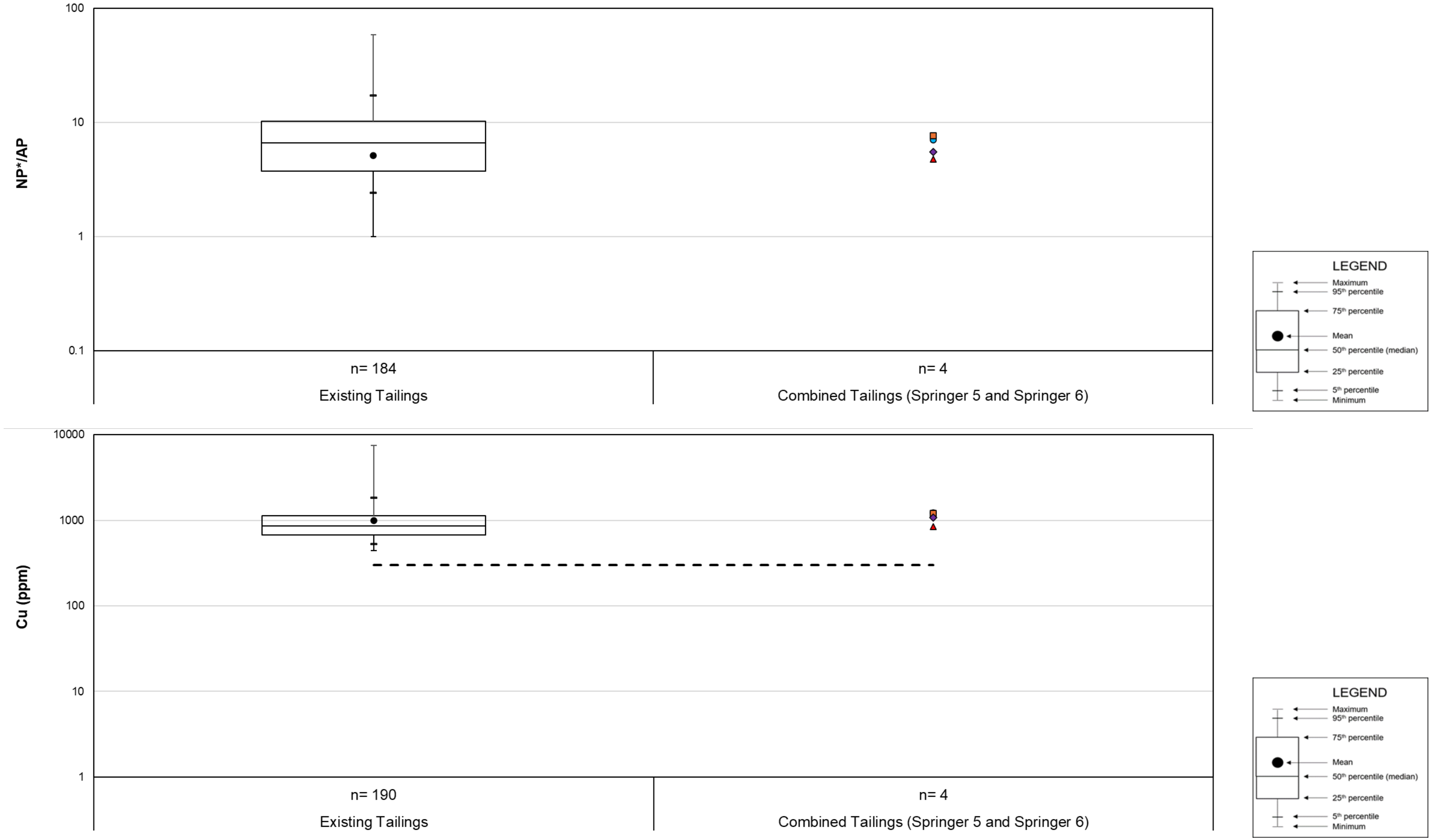
For all key parameters, the statistical distributions for future combined tailings from Springer 5 and Springer 6 were within the range of existing tailings results. Most metallurgical tailings samples from the expansion areas were representative of the median concentrations for existing tailings.

Figure 5: Comparison of Statistical Distributions for Total Sulphur and NP*



Source: https://srk.sharepoint.com/sites/NACAPR003709/Internal/Task320_PermitApplicationSupport/4_Metallurgical Tailings/2_Working Files/[MPMC_MetallurgicalTailings_CAPR003709_KWJ_Rev00.xlsx]

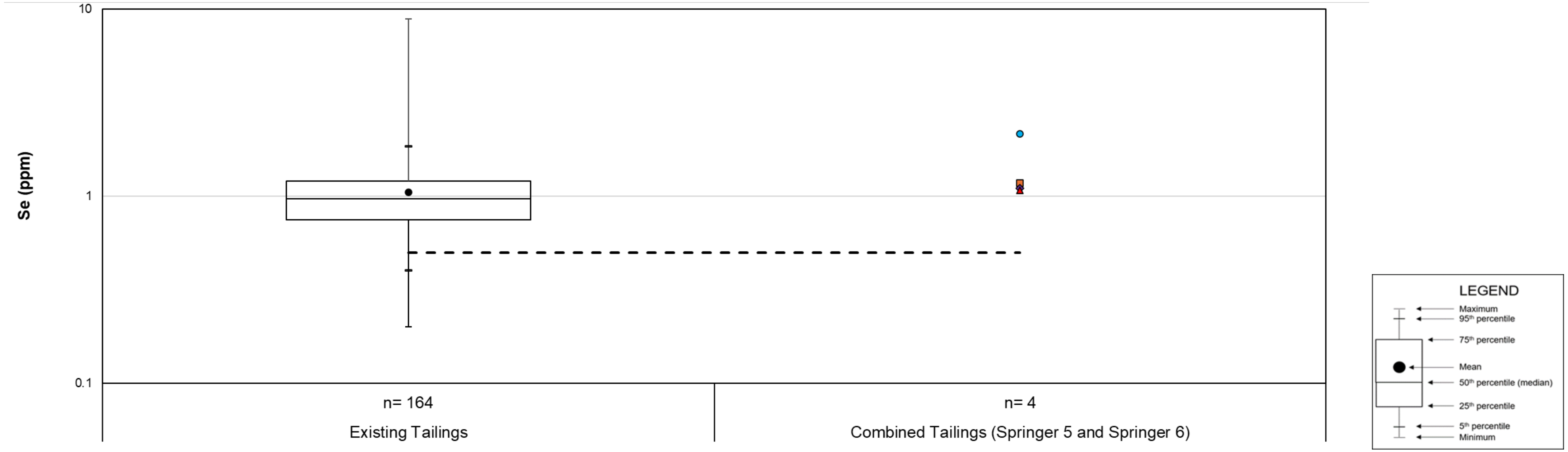
Figure 6: Comparison of Statistical Distributions for NP*/AP and Copper



Source: https://srk.sharepoint.com/sites/NACAPR003709/Internal/Task320_PermitApplicationSupport/4_Metallurgical Tailings/2_Working Files/[MPMC_MetallurgicalTailings_CAPR003709_KWJ_Rev00.xlsx]

Note: The dotted line represents the screening criteria of 10 times the global average concentration in high calcium granite (Section 3.4).

Figure 7: Comparison of Statistical Distributions for Selenium



Source: https://srk.sharepoint.com/sites/NACAPR003709/Internal/Task320_PermitApplicationSupport/4_Metallurgical Tailings/2_Working Files/[MPMC_MetallurgicalTailings_CAPR003709_KWJ_Rev00.xlsx]

Note: The dotted line represents the screening criteria of 10 times the global average concentration in high calcium granite (Section 3.4)

6 Conclusions and Recommendations

This memorandum presents static geochemical characterization of future head and tailings samples from the Springer 5 and Springer 6 areas of the Springer Expansion. The main conclusions of static geochemical characterization of the samples are as follows:

- Paste pH was slightly alkaline to alkaline for all samples. Cleaner tailings had the highest pHs due to the addition of lime in the metallurgical process.
- Total sulphur content was higher in all Springer 6 samples compared to Springer 5 samples, which is consistent with previous geochemical characterization (SRK 2025a). Cleaner tailings had the highest total sulphur content, followed by head and rougher tailings.
- NP* was highest in the cleaner tailings and lower and similar in the head and rougher tailings. NP* was lower than modified NP for all samples, which indicates the contribution of silicates to NP determined by the modified method and probably also low concentrations of iron carbonates, which is consistent with previous geochemical characterization (SRK 2025a).
- Most head samples were PAG, whereas all rougher and combined tailings samples and most cleaner tailings samples were non-PAG. Rougher tailings samples were non-PAG due to lower sulphur content and cleaner tailings samples were non-PAG due to lime addition in the metallurgical process.
- Elements that showed enrichment relative to the screening criteria (Section 3.4) for at least one sample were silver, arsenic, copper, molybdenum, and selenium.
    - Copper was enriched in all samples and showed the highest concentrations in head samples, which indicates the removal of copper through metallurgical processing.
    - Selenium was enriched in all head and combined tailings samples and most rougher and cleaner tailings samples. The highest selenium concentrations were observed in head samples followed by cleaner tailings then rougher tailings samples.
- The statistical distributions of future combined tailings samples were within the range of existing composite tailings samples at the Mount Polley site.

Recommendations on next steps forward for these materials are as follows:

- HCTs for the selected head and rougher tailings samples should be initiated to gain insights on the long-term leaching behaviour of these materials. The HCT samples will be selected upon receipt of all static testing results.

Regards,
SRK Consulting (Canada) Inc.

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Staff Consultant (Geochemistry)

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Nov. 19/2025

Shauna Litke, PEng (BC)
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Stephen Day, PGeo
Corporate Consultant (Geochemistry)

EGBC Permit to Practice: 1003655

Attachments:

Attachment 1	MPMC Processing Flow Sheets
Attachment 2	QA/QC Results
Attachment 3	Complete Acid-Base Accounting Results
Attachment 4	Complete Elemental Results

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References

Ministry of Mining and Critical Metals. 2025. Major Mine Permit M-200 – Approving Mine Plan and Reclamation Plan. August 2025.

MEND. 2009. Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials. MEND Report 1.20.1. Report prepared by CANMET Mining and Mineral Sciences Laboratories.

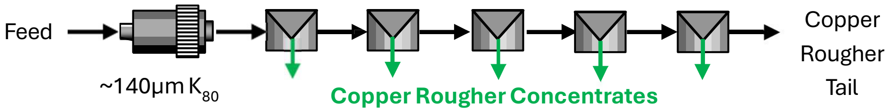
SRK Consulting Inc. 2025a. Mount Polley Mine Springer Expansion Project Metal Leaching and Acid Rock Drainage Geochemical Characterization, Mount Polley Mine, February 2025.

SRK Consulting Inc. 2025b. Analytical Instructions for Mount Polley Springer Expansion Metallurgical Tailings and Head Samples, Mount Polley Mine, August 2025.

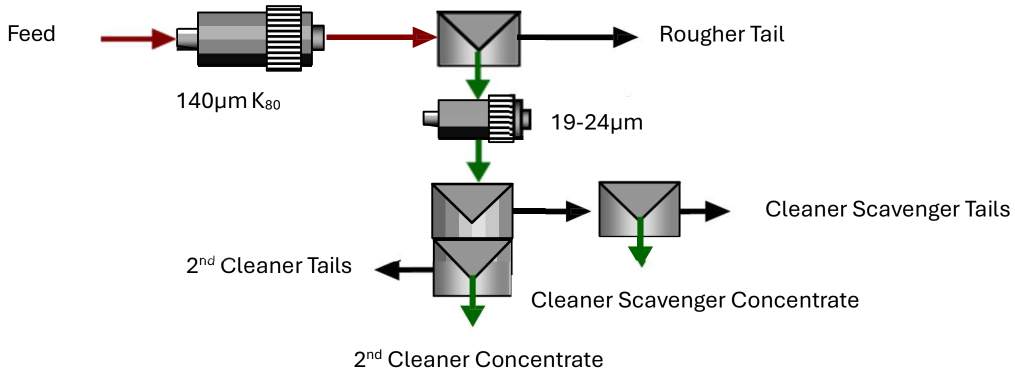
Attachment 1 MPMC Processing Flow Sheets

Attachment 1: MPMC Processing Flowsheets

Rougher Tailings Test Flowsheet



Cleaner Tailings Test Flowsheet



Attachment 2 QA/QC Results

Attachment 2: QA/QC Results

QC Test	n	SRK QC Criteria	Results
paste pH			
Pulp Duplicate	(n=1)	For any samples, +/- 0.5 difference pH unit	All passed
Field Duplicate	(n=0)	For any samples, +/- 0.5 difference pH unit	Not Applicable
Standard Reference Material	(n=0)	Within specified tolerance ranges.	Not Applicable
Total C and TIC			
Lab Blank	(n=1) for TIC and (n=1) for Total C	<5X detection limit (DL)	Not Applicable
Carbon balance (Total C > TIC)	(n=16)	For samples > 10X the detection limit (DL), Total Carbon should be greater than Total Inorganic Carbon, if not the % difference should be within +/-20%	All passed
Pulp Duplicate	(n=1) for TIC and (n=1) for Total C	For samples > 10X the detection limit (DL), % RPD within +/-20%	All passed
Field Duplicate	(n=0) for TIC and (n=0) for Total C	For samples > 10X the detection limit (DL), % RPD within +/-30%	Not Applicable
Standard Reference Material	(n=1) for TIC and (n=1) for Total C	Within specified tolerance ranges.	All passed
Total S & Total Sulphate			
Lab Blank	(n=1) for Total S and (n=1) for Total Sulphate	<5X detection limit (DL)	All passed
Sulphur balance (total S > sulphate S)	(n=16)	For samples > 10X the detection limit (DL), Total Sulphur should be greater than Total Sulphate, if not the % difference should be within +/-20%	All passed
Pulp Duplicate	(n=1) for Total S and (n=1) for Total Sulphate	For samples > 10X the detection limit (DL), % RPD within +/-20%	All passed
Field Duplicate	(n=0) for Total S and (n=0) for Total Sulphate	For samples > 10X the detection limit (DL), % RPD within +/-30%	Not Applicable
Standard Reference Material	(n=1) for Total S and (n=1) for Total Sulphate	Within specified tolerance ranges.	All passed
Modified NP, Fizz Rating and Terminal pH			
Lab Blank	(n=0)	within -12.5 to 12.5 NP Kg CaCO3/t	Not Applicable
NP consistent with paste pH	(n=16)	Negative NP has paste pH <= 5	All passed
Pulp Duplicate	(n=1) for NP, (n=0) for terminal pH, and (n=1) for Fizz Rating	% RPD better than +/-15% for NP>20 kg/t, % RPD better than +/-20% for NP>10 kg/t, Difference within +/-5kg/t for NP<10 kg/t. Fizz test rating is the same.	All passed
Field Duplicate	(n=0) for NP, (n=0) for terminal pH, and (n=0) for Fizz Rating	% RPD better than +/-15% for NP>20 kg/t, % RPD better than +/-20% for NP>10 kg/t, Difference within +/-5kg/t for NP<10 kg/t. Fizz test rating is the same.	Not Applicable
Terminal pH	(n=16)	within pH 1.5-2	All passed
Standard Reference Material	(n=1) for NP, (n=0) for terminal pH, and (n=1) for Fizz Rating	Within specified tolerance ranges.	All passed
Modified NP and TIC			
Comparison between Modified NP and TIC	(n=16)	Check for trends/correlation	NP generally higher than TIC
Total S-Leco and S-ICP (Metals - AR)			
Comparison between Total S-Leco and S-ICP	(n=16)	For samples >10X detection limit (DL), % RPD within +/-20%	All passed
Metals - Aqua Regia Digestion with ICP-OES/MS Finish (AR)			
Lab Blank	(n=1)	<5X detection limit (DL)	All passed
Pulp Duplicate	(n=1)	For samples >10X detection limit (DL), % RPD within +/- 20%, ok 10% of metal scan failing.	All passed
Field Duplicate	(n=0)	For samples > 10X the detection limit (DL), % RPD within +/-30%	Not Applicable
Standard Reference Material	(n=2)	<10X DL, Within specified tolerance ranges.	All passed
Hg (CVA37A25)			
Lab Blank	(n=1)	<5X Detection Limit; pH should be within 5-6 pH units	Passed
Pulp Duplicate	(n=1)	For samples >10X detection limit (DL), % RPD within +/- 20%, ok 10% of metal scan failing.	Passed

Standard Reference Material	(n=2)	<10X DL, Within specified tolerance ranges.	All passed
Whole Rock Analysis - XRF			
Lab Blank	(n=1)	<5X Detection Limit; pH should be within 5-6 pH units	All passed
Pulp Duplicate	(n=1)	For samples >10X detection limit (DL), % RPD within +/- 20%, ok 10% of metal scan failing.	All passed
Standard Reference Material	(n=2)	<10X DL, Within specified tolerance ranges.	Awaiting expected values for OREAS 751b and Std OREAS 72b from the lab.

Attachment 3 Complete Acid-Base Accounting Results

SGS proposal: 21213-PR1-R1
SGS project #: 2552

Work order date: 2-Oct-25
Report date: 21-Oct-25
Sample receipt date: 11-Sep-25
Version: Final

Customer details

Name:	Gabriel Holmes
Address:	Mount Polley Mining Corporation

Project reference: Springer Expansior

P.O. number:

COC:

ANALYSIS REPORT

SGS WO: 1

Report Distribution

Name	Email
Gabriel Holmes	gabriel.holmes@mountpolley.com

Special notes:

ANALYSIS REPORT

Method Summaries *Test method information available upon request.*

S(T) and C(T): Total sulfur and total carbon by LECO, Method CSA06V
S(SO4): Sulfate by HCl digestion with ICP finish, Method CSA07V
S(S2-): Sulfide by calculation of S(T) - S(SO4) or by nitric acid digestion with ICP finish (Method CSA08C1)

TIC: Total inorganic carbon by coulometry, Method CSB02V
AP: Acid generating potential based on sulfide sulfur
NP: Modified neutralisation potential by excess acid addition and back titration to pH 8.3
Net NP: Net neutralisation potential = NP - AP

Metals by aqua regia digest with ICP-OES/MS finish, Method ICP21B20/ICM21B20
Metals by multi-acid digest with ICP-OES/MS finish, Method ICP40Q12/IMS40Q12

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Preliminary Data	**Final Data Approval**
Etemadifar	
Anahita Etemadifar - Laboratory Supervisor	Noelene Ahern - Manager: ARD

ABA Report

Test Units	S(T) %	S(SO4) %	S(S-2) %	Insoluble S %	AP kg CaCO3/t
Method Code	CSA06V	CSA07C1	Calc.	Calc.	Calc.
LOD	0.005	0.01	0.01	#N/A	#N/A
Sample ID					
DC3 Feed	0.040	<0.01	0.04	NA	1.3
DC4 Feed	0.145	0.01	0.14	NA	4.2
DC5 Feed	0.615	0.02	0.60	NA	18.6
DC6 Feed	0.616	0.04	0.58	NA	18.0
DC7 Feed	0.278	0.04	0.24	NA	7.4
DC8 Feed	0.352	0.01	0.34	NA	10.7
Test 10 RT	0.036	0.02	0.02	NA	0.5
Test 11 RT	0.099	0.02	0.08	NA	2.5
Test 15 RT	0.110	0.01	0.10	NA	3.1
Test 16 RT	0.097	0.01	0.09	NA	2.7
Test 17 RT	0.087	0.01	0.08	NA	2.4
Test 18 RT	0.074	<0.01	0.07	NA	2.3
Test 15 CST	0.700	0.02	0.68	NA	21.3
Test 16 CST	0.614	0.03	0.58	NA	18.3
Test 17 CST	0.331	0.02	0.31	NA	9.7
Test 18 CST	0.331	0.01	0.32	NA	10.0
Duplicates					
DC7 Feed	0.276				
Test 18 RT		<0.01			

QA/QC					
Blank	0.009	<0.01			
Certified standards					
GS915-8	0.131				
RTS-3a		1.01			

SGS proposal: 21213-PR1-R1 Work order date: 2-Oct-25
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Version: Final

ABA Report

Test	C(T)	TIC	CaCO3 NP	Modified Sobek terminal pH	Modified NP	Net Modified NP	Fizz Test	Paste pH
Units	%	%	kg CaCO3/t		kg CaCO3/t	kg CaCO3/t		
Method Code	CSA06V	CSB02V	Calc.		Modified	Calc.	Sobek	Sobek
LOD	0.005	0.01						0.2
Sample ID								
DC3 Feed	0.594	0.41	34.2	1.74	52.9	51.7	Slight	8.93
DC4 Feed	0.244	0.25	20.8	1.75	28.6	24.4	Slight	9.04
DC5 Feed	0.308	0.32	26.7	1.77	38.4	19.8	Slight	8.54
DC6 Feed	0.295	0.31	25.8	1.79	34.1	16.1	Slight	8.38
DC7 Feed	0.157	0.16	13.3	1.86	21.8	14.4	Slight	8.57
DC8 Feed	0.119	0.13	10.8	1.71	16.4	5.7	Slight	9.00
Test 10 RT	0.446	0.45	37.5	1.87	44.2	43.7	Slight	8.62
Test 11 RT	0.249	0.25	20.8	1.52	28.1	25.6	Slight	8.89
Test 15 RT	0.326	0.32	26.7	1.81	41.0	37.9	Slight	9.07
Test 16 RT	0.306	0.32	26.7	1.81	34.6	31.8	Slight	9.04
Test 17 RT	0.174	0.14	11.7	1.89	22.7	20.3	Slight	9.47
Test 18 RT	0.141	0.14	11.7	1.85	17.1	14.8	Slight	9.43
Test 15 CST	0.419	0.41	34.2	1.84	46.5	25.2	Moderate	8.82
Test 16 CST	0.586	0.56	46.7	1.85	58.0	39.7	Moderate	8.83
Test 17 CST	0.919	0.67	55.8	1.98	86.6	76.9	Moderate	11.37
Test 18 CST	0.266	0.23	19.2	1.76	28.8	18.7	Slight	9.06
Duplicates								
DC3 Feed					52.5		Slight	8.96
DC4 Feed		0.26						
DC7 Feed	0.157							

Test	C(T)	TIC	CaCO3 NP	Modified Sobek terminal pH	Modified NP	Net Modified NP	Fizz Test	Paste pH
QA/QC								
Blank	0.010	<0.01						
Certified standards								
NBM-1					42.4		Slight	
TIC-L1		0.10						
GS915-8	0.068							

ANALYSIS REPORT
ABA Report - CRM Expected Values and Tolerances

CRM	**Test**	**S(T)**	**S(SO4)**	**S(SO4)**	**S(S-2)**	**C(T)**	**TIC**	**CO2**	**Modified NP Method 1996**	**Modified NP**	**Modified with Siderite Correction NP**
	Units	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**kg CaCO3/t**	**kg CaCO3/t**	**kg CaCO3/t**
	Method Code	CSA06V	CSA07V	CSA07D	Calc.	CSA06V	CSB02V	CSB02V		Modified	
	LOD	0.005	0.01	1.01	0.01	0.005	0.01	0.005		0.5	
GGC-07	Expected value	0.51				0.56					
	Tolerance (+/-)	0.09				0.09					
HCC-1	Expected value	33.92									
	Tolerance (+/-)	5.04									
RTS-3a	Expected value		0.98	1.34							
	Tolerance (+/-)		0.12	0.35							
OREAS 278	Expected value				0.699						
	Tolerance (+/-)				0.06						
NBM-1	Expected value								38.67	42.07	50.27
	Tolerance (+/-)								3.55	3.72	2.31
TIC-L1	Expected value						0.13	0.477			
	Tolerance (+/-)						0.02	0.78			
GS314-2	Expected value	2.56				5.15					
	Tolerance (+/-)	0.14				0.27					
GS915-8	Expected value	0.13				0.07					
	Tolerance (+/-)	0.02				0.02					
OREAS 550	Expected value	0.220				4.110					
	Tolerance (+/-)	0.004				0.22					
SX35-13	Expected value						11.954				
	Tolerance (+/-)						0.626				
SY4	Expected value						0.95				
	Tolerance (+/-)						0.06				

Sobek ABA kg CaCO3/t	Sobek With Siderite NP kg CaCO3/t	Fizz Test	Paste pH
		Sobek	Sobek 0.2
51.71	57.6	Slight	
2.43	1.3		

Attachment 4 Complete Elemental Results

SGS proposal: 21213-PR1-R1
SGS project #: 2552

Work order date: 2-Oct-25
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Name:	Gabriel Holmes
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COC:

ANALYSIS REPORT

SGS WO: 1

Report Distribution

Name	Email
Gabriel Holmes	gabriel.holmes@mountpolley.com

Special notes:

ANALYSIS REPORT

Method Summaries *Test method information available upon request.*

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S(SO4): Sulfate by HCl digestion with ICP finish, Method CSA07V
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TIC: Total inorganic carbon by coulometry, Method CSB02V
AP: Acid generating potential based on sulfide sulfur
NP: Modified neutralisation potential by excess acid addition and back titration to pH 8.3
Net NP: Net neutralisation potential = NP - AP

Metals by aqua regia digest with ICP-OES/MS finish, Method ICP21B20/ICM21B20
Metals by multi-acid digest with ICP-OES/MS finish, Method ICP40Q12/IMS40Q12

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Preliminary Data	**Final Data Approval**
Anahita Etemadifar - Laboratory Supervisor	Noelene Ahern - Manager: ARD

Metals - Aqua Regia Digestion with ICP-OES/MS Finish

Test	Al	Ba	Ca	Cr	Cu	Fe	K	Li	Mg	Mn	Na	Ni	P	S	Sr	Ti	V
Units	%	ppm	%	ppm	ppm	%	%	ppm	%	ppm	%	ppm	%	%	ppm	%	ppm
Method Code	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20
Lower detection	0.01	5	0.01	1	0.5	0.01	0.01	1	0.01	2	0.01	1	0.01	0.01	0.5	0.01	1
Upper detection	15	10000	15	10000	10000	15	15	10000	15	10000	15	10000	15	5	10000	15	10000
Sample ID																	
DC3 Feed	1.24	181	2.85	6	2219	4.42	0.14	11	0.72	680	0.06	4	0.12	0.03	61.6	0.14	197
DC4 Feed	1.90	78	2.87	11	2361	6.25	0.11	18	0.94	784	0.05	7	0.14	0.15	60.4	0.20	240
DC5 Feed	1.90	94	2.65	7	6297	6.14	0.33	13	0.88	418	0.14	5	0.14	0.67	560	0.18	225
DC6 Feed	1.77	65	2.88	16	7318	8.12	0.24	11	0.73	433	0.08	8	0.16	0.66	204	0.15	236
DC7 Feed	1.32	274	1.83	4	3381	3.93	0.15	6	0.40	284	0.33	3	0.10	0.30	120	0.15	157
DC8 Feed	1.33	127	1.64	4	4172	6.09	0.2	10	0.77	342	0.12	3	0.12	0.37	120	0.18	219
Test 10 RT	1.17	160	2.59	9	2010	4.57	0.11	10	0.70	662	0.05	5	0.12	0.03	53.8	0.14	202
Test 11 RT	1.97	78	3.03	13	1397	6.44	0.12	17	0.91	789	0.05	8	0.14	0.10	65.5	0.21	246
Test 15 RT	1.95	97	2.76	10	1144	6.03	0.34	13	0.88	441	0.13	7	0.15	0.12	572	0.19	232
Test 16 RT	1.83	69	2.96	19	1081	7.86	0.26	11	0.74	454	0.08	9	0.16	0.10	215	0.16	238
Test 17 RT	1.27	270	1.82	6	995	3.89	0.14	6	0.38	279	0.32	4	0.10	0.09	114	0.14	155
Test 18 RT	1.25	123	1.65	6	780	5.9	0.19	10	0.75	335	0.11	4	0.12	0.07	112	0.17	214
Test 15 CST	2.39	120	3.27	55	4149	4.86	0.36	16	1.06	503	0.14	35	0.13	0.77	663	0.21	178
Test 16 CST	2.22	87	4.01	100	5983	7.61	0.29	12	0.76	502	0.10	56	0.10	0.67	254	0.20	224
Test 17 CST	1.50	318	4.54	95	3932	3.52	0.18	8	0.57	390	0.28	50	0.09	0.37	148	0.21	132
Test 18 CST	1.63	147	2.33	111	3454	4.79	0.23	12	0.93	444	0.11	67	0.09	0.37	148	0.24	171
Duplicates																	
*Rep Test 16 RT	1.84	70	2.98	20	1084	7.84	0.26	11	0.74	454	0.08	9	0.16	0.10	215	0.16	237
*Rep Test 18 RT																	
QA/QC																	
*Blk BLANK	<0.01	<5	<0.01	<1	1	<0.01	<0.01	<1	<0.01	<2	<0.01	<1	<0.01	<0.01	<0.5	<0.01	<1
Certified standards																	
*Std OREAS 151C	1.88	432	0.42	51	2402	2.92	0.89	38	0.69	280	0.15	17	0.06	0.70	33.8	0.23	61
*Std OREAS 609b	0.68	235	0.75	17	4950	2.31	0.26	7	0.07	205	0.06	7	0.02	1.76	36.1	0.01	5
*Std OREAS 609b																	
*Std CZN-4																	

Test	Zn	Zr	Ag	As	Be	Bi	Cd	Ce	Co	Cs	Ga	Ge	Hf	Hg	In	La	Lu
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Method Code	ICP21B20	ICP21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20
Lower detection	1	0.5	0.01	1	0.1	0.02	0.01	0.05	0.1	0.05	0.1	0.1	0.05	0.01	0.02	0.1	0.01
Upper detection	10000	10000	100	10000	100	10000	10000	1000	10000	1000	10000	10000	500	100	500	10000	1000
Sample ID																	
DC3 Feed	124	15.4	0.53	9	0.7	0.2	0.46	12.63	16	0.57	8.2	0.4	0.52	0.12	0.11	6.6	0.15
DC4 Feed	107	12.9	0.93	7	0.8	0.1	0.23	13.44	18.9	0.54	10.5	0.4	0.44	0.07	0.09	6.9	0.17
DC5 Feed	53	6.9	1.30	11	0.8	0.3	0.25	18.51	20.4	3.39	8.6	0.5	0.23	0.08	0.14	9.6	0.18
DC6 Feed	45	6.2	1.68	6	0.9	0.4	0.24	17.13	21.5	1.83	8.2	0.4	0.22	0.07	0.12	9.5	0.16
DC7 Feed	20	8.4	0.61	7	0.4	0.1	0.07	13.58	11.9	1.55	6.0	0.4	0.29	0.05	0.09	7.3	0.14
DC8 Feed	34	5.8	0.66	15	0.7	0.1	0.27	15.11	17.9	2.70	9.0	0.7	0.24	0.17	0.12	8.1	0.17
Test 10 RT	120	15.1	0.33	9	0.6	0.1	0.39	12.76	15.5	0.55	8.2	0.4	0.53	0.08	0.11	6.6	0.15
Test 11 RT	106	13.6	0.66	7	0.9	0.0	0.17	14.26	19.5	0.54	11.0	0.5	0.45	0.05	0.09	7.5	0.18
Test 15 RT	47	7.2	0.32	10	0.8	0.1	0.11	18.99	16.8	3.35	8.7	0.4	0.25	0.05	0.07	9.7	0.19
Test 16 RT	44	6.5	0.43	5	0.9	0.1	0.13	17.35	21.5	1.92	8.7	0.3	0.22	0.05	0.06	9.7	0.17
Test 17 RT	20	8.0	0.20	6	0.4	0.0	0.06	12.02	11.1	1.44	5.6	0.3	0.26	0.03	0.07	6.6	0.13
Test 18 RT	35	5.3	0.20	14	0.7	0.1	0.08	14.76	17.3	2.59	8.3	0.7	0.22	0.09	0.09	7.7	0.17
Test 15 CST	77	12.4	1.15	19	1.1	0.4	0.32	20.66	30.6	3.67	8.8	0.4	0.38	0.13	0.20	11.2	0.2
Test 16 CST	80	14.6	2.27	13	1.2	0.6	0.48	17.75	34.2	2.04	9.2	0.3	0.43	0.14	0.34	9.8	0.19
Test 17 CST	52	18.7	0.80	13	0.5	0.2	0.18	16.08	16.5	1.22	6.6	0.3	0.58	0.08	0.16	8.7	0.18
Test 18 CST	58	16.1	0.78	22	0.8	0.3	0.22	17.05	22.7	2.10	9.5	0.7	0.48	0.19	0.25	9	0.2
Duplicates																	
*Rep Test 16 RT	43	6.5	0.41	5	0.9	0.1	0.12	17.23	19.9	1.84	8.6	0.3	0.22	0.05	0.06	9.4	0.16
*Rep Test 18 RT																	
QA/QC																	
*Blk BLANK	<1	<0.5	<0.01	<1	<0.1	<0.02	<0.01	<0.05	<0.1	<0.05	<0.1	<0.1	<0.05	<0.01	<0.02	<0.1	<0.01
Certified standards																	
*Std OREAS 151C	91	6.3	0.99	21	1.5	7.0	0.21	33.26	7.5	8.49	8.5	0.1	0.25	0.06	0.10	15.1	0.1
*Std OREAS 609b	1264	34.8	24.61	1316	0.5	111.0	8.19	32.77	4.7	1.34	4.4	0.2	1.00	0.56	2.00	16.9	0.03
*Std OREAS 609b																	
*Std CZN-4																	

