APPENDIX 12-D

Geochemical Characterization Report

GOLDCORP

Appendix 12-D

Coffee Gold Project

Geochemical Characterization Report

Project No. A362-2
22 March 2017

LORAX ENVIRONMENTAL

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1. Introduction

1.1 Project Background

The proposed Coffee Gold Mine (the Project), is an advanced exploration gold project located in the White Gold District of west-central Yukon, approximately 130 km south of Dawson City. The Project contains several gold occurrences within an exploration concession covering an area of more than 600 km^2.

The Project will mine 60 MT of ore and 300 MT of waste rock from four open pits during an 11 ½ year mine life. The ore will be crushed and placed onto a heap leach facility by truck for nine months of the year. During the three coldest months of winter, run-of-mine (ROM) ore will be stockpiled. Gold will be extracted from pregnant leach solution by a 5 tonnes per day (t/d) adsorption, desorption, recovery (ADR) carbon plant with mercury retorting to produce a final gold doré product. Waste rock will either be stored in a waste rock storage facility (WRSF) adjacent to mine pits, or backfilled into other completed mine pits.

1.2 Scope and Purpose

The purpose of the geochemical characterization program is to determine the metal leaching and acid rock drainage (ML/ARD) potential of geologic material that will be disturbed by mining activities. Techniques used to assess ML/ARD potential include static tests, which examine the intrinsic ML/ARD potential of a sample, and kinetic tests, which expose the material to various weathering conditions. These results are used to predict the geochemical evolution of drainage produced from mine waste facilities that will exist during mine operations and closure, and inform mine waste management, water quality predictions, aquatic resources effects assessments and mitigation/contingency measures.

1.3 Report Structure

The geochemical characterization program relates the ML/ARD characteristics of various rock units present at site. The site geology and rock units defined in the geologic block model are described in Chapter 2. Analytical methods of the various field and laboratory testwork are described in Chapter 3, and the results are presented and discussed in Chapter 4. In Chapter 4 the intrinsic ML/ARD potential from different rock units is described. This information is then combined with site specific information on climate, hydrology and the mine plan to produce geochemical source terms in Chapter 5.

2. Geology

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2. Geology

This chapter provides a description of site geology and an overview of the volume of various geologic materials that will be excavated during mine life. The information presented in this section has largely been drawn from the Feasibility Study (JDS, 2016) for the Project. Geologic information most relevant to the geochemical characterization of materials to be disturbed as part of the Project is summarized below.

2.1 Regional Geology

The Project is located in the Yukon-Tanana Terrane (YTT), an accreted pericratonic rock sequence that extends from southeast Alaska into northern British Columbia. The YTT consists of schists and gneisses that were deformed and metamorphosed in the late Paleozoic era, and subjected to a number of intrusive events in the Mesozoic. The YTT hosts a number of gold deposits related to these Mesozoic intrusions. The Paleozoic rocks are pervasively foliated and contain at least two overprinting rock fabrics. During the Early Jurassic period, the rocks were tectonically stacked along foliation parallel thrust faults.

2.2 Local Geology

The Project area consists of felsic to mafic gneisses and schists of Paleozoic age which were intruded by a large granitic body in the late Cretaceous. A number of intermediate to felsic dikes have cut granitic and metamorphic country rock. Mineralization at the Project is divided into two main west-northwest trending, south to southwest dipping panels bordering a third intrusive rock panel to the south. From north to south, these are divided into an augen gneiss-mafic schist sequence overlain by a package of interbanded biotite-feldspar-quartz-muscovite schist, mafic metavolcanic rocks and metacarbonate rocks. To the south, the sequences are butted against a Cretaceous granite along a west-northwest trending contact. The Paleozoic metamorphic rocks and the Cretaceous granite rock sequence are cut by intermediate to felsic dykes. The major rock units present at the Project site are shown in Table 2-1. A vast majority of the rock that will be mined from mine pits are the felsic gneiss (Supremo and Double Double pits), biotite schist (Latte pit) and granite (Kona pit).

Gold mineralization at the site is hydrothermal in origin and structurally controlled. The gold mineralization is associated with brecciation, pyrite and silica sericite alteration, and minor quartz veins. Main groupings of rock types at the Project site are described below. Note that there is some variability within these main rock types, and multiple lithology codes have been used in drill core logging.

**Table 2-1:
Rock Units in the Project Area**

Rock Unit	Description
Felsic Gneiss	Variable quartz + feldspar augen + biotite +muscovite. Typical Mg# 2-28. Low in potassium. Host to gold mineralized zones at Supremo.
Biotite Schist	Biotite+/-feldspar+/-quartz+/-muscovite+/- amphibole. Commonly carbonate-rich. High in potassium. Typical Mg# 20 - 40. Locally mylonitic. Host to gold mineralized zones at Latte.
Muscovite Schist	Mainly quartz + muscovite. Typical Mg# 10 - 20. Locally mylonitic.
Biotite Amphibolite	Amphibole + feldspar + biotite. Typical Mg# 20 - 40. Biotite and amphibole both Fe-rich. Contains up to 20% biotite.
Amphibolite	Found within the lower mafic footwall. Amphibole + feldspar ± biotite. Typical Mg# 30-50, biotite and amphibole more Mg-rich than biotite amphibolite. Contains up to 15% biotite.
Metagabbro/Amphibolite	Interleaved metagabbro with coarse magnesiohornblende + feldspar, and fine-grained, massive amphibolite with >95% magnesiohornblende. Moderate to strong retrogression to actinolite. High Mg content of biotite, amphibole.
Ultramafics	Serpentinite, pyroxenite or listwaenite. Typical Mg# 50 - 73, higher than all amphibolites and metagabbro. Very high in chromium and nickel.
Granite	Coffee Creek granite and Dawson Range batholith. Both are phases of the Whitehorse Plutonic suite and are uranium-rich. Dawson Range batholith higher in Thorium. Both are identifiable using airborne radiometrics.
Dacite Dykes	Quartz + feldspar phenocryst porphyry. Generally strongly silicified and sericitized. Strong spatial association with mineralized gold zones.
Andesite Dykes	Feldspar phenocrystic. Aphanitic in gold-bearing structures where all original textures are destroyed by intense silicification and sericitization. Strong spatial association with mineralized gold zones.

Source: Kaminak 2016

2.3 Weathering Facies

Structural weaknesses associated with gold mineralization have led to extensive weathering and oxidation along structurally-controlled corridors at the Project. The extent of oxidation is directly related to the amount of fracturing and the presence of sulphide mineralization and clay alteration. The surrounding country rock outside of these corridors is typically fresh (unoxidized) from surface. Weathering facies have been grouped according to the following nomenclature: oxide, upper transition, lower transition, fresh (unweathered). Brief summaries of these divisions are described in turn below.

Oxide

Oxide materials are defined as materials which show greater than 95% of rock surfaces being oxidized. The oxide facies is characterized by the presence of cubic vugs or limonite/hematite stains after pyrite. Rock surfaces show a pale orange-brown to dark red discoloration.

Upper Transition

The upper transition materials are defined by between 50% to 95% visible oxidation on rock faces. Outside of the ore zones, this material typically shows oxidized intervals or stronger limonite veining with associated limonite halos separated by fresh (unweathered) intervals. In mineralized zones, upper transition materials also typically show unoxidized windows. In support of the geologic block model used to develop the mine plan, the upper transition unit is further broken down into upper and middle transition units. For the purpose of the geochemical evaluation, the upper and middle transition materials are treated as a single weathering facies.

Lower Transition

The lower transition facies describes materials showing between 5% and 50% oxidation. Fresh (unweathered) materials are more pervasive. In mineralized zones, the lower transition facies show <50% oxidization of pyrite around veins/fractures.

Fresh (unweathered)

The fresh (unweathered) facies describes materials showing ≤5% oxidation. These materials are characterized by an absence of oxidation of brassy metamorphic pyrite and the presence of weak to absent fracture-controlled limonite-hematite. Very minor joint-controlled oxidation on unmineralized joint/fracture surfaces can also be present, although oxidation does not extend into adjacent country rock

3. Methodology

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3. Methodology

In this section, the rational for sample selection is discussed and a brief overview of analytical methods is provided.

3.1 Sample Selection

A key objective of the geochemical program was to produce a dataset that is representative of all types of materials to be disturbed or exposed during the Project. In this regard, appropriate sample selection is critical for adequately describing the variability in mine waste geochemical characteristics. The sampling program was specifically designed to characterize geochemical properties giving consideration to the following variables:

- Material type (*e.g.,* ore, waste rock, leach tailings, borrow material, overburden)
- Lithology (*e.g.,* gneiss, schist, granite, other)
- Weathering (*e.g*., oxide, transition, fresh)

The geochemical program included a variety of static testwork and kinetic testwork, in addition to detailed mineralogical analysis. A summary of the of number of samples and type of tests (by material type) is provided in Table 3-1. Test procedures are described below.

Table 3-1:
Summary of Geochemical Characterization Testwork for the Coffee Gold Mine as a Function of Material Type

Analytical Test	Ore	Waste Rock	Leach Tailings	Overburden and Borrow Material
Static Tests				
Acid base accounting (ABA)	38	348	16	105
Shake Flask Extraction (SFE)	18	102	*NS*	31
Aqua Regia (ICP-MS) Trace Metals	38	348	16	105
Aqua Regia (ICP-OES) Metals*	3,545	26,549	*NS*	*NS*
Kinetic Tests				
Humidity Cells	*NS*	8	*NS*	*NS*
Unsaturated Columns	6	6	7	*NS*
Field Bins	*NS*	8	3	*NS*
Cyanide column effluent	*NS*	*NS*	26	*NS*
Mineralogy				
XANES	6	5	*NS*	*NS*
XRD	7	41	8	*NS*
µXRF	6	7	*NS*	*NS*

Notes:
NS = no sample
*Analyses completed in support of the exploration assay database
XANES = x-ray absorption near-edge spectroscopy
XRD = x-ray diffraction
µXRF = micro x-ray fluorescence

One of the primary objectives of static testing was to assign ML/ARD characteristics by rock type. As described in Chapter 2 (Geology), the Coffee Gold Mine deposit consists of several mineralized lithologies overprinted by an in-situ weathering profile; therefore, the geochemistry of site mine rock (waste rock and ore) was assessed by lithology (gneiss, granite, schist and other) and weathering facies (oxide, upper and lower transition and fresh). A summary of the sample distribution for waste rock and ore as a function of lithologic unit and weathering facies is provided in Table 3-2 along with the percentage of waste rock and ore to be disturbed during the life of the Project. Plan view maps showing sampling locations for surficial samples (overburden and borrow) are shown in Figure 3-1. Drill core collar locations for waste rock and ore sampled from drill core is shown in Figure 3-2. Cross sections show sample locations with respect to pit shells are provided in Appendix A.

Table 3-2:
Summary of Waste Rock and Ore Proportions for the Coffee Gold Mine and Number of Samples Submitted for Static Testwork

Lithologic Unit	Weathering Facies	Waste Rock		Ore	
		% of total	*n* of samples	% of total	*n of* samples
Gneiss	Oxide	85.8%	34	72.5%	5
	Upper Transition		26		5
	Lower Transition		79		
	Fresh		49	*NA*	*NA*
Schist	Oxide	11.3%	15	24.2%	6
	Upper Transition		14		5
	Lower Transition		19		
	Fresh		31	*NA*	*NA*
Granite	Oxide	1.8%	6	2.7%	6
	Upper Transition		17		8
	Lower Transition		14		
	Fresh		20	*NA*	*NA*
Other	Oxide	0.1%	4	0.4%	1
	Upper Transition		7		2
	Lower Transition		6		
	Fresh		7	*NA*	*NA*
Total		*100%*	*348*	*100%*	*38*

Notes:
NA = not applicable,
NS = no samples*other lithologies not included in ore block model

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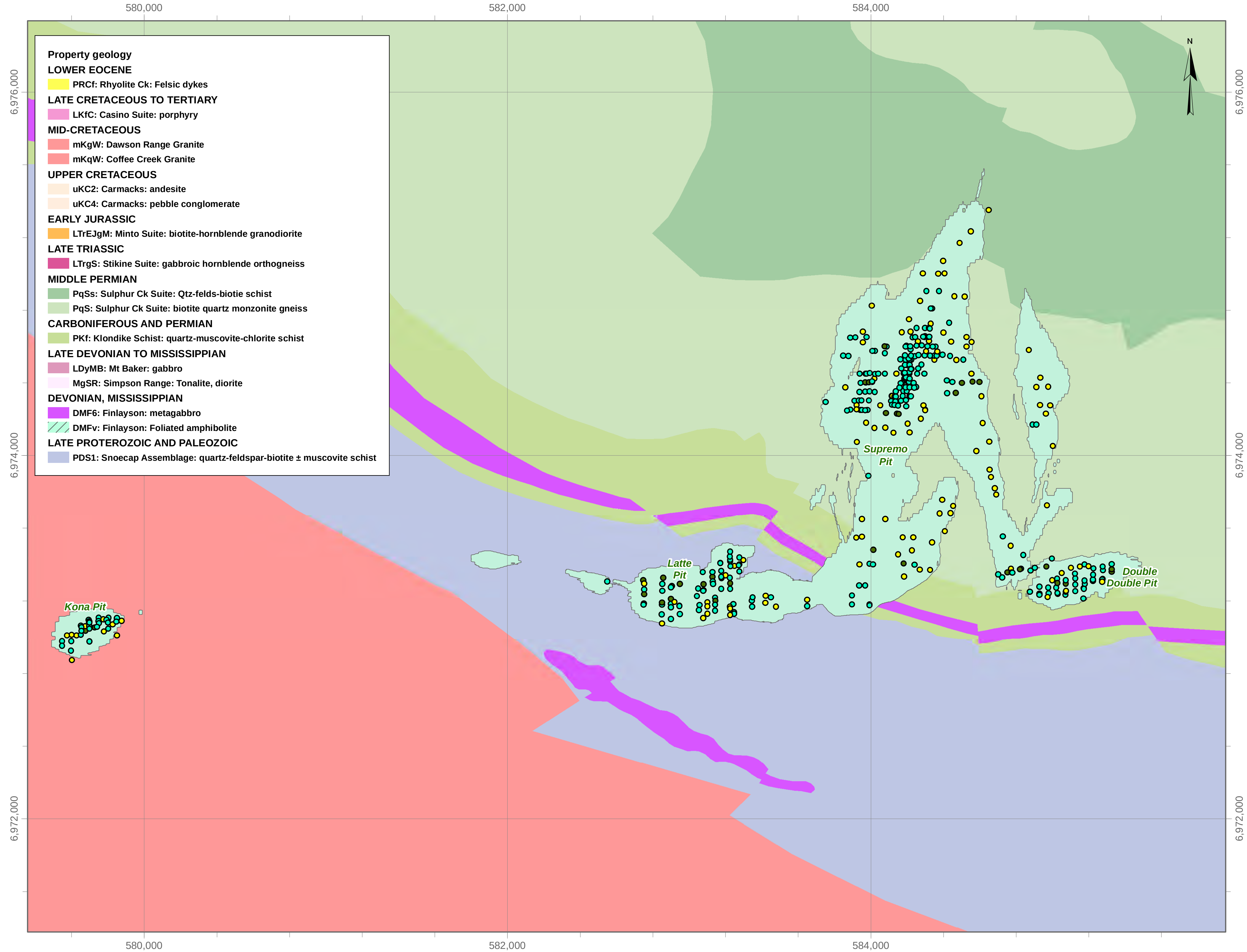

LEGEND

Drill Collars

- ABA Samples
- ICP Samples
- ABA and ICP Samples
- Pits

Coordinate System: *NAD 1983 UTM Zone 7N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Meter*

1:20,000

0 200 400 Meters

DATE SAVED:	Mar 21, 2017
DRAWN BY:	GM
REVIEWED:	JD
VERSION:	1

CLIENT:

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PROJECT:

Coffee Gold Project

TITLE:

Collar Locations of Drill Core Samples Collected for ABA and ICP-OES Analysis

PROJECT #: A362-1 *FIGURE:* 3-1

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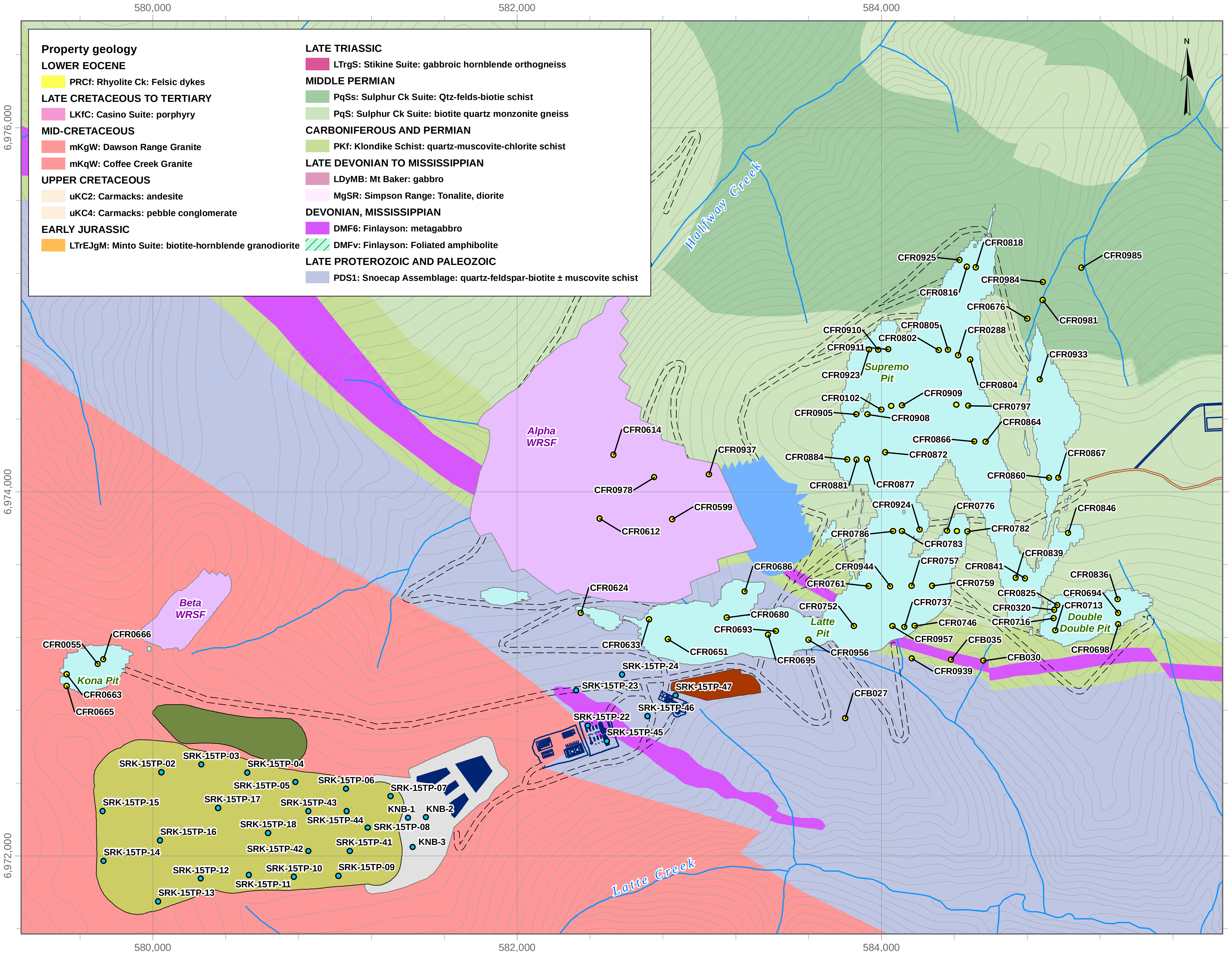

LEGEND

- Test Pits
- Overburden Drill Collars with ABA Samples
- Pits
- Waste Rock Dumps
- Leach pad
- Organics Stockpile
- ROM Stockpile
- Event Pond
- Heap Leach Access Disturbance Footprint
- Frozen Soil Storage Area
- Support Infrastructure
- Haul Road

Coordinate System: *NAD 1983 UTM Zone 7N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Meter*

1:20,000

0 200 400 Meters

DATE SAVED:	Mar 21, 2017
DRAWN BY:	GM
REVIEWED:	JD
VERSION:	1

CLIENT:

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PROJECT:

Coffee Gold Project

TITLE:

Overburden Drill Core Locations with ABA Samples

PROJECT #: A362-1 FIGURE: 3-2

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3.2 Analytical Methods

3.2.1 Mineralogy

3.2.1.1 Quantitative X-ray Diffraction

X-ray diffraction (XRD) is a powerful tool used to characterize the crystal structures of materials. Each mineral possesses a characteristic X-ray diffraction pattern that can be matched against a database of recorded phases. XRD data are produced when a monochromatic beam is projected onto a sample at an angle; this produces diffraction pattern peaks, which can be used as "fingerprints" to identify the mineral phases present. XRD was conducted at SGS and the University of British Columbia (UBC) Earth & Ocean Sciences Department. Select samples were submitted to the Canadian Light Source (CLS) for x-ray absorption near-edge spectroscopy (XANES) analysis in order to achieve higher resolution and identify minerals present in trace quantities.

3.2.1.2 μ-X-ray Florescence (XRF) Mapping

Synchrotron X-ray florescence (XRF) is a powerful approach for probing and mapping the distribution of elements in a given sample, with the data output used to define phase associations for parameters of concern (*e.g.*, arsenic (As) and uranium (U)). The principle of XRF is based on the detection of X-ray photons emitted from elements irradiated with X-rays. The emitted X-ray photon energies are element specific providing a unique identification for each element. μ-XRF maps were collected on the Very Sensitive Elemental and Structural Probe Employing Radiation from a Synchrotron (VESPERS) beamline at the CLS using a pink beam (meaning the photon beam consists of a wide range of energies, at a maximum of 20 KeV).

3.2.1.3 X-ray Absorption Near-Edge Spectroscopy (XANES)

Each element has a characteristic energy at which it absorbs X-rays, termed the X-ray absorption edge. Features of this edge and the absorption features of the elements on either side of the edge can provide information about the oxidation state and coordination environment of the element of study. XANES is part of the x-ray absorption spectrum and generally ranges from -50 eV to +100 eV relative to the absorption edge. In this regard, XANES analysis (performed at the CLS) was conducted to acquire phase association information for As and U, both of which represent parameters of potential concern in mine waste materials.

3.2.2 Static Tests

3.2.3 Acid-Base Accounting

Acid-base accounting (ABA) consists of a suite of tests used to estimate the acid generating potential (AP) and acid neutralizing potential (NP) of a sample. An accounting technique is then used to compare the AP and NP with standard criteria thereby indicating the theoretical acid generation potential of a sample. ABA was conducted by ALS in North Vancouver, B.C. Neutralization potential was measured using the standard sobek method (sobek NP) (Sobek et al. 1978) and the siderite peroxide correction sobek method (siderite NP) (Skousen *et al*., 1997). Carbonate NP (CaNP) was quantified from the total inorganic carbon (TIC) content by treating the sample with $HClO_4$ to evolve inorganic carbon (C) as CO_2, which was then measured by coulometery. A surrogate NP is developed by correlating NP values measured in ABA testwork to elemental abundances measured in the ICP-OES database, as discussed in Chapter 4. Total sulphur (S) was determined using a Leco furnace analyzer. Sulphate-S was determined via HCl extraction and measured gravimetrically after precipitation of barium chloride ($BaCl_2$). Sulphide-S was determined by first leaching the sulphate-S with sodium carbonate ($NaCO_3$) and then measuring the remaining sulphide-S with a Leco furnace. The oxidized sulphide was then determined gravimetrically after precipitation with $BaCl_2$.

3.2.4 Metal Abundance

Metal abundance in mine rock was measured as part of the ML/ARD characterization program and as part of the exploration program. Metal analysis conducted in support of the exploration program used a two acid (aqua regia) digestion followed by a 35 element (including S) inductively coupled plasma optical emission spectrometry (ICP-OES) scan (exploration database). Metal analysis conducted as part of the geochemical characterization program also used a two acid (aqua regia) digestion; however, this was followed by a 51 element inductively coupled plasma mass spectrometry (ICP-MS) scan (ABA database). The exploration database is considerably larger than the ABA database, with approximately 80,000 exploration samples versus a few hundred ABA samples. Both data sets were used in the analysis of acid-generating potential. All metal assays were conducted at ALS in North Vancouver, B.C.

3.2.5 SFE

Shake flask extractions (SFE) were conducted as described by Price (1997) in *Draft Guidelines and Recommended Methods for the Prediction of Metal Leaching and Acid Rock Drainage at Minesites in British Columbia*, using a 24 hour NanoPure water leach extraction test at a 3:1 liquid to solid ratio. The leachate was filtered and submitted for analysis including pH, conductivity, sulphate and dissolved metals.

3.2.6 Kinetic Tests

Kinetic test data are used to assess long term drainage chemistry, develop source terms for water quality predictions and evaluate disposal strategies for waste rock that will be produced during the life of the Project. The kinetic tests developed for the Project include eight humidity cells, 17 unsaturated columns and 11 field bins. A brief overview of these kinetic test programs is provided below. A summary of the kinetic tests developed for waste rock, ore and leach tailings for the Project is summarized in Table 3-3.

Most waste rock kinetic tests used composite samples each constructed from approximately 80 m of split drill core collected from three to six drill holes from across the site. Drill core samples were selected by comparing metal assay results to statistics on metal abundance in non-mineralized (Au < 0.3 ppm) material of the respective lithologies/weathering zones. Composite samples were produced for the three main weathering zones (oxide, transition and fresh) and the three dominant lithologies (gneiss, schist and granite). Note that a granite oxide composite was not constructed due to it's relatively low abundance in the deposit (approx. 0.5% of waste rock). In addition to these composite samples, humidity cells were initiated on two individual drill core samples (HC7 and HC8) to examine metal leaching from schist and gneiss fresh facies that has As and U concentrations in the upper 90^{th} percentile of the respective material types. Laboratory and field kinetic test results are provided in Appendix D.

3.2.6.1 Humidity Cells

Humidity cell tests measure the weathering rates of geological materials that are exposed to air and water under controlled laboratory conditions. The tests are designed to mimic weathering conditions by exposing samples to alternating cycles of dry and moist air, with regular flushings of the samples. The leachate is collected and analyzed at regular intervals to assess primary reaction rates for acid generation, neutralization, and metal release under controlled laboratory conditions. The reaction rates can be used to estimate the time to NP depletion and onset of acid generation.

Humidity cells are composed of Plexiglas cylinders (10.2 cm inner diameter, 25.5 cm length) filled with 1 kg of sample crushed to approximately minus 6 mm. The sample material is placed on a perforated acrylic disk covered in a nylon mesh. The contents of the cell are subjected to three days of dry air permeation followed by three days of humid air permeation (<10% relative humidity). On the seventh day, at the end of each wet/dry cycle, the contents of the cell are leached with 500 mL of distilled de-ionized water (Price, 1997). The purpose of the leaching step is to recover any readily soluble reaction products that have formed due to mineral dissolution or sulphide oxidation. The leachate is then analyzed for pH, conductivity, hardness, anions and dissolved metals, including mercury (Hg).

Table 3-3:
Summary of Kinetic Tests Initiated for the Coffee Gold Mine

Test ID	Duplicates	Material	Lithology	Weathering Facies	Start Date	Test Status
Unsaturated Columns						
Col 1		Leach Tailings	Gneiss/Schist	Oxide/Transition	10-Apr-14	active
Col 2	Duplicate of Col 1	Leach Tailings	Gneiss/Schist	Oxide/Transition	10-Apr-14	active
Col 3		Waste Rock	Schist	Oxide	16-Jul-14	active
Col 4		Waste Rock	Schist	Transition	16-Jul-14	active
Col 5		Waste Rock	Gneiss	Oxide	16-Jul-14	active
Col 6		Waste Rock	Gneiss	Transition	30-Jul-14	active
Col 7		Ore	Granite	Oxide	22-Apr-15	active
Col 8		Ore	Granite	Transition	22-Apr-15	active
Col 9		Ore	Schist	Oxide	22-Apr-15	active
Col 10		Ore	Schist	Transition	22-Apr-15	active
Col 11		Ore	Gneiss	Oxide	22-Apr-15	active
Col 12		Ore	Gneiss	Transition	22-Apr-15	active
Col 13		Waste Rock	Granite	Transition	20-May-15	active
Col 14		Waste Rock	Granite	Fresh	20-May-15	active
Col 15		Leach Tailings	Schist	Oxide/Transition	3-Jun-15	active
Col 16		Leach Tailings	Gneiss	Oxide/Transition	3-Jun-15	active
Col 17		Leach Tailings	Gneiss/Granite	Oxide/Transition	3-Jun-15	active
Humidity Cells						
HC 1	Duplicate of Col 4	Waste Rock	Schist	Transition	25-Jun-14	terminated
HC 2		Waste Rock	Schist	Fresh	25-Jun-14	terminated
HC 3	Duplicate of Col 6	Waste Rock	Gneiss	Transition	25-Jun-14	terminated
HC 4		Waste Rock	Gneiss	Fresh	25-Jun-14	terminated
HC 5	Duplicate of Col 13	Waste Rock	Granite	Transition	6-May-15	active
HC 6	Duplicate of Col 14	Waste Rock	Granite	Fresh	6-May-15	active
HC 7		Waste Rock	Schist	Fresh	12-Aug-15	active
HC 8		Waste Rock	Gneiss	Fresh	12-Aug-15	active
Field Bins						
FB-GO	Duplicate of Col 5	Waste Rock	Gneiss	Oxide	17-Jun-14	active
FB-GT	Duplicate of Col 6 & HC 3	Waste Rock	Gneiss	Transition	17-Jun-14	active
FB-GS	Duplicate of HC 4	Waste Rock	Gneiss	Fresh	17-Jun-14	active
FB-SO	Duplicate of Col 3	Waste Rock	Schist	Oxide	17-Jun-14	active
FB-ST	Duplicate of Col 4 & HC 1	Waste Rock	Schist	Transition	17-Jun-14	active
FB-SS	Duplicate of HC 2	Waste Rock	Schist	Fresh	17-Jun-14	active
FB-GGT	Duplicate of Col 13 & HC 5	Waste Rock	Granite	Transition	17-Jun-15	active
FB-GGS	Duplicate of Col 14 & HC 6	Waste Rock	Granite	Fresh	17-Jun-15	active
FB-LT1	Duplicate of Col 1 & Col 2	Leach Tailings	Gneiss/Schist	Oxide/Transition	17-Jun-14	active
FB-LT2		Leach Tailings	Schist	Oxide	10-Aug-15	active
FB-LT3		Leach Tailings	Gneiss	Oxide	10-Aug-15	active

Notes:
All columns and humidity cells are constructed of Plexiglas with acrylic perforated disk & nylon mesh;
All unsaturated columns are operated as trickle leach and all humidity cells as flood leach according to the MEND method (Price, 1997);
No sample preparation was conducted prior to flushings;
All columns and humidity cells were operated in a cold room at SGS and maintained at 4°C.

The humidity cell experiments were operated in a 4°C cold room to mimic the subarctic environment of the Project site. Although seasonally warmer temperatures can be expected in the near-surface waste materials, the bulk of the waste rock mass can be expected to remain at near-freezing temperatures throughout the year. In this regard, cool (4°C) experiment conditions are more representative of conditions to be expected at site. A summary of the humidity cell tests for the Project are provided in Table 3-3.

Humidity cell tests were subjected to recirculation experiment that involved recirculating the weekly effluent as influent to the tests. Effluent was re-circulated for three consecutive cycles, and then on the fourth cycle the leachate chemistry was analyzed. The objective of the recirculation experiment was to simulate increased pore water residence time to allow for assessment of whether the leachate chemistry produced by the kinetic tests are controlled primarily by the kinetic loading rates or by pH related solubility influences.

3.2.6.2 Unsaturated Columns

The unsaturated column test work is used to determine the kinetic behaviour of waste rock and ore stored on the surface and exposed to atmospheric weathering (sub-aerial storage). Unsaturated columns permit more flexibility than humidity cells with respect to test scale, particle size and range, sample mass, water infiltration or flow rate, degree of oxygenation and monitoring (cycle length).

The unsaturated columns are composed of Plexiglas cylinders (21.0 cm inside diameter, 20.5 cm length) filled with 4.4 kg to 20 kg of sample. The sample material is placed on a perforated Plexiglas disk covered in a nylon mesh. Columns containing waste rock or ore have the sample crushed to approximately minus 6 mm while the grain size distribution of leach tailings samples were not modified. The unsaturated columns are subjected to a trickle leach, whereby 400 mL of distilled de-ionized water is sprinkled on a bi-weekly basis. This is equivalent to 4.35 mm of rainfall per week. As per the rationale described above for the humidity cells, the unsaturated columns were operated in a 4°C cold room to mimic the subarctic environment of the Project site. Leachate collected from the unsaturated columns is analyzed for the same parameters as the humidity cells (pH, conductivity, hardness, anions and dissolved metals, including Hg).

Column tests were subjected to recirculation experiment that involved recirculating the weekly effluent as influent to the tests. Initially, effluent was re-circulated for one cycle, and then on the second cycle the leachate chemistry was analyzed. After a period of 8 cycles little change in solution chemistry was observed. Therefore, the re-circulation period was extended to two cycles, with the leachate being analyzed on the third cycle. The objective of the recirculation experiment was to simulate a slower an increased residence time to allow for assessment of whether the leachate chemistry produced by the kinetic tests are controlled primarily by the kinetic loading rates or by pH related solubility influences.

3.2.6.3 Field Bins

Field bins are utilized to characterize the weathering characteristics of larger-scale samples under ambient climate conditions. Loading measurements from field bins can be utilized to develop scaling factors for laboratory-based tests when developing water quality predictions. The field bin leachate results can also be used to estimate drainage quality and give an indication of the timescale over which acidic conditions may develop.

The field bins for the Project were erected in Small's Expediting yard adjacent to the Whitehorse airport. Six barrels were loaded with crushed drill core and one barrel was filled with cyanide column leach residue on May 7th, 2014 (Table 3-3). Five additional barrels were developed the following year on June 6th, 2015, including one empty rain test barrel which was established to assess the chemistry of infiltrating water.

The field bins consist of 119L HDPE colorless barrels (80 cm high x 45 cm diameter) mounted in wooden cribs that are supported on a slight incline to improve the flow of leachate towards the drainage tap and collection containers (Table 3-3). A hole is drilled and threaded in the bottom of each barrel. This is where the acid-washed tubing and fittings are securely fit to allow leachate to drain to the collection system attached to the base of the cribs below the field bins. Two pieces of nylon mesh are placed over the hole at the bottom of the bin to prevent fines from clogging the drain. As well, elbow taps (positioned with the opening facing down) are threaded into holes drilled along the sides of each of the barrels to ensure adequate air flow through the interior of the bin.

Prior to placing the test material in a barrel, the samples were weighed, mixed and split using the cone and quarter technique. The split sample, comprising roughly 12.5% of the original material, was sent to the analytical laboratory for physical sediment characteristics, geochemical static testwork and additional laboratory kinetic testing. The quartering process is performed in order to ensure that each sample is properly mixed and that a representative sample is obtained for further analyses and duplicate laboratory kinetic testwork.

The initial leachate sample was achieved by irrigating the field bins with approximately 8L of distilled-deionized water. Subsequent sampling is conducted when sufficient volumes of natural precipitation have collected in the leachate collection jugs. Precipitation percolates through, and reacts with, the mine rock stored in the field bins and then flows through tubing attached to the bottom of each bin into collection jugs located in Rubbermaid totes (Figure 3-3). Leachate is collected and analyzed for pH, conductivity, anions and dissolved metals, including Hg. Leachate collected from the leach tailings field bins are also analyzed for cyanide forms and compounds, including total, weak acid dissociable (WAD), cyanate (CNO^z) and thiocyanate (SCN^-).

Figure 3-3: Picture of Field Kinetic Tests

3.2.7 Metallurgical Columns

Metallurgical testwork for the Project was carried out by Kappes, Cassiday & Associates (KCA) in Reno, Nevada in 2014 and 2015. Ore (head) sample preparation and cyanide column leach testwork procedures are detailed in the report *Coffee Project Report of Metallurgical Test Work* (KCA, 2015).

In total, 17 columns were established during this phase of metallurgical testing to account for variations in scale, grain size, lithology and weathering facies. Three different scales and particle size distributions were established for testwork:

- Large scale columns, which measured 45.7 cm in diameter and contained 730 kg of sample composed of 80% particles passing 150 mm;
- Intermediate scale columns, which measured 20.3 cm in diameter and contained approximately 90 kg of sample composed of 80% particles passing 80 mm; and
- Small scale columns, which measured 15 cm in diameter and contained approximately 50 kg of sample composed of 80% particles passing 12.5 mm.

Lime buffered cyanide solution (NaCN) was continuously distributed onto the material through Tygon tubing at a flow rate of 10 to 12 L/hr/m^2 of column surface area. The column tests were run as continuously drained drip leach tests to more accurately reflect the actual conditions of a full scale heap leach. Following the stripping of Au from the effluent, the barren solution was recirculated through the column with makeup NaCN amended as required to maintain a target level of 0.6 g NaCN /L and hydrated lime ($Ca(OH)_2$) added as needed for pH control. At the end of the cyanide leach experiments, samples of spent ore (leach tailings) were collected from the metallurgical columns for geochemical characterization. The final leach solution from the columns were collected to provide an indication of heap leach process water chemistry during Operations. No steps were taken to rinse remaining pore water or detoxify cyanide in leach tailings samples before samples were collected for geochemical testwork.

3.2.8 Radioisotopes

Solid samples of waste rock, ore and overburden were analyzed for naturally occurring radioactive material (NORM) by the Saskatchewan Research Council (SRC) Environmental Analytical Laboratories. The samples were analyzed for the major components of NORM, namely, natural U (principally ^{238}U) and thorium (^{232}Th) and their major radioactive decay products, and ^{40}K, the naturally occurring radionuclide of potassium. The results for ^{238}U and ^{232}Th were based on the analysis by the ICP-MS method of U and Th concentrations on a mass basis. Conversion to radioactivity concentrations by SRC was done using standard conversion factors for natural U and Th (0.01235 Bq/g per ppm of U; 0.00406 Bq/g per ppm of Th). The concentrations of other radionuclides were determined by gamma radiation spectrometry.

The activity of ^{226}Ra was measured in kinetic test leachate and in process solution from metallurgical columns. Kinetic test leachate samples included leach tailings field bins, waste rock field bins and laboratory ore columns. Field bin samples were not filtered while ore columns and metallurgical column samples were filtered prior to analysis. The activity of ^{226}Ra was determined at ALS Environmental or SRC Environmental Analytical Laboratories by alpha radiation spectrometry.

3.3 Quality Assurance and Quality Control

3.3.1 Static Testwork

The quality assurance and quality control (QA/QC) program for the static test program involved the analysis of laboratory duplicates. Approximately one duplicate was measured for every 20 samples. The analytical laboratory adheres to a precision specification of $\pm$10% for internal geochemical laboratory duplicates. Precision can be expressed as a function of concentration:

$$P_c = ((\text{Detection Limit} / c) + P) \times 100\%$$

where *Pc* is the precision at concentration c; *c* is concentration of the element; and *P* is the "Precision Factor" of the element. This is the precision of the method at very high concentrations. Any laboratory duplicate result that does not adhere to the precision specifications would trigger a re-analysis.

3.3.2 Kinetic Program

QA/QC samples for the laboratory kinetic test programs (humidity cells and columns) include the collection of a blank sample during each sampling event to monitor any contamination that may occur during sample collection and handling. Each set of samples submitted for analyses is also subjected to a rigorous internal laboratory QC program.

A field QA/QC program was established to evaluate the quality of the field bin data set, including field duplicates and field blanks. The field duplicate sample is intended to monitor the variability in sub-sampling and analysis, while the field blank is used to quantify any contamination that may occur during sample collection, handling and transportation. Field QA/QC data for all the field bins are presented in Appendix D.1-6, and includes data for field duplicate and field blank samples collected in 2014 and 2015.

For the purpose of evaluating the field duplicate samples, acceptable precision and accuracy was defined to be within 20% relative percent difference (RPD) at concentrations greater than 10 times (10×) the detection limit (DL); where,

$$RPD = [(\text{result} - \text{duplicate result}) * 100] / [(\text{result} + \text{duplicate result}) / 2]$$

All field duplicates were within the data quality objectives, with nearly all (98%) of RPD values < 20% (for concentrations greater than 10 times the detection limit). Field blanks show all but one parameter to be at concentrations below their respective detection limits. Only the sulphate value for the field blank sample collected June 4, 2014 is at the detection limit (0.3 mg/L). Overall, results of the QA/QC program demonstrate very good quality control on limiting contamination during sampling activities.

4. Geochemical Characterization Results

GOLDCORP

4. Geochemical Characterization Results

The following sections provide data collected for the geochemical characterization of geologic waste materials for the Project. The chapter has been divided by waste material, including waste rock, ore, leach tailings and overburden/borrow materials. Within each section, data are provided with respect to mineralogy, ABA, SFE, solid phase elements and kinetic testwork. As well, variations in geochemical properties as a function of lithology and weathering facies within each waste type are discussed. The results from these components are ultimately used to define acid generating potential, metal leaching potential and drainage chemistry predictions (source terms) for mine waste facilities. This chapter presents the same analytical data as that presented in the 2016 Geochemical Characterization Report (Lorax, 2016), with the exception of waste rock field bin data which has been updated with results from the summer and fall of 2016 (section 4.1.6.4).

4.1 Waste Rock

4.1.1 Overview of Test Results

Geochemical testwork indicates that all lithologies and weathering facies of waste rock have little or no potential for acid generation. The low potential for acid generation is, in part, related to the lack of sulphur (S) mineralization, with median total S values in gneiss, granite and schist being 0.01, <0.01 and 0.03 wt.%, respectively. There is some variation in sulphur content between weathering facies within each lithology, with the fresh weathering facies typically showing greater S content then the transition and oxide facies. However, the S content remains relatively low even in unweathered (fresh) waste rock, with median values ranging from <0.01 to 0.11 wt.%. Due to the low S concentrations and the presence of carbonate minerals, all waste rock is classified as non-reactive or non-PAG.

Mineralogical investigations indicate that the most frequently detected sulphur mineral waste rock is pyrite (<1 wt.%). Calcite represents the dominant carbonate mineral (<29 wt.%), indicating that these materials are capable of buffering acid generating reactions. However, carbonate minerals that are less effective at neutralizing acid are also present in appreciable amounts in the gneiss and schist (<11 wt.%). The oxide gneiss and granite waste rock have limited buffering capacity, owing to the undetectable to very low abundance of carbonate minerals.

Solid phase metal analysis found that As, Sb, Bi and Se were enriched in all rock types, while U enrichment was limited to the granite and gneiss lithologies. Elemental enrichment is related to both lithology and weathering facies, with Sb and As concentrations being most enriched in the oxide weathering facies, and in the granite lithology. Schist waste rock is also elevated with respect to Se and Cr. Granite and gneiss waste rock show U enrichment.

Results of the SFE indicate that As and Sb are metals of potential concern from all waste rock lithologies, most notably granite. Elevated concentrations of Cr were also observed in the gneiss and schist lithologies. It is interesting to note that U was not found to be elevated in SFE testwork, which is in contrast to metal enrichment and metal leaching results from kinetic testwork. This result is attributed to the low alkalinity produced during SFE experiments.

Field and laboratory kinetic tests are consistent with static testwork results, with the highest As concentrations produced by granite waste rock, the highest Sb concentrations produced by schist fresh facies and the overall highest U concentrations produced by gneiss waste rock. Uranium was similarly enriched in the granite waste rock, however, the concentrations in granite leachate were highly variable, and can be related to the low alkalinity produced in some granite samples which inhibits U solubility. The gneiss and schist oxide facies produced the highest Cr concentrations and the lowest As and Sb concentrations. Note that this is contrary to elemental enrichment testing which showed that oxide facies generally had the greatest As and Sb. This result is attributed to the relative abundance of Fe in the oxide kinetic test samples.

4.1.2 Mineralogy

The following section provides an overview of the mineralogical results for waste rock samples. Mineralogical laboratory reports for XRD and assessments completed at the CLS are presented in Appendix B.1 and Appendix B.2, respectively.

4.1.2.1 Gneiss Waste Rock

Gneiss materials are typically characterized by quartz, plagioclase, K-feldspar, kaolinite, +/- illite/muscovite, +/- phlogopite, and, with exception of the oxide weathering facies, carbonate minerals including calcite +/- ankerite +/- dolomite (Table 4-1). Of these, quartz, plagioclase, and K-feldspar comprise the major rock forming minerals. Sheet silicates such as illite/muscovite, kaolinite, phlogopite, and bioite, also contribute significantly to the total mineral make up. Kaolinite, a secondary clay mineral that generally forms from the weathering of aluminium feldspars, is typically present in the greatest amounts in the oxide facies and, to a lesser extent, the upper transition facies. The fresh facies has the lowest occurrence of kaolinite. Illite/muscovite is variable within each facies and does not show any discernible trend.

Calcite represents the dominant carbonate mineral for each of the upper transition, lower transition and fresh facies. Dolomite is rare, present in only a single upper transition sample (KAM091516, Table 4-1), a single lower transition sample (KAM079117), and two fresh samples (KAM078808 and KAM092488) Ankerite is typically present in the upper transition samples, is present in a single lower transition sample (KAM051451) and notably absent from samples associated with oxide and fresh weathering facies. The presence of carbonate minerals in gneiss samples from the upper transition, lower transition, and fresh materials in appreciable abundances, indicates that these weathering facies are capable of buffering acid generating reactions. In contrast, the oxide gneiss has limited buffering capacity, owing to the absence of carbonate minerals detectable by XRD. However, ABA results discussed in subsequent sections show that some carbonate content is associated with oxide weathering facies.

Sulphide minerals are present in each of the gneiss weathering facies (oxide, upper transition, lower transition, and fresh), although, not all samples show detectable sulphide minerals irrespective of weathering facies. With respect to gneiss waste rock, the major sulphide species is pyrite, with pyrrhotite present in a single fresh sample (KAM145241, Table 4-1).

In addition to sulphide minerals, XRD identified the presence of sulphate minerals in the gneiss samples including gypsum (lower transition facies), hydronium-jarosite (oxide facies) and natroalunite (fresh facies). These minerals are present in very low abundances (Table 4-1). Since natroalunite is typically a secondary mineral formed through weathering processes, it is unexpected to see detectable quantities associated with the fresh (unweathered) material. In this regard, the presence of natroalunite in this sample should be viewed with some uncertainty. Similarly, the very low abundance of gypsum in a lower transition sample should also be viewed as being uncertain.

Table 4-1:
XRD Results for Gneiss Waste Rock Samples

		Oxide			Upper Transition						Lower Transition					Fresh				
Sample ID		KAM144308	KAM139298	KAM137583	KAM152499	KAM084288	KAM097065	KAM097065	KAM029087	KAM091516	KAM050812	KAM079117	KAM143923	KAM051451	N839989	KAM145241	KAM153051	N837976	KAM078808	KAM092488
Mineral	**Ideal Formula**	wt. %																		
Ankerite	$Ca(Fe^{2+},Mg,Mn)(CO_3)_2$				0.75	8.1	0.50			2.4				1.6						
Calcite	$CaCO_3$				0.63	2.7	2.9	2.4	5.1	6.7	7.3	0.22	7.8	7.3	0.64	9.6	0.68	10	0.50	
Dolomite	$(Ca,Mg)CO_3$									13		5.1							4.9	4.1
Siderite	$Fe^{2+}CO_3$																			
Dawsonite	$NaAlCO_3(OH)_2$												0.16							
Pyrite	FeS_2			0.35		0.38	0.20					0.69			0.59		0.31		0.70	0.46
Pyrrhotite	$Fe_{1-x}S$															0.33				
Gypsum	CaSO4 2H2O												0.29							
Goethite	$a\text{-}Fe^{3+}O(OH)$					0.90														
Hydroniumjarosite	$H_2Fe_6^{3+}(SO_4)_4(OH)_{12}$			0.54																
Natroalunite	$NaAl_3(SO4)_2(OH)_6$																	0.39		
Diaspore	AlO(OH)							0.7												
Biotite	$K(Mg,Fe)_3[AlSi_3O_{10}(OH,F)_2$													8.1						
Phlogopite	$KMg_3AlSi_3O_{10}(OH)_2$			1.9	2.5					14	9.5		1.6		3.5	6.3		16		
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$	10						12			7.3		25	14					7.2	14
Illite/Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$/ $K_{0.65}Al_{2.0}Al_{0.65}Si_{3.35}O_{10}(OH)_2$		6.1	14	6.7	4.0	9.0		6.0			8.7			26		5.1			
Kaolinite	$Al_2Si_2O_5(OH)_4$	9.6	16	12	2.6	17	14	7.8	15	13		8.3	7.6		6.9		3.8		1.7	9.6
K-feldspar	$KAlSi_3O_8$	24	31	20	20	17	14	14	22	28	25	33	1.7	11	11	33	18	4.6		23
Plagioclase	$NaAlSi_3O_8 - CaAl_2Si_2O_8$			13	28	1.39	3.8	3.1		7.3	13	7.1	9.0	25	7.8	24	32	20	56	
Quartz	SiO_2	56	48	38	37	48	55	60	51	16	27	37	47	26	33	14	40	19	29	49
Anatase	TiO_2			0.41					0.50						0.49					
Clinozoisite	$Ca_2Al_3(SiO_4)_3(OH)$				1.8		0.46				9.8				6.0			11		
Grossular	$Ca_3Al_2(SiO_4)_3$													1.0				0.57		
Actinolite	$Ca_2(Mg,Fe^{2+})_5Si_8O_{22}(OH)_2$															1.6		15		
Augite	$(Ca,Na)(Mg,Fe,Al,Ti)(Si,Al)_2O_6$															11	1.0			
Clinochlore	$(Mg,Fe^{2+})_5Al(Si_3Al)O_{10}(OH)_8$										1.2			6.1	4.3			3.5		
Barite	$BaSO_4$	0.20																		
	Total	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*

4.1.2.2 Schist Waste Rock

The schist oxide, upper transition, lower transition, and fresh materials are composed of quartz, K-feldspar, +/- plagioclase, kaolinite, +/- illite/muscovite, +/- phlogopite, +/- biotite, carbonate minerals, including calcite +/- ankerite +/- dolomite, +/- siderite, and +/- dawsonite, and sulphide minerals, including +/- pyrite, +/- arsenopyrite, +/- galena, and +/- manganese sulphide (Table 4-2). Of these, quartz, plagioclase, K-feldspar, kaolinite and illite/muscovite represent the bulk of the mineral assemblage irrespective of weathering facies. The schist unit exhibits the greatest abundances of sheet silicates. As with the gneiss unit, kaolinite is typically present in the greatest abundance in the oxide facies, followed by the upper transition.

Calcite and dolomite comprise the major carbonate minerals for each of the oxide, upper transition, lower transition, and fresh materials. Ankerite is also present in appreciable amounts in each of the upper transition, lower transition, and fresh weathering facies. Siderite is present in two samples, from the upper transition (KAM022156, Table 4-2) and fresh (KAM036824) facies. Appreciable quantities of Fe/Mn-bearing carbonates in the upper transition, lower transition, and fresh weathering facies indicate that CaNP may overestimate the NP derived from carbonate minerals for the schist unit from these facies.

Pyrite is present in each of the upper transition, lower transition, and fresh weathering facies. In contrast, sulphide minerals (including pyrite) were not detected in the oxide schist facies. No sulphate minerals were detected in any of the schist samples.

4.1.2.3 Granite Waste Rock

The granite unit is generally characterized as being composed of quartz, +/- plagioclase, +/- K-feldspar, kaolinite, +/- illite/muscovite, +/- phlogopite, and +/- trace carbonate minerals (Table 4-3). Quartz, +/- plagioclase, an +/- K-feldspar comprise the major minerals for the granite material. The granite oxide facies is primarily quartz (55 to 66 wt.%) with trace amounts of K-feldspar (< 2 wt.%), while the upper transition, lower transition, and fresh facies granite material is comprised of quartz (31 to 62 wt.%), K-feldspar (0 to 31 wt.%), +/- plagioclase (0 to 35 wt.%). Sheet silicates such as kaolinite and illite/muscovite are generally most abundant in the oxide facies, with a combined contribution of 33% to 42 % of the granite composition. The lower transition facies exhibit slightly lower abundances of kaolinite and illite/muscovite (23 to 24 wt.%), with the exception of R305815 which shows much lower abundances.

The granite samples showed undetectable to very low abundances of carbonate minerals. Hydrocalumite was observed in a single oxide sample (R305826, Table 4-3) and a single fresh sample (R305832). Calcite and dolomite were only observed in fresh granite samples (KAM025798 and R305825). Iron bearing carbonates were also observed in two samples at very low abundances, including upper transition (R305818) and fresh (KAM025798) weathering facies.

Pyrite was the only sulphide mineral observed for the granite, and only present in two samples. These included a single upper transition sample (KAM025898, Table 4-3) and a single fresh sample (R305825), both showing abundances of <1 wt.%.

In addition to sulphide minerals being present, XRD identified the presence of acidic sulphate minerals (hydronium-jarosite) in a single upper transition sample. This material is present in very low abundance and therefore there is some uncertainty as to the validity of this identification.

4.1.2.4 Other Waste Rock Lithologies

Mineral assemblages for other waste rock materials, including two dyke samples (KAM029393 and KAM03975) and a single breccia sample (KAM036549) (Table 4-4). For the oxide dyke, the major minerals include quartz, kaolinite, and illite/muscovite. Neither carbonate nor sulphide minerals were present in the XRD scans. With respect to lower transition dyke material, dominant minerals included quartz, K-feldspar, plagioclase, kaolinite, illite/muscovite, biotite, and carbonate minerals (calcite, ankerite, and siderite). Sulphide minerals were not detectable in XRD scans of the lower transition dyke sample. The fresh breccia material exhibits quartz, K-feldspar, kaolinite, muscovite, and carbonate minerals, such as dolomite, ankerite, and siderite. The only sulphide mineral present in these samples was pyrite (0.5 wt.%) in the fresh breccia sample.