Test	Mo	Nb	Pb	Rb	Sb	Sc	Se	Sn	Ta	Tb	Te	Th	Tl	U	W	Y	Yb	Hg
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Method Code	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	CVA37A25
Lower detection	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	0.005
Upper detection	10000	1000	10000	10000	10000	10000	1000	1000	10000	10000	1000	10000	10000	10000	10000	10000	100	100
Sample ID																		
DC3 Feed	0.97	0.11	5.7	5.7	0.3	5.4	<1	1.3	<0.05	0.3	<0.05	0.9	<0.02	0.68	0.4	10.55	1.10	0.101
DC4 Feed	1.85	0.12	4.7	5.5	0.4	5.4	1	1.2	<0.05	0.3	<0.05	0.9	<0.02	0.52	0.4	10.60	1.20	0.066
DC5 Feed	14.00	0.32	7.5	20.1	0.5	3.9	9	1.8	<0.05	0.4	0.19	1.2	0.04	1.07	0.4	13.61	1.30	0.077
DC6 Feed	6.83	0.31	5.2	15.5	0.2	2.7	8	1.5	<0.05	0.3	0.40	1.0	0.03	1.06	0.3	11.54	1.20	0.073
DC7 Feed	7.46	0.28	3	6.5	0.2	2.2	4	1.4	<0.05	0.3	0.10	0.9	<0.02	0.70	0.4	9.87	1.00	0.043
DC8 Feed	4.57	0.30	4.2	10.8	0.4	3.6	5	1.9	<0.05	0.3	0.17	1.0	0.02	0.66	0.5	12.42	1.30	0.165
Test 10 RT	1.03	0.12	5.6	4.6	0.3	5.2	<1	1.4	<0.05	0.3	<0.05	0.9	<0.02	0.75	0.5	10.30	1.00	0.079
Test 11 RT	1.81	0.12	4.6	6.1	0.4	5.5	<1	1.4	<0.05	0.3	<0.05	1.0	<0.02	0.61	0.5	11.67	1.20	0.043
Test 15 RT	5.99	0.32	3.6	20.5	0.4	3.7	2	1.9	<0.05	0.4	0.06	1.3	0.04	1.08	0.5	13.58	1.30	0.06
Test 16 RT	4.61	0.30	2.8	16.1	0.2	2.8	1	1.5	<0.05	0.3	0.13	1.1	0.03	1.14	0.4	12.06	1.20	0.051
Test 17 RT	4.68	0.28	2.1	6	0.2	1.9	1	1.4	<0.05	0.3	<0.05	0.8	<0.02	0.65	0.4	9.05	0.90	0.037
Test 18 RT	3.34	0.28	2	10.3	0.4	3.2	1	1.9	<0.05	0.3	0.07	0.9	<0.02	0.66	0.5	11.86	1.20	0.09
Test 15 CST	10.05	0.28	14.5	20.6	0.7	4.7	8	3.2	<0.05	0.4	0.31	1.6	0.05	1.33	1.8	14.55	1.40	0.103
Test 16 CST	12.34	0.31	20.7	14.5	0.6	3.4	8	4.6	<0.05	0.4	1.25	1.2	0.06	1.31	1.8	13.05	1.40	0.167
Test 17 CST	15.24	0.31	12.2	6.9	0.4	3.1	5	3	<0.05	0.3	0.23	1.2	0.02	1.06	2.5	12.06	1.30	0.052
Test 18 CST	11.13	0.28	10.4	10.5	0.8	4.6	4	4	<0.05	0.4	0.32	1.2	0.03	0.92	1.8	14.10	1.50	0.203
Duplicates																		
*Rep Test 16 RT	4.52	0.30	2.9	16.2	0.2	2.8	2	1.6	<0.05	0.3	0.15	1.1	0.03	1.15	0.4	12.19	1.20	
*Rep Test 18 RT																		0.083
QA/QC																		
*Blk BLANK	<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	<0.005
Certified standards																		
*Std OREAS 151C	55	1.14	22.2	89.1	1.4	7.6	4	3.6	<0.05	0.5	1.28	6.7	0.61	3.17	5.9	10.48	0.80	
*Std OREAS 609b	4.86	0.50	379	14	126.0	1.1	13	9	<0.05	0.3	21.73	6.1	0.95	2.18	1.7	5.36	0.20	
*Std OREAS 609b																		0.539
*Std CZN-4																		4.292

Whole Rock Analysis - XRF

Sample ID	Al2O3 %	CaO %	Cr2O3 %	Fe2O3 %	K2O %	MgO %	Mn3O4 %	Na2O %	P2O5 %	SiO2 %	TiO2 %	V2O5 %	Sum %	LOI %
Method Code	XRF72	XRF72	XRF72	XRF72	XRF72	XRF72	XRF72	XRF72	XRF72	XRF72	XRF72	XRF72	XRF72	PHY01V
LOD	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-10
DC3 Feed	15.61	6.11	<0.01	7.55	5.28	2.16	0.15	3.72	0.26	53.39	0.56	0.05	95.16	4.3700
DC4 Feed	16.53	6.29	<0.01	10.14	4.09	2.43	0.16	3.89	0.32	51.45	0.7	0.05	96.54	2.9703
DC5 Feed	16.07	5.46	<0.01	9.74	5.18	2.17	0.11	3.26	0.31	50.77	0.57	0.05	95.29	3.8792
DC6 Feed	15.45	6.54	<0.01	12.99	4.36	2.26	0.11	3.31	0.37	48.69	0.53	0.05	96.23	3.3307
DC7 Feed	16.22	5.82	<0.01	6.88	4.6	2.21	0.11	4.66	0.22	55.4	0.54	0.04	97.52	2.1002
DC8 Feed	16.33	3.89	<0.01	9.51	7.07	1.95	0.08	3.16	0.27	53.93	0.54	0.04	97.79	2.0204
Test 10 RT	15.74	5.78	<0.01	7.73	5.3	2.16	0.16	3.76	0.26	53.87	0.56	0.04	95.66	3.5800
Test 11 RT	16.48	6.32	<0.01	10.29	4.13	2.35	0.15	3.93	0.31	51.47	0.69	0.05	96.57	2.9206
Test 15 RT	16.37	5.53	<0.01	9.59	5.29	2.16	0.1	3.34	0.32	51.81	0.56	0.04	95.55	4.1300
Test 16 RT	15.7	6.73	<0.01	12.62	4.4	2.31	0.11	3.38	0.36	49.52	0.53	0.05	96.05	3.4400
Test 17 RT	16.29	5.91	<0.01	6.93	4.62	2.18	0.11	4.69	0.22	55.75	0.54	0.03	97.63	1.8598
Test 18 RT	16.41	4.01	<0.01	9.5	7.07	1.96	0.08	3.2	0.27	54.08	0.54	0.04	97.56	2.0098
Test 15 CST	16.63	6	<0.01	7.79	4.88	2.42	0.1	2.99	0.27	50.66	0.61	0.03	94.16	5.8312
Test 16 CST	15.36	7.57	0.01	12.01	4.5	2.08	0.11	2.9	0.23	47.52	0.55	0.05	94.45	5.4211
Test 17 CST	15.29	8.75	0.02	6.07	4.46	2.08	0.11	4.17	0.18	51.74	0.6	0.03	94.44	4.9590
Test 18 CST	16.57	4.48	0.01	7.48	7.21	2.06	0.08	2.91	0.19	53.74	0.63	0.04	96.38	2.8997
Duplicate														
*Rep DC8 Feed	16.34	3.89	<0.01	9.5	7.05	1.95	0.08	3.19	0.27	53.73	0.55	0.04	97.63	1.9698
***Blk BLANK**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
QC														
*Std OREAS 751b	9	0.69	<0.01	1.4	1.4	0.38	0.12	0.86	0.09	83.2	0.22	<0.01	97.5	
*Std OREAS 72b	8.84	3.89	0.14	9.74	1.31	15.73	0.14	1.29	0.06	51.14	0.35	0.01	95.8	
*Std OREAS 73b														6.91069

Metals - Aqua Regia Digestion with ICP-OES/MS Finish - CRM Expected Values and Tolerance

CRM	Test	Al	Ba	Ca	Cr	Cu	Fe	K	Li	Mg	Mn	Na	Ni	P	S	Sr	Ti	V	Zn	Zr	Ag	As	Be	Bi
	Units	%	ppm	%	ppm	ppm	%	%	ppm	%	ppm	%	ppm	%	%	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Method Code	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICP21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20
	Lower detection	0.01	5	0.01	1	0.5	0.01	0.01	1	0.01	2	0.01	1	0.01	0.01	0.5	0.01	1	1	0.5	0.01	1	0.1	0.02
	Upper detection	15	10000	15	10000	10000	15	15	10000	15	10000	15	10000	15	5	10000	15	10000	10000	10000	100	10000	100	10000
OREAS 501b	Expected value	1.99	369	0.966	85	2580	4.08	1.08	31.7	1.21	393	0.167	37.5	0.1	0.364	60	0.338	110	80	10.9	0.721	18.6	0.49	1.6
	Tolerance (%)	11.26%	13.39%	12.59	12.94%	10.05%	10.61%	12.31%	17.89%	12.07%	11.27%	24.97%	16.67%	22.5%	16.87%	12.08%	17.4%	12.27%	13.12%	21.47%	13.47%	23.44%	61.02%	13.12%
OREAS 502C	Expected value	2.07	383	1.09	66	7990	4.45	1.07	30.9	1.21	380	0.19	36.4	0.10	0.82	66	0.34	110	102	9.53	0.80	59	0.53	0.68
	Tolerance (%)	15.6	18	18.4	18.7	6.6	11.4	15.2	14.1	10.2	7.2	32.2	18.8	12.5	14.5	25.5	10.8	11.3	15.0	15.7	20.1	17.7	38.5	16.5
OREAS 503D	Expected value	2.08	361	1.19	66	5220	4.58	1.06	27.9	1.21	410	0.21	31.2	0.11	0.80	88	0.32	104	67	12.2	1.32	87	0.6	1.4
	Tolerance (%)	16.8	20	20.0	17.1	6.6	11.5	10.8	33.0	12.7	106.3	38.3	13.0	14.9	13.9	36.5	18.1	14.7	21.4	22.0	25.1	15.8	38.6	11.1
OREAS 260	Expected value	1.33	151	0.885	49.2	46.5	3.73	0.285	21.5	0.59	450	0.08	75.0	0.04	0.08	14.8	BDL	22	125	BDL	0.15	12.5	1.24	0.54
	Tolerance (%)	31.2	24	15.9	29.9	14.8	12.9	57.9	18.0	12.1	20	22.0	10.8	15.0	15.6	24.7		32.7	14.4		26.7	36.0	24.0	16.7
OREAS 920	Expected value	2.43	80	0.32	42.5	110	3.63	0.45	21.2	1.10	526	< 0.04	38.4	0.07	0.03	16.9	0.12	26.3	106.4	21.3	0.10	4.4	0.73	0.68
	Tolerance (%)	18.6	13	19.8	12.7	12.8	12.7	44.5	21.7	18.9	10.3		14.8	20.4	40.5	14.1	60.5	25.8	14.5	23.5	59.2	29.8	41.5	41.8
OREAS 209	Expected value	1.23	73	1.49	39.1	75.6	6.04	0.06	5.38	2.35	1360	0.19	112.8	0.16	0.89	63.5	0.12	39.7	74.3	27.4	0.26	1047	< 0.5	0.06
	Tolerance (%)	13.3	26	13.9	19.9	14.6	18.0	35.1	22.3	16.9	15.3	34.3	16.6	19.2	22.0	31.4	47.5	28.1	15.5	13.5	41.4	13.5		20.3
OREAS 905	Expected value	0.82	249	0.34	17.6	1562	3.50	0.32	4.87	0.16	350	0.09	8.9	0.023	0.07	12.3	0.02	6.1	67.0	47.5	0.52	32	0.93	5.7
	Tolerance (%)	18.0	18	16.0	30.7	9.0	12.8	21.4	41.3	22.8	8.6	29.3	21.5	26.1	32.3	28.5	47.4	42.1	22.4	31.6	28.5	17.2	25.5	18.4
OREAS 261	Expected value	1.33	171	1.15	48.5	64.0	3.74	0.281	21.1	0.66	460	0.08	74.0	0.04	0.11	17.5		22.6	128		0.20	17.8	1.23	0.59
	Tolerance (%)	11.9	17	12.2	15.2	12.0	10.7	18.9	21.9	13.8	11	40.5	13.4	40.5	32.7	17.1		21.1	12.0		22.3	24.0	30.3	18.5
OREAS 263	Expected value	1.29	175	1.03	48	87.0	3.68	0.288	20.1	0.59	490	0.08	72.0	0.04	0.13	16.9		22.8	127		0.29	30.8	1.22	0.57
	Tolerance (%)	11.9	17	12.4	15.2	11.4	10.7	18.7	22.4	14.2	11	41.7	13.5	40.5	29.8	17.4		21.0	12.0		18.8	18.1	30.5	18.8
OREAS 235	Expected value	2.5	104	0.2	100.0	24.0	3.4	1.0	33.4	1.3	210	0.1	57.0	0.1	0.1	16.7	0.1	67.0	75.0	27.3	0.135	331	1.22	0.33
	Tolerance (%)	10.5%	14.8%	12.5%	12.5%	15.2%	10.7%	11.3%	17.5%	10.2%	12.4%	26.9%	14.4%	25.0%	42.1%	17.5%	11.8%	13.7%	13	15	29	11	20	18
OREAS 151b	Expected value	2.43	71	1.37	26.3	1800.0	3.28	0.404	6.07	1.42	280	0.18	14.2	0.05	0.72	38.5		140	238	3.170	0.52	30.8	0.22	0.40
	Tolerance (%)	11.0	28	11.8	19.5	10.1	10.8	16.2	51.2	11.8	12	24.2	27.6	34.0	13.5	13.3		11.8	11.1	49.4	14.8	18.1	66.8	16
OREAS 609b	Expected value	0.684		0.764	17.4	4970	2.32	0.279	7.32	0.067	210	0.06	7.05	0.021	1.76	36.2	0.009	5.69	1259	34.6	24.4	1460	0.59	109
	Tolerance (%)	11.83		10.65	24.37	10.03	11.08	14.48	44.15	13.73	12.38	30.83	45.56	45.71	11.42	13.45	37.78	53.94	10.20	13.61	10.10	10.17	31.19	10.02
OREAS 607b	Expected value	0.627	412	0.87	14.8	554	1.59	0.261	8.34	0.084	240	0.06	4.98	0.026	0.491	34.6	0.011	3.49	641	35.3	6.1	170	0.66	13.4
	Tolerance (%)	11.99	11.21	10.57	26.89	10.23	11.57	14.79	39.98	12.98	12.08	30.83	60.20	38.85	15.09	13.61	32.73	81.63	10.39	13.54	10.41	11.47	28.94	10.19
OREAS 610	Expected value	0.85		0.12	33.1	9720.0	2.27	0.213	8.46	0.11	66	0.05	24.3	0.02	2.65	38.6		11.6	1764.00	11	48.4	2807	0.3	220
	Tolerance (%)	11.48		14.17	17.55	10.01	11.10	15.87	39.55	12.36	17.58	35.51	20.29	40.12	10.94	13.24		31.55	10.14	21.26	10.05	10.09	53.10	10.01
OREAS 501c	Expected value	2.17	428	1.02	68	2750	4.1	1.17	33	1.22	390	0.202	58	0.096	0.343	65	0.363	110	74	9.34	0.444	24.3	0.59	0.7
	Tolerance (%)	11.15	12.92	12.45	13.68	10.05	10.61	12.10	17.58	12.05	11.28	22.38	14.31	23.02	17.29	11.92	16.89	12.27	13.38	23.38	15.63	20.29	31.19	13.57
OREAS 601c	Expected value	0.663		0.779	14.7	1160	1.84	0.254	7.56	0.084	210	0.053	6	0.024	0.909	36.3	0.01	4.75	381	33.5	50.4		0.59	21.3
	Tolerance (%)	11.89		10.64	27.01	10.11	11.36	14.92	43.07	12.98	12.38	33.58	51.67	41.25	12.75	13.44	35.00	62.63	10.66	13.73	10.05		31.19	10.12
OREAS 624	Expected value	2.06		1.31	19.8				7.65	1.19	620	0.076	17.5	0.052	10.8	11.2		17.8	24,000	45.1	45	108		20.5
	Tolerance (%)	11.21		11.91	22.63				42.68	12.10	10.81	42.89	24.29	34.04	10.23	21.16		24.04	10.10	12.77	10.06	12.31		10.24
OREAS 601b	Expected value	0.63		0.578	24.6	1010	1.94	0.246	7.78	0.0411	192	0.067	6.39	0.0178	0.807	33.2	0.022	3.83	267	38.3	50	276	0.47	18
	Tolerance (%)	13.97		14.33	20.16	10.12	11.29	20.16	42.13	70.83	12.60	47.31	49.12	80.22	13.10	13.77	123.64	75.27	10.94	13.26	12.50	12.72	63.19	10.28
OREAS 623	Expected value	1.80		1.09	19.4	17200.0	13.01	0.175	10	1.11	570	0.07	15.6	0.04	8.75	14.2		15.8	10100.00	50	20.4	76		16.9
	Tolerance (%)	11.39		12.29	22.89	10.01	10.19	24.29	35.00	12.25	10.88	46.76	26.03	41.25	10.29	18.80		25.82	10.02	12.50	16.13	26.84		10.30
OREAS 603c	Expected value	0.72		0.795	16.6	12000.0	3.64	0.254	8.17	0.08	600	0.05	25.8	0.024	3.38	37.3	0.01	6.27	7860.00	43	296	1530	0.6	90
	Tolerance (%)	11.73		10.63	25.06	10.01	10.69	14.92	40.60	12.98	10.83	33.58	19.69	41.25	10.74	13.35	32.73	14.65	10.03	12.93	10.42	10.16	30.49	10.03
OREAS 523	Expected value	1.15		3.2	24.9	16800.0	28.05	0.615	16.2	0.992	4370		62.0	0.090	3.84	62	0.158	110	38.10	49	2.36	665	0.34	13.5
	Tolerance (%)	12.17		10.78	20.04	10.01	10.09	14.07	25.43	12.52	10.11		14.03	23.89	10.65	12.02	25.82	12.27	16.56	12.55	62.97	11.13	377.65	102.59
OREAS 151c	Expected value	1.94	424	0.427	49.2	2390.0	2.94	0.894	37.8	0.68	280	0.15	17.2	0.06	0.68	34.9		61	91	6.300	1.01	21.5	1.46	6.56
	Tolerance (%)	10.6	11	11.2	15.1	10.1	10.9	11.4	16.6	10.4	12	18.1	24.5	22.5	13.7	13.6		14.1	12.8	29.8	12.5	21.6	18.6	10

Metals - Aqu

CRM	Test	Cd	Ce	Co	Cs	Ga	Ge	Hf	Hg	In	La	Lu	Mo	Nb	Pb	Rb	Sb	Sc	Se	Sn	Ta	Tb	Te	Th	Tl
	Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Method Code	ICP21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20
	Lower detection	0.01	0.05	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
	Upper detection	10000	1000	10000	1000	10000	10000	500	100	500	10000	1000	10000	1000	10000	10000	10000	10000	1000	1000	10000	10000	1000	10000	10000
OREAS 501b	Expected value		61	14.9	9.93	8.7	0.2	0.43		0.19	29.3	0.21	97		9.42	126	0.49	7.08	2.78	4.65			0.078	17.9	
	Tolerance (%)		10.2%	11.68%	11.26%	12.87%	135%	39.07%		36.32%	10.85%	21.9%	10.13%		15.31%	10.4%	35.51%	13.53%	99.93%	26.13%			170.26%	11.4%	
OREAS 502C	Expected value	BDL	59	13.5	9.02	8.7	BDL	0.4	BDL	0.06	29.4	0.22	223	BDL	11.1	124	4.8	7.28	BDL	2.71	0.01	0.6	0.47	17.6	0.67
	Tolerance (%)		16.3	10.6	14.5	19.6		16.2		26.2	24.3	15.4	15.8		24.4	11.8	56.9	21.9		24.4	56.5	15.4	30.7	15.6	24.0
OREAS 503D	Expected value	BDL	62	15.9	9.28	8.7	0.15	0.5	BDL	0.07	30.5	0.21	342	1.21	8.39	120	2.4	7.18	3.04	2.51	BDL	0.6	0.30	17.4	0.66
	Tolerance (%)		21.0	11.1	16.7	18.7	56.7	18.3		21.9	16.0	10.6	12.9	59.2	21.5	12.1	36.1	21.9	45.5	16.2		18.7	32.1	9.6	30.1
OREAS 260	Expected value	0.21	BDL	32.1	BDL	5.1	BDL	BDL	BDL	0.03	BDL	0.14	0.43	BDL	30.7	BDL	1.3	3.39	BDL	BDL	BDL	0.52	0.08	11.3	0.2
	Tolerance (%)	24.3		12.9		42.2				55.6		12.9	20.2		19.2		38.6	46.9				40.4	59.3	31.9	54.5
OREAS 920	Expected value	0.06	71.5	15.0	2.10	6.9	< 0.1	0.6	< 0.01	0.03	37.2		0.41		21.5	24.8	0.6	2.91	0.87	1.21	< 0.05	0.73	< 0.05	15.3	0.15
	Tolerance (%)	39.3	14.3	13.8	56.9	28.7		41.8		17.2	27.3		50.7		20.0	34.1	45.1	47.1	59.5	55.1		59.7		24.0	43.7
OREAS 209	Expected value	< 0.2	27.7	29.0	0.92	4.0		0.7	< 1	0.02	12.8	0.13	2.0		3.3	4.0	< 2	3.33	0.99	0.94	< 0.05	0.49		1.8	0.04
	Tolerance (%)		18.2	11.6	21.5	21.6		17.9		53.7	49.3	27.7	15.7		42.4	25.1		41.1	36.6	35.5		26.8		17.7	59.4
OREAS 905	Expected value	0.34	80.0	13.9	1.32	6.4		1.2	<0.05	0.58	39.8	0.03	3.0		17.1	19.3	1.1	1.89	2.32	1.27		0.44	0.07	8.9	0.11
	Tolerance (%)	25.59	19.88	23.72	36.36	30.79		54.10		21.72	18.54	44.12	17.2		29.3	21.9	42.9	30.2	56.9	33.1		34.1	50.8	23.8	27.3
OREAS 261	Expected value	0.27		31.5		5.0			0.1	0.03		0.14	0.5		34.2		2.4	3.42				0.51	0.11	10.9	0.28
	Tolerance (%)	19.3		10.8		15.0			45.2	188.6		27.9	36.0		11.5		15.1	17.3				19.8	123.6	12.3	27.9
OREAS 263	Expected value	0.27		31		4.9			0.2	0.03			0.6		34.0		7.4	3.52				0.50	0.21	10.6	0.53
	Tolerance (%)	19.3		10.8		15.1			24.7	182.4			31.9		11.5		11.7	17.1				20.0	69.5	12.4	19.4
OREAS 235	Expected value	0.033	57	12.3	7.47	7.84	0.096	0.76		0.023	29.1	0.12	0.57	0.3	8.57	95	235	5.79		1.32		0.44		13	0.6
	Tolerance (%)	86	10	12	12	13	270	26		64	11	31	32	52	16	10	10	14		48		21		11	18
OREAS 151b	Expected value	0.58	16.2	10.9	1.22	8.1		0.1		0.07	7.34	0.12	54.0		41.4	20.4	0.7	8.84	3.06	1.25		0.36	0.09	2.4	0.12
	Tolerance (%)	14	10.3	12.3	20.3	13.1		135.0		27.9	13.4	30.8	10.2		11.2	10.6	23.4	12.8	91.7	50.0		23.9	157	15.1	51.7
OREAS 609b	Expected value	7.93	34	4.75	1.4	4.89	0.13	1.03	0.52	1.98	16.8	0.03	5.1	0.42	384	13.9	134	1.02	15	9.13		0.29	21.8	6.17	0.009
	Tolerance (%)	10.32	10.15	15.26	18.93	15.11	202.31	22.14	14.81	10.60	11.49	93.30	12.45	39.76	10.13	10.90	10.09	34.51	26.67	15.48		27.24	10.57	12.03	287.78
OREAS 607b	Expected value	3.16	41.6	2.17	1.52	3.46	0.076	1.01	0.098	0.36	20.6	0.029	3.06		1681	13.9	9.79	1.09	3.03	1.19		0.34	2.35	6.94	0.41
	Tolerance (%)	10.79	10.12	21.52	18.22	17.23	338.95	22.38	35.51	13.47	11.21	96.21	14.08		10.03	10.90	11.28	32.94	92.51	52.02		24.71	15.32	11.80	22.20
OREAS 610	Expected value	12.3	13.7	7.73	0.74	6.36		0.38	0.80	3.76	6.68		4.47	0	512	7.63	265.0	0.84	27.7	24.8	38.60		41.70	3.08	1.49
	Tolerance (%)	10.20	10.36	13.23	26.89	13.93		42.89	13.12	10.33	13.74		12.80	88.12	10.10	11.64	10.05	39.76	19.03	12.02	13.24		10.30	14.06	13.36
OREAS 501c	Expected value		64	14.2	9.88	8.56	0.4		0.047	31.9			95		8.43	134	1.59	7.36		2.7				19.3	
	Tolerance (%)		10.08	11.76	11.27	12.92	41.25		36.60	10.78			10.13		15.93	10.09	17.86	13.40		28.52				10.65	
OREAS 601c	Expected value	2.7	34.7	4.27	1.32	3.86	0.084	0.97	0.22	0.5	17.3	0.028	3.35		248	12.4	29.7	1.03	8.02	1.59		0.3	7.22	6.13	1.20
	Tolerance (%)	10.93	10.14	15.85	19.47	16.48	307.62	22.89	21.36	12.50	11.45	99.29	13.75		10.20	11.01	10.42	34.27	41.17	41.45		26.67	11.73	12.04	14.17
OREAS 624	Expected value	125	24	265	0.43	14		1.14	1.89	3.62	11.2	0.13	14.2	0.43	6,290	5.4		4.83	29.7	6.04		0.29	0.76	2.9	
	Tolerance (%)	10.02	10.52	10.09	39.07	11.79		20.96	11.32	11.38	12.23	29.23	10.88	39.07	10.01	19.26		15.18	18.42	22.42		27.24	26.45	18.62	
OREAS 601b	Expected value	2.04	38.5	2.55	1	3.77	0.1	1.11	0.2		19.9		4.83		234	11.9	18	1	10	1.19		0.28	13.00	6.96	1.08
	Tolerance (%)	11.23	10.32	19.80	20.87	16.63	307.62	21.26	1260.00		16.28		61.76		12.14	14.20	10.69	35.00	35.00	73.03		27.86	10.96	13.59	14.63
OREAS 623	Expected value	52	36.4	216.00		11.90					17.90		8.38		2520		20.2	4.63	18.6	4.07		0.34	0.57	4.7	0.26
	Tolerance (%)	10.05	10.34	14.86		12.10					11.40		11.49		10.02		10.62	15.40	23.44	28.43		24.71	31.93	15.30	29.23
OREAS 603c	Expected value	30.4	30.7	14.10	1	5.40	0.2	1.16	1.35	3.72	14.60	0.03	56.00	0.51	10228	13.8	339.0	1.18	28.8	9.3		0.3	23.20	5.44	3.68
	Tolerance (%)	10.08	10.16	11.77	19.69	14.63	135.00	20.78	11.85	10.34	11.71	93.33	10.22	34.51	10.05	10.91	10.04	31.19	18.68	15.38		26.67	10.54	12.30	11.36
OREAS 523	Expected value			698.000							233		293		27.4			6.41		9.88					
	Tolerance (%)			10.36							10.54		10.85		28.25			29.50		263.04					
OREAS 151c	Expected value	0.22	31	7.47	8.13	9.0	0.13	0.3	0.1	0.10	14.5	0.09	55.0		20.8	89.0	1.5	7.18	4.48	3.57		0.48	1.27	6.0	0.23
	Tolerance (%)	21	10.2	13.4	11.5	12.8	202.3	60.0	60.0	22.5	11.7	37.8	10.2		12.4	10.1	18.6	13.5	65.8	24.0		20.4	20	12.1	20.7

Metals - Aqu

CRM	**Test**	U	W	Y	Yb
	Units	ppm	ppm	ppm	ppm
Method Code	ICP21B20	ICM21B20	ICM21B20	ICM21B20	ICM21B20
	Lower detection	0.05	0.1	0.05	0.1
	Upper detection	10000	10000	10000	100
OREAS 501b	Expected value	4.56	2.34	16.6	1.5
	Tolerance (%)	12.74%	20.68%	10.75%	0.3
OREAS 502C	Expected value	4.53	2.98	16.1	1.51
	Tolerance (%)	21.7	49.2	17.5	10.6
OREAS 503D	Expected value	4.35	1.91	16.9	1.47
	Tolerance (%)	21.7	49.2	17.7	13.4
OREAS 260	Expected value	1.29	0.063	11.70	0.99
	Tolerance (%)	39.5	33.3	30.8	29.4
OREAS 920	Expected value	2.15	< 0.6	18.80	< 1.5
	Tolerance (%)	38.5		46.9	
OREAS 209	Expected value	0.43	0.36	12.98	0.93
	Tolerance (%)	29.9	51.4	15.2	17.3
OREAS 905	Expected value	2.37	<1	7.08	0.27
	Tolerance (%)	24.6		20.8	44.4
OREAS 261	Expected value	1.29	0.09	11.70	0.98
	Tolerance (%)	19.7	281.7	11.1	35.5
OREAS 263	Expected value	1.28		12.00	0.99
	Tolerance (%)	19.8		11.0	35.3
OREAS 235	Expected value	1.55	0.45	9.47	0.85
	Tolerance (%)	18	38	11	39
OREAS 151b	Expected value	0.60		10.40	0.93
	Tolerance (%)	30.8		11.2	36.9
OREAS 609b	Expected value	2.04	1.81	5.22	0.21
	Tolerance (%)	16.13	16.91	12.39	129.05
OREAS 607b	Expected value	2.23	0.58	5.77	0.21
	Tolerance (%)	15.61	31.55	12.17	129.05
OREAS 610	Expected value	1.12	3.58	3.09	
	Tolerance (%)	21.16	13.49	14.05	
OREAS 501c	Expected value	4.87	2.96		
	Tolerance (%)	12.57	14.22		
OREAS 601c	Expected value	2.04	1.16	5.1	0.23
	Tolerance (%)	16.13	20.78	12.45	118.70
OREAS 624	Expected value	0.74	2.73	6.59	0.84
	Tolerance (%)	26.89	19.16	11.90	39.76
OREAS 601b	Expected value	2.22	1.86	5.34	0.2
	Tolerance (%)	15.63	23.44	33.41	135.00
OREAS 623	Expected value	1.43	2.62	7.43	
	Tolerance (%)	18.74	19.54	11.68	
OREAS 603c	Expected value	2.19	2.99	5.55	0.22
	Tolerance (%)	15.71	14.18	12.25	123.64
OREAS 523	Expected value		160	14.8	
	Tolerance (%)		25.62	18.45	
OREAS 151c	Expected value	3.06	5.56	10.30	0.69
	Tolerance (%)	14.1	12.2	11.2	46.2

Whole Rock Analysis XRF 72

CRM	**Test**	Al2O3	BaO	CaO	Cr2O3	Fe2O3	K2O	MgO	MnO	Na2O	P2O5	SiO2	TiO2	V2O5	LOI
	Units	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Method Code	WRA-XRF72	WRA-XRF72	WRA-XRF72	WRA-XRF72	WRA-XRF72	WRA-XRF72	WRA-XRF72	WRA-XRF72	WRA-XRF72	WRA-XRF72	VRA-XRF7	WRA-XRF72	WRA-XRF72	WRA-XRF72	PHY01K
	Lower detection	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-10
OREAS 751	Expected value	15.88	0.050	1.06		2.4	2.92	0.507	0.089	3.420	0.28	71.43	0.243		0.696
	Tolerance (%)	2.16	52.100	4.36		3.0	2.86	6.93	30.09	2.73	10.93	2.030	12.29		13.6
OREAS 70B	Expected value	7.18		4.31	0.183	7.88	0.705	22.45	0.148	1.00	0.055	48.7	0.30		6.69
	Tolerance (%)	2.4		2.6	15.77	2.32	5.55	2.11	18.84	4.50	47.47	2.1	10.42		0.69

APPENDIX 6-3: MOUNT POLLEY MINE GEOCHEMICAL SOURCE TERMS – 2025 UPDATE

FINAL

Mount Polley Mine Geochemical Source Terms – 2025 Update

Mount Polley Mine, BC, Canada
Mount Polley Mining Corporation

SRK Consulting (Canada) Inc. ▪ CAPR002434 ▪ March 2025

FINAL

Mount Polley Mine Geochemical Source Terms – 2025 Update

Mount Polley Mine, BC, Canada

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Cover Image(s):
Springer Pit in 2023. Photo credit: MPMC

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Appendices

Definitions

This list contains definitions of symbols, units, abbreviations, and terminology that may be unfamiliar to the reader.

ABA	Acid-base accounting
AP	Acid Potential
$CaSO_4 \cdot 2H_2O$	gypsum
CGM	conceptual geochemical model
$(Cu,Al)_2H_2Si_2O_5(OH)_4 \cdot nH_2O$	chrysocolla
$Cu_2CO_3(OH)_2$	malachite
Cu_5FeS_4	bornite
Cu_9S_5	digenite
$CuFeS_2$	chalcopyrite
CuO	tenorite
CuS	covellite
FeS_2	pyrite
HCT	Humidity Cell Test
LSW	Low Sulphur Waste
ML/ARD	metal leaching and acid rock drainage
MPIC	Mount Polley Intrusive Complex
MPM	Mount Polley Mine
MPMC	Mount Polley Mining Corporation
NAG	Non-Acid Generating
NEZ	Northeast Zone
NP	Neutralization Potential
NW	Northwest
PAG	Potentially Acid Generating
SERDS	South East Rock Disposal Site
SFE	Shake Flask Extraction
TC	Total Carbon
TIC	Total Inorganic Carbon
TSF	Tailings Storage Facility

Executive Summary

Mount Polley Mining Corporation prepared a Joint Mines Act and Environmental Management Act Permit Amendment Application to support the Springer Pit Expansion Project. The scope of the application includes an extension of the South East Rock Disposal Site (SERDS), an expansion of the Springer Pit, an extension to the duration of treated water discharge to Quesnel Lake to be throughout mining operations, and an extension of the Northwest Potentially Acid Generating (PAG) Stockpile disposal date. This application involves modelling of water quality at the site and in the receiving environment. Inputs to this model are geochemical source terms which are estimations of the chemistry of water in contact with materials and surfaces exposed by mining activity. Source terms mainly consider the potential for metal leaching and acid rock drainage (ML/ARD).

The source terms were developed with input from the site-wide geochemical characterization program. The derivation and use of source terms was described in a previous version of this report (SRK 2023b), which has been reviewed and updated based on findings from MPMC 2025 and SRK 2025a. This 2025 update supersedes the previous report (SRK 2023a) and formally replaces Appendix 2-2 of the application.

The Mount Polley deposit is classified as an alkalic porphyry copper gold deposit. The deposit has been mined from several mineralized zones (Springer, Cariboo, Bell, Southeast, Northeast, Boundary). The proposed extension of the existing Springer and Cariboo pits includes mining in four new areas: Springer 5, Springer 6, WX Zone, and C2 Zone). With the exception of the distinctive small Pond Zone skarn deposit, all other zones have common geological features including mainly a monzonitic plutonic host rock, association with breccia bodies in the intrusion, dominantly potassic hydrothermal alteration, lack of pronounced pyrite haloes, enrichment in copper and selenium relative to global norms, pervasive calcite, and natural oxide alteration. As a result, geochemical characteristics are consistent between zones, allowing a site-wide approach to geochemical characterization.

Potentially acid generating (PAG) and non-PAG waste rock materials occur locally as pyrite zones but non-PAG dominates. ARD potential was used to segregate waste rock, with non-PAG waste rock being placed in several waste rock dumps and PAG waste rock either deposited in completed pits that are projected to flood at the closure of the mine (in accordance with the management practice of subaqueous disposal) or placed in a temporary stockpile for final disposal in the Springer-Cariboo Pit. Based on review of operational processes and data, non-PAG waste rock is expected to be non-acidic in perpetuity. Tailings are classified as non-PAG based on operational monitoring and testing of tailings spilled into Hazeltine Creek in August 2014.

Major geochemical sources were identified as waste rock stockpiles and the tailings. Other sources include backfilled waste rock, ore processing, pit walls, ore stockpiles, and magnetite stockpiles. Source terms were mainly developed from conceptual geochemical models then interpretation of rock geochemical characteristics and seepage data rather than scale-up of laboratory kinetic test data. Pit wall source terms (including PAG walls) were obtained by scaling of kinetic test data. Source terms were not specifically developed for the magnetite stockpiles because they are small sources.

1 Introduction

Mount Polley Mining Corporation (MPMC), a wholly owned subsidiary of Imperial Metals Corporation, has been operating the Mount Polley Mine (MPM), located approximately 56 km northeast of Williams Lake and approximately 15 km southwest of the community of Likely British Columbia, Canada, since 1996. MPMC recovers copper and gold from porphyry-style mineralization by open pit and underground mining. Ore will be processed at the onsite plant with concentration recovered by flotation. The plant is capable of processing 22,000 t/d of ore using standard mineral flotation technology.

MPMC prepared a Joint Mines Act and Environmental Management Act Permit Amendment Application to support the Springer Expansion Project (the Project), which was submitted to BC Ministry of Mining and Critical Minerals (MCM) (formerly the Ministry of Energy, Mines and Low Carbon Innovation) on July 5, 2024. The Application was prepared by MPMC and was submitted with respect to the Mines Act M-200 Permit for MPM. The scope of the application includes an extension of the South East Rock Disposal Site (SERDS), an expansion of the Springer Pit (which includes Springer 5, Springer 6, C2, and WX), an extension to the duration of treated water discharge to Quesnel Lake throughout mining operations, and an extension of the period of waste rock placement at the Northwest Potentially Acid Generating (PAG) Stockpile. MPMC requested SRK Consulting (Canada) Inc. (SRK) to update geochemical source terms and provide documentation to support a reduction in the Neutralization Potential Ratio (NPR) criterion from 2 to 1.6.

MCM reviewed the application and provided environmental geoscience review comments to MPMC on August 15, 2024. SRK provided responses in a technical memo that was submitted to MCM on December 17, 2024, which commits to address outstanding information requirements for the Project, which are summarized in Table 1 (SRK 2024b). MPMC (2025) and SRK (2025a) were submitted to MCM on February 28, 2025 under separate covers and form Deliverable #1: Geological Characterization of Springer Expansion Project and Deliverable #2: Geochemical Characterization of Springer Expansion Project, respectively, in Table 1. The purpose of SRK (2025a) was to characterize the materials that will be mined as part of the Project, including an assessment outlining the estimated time to onset of acidic conditions for PAG materials and how it relates to the proposed timeline of the Project. It focused on the ML/ARD potential and geochemical characterization associated with the Springer Expansion, including the production of future waste rock and tailings.

This application also involved modelling of water quality at the site and in the receiving environment. Inputs to this model are geochemical source terms which are estimations of the chemistry of water in contact with materials and surfaces exposed by mining activity. The source terms were developed with input from the site-wide geochemical characterization program (SRK 2025a). The derivation and use of source terms was described in a previous version of this report (SRK 2023b), which has been reviewed and updated based on findings from MPMC 2025 and SRK 2025a. This 2025 update supersedes the previous report (SRK 2023a), would formally replace Appendix 2-2 of the application, and forms Deliverable #3 in Table 1.

Table 1: Summary of Expected Deliverables

Number	Deliverable/ Commitment	Author	Status	Comment
1	Geological Characterization of Springer Expansion Project	MPMC	Submitted to MCM on February 28, 2025 (MPMC 2025)	Based on 2024 JAIR requirements. This deliverable will include descriptions of major rock units previously mined and planned to be mined as part of the Springer Pit Expansion Project. It will also include a detailed description of the ore deposit.
2	Geochemical Characterization of Springer Expansion Project	SRK	Submitted to MCM on February 28, 2025 (SRK 2025a)	Based on 2024 JAIR and will expand on the characterization of ore and waste to be mined as per in SRK (2023a).
3	Mount Polley Mine Geochemical Source Terms	SRK	This deliverable	Source terms described in SRK (2023a) will be reviewed and updated if needed. Updates will be informed by the geochemical characterization of Springer Expansion materials (Deliverable #2: Geochemical Characterization of the Springer Expansion Project).
4	ML/ARD Management and Monitoring Plan	SRK	New deliverable	The existing ML/ARD Management Procedure Manual will be superseded by a new ML/ARD Management and Monitoring Plan to align with 2024 JAIR.
5	Evaluation of Acid-Base Accounting Procedures and the Criterion for Classifying ARD Potential of Waste Rock	SRK	Submitted to MCM on March 7, 2025 (SRK 2025b)	Updated to include data not available at the time of issuing SRK (2023b), address comments as described EMLI Round 1 comments (August 15, 2024), and align text with other Application sections to improve clarity.

Source: SRK 2024b

2 Background

2.1 Site Overview and Closure

Figure 1 shows the locations of the open pits at MPM. Full scale mining began in the Cariboo Pit by mining high oxide and high gold parts of the ore body then transitioning to the Bell Pit in 1999. Mining was suspended in 2001 due to unfavorable market conditions. The mine re-opened in 2005 after a three-and-a-half-year care-and-maintenance period. The following zones have been mined since 2005:

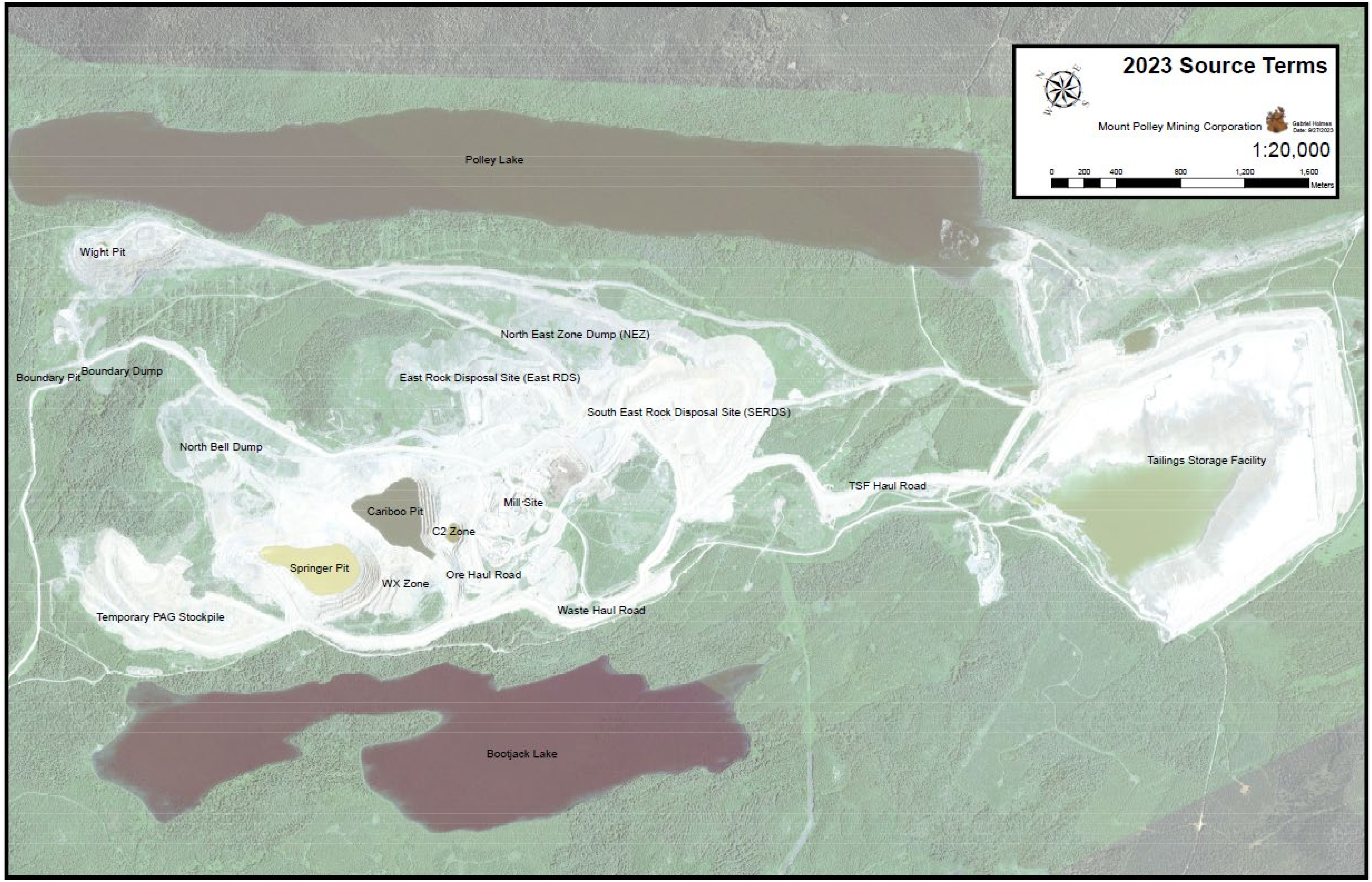
- Completed mining and backfilling of the Bell Pit.
- Completed mining and backfilling of the small Southeast Zone and Pond Zone Pits.
- Completed mining and flooding of the Wight Pit (Northeast Zone).
- Completed mining of the Boundary Pit.
- Completed permitted mining and flooding of Northeast Zone underground (access from the Wight Pit).

In August 2014, mining was suspended due to the breach of the tailings dam. Mining restarted in 2015 with tailings being deposited in the Springer Pit. In 2016, tailings were deposited in the Tailings Storage Facility (TSF) following reconstruction of the dam.

In May 2019, mining was again suspended due to unfavourable market conditions, but mining operations restarted in November 2021 and milling operations resumed in June 2022. Active mining is currently focussed on the Cariboo and Springer Pits (which will merge to a single pit).

Upon completion of mining, the Springer-Cariboo Pit will be backfilled by rock from the Temporary Northwest (NW) PAG Stockpile (the NAG/PAG Pad) and allowed to flood. The TSF will be decommissioned with a minimal water cover.

Figure 1: **Pits and Waste Rock Dumps**



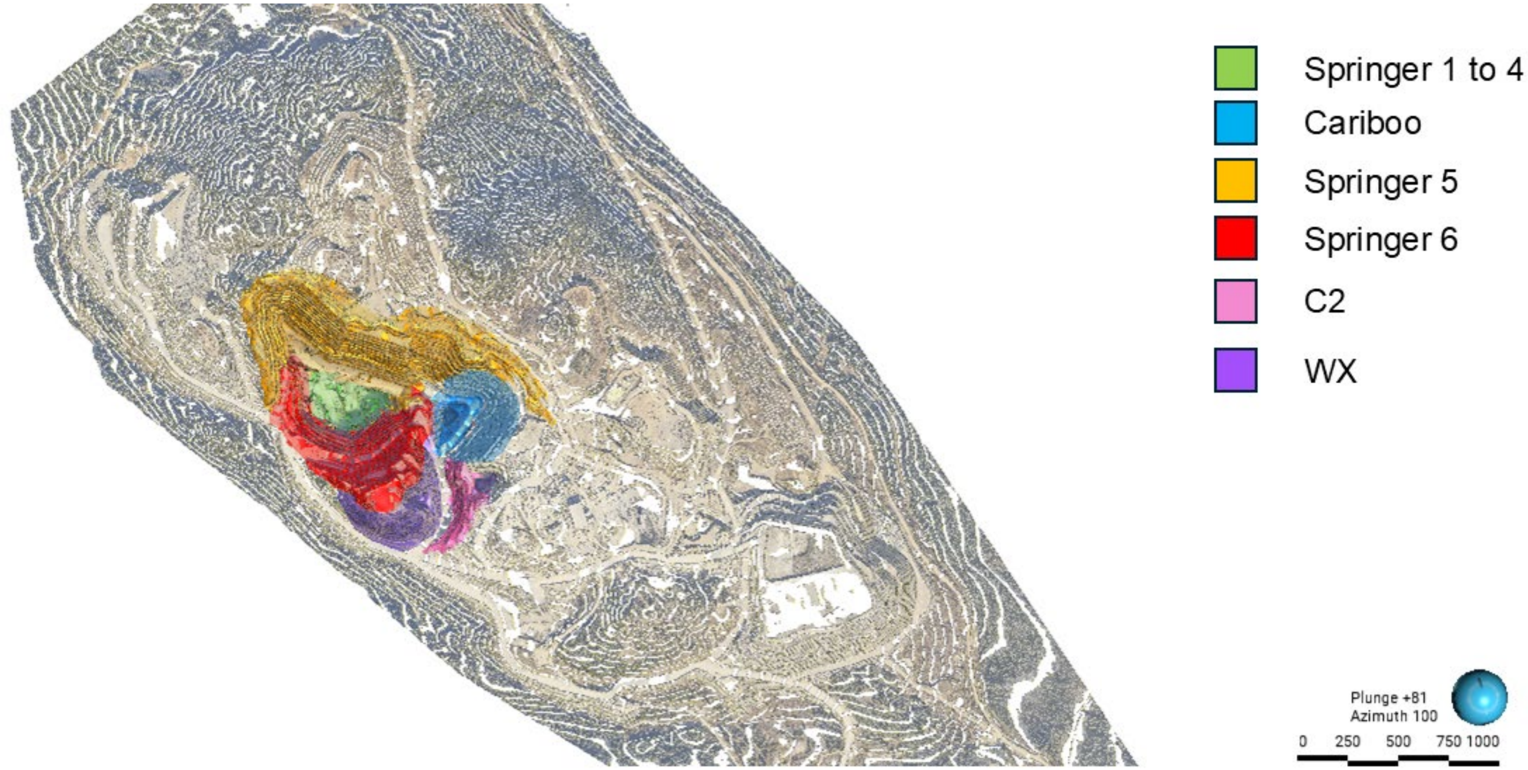
Sources: Provided by MPMC

2.2 Springer Pit Expansion Project Description

MPMC's current Life of Mine (LOM) plan is anticipated to run to 2025. MPMC is proposing to extend the existing pit infrastructure with the Springer Expansion Project (the Project). This extension will extend the mine life into the year 2032 and includes the following modifications:

- **Pit and waste rock dump extensions:** expansion of the Springer Pit in two phases (Phase 5 and Phase 6), as well as further mining of C2 Pit and pushback into the WX Zone, both near the current Cariboo Pit (Figure 2). PAG waste rock will be placed in the temporary Northwest PAG stockpile while non-PAG (referred to as NAG at MPM) waste rock will be placed in an extension of the existing Southeast Rock Disposal Site (SERDS). Magnetite will be continued to be temporarily stockpiled after separation from the tailings stream.
- **Disposal date of rehandled PAG waste rock in NW PAG Stockpile:** extension to the disposal timeframe of PAG waste rock into the completed Springer-Cariboo Pit.
- **Tailings storage expansion:** raise of the existing Tailings Storage Facility (TSF) to accommodate additional tailings from the extended mine life. No modifications in processing are proposed.
- **Treated water discharge to Quesnel Lake extension:** extend the discharge to Quesnel Lake to the end of mining operations in 2031.

Figure 2: Site Orthophoto with the Springer Expansion Pit Shells and Previously Mined Shells



Sources: MPMC

2.3 Geological Setting

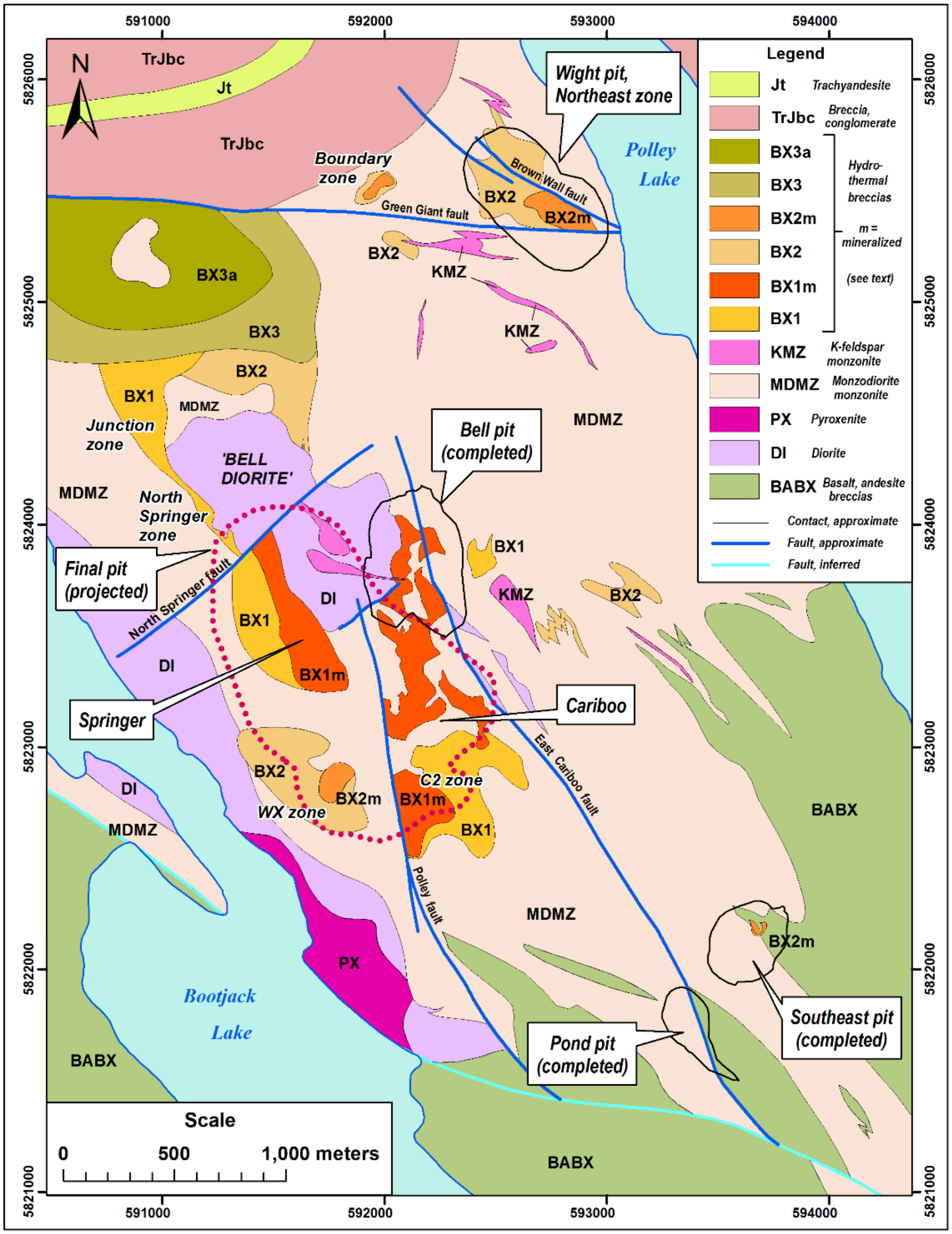
The Mount Polley deposit is classified as an alkalic porphyry copper gold deposit (BC MINFILE No. 093A 008). With the exception of the distinctive small Pond Zone, it has been mined from several mineralized zones which have the following common features:

- The host rock for porphyry mineralization is the Mount Polley Intrusive Complex (MPIC) which intruded into Nicola Group Volcanics (Figure 3). The intrusion is primarily monzonite to monzo-diorite in composition. Smaller phases vary in composition from diorite to syenite.
- Mineralization is associated with magmatic-hydrothermal breccias. Alteration and mineralization occurs in the matrix of the breccias, and in veins and swarms distributed around the breccias. Distinct breccia units are subdivided by texture, composition, and alteration. Breccia 1 (BX1) is the main host for the bulk of the mineralization at MPM which is mined in the Cariboo and Springer Pits (Figure 3). BX1 is characterized by alteration which resulted in the strongest destruction of both primary and breccia textures. Breccia bodies BX2 host satellite mineralization in the Southeast Zone, Wight Pit, and Boundary Zone. BX2 is less intensively altered and original textures are more apparent. BX3 is unmineralized and has not been mined.
- Alteration at MPM is classified as potassic (sodic and calcic) with salmon-pink potassium feldspar as the main alteration mineral. Biotite is less common. Sodic alteration is defined by albite and calcic alteration (actinolite, diopside, epidote, clinozoisite, and sporadic andraditic garnet). Calcite is pervasive. Alteration is zoned with the strongest calcic-potassic alteration in the core associated with BX1. Nicola Group rocks and fringing MPIC rocks are propylitically-altered and characterized by stronger epidote and pyrite.
- Like other alkalic porphyry deposits (e.g., Copper Mountain, Brenda), MPM lacks the strong hydrothermal alteration zoning that is commonly observed in calc-alkalic porphyry deposits (e.g., Highland Valley Copper, Island Copper, Gibraltar). In particular, phyllic alteration is absent at MPM. A common feature of calc-alkalic porphyry deposits is often a pronounced pyritic halo that surrounds the copper mineralization and is associated with phyllic and propylitic alteration. At MPM, discontinuous pyritic zones are present. MPM geological staff identified a pyritic zone in the south wall of the Springer Pit which extends into the adjacent Cariboo Pit. Samples from Bell Pit blast holes collected in the early years of operations were identified as being from a pyritic zone but the location of this feature is not known.
- Sulphide mineralization consists mainly of chalcopyrite ($CuFeS_2$) and pyrite (FeS_2), with lesser bornite (Cu_5FeS_4), covellite (CuS), and digenite (Cu_9S_5). Bornite is relatively more abundant in the Northeast and Boundary Zones.
- Carbonate mineralization is principally calcite, with occurrences of malachite ($Cu_2CO_3(OH)_2$) formed as a natural weathering product. Iron carbonates have not been reported.
- A significant portion of the copper at the MPM is not associated with sulphides (upwards of 50% in the upper portions of each pit). This fraction has been termed ‘copper oxide’ by MPM personnel and is associated primarily with chrysocolla ($(Cu,Al)_2H_2Si_2O_5(OH)_4 \cdot nH_2O$) and malachite ($Cu_2CO_3(OH)_2$) in equal proportions (Henry 2009). SRK (2015b) has shown that chlorite is a

significant host for copper. It is assumed that chlorite formed hydrothermally and incorporated copper as part of the mineralizing event rather than due to weathering. Suarez et al. (2009) found that the form of copper in chlorite at the Aguablanca Ni-Cu-PGE Sulfide Deposit was native copper between silicate layers rather than as a substitution in the crystal lattice. The mineral is suspected to have formed during hydrothermal alteration rather than by natural weathering processes. It is not known whether this same form of copper is also present at MPM.

Copper mineralization at the small Pond Zone is classified as andradite-clinopyroxene-magnetite skarn occurring at the contact between a diorite to monzodiorite intrusion and a localized occurrence of limestone in the Nicola Group. From an ML/ARD perspective, a significant feature of the Mount Polley mineralization is the lack of reported arsenic, lead, and zinc minerals. Since arsenic, zinc, and associated cadmium are relatively mobile under non-acidic conditions, the lack of the minerals hosting these elements indicates that potential for leaching concerns is lower than other porphyries. Based on the copper sulphide and copper oxide dominated mineralogy, the primary metal leaching concern is expected to be for copper. In addition, the lack of a distinctive pyrite halo means that pyrite abundance is lower than other porphyry deposits and ARD potential is expected to be lower.

Figure 3: Geological Map of the Mount Polley Mine



Sources: Rees (2013)

2.4 ML/ARD Management

2.4.1 Classification of Mine Waste

According to the *Mines Act* Permit M-200 (referred to as the M-200 Permit in this document), potentially acid generating (PAG) and ML materials are defined as:

- Neutralization potential (NP) is calculated using total inorganic carbon (TIC).
- Acid potential (AP) is calculated using total sulphur.
- All waste rock, quarry rock, borrow materials, and tailings are classified as PAG if they have an NP/AP ratio of less than 2.0.
- Borrow material or waste rock containing soluble metal levels (as determined by the shake flask test) higher than the receiving water objectives are defined as having potential for metal leaching.

2.4.2 Mine Waste Rock and Tailings Management

The M-200 Permit specifies the following requirements for waste management:

- Waste Rock
    - PAG waste rock can only be permanently disposed of in the Cariboo, combined Cariboo/Springer, Wight, and Southeast Zone pits, where it is submerged permanently beneath a water cover.
    - A maximum of 62 million tonnes of PAG waste rock can be stored in the Temporary NW PAG Stockpile.
    - Isolated pockets of PAG materials (less than 1,000 tonnes) may be blended with non-PAG materials within the waste rock dumps, at a minimum non-PAG:PAG ratio of 20:1.
- Tailings
    - PAG tailings may not be cycloned for use in dam construction.
    - Cyclone tailings must have an NP/AP ratio greater than 2.0.
    - Cycloned tailings may be used for construction of the following TSF components:
        - The upstream and downstream faces of the Perimeter Embankment.
        - The upstream side of the Main Embankment.
        - The maintenance of a till core in the Perimeter and Main Embankments.

The procedure used by MPMC to identify and segregate PAG waste rock is attached in Appendix A.

2.4.3 Waste Rock Inventory

Table 2 summarizes major waste rock disposal locations as of September 30, 2023, which are shown in Figure 1. The primary NAG rock disposal locations are the North Bell Dump, which includes backfill in the Bell Pit, the South East Rock Disposal Site (SERDS), which also includes the backfilled Southeast Zone and Pond Zone Pits, and the Northeast Zone (NEZ) Dump. NAG rock has been used for construction purposes (Waste Haul Road and the TSF). NAG rock from the open pits has been disposed at a variety of different locations resulting in waste rock dumps containing non-unique source materials. The exception is that the NEZ Dump received waste primarily from the Wight Pit.

As described in SRK (2016), prior to 2005 (i.e., before operations were re-started), limited PAG waste rock was mined and was dumped into the bottom of the Bell Pit. A small amount was dumped over the north end of the Cariboo Pit, but it was re-handled to the bottom of the Cariboo Pit. Acid-base accounting (ABA) analyses were performed by an external lab.

Since 2005, PAG waste rock has primarily been disposed in the Temporary NW PAG Stockpile (which includes the NAG/PAG Pad and called Ex-pit PAG in this report) which is planned to be backhauled to the Springer-Cariboo Pit at closure for subaqueous disposal. PAG rock has also been disposed sub-aqueously in the Cariboo Pit backfill and Southeast Zone Pit. PAG rock mainly originates from the Cariboo Pit and Springer Pit. The PAG waste rock in the North Bell Dump originated from the Southeast Zone Pit which was dominated by PAG waste rock.

An amendment to Mines Act Permit M-200 on July 8, 2009 allowed the placement of low sulphur (less than 0.3%) waste (LSW) as 2 m layers with Springer Zone NAG waste rock to create a NAG waste rock blend. The quantity of PAG rock mined from the Pond Zone was 6,615 t, which was disposed in a portion of the Northeast Zone Dump referred to as the Sandwich Dump.

2.4.4 Stockpiled Ore

Stockpiled ore is not classified by ARD potential, but the quantities are insignificant relative to waste rock. The current quantity of stockpiled ore is summarized in Table 3.

Table 2: Waste Rock Disposal Locations as of September 30, 2023

Placement Location	NAG		PAG	
	Mass (kt)	Percent of NAG	Mass (kt)	Percent of PAG
Bell Pit Rock Disposal	74,891	30%	530[1]	1%
Boundary Pit Rock Disposal	821	0.3%	-	0%
Temporary NW PAG Stockpile	7,461	3.0%	34,560	78%
East Rock Disposal Site	28,502	11%	-	0%
South East Rock Disposal Site	66,617	26%	-	0%
SERDS Co-Disposal	3,146	1.2%	-	0%
Northeast Zone Dump	34,590	14%	-	0%
Sandwich Dump	275[2]	0.1%	-	0%
Southeast Pit Backfill	36	0.01%	1,017[1]	2%
Wight Pit Backfill	363	0.1%	8,089	18%
Crusher Haul Road	4,116	1.6%	-	0%
SERD Lower Haul Road	6,953	2.8%	-	0%
TSF Access and Haul Roads	6,624	2.6%	-	0%
TSF Dam	15,230	6.0%	-	0%
Other (Minor Road Construction and Maintenance)	2,999	1.2%	-	0%
Total Tonnes	**252,625**		**44,197**	

Sources: MPMC, https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/Source_Terms/Compiled_Geochem_Data_CAPR002434_Rev02_SJL_KWJ.xlsx

Notes:

[1] Submerged.

[2] Includes 6,615 t of low sulphur waste from the Pond Zone.

Table 3: Stockpiled Ore Inventory

Stockpile	Mass (kt)
#1 Stockpile	70
Upper Super High Grade & High Oxide	12
Low Grade Stockpiles[1]	800
Springer Ore Muck (in pit)	162
#3 Stockpile	1,538
High Oxide	2,564
Total	**5,147**

Sources: MPMC, https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/Source_Terms/Compiled_Geochem_Data_CAPR002434_Rev02_SJL_KWJ.xlsx

Notes:

[1] Total of two low grade stockpiles.

3 Geochemical Characteristics

3.1 Existing and Future Mined Rock

SRK (2025a) presented geochemical characterization of existing and future waste rock, ore, and LGO according to MPMC's updated mine plan and geological model. The main conclusions of the geochemical characterization are as follows:

- General findings from existing and future waste rock, ore, and LGO geochemical characterization were that sulphur content was the primary control on ARD potential. For future rock, Springer 6 and WX had the highest sulphur content and therefore the highest proportions of PAG rock on the basis of both the mine plan and ARD classifications using ABA data.
- Existing and future waste rock, ore, and LGO had a similar list of elements that were enriched relative to the screening criteria. Copper and selenium concentrations were comparable for existing and future mining areas.
- HCT trends for samples representing existing mined rock and future waste rock were similar, as were leachate concentrations.
- For existing mined rock, future waste rock, ore, and LGO, lithological classification was determined to not be a control on ML/ARD potential.
- Delay to onset of ARD for PAG materials is of the order of decades due to the presence of calcite.

The similarities of the mineralized zones, including their host rocks (SRK 2025a), indicate that source terms can appropriately be developed on a site-wide basis rather than considering significant differences between the zones.

3.2 Tailings

Metallurgical tailings generated from testing of Springer 5, Springer 6, C2 and WX zones were not available for geochemical testing at the time of reporting. Because the processing of the ore for the Project will use the same standard flotation technology that is currently being used, ore and LGO from these zones were initially compared to previously mined rock in SRK (2025a) to determine if similar characteristics of future ore and LGO are anticipated in these zones. SRK (2025a) concluded this was the case, but also recommended geochemical characterization of tailings from metallurgical test work be completed on samples from Springer 5, Springer 6, WX, and C2 areas. The main conclusions of geochemical characterization of tailings at MPM were:

- Sulphur concentrations in Mount Polley tailings are uniformly low, with total sulphur ranging from 0.01% to 1.1% (median concentration of 0.10%). The majority of tailings samples (99%) were found to be NAG based on their TIC/AP values.
- Median concentrations of copper and selenium were present in the tailings at an order of magnitude higher concentrations compared to average crustal concentrations for low calcium

granite. Copper is partially deported in silicate minerals. Selenium is associated with the sulphide component of the tailings and is also correlated with copper content.

- Kinetic testing on tailings samples has to-date confirmed they are non-acid generating.

3.3 Other Sources

Two other sources were identified as potentially requiring geochemical source terms.

Magnetite is recovered from MPM tailings to generate a concentrate for use as a dense medium in coal processing. The magnetite stockpiles are located adjacent to the ore processing plant. No geochemical data are available for the magnetite.

Sulphur was imported in 2004 as part of evaluations of recovery of copper present as oxide. Excess sulphur was stored in a nearby stockpile, first in the Cariboo Pit (2006-2009) and then moved to a crushed rock pad beside the heap leach pad (2009-2018) when mining resumed in the Cariboo Pit. SRK (2022) found the elemental sulphur was composed of about 90% sulphur, and assumed the material had no neutralization potential. Oxidation of the sulphur generated sulphuric acid, which markedly increased the solubility of metals in the surrounding materials that would not otherwise be leachable at neutral pH. In 2018, the excess sulphur was relocated on top of the lined leach pad after evidence showed that water quality on the mine may be affected by contaminated drainage from below the sulphur stockpile (Litke et al. 2019). The affected drainage is seepage from the NEZ Dump, located east of the Test Heap Leach Facility.

4 Conceptual Geochemical Models

4.1 Purpose

The purpose of conceptual geochemical models (CGMs) is to describe the anticipated geochemical performance of each source at MPM which is then implemented as a numerical model to generate source terms. CGMs consider the current understanding of geochemical characteristics (as described in Sections 3.1 and 3.2).

The following sources were evaluated and CGMs for each are described below:

- NAG waste rock and construction fills.
- NAG waste rock influenced by the sulphur stockpile.
- PAG waste rock.
- Ore stockpiles.
- Pit backfills.
- Pit walls.
- Ore processing.
- Tailings.

4.2 Ex-Pit NAG Waste Rock and Construction Fills

Processes in NAG waste rock under non-acidic conditions include:

- Oxidation of sulphides (pyrite, chalcopyrite, and bornite) to release iron, acidity, sulphate, and trace elements contained in the sulphides. Copper is expected to be primarily released by oxidation of chalcopyrite and bornite. Iron released by oxidation of sulphides replaces pyrite and other sulphides as solid iron (III) oxyhydroxides. Iron concentrations in the drainage are expected to be at or near detection limits.
- The oxidation reaction is exothermic (releases heat) and is expected to result in average internal temperatures that are higher than ambient average temperatures. During winter, internal temperatures will be higher than ambient temperatures.
- Due to the temperature difference in winter, air will move by advection through the waste rock by convection. Cold air will be drawn in through coarser materials at the base formed by end-dumping. The heated air will exit the dump at a higher elevation. This process is expected to result in deep penetration of oxygen and generally an over-supply of oxygen for oxidation of sulphides.
- Neutralization of acidity produced by the oxidation reaction will be by reaction with calcium carbonate minerals or mixing with alkaline waters resulting in neutral to basic pHs. The pH of contact waters will be determined by the partial pressure of carbon dioxide in pore gases (lower pH with higher CO_2).

- For non-PAG waste rock the neutral pH weathering environment will result in precipitation of metals as various secondary minerals, including gypsum ($CaSO_4 \cdot 2H_2O$), metal oxides (tenorite - CuO), metal carbonates (malachite – $Cu_2CO_3(OH)_2$), and metal silicates (e.g., chrysocolla). Adsorption to secondary oxides will also occur. The resulting concentrations of metals (principally copper) in contact waters will be controlled by the relatively low solubility of the secondary minerals and the tendency to be adsorbed at these pHs.
- Selenium and molybdenum originate from oxidation of pyrite, but form oxyanions that are mobile at the expected pH. The concentrations of these trace elements are expected to increase.
- There is a hydraulic lag between when waste is placed, and its signature appears at monitoring locations.

Due to the solubility control exerted by secondary minerals, contact water chemistry is expected to be constrained so that chemical loadings are directly proportional to infiltrating water volume. Sulphate is expected to increase as new waste is added but will be constrained by gypsum solubility.

4.3 NAG Waste Rock Influenced by the Sulphur Stockpile

Elevated sulphate and metal concentrations at NEZ Seep 1 and NEZ Seep 2 since 2014 are believed to be influenced by elemental sulphur stockpile oxidation and leaching. The stockpile was stored on the East RDS near the leach pad until its removal in 2018. For context, monitoring of the drainage from the leach pad containing ore, waste rock, and elemental sulphur showed average pH, sulphate, and copper of 3.3, 15 g/L, and 750 mg/L, respectively. There was a risk that depletion of acid neutralizing minerals from the waste rock could have triggered acidification of the waste rock on the infiltrating water flowpath but this does not seem to have occurred based on sampling of the foundation materials (Litke et al. 2019). It is expected that the seeps influenced by the sulphur stockpile will show a downward trend in parameters such as sulphate and copper now that the elemental sulphur was removed.

The seeps from the NEZ Dump that are influenced by the sulphur stockpile leachate (NEZ Seep 1 and NEZ Seep 2) are collected and managed separately from the other waste rock seepages.

4.4 Ex-Pit PAG Waste Rock

Segregated and exposed ex-pit PAG waste rock is present in the Temporary NW PAG Stockpile located adjacent to the Springer Pit. PAG rock at MPM is not defined by a particular rock type but is associated with pyrite halos formed by hydrothermal alteration. Sulphide content is higher than NAG waste rock.