Table 4-2:
XRD Results for Schist Waste Rock Samples

		Oxide		Upper Transition				Lower Transition				Fresh			
Sample ID		KAM029385	J957606	KAM147059	KAM037928	KAM079346	KAM022156	KAM043465	KAM081312	KAM047995	KAM039252	KAM149916	KAM151027	KAM036824	KAM149916
Mineral	**Ideal Formula**	**wt. %**													
Ankerite	$Ca(Fe^{2+},Mg,Mn)(CO_3)_2$			10		9.8	11	9.7	0.089	3.9	5.4	0.90		5.5	11
Calcite	$CaCO_3$		29		13			1.7	0.28	5.6	3.8	4.8			2.0
Dolomite	$(Ca, Mg)CO_3$			11		12							22	9.3	7.9
Siderite	$Fe^{2+}CO_3$						0.49							4.5	
Dawsonite	$NaAlCO_3(OH)_2$			0.19									0.21		
Hydrocalumite	$Ca_4Al_2(OH)_{12}(Cl,CO_3,OH)_2 \cdot 4H_2O$														
Galena	PbS			0.048											
Pyrite	FeS_2			1.0			0.52	0.94		0.50	0.70	1.4	0.91	1.3	0.60
Pyrite, arsenian	$Fe(As, S)_2$														0.80
Manganese sulfide	MnS_2														0.40
Hematite	$a\text{-}Fe_2O_3$		0.28		0.70										
Biotite	$K(Mg,Fe)_3[AlSi_3O_{10}(OH,F)2$				2.0					10	9.0				
Phlogopite	$KMg_3AlSi_3O_{10}(OH)_2$											12			
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$	21				12		17	9.0	0.00	9.7	8.6		14	25
Illite/Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$/ $K_{0.65}Al_{2.0}Al_{0.65}Si_{3.35}O_{10}(OH)_2$		12	9.6	11		22			6.3			20		
Kaolinite	$Al_2Si_2O_5(OH)_4$	20	13	21	13	21	21	10	0.93	4.2	9.7	4.1	4.9	15	11
K-feldspar	$KAlSi_3O_8$	6.5	10		15	10		3.2	15	12	16	6.1	1.8	1.6	
Plagioclase	$NaAlSi_3O_8 – CaAl_2Si_2O_8$								35	20	8.6	10			
Quartz	SiO_2	50	35	46	43	35	44	57	40	34	36	42	41	49	41
Cristobalite	SiO_2														
Anatase	TiO_2		0.91		1.0		0.66	0.44		0.40	0.40	0.48	0.14		
Rutile	TiO_2			0.42									0.43		
Clinozoisite	$Ca_2Al_3(SiO_4)_3(OH)$											6.0			
Grossular	$Ca_3Al_2(SiO_4)_3$												8.0		
Clinochlore	$(Mg,Fe^{2+})_5Al(Si_3Al)O_{10}(OH)_8$									2.1		3.8			
Analcime	$Na_2(Al_2Si_4O_{12}) \cdot 2H_2O$														
Diopside	$CaMgSi_2O_6$	2.2													
	Total	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*

Table 4-3:
XRD Results for Granite Waste Rock Samples

		Oxide		**Upper Transition**					**Lower Transition**			**Fresh**		
Sample ID		R305826	R305808	R305824	KAM025898	KAM025898	R305818	R305821	R305817	R305803	R305815	R305832	KAM025798	R305825
Mineral	**Ideal Formula**	**wt. %**												
Ankerite	$Ca(Fe^{2+},Mg,Mn)(CO_3)_2$						0.20							
Calcite	$CaCO_3$												0.93	
Dolomite	$(Ca,Mg)CO_3$													0.10
Siderite	$Fe^{2+}CO_3$												0.50	
Hydrocalumite	$Ca_4Al_2(OH)_{12}(Cl,CO_3,OH)_2 \cdot 4H_2O$	0.10										0.40		
Pyrite	FeS_2					0.20								0.087
Gorceixite	$BaAl_3(PO_4)_2(OH)_5 \cdot H_2O$		0.11											
Iron-alpha	a-Fe				0.28								0.22	
Hematite	a-Fe_2O_3							0.20			0.2?	0.18	0.28	
Hydroniumjarosite	$H_2Fe_6^{3+}(SO_4)_4(OH)_{12}$							0.27						
Jarosite	$KFe_3^{+3}(SO_4)_2(OH)_6$						0.40							
Biotite	$K(Mg,Fe)_3[AlSi_3O_{10}(OH,F)_2$					1.0			1.4		2.0	2.6		
Phlogopite	$KMg_3AlSi_3O_{10}(OH)_2$				1.1								1.7	
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$												1.1	
Illite/Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$/ K0.65Al2.0Al0.65Si3.35$O_{10}(OH)_2$	35	1.8	0.55		1.7	12	4.8	3.1	1.4		2.7		
Kaolinite	$Al_2Si_2O_5(OH)_4$	7.6	32	37	10	8.4	8.5	4.1	21	22	0.61	7.1	0.87	19
K-feldspar	$KAlSi_3O_8$	1.6			30	30	21	31	30	31	28	29	28	31
Plagioclase	$NaAlSi_3O_8 - CaAl_2Si_2O_8$				21	18		25			34	19	35	
Quartz	SiO_2	55	66	62	37	37	54	31	45	38	35	39	31	49
Cristobalite	SiO_2					2.9	4.1	2.5		7.4				
Anatase	TiO_2		0.18	0.28										
Rutile	TiO_2							0.70						
Clinochlore	$(Mg,Fe^{2+})5Al(Si_3Al)O_{10}(OH)_8$												0.81	
Analcime	$Na_2(Al_2Si_4O_{12}) \cdot 2H_2O$	0.24												
	Total	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*

Table 4-4:
XRD Results for Dyke (KAM02939 and KAM037975) and Breccia (KAM036549) Waste Rock Samples

		Oxide	Lower Transition	Fresh
Sample ID		KAM029393	KAM037975	KAM036549
Mineral	**Ideal Formula**	**wt. %**		
Ankerite	$Ca(Fe^{2+},Mg,Mn)(CO_3)_2$		2.4	12
Calcite	$CaCO_3$		8.5	
Dolomite	$(Ca,Mg)CO_3$			6.5
Siderite	$Fe^{2+}CO_3$		0.80	0.60
Pyrite	FeS_2			0.50
Hematite	$a\text{-}Fe_2O_3$		1.1	
Diaspore	$AlO(OH)$			1.10
Biotite	$K(Mg,Fe)_3[AlSi_3O_{10}(OH,F)_2$		14	
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$			18
Illite/Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$/ $K_{0.65}Al_{2.0}Al_{0.65}Si_{3.35}O_{10}(OH)_2$	15	5.9	
Kaolinite	$Al_2Si_2O_5(OH)_4$	30	6.9	8.2
K-feldspar	$KAlSi_3O_8$		8.3	3.6
Plagioclase	$NaAlSi_3O_8 – CaAl_2Si_2O_8$		25	
Quartz	SiO_2	54	26	49
Anatase	TiO_2	0.70	0.90	0.40
	Total	*100*	*100*	*100*

4.1.2.5 Summary of Sulphur and Carbonate Mineralogy

Regardless of the lithotype or weathering facies, pyrite is the primary sulphide mineral. In general, the schist unit shows the greatest sulphide mineral abundance (Table 4-2), followed by the gneiss and the granite units. Typically, the oxide samples are depleted with respect to sulphide minerals. Other sulphide minerals identified in trace abundances include pyrrhotite in both the gneiss and schist lithology; and arsenopyrite, galena, and manganese-sulphide in the schist lithology. However, due to the low abundances of these sulphide minerals, their presence cannot be stated with certainty based on the XRD data. Sulphate minerals were identified in gneiss and granite lithologies. These minerals were generally, but not always, found in the oxide and transition weathering facies. The two sulphate minerals, hydroniumjarosite and K-jarosite, identified in the granite lithology (Table 4-3) are both acid generating, while sulphate minerals identified in the gneiss lithology were a combination of acid generating (hydroniumjarosite, Table 4-1) and non-acid generating (gypsum and barite). No sulphate minerals were identified by XRD in schist waste rock; however, ABA analysis shows that minor quantities of sulphate are present in this rock type (75^{th} percentile of 0.01 wt.%) and barite was identified in schist ore.

Carbonate mineral phases identified by XRD include: calcite, dolomite, ankerite, siderite, and in rare instances dawsonite. Of these, NP is strongly associated with more readily soluble carbonate minerals including calcite and dolomite. When available, these carbonates buffer acid generating reactions such that a neutral pH is maintained. Within a given lithology, carbonate abundance shows a general pattern of decreasing abundance with increased degree of weathering. In this regard, oxide facies samples show the lowest carbonate mineral abundance, with many samples exhibiting undetectable levels. Similarly, a number of upper transition samples exhibit carbonate-depleted characteristics. Highest carbonate abundances are exhibited by unweathered (fresh) schist materials (Table 4-2), followed by the gneiss and granite units. The Fe- and Mn-bearing carbonates, ankerite and siderite, were identified in approximately half the samples. Typically, the Fe-carbonates are in much lower concentrations than calcite and dolomite and are associated with the gneiss and schist samples (predominantly upper and lower transition samples).

4.1.2.6 Trace Element Occurrence

For the purposes of identifying mineral associations for trace elements of interest, mine waste rock and ore samples were analyzed at the CLS using high resolution microscopy methods. Specific trace elements examined were As and U owing to elevated concentrations observed in site water quality and in kinetic test results. The analysis included µXRF and XANES testing to determine elemental-phase associations and valence state. Note that µXRF could not detect elements with emission energies that fall below Ar, meaning that elements lighter than Ar are not detectable. The complete results of this analysis are provided in Appendix B.2.

Arsenic

The XANES results are presented in Table 4-6. A total of 10 samples were compared with As K-edge XANES spectra and five standards. The results show that arsenate (As(V)) is the only oxidation state identified within the oxide weathering facies, and is the dominant speciation in most samples from the transition and fresh weathering facies. Reduced forms of As (As(-I) and As(III)) were less abundant than As(V) in all but one unweathered (fresh) gneiss waste rock sample.

For all samples where As was detected, a co-association with Fe was observed. This is consistent with XRD results which have identified the presence of arsenopyrite (FeAsS), arsenian-pyrite[$Fe(As,S)_2$] and scorodite ($FeAsO_4*H_2O$), but may also be a result of As being present on Fe-oxide mineral surfaces. In one schist transition sample, As was associated with both Fe and Ca, indicating the presence of yukonite [$Ca_3Fe(AsO_4)_2(OH)_3*5H_2O$]. Although it was not identified by µXRD, XANES data indicated the presence of As(I) suggesting that the sulphide minerals realgar (As_4S_4) or orpiment (As_2S_3) may also be present.

Uranium

For quantifying U oxidation states, XANES spectra were collected for nine samples (Table 4-7). Analysis of the gneiss oxide composite sample was attempted (5.5 ppm U); however, the concentration was below the detection capabilities of the beamline. The oxidation state of U in most of the samples is a mixture of U(IV) and U(VI) with the only exception being a single gneiss oxide sample where U(VI) was the only oxidation state detected. In general, oxide samples are dominated by U(VI) while transition and fresh samples show a wide range of U(VI) and U(IV) proportions. It is interesting to note that in all samples, including fresh unweathered material, U(VI) is present. This has implications for U release to pore water as U(VI) is more soluble than in the reduced oxidation state.

Associations of U with other elements was examined with µXRF data collected from 18 samples. Results are summarized in Table 4-5. Despite the high resolution of the µXRF technique, U minerals were only identified in 8 of the samples analyzed due to its low abundance. Uranium minerals are chemically diverse and a range of minerals may be present that incorporate elements which overlap with spots identified by µXRF. For the purpose of identifying the most likely U host phases, only relatively common minerals were considered.

Uranium minerals can be classified as reduced or oxidized species. Reduced uranium minerals incorporate U in the tetravalent oxidation state [U(IV)] while oxidized uranium minerals incorporate U in the hexavalent oxidation state [U(VI)]. XANES data, described below, indicates that U is present in both oxidation states in most samples. The most abundant U(IV) bearing minerals in decreasing prevalence are uraninite (UO_2), coffinite ($USiO_4 \cdot nH_2O$) and brannerite [$(U,Ca,Y,Ce)(Ti,Fe)_2O_6$] (Gilligan *et al*., 2015). In gneiss waste rock samples, U was found to be associated with Fe, Ti, Ca, As, Cu and Th. The association of U with Ca, Fe and Ti in three out of six gneiss samples suggests that brannerite is present (Table 4-5), although the presence of the uraninite and coffinite cannot be precluded. Note that in one gneiss sample (72146B) no elemental overlap was found with U. This indicates that U is occurring with elements lighter than Ar, which includes Si and O.

Minerals containing U(VI) can occur in a diverse group of minerals that can be broadly classified as hydrated uranyl oxides, phosphates, vanadates, silicates and carbonates. Uranyl carbonate minerals generally form in evaporate deposits, which is a class of minerals not expected to occur in the Project waste rock or ore. No association between U and V was identified, indicating that vanadates are not present. Silicon, P and O have emission energies below the range that was detectable by this analysis. Associations of U with Cu and/or As in gneiss waste rock and ore suggest the presence of uranyl phosphate minerals. That is, Cu occurs in tobernite ($Cu(UO_2)_2(PO_4)_8 \cdot 12H_2O$) and AsO_4 can commonly substitute for PO_4 in the autunite series minerals ($Ca(UO_2)_2(AsO_4,PO_4)_8 \cdot 8H_2O$. The association between U and Fe could be related to a variety of oxidized or reduced minerals, but may also reflect adsorption of the positively charged uranyl ion onto negatively charged surfaces of sulfides, clays and organic matter, as well as Fe, Mn and Al oxyhydroxide particles (Lottermoser, 2007).

In schist waste rock, U was found to be associated with Fe, Ca and As (Table 4-5). In a single sample, 72146B, no detectable elements (i.e., elements heavier than Ar) overlapped with a U spot, indicating the presence of a U oxide or silicate mineral. The association of U with As and Ca suggests the presence of an autunite series mineral, as described above.

Table 4-5:
Summary of As and U µ-XRF Results for Coffee Gold Mine Samples

Sample Description	Drill Core /Head ID	Lithology	Weathering	Ore/ Waste	Verified U Spots[1]	Verified As Spots	U Spatial Overlap						As Spatial Overlap	
							Fe	As	Ca	Cu	Ti	Th	Fe	Ca
Kinetic Test Sample (FB-GO, Col 5)	Composite	Gneiss	Oxide	Waste	X	X	✓	✓	✓	✓	✓	✓	✓	-
High U Drill Core	KAM144308	Gneiss	Oxide	Waste	X^2	X	✓	-	✓	✓	-	✓	✓	-
Kinetic Test Sample (FB-GT, HC3, Col 6)	Composite	Gneiss	Transition	Waste	-	X	-	-	-	-	-	-	✓	-
High U Drill Core	KAM091516	Gneiss	Transition	Waste	X^2	X	✓	-	✓	✓	✓	-	✓	-
Kinetic Test Sample (FB-GS, HC4)	Composite	Gneiss	Fresh	Waste	X	X	✓	-	-	✓	✓	-	✓	-
High U Drill Core	KAM078808	Gneiss	Fresh	Waste	X^2	X	✓	-	-	✓	-	-	✓	-
Kinetic Test Sample (FB-SO, Col 3)	Composite	Schist	Oxide	Waste	-	X	-	-	-	-	-	-	✓	-
High U Drill Core	KAM029385	Schist	Oxide	Waste	-	X	-	-	-	-	-	-	✓	-
Kinetic Test Sample (FB-ST, HC1, Col 4)	Composite	Schist	Transition	Waste	-	X	-	-	-	-	-	-	✓	-
High U Drill Core	KAM079346	Schist	Transition	Waste	X	X	✓	-	✓	-	-	-	✓	-
Kinetic Test Sample (FB-SS, HC2)	Composite	Schist	Fresh	Waste	-	X	-	-	-	-	-	-	✓	-
High U Drill Core	KAM047252	Schist	Fresh	Waste	X^2	X	✓	✓	✓	-	-	-	✓	-
Met Head Sample	72146B	Gneiss	Transition	Ore	X	X	-	-	-	-	-	-	✓	-
Met Head Sample	50% 72144B 50% 72145B	Gneiss	Oxide	Ore	-	X	-	-	-	-	-	-	✓	-
Met Head Sample	72139B	Granite	Oxide	Ore	-	X	-	-	-	-	-	-	✓	-
Met Head Sample	72140B	Granite	Transition	Ore	-	X	-	-	-	-	-	-	✓	-
Met Head Sample	50% 72138B 50% 72137B	Schist	Oxide	Ore	-	X	-	-	-	-	-	-	✓	-
Met Head Sample	50% 72135B 50% 72136B	Schist	Transition	Ore	-	X	-	-	-	-	-	-	✓	✓

Notes: [1] Single spot indicated by X, two spots indicated by X^2.

Table 4-6: Relative Abundance of As Species Estimated from the Linear Combination Fits of XANES Data

Sample Description	Drill Core /Head ID	Lithology	Weathering Facies	Ore/ Waste	As(V)	As(-I)	As(III)
					%	%	%
Met Head Sample	72144B	Gneiss	Oxide	Ore	100	-	-
High U Drill Core Sample	KAM144308	Gneiss	Oxide	Waste	100	-	-
Kinetic Test Sample (GS)	Composite	Gneiss	Fresh	Waste	59	19	22
High U Drill Core Sample	KAM078808	Gneiss	Fresh	Waste	20	61	20
Met Head Sample	72139B*	Granite	Oxide	Ore	100	-	-
High U Drill Core Sample	KAM029385	Schist	Oxide	Waste	100	-	-
Met Head Sample	72135B	Schist	Oxide	Ore	100	-	-
Met Head Sample	72137B	Schist	Transition	Ore	91	9.3	-
Met Head Sample	72146B	Gneiss	Transition	Ore	95	5.7	-
Met Head Sample	72140B	Granite	Transition	Ore	100	-	-

Table 4-7: Relative Abundance of U Species Estimated from the Linear Combination Fits of XANES Data

Sample Description	Sample ID	Lithology	Weathering Facies	Ore/ Waste	U(IV)	U(VI)
					%	%
High U Drill Core Sample	KAM144308	Gneiss	Oxide	Waste	0	100
High U Drill Core Sample	KAM091516	Gneiss	Transition	Waste	83	17
High U Drill Core Sample	KAM078808	Gneiss	Fresh	Waste	73	27
Kinetic Test Sample (GS)	Composite	Gneiss	Fresh	Waste	33	67
High U Drill Core Sample	KAM029385	Schist	Oxide	Waste	11	89
High U Drill Core Sample	KAM079346	Schist	Transition	Waste	53	47
SS Waste	KAM047252	Schist	Fresh	Waste	72	28
Met Head Sample	72146B	Gneiss	Transition	Ore	51	49

4.1.3 Acid Base Accounting

This section discusses the ABA results for the Project waste rock lithologies. Nearly 350 waste rock samples were submitted for ABA testwork. The statistical distributions for the major waste rock lithologies (gneiss, schist and granite) are presented by weathering facies in Table 4-8 and Table 4-9, respectively. The complete set of ABA results and data for the minor waste rock lithologies are provided in Appendix C.1-1.

4.1.3.1 Rinse and Paste pH

Paste and rinse pH values provide information on the pH of a rock type immediately after excavation. Paste pH is the standard test conducted as part of most ABA testwork, however, it often produces an unreliably high estimate of pH. This is because the sample is pulverized to 100 µm size or smaller to produce a paste, resulting in an extremely high number of new surfaces and the exposure (and abrasion) of minerals not previously subjected to weathering. Rinse pH provides a more representative indication of the present drainage pH of a sample as it is conducted on a sample that is crushed to <2 mm (i.e., grain size of sand). Figure 4-1 shows paste pH against rinse pH with a 1:1 line superimposed, illustrating lower rinse pH values compared to paste pH.

Rinse pH for the two dominant lithologies (gneiss and schist) are circum-neutral to alkaline (6.6≤pH≤9.9, weather facies medians ranging from 7.2 - 8.8) (Table 4-8 and Table 4-9). The granite samples show slightly lower pH values (6.0≤pH≤9.2) (Table 4-10). In general, rinse pH decreases with increased weathering, whereby the oxide facies samples show the lowest pH values and the fresh facies samples show the highest pH values. However, rinse pHs even for the most weathered samples (oxide) typically remain above pH 7. Overall, the rinse pH values demonstrate that the in-situ pH of the waste rock types at the Project site are circum-neutral to alkaline.

Table 4-8:
Statistical Distribution of ABA Results by Weathering Facies for Gneiss Waste Rock

Parameter	Rinse pH	Paste pH	Total-S	Sulphide-S	Sulphate-S	T-C NP*	CaNP	Sobek NP	Siderite NP	T-C NNP*	Sobek NNP	NPR	NPR	NPR
Unit	s.u.	s.u.	wt.%	wt.%	wt.%	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	T-C NP*/ T-AP	CaNP/ T-AP	SobekNP/ T-AP
Gneiss (Oxide)														
n	21	34	34	22	22	34	22	18	18	34	18	34	22	18
Min	6.6	6.4	*<0.01*	0.005	*<0.005*	*<0.8*	*<4.5*	3.0	4.0	0.5	2.7	2.5	7.2	8.0
25th PCTL	7.2	7.3	*<0.01*	*<0.01*	*<0.01*	1.6	*<4.5*	4.3	5.0	1.2	4.0	5.0	15	13
Median	7.3	7.7	0.01	0.01	0.01	3.9	4.5	6.5	7.5	3.6	6.2	9.1	15	20
75th PCTL	7.5	8.4	0.01	0.01	0.01	7.8	15	17	18	7.5	15	18	18	28
Max	8.7	9.3	0.10	0.10	0.02	40	36	25	25	38	25	78	76	83
Gneiss (Upper Transition)														
n	16	25	26	17	17	26	17	10	10	26	10	26	17	10
Min	7.1	6.6	*<0.01*	0.005	*<0.01*	0.8	2.3	2.0	3.0	-27.0	1.7	0.1	0.2	1.4
25th PCTL	7.3	7.2	*<0.01*	*<0.01*	*<0.01*	1.0	*<4.5*	10.0	5.3	0.5	6.9	2.6	14	11
Median	7.5	7.5	0.01	0.01	0.01	1.9	*<4.5*	28	25	1.2	23	5.1	15	24
75th PCTL	7.7	7.9	0.01	0.03	0.01	18	25	33	31	18	30	23	25	63
Max	9.2	9.4	0.94	0.90	0.02	50	48	52	53	49	52	159	153	166
Gneiss (Lower Transition)														
n	44	79	79	44	44	79	44	13	13	79	13	79	44	13
Min	6.8	6.8	*<0.01*	0.005	*<0.01*	*<0.8*	*<4.5*	4.0	5.0	-0.2	3.7	0.8	6.2	5.7
25th PCTL	7.9	8.1	*<0.01*	*<0.01*	*<0.01*	1.6	*<4.5*	13	15	1.2	13	5.0	15	20
Median	8.8	8.6	0.01	0.01	0.01	3.9	8.0	20	20	3.6	19	7.8	15	32
75th PCTL	9.2	9.1	0.02	0.01	0.01	19	35	48	50	17	40	23	39	61
Max	9.8	9.7	0.30	0.25	0.03	86	91	127	121	85	125	173	159	100
Gneiss (Fresh)														
n	34	49	49	34	34	49	34	10	10	49	10	49	34	10
Min	7.2	7.6	*<0.01*	*<0.01*	*<0.01*	0.8	*<4.5*	6.0	6.0	0.5	5.7	1.1	1.1	5.5
25th PCTL	8.6	8.7	*<0.01*	*<0.01*	*<0.01*	3.1	*<4.5*	9.0	10	1.3	8.7	5.2	15	21
Median	9.0	9.0	0.01	0.01	0.01	13	8.0	18	20	11	16	17	15	26
75th PCTL	9.5	9.3	0.04	0.04	0.01	32	35	38	39	31	34	35	27	41
Max	9.9	9.8	0.43	0.16	0.03	98	98	128	140	94	127	316	311	390
Gneiss (All Weathering Facies)														
n	115	187	188	117	117	188	117	51	51	188	51	188	117	51
Min	6.6	6.4	*<0.01*	*<0.01*	*<0.01*	*<0.8*	2.3	2.0	3.0	-27	1.7	0.08	0.15	1.4
25th PCTL	7.4	7.7	*<0.01*	*<0.01*	*<0.01*	1.6	*<4.5*	6.0	6.5	1.2	5.7	5.0	14	13
Median	8.4	8.5	0.01	0.01	0.01	4.7	4.5	15	15	4.4	13	10	15	27
75th PCTL	9.2	9.1	0.02	0.02	0.01	21	23	29	26	20	26	26	29	42
Max	9.9	9.8	0.94	0.90	0.03	98	98	128	140	94	127	303	298	390

Notes: Values in grey italics are below the analytical detection limit; *n* = number of analyses included in statistical distribution; * adjusted T-C NP; calculated as Total C wt.% * 77.6 (see Section 4.1.2.3 for discussion); NNP = net neutralization potential, derived by subtracting AP from NP.

Table 4-9:
Statistical Distribution of ABA Results by Weathering Facies for Schist Waste Rock

Parameter	Rinse pH	Paste pH	Total-S	Sulphide-S	Sulphate-S	T-C NP*	CaNP	Sobek NP	Siderite NP	T-C NNP*	Sobek NNP	NPR	NPR	NPR
Unit	s.u.	s.u.	wt.%	wt.%	wt.%	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	T-C NP*/ T-AP	CaNP/ T-AP	SobekNP/ T-AP
Schist (Oxide)														
n	13	15	15	13	13	15	13	12	12	15	12	15	13	12
Min	6.8	6.6	*<0.01*	*<0.01*	*<0.01*	1.6	*<4.5*	4.0	4.0	1.3	3.7	4.6	4.0	3.4
25th PCTL	7.0	7.4	0.01	*<0.01*	*<0.01*	7.8	4.5	18	21	6.8	17	9.6	14	15
Median	7.2	7.6	0.01	0.01	*<0.01*	63	116	127	137	49	121	20	19	43
75th PCTL	7.3	8.0	0.07	0.05	0.01	155	157	161	167	144	161	155	236	258
Max	7.8	8.5	0.44	0.34	0.06	250	268	268	271	250	268	800	858	858
Schist (Upper Transition)														
n	11	14	14	11	11	14	11	6	6	14	6	14	11	6
Min	7.2	7.7	*<0.01*	*<0.01*	*<0.005*	2.3	*<4.5*	6.0	7.0	2.0	5.7	5.4	5.7	6.6
25th PCTL	7.7	8.1	0.02	0.01	*<0.01*	76	72	94	97	75	92	18	16	13
Median	8.2	8.2	0.04	0.02	*<0.01*	107	93	118	119	103	114	51	37	17
75th PCTL	8.3	8.4	0.08	0.14	0.01	168	155	188	182	160	167	137	127	115
Max	8.5	8.6	1.02	0.97	0.03	209	223	209	202	193	189	539	393	432
Schist (Lower Transition)														
n	15	19	19	15	15	19	15	7	7	19	7	19	15	7
Min	7.2	7.5	*<0.01*	*<0.01*	*<0.01*	0.8	*<4.5*	7.0	7.0	0.5	6.7	2.6	8.3	13
25th PCTL	7.3	8.1	0.01	*<0.01*	*<0.01*	34	30	53	74	31	49	11	15	18
Median	8.1	8.3	0.03	0.01	0.01	61	57	60	96	61	55	32	33	26
75th PCTL	8.7	8.5	0.11	0.06	0.01	84	78	105	110	77	104	194	131	50
Max	9.4	9.3	0.32	0.13	0.02	230	216	115	123	229	112	350	230	320
Schist (Fresh)														
n	19	31	31	19	19	31	19	8	8	31	8	31	19	8
Min	7.3	8.1	*<0.01*	*<0.01*	*<0.01*	*<0.8*	*<4.5*	11	12	0.5	11	2.3	2.2	3.3
25th PCTL	8.3	8.4	0.01	*<0.01*	*<0.01*	33	35	86	87	33	63	9.4	12	5.6
Median	8.6	8.6	0.06	0.03	0.01	57	59	108	107	51	89	23	24	42
75th PCTL	8.9	8.9	0.16	0.17	0.01	87	91	112	117	85	110	93	100	75
Max	9.3	9.3	0.97	0.80	0.03	376	141	147	149	375	147	345	356	470
Schist (All Weathering Facies)														
n	58	79	79	58	58	79	58	33	33	79	33	79	58	33
Min	6.8	6.6	*<0.01*	*<0.01*	*<0.01*	*<0.8*	*<4.5*	4.0	4.0	0.46	3.7	2.3	2.2	3.3
25th PCTL	7.3	8.1	*<0.01*	*<0.01*	*<0.01*	33	32	47	51	31	46	11	14	13
Median	8.2	8.3	0.03	0.01	*<0.01*	63	65	108	106	59.4	93	28	25	26
75th PCTL	8.6	8.6	0.14	0.10	0.01	110	121	135	144	108	126	131	131	147
Max	9.4	9.3	1.0	0.97	0.06	376	268	268	271	375	268	800	858	858

Notes: Values in grey italics are below the analytical detection limit; *n* = number of analyses included in statistical distribution; * adjusted T-C NP; calculated as Total C wt.% * 77.6 (see Section 4.1.2.3 for discussion); NNP = net neutralization potential, derived by subtracting AP from NP.

Table 4-10:
Statistical Distribution of ABA Results by Weathering Facies for Granite Waste Rock

Parameter	Rinse pH	Paste pH	Total-S	Sulphide-S	Sulphate-S	T-C NP*	CaNP	Sobek NP	SideriteNP	T-C NNP*	Sobek NNP	NPR	NPR	NPR
Unit	s.u.	s.u.	wt.%	wt.%	wt.%	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	T-C NP* /T-AP	CaNP /T-AP	SobekNP /T-AP
Granite (oxide)														
n	6	6	6	6	6	6	6	6	3	6	6	6	6	6
Min	6.0	5.9	*<0.01*	*<0.01*	*<0.01*	0.8	*<4.5*	1.0	3.0	0.5	0.7	2.5	14	3.2
25th PCTL	6.2	6.0	*<0.01*	*<0.01*	0.01	1.0	*<4.5*	2.0	3.5	0.7	1.7	3.1	14	6.4
Median	6.4	6.4	0.01	0.01	0.01	1.9	*<4.5*	2.0	4.0	1.6	1.7	6.2	14	6.4
75th PCTL	6.6	6.8	0.01	0.01	0.02	2.9	*<4.5*	2.0	4.0	2.6	1.7	9.6	15	7
Max	7.5	7.8	0.01	0.01	0.02	3.1	*<4.5*	4.0	4.0	2.8	3.7	10	15	13
Granite (Upper Transition)														
n	11	17	17	17	17	11	11	17	7	17	17	11	11	17
Min	5.7	5.8	*<0.01*	*<0.01*	*<0.01*	0.8	2.3	1.0	2.0	-3.8	-2.8	0.4	1.1	0.3
25th PCTL	6.9	6.5	*<0.01*	*<0.01*	*<0.01*	1.2	*<4.5*	1.0	3.0	-0.3	0.7	2.5	11	3.2
Median	7.0	6.9	0.01	*<0.01*	0.01	1.6	*<4.5*	2.0	4.0	0.5	1.7	5.2	14	6.7
75th PCTL	7.3	7.2	0.01	0.01	0.01	2.3	*<4.5*	3.0	4.5	1.3	2.7	7.4	15	9.6
Max	8.9	8.8	0.13	0.11	0.05	5.4	6.8	6.0	6.0	5.1	5.7	17	22	20
Granite (Lower Transition)														
n	12	14	14	14	14	12	12	14	7	14	14	12	12	14
Min	6.3	5.9	*<0.01*	*<0.01*	*<0.01*	0.8	*<4.5*	1.0	4.0	-0.3	0.4	1.5	2.9	1.3
25th PCTL	6.8	6.7	*<0.01*	*<0.01*	0.01	2.3	*<4.5*	2.3	5.0	0.9	1.9	4.9	14	7.4
Median	8.0	7.8	0.01	*<0.01*	0.01	2.7	*<4.5*	3.5	6.0	2.0	3.2	7.8	15	11
75th PCTL	8.7	8.6	0.01	0.01	0.01	4.5	5.1	5.0	6.5	3.4	4.7	15	17	17
Max	9.0	9.0	0.05	0.01	0.02	8.5	9.1	7.0	7.0	8.2	6.7	28	30	23
Granite (Fresh)														
n	13	20	20	20	20	13	13	20	6	20	20	13	13	20
Min	6.8	6.7	*<0.01*	*<0.01*	*<0.01*	*<0.8*	*<4.5*	2.0	3.0	-4.4	1.6	0.5	2.9	1.4
25th PCTL	8.0	7.6	*<0.01*	*<0.01*	*<0.01*	0.8	*<4.5*	3.0	4.3	-0.7	2.1	2.5	14	4.0
Median	8.5	8.5	0.01	0.01	0.01	3.1	4.5	4.0	5.0	0.5	3.1	10	15	8.2
75th PCTL	9.0	8.8	0.03	0.01	0.01	5.4	4.5	5.3	5.8	3.0	4.7	18	15	17
Max	9.2	9.3	0.14	0.14	0.02	20	18	18	19	20	18	65	58	58
Granite (All Weathering Facies)														
n	42	57	57	38	57	42	42	57	23	42	57	42	42	57
Min	5.7	5.8	*<0.01*	*<0.01*	*<0.01*	0.8	2.3	1.0	2.0	-2	-2.8	0.41	1.1	0.3
25th PCTL	6.8	6.7	*<0.01*	*<0.01*	*<0.01*	1.6	*<4.5*	2.0	4.0	0.5	1.7	2.5	14	3.2
Median	7.4	7.3	0.01	0.01	0.01	2.3	*<4.5*	3.0	5.0	2.0	2.7	7.4	14	6.7
75th PCTL	8.7	8.6	0.01	0.01	0.01	3.7	4.5	5.0	6.0	2.9	3.7	10	15	13
Max	9.2	9.3	0.14	0.14	0.05	20	18	18	19	20	18	65	58	58

Notes: Values in grey italics are below the analytical detection limit; *n* = number of analyses included in statistical distribution; * adjusted T-C NP; calculated as Total C wt.% * 77.6 (see Section 4.1.2.3 for discussion); NNP = net neutralization potential, derived by subtracting AP from NP.

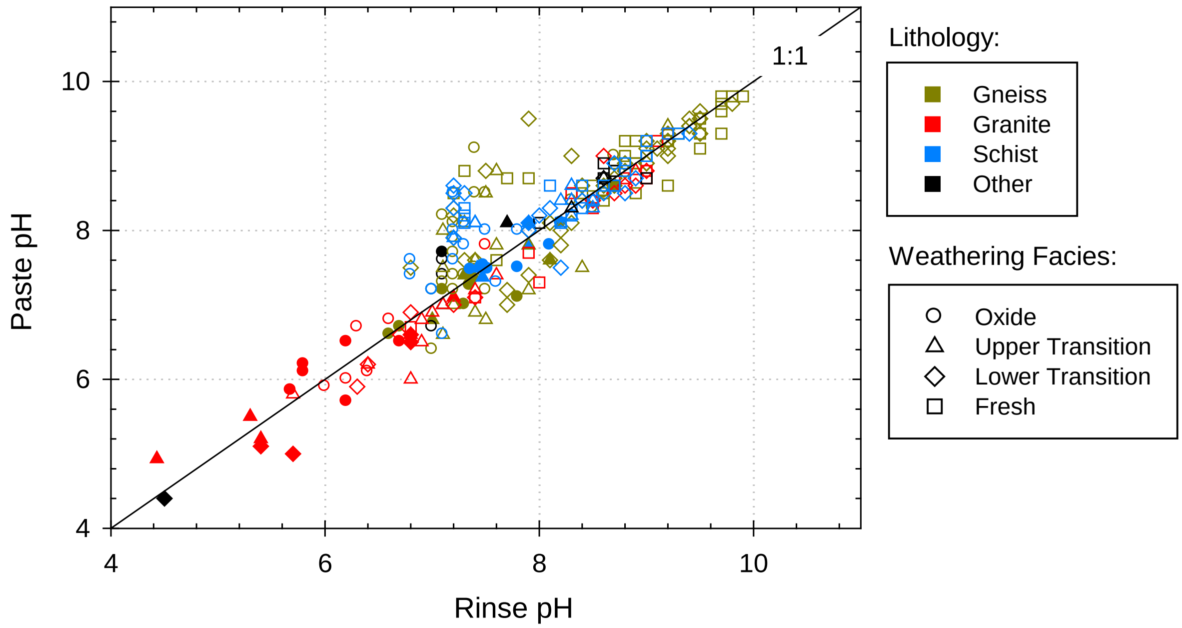

Figure 4-1: Rinse pH vs paste pH for Coffee Gold Mine waste rock and ore samples as presented by lithology and weathering facies. Waste rock samples are represented by hollow samples and ore samples are represented by filled symbols

4.1.3.2 Acid Potential

The acid generating potential (AP) of a rock sample is estimated from the sulphur (S) content. The amount of acidity generated per mass of S depends in large part on the mineralogy and solid phase speciation of sulphur. That is, different sulphide and sulphate minerals produce different amounts of acidity when oxidized. Mineralogical investigations (Section 4.1.2) identified pyrite as the dominant S-bearing mineral. The AP of pyrite is calculated based on the stoichiometry of pyrite oxidation and $Fe(OH)_3$ precipitation:

$$2FeS_2 + 7.5O_2 + 7H_2O = 4SO_4^{2-} + 2Fe(OH)_3 + 8H^+$$

Based on this equation, two moles of H^+ are produced per mole of S. Other S-bearing minerals identified by mineralogical determination include pyrrhotite, galena, natroalunite, gypsum and hydronium-jarosite. Of these minerals, pyrrhotite, natroalunite and hydronium-jarosite have the potential to generate acidity. With the exception of pyrrhotite, the acidity potential per mole of S is equal or less than that of pyrite. Due to the similar acidity potential and scarcity of other S bearing minerals, the above stoichiometry of pyrite oxidation is assumed to be appropriate for relating total-S to AP.

AP from ABA

Figure 4-2 shows the relationship between sulphide-S and total-S, with samples on the 1:1 line demonstrating perfect agreement. Overall, strong agreement is observed between the two measures of S, with total-S values being generally slightly higher than those for sulphide-S. This indicates that the majority of S in host lithology types is present in sulphide minerals, which is consistent with the mineralogical assessment which found the dominant sulphur mineral is pyrite. Given the above considerations, total-S was used to calculate AP. This assumption is considered to represent a conservative means to assess the acid generating potential of waste rock for the Project. Note that of the 252 waste rock samples measured for sulphide-S, 148 show total-S and sulphide-S concentrations at or below the detection limit of 0.01 wt.%; therefore, symbols for these data points overlap in Figure 4-2.

Sulphur species abundances are presented by weathering facies for gneiss, schist and granite waste rock in Table 4-8, Table 4-9 and Table 4-10. In general, total and sulphide-S concentrations decrease with increased weathering for each major lithologic unit, and relative concentrations of total and sulphide-S are highest in the schist samples and lowest in the granite samples. Specifically, total and sulphide-S concentrations are at or below the detection limit in a majority of the samples from the most weathered (oxide) facies, with the median value for the schist, 75th percentile value for the gneiss and all of the granite waste rock samples at or below 0.01 wt.% (Table 4-8, Table 4-9 and Table 4-10). In the schist samples, there is a distinct correlation between total-S content and weathering facies, with 75th percentile concentrations of 0.07, 0.08, 0.11, and 0.16 wt.% for the oxide, upper transition, lower transition and fresh facies, respectively. Sulphate-S concentrations are low in all samples (<0.06 wt.%), with the majority of samples at or near the detection limit (0.01 wt.%).

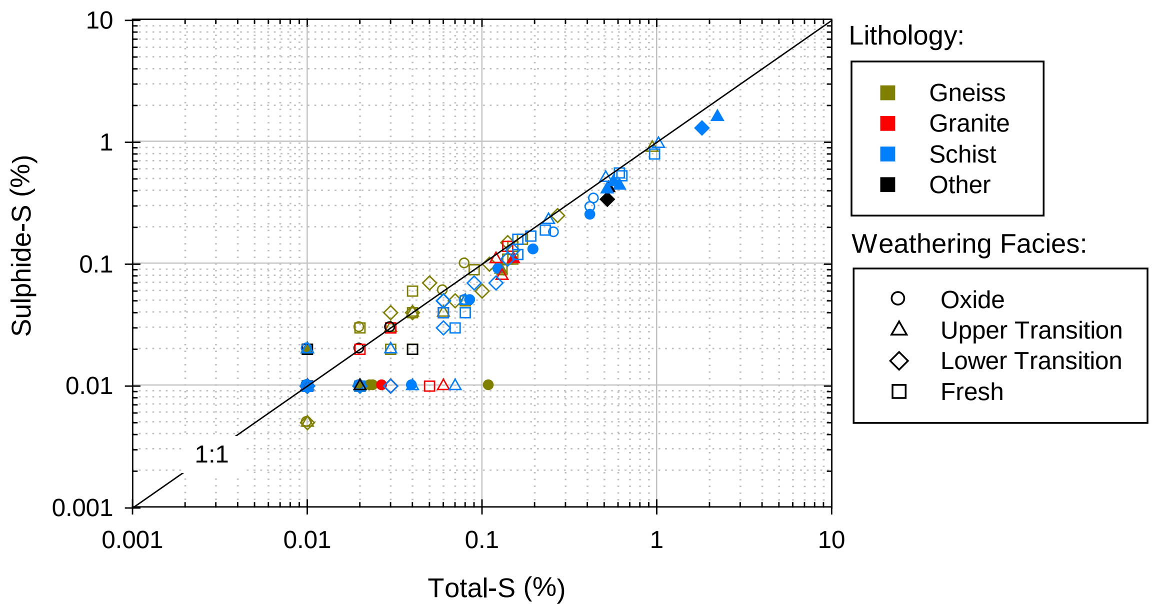

Figure 4-2: Total-S versus sulphide-S for waste rock and ore samples as presented by lithology and weathering facies. Ore samples are represented by filled symbols, waste rock samples are represented by hollow symbols.

AP Surrogates

A considerably larger sample population is available from the exploration assay database which comprises 26,549 analyses by aqua regia digestion and ICP-OES analysis (Section 3.2.4). This database included measurements of S, and has the potential to vastly expand statistics on sulphur distribution throughout the deposit. However, aqua regia often provide an incomplete digestion of sulphur minerals, with Leco furnace being the preferred method to obtain more reliable sulphur measurements. In order to determine the reliability of sulphur measured by an aqua regia digestion, results for the Leco furnace and aqua regia digestions conducted as part of the ABA sampling program are compared in Figure 4-3.

Comparison of total-S results from the ABA database shows that the majority of the samples plot along the 1:1 line (Figure 4-3), indicating near perfect agreement. Samples near or below the detection limit (0.01 wt.%) show greater variation, which in part can be attributed to the increased uncertainty near the limits of the analytical instrument. However, where there is deviation from the 1:1 line at higher concentrations, total-S measurements from aqua regia digestion are generally higher than those measured by LECO furnace. This exercise demonstrates that the application of total-S values from the exploration database as a surrogate to derive AP is a conservative means to evaluate ARD potential of mine rock. The statistical distribution of surrogate AP values (presented as total-S) are presented in Table 4-11.

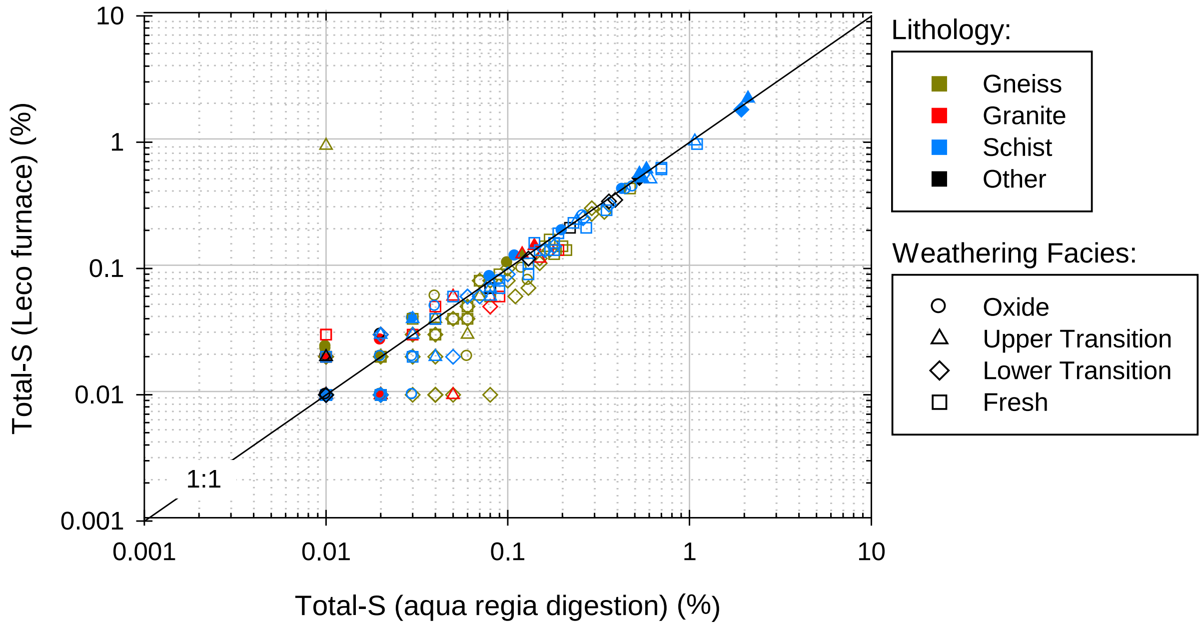

Figure 4-3: Total-S by LECO furnace vs total-S by aqua regia digestion for Coffee Gold Mine waste rock samples as presented by lithology and weathering facies. Ore samples are represented by filled symbols

Table 4-11: Statistical Distribution of Sulphur (wt.%) Measured in Assay Database Used for Surrogate Acid Potential Values for Waste Rock Lithologies

Lithology	Statistic	Oxide	Upper Transition	Lower Transition	Fresh	All Weathering Facies
Gneiss	*n*	3218	4367	5647	1073	14305
	n <DL	1861	1951	1871	410	6093
	Max	1.3	0.67	2.2	1.0	2.2
	95th PCTL	0.07	0.12	0.17	0.19	0.14
	75th PCTL	0.01	0.02	0.05	0.05	0.03
	Median	*<0.01*	0.01	0.01	0.01	0.01
	25th PCTL	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
	5th PCTL	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
	Min	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Schist	*n*	2355	2175	3330	861	8721
	n <DL	443	229	748	96	1516
	Max	1.2	2.6	2.3	3.4	3.4
	95th PCTL	0.22	0.64	0.4	0.6	0.45
	75th PCTL	0.05	0.15	0.11	0.31	0.12
	Median	0.02	0.04	0.02	0.11	0.03
	25th PCTL	0.01	0.02	0.01	0.02	0.01
	5th PCTL	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
	Min	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Granite	*n*	578	140	235	24	977
	n <DL	406	120	144	13	683
	Max	0.46	0.31	0.22	0.43	0.46
	95th PCTL	0.022	0.021	0.02	0.15	0.03
	75th PCTL	0.01	*<0.01*	0.01	0.05	0.01
	Median	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
	25th PCTL	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
	5th PCTL	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
	Min	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Other	*n*	1411	585	710	241	2947
	n <DL	388	133	187	29	737
	Max	1.91	1.6	1.3	4.1	4.1
	95th PCTL	0.38	0.38	0.27	1.9	0.43
	75th PCTL	0.06	0.09	0.03	0.35	0.07
	Median	0.02	0.03	0.01	0.04	0.02
	25th PCTL	*<0.01*	0.01	*<0.01*	0.01	*<0.01*
	5th PCTL	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*
	Min	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*

Notes: Values in grey italics are below the analytical detection limit. *n* is the number of samples included in the statistical distribution, *n* < DL is the number of samples below the detection limit.

4.1.3.3 Neutralization Potential

A variety of analytical methods are available to measure NP, including bulk NP (Sobek NP and siderite NP methods) and carbonate mineral specific NP (NP derived from total carbon and inorganic carbon content) (Section 3.2.2). Each NP method contributes to the understanding of the NP of a material; however, no one method provides an accurate measurement of the effective 'field' neutralization capacity (i.e., the ability of a potential NP source to maintain a neutral drainage chemistry). It is therefore important to understand the mineralogy of the phases contributing to the overall NP of the sample. The solubility of fast dissolving carbonate allows for the rapid neutralization of acid generated via sulphide mineral oxidation. Conversely, non-carbonate minerals (*e.g.,* silicates) are a less reliable NP source since the rate of dissolution for these minerals is considerably slower, and requires that the generation of acidity also be slow in order for these minerals to provide effective neutralization potential.

The Sobek NP procedure involves soaking the sample in strong acid (heated) to ensure effective dissolution, and then back titrating to determine the remaining un-neutralized acidity. This method is generally thought to underestimate the NP of slowly dissolving aluminosilicate minerals since it is carried out for a limited duration. Further, this method can overestimate NP from other minerals which would not be predicted to dissolve under neutral-pH weathering (i.e., due to the aggressive extraction technique) or would not contribute to the effective NP (*e.g.*, presence of Fe and/or Mn bearing carbonate minerals such as ankerite and siderite).

Siderite NP is similar to the Sobek method but attempts to correct for Fe and Mn bearing carbonate minerals that do not contribute to the overall effective NP of a sample by adding a chemical oxidant (H_2O_2) to ensure that any reduced species (Fe^{2+} and Mn^{2+}) are oxidized during the analysis. In contrast, Carbonate NP is based on the measurement of inorganic C in a sample and assumes that all carbonate minerals contributing to CaNP react like calcite. Therefore, similar to the Sobek NP method, the CaNP procedure can overestimate the effective NP of a material if significant Fe or Mn-carbonate minerals are present.

A comparison of the bulk NPs and CaNP can provide information about the NP sources and capacity of the carbonate minerals. If Sobek NP is higher than CaNP, for example, it can be inferred there is measurable neutralization available from non-carbonate minerals. Conversely, if CaNP and Sobek NP are higher than siderite NP, then a measurable portion of the inorganic C is not generating alkalinity or is unreactive, and indicates either the presence of Fe or Mn-bearing carbonates (Price, 1997).

NP from ABA

Figure 4-4 plots siderite NP and CaNP as a function of Sobek NP for waste rock and ore samples from each weathering facies of each dominant lithologic unit. The results demonstrate that Sobek NP and siderite NP are generally very similar. The similarity between these NP measurements shows, that although Fe and Mn oxides are present (Section 4.1.1), they are not prevalent enough to significantly affect NP measurements. Furthermore, siderite NP is often slightly higher than Sobek NP. This is an artifact of the analytical technique, caused by an additional boiling step in the siderite procedure to breakdown any residual peroxide. Hydrochloric acid is volatile and is lost during the boiling step thereby leaving less acidity to back titrate, resulting in higher NP. This results in siderite NP overestimating Sobek NP when little or no Mn or Fe carbonates are present. Variance between the two bulk NP measurements in the lower range of NP concentrations (less than approximately 10 kg $CaCO_3$/t), can also in part be attributed to analytical limitations near the detection limits. The bulk NP methods generally produce higher NP estimates compared to CaNP, indicating that non-carbonate minerals are contributing to the overall Sobek and siderite NP measurements. Based on the NP data presented in Figure 4-4, CaNP provide a conservative estimate of NP compared to Sobek or siderite measurements for waste rock and ore.

Overall, the schist waste rock samples exhibit the highest CaNP (range: <4.5 to 268 kg $CaCO_3$/t; median of 65 kg $CaCO_3$/t; Table 4-8) while the granite waste rock samples have the lowest CaNP (range: 2.3 to 18 kg $CaCO_3$/t; median of <4.5 kg $CaCO_3$/t; Table 4-9). The gneiss samples are also characterized by low CaNP, with concentrations ranging from 2.3 to 98 kg $CaCO_3$/t (median of 4.5 kg $CaCO_3$/t) (Table 4-10). Waste rock CaNP is generally inversely related to the degree of weathering within a given lithologic unit, with oxide facies samples showing the overall lowest CaNP values and samples from the fresh facies having the highest CaNP. Median CaNP values for granite waste rock samples are below the detection limit (<4.5 kg $CaCO_3$/t) for all weathering facies. Median CaNP values for the gneiss samples are also below the detection limit for the oxide and upper transition facies, but are slightly higher for the lower transition and fresh facies (8 kg $CaCO_3$/t for both facies). CaNP values for the gneiss waste rock weathering facies increase with decreasing degree of weathering, with 75th percentile values of 15, 25 and 35 kg $CaCO_3$/t CaNP for the oxide, upper transition and lower transition and fresh facies, respectively. The opposite is true for the schist waste rock samples where median values for the oxide and upper transition facies samples have higher CaNP (116 and 93 kg $CaCO_3$/t) compared to the lower transition and fresh facies (57 and 59 kg $CaCO_3$/t).

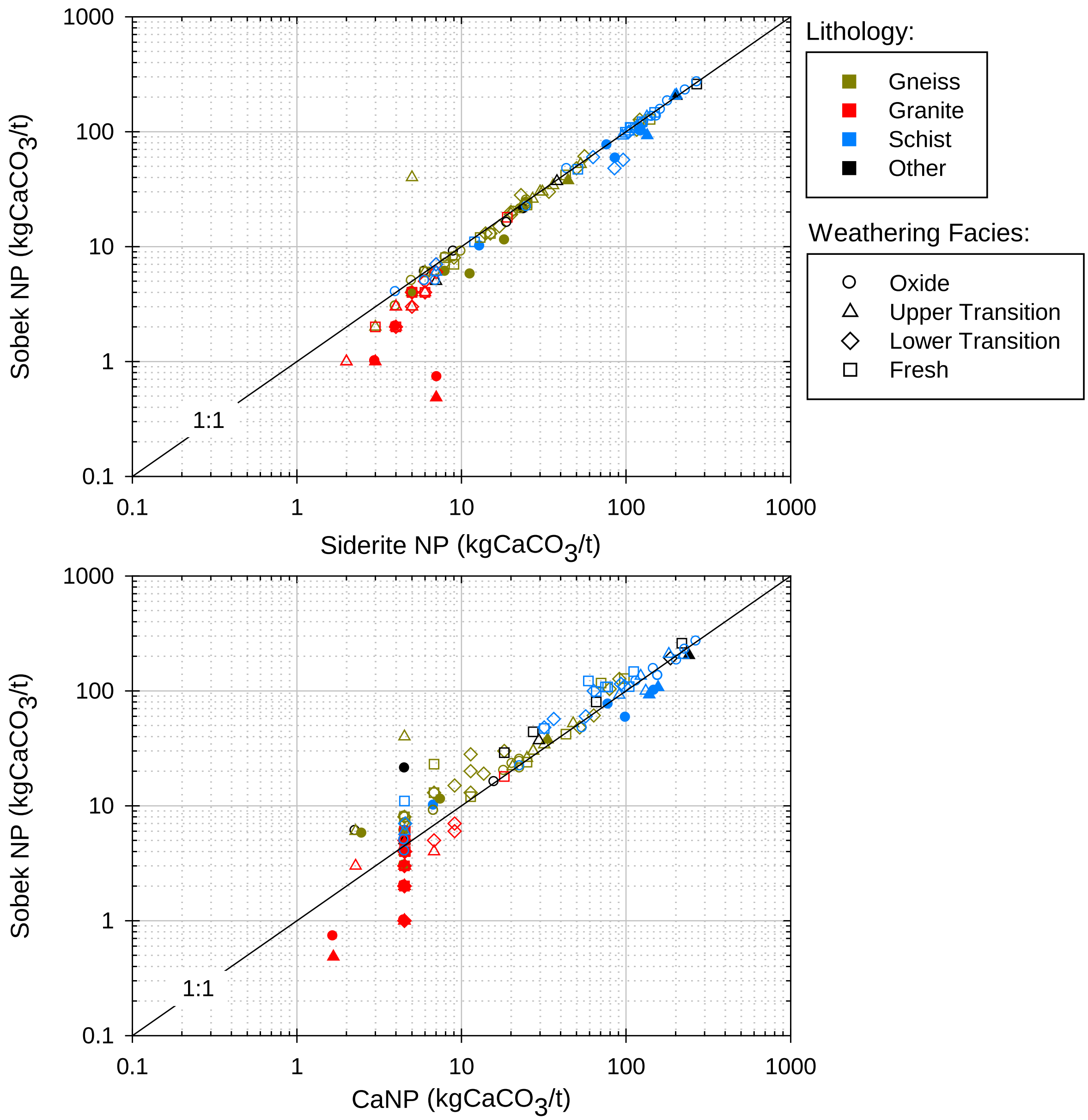

Figure 4-4: Relationship between Sobek NP and siderite NP (top) and Sobek NP and CaNP (bottom) waste rock samples as presented by lithology and weathering facies. Ore samples are represented by filled symbols.