Due to the higher sulphide content of PAG waste rock, the overall oxidation rate of PAG waste rock is expected to be greater than NAG waste rock. However, before acidification occurs, PAG and NAG weathering conditions are expected to be similar with secondary minerals exerting solubility controls. For example, the solubility of sulphate is expected to be controlled by gypsum which will be similar regardless of the sulphide oxidation rate.

Acidification is expected to take decades to progress with early contact waters remaining basic and having metal concentrations controlled by the solubility of secondary minerals. The timeframe for acidification effects is expected to be on the order of decades.

4.5 Ore Stockpiles

Ore stockpiles will perform the same as NAG and PAG waste rock depending on composition. The presence of more copper sulphides than waste rock will result in more leachable copper being generated but similar solubility controls are expected for the elements of interest.

4.6 Pit Backfill

Existing backfilled pits are the Bell Pit (completely full), the Southeast Zone Pit (completely full), the Pond Zone Pit (completely full), the Wight Pit (partially full), and Cariboo Pit (partially full). PAG rock from Temporary NW PAG Stockpile will be backfilled into the Springer-Cariboo Pit at completion of mining. Backfilling of currently filled pits occurred during operation so that run-of mine waste rock was directed immediately to a backfill location. The water level has risen in most of these pits resulting in complete submergence of PAG rock and partial submergence of NAG rock. PAG rock in the Cariboo Pit remains unsubmerged due to drawdown of the water table as operations continue in these pits.

4.7 Pit Walls

Exposed pit walls will remain in the Springer-Cariboo Pit, Wight Pit and Boundary Pit. All other pits have been backfilled resulting in pit wall reactive surfaces becoming part of the backfill.

Pit walls are composed of fractured walls and rubble resulting from over-blast and physical weathering. Localized wall failures will contribute additional talus. Reactive surface area for pit walls is contained primarily in the broken rock rather than fractured walls.

For source terms, pit walls are assumed to perform the same as waste rock dumps composed of PAG and NAG waste but flow paths are much shorter.

During flooding of pit walls, accumulated soluble weathering products will be flushed into pit walls. Following submergence, oxidation of walls will effectively be stopped due to reduction in availability of oxygen. Highwalls above final flood levels will continue to weather.

4.8 Ore Processing

Ore processing results in crushing and grinding of ore in contact water. Soluble components of the ore are dissolved and become part of the process water. Modification of process water chemistry may occur in the cleaner circuit where lime is added to increase pH. The change in pH may cause copper to precipitate.

The ore source term is expressed as mass leached per mass of ore. Except for the possible effects of pH adjustment described above, process water concentrations are expected to be too low to be controlled by secondary minerals.

The ore processing terms will depend on the degree of oxidation of the ore. Freshly blasted ore will contribute less load than ore re-handled from stockpiles, and deep fresh ore will contribute less load than near surface ore that has been naturally oxidized.

4.9 Tailings Solids

During operations, tailings are deposited by spigotting from the TSF embankments, resulting in tailings beaches and slimes migrating to the centre of TSF.

Under normal operational conditions, slimes in the centre would be fully saturated and below the process pond. Due to the finger drains in the dam, the water table drops from surface at the edge of the pond in the centre of the facility to the finger drains. As a result, tailings near the embankments are partially saturated. Oxygen enters the unsaturated tailings in the beaches and embankments by diffusion resulting in near surface tailings oxidizing most rapidly and consuming oxygen. An oxygen concentration profile will be present in the tailings which decreases most rapidly near surface and eventually results in negligible oxygen concentrations at depth. For tailings containing sulphur concentrations near 0.1%, the expectation is that oxidation of tailings will occur to tens of metres in depth.

Due to the acid-consuming characteristics of the tailings, the weathering environment is pH-basic and overall processes are comparable to NAG waste rock (Section 4.2). Pore water chemistry during operations is dominated by process water with less effect from weathering processes because tailings are continually deposited, resulting in re-setting of the oxidation profile.

Process water contains low levels of dissolved organic carbon from flotation process reagents (e.g., methyl isobutyl carbinol). These compounds may act as a source of reduced carbon to facilitate reductive dissolution processes in the saturated components of the tailings such as dissolution of iron oxides and release of contained trace elements. SRK (2015a) assessed this susceptibility and concluded the tailings were stable under chemically-reducing conditions.

Following the tailings dam failure in August 2014, the water table dropped, allowing more of the tailings to become unsaturated than under operational conditions. Draindown of pore waters will have occurred allowing oxidation processes to influence pore water chemistry. Reactivation of the tailings pond resulted in the water table rising again into the tailings. As the water table rose, oxidation products formed following partial draindown were dissolved by process waters. Pore waters were therefore expected to reflect a mixture of process water effects and flushing of oxidation products in the years following the reactivation of the pond. However, with the return to operational conditions in 2022, process water will be dominate.

After operations cease, the process pond will decrease and the water table will again drop resulting in more tailings becoming unsaturated. Draindown of the tailings will result in a transition from process water dominated chemistry to oxidation effects becoming dominant. Eventual pore water chemistry will be controlled by equilibration of water chemistry with tailings weathering products which will include oxides and sulphates.

4.10 Nitrogen Leaching

Nitrogen leaching is covered separately from the foregoing conceptual models because it originates from explosives residuals rather than mineral weathering. Since the rock does not generate leachable nitrogen, the leaching of residuals provides a flush of nitrogen which occurs with water contact. It is expected that the load of nitrogen flushed is greatest initially then decaying in proportion to the remaining soluble nitrogen. In terms of cumulative leaching, a newly constructed waste rock dump would be expected to show increasing loads for several years then stable loads as the volume of rock added each year becomes small relative to the total volume. “Tailing off” at closure will occur. Delays and lag effects may be expected due to hydrological factors.

For a mature site such as MPM, active and long closed waste rock dumps indicate nitrogen release under operational and closed conditions. Sump waters from open pits indicate leaching from pit walls.

Leaching of explosive residual from ore will occur due to flushing in the milling process. Tailings solids themselves will not leach nitrogen because flushing during processing is very efficient. Nitrogen leaching from the TSF will reflect the influence of process water.

5 Source Terms

5.1 General Approach

MPM operations started in 1997, resulting in generation of waste rock and tailings. These full-scale waste facilities provide a more appropriate basis for predicting current and future water chemistry than scaling laboratory tests to full-scale conditions, provided that near source monitoring locations are available and appropriate allowance for local dilution effects at monitoring locations are included. The general approach for MPM has been to use interpreted full scale monitoring data to develop source terms supplemented by laboratory data where needed. This approach removes most of the uncertainty related to predicting source term chemistry.

The approach for each term described below follow the same methods outlined in SRK (2016). The update incorporates recent monitoring and testing data.

5.2 Incorporating Uncertainty

The CGMs described in Section 4 indicate that geochemical processes reflected in source terms consist of weathering of primary minerals, which is determined by rates of mineral conversions, and dissolution processes which combine rates and solubility constraints. The latter consists of the rate at which minerals dissolve and the eventual concentrations achieved when equilibrium with the contact water is reached. For example, chalcopyrite oxidizes at some rate to produce copper sulphate. The copper sulphate then dissolves at a rate adding copper and sulphate to the water until copper and sulphate concentrations in the water are in equilibrium with the solid copper sulphate.

As described in Section 5.1, the general methodology used to develop the source terms relies mainly on-site monitoring data which reflects the end product of weathering and dissolution of weathering products. The assumption is that the monitoring data contain indications of the endpoint solubility of the weathering products with the proviso that dilution needs to be considered. Higher end concentrations in the dataset are used as the starting point to develop source terms because these are most likely to be closest to a solubility limit. To represent uncertainty in the underlying solubility limits, the statistics from water chemistry databases used are the 95th and 99th percentile concentrations. Maximum concentrations are not used to eliminate the bias caused by spurious concentrations resulting from sampling and analytical errors. The two high end percentiles are used because concentrations constrained by the solubility of minerals are not fixed but dependent on total solution chemistry including, particularly, pH.

Other approaches to incorporating uncertainty are described in the following sections.

5.3 NAG Waste Rock and Construction Fills

5.3.1 Method

The method for the NAG waste rock source terms is similar to the method in SRK (2016) and is as follows:

- Evaluate partitioning of reactive minerals during blasting.
- Evaluate potential for acidification due to included PAG rock.
- Evaluate seepage chemistry for geochemical controls.
- Prepare statistical summaries for seeps from major rock dumps.
- Scale-up maximum concentrations to account for dilution effects to yield source terms.

The basis for the latter step is that seepage chemistry may be diluted from true contact water and therefore needs to be scaled to remove dilution effects. Scaling was approached by assuming that gypsum is likely to exert a strong solubility control on major ion chemistry due to the interaction between oxidizing sulphides (yielding sulphate) and dissolving carbonates (yielding calcium). It also has well-defined behaviour in which chemistry matches thermodynamic models and is expected to be one of the most soluble secondary minerals in this setting. The high solubility indicates that it will likely be the last to reach equilibrium with contact water compared to other major primary minerals.

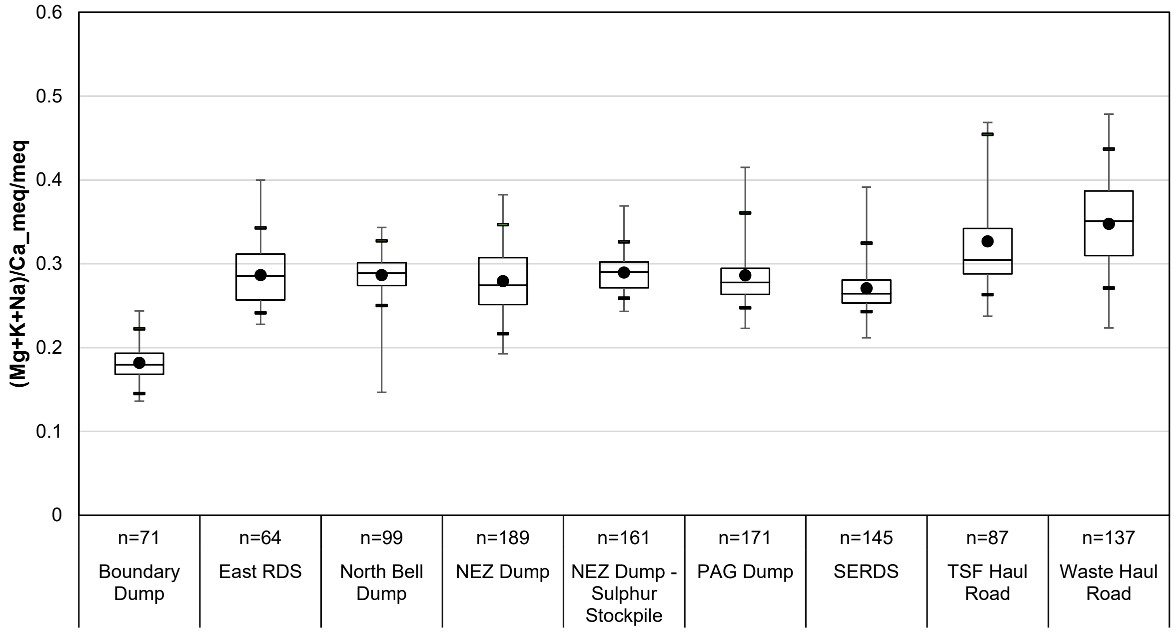
Scaling is therefore achieved using the following equation:

$$[M]_{corrected} = \left(\frac{[SO_4]_{theoretical}}{[SO_4]_{observed}}\right) \cdot [M]_{observed}$$

Where $[M]_{corrected}$ is the scaled element concentration, $[SO_{4,\ theoretical}]$ is the maximum sulphate concentration indicated by the solubility of gypsum, $[SO_{4,\ observed}]$ is the observed sulphate concentration, and $[M]_{observed}$ is the observed element concentration. The $[SO_{4,\ observed}]$ values are the 95th and 99th percentile seep concentrations selected to be at the upper end of the distribution so that the need for correction is minimized.

$[SO_{4,\ theoretical}]$ depends on bulk chemistry being lowest for waters containing only calcium as the balancing cation. As other major ions (K, Mg, and Na) increase in significance, $[SO_{4,\ theoretical}]$ increases. The ratio (Mg+K+Na)/Ca shows variation within MPM (Figure 4), with the lowest ratio for the Boundary Dump and highest for seeps from the two haul roads. For the purpose of determining a range of $[SO_{4,\ theoretical}]$, the 50th and 95th percentiles for each dump group were used. The 50th percentile indicates median predicted sulphate whereas the 95th percentile is a conservative limit. The actual range of the ratio is fairly narrow. For the Boundary Dump, the resulting range is 1510 mg/L to 1550 mg/L whereas for the Waste Haul Road, the range is 1670 mg/L to 1750 mg/L.

Figure 4: Box and Whisker Distributions for the Cation Ratio



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5.3.2 Inputs

Mineral Partitioning During Blasting

Mineral partitioning during blasting was evaluated using blast hole cuttings because this can have an effect on the classification of waste for ARD potential (Day et al. 2015). If carbonate minerals preferentially partition into the blast fines, the use of a bulk NP/AP classification factor can lead to misclassification of rock that will probably not generate acid as PAG. The reverse can also occur if sulphide minerals preferentially classify into the fines.

In 2001, blast muck samples from the Bell and Cariboo Pits were collected and the +2 mm and -2 mm fractions were tested separately for acid-base accounts. SRK (2016) describes the interpretation for mineral partitioning for these samples. Both sulphur and carbonate preferentially partitioned into the -2 mm fraction but the effect was much stronger for carbonate. For the Cariboo Pit, there was no correlation between the fractions so the observed partitioning was qualitative only, but for the Bell Pit, a regression was derived. The finding from this assessment was that the classification of PAG using TIC/AP of 2 in blast hole cuttings has probably led to misclassification of some NAG rock as PAG. This finding was not used directly but primarily to confirm that under-classification of PAG rock (i.e., increased likelihood of PAG rock in NAG rock) is not a concern for MPM.

Potential for Acidification

The potential for acidification of NAG rock is described in SRK (2016) and considered:

- The likelihood that misclassified PAG waste rock occurs as large, segregated volumes (resulting in hotspots).
- The mass balance ABA resulting from misclassified PAG rock.

SRK (2016) concluded acidification of NAG waste rock at more than a very local scale is not expected because the percentage of PAG rock that could have been inadvertently included in the NAG waste risk is likely no more than a few percent. As there is a good understanding of the occurrence of PAG rock based on geological controls, it is expected that unaccounted for PAG rock is probably not more than a few percent. Therefore, NAG rock can be expected to remain permanently non-acidic and that long term changes in the NAG rock source term do not need to be considered.

Waste Rock Seepage Database

The seepage database was interpreted to understand what mineralogical controls may be constraining water chemistry, determine if seasonal variations are apparent, and derive statistics for the input into source term derivation.

As a general interpretation effort, relationships between rock composition and seepage chemistry were evaluated. However, except for the Wight Pit (Northeast Zone Dump) and Boundary Pit waste rock dumps, waste rock from all pits has been placed in several different locations limiting the opportunity to link rock composition to seepage chemistry.

Description of the Database

The current database as of the end of 2022 contains 1124 water analyses for seeps located as shown in Figure 5. Seeps have been sampled biannually since 2013. Filtering of samples has occurred in the field since 2014. Samples are analyzed for a full range of major and trace ions.

Figure 5: Seep Sampling Locations

Sources: MPMC

General Description of Water Chemistry

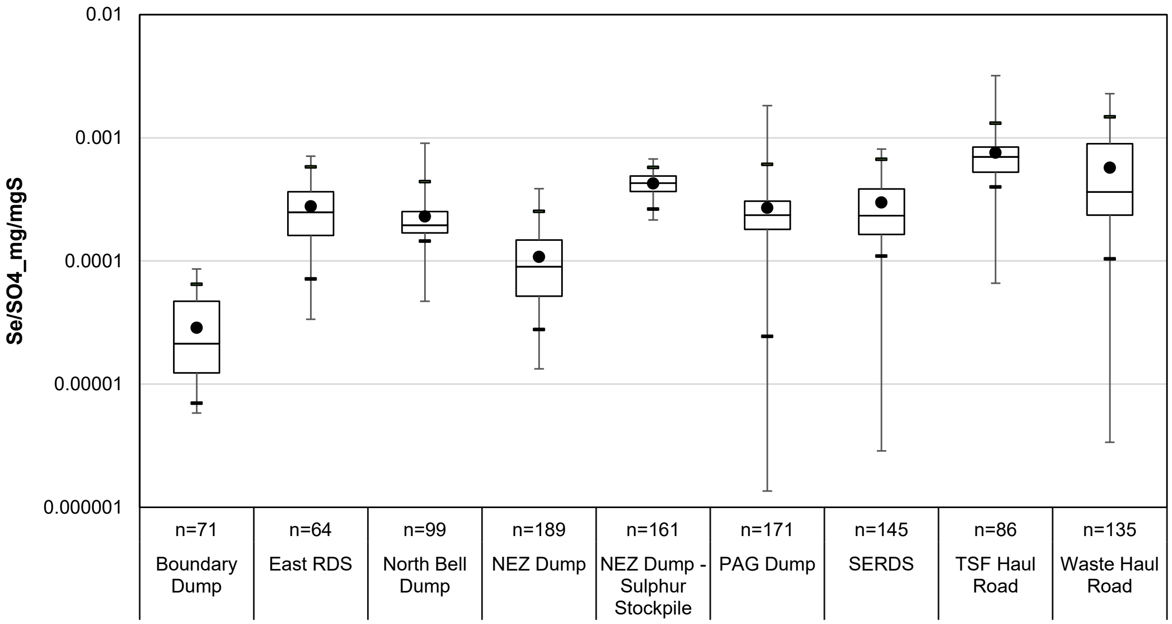
Water chemistry statistics are grouped according to the areas indicated in Table 4.

All seeps are non-acidic with medians above 7 and more typically nearer 8. The major anion is sulphate followed by bicarbonate (indicated by alkalinity) which is balanced mainly by calcium and magnesium. As discussed with reference to Figure 4, some differences in major ion chemistry were reflected in the cation ratio but differences in seepage chemistry were generally absent, except for NEZ Dump seeps influenced by the sulphur stockpile, reflecting consistencies with the geological setting and placement of waste rock from the pits at multiple locations for all other waste rock dumps.

Selenium to sulphate ratios were examined for comparison with ratios in the rocks. Rock chemistry showed some distinctive variations in the ratio with typical ratios between 0.0001 and 0.001 mg Se/mg S. Likewise, the ratio was in the same range for seeps (Figure 6). Wight Pit extended to lower ratios in both rock and seeps. SRK concluded that selenium leaching is due to oxidation of sulphides and that leaching effects are similar throughout the site.

Nitrate concentrations varied considerably by source area (Figure 7). Distinctively higher concentrations were found for the Southeast Dump, the Temporary NW PAG Stockpile, TSF Haul Road, and the North Bell Dump. The differences are linked to placement activity with lowest concentrations for dumps less recently active. Notably, nitrate concentrations in the North Bell Dump have decreased in recent years (Figure 7).

Figure 6: Se/SO_4 Ratios in Waste Rock Seepage



Sources: https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/[Source_Terms/Source_Terms_CAPR002434_Rev00_SJL.xlsx]

Figure 7: Nitrate Concentrations in Waste Rock Seepage

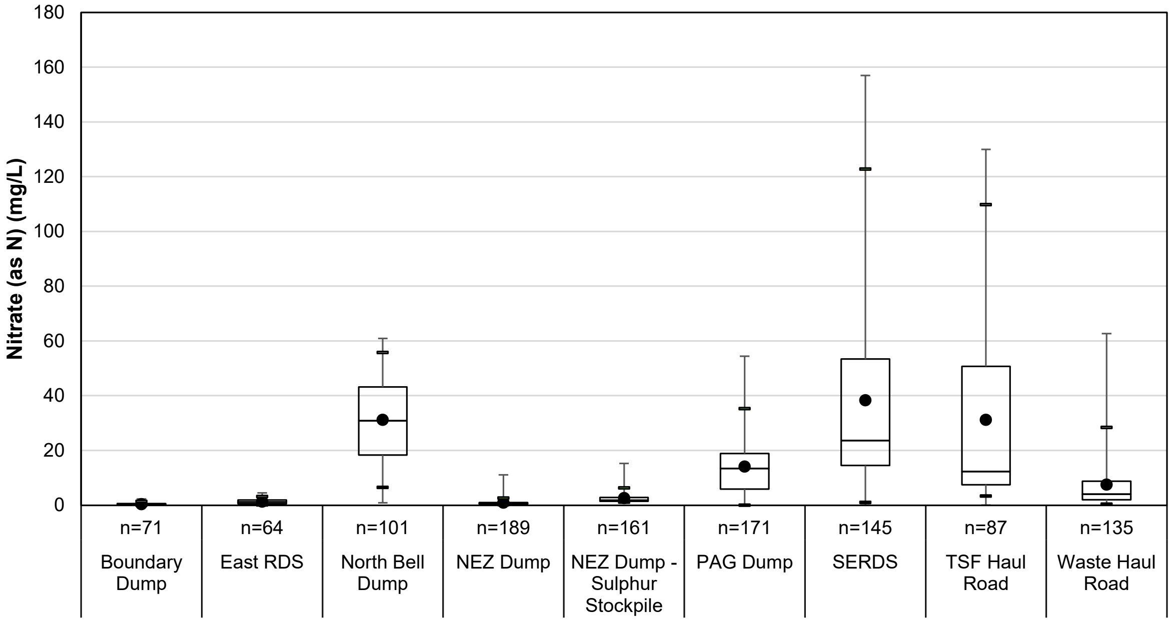


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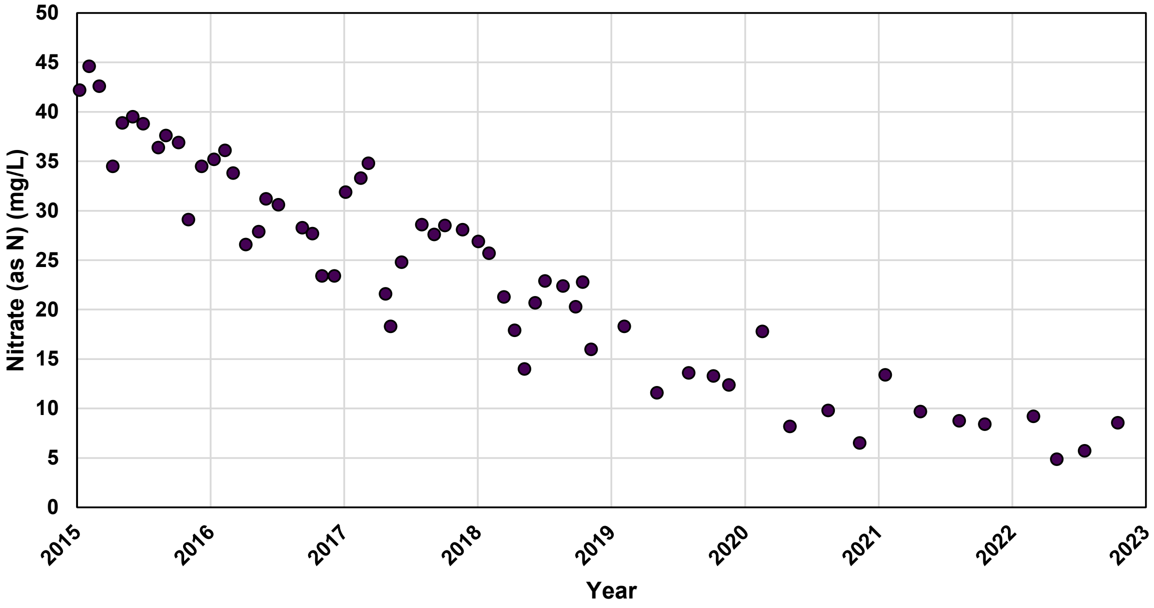
Figure 8: Timeseries of Nitrate Concentrations from the North Bell Dump



Sources: https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/Annual_Reporting/Contact_Water/2022_ContactWQ_CAPR002434_rev0_SJL.xlsb

Table 4: Waste Rock Seepage Statistics

Statistic	Zone	n	pH[1]	Alkalinity[1]	Cl	F	NO_3	NO_2	SO_4	Al-D	As-D	Cd-D	Ca-D	Co-D	Cu-D	Fe-D	Mg-D	Mn-D	Mo-D	Ni-D	Se-D	Zn-D
				mg/L	mg/L	mg/L	mg-N/L	mg-N/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
P95	Boundary	92	7.0	110	5.0	0.29	1.5	0.012	640	0.0077	0.0018	0.000071	260	0.00077	0.0087	0.26	40	0.41	0.053	0.0005	0.010	0.0035
	Wight	215	6.9	63	10	0.40	2.7	0.02	1200	0.014	0.00061	0.00020	370	0.00051	0.021	0.09	88	0.44	0.18	0.0015	0.050	0.0081
	NEZ Dump - Sulphur Stockpile	176	6.7	25	10	0.80	6.4	0.02	1200	0.069	0.00031	0.0011	380	0.014	1.8	0.06	78	1.1	0.25	0.017	0.21	0.11
	All Non-PAG	886	7.0	43	10	0.59	89	0.086	1300	0.018	0.0028	0.00067	490	0.0014	0.022	0.06	94	0.85	0.37	0.0012	0.32	0.068
	All PAG - Pre-Acid	202	7.0	81	10	0.40	35	0.93	1300	0.017	0.0018	0.00033	450	0.0059	0.012	0.37	71	3.3	0.58	0.0011	0.15	0.0063
P99	Boundary	92	7.0	78	6.2	0.38	2.2	0.022	730	0.02	0.0023	0.000082	260	0.0013	0.0095	0.33	43	0.51	0.074	0.00055	0.013	0.0045
	Wight	215	6.8	58	10	0.42	5.7	0.02	1300	0.02	0.00079	0.00036	400	0.0010	0.039	0.87	92	2.3	0.25	0.0022	0.062	0.019
	NEZ Dump - Sulphur Stockpile	176	6.1	9.7	17	1.4	10	0.02	1300	0.75	0.00061	0.0020	410	0.031	16	0.076	79	1.8	0.31	0.031	0.24	0.23
	All Non-PAG	886	6.7	33	17	0.69	130	0.82	1500	0.032	0.0034	0.0015	590	0.0073	0.043	0.49	110	3.2	0.55	0.0027	0.52	0.18
	All PAG - Pre-Acid	202	6.7	52	15	0.40	51	3.6	1300	0.16	0.0025	0.00052	470	0.018	0.024	1.8	76	8.1	0.66	0.0018	0.24	0.023

Sources: https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/Source_Terms/Source_Terms_CAPR002434_Rev00_SJL.xlsx

Notes:

[1] Statistics reported for pH and alkalinity are 5th percentile (for P95) and 1st percentile (for P99).

Interpretation of Water Chemistry

Water chemistry was interpreted by using PHREEQC and the minteq.v4 database to calculate mineral saturation indices thereby providing an indication of possible constraining minerals.

Saturation indices for sulphate were consistent with gypsum as a strong solubility control (Figure 9). At higher sulphate concentrations, gypsum saturation indices approached 0. Most seeps had sulphate concentrations well below those required to be at gypsum saturation indicating possible dilution effects, lack of gypsum, or incomplete equilibration. Regardless, the general observation is gypsum likely controls major ion (calcium and sulphate) chemistry with pH control by carbonate. Saturation indices greater than 0 for calcite were consistent with its dissolution and partial pressures for CO_2 were above -3.4 (Figure 10).

Saturation indices for malachite were well above 0 showing that copper concentrations were higher than would be predicted if malachite is controlling copper (Figure 11). Tenorite saturations indices were between 0 and 1 at higher copper concentrations indicating that it is more likely that a copper oxide is controlling copper concentrations. The finding that malachite does not appear to be controlling copper concentration is not consistent with the observed presence of malachite which formed by natural oxidation of the orebody. The likely controls on copper concentrations are secondary minerals resulting from oxidation of the waste rock following mining.

Other indications that higher end concentrations indicate mineral saturation included molybdenum which may be controlled by calcium molybdate (Figure 12). Trace elements occurring at concentrations well below saturation in indices of 0 for their discrete minerals are probably adsorbed or co-precipitated with major secondary minerals (for example, iron oxyhydroxides).

Like the majority of trace elements, saturation indices for selenium minerals were well below 0, reflecting that discrete selenium minerals are not likely to be forming. Relationships between selenium concentrations and saturation indices for major ions that do appear to be controlling solution chemistry were examined (Figure 13). The relationship with tenorite saturation indices showed that selenium concentrations appear to be constrained as copper concentrations were constrained. This may indicate that selenium is co-precipitating or adsorbing with an oxide or that the conditions resulting in copper oxide precipitation also result in selenium removal from solution. These interpretations do not provide a conclusive mechanism for constraining selenium concentrations but suggest that higher selenium concentrations in the dataset may be constrained. On this basis, seepage concentrations were used as the basis to calculate source terms.

Figure 9: Gypsum Saturation Indices Compared to Sulphate Concentrations

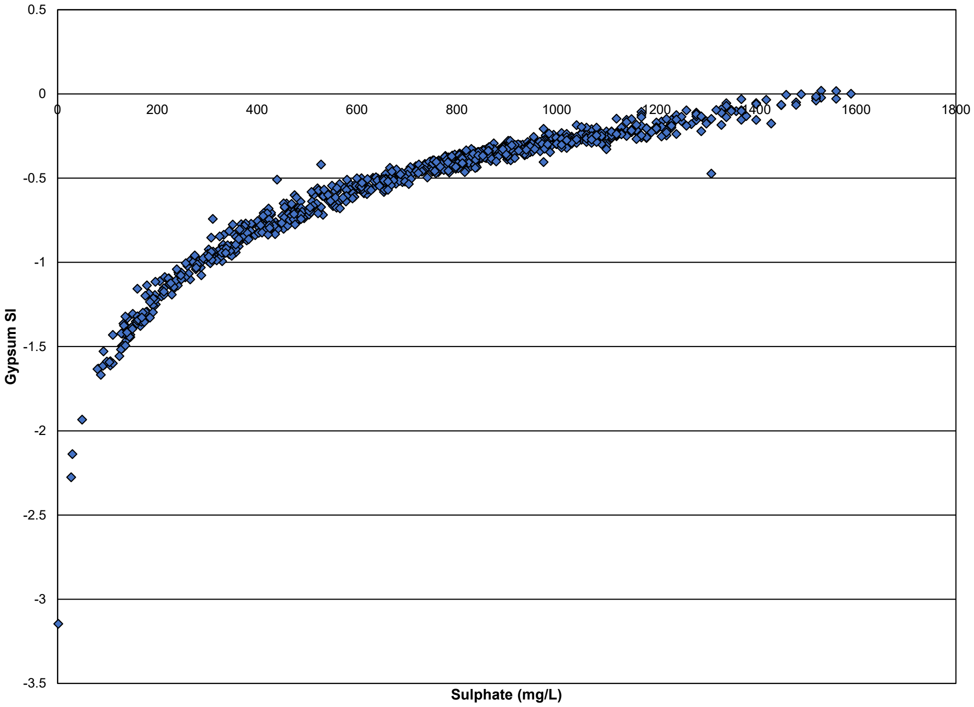


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Figure 10: Partial Pressure of CO_2 in Waste Rock Seepages

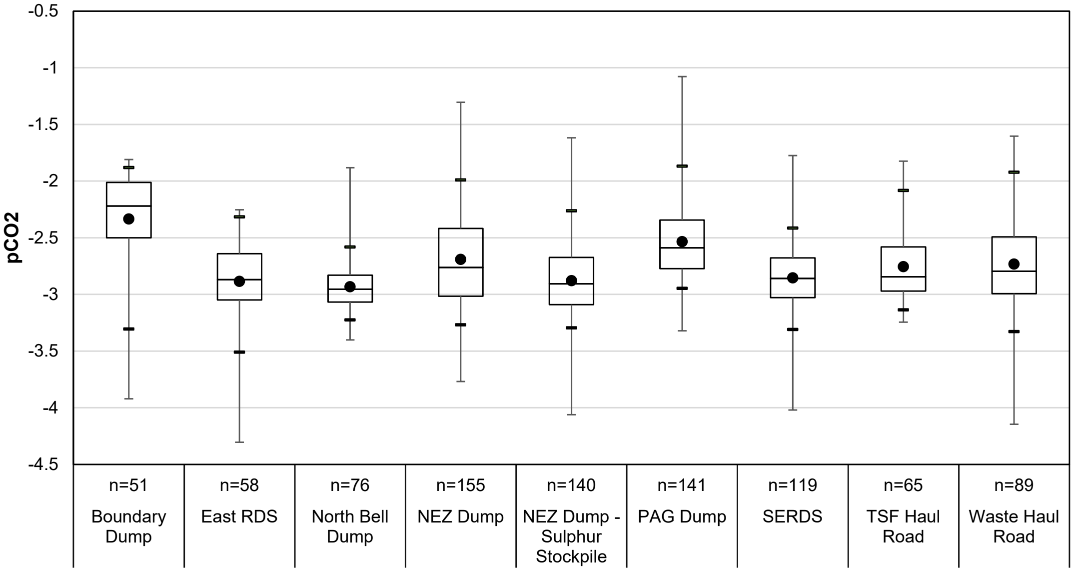

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Figure 11: Copper Mineral Saturation Indices Compared to Copper Concentrations

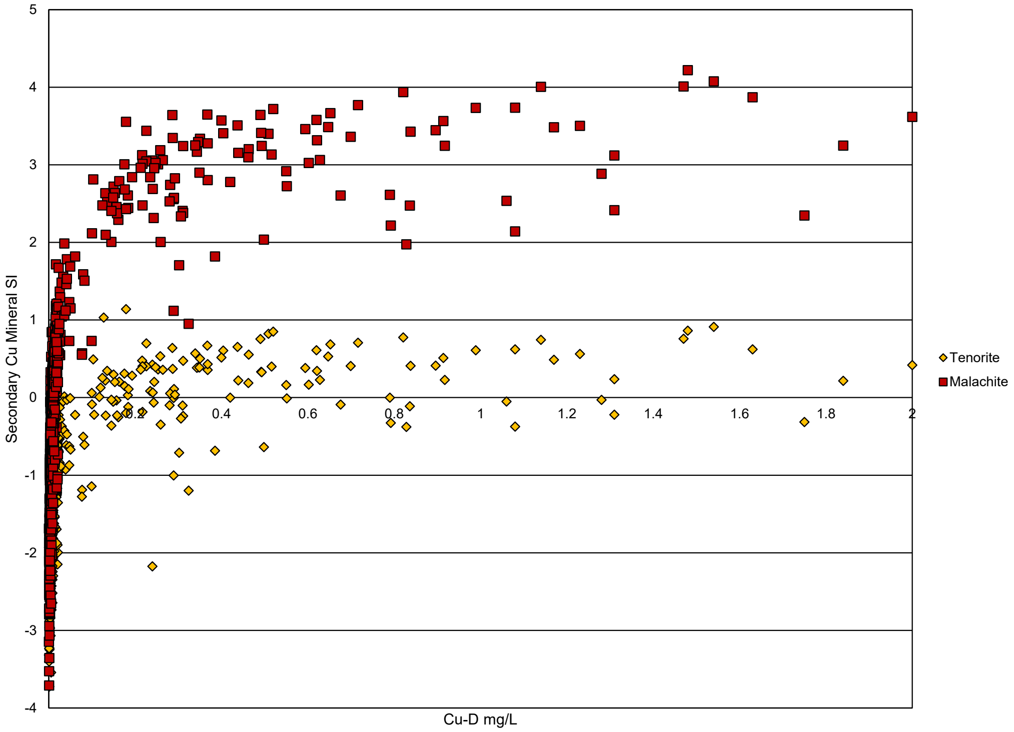

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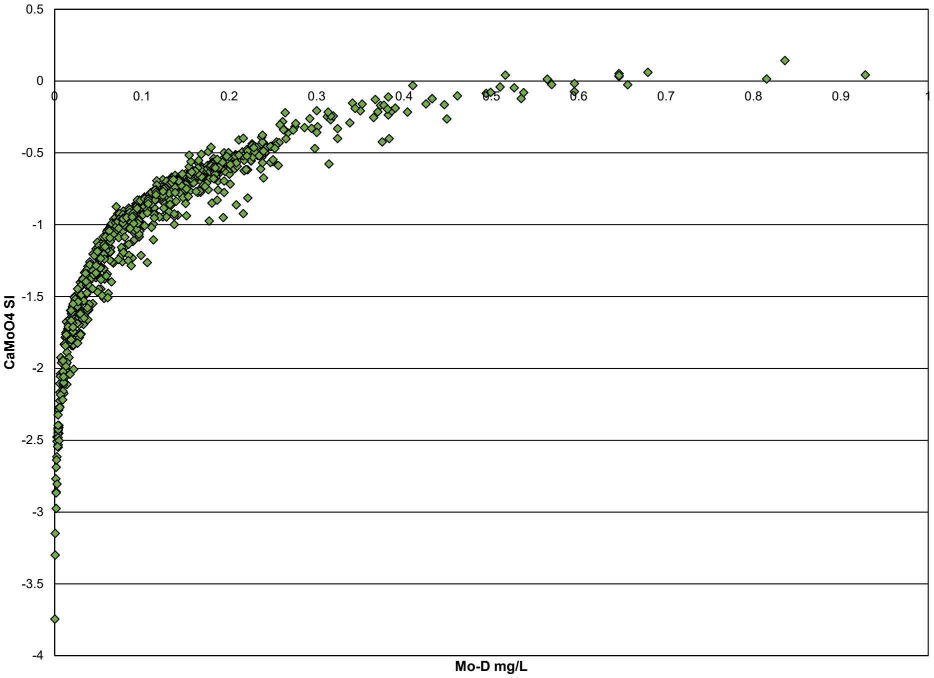
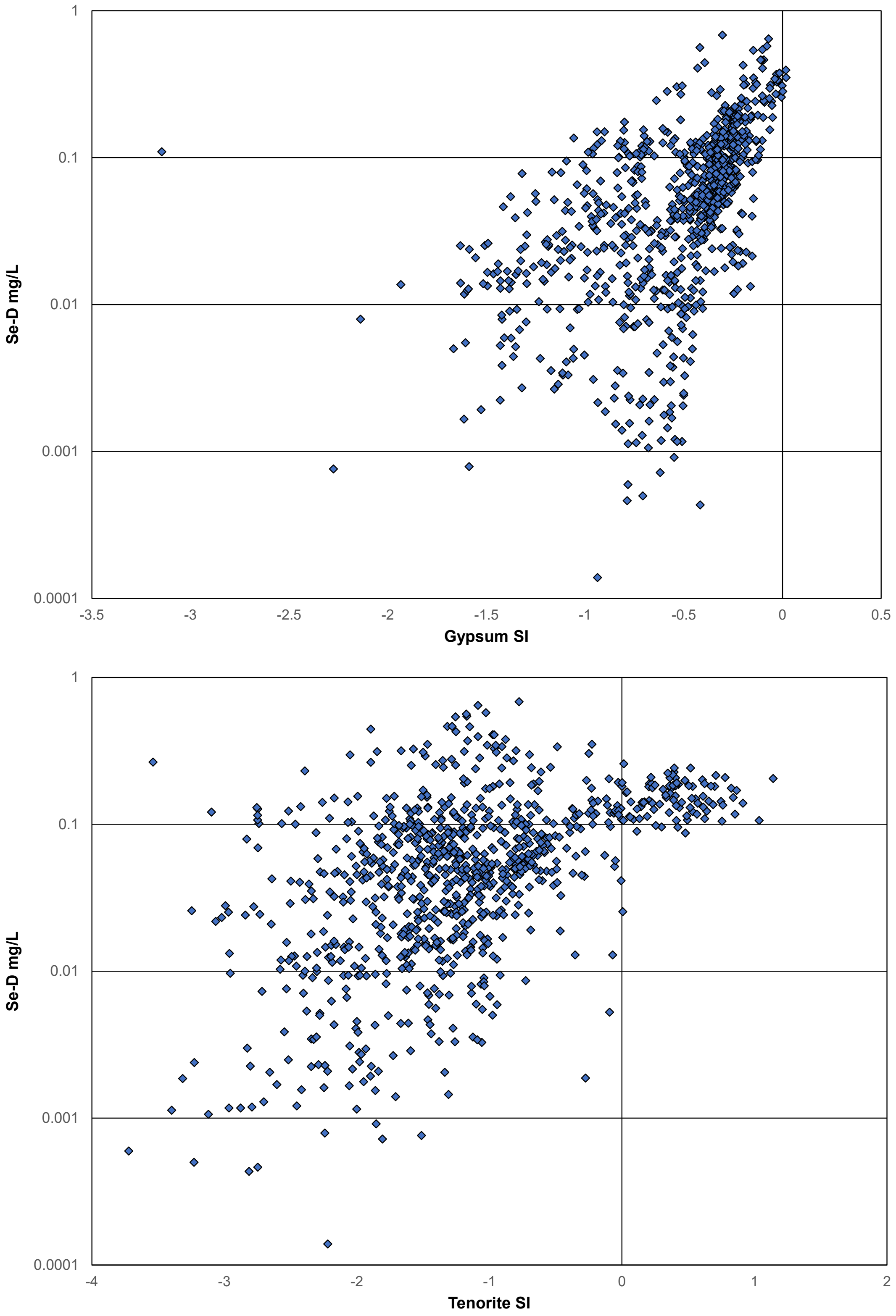
Figure 12: $CaMoO_4$ Saturation Indices Compared to Molybdenum Concentrations



Sources: https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/[Source_Terms/Source_Terms_CAPR002434_Rev00_SJL.xlsx]

Figure 13: **Relationships between Selenium Concentrations and Saturation Indices for Gypsum (top left), $CaMoO_4$ (top right), and Tenorite (bottom)**



Sources: https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/[Source_Terms/Source_Terms_CAPR002434_Rev00_SJL.xlsx]

5.3.3 Results

Source terms for NAG waste rock are provided in Appendix B.

5.4 NAG Waste Rock Influenced by the Sulphur Stockpile

Because acidification of the waste rock on the infiltrating water flowpath from the sulphur stockpile does not seem to have occurred based on sampling of the foundation materials and the sulphur stockpile has been relocated, no separate waste rock term was derived. Because the stockpile has been removed, the influence from the sulphur stockpile on these seeps may dimmish with time. The waste rock term for the seeps influenced by the sulphur stockpile is that shown as “NEZ Dump - Sulphur Stockpile” in Appendix B.

5.5 PAG Waste Rock

Since ex-pit PAG waste rock will be re-handled to the Springer-Cariboo Pit at closure before acidification is predicted to occur, and the same solubility controls are expected as NAG, no separate PAG waste rock term was generated. The PAG waste rock term is that shown as “All-PAG Pre-acid” in Appendix B.

Acidification of PAG walls is discussed subsequently in Section 5.8.

5.6 Ore Stockpiles

Ore stockpiles are composed of rock with similar composition to waste rock with the exception of higher copper concentrations. Overall controls on water chemistry are expected to be similar to NAG waste rock and no separate term was developed. The effects of processing oxidized ore are considered separately in Section 5.9.

5.7 Pit Backfill

Exposed components of pit backfill are assigned the same source term as NAG waste rock. Following submergence, the same source term is assigned to the pore water chemistry assuming that pore waters equilibrate with the same previously formed secondary minerals. Over time, leaching of these minerals will result in decreasing concentrations; however, this process has not been quantified and it is conservatively assumed that constant pore water chemistry will be maintained in perpetuity.

5.8 Pit Walls

5.8.1 Method

Similar to the approach outlined in SRK (2016), pit wall source terms prior to flooding consider the loading from weathering of rubble in exposed walls. Walls covered by waste rock backfill are not assigned a loading because the reactive surface area in waste rock far exceeds that in the rubble on pit walls.

The process of flushing walls by rising water levels was not considered because the relative volume water involved and flushing of pit walls weathering under non-acidic conditions will be small relative to ongoing flushing of exposed walls and flushing of backfilled waste rock.

Pit walls covered by water are also assumed to yield negligible loading because oxidation processes are effectively altered by a water cover. Ongoing leaching may occur (as described for waste rock backfill) but the volume involved is relatively small.

The load of parameter *i* released by weathering of rubble on pit benches (W_i) is calculated from:

$$W_i = M \cdot R_i \cdot k_O \cdot k_T \cdot k_p$$

Where R_i is the rate of release indicated by HCTs scaled to allow for oxygen availability (k_O), differences in temperature (k_T), and differences in reactive surface area (k_p), and applied to as mass M. Mass is calculated on a per m^2 planar wall basis, using a rock density (ρ) and an assumed reacting thickness (h):

$$M = 1 \cdot h \cdot \rho$$

The load leached (L_i) is calculated from:

$$L_i = W_i \cdot k_c$$

k_c is a factor to account for incomplete leaching of weathering products.

The resulting concentration [M_i] in wall area runoff over infiltration area, I, is obtained:

$$[M_i] = \frac{L_i}{I}$$

Concentrations obtained for non-acidic walls are constrained to the NAG waste rock if concentrations greater than for NAG waste rock are obtained. For PAG walls, concentrations were not constrained assuming that low pHs will result in high solubility of secondary minerals.

5.8.2 Inputs

R_is for non-acidic conditions were estimated from three humidity cells (HC14, HC15, and HC16) performed on Springer Pit rock and two humidity cells (HC (3) and HC (4)) performed on WX Zone rock (Table 5). The average of the five tests was used to estimate R. Scaling factors used for k_O, k_T, k_p, and

k_C were 1, 0.3, 0.1, and 1, respectively, and assume that oxygen is not limited, temperatures are lower under site conditions, rock is coarser than humidity cells, and weathering products are completely leached.

No naturally progressing humidity cells have yielded acidic leachate for MPM but rates obtained from HCTs on Pond Zone rock forced to generate acid by stripping of carbonate (HC12 and HC13 in Table 5) were used to estimate an acidic source term. Since these samples were selected to evaluate oxidation rates following carbonate depletion for samples containing lower sulphide in the Pond Zone, the HCT weathering rates $R_{i,HCT}$ were scaled to sulphide concentrations in the acidic Springer Pit walls ($S_{i,Wall}$) using:

$$R_{i,acid}=R_{i,HCT}\left(\frac{S_{acid,wall}}{S_{HCT}}\right)$$

$S_{acid,wall}$ was estimated from the blast hole cuttings database from the Springer Pit. For each PAG sample in the database, the sulphur remaining following depletion of all NP was calculated from the measured sulphide content (S_0) and carbonate content ($NP_{TIC,0}$) and the rate ratio for depletion of carbonate (R_{ratio}):

$$S_{acid,wall}=S_0-\left(\frac{NP_{TIC,0}}{R_{ratio}\cdot 31.25}\right)$$

R_{ratio} is equivalent to the PAG/NAG segregation criterion of 2. The 95th percentile of the resulting distribution of $S_{acid,wall}$ was calculated to be 2.3% compared to the 95th percentile of measured values of 2.8%. The resulting rates are shown in Table 7.

Probabilities cannot be attached to the resulting acidic source terms, which should be applied to assess proximity to potential trigger levels but not probability of exceedance to water quality objectives. Further refinement of these source terms may be possible if HCTs of Springer 6 and WX Zone yield acidic leachates, however current laboratory weathering rates indicate acid generation for these HCTs may be on the order of years to decades.

The weathering thickness (h) was set to 2 m to be equivalent to typical over-blast thickness. The bulk density, ρ, was used as 2.65 t/m^3.

Total annual precipitation of 620 mm/year (MPMC 2022) was used to estimate infiltration of 560 mm/year assuming that 90% of precipitation contacts wall rocks.

Table 5: Humidity Cell Rates (mg/kg/wk) Used for Pit Wall Terms

HCT	Zone	Alkalinity	SO_4	Al	As	Cd	Ca	Co	Cu	Fe	Pb	Mg	Mn	Mo	Ni	Se	U	Zn
HC-12	Pond	0	14	0.063	0.0014	0.000078	2.6	0.0037	0.068	0.037	0.00010	0.52	0.19	0.00038	0.0013	0.0030	0.000050	0.056
HC-13	Pond	0	4.6	0.025	0.000058	0.000035	1.2	0.0051	0.088	0.0054	0.000043	0.22	0.12	0.00013	0.0011	0.00014	0.0000044	0.011
HC-14	Springer	18	3.2	0.022	0.00068	0.000029	7.2	0.000031	0.0024	0.018	0.000037	1.0	0.0020	0.0067	0.000052	0.0064	0.000068	0.0014
HC-15	Springer	6.3	12	0.17	0.00013	0.0000048	7.2	0.00013	0.0061	0.063	0.00014	0.12	0.0028	0.0042	0.000054	0.00017	0.000035	0.0013
HC-16	Springer	13	0.92	0.068	0.00063	0.0000051	4.0	0.000013	0.00089	0.0039	0.000028	0.38	0.00034	0.0022	0.000046	0.00019	0.000032	0.0010
HC-17	Springer	8.2	9.9	0.039	0.00036	0.0000194	7.2	0.000015	0.0010	0.0038	0.000045	0.33	0.00124	0.0427	0.000093	0.00082	0.000095	0.0010
HC-18	Springer	7.5	18	0.021	0.00044	0.0000162	9.1	0.000020	0.0013	0.0038	0.000141	0.29	0.00138	0.0333	0.000103	0.00124	0.000188	0.0014
HC-19	WX	7.0	10.5	0.030	0.00041	0.000012	5.8	0.000011	0.0007	0.0037	0.000060	0.21	0.0015	0.018	0.000091	0.00067	0.000164	0.0010
HC-20	WX	7.9	15	0.022	0.00055	0.000025	9.0	0.000004	0.0011	0.0055	0.00005	0.31	0.0003	0.060	0.00012	0.0006	0.00018	0.0014

Sources: https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/Source_Terms/Source_Terms_CAPR002434_Rev00_SJL.xlsx

5.8.3 Results

Pit wall source terms of non-acidic and acidic walls are shown in Appendix C.

5.9 Ore Processing

5.9.1 Method

The method and resulting source terms are the same as presented in SRK (2016). The mass leached from ore as it is processed was calculated from shake flask extraction test data. Concentrations in the shake flask tests (in mg/L) were converted to mass leached as (mg/t) by multiplying by factors of 3 L/kg which is the leach ratio in the test, and 1000 kg/t. The mass leached is used to determine the load added to the process water from each tonne of rock processed.

5.9.2 Inputs

Shake flask data from characterization of eight samples from four ore stockpiles were used (SRK 2015b). The data were used to calculate 5th, 50th and 95th percentile of the loads leached. Since the rock in the stockpiles varied in age from one to nine years, they were not representative of freshly blasted ore. To account for this, the 5th percentile was used to indicate leaching of freshly blasted ore and the 95th percentile was used for processing of the stockpiles.

5.9.3 Results

The resulting source terms are provided in Appendix D.

5.10 Tailings

5.10.1 Method

Tailings source terms were developed for operating conditions (i.e., when tailings are being discharged) and closure conditions when contact waters are assumed to represent oxidation of tailings following draindown of process waters. Re-flooding resulting from reactivation of the impoundment would result in seepage chemistry intermediate between these conditions.

For operational conditions, observed seepage chemistry from tailings dam drains was assumed to be representative of future tailings contact water. Seepage chemistry is assumed to reflect mainly the influence of entrained process water with less influence from oxidation of tailings. Since localized influence from groundwater and non-contact surface can be expected, the range of concentrations assumed was the 95th and 99th percentiles.

For closure conditions, the preferred approach was to obtain direct chemistry from contact waters in the current unsaturated zone because these would likely represent the conditions when the tailings are fully drained down. No suitable monitoring locations were identified with likely contact water chemistry, so data from the tailings columns were used, similar to the approach outlined in SRK (2016).

Interpretation of leach column data (see below) indicated that early chemistry provided a good indication of contact water chemistry reflecting the influence of oxidation processes. The following method was used to estimate contact water chemistry for drained down tailings:

- The 95th and 99th percentile concentrations of column data were calculated (for alkalinity, the 5th and 1st percentile, respectively, were used).
- For the majority of parameters, drain down chemistry was characterized by the column data percentiles.
- For selenium, interpretation of the column data resulted in the conclusion that attenuation of selenium may be occurring in the early stages of testing as a result of reductive process converting selenate to selenite. To address this possible effect, selenium concentrations were calculated using the sulphate statistics and the range of Se/SO_4 ratios indicated by later data:

$$[Se] = \left(\frac{Se}{SO_4}\right)_{ratio} \times [SO_4]$$

- The equivalent dam drain percentile was used for ammonia because it was not measured in column leachates.
- Manganese concentrations were markedly lower in column leachates compared to seepage. This difference may reflect that conditions in desaturated tailings favour lower mobility of manganese, but the seepage data were selected.

5.10.2 Inputs

Seepage data statistics were calculated for all seepage collection points collected between 1998 and 2022 (Table 6).

Seepage and column data were evaluated for solubility controls using the same approach as waste rock (Section 5.3). Sulphate concentrations in the early column data were close to 2000 mg/L and found to yield gypsum saturation indices near 0, and therefore consistent with solubility control by gypsum (Figure 14). Seepage saturation indices tended to be well below 0. Other parameters showing possible secondary mineral controls were copper (tenorite) and molybdenum (calcium molybdate). Based on similar reasoning as waste rock, the early column data appear to indicate secondary mineral solubility controls for these elements and provide a good indication of the solubility of other elements.

Table 6: Tailings Seepage Statistics

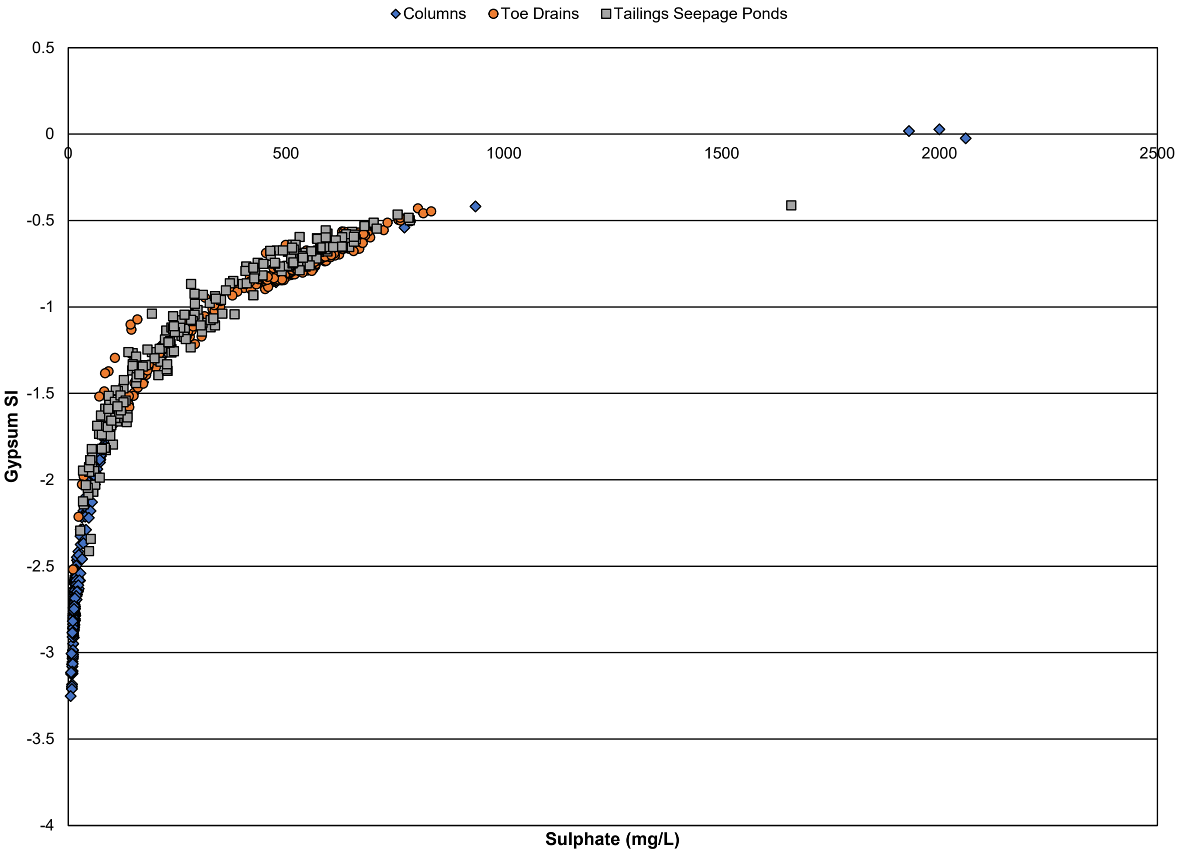
Statistic	Type	n	pH[1]	Alkalinity[1]	Cl	F	NO_3	NO_2	SO_4	Al-D	As-D	Cd-D	Ca-D	Co-D	Cu-D	Fe-D	Mg-D	Mn-D	Mo-D	Ni-D	Se-D	Zn-D
				mg/L	mg/L	mg/L	mg-N/L	mg-N/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
P95	Toe Drain	802	7.2	62	29	1.0	4.6	0.29	680	0.007	0.0024	0.00030	210	0.0016	0.013	0.40	29	1.2	0.29	0.0012	0.019	0.018
	Seepage Pond	417	7.3	65	26	0.80	9.4	0.18	650	0.036	0.0027	0.00019	220	0.00063	0.013	0.14	35	0.49	0.25	0.0016	0.037	0.014
P99	Toe Drain	802	6.9	52	31	1.1	6.4	0.39	780	0.044	0.0033	0.00033	240	0.0022	0.025	0.47	33	1.6	0.39	0.0017	0.032	0.026
	Seepage Pond	417	7.0	48	30	0.84	16	0.26	760	0.10	0.0031	0.00027	240	0.00085	0.025	0.25	42	0.83	0.30	0.0042	0.062	0.038

Sources: https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/Source_Terms/Source_Terms_CAPR002434_Rev00_SJL.xlsx

Notes:

[1] Statistics reported for pH and alkalinity are 5th percentile (for P95) and 1st percentile (for P99).

Figure 14: Gypsum Saturation Indices for Tailings Seepage and Column Data

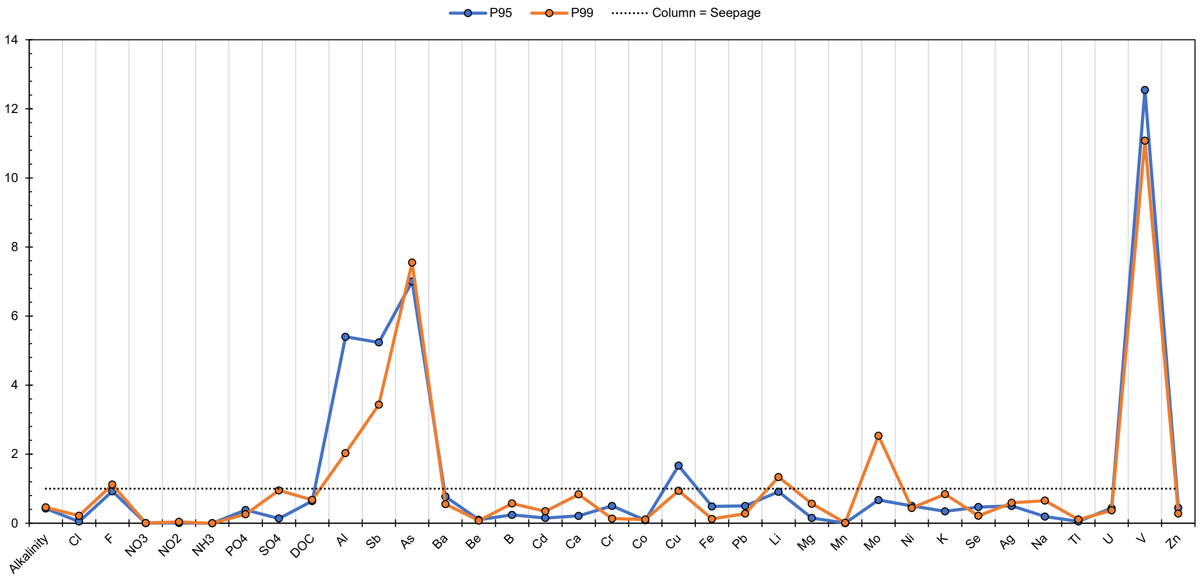


Sources: https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/Source_Terms/Source_Terms_CAPR002434_Rev00_SJL.xlsx

Figure 15 shows the ratio of Column to Seepage for the two statistics. The columns showed higher concentrations than seepage for some elements (Al, As, Sb, V), but were within an order of magnitude for all except arsenic. The high concentrations of arsenic (> 0.01 mg/L) in the column leachates were not associated with an initial flush and may be evidence of some desorption during testing. Concentrations have been < 0.01 mg/L since cycle 233.

Most parameters linked to acid generation and neutralization processes (SO_4, Ca, Mg) and related elements (Cu, Mo, Se) are now similar to or lower in the columns compared to what was reported in SRK (2016), reflecting depletion as the tests proceeded. Those lower in column data also include nitrogen forms (which would be introduced by leaching in the process plant), and manganese and iron. Manganese and iron may be higher in seepage due to reducing conditions in drains.

Figure 15: Comparison of P95 and P99 Statistics for Ratio of Column/Seepage



Sources: https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/Source_Terms/Source_Terms_CAPR002434_Rev00_SJL.xlsx

5.10.3 Results

Tailings source terms are provided in Appendix E.

5.11 Magnetite Stockpiles

No separate source term was developed for the magnetite stockpiles. Relative to other sources, these stockpiles are not expected to be significant sources.

5.12 Nitrogen Leaching

Nitrogen leaching was included for each source term as follows:

- **Waste Rock:** Nitrogen sources terms were developed from existing seepage by grouping waste rock dumps into active (PAG Ex-Pit and SERDS), and inactive (Boundary Dump and NEZ Dump). For each group, mean concentrations and 95% confidence limits on the means were calculated to consider uncertainty (Table 7).
- **Pit Walls:** Pit walls were assumed to have zero contribution due to the small mass involved and expected results of meteoric leaching which is expected to result in any leaching effects having short duration and being insignificant relative to waste rock reporting to pit water sumps.
- **Backfill:** Backfill source terms are the same as those for waste rock (Table 7).

- **Ore Processing:** Leaching of nitrogen forms by processing were based on the shake flask extraction data (Appendix D).
- **Tailings:** Tailings source terms are based on the observed seepage for operational conditions and column data for draindown conditions (Appendix E).

Table 7: Waste Rock Nitrogen Source Terms

Phase	Statistic	Ammonia	Nitrate	Nitrite
		mg-N/L	mg-N/L	mg-N/L
Inactive	Low 95% Confidence Limit	0.013	0.84	0.0065
	Mean	0.027	1.6	0.0078
	Upper 95% Confidence Limit	0.04	2.4	0.0092
Active	Low 95% Confidence Limit	0.017	19	0
	Mean	0.057	26	0.38
	Upper 95% Confidence Limit	0.098	33	1.0

Sources: https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/Source_Terms/Source_Terms_CAPR002434_Rev00_SJL.xlsx

6 Conclusions

This report presents source term geochemical predictions that are inputs into the site wide water quality model. The main conclusions that provided input into the source terms are:

- While several ore zones at MPM have been mined since 1997, all except the relatively small Pond Zone are alkalic porphyry mineralization centred on magmatic-hydrothermal breccia bodies with similar geological characteristics. The host rock for the mineralization is the MPIC which is mainly monzonite (MPMC 2025). The similarities of the mineralized zones, including their host rocks (SRK 2025a), indicate that source terms can appropriately be developed on a site-wide basis rather than considering significant differences between the zones.
- As a result of geochemical segregation of waste rock based on ARD potential through the mine life, PAG waste rock has been or will be placed in open pits where it will be permanently flooded thereby preventing ARD from developing.
- It is expected that operational inefficiencies will have resulted in PAG waste being incorporated into the NAG waste rock, but the segregation approach was conservative and mass balance excess of acid neutralizing minerals over acid generating minerals means that future development of ARD is unlikely. Weathering conditions are predicted to be pH-basic in perpetuity.
- Tailings are non-PAG (SRK 2025a).
- As a result of the pH-basic weathering conditions, chemistry of seepage from the existing full-scale facilities reflects solubility limits for weathering minerals. Chemistry is affected by dilution which was corrected using the solubility limit of gypsum.

Closure

This report, Mount Polley Mine Geochemical Source Terms – 2025 Update, was prepared by

March 13, 2025

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EGBC Permit to Practice: 1003655

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

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Appendix A ML/ARD Management Procedure Manual

Prepared by Mount Polley Mining Corporation

MOUNT POLLEY MINING CORPORATION
IMPERIAL METALS CORPORATION

ML/ARD MANAGEMENT PROCEDURE MANUAL

OBJECTIVE

The objective of this Metal Leaching/Acid Rock Drainage (ML/ARD) Management Procedure Manual is to provide detail on how ML/ARD potential is considered in material management at the Mount Polley Mine (MPM). This document summarizes all the various procedures and considerations related to ML/ARD potential through mine life processes.

DOCUMENT REVISION HISTORY

This document replaces earlier versions of similar documents that directed ML/ARD Management at MPM in response to *Mines Act* Permit M-200 issued on August 3, 1995. The procedures as described have been in the place since that date.

Document Update Summary

Revision Date	**Author**	**Comment**
June 30, 2016	Chad Cameron Ben Harding Katie McMahen Luke Moger Ryan Brown Stephen Day (SRK)	Original Document
August 04, 2022	Mathieu O'Leary Gabriel Holmes Aaron Zwiebel (DWB) Shauna Litke (SRK)	Added contacts, water treatment plant waste ML/ARD characterization, QA/QC sampling, and PAG misplacement action plan.

KEY CONTACTS AND QUALIFIED PROFESSIONALS

Numerous personnel at Mount Polley are responsible for carrying out the procedures written in this plan. Key mine personnel and their contact information are as follows.

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Any update to this document is reviewed by a Qualified Professional (QP) in the area of practice of ML/ARD management, as required by *Mines Act* Permit M-200 Condition A.5. Qualified professionals reviewing this document are as follows:

Version	Qualified Professional	Phone	Email
June 30, 2016	Stephen Day, PGeo (SRK)	604-862-4097	sday@srk.com
August 04, 2022	Shauna Litke, PEng (SRK) Stephen Day, PGeo (SRK)	604-235-8542 604-862-4097	slitke@srk.com sday@srk.com

BACKGROUND

Metal leaching and acid generation are naturally occurring chemical processes which may have negative impacts on the receiving environment. The potential environmental impact of ML/ARD will depend on their magnitude, the sensitivity of the receiving environment, dilution and/or attenuation, as well as any mitigation measures that are in place.

Metal leaching occurs as a result of: weathering of metal-containing minerals (i.e., exposure to water and oxygen), drainage conditions that increase solubility, and flow of water through source materials. Acid generation occurs when minerals containing reduced sulphur (e.g. sulphide and elemental sulphur) are exposed to the weathering effects of oxygen and water. In iron sulphide minerals (e.g. pyrite) acidity is also generated when ferric iron precipitates. Other minerals in the source rock, primarily calcium and magnesium carbonates can neutralize the acid. ARD occurs when the amount of acid-generation exceeds the ability of the source rock to neutralize this acid. Any surplus acid is entrained in water and can create acidic and metal-containing run-off.

Pre-mining and operational geochemical characterization has shown that ARD potential at MPM is restricted due to the abundance of acid-consuming carbonate minerals compared to acid generating sulphide minerals. In addition, the presence of natural carbonate and oxide copper minerals in the pre-mining weathering zone reinforce the expectation that weathering conditions are dominantly basic. However, due to the potential consequences of acid generation for long term management of the site, Mount Polley Mining Corporation (MPMC) actively manages waste rock based on its ARD potential as described in the following sections.

MPMC has focused on managing potential for ARD due to the link between acid generation and enhanced solubility of copper which is expected to be the primary concern for ML. Selenium leaching has also been identified as occurring at MPM. Selenium is released by oxidation of sulphide minerals but leaching is not necessarily associated with pH depression. Selenium leaching occurs regardless of whether waste rock is classified as potentially ARD generating (PAG) or non-PAG (referred to as NAG at MPM).

UNDERSTANDING OF THE DISTRIBUTION OF ARD POTENTIAL

Like other alkalic porphyry deposits (e.g. Copper Mountain, Brenda), MPM lacks the strong hydrothermal alteration zoning that is commonly observed in calc-alkalic porphyry deposits (e.g. Highland Valley Copper, Island Copper, Gibraltar). In particular, phyllic alteration is absent at MPM. A common feature of calc-alkalic porphyry deposits is often a pronounced pyritic halo that surrounds the copper mineralization and is associated with phyllic and propylitic alteration. At MPM, discontinuous pyritic zones are present but do not appear to be mineralization halos. MPMC geological staff identified a pyritic zone in the south wall of the Springer Pit which extends into the adjacent Cariboo Pit.

This ML/ARD Management Procedure Manual applies to waste rock and ore stockpiles. Tailings are consistently NAG due to removal of copper sulphides by ore processing.

MANAGEMENT OF PAG ROCK

Best practice for management of PAG rock is subaqueous disposal in a configuration that provides permanent and low maintenance containment. At MPM, this has been implemented by disposing of waste rock in completed open pits that will subsequently fill with water. Mine planning is carried out at MPM such that the open pits have sufficient capacity that PAG material can be re-handled into the open pits and stored subaqueously at closure. The following pits are available for subaqueous disposal (in sequence):

- Cariboo Pit
- Bell Pit
- Pond Zone Pit
- Southeast Zone Pit
- Wight Pit
- Cariboo-Springer Pit.

For the Springer Pit, backfill locations are not currently available. The PAG rock is therefore stockpiled adjacent to the open pit in the Temporary Northwest PAG Stockpile for backhauling to the Cariboo-Springer Pit upon completion of mining.

For the small Pond Zone Pit, low sulfur PAG waste rock is layered with NAG waste rock.

Onset of acidic conditions in waste rock at MPM takes at least decades as shown by humidity cells, and the lack of acidification in the natural exposure of the deposit indicates that flooding of PAG waste rock does not need to be immediate. The current approaches of backfilling into dry pits and stockpiling following by backfilling allows PAG rock to be submerged before it acidifies.

DETERMINATION OF ML/ARD POTENTIAL

Waste rock on site is separated into two categories, NAG and PAG, using Neutralizing Potential Ratio (NPR) defined as:

NPR = NP/AP.

Acid Potential (AP) (in kg $CaCO_3$/t) is measured from:

- Total sulphur (%) x 31.25

Neutralizing Potential (NP) (in kg $CaCO_3$/t) is measured from total carbonate NP determined from:

- Total carbon (%C) x 83.33.

Due to the dominantly intrusive rock host at MPM, total carbon is an appropriate proxy for carbonate.

As required by *Mines Act* Permit M-200, PAG is defined as:

- $NPR \leq 2$ and total $S > 0.1\%$.