The use of total-C to derive NP in place of CaNP (derived from TIC) was assessed given the considerably lower detection limit (0.01 wt.%) for total-C measurements and the more rapid and cost effective analytical method for total-C (LECO furnace). Total-C and CaNP show a strong correlation (R^2 = 0.99), illustrating a high degree of predictability for CaNP based on total-C measurements (Figure 4-5). This relationship can be expressed by the following equation:

$$\text{CaNP (kg CaCO}_3\text{/t)} = 77.6 \times \text{Total C (wt.\%)}$$

The minor variation between the CaNP and total-C values in Figure 4-5 is attributed to either a small amount of organic C present in the sample (present in situ or as a result of sample contamination) and/or from analytical differences between the total-C and TIC determinations.

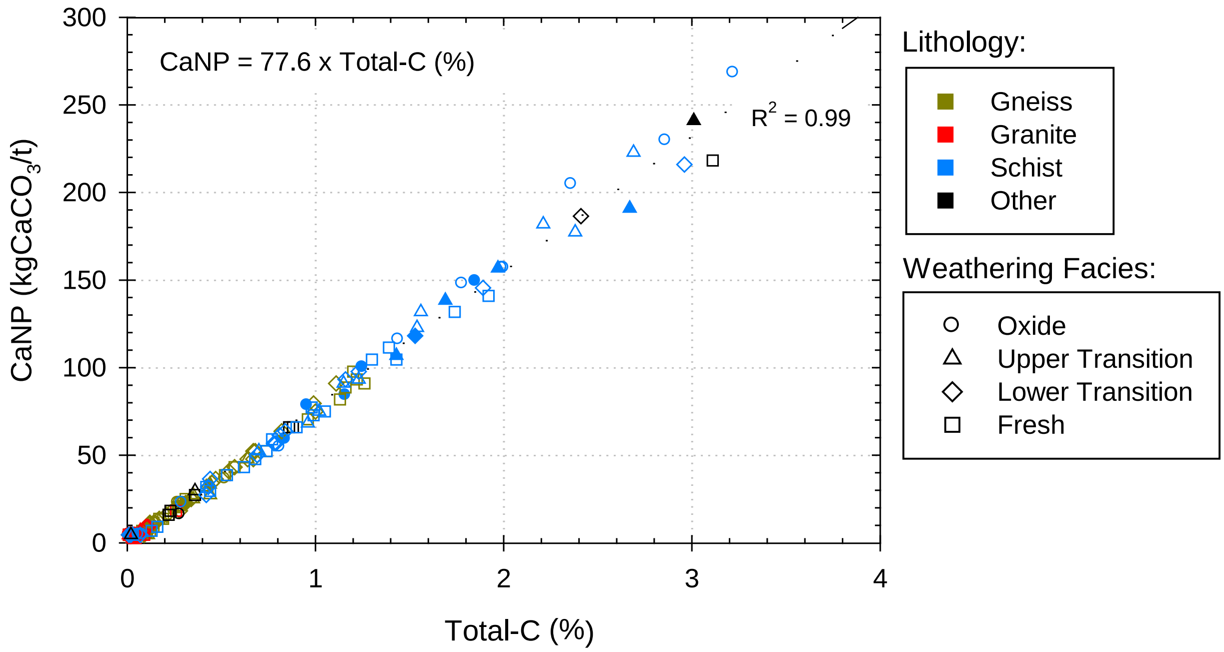

Figure 4-5: Total-C (Leco) plotted against CaNP for waste rock samples as presented by lithology and weathering facies. Ore samples are represented by filled symbols. Dotted line shows the linear regression as per the equation shown on the figure.

NP Surrogates

It is often the case that surrogates for NP measurements can be found in metal assay data. The potential for surrogate NPs were investigated in order to determine if the large exploration database can provide an indication of NP distribution throughout the deposit. This investigation found a relationship between Ca and Sobek NP. A comparison of Sobek NP (via ABA analysis) versus ICP Ca NP (as measured through solid phase Ca determination by aqua regia digestion) is presented in Figure 4-6. This estimate of surrogate NP assumes that all Ca is present in the form of $CaCO_3$. The majority of the samples plot just above the 1:1 line, indicating that Sobek NP is generally higher than NP derived from the Ca measurements. Accordingly, the application of Ca from aqua regia digestion as a surrogate to derive NP represents a conservative means to augment the ABA data set for site rock NP determinations. Assuming that 100% of Ca resides in $CaCO_3$ results in the following forumla which relates Ca wt.% to NP.

$$NP = Ca \times 40.08^{-1} \times 1000$$

Where NP is in units of $kgCaCO_3/t$, Ca is in units of wt.% and 40.08 is the molar weight of Ca. As discussed in Section 3.2.4, a considerably larger sample population is available from the exploration assay database which comprises 26,549 calcium (Ca) analyses by aqua regia digestion. Utilization of this larger dataset allows for a more robust assessment of the ARD potential of waste rock and ore using Ca values to derive NP. The statistical distribution for surrogate NP values (calculated using Ca from the exploration database) are presented in Table 4-12.

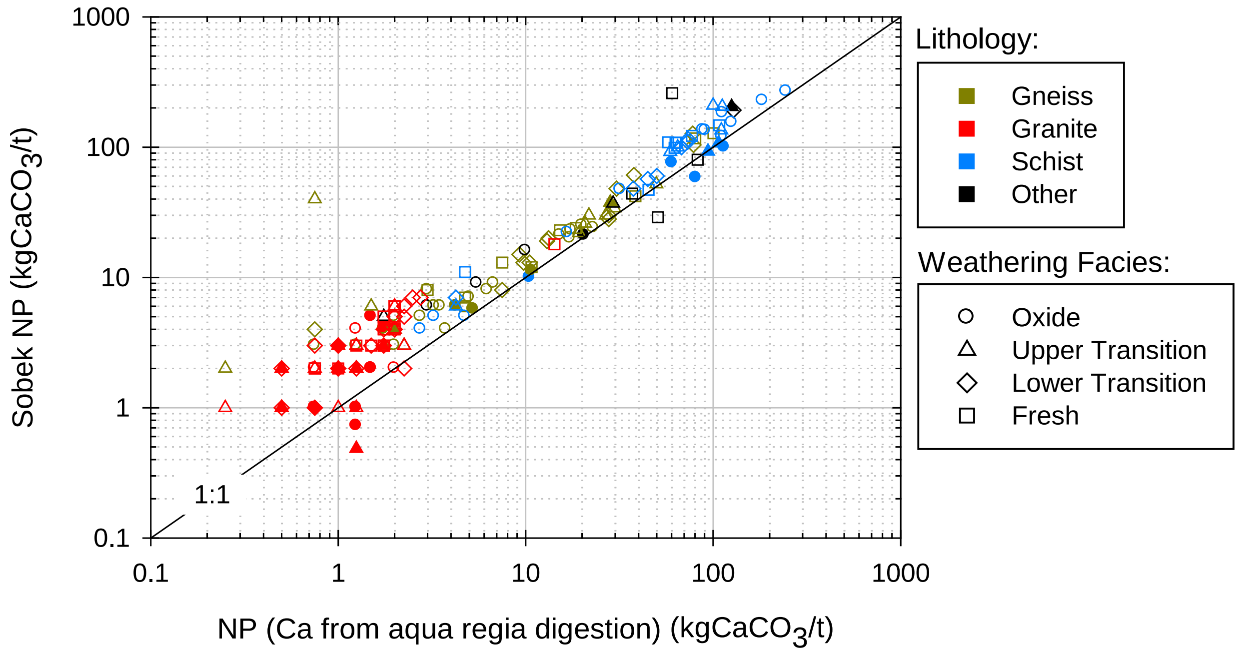

Figure 4-6: Sobek NP versus surrogate NP calculated using Ca from aqua regia digestion (ABA database) for static test samples. Waste rock samples are hollow symbols, ore samples are represented by filled symbols.

Table 4-12:
Statistical Distribution of Neutralization Potential (kg $CaCO_3$/t) Values Calculated from Ca Measured in Assay Database for Waste Rock Lithologies

Lithology	Statistic	Oxide	Upper Transition	Lower Transition	Fresh	All Weathering Facies
Gneiss	*n*	3218	4367	5647	1073	14305
	Max	195	245	280	167.8	280
	95th PCTL	57.3	60.8	75.8	78.1	70.5
	75th PCTL	7.5	19.3	34.5	35.3	25
	Median	1.8	6	17	18.3	9.5
	25th PCTL	1	1.8	6.5	9	2
	5th PCTL	0.5	0.8	1.5	3	0.5
	Min	*<0.3*	*<0.3*	0.3	0.8	*<0.3*
Schist	*n*	2355	2175	3330	861	8721
	Max	625	625	625	625	625
	95th PCTL	237.5	255	165	227.5	220
	75th PCTL	116	120.8	78.8	97	103
	Median	74.8	79.8	47	63	63.5
	25th PCTL	33.5	50.8	25.5	39.8	33.3
	5th PCTL	2.5	11.8	8.8	13.3	6.5
	Min	0.3	0.5	2	4.5	0.3
Granite	*n*	578	140	235	24	977
	Max	11.5	4.5	10.8	3	11.5
	95th PCTL	2.5	3	3	2.7	2.8
	75th PCTL	1.8	2.3	2.3	1.3	2
	Median	1.3	1.8	1.8	0.5	1.5
	25th PCTL	0.8	1.3	1.3	0.3	1
	5th PCTL	0.5	0.5	*<0.3*	*<0.3*	0.5
	Min	*<0.3*	*<0.3*	*<0.3*	*<0.3*	*<0.3*
Other	*n*	1411	585	710	241	2947
	Max	592.5	505	540	287.5	592.5
	95th PCTL	197.5	222.5	167.5	137.8	197.5
	75th PCTL	113.5	115.8	74.1	79	101.6
	Median	54.8	50.3	35.5	46.3	43.3
	25th PCTL	5.3	9	13	19.5	8.5
	5th PCTL	0.8	0.8	1.5	5	1
	Min	0.3	0.3	*<0.3*	*<0.3*	*<0.3*

Notes: Values in grey italics are below the analytical detection limit. *n* is the number of samples included in the statistical distribution, *n* < DL is the number of samples below the detection limit

4.1.3.4 Net Potential Ratio

The acid generating potential of mine rock will be defined by the ratio of NP to AP and a minimum sulphur content. The NP/AP ratio, or net potential ratio (NPR), used to define the acid generating potential of mine rock will vary depending on the type of NP estimate used in the calculation. Bulk NP measurements, such as the Sobek method, involve boiling a rock sample in acid and often releases NP that would not be effective at maintaining a neutral pH in a mine waste environment. Therefore, when Sobek NP is used to calculate NPR a criterion of 3 is used to define non-PAG rock. Conversely, carbonate minerals are generally effective at maintaining a neutral pH while present, and an NPR ratio of 2 is applied when carbonate mineral specific NP estimates are used to estimate NPR. For the purposes of PAG definition, AP will be defined by a total-S measurement for all material types.

In addition to this NPR criteria, samples require a minimum quantity of AP to be classified as acid generating. A total-S cutoff of 0.02 wt.% is used to define non-reactive samples. This is considered highly conservative given that this low concentration is below average continental abundance (0.04 wt.%) and much of the mine rock is at a highly weathered state. The classification criteria used to screen for ARD potential are as follows:

- Where the total-S content is <0.02 wt.% the sample is classified as non-reactive
- Where the total-S content is ≥0.02 wt.%, and the Sobek NP/AP ratio is greater than 3 or carbonate - NP/AP of greater than 2, the sample is classified as non-PAG.
- Where the total-S content is ≥0.02 wt.%, the Sobek NP/AP ratio between 1 and 3 or a carbonate-NP/AP of between 1 and 2, the sample is classified as having an uncertain acid generating potential.
- Where the total-S content is ≥0.02 wt.%, the Sobek NP/AP ratio or a carbonate-NP/AP is less than 1, the sample is classified as potentially acid generating.

For the purposes of this pre-mining geochemical assessment a variety of methods are used to estimate NP, AP and NPR. As such there is some variability in the classification scheme depending on the type of measurement being applied. During mine operations set of definitive criteria and set analyses will be used to classify mine waste as PAG or non-PAG. These criteria are described in the Mine Waste ML/ARD Management and Monitoring Plan.

Figure 4-7 presents Sobek NP, CaNP and T-C NP versus T-AP. The results show that all samples with total-S at or below the detection limit (T-AP ≤ 0.3 kg $CaCO_3$/t) are non-PAG. The plots also indicate that several granite waste rock and ore samples (generally from the upper transition facies) are either PAG or have an uncertain PAG potential when Sobek

NP is applied. When the most conservative NP is applied (T-C NP), a few granite and gneiss samples are indicated to be PAG or have an uncertain potential. With the exception of one upper transition ore sample, the schist waste rock and ore samples are indicated to be non-PAG.

The statistical distribution for NPR derived using the different NP values are presented by weathering facies for each lithology Table 4-8, Table 4-9 and Table 4-10. Consistent with the distribution of NP for the waste rock lithologies, the schist samples have the overall highest NPR (T-C NP*) values (median NPR = 28) and the granite samples have the lowest (median NPR = 7.5). Within a given lithology, the lowest NPR distribution is generally indicated for the oxide facies compared to relatively higher NPR values for fresh facies. The considerably higher NP of the schist waste rock samples is further supported by the high net neutralization potential (NNP) values, which is the amount of excess NP relative to AP (*i.e.,* NNP = NP – AP). To provide context, a NNP of 0 is equivalent to a NPR of 1. Median values for T-C NNP* for the schist, gneiss and granite waste rock samples are 59.4, 4.4 and 2.0 kg $CaCO_3$/t, respectively (Table 4-9).

The statistical distributions presented in Table 4-8, Table 4-9 and Table 4-10 do not take into account the samples with negligible AP. Table 4-13 provides a summary of the relative proportions of PAG, uncertain, neutral and non-PAG waste rock samples by lithologic units according to the different NP methods and criteria described above. Also presented in Table 4-13 are the relative proportions of PAG and non-PAG waste rock samples according to NPR values derived using surrogate NP and AP values calculated using Ca and S from the exploration database. The results demonstrate that the distribution of PAG and non-PAG waste rock is generally consistent, with all schist and other minor lithology samples indicated to be non-PAG and 1 to 4% of gneiss samples indicated to have some PAG potential. A higher proportion of the granite samples are classified as PAG or uncertain (10% using surrogate NP and AP), however, a majority of this rock unit is classified as being non-PAG or as neutral independent of NPR criteria applied. Overall, the results of the ABA analyses indicate that ARD is not expected to be an issue for the Coffee Creek waste rock.

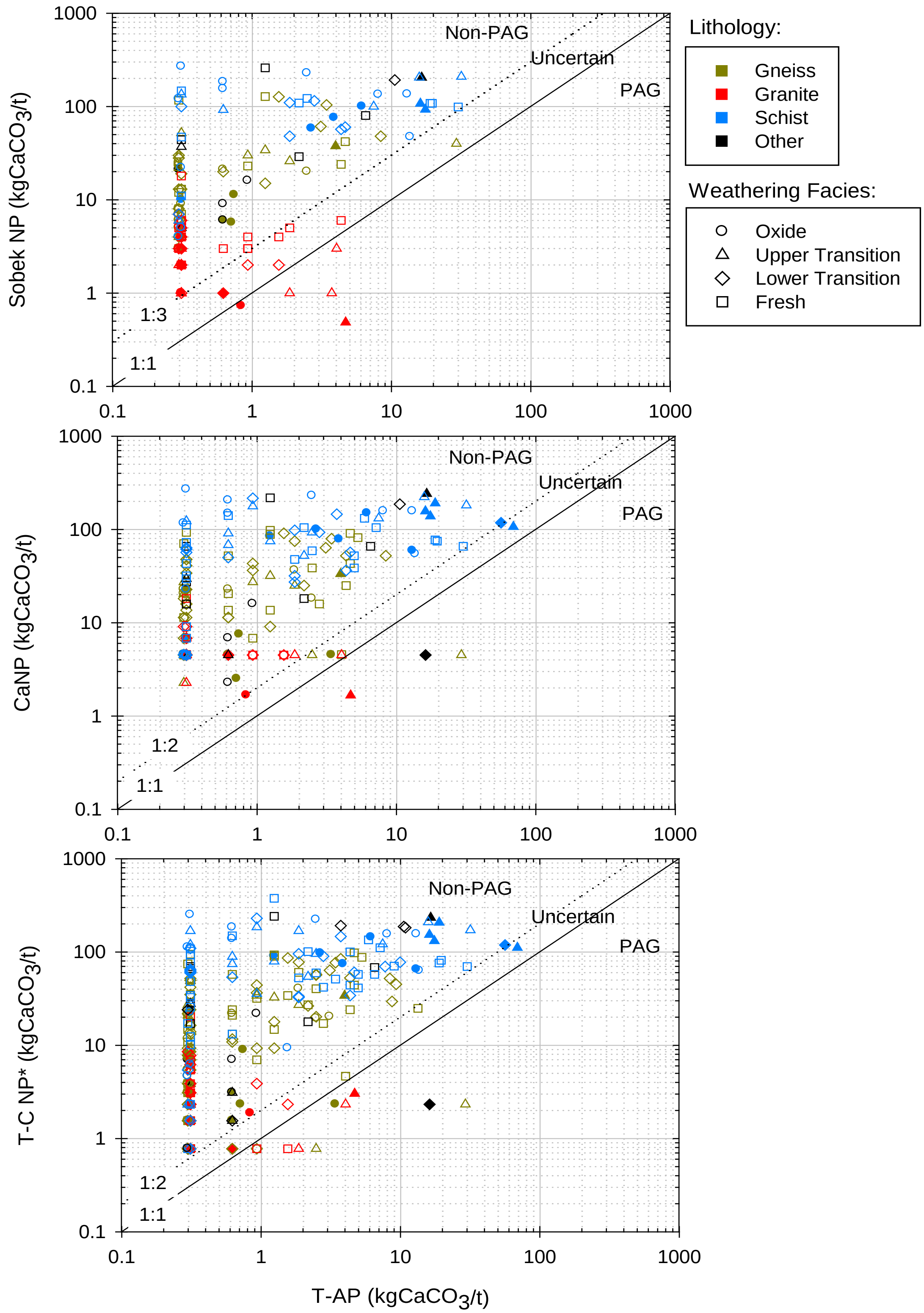

Figure 4-7: Sobek NP (top), CaNP (middle) and T-C NP* (bottom) *vs* T-AP for Coffee Gold Mine waste rock and ore as presented by lithology and weathering facies. Ore samples are represented by filled symbols while waste rock is shown as hollow symbols.

**Table 4-13:
ARD Distributions for Coffee Gold Mine Waste Rock Lithologies based on Various Estimates of Neutralization Potential**

Lithology	ARD Designation	NPR (T-C NP*/AP)		NPR (CaNP/T-AP)		NPR (Sobek NP/T-AP)		NPR (surrogate NP/AP)	
		n	%	*n*	%	*n*	%	*n*	%
GNEISS	*Total No. Samples*	*188*		*117*		*51*		*14305*	
	Non-reactive	135	72%	82	70%	35	69%	9303	65%
	Non-PAG	46	24%	32	27%	15	29%	4531	32%
	Uncertain	4	2%	2	2%	1	2%	347	2%
	PAG	3	2%	1	1%	0	0%	124	1%
SCHIST	*Total No. Samples*	*79*		*58*		*33*		*8721*	
	Non-reactive	31	39%	23	40%	13	39%	3099	36%
	Non-PAG	48	61%	35	60%	20	61%	5336	61%
	Uncertain	0	0%	0	0%	0	0%	263	3%
	PAG	0	0%	0	0%	0	0%	23	0%
GRANITE	*Total No. Samples*	*42*		*42*		*57*		*977*	
	Non-reactive	36	86%	36	86%	45	79%	865	89%
	Non-PAG	1	2%	5	12%	4	7%	11	1%
	Uncertain	1	2%	1	2%	5	9%	50	5%
	PAG	4	10%	0	0%	3	5%	51	5%
Other (including Metabasalt)	*Total No. Samples*	*24*		*15*		*11*		*2546*	
	Non-reactive	11	46%	6	40%	3	27%	1089	43%
	Non-PAG	13	54%	9	60%	8	73%	1284	50%
	Uncertain	0	0%	0	0%	0	0%	96	4%
	PAG	0	0%	0	0%	0	0%	77	3%

Notes:
n = number of analyses included in distribution.
* adjusted T-C NP; calculated as Total C wt.% * 77.6 (see Section 4.1.3.3 for discussion).
NPR (surrogate NP/AP) is NP derived from Ca and AP derived from S from the aqua regia digestion exploration database.
All samples with total-S <0.02 wt.% are considered non-reactive.
Criteria for NPRs derived using sobek NP and ICP data are defined as NPR ≥3 (non-PAG), 1≤NPR<3 (uncertain), NPR<1 (PAG).
Criteria for NPRs derived using T-C NP* and CaNP are defined as NPR ≥2 (non-PAG), 1≤NPR<2 (uncertain), NPR<1 (PAG).

4.1.4 Shake Flask Extractions

Metal concentrations measured in SFE provide an indication of the readily soluble metals which will be immediately available for leaching upon exposure to infiltrating water. In order to highlight the significance of various SFE results, the results are compared to Metal Mining Effluent Regulations (MMER, 2002) and Canadian Council of Ministers of the Environment (CCME, 2007) water quality guidelines for the protection of aquatic life. A summary of the relevant guidelines is presented Table 4-14.

**Table 4-14:
Summary of Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines for the Protection of Aquatic Life and Metal Mining Effluent Regulations (MMER) Water Quality Guidelines**

Parameter	Units	CCME[1]		MMER[2]		
		30-day	Max	MMM	MCS	MGS
Total Cyanide	mg/L		0.005			
Sulphate	mg/L	218				
Al	mg/L	0.1				
Sb	mg/L		0.009			
As	mg/L	0.005		0.5	0.75	1
Cd	mg/L	0.0001	0.0011			
Co	mg/L	0.004	0.11			
Cr	mg/L		0.001			
Cu	mg/L	0.002		0.3	0.45	0.6
Fe	mg/L	0.3				
Pb	mg/L	0.001		0.2	0.3	0.4
Hg	mg/L	0.000026				
Mo	mg/L	0.073				
Ni	mg/L	0.025		0.5	0.75	1
Se	mg/L	0.001				
Ag	mg/L	0.00025				
Tl	mg/L	0.0008				
U	mg/L	0.015	0.033			
Zn	mg/L	0.03		0.5	0.75	1
^{226}Ra	Bq/L			0.37	0.74	1.11

Notes: All guidelines are for total metals unless otherwise indicated

1. Canadian Council of Ministers of the Environment (CCME, 2007) Freshwater Quality Guidelines for Protection of Aquatic Life; Guidelines for Cu, Ni and Pb are based on the default value for when hardness is not known (which corresponds to the 25th percentile hardness value of ~55 mg $CaCO_3$/L calculated using available SW data (n=754, Jun-27-2014 - Jan-26-2016); Guideline for Cd are calculated using the 25th percentile hardness of ~55 mg $CaCO_3$/L; guideline for Cr is for hexavalent (VI); Underlined guidelines for sulphate, Co and Sb are derived from BC MOE water quality guidelines for protection of freshwater aquatic life for reference. Sulphate is hardness dependent and is based on a hardness of 55 mg $CaCO_3$/L.
2. Metal Mines Effluent Regulations (MMER, 2002); maximum authorized monthly mean (MMM); maximum authorized concentration in a composite sample (MCS); and maximum authorized concentration in a grab sample (MGS).

A statistical distribution of SFE parameters that exceed water quality guidelines are presented by weathering facies for gneiss, schist and granite in Table 4-15, Table 4-16 and Table 4-17. Aluminium, Sb, As and Hg are indicated to exceed the CCME guidelines in SFE from almost all of the weathering facies of each dominant lithology. In particular, As exceeds the CCME guideline in median values for the schist unit and nearly every sample from the gneiss and granite units. Maximum values for each weathering facies of the granite unit also exceed the maximum MMER guideline (1 mg/L As). Concentrations of Cu, Fe, Pb and U exceed the CCME guidelines in SFE from one or more samples from each of the weathering facies for the granite and gneiss units, while Cr exceeds the CCME guideline from several of the gneiss and schist samples. Two oxide schist samples contain sulphate in SFE at values that exceed the reference guideline. The elevated sulphate in SFE leachate from these samples is consistent with higher solid phase sulphur measured in the samples (0.42 and 0.26 wt.%S, Appendix C.1-2), and reflects the rinsing of surface oxidation products from the highly weathered material. It should be noted that a detection limit of 0.00005 mg/L for Hg was often applied during analysis, which is higher than the CCME guideline (0.000026 mg/L); therefore, it is difficult to provide an accurate assessment of the proportion of samples for each lithology with soluble Hg at levels that exceed the guideline. In general, Hg is not enriched in solid phase of the waste rock samples; however, median values for the oxide facies of schist and granite waste rock show enrichment (Section 4.1.4). Soluble metal concentrations in SFE from other minor lithologies are generally low, with one or more samples having Al, Sb, As or Hg at concentrations that exceed the respective CCME guidelines (Appendix C.1-2).

Overall, the highest median and maximum metal concentrations in SFE are from all weathering facies of the granite unit (Table 4-16), while the lowest are generally from the schist unit (in particular samples from the fresh facies). Leachate pH for the gneiss and schist samples are neutral to alkaline, ranging from 7.4 to 9.5 (median values >8), reflecting the higher NP of these units. Leachate pH values for the granite samples are slightly lower, ranging from 6.4 to 9.2, with consistently lower pH measured for the oxide samples (median of 6.7).

Aluminum and Fe are sparingly water soluble under neutral pH and aerobic conditions. Therefore, the high concentrations of these metals are expected to be due to fine suspended solids (colloidal size) that passed through the 0.45μm filter during the extraction experiment. The exceedances observed for other metals in SFEs may also be associated with suspended solids given that the samples comprising the highest concentrations of Al and Fe in SFEs tend to also comprise the most elevated concentrations of other metals (As, Co, Cu, Fe, Pb, Mn, Ni, U and/or Ag and Zn). This is particularly evident for samples from the more weathered facies of each lithology and for the granite samples (*e.g.*, samples ABA064, ABA096, ABA059, ABA067, ABA065, ABA054, ABA174, ABA152, ABA166; Appendix C.1-2). However, there are also several SFE samples that contain elevated As, Sb and Cr but low Al and Fe (*e.g.*, ABA146, ABA143, ABA148, oxide schist samples and ABA132; Appendix C.1-2). Overall, the results of the SFE indicate that Cr may be a concern in gneiss and schist lithologies, while As and Sb may be metals of potential concern from all waste rock lithologies. It is interesting to note that U concentrations are generally low in SFE data, with median values of all lithologies and weathering facies being below CCME guidelines. This is likely related to the low alkalinity produced during the SFE procedure inhibiting U solubility (median alkalinity of 21 mg$CaCO_3$/L, 30 mg$CaCO_3$/L and 4.3 mg$CaCO_3$/L for gneiss, schist and granite, respectively).

Table 4-15:
Shake Flask Extraction Results for Gneiss Waste Rock by Weathering Facies

Gneiss	pH	Sulfate	Al	Sb	As	Cr	Co	Cu	Fe	Pb	Hg	Se	Tl	U	Zn
	pH	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
Oxide (*n* = 9)															
Min	7.2	*<0.5*	0.019	0.0014	0.0095	0.00025	0.00005	0.0005	0.015	0.00005	0.000025	0.00025	*<0.0001*	0.00007	0.005
25th PCTL	8.0	0.52	0.13	0.0049	0.035	*<0.0005*	*<0.0001*	*<0.001*	*<0.03*	*<0.0001*	*<0.00005*	*<0.0005*	*<0.0001*	0.00018	*<0.01*
Median	8.3	1.3	0.43	0.0069	0.12	0.0005	0.0001	*<0.001*	0.062	0.00013	*<0.00005*	*<0.0005*	0.00012	0.0018	*<0.01*
75th PCTL	8.8	1.9	3.0	0.021	0.18	0.0029	0.00071	0.0018	3.2	0.0068	0.000065	*<0.0005*	0.00013	0.0036	*<0.01*
Max	9.4	16	3.8	0.046	1.2	0.004	0.001	0.0044	5.7	0.01	0.00014	*<0.0005*	0.00063	0.019	*<0.01*
Upper Transition (*n* = 7)															
Min	7.3	*<0.5*	0.028	0.00045	0.0079	0.00025	0.00005	0.0005	0.015	0.00005	0.000025	0.00025	0.00005	0.000069	0.005
25th PCTL	7.8	0.62	0.078	0.0016	0.014	0.0005	0.000075	0.00075	0.031	0.000075	0.000025	0.00038	*<0.0001*	0.00016	0.0075
Median	8.1	0.89	0.28	0.0049	0.046	0.00069	0.00033	0.001	0.24	0.0001	0.00005	*<0.0005*	0.0001	0.00039	*<0.01*
75th PCTL	8.4	1.3	2.3	0.0097	0.087	0.0015	0.0011	0.0034	1.4	0.0028	0.00061	*<0.0005*	0.00018	0.0031	*<0.01*
Max	9.5	12	7.6	0.028	0.2	0.0029	0.0017	0.0053	4.7	0.023	0.0056	0.0005	0.00027	0.0074	0.01
Lower Transition (*n* = 19)															
Min	7.4	*<0.5*	0.016	0.00011	0.0045	0.00025	0.00005	0.0005	0.015	0.00005	0.000025	0.00025	*<0.0001*	0.000038	0.005
25th PCTL	8.4	0.52	0.22	0.00038	0.012	*<0.0005*	*<0.0001*	*<0.001*	*<0.03*	*<0.0001*	*<0.00005*	*<0.0005*	*<0.0001*	0.00023	*<0.01*
Median	9.2	1.1	0.34	0.00082	0.017	*<0.0005*	*<0.0001*	*<0.001*	0.051	0.0001	*<0.00005*	*<0.0005*	*<0.0001*	0.00058	*<0.01*
75th PCTL	9.3	2.2	0.65	0.0023	0.031	0.0005	0.0001	*<0.001*	0.14	0.00026	*<0.00005*	*<0.0005*	*<0.0001*	0.0015	*<0.01*
Max	9.8	15	4.1	0.0064	0.092	0.011	0.00086	0.0031	2.4	0.0035	0.0014	0.0021	0.00025	0.026	0.01
Fresh (*n* = 16)															
Min	8.1	*<0.5*	0.062	*<0.0001*	0.0022	*<0.0005*	*<0.0001*	*<0.001*	*<0.03*	*<0.0001*	*<0.00005*	*<0.0005*	*<0.0001*	0.000036	*<0.01*
25th PCTL	8.9	0.6	0.21	0.00027	0.006	*<0.0005*	*<0.0001*	*<0.001*	*<0.03*	*<0.0001*	*<0.00005*	*<0.0005*	*<0.0001*	0.00043	*<0.01*
Median	9.1	1.2	0.45	0.00052	0.014	*<0.0005*	*<0.0001*	*<0.001*	0.14	0.00011	*<0.00005*	*<0.0005*	*<0.0001*	0.0011	*<0.01*
75th PCTL	9.1	4.3	0.68	0.0014	0.033	*<0.0005*	0.00016	0.0011	0.32	0.00046	*<0.00005*	*<0.0005*	*<0.0001*	0.0018	*<0.01*
Max	9.4	10	5.5	0.028	0.16	0.0046	0.0016	0.0066	5.0	0.0044	0.000076	0.00082	*<0.0001*	0.059	*<0.01*

Notes:
Values in grey italics are below the analytical detection limit; All guidelines are for total metals unless otherwise indicated.
Values that exceed the Metal Mines Effluent Regulations (MMER, 2002) maximum (MMM) water quality guideline are shaded in dark grey.
Values that exceed the Canadian Council of Ministers of the Environment (CCME, 2007) Water Quality Guidelines are shaded in light blue (30-day) and dark blue (maximum);
Guidelines for Cu, Ni and Pb are based on the default value for when hardness is not known (which corresponds to the 25th percentile hardness value of ~55 mg $CaCO_3$/L calculated using available SW data (n=754, Jun-27-2014 - Jan-26-2016);
Guideline for Cd are calculated using the 25th percentile hardness of ~55 mg $CaCO_3$/L; guideline for Cr is for hexavalent (VI);
Guidelines for sulphate, Co and Sb are derived from BC MOE water quality guidelines for protection of freshwater aquatic life for reference. Sulphate is hardness dependent and is based on a hardness of 55 mg $CaCO_3$/L.

Table 4-16:
Shake Flask Extraction Results for Schist Waste Rock by Weathering Facies

Schist	pH	Sulfate	Al	Sb	As	Cr	Co	Cu	Fe	Pb	Hg	Se	Tl	U	Zn
	pH	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
Oxide (*n* = 7)															
Min	8	1.8	0.048	0.0012	<0.001	<0.0005	<0.0001	<0.001	0.015	<0.0001	0.000025	<0.0005	<0.0001	0.000019	<0.01
25th PCTL	8.3	3.2	0.065	0.0025	0.0035	0.0005	<0.0001	<0.001	0.022	<0.0001	0.000038	<0.0005	<0.0001	0.000063	<0.01
Median	8.5	4.5	0.088	0.0041	0.007	0.00077	<0.0001	<0.001	<0.03	<0.0001	<0.00005	<0.0005	<0.0001	0.000079	<0.01
75th PCTL	8.6	280	0.13	0.0098	0.052	0.0033	<0.0001	<0.001	<0.03	<0.0001	0.00006	0.0008	0.00038	0.0048	<0.01
Max	8.8	920	0.22	0.012	0.16	0.0044	0.0001	0.001	<0.03	0.0001	0.0017	0.0022	0.00092	0.012	0.01
Upper Transition (*n* = 2)															
Min	8.3	8.4	0.092	0.00011	0.0005	0.00025	0.00005	0.0005	0.015	0.00005	<0.00005	0.00025	0.00005	0.00016	0.005
Max	8.8	29	0.14	0.0028	<0.001	0.00061	<0.0001	<0.001	<0.03	<0.0001	0.00014	<0.0005	<0.0001	0.00035	<0.01
Lower Transition (*n* = 8)															
Min	7.8	<0.5	0.055	0.00053	0.0005	0.00025	0.00005	0.0005	0.015	0.00005	0.000025	0.00025	0.00005	0.000046	0.005
25th PCTL	8.4	4.0	0.16	0.0011	0.0048	<0.0005	0.000088	0.00088	0.026	0.000088	0.000025	<0.0005	<0.0001	0.0003	0.0088
Median	8.7	9.9	0.26	0.0018	0.0098	0.0007	<0.0001	<0.001	<0.03	<0.0001	<0.00005	<0.0005	<0.0001	0.00056	<0.01
75th PCTL	9	12	0.57	0.0057	0.019	0.0014	0.00029	<0.001	0.61	0.00036	0.000062	<0.0005	<0.0001	0.00081	<0.01
Max	9.3	130	7.3	0.022	0.36	0.0046	0.00099	0.0037	4.6	0.0036	0.00062	0.0011	0.00015	0.0041	0.01
Fresh (*n* = 7)															
Min	8.6	0.52	0.072	0.00017	<0.001	<0.0005	<0.0001	<0.001	<0.03	<0.0001	<0.00005	<0.0005	<0.0001	0.000022	<0.01
25th PCTL	8.9	0.54	0.11	0.00023	0.0036	<0.0005	<0.0001	<0.001	<0.03	<0.0001	<0.00005	<0.0005	<0.0001	0.000042	<0.01
Median	9.3	0.93	0.14	0.00026	0.0049	<0.0005	<0.0001	<0.001	<0.03	<0.0001	<0.00005	<0.0005	<0.0001	0.000078	<0.01
75th PCTL	9.3	11	0.16	0.00036	0.0063	<0.0005	0.00012	<0.001	<0.03	<0.0001	<0.00005	<0.0005	<0.0001	0.00018	<0.01
Max	9.4	97	0.22	0.011	0.0078	0.00087	0.00014	<0.001	0.09	<0.0001	<0.00005	0.00073	<0.0001	0.008	<0.01

Notes:
Values in grey italics are below the analytical detection limit; All guidelines are for total metals unless otherwise indicated.
Values that exceed the Metal Mines Effluent Regulations (MMER, 2002) maximum (MMM) water quality guideline are shaded in dark grey.
Values that exceed the Canadian Council of Ministers of the Environment (CCME, 2007) Water Quality Guidelines are shaded in light blue (30-day) and dark blue (maximum);
Guidelines for Cu, Ni and Pb are based on the default value for when hardness is not known (which corresponds to the 25th percentile hardness value of ~55 mg $CaCO_3$/L calculated using available SW data (n=754, Jun-27-2014 - Jan-26-2016);
Guideline for Cd are calculated using the 25th percentile hardness of ~55 mg $CaCO_3$/L; guideline for Cr is for hexavalent (VI);
Guidelines for sulphate, Co and Sb are derived from BC MOE water quality guidelines for protection of freshwater aquatic life for reference. Sulphate is hardness dependent and is based on a hardness of 55 mg $CaCO_3$/L.

Table 4-17:
Shake Flask Extraction Results for Granite Waste Rock Weathering Facies

Granite	pH	Sulfate	Al	Sb	As	Cr	Co	Cu	Fe	Pb	Hg	Se	Tl	U	Zn
	pH	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
Oxide (*n* = 3)															
Min	6.6	*<0.5*	0.005	0.017	0.096	*<0.0005*	*<0.0001*	*<0.001*	0.034	*<0.0001*	0.00017	*<0.0005*	0.0001	0.000046	*<0.01*
Median	6.7	0.5	0.11	0.018	0.25	*<0.0005*	*<0.0001*	*<0.001*	0.29	0.00022	0.00024	*<0.0005*	0.0001	0.00015	*<0.01*
Max	6.8	1.7	5.2	0.029	3.5	0.0005	0.0024	0.0032	8.5	0.017	0.00029	*<0.0005*	0.0013	0.0083	*<0.01*
Upper Transition (*n* = 7)															
Min	6.5	*<0.5*	*<0.005*	0.00034	0.018	*<0.0005*	*<0.0001*	*<0.001*	*<0.03*	*<0.0001*	0.000025	*<0.0005*	0.0001	0.000035	*<0.01*
25th PCTL	7.1	0.92	3.7	0.0039	0.021	*<0.0005*	0.00018	*<0.001*	1.8	0.0043	*<0.00005*	*<0.0005*	0.00012	0.0038	*<0.01*
Median	7.5	4.0	4.9	0.0055	0.059	*<0.0005*	0.00082	*<0.001*	4.1	0.0074	0.00005	*<0.0005*	0.00015	0.0073	0.011
75th PCTL	8	4.9	7.3	0.011	0.61	0.00058	0.001	0.002	5.8	0.019	0.00012	*<0.0005*	0.0002	0.012	0.034
Max	8.8	16	14	0.035	1.5	0.00066	0.0017	0.0091	13	0.027	0.00055	0.0005	0.00023	0.022	0.066
Lower Transition (*n* = 6)															
Min	6.4	*<0.5*	4.3	0.00058	0.018	*<0.0005*	0.00099	*<0.001*	4.2	0.002	*<0.00005*	*<0.0005*	*<0.0001*	0.0051	0.022
25th PCTL	7.8	0.51	4.6	0.001	0.036	0.00052	0.0012	*<0.001*	5.6	0.0051	*<0.00005*	*<0.0005*	0.00016	0.0071	0.023
Median	8.6	0.62	5.1	0.0015	0.082	0.00059	0.0013	0.0014	6.6	0.0077	*<0.00005*	*<0.0005*	0.00018	0.012	0.024
75th PCTL	8.8	0.9	5.5	0.032	0.3	0.00069	0.002	0.0026	7.1	0.0094	0.000083	*<0.0005*	0.00022	0.016	0.028
Max	8.9	1.2	6.5	0.16	2.5	0.001	0.0045	0.0048	18	0.015	0.0001	*<0.0005*	0.00032	0.017	0.035
Fresh (*n* = 8)															
Min	6.6	*<0.5*	0.0074	0.00039	0.0031	0.00025	0.00005	0.0005	0.015	0.00005	0.000025	0.00025	0.00005	0.00012	0.005
25th PCTL	7.4	*<0.5*	0.4	0.0006	0.024	*<0.0005*	0.00017	0.001	0.23	0.00038	*<0.00005*	*<0.0005*	*<0.0001*	0.0025	*<0.01*
Median	8.2	1.2	3.4	0.0024	0.061	0.0005	0.00099	0.0012	3.2	0.0021	*<0.00005*	*<0.0005*	0.00012	0.0068	*<0.01*
75th PCTL	8.8	3.8	5.0	0.016	0.31	0.00074	0.0021	0.0034	5.6	0.008	*<0.00005*	*<0.0005*	0.00019	0.013	0.03
Max	9.2	27	7.5	0.064	1.3	0.00088	0.0071	0.0059	5.8	0.013	*<0.00005*	*<0.0005*	0.00022	0.017	0.038

Notes:
Values in grey italics are below the analytical detection limit; All guidelines are for total metals unless otherwise indicated.
Values that exceed the Metal Mines Effluent Regulations (MMER, 2002) MGS water quality guideline are shaded in dark grey.
Values that exceed the Canadian Council of Ministers of the Environment (CCME, 2007) Water Quality Guidelines are shaded in light blue (30-day) and dark blue (maximum);
Guidelines for Cu, Ni and Pb are based on the default value for when hardness is not known (which corresponds to the 25th percentile hardness value of ~55 mg $CaCO_3$/L calculated using available SW data (n=754, Jun-27-2014 - Jan-26-2016);
Guideline for Cd are calculated using the 25th percentile hardness of ~55 mg $CaCO_3$/L; guideline for Cr is for hexavalent (VI);
Guidelines for sulphate, Co and Sb are derived from BC MOE water quality guidelines for protection of freshwater aquatic life for reference. Sulphate is hardness dependent and is based on a hardness of 55 mg CaCO3/L.

4.1.5 Solid-Phase Elemental Abundance

Statistical summaries of solid phase element results are presented by weathering facies for by lithologic unit Table 4-18, Table 4-19 and Table 4-20 compared to average continental abundances (ACA; Price, 1997). The complete set of solid phase element results are presented in Appendix C.1-3. The results show that the waste rock samples are enriched in Sb, As, Bi, Hg, Se and U with respect to ACAs (shaded values in the tables). In order to compare relative metal enrichment between different lithologies, Table 4-21 presents the median values with a colour gradient superimposed to highlight relative concentrations. The data demonstrate that elemental enrichment is related to both lithology and weathering facies. In general, the highest Sb, As and Hg concentrations were measured in samples from the granite oxide facies (10 ppm, 2400 ppm, 0.46 ppm, respectively) as well as in samples from the oxide facies of the other lithologic units. The highest U content was measured in all weathering facies of the granite samples (median of 6.0 - 6.7 ppm). In contrast, the schist samples show the highest abundance of Se (median of 0.5 - 0.7 ppm) as well as other metals generally associated with sulphide mineralization (*i.e.,* Cr, Co, Cu, Zn) (Table 4-19). The enrichment of Sb, As, Hg and U in the waste rock are particularly relevant given that these elements also exceeded water quality guidelines in SFE (Section 4.1.3).

Also presented for comparison are Sb and As concentrations from the exploration ICP-OES database (Table 4-21). Data for other elements (*e.g.*, U) could not be compared due to the high detection limits applied in support of the exploration program analyses. Further, some elements (*e.g.,* Se) were not analyzed as part of the assays for the exploration program. Table 4-22 presents the statistical distribution of Sb and As for each lithology as a whole, with light and dark grey shading representing three and ten times higher than the ACA values. Note that for the larger assay database, the 95th and 5th percentile values are shown in place of the maximum and minimum values to provide a more representative upper and lower limit for the lithologic and weathering facies and avoid highlighting outliers. Also provided in Table 4-22 are the distributions of Sb and As by weathering facies for each lithologic unit, with a colour gradient superimposed to highlight the relative concentrations. The data from the larger sample population of the assay database indicate that the highest concentrations of Sb and As (95th percentiles of 74 and 4240 ppm) are associated with the fresh facies of the granite unit, followed by the oxide facies. This contrasts with the results of the ICP-MS database which shows the highest values for the granite oxide; however, considerably fewer samples are available for this unit. With the exception of these samples, the data in Table 4-22 demonstrate that the highest Sb and As concentrations are generally associated with the oxide facies for each lithology. The overall lowest Sb and As concentrations are indicated for the gneiss and schist waste rock samples, particularly for the lower transition and fresh facies (median Sb = <2 ppm and median As = 6-12 ppm). For complete statistics of the exploration ICP-OES see Appendix C.1-4.

Table 4-18:
Solid Phase Elements by Aqua Regia Digestion for Gneiss Waste Rock by Weathering Facies

ACA	*8.23*	*0.2*	*1.8*	*0.0085*	*102*	*25*	*60*	*5.6*	*14*	*0.085*	*0.05*	*2.7*	*70*
Gneiss	**Al**	**Sb**	**As**	**Bi**	**Cr**	**Co**	**Cu**	**Fe**	**Pb**	**Hg**	**Se**	**U**	**Zn**
	%	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**%**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**
Oxide (*n* = 34)													
Min	0.33	0.47	2.7	0.05	3.0	0.60	0.60	0.48	2.1	*<0.01*	0.2	1.2	5.0
25th PCTL	0.55	1.5	41	0.092	5.0	1.4	2.3	0.79	5.9	0.032	0.4	3.7	8.2
Median	0.68	3.1	98	0.13	6.5	1.8	3.4	1.0	7.6	0.085	0.45	7.0	12
75th PCTL	0.86	13	220	0.18	11	3.0	8.0	1.3	11	0.2	0.6	9.7	18
Max	1.9	52	2100	2.1	110	21	17	4.0	33	0.91	1.2	29	45
Upper Transition (*n* = 26)													
Min	0.36	0.11	3.7	0.02	3.0	0.4	1.6	0.32	4.0	0.01	0.2	2.2	2.0
25th PCTL	0.61	3.7	85	0.1	5.0	1.6	3.8	0.88	7.2	0.06	0.3	3.7	9.2
Median	0.7	6.4	240	0.16	7.0	2.4	5.0	1.0	10	0.16	0.4	6.2	14
75th PCTL	0.86	15	480	0.38	13	5.0	7.7	1.5	13	0.76	0.5	13	23
Max	3.1	83	2100	2.1	60	31	27	4.6	32	5.2	1.0	22	70
Lower Transition (*n* = 79)													
Min	0.27	*<0.05*	2.6	0.03	2	0.6	0.8	0.43	1.2	*<0.01*	*<0.2*	0.29	2.0
25th PCTL	0.57	0.44	11	0.08	5	1.6	2.3	0.83	4.2	*<0.01*	0.4	2.5	9.0
Median	0.81	1.4	20	0.14	7	2.4	3.5	1.2	6.2	0.01	0.4	3.6	16
75th PCTL	1.3	3.2	56	0.25	22	7.8	6.8	2	8	0.06	0.5	5.9	26
Max	4.2	28	330	1.0	160	22	26	7.3	88	1.7	1	19	72
Fresh (*n* = 49)													
Min	0.22	*<0.05*	2.0	0.02	5.0	0.6	0.9	0.44	1.5	0.01	0.3	0.27	4.0
25th PCTL	0.52	0.22	4.7	0.09	6.0	1.5	2.8	0.99	3.3	0.01	0.4	1.9	11
Median	1.1	0.5	6.3	0.18	11	5.0	4.8	1.7	5.2	0.01	0.5	2.7	20
75th PCTL	1.6	1.1	18	0.51	55	13	9.3	2.5	7.6	0.01	0.6	3.5	32
Max	2.3	14	240	8.4	370	20	29	3.7	43	0.07	1.3	20	64

Notes:
Values in grey italics are below the analytical detection limit.
Average Continental Abundance (ACA) according to Price (1997).
Values shaded in light grey are 3x's the ACA, values shaded in dark grey are 10x's the ACA.

Table 4-19:
Solid Phase Elements by Aqua Regia Digestion for Schist Waste Rock by Weathering Facies

ACA	*8.23*	*0.2*	*1.8*	*0.0085*	*102*	*25*	*60*	*5.6*	*14*	*0.085*	*0.05*	*2.7*	*70*
Schist	**Al**	**Sb**	**As**	**Bi**	**Cr**	**Co**	**Cu**	**Fe**	**Pb**	**Hg**	**Se**	**U**	**Zn**
	%	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**%**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**
Oxide (*n* = 15)													
Min	0.5	3.0	25	0.09	4.0	1.1	1.0	0.68	2.4	0.08	0.3	0.63	5.0
25th PCTL	0.76	5.1	160	0.17	12	6.5	6.3	1.9	7.2	0.25	0.4	1.6	28
Median	0.9	9.1	190	0.26	30	9.6	14	2.7	9.7	0.33	0.7	2.1	44
75th PCTL	1.1	11	390	0.36	38	13	21	3.0	11	0.42	0.9	3.3	60
Max	1.4	44	1400	1.6	46	19	57	4.3	19	0.75	1.4	9.6	67
Upper Transition (*n* = 14)													
Min	0.81	0.95	6.4	0.09	8.0	5.0	5.2	1.8	4.7	0.01	0.4	1.0	16
25th PCTL	0.98	3.4	23	0.2	26	9.1	11	2.4	6.9	0.022	0.62	1.5	37
Median	1.2	4.1	47	0.28	32	11	17	2.6	8.4	0.12	0.7	2.1	48
75th PCTL	1.5	8.4	160	0.48	39	13	28	3.5	11	0.19	0.98	2.6	68
Max	2.4	66	310	3.9	130	29	110	4.7	37	0.32	1.1	4.3	140
Lower Transition (*n* = 19)													
Min	0.39	0.06	3.5	0.09	6.0	2.3	3.2	0.91	1.6	0.01	0.2	0.81	7.0
25th PCTL	1.6	0.74	9.6	0.27	38	12	6.6	2.5	6.4	0.01	0.4	1.3	47
Median	1.9	1.7	20	0.43	60	14	14	3.2	8.8	0.01	0.6	1.6	53
75th PCTL	2.3	3.0	31	0.68	78	17	25	3.4	12	0.025	0.8	1.9	63
Max	2.7	19	48	2.4	150	22	42	4.4	49	0.32	1.3	3.7	99
Fresh (*n* = 31)													
Min	0.81	0.11	1.4	0.04	10	4.2	4.1	1.4	2.2	0.01	*<0.2*	0.34	12
25th PCTL	1.6	0.3	10	0.14	41	13	8.4	2.6	4.2	0.01	0.25	0.7	39
Median	2.0	0.81	20	0.21	67	15	14	3.2	6.3	0.01	0.5	1.4	46
75th PCTL	2.2	1.7	30	0.34	130	19	22	3.4	8.6	0.01	0.8	2.2	58
Max	3.0	10	130	18	230	28	48	4.6	30	0.06	1.1	6.2	130

Notes:
Values in grey italics are below the analytical detection limit.
Average Continental Abundance (ACA) according to Price (1997).
Values shaded in light grey are 3x's the ACA, values shaded in dark grey are 10x's the ACA.

Table 4-20:
Solid Phase Elements by Aqua Regia Digestion for Granite Waste Rock by Weathering Facies

ACA	*8.23*	*0.2*	*1.8*	*0.0085*	*102*	*25*	*60*	*5.6*	*14*	*0.085*	*0.05*	*2.7*	*70*
Granite	**Al**	**Sb**	**As**	**Bi**	**Cr**	**Co**	**Cu**	**Fe**	**Pb**	**Hg**	**Se**	**U**	**Zn**
	%	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**%**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**
Oxide (*n* = 6)													
Min	0.43	0.82	81	0.06	2.0	0.7	1.7	1.0	7.7	0.01	*<0.2*	5.3	5.0
25th PCTL	0.49	7.8	1700	0.07	2.2	1.2	1.9	1.6	18	0.2	0.2	5.6	8.5
Median	0.57	10	2400	0.07	3.0	2.0	2.4	1.6	21	0.46	0.25	6.0	24
75th PCTL	0.69	29	2800	0.092	3.8	2.6	2.9	1.9	22	0.81	0.38	7.6	30
Max	0.73	38	3000	0.77	5.0	10	14	2.0	26	0.84	0.4	22	36
Upper Transition (*n* = 17)													
Min	0.33	0.11	2.7	0.07	2.0	0.1	1.1	0.36	6.8	*<0.01*	*<0.2*	4.6	5.0
25th PCTL	0.48	0.83	110	0.1	4.0	0.6	1.5	0.7	9.9	0.03	0.3	5.7	13
Median	0.61	1.2	200	0.12	4.0	0.9	2.3	0.93	13	0.13	0.4	6.7	19
75th PCTL	0.73	2.0	360	0.13	5.0	1.1	4.7	1.2	20	0.21	0.5	9.2	23
Max	1.1	28	3000	0.27	8.0	1.6	9.2	1.4	39	0.79	0.8	46	37
Lower Transition (*n* = 14)													
Min	0.41	0.08	2.1	0.06	2.0	0.5	1.2	0.48	5.4	*<0.01*	0.2	4.4	4.0
25th PCTL	0.49	0.31	13	0.06	3.0	1.3	1.6	0.97	5.6	0.01	0.3	5.1	24
Median	0.57	1.0	33	0.075	5.0	1.5	1.8	1.2	8.2	0.02	0.4	6.0	31
75th PCTL	0.87	3.5	410	0.088	7.0	2.4	2.4	1.6	12	0.22	0.4	8.9	36
Max	0.95	85	2300	1.0	12	5.0	13	2.8	25	1.7	0.5	26	88
Fresh (*n* = 20)													
Min	0.4	0.06	3.3	0.05	3.0	1.1	0.8	0.88	4.9	*<0.01*	0.2	4.4	19
25th PCTL	0.44	0.2	5.8	0.068	5.0	1.4	1.5	1.1	5.7	*<0.01*	0.38	6.3	26
Median	0.46	0.48	20	0.1	6.0	1.5	3.0	1.2	6.4	0.01	0.4	6.7	29
75th PCTL	0.53	2.0	80	0.32	7.0	2.0	3.9	1.4	8.6	0.022	0.5	7.4	37
Max	1.0	16	1400	1.3	10	3.4	7.2	1.7	15	0.22	0.7	29	72

Notes:
Values in grey italics are below the analytical detection limit.
Average Continental Abundance (ACA) according to Price (1997).
Values shaded in light grey are 3x's the ACA, values shaded in dark grey are 10x's the ACA.

Table 4-21:
Comparison of Median Solid Phase Values for Enriched Elements in Waste Rock by Weathering Facies and Lithologies

Lithologic Unit	Al	Sb	As	Bi	Cr	Co	Cu	Fe	Pb	Hg	Se	U	Zn
	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
Gneiss *(Medians)*													
Oxide (n = 34)	0.68	3.1	98	0.13	6.5	1.8	3.4	1.0	7.6	0.085	0.45	7.0	12
Upper Transition (n = 26)	0.7	6.4	240	0.16	7.0	2.4	5.0	1.0	10	0.16	0.4	6.2	14
Lower Transition (n = 79)	0.81	1.4	20	0.14	7.0	2.4	3.5	1.2	6.2	0.01	0.4	3.6	16
Fresh (n = 49)	1.1	0.5	6.3	0.18	11	5.0	4.8	1.7	5.2	0.01	0.5	2.7	20
Schist *(Medians)*													
Oxide (n = 15)	0.9	9.1	190	0.26	30	9.6	14	2.7	9.7	0.33	0.7	2.1	44
Upper Transition (n = 14)	1.2	4.1	47	0.28	32	11	17	2.6	8.4	0.12	0.7	2.1	48
Lower Transition (n = 19)	1.9	1.7	20	0.43	60	14	14	3.2	8.8	0.01	0.6	1.6	53
Fresh (n = 31)	2.0	0.81	20	0.21	67	15	14	3.2	6.3	0.01	0.5	1.4	46
Granite *(Medians)*													
Oxide (n = 6)	0.57	10	2400	0.07	3.0	2.0	2.4	1.6	21	0.46	0.25	6.0	24
Upper Transition (n = 17)	0.61	1.2	200	0.12	4.0	0.9	2.3	0.93	13	0.13	0.4	6.7	19
Lower Transition (n = 14)	0.57	1.0	33	0.075	5.0	1.5	1.8	1.2	8.2	0.02	0.4	6.0	31
Fresh (n = 20)	0.46	0.48	20	0.1	6.0	1.5	3.0	1.2	6.4	0.01	0.4	6.7	29
Other *(Median)*													
All (n = 24)	1.4	3.1	81	0.16	16	14	8.8	3.2	8.7	0.07	0.5	3.0	51

Notes:
Green gradient shading represents relative concentrations of elements for all weathering facies and lithologic units.

Table 4-22:
Solid Phase As and Sb Concentrations in Waste Rock from the Exploration Database

Lithology	**Gneiss**		**Schist**		**Granite**		**Other Lithologies**	
Parameter	**Sb**	**As**	**Sb**	**As**	**Sb**	**As**	**Sb**	**As**
Units	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**
Total for Lithologic Unit								
n	*14296*	*14296*	*8715*	*8715*	*975*	*975*	*2895*	*2895*
5th PCTL	*<2*	2	*<2*	2	*<2*	3	*<2*	4
25th PCTL	*<2*	7	*<2*	8	*<2*	23	*<2*	21
Median	2	26	2	24	2	118	4	85
75th PCTL	5	118	6	89	6	582	12	412
95th PCTL	26	578	25	737	36.3	2540	56	1540
Oxide facies								
n	*3218*	*3218*	*2355*	*2355*	*578*	*578*	*1411*	*1411*
5th PCTL	*<2*	15	*<2*	8	*<2*	10	*<2*	15
25th PCTL	3	66	3	36.5	*<2*	59.5	4	70
Median	7	179	7	116	3	288	8	284
75th PCTL	16	349	14	368	8	859	20	680
95th PCTL	52	1060	61	1360	36	2710	76	2000
Upper Transition Facies								
n	*4367*	*4367*	*2175*	*2175*	*140*	*140*	*585*	*585*
5th PCTL	*<2*	3	*<2*	4	*<2*	2	*<2*	5
25th PCTL	*<2*	13	*<2*	13	*<2*	10	2	23
Median	2	38	3	32	*<2*	27	4	65
75th PCTL	6	124	7	100	2	95	9	248
95th PCTL	25	583	18	633	13	1460	45	1760
Lower Transition Facies								
n	*5647*	*5647*	*3330*	*3330*	*235*	*235*	*710*	*710*
5th PCTL	*<2*	*<2*	*<2*	2	*<2*	2	*<2*	2
25th PCTL	*<2*	4	*<2*	5	*<2*	6	*<2*	8
Median	*<2*	10	*<2*	12	*<2*	32	*<2*	18
75th PCTL	2	29	2	28	3	108	4	56
95th PCTL	8	174	8	133	24	1620	25	460
Fresh Facies								
n	*1073*	*1073*	*861*	*861*	*24*	*24*	*241*	*241*
5th PCTL	*<2*	*<2*	*<2*	*<2*	*<1.4*	37.9	*<2*	*<2*
25th PCTL	*<2*	3	*<2*	5	6	685	*<2*	6
Median	*<2*	6	*<2*	10	33	1650	*<2*	23
75th PCTL	2	14	2	18	39.5	3160	5	457
95th PCTL	8	74.8	5	74	74	4240	19	4730

Notes:
Values in grey italics are below the analytical detection limit.
Values shaded in light grey are 3x's the Average Continental Abundance (ACA) for Sb (2 ppm) and As (1.8 ppm), according to Price (1997), values shaded in dark grey are 10x's the ACA values.
Red and green gradient shading represent relative concentrations of Sb and As, for all weathering facies and lithologic units.

4.1.6 Kinetic Test Samples

4.1.6.1 Sample Selection Criteria and Rationale

A total of six unsaturated columns, eight humidity cells and eight field bins have been initiated for the different weathering facies (oxide, transition and fresh) of the dominant waste rock lithologies (gneiss, schist and granite) to assess the ML/ARD potential of stockpiled waste rock. A summary of the waste rock kinetic test material, sample selection criteria and rationale for the testwork are presented in Table 4-23. With the exception of HC7 and HC8, which were initiated to evaluate the potential extreme-case of As-leaching from gneiss and schist waste rock, waste rock used for laboratory kinetic testwork (columns and humidity cells) are representative split samples from the waste rock field bins (*i.e.,* duplicates in Table 4-23).

The compositions of kinetic test samples are compared to the range of metal and sulphur concentrations observed in the greater static test database in Figure 4-8 and Figure 4-9. These figures are box plots showing the distribution of total-S and solid phase element concentrations (As, Sb and U) for the larger sample populations (exploration and ABA databases) by waste rock lithology and weathering facies (as presented in Section 4.1.4), with the results for the kinetic test sub-samples superimposed. Total-S concentrations for the kinetic test sub-samples indicate that the kinetic tests represent moderate to high total-S with respect to the larger sample population (i.e*.,* exploration database); therefore, leachate data compiled from the kinetic tests represent 'best-estimate' to 'worst-case' drainage quality with respect to potential acid generation from subaerially stockpiled gneiss, schist and granite waste rock for the Project (Figure 4-8 and Table 4-23).

Solid phase concentrations of As, Sb and U for the kinetic test sub-samples are generally in the moderate to very high concentration ranges with respect to the larger sample populations (*i.e.,* exploration database for As and Sb and ABA database for U); therefore, leachate data compiled from kinetic testwork represent 'best-estimate' to 'worst-case' drainage quality with respect to potential metals of concern. Only the granite fresh facies kinetic test sub-sample comprises low concentrations of As and Sb with respect to the exploration database distribution; therefore, As and Sb may be under-represented in leachate collected from the granite fresh kinetic tests.

Table 4-23:
Waste Rock Kinetic Test Summary

Lithology	Weathering Facies	Test ID	Kinetic Test	Sample Description	Dry Wt. of Sample (kg)	Test Duration (weeks)	Recirculation Cycles
Gneiss	Oxide	Col 5	Unsaturated Column	Moderate T-S (60th PCTL) and As, Sb, U.	10.0	86	45-77
		FB-GO	Field Bin (Dup of Col 5)		183	70	-
	Transition	Col 6	Unsaturated Column	High T-S (85th PCTL) and As, Sb, U (>75th PCTL).	10.0	84	43-75
		HC3	Humidity Cell (Dup of Col 6)		1.0	87	46-73
		FB-GT	Field Bin (Dup of Col 6 and HC 3)		229	70	-
	Fresh	HC4	Humidity Cell	Very high T- S, As, U (95th PCTL), low Sb.	1.0	87	46-73
		FB-GS	Field Bin (Dup of HC 4)		190	70	-
		HC8	Humidity Cell	Very high T-S and U (95th PCTL) and As (> 95th PCTL).	1.0	28	-
Schist	Oxide	Col 3	Unsaturated Column	Moderate T-S and U (65th PCTL), high As and Sb (>75th PCTL).	10.0	86	45-77
		FB-SO	Field Bin (Dup of Col 3)		171	70	-
	Transition	Col 4	Unsaturated Column	High T-S (70th PCTL), As and U (80th PCTL), low Sb.	10.0	86	45-77
		HC1	Humidity Cell (Dup of Col 4)		1.0	87	46-73
		FB-ST	Field Bin (Dup of Col 4 and HC 1)		165	70	-
	Fresh	HC2	Humidity Cell	Very high T-S (~90th PCTL), high As, Sb, U (~80th PCTL)	1.0	87	46-73
		FB-SS	Field Bin (Dup of HC 2)		202	70	-
		HC7	Humidity Cell	Very high T-S, As, Sb (>95th PCTL), U (90th PCTL)	1.0	28	-
Granite	Transition	Col 13	Unsaturated Column	Very high T-S (>95th PCTL), high As (85th PCTL), very low Sb (<5th PCTL), moderate U (60th PCTL)	10.0	41	-
		HC5	Humidity Cell (Dup of Col 13)		1.0	42	-
		FB-GGT	Field Bin (Dup of Col 13 and HC 5)		166	18	-
	Fresh	Col 14	Unsaturated Column	High T-S (70th PCTL), low to very low As, Sb and U (<25th PCTL)	10.0	41	-
		HC6	Humidity Cell (Dup of Col 14)		1.0	42	-
		FB-GGS	Field Bin (Dup of Col 14 and HC 6)		134	18	-

Notes: All columns and humidity cells are constructed of Plexiglas with acrylic perforated disk & nylon mesh; All tests operated at temperature of 4°C; Leachate is sampled bi-weekly from all columns and weekly from all humidity cells; All columns are operated as trickle leach and all humidity cells operated as flood leach according to the MEND method (discussed in more detail in Section 3.2.6) Test duration refers to data available prior to cutoff date of March, 2016.

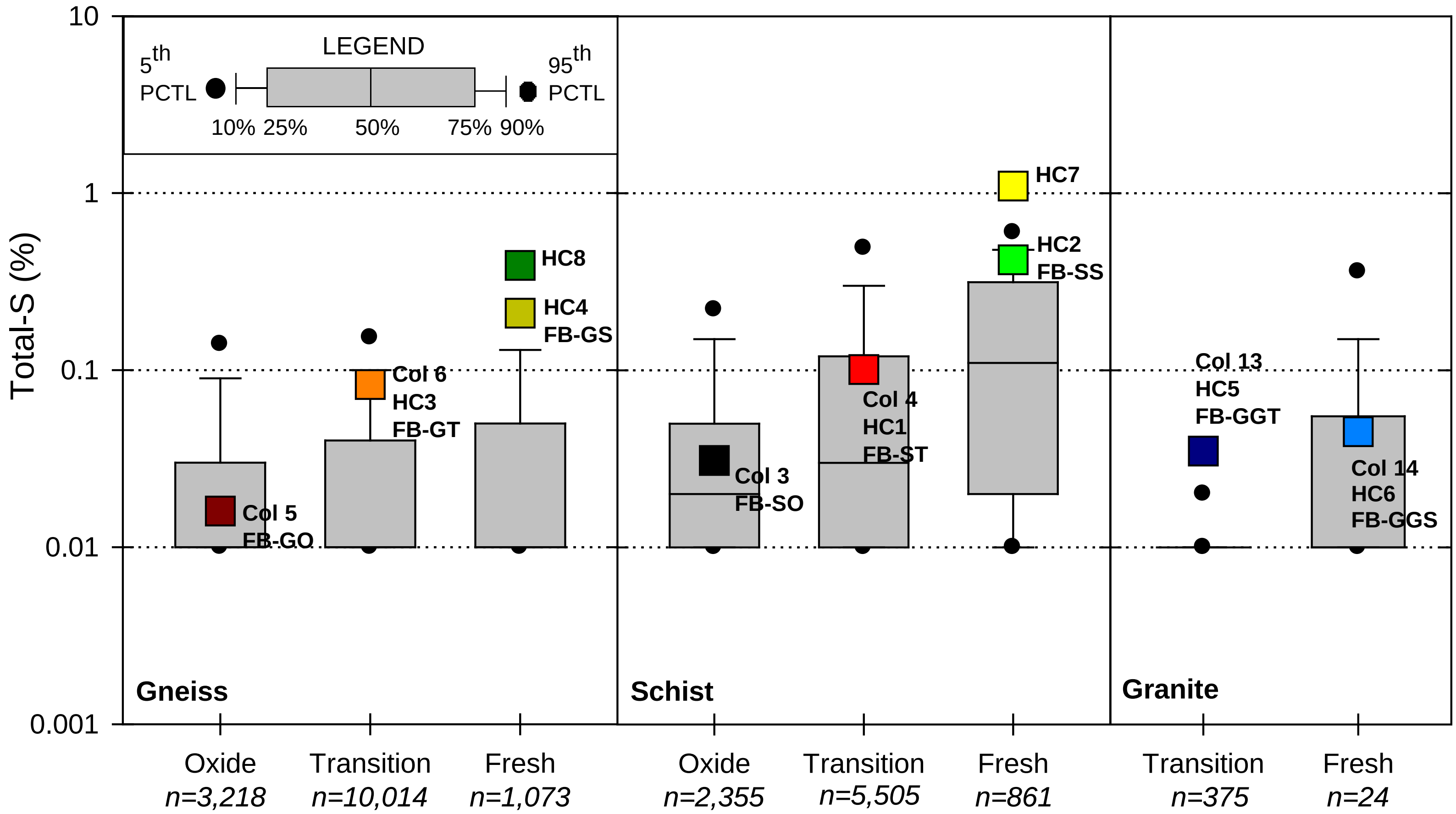

Figure 4-8: Box plots showing the ranges of total-S for the exploration database with total-S for the kinetic test sub-samples superimposed.

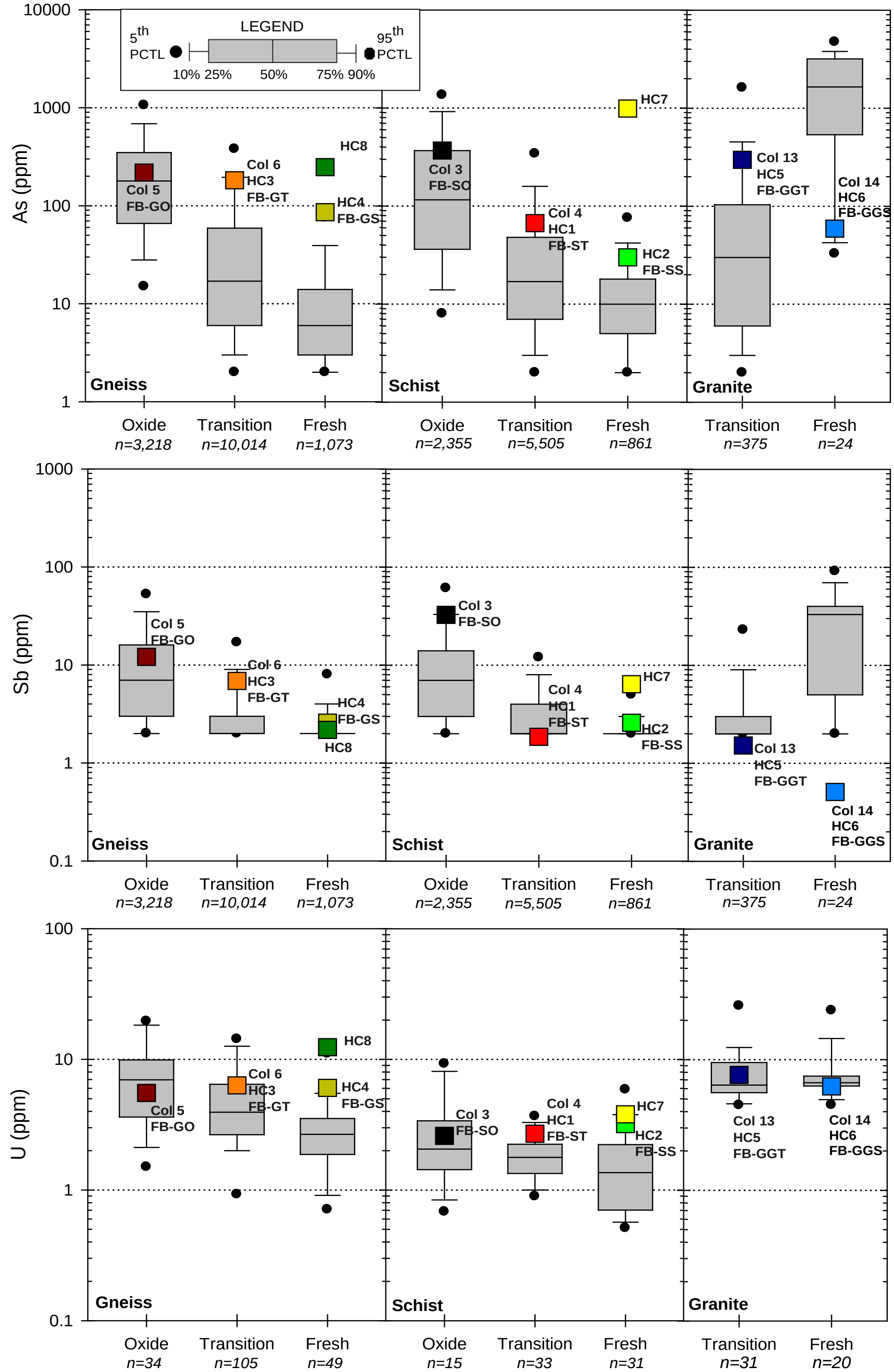

Figure 4-9: Box plots showing the ranges of As and Sb for the exploration database and U for the ABA database with concentrations for the kinetic test sub-samples superimposed

4.1.6.2 Static Tests

Mineralogy

A sub-sample from each of the waste rock kinetic tests was submitted for quantitative phase analysis using the Rietveld Method XRD. The minerals identified by XRD in the waste rock kinetic test sub-samples are provided in Table 4-24. The major rock forming minerals identified in each sample are quartz and feldspars, with lesser amounts of muscovite, biotite, chlorite and other silicates. Each sample also comprises measurable concentrations of kaolinite (1.4 – 15 wt.%), demonstrating the weathered state of the waste rock. Pyrite was only identified in the two sub-samples comprising high total-S (> 95th percentile, Figure 4-8), the gneiss fresh facies HC8 (0.5 wt.%) and schist fresh facies HC7 (1.3 wt.%).

Four carbonate minerals were identified in the schist and gneiss kinetic test sub-samples (Table 4-24). The highest proportion of carbonate minerals were identified in the schist sub-samples, with 8.2 wt.% measured in the oxide facies and approximately 20 wt.% measured in both fresh facies. The dominant carbonate mineral in the schist sub-samples is calcite, with concentrations ranging from 3.9 wt.% in the oxide facies up to 14.6 wt.% in the transition facies. High concentrations of ankerite (an Fe and Mn-bearing and therefore less effective neutralizing carbonate) were also identified in each schist sub-sample, with up to 9 wt.% identified in one of the fresh facies (HC2). Siderite (another Fe-bearing carbonate) was identified in appreciable amounts (4.5 wt.%) in the schist fresh facies sub-sample HC7. The distribution of carbonates in the schist kinetic test sub-samples is consistent with the wide range of carbonate concentrations (0.09 up to 29 wt.%) identified for the static test samples (Section 4.1.3).

The gneiss sub-samples comprise considerably less carbonates than the schist, with 3.0 wt.% measured in the oxide facies and up to 6.8 wt.% measured in one of the fresh facies (HC4). The dominant carbonate in the gneiss sub-samples is ankerite (1.3 – 4.5 wt.%), with lesser amounts of calcite (1 – 2.3 wt.%). Ankerite was also identified in appreciable amounts (up to 8.1 wt.%) in the transition static test samples (Section 4.1.1).

No carbonate minerals were detected in sub-samples from the granite kinetic tests, which is consistent with very low concentrations of carbonate minerals (<0.9 wt.%) identified in only a few of static test samples (Section 4.1.1).

Table 4-24:
X-Ray Diffraction Results for Waste Rock Kinetic Test Sub-Samples

	Lithology	**Gneiss**				**Schist**				**Granite**	
	Weathering Facies	**Oxide**	**Transition**	**Fresh**		**Oxide**	**Transition**	**Fresh**		**Transition**	**Fresh**
Kinetic Test IDs	**Column**	**Col 5**	**Col 6**	**-**	**-**	**Col 3**	**Col 4**	**-**	**-**	**Col 13**	**-**
	Humidity Cell	**-**	**HC3**	**HC4**	**HC8**	**-**	**HC1**	**HC2**	**HC7**	**HC5**	**HC6**
	Field Bin	**FB-GO**	**FB-GT**	**FB-GS**	**-**	**FB-SO**	**FB-ST**	**FB-SS**	**-**	**FB-GGT**	**FB-GGS**
Mineral	**Formula**	**wt. %**									
Quartz	SiO_2	47	46	39	49	55	31	33	49	35	29
Microcline	$KAlSi_3O_8$	19	16.3	12	23	0.7	7.8	11	1.6	27	29
Albite	$NaAlSi_3O_8$	7.5	9.7	17		1.2	20	8.7		18	22
Anorthite	$CaAl_2Si_2O_8$									6.7	9.8
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$	7.9	5.3	9.6	14	14	6.2	11	14	5.7	4.6
Biotite	$K(Mg,Fe)_3(AlSi_3O_{10})(OH)_2$	1.0	1.2	3.0		1.3	7.0	4.4		0.7	1.4
Chlorite	$(Fe,(Mg,Mn)_5,Al)(Si_3Al)O_{10}(OH)_8$	4.1	3.6	2.8		5.3	3.5	5			
Kaolinite	$Al_2Si_2O_5(OH)_4$	8.7	12	6.7	9.6	13	1.4	5.6	15	7.0	4.4
Actinolite	$Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$	0.3	0	0.4		0.4	2.3	0.3			
Diopside	$CaMgSi_2O_6$	1.7	1.3	2.1		0.6	3.9	1.8			
Calcite	$CaCO_3$	1.7	1.0	2.3		3.9	15	11			
Dolomite	$CaMg(CO_3)_2$				4.1				9.3		
Ankerite	$CaFe(CO_3)_2$	1.3	4.4	4.5		4.3	1.8	9.0	5.5		
Siderite	$FeCO_3$								4.5		
Pyrite	FeS_2				0.5				1.3		

Acid Base Accounting and Solid Phase Elements

Acid-base accounting and solid phase element result for the waste rock kinetic test sub-samples are presented in Table 4-25. All sub-samples have neutral to slightly alkaline rinse pH. The lowest pH (7.1) was measured in the granite transition sub-sample and reflects the low, but measurable, total-S (0.035 wt.%) and a lack of CaNP (0.8 kg $CaCO_3$/t), consistent with XRD results (Table 4-24).

For the gneiss and schist kinetic test sub-samples, concentrations of total-S and CaNP increase with decreasing degree of weathering within a lithology. The lowest total-S concentrations are indicated for the gneiss and schist oxide facies sub-samples (0.016 and 0.031 wt.%, respectively) and the highest total-S concentrations are indicated for the gneiss fresh facies (0.21 and 0.39 wt.%) and schist fresh facies (0.42 and 1.1 wt.%). The schist fresh facies sub-samples also comprise the highest CaNP values (174 kg$CaCO_3$/t and 151 kg $CaCO_3$/t). Of note, CaNP for the schist oxide facies (78 kg $CaCO_3$/t) is higher than the highest CaNP for the gneiss fresh facies (55 kg $CaCO_3$/t) (Table 4-2). The lowest CaNP values are indicated for the two granite kinetic test sub-samples (< 9.2 kg $CaCO_3$/t).

Sub-samples HC8 (gneiss) and HC7 (schist), which were selected for kinetic testwork to evaluate the potential for an ‘extreme-case’ of As leaching, comprise the highest total-S concentrations (0.39 and 1.1 wt.%, respectively) and As concentrations (248 and 989 ppm, Table 4-25). The highest metal concentrations were measured in the schist kinetic test sub-samples, with the overall highest values measured in the high total-S and As schist fresh facies sub-sample, HC7.

Table 4-25:
Acid-Base Accounting for Waste Rock Kinetic Test Sub-Samples

	Lithology	**Gneiss**				**Schist**				**Granite**	
	Weathering Facies	**Oxide**	**Transition**	**Fresh**		**Oxide**	**Transition**	**Fresh**		**Transition**	**Fresh**
Kinetic Test IDs	**Column**	**Col 5**	**Col 6**	**-**	**-**	**Col 3**	**Col 4**	**-**	**-**	**Col 13**	**Col 14**
	Humidity Cell	**-**	**HC3**	**HC4**	**HC8**	**-**	**HC1**	**HC2**	**HC7**	**HC5**	**HC6**
	Field Bin	**FB-GO**	**FB-GT**	**FB-GS**	**-**	**FB-SO**	**FB-ST**	**FB-SS**	**-**	**FB-GGT**	**FB-GGS**
Acid Base Accounting Parameters											
Rinse pH	s.u.	8.5	8.0	8.2	8.6	8.4	8.4	8.5	8.2	7.1	8.6
Total-S	wt.%	0.016	0.083	0.21	0.39	0.031	0.10	0.42	1.1	0.035	0.045
Sulphate-S	wt.%	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	0.01	*<0.01*	0.02	*<0.01*	*<0.01*
Sulphide-S	wt.%	0.01	0.07	0.18	0.38	0.01	0.05	0.35	1.1	*<0.01*	0.03
CaNP	kg $CaCO_3$/t	19	40	55	20	78	132	174	151	0.8	9.2
Sobek NP	kg $CaCO_3$/t	23	33	52	20	75	173	181	127	2.8	5.7
Siderite NP	kg $CaCO_3$/t	27	41	57	-	76	193	200	-	7.6	9.9
Solid Phase Elements by Aqua Regia											
Ag	ppm	0.17	0.03	0.03	0.06	0.17	0.05	0.11	0.05	0.04	0.03
Al	%	0.58	0.47	0.92	0.34	0.49	1.5	1.4	0.57	0.4	0.38
As	ppm	218	182	86	248	369	67	30	989	298	59
Cd	ppm	0.07	0.05	0.03	0.07	0.14	0.07	0.1	0.13	0.05	0.05
Co	ppm	6.2	4.1	8	1	13	15	14	17	1.6	1.6
Cr	ppm	142	122	112	100	125	190	145	111	132	125
Cu	ppm	9.8	5.9	6.7	2	24	16	18	27	7.6	5.6
Fe	%	1.5	1.2	1.8	0.6	2.9	2.6	2.9	3.7	0.87	1.1
Hg	ppm	0.15	0.24	0.07	0.11	0.44	0.03	0.12	0.51	0.14	0.08
Mn	ppm	339	280	373	102	530	589	660	733	384	678
Mo	ppm	5.0	4.9	4.5	5.4	3.8	5.5	3.3	3.6	6.7	6.2
Ni	ppm	9.7	5.7	13	5.7	27	50	54	43	6.4	5.8
Pb	ppm	11	7.4	6	6	17	9.3	15	43	16	8
Sb	ppm	12	6.9	2.6	2.2	32.6	1.9	2.6	6.4	1.5	0.51
Se	ppm	*<1*	*<1*	*<1*	2	*<1*	*<1*	*<1*	3	*<1*	*<1*
U	ppm	5.5	6.3	6.1	12.4	2.6	2.7	3.2	3.8	7.6	6.2
Zn	ppm	21	16	19	4	41	43	58	91	29	32

Notes: Values in grey italics are below the analytical detection limit; n = number of analyses included in statistical distribution; * adjusted T-C NP; calculated as Total C wt.% * 77.6 (see Section 4.1.2.3.1 for discussion); NNP = net neutralization potential, derived by subtracting AP from NP.

Particle Size Distribution

The rate of dissolution increases as particle surface area increases; therefore, it is important to know the relative volume of fine particles when discussing the bulk samples as a whole (Jambor, 2002). Table 4-26 presents the distribution of grain sizes determined from sub-samples collected from the kinetic tests. These data indicate that the gneiss and schist waste rock kinetic tests are predominantly composed of particles measuring >0.425 mm (>70%), with the greatest proportion composed of particles measuring >0.425 and <6.3 mm. The HC8 and HC7 sub-samples, however, are dominantly composed of particles measuring >6.3 mm in diameter. The granite samples have a finer particle size range, with ~80% of each sub-sample composed of particles measuring <1.7 mm in diameter.

Table 4-26:
Particle Size Distribution for Waste Rock Kinetic Test Sub-Samples

Lithology		Gneiss				Schist				Granite	
Weathering Facies		Oxide	Transition	Fresh		Oxide	Transition	Fresh		Transition	Fresh
Kinetic Test IDs		Col 5	Col 6	-	-	Col 3	Col 4	-	-	Col 13	-
		-	HC3	HC4	HC8	-	HC1	HC2	HC7	HC5	HC6
		FB-GO	FB-GT	FB-GS	-	FB-SO	FB-ST	FB-SS	-	FB-GGT	FB-GGS
Sieve Designation	Aperture (mm)	Weight Retained (%)									
+ 3/8"	9.5	0.6	2.4	1.5	15	1.5	2.2	1.1	13	*ND*	*ND*
-3/8" + 1/4"	6.3	5.1	17	10	47	12	13	12	40	0.08	0
-1/4" + 5	4.0	17	26	22	17	23	19	20	17	1.9	2.4
5	1.7	19	18	21	11	20	15	17	14	18	20
25	0.425	27	18	22	7.7	23	24	23	12	35	35
65	0.15	13	7.3	9.0	1.6	9.0	11	11	3.1	18	17
170	0.053	9.5	5.6	7.5	1.0	5.9	8.5	7.6	1.3	13	12
-270	-0.053	8.9	5.7	7.0	0.10	5.8	7.4	7.6	1.1	15	13
Total		*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*

4.1.6.3 Laboratory Kinetic Test Results

Results of the waste rock laboratory kinetic test program, including unsaturated columns and humidity cell tests, for gneiss, schist and granite weathering facies are presented and discussed in this section. A summary of the final and median loading rates from each kinetic test is presented in Table 4-27 (gneiss), Table 4-28 (schist) and Table 4-29 (granite). Note that the program for the granite waste rock was initiated after the gneiss and schist programs; therefore, there are fewer weeks of data for the granite tests (Table 4-23). Time series plots for weekly loading rates are presented in Figure 4-10 through Figure 4-14. The complete set of leachate concentrations, calculated loading rates and time series plots for unsaturated columns and humidity cell waste rock kinetic tests are provided in Appendix D.1.

Leachate pH and Sulphate Loading

Leachate pH for the gneiss, schist and granite waste rock laboratory kinetic tests are neutral to slightly alkaline, with weekly pH values for gneiss and schist kinetic tests generally ranging between 7.5 and 8.3 over the test period (Figure 4-10) and increasing over the recirculation experiment (between the dashed lines, Figure 4-10). Leachate pH values for the granite waste rock, particularly the fresh facies (Col 13 and HC6), are slightly lower, ranging from 6.7 to 8.2, and shows a slight decrease over the test period.

Weekly alkalinity loadings from the waste rock columns and humidity cells show a slight decrease over the test period. Alkalinity loading rates decrease from ~6 to ~2 mg $CaCO_3$/kg/wk from the columns and from ~25 to ~15 mg $CaCO_3$/kg/wk from the humidity cells, with a greater decrease observed during the recirculation experiment and from the high S fresh facies tests (HC8 and HC7). In general, alkalinity production rates are higher (by nearly an order of magnitude) from the transition and fresh facies humidity cell tests (particularly from the schist) compared to the columns. The slightly lower pH for the granite transition and fresh facies is consistent with a more prominent decrease in alkalinity production from the granite waste rock, particularly the fresh facies column (decreasing to <0.4 mg $CaCO_3$/kg/wk, Figure 4-11).

After the initial flush of the test material loading rates for sulphate decrease to <1 mg/kg/wk around week 20 from all waste rock kinetic tests (Figure 4-12). Weekly sulphate loadings from the humidity cells remain stable near or below the detection limit (equivalent to 2 mg/L) for the rest of the test period. Sulphate loadings from the columns continue to decrease over the test period, with lower rates (<0.1 mg/kg/wk) measured for the oxide facies of the gneiss and schist waste rock (Col 5 and Col 6). Loading rates are observed to decrease further during re-circulation experiment, as discussed below.

Table 4-27:
Loading Rates for Gneiss Waste Rock Laboratory Kinetic Tests

Parameter	Unit	Gneiss														
		Oxide (Col 5)			**Transition (Col 6)**			**Transition (HC 3)** (DUP of Col 6)			**Fresh (HC 4)**			**Fresh (HC 8)**		
		Median (Final 5)	**Median (All*)**	**75th PCTL (All*)**	**Median (Final 5)**	**Median (All*)**	**75th PCTL (All*)**	**Median (Final 5)**	**Median (All*)**	**75th PCTL (All*)**	**Median (Final 5)**	**Median (All*)**	**75th PCTL (All*)**	**Median (Final 5)**	**Median (All*)**	**75th PCTL (All*)**
pH	s.u.	8.2	8.2	8.2	8.3	8.2	8.3	7.5	7.7	7.8	7.8	7.8	7.8	7.3	7.4	7.5
Alkalinity	mg $CaCO_3$/kg/wk	1.7	2.4	2.7	2.0	2.2	2.2	8.7	11	13	16	16	18	5.3	5.2	5.4
Sulphate	mg/kg/wk	0.098	0.099	0.11	0.23	0.32	0.34	1.0	1.0	1.0	0.98	0.98	1.00	0.99	0.99	0.99
D-Al	mg/kg/wk	0.000069	0.000069	0.000088	0.000074	0.000095	0.00011	0.0072	0.0095	0.012	0.016	0.020	0.023	0.0054	0.0060	0.0067
D-Sb	mg/kg/wk	0.000039	0.000040	0.000041	0.00017	0.00014	0.00016	0.00025	0.00040	0.00045	0.00069	0.0014	0.0016	0.00064	0.00064	0.00067
D-As	mg/kg/wk	0.00025	0.00021	0.00024	0.00078	0.00079	0.00085	0.0016	0.0025	0.0040	0.0013	0.0024	0.0031	0.0076	0.0084	0.0091
D-Cd	mg/kg/wk	0.000000090	0.000000098	0.00000016	0.000000093	0.00000013	0.00000022	0.0000015	0.0000015	0.0000019	0.0000015	0.0000015	0.0000015	0.0000015	0.0000020	0.0000023
D-Ca	mg/kg/wk	0.43	0.43	0.45	0.50	0.49	0.50	2.3	2.4	2.6	4.0	3.8	4.3	1.1	1.1	1.1
D-Cr	mg/kg/wk	0.000010	0.0000067	0.0000094	0.0000011	0.0000011	0.0000014	0.000015	0.000015	0.000015	0.000015	0.000015	0.000015	0.000015	0.000015	0.000017
D-Co	mg/kg/wk	0.00000056	0.00000095	0.0000012	0.00000040	0.00000076	0.00000085	0.0000045	0.000010	0.000015	0.0000048	0.0000074	0.0000097	0.0000078	0.0000096	0.000011
D-Cu	mg/kg/wk	0.000014	0.000019	0.000021	0.0000060	0.000013	0.000015	0.00012	0.00014	0.00020	0.00011	0.00015	0.00024	0.00013	0.00025	0.00030
D-Fe	mg/kg/wk	0.00011	0.000100	0.00011	0.000100	0.000100	0.00011	0.0035	0.0035	0.0035	0.0034	0.0034	0.0035	0.0035	0.0035	0.0035
D-Pb	mg/kg/wk	0.00000049	0.00000049	0.00000084	0.00000047	0.00000019	0.00000051	0.0000051	0.0000051	0.000014	0.0000049	0.0000050	0.0000099	0.000010	0.000015	0.000025
D-Mg	mg/kg/wk	0.15	0.15	0.16	0.23	0.24	0.25	0.62	0.69	0.80	1.2	1.2	1.4	0.42	0.43	0.44
D-Mn	mg/kg/wk	0.0000029	0.0000088	0.000014	0.0000020	0.0000061	0.000010	0.0030	0.0034	0.0040	0.0033	0.0041	0.0047	0.0029	0.0026	0.0029
D-Hg	mg/kg/wk	0.00016	0.00014	0.00016	0.00014	0.00014	0.00015	0.0051	0.0050	0.0051	0.0049	0.0049	0.0050	0.0050	0.0050	0.0062
D-Mo	mg/kg/wk	0.00035	0.00032	0.00034	0.00023	0.00045	0.00051	0.00020	0.00041	0.00059	0.00018	0.00033	0.00041	0.000055	0.00012	0.00024
D-Ni	mg/kg/wk	0.0000033	0.0000058	0.0000070	0.0000034	0.0000067	0.0000075	0.000051	0.000050	0.000051	0.000049	0.000049	0.000050	0.000050	0.000051	0.000098
D-Se	mg/kg/wk	0.0000011	0.0000029	0.000013	0.0000012	0.0000026	0.000014	0.000020	0.000020	0.00040	0.000020	0.000025	0.00039	0.000020	0.000020	0.000040
D-Ag	mg/kg/wk	0.000000033	0.000000030	0.000000035	0.000000029	0.000000029	0.000000034	0.0000010	0.0000010	0.0000010	0.00000098	0.00000098	0.00000099	0.00000099	0.00000099	0.0000010
D-U	mg/kg/wk	0.0013	0.0013	0.0014	0.0038	0.0035	0.0038	0.0079	0.011	0.013	0.0034	0.0036	0.0042	0.0094	0.0099	0.010
D-Zn	mg/kg/wk	0.000016	0.000015	0.000017	0.000014	0.000014	0.000016	0.00051	0.00050	0.00051	0.00049	0.00049	0.00050	0.00050	0.00050	0.00050

Notes: All* excludes the first 10 cycles (which represent the flushing of surface oxidation products) and the recirculation cycles.

Table 4-28:
Loading Rates for Schist Waste Rock Laboratory Kinetic Tests

Parameter	Unit	Schist														
		Oxide (Col 3)			**Transition (Col 4)**			**Transition (HC 1)** (DUP of Col 4)			**Fresh (HC 2)**			**Fresh (HC 7)**		
		Median (Final 5)	**Median (All*)**	**75th PCTL (All*)**	**Median (Final 5)**	**Median (All*)**	**75th PCTL (All*)**	**Median (Final 5)**	**Median (All*)**	**75th PCTL (All*)**	**Median (Final 5)**	**Median (All*)**	**75th PCTL (All*)**	**Median (Final 5)**	**Median (All*)**	**75th PCTL (All*)**
pH	s.u.	8.2	8.1	8.2	8.2	8.2	8.2	7.8	7.8	7.9	7.9	7.9	7.9	7.5	7.6	7.6
Alkalinity	mg $CaCO_3$/kg/wk	2.0	2.1	2.3	1.9	2.2	2.3	16	17	18	18	18	20	11	11	11
Sulphate	mg/kg/wk	0.12	0.18	0.26	0.88	1.0	1.2	1.0	1.0	1.5	1.0	0.99	1.5	1.5	2.0	2.3
D-Al	mg/kg/wk	0.000070	0.000068	0.000078	0.000070	0.000076	0.000098	0.013	0.013	0.014	0.018	0.021	0.025	0.0068	0.0078	0.0091
D-Sb	mg/kg/wk	0.000063	0.000050	0.000052	0.000026	0.000031	0.000034	0.000099	0.00015	0.00019	0.0020	0.0040	0.0057	0.0030	0.0031	0.0035
D-As	mg/kg/wk	0.00018	0.00011	0.00016	0.000099	0.00010	0.00011	0.0010	0.0012	0.0015	0.0014	0.0028	0.0045	0.0075	0.0093	0.010
D-Cd	mg/kg/wk	0.000000052	0.000000041	0.000000062	0.00000014	0.00000014	0.00000020	0.0000015	0.0000015	0.0000017	0.0000015	0.0000015	0.0000023	0.0000015	0.0000015	0.0000016
D-Ca	mg/kg/wk	0.51	0.50	0.53	0.56	0.52	0.55	4.5	4.4	4.6	4.8	4.7	5.0	2.7	2.7	2.8
D-Cr	mg/kg/wk	0.000016	0.0000094	0.000012	0.000011	0.0000072	0.000011	0.000040	0.000030	0.000045	0.000015	0.000015	0.000023	0.000015	0.000015	0.000016
D-Co	mg/kg/wk	0.00000051	0.00000059	0.00000091	0.00000060	0.0000012	0.0000016	0.0000020	0.0000064	0.0000087	0.000020	0.000021	0.000026	0.00014	0.00015	0.00017
D-Cu	mg/kg/wk	0.0000090	0.000015	0.000020	0.000017	0.000022	0.000027	0.00011	0.00019	0.00028	0.000099	0.00015	0.00021	0.000078	0.00015	0.00020
D-Fe	mg/kg/wk	0.00012	0.000092	0.000098	0.00012	0.00011	0.00012	0.0035	0.0034	0.0035	0.0035	0.0035	0.0035	0.0034	0.0034	0.0035
D-Pb	mg/kg/wk	0.0000015	0.00000029	0.00000066	0.0000015	0.00000061	0.0000015	0.0000050	0.0000050	0.000015	0.0000050	0.0000050	0.000015	0.000015	0.000015	0.000023
D-Mg	mg/kg/wk	0.21	0.20	0.23	0.29	0.28	0.29	0.93	1.1	1.3	1.3	1.4	1.7	1.1	1.2	1.2
D-Mn	mg/kg/wk	0.0000044	0.0000075	0.000010	0.0000079	0.000029	0.000044	0.0017	0.0018	0.0021	0.0071	0.0060	0.0068	0.0057	0.0055	0.0061
D-Hg	mg/kg/wk	0.00017	0.00013	0.00014	0.00017	0.00016	0.00017	0.0050	0.0049	0.0050	0.0050	0.0050	0.0050	0.0049	0.0049	0.0050
D-Mo	mg/kg/wk	0.000063	0.000041	0.000053	0.00025	0.00037	0.00045	0.00031	0.00064	0.00093	0.000055	0.00013	0.00017	0.000044	0.00012	0.00029
D-Ni	mg/kg/wk	0.0000035	0.0000059	0.0000070	0.000015	0.000020	0.000026	0.000050	0.000050	0.000050	0.00020	0.00020	0.00025	0.00064	0.00077	0.00084
D-Se	mg/kg/wk	0.0000043	0.0000052	0.000013	0.0000087	0.0000096	0.000014	0.000045	0.000058	0.00041	0.000020	0.000031	0.00042	0.000020	0.000020	0.000042
D-Ag	mg/kg/wk	0.000000033	0.000000026	0.000000029	0.000000033	0.000000033	0.000000045	0.0000010	0.00000099	0.0000012	0.0000010	0.00000099	0.0000010	0.00000098	0.00000099	0.0000012
D-U	mg/kg/wk	0.000074	0.000069	0.000075	0.00057	0.00059	0.00061	0.0010	0.0015	0.0018	0.0020	0.0027	0.0034	0.0020	0.0023	0.0025
D-Zn	mg/kg/wk	0.000018	0.000014	0.000020	0.000017	0.000017	0.000019	0.00050	0.00049	0.00050	0.00050	0.00050	0.00050	0.00049	0.00049	0.00049

Notes: All* excludes the first 10 cycles (which represent the flushing of surface oxidation products) and the recirculation cycles.

Table 4-29:
Loading Rates for Granite Waste Rock Laboratory Kinetic Tests

Parameter	Unit	Granite											
		Transition (Col 13)			**Fresh (Col 14)**			**Transition (HC 5)** (DUP of Col 13)			**Fresh (HC 6)** (DUP of Col 14)		
		Median (Final 5)	**Median (All*)**	**75th PCTL (All*)**	**Median (Final 5)**	**Median (All*)**	**75th PCTL (All*)**	**Median (Final 5)**	**Median (All*)**	**75th PCTL (All*)**	**Median (Final 5)**	**Median (All*)**	**75th PCTL (All*)**
pH	s.u.	7.5	7.5	7.5	8.2	8.2	8.2	6.7	7.1	7.3	7.0	7.3	7.3
Alkalinity	mg $CaCO_3$/kg/wk	0.31	0.29	0.32	1.4	1.6	1.6	1.6	2.0	2.2	4.8	5	6
Sulphate	mg/kg/wk	0.45	0.46	0.53	0.60	0.60	0.67	1.0	1.0	1.0	0.98	0.99	0.99
D-Al	mg/kg/wk	0.000045	0.000050	0.000077	0.000074	0.000077	0.000088	0.0072	0.017	0.029	0.0094	0.021	0.030
D-Sb	mg/kg/wk	0.00010	0.000090	0.00010	0.000094	0.000093	0.000094	0.00029	0.00054	0.00080	0.00025	0.00037	0.00044
D-As	mg/kg/wk	0.0016	0.0015	0.0016	0.00045	0.00045	0.00046	0.014	0.026	0.050	0.0047	0.0076	0.012
D-Cd	mg/kg/wk	0.000000077	0.000000073	0.000000084	0.00000015	0.00000013	0.00000017	0.0000015	0.0000019	0.0000052	0.0000015	0.0000015	0.0000022
D-Ca	mg/kg/wk	0.050	0.049	0.050	0.52	0.53	0.55	0.16	0.15	0.16	1.2	1.4	1.6
D-Cr	mg/kg/wk	0.00000045	0.00000045	0.00000078	0.00000044	0.00000051	0.00000073	0.000015	0.000017	0.000020	0.000015	0.000015	0.000015
D-Co	mg/kg/wk	0.000015	0.000014	0.000015	0.000012	0.000012	0.000014	0.000049	0.000050	0.000058	0.000032	0.000027	0.000033
D-Cu	mg/kg/wk	0.0000084	0.0000083	0.000013	0.0000068	0.0000072	0.0000084	0.00029	0.00022	0.00026	0.00013	0.00012	0.00018
D-Fe	mg/kg/wk	0.00011	0.000085	0.000098	0.000100	0.000100	0.00010	0.0035	0.0073	0.012	0.0034	0.0051	0.0093
D-Pb	mg/kg/wk	0.00000060	0.00000053	0.0000011	0.0000019	0.0000019	0.0000037	0.000025	0.000050	0.000081	0.0000099	0.000039	0.000053
D-Mg	mg/kg/wk	0.013	0.012	0.013	0.10	0.11	0.11	0.043	0.040	0.044	0.21	0.23	0.26
D-Mn	mg/kg/wk	0.0070	0.0060	0.0067	0.012	0.012	0.012	0.024	0.021	0.023	0.039	0.033	0.038
D-Hg	mg/kg/wk	0.00015	0.00012	0.00014	0.00014	0.00014	0.00015	0.0051	0.0050	0.0051	0.0049	0.0049	0.0050
D-Mo	mg/kg/wk	0.000032	0.000045	0.000048	0.00016	0.00016	0.00020	0.00013	0.00066	0.0011	0.00010	0.00032	0.00044
D-Ni	mg/kg/wk	0.0000045	0.0000046	0.0000051	0.0000029	0.0000030	0.0000044	0.000051	0.000050	0.000051	0.000049	0.000049	0.000050
D-Se	mg/kg/wk	0.00000060	0.00000065	0.00000087	0.00000058	0.00000064	0.0000010	0.000020	0.000020	0.000037	0.000020	0.000020	0.000022
D-Ag	mg/kg/wk	0.000000030	0.000000026	0.000000037	0.000000029	0.000000029	0.000000029	0.0000010	0.0000010	0.0000042	0.00000098	0.00000100	0.0000017
D-U	mg/kg/wk	0.000013	0.000013	0.000014	0.00081	0.00081	0.00088	0.00014	0.00023	0.00044	0.00031	0.00041	0.00048
D-Zn	mg/kg/wk	0.000	0.000036	0.000050	0.000015	0.000015	0.000028	0.00098	0.00051	0.00098	0.00049	0.00049	0.00050

Notes: All* excludes the first 10 cycles (which represent the flushing of surface oxidation products) and the recirculation cycles.

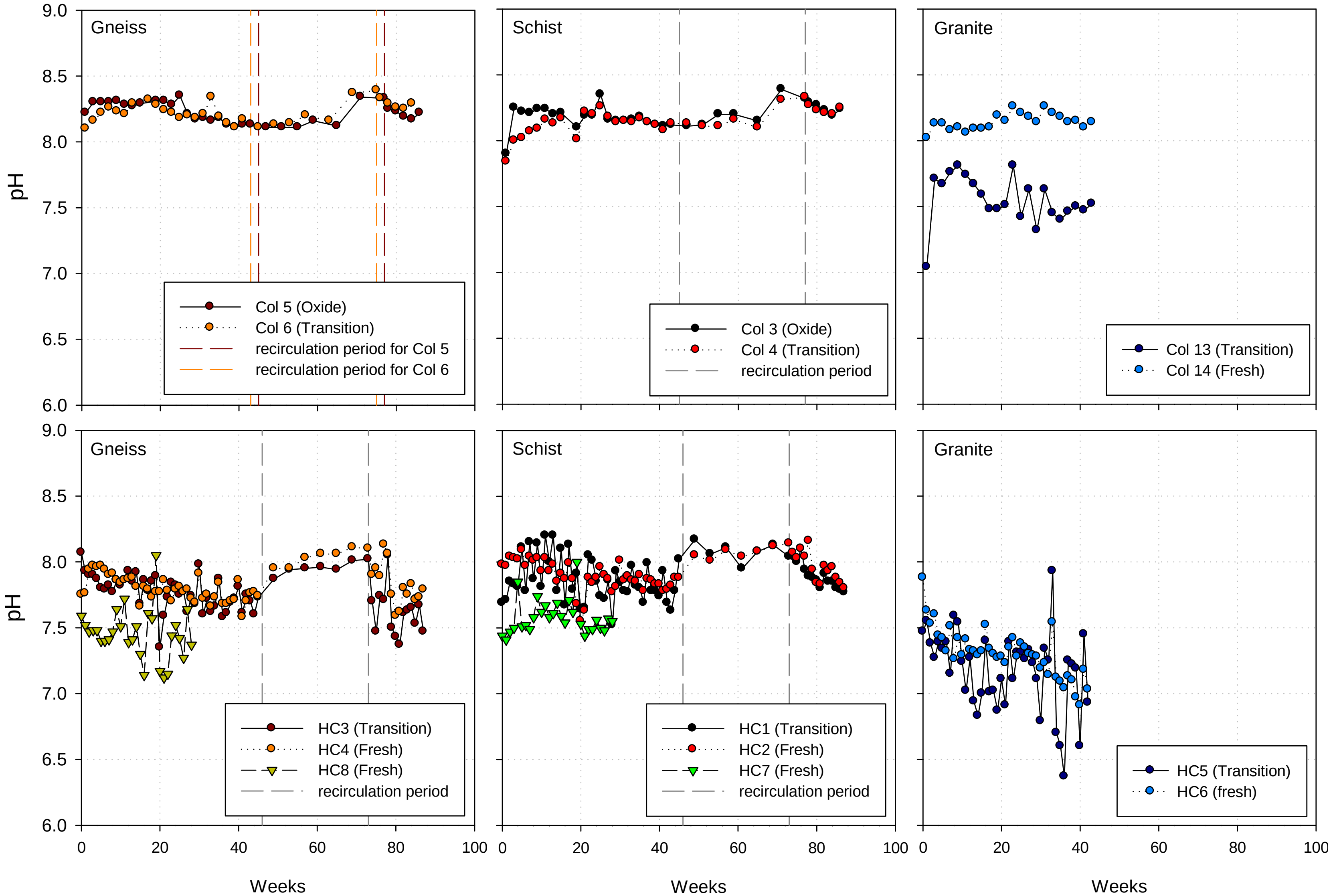

Figure 4-10: Leachate pH from gneiss, schist and granite waste rock unsaturated columns and humidity cells.