This *Mines Act* Permit M-200 requirement was specified in terms of NP determined by a whole-rock acid extraction and titration method; however, MPMC chose to use total carbonate which yields lower NP than the titration methods.

MATERIAL CHARACTERIZATION OVERVIEW

This section provides an overview of characterization procedures.

The MPM program characterizes all material types that will be handled during the mine life. Analysis is completed on site by Mount Polley's LECO™ instrument , allowing MPMC to best manage mine waste by directing it to suitable storage sites, or to construction usage when required (and if deemed suitable).

On each bench, a sample of cuttings is collected from each blast hole and analyzed for total copper, non-sulphide copper, iron, and gold. Areas of ore and waste are identified by interpolation of these assay results and the economic analysis of the resulting metal grades. Ore/waste boundaries are then established based on the calculated mill head values.

In areas which have proven to be consistently NAG on previous adjacent benches in blasthole samples, the waste tonnage in each blast is divided by 40,000 in order to determine the number of ABA samples to be submitted (i.e., one per 40,000 tonnes (t) of waste). However, in areas where PAG has been modelled through either exploration sampling, or results of previous blasthole sampling on other benches, (or where NAG and PAG may coincide), the sample density is doubled to one per 20,000 t. This approach results in greater sampling density in areas of suspected NAG/PAG boundaries, and increases the certainty of defining PAG. Typically structures at MPM are vertically oriented, and relatively continuous. This provides some assurance that blasthole samples from previously mined benches have relevance for determining where additional samples should be taken on new benches.

Any ore that will be stockpiled rather than processed immediately is sampled at a frequency of one (1) per 20,000 t to determine if it is classified as PAG or NAG. Millfeed ore areas are excluded from ABA analysis, as this material is processed through the Mill.

Composite tailings samples are collected and analyzed every month when processing of ore occurs to represent the tonnage of tailings deposited.

Water treatment wastes are quantified monthly and sampled quarterly, with material characterization performed to assess ML/ARD potential and contribute to a material inventory.

As a confirmatory sampling measure, the Environmental Department takes random weekly grab samples from the NAG waste dump when NAG is being dumped and/or used for construction, to verify that material is being appropriately characterized and handled.

In the event that a confirmatory sample or other activities result in the discovery of PAG material in a NAG-designated area, a QP is to be informed without delay, who will dictate the response actions in coordination with site contacts. Mount Polley is permitted to blend pockets of less than 1,000 t of PAG materials with non-PAG materials at a ratio of 20:1, as described in *Mines Act* Permit M-200 Section D.3.(c)(i)(d). If these conditions cannot be met, it may be necessary to remove PAG material from NAG areas.

Water chemistry monitoring of seepage from rock dumps, water treatment plant wastes, and contact water from the site water collection systems is also conducted by the Environmental Department to inform development of geochemical source terms and long-term water quality predictions. Similarly, tailings composites and monthly random drill pulp samples are sent to a third-party laboratory for metals analysis as an additional source of data for site geochemical models.

IN-PIT SEGREGATION

Blasthole Samples:

1. After the production drill has completed and moved away from the hole, the sample may be taken.
2. Using a tube sampler, the Driller will take a representative sample of the cuttings pile.
3. Samples are to be collected in a clean plastic sample bag.
4. The Driller is to complete a Blasthole Sample Tag, tearing off the tag once completed and inserting it into sample bag.
5. The sample bag is to be tied off using ribbon.

6. In the case where multiple composite samples are to be taken from a single hole, the remaining cuttings after the sample are to be removed by the Driller so a clean new pile of cuttings can be formed.
7. Completed samples are to be left on the drill by the Driller. At the end of shift, the Mine Operations Pit Supervisor (or designate) will collect all samples and deliver them to the Bucking Room.

Bucking Room:

1. Each sample is to be transferred from the sample bag to a clean metal tray. The Blasthole Sample Tag is to be kept with the sample.
2. The sample is to be dried at 105°C.
3. The sample is then to be crushed in the Primary Crusher.
4. The sample is then to be crushed in the Fine Crusher.
5. The sample is to be split until the sample size is approximately 200 g.
    a. Reject from the sample is to be wasted.
6. The sample is then to be pulverized for 75 seconds.
7. The sample is to be placed in a pouch with the Blasthole Sample Tag stapled to the pouch.
8. If the pouch is a pit sample, it is to be sent to Assay Lab 1. If the sample is an ABA sample, it is to be sent to Assay Lab 2.

Assay Lab 1:

1. The Assay Lab is to run the sample through the atomic absorption analyzer which automatically transfers the copper (CU), non-sulphide copper (CUNS) and iron (FE) values into the LIMS database.
2. The samples for gold analysis are to be fire assayed and analyzed by atomic absorption which automatically transfers the gold (AU) value into the LIMS database.
3. The sample is then to be placed into storage. Pit samples are to be stored for 21 days.

Ore Control Technician 1:

1. Once assays have been entered into the LIMS database, the Ore Control Technician will review the data and roughly determine where in the blast any Mill Feed Ore will be located.
2. Once the Ore Control Technician drafts the Mill Feed Ore locations, the Ore Control Technician will evenly select holes in the non-Mill Feed Ore areas (including materials designated for ore stockpiles) at a ratio of one (1) sample per 20,000 t of rock. This equates to about one for every nine blast holes. Additional samples can be requested whenever additional data is desired for improving understanding of the geological conditions. An example of a sample layout is included as Figure 1.

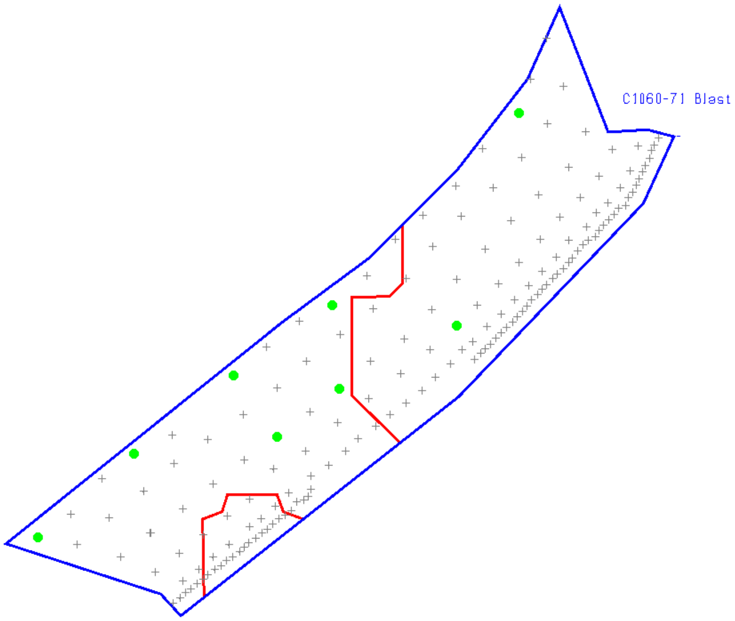

Figure 1: Location of ABA samples (green dots) within a blast. Red polygons denote mill feed ore, remainder is waste. The Ore Control Technician focuses sampling on areas which are designated waste and/or stockpile ore by the blasthole model. Reference blast = 149,173 t.

3. The Ore Control Technician is to then make an Analysis Request with the holes selected to the Assay Lab.

Assay Lab 2:

1. If the Assay Lab receives an Analysis Request, they will retrieve the sample pouch from storage, otherwise the sample will be delivered to the Bucking Room.
2. The Assay Lab will run the sample through the LECO CS230 Carbon Sulphur Analyzer.
3. Once analyzed, the machine transfers the carbon percentage (C%) and the sulphur percentage (S%) to a spreadsheet where NPR, NP and AP are calculated.
4. The NPR, NP, AP, C% and S% are transferred automatically to the LIMS database.
5. The sample is then to be placed into storage. ABA samples are to be stored for 14 days.

Ore Control Technician 2:

1. Once all the assays and ABAs have been entered into the LIMS database, the Ore Control Technician is to review the data and model the blast.
2. Modeling the blast
    a. The software used is MineSight.
    b. The model is based on a 5 metre (m) x 5 m x 12 m block system.
    c. The block closest to the ABA sample will closely match the sample.
    d. The blocks between the samples receive a weighted average of the sample carbon and sulfur grades.

   e. Once each block gets the weighted C% and S%, then the AP, NP and NPR is calculated for each block.
   f. Using the calculated NPR value, the model is to be coded as Ore/NAG/PAG by the Ore Control Technician and the resulting markup design is to be provided to the Surveyor.
3. The Ore Control Technician is responsible for the release of the final ore markup to the Surveyor. An example of a sample layout is included as Figure 2.

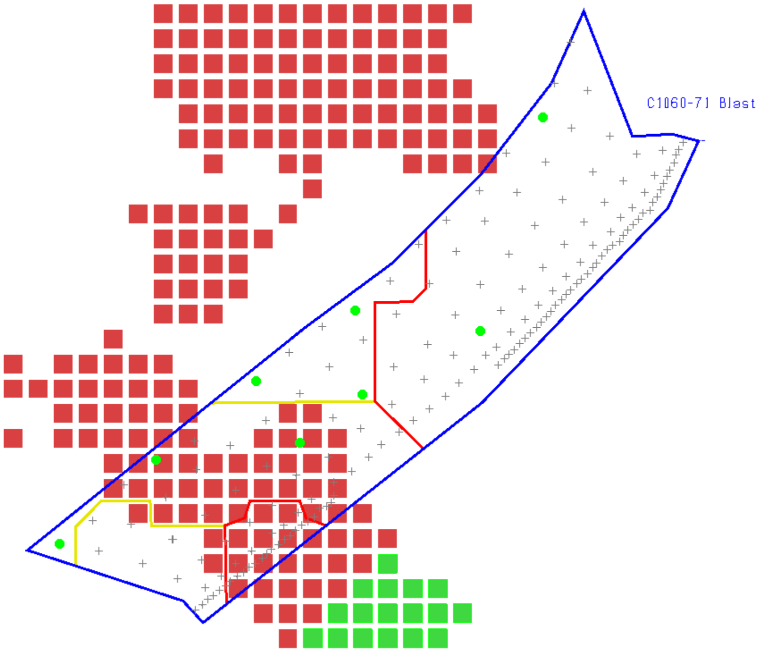

Figure 2. ABA results from samples shown in Figure 1 are used to update the blasthole PAG model item which identifies blocks which meet PAG criteria (red). The Ore Control Technician then marks up the PAG waste (yellow polygon) and the complete ore/waste markup is released to the Surveyor.

Surveyor:

1. The Surveyor will be responsible for the layout all Ore/NAG/PAG, as determined by the Ore Control Technician, in the field.

2. Using four (4) foot stakes spaced approximately 5 m apart, the Surveyor will mark out the contacts using marked placards.
   a. Red Placard = High Grade Ore
   b. White Placard = Super High Grade Ore
   c. Green Placard = Low Grade Ore
   d. Yellow Placard = PAG
   e. Blue Placard = NAG
   f. Pink Ribbon = High Grade Mill Feed Ore
3. Once complete, the Surveyor will print out maps of the area delineating material types for the shovel operator(s), and, if required, provide field verification of material types.

MATERIAL HANDLING

Shovel/Haul Truck Operators:

1. The Shovel Operator will mine the rock, following the contacts laid out by the Surveyor.
2. The Shovel Operator will ensure that all material contained within the contact stakes is routed as described by the markup and that any uncertainty in material classification is resolved by seeking the assistance of either the Pit Supervisor or the Engineering Department.
3. Upon loading a haul truck, the Shovel Operator shall direct the Haul Truck Driver as to the material type being hauled, and destination, using a horn sequence. The Haul Truck Driver will then take the material to the designated area.

IN-PIT MONITORING

Shovel Operator:

The Shovel Operator follows the staking of the Surveyor. Any material marked out as PAG is only to be hauled to approved locations. If a discrepancy is found, the Surveyor is to be called out to verify the material markup.

Pit Supervisor:

Throughout the shift, the Pit Supervisor will check in with the Shovel Operator and confirm the material type being loaded and that the destination is correct.

Haul Truck Driver:

If the Haul Truck Driver is uncertain of the material loaded, the Haul Truck Driver will confirm with the Shovel Operator or the Pit Supervisor.

Ore Control Technician:

The Ore Control Technician is to check Shovel Operator dig faces and confirm that the markup is appropriate and material is being routed appropriately.

Surveyor:

The Surveyor is to verify that material staking is visible and correct.

Environmental Department:

Once a month, the Environmental Department is to send a randomly selected drill hole pulp sample that MPMC analyzed for total sulfur and total carbon at the Assay Lab to a third-party laboratory (typically ALS Environmental in Burnaby, BC) for element analysis by ICP-MS following aqua regia digestion as an additional source of data to support site geochemical models.

Additionally, the Environmental Department takes water samples from all pit sumps to inform long-term geochemical predictions. Samples are collected as per MPMC-SOP-002: Surface Water Quality Monitoring. Monitoring locations and frequencies are regularly updated to reflect site developments and are summarized in the Comprehensive Environmental Management Plan.

TAILINGS MONITORING

Mill Metallurgy

1. The Mill Metallurgy Department is to take a monthly composite sample of the tailings generated through the month.
    - Slurry is to be sampled every two (2) hours and made into a composite for the shift.
    - The shift composite is then to be added to a monthly composite.
    - At the end of the month, the monthly composite is to be given to the Bucking Room and prepared for ABA total sulfur and carbon analysis.
2. The Environmental Department is to send the monthly tailings composite sample to a third-party laboratory (typically ALS Environmental in Burnaby, BC) for element analysis by ICP-MS following aqua regia digestion to provide data for site geochemical modelling.

WATER TREATMENT PLANT WASTE

Environmental Department:

1. Record the value on the waste line totalizer monthly when Water Treatment Plant (WTP) data are downloaded.
2. Collect samples of waste which has exited the WTP quarterly to characterize WTP wastes. Samples shall be taken of material that has exited the sludge line, to the West of the WTP and down-flow from where microsand is cycloned for re-use.
3. Sampling Method for liquid wastes (adapted from MPMC-WORK-002):
    - Record in-situ measures: pH, temperature, conductivity, and turbidity.
    - Take a water sample from the pipe outflow and send for lab analysis corresponding with other contact water samples as described in the Comprehensive Environmental Monitoring Plan, including but not limited to: physical parameters, pH, total and dissolved metals.
4. Sampling method for solid wastes (adapted from MPMC-WORK-016):
    - Take a composite sample of solids from the sludge pile adjacent to the WTP, with samples from at least 5 locations on the pile.
    - Send to an external laboratory for total sulfur, total inorganic carbon, elemental analysis by ICP-MS following aqua regia digestion and shake flask extraction testing to assess the ML/ARD potential of solids.
5. Review and archive lab data in a timely manner for use by personnel responsible for the Annual Reclamation Report.
6. The TSS concentration in wastewater will be used along with the waste line totalizer values to quantify the solids delivered to the TSF. The relationship between total and dissolved metals in the WTP waste line sample will be used to quantify the suspended (filterable) metals in this sample.

7. This information will be included in the MLARD materials inventory, and reported to EMLI in the Annual Reclamation Report as per Code Section 10.5.7 on water treatment wastes and by-products.

NAG MATERIAL MONITORING

Environment Department

1. As a confirmatory sampling measure, the Environmental Department is to take ABA grab samples from the NAG Dump and any area where NAG rock is used for construction on a weekly basis, while NAG dumping and/or NAG rock construction is occurring. Sampling will conform with MPMC-SOP-016: ABA and Soil Sampling.
2. To assure data quality, as recommended in the BC Field Sampling Manual, a minimum of one in ten samples will be a duplicate sample, as written in MPMC-SOP-016.
3. Seeps and contact water collected on site are sampled to provide data for site geochemical modelling. Samples are collected as per MPMC-SOP-002: Surface Water Quality Monitoring. The frequency and locations of these monitoring sites are updated regularly to reflect changes to the mine site are summarized in the Comprehensive Environmental Management Plan.

RESPONSE TO FINDING PAG IN NAG AREAS

Environmental Department

1. Upon reviewing data indicating PAG material has been found in a NAG area, without delay contact one or more Qualified Professionals listed in this document, and the Pit Supervisor or designate to pass along the relevant data and sampling location.
2. Return to the location where PAG material was discovered and stake the sampling location. Note that material may have been dozed, buried or pushed down the dump face, in which case personnel are to mark as close as possible.
3. At the discretion of Qualified Professionals, undertake additional ABA sampling to assess the prevalence of PAG material.

Pit Supervisor:

1. Discuss NAG/PAG separation with shovel and haul truck operators and investigate the possibility of a loading or dumping mix-up. This is not a punitive activity but meant to identify potential causes and estimate material volume.
2. At the discretion of Qualified Professionals, organize the removal of PAG material from the non-PAG area.

ML/ARD Qualified Professional
1. Work with site contacts to develop an appropriate plan of action to address the situation.
2. If it is not possible to demonstrate that PAG material meets conditions outlined in M-200 Section D.3.(c)(i)(d), it may be necessary to remove recoverable PAG material.

REVIEW OF RESULTS AND PROGRAM EFFICACY

Data collected and corresponding interpretation regarding the ML/ARD program are included in the Annual Environmental and Reclamation Report (AERR), due annually to the British Columbia Ministry of Environment and Ministry of Energy and Mines on March 31 of each year, reflective of the previous calendar year. Personnel responsible for the AERR may recommend updates to the ML/ARD program based on operational changes or findings of annual reporting. The AERR includes sections on: waste rock characterization and disposal; drainage water quality monitoring; and, updates to long-term predictions (kinetic testing).

Appendix B Waste Rock Source Terms

Table 8: Waste Rock Source Terms

	pH	Alkalinity mg $CaCO_3$/L	Cl mg/L	F mg/L	P-D mg/L	SO4 mg/L	Al-D mg/L	Sb-D mg/L	As-D mg/L	Ba-D mg/L	Be-D mg/L	Bi-D mg/L	B-D mg/L	Cd-D mg/L	Ca-D mg/L	Cr-D mg/L	Co-D mg/L	Cu-D mg/L
Median Cation Ratio																		
Boundary	7.0	110	10	0.63	0.37	1400	0.032	0.00046	0.0043	0.098	0.0019	0.00093	0.14	0.00014	490	0.00093	0.0022	0.018
Wight	6.9	63	10	0.41	0.023	1400	0.021	0.00039	0.0008	0.076	0.001	0.001	0.28	0.00036	400	0.00059	0.00096	0.037
NEZ Dump - Sulphur Stockpile	6.7	25	21	1.7	0.015	1600	0.9	0.00095	0.00076	0.079	0.0025	0.0013	0.13	0.0025	510	0.0013	0.034	15
All Non-PAG	7.0	43	13	0.59	0.071	1400	0.025	0.0026	0.0031	0.1	0.0018	0.00091	0.22	0.0012	500	0.00091	0.0042	0.028
All PAG - Pre-Acid	7.0	81	14	0.4	0.055	1400	0.072	0.00057	0.0025	0.15	0.001	0.001	0.37	0.0005	470	0.001	0.017	0.024
High Cation Ratio																		
Boundary	7.0	78	10	0.63	0.38	1400	0.032	0.00046	0.0043	0.099	0.0019	0.00094	0.14	0.00014	490	0.00094	0.0022	0.018
Wight	6.8	58	10	0.42	0.023	1400	0.022	0.00039	0.00081	0.077	0.001	0.001	0.28	0.00036	400	0.0006	0.00097	0.037
NEZ Dump - Sulphur Stockpile	6.1	9.7	40	3.1	0.029	3000	1.7	0.0018	0.0014	0.15	0.0047	0.0024	0.24	0.0047	970	0.0024	0.065	28
All Non-PAG	6.7	33	14	0.59	0.072	1400	0.025	0.0026	0.0031	0.1	0.0018	0.00092	0.22	0.0013	500	0.00092	0.0042	0.028
All PAG - Pre-Acid	6.7	52	14	0.41	0.055	1400	0.073	0.00058	0.0025	0.15	0.001	0.001	0.37	0.0005	470	0.001	0.017	0.024

	Fe-D mg/L	Pb-D mg/L	Li-D mg/L	Mg-D mg/L	Mn-D mg/L	Mo-D mg/L	Ni-D mg/L	K-D mg/L	Se-D mg/L	Si-D mg/L	Ag-D mg/L	Na-D mg/L	Sr-D mg/L	Tl-D mg/L	Sn-D mg/L	Ti-D mg/L	U-D mg/L	V-D mg/L	Zn-D mg/L
Median Cation Ratio																			
Boundary	0.61	0.00033	0.0056	78	0.94	0.13	0.00097	3.6	0.024	14	0.000019	17	6.7	0.00002	0.0005	0.038	0.0026	0.0026	0.0078
Wight	0.8	0.0001	0.0037	93	2.1	0.23	0.0022	4.0	0.062	7.2	0.00002	28	6.6	0.00002	0.0002	0.021	0.0048	0.002	0.018
NEZ Dump - Sulphur Stockpile	0.088	0.00025	0.028	98	2.1	0.38	0.035	3.5	0.3	7.7	0.00005	33	7.5	0.000064	0.0005	0.029	0.0023	0.0034	0.26
All Non-PAG	0.21	0.000091	0.013	99	1.8	0.44	0.0023	4.9	0.41	11	0.000018	30	7.0	0.00018	0.00018	0.019	0.0068	0.0029	0.15
All PAG - Pre-Acid	1.8	0.00013	0.0072	76	7.9	0.66	0.0017	7.0	0.24	9.5	0.000021	53	1.7	0.00002	0.0002	0.026	0.0027	0.0039	0.021
High Cation Ratio																			
Boundary	0.61	0.00033	0.0056	78	0.94	0.13	0.00097	3.6	0.024	14	0.000019	17	6.7	0.00002	0.0005	0.038	0.0026	0.0026	0.0078
Wight	0.81	0.0001	0.0038	93	2.2	0.24	0.0022	4.1	0.062	7.3	0.00002	28	6.6	0.00002	0.0002	0.021	0.0049	0.002	0.018
NEZ Dump - Sulphur Stockpile	0.17	0.00047	0.052	190	4.0	0.72	0.067	6.6	0.57	15	0.000095	62	14	0.00012	0.00095	0.055	0.0044	0.0065	0.49
All Non-PAG	0.21	0.000092	0.013	100	1.8	0.44	0.0023	5.0	0.42	11	0.000018	30	7.1	0.00018	0.00018	0.019	0.0069	0.003	0.15
All PAG - Pre-Acid	1.8	0.00013	0.0072	76	7.9	0.66	0.0017	7.0	0.24	9.6	0.000021	53	1.7	0.00002	0.0002	0.026	0.0027	0.0039	0.021

Sources: https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/Source_Terms/Source_Terms_CAPR002434_Rev00_SJL.xlsx

Appendix C Pit Wall Source Terms

Table 9: Pit Wall Source Terms

Case	Alkalinity	Cl	F	P-D	SO_4	Al-D	Sb-D	As-D	Ba-D	Be-D	Bi-D	B-D	Cd-D	Ca-D	Cr-D	Co-D	Cu-D	Fe-D
	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	mg/L
PAG Low	0	85	4.8	9.3	1300	4.6	0.0063	0.057	2.5	0.013	0.0035	2.3	0.0057	180	0.0083	0.54	11	1.5
PAG High	0	120	7.1	18	1800	5.2	0.011	0.11	3	0.02	0.0066	3.2	0.0066	190	0.0091	0.85	18	2.4
NAG Average	140	10	0.59	0.067	140	0.025	0.0017	0.0028	0.026	0.000078	0.000058	0.15	0.00025	110	0.00071	0.00067	0.022	0.14

Case	Pb-D	Li-D	Mg-D-D	Mn	Mo-D	Ni-D	K-D	Se-D	Si-D	Ag-D	Na-D	Sr-D	Tl-D	Sn-D	Ti-D	U-D	V-D	Zn-D
	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	mg/L
PAG Low	0.0069	0.19	32	13	0.018	0.14	21	0.1	380	0.0017	91	0.65	0.00067	0.012	0.038	0.002	0.018	2.7
PAG High	0.0072	0.28	32	15	0.031	0.2	30	0.19	510	0.0017	140	0.74	0.0009	0.017	0.042	0.0033	0.02	3.5
NAG Average	0.000092	0.0066	6.6	0.024	0.23	0.0011	1.8	0.03	11	0.000018	13	0.26	0.000026	0.00018	0.007	0.0014	0.003	0.019

Sources: https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/Source_Terms/Source_Terms_CAPR002434_Rev00_SJL.xlsx

Notes:

[1] MPMC estimates PAG rock above 1030 masl is 13%. Acidification will be progressive.

[2] Concentrations are "annual". Seasonal variation can be expected but these concentrations are intended to reflect seasonal worst for each case.

[3] Probabilities cannot be attached to the terms. Use the terms to assess proximity to trigger levels but not to assess probability of exceedance.

Appendix D Ore Processing Source Terms

Table 10: Ore Processing Source Terms

Case	Alkalinity	Cl	F	NO_3	NO_2	NH_3	PO_4	SO_4	DOC	Al	Sb	As	Ba	Be	B	Cd	Ca	Cr
	mg $CaCO_3$/t	mg/t	mg/t	mg-N/t	mg-N/t	mg-N/t	mg/t	mg/t	mg/t	mg/t	mg/t	mg/t	mg/t	mg/t	mg/t	mg/t	mg/t	mg/t
P5	73000	1500	11000	93	20	610	2800	33000	0	280	0.47	6.3	33	1.5	33	0.15	26000	1.5
P50	87000	1500	14000	230	26	810	2800	48000	0	480	1.2	9	42	1.5	39	0.15	30000	1.5
P95	92000	2800	15000	3600	33	1000	2800	96000	0	580	2.3	20	120	1.5	75	0.15	46000	1.5

Case	Co	Cu	Fe	Pb	Li	Mg	Mn	Mo	Ni	K	Se	Ag	Na	Tl	U	V	Zn
	mg/t	mg/t	mg/t	mg/t	mg/t	mg/t	mg/t	mg/t	mg/t	mg/t	mg/t	mg/t	mg/t	mg/t	mg/t	mg/t	mg/t
P5	0.3	3	90	0.3	15	2100	2.2	51	1.5	2900	12	0.15	12000	0.3	0.11	12	30
P50	0.3	8.1	90	0.3	15	4100	3.1	69	1.5	5800	49	0.15	14000	0.3	0.22	30	30
P95	0.3	26	90	0.3	15	5500	14	130	1.5	8100	61	0.15	18000	0.3	0.34	53	30

Sources: https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/Source_Terms/Source_Terms_CAPR002434_Rev00_SJL.xlsx

Appendix E Tailings Source Terms

Table 11: Tailings Source Terms

Case		Alkalinity	Cl	F	NO$_3$	NO$_2$	NH$_3$	PO$_4$	SO$_4$	DOC	Al-D	Sb-D	As-D	Ba-D	Be-D	B-D	Cd-D	Ca-D
		mg CaCO$_3$/L	mg/L	mg/L	mg-N/L	mg-N/L	mg-N/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Seepage	P95	63	29	1.0	9.3	0.27	0.2	0.029	700	6.9	0.017	0.00099	0.0026	0.087	0.001	0.18	0.00041	220
Seepage	P99	51	30	1.1	25	0.31	0.32	0.056	1200	9.3	0.069	0.0017	0.0032	0.15	0.0016	0.25	0.0006	370
Drained Down	P95	27	1.4	0.94	0.014	0.002	0.2	0.011	95	4.4	0.094	0.0052	0.018	0.067	0.0001	0.043	0.000061	47
Drained Down	P99	23	6.6	1.2	0.19	0.012	0.32	0.015	1100	6.3	0.14	0.0059	0.024	0.085	0.00012	0.14	0.00021	310

Case		Cr-D	Co-D	Cu-D	Fe-D	Pb-D	Li-D	Mg-D	Mn-D	Mo-D	Ni-D	K-D	Se-D	Ag-D	Na-D	Tl-D	U-D	V-D	Zn-D
		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	mg/L
Seepage	P95	0.001	0.0012	0.016	0.062	0.0001	0.011	34	1.0	0.3	0.001	19	0.036	0.00002	110	0.0002	0.004	0.002	0.0083
Seepage	P99	0.0038	0.002	0.048	0.24	0.0003	0.021	68	1.5	0.4	0.0022	21	0.16	0.00002	120	0.0002	0.0097	0.0031	0.023
Drained Down	P95	0.0005	0.0001	0.026	0.03	0.00005	0.01	5.1	1.0	0.2	0.0005	6.5	0.047	0.00001	20	0.00001	0.004	0.025	0.0037
Drained Down	P99	0.0005	0.00021	0.045	0.03	0.000082	0.028	38	1.5	1.0	0.00098	18	0.56	0.000012	78	0.000021	0.0097	0.034	0.0063

Sources: https://srk.sharepoint.com/sites/NACAPR002434/Internal/!020_Project_Data/010_SRK/Source_Terms/Source_Terms_CAPR002434_Rev00_SJL.xlsx

APPENDIX 6-4: FLOCCULANT MANAGEMENT PLAN

REPORT

Flocculant Management Plan

Water Treatment Plant - Mount Polley Mine

Submitted to:

Mount Polley Mining Corporation

Box 12
Likely, BC V0L 1N0

Attention: Matt O'Leary

Submitted by:

WSP Canada Inc.

840 Howe Street, Suite 1000 Vancouver, British Columbia, V6Z 2M1

Reference No. 23590671-010-R-Rev0-31391

27 March 2023

Distribution List

Electronic Copy: Mount Polley Mining Corporation

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1.0 INTRODUCTION

Mount Polley Mining Corporation (MPMC) has retained WSP Canada Inc. (WSP) to prepare a Flocculant Management Plan (FMP) for MPMC’s Veolia Actiflo® (Actiflo) Water Treatment Plant (the Plant) as required by *Environmental Management Act* (EMA) Permit 11678 (BC ENV 1 December 2022), Section 2.10. The Plant is a patented high-rate ballasted coagulation and flocculation clarification process provided by Veolia Water Technologies Canada (Veolia) under the tradename Actiflo. The Plant was commissioned by Veolia in October 2015 and is currently in use for the treatment of mine contact water on-site.

The FMP will be included in the 31 March 2023 Annual Report submitted to the BC ENV Director. The FMP provides a plan for the use of settling aids, settling aid inventory and storage, managing settling aid toxicity, and providing inspection and monitoring. The appendices in the FMP include safety data sheets (SDSs) for the settling aids and a template Water Treatment Plant Shift Report for inspection and monitoring.

MPMC have a second, portable, Veolia Actiflo treatment plant on-site as of writing. This second unit is a rental and is scheduled to leave the site in April of 2023. This document therefore focuses on the main installed Veolia treatment plant; however, the portable water treatment plant uses the same treatment process and manages use of settling aids in a similar manner.

1.1 Objective of this Plan

The objective of the FMP is to describe the methods for settling of solids at the Plant using settling aids including coagulant (polyaluminum chloride), flocculant (polymer), and ballast (microsand), while preventing potential detrimental effects such as toxicity in the receiving environment. The FMP also describes the procedures and equipment used for storage and dosing of settling aids, including monitoring of influent and effluent water quality.

2.0 SETTLING AIDS USED AND DESCRIPTION OF WORKS

Three types of settling aids are used in the Plant for the settling of solids from influent water: polymer, polyaluminum chloride (PAC), and microsand. PAC is a coagulant that is injected into the raw water to neutralize surface charges on suspended particles. Polymer, or flocculant, aids in floc formation and increases the floc size to aid in gravity settling of flocs during clarification. Microsand is added to the Plant’s injection tank and becomes enmeshed within the forming flocs, thereby further increasing the density and improving the settleability of the flocs. The types of setting aids used, product names, and suppliers are summarized in Table 1. The safety data sheets (SDS) for the settling aids are provided in Appendix A. A process schematic of the Plant is included in Figure 1, showing the location where settling aids are applied to the treatment process.

Table 1: Settling Aid Type, Product Name, and Supplier

Settling Aid Type	Product Name	Supplier
Polymer	Magnafloc 338	Quadra Chemicals
Polyaluminum Chloride (PAC)	NIAD I	Quadra Chemicals
Microsand	Actisand, Media Microsand 135 µm	Veolia

Figure 1 shows the Plant schematic which includes the locations of PAC, microsand, and polymer additions. PAC is pumped into the raw water upstream of the coagulation tank. Microsand is continuously recycled within the Plant through the hydroclone and manually added into the injection tank to maintain a target microsand concentration. Polymer is pumped to both the injection tank and flocculation tank at a typical ratio of 70% and 30%, respectively.

The PAC dosing system includes two storage tanks (15,140 L each) that supply liquid PAC to two dosing pump skids that pump PAC into the Plant influent pipeline. Each dosing skid consists of one Pulsafeeder variable flow diaphragm pump: one with a capacity of 220 L/h and the other with a capacity of 400 L/h. The pumps operate in a duty/standby configuration. Liquid PAC is delivered to site in bulk (at 35–45% concentration) which is transferred into the PAC storage tanks immediately when received on-site. The PAC flowrate from the dosing pumps is controlled automatically at the Plant control panel based on an operator adjustable PAC dosage setpoint and is proportional to Plant influent flowrate.

Microsand is recycled to the injection tank via the underflow of the hydrocyclone, which separates the microsand from the sludge in the clarifier recycle flow. Two recycling lines exist at the Plant, each with a hydrocyclone. Microsand concentration is estimated through on-site measurement and calculation (twice a day) and additional microsand is added manually to the injection tank when required to replace microsand lost via the hydrocyclone overflow or Plant effluent and maintain the target microsand concentration.

Liquid polymer is produced on-site from dry polymer delivered to site. A hopper tank contains the dry polymer and uses a vacuum conveyor and screw feeder to supply dry polymer to a 2,500 L mixing tank with an active mixer. The dry polymer is mixed with water in the mixing tank to create the liquid polymer at a typical concentration of 2,000 mg/L. A 2,500 L storage tank contains the liquid polymer from the mixing tank and is connected to the two dosing pumps on a single skid. The pump skid consists of two Seepex variable flow progressive pumps (one duty, one standby) with maximum flowrate of 1,294 L/h each that supply liquid polymer to both the injection tank and flocculation tank. The polymer flowrate from the dosing pumps is controlled automatically at the Plant control panel based on an operator adjustable polymer dosage setpoint and is proportional to Plant influent flowrate.

3.0 JUSTIFICATION FOR SETTLING AID SELECTION

The treatment process of the Plant is a compact and high settling rate technology that requires the use of settling aids to achieve the designed treatment performance. Selection of settling aids is based on supplier experience and recommendations from Veolia, available products from suppliers in the region, bench-scale testing of settling aids with site influent water, and multiple years of Plant operation and monitoring results that meet treatment objectives while preventing toxicity. The management works for settling aids were provided as a component of the Veolia design and supplied with the Actiflo treatment package and are industry-standard components for the mixing, storage, and dosing of settling aids.

PAC is an industry-standard coagulant that neutralizes surface charges on particles to allow them to bind together to form flocs. Coagulation is effective at removing total suspended solids (TSS) and natural organic matter from wastewater. PAC can be used over a wide range of pH (5.0–8.0) and temperature applications which makes it desirable for use as a settling aid coagulant in water treatment applications.

Microsand serves as a support media for floc formation. Microsand also increases the density of the flocs, which causes flocs to settle more rapidly. The use of microsand as ballast is a core component of the Actiflo treatment technology that allows the system to achieve the target performance in a compact footprint.