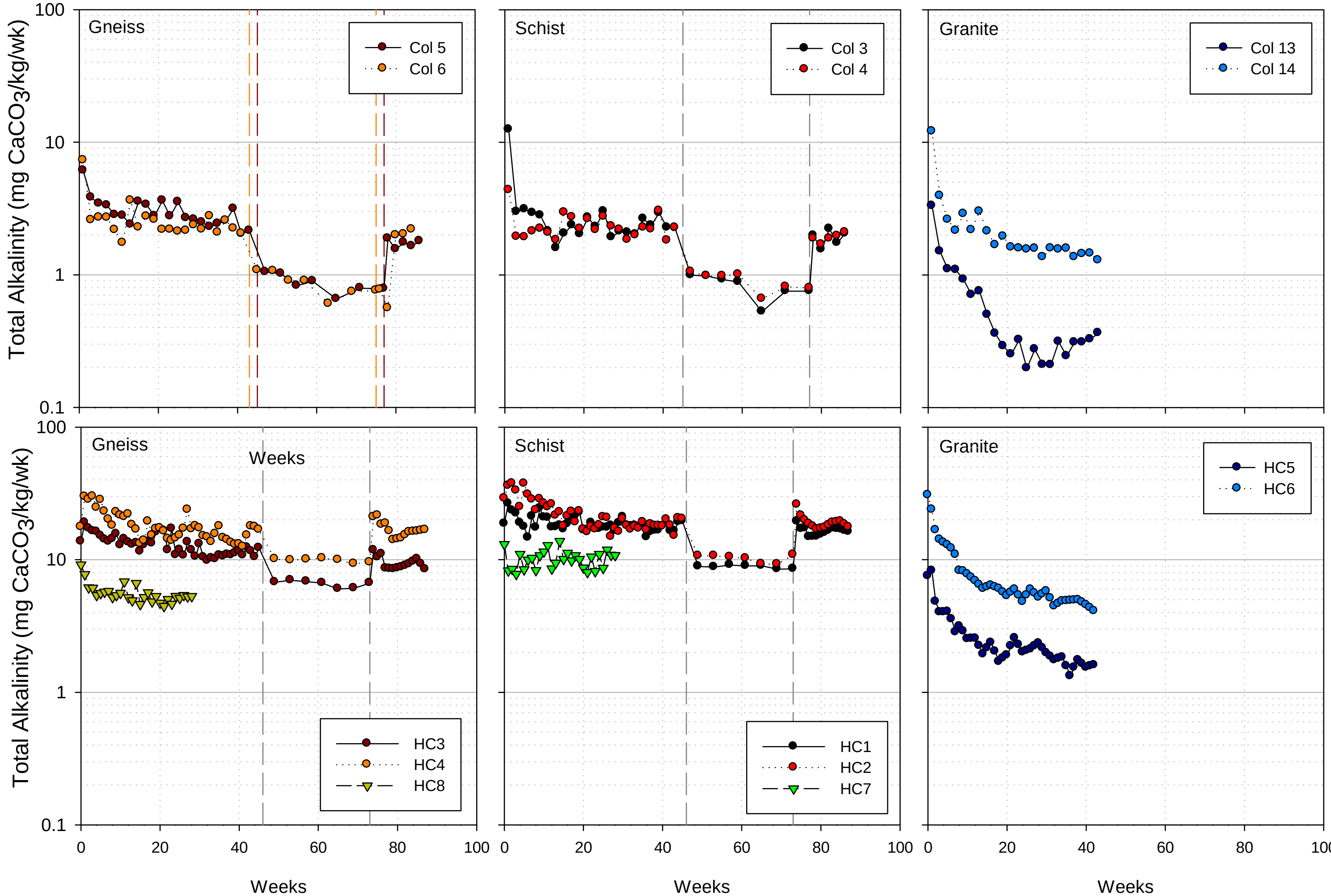

Figure 4-11: Alkalinity loading rates from gneiss, schist and granite waste rock unsaturated columns and humidity cells.

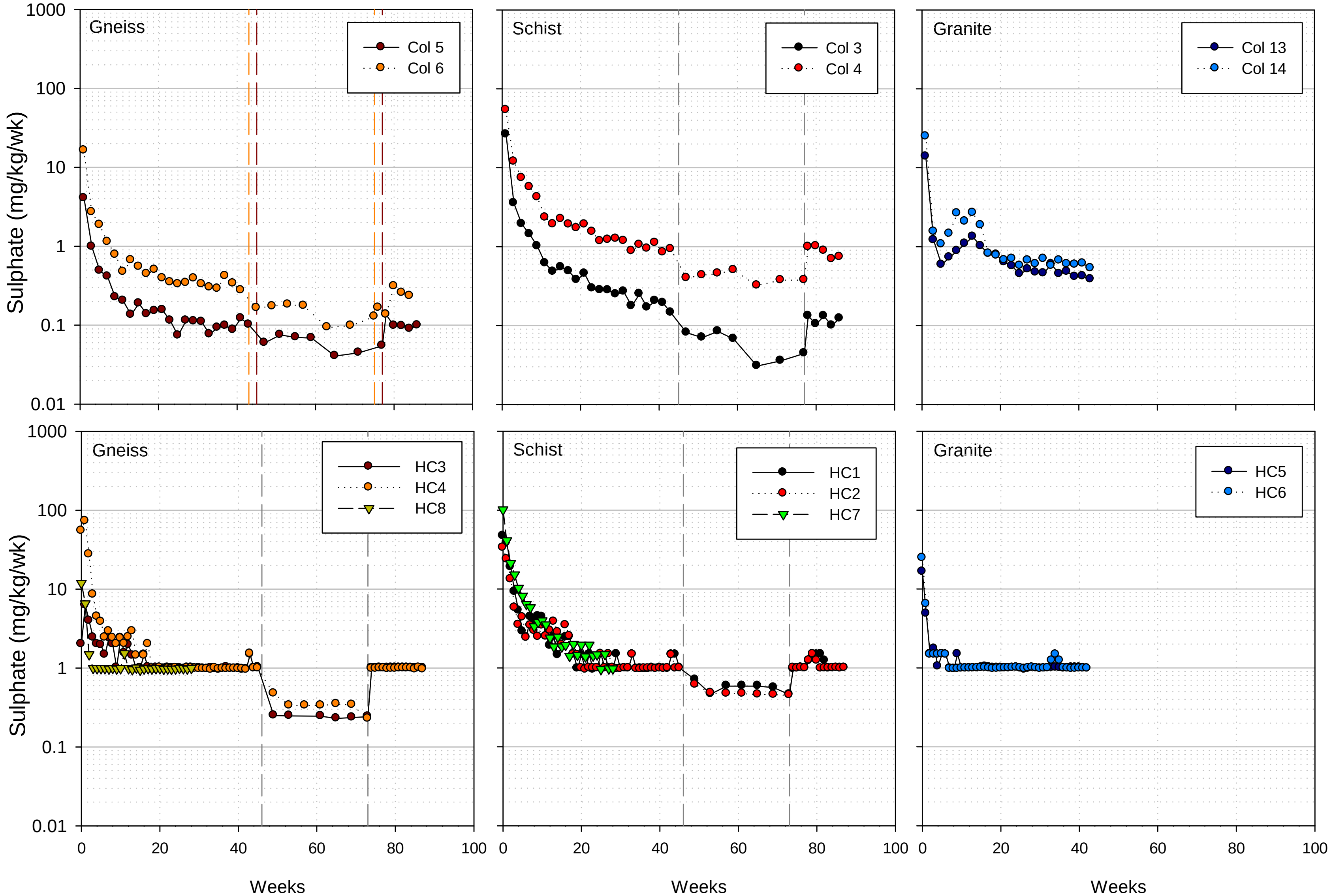

Figure 4-12: Sulphate loading rates from gneiss, schist and granite waste rock unsaturated columns and humidity cells

Metal Leaching Results

Potential metals of concern identified during static testwork include As, Sb, Cr, U and possibly Hg (Section 4.1.4 and 4.1.5). Loading rates for Hg decrease rapidly to below the analytical detection limit (0.01 µg/L; Appendix D.1) from all waste rock kinetic tests following the initial flushing of surface oxidation products. Time series profiles for the other parameters (As, Sb, Cr and U) from the waste rock kinetic tests are shown in Figure 4-13 (columns) and Figure 4-14 (humidity cells). Kinetic test results show that metal loading rates are effected by both rock type and the kinetic test procedure (i.e., humidity cell versus column).

The highest As loading rates are observed in the granite humidity cells and columns, which is consistent with SFE results but not necessarily solid phase metal abundance. Several kinetic test samples (Col 5, Col 3, and HC7) have higher As content than the granite samples but are producing lower As loading rates. This result can be related to differences in pH and Fe abundance, which will be discussed in more detail in Section 5.1.4.1.

Antimony loading rates vary widely between different kinetic tests. Column results Figure 4-14 generally show similar Sb loading rates for the three major lithologies. There is some indication that higher loading rates are associated with less weathered mine rock. This result is inconsistent with relative Sb enrichment in Sb test samples, as Sb content has a relationship with the degree of weathering.

Chromium loading rates are generally highest in the schist lithology, as indicated by column results. However, leachate concentrations are relatively low even in the schist columns, with the maximum concentration after the first flush being 0.00102 mg/L. Humidity cells generally produced Cr concentrations at or below the detection limit of 0.00003 mg/L, confounding any comparison between rock units.

The highest U loadings are generally observed in the gneiss lithology. The granite lithology, which contains similar solid phase U concentrations, produced a wide range of U loading rates. This variation in U loading rates can be related to alkalinity. That is, granite kinetic tests Col 13 and HC6 which are producing relatively high U loading rates, compared to Col 15 and HC5, are also producing relatively high alkalinity loading rates. This result is related to alkalinity supporting uranium solubility in neutral pH environments.

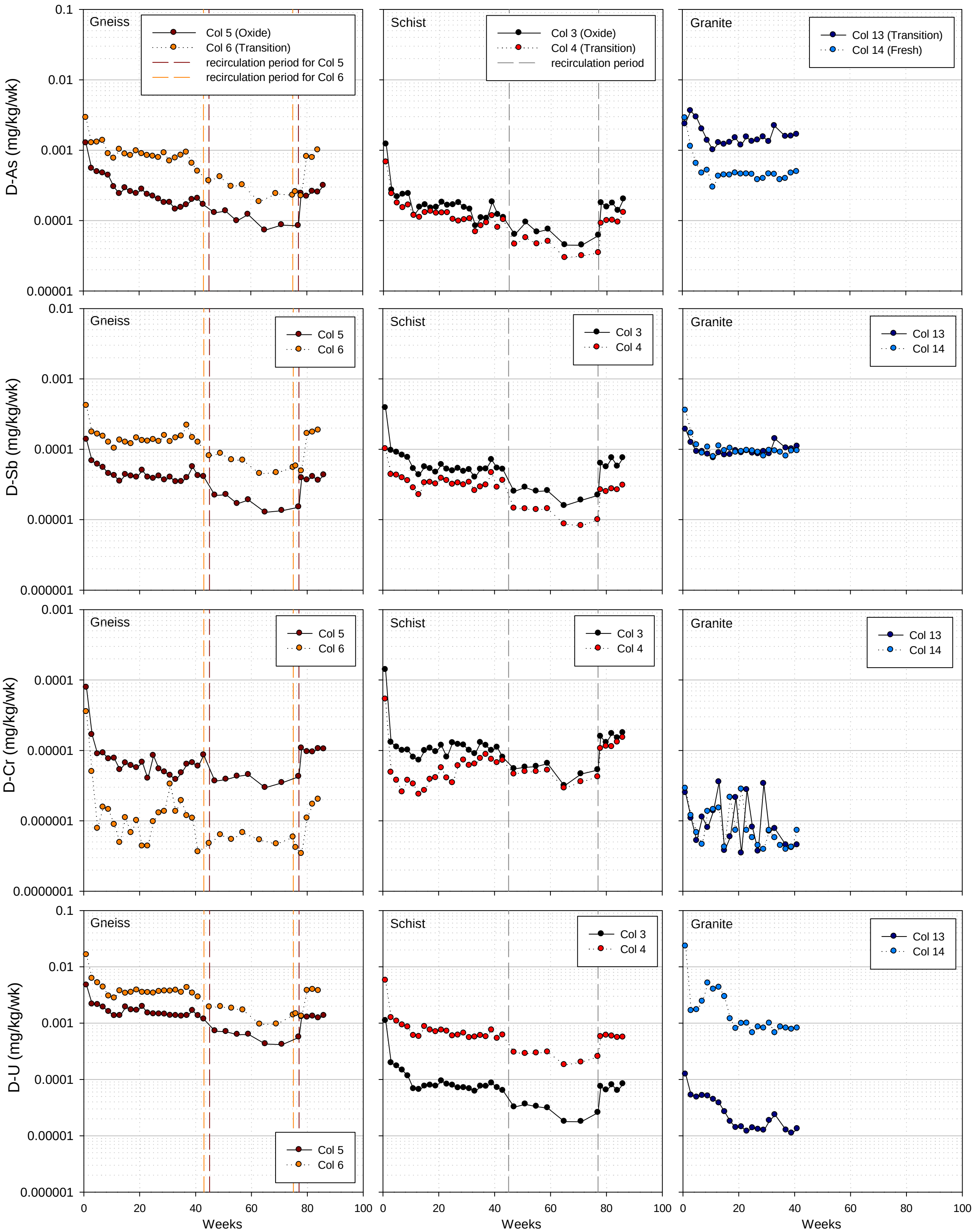

Figure 4-13: Metal (As, Sb, Cr and U) loading rates from gneiss, schist and granite waste rock unsaturated columns

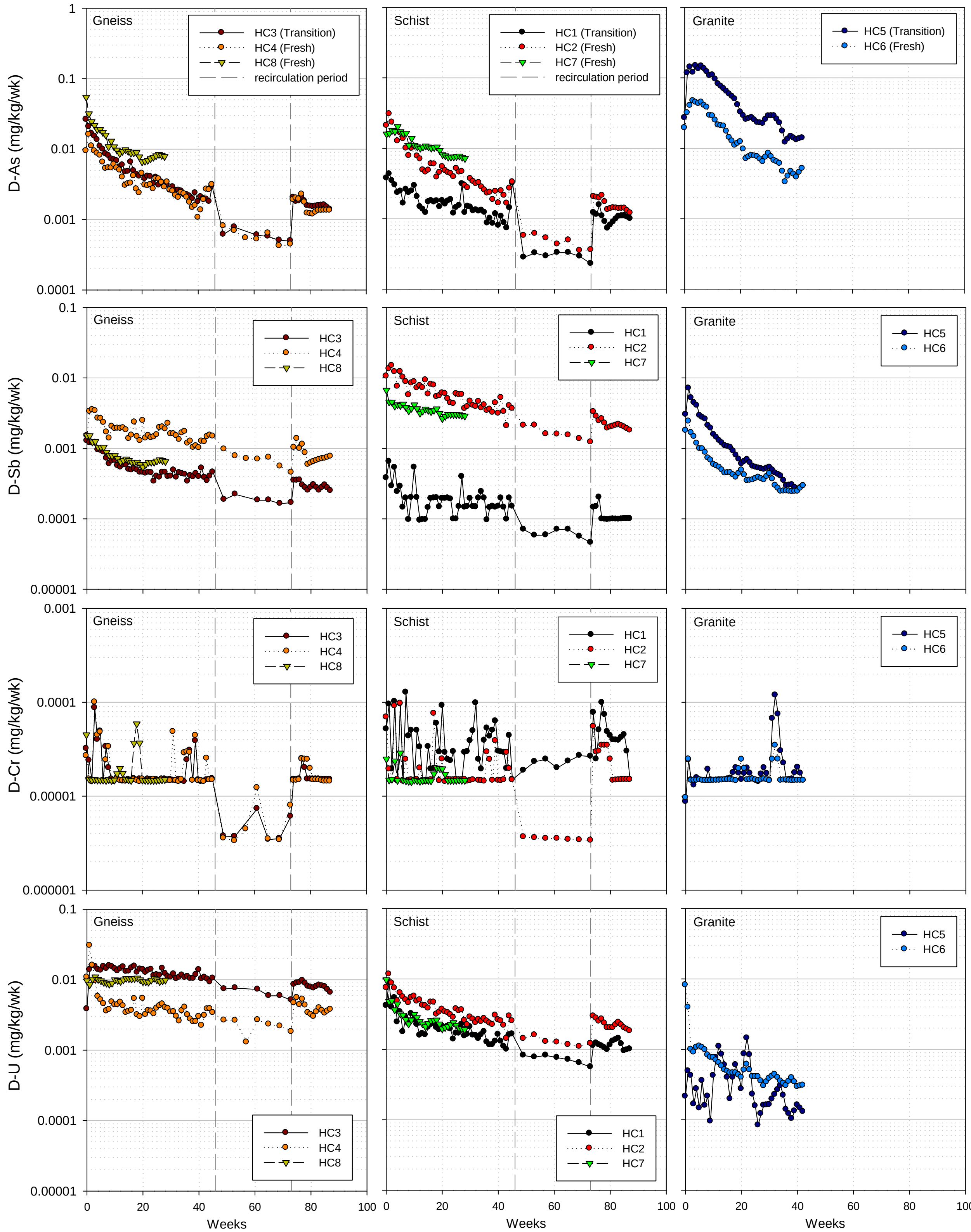

Figure 4-14: Metal (As, Sb, Cr and U) loading rates from gneiss, schist and granite waste rock humidity cells

In general, kinetic tests composed of the same test sub-samples are producing similar results with respect to leachate quality. In particular, preliminary data for the field kinetic tests (presented in Section 4.1.5.4), which are subjected to the actual site conditions and precipitation rates, support the results produced by the controlled (increased weathering) laboratory kinetic tests. Specifically, the highest As concentrations are leaching from field and laboratory kinetic tests composed of granite waste rock, in particular the transition facies and the highest Sb concentrations are produced by the schist fresh facies kinetic tests. The highest U concentrations are produced by the gneiss waste rock, transition and fresh facies, as well as the fresh facies for the schist and granite waste rock. The gneiss and schist oxide facies kinetic tests are producing the highest Cr concentrations and the lowest As and Sb concentrations (as well as the lowest U for the schist oxide).

Furthermore, the highest sulphate concentrations are produced by the gneiss and schist fresh facies kinetic tests and Mn tends to be elevated in all the granite transition and fresh facies kinetic tests compared to the gneiss and schist kinetic tests.

Recirculation Experiment

The gneiss and schist waste rock unsaturated columns and humidity cell tests were subjected to recirculation periods (Table 4-30) that involved recirculating the weekly (or biweekly) effluent (leachate) as influent to the tests. The objective of the recirculation experiment was to simulate a slower flowrate and therefore a longer residence time to allow for assessment of whether the leachate chemistry produced by the kinetic tests are controlled primarily by the kinetic loading rates or by pH related solubility influences.

Table 4-30 presents the final loading rate prior to the recirculation experiment (*i.e.,* reduction in flow rate), the final loading rate of the recirculation experiment and the median value for the recirculation period. The calculated differences between the final loading rate prior to the experiment and the final and median loading rates of the recirculation period are highlighted in yellow in Table 4-30. The recirculation periods are marked on the time series plots by dashed vertical lines (Figure 4-10 to Figure 4-14).

All kinetic tests show a slight increase in pH over the recirculation period. The increase in pH is particularly evident for the gneiss transition and fresh facies humidity cell tests, which increase by approximately half a pH unit. Loading rates for alkalinity, sulphate and nearly all metals decrease following the reduced flow conditions in the unsaturated waste rock laboratory kinetic tests (Table 4-30), with the majority of parameters from the waste rock columns and humidity cells decreasing by more than 50% (i.e., Diff of -50 or lower) by the final cycle of the recirculation period. For humidity cell tests comprising gneiss waste rock, many parameters decrease by more than 75%. Of note, are the increases in Cr from Col 6 (gneiss transition) and HC1 (schist transition) and the increase in Mo from HC2 (schist fresh). Other parameters such as Cd show increased, but fluctuating, loading rates over the recirculation period (Appendix D.1). The largest production decreases from the gneiss and schist waste rock columns are for Mn, Ni, Se, Ag and, to a lesser degree, Sb and Cu (as well as sulphate from schist oxide, Col 3). The largest decreases from the gneiss and schist humidity cells are for Al, As, Cd and Hg (>76%) as well as sulphate, Cu, Ni and Zn production rates from both gneiss waste rock humidity cells (HC3 and HC4).

Table 4-31 presents the concentrations prior to and during the recirculation experiment and the calculated percent differences (highlighted in yellow in Table 4-31). Time series profiles for leachate concentrations are presented in Appendix D.1. Concentrations for many parameters from the waste rock kinetic tests, particularly the columns, remain relatively unchanged (a percent difference of 0 indicates no change in concentration over the recirculation period), further supporting that metal release is primarily controlled by flushing rates and sample mass (i.e., solubility controls). Moreover, a pronounced increase in pH and alkalinity is observed for the humidity cells over the recirculation period, consistent with the increase in several metals over the same time frame, namely anion forming metals (i.e., Sb, As, Cr, Mo, U) (Table 4-31; Appendix D.1). In columns where pH and alkalinity remain relatively stable during the re-circulation time period, no such increase in anion forming metal concentrations is observed.

Table 4-30: Loading Rate and Percent Differences for Recirculation Experiment for Gneiss and Schist Waste Rock Kinetic Tests

Kinetic Test	Loading Rates	pH	Cond.	Alkalinity (as $CaCO_3$)	Sulphate	Al	Sb	As	Cd	Cr	Cu	Fe	Mn	Hg	Mo	Ni	Se*	Ag	U	Zn
		s.u.	µS/cm	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	µg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
Unsaturated Columns																				
Gneiss Oxide (Col 5)	Cycle immediately before recirculation period (Cycle 43)	8.1	278	2.1	0.10	0.000074	0.000041	0.00017	0.000000044	0.0000086	0.000017	0.00010	0.0000088	0.00015	0.00030	0.0000058	0.0000012	0.000000058	0.0012	0.000015
	Final cycle of recirculation period (Cycle 77)	8.3	256	0.78	0.055	0.000040	0.000015	0.000084	0.000000021	0.0000042	0.0000077	0.000048	0.0000013	0.000068	0.00015	0.0000014	0.00000048	0.000000014	0.00056	0.0000068
	Median for recirculation period (cycles 45-77)	8.1	256	0.83	0.060	0.000043	0.000017	0.000099	0.000000084	0.0000039	0.0000071	0.000049	0.0000018	0.000084	0.00019	0.0000015	0.00000051	0.000000017	0.00063	0.0000070
	% Change of Final Recirculation Cycle		-8.2	-64	-46	-46	-63	-50	-53	-50	-56	-53	-85	-53	-51	-76	-61	-76	-52	-53
	% Change of Median for Recirculation Period		-8.2	-61	-41	-42	-59	-41	93	-55	-59	-52	-80	-42	-38	-74	-58	-71	-47	-52
Gneiss Transition (Col 6)	Cycle immediately before recirculation period (Cycle 41)	8.2	343	2.0	0.28	0.00010	0.00012	0.00050	0.000000036	0.00000036	0.000014	0.000084	0.0000088	0.00012	0.00027	0.0000060	0.0000023	0.000000036	0.0029	0.000012
	Final cycle of recirculation period (Cycle 75)	8.4	316	0.76	0.13	0.000044	0.000055	0.00023	0.000000018	0.00000058	0.0000041	0.000041	0.00000058	0.000058	0.000094	0.0000012	0.00000064	0.000000012	0.0014	0.0000058
	Median for recirculation period (cycles 43-75)	8.2	310	0.90	0.17	0.000059	0.000070	0.00030	0.000000042	0.00000058	0.0000047	0.000047	0.0000038	0.000068	0.00014	0.0000020	0.00000088	0.000000016	0.0017	0.0000068
	% Change of Final Recirculation Cycle		-7.8	-63	-54	-57	-56	-54	-51	62	-72	-51	-93	-51	-65	-81	-72	-68	-52	-51
	% Change of Median for Recirculation Period		-9.6	-56	-40	-42	-44	-39	13	50	-67	-44	-73	-44	-50	-66	-62	-56	-41	-44
Schist Oxide (Col 3)	Cycle immediately before recirculation period (Cycle 43)	8.1	318	2.3	0.15	0.000072	0.000052	0.00011	0.000000040	0.0000080	0.000020	0.000093	0.0000073	0.00013	0.000041	0.0000053	0.0000040	0.000000040	0.000063	0.000013
	Final cycle of recirculation period (Cycle 77)	8.3	263	0.76	0.044	0.000039	0.000022	0.000061	0.000000019	0.0000053	0.0000062	0.000044	0.0000011	0.000063	0.000025	0.0000013	0.00000082	0.000000013	0.000026	0.0000063
	Median for recirculation period (cycles 45-77)	8.2	269	0.89	0.068	0.000039	0.000025	0.000063	0.000000021	0.0000055	0.0000068	0.000047	0.0000018	0.000070	0.000025	0.0000014	0.0000011	0.000000014	0.000031	0.0000070
	% Change of Final Recirculation Cycle		-17	-67	-70	-46	-57	-44	-52	-34	-69	-52	-85	-52	-39	-76	-79	-68	-59	-52
	% Change of Median for Recirculation Period		-16	-61	-54	-46	-51	-42	-47	-31	-66	-49	-75	-47	-39	-75	-72	-65	-51	-47
Schist Transition (Col 4)	Cycle immediately before recirculation period (Cycle 43)	8.1	375	2.3	0.93	0.00010	0.000036	0.00010	0.000000049	0.0000072	0.000027	0.00011	0.000021	0.00016	0.00043	0.000021	0.0000060	0.00000013	0.00061	0.000016
	Final cycle of recirculation period (Cycle 77)	8.3	365	0.79	0.38	0.000036	0.0000099	0.000035	0.000000021	0.0000042	0.0000071	0.000050	0.0000015	0.000071	0.000092	0.0000057	0.0000023	0.000000014	0.00025	0.0000071
	Median for recirculation period (cycles 45-77)	8.1	365	0.98	0.40	0.000044	0.000014	0.000046	0.000000041	0.0000046	0.0000071	0.000055	0.0000041	0.000081	0.00015	0.0000075	0.0000030	0.000000024	0.00029	0.0000081
	% Change of Final Recirculation Cycle		-2.7	-65	-59	-65	-72	-66	-56	-42	-74	-56	-93	-56	-78	-73	-61	-89	-59	-56
	% Change of Median for Recirculation Period		-2.7	-57	-57	-58	-61	-55	-17	-36	-74	-52	-80	-50	-65	-64	-50	-81	-53	-50
Humidity Cells																				
Gneiss Transition (HC3)	Cycle immediately before recirculation period (Cycle 45)	7.7	38	12	1.0	0.0096	0.00046	0.0030	0.0000015	0.000015	0.00033	0.0036	0.0034	0.0051	0.00031	0.000051	0.0005*	0.0000010	0.010	0.0010
	Final cycle of recirculation period (Cycle 73)	8.0	98	6.7	0.24	0.0015	0.00017	0.00050	0.00000036	0.0000061	0.000047	0.0022	0.0015	0.0012	0.00024	0.000012	0.000017	0.00000036	0.0051	0.00012
	Median for recirculation period (cycles 46-73)	8.0	106	6.7	0.24	0.0015	0.00018	0.00059	0.00000036	0.0000037	0.000047	0.00086	0.0015	0.0012	0.00019	0.000012	0.0000050	0.00000025	0.0059	0.00012
	% Change of Final Recirculation Cycle		157	-46	-76	-84	-63	-83	-76	-60	-86	-39	-55	-76	-21	-76	NA	-64	-51	-88
	% Change of Median for Recirculation Period		181	-45	-76	-85	-60	-80	-76	-76	-86	-76	-55	-76	-39	-76	NA	-76	-43	-88
Gneiss Fresh (HC4)	Cycle immediately before recirculation period (Cycle 45)	7.7	62	17	0.99	0.021	0.0015	0.0031	0.0000015	0.000015	0.00020	0.0035	0.0047	0.0050	0.00032	0.000050	0.0005*	0.00000099	0.0034	0.00050
	Final cycle of recirculation period (Cycle 73)	8.1	145	9.5	0.23	0.0014	0.00046	0.00044	0.00000034	0.0000080	0.000043	0.0025	0.0018	0.0011	0.00025	0.000011	0.000020	0.00000023	0.0018	0.00011
	Median for recirculation period (cycles 46-73)	8.1	172	9.9	0.33	0.0015	0.00071	0.00055	0.00000035	0.0000036	0.000040	0.00080	0.0018	0.0011	0.00022	0.000022	0.0000089	0.00000024	0.0023	0.00011
	% Change of Final Recirculation Cycle		137	-43	-77	-93	-69	-86	-77	-46	-78	-28	-62	-77	-21	-77	NA	-77	-46	-77
	% Change of Median for Recirculation Period		179	-41	-66	-93	-52	-83	-77	-76	-80	-77	-62	-77	-29	-55	NA	-76	-32	-77
Schist Transition (HC1)	Cycle immediately before recirculation period (Cycle 45)	8.0	73	20	1.0	0.013	0.00015	0.0032	0.0000015	0.000015	0.00017	0.0035	0.0016	0.0050	0.00077	0.000050	0.0005*	0.0000010	0.0017	0.00050
	Final cycle of recirculation period (Cycle 73)	8.0	138	8.5	0.46	0.0022	0.000046	0.00023	0.00000035	0.000026	0.000071	0.00092	0.00058	0.0012	0.00035	0.000012	0.000028	0.0000015	0.00056	0.00023
	Median for recirculation period (cycles 46-73)	8.1	161	8.9	0.59	0.0012	0.000059	0.00029	0.00000035	0.000024	0.000041	0.00082	0.00046	0.0012	0.00029	0.000024	0.000018	0.00000024	0.00076	0.00012
	% Change of Final Recirculation Cycle		89	-56	-54	-83	-69	-93	-77	76	-57	-74	-63	-77	-55	-77	NA	50	-66	-54
	% Change of Median for Recirculation Period		121	-54	-41	-91	-61	-91	-77	57	-75	-77	-71	-77	-62	-53	NA	-77	-54	-77
Schist Fresh (HC2)	Cycle immediately before recirculation period (Cycle 45)	7.9	73	20	0.99	0.020	0.0037	0.0033	0.0000015	0.000015	0.00020	0.0035	0.0064	0.0050	0.000050	0.00020	0.0005*	0.00000099	0.0025	0.0015
	Final cycle of recirculation period (Cycle 73)	8.1	172	11	0.45	0.0012	0.0012	0.00036	0.00000034	0.0000034	0.00012	0.0045	0.0034	0.0011	0.00017	0.00017	0.000012	0.00000034	0.0012	0.00023
	Median for recirculation period (cycles 46-73)	8.1	172	10	0.47	0.0015	0.0016	0.00049	0.00000036	0.0000035	0.000052	0.00082	0.0037	0.0012	0.000052	0.00020	0.0000069	0.00000024	0.0013	0.00012
	% Change of Final Recirculation Cycle		134	-46	-55	-94	-67	-89	-77	-77	-40	30	-47	-77	243	-15	NA	-66	-52	-85
	% Change of Median for Recirculation Period		134	-48	-53	-93	-57	-85	-76	-76	-75	-76	-42	-76	4.4	0.88	NA	-76	-50	-92

Notes: Negative values represent a decrease in production rates; percent difference values are highlighted, * a high detection limit of 0.001 mg/L was often applied for Se analyses; as a result, for all columns, the second to last cycle prior to the recirculation period (which provided a measurable value) was applied for calculation of percent differences; however, for humidity cells, the 13 cycles prior to the recirculation period applied the high detection limit (*i.e.* 0.0005 mg/kg/wk) which is considered to be a disproportionately high value to use in the calculation of percent differences.

Table 4-31:
Concentrations and Percent Differences for Recirculation Experiment for Gneiss and Schist Waste Rock Kinetic Tests

Kinetic Test	Concentrations	pH	Cond.	Alkalinity (as $CaCO_3$)	Sulphate	Al	Sb	As	Cd	Cr	Cu	Fe	Mn	Hg	Mo	Ni	Se*	Ag	U	Zn
		s.u.	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Unsaturated Columns																				
Gneiss Oxide (Col 5)	Cycle immediately before recirculation period (Cycle 43)	8.1	278	148	7.0	0.0051	0.0028	0.012	0.0000030	0.00059	0.0012	0.0070	0.00061	0.010	0.021	0.00040	0.000090	0.0000040	0.081	0.0010
	Final cycle of recirculation period (Cycle 77)	8.3	256	114	8.0	0.0058	0.0022	0.012	0.0000030	0.00062	0.0011	0.0070	0.00019	0.010	0.022	0.00020	0.000070	0.0000020	0.082	0.0010
	Median for recirculation period (cycles 45-77)	8.1	256	122	8.0	0.0066	0.0025	0.015	0.000010	0.00059	0.0011	0.0070	0.00027	0.010	0.026	0.00020	0.000070	0.0000020	0.084	0.0010
	% Change of Final Recirculation Cycle		-8.2	-23	14	14	-21	6.0	0	5.1	-5.9	0	-69	0	3.4	-50	-22	-50	1.1	0
	% Change of Median for Recirculation Period		-8.2	-18	14	29	-11	31	233	0	-6.7	0	-56	0	24	-50	-22	-50	3.3	0
Gneiss Transition (Col 6)	Cycle immediately before recirculation period (Cycle 43)	8.2	343	170	23	0.0085	0.010	0.042	0.0000030	0.000030	0.0012	0.0070	0.00073	0.010	0.022	0.00050	0.00017	0.0000030	0.24	0.0010
	Final cycle of recirculation period (Cycle 77)	8.4	316	130	22	0.0075	0.0094	0.039	0.0000030	0.00010	0.00070	0.0070	0.00010	0.010	0.016	0.00020	0.00011	0.0000020	0.24	0.0010
	Median for recirculation period (cycles 45-77)	8.2	310	135	22	0.0086	0.010	0.046	0.0000060	0.00010	0.00070	0.0070	0.00030	0.010	0.020	0.00030	0.00013	0.0000020	0.24	0.0010
	% Change of Final Recirculation Cycle		-7.8	-24	-4.3	-12	-9.6	-6.3	0	233	-42	0	-86	0	-28	-60	-35	-33	-1.3	0
	% Change of Median for Recirculation Period		-9.6	-21	-4.3	1.2	-0.96	11	100	233	-42	0	-59	0	-10	-40	-24	-33	1.3	0
Schist Oxide (Col 3)	Cycle immediately before recirculation period (Cycle 43)	8.1	318	171	11	0.0054	0.0039	0.0083	0.0000030	0.00060	0.0015	0.0070	0.00055	0.010	0.0031	0.00040	0.00029	0.0000030	0.0048	0.0010
	Final cycle of recirculation period (Cycle 77)	8.3	263	119	7.0	0.0061	0.0035	0.0097	0.0000030	0.00083	0.00098	0.0070	0.00017	0.010	0.0040	0.00020	0.00013	0.0000020	0.0041	0.0010
	Median for recirculation period (cycles 45-77)	8.2	269	135	10	0.0065	0.0037	0.0098	0.0000030	0.00083	0.0010	0.0070	0.00025	0.010	0.0040	0.00020	0.00017	0.0000020	0.0046	0.0010
	% Change of Final Recirculation Cycle		-17	-30	-36	13	-10	17	0	38	-35	0	-69	0	28	-50	-55	-33	-15	0
	% Change of Median for Recirculation Period		-16	-21	-9.1	20	-5.1	18	0	38	-33	0	-55	0	28	-50	-41	-33	-3.6	0
Schist Transition (Col 4)	Cycle immediately before recirculation period (Cycle 43)	8.1	375	140	57	0.0064	0.0022	0.0063	0.0000030	0.00044	0.0017	0.0070	0.0013	0.010	0.026	0.0013	0.00046	0.0000080	0.038	0.0010
	Final cycle of recirculation period (Cycle 77)	8.3	365	112	53	0.0051	0.0014	0.0049	0.0000030	0.00059	0.0010	0.0070	0.00021	0.010	0.013	0.00080	0.00033	0.0000020	0.036	0.0010
	Median for recirculation period (cycles 45-77)	8.1	365	124	56	0.0064	0.0017	0.0057	0.0000050	0.00061	0.0011	0.0070	0.00050	0.010	0.018	0.0010	0.00036	0.0000030	0.036	0.0010
	% Change of Final Recirculation Cycle		-2.7	-20	-7.0	-20	-36	-22	0	34	-40	0	-84	0	-51	-38	-28	-75	-4.8	0
	% Change of Median for Recirculation Period		-2.7	-11	-1.8	0.00	-23	-9.5	67	39	-32	0	-61	0	-30	-23	-22	-63	-4.8	0
Humidity Cells																				
Gneiss Transition (HC3)	Cycle immediately before recirculation period (Cycle 45)	7.7	38	24	2.0	0.019	0.00090	0.0058	0.0000030	0.000030	0.00064	0.0070	0.0066	0.010	0.00060	0.00010	0.0010*	0.0000020	0.021	0.0020
	Final cycle of recirculation period (Cycle 73)	8.0	98	55	2.0	0.012	0.0014	0.0041	0.0000030	0.000050	0.00039	0.018	0.012	0.010	0.0020	0.00010	0.00014	0.0000030	0.042	0.0010
	Median for recirculation period (cycles 46-73)	8.0	106	54	2.0	0.012	0.0015	0.0049	0.0000030	0.000030	0.00045	0.0070	0.014	0.010	0.0016	0.00010	0.000045	0.0000020	0.055	0.0010
	% Change of Final Recirculation Cycle		157	129	0	-35	56	-29	0	67	-39	157	87	0	232	0	*NA*	50	107	-50
	% Change of Median for Recirculation Period		181	127	0	-35	67	-16	0	0	-30	0	105	0	167	0	*NA*	0	170	-50
Gneiss Fresh (HC4)	Cycle immediately before recirculation period (Cycle 45)	7.7	62	34	2.0	0.043	0.0030	0.0063	0.0000030	0.000030	0.00040	0.0070	0.0095	0.010	0.00064	0.00010	0.0010*	0.0000020	0.0069	0.0010
	Final cycle of recirculation period (Cycle 73)	8.1	145	84	2.0	0.012	0.0040	0.0039	0.0000030	0.000070	0.00038	0.022	0.016	0.010	0.0022	0.00010	0.00018	0.0000020	0.016	0.0010
	Median for recirculation period (cycles 46-73)	8.1	172	86	3.0	0.013	0.0064	0.0049	0.0000030	0.000030	0.00035	0.0070	0.016	0.010	0.0020	0.00020	0.000080	0.0000020	0.020	0.0010
	% Change of Final Recirculation Cycle		137	147	0	-71	33	-38	0	133	-5.0	214	64	0	244	0.00	*NA*	0	133	0
	% Change of Median for Recirculation Period		179	152	50	-69	113	-22	0	0	-13	0	64	0	214	100	*NA*	0	192	0
Schist Transition (HC1)	Cycle immediately before recirculation period (Cycle 45)	8.0	73	39	2.0	0.026	0.00030	0.0064	0.0000030	0.000030	0.00033	0.0070	0.0032	0.010	0.0015	0.00010	0.0010*	0.0000020	0.0033	0.0010
	Final cycle of recirculation period (Cycle 73)	8.0	138	74	4.0	0.019	0.00040	0.0020	0.0000030	0.00023	0.00062	0.0080	0.0050	0.010	0.0030	0.00010	0.00024	0.000013	0.0049	0.0020
	Median for recirculation period (cycles 46-73)	8.1	161	76	5.0	0.010	0.00050	0.0026	0.0000030	0.00020	0.00035	0.0070	0.0039	0.010	0.0025	0.00020	0.00015	0.0000020	0.0065	0.0010
	% Change of Final Recirculation Cycle		89	90	100	-26	33	-69	0	667	88	14	59	0	97	0	*NA*	550	48	100
	% Change of Median for Recirculation Period		121	94	150	-61	67	-59	0	567	6.1	0	23	0	61	100	*NA*	0	96	0
Schist Fresh (HC2)	Cycle immediately before recirculation period (Cycle 45)	7.9	73	41	2.0	0.040	0.0074	0.0067	0.0000030	0.000030	0.00041	0.0070	0.013	0.010	0.00010	0.00040	0.0010*	0.0000020	0.0051	0.0030
	Final cycle of recirculation period (Cycle 73)	8.1	172	97	4.0	0.011	0.011	0.0032	0.0000030	0.000030	0.0011	0.040	0.030	0.010	0.0015	0.0015	0.00011	0.0000030	0.011	0.0020
	Median for recirculation period (cycles 46-73)	8.1	172	87	4.0	0.013	0.014	0.0043	0.0000030	0.000030	0.00045	0.0070	0.031	0.010	0.00044	0.0017	0.000060	0.0000020	0.011	0.0010
	% Change of Final Recirculation Cycle		134	136	100	-72	47	-52	0	0	163	471	132	0	1410	275	*NA*	50	110	-33
	% Change of Median for Recirculation Period		134	112	100	-69	82	-36	0	0	9.8	0	141	0	340	325	*NA*	0	110	-67

Notes: Negative values represent a decrease in concentration; percent difference values are highlighted, * a high detection limit of 0.001 mg/L was often applied for Se analyses; as a result, for all columns, the second to last cycle prior to the recirculation period (which provided a measurable value) was applied for calculation of percent differences; however, for humidity cells, the 13 cycles prior to the recirculation period applied the high detection limit (*i.e.* 0.0005 mg/kg/wk) which is considered to be a disproportionately high value to use in the calculation of percent differences.

4.1.6.4 Field Kinetic Test Results

Leachate chemistry for the field kinetic tests are presented by lithology in Table 4-32 to Table 4-36. The results are compared to MMER (2002) and CCME (2007) water quality guidelines for the protection of aquatic life to highlight the significance of the preliminary field bin leachate data. A summary of the relevant guidelines are presented in Table 4-14. The waste rock field bin data has been updated with results from the summer and fall of 2016. Note that these are the only kinetic tests for which results presented in the Lorax, 2016 Geochemical Characterization Report (Lorax, 2016) have been updated. This was done as the additional field bin data was required to calculate granite waste rock loading rates, which allows for a consistent approach to calculating waste rock source terms for all types of waste rock that will be produced by the Project.

A number of parameters exceed CCME guidelines in field bin drainage. Parameters which exceed 10x CCME guidelines in gneiss waste rock are As, SO_4 and U. Of these parameters U consistently exceeds 10x CCME in the FB-GT and FB-GS field bins, while As consistently exceeds 10x CCME in FB-GO. In schist field bins, Hg, As, Se and U were observed above 10x CCME. With the exception of U and Zn, these parameters was only observed above 10x CCME on one occasion which was generally the first field bin sample produced from the initial irrigation of the waste rock with DI water after it was packed in the field bin. Uranium consistently exceeded 10x CCME in FB-SS and Zn exceeded 10x CCME in FB-SO on two occasions. In granite field bins As, Mn and SO_4 were found above 10x CCME in multiple samples, and ^{226}Ra and As were found above MMER in the first flush of FB-GGT.

The only field bin to become mildly acidic during the test duration is FB-GGT. This field bin dropped from an initial pH of 7.9 to 5.1, which is near the pH of rain water (approximately pH 5.6). Most metal concentrations remain relatively unchanged over this pH decline, which the exception of Mn which was relatively low in the first sample and then increased from 3.7 mg/L in the first sample to 25 - 20 mg/L in subsequent samples. Other metal cations, such as Zn, Cr, Cu, Cd and Pb show little or no increase associated with the pH decline. The low pH produced by FB-GGT is not considered representative of broader granite transition material, as it has a sulphur content that is above the 95th percentile of typical granite transition waste rock (Figure 4-8). Therefore, the mildly acidic pH produced from this kinetic test is not considered representative of what will be produced from stockpiled granite waste rock at site.

Overall, the gneiss waste rock is leaching the highest concentrations of Mo and U, the schist waste rock is leaching the highest concentrations of Sb and Zn, and the granite waste rock is leaching the highest concentrations of As, Mn and ^{226}Ra.

The highest concentrations of parameters are often measured in the first sample from each of the field bins, which is in response to the dissolution of fine particles and secondary surface oxidation products and high TSS leading to a high potential for colloidal particles to pass through the 0.45 µm filter. This is particularly evident for the nitrogen species and dissolved Sb, As, Cu, Hg, Ni and Se which show a decrease in concentration following the initial leachate sample. Other parameters, namely sulphate and dissolved Cr, Mo, U and Zn, show fluctuating levels in leachate from the gneiss and schist field bins over the two field seasons.

Loading rates for gneiss and schist field bins are presented in Table 4-37. These loading rates are calculated excluding the first sample which was collected by irrigating the field bins with DI water immediately after they were built.

Table 4-32:
Leachate Concentrations for Oxide and Transition Gneiss Waste Rock Field Bins

Lithology		Gneiss											
Facies (Field Bin)		Oxide (FB-GO)						Transition (FB-GT)					
Date Sampled		17-Jun-14	25-Sep-14	4-Jun-15	22-Oct-15	17-Jun-2016	7-Oct-2016	17-Jun-14	6-Oct-14	4-Jun-15	22-Oct-15	17-Jun-2016	7-Oct-2016
Volume	L	4	0.55	8.2	5	8.8	11.9	4	1.5	3.8	4	4.2	3.1
pH	s.u.	7.8	8.2	8.3	8.2	8.2	8.0	7.7	8.1	8.0	7.9	8.0	7.7
Anions and Nutrients													
$Alkalinity_T$	$mgCaCO_3/L$	339	148	114	76	92.7	65.0	243	91	69	63	66.3	40.5
Cl	mg/L	44	14	2.3	2.4	3.74	1.79	20	13	5.3	5.4	3.5	1.16
F	mg/L	0.7	ND	0.58	0.87	0.865	0.855	0.51	ND	0.37	0.35	0.463	0.374
NH_3-N	mg/L	0.026	ND	0.01	<0.005	< 0.005	<0.0050	0.0086	0.025	0.0097	<0.005	< 0.005	<0.0050
NO_3-N	mg/L	3.6	0.084	0.0081	0.22	0.292	0.184	0.43	<0.05	<0.005	0.041	0.096	<0.0050
NO_2-N	mg/L	0.14	ND	<0.001	0.0011	ND	ND	0.023	ND	0.0012	<0.002	ND	ND
SO_4	mg/L	109	150	51.8	63.9	76.0	83.4	301	572	310	570	473	250
Dissolved Metals													
Al	mg/L	0.0078	0.0057	0.017	0.048	0.0455	0.0296	0.0091	0.0051	0.0034	0.0049	0.0071	0.0062
Sb	mg/L	0.0081	0.0043	0.0037	0.0041	0.00517	0.00411	0.018	0.01	0.01	0.0073	0.0117	0.00686
As	mg/L	0.047	0.032	0.041	0.066	0.0665	0.0879	0.088	0.045	0.043	0.035	0.0468	0.0440
Ba	mg/L	0.107	0.044	0.015	0.029	0.038	0.033	0.077	0.03	0.02	0.026	0.027	0.037
Cd	mg/L	<0.00002	<0.00001	<0.000005	<0.000005	< 0.000005	<0.0000050	<0.00002	0.000014	<0.000005	0.000019	0.0000109	0.0000184
Cr	mg/L	0.0012	0.0016	0.00028	0.0033	0.0025	0.0024	0.00011	<0.001	<0.0001	0.00022	< 0.001	<0.0010
Co	mg/L	0.0008	<0.0003	0.00012	0.00016	< 0.0003	<0.00030	0.0009	0.0006	0.00014	0.00029	< 0.0003	<0.00030
Cu	mg/L	0.0075	0.0025	0.001	0.0022	0.0023	0.0023	0.01	0.0024	0.0013	0.0018	0.0018	0.0015
Fe	mg/L	<0.01	<0.03	<0.01	0.044	< 0.03	<0.030	<0.01	<0.03	<0.01	<0.01	< 0.03	<0.030
Pb	mg/L	<0.00005	<0.0005	<0.00005	0.00016	< 0.0005	<0.00050	<0.00005	<0.0005	<0.00005	0.000085	< 0.0005	<0.00050
Mn	mg/L	0.027	0.007	0.00018	0.0058	0.00059	0.00082	0.065	0.016	0.0006	0.0075	0.00054	0.00025
Hg	mg/L	0.00023	0.000021	0.000008	0.000011	0.0000065	0.0000051	0.0002	<0.00001	<0.000005	0.000007	< 0.000005	<0.0000050
Mo	mg/L	0.036	0.056	0.058	0.16	0.118	0.129	0.044	0.049	0.046	0.049	0.0602	0.0526
Ni	mg/L	0.0039	0.0013	<0.0005	<0.0005	< 0.001	<0.0010	0.007	0.001	0.001	0.00071	< 0.001	<0.0010
Se	mg/L	0.0049	0.0022	0.00047	0.00033	0.000306	0.000108	0.004	0.002	0.001	0.00044	0.000276	0.000184
Ag	mg/L	<0.00001	<0.00002	<0.00001	<0.00001	< 0.00002	<0.000020	<0.00001	<0.00002	<0.00001	<0.00001	< 0.00002	<0.000020
U	mg/L	0.13	0.16	0.075	0.067	0.0880	0.0487	0.44	0.59	0.39	0.57	0.470	0.215
Zn	mg/L	0.0044	0.019	<0.001	0.0091	< 0.005	<0.0050	0.0053	0.01	0.0045	0.11	0.0435	0.0556
Radioisotopes													
Ra-226	Bq/L	ND	ND	0.026	0.026	0.019	< 0.01	ND	ND	0.026	0.026	0.033	0.033

Notes: Values in grey italics are below the analytical detection limit; *ND* = no data; all guidelines are for total metals except Al and Fe; values that exceed the MMER (2002) MGS water quality guideline are shaded in grey. Values that exceed the maximum or 30-day CCME (2007) water quality guidelines are shaded in light blue, and by 10 times are shaded in dark blue; guidelines for Cu, Ni and Pb are based on the default value for when hardness is not known (which corresponds to the 25th percentile hardness value of ~55 mg $CaCO_3$/L calculated using available SW data (n=754, Jun-27-2014 - Jan-26-2016); guideline for Cd are calculated using the 25^{th} percentile hardness of ~55 mg $CaCO_3$/L; guideline for Cr is for hexavalent (VI); guidelines for sulphate, Co and Sb are derived from BC MOE water quality guidelines for protection of freshwater aquatic life for reference. Sulphate is hardness dependent and is based on a hardness of 55 mg $CaCO_3$/L.

Table 4-33:
Leachate Concentrations for Fresh Gneiss Waste Rock Field Bins

Lithology		Gneiss					
Facies (Field Bin)		Fresh (FB-GS)					
Date Sampled		17-Jun-14	6-Oct-14	4-Jun-15	22-Oct-15	17-Jun-2016	7-Oct-2016
Volume	L	4	1.5	8	4	3	1.1
pH	s.u.	7.6	7.7	7.9	8.0	8.0	8.0
Anions and Nutrients							
T-Alkalinity	mgCaCO$_3$/L	251	97	62	76	70.7	75.9
Cl	mg/L	17	17	5	2.8	4.9	<5.0
F	mg/L	<0.4	ND	0.43	0.19	0.24	<0.20
NH_3-N	mg/L	0.17	0.012	0.037	<0.005	< 0.005	<0.0050
NO_3-N	mg/L	2.4	1.5	0.72	1.1	1.80	<0.050
NO_2-N	mg/L	0.045	ND	<0.01	<0.005		
SO_4	mg/L	1060	2280	1120	1180	1180	937
Dissolved Metals							
Al	mg/L	0.009	0.005	0.0021	0.0091	< 0.005	<0.0050
Sb	mg/L	0.017	0.012	0.012	0.01	0.0126	0.00994
As	mg/L	0.066	0.015	0.013	0.012	0.0143	0.0103
Ba	mg/L	0.049	<0.02	0.013	0.029	< 0.02	< 0.02
Cd	mg/L	0.000012	<0.00002	<0.000005	0.0000073	0.0000122	0.0000132
Cr	mg/L	<0.0001	<0.001	0.00014	<0.0001	< 0.001	<0.0010
Co	mg/L	0.0017	0.0014	0.00042	0.00035	< 0.0003	<0.00030
Cu	mg/L	0.0072	0.0022	0.0009	0.0013	0.0011	0.0010
Fe	mg/L	<0.01	<0.03	<0.01	<0.01	< 0.03	<0.030
Pb	mg/L	<0.00005	<0.0005	<0.00005	<0.00005	< 0.0005	<0.00050
Mn	mg/L	0.14	0.044	0.006	0.013	0.00192	0.00030
Hg	mg/L	0.00002	<0.00001	<0.000005	<0.000005	< 0.000005	<0.0000050
Mo	mg/L	0.017	0.016	0.013	0.023	0.0302	0.0360
Ni	mg/L	0.011	0.0078	0.0037	0.0028	0.0029	0.0020
Se	mg/L	0.0052	0.0064	0.0014	0.000603	0.000608	0.000437
Ag	mg/L	<0.00001	<0.00002	<0.00001	<0.00001	< 0.00002	<0.000020
U	mg/L	0.4	0.75	0.43	0.49	0.443	0.375
Zn	mg/L	0.001	<0.005	0.0016	0.076	0.0461	0.0777
Radioisotopes							
Ra-226	Bq/L	ND	ND	0.06	0.057	0.053	0.033

Table 4-34:
Leachate Concentrations for Oxide and Transition Schist Waste Rock Field Bins

Lithology		**Schist**											
Facies (Field Bin)		**Oxide (FB-SO)**						**Transition (FB-ST)**					
Date Sampled		17-Jun-14	25-Sep-14	4-Jun-15	22-Oct-15	17-Jun-2016	7-Oct-2016	17-Jun-14	25-Sep-14	4-Jun-15	22-Oct-15	17-Jun-2016	7-Oct-2016
Volume	L	4	2	7.8	4	1.2	3.5	4	2	6.2	3	5	3.0
pH	s.u.	7.9	7.7	8.2	8.1	7.8	7.9	7.8	7.8	8.0	7.9	7.9	7.7
Anions and Nutrients													
T-Alkalinity	$mgCaCO_3/L$	499	41	89	85	55.3	47.7	118	46	70	51	65.9	47.3
Cl	mg/L	68	5.9	3.8	2.9	1.66	<0.5	15	5.5	1.7	4.4	2.5	<2.5
F	mg/L	0.69	ND	0.47	0.52	0.392	0.234	0.5	ND	0.41	0.22	0.431	0.29
NH_3-N	mg/L	0.17	<0.005	<0.005	<0.005	ND	<0.005	0.044	<0.005	<0.005	<0.005	<0.005	<0.005
NO_3-N	mg/L	3.2	<0.005	<0.005	<0.005	<0.005	<0.005	0.97	<0.05	<0.005	0.26	0.203	<0.025
NO_2-N	mg/L	0.22	ND	<0.001	<0.001	ND	ND	0.014	ND	<0.001	<0.002	ND	ND
SO_4	mg/L	732	133	158	109	62.2	21.9	516	633	416	575	512	366
Dissolved Metals													
Al	mg/L	0.0063	0.024	0.0033	0.003	0.0192	0.0246	0.011	0.014	0.0026	0.0023	0.0065	<0.0050
Sb	mg/L	0.009	0.0012	0.0032	0.003	0.00201	0.00181	0.0023	0.0015	0.0018	0.0013	0.00242	0.00106
As	mg/L	0.031	0.004	0.010	0.0092	0.00685	0.00702	0.013	0.0025	0.0033	0.0022	0.00371	0.00232
Ba	mg/L	0.089	0.03	0.013	0.054	0.034	0.040	0.052	0.029	0.023	0.034	0.041	0.044
Cd	mg/L	0.000013	0.000023	<0.000005	0.0000061	0.0000110	<0.0000050	<0.00001	0.000021	<0.000005	0.000013	<0.000005	0.0000119
Cr	mg/L	0.0015	<0.001	0.00089	0.0023	<0.001	<0.001	<0.0001	<0.001	0.00013	0.00052	<0.001	<0.001
Co	mg/L	0.0015	0.0008	<0.0001	0.00012	0.00033	<0.00030	0.001	0.00036	0.00012	0.00018	< 0.0003	<0.00030
Cu	mg/L	0.006	0.003	0.0006	0.00063	0.0016	<0.0010	0.0061	0.0016	0.00074	0.00087	0.0021	<0.0010
Fe	mg/L	<0.01	0.074	<0.01	<0.01	0.039	0.056	<0.01	0.032	<0.01	<0.01	<0.03	<0.030
Pb	mg/L	<0.00005	0.00084	<0.00005	0.00013	0.00079	<0.00050	<0.00005	0.00067	<0.00005	0.000053	0.00122	<0.00050
Mn	mg/L	0.036	0.096	0.0014	0.011	0.0528	0.0197	0.049	0.036	0.0021	0.02	0.00495	0.00307
Hg	mg/L	0.00031	0.000059	0.000009	0.0000052	< 0.000005	0.0000059	0.000019	<0.00001	<0.000005	<0.000005	<0.000005	<0.000005
Mo	mg/L	0.0037	0.0011	0.0052	0.0059	0.0032	0.0023	0.023	0.015	0.022	0.016	0.0277	0.0182
Ni	mg/L	0.005	<0.001	<0.0005	<0.0005	< 0.001	<0.0010	0.012	0.0024	0.0013	0.0013	0.0024	<0.0010
Se	mg/L	0.008	0.0011	0.00095	0.00031	0.000131	0.000058	0.013	0.0069	0.0015	0.0024	0.00108	0.000481
Ag	mg/L	<0.00001	<0.00002	<0.00001	<0.00001	< 0.00002	<0.000020	<0.00001	<0.00002	<0.00001	<0.00001	< 0.00002	<0.000020
U	mg/L	0.032	0.0036	0.0052	0.0062	0.00332	0.00199	0.047	0.064	0.044	0.045	0.0458	0.0230
Zn	mg/L	0.0026	0.56	0.024	0.15	0.325	0.0076	<0.001	0.21	0.030	0.11	0.0383	0.0449
Radioisotopes													
Ra-226	Bq/L	ND	ND	<0.01	0.011	0.013	< 0.01	ND	ND	0.025	0.023	0.016	0.021

Notes: Values in grey italics are below the analytical detection limit; *ND* = no data; all guidelines are for total metals except Al and Fe; values that exceed the MMER (2002) MGS water quality guideline are shaded in grey. Values that exceed the maximum or 30-day CCME (2007) water quality guidelines are shaded in light blue, and by 10 times are shaded in dark blue; guidelines for Cu, Ni and Pb are based on the default value for when hardness is not known (which corresponds to the 25th percentile hardness value of ~55 mg $CaCO_3$/L calculated using available SW data (n=754, Jun-27-2014 - Jan-26-2016); guideline for Cd are calculated using the 25th percentile hardness of ~55 mg $CaCO_3$/L; guideline for Cr is for hexavalent (VI); guidelines for sulphate, Co and Sb are derived from BC MOE water quality guidelines for protection of freshwater aquatic life for reference. Sulphate is hardness dependent and is based on a hardness of 55 mg $CaCO_3$/L.