Polymer is used in the Plant to facilitate the formation of floc and fixing of the floc onto the microsand particle surface. Polymer causes small particles to form into larger aggregations which facilitates settling. Magnafloc 338 aids in lowering the TSS concentration in the specific site influent water and displayed the best performance in terms of observed solids settling rate and overflow clarity during bench-scale testing when compared to five other BASF Corporation products: Magnafloc 10, Magnafloc 155, Magnafloc 919, Magnafloc 1011, and Magnafloc 5250 (Quadra Chemicals 2021; 2020).

4.0 SETTLING AID INVENTORY AND STORAGE PLAN

PAC, microsand, and polymer will be stored on-site in sufficient quantities to prevent operational shortages, but not in excess. A 3-month supply of settling aids is maintained on-site, which has proved sufficient over several years of Plant operation. The maximum storage durations of settling aids as recommended by the supplier is listed in Table 2. Table 2 also lists the amount received per shipment and the shipment frequency, which reflects the consumption and turn-over rate of settling aids on-site as stored product does not increase annually.

Table 2: Recommended Storage Durations, Storage Amounts, Shipment Amounts, and Shipment Frequencies for the Settling Aids

Settling Aid	Recommended Maximum Storage Duration	Amount Received per Shipment	Shipment Frequency
Polymer	2 years from receipt [a]	2,700 kg	Every 3 months
PAC	> 3 months	20,000 kg (approx. 20,000 L)	Every 3 months
Microsand	Indefinite	4,200 kg	Every 3 months

Note: PAC = polyaluminum chloride.
a) Communicated by polymer supplier Quadra Chemicals

Upon receipt on-site, liquid bulk PAC is transferred directly into the PAC storage tanks at the Plant. Negligible degradation of PAC effectiveness is anticipated over the general PAC turn-over frequency of three months, supported by the ongoing efficacy of the Plant given this shipment schedule. Jar testing (bench-scale treatment testing in beakers) can be completed by Plant operators or sub-contractors to confirm PAC effectiveness near the end of the three-month storage duration if indicated by varying treatment performance.

Microsand bags and dry polymer bags are stored at the Plant within a shipping container storage unit and occasionally at the mine warehouse. Microsand is manually added to the treatment process when required (twice a day) and the dry polymer hopper is manually refilled as required following visual hopper level inspections (six times a day).

The shelf life of the dry polymer is noted at two years from receipt by the supplier and can be stored for a duration significantly longer than the general turn-over frequency of three months, as long as cool and dry storage conditions are maintained.

Microsand is an inert product and does not experience degradation in effectiveness similar to chemical degradation. The expected general turn-over frequency of three months for the microsand is considered well within a maximum recommended storage duration for this inert product.

5.0 DOSAGE, FLOWRATE, AND TOXICITY OF SETTLING AIDS

Table 3 summarizes the actual dosage range of settling aids used at the Plant over 2022 and compares these concentrations to toxic dosages supported by Plant-specific toxicity testing and available literature. The actual application flowrate range of the dosed settling aids (liquid PAC and liquid polymer) are also provided in Table 3.

The Plant automatically adjusts PAC and polymer dosing pump flowrates to maintain the targeted dosage setpoints shown in Table 3. Microsand concentration is measured and corrected twice a day manually to maintain the targeted concentration shown in Table 3. The target dosages have been determined through vendor recommendation and further refined through empirical on-site testing. The dosage targets range between a minimum and maximum value based on influent turbidity, with high settling aid dosages corresponding to high influent turbidity (further discussed in Section 8.0).

The majority of polymer and PAC added to the Plant influent is removed from the treatment process with the concentrated settled floc waste stream (waste sludge stream). The majority of microsand is recycled from the sludge stream back into the treatment process during microsand-sludge separation in the hydrocyclone. Concentration of settling aids in Plant treated effluent are fractional compared to influent dosage concentration and are expected to be significantly below toxic dosages for Rainbow Trout and *Daphnia magna* (confirmed by the toxicity monitoring plan implemented at the Plant).

Microsand concentration in the treated effluent is monitored through effluent turbidity and TSS monitoring and effluent TSS is maintained significantly below toxic concentrations.

Table 3: Actual and Toxic Dosages for the Settling Aids

Settling Aid	Actual Flowrate [a]	Target Dosage or Concentration	Toxic Dosage Rainbow Trout	Toxic Dosage *Daphnia magna*	
	(L/hr)	(mg/L)	LC50 (mg/L) [95% CL]	LC50 (mg/L)	EC50 (mg/L) [95% CL]
Polymer	250–1,050	0.5–2.1	114.9 [85.9–152.8] [b]	>100 [b]	10.2 [7.3–13.9] [b]
PAC	3.7–25.6	1.0–7.0	753.1 [c]	-	10.71 [f]
Microsand	As required to maintain target concentration	3,000–6,000 [e]	>10,000 [d]	-	-

Note: PAC = polyaluminum chloride; LC = lethal concentration; EC = effect concentration; CL = confidence limits.

a) Actual flowrate of liquid PAC and liquid polymer over the range of stated dosage, scaled for a Plant influent flowrate of 1,000 m^3/hr, and at the settling aid concentrations noted in Section 2.0.

b) Golder 2022

c) Study conducted in common carp (*Cyprinus carpio*). Macova 2009.

d) Servizi and Gordon 1990; Servizi and Martens 1991; Servizi and Martens 1987.

e) Veolia 2016.

f) Jancula 2011.

Monitoring procedures as specified in MPMC's Comprehensive Environmental Monitoring Plan (CEMP) (MPMC 2019) describe the measures taken to prevent toxicity in the Plant treated effluent. Toxicity tests are conducted regularly for samples taken from the Plant effluent (HAD-3). Toxicity results throughout 2022 for the HAD-3 sample location resulted in a rainbow trout 96-h LC50 >100 % v/v and *Daphnia magna* 48-h LC50 >100 % v/v for all samples.

Standardized toxicity testing including Rainbow Trout 96-hour LC50 test and *Daphnia magna* 48-hour LC50 test for the polymer flocculant Magnafloc 338 was previously conducted by Golder (Golder 2022). Magnafloc 338 in a 0.2% active ingredient stock solution did not result in acute lethality at test concentrations exceeding a dosing rate of 8.6 mg/L. Table 3 shows the Magnofloc 338 dosages that did result in acute toxicity.

Acutely lethal toxicity data for PAC in Rainbow Trout is not available from the literature. Acutely lethal toxicity testing has been conducted in common carp (*Cyprinus carpio*) and provided a 96-hour LC50 of 753.1 mg/L (Macova 2009). Acute toxicity of PAC in Daphnia magna provided an EC50 of 10.71 mg/L resulting in immobility in daphnids (Jancula 2011). The Plant's target effluent PAC concentration ranges from 1.0 – 7.0 mg/L, which is below the LC50 in the common carp and the EC50 in *Daphnia magna*.

The acutely lethal level of suspended solids (microsand) for fish are in the 10's of thousands of mg/L (Servizi and Gordon 1990), (Servizi and Martens 1991), (Servizi and Martens 1987). The Plant's effluent TSS is maintained below a monthly average of 15 mg/L (and maximum grab sample of 30 mg/L), as per EMA permit requirements, and is significantly below toxic dosage.

6.0 INSPECTION PROCEDURES

Inspections of the Plant equipment and treatment performance are recorded in the Water Treatment Plant Shift Report twice per day by the Plant operator. An example of a completed Water Treatment Plant Shift Report from 10 December 2022 is provided in Appendix B. The shift report includes information on:

- Influent and effluent flow rate, volume, and water quality.
- Operating parameters of key Plant sub-processes, including settling aid storage volumes.
- Results from microsand measurements and concentration calculations and resulting microsand addition.
- Dosing calibrations and calculations for polymer and PAC addition.
- Safety shower and eye wash inspection results.
- Influent water supply parameters.
- Summary of any shift comments on unusual events, maintenance, or servicing.

A preventative maintenance inspection is performed weekly by the Plant millwright. The preventative maintenance inspection includes, but is not limited to, the following checks:

- Inspect motors and pumps for leaks, deterioration, and unusual noise.
- Inspect hydrocyclones for wear.
- Inspect piping and connections.
- Check calibration of polymer and PAC dosing pumps

Calibrations for monitoring equipment are performed as follows:

- Calibrate online pH meter daily.
- Calibrate online turbidity analyzers monthly.
- Calibrate handheld laboratory pH meter daily.
- Calibrate handheld laboratory turbidity analyzer monthly.

Additional inspection and maintenance requirements are conducted in accordance with the Operating and Maintenance Manual for the Plant (Veolia 2016).

7.0 MONITORING PROCEDURES

Plant influent and effluent flowrate and water quality is monitored per the CEMP to ensure that the water conforms to the EMA permit requirements. Influent and effluent flowrate and turbidity/TSS are monitored continuously by Plant online instrumentation and logged in the Plant control system every 15 minutes. Daily inspection procedures and tracking on the Plant shift reports also informs monitoring of settling aid systems, including calibrations. Monitoring information on influent flowrate and water quality dictates the target dosages for the settling aids set by Plant operators.

Parameters that will be monitored and analyzed for Plant treated effluent are as listed in Section 1.2.4 of the EMA permit and are summarized below:

- Rainbow Trout 96-hr LC50
- *Daphnia magna* 48-hr LC50
- pH
- Total Suspended Solids (TSS)
- Major Ions
- Nutrients
- Total and dissolved metals

Monitoring frequency of these parameters is outlined in the CEMP. If the Plant effluent water quality exceeds the trigger levels for any parameter as listed in Section 1.2.4 of the EMA permit, MPMC will immediately complete Trigger Response Plan actions as outlined in their Annual Discharge Plan (MPMC 2018).

Continuous instrumentation installed in the Plant to monitor water quality and flowrates include:

- Influent turbidity meter
- Influent flow meter
- Treated effluent turbidity meter
- Treated effluent pH meter with integrated temperature meter
- Treated effluent flow meter

8.0 SETTLING AID DOSAGE CONTROL

The use of settling aids for the Plant treatment technology is required to achieve the designed treatment performance and settling aids are to be used continuously as long as TSS exists in the Plant influent. Over 2022 influent TSS ranged between 0.5 and 23.4 mg/L (monitored at the E-19 Plant influent monitoring point).

Settling aid dosage control seeks to achieve a target dosage for PAC and polymer, and a target concentration of microsand being recycled within the Plant process. The Plant's control system automatically adjusts the PAC and polymer flowrate to meet the target dosage setpoints with changing influent flowrate. The target dosages vary over the year according to seasonal flowrate and water quality; the dosage ranges are summarized in Table 3. Plant operators monitor the influent flowrate, turbidity, and TSS, and set the dosage targets according to those influent conditions and the procedure noted below. As the influent turbidity/TSS increases, the PAC and polymer dosages are increased to achieve desired Plant performance. Microsand concentration is maintained within the target range noted in Table 3 and is not varied with influent turbidity/TSS.

The target settling aid dosages/concentrations are adjusted according to the below procedure within the range shown in Table 3.

1) Monitor the effluent turbidity and TSS, per the Water Treatment Plant Shift Report, and compare the measurements to previous results to identify trends.

2) If the effluent turbidity or TSS increases by more than 10%, confirm that the microsand concentration is within the target range shown in Table 3. If needed, add microsand to maintain the target concentration.

3) If the microsand concentration is within its target range, check the influent turbidity recordings to identify whether it is changing with time.

4) If the influent turbidity is stagnant or trending upwards:

    a. Increase the target PAC concentration via the Plant control system by 1 mg/L. The target PAC concentration should generally stay within the range presented in Table 3.

    b. Wait at least five hydraulic retention times, or until the effluent TSS and turbidity measurements have stabilized. The hydraulic retention time is approximately 10 minutes at an influent flow rate of 830 m^3/hr.

    c. Collect an effluent sample and visually check for the presence of pinhead-like floc.

    d. If pinhead-like floc are observed, increase the target polymer concentration via the Plant control system by 0.25 mg/L. The target polymer concentration should generally stay within the range presented in Table 3.

    e. Continue monitoring the effluent turbidity and TSS measurements for the next 24 hours to confirm that they have decreased or stabilized.

    f. If the effluent turbidity and TSS measurements are continuing to trend upwards, return to Step 3.

5) If the influent turbidity is decreasing:

   a. Decrease the target PAC concentration via the Plant control system by 0.5 mg/L. The target PAC concentration should generally stay within the range presented in Table 3.

   b. Wait at least five hydraulic retention times, or until the effluent TSS and turbidity measurements have stabilized.

   c. Collect an effluent sample and check if the water has a slimy feel or other indications that polymer is being overdosed.

   d. If warranted based on the observations from the previous step, decrease the target polymer concentration via the Plant control system by 0.25 mg/L. The target polymer concentration should generally stay within the range presented in Table 3.

   e. Continue monitoring the effluent turbidity and TSS measurements for the next 24 hours to confirm that they have decreased or stabilized.

   f. If the effluent turbidity and TSS measurements are continuing to trend upwards, return to Step 3.

If this dosage adjustment procedure is not effective in managing effluent turbidity or TSS, then jar testing is to be carried out by Plant operators or sub-contractors to estimate appropriate settling aid dosages/concentrations for influent water quality conditions.

9.0 CLOSURE

The reader is referred to the Study Limitations section, which precedes the text and forms an integral part of this report.

We trust the above meets your present requirements. If you have any questions or comments, please contact the undersigned.

Signature Page

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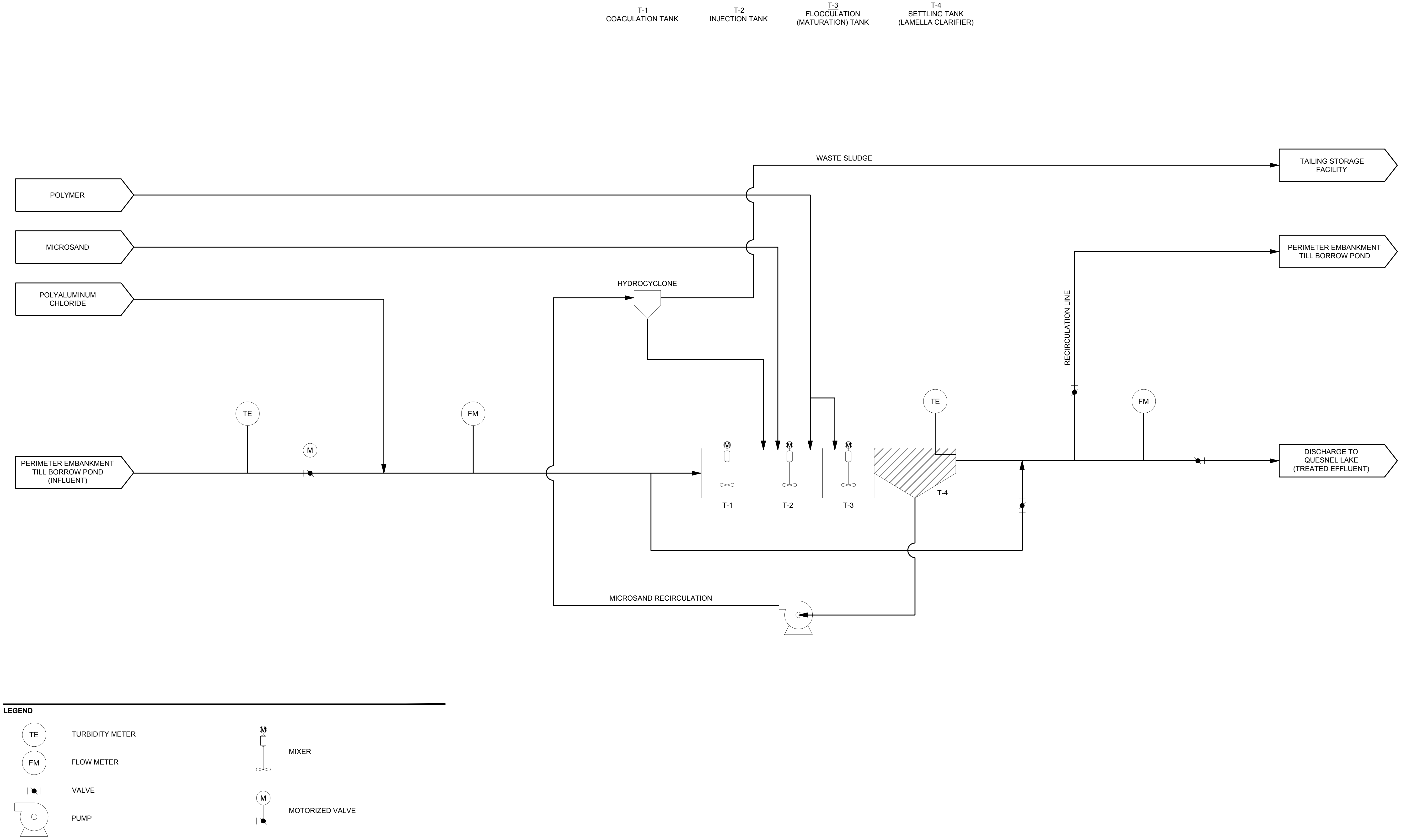

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MOUNT POLLEY MINE WATER TREATMENT PLANT SCHEMATIC

FIGURE 1

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APPENDIX A

Chemical Safety Data Sheets (SDSs)

Safety Data Sheet

November 2016 (Rev. 1)

Section 1 – Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name:	Crystalline Silica (Quartz), Sand, Silica Sand
Trade name:	Silica Sand-All Grades, Actisand®, Vita-S, RRW, Tip Top
CAS No.:	14808-60-7

1.2. Uses of the product and uses advised against

Use(s):	Foundry Molds, Glass and Ceramic Melt Sand, Aggregate Filler, Filtration Media, Frac Sand
Prohibited use(s):	**Warning!** Do not use this product for abrasive blasting.

1.3. Details of the product manufacturer and supplier of the safety data sheet

Manley Bros. of Indiana, Inc.
P.O. Box 80
300 South Vermillion Road
Troy Grove, IL 61372
USA

Telephone: (815) 539 7486

1.4. Emergency Telephone Number

(815) 539-7486 (7:00 am – 4:00 pm Central Time, Monday-Friday)

Section 2 – Hazards Identification

2.1. General

This product contains respirable quartz as an impurity and may damage the lungs or cause cancer through prolonged or repeated inhalation. Depending on the type of handling and the ultimate use employed by the end-user, airborne respirable crystalline silica may be generated. Prolonged and/or massive inhalation of respirable crystalline silica may cause lung fibrosis, commonly referred to as silicosis. Occupational exposure to respirable crystalline silica dust should be monitored and controlled. This product should be handled with care to avoid dust generation.

2.2. Classification of the substance or mixture

GHS-US classification

STOT SE 3	H335
Carcinogen 1A	H350
STOT RE 2 (1% < quartz fine fraction < 10 %)	H373

For the full text of H-phrases: see Section 16

2.3. Label elements

GHS-US labeling

Hazard pictograms (GHS-US):

Signal word (GHS-US): Warning

Hazard statements (GHS-US)

H335	May cause respiratory irritation.
H350	May cause cancer (inhalation).
H373	May cause damage to the lungs and/or respiratory system through prolonged or repeated inhalation.

Precautionary statements (GHS-US)

P304+P34	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308+P313	If exposed or concerned: Get medical advice/attention.
P312	Call a POISON CENTER/doctor if you feel unwell.
P260	Do not breathe dust.
P264	Wash hands and forearms thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P202	Do not handle until all safety precautions have been read and understood.
P280	Wear eye protection, protective clothing, and protective gloves.
P260	Do not breathe dust.
P271	Use only outdoors or in a well-ventilated area.
P314	Get medical attention if you feel unwell.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.
P501	Dispose of contents/container according to local, regional, national, and international regulations.

2.4. Other hazards

2.4.1. **Warning!** Do not use this product for abrasive blasting. NIOSH does not recommend the use of sand as an abrasive blasting medium. However NIOSH does recommend the use of a Type CE blasting helmet with supplied air if sand is used for the purpose of abrasive blasting.

2.4.2. Re-use of this product as an abrasive blasting medium can result in fractionation, thereby creating smaller airborne particle sizes than that of the original product. The resulting fractionation can increase the respirable fraction of airborne dust generated during re-use.

2.4.3. This product may become contaminated during use and/or re-use, and the user is responsible for evaluating workplace exposures to contaminants that may be generated as result. Employer selection and implementation of exposure controls or disposal options should consider both silica sand and the potential hazards of the material acted upon by the blasting or filtering operation.

2.4.4. Hazardous Decomposition or Byproducts: Silica will dissolve in hydrofluoric acid and produce a corrosive gas – silicon tetrafluoride.

Section 3 – Composition/information on ingredients

3.1. Substances

Name	Product identifier	% composition	GHS-US classification[1]
Quartz, SiO_2	CAS No. 14808-60-7 EINECS No. 238-878-4	>95%	[2]STOT SE 3 - H335 Carcinogen 1A - H350 [3]STOT RE 2 - H373

[1] For the full text of H-phrases: see section 16
[2] STOT SE = Specific target organ toxicity for a single exposure.
[3] STOT RE = Specific target organ toxicity for repeated exposure.

3.2. Mixtures

Not applicable

Section 4 – First Aid Measures

4.1. Description of first aid measures

General:	If medical advice is needed, have product label or safety data sheet at hand.
Inhalation:	If gross inhalation of silica sand occurs, remove the person to fresh air and keep comfortable for breathing, perform artificial respiration as needed, and obtain medical attention as needed.
Eye contact:	Wash the eye with water for at least 15 minutes while holding the eyelids wide open. If irritation persists, seek medical attention.
Skin:	Wash skin with soap and plenty of water. If abrasion occurs, or if irritation persists, seek medical attention.
Ingestion:	If large amounts are ingested do not induce vomiting. Seek medical advice.

4.2. Principal symptoms and health effects both acute and delayed

General:	Prolonged or repeated inhalation may damage lungs.
Inhalation:	May cause respiratory irritation, sneezing, coughing, burning sensation in the throat or constriction of the larynx, or difficulty breathing.
Eye contact:	Redness, irritation or pain.
Skin:	Prolonged contact with large amounts of this product may cause mechanical irritation. Dust may cause irritation in skin folds or by contact in combination with tight clothing.
Ingestion:	Abdominal pain.
Chronic symptoms:	Shortness of breath, wheezing, cough and sputum production. May cause cancer, silicosis, lung disease, autoimmune disease, tuberculosis, and nephrotoxicity.

4.3. Indication of any immediate medical attention and special treatment needed

No specific actions are required.

Section 5 – Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media:	Use the extinguishing media appropriate for the surrounding fire.
Unsuitable extinguishing media:	None known.

5.2. Special hazards arising from the substance or mixture

Fire hazard:	None. This product is not flammable.
Explosion hazard:	None. This product is not explosive.
Reactivity:	No hazardous combustion products or hazardous reactions are known.

5.3. Advice for firefighters

No specific firefighting instructions are required. Use normal individual personal protective equipment and fight fire from a reasonable distance using normal precautions.

Section 6 – Accidental Release Measures

6.1. Personal precautions, protective equipment, and emergency procedures

General:	Do not breathe dust. Avoid generating airborne dust. Collect the material using a method that does not produce dust [High-Efficiency Particulate Air (HEPA) vacuum or thoroughly wetting down the material]. Dispose of according to federal, state, and local regulations.
Protective equipment:	Wear protective clothing as appropriate for the work environment, including gloves, and eye/face protection. Use respiratory protection as recommended in Section 8 – Exposure controls/personal protection.
Emergency procedure:	Collect as any inert solid.

6.2. Environmental precautions

No special requirements.

6.3. Methods and material for containment and cleaning up

Avoid dry sweeping or otherwise generating dust during clean-up of spills. Use water spraying or vacuum cleaning systems to prevent airborne dust generation. Recover product by vacuuming or shoveling and place the material in a covered container appropriate for disposal.

6.4 Reference to other Sections

Refer to Sections 8 and 13 for additional information.

Section 7 – Handling and Storage

7.1. Precautions for safe handling

Work practices:	Avoid airborne dust generation. Provide appropriate exhaust ventilation or wet methods at places where airborne dust is generated. Use HEPA-filtered systems as necessary. Do not rely on vision to determine whether respirable silica is present in the air since it may be present without a visible cloud. In case of insufficient ventilation, wear respiratory protective equipment as recommended in Section 8. Handle packaged products carefully to prevent bursting. If you require advice on safe handling techniques, please contact your supplier.
Hygiene practices:	Do not eat, drink, or smoke in work areas. Wash hands after use. Remove contaminated clothing and protective equipment before entering eating areas.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures:	Minimize airborne dust generation and prevent wind dispersal during loading and unloading.
Precautions:	Store in a cool, dry place. Keep containers closed and store packaged products so as to prevent accidental bursting.

7.3. Specific end use(s)

Intended use(s):	Foundry Molds, Glass and Ceramic Melt Sand, Aggregate Filler, Filtration Media, Frac Sand.
Prohibited use(s):	**Warning!** Do not use this product for abrasive blasting.

Section 8 – Exposure Controls/Personal Protection

8.1. Control Parameters

Quartz (14808-60-7)		
USA OSHA	OSHA PEL for mineral dust 8-Hr. TWA	0.05 mg/m^3 resp. fraction
USA NIOSH	NIOSH REL 8-Hr. TWA	0.05 mg/m^3
USA ACGIH	ACGIH TLV8-Hr. TWA	0.025 mg/m^3

CAUTION:
Crystalline silica exists in several forms, the most common of which is quartz. If crystalline silica (quartz) is heated to more than 870°C (1,598°F) it can change to a form of crystalline silica known as trydimite, and if crystalline silica (quartz) is heated to more than 1,470°C (2,678°F), it can change to a form of crystalline silica known as cristobalite. Crystalline silica as trydimite and cristobalite are more fibrogenic than crystalline silica as quartz.

8.2. Exposure controls

8.2.1. Engineering controls

Minimize the generation of airborne dust. Use process controls, local exhaust ventilation, water/wet methods, or other engineering controls to maintain airborne levels below the limits shown in Section 8.1. above. See also ACGIH, Industrial Ventilation – Recommended Practice (latest edition).

8.2.2. Personal protective equipment (PPE)

Respiratory Protection: Avoid breathing dust produced during the use and handling of this product. The following chart specifies the types of respirators that may provide respiratory protection for crystalline silica. Use only NIOSH-approved respirators. Do not use this product for abrasive blasting; however, NIOSH recommends that workers wear the type CE abrasive blasting supplied air respirator operated in the positive-pressure mode (assigned protection factor (APF) of 2,000) if abrasive blasting operations involve crystalline silica sand.

Particulate Concentration	**Minimum respiratory protection required PEL = 0.05 mg/m^3 (50 ug/m^3)**
≤0.5 mg/m^3 (10 x PEL)	• Half-mask air-purifying respirator with a P100 filter approved by NIOSH.
≤2.5.0 mg/m^3 (50 x PEL)	• Full facepiece air-purifying respirator with a P100 filter approved by NIOSH, or • Supplied-air respirator equipped with a hood or helmet and operated in a continuous-flow mode (for example, type CE abrasive blasting respirators operated in the continuous flow mode) approved by NIOSH.
≤50 mg/m^3 (1,000 x PEL)	• Any powered air-purifying respirator with a P100 filter approved by NIOSH, or • Any supplied-air respirator equipped with a hood or helmet and operated in a continuous-flow mode (for example, type CE abrasive blasting respirators operated in the continuous flow mode) approved by NIOSH.
≤50 mg/m^3 (1,000 x PEL)	• Full facepiece supplied-air respirator operated in pressure-demand mode, or • Any supplied-air respirator equipped with a hood or helmet and operated in a continuous-flow mode (for example, type CE abrasive blasting respirators operated in the continuous flow mode) approved by NIOSH.
Planned or emergency entry into environments containing unknown concentrations or concentrations >50 mg/m^3 (1,000 x PEL)	• Any self-contained breathing apparatus equipped with a full face piece and operated in a pressure-demand or other positive-pressure mode.

Particulate Concentration	**Minimum respiratory protection required PEL = 0.05 mg/m^3 (50 ug/m^3)**
Firefighting	• Any self-contained breathing apparatus equipped with a full face piece and operated in a pressure-demand or other positive-pressure mode approved by NIOSH.
Escape only	• Any air-purifying respirator with a P100 filter approved by NIOSH, or • Any appropriate escape-type, self-contained breathing apparatus.

If the workplace airborne crystalline silica concentration is unknown for a given task, conduct air monitoring to determine the appropriate level of respiratory protection needed. Consult with a certified industrial hygienist, your insurance risk manager, or the OSHA/MSHA Consultative Services group for more information. Ensure appropriate respirators are worn during and following the task, including clean-up or whenever airborne dust is present, in order to manage employee exposures below occupational health limits.

Eye protection:	Goggles are recommended where airborne dust is produced.
Hand and skin protection:	Impermeable gloves are recommended in situations where abrasion from sand may occur. Wash hands with soap and water after use.
Other:	Wear protective clothing as appropriate for the work environment. Dusty clothing should be laundered before it is reused. Do not take dusty clothing home.

Section 9 – Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Appearance:	Light buff to white granular solid
Odor:	Odorless
pH:	Not applicable
Vapor Pressure	Not applicable
Vapor Density	Not applicable
Boiling Point or Range, °F:	2,230°C (4,046°F) for quartz
Melting Point or Range, °F:	1,710°C (3,110°F) for quartz
Solubility In Water:	Insoluble
Specific Gravity:	2.65 (quartz)

9.2 Other information

No other information

Section 10 – Stability and Reactivity

10.1. Reactivity

Inert, not reactive.

10.2. Chemical stability

Stable under normal temperature and pressure.

10.3. Possibility of hazardous reactions

Hazardous polymerization will not occur.

10.4 Conditions to avoid

None known

10.5 Incompatible materials

Strong oxidizing agents such as fluorine, chlorine trifluoride, hydrogen fluoride, and oxygen difluoride.

10.6 Hazardous decomposition products

Silica will dissolve in hydrofluoric acid and produce a corrosive gas – silicon tetrafluoride.

Section 11 – Toxicological Information

A. SILICOSIS

The primary effect on humans from exposure to crystalline silica is silicosis, a lung disease caused by the inhalation and retention of respirable crystalline silica dust. Silicosis can exist in several forms; chronic (or ordinary), accelerated, or acute.

Chronic or Ordinary Silicosis is the most common form of silicosis, and can occur after many years of exposure to levels above the occupational exposure limits for airborne respirable crystalline silica dust. It is further defined as either simple or complicated silicosis.

Simple silicosis is characterized by lung lesions (shown as radiographic opacities) less than 1 centimeter in diameter, primarily in the upper lung zones. Often, simple silicosis is not associated with symptoms, detectable changes in lung function or disability. Simple silicosis may be progressive and may develop into complicated silicosis or progressive massive fibrosis (PMF).

Complicated silicosis or PMF is characterized by lung lesions (shown as radiographic opacities) greater than 1 centimeter in diameter. Although there may be no symptoms associated with complicated silicosis or PMF, the symptoms, if present, are shortness of breath, wheezing, cough and sputum production. Complicated silicosis or PMF may be associated with decreased lung function and may be disabling. Advanced complicated silicosis or PMF may lead to death. Advanced complicated silicosis or PMF can result in heart disease (cor pumonale) secondary to the lung disease.

Accelerated Silicosis can occur with exposure to high concentrations of respirable crystalline silica over a relatively short period; the lung lesions can appear within five (5) years of the initial exposure. The progression can be rapid. Accelerated silicosis is similar to chronic or ordinary silicosis, except that the lung lesions appear earlier and the progression is more rapid.

Acute Silicosis can occur with exposures to very high concentrations of respirable crystalline silica over a very short time period, sometimes as short as a few months. The symptoms of acute silicosis include progressive shortness of breath, fever, cough and weight loss. Acute silicosis is fatal.

B. CANCER

IARC - The International Agency for Research on Cancer ("IARC") concluded that there was "*sufficient evidence* in humans for the carcinogenicity of crystalline silica in the forms of quartz or cristobalite from occupational sources", and that there is "*sufficient evidence* in experimental animals for the carcinogenicity of quartz and cristobalite." The overall IARC evaluation was that "crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is *carcinogenic to humans* (*Group 1*)." The IARC evaluation noted that not all industrial circumstances studied evidenced carcinogenicity. The monograph also stated that “[C]arcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs." For further information on the IARC evaluation, see IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Volume 68, "Silica, Some Silicates..." (1997).

NTP - The National Toxicology Program, in its Ninth Annual Report on Carcinogens, concluded that respirable crystalline silica is known to be a human carcinogen, based on sufficient evidence of carcinogenicity from studies in humans indicating a causal relationship between exposure to respirable crystalline silica and increased lung cancer rates in workers exposed to crystalline silica dust.

OSHA – Not regulated as a carcinogen.

There have been many articles published on the carcinogenicity of crystalline silica, which the reader should consult for additional information; the following are examples of recently published articles: (1) “Lung cancer among industrial sand workers exposed to crystalline silica,” *Am J Epidemiol*, (153) 695-703 (2001); (2) "Crystalline Silica and the risk of lung cancer in the potteries", *Occup Environ Med*, (55) 779-785 (1998); (3) "Is

Silicosis Required for Silica-Associated Lung Cancer?", *American Journal of Industrial Medicine*, (37) 252- 259 (2000); (4) " Silica, Silicosis, and Lung Cancer: A Risk Assessment," *American Journal of Industrial Medicine*, (38) 8-18 (2000); (5) "Silica, Silicosis, and Lung Cancer: A Response to a Recent Working Group Report," *Journal of Occupational and Environmental Medicine*, (42) 704-720 (2000).

C. AUTOIMMUNE DISEASES

There is evidence that exposure to respirable crystalline silica (without silicosis) or that the disease silicosis may be associated with the increased incidence of several autoimmune disorders, -- scleroderma, systemic lupus erythematosus, rheumatoid arthritis and diseases affecting the kidneys. For a review of the subject, the following may be consulted: "Occupational Exposure to Crystalline Silica and Autoimmune Disease", *Environmental Health Perspectives*, (107) Supplement 5, 793-802 (1999); "Occupational Scleroderma," *Current Opinion in Rheumatology*, (11) 490-494 (1999); “Connective tissue disease and silicosis,” *Am J Ind Med*, (35), 375-381 (1999).

D. TUBERCULOSIS

Individuals with silicosis are at increased risk to develop pulmonary tuberculosis, if exposed to persons with tuberculosis. The following may be consulted for further information: *Occupational Lung Disorders*, Third Edition, Chapter 12, entitled "Silicosis and Related Diseases", Parkes, W. Raymond (1994); "Risk of pulmonary tuberculosis relative to silicosis and exposure to silica dust in South African gold miners," *Occup Environ Med*, (55) 496-502 (1998); “Occupational risk factors for developing tuberculosis”, *Am J Ind Med*, (30) 148-154 (1996).

E. KIDNEY DISEASE

There is evidence that exposure to respirable crystalline silica (without silicosis) or that the disease silicosis is associated with the increased incidence of kidney diseases, including end stage renal disease. For additional information on the subject, the following may be consulted: "Kidney Disease and Silicosis", *Nephron*, (85) 14-19 (2000); “End stage renal disease among ceramic workers exposed to silica,” *Occup Environ Med*, (56) 559-561 (1999); “Kidney disease and arthritis in a cohort study of workers exposed to silica,” *Epidemiology*, (12) 405-412 (2001).

F. NON-MALIGNANT RESPIRATORY DISEASES

NIOSH has cited the results of studies that report an association between dusts found in various mining operations and non-malignant respiratory disease, particularly among smokers, including bronchitis, emphysema, and small airways disease. The results were not conclusive regarding an association among those with silicosis, only smokers, or the result of general mineral dust that does not contain silica. See *NIOSH Hazard Review – Health Effects of Occupational Exposure to Respirable Crystalline Silica*, published in April 2002, available from NIOSH, 4676 Columbia Parkway, Cincinnati, OH 45226, or at http://www.cdc.gov/niosh/02-129A.html.

Section 12 – Ecological Information

12.1. Toxicity

Not relevant.

12.2. Persistence and degradability

Not biodegradable.

12.3. Bioaccumulative potential

Not known to bioaccumulate.

12.4. Mobility in soil

Negligible.

12.5. Other adverse effects

No other specific adverse effects known.

Section 13 – Disposal Considerations

13.1.	**Waste treatment methods**
General:	The unused product/product residue may be landfilled.
Packaging:	Material should be placed in covered containers to minimize generation of airborne dust.
RCRA:	Crystalline silica (quartz) is not classified as a hazardous waste under the Resource Conservation and Recovery Act, or its regulations, 40 CFR §261 et seq.
NOTE:	The above information applies to Manley Bros. Silica Sand only as sold. Since the product may become contaminated during use and/or re-use, it is the responsibility of the user to determine the appropriate disposal method.

Section 14 – Transport Information

14.1. UN Number

Not relevant.

14.2. UN proper shipping name

Not relevant.

14.3. Transport hazards class

Crystalline silica (quartz) is not a hazardous material for purposes of transportation under the U.S. Department of Transportation Table of Hazardous Materials, 49 CFR §172.101.

14.4. Packing group

Not applicable.

14.5. Environmental hazards

Not relevant.

14.6. Special precautions for user

No special precautions.

Section 15 – Regulatory Information

15.1. US Federal regulations

TSCA No.: Crystalline silica (quartz) is listed on the EPA TSCA inventory under CAS No. 14808-60-7.

SARA Section 311/312: Crystalline silica is listed under CAS No. 14808-60-7: Silica sand, all grades. Classified as an immediate and delayed health hazard.

RCRA: Crystalline silica (quartz) is not classified as a hazardous waste under the Resource Conservation and Recovery Act, or its regulations, 40 CFR §261 et seq.

CERCLA: Crystalline silica (quartz) is not classified as a hazardous substance under regulations of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), 40 CFR §302.

Emergency Planning and Community Right to Know Act: Crystalline silica (quartz) is not an extremely hazardous substance under Section 302 and is not a toxic chemical subject to the requirements of Section 313.

Clean Air Act: Crystalline silica (quartz) mined and processed by Manley Bros. of Indiana was not processed with or does not contain any Class I or Class II ozone depleting substances.

FDA: Silica is included in the list of substances that may be included in coatings used in food contact surfaces, 21 CFR §175.300(b)(3)(xxvi).

NTP: Respirable crystalline silica (quartz) is classified as a known human carcinogen.

OSHA Carcinogen: Crystalline silica (quartz) is not listed.

15.2. US state regulations

California Proposition 65: Crystalline silica (quartz) is classified as a substance known to the state of California to be a carcinogen.

California Inhalation Reference Exposure Limit (REL): The California chronic REL for respirable crystalline silica is 3 ug/m^3. A chronic REL is an airborne level of a substance at or below which no adverse health effects are anticipated in individuals indefinitely exposed to the substance at that level.

Maine**:** Listed as a chemical of high concern.

Massachusetts Toxic Use Reduction Act: Respirable crystalline silica is considered toxic per the Massachusetts Toxic Use Reduction Act.

Minnesota**:** Listed on the state hazardous substances list.

New Jersey Right to Know Act: Quartz is considered hazardous for purposes of the Act and is also listed on the New Jersey special health hazards substances list.

Pennsylvania Worker and Community Right to Know Act: Quartz is considered hazardous for purposes of the Act, but it is not a special hazardous substance or an environmental hazardous substance.

15.3 International regulations

Canada: Manley Bros. of Indiana products, as naturally occurring substances, are on the Canadian DSL and categorized under WHMIS as D-2A

European Union: EINECS No.: 231-545-4

IARC: Crystalline silica (quartz) is classified in IARC as a Group 1 carcinogen.

15.4. Other regulations

National, state, provincial or local emergency planning, community right to know or other laws, regulations or ordinances may be applicable--consult applicable national, state, provincial or local laws.

Section 16 – Other Information

An electronic version of this SDS is available at http://www.manleybros.com/. More information on the effects of crystalline silica exposure may be obtained from the Occupational Safety and Health Administration (OSHA) (phone number: 1-800-321-OSHA; website: http://www.osha.gov) or from the National Institute for Occupational Safety and Health (NIOSH) (phone number: 1-800-35-NIOSH; website: http://www.cdc.gov/niosh).

HMIS:	
Health:	2 (See Section 2 and Section 11 of this SDS)
Flammability:	0
Reactivity:	0
Protective Equipment:	E

NFPA	
Health:	2
Flammability:	0
Reactivity:	0

FULL-TEXT H-PHRASES

Hazard statements (GHS-US)

H335	May cause respiratory irritation
H350	May cause cancer (inhalation)
H373	May cause damage to the lungs and/or respiratory system through prolonged or repeated inhalation

MANLEY BROS. OF INDIANA, INC. COMPANY DISCLAIMER

This Safety Data Sheet was prepared in accordance with the requirements outlined in the Federal Register, Volume 77, No. 58, March 26, 2012, page 17574. In this final rule, OSHA modified its Hazard Communication Standard (HCS) to conform to the United Nations' Globally Harmonized System of Classification and Labelling of Chemicals (GHS). The modifications to the standard included but were not limited to revised criteria for classification of chemical hazards and a new specified format for Safety Data Sheets.

The information contained in this Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process. The information and recommendations set forth herein are based on technical data that Manley Bros. of Indiana, Inc. believes to be correct and reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside the control of Manley Bros. of Indiana, Inc. no warranties, expressed or implied, are made and no liability is assumed in connection with any use of this information. Any use of this data and information must be determined by the user to be in accordance with federal, state, and local laws and regulations. Customers and users of crystalline silica must comply with all applicable health and safety laws, regulations, and orders.

Revision 1:

Section 8.1 Control Parameters. Revises the Permissible Exposure Limit (PEL) for respirable crystalline silica to 0.05 mg/m^3 pursuant to OSHAs Final Rule to protect workers against exposure to respirable crystalline silica (29 CFR 1910.1053 and 29 CFR 1926.1153), effective June 23, 2016.

Section 8.2.2. PPE. Revises the minimum level of respiratory protection required for compliance with the revised PEL.

Safety Data Sheet
Magnafloc® 338

1. Identification

Product identifier used on the label

Magnafloc® 338

Recommended use of the chemical and restriction on use
Recommended use*: Rheology modifier; Paper water management; flocculation agent

* The “Recommended use” identified for this product is provided solely to comply with a Federal requirement and is not part of the seller's published specification. The terms of this Safety Data Sheet (SDS) do not create or infer any warranty, express or implied, including by incorporation into or reference in the seller's sales agreement.

Details of the supplier of the safety data sheet

Company:
BASF Canada Inc.
100 Milverton Drive
Mississauga, ON L5R 4H1, CANADA

Telephone: +1 289 360-1300

Emergency telephone number

CHEMTREC: 1-800-424-9300
BASF HOTLINE: (800) 454-COPE (2673)

Other means of identification
Synonyms: Anionic acrylamide copolymer

2. Hazards Identification

According to Hazardous Products Regulations (HPR) (SOR/2015-17)

Classification of the product

No need for classification according to GHS criteria for this product.

Label elements

The product does not require a hazard warning label in accordance with GHS criteria.

Hazards not otherwise classified

Very slippery when wet.
This type of product has a tendency to create dust if roughly handled. The product does not burn readily but as with many organic powders, flammable dust clouds may be formed in air. The product is under certain conditions capable of dust explosion.

Labeling of special preparations (GHS):
This product is not combustible in the form in which it is shipped by the manufacturer, but may form a combustible dust through downstream activities (e.g. grinding, pulverizing) that reduce its particle size.

3. Composition / Information on Ingredients

According to Hazardous Products Regulations (HPR) (SOR/2015-17)

This product does not contain any components classified as hazardous under the referenced regulation.

4. First-Aid Measures

Description of first aid measures

General advice:
Remove contaminated clothing.

If inhaled:
If difficulties occur after dust has been inhaled, remove to fresh air and seek medical attention.

If on skin:
Wash thoroughly with soap and water.

If in eyes:
Wash affected eyes for at least 15 minutes under running water with eyelids held open.

If swallowed:
Rinse mouth and then drink plenty of water. Check breathing and pulse. Place victim in the recovery position, cover and keep warm. Loosen tight clothing such as a collar, tie, belt or waistband. Seek medical attention. Never induce vomiting or give anything by mouth if the victim is unconscious or having convulsions.

Most important symptoms and effects, both acute and delayed

Symptoms: The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11., Further important symptoms and effects are so far not known.
Hazards: No hazard is expected under intended use and appropriate handling.

Indication of any immediate medical attention and special treatment needed

Note to physician

Treatment:	Treat according to symptoms (decontamination, vital functions), no known specific antidote.

5. Fire-Fighting Measures

Extinguishing media

Suitable extinguishing media:
dry powder, foam

Unsuitable extinguishing media for safety reasons:
water jet

Additional information:
If water is used, restrict pedestrian and vehicular traffic in areas where slip hazard may exist.

Special hazards arising from the substance or mixture

Hazards during fire-fighting:
carbon oxides, nitrogen oxides
The substances/groups of substances mentioned can be released in case of fire. Very slippery when wet.

Advice for fire-fighters

Protective equipment for fire-fighting:
Wear a self-contained breathing apparatus.

Further information:
Dusty conditions may ignite explosively in the presence of an ignition source causing flash fire.

6. Accidental release measures

Further accidental release measures:
Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). Avoid the formation and build-up of dust - danger of dust explosion. Dust in sufficient concentration can result in an explosive mixture in air. Handle to minimize dusting and eliminate open flame and other sources of ignition. Forms slippery surfaces with water.

Personal precautions, protective equipment and emergency procedures

Use personal protective clothing.

Environmental precautions

Do not discharge into drains/surface waters/groundwater.

Methods and material for containment and cleaning up

Nonsparking tools should be used.

7. Handling and Storage

Precautions for safe handling

Breathing must be protected when large quantities are decanted without local exhaust ventilation. Handle in accordance with good industrial hygiene and safety practice. Forms slippery surfaces with water.

Protection against fire and explosion:
Avoid dust formation. Dust in sufficient concentration can result in an explosive mixture in air. Handle to minimize dusting and eliminate open flame and other sources of ignition. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Dry powders can build static

electricity charges when subjected to the friction of transfer and mixing operations. Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres. Refer to NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids (2013 Edition) for safe handling.

Conditions for safe storage, including any incompatibilities

Further information on storage conditions: Store in unopened original containers in a cool and dry place. Avoid wet, damp or humid conditions, temperature extremes and ignition sources.

Storage stability:
Avoid extreme heat.

8. Exposure Controls/Personal Protection

No occupational exposure limits known.

Advice on system design:
It is recommended that all dust control equipment such as local exhaust ventilation and material transport systems involved in handling of this product contain explosion relief vents or an explosion suppression system or an oxygen deficient environment. Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment). Use only appropriately classified electrical equipment and powered industrial trucks.

Personal protective equipment

Respiratory protection:
Wear a NIOSH-certified (or equivalent) organic vapour/particulate respirator.

Hand protection:
Chemical resistant protective gloves

Eye protection:
Safety glasses with side-shields.

Body protection:
light protective clothing

General safety and hygiene measures:
Handle in accordance with good industrial hygiene and safety practice. Ensure adequate ventilation. Wearing of closed work clothing is recommended. Wear protective clothing as necessary to minimize contact. Handle in accordance with good industrial hygiene and safety practice. No eating, drinking, smoking or tobacco use at the place of work.

9. Physical and Chemical Properties

Form:	powder
Odour:	odourless
Odour threshold:	No data available.
Colour:	off-white

pH value:	6 - 8 (10 g/l) The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.
Melting point:	The substance / product decomposes therefore not determined.
Boiling point:	not applicable
Sublimation point:	No applicable information available.
Flash point:	not applicable
Flammability:	not flammable
Lower explosion limit:	No applicable information available.
Upper explosion limit:	No applicable information available.
Autoignition:	No applicable information available.
Vapour pressure:	The product has not been tested.
Relative density:	No data available.
Bulk density:	approx. 500 kg/m3
Vapour density:	No applicable information available.
Partitioning coefficient n-octanol/water (log Pow):	Study scientifically not justified.
Self-ignition temperature:	not self-igniting
Viscosity, dynamic:	not applicable, the product is a solid
Solubility in water:	Forms a viscous solution.
Solubility (quantitative):	No applicable information available.
Solubility (qualitative):	No applicable information available.
Evaporation rate:	The product is a non-volatile solid.
Other Information:	If necessary, information on other physical and chemical parameters is indicated in this section.

10. Stability and Reactivity

Reactivity
No hazardous reactions if stored and handled as prescribed/indicated.

Corrosion to metals:
No corrosive effect on metal.

Oxidizing properties:
not fire-propagating

Chemical stability
The product is stable if stored and handled as prescribed/indicated.

Possibility of hazardous reactions
The product is not a dust explosion risk as supplied; however the build-up of fine dust can lead to a risk of dust explosions.
Stable under normal conditions.
No hazardous reactions known.

Conditions to avoid
Avoid extreme temperatures. Avoid humidity.

Incompatible materials
strong acids, strong bases, strong oxidizing agents

Hazardous decomposition products

Decomposition products:
Hazardous decomposition products: No hazardous decomposition products if stored and handled as prescribed/indicated.

11. Toxicological information

Primary routes of exposure

Routes of entry for solids and liquids are ingestion and inhalation, but may include eye or skin contact. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquefied gases.

Acute Toxicity/Effects

Acute toxicity
Assessment of acute toxicity: No known acute effects.

Oral
Type of value: LD50
Species: rat
Value: > 5,000 mg/kg (OECD Guideline 401)

Irritation / corrosion
Assessment of irritating effects: Not irritating to eyes and skin.

Skin
Species: rabbit
Result: non-irritant
Method: OECD Guideline 404

Eye
Species: rabbit
Result: non-irritant

Sensitization
Assessment of sensitization: Based on the ingredients, there is no suspicion of a skin-sensitizing potential.

Aspiration Hazard
No aspiration hazard expected.

Chronic Toxicity/Effects

Repeated dose toxicity
Assessment of repeated dose toxicity: Based on our experience and the information available, no adverse health effects are expected if handled as recommended with suitable precautions for designated uses. The product has not been tested. The statement has been derived from the properties of the individual components.

Genetic toxicity
Assessment of mutagenicity: Based on the ingredients, there is no suspicion of a mutagenic effect.

Carcinogenicity

Assessment of carcinogenicity: The whole of the information assessable provides no indication of a carcinogenic effect.
None of the components in this product at concentrations greater than 0.1% are listed by IARC; NTP, OSHA or ACGIH as a carcinogen.

Reproductive toxicity
Assessment of reproduction toxicity: Based on the ingredients, there is no suspicion of a toxic effect on reproduction.

Teratogenicity
Assessment of teratogenicity: Based on the ingredients, there is no suspicion of a teratogenic effect.

Other Information
The product has not been tested. The statements on toxicology have been derived from products of a similar structure and composition.

Symptoms of Exposure

The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11., Further important symptoms and effects are so far not known.

12. Ecological Information

Toxicity

Toxicity to fish
LC50 (96 h) > 100 mg/l, Oncorhynchus mykiss (static)
(under static conditions in the presence of 10 mg/L humic acid)

Aquatic invertebrates
LC50 (48 h) > 100 mg/l, Daphnia magna

Persistence and degradability

Assessment biodegradation and elimination (H2O)
Not readily biodegradable (by OECD criteria).

Bioaccumulative potential

Assessment bioaccumulation potential
Based on its structural properties, the polymer is not biologically available. Accumulation in organisms is not to be expected.

Mobility in soil

Assessment transport between environmental compartments

Information on: Anionic polyacrylamide

Adsorption to solid soil phase is expected.

Additional information

Other ecotoxicological advice:

The product has not been tested. The statements on ecotoxicology have been derived from products of a similar structure and composition.

13. Disposal considerations

Waste disposal of substance:
Must be disposed of or incinerated in accordance with local regulations.

Container disposal:
Dispose of in a licensed facility. Recommend crushing, puncturing or other means to prevent unauthorized use of used containers.

14. Transport Information

Land transport
TDG

Not classified as a dangerous good under transport regulations

Sea transport
IMDG

Not classified as a dangerous good under transport regulations

Air transport
IATA/ICAO

Not classified as a dangerous good under transport regulations

15. Regulatory Information

Federal Regulations

Registration status:

Chemical	DSL, CA	released / listed

16. Other Information

SDS Prepared by:
BASF NA Product Regulations
SDS Prepared on: 2017/06/14

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END OF DATA SHEET

NIAD I

Safety Data Sheet

According To U.S. Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules And Regulations And According To Canada's Hazardous Products Regulation February 11, 2015.

Revision Date: 05/07/2018 Date of issue: 11/16/2016 Version: 2.0

SECTION 1: IDENTIFICATION

Product Identifier

Product Form: Mixture

Product Name: NIAD I

Intended Use of the Product

Industrial

Name, Address, and Telephone of the Responsible Party

Manufacturer

CHEMTRADE LOGISTICS INC.
155 Gordon Baker Road
Suite 300
Toronto, Ontario M2H 3N5
For SDS Info: (416) 496-5856
www.chemtradelogistics.com

Emergency Telephone Number

Emergency Number : Canada: CANUTEC +1-613-996-6666 / US: CHEMTREC +1-800-424-9300
INTERNATIONAL + 1-703-741-5970
Chemtrade Emergency Contact: (866) 416-4404
For Chemical Emergency, Spill, Leak, Fire, Exposure, or Accident, call CHEMTREC – Day or Night

SECTION 2: HAZARDS IDENTIFICATION

Classification of the Substance or Mixture

GHS Classification

Met. Corr. 1	H290
Skin Corr. 1A	H314
Eye Dam. 1	H318

Full text of hazard classes and H-statements : see section 16

Label Elements

GHS Labeling

Hazard Pictograms :

GHS05

Signal Word : Danger

Hazard Statements : H290 - May be corrosive to metals.
H314 - Causes severe skin burns and eye damage.
H318 - Causes serious eye damage.

Precautionary Statements : P234 - Keep only in original container.
P260 - Do not breathe vapors, mist, or spray.
P264 - Wash hands, forearms, and other exposed areas thoroughly after handling.
P280 - Wear protective gloves, protective clothing, and eye protection.
P301+P330+P331 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 - Immediately call a POISON CENTER or doctor.
P321 - Specific treatment (see section 4 on this SDS).

P363 - Wash contaminated clothing before reuse.
P390 - Absorb spillage to prevent material damage.
P405 - Store locked up.
P406 - Store in corrosive resistant container with a resistant inner liner.
P501 - Dispose of contents/container in accordance with local, regional, national, and international regulations.

Other Hazards

Exposure may aggravate pre-existing eye, skin, or respiratory conditions. May be corrosive to respiratory tract.

Unknown Acute Toxicity Not available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Mixture

Name	Product Identifier	% *	GHS Ingredient Classification
Water	(CAS No) 7732-18-5	40 - 70	Not classified
Aluminum chloride, basic	(CAS No) 1327-41-9	30 - 60⁺	Met. Corr. 1, H290 Eye Dam. 1, H318

Full text of H-phrases: see section 16

*Percentages are listed in weight by weight percentage (w/w%) for liquid and solid ingredients. Gas ingredients are listed in volume by volume percentage (v/v%).

⁺The actual concentration of the ingredient(s) is withheld as a trade secret in accordance with the Hazardous Products Regulations (HPR) SOR/2015-17 and 29 CFR 1910.1200.

SECTION 4: FIRST AID MEASURES

Description of First-aid Measures

General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

Inhalation: When symptoms occur: go into open air and ventilate suspected area. Obtain medical attention if breathing difficulty persists.

Skin Contact: Remove contaminated clothing. Immediately flush skin with plenty of water for at least 30 minutes or continue until medical aid is available. Wash contaminated clothing before reuse. Seek immediate medical advice/attention.

Eye Contact: Remove source of exposure and rinse cautiously with water for at least 30 minutes or continue until medical aid is available. Remove contact lenses, if present and easy to do. Continue rinsing. Seek immediate medical advice/attention.

Ingestion: Rinse mouth. Do NOT induce vomiting. Obtain medical attention.

Most Important Symptoms and Effects Both Acute and Delayed

General: Causes severe skin burns and eye damage. Causes serious eye damage.

Inhalation: May be corrosive to the respiratory tract.

Skin Contact: Causes severe irritation which will progress to chemical burns.

Eye Contact: Causes permanent damage to the cornea, iris, or conjunctiva.

Ingestion: May cause burns or irritation of the linings of the mouth, throat, and gastrointestinal tract.

Chronic Symptoms: None known.

Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, seek medical advice and attention. If medical advice is needed, have product container or label at hand.

SECTION 5: FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media: Water spray, dry chemical, foam, carbon dioxide.

Unsuitable Extinguishing Media: Do not use a heavy water stream. Use of heavy stream of water may spread fire.

Special Hazards Arising From the Substance or Mixture

Fire Hazard: Not considered flammable but may burn at high temperatures.

Explosion Hazard: Contact with metallic substances may release flammable hydrogen gas.

Reactivity: May be corrosive to metals. Contact with metals may evolve flammable hydrogen gas. May react exothermically with water releasing heat. Adding an acid to a base or base to an acid may cause a violent reaction.

Advice for Firefighters

Precautionary Measures Fire: Exercise caution when fighting any chemical fire.

Firefighting Instructions: Use water spray or fog for cooling exposed containers.

Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.

Reference to Other Sections

Refer to section 9 for flammability properties.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Do not get in eyes, on skin, or on clothing. Do not breathe vapor, mist or spray.

For Non-Emergency Personnel

Protective Equipment: Use appropriate personal protection equipment (PPE).

Emergency Procedures: Evacuate unnecessary personnel.

For Emergency Personnel

Protective Equipment: Equip cleanup crew with proper protection.

Emergency Procedures: Upon arrival at the scene, a first responder is expected to recognize the presence of dangerous goods, protect oneself and the public, secure the area, and call for the assistance of trained personnel as soon as conditions permit. Ventilate area.

Environmental Precautions

Prevent entry to sewers and public waters.

Methods and Materials for Containment and Cleaning Up

For Containment: Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams. As an immediate precautionary measure, isolate spill or leak area in all directions.

Methods for Cleaning Up: Clean up spills immediately and dispose of waste safely. Absorb spillage to prevent material damage. Cautiously neutralize spilled liquid. Transfer spilled material to a suitable container for disposal. Contact competent authorities after a spill.

Reference to Other Sections

See Section 8 for exposure controls and personal protection and Section 13 for disposal considerations.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

Additional Hazards When Processed: May be corrosive to metals. May release corrosive vapors.

Precautions for Safe Handling: Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Handle empty containers with care because they may still present a hazard. Do not get in eyes, on skin, or on clothing. Do not breathe vapors, mist, or spray.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures.

Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Comply with applicable regulations.

Storage Conditions: Store in corrosive resistant container with a resistant inner liner. Keep container closed when not in use. Store in a dry, cool place. Keep/Store away from direct sunlight, extremely high or low temperatures and incompatible materials.

Incompatible Materials: Strong acids, strong bases, strong oxidizers.

Specific End Use(s)

Industrial

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

For substances listed in section 3 that are not listed here, there are no established Exposure limits from the manufacturer, supplier, importer, or the appropriate advisory agency including: ACGIH (TLV), AIHA (WEEL), NIOSH (REL), OSHA (PEL), Canadian provincial governments, or the Mexican government.

Exposure Controls

Appropriate Engineering Controls: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Ensure adequate ventilation, especially in confined areas. Ensure all national/local regulations are observed.

Personal Protective Equipment: Gloves. Protective clothing. Protective goggles. Insufficient ventilation: wear respiratory protection.

Materials for Protective Clothing: Acid-resistant clothing.

Hand Protection: Wear acid-resistant protective gloves.

Eye Protection: Chemical safety goggles and face shield.

Skin and Body Protection: Wear suitable protective clothing.

Respiratory Protection: If exposure limits are exceeded or irritation is experienced, approved respiratory protection should be worn. In case of inadequate ventilation, oxygen deficient atmosphere, or where exposure levels are not known wear approved respiratory protection.

Other Information: When using, do not eat, drink or smoke.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

Physical State	:	Liquid
Appearance	:	Clear yellow to clear amber
Odor	:	Faint aroma
Odor Threshold	:	Not available
pH	:	< 1 (1% solution)
Evaporation Rate	:	Not available
Melting Point	:	Not applicable
Freezing Point	:	Not available
Boiling Point	:	105 °C (221 °F)
Flash Point	:	Not flammable
Auto-ignition Temperature	:	Not applicable
Decomposition Temperature	:	Not available
Flammability (solid, gas)	:	Not applicable
Lower Flammable Limit	:	Not applicable
Upper Flammable Limit	:	Not applicable
Vapor Pressure	:	Not available
Relative Vapor Density at 20°C	:	Not available
Relative Density	:	Not available
Specific Gravity	:	1.334 - 1.37 (@ 20 °C)
Solubility	:	Appreciable in water
Partition Coefficient: N-Octanol/Water	:	Not available
Viscosity	:	Not available

SECTION 10: STABILITY AND REACTIVITY

Reactivity: May be corrosive to metals. Contact with metals may evolve flammable hydrogen gas. May react exothermically with water releasing heat. Adding an acid to a base or base to an acid may cause a violent reaction.

Chemical Stability: Stable under recommended handling and storage conditions (see section 7).

Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

Conditions to Avoid: Direct sunlight, extremely high or low temperatures, and incompatible materials.

Incompatible Materials: Strong acids, strong bases, strong oxidizers. Metals. May be corrosive to metals.

Hazardous Decomposition Products: Thermal decomposition generates : Hydrogen chloride. Chlorine gas. Oxides of aluminum. Corrosive vapors.

SECTION 11: TOXICOLOGICAL INFORMATION

Information on Toxicological Effects - Product

Acute Toxicity (Oral): Not classified

Acute Toxicity (Dermal): Not classified

Acute Toxicity (Inhalation): Not classified

LD50 and LC50 Data: Not available

Skin Corrosion/Irritation: Not classified
pH: < 1 (1% solution)
Eye Damage/Irritation: Causes serious eye damage.
pH: < 1 (1% solution)
Respiratory or Skin Sensitization: Not classified
Germ Cell Mutagenicity: Not classified
Carcinogenicity: Not classified
Specific Target Organ Toxicity (Repeated Exposure): Not classified
Reproductive Toxicity: Not classified
Specific Target Organ Toxicity (Single Exposure): Not classified
Aspiration Hazard: Not classified
Symptoms/Injuries After Inhalation: May be corrosive to the respiratory tract.
Symptoms/Injuries After Skin Contact: Causes severe irritation which will progress to chemical burns.
Symptoms/Injuries After Eye Contact: Causes permanent damage to the cornea, iris, or conjunctiva.
Symptoms/Injuries After Ingestion: May cause burns or irritation of the linings of the mouth, throat, and gastrointestinal tract.
Chronic Symptoms: None known.

Information on Toxicological Effects - Ingredient(s)

LD50 and LC50 Data:

Aluminum chloride, basic (1327-41-9)	
LD50 Oral Rat	> 2000 mg/kg
LD50 Dermal Rat	> 2000 mg/kg

SECTION 12: ECOLOGICAL INFORMATION

Toxicity

Ecology - General: Not classified.

Persistence and Degradability

NIAD I	
Persistence and Degradability	Not established.

Bioaccumulative Potential

NIAD I	
Bioaccumulative Potential	Not established.

Mobility in Soil

Not available

Other Adverse Effects

Other Information: Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Recommendations: Dispose of contents/container in accordance with local, regional, national, and international regulations
Additional Information: Container may remain hazardous when empty. Continue to observe all precautions.
Ecology - Waste Materials: Avoid release to the environment.

SECTION 14: TRANSPORT INFORMATION

The shipping description(s) stated herein were prepared in accordance with certain assumptions at the time the SDS was authored, and can vary based on a number of variables that may or may not have been known at the time the SDS was issued.

14.1 In Accordance with DOT

Proper Shipping Name : CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (CONTAINS POLYALUMINUM HYDROXYCHLORIDE)
Hazard Class : 8
Identification Number : UN3264
Label Codes : 8

Packing Group : III

ERG Number : 154

14.2 In Accordance with IMDG

Proper Shipping Name : CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (CONTAINS POLYALUMINUM HYDROXYCHLORIDE)
Hazard Class : 8
Identification Number : UN3264
Label Codes : 8

Packing Group : III
EmS-No. (Fire) : F-A
EmS-No. (Spillage) : S-B

14.3 In Accordance with IATA

Proper Shipping Name : CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.(CONTAINS POLYALUMINUM HYDROXYCHLORIDE)
Hazard Class : 8
Identification Number : UN3264
Label Codes : 8

Packing Group : III
ERG Code (IATA) : 8L

14.4 In Accordance with TDG

Proper Shipping Name : CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (CONTAINS POLYALUMINUM HYDROXYCHLORIDE)
Hazard Class : 8
Identification Number : UN3264
Label Codes : 8

Packing Group : III

SECTION 15: REGULATORY INFORMATION

US Federal Regulations

NIAD I	
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard

Aluminum chloride, basic (1327-41-9)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Water (7732-18-5)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

US State Regulations

Neither this product nor its chemical components appear on any US state lists.

Canadian Regulations

Aluminum chloride, basic (1327-41-9)
Listed on the Canadian DSL (Domestic Substances List)

Water (7732-18-5)
Listed on the Canadian DSL (Domestic Substances List)

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Revision Date : 05/07/2018

Revision Summary Update sections 3 and 16

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200 and Canada’s Hazardous Products Regulations (HPR).

Eye Dam. 1	Serious eye damage/eye irritation Category 1
Met. Corr. 1	Corrosive to metals Category 1
H290	May be corrosive to metals
H318	Causes serious eye damage

NFPA Health Hazard : 3
NFPA Fire Hazard : 0
NFPA Reactivity : 0

HMIS Rating

Health : 3
Flammability : 0
Physical : 0

Handle product with due care and avoid unnecessary contact. This information is supplied under U.S. OSHA’S “Right to Know” (29 CFR 1910.1200) and Canada’s WHMIS regulations. Although certain hazards are described herein, we cannot guarantee these are the only hazards that exist. The information contained herein is based on data available to us and is believed to be true and accurate but it is not offered as a product specification. No warranty, expressed or implied, regarding the accuracy of this data, the hazards connected with the use of the product, or the results to be obtained from the use thereof, is made and Chemtrade and its affiliates assume no responsibility. Chemtrade is a member of the CIAC (Chemistry Industry Association of Canada) and adheres to the codes and principles of Responsible Care™.

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Chemtrade NA GHS SDS 2015

APPENDIX B

Water Treatment Plant Shift Report

Water Treatment Plant Shift Report

Date: 12-10-22 **Day Shift:** Chad **Night Shift:** Ryan

	RAW WATER							ACTIFLO				CLARIFIED WATER ACTIFLO					
Time	FCV1-012	Flow Rate	Influent Totalizer	Temp.			TSS in Lab	Floc Quality and Intersitial Water	Hydro-cyclone Inlet Pressure	Sand Recirculation Pump Running	Lamellas (Degree of Dirtiness)	TSS Online	TSS In Lab		pH	Treated Water Flowrate	Effluent Totalizer
	% Open	m³/h	m³	°C			mg/l	Floc S/M/B Water: Clear/Dirty	PSI	P2-011 or P2-012	0-Clean; 5-Very Dirty	MG/L	MG/L			m³/h	m³
7:00 AM	62.1	1088	39932945	3.0	6.95	3.27	5.00	S/C	22	012	2	4.08	4.00	2.97	7.53	1068	37552170
10:00 AM	INITIALS:	CD	☑	All systems functioning normally													
1:00 PM	INITIALS:	CD	☑	All systems functioning normally													
4:00PM	INITIALS:	CD	☑	All systems functioning normally													
7:00 PM	61.2	1081	39945012	3.0	7.04	4.10	7.00	S/C	22	012	2	3.94	5.00	3.21	7.54	1071	37564462
10:00 PM	INITIALS:	RS	☑	All systems functioning normally													
1:00 AM	INITIALS:	RS	☑	All systems functioning normally													
4:00 AM	INITIALS:	RS	☑	All systems functioning normally													

Shift Summary

Flow			
Day Shift			
	Start (m³)	End (m³)	Vol. Processed (m³)
Influent	39932945	39945012	12067.00
Effluent	37552170	37564462	12292.00
Night Shift			
	Start (m³)	End (m³)	Vol. Processed
Influent	39945012	39957467	12455.00
Effluent	37564462	37577506	13044.00
Reagent			
	Start	End	Consumption
Sand Bags	54	49	5
Polymer Bags	49	48.5	0.5
Coagulant Level %	71.5	71.3	0.2

Safety Shower & Eye Wash

Shift	Tank Full (Y/N)	Clean (Y/N)	Functional (Y/N)
Day	Y	Y	Y
Night			

Note: Safety Shower and eye wash station must be tested every Wednesday on day shift. Record "Y" under "Functional" if test passes.

Well level at start and middle of shift (m)	
Day Shift	Night Shift
2.49	2.41
2.39	2.31
PETBP to the WTP	
WTP op hr	#REF!
TSF Booster O/F	

REAGENTS

	Sand							Polymer							Coagulant						
Time	Sand Volume	Total Volume	Calculated Concentration	Sand Bags Added	Dry Polymer Level	Volume Pumped	Time	Pump Running	Pump Speed	Carry Water Flowrate	Polymer Concentration	Calculated Dosage	Dosage Setpoint	Polymer Distribution	Volume Pumped	Time	Pump Running	Stroke	Pump Speed	Calculated Dosage	Dosage Setpoint
	L	L	g/L	-	% in Window	L	s	P9-521 / P9-522	%	L/h	g/L	mg/L	mg/L	% injection / maturation tanks	mL	s	P9-511 / P9-512	-	%	mg/L	mg/L
7:00 AM	0.01	5	0.23	1	75	3	23.12	521	51	1800	2	0.86	1.10	70/30	300	176.51	511	7	4	1.54	1.0
10:00 AM					☑ Polymer Level Full																
	0.02	5		0																	
1:00 PM					☑ Polymer Level Full																
4:00 PM					☑ Polymer Level Full																
7:00 PM	0.01	5	0.23	1	100	3	24.24	521	51	1800	2	0.82	1.10	70/30	300	179.10	511	7	4	1.53	1.0
10:00 PM					☑ Polymer Level Full																
	0.01	5	0.23	0																	
1:00 AM					☑ Polymer Level Full																
4:00 AM					☑ Polymer Level Full																

Raw Water Pumps

Raw Water Source		To The TSF	
pump	time	PETBP / CCS	time
SP2	12		
SP3	12		
CP1	12		
CP2	12		
CP3	12		
CP4	12		
WP1	12		
SP2	12		
SP3	12		
CP1	12		
CP2	12		
CP3	12		

Comments / Unusual Events	Downtime (minutes)	
	D/S Operator	CD

Comments / Unusual Events	Downtime (minutes)	
CP 4 - 12		
WP - 12		
TSF- Diesel 24		
	N/S Operator	RS

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