Table 4-35:
Leachate Concentrations for Fresh Schist Waste Rock Field Bins

Lithology		Schist					
Facies (Field Bin)		Fresh (FB-SS)					
Date Sampled		17-Jun-14	25-Sep-14	4-Jun-15	22-Oct-15	17-Jun-2016	7-Oct-2016
Volume	L	4	2	7.8	3	3.9	2
pH	s.u.	7.7	7.8	8.1	8.1	8.1	7.9
Anions and Nutrients							
T-Alkalinity	$mgCaCO_3/L$	294	146	79	91	84.9	80.8
Cl	mg/L	24	24	3.8	6.9	5.4	2.6
F	mg/L	0.83	ND	0.36	0.25	0.30	0.23
NH_3-N	mg/L	0.29	ND	0.021	ND	<0.005	<0.005
NO_3-N	mg/L	0.95	<0.1	<0.025	<0.025	< 0.025	<0.025
NO_2-N	mg/L	0.013	ND	<0.005	<0.005	ND	ND
SO_4	mg/L	451	1660	679	882	916	686
Dissolved Metals							
Al	mg/L	0.013	<0.005	0.0017	0.0037	< 0.005	<0.0050
Sb	mg/L	0.059	0.043	0.041	0.025	0.0279	0.0180
As	mg/L	0.088	0.019	0.014	0.0092	0.0108	0.00623
Ba	mg/L	0.055	0.025	0.015	0.023	0.023	0.027
Cd	mg/L	0.000011	<0.00002	<0.000005	<0.000005	< 0.000005	0.0000059
Cr	mg/L	0.00024	<0.001	<0.0001	<0.0001	<0.001	<0.001
Co	mg/L	0.0018	0.0045	0.001	0.0011	< 0.0003	<0.00030
Cu	mg/L	0.011	0.0025	0.00079	0.00096	0.0011	<0.0010
Fe	mg/L	<0.01	<0.03	<0.01	<0.01	< 0.03	<0.030
Pb	mg/L	<0.00005	<0.0005	<0.00005	<0.00005	< 0.0005	<0.00050
Mn	mg/L	0.053	0.15	0.014	0.053	0.00377	0.00031
Hg	mg/L	<0.00001	<0.00001	<0.000005	<0.000005	< 0.000005	<0.0000050
Mo	mg/L	0.012	0.017	0.0081	0.0072	0.0062	0.0092
Ni	mg/L	0.063	0.058	0.021	0.015	0.0140	0.0090
Se	mg/L	0.0054	0.0056	0.00094	0.00049	0.000323	0.000244
Ag	mg/L	0.000013	<0.00002	<0.00001	<0.00001	< 0.00002	<0.000020
U	mg/L	0.13	0.57	0.22	0.25	0.239	0.151
Zn	mg/L	0.002	0.012	0.0013	0.088	0.0631	0.0677
Radioisotopes							
Ra-226	Bq/L	ND	ND	0.016	0.028	0.03	0.024

Table 4-36:
Leachate Concentrations for Granite Waste Rock Field Bins

Lithology		Granite							
Facies (Field Bin)		Fresh (FB-GGT)				Transition (FB-GGS)			
Date Sampled		17-Jun-15	22-Oct-15	17-Jun-2016	7-Oct-2016	17-Jun-15	22-Oct-15	17-Jun-2016	7-Oct-2016
Volume		4.0.	6	4.5	3.6	1.5	5	3	7.8
pH	s.u.	7.9	6.4	5.32	5.13	8.3	7.7	8.10	7.44
Anions and Nutrients									
T-Alkalinity	mgCaCO$_3$/L	123	1.2	<1	<1	227	41	29.9	20.7
Cl	mg/L	26	6	2.0	<2.5	24	5	1.81	<2.5
F	mg/L	<0.2	0.1	0.082	<0.10	<0.8	0.86	0.803	0.77
NH_3-N	mg/L	1.6	0.73	0.233	<0.005	0.42	0.19	<0.005	<0.005
NO_3-N	mg/L	1.2	0.015	<0.01	<0.025	0.4	0.066	0.253	0.915
NO_2-N	mg/L	0.17	<0.002	ND	ND	0.03	0.07	ND	ND
SO_4	mg/L	317	708	554	424	597	497	225	380
Dissolved Metals									
Al	mg/L	0.012	0.028	0.0434	0.0614	0.0059	0.0037	0.0209	0.0120
Sb	mg/L	0.016	0.0089	0.0107	0.00662	0.0088	0.0073	0.00734	0.00537
As	mg/L	0.64	0.15	0.133	0.105	0.13	0.081	0.0473	0.0374
Ba	mg/L	0.083	0.03	0.039	0.028	0.049	0.027	< 0.02	0.028
Cd	mg/L	0.00011	0.0002	0.000198	0.000135	0.000091	0.000073	0.0000284	0.000105
Cr	mg/L	<0.0001	<0.0005	<0.001	<0.001	<0.0001	<0.0001	<0.001	<0.001
Co	mg/L	0.021	0.074	0.0661	0.0570	0.029	0.0054	0.00095	0.00518
Cu	mg/L	0.0015	0.0011	0.0014	0.0015	0.0025	0.00048	< 0.001	<0.0010
Fe	mg/L	<0.01	0.013	<0.03	0.033	<0.01	<0.01	<0.03	<0.03
Pb	mg/L	<0.00005	<0.00025	<0.0005	<0.0005	0.000053	<0.00005	<0.0005	<0.0005
Mn	mg/L	3.7	25	22.8	20.0	3.7	3.1	1.43	4.92
Hg	mg/L	0.000046	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
Mo	mg/L	0.00073	0.00045	< 0.001	<0.0010	0.02	0.02	0.0110	0.0087
Ni	mg/L	0.0053	0.02	0.0183	0.0160	0.0031	0.00068	< 0.001	<0.0010
Se	mg/L	0.0011	0.00049	0.00029	<0.00025	0.00056	0.00019	< 0.00005	<0.000050
Ag	mg/L	<0.00001	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00002	<0.00002
U	mg/L	0.0058	0.0008	0.00134	0.00271	0.53	0.12	0.0308	0.0128
Zn	mg/L	0.14	0.25	0.227	0.212	0.0068	0.0075	< 0.005	0.0187
Radioisotopes									
Ra-226	Bq/L	0.39	0.099	0.019	0.017	ND	0.028	0.01	0.039

Notes: Values in grey italics are below the analytical detection limit; *ND* = no data; all guidelines are for total metals except Al and Fe; values that exceed the MMER (2002) MGS water quality guideline are shaded in grey. Values that exceed the maximum or 30-day CCME (2007) water quality guidelines are shaded in light blue, and by 10 times are shaded in dark blue; guidelines for Cu, Ni and Pb are based on the default value for when hardness is not known (which corresponds to the 25th percentile hardness value of ~55 mg CaCO$_3$/L calculated using available SW data (n=754, Jun-27-2014 - Jan-26-2016); guideline for Cd are calculated using the 25th percentile hardness of ~55 mg CaCO$_3$/L; guideline for Cr is for hexavalent (VI); guidelines for sulphate, Co and Sb are derived from BC MOE water quality guidelines for protection of freshwater aquatic life for reference. Sulphate is hardness dependent and is based on a hardness of 55 mg CaCO$_3$/L.

Table 4-37:
Loading Rates for Waste Rock Field Kinetic Tests

Lithology		Gneiss			Schist			Granite	
Weathering Facies		Oxide	Transition	Fresh	Oxide	Transition	Fresh	Transition	Fresh
Field Test ID		FB-GO	FB-GT	FB-GS	FB-SO	FB-ST	FB-SS	FB-GGT	FB-GGS
Sulphate	mg/kg/wk	0.11	0.26	0.95	0.10	0.47	0.67	0.67	0.72
P	mg/kg/wk	0.000078	0.00003	0.000039	0.000045	0.000049	0.000039	0.00017	0.000092
Al	mg/kg/wk	0.000052	0.0000032	0.0000035	0.0000094	0.0000051	0.0000027	0.00005	0.00002
Ag	mg/kg/wk	0.000000025	9.2E-09	0.00000001	0.000000012	0.000000015	0.000000011	0.000000058	0.00000003
As	mg/kg/wk	0.00011	0.000026	0.00001	0.0000076	0.0000029	0.0000095	0.00015	0.0001
Ca	mg/kg/wk	0.019	0.05	0.17	0.017	0.093	0.11	0.13	0.2
Cd	mg/kg/wk	0.000000008	7.9E-09	6.6E-09	6.8E-09	8.8E-09	5.2E-09	0.00000021	0.00000015
Co	mg/kg/wk	0.00000041	0.00000027	0.00000042	0.00000023	0.00000031	0.00000087	0.000077	0.0000082
Cr	mg/kg/wk	0.0000041	0.00000037	0.00000046	0.0000012	0.00000075	0.00000037	0.00000094	0.0000012
Cu	mg/kg/wk	0.0000031	0.00000095	0.0000009	0.0000011	0.0000013	0.00000095	0.0000015	0.0000015
Fe	mg/kg/wk	0.000043	0.000012	0.000013	0.000024	0.00002	0.000014	0.000028	0.000042
Hg	mg/kg/wk	0.000000011	3.6E-09	4.2E-09	0.000000011	5.4E-09	4.3E-09	5.8E-09	9.2E-09
Mg	mg/kg/wk	0.007	0.024	0.12	0.0087	0.052	0.085	0.029	0.033
Mn	mg/kg/wk	0.0000022	0.0000022	0.0000076	0.000018	0.0000089	0.000024	0.026	0.0067
Mo	mg/kg/wk	0.00018	0.000031	0.000015	0.0000037	0.000021	0.0000066	0.00000092	0.000024
Ni	mg/kg/wk	0.0000013	0.00000056	0.0000029	0.00000061	0.0000015	0.000016	0.000021	0.0000016
Pb	mg/kg/wk	0.00000054	0.00000018	0.00000015	0.00000026	0.00000048	0.00000019	0.00000047	0.00000062
Sb	mg/kg/wk	0.0000068	0.0000055	0.0000089	0.0000022	0.0000017	0.000026	0.00001	0.000012
Se	mg/kg/wk	0.00000031	0.00000037	0.00000095	0.00000055	0.000002	0.00000095	0.00000041	0.00000018
Tl	mg/kg/wk	0.00000024	0.00000011	0.0000001	0.00000013	0.00000014	0.00000011	0.00000041	0.00000031
U	mg/kg/wk	0.00011	0.00026	0.00036	0.000004	0.000042	0.0002	0.0000018	0.0001
Zn	mg/kg/wk	0.0000076	0.000029	0.000024	0.000068	0.000044	0.000028	0.00027	0.000022

Note: Loading rates calculated excluding the first flush sample.

4.1.6.5 Comparison of Duplicate Kinetic Tests

To assess scale issues between the measured kinetic test rates and predictions of full scale waste rock storage conditions, duplicate samples of each lithology and weathering facies were submitted in multiple masses for kinetic testing under different operating conditions (i.e., unsaturated columns, humidity cells and field bins) (Table 4-36).

Loading rates measured from duplicate kinetic tests are compared in Table 4-36. This table shows median loading rates measured in laboratory kinetic tests and mean loading rates measured in field bins over the test duration. In general results for SO_4, As, Sb and U show that loading rates decline as kinetic tests become progressively larger. That is, humidity cells have the greatest loading rates, columns have intermediate loading rates and field bins have the lowest field bins. For example, the As loading rate in the gneiss transition humidity cell (HC3) is 2.3 and 17 times greater than that observed in a duplicate column (Col 6) and field bin (FB-GT), respectively. A similar result is observed for U, where HC3 is producing loading rates that are a factor of 3.1 and 38 times greater than Col 6 and FB-GT. The discrepancy between loading rates from duplicate kinetic tests at different scales and operating conditions suggests that loading rates are being affected by solubility constraints.

Arsenic solubility in neutral pH aerobic environments is pH sensitive, with sorption reactions often controlling dissolved concentrations (Pierce and Moore, 1982). Concentrations of As are plotted against pH in Figure 4-15. Note that in this figure and in Figure 4-16, the initial three cycles from laboratory kinetic tests and the first flush from field bins are excluded from the plots. These plots show that a similar concentration range of As is produced in kinetic test leachate where loading rates varied by over an order of magnitude. While there is some variability in the concentration produced by differing kinetic tests, the difference in concentration are smaller in magnitude than the differences in loading rates and can generally be related to pH.

In aerobic pH-neutral to alkaline environments uranium solubility has been shown to be sensitive to pH and alkalinity, with alkalinity general being the more influential (Davis and Curtis, 2003). The relationship between U and Alkalinity is presented in Figure 4-16 for duplicate kinetic tests below. In general, laboratory kinetic tests show a similar relationship between U concentrations and alkalinity, while field bin data deviates from this relationship in most cases. This variation in the relationship between U and alkalinity may be related to the relatively long storage time of field bin leachate. That is, drainage collected in collection jugs may be held for weeks to months in the field between water quality measurements, over this time temperature fluctuations, interaction with atmospheric CO_2 and potential precipitation reactions will affect alkalinity. Note that the first flush sample, which was collected immediately after field bins were irrigated with DI water shows considerably higher alkalinity values than subsequent measurements (Table 4-32, Table 4-33 and Table 4-34).

Table 4-38:
Comparison of Loading Rates from Duplicate Samples Operated in Kinetic Tests with Different Masses and Operating Procedure

Sample Description	Kinetic Test ID	Mass	Time	Leachate	SO_4	As	Sb	U
		Kg	Week	L	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
Gneiss Oxide	Col 5	10	86	14	0.099	0.00021	0.000040	0.0013
	FB-GO	183	120	38	0.11	0.00011	0.0000068	0.00011
Gneiss Transition	HC3	1.0	87	43	1.0	0.0025	0.00040	0.011
	Col6	10	84	14	0.32	0.00079	0.00014	0.0035
	FB-GT	229	120	20.6	0.26	0.000026	0.0000055	0.00026
Gneiss Fresh	HC4	1.0	87	42	0.98	0.0024	0.0014	0.0036
	FB-GS	190	70	18	0.95	0.00001	0.0000089	0.00036
Schist Oxide	Col 3	10	86	14	0.18	0.00011	0.000050	0.000069
	FB-SO	171	120	22.5	0.10	0.0000076	0.0000022	0.000004
Schist Transition	HC1	1.0	87	43	1.0	0.0012	0.00015	0.0015
	Col 4	10	86	15	1.0	0.00010	0.000031	0.00059
	FB-ST	165	70	23.2	0.47	0.0000029	0.0000017	0.000042
Schist Fresh	HC2	1.0	87	43	0.99	0.0028	0.0040	0.0027
	FB-SS	202	120	22.7	0.67	0.0000095	0.000026	0.00020
Granite Transition	HC5	1.0	42	22	1.0	0.026	0.00054	0.00023
	Col13	10	41	6.2	0.46	0.0015	0.000090	0.000013
	FB-GGT	166	68	14.1	0.67	0.00015	0.00001	0.0000018
Granite Fresh	HC6	1.0	42	22	0.99	0.0076	0.00037	0.00041
	Col 14	10	41	6.6	0.60	0.00045	0.000093	0.00081
	FB-GGS	134	68	17.3	0.72	0.0001	0.000012	0.0001

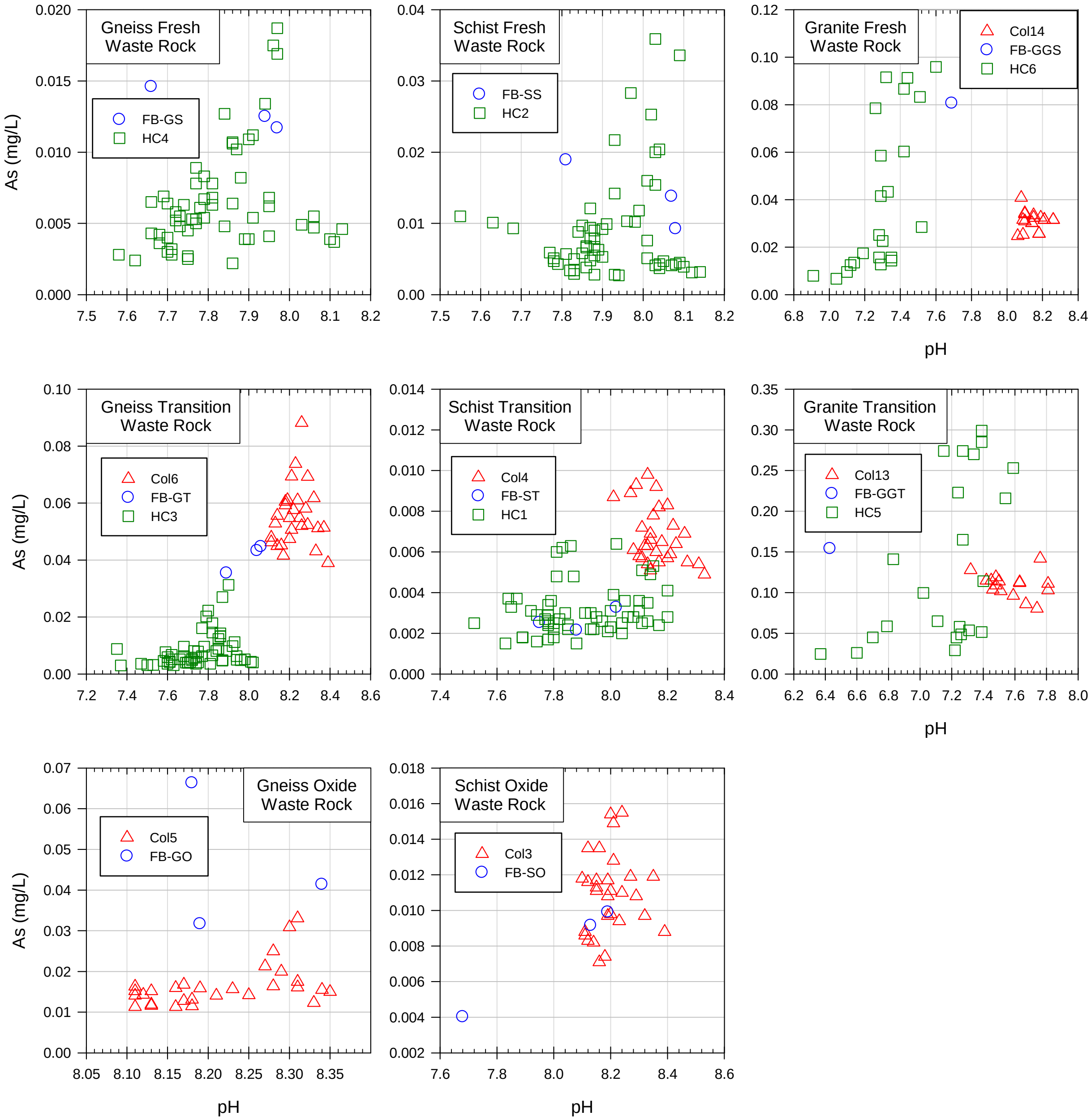

Figure 4-15: Arsenic versus pH measured in duplicate kinetic test samples containing different masses and operated under different procedures

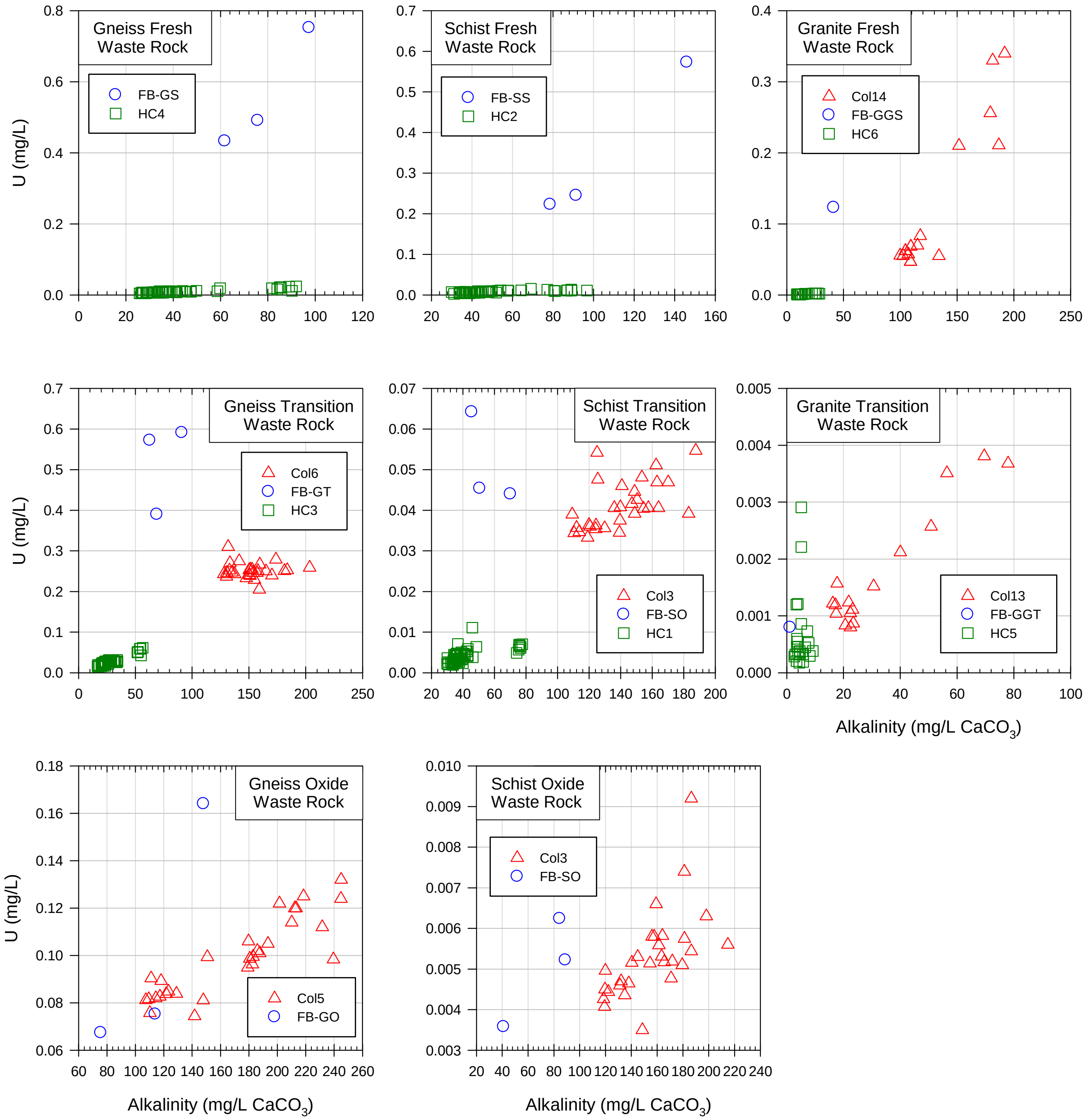

Figure 4-16: Uranium versus alkalinity measured in duplicate kinetic test samples containing different masses and operated under different procedures

4.1.7 Radioisotopes

4.1.7.1 Occurrence

Solid samples of waste rock, ore, and overburden were analyzed for NORM isotopes at SRC. The purpose of this analysis was to determine if geologic material at the Project site exceeds the Health Canada (2011) guidelines for Unconditional Derived Release Limits (UDRLs) of NORM.

The SRC NORM results, along with U and Th concentrations measured in the ICP-OES database, were reviewed by radioisotope specialists at Arcadis Canada Inc. (Arcadis). The elevated U detection limits in the ICP-OES database (10 ppm) did not pose a problem in this analysis, as U typically must be present in concentrations > 10ppm to exceed UDRLs.

The Arcadis review of SRC data and ICP-OES metal assays is provided in Appendix D.1-5. Overall, the data indicate secular equilibrium of the natural U and Th decay series, and there is high confidence that the materials that will be left on site can be considered as unrestricted according to the Canadian NORM Guidelines.

The Arcadis review also concluded that a state of secular equilibrium likely exists in the geologic samples, which has implications for the distribution of other radioisotopes, particularly ^{226}Ra which is regulated under MMER. Because secular equilibrium exists, the activity of ^{226}Ra in host rock can be determined by measurements of U concentration. Hence, the relative enrichment compared of ^{226}Ra and other daughter products of ^{238}U decay chain are directly proportional to the total U.

4.1.7.2 Kinetic Test Leachate

The activity of ^{226}Ra was measured in unfiltered field bin drainage. The relative activities are compared to solid phase U occurrence in the different rock samples (Table 4-25). That is, the schist waste rock field bins have the lowest range of activity (<0.01 Bq/L to 0.028 Bq/L), the gneiss has intermediate activity (0.026 to 0.06 Bq/L) and granite has the highest activity (0.028 Bq/L to 0.39 Bq/L) (Table 4-32, Table 4-33 and Table 4-34). Note that the peak activity of 0.39 Bq/L was observed in an unfiltered sample collected from the first flush of the granite field bin, and likely is an overestimate of dissolved activities.

There is generally a poor relationship between U concentration and ^{226}Ra activity in field bin leachate. For instance, FB-GGT is producing considerably higher ^{226}Ra then FB-GGS, while dissolved U is more than 100x greater in FB-GGS compared to FB-GGT (Table 4-34). In fact, FB-GGT is producing the lowest U concentrations of any of the waste rock field bins. This is related to the differences in chemistry between Ra and U. In aqueous systems, Ra forms a bivalent cation [Ra(II)] and behaves similar to other alkaline earth metals such as Mg, Sr, Ca and particularly Ba. Conversely, U occurs in multiple oxidation states [U(IV) and U(VI)], and its solubility is dependent on redox potential, pH and complexation reactions with CO_3, PO_4 and SO_4. Hence, although these two parameters co-occur in the solid phase, different mechanisms control their release to pore water and subsequent mobility. Controls on Ra mobility are discussed further in Section 5.1.4.3.

4.2 Ore

4.2.1 Overview of Test Results

As a result of in-situ weathering, sulphide and carbonate minerals have largely been depleted from the ore. However, a few observations can be made, (1) transitional ore has slightly higher S and NP compared to oxide ore; (2) schist ore has the highest NP (51 $kgCaCO_3/t$) compared to gneiss (2.3 $kgCaCO_3/t$) and granite (median of 1.5 $kgCaCO_3/t$) ore; and (3) schist ore has the highest trace S mineralization (median of 0.07 wt.%) compared to gneiss and granite ore (median of 0.01 wt.%). As a result of the low S content, the low NP is sufficient to maintain a neutral drainage pH (rinse pH of 6.7 – 8.7) in gneiss and schist ore samples; therefore, the schist and gneiss ore are classified as non-PAG or non-reactive. Conversely, granite ore, which has the overall lowest NP values and a mildly acidic rinse pH (4.4 - 6.8), is classified as PAG.

Solid phase metal analysis shows the oxide and transition facies are enriched in Sb, As, Bi, Se, Ag and U with respect to ACA. Enrichment of As and Sb is significantly higher in ore compared to waste rock, being two orders of magnitude higher in the ore samples compared to waste rock samples.

Kinetic testing indicates that the mildly acidic conditions produced by granite ore will lead to a significant increase in metal leaching potential. Specifically, the granite transition facies produced acidic drainage (pH 4.5-5.5) over the test period, resulting in increased loads of metal cations (Al, Cd, Co, Cu, Fe, Mn, Ni and Zn) and As loads of up to two orders of magnitude higher than that produced by the schist and gneiss ore. Leachate pH produced by gneiss and schist ore kinetic tests remain slightly alkaline over the test period with metal loadings either gradually decreasing or producing relatively low and stable loading rates. Similar to the waste rock kinetic tests, loading rates from the ore kinetic tests are not proportional to the relative solid phase content of the kinetic test material but rather are influenced by pH conditions within the kinetic test.

4.2.2 Mineral Identification

The following section provides an overview of the mineralogical results of the Project ore lithologies. Mineralogical analysis of the Project ore was carried out on composite head samples developed for metallurgical testing. XRD results for Project ore samples are summarized in Table 4-37. Mineralogical laboratory reports for XRD and assessments completed at the CLS are presented in Appendix B.1 and Appendix B.2, respectively.

4.2.2.1 Gneiss Ore

The gneiss oxide ore sample is composed of quartz, microcline, kaolinite, muscovite and phengite, while the gneiss transition ore sample is composed of quartz, albite, microcline, kaolinite, muscovite, phengite, arsenopyrite, pyrite and carbonate minerals including calcite and dolomite (Table 4-37). The gneiss oxide ore sample is relatively deplete with respect to carbonate minerals.

The gneiss transition ore sample exhibits appreciable carbonate content, with near equal abundances of calcite and dolomite. Sulphide minerals were not detected by XRD in the gneiss oxide ore sample, highlighting limited AP for this material. In contrast, XRD found both pyrite and arsenopyrite in the gneiss transition sample.

4.2.2.2 Schist Ore

The schist oxide ore sample is composed of quartz, microcline, albite, phengite, kaolinite, dolomite, arsenopyrite, pyrite, orthoclase and barite, while the schist transition ore sample is composed of quartz, dolomite, muscovite, kaolinite, phengite, microcline, calcite, biotite, pyrite and barite. Carbonate minerals present in the schist ore include calcite and dolomite (Table 4-37). The carbonate assemblage of the schist oxide ore is composed solely of dolomite, while the schist transition ore exhibits both calcite and dolomite. Overall, the schist transition ore sample has approximately five times greater carbonate abundance relative to the schist oxide ore sample.

Sulphide minerals were detected in both schist ore sample. The schist oxide ore contains pyrite and arsenopyrite, while the schist transition ore contains only pyrite. Barite was detected in both schist oxide and transition ore samples.

4.2.2.3 Granite Ore

The granite oxide ore sample is composed of quartz, phengite, microcline, kaolinite and scorodite, while granite transition ore is characterized as having quartz; muscovite; kaolinite; microcline; orthoclase; and scorodite (Table 4-37). For each of the oxide and transition granite ore samples, carbonate minerals were not identified in XRD scans. Sulphides (as pyrite) were detected for the granite oxide ore material, while sulphides were not detected for the granite transition ore material.

Table 4-39:
XRD Results for Gneiss, Granite and Schist Ore Samples

Lithology		Gneiss		Schist		Granite	
Sample ID		**72144B**	**72146B**	**72135B**	**72137B**	**72139B**	**72140B**
Weathering		**Oxide**	**Transition**	**Oxide**	**Transition**	**Oxide**	**Transition**
Mineral		wt.%					
Calcite	$CaCO_3$		2.5		4		
Dolomite	$(Ca, Mg)CO_3$		3.4	3.5	15		
Pyrite	FeS_2		0.4	0.2	0.9	0.2	
Arsenopyrite	FeAsS		0.9	0.8			
Biotite	$K(Mg,Fe)_3[AlSi_3O_{10}(OH,F)_2$				1.8		
Phengite	$K(Al,Mg)_2(OH)_2(Si,Al)_4O_{10}$	18	7.7	9.2	7.3	22	
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$	12	10		13		18
Kaolinite	$Al_2Si_2O_5(OH)_4$	7.2	6.3	10	7.9	12	9.3
Quartz	SiO_2	54	47	48	46	55	56
Orthoclase	$KAlSi_3O_8$			0.9			7.3
Microcline	$KAlSi_3O_8$	8.5	12	18	4.1	11	7.3
Albite	$NaAlSi_3O_8$		7.2	9.2			
Scorodite	$FeAsO_4 \cdot 2H_2O$					1.3	2.1
Magnesiohornblende	$Ca_2Mg_4Al(AlSi_7O_{22})(OH)_2$		1.7				
Barite	$BaSO_4$			0.2	0.5		
	Total	*100*	*100*	*100*	*100*	*100*	*100*

4.2.2.4 Trace Metal Occurrence

The occurrence of elements of interest (As and U) was investigated in ore samples using high-resolution microscopy examination at the CLS. The analysis included µXRF and XANES testing to determine elemental-phase associations and valence state. Results for µXRF are presented in Table 4-5 and the results for XANES are presented in Table 4-6 and Table 4-7. Elemental associations and oxidation states of As and U in ore samples are generally similar to waste rock, which is discussed in Section 4.1.1.6. The complete results of this analysis are provided in Appendix B.2.

4.2.3 Acid Base Accounting

This section discusses the ABA results for ore lithologies. A total of 38 samples were submitted for ABA testwork to characterize ore from the oxide and transition facies of the dominant lithologic units (gneiss, schist and granite). These samples were collected from 1-2 m drill core segments and from metallurgical head samples. This database is augmented by an additional 3,579 ore samples that were submitted for metals assays as part of the exploration program. The statistical distributions for the ABA results are presented by weathering facies (oxide and transition) for gneiss, schist and granite ore in Table 4-38. The complete set of ABA results for the ore samples are provided in Appendix C.2-1.

4.2.3.1 Rinse pH

Rinse pH for the two dominant lithologies (gneiss and schist) are neutral to slightly alkaline ($6.7 \leq pH \leq 8.7$, median values of 7.3 and 7.7, respectively). By comparison, the granite samples show lower rinse pH values ($4.4 \leq pH \leq 6.8$, median values of 6.0 and 5.6 for oxide and transition, respectively). Unlike the waste rock sample set, the rinse pH values for the ore samples indicate that the in situ pH is largely controlled by lithology rather than the degree of weathering.

4.2.3.2 Acid Potential

The dominant sulphur species present in ore is generally similar between waste rock and ore, as such, acid potential is calculated based on the same assumptions as those employed for waste rock. Refer to Section 4.1.2.2 for a discussion of sulphur species and acid potential (AP).

AP from ABA

Figure 4-2 shows a strong relationship between total-S and sulphide-S, indicating that when S is detectable, it is primarily present in sulphide minerals. However, Total-S and S species abundances for ore lithologies are presented for oxide and transition facies in Table 4-38. Consistent with the results for the waste rock samples, total-S and sulphide-S are highest in the schist ore samples and lowest in the granite ore samples, with overall concentrations decreasing with increased weathering within each lithologic unit. Total-S and sulphide S for the schist ore samples, in particular, are higher than measured for the waste rock samples, with median values for the oxide and transition ore facies of 0.11 and 0.61 wt.% total-S, respectively. Median values for the gneiss and granite ore samples (0.02 and 0.01 wt.% total-S, respectively) are considerably lower and more consistent with values measured for waste rock samples.

Sulphate-S concentrations are low in the gneiss and granite ore samples, consistent with values measured for waste rock (0.01 wt.%). Notably higher sulphate-S values were measured for the schist ore samples, with median values of 0.02 and 0.15 wt.% for the oxide and transition facies, respectively.

Table 4-40:
Statistical Distribution of ABA Results by Weathering Facies for Ore Lithologies

Unit	Parameter	Rinse pH	Paste pH	Total-S	Sulphide-S	Sulphate-S	T-C NP*	CaNP	Sobek NP	Siderite NP	T-C NNP*	Sobek NNP	NPR	NPR	NPR
	Unit	s.u.	s.u.	wt.%	wt.%	wt.%	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	T-CNP*/ T-AP	CaNP/ T-AP	SobekNP/ T-AP
Gneiss	**Oxide facies**														
	n	*5*	*5*	*5*	*5*	*3*	*5*	*5*	*3*	*3*	*5*	*3*	*5*	*5*	*3*
	Min	6.7	6.7	0.01	*<0.01*	*<0.01*	2.3	2.5	5.7	8.0	-1.1	5.0	0.7	1.3	7.9
	Median	7.3	7.2	0.02	*<0.01*	0.01	3.1	*<4.5*	6.0	11	2.5	5.4	5.0	7.2	9.6
	Max	7.4	7.4	0.11	0.01	0.06	8.9	7.5	11	18	8.2	11	12	14	15
	Transition Facies														
	n	*5*	*5*	*5*	*5*	*4*	*5*	*5*	*2*	*2*	*5*	*2*	*5*	*5*	*2*
	Min	7.0	6.8	*<0.01*	0.01	*<0.01*	1.6	*<4.5*	4.0	5.0	1.3	3.7	5.2	8.3	9.4
	Median	7.3	7.5	0.01	0.02	0.01	7.8	*<4.5*	21	25	7.5	19	8.5	15	11
	Max	8.7	8.6	0.13	0.09	0.01	34	33	38	44	30	34	77	73	13
Schist	**Oxide facies**														
	n	*6*	*6*	*6*	*6*	*3*	*6*	*6*	*4*	*4*	*6*	*4*	*6*	*6*	*4*
	Min	7.4	7.5	0.01	*<0.01*	*<0.01*	7.0	6.8	10.0	13	6.7	9.7	5.0	4.5	16
	Median	7.7	7.5	0.11	0.07	0.02	82	81	67	82	80	64	23	23	20
	Max	8.2	8.1	0.42	0.25	0.05	144	149	100	124	137	94	72	67	32
	Transition Facies														
	n	*4*	*5*	*5*	*5*	*3*	*5*	*5*	*2*	*2*	*5*	*2*	*5*	*5*	*2*
	Min	7.4	7.4	0.52	0.41	0.02	111	107	93	123	42	75	1.6	1.5	5.3
	Median	7.7	7.8	0.61	0.47	0.15	131	138	100	129	114	83	7.4	7.8	5.9
	Max	7.9	8.1	2.2	1.6	0.19	207	191	107	134	188	91	11	10	6.6
Granite	**Oxide facies**														
	n	*6*	*6*	*6*	*6*	*5*	*6*	*6*	*6*	*3*	*6*	*6*	*6*	*6*	*6*
	Min	5.7	5.7	*<0.01*	*<0.01*	*<0.01*	*<0.8*	1.7	0.7	3.0	0.5	-0.1	2.2	2.0	0.9
	Median	6.0	6.2	0.01	0.01	0.01	2.3	*<4.5*	1.5	4.0	2.0	1.2	7.4	14	4.8
	Max	6.7	6.5	0.03	0.01	0.02	6.2	*<4.5*	5.0	7.1	5.9	4.7	21	15	17
	Transition Facies														
	n	*8*	*8*	*8*	*8*	*7*	*8*	*8*	*7*	*2*	*8*	*8*	*8*	*8*	*7*
	Min	4.4	4.9	*<0.01*	*<0.01*	0.01	0.8	1.7	0.5	3.0	-1.7	-4.2	0.6	0.4	0.1
	Median	5.6	5.4	0.01	*<0.01*	0.01	2.7	*<4.5*	2.0	5.0	1.6	1.2	6.3	15	6.4
	Max	6.8	6.6	0.15	0.11	0.02	3.9	*<4.5*	3.0	7.0	3.6	2.7	13	15	10

Notes:
Values in grey italics are below the analytical detection limit; *n* = number of analyses included in statistical distribution.
* adjusted T-C NP; calculated as Total C wt.% * 77.6.
NNP = net neutralization potential, derived by subtracting AP from NP.

AP Surrogates

The exploration ICP-OES database included S measurements, which can be used to accurately estimate total-S as measured by Leco furnace as described in Section 4.1.2.2 (Figure 4-3). The exercise demonstrates that the application of S values from the exploration database as a surrogate to derive AP is a conservative means to evaluate ARD potential of mine rock. The statistical distribution of S measured by ICP-OES used to calculate surrogate AP values for ore is presented in Table 4-39.

Table 4-41:
Statistical Distribution of Sulphur (wt.%) Measured in Assay Database Used for Surrogate Acid Potential Values for Ore Lithologies and Weathering Facies

Lithology	Statistic	Oxide	Upper Transition	Lower Transition	All Weathering Facies
Gneiss	*n*	804	307	140	1251
	n <DL	344	104	22	470
	Max	1.3	1.2	1.9	1.9
	95th PCTL	0.15	0.45	1.1	0.44
	75th PCTL	0.020	0.080	0.48	0.040
	Median	0.010	0.020	0.070	0.010
	25th PCTL	*<0.01*	*<0.01*	0.010	*<0.01*
	5th PCTL	*<0.01*	*<0.01*	*<0.01*	*<0.01*
	Min	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Schist	*n*	567	227	62	856
	n <DL	55	6.0	4.0	65
	Max	2.0	4.3	3.6	4.3
	95th PCTL	0.54	2.5	3.2	2.0
	75th PCTL	0.10	1.5	2.0	0.49
	Median	0.050	0.82	1.1	0.070
	25th PCTL	0.020	0.25	0.023	0.020
	5th PCTL	*<0.01*	0.030	*<0.01*	*<0.01*
	Min	*<0.01*	*<0.01*	*<0.01*	*<0.01*
Granite	*n*	141	20	7	168
	n <DL	58	2.0	0.00	60
	Max	0.81	0.91	0.36	0.91
	95th PCTL	0.070	0.70	0.33	0.25
	75th PCTL	0.020	0.31	0.23	0.030
	Median	0.010	0.15	0.19	0.010
	25th PCTL	*<0.01*	0.018	0.020	*<0.01*
	5th PCTL	*<0.01*	*<0.01*	0.010	*<0.01*
	Min	*<0.01*	*<0.01*	0.010	*<0.01*
Other	*n*	901	327	76	1304
	n <DL	236	58	2.0	296
	Max	4.0	4.2	4.0	4.2
	95th PCTL	0.63	1.6	2.2	1.5
	75th PCTL	0.080	0.55	1.5	0.17
	Median	0.020	0.030	1.1	0.020
	25th PCTL	*<0.01*	0.010	0.13	0.010
	5th PCTL	*<0.01*	*<0.01*	0.010	*<0.01*
	Min	*<0.01*	*<0.01*	*<0.01*	*<0.01*

4.2.3.3 Neutralization Potential

A variety of analytical methods were used to measure NP in waste rock and ore ABA samples. Refer to Section 4.1.2.3 for a discussion and interpretation of NP estimates produced form different methods.

NP from ABA

The relationship between sobek NP, siderite NP and CaNP for waste rock and ore samples are plotted in Figure 4-4. In general, the results for ore are similar to waste rock, in that siderite NP is greater than sobek NP, and sobek NP is greater than CaNP. Neutralization potential can also be estimated based on a total carbon measurement (Section 4.1.3.3). Using total carbon to estimate NP (T-C NP) and has the advantage of lower detection limits compared to CaNP.

Median NP values (CaNP, T-C NP* and sobek NP) for the ore samples are generally similar to median values for the waste rock samples, with the schist ore samples showing the overall highest NP concentrations (range: 7.0 to 207 kg $CaCO_3$/t T-C NP*; median = 110 kg $CaCO_3$/t, Appendix C.2-1) and the granite samples showing the lowest values (range: 0.8 to 6.2 kg $CaCO_3$/t T-C NP*; median = 2.3 kg $CaCO_3$/t). The gneiss samples also have overall low CaNP, with concentrations ranging from 1.6 up to 34 kg $CaCO_3$/t (median = 3.1 kg $CaCO_3$/t). The amount of NP in the ore samples is generally inversely related to the degree of weathering for a given lithologic unit, with samples from the oxide facies being characterized by lower NP values in comparison to transition facies.

NP Surrogates

The larger exploration database can be used to support interpretations of ARD potential given the strong correlation between sobek NP (as determined via ABA analysis) and CaNP (as measured through solid phase Ca determination by aqua regia digestion) (Figure 4-6). The results demonstrate that the application of aqua regia Ca from the exploration database may be used as a conservative surrogate to derive NP values. The statistical distribution of surrogate NP values (calculated using Ca from the exploration database) for ore are presented in Table 4-40.

Table 4-42: Statistical Distribution of Neutralization Potential Values Calculated from Ca Measured in Assay Database for Ore Lithologies

Lithology	Statistic	Oxide	Upper Transition	Lower Transition	All Weathering Facies
Gneiss	*n*	804	307	140	1251
	Max	162.5	125.3	136.5	162.5
	95th PCTL	42	78.4	56.5	58
	75th PCTL	3.8	7.8	21.1	4.5
	Median	2	2.5	5.9	2.3
	25th PCTL	1.3	1.5	1.8	1.5
	5th PCTL	0.8	1	1	0.8
	Min	*<0.3*	0.3	0.8	*<0.3*
Granite	*n*	141	20	7	168
	Max	5.8	1.5	12.8	12.8
	95th PCTL	2.5	1.5	9.4	2.5
	75th PCTL	1.8	1.3	1.4	1.8
	Median	1.5	0.5	1	1.5
	25th PCTL	1	*<0.3*	*<0.3*	0.8
	5th PCTL	*<0.3*	*<0.3*	*<0.3*	*<0.3*
	Min	*<0.3*	*<0.3*	*<0.3*	*<0.3*
Schist	*n*	567	227	62	856
	Max	262.5	380	625	625
	95th PCTL	142.2	164.6	147	153.6
	75th PCTL	71.5	95	91.4	84.1
	Median	32.8	67.5	74.1	51.3
	25th PCTL	8.3	52.8	59.8	15
	5th PCTL	3.5	21.3	10.3	4.4
	Min	0.8	1.8	4.3	0.8
Other	*n*	901	327	76	1304
	Max	290	250	134	290
	95th PCTL	163.3	170.9	99.8	164.9
	75th PCTL	58.8	95.5	88.4	74.5
	Median	5	13	11.3	6.4
	25th PCTL	2	1.5	5.3	1.8
	5th PCTL	0.8	0.8	0.3	0.8
	Min	0.3	0.3	*<0.3*	*<0.3*

Notes: Values in grey italics are below the analytical detection limit. n is the number of samples included in the statistical distribution, n < DL is the number of samples below the detection limit.

4.2.3.4 Net Potential Ratio

The acid generating potential of mine rock will be defined by the ratio of NP to AP and a minimum sulphur content, as described in Section 4.1.2.4. NPR values for ore were calculated using NP derived from sobek NP, CaNP and T-C NP* and AP derived from total-S (*i.e.,* T-AP). As outlined for waste rock samples, ore samples with total-S < 0.02 wt.% is considered to have negligible AP and is non-PAG. The same criteria used to classify waste rock samples are applied to ore samples (as outlined in Section 4.1.2.4).

Figure 4-7 presents sobek NP, CaNP and T-C NP* versus T-AP for the waste rock and ore samples. The statistical distribution for NPR derived using the different NP values are presented by weathering facies for each lithology Table 4-41. Median NPR values for the ore samples are >5, indicating that the majority of the ore samples are non-PAG. Similar to NPR distribution for the waste rock samples, schist ore materials have the highest NPR(T-CNP*) values (median = 11) while granite samples show the lowest (median NPR = 7.4). Of note is the overall lower NPR values for the schist ore compared to that for of the schist waste rock (median of 28). As was noted for the schist waste rock, the schist ore samples also show appreciable NNP values, which is the amount of excess NP relative to AP, with median values of 80 and 114 kg $CaCO_3$/t T-C NNP* for the oxide and transition facies, respectively.

Table 4-41 provides a summary of the relative proportions of PAG and non-PAG ore samples by lithologic unit and weathering facies according to varying NP methods. Included in the table are the number and percentage of samples with total-S <0.02 wt.%, which are considered to have negligible AP and are therefore classified as non-PAG. Also presented in Table 4-41.are the relative proportions of PAG and non-PAG ore samples according to NPR values derived from NP and AP using Ca and S from the larger ICP-MS assay database. The exploration data are presented for reference to support the ABA database. The results demonstrate that the NPR distribution of PAG and non-PAG ore varies depending on the NP and AP methods used to calculated NPR. Given the considerably higher number of samples available from the exploration assay database, these values are considered to provide a more representative distribution for the ore lithologies. Based on these data, 5% of schist ore samples are indicated to be PAG (with another 21% indicated to have an uncertain potential), 12% of the gneiss and other minor lithology ore samples are indicated be PAG (15-17% uncertain) and 26% of the granite ore samples indicated to be PAG (13% uncertain).

Overall, the results of the ABA analyses indicate that there is a greater potential for ARD to be generated from the ore samples compared to waste rock, with up to approximately 27% of the gneiss, schist and other minor lithologic ore and up to 39% of granite ore indicated to have some PAG potential.

Table 4-43:
ARD Distributions for Coffee Gold Mine Ore Lithologies

Lithology	ARD Designation	NPR (T-CNP*/AP)		NPR (CaNP/T-AP)		NPR (Sobek NP/T-AP)		NPR (surrogate NP/AP)	
		n	%	n	%	n	%	n	%
GNEISS	*Total No. Samples*	*10*		*10*		*5*		*1251*	
	Non-Reactive	3	30%	3	30%	1	20%	711	57%
	Non-PAG	6	60%	6	60%	4	80%	201	16%
	Uncertain	0	0%	1	10%	0	0%	183	14.6%
	PAG	1	10%	0	0%	0	0%	155	12.4%
SCHIST	*Total No. Samples*	*11*		*11*		*6*		*858*	
	Non-Reactive	0	0%	0	0%	0	0%	147	17%
	Non-PAG	10	91%	10	91%	6	100%	489	57%
	Uncertain	1	9%	1	9%	0	0%	180	21.0%
	PAG	0	0%	0	0%	0	0%	42	4.9%
GRANITE	*Total No. Samples*	*14*		*14*		*13*		*168*	
	Non-Reactive	6	43%	6	43%	5	38%	98	58%
	Non-PAG	6	43%	6	43%	5	38%	4	2.0%
	Uncertain	1	7%	1	7%	1	8%	22	13.1%
	PAG	1	7%	1	7%	2	15%	44	26.2%
Other (including Metabasalt)	*Total No. Samples*	*3*		*3*		*1*		*1268*	
	Non-Reactive	2	*NA*	2	*NA*	1	*NA*	527	42%
	Non-PAG	0	*NA*	0	*NA*	0	*NA*	379	30%
	Uncertain	0	*NA*	0	*NA*	0	*NA*	213	16.8%
	PAG	1	*NA*	1	*NA*	0	*NA*	148	11.7%

Notes:
n = number of analyses included in distribution
* adjusted T-C NP; calculated as Total C wt.% * 77.6 (see Section 4.1.3.3).
NPR (surrogate NP/AP): NP derived using Ca and AP derived using S from aqua regia digestion of the exploration database.
All samples with total-S <0.02 wt.% are considered Neutral.
Criteria for NPRs derived using sobek NP and surrogate NP are defined as NPR ≥3 (non-PAG), 1≤NPR<3 (uncertain), NPR<1 (PAG)
Criteria for NPRs derived using T-C NP* and CaNP are defined as NPR ≥2 (non-PAG), 1≤NPR<2 (uncertain), NPR<1 (PAG)
NA: had too few samples from ABA analyses to provide representative percentages for the unit as a whole.

4.2.4 Shake Flask Extractions

A statistical distribution of parameters that exceed the CCME and MMER water quality guidelines in SFE are presented by ore lithology and weathering facies in Table 4-42. A summary of the CCME and MMER guidelines are presented guidelines are presented Table 4-14. The complete SFE results are presented in Appendix C.2-2. Consistent with exceedances for waste rock samples, Al, Sb, As and Hg are indicated to exceed the CCME guidelines in SFE from each of the dominant lithologies and other minor lithologies (two samples submitted for SFE). In particular, As exceeds the CCME guideline in every sample for the gneiss, schist, granite and other minor lithologic unit samples. Additionally, one sample form the gneiss and three samples from the granite ore also exceed MMER guidelines. Concentrations of Co, Cu, Fe, Pb, Tl, U and Zn exceed CCME guidelines in SFE in one or more samples from the granite unit, while sulphate and Se exceed the respective guidelines in SFE from the schist unit. The elevated sulphate, for two schist ore samples in particular, is consistent with higher solid phase sulphur measured for the same two schist samples (0.2 and 0.56 wt.% total-S, Appendix C.2-1).

The highest metal concentrations in SFE are associated with oxide and transition granite facies, while the lowest values are generally associated with samples from the oxide schist ore. Exceptions to this include sulphate and Se, which are highest in the samples form the oxide and, in particular, transition facies of the schist ore. Leachate pH for the gneiss and schist samples are neutral to alkaline, ranging from 7.5 to 8.1 (slightly lower than the ranges for waste rock). Leachate pH values for the granite samples are lower, and marginally acidic in some cases, ranging from 5.6 to 7.4, with consistently low pH measured for the oxide granite samples (median pH = 5.6).

Some of the SFE metal exceedances (Al, Co, Cu, Fe, Pb, Mn, Zn) are likely associated with fine suspended solids carried through the 0.45 µm filter during the extraction experiment. However, there are SFE samples that contain elevated As and Sb (and Se in schist samples) which do not coincide with elevated concentrations of Al and Fe.

Overall, the results of the SFE for ore samples indicate that As, Sb and Hg may be metals of potential concern from ore lithologies and that Se may also pose a potential concern from schist ore. Unlike the schist waste rock, elevated Cr was not observed for the ore. It is interesting to note that U concentrations are generally low, with only a single granite-oxide sample producing U concentrations above CCME guidelines.

Table 4-44: Shake Flask Extraction Results for Ore Samples by Lithology by Weathering Facies

Unit	Parameter	pH	SO_4	Al	Sb	As	Cr	Cu	Fe	Pb	Mn	Hg	Se	Tl	U	Zn
	Unit		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
Gneiss	**Oxide facies (n = 2)**															
	Min	7.8	2.0	0.034	0.0052	0.096	0.000070	0.0011	*<0.007*	*<0.00001*	0.0047	0.00012	0.00004	0.000081	0.0022	*<0.001*
	Max	7.9	2.0	0.049	0.0069	0.13	*<0.00003*	0.0015	0.014	0.00004	0.0090	0.00044	0.00011	0.00020	0.0072	*<0.001*
	Transition Facies (n = 3)															
	Min	7.5	0.8	0.027	0.0083	0.14	*<0.00003*	0.0004	*<0.007*	*<0.00001*	*<0.0005*	0.00004	0.00037	*<0.0001*	0.00006	*<0.001*
	Median	7.8	7.9	0.086	0.042	0.18	*<0.00050*	*<0.001*	0.084	*<0.0001*	0.016	0.00046	*<0.0005*	0.00022	0.00096	*<0.01*
	Max	8.1	45	0.37	0.049	0.54	*<0.00050*	*<0.001*	0.16	0.00064	0.025	0.00051	*<0.0005*	0.00028	0.0089	*<0.01*
Schist	**Oxide facies (n = 3)**															
	Min	7.8	10	0.009	0.0037	0.086	*<0.00003*	0.00041	*<0.007*	*<0.00001*	0.0025	*<0.00001*	0.0003	0.000046	0.00094	*<0.001*
	Median	7.8	43	0.023	0.0046	0.12	*<0.00003*	0.001	*<0.007*	*<0.00001*	0.0042	*<0.00001*	0.00043	0.00011	0.0011	*<0.001*
	Max	8.0	225	0.026	0.0048	0.13	*<0.00003*	0.0014	*<0.007*	*<0.00001*	0.0245	0.00002	0.00094	0.00023	0.0015	*<0.001*
	Transition Facies (n = 2)															
	Min	7.7	208	0.012	0.011	0.074	*<0.00003*	0.0013	*<0.007*	*<0.00001*	0.047	*<0.00001*	0.0010	0.00024	0.0020	*<0.001*
	Max	7.8	328	0.022	0.014	0.15	*<0.00003*	0.0015	*<0.007*	*<0.00001*	0.057	*<0.00001*	0.0011	0.00033	0.0027	*<0.001*
Granite	**Oxide facies (n = 3)**															
	Min	6.1	1.7	0.092	0.020	0.51	*<0.00003*	*<0.001*	0.019	0.00013	0.0028	0.00003	0.00008	0.000051	0.00025	0.004
	Median	6.2	3.0	3.2	0.045	1.0	*<0.00005*	0.0042	0.92	0.00052	0.0031	0.0001	*<0.0005*	0.00065	0.0011	*<0.01*
	Max	7.4	9.6	18	0.17	1.8	0.00069	0.0058	25	0.029	0.48	0.0063	*<0.0005*	0.0023	0.033	0.042
	Transition Facies (n = 3)															
	Min	5.6	2.8	0.005	0.0040	0.13	*<0.0003*	*<0.001*	*<0.03*	*<0.0001*	0.0037	*<0.00001*	0.00043	0.00038	0.00025	*<0.01*
	Median	5.6	14	0.074	0.0062	0.22	*<0.0005*	*<0.001*	0.12	0.00014	0.0072	*<0.00005*	*<0.0005*	0.00086	0.00047	*<0.01*
	Max	5.7	40	1.4	0.023	1.5	*<0.0005*	0.017	0.94	0.00058	0.87	0.000073	*<0.0005*	0.00095	0.0026	0.033

Notes:
Values in grey italics are below the analytical detection limit; All guidelines are for total metals unless otherwise indicated.
Values that exceed the Metal Mines Effluent Regulations (MMER, 2002) MMM and MGS water quality guideline are shaded in light and dark grey, respectively.
Values that exceed the Canadian Council of Ministers of the Environment (CCME, 2007) Water Quality Guidelines are shaded in light blue (30-day) and dark blue (maximum);
Guidelines for Cu, Ni and Pb are based on the default value for when hardness is not known (which corresponds to the 25th percentile hardness value of ~55 mg $CaCO_3$/L calculated using available SW data (n=754, Jun-27-2014 - Jan-26-2016);
Guideline for Cd are calculated using the 25th percentile hardness of ~55 mg $CaCO_3$/L; guideline for Cr is for hexavalent (VI);
Guidelines for sulphate, Co and Sb are derived from BC MOE water quality guidelines for protection of freshwater aquatic life for reference. Sulphate is hardness dependent and is based on a hardness of 55 mg $CaCO_3$/L.

4.2.5 Solid Phase Elemental Abundance

Statistical summaries of solid phase element results for ore are presented for oxide and transition facies by lithologic unit in Table 4-43 and compared to average continental abundances (ACA; Price, 1997). The complete set of solid phase element results are presented in Appendix C.2-3. The results show that the oxide and transition facies are enriched in Sb, As, Bi, Hg, Se and Ag and U with respect to ACAs (shaded values in the tables). With the exception of Ag, the observed metal enrichments for ore samples are consistent with those observed for waste rock samples, with concentrations in the ore samples generally higher than values measured for waste rock of same lithologic and weathering group. In particular, Sb and As are one to two orders of magnitude higher in the ore samples compared to waste rock samples of the same lithology and weathering group. The exception is the schist unit, for which metal concentrations (other than Sb and As) in ore samples are consistent with concentrations in waste rock. Overall, the highest metal concentrations are observed for the schist ore samples while the lowest are observed for granite ore materials (Table 4-43).

Also presented for comparison are Sb and As concentrations from the exploration ICP-OES database (Table 4-44). This table presents the statistical distribution of Sb and As for each lithology, with light and dark grey shading representing three and ten times higher than the ACA values. Note that for the larger assay database, the 95th and 5th percentile values are shown in place of the maximum and minimum values to provide more representative upper and lower limits for the lithologic and weathering facies groups and avoid highlighting outliers. Also provided in Table 4-44 are the distributions of Sb and As by weathering facies for each lithologic unit, with colour grading superimposed to highlight the relative concentrations.

These results show that concentrations of As are highest in schist (median of 2450 ppm). Similarly, high As concentrations are observed in the granite lithology and other minor lithologies (2040 and 1790 ppm), with the considerably lower AS values observed in the gneiss lithology (966 ppm). Antimony is generally present at much lower concentrations than As in all ore lithologies. The highest concentration is observed in the 'other' lithologies grouping with (median of 32 ppm), with intermediate Sb concentrations in the gneiss and schist lithologies (median of 21 ppm and 22 ppm, respectively) and the lowest concentrations are present in the granite lithology (15 ppm). For complete statistics of the exploration ICP-OES see Appendix C.2-4.

Table 4-45: Solid Phase Elements by Aqua Regia Digestion for Ore Lithologies by Weathering Facies

	ACA	*8.23*	*0.2*	*1.8*	*0.009*	*25*	*60*	*5.6*	*14*	*0.085*	*0.05*	*0.075*	*0.85*	*2.7*	*70*
Unit	**Parameter**	**Al**	**Sb**	**As**	**Bi**	**Co**	**Cu**	**Fe**	**Pb**	**Hg**	**Se**	**Ag**	**Tl**	**U**	**Zn**
	Unit	**%**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**%**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**
Gneiss	**Oxide facies (*n* = 5)**														
	Min	0.29	9.3	238	0.14	1.1	2.5	0.9	12	0.35	0.3	0.1	0.43	11	9.0
	Median	0.47	34	940	0.23	4.7	5.6	1.6	22	0.55	0.9	0.14	0.5	14	25
	Max	1.1	48	1095	0.91	6.5	58	2.3	52	1.8	*<1*	0.24	0.9	20	41
	Transition Facies (*n* = 5)														
	Min	0.36	11	333	0.06	1.1	1.8	0.88	10	0.27	0.2	0.05	0.28	5.7	10
	Median	0.5	50	1185	0.29	2.2	3.5	1.6	18	0.73	0.4	0.1	1.1	11	15
	Max	1.1	161	1700	0.3	6.6	15	1.9	25	1.4	*<1*	0.3	1.2	19	27
Schist	**Oxide facies (*n* = 6)**														
	Min	0.38	6.0	1100	0.23	9.4	12	2.6	12	0.41	0.6	0.08	0.3	2.4	41
	Median	0.535	17	1450	0.52	14	14	3.0	16	0.46	0.95	0.25	0.38	2.9	48
	Max	0.9	41	5910	1.3	16	20	4.1	20	1.6	*<1*	0.59	1.5	6.0	57
	Transition Facies (*n* = 5)														
	Min	0.43	7.3	712	0.16	8.8	10	2.6	6.8	0.17	0.5	0.13	0.22	1.8	43
	Median	0.6	22	1340	0.37	12	16	2.7	14	0.33	0.7	0.25	0.4	2.6	48
	Max	0.75	49	5130	0.74	14	26	2.9	29	0.6	*<1*	0.64	0.73	3.5	49
Granite	**Oxide facies (*n* = 6)**														
	Min	0.41	6.8	714	0.07	0.2	0.8	0.82	11	0.17	*<0.2*	0.08	0.56	1.8	3.0
	Median	0.475	25	2075	0.09	1.2	1.8	1.2	18	0.98	0.45	0.095	0.93	14	21
	Max	0.54	38	7940	0.19	6.8	2.6	1.6	42	8.5	1	0.12	2.7	52	42
	Transition Facies (*n* = 8)														
	Min	0.34	3.2	603	0.04	0.3	0.7	0.62	11	0.16	*<0.2*	0.03	0.24	5.1	4.0
	Median	0.77	23	2195	0.07	1.3	3.6	1.4	18	0.37	0.3	0.07	0.77	12	17
	Max	0.94	146	*>10000*	0.1	11	17	5.9	29	4.0	*<1*	0.1	1.21	53	20

Notes:
Values in grey italics are below the analytical detection limit.
Average Continental Abundance (ACA) according to Price (1997).
Values shaded in light grey are 3x's the ACA, values shaded in dark grey are 10x's the ACA.

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Table 4-46:
Solid Phase As and Sb Concentrations in Ore from the Exploration Database

Lithology	**Gneiss**		**Schist**		**Granite**		**Other Lithologies**	
Parameter	**Sb**	**As**	**Sb**	**As**	**Sb**	**As**	**Sb**	**As**
Units	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**
Total for Lithologic Unit								
n	*1251*	*1251*	*856*	*856*	*168*	*168*	*1304*	*1304*
5th PCTL	4.0	235	5.0	516	5.0	707	6.0	255
25th PCTL	10	507	10	1320	10	1350	14	828
Median	21	966	22	2450	15	2040	32	1790
75th PCTL	47	1840	54	3800	36	3290	93	3320
95th PCTL	141	3840	391	8070	169	7190	433	6760
Oxide facies								
n	*804*	*804*	*567*	*567*	*141*	*141*	*901*	*901*
5th PCTL	5.0	263	5.0	584	5.0	711	6.0	312
25th PCTL	11	498	12	1340	10	1180	17	924
Median	24	919	27	2450	16	2030	41	1920
75th PCTL	52	1740	72	3610	34	3150	103	3310
95th PCTL	144	3770	514	8010	171	7410	390	6270
Upper Transition Facies								
n	*307*	*307*	*227*	*227*	*20*	*20*	*327*	*327*
5th PCTL	3.3	194	4.0	404	3.0	1470	5.0	218
25th PCTL	11	568	7.5	1430	8.5	1730	10	452
Median	21	1060	16	2530	11.5	2010	18	1460
75th PCTL	41	1930	33	4720	24	3320	45	2660
95th PCTL	124	3850	121	7690	160	6390	595	6370
Lower Transition Facies								
n	*140*	*140*	*62*	*62*	*7*	*7*	*76*	*76*
5th PCTL	2.0	143	2.2	25	3.6	632	4.8	111
25th PCTL	6.0	445	7.0	895	26	1050	11	1520
Median	10	1010	13	2100	62	3290	39	2720
75th PCTL	21	2230	35	3650	69	5020	109	6300
95th PCTL	71.6	4080	104	7910	103	5700	1280	10000

Notes:
Values in grey italics are below the analytical detection limit.
Values shaded in light grey are 3x's the Average Continental Abundance (ACA) for Sb (2 ppm) and As (1.8 ppm), according to Price (1997), values shaded in dark grey are 10x's the ACA values.
Red and green gradient shading represent relative concentrations of Sb and As, for all weathering facies and lithologic units.

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4.2.6 Kinetic Tests

4.2.6.1 Sample Selection Criteria and Rationale

A total of six unsaturated columns composed of the different ore lithologies and weathering facies (oxide and transition) were initiated for kinetic testwork to obtain information on acid generation and metal leaching rates from ore that will be temporarily sub-aerially stored in the ROM stockpiles and exposed on the pit walls. The kinetic test ore samples were sourced from composite head samples used in metallurgical testwork. A summary of the ore columns, sample selection criteria and rationale for the testwork are provided in Table 4-45. Note that the ore samples were developed as composites to represent typical ore from the various mine pits. As such, other minor lithologies may also be included the composite samples, but for the purpose of discussion they will be referred to by the dominant ore lithology within each pit. Since Double Double is hosted in gneiss similar to Supremo pit, the composite ore sample from the much larger Supremo pit is used to represent ore from both Suremo and Double Double. Figure 4-17 and Figure 4-18 present box plots showing the distribution of total-S and solid phase As, Sb and U for each ore type, with the results for the kinetic test sub-samples superimposed. The data presented Figure 4-17 and Figure 4-18 indicate that the kinetic tests represent moderate to high total-S and low to very high concentrations of As, Sb and U with respect to the larger sample population (*i.e.*, exploration or ABA database); therefore, leachate from the column tests are considered to be representative of 'best-estimate' to 'worst-case' drainage quality from sub-aerially stockpiled gneiss, schist and granite ore (Table 4-45). All the unsaturated columns were operated as trickle leach columns operated on bi-weekly cycles. Additional detail pertaining to the operating procedures are provided in Section 3.2.6 and Appendix D.2.

Table 4-47: Ore Kinetic Test Details

Lithology	Weathering Facies	Test ID	Head Sample/ Metallurgical Column	Sample Description	Dry Wt. of Sample (kg)	Cycles/ Weeks
Gneiss (Supremo)	Oxide	Col 11	50% 72144B 50% 72145B	Moderate to high T-S (75th PCTL) and moderate As, Sb, U	5.0	45
	Transition	Col 12	72146B	Moderate to high T-S (75th PCTL) and moderate As, Sb, U	4.3	45
Schist (Latte)	Oxide	Col 9	50% 72135B, 50% 72136B	High T-S (80th PCTL); moderate to low As, Sb, U < 50th PCTL)	5.0	45
	Transition	Col 10	50% 72137B, 50% 72138B	Moderate to low T-S (40th PCTL); low As, high Sb, moderate U	5.0	45
Granite (Kona)	Oxide	Col 7	72139B	High T-S (80th PCTL); high As, Sb (>75th PCTL), moderate U	4.4	45
	Transition	Col 8	72140B	Moderate T-S (50th PCTL); very high As, Sb (>90th PCTL), low U	4.4	45

Notes: All columns are constructed of Plexiglas with acrylic perforated disk & nylon mesh; All tests operated at temperature of 4°C; Leachate is sampled bi-weekly from all columns; All columns are operated as trickle leach (discussed in more detail in Section 3.2.6).

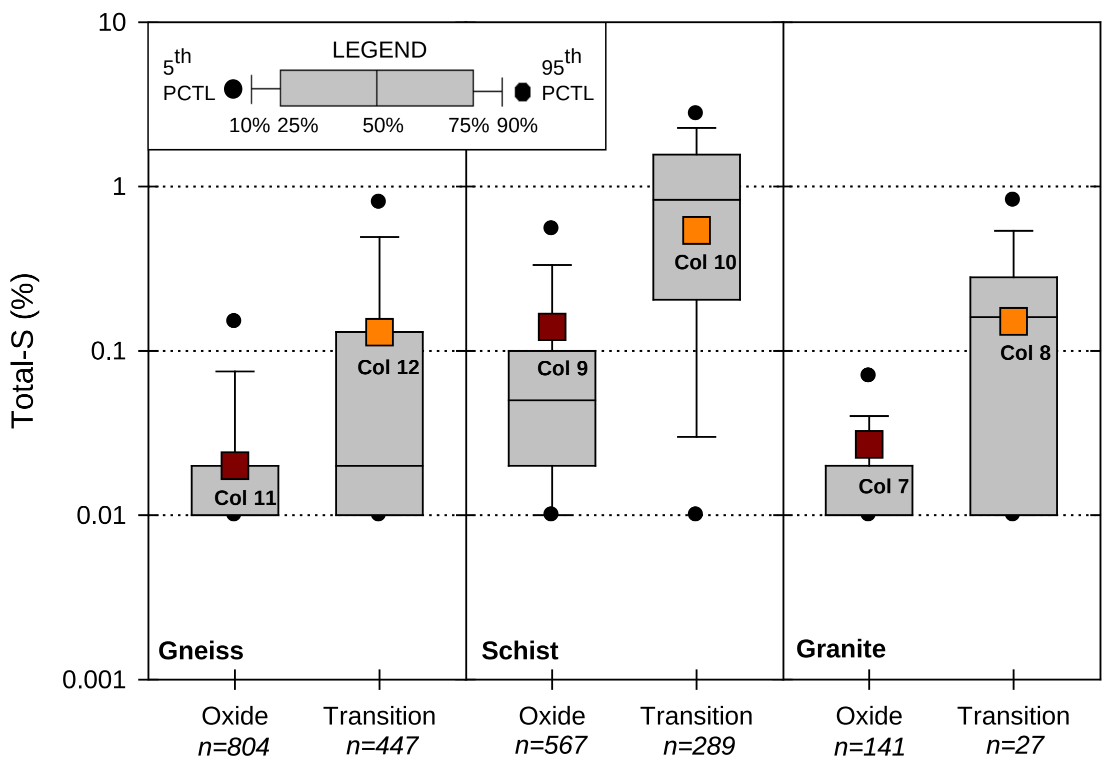

Figure 4-17: Box plots showing the concentration ranges for total-S for the exploration database ore samples with total-S for the kinetic test sub-samples superimposed

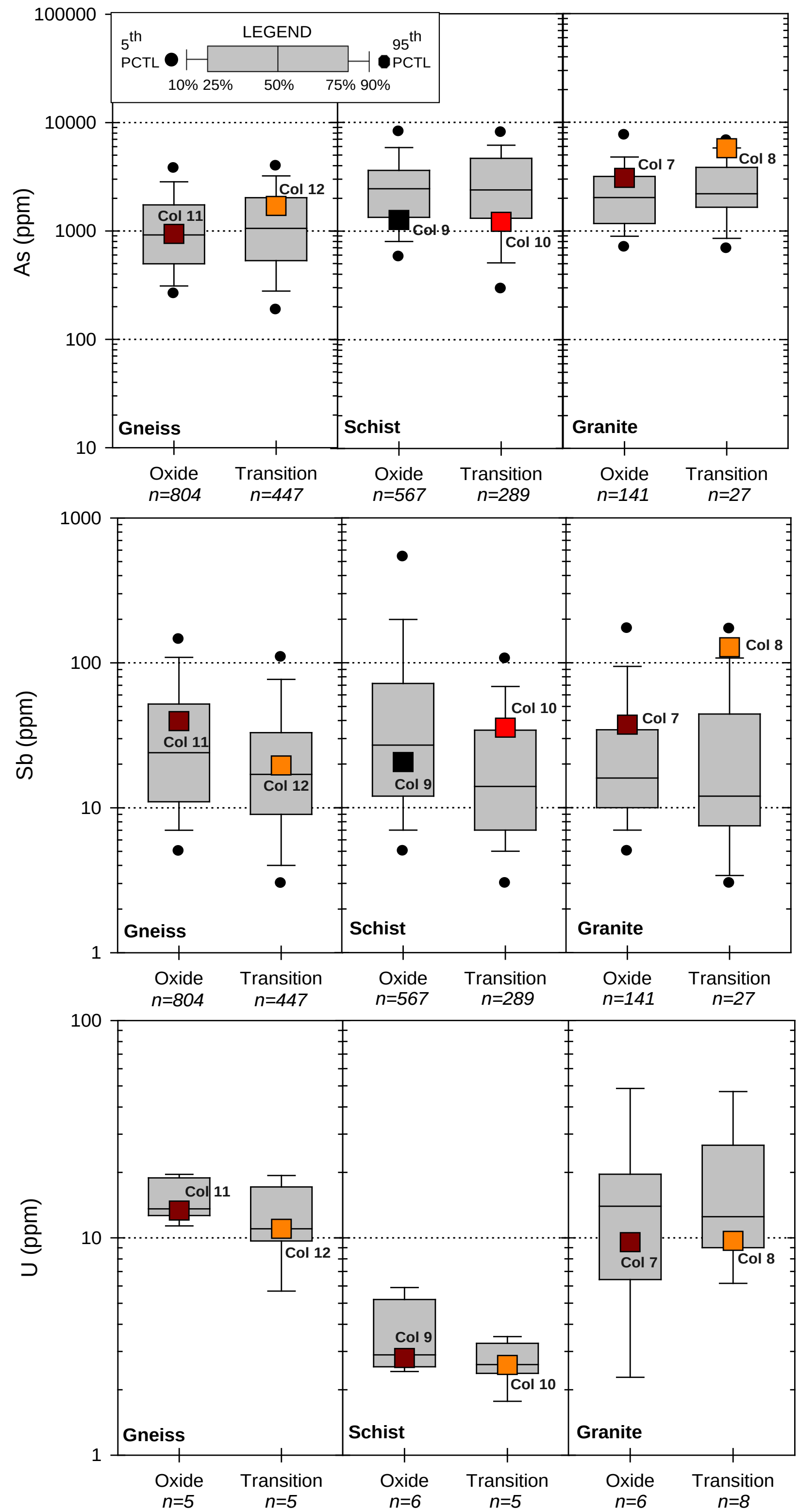

Figure 4-18: Box plots showing the concentration ranges for solid phase As and Sb for the exploration database ore samples and U for the ABA database ore samples with the kinetic test sub-samples superimposed.

4.2.6.2 Static Tests

Acid Base Accounting and Solid Phase Elements

Rinse pH for the gneiss and schist ore column sub-samples are pH-neutral (pH ~7.4, Table 4-46), owing to low total-S and presence of NP in the gneiss sub-samples and moderate total-S but higher NP in the schist sub-samples. Both granite ore sub-samples have acidic rinse pH values of pH 5.7 (oxide facies, Col 7) and 4.4 (transition facies, Col 8). Despite the low total-S content of these samples, they lack carbonate mineralization (CaNP) allowing even minor amounts of sulphur to produce a mildly acidic pH.

Consistent with the larger static test ore sample population, the highest total-S value was measured in the schist transition sub-sample (0.54 wt.%, Col 10) and the lowest total-S values were measured in the gneiss and granite oxide facies (0.02 and 0.03 wt.%, respectively). The schist oxide and transition sub-samples comprise the highest CaNP (125 and 148 kg $CaCO_3$/t) while the lowest CaNP values were measured in the granite oxide and transition sub-samples (1.7 kg $CaCO_3$/t for both) and the gneiss oxide facies sub-sample (5 kg $CaCO_3$/t).

The schist oxide facies and, in particular, transition facies sub-samples comprise the highest overall solid phase element concentrations (Ag, Al, Cd, Co, Cu, Fe, Mn, Ni, Pb, Zn; Table 4-46). However, the highest solid phase As and Sb concentrations were measured in the granite transition sub-sample (5770 and 128 ppm, respectively) and the highest U concentrations was measured in the gneiss oxide and transition sub-samples (13 and 11 ppm). Selenium concentrations are below the detection limit (<1 ppm) for each sub-sample.

Particle Size Distribution

Table 4-47 presents the distribution of grain sizes determined from representative sub-samples of the ore columns. These data indicate that the ore columns are predominantly composed of particles measuring > 0.425 and < 9.5 mm (81 – 91%), with the greatest proportion of test material composed of particles measuring >6.3 and < 9.5 mm.

Table 4-48:
Acid Base Accounting and Solid Phase Elements for Ore Column Sub-Samples

	Lithology	Gneiss		Schist		Granite	
	Weathering Facies	Oxide	Transition	Oxide	Transition	Oxide	Transition
	Column ID	Col 11	Col 12	Col 9	Col 10	Col 7	Col 8
Acid Base Accounting Parameters							
Rinse pH	s.u.	7.4	7.3	7.4	7.4	5.7	4.4
Total-S	wt.%	0.02	0.13	0.14	0.54	0.03	0.15
Sulphate-S	wt.%	*<0.01*	0.02	0.04	0.05	*<0.01*	0.02
Sulphide-S	wt.%	*<0.01*	0.09	0.09	0.44	0.01	0.11
CaNP	kg $CaCO_3$/t	5	33	125	148	1.7	1.7
Sobek NP	kg $CaCO_3$/t	8	38	79	100	0.7	0.5
Siderite NP	kg $CaCO_3$/t	15	44	105	129	7.1	7.0
Solid Phase Elements by Aqua Regia							
Ag	ppm	0.11	0.16	0.25	0.29	0.080	0.090
Al	%	0.43	0.56	0.44	0.65	0.41	0.34
As	ppm	940	1700	1265	1215	3080	5770
Cd	ppm	0.060	0.040	0.10	0.090	0.060	0.040
Co	ppm	5.6	6.6	11	11	1.2	1.9
Cr	ppm	84	107	86	83	77	76
Cu	ppm	4.1	3.5	20	21	0.8	3.8
Fe	%	1.6	1.8	2.7	2.6	1.3	1.5
Hg	ppm	0.96	1.15	0.48	0.47	0.83	4.0
Mn	ppm	300	396	545	502	114	217
Mo	ppm	2.0	3.1	1.5	2.8	1.9	2.3
Ni	ppm	17	12	52	44	1.9	2.3
Pb	ppm	13	14	17	17	15	16
Sb	ppm	40	20	21	36	37	128
Se	ppm	*<1*	*<1*	*<1*	*<1*	*<1*	*<1*
U	ppm	13	11	2.8	2.6	9.6	9.7
Zn	ppm	26	27	55	48	18	19

Notes: Values in grey italics are below the analytical detection limit.

Table 4-49:
Particle Size Distribution for Ore Column Sub-Samples

Sieve	Aperture	Col 7	Col 8	Col 9	Col 10	Col 11	Col 12
Designation	(mm)	Weight Retained (%)					
+ 3/8"	9.500	1.7	8.6	6.8	5.3	4.1	4.6
-3/8" + 1/4"	6.300	26.8	30.7	36.2	37	42.6	25.7
-1/4" + 5	4.000	22.2	26.2	23	22.9	23.7	18.3
-5 + 10	1.700	18.3	18.9	15.4	13	14	17.1
-10 + 35	0.425	19.8	11.8	11.9	14	10.6	19.7
-35 + 100	0.150	5.4	2.3	3.8	4.3	2.7	7.3
-100 + 270	0.053	2.8	0.9	2.0	2.1	1.3	4.5
-270	-0.053	3.0	0.6	0.9	1.4	1.0	2.8
	Total	*100*	*100*	*100*	*100*	*100*	*100*

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4.2.6.3 Column Results

Results for unsaturated column testwork for ore samples are presented in this section. The complete set of leachate concentrations, calculated loading rates and time series plots for unsaturated ore columns are provided in Appendix D.2. A summary of the final and median loading rates from each kinetic test is presented in Table 4-48, Table 4-49 and Table 4-50. Time series profiles for weekly loading rates are presented in Figure 4-19 and Figure 4-20.

Leachate pH and Sulphate Loading

Leachate pH for the gneiss and schist oxide and transition ore columns remain slightly alkaline over the test period (median of 8.1; Table 4-48, Table 4-49, and Figure 4-19). Leachate pH for the granite oxide facies ore column remains neutral over the test period (median of 7.2, Table 4-50 and Figure 4-19) but an overall gradual decrease is evident from the initial pH of 7.6 to < 7.0 in the last few weeks of testing. Note that a subsample of this material produced a mildly acidic rinse pH during static testing (pH 5.7), indicating that the kinetic test sample is a heterogeneous mix of material, some of which lacks effective NP (Table 4-46). The granite transition facies ore column is acidic over the test period, fluctuating between pH 4.5 and 5.5. The low pH for Col 8 is consistent with low alkalinity production from the column (<0.03 mg $CaCO_3$/kg/wk). Sulphate loading rates from each of the ore columns shows a consistent decrease of one to two orders of magnitude over the test period to <5 mg/kg/wk. The initial sulphate load is generally proportional to the solid phase S content of the test material, with >100 mg/kg/wk leached from all transition facies columns (Col 12, Col 10 and Col 8) and the schist oxide facies column while <5 mg/kg/wk leached from the gneiss oxide facies column (Col 7).

Metal Leaching Trends

Metal loadings from the gneiss and schist oxide and transition ore columns are either gradually decreasing over the test period or are producing relatively low and stable loading rates (following the initial flush). A notable exception is Sb, which shows increased loadings in leachate from the gneiss transition column (Col 12). Uranium loadings from the gneiss oxide and transition ore columns (Col 11 and Col 12) are elevated with respect to the other ore columns and produced relatively stable loadings of >0.001 mg/kg/wk since week 25 of testing (Figure 4-20). The same is observed for Mo, with fairly stable loads of 0.0003 and 0.0005 mg/kg/wk produced by the gneiss oxide and transition ore columns, respectively.

The granite transition ore column (Col 8), which is producing acidic leachate, is producing the highest loads of metal cations, which include Al, Cd, Co, Cu, Fe, Mn, Ni and Zn (Appendix D.2) consistent with the lower pH environment for the column (Figure 4-19).

In particular, As loadings from the granite transition column (0.47 mg/kg/wk) are up to two orders of magnitude higher than that produced by the schist and gneiss columns (Figure 4-20). The sub-sample for Col 8 comprises the highest solid phase As concentrations of the ore kinetic tests (5770 ppm, Table 4-46); however, the schist ore columns generally comprise the highest solid phase concentrations of other metals. Similar to the waste rock kinetic tests, loading rates from the ore columns are not proportional to the relative solid phase content of the kinetic test material but rather are influenced by pH conditions within the kinetic test.

Table 4-50:
Loading Rates for Gneiss Ore Columns

Parameter	Unit	Gneiss					
		Oxide (Col 11)			Transition (Col 12)		
		Median (Final 5)	Median (All*)	75th PCTL (All*)	Median (Final 5)	Median (All*)	75th PCTL (All*)
pH		8.1	8.1	8.1	8.1	8.1	8.1
Alkalinity	mg $CaCO_3$/kg	2.9	3.1	3.4	3.7	4.0	4.4
Sulphate	mg/kg/wk	0.27	0.29	0.31	1.9	2.0	2.3
D-Al	mg/kg/wk	0.00012	0.00014	0.00017	0.00016	0.00017	0.00029
D-Sb	mg/kg/wk	0.00021	0.00022	0.00025	0.0018	0.0013	0.0016
D-As	mg/kg/wk	0.0052	0.0053	0.0057	0.013	0.012	0.013
D-Cd	mg/kg/wk	0.00000013	0.00000013	0.00000018	0.00000013	0.00000016	0.00000025
D-Ca	mg/kg/wk	1.0	1.0	1.1	1.5	1.6	1.7
D-Cr	mg/kg/wk	0.0000080	0.0000072	0.0000079	0.0000013	0.0000014	0.0000028
D-Co	mg/kg/wk	0.0000019	0.0000022	0.0000022	0.0000042	0.0000041	0.0000055
D-Cu	mg/kg/wk	0.000015	0.000020	0.000024	0.000018	0.000021	0.000022
D-Fe	mg/kg/wk	0.00031	0.00031	0.00031	0.00031	0.00031	0.00032
D-Pb	mg/kg/wk	0.0000013	0.00000045	0.0000011	0.00000045	0.00000045	0.00000076
D-Mg	mg/kg/wk	0.28	0.27	0.29	0.45	0.47	0.50
D-Mn	mg/kg/wk	0.000056	0.000033	0.000054	0.00085	0.00081	0.00093
D-Hg	µg/kg/wk	0.00044	0.00044	0.00045	0.00044	0.00045	0.00045
D-Mo	mg/kg/wk	0.00038	0.00040	0.00044	0.00054	0.00060	0.00072
D-Ni	mg/kg/wk	0.0000044	0.0000044	0.0000086	0.000013	0.000015	0.000021
D-Se	mg/kg/wk	0.0000018	0.0000032	0.0000035	0.000011	0.000011	0.000015
D-Ag	mg/kg/wk	0.000000087	0.000000088	0.000000090	0.000000089	0.000000090	0.000000091
D-U	mg/kg/wk	0.0012	0.0013	0.0014	0.00097	0.0011	0.0012
D-Zn	mg/kg/wk	0.000044	0.000044	0.000045	0.000045	0.000045	0.000046

Notes: All* Excludes first 10 cycles (which represent the initial flushing of surface oxidation products).

Table 4-51:
Loading Rates for Schist Ore Columns

Parameter	Unit	Schist					
		Oxide (Col 9)			Transition (Col 10)		
		Median (Final 5)	Median (All*)	75th PCTL (All*)	Median (Final 5)	Median (All*)	75th PCTL (All*)
pH		8.1	8.1	8.1	8.1	8.1	8.1
Alkalinity	mg $CaCO_3$/kg	3.6	3.9	4.1	2.8	2.9	3.1
Sulphate	mg/kg/wk	1.9	2.0	2.5	4.5	5.9	9.1
D-Al	mg/kg/wk	0.00013	0.00015	0.00023	0.00017	0.00017	0.00022
D-Sb	mg/kg/wk	0.00013	0.00014	0.00015	0.00069	0.00070	0.00073
D-As	mg/kg/wk	0.0039	0.0049	0.0053	0.0053	0.0052	0.0056
D-Cd	mg/kg/wk	0.00000017	0.00000021	0.00000032	0.00000013	0.00000013	0.00000016
D-Ca	mg/kg/wk	1.5	1.6	1.7	2.2	2.8	3.4
D-Cr	mg/kg/wk	0.0000050	0.0000043	0.0000049	0.0000013	0.0000014	0.0000020
D-Co	mg/kg/wk	0.0000024	0.0000025	0.0000033	0.000013	0.000015	0.000018
D-Cu	mg/kg/wk	0.000027	0.000029	0.000035	0.000019	0.000023	0.000031
D-Fe	mg/kg/wk	0.00030	0.00031	0.00031	0.00029	0.00029	0.00030
D-Pb	mg/kg/wk	0.0000020	0.00000095	0.0000026	0.0000029	0.00000087	0.0000026
D-Mg	mg/kg/wk	0.58	0.60	0.63	0.60	0.73	0.87
D-Mn	mg/kg/wk	0.00013	0.00013	0.00021	0.0012	0.0015	0.0017
D-Hg	µg/kg/wk	0.00044	0.00044	0.00044	0.00042	0.00042	0.00043
D-Mo	mg/kg/wk	0.00010	0.00011	0.00012	0.00012	0.00012	0.00014
D-Ni	mg/kg/wk	0.000037	0.000045	0.000053	0.000099	0.00012	0.00015
D-Se	mg/kg/wk	0.000022	0.000025	0.000028	0.000037	0.000043	0.000047
D-Ag	mg/kg/wk	0.000000089	0.00000011	0.00000017	0.000000084	0.000000084	0.000000086
D-U	mg/kg/wk	0.000050	0.000066	0.000087	0.00018	0.00023	0.00032
D-Zn	mg/kg/wk	0.000044	0.000044	0.000050	0.000042	0.000042	0.000050

Notes: All* Excludes first 10 cycles (which represent the initial flushing of surface oxidation products).

Table 4-52:
Loading Rates for Granite Ore Columns

Parameter	Unit	Granite					
		Oxide (Col 7)			Transition (Col 8)		
		Median (Final 5)	Median (All*)	75th PCTL (All*)	Median (Final 5)	Median (All*)	75th PCTL (All*)
pH		7.0	7.2	7.5	4.5	4.6	5.1
Alkalinity	mg $CaCO_3$/kg	0.40	0.49	0.56	0.0045	0.0045	0.0046
Sulphate	mg/kg/wk	0.16	0.17	0.22	2.6	2.6	2.9
D-Al	mg/kg/wk	0.0047	0.0037	0.0065	0.0078	0.0084	0.0094
D-Sb	mg/kg/wk	0.00067	0.00077	0.00094	0.00031	0.00031	0.00033
D-As	mg/kg/wk	0.016	0.018	0.020	0.47	0.48	0.53
D-Cd	mg/kg/wk	0.00000021	0.00000013	0.00000017	0.0000030	0.0000031	0.0000035
D-Ca	mg/kg/wk	0.11	0.099	0.11	0.65	0.70	0.74
D-Cr	mg/kg/wk	0.0000021	0.0000021	0.0000029	0.0000018	0.0000027	0.0000038
D-Co	mg/kg/wk	0.0000035	0.0000034	0.0000039	0.0028	0.0030	0.0033
D-Cu	mg/kg/wk	0.000035	0.000039	0.000062	0.00069	0.00069	0.00074
D-Fe	mg/kg/wk	0.00064	0.00052	0.0011	0.0050	0.0053	0.0068
D-Pb	mg/kg/wk	0.0000030	0.0000029	0.0000044	0.0000065	0.0000032	0.000012
D-Mg	mg/kg/wk	0.030	0.027	0.029	0.16	0.17	0.19
D-Mn	mg/kg/wk	0.00086	0.00069	0.00086	0.11	0.11	0.12
D-Hg	µg/kg/wk	0.00084	0.00045	0.00085	0.00046	0.00045	0.00047
D-Mo	mg/kg/wk	0.000049	0.000063	0.000099	0.000015	0.000015	0.000025
D-Ni	mg/kg/wk	0.0000084	0.0000045	0.0000085	0.00071	0.00075	0.00088
D-Se	mg/kg/wk	0.0000027	0.0000027	0.0000037	0.000019	0.000023	0.000026
D-Ag	mg/kg/wk	0.000000084	0.00000011	0.00000018	0.000000092	0.000000092	0.00000021
D-U	mg/kg/wk	0.000017	0.000015	0.000032	0.000054	0.000054	0.000058
D-Zn	mg/kg/wk	0.000046	0.000045	0.000084	0.0044	0.0045	0.0048

Notes: All* Excludes first 10 cycles (which represent the initial flushing of surface oxidation products).

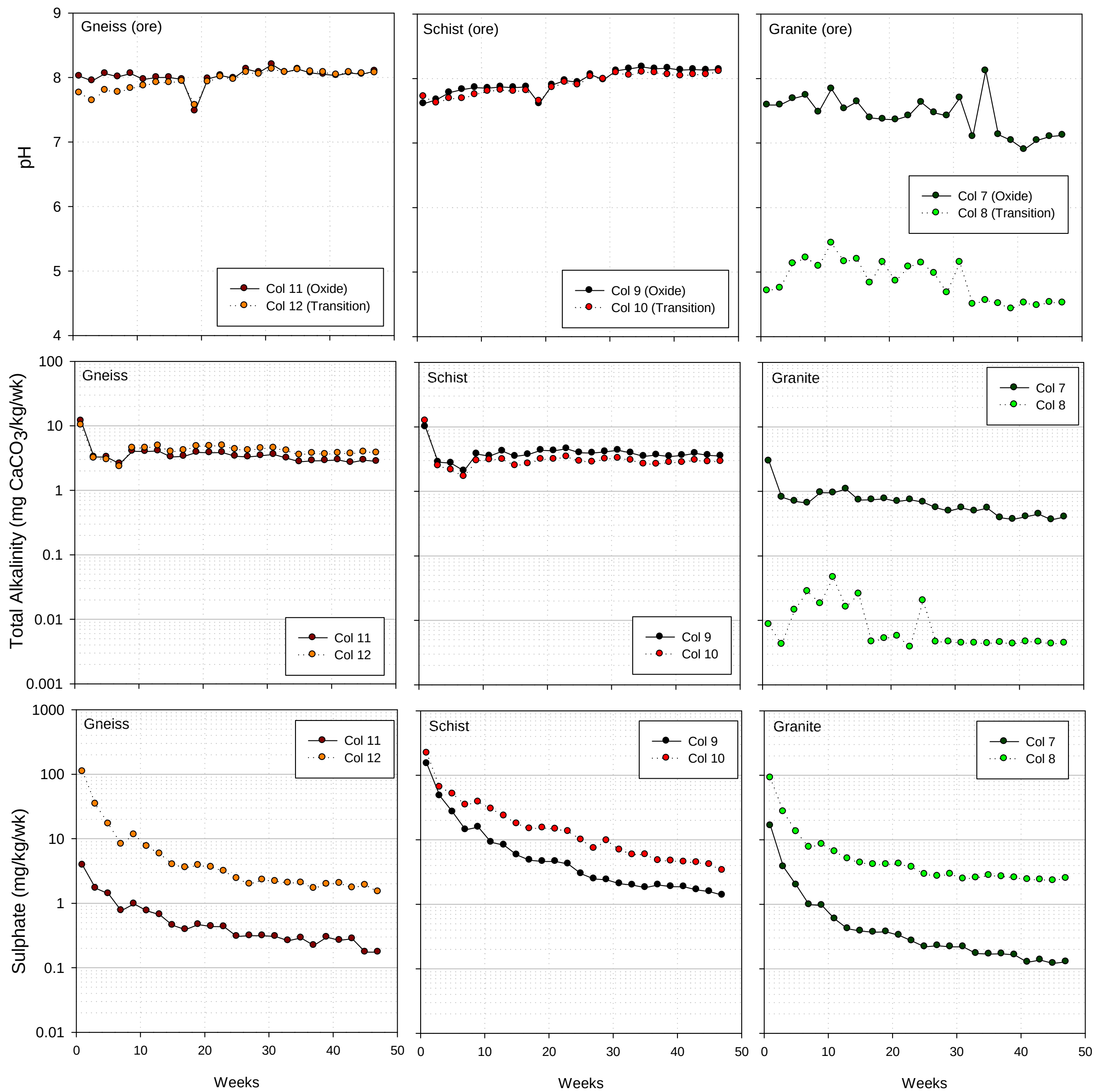

Figure 4-19: Time series plots for leachate pH, total alkalinity and weekly sulphate loadings for ore columns.

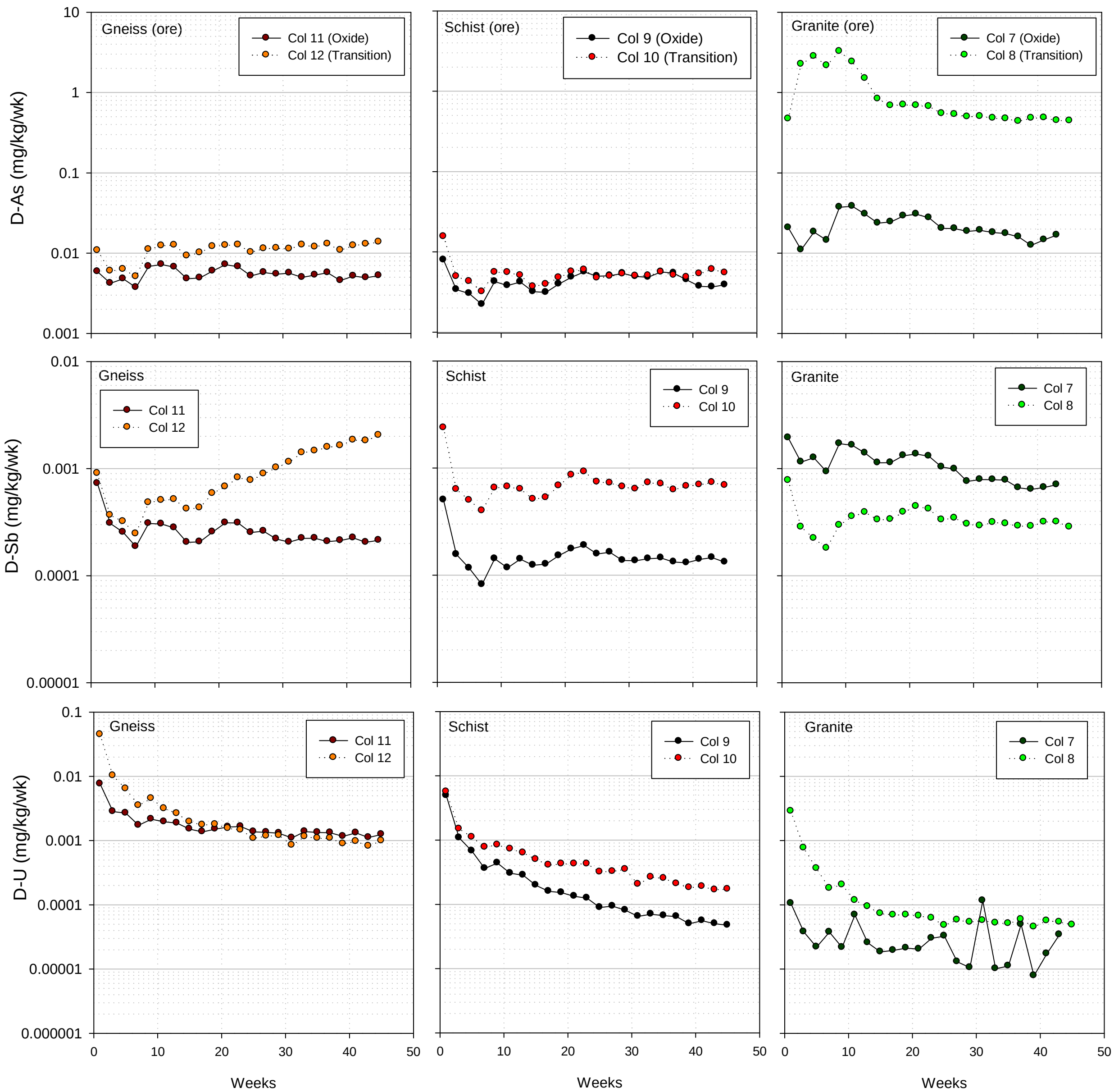

Figure 4-20: Weekly leaching rates for Sb, As and U in leachate from ore columns

4.2.7 Radioisotopes

4.2.7.1 Occurrence

The NORM results for ore samples are presented in Appendix D.1-5 and summarized in Section 4.1.6. Overall, the results show that ore can be considered as unrestricted according to the Canadian NORM Guidelines.

4.2.7.2 Kinetic Test Leachate

The activity of ^{226}Ra was measured in filtered leachate from the six laboratory ore columns on two occasions. Due to the large volume required for ^{226}Ra measurements (250 ml to 1000 ml), samples were collected over several cycles (Table 4-51). The first round of samples collected a volume of 250ml from each column, which gave an elevated detection limit of 0.03 Bq/L. Most samples produced activities below this detection limit, therefore, a second round of samples was submitted with a larger volume of water (1000 ml) to achieve a lower detection limit of 0.01 Bq/L.

Results of ^{226}Ra measurements in ore columns are presented alongside Ba and U concentrations averaged over the same cycles in Table 4-51. A majority of activity measurements are at or below the method detection limit. The relationship between ^{226}Ra activities, with ore type, Ba concentration or U occurrence is difficult to ascertain from this data due to the large number of detection limit values. In general, the results indicate that there is a low potential for ^{226}Ra leaching from ore as shown by ^{226}Ra concentrations generally at or below detection limits.

Table 4-53:
Activity of ^{226}Ra in Ore Column Kinetic Test Leachate

Column ID	Sample Description	Cycle/Week	Ba (mg/L)	U (mg/L)	^{226}Ra (Bq/L)
Col 12	Supremo Transition Ore	05-Jul	0.0041	0.047	*<0.03*
		10-Dec	0.0047	0.026	*<0.01*
Col 11	Supremo Oxide Ore	05-Jul	0.044	0.039	*<0.03*
		10-Dec	0.046	0.031	0.03
Col 10	Latte Transition Ore	05-Jul	0.0046	0.014	*<0.03*
		10-Dec	0.0063	0.0080	0.01
Col 9	Latte Oxide Ore	05-Jul	0.011	0.0063	0.04
		10-Dec	0.016	0.0023	*<0.01*
Col 8	Kona Transition Ore	05-Jul	0.00030	0.0018	*<0.03*
		10-Dec	0.00070	0.0011	0.01
Col 7	Kona Oxide Ore	05-Jul	0.00060	0.00050	0.03
		10-Dec	0.0010	0.00060	0.01

Notes: Values in grey italics are below the analytical detection limit.

4.3 Leach Tailings

This section presents the geochemical characterization results for leach tailings generated by the heap leach facility (HLF). Leach tailings will be generated when ore placed in the HLF is mixed with lime (CaO) and irrigated with NaCN solution which will change the character of metal leaching by raising pore water pH and by the formation of CN-metal complexes. At the end of mine life, the HLF will be rinsed to remove residual CN from HLF pore water. Lime that remains in the HLF will eventually be rinsed or re-precipitate as calcite, resulting in a decline in pH from the alkaline values required to support CN stability to more neutral values. The goal of this geochemical characterization testwork is to describe HLF drainage at the end of mine life and in the long term after rinsing and detoxification is complete.

Leach tailings samples were collected from metallurgical cyanide leach columns operated at Kappes, Cassiday & Associates (KCA) in 2014 and 2015, and are considered to be representative of the leach tailings that will be generated by the HLF during Operation. Specifically, the leach tailings represent ore that has been mixed with lime and leached with NaCN to extract Au.

4.3.1 Overview of Test Results

Leach tailings have a lower ARD potential compared to ore due to the increased NP from lime that is added to maintain CN stability. Geochemical test work completed for tailings samples are consistent with results for ore (and waste rock), whereby tailings samples derived from granite ore have a lower NP content and, therefore, a greater potential to be PAG. Metal enrichment is expected to be similar between leach tailings and ore, as only a minor fraction of the total metal content will be removed during HLF operation.

Elements of potential concern from the HLF process water include Sb, As, Cr, Cu, Hg and possibly Cd and Zn from each of the ore units, sulphate and Se from the schist unit, and U from the granite and gneiss units. Metal solubility in process solution is supported by the high pH (>9.8) and presence of CN.

Kinetic testing on leach tailings sampled produced from metallurgical testing showed an immediate decline in pH from rinsing of residual lime, with pH values stabilizing at slightly alkaline values. Initial production rates for As, Sb and U are similar to the rates measured for ore of the same lithology and weathering facies; however, rates for the leach tailings columns show a continuous decrease following the initial flush. This is likely related to rinsing of water soluble metals during metallurgical testwork. The lowest U loading rates (by nearly an order of magnitude) are from the schist tailings, consistent with metallurgical column leach solution.

4.3.2 Mineralogy

The mineralogy of leach tailings is expected to be generally similar to that of ore. During the CN leaching process, some water soluble minerals, such as sulphates (*i.e.*, gypsum) or other secondary oxidation products (*i.e.*, oxides) may be rinsed from particle surfaces. The addition of lime may also result in the precipitation of secondary oxides and carbonates.

4.3.3 Acid Base Accounting

Select ABA results for 16 leach tailings samples are presented in Table 4-52. The full suite of ABA results for leach tailings samples are provided in Appendix C.3-1. The rinse pH of the leach tailings is alkaline (8.6≤pH≤9.7) reflecting the addition of lime during the metallurgical testing to support CN stability. Sobek NP measured in tailings show a large range in values (0.37 to 146 kg $CaCO_3$/t). Siderite NP values are uniformly greater than Sobek NP measurements. This difference in NP values was also observed in waste rock and ore, as described in Section 4.1.3.3. Note that NP estimated from carbon content will not accurately describe leach tailings due to the presence of lime, which contributes to NP but does not contain carbon. Both tailings samples derived from granite ore (oxide and transition facies) exhibit low sobek NP (≤ 1 kg $CaCO_3$/t).

Net potential ratio values for tailings samples were calculated using Sobek NP and AP derived from both total-S and sulphide-S. With the exception of granite, all leach tailings samples have NPR >4.7 when total-S is used to derive AP, and NPR>7.0 when sulphide-S is applied. The two tailings samples derived from granite ore have NPR values ranging from 0.1 to 0.6, and as such, are classified as PAG. The NPR results for tailings are consistent with results for ore (and waste rock), whereby tailings samples derived from granite ore have a greater potential to be PAG.

4.3.4 Trace Metal Enrichment

Solid phase element results for leach tailings are presented in Table 4-53 and are compared to ACA values (Price, 1997). The complete set of solid phase element results are presented in Appendix C.3-2. Antimony, As, Bi, Hg and U are indicated to be enriched in the leach tailings with respect to ACAs, with Sb, As and Bi enriched in all samples by 10x's the ACA. Solid phase elemental abundance in leach tailings are generally similar, or higher, than median values for ore of the same lithology and weathering facies.

Table 4-54:
Acid Base Accounting Results for Leach Tailings

Geologic Unit	Weathering Facies	Metallurgical ID (leach tailings)	Head Sample ID (ore)	Sample Description	Rinse	Total- S	Sulphide-S	Sulphate-S	Sobek NP	Siderite NP	NPR	NPR
					pH	wt.%	wt.%	wt.%	kg $CaCO_3$/t	kg $CaCO_3$/t	NP/TAP	NP/SAP
Gneiss	Oxide	73004	72134	Supremo Mine Block (1")	9.7	0.007	*<0.01*	*<0.01*	3.5	12	16.2	11.3
		73013	72142	Supremo #1	9.6	0.014	*<0.01*	*<0.01*	6.2	13	14.2	19.9
		73022	72143	Supremo #2	9.7	0.015	*<0.01*	*<0.01*	2.2	8.7	4.7	7.0
		73028	72144	Supremo Oxide T1	9.6	0.033	0.01	*<0.01*	12	18	11.5	37.9
		73034	72145	Supremo Oxide T4	9.7	0.022	0.01	*<0.01*	30	36	43.3	95.2
	Transition	73040	72146	Supremo 80%	9.5	0.097	0.05	0.02	38	44	12.4	24.1
Gneiss/Schist	Oxide/Transition	70340	-	Supremo/Latte	8.4	0.08	0.04	0.02	48	-	19.2	38.4
Schist/Gneiss	Oxide	72186	72141	DD oxide	9.6	0.13	0.1	0.01	79	83	19.5	25.3
Schist	Oxide	72117	72101	Latte -583150 Trench (6")	9.6	0.035	*<0.01*	0.02	65	69	59.4	208.0
		72123	72102	Latte 583350 Trench (6")	9.7	0.048	0.02	0.02	96	119	63.9	153.3
		73001	72133	Latte mine block (1")	9.5	0.051	*<0.01*	0.04	5.6	15	3.5	18.0
		72150	72135	Latte Oxide West	8.6	0.11	0.07	0.02	124	154	36.1	56.7
		72156	72136	Latte Oxide East	9.6	0.087	0.06	0.02	79	85	29.2	42.3
	Transition	72162	72137	Latte 80%'	8.9	0.41	0.33	0.04	146	175	11.4	14.2
		72168	72138	Latte 60%	8.9	0.47	0.39	0.03	127	155	8.6	10.4
Granite	Oxide	72174	72139	Kona Oxide	9.7	0.033	0.02	*<0.01*	0.37	8.3	0.4	0.6
	Transition	72180	72140	Kona 80% CN	9.7	0.18	0.14	0.01	0.61	7.6	0.1	0.1

Notes:
Values in grey italics are below the analytical detection limit.
NNP: net neutralization potential calculated by subtracting TAP (acid potential derived from T-S) from Sobek NP.
NPR: net potential ratio

Table 4-55:
Solid Phase Element Results for Leach Tailings

			Average Continental Abundance	*8.23*	*0.2*	*1.8*	*0.01*	*0.15*	*102*	*25*	*60*	*5.6*	*14*	*0.09*	*1.2*	*84*	*0.08*	*2.7*	*70*
Geologic Unit	**Weathering Facies**	**Metallurgical ID (leach tailings)**	**Head Sample ID (ore)**	**Al**	**Sb**	**As**	**Bi**	**Cd**	**Cr**	**Co**	**Cu**	**Fe**	**Pb**	**Hg**	**Mo**	**Ni**	**Ag**	**U**	**Zn**
				%	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**%**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**
Schist	Oxide	72117	72101	0.76	138	1120	0.82	0.08	102	14.3	33.1	3.32	12.4	0.2	3.75	42.6	0.07	1.69	62
		72123	72102	0.53	52.7	1580	0.5	0.15	88	12.8	24.5	3.18	15.8	0.57	3.64	30	0.08	2.09	58
		73001	72133	0.44	243	9020	0.5	0.13	90	11	24.9	3.89	16.3	0.81	3.63	33.2	0.64	4.49	75
		72150	72135	0.4	25.5	1380	0.37	0.1	126	12.1	21.3	2.69	13.8	0.31	3.99	102	0.13	2.11	46
		72156	72136	0.52	27.4	1280	0.39	0.15	109	11.5	12.3	2.8	15.4	0.26	4.27	55.9	0.06	2.59	55
	Transition	72162	72137	0.65	20.8	1710	0.45	0.09	88	12.6	14.5	2.51	14.8	0.36	3.39	58.5	0.11	2.58	50
		72168	72138	0.83	55.5	932	0.46	0.1	103	10.6	19.5	2.75	12.5	0.28	4.28	40.8	0.08	2.42	49
Granite	Oxide	72174	72139	0.44	47.7	4170	0.08	0.05	93	1.4	2.2	1.48	15.6	0.55	4.84	5	0.03	8.8	17
	Transition	72180	72140	0.34	86.4	5880	0.11	0.04	103	1.4	1.6	1.23	19.5	2.99	5.47	5.4	0.06	7.35	12
Gneiss	Oxide	73004	72134	0.45	97.3	2660	0.45	0.2	122	14.8	19.9	4.35	9.3	1.39	6.52	57.8	0.25	22.6	40
		73013	72142	0.77	41.4	1060	0.23	0.12	137	13.3	8.5	2.91	14.3	0.56	4.65	70.4	0.12	20.1	42
		73022	72143	0.48	40.4	588	0.49	0.07	93	6.3	11.1	1.8	11	0.13	4.96	11.9	0.06	6.89	21
		73028	72144	0.49	54.5	969	0.32	0.09	98	8.5	7.7	2.25	14	0.6	4.82	13.5	0.09	17.7	41
		73034	72145	0.46	31.1	1040	0.18	0.06	110	4.4	6.6	1.45	12.8	1.09	5.35	15.7	0.15	12.4	21
	Transition	73040	72146	0.7	22	1760	0.57	0.08	126	6.8	2.3	1.98	13.2	1.06	6.39	22.6	0.06	12	29
Schist/Gneiss	Oxide	72186	72141	0.76	42.8	1410	0.8	0.11	120	13.1	10.1	3.15	13.7	0.41	4.09	34.2	0.06	4.91	42

Notes:
Average Continental Abundance (ACA) according to Price (1997).
Values shaded in light grey are 3x's the ACA, values shaded in dark grey are 10x's the ACA. Values shaded in blue are at the ACA.

4.3.5 Metallurgical Column Leach Solution

The final leach solution from CN leach columns operated at KCA was collected to provide an indication of heap leach water chemistry during operations. In the column experiments, ore samples were mixed with lime and irrigated with a NaCN solution, leading to elevated pH, cyanide species and concentrations of metals that form CN complexes (*e.g.*, Cu, Cd, Hg, Fe, Ni and Zn). Following the stripping of Au from the effluent, the barren solution was re-circulated through the column with makeup NaCN amended as required. In total, 16 columns were established to account for variations in scale, grain size, lithology and weathering facies.

Select parameters for the final leachate chemistry from the 16 metallurgical columns are provided in Table 4-54. The complete set of results are provided in Appendix C.3-3. The water chemistry of the final leachate is presented in Table 4-54 with MMER and CCME (10x's) guidelines to provide an indication of the relative pore water quality that can be expected from the different ore types during Operation. In this manner parameters of potential concern (that may require treatment) can be identified. Key observations are as follows:

- The highest sulphate concentrations were measured in leachate from the schist ore, in particular the transition facies, which is consistent with higher total-S and sulphide-S measured for schist ore samples.
- The highest As and Sb concentrations were measured in leachate from the granite ore, in particular the transition facies, with values ranging from 40 to 85 mg/L As and 0.17 to 0.93 mg/L Sb.
- The highest Se concentrations were leached from the schist ore transition facies (0.010 to 0.019 mg/L), with all columns leaching Se at concentrations that exceed the 10x CCME value.
- The schist ore columns showed little to no potential for U leaching (<0.0059 mg/L), with all values well below 10x CCME guidelines and several orders of magnitude lower than those observed in leachate from the granite and gneiss (oxide in particular) ore columns.
- In general, higher concentrations of sulphate, As, Sb and Se are measured in leachate from the transition facies ore as compared to oxide facies ore of the equivalent lithology (with notable exception of As and Sb in schist columns).

Table 4-56:
Final Leachate from Metallurgical Cyanide Columns

Lithology	Weathering Zone	Head ID (ore)	Column ID (leach tailings)	Particle Size	Column mass	pH	T-Alk	T-CN	SO_4	D-Al	D-Sb	D-As	D-Ba	D-Cd	D-Cr	D-Cu	D-Hg	D-P	D-Se	D-U	D-Zn	Ra-226
				mm	kg	s.u.	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	Bq/L
Schist	Oxide	72133	*73001	12.5	48	10.0	458	101	43	0.035	0.082	16	0.012	0.00011	0.012	0.21	0.0012	0.24	0.00059	0.033	0.061	-
		72136	*72156	12.5	50	9.9	366	144	547	0.064	0.036	2.4	0.015	0.00057	0.0078	0.75	0.0055	0.075	0.0039	0.0015	0.16	-
			72153	80	101	9.8	590	119	725	0.045	0.085	6.0	0.014	0.0075	0.0060	2.8	0.0069	0.19	0.0044	0.0059	1.6	-
	Transition	72137	*72162	12.5	50	9.8	301	168	2370	0.028	0.042	0.87	0.011	0.00009	0.0014	1.5	0.00069	*<0.1*	0.014	0.00012	0.096	-
			72159	80	94	9.5	322	125	2980	0.074	0.15	3.0	0.020	0.0032	0.0023	4.9	0.0047	*<0.1*	0.018	0.00026	1.4	-
		72138	*72168	12.5	49	9.6	223	134	2670	0.019	0.049	0.5	0.0090	0.00010	0.0014	2.1	0.0004	*<0.1*	0.010	0.00008	0.12	-
			72165	80	84	9.5	229	99	2570	0.086	0.21	1.8	0.025	0.0022	0.0019	4.6	0.0024	*<0.1*	0.019	0.00008	1.0	-
Granite	Oxide	72139	*72174	12.5	50	10.1	580	164	38	0.39	0.17	40	0.0070	0.00020	0.012	0.28	0.0017	0.32	0.0012	0.58	0.10	-
			72171	80	104	9.8	738	139	57	0.33	0.26	55	0.013	0.0059	0.0044	1.8	0.0054	0.37	0.0025	1.1	1.9	-
	Transition	72140	*72180	12.5	50	10.0	570	168	424	1.21	0.93	85	0.0040	*<0.0001*	*<0.002*	0.54	0.0048	0.26	0.0043	0.45	0.12	-
			72177	80	98	9.7	661	179	666	0.53	0.78	75	0.018	0.0026	0.0017	2.3	0.022	0.40	0.0076	0.83	1.4	-
Gneiss	Oxide	72142	*73013	12.5	43	10.0	491	172	12	0.056	0.015	0.71	0.030	0.00017	0.013	0.16	0.00078	0.52	0.00087	0.47	0.036	-
			73010	80	83	9.8	517	100	10	0.18	0.028	0.81	0.089	0.0046	0.013	0.55	0.0015	0.16	0.0015	0.14	0.41	-
			73007	150	718	9.9	468	168	6.9	0.19	0.010	0.17	0.35	0.0374	0.037	1.9	0.060	*<0.05*	0.0016	0.0045	1.1	0.10
		72143	*73022	12.5	44	10.0	473	134	12	0.18	0.020	0.67	0.024	0.00004	0.013	0.09	0.00011	0.25	0.0019	0.17	0.021	-
			73019	80	86	9.9	883	90	11	0.34	0.047	2.0	0.047	0.0033	0.024	0.57	0.00065	1.0	0.0040	0.74	0.41	-
			73016	150	741	9.9	678	124	8.1	0.37	0.028	1.0	0.037	0.0255	0.051	1.5	0.015	0.33	0.0050	0.15	1.1	0.018
		72144	*73028	12.5	50	10.0	492	126	42	0.11	0.036	3.6	0.033	0.00030	0.021	0.32	0.0023	0.39	0.0011	0.41	0.064	-
			73025	80	99	9.9	738	124	45	0.16	0.13	5.1	0.038	0.0029	0.022	1.1	0.0027	0.51	0.00083	0.41	0.64	-
		72145	*73034	12.5	49	10.0	418	161	63	0.040	0.033	2.8	0.015	0.00027	0.013	0.21	0.0040	0.18	0.00083	0.27	0.027	-
			73031	80	95	9.8	644	170	58	0.052	0.073	2.8	0.067	0.0019	0.012	1.1	0.0045	0.19	0.00079	0.15	0.66	-
		72134	*73004	12.5	46	10.0	676	113	8.8	0.054	0.026	1.4	0.0050	0.00053	0.0091	0.29	0.0055	0.97	0.0012	1.9	0.056	-
	Transition	72146	*73040	12.5	50	10.0	374	156	744	0.061	0.18	7.5	0.0030	0.00006	0.0015	0.32	0.0024	0.12	0.0063	0.058	0.039	-
			73037	80	94	9.8	1180	136	444	0.087	0.27	13	0.0070	0.0010	0.012	1.0	0.0032	1.0	0.0071	0.46	0.59	-
Gneiss/Schist	Oxide	72141	*72186	12.5	50	10.1	439	142	177	0.058	0.035	1.9	0.0040	0.00008	0.013	0.39	0.00012	0.11	0.0057	0.00032	0.068	-
			72183	80	95	9.8	564	134	220	0.028	0.089	2.6	0.018	0.0033	0.0042	3.2	0.0027	0.089	0.0098	0.0040	1.1	-

Notes:
Values in grey italics are below the analytical detection limit; * samples for which there are static test results presented in Table 4-53 and Table 4-54;
Values that exceed the Metal Mines Effluent Regulations (MMER, 2002) maximum (MMM) water quality guideline are shaded in dark grey.
Values that exceed the Canadian Council of Ministers of the Environment (CCME, 2007) Water Quality Guidelines for the Protection of Freshwater Aquatic Life by 10x's are shaded in light grey;
All guidelines are for total metals unless otherwise indicated.
Guidelines for Cu, Ni and Pb are based on the default value for when hardness is not known (which corresponds to the 25th percentile hardness value of ~55 mg CaCO3/L calculated using available SW data (n=754, Jun-27-2014 - Jan-26-2016);
Guideline for Cd are calculated using the 25th percentile hardness of ~55 mg CaCO3/L; guideline for Cr is for hexavalent (VI);
Guidelines for sulphate, Co and Sb are derived from BC MOE water quality guidelines for protection of freshwater aquatic life for reference. Sulphate is hardness dependent and is based on a hardness of 55 mg CaCO3/L.

Total CN concentrations range from 90 to 179 mg/L in final effluent samples from the metallurgical CN columns. The presence of CN supports the solubility of a variety of metals that would otherwise be insoluble at neutral pH (*e.g.,* Cu, Cd, Zn, Hg, *etc*.). Other metals such as As, Sb and U, which are not directly associated with CN complexation, may also be present in elevated concentrations due to the increased solubility of oxyanions at high pH and alkalinity. Detoxification of the HLF will destroy CN and reduce the solubility of metals which form CN-complexes. Furthermore, pH can be expected to decline with time as lime is either rinsed from the system or re-precipitated as calcite. This will reduce the solubility of As, Sb and U; however, they will likely remain in effluent at concentrations of concern.

Based on the results of the final leach from the CN columns, elements of potential concern from the HLF include Sb, As, Cr, Cu, Hg and possibly Cd and Zn from each of the ore units, as well as sulphate and Se from the schist unit, and U from the granite and gneiss units. Of these, Sb, As, Hg and U are indicated to be enriched in solid phase analyses (Section 4.3.3).

4.3.6 Kinetic Tests

4.3.6.1 Sample Selection and Rationale

Five unsaturated columns and three field bins were constructed with leach tailings to obtain information on metal leaching rates from spent ore in the HLF after mine closure. The leach tailings used for kinetic testwork were sub-sampled from the final residue available upon completion of the metallurgical column testwork. Ore composites used for metallurgical testing were composed of lithologies and weathering facies in proportions representative of the proportions that will be placed in the HLF during the mine life. A summary of the leach tailings, sample selection criteria and rationale for the testwork are provided in Table 4-55. All the unsaturated columns were operated as trickle leach columns at 4°C. Additional detail pertaining to the operating procedures are provided in Section 3.2.6 and Appendix D.3. An overview of the metallurgical column testwork that produced the leach tailings is presented in Section 3.2.7.

Figure 4-21 and Figure 4-22 present box plots showing the distribution of total-S and solid phase As, Sb and U for each ore type, with the results for the kinetic test sub-samples superimposed. Note that several of the kinetic test samples contain a combination of lithologies (Col 1, Col 3, FB-LT1 and Col 17). These samples are compared against the the dominant rock type that composes the kinetic tests. The comparison indicates that the kinetic tests represent moderate too high total-S, with all samples except FB-LT3 plotting at or above medium values of the respective rock units. Antimony concentrations were uniformly above medium concentrations of the respective rock units. Most kinetic tests samples plotted near or above median values of As and U, with the exception of FB-LT3 which plotted near the 25th percentile and 10th percentile for As and U, respectively.

Table 4-57:
Leach Tailings Kinetic Test Details, Sample Selection Criteria and Rationale

Lithology	Weathering Facies	Kinetic Test ID	Type of Test	Mass (kg)	Metallurg. Column ID	Weeks	Recirc. Cycles
Gneiss (82%) Schist (18%)	Oxide (90%) Transition (10%)	Col 1	Unsaturated Column	10.0	70340	98	57-89
		Col 2		20.0		98	57-89
		FB-LT1	Field Bin	76.3		70	-
Gneiss	Oxide (80%) Transition (20%)	Col 16	Unsaturated Column	5.0	40% 73028, 40% 73034, 20% 73040	39	-
Gneiss	Oxide	FB-LT2	Field Bin	200	50% 73007 50% 73016	10	-
Schist	Oxide	FB-LT3	Field Bin	200	50% 72108 50% 72111	10	-
Schist	Oxide (40%) Transition (60%)	Col 15	Unsaturated Column	5.0	20%72162, 20% 72168, 30% 72150, 30% 72156	39	-
Gneiss (90%) Granite (10%)	Oxide (80%) Transition (20%)	Col 17	Unsaturated Column	5.0	35% 73028, 35% 73034, 18% 73040, 7% 72174, 3% 72180	39	-

Notes: All columns are constructed of Plexiglas with acrylic perforated disk & nylon mesh; All tests operated at temperature of 4°C; Leachate is sampled bi-weekly from all columns; All columns are operated as trickle leach (discussed in more detail in Section 3.2.6).

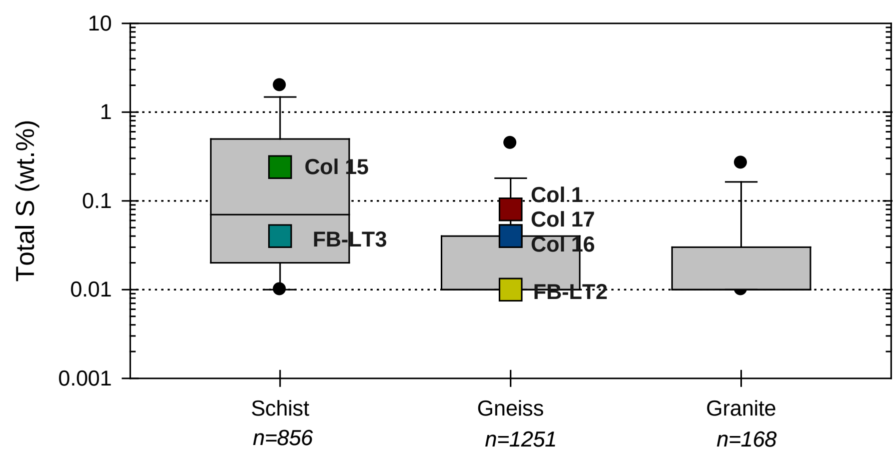

Figure 4-21: Box plots showing the concentration ranges for total-S from the exploration database ore samples with total-S for leach tailings kinetic test sub-samples superimposed

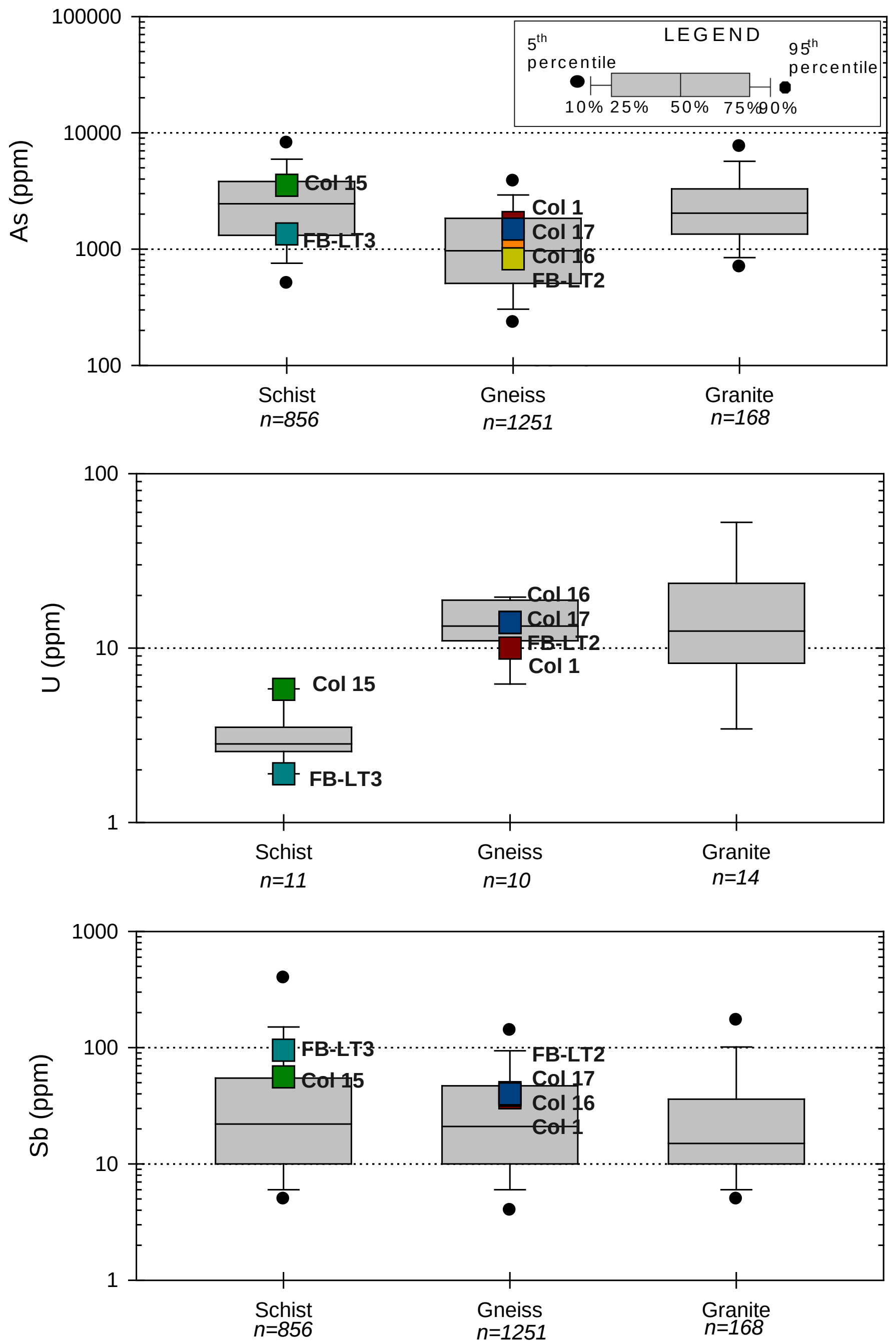

Figure 4-22: Box plots showing the concentration ranges for solid phase As and Sb from the exploration database ore samples and U from the ABA database ore samples with the leach tailings kinetic test sub-samples superimposed.

4.3.6.2 Static Tests

Mineralogy

A sub-sample of the leach tailings composite sample LT1 (derived from 82% gneiss, 18% schist and 90% oxide 10% transition ore) used for laboratory and field kinetic testwork in Col 1, Col 2 (20 kg duplicate of Col 1) and FB-LT1 was submitted for quantitative phase analysis using the Rietveld Method XRD. The minerals identified by XRD in the waste rock kinetic test sub-sample are provided in Table 4-56. The major rock forming minerals identified in each sample are quartz and feldspars (microcline and albite), with lesser amounts of muscovite, biotite, chlorite and phlogopite. The sample also comprises measurable concentrations of kaolinite (6.8 wt.%), demonstrating the weathered state of the test material. No sulphide minerals were identified in the leach tailings sample. However, two carbonate minerals, calcite (1.4 wt.%) and dolomite (4.6 wt.%), were identified.

Table 4-58:
XRD Results for Leach Tailings Kinetic Test Sub-samples

	Lithology	**Gneiss/Schist**
	Weathering Facies	**Oxide/Transition**
	Kinetic Test IDs	**Col 1/Col 2 & FB-LT1**
Mineral	**Formula**	**wt. %**
Quartz	SiO_2	56.3
Microcline	$KAlSi_3O_8$	1.6
Albite	$NaAlSi_3O_8$	4.6
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$	14.8
Biotite	$K(Mg,Fe)_3(AlSi_3O_{10})(OH)_2$	0.5
Phlogopite	$KMg_3(AlSi_3O_{10})(OH)$	3.1
Chlorite	$(Fe,(Mg,Mn)_5,Al)(Si_3Al)O_{10}(OH)_8$	6.4
Kaolinite	$Al_2Si_2O_5(OH)_4$	6.8
Calcite	$CaCO_3$	1.4
Dolomite	$CaMg(CO_3)_2$	4.6

Acid Base Accounting and Solid Phase Elements

Rinse pH for the leach tailings kinetic test sub-samples are alkaline (8.4 – 9.6), owing in part, to the addition of lime to the ore prior to leaching (Table 4-57). Total-S values range from 0.01 wt.% in the gneiss oxide field bin sub-sample (FB-LT2) up to 0.24 wt.% in the schist oxide/transition column sub-sample (Col 15). Consistent with observations made for the waste rock and ore, leach tailings comprising schist contain the highest amounts of Sobek NP (55 – 80 kg $CaCO_3$/t) compared to leach tailings comprising only gneiss and/or granite (NP ≤ 23 kg $CaCO_3$/t).

The overall highest solid phase metal concentrations (Al, Cd, Co, Cu, Fe, Mn, Ni, Sb and Zn) were measured in the schist oxide field bin sub-sample (FB-LT3, Table 4-57) and the highest As concentration (3,543 ppm) was measured in the schist oxide/transition sample (Col 15).

**Table 4-59:
Acid-Base Accounting Results and Solid Phase Elements in Leach Tailings Kinetic Test Sub-samples**

	Lithology	Gneiss/ Schist	Gneiss	Gneiss	Schist	Schist	Gneiss/ Granite
	Weathering Facies	Oxide/ Transition	Oxide/ Transition	Oxide	Oxide/ Transition	Oxide	Oxide/ Transition
Kinetic Test IDs	Column	Col 1	Col 16	-	Col 15	-	Col 17
	Field Bin	FB-LT1	-	FB-LT2	-	FB-LT3	-
Acid Base Accounting Parameters							
Rinse pH	s.u.	8.4	9.6	9.6	9.4	9.6	9.4
Total-S	wt.%	0.08	0.04	0.01	0.24	0.04	0.04
Sulphate-S	wt.%	0.02	0.012	*<0.01*	0.02	0.02	0.012
Sulphide-S	wt.%	0.04	0.02	*<0.01*	0.19	0.02	0.02
CaNP	kg $CaCO_3$/t	47	23	1.7	59	81	20
Sobek NP	kg $CaCO_3$/t	48	24	4.2	55	80	21
Siderite NP	kg $CaCO_3$/t	-	30	11	71	94	28
Solid Phase Elements by Aqua Regia							
Ag	ppm	0.13	0.11	0.09	0.065	0.075	0.0987
Al	%	0.33	0.52	0.63	0.53	0.65	0.50
As	ppm	1690	1156	824	3543	1350	1488
Cd	ppm	0.09	0.076	0.095	0.065	0.12	0.072
Co	ppm	8.2	6.5	9.8	5.5	14	5.9
Cr	ppm	123	108	115	97	95	105
Cu	ppm	15	6.2	9.8	7.9	29	5.6
Fe	%	2.3	1.9	2.4	1.9	3.3	1.8
Hg	ppm	0.57	0.89	0.35	1.2	0.39	0.91
Mn	ppm	402	412	537	284	638	376
Mo	ppm	4.5	5.4	4.8	4.6	3.7	5.2
Ni	ppm	14	16	41	23	36	15
Pb	ppm	15	13	13	16	14	13
Sb	ppm	37	39	41	56	95	40
Se	ppm	*<1*	*<1*	*<1*	*<1*	*<1*	*<1*
U	ppm	10	14	14	5.8	1.9	14
Zn	ppm	33	31	32	29	60	29

Notes: Values in grey italics are below the analytical detection limit. Green gradient shading represents relative concentrations for each parameter.

Particle Size Distribution

Table 4-60 presents the particle size distribution for individual leach tailings samples that compose the composite samples used for kinetic testwork. The proportion of each leach tailings sample used to construct the ML/ARD columns and field bins are provided in Table 4-57. Also provided in Table 4-61, are the particle size distribution of crushed ore used in the metallurgical columns. Field kinetic tests FB-LT2 and FB-LT3 comprise notably larger particles than the samples that make up the other field test and columns. Specifically, 45% of particles that compose FB-LT2 and FB-LT3 are between 37.5 and 75 mm in diameter, owing to the larger particles of crushed ore (82 – 115 mm) used in the metallurgical columns that produced the leach tailings. The leach tailings that compose kinetic tests Col 15, Col 16 and Col 17 also comprise a well sorted distribution of particles measuring < 16 mm in diameter, with the greatest proportion of particles (61-66%) comprising the 1.7 to 12.5 mm diameter fraction. Sample 70340 (Col 1 and FB-LT1) is predominantly composed of particles measuring between 6.3 mm and 37.5 mm in diameter (67%), with the greatest proportion of the test material comprising the 6.3 to 12.5 mm fraction (30%).

4.3.6.3 Unsaturated Column Results

At mine closure, it is anticipated that five pore volumes will be passed through the leach tailings during rinse down of the HLF. As discussed in Section 3.2.7, the leach tailings were not rinsed following metallurgical testwork or prior to placing the material in the columns and field bins for ML/ARD kinetic testwork. In order to accurately account for leaching conditions at closure following the rinse of the HLF, loading rates were calculated (median and 75th percentile values) for the 10 weeks after five pore volumes have passed through the leach tailings columns (Table 4-61). Time series profiles for the leach columns are presented in Figure 4-23 through Figure 4-25 and in Appendix D.3.

Leachate pH and Sulphate Loading

Leachate pH for all tailings columns remain slightly alkaline over the test period (7.9 - 8.9, Table 4-61). A gradual decline in pH reflecting rinsing of lime is evident in all leach tailings columns except Col 15 (schist) (Figure 4-23). The pH values from Col 15 were initially relatively low compared to other columns (pH 8.0) and have remained relatively constant over the test period. A decrease in leachate pH is expected from the leach tailings in response to the rinsing and/or re-precipitation of residual lime from metallurgical testing. Lime is unstable in the presence of water and atmospheric CO_2, and will re-precipitate as calcium carbonate minerals with time. The lower pH values associated with Col 15 is likely due to a smaller lime addition during metallurgical testing, which was 1 g/kg compared to 1.5 g/kg in gneiss samples (KCA, 2015).

Table 4-60:
Particle Size Distribution for Leach Tailings Kinetic Sample

ML/ARD Kinetic Test ID	**Col 1/Col 2 FB-LT1**	**Col 17**					**FB-LT3**		**Col 15**				**FB-LT2**	
		Col 16			*NA*	*NA*								
Metallurgical Column ID	**70340***	**73028**	**73034**	**73040**	**72174**	**72180**	**72108**	**72111**	**72162**	**72168**	**721504**	**72156**	**73007**	**73016**
	NA	12.1	12.9	12.2	11.4	12.2	82.3	115	12.2	12.4	11.5	12.4	93.8	110.3
Sieve (mm)	Weight Retained (%)													
175	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	8.8	0	0	0	0	5.4	5.4
100	0	0	0	0	0	0	13.6	13.3	0	0	0	0	9.4	16.1
75	0	0	0	0	0	0	6.1	14.9	0	0	0	0	11.5	15.4
62.5	0	0	0	0	0	0	8.9	8.8	0	0	0	0	4.7	6
50	0	0	0	0	0	0	6	6.9	0	0	0	0	7.6	8.5
37.5	0	0	0	0	0	0	6.4	6	0	0	0	0	7.4	4.1
25	15	0	0	0	0	0	9.1	6.6	0	0	0	0	6.9	6.1
16	22	0	0	0	0	0	9.6	6	0	0	0	0	6.4	5.9
12.5		16.4	21.6	18.1	16.3	17.1	4.8	3	17.3	18.2	15.8	17.8	3.5	3.6
9.5	30.1	23.4	22	23.3	29	37.1	9.8	6.5	37.6	38.8	34.2	38.2	7.1	7.6
6.3		20.4	19.1	18.3										
1.7	18.7	22.1	22	22.9	33.3	26.7	11.8	7.9	26.8	25.3	27.1	25.5	11.1	8
<1.7	14.4	17.8	15.3	17.4	21.4	19.2	14	11.2	18.3	17.7	22.9	18.6	19.1	13.4
Total	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*

Notes:
PSD for leach tailings samples were conducted as part of the metallurgical testwork (KCA, 2015)
* PSD completed at SGS; 14.4% <1.7 mm was further subdivided into 7.7% retained on 0.425 mm sieve, 3.8% on 0.15 mm, 2.1% on 0.053 mm and 0.8% < 0.053 mm.

Table 4-61:
Loading rates for leach tailings unsaturated columns for 10 cycles after 5 pore volumes have been rinsed.

Parameter	Unit	Gneiss/Schist (Oxide/Transition)				Schist (Oxide/Transition)		Gneiss (Oxide/Transition)		Gneiss/Granite (Oxide/Transition)	
		Col 1 (10 kg)		Col 2 (20 kg)		Col 15 (5 kg)		Col 16 (5 kg)		Col 17 (5 kg)	
		weeks 19-37		weeks 35-53		weeks 9-27		weeks 7-25		weeks 7-25	
		Median	75th PCTL	Median	75th PCTL	Median	75th PCTL	Median	75th PCTL	Median	75th PCTL
pH		8.4	8.4	8.5	8.5	8.1	8.2	8.5	8.6	8.5	8.6
Alkalinity	mgCaCO$_3$/kg/wk	4.5	4.9	2.8	2.9	6.2	6.8	12	15	208	271
Sulphate	mg/kg/wk	0.53	0.58	0.26	0.28	5.5	8.2	0.42	0.57	0.54	0.72
Total CN	mg/kg/wk	0.0023	0.0032	0.0011	0.0013	0.013	0.021	0.014	0.022	0.014	0.023
WAD CN	mg/kg/wk	0.00017	0.00018	0.000088	0.00015	0.0012	0.0016	0.0017	0.0029	0.0016	0.0019
Ammonia-N	mg/kg/wk	0.0067	0.0092	0.0035	0.0042	0.0098	0.015	0.0051	0.0056	0.0054	0.0077
Nitrate-N	mg/kg/wk	0.00098	0.00100	0.00051	0.00053	0.0029	0.0033	0.0029	0.0033	0.0029	0.0033
Nitrite-N	mg/kg/wk	0.00050	0.00065	0.0010	0.0015	0.0015	0.0016	0.0015	0.0017	0.0015	0.0016
Al	mg/kg/wk	0.00027	0.00032	0.000074	0.000098	0.00031	0.00034	0.0015	0.0024	0.0032	0.0065
Sb	mg/kg/wk	0.00062	0.00066	0.00036	0.00039	0.0018	0.0022	0.0018	0.0020	0.0024	0.0026
As	mg/kg/wk	0.034	0.036	0.019	0.020	0.027	0.038	0.11	0.14	0.17	0.20
Cd	mg/kg/wk	0.00000011	0.00000019	0.00000011	0.00000012	0.00000022	0.00000029	0.00000016	0.00000030	0.00000018	0.00000019
Ca	mg/kg/wk	0.089	0.091	0.050	0.053	1.8	1.9	0.24	0.25	0.24	0.25
Cr	mg/kg/wk	0.000034	0.000042	0.000021	0.000023	0.0000081	0.0000097	0.000025	0.000031	0.000016	0.000022
Co	mg/kg/wk	0.000094	0.00012	0.000051	0.000060	0.00023	0.00038	0.00023	0.00035	0.00025	0.00049
Cu	mg/kg/wk	0.000019	0.000022	0.0000096	0.000010	0.000045	0.000050	0.000036	0.000045	0.000044	0.000054
Fe	mg/kg/wk	0.00070	0.00092	0.00048	0.00058	0.0043	0.0062	0.0043	0.0076	0.0051	0.0089
Pb	mg/kg/wk	0.00000033	0.00000097	0.00000017	0.00000024	0.00000057	0.0000016	0.00000096	0.00000134	0.0000014	0.0000019
Mn	mg/kg/wk	0.0000096	0.000012	0.0000046	0.0000052	0.00041	0.00049	0.000035	0.000037	0.000034	0.000046
Hg	µg/kg/wk	0.00016	0.00017	0.000088	0.000092	0.00049	0.00054	0.00056	0.00108	0.00057	0.0013
Mo	mg/kg/wk	0.00046	0.00060	0.00029	0.00035	0.00029	0.00070	0.00071	0.00091	0.00059	0.00085
Ni	mg/kg/wk	0.0000044	0.0000050	0.0000018	0.0000023	0.000064	0.000084	0.0000056	0.0000091	0.0000057	0.0000094
Se	mg/kg/wk	0.0000053	0.0000067	0.0000083	0.0000088	0.000028	0.000042	0.000014	0.000017	0.000014	0.000015
Ag	mg/kg/wk	0.000000033	0.000000036	0.000000018	0.000000023	0.00000059	0.0000022	0.00000067	0.00000130	0.00000067	0.00000088
U	mg/kg/wk	0.0032	0.0038	0.0017	0.0019	0.00059	0.00067	0.018	0.025	0.020	0.026
Zn	mg/kg/wk	0.000016	0.000017	0.0000084	0.0000088	0.000049	0.000057	0.000049	0.000055	0.000049	0.000055

Notes: All concentrations below the analytical detection limit were set at the limit for calculation of loading rates and statistics;
Weeks used in derivation of median and 75th percentile values are based on five pore volumes having passed through the leach tailings of the kinetic test column.
Green gradient shading represents relative concentrations of median values for each parameter

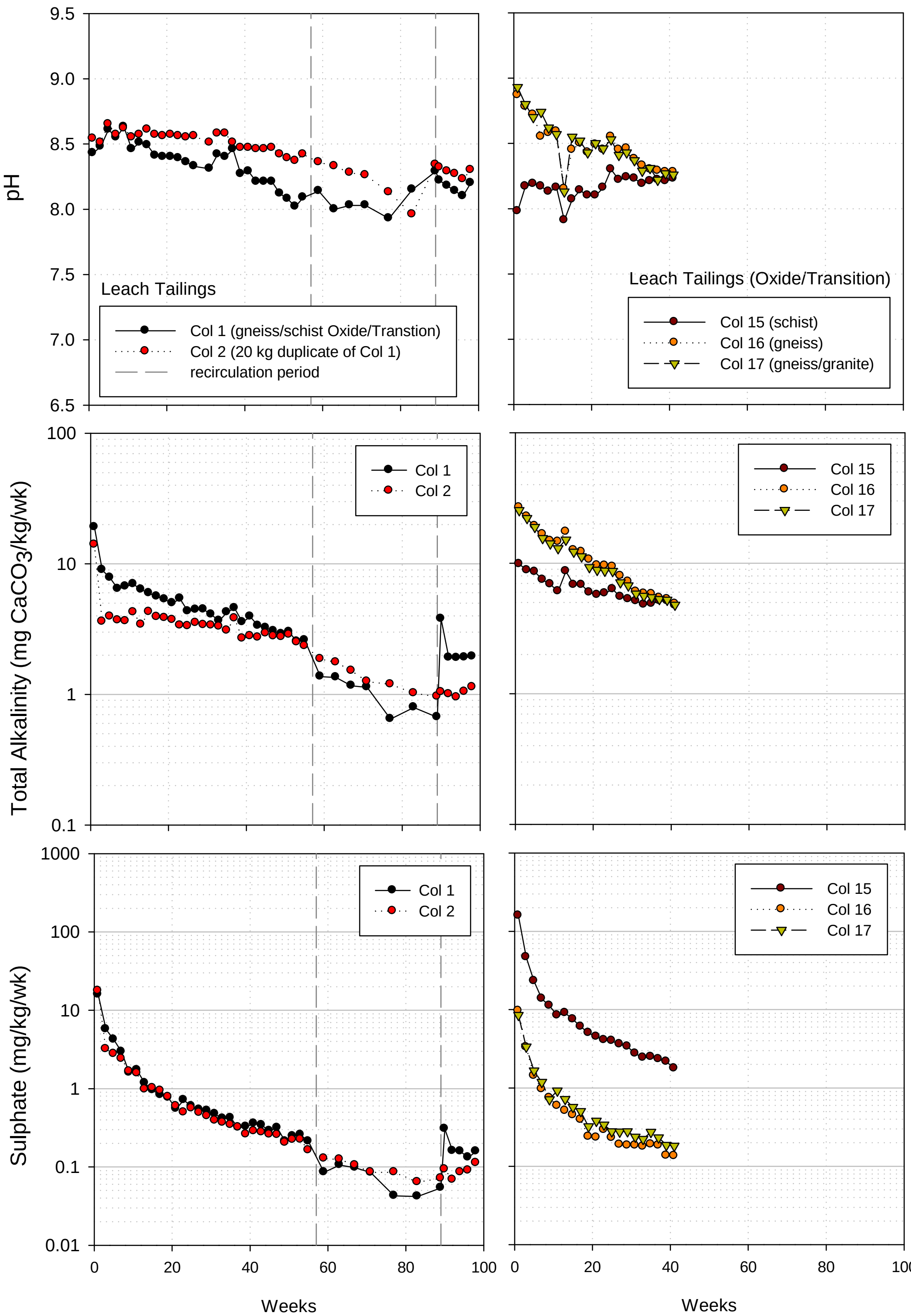

Figure 4-23: Leachate pH and weekly loading rates for total alkalinity and sulphate from leach tailings columns

Sulphate loading rates from each of the tailings columns shows a consistent decrease of one to two orders of magnitude over the test period, with Col 1, Col 2, Col 16 and Col 17 decreasing from ~10 mg/kg/wk to <0.2 mg/kg/wk. The initial sulphate load for the schist tailings (Col 15) is higher (158 mg/kg/wk), consistent with higher solid phase total and sulphide-S measured in the sub-sample (0.24 and 0.19 %, respectively; Table 4-61), and decreases to <2 mg/kg/wk over the 39 weeks of testing.

Residual Cyanide

Total and weak acid dissociable (WAD) cyanide loading rates from the leach tailings columns are initially low (< 1 mg/kg/wk) and decrease two to three orders of magnitude over the test period. The WAD cyanide analysis includes free CN and weak complexes with Zn, Cd, Ag, Cu, and Ni. Total cyanide analysis measures all of the cyanide present in any form, including in strong CN complexes with Fe, Co and Au.

Slightly higher total cyanide production rates are measured in leachate from Col 16, Col 17 and, in particular, Col 15 Table 4-61, Figure 4-24). WAD cyanide production rates decrease to near detection levels (0.01 mg/L) by approximately week 25 of testwork. Time series profiles indicate that cyanide (and WAD cyanide) production rates from Col 1 and Col 2 may be increasing following the recirculation period (Figure 4-24).

Thiocyanate (SCN) and cyanate (CNO) complexes were also evaluated in leachate samples from the tailings columns; however, with the exception of the initial flush for Col 15, 16 and 17, all values were below the detection limits (<2 and <1 mg/L, respectively)

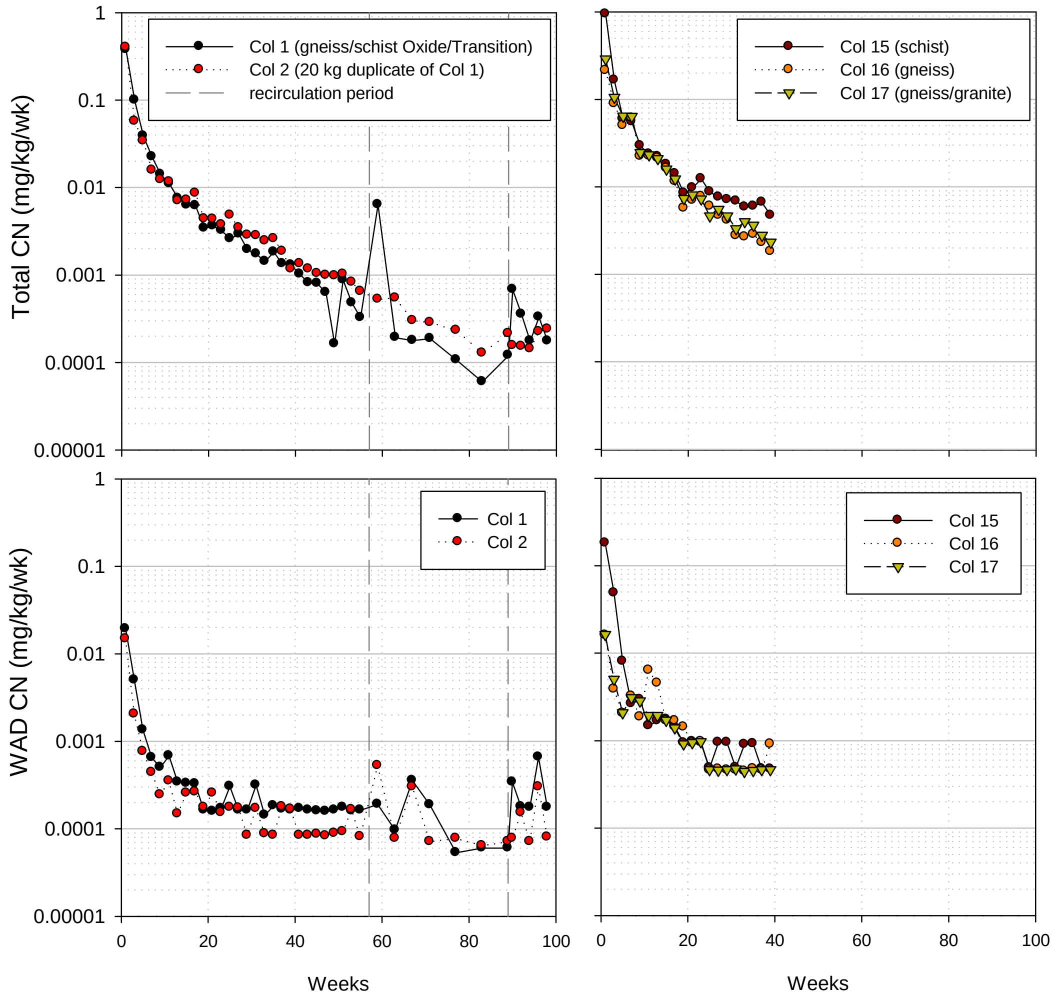

Figure 4-24: Loading rates for cyanide from leach tailings columns

Metal Leaching Trends

Time series profiles of As, Sb and U production rates are presented in Figure 4-25. Time series profiles for all other metals are provided in Appendix D.3. Loading rates for the leach tailings are generally relatively consistent (within the same order of magnitude), with slightly higher loadings observed for Col 15, Col 16 and Col 17 for most metals (Table 4-61, Figure 4-25, Appendix D.3). Loading rates for Col 16 and Col 17 are generally similar, with only slightly higher loadings of As and Al produced by the gneiss/granite tailings (Col 17) compared to the gneiss tailings (Col 16). The lowest U loading rates (by nearly an order of magnitude) are from the schist tailings (Col 15). Loading rates for the schist tailings (Col 15) are generally consistent with or slightly lower than the gneiss tailings (Col 16 and Col 17), with the exception of Mn, Ni and Se (Col 15, Appendix D.3), which are slightly higher compared to the gneiss tailings. This result is consistent with metallurgical column leach solution, which found that schist leach columns contained significantly lower U concentrations than gneiss or granite leach columns (Table 4-57).

In general, metal production rates from each of the leach tailings columns decrease or remain relatively stable at or below the respective detection limit (Cd, Pb, Hg, Ni, Zn) over the test period (Figure 4-25; Appendix D.3). The only exception is Mn from the gneiss and gneiss/granite columns (Col 16 and Col 17), which increases an order of magnitude (0.00013 and 0.00004 mg/kg/wk, respectively) after reaching a low at approximately week 20 of testwork.

Initial production rates for As, Sb and U are similar to the rates measured for ore of similar lithology and weathering facies (Figure 4-25). However, unlike the production rates from the ore columns, rates for the leach tailings columns show a continuous decrease following the initial flush.

Recirculation Experiment

Col 1 and Col 2 were subjected to a recirculation experiment that involved recirculating leachate as influent to the columns. Table 4-63 presents the final production rate prior to the recirculation experiment (*i.e.*, reduction in flow rate), the final production rate of the recirculation experiment and the median value for the recirculation period. The calculated differences between the final production rate prior to the experiment and the final and median loading rates of the recirculation period are highlighted in yellow in Table 4-63. The recirculation periods are marked on the time series profiles by dashed vertical lines (Figure 4-23 through Figure 4-25).

Loading rates for nearly all parameters either decrease (by less than an order of magnitude) or remain at the detection limit following the reduced flow conditions in the leach tailings columns (Figure 4-23 through Figure 4-25). Parameters generally decrease by more than 60% (*i.e.*, Diff of -60 or lower) by the final cycle of the recirculation period (Table 4-63). The most notable exceptions are nitrate-N for both columns and, in particular, nitrite-N for Col 1, which show increases over the recirculation period.

Table 4-64 presents the concentrations prior to and during the recirculation experiment and the calculated percent differences (highlighted in yellow). Time series profiles for leachate concentrations are presented in Appendix D.3. Similar to the results of the waste rock recirculation experiment, concentrations for many parameters from the leach tailings columns remain relatively unchanged, generally decreasing by less than 50% (Diff of -50 or higher), indicating that metal release is primarily solubility controlled. A slight overall increase in Mn for Col 1 and Col 2 and a more pronounced increase in nitrate-N for both columns and nitrate-N for Col 1 is evident (Table 4-64, Appendix D.3). The increase in nitrate-N is consistent with the oxidation (and decrease) in ammonia-N for unsaturated (sub-aerial) columns.

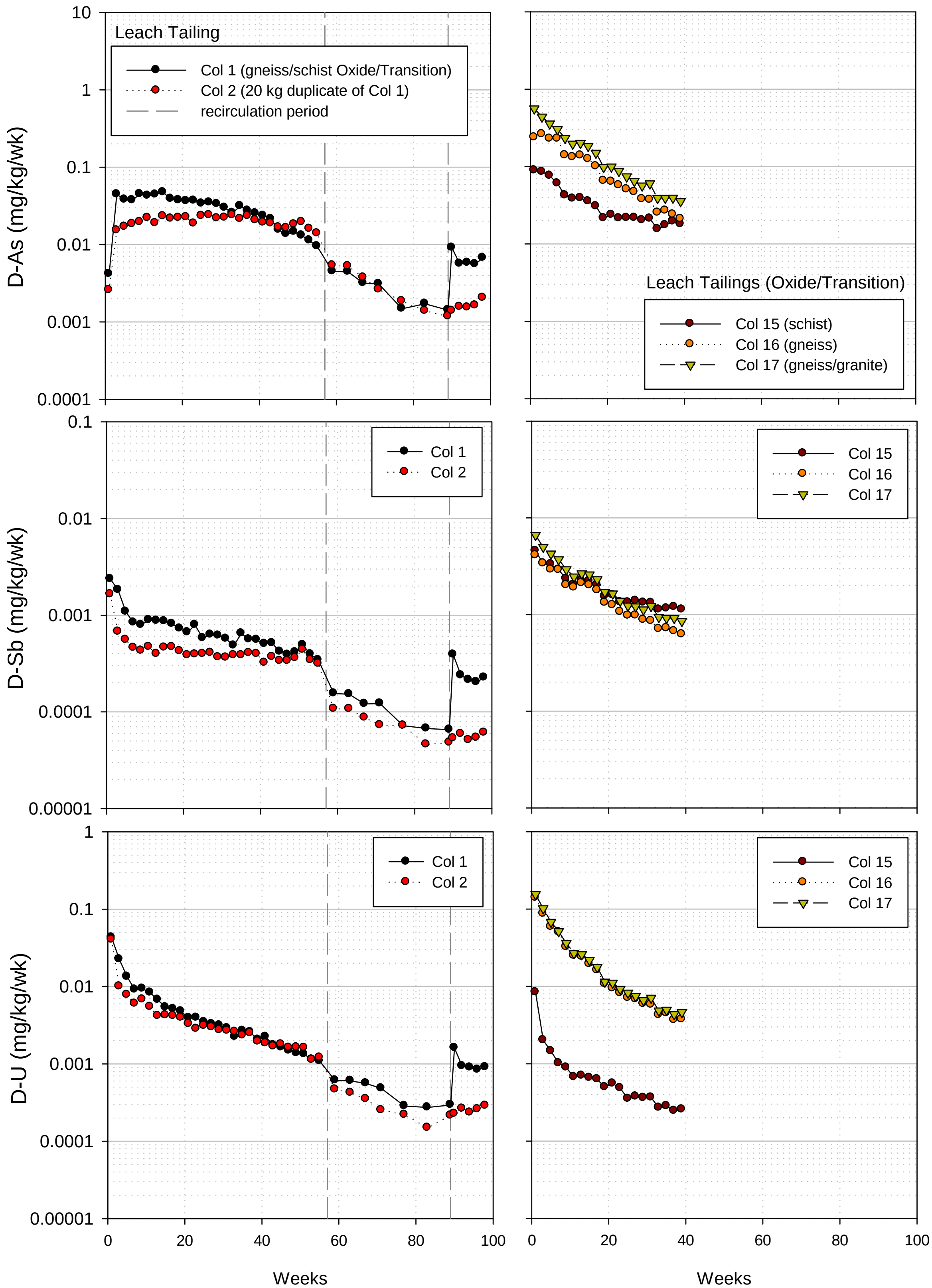

Figure 4-25: Loading rates for As, Sb and U from leach tailings columns

Table 4-62:
Loading Rates and Percent Difference of Recirculation Experiment for Gneiss/Schist Oxide/Transition Facies Leach Tailings Columns

Parameter	Unit	Col 1					Col 2				
		Loading Rates for Recirculation			*Percent Change*		Loading Rates for Recirculation			*Percent Change*	
		Cycle immediately before (Cycle 56)	Median (Cycles 57-89)	Final cycle (Cycle 89)	*Median for Recirc. Period*	*Final Recirc. Cycle*	Cycle immediately before (Cycle 56)	Median (Cycles 57-89)	Final cycle (Cycle 89)	*Median for Recirc. Period*	*Final Recirc. Cycle*
pH	s.u.	8.1	8.0	8.3	*NA*	*NA*	8.4	8.3	8.3	*NA*	*NA*
Alkalinity	mg/kg/wk	2.6	1.1	0.67	*-56*	*-74*	2.3	1.3	0.96	*-47*	*-59*
Sulphate	mg/kg/wk	0.21	0.084	0.054	*-60*	*-74*	0.16	0.086	0.071	*-47*	*-56*
Total CN	mg/kg/wk	0.00033	0.00018	0.00012	*-45*	*-63*	0.00065	0.00029	0.00021	*-56*	*-67*
WAD CN	mg/kg/wk	0.00016	0.00010	0.00006	*-41*	*-63*	0.00008	0.00008	0.00007	*-5*	*-12*
Ammonia-N	mg/kg/wk	0.0065	0.0057	0.00060	*-12*	*-91*	0.0016	0.0015	0.00036	*-8*	*-78*
Nitrate-N	mg/kg/wk	0.0010	0.0015	0.0018	*53*	*85*	0.0092	0.079	0.079	*761*	*761*
Nitrite-N	mg/kg/wk	0.0041	0.0768	0.0768	*1790*	*1790*	0.00049	0.00012	0.00011	*-76*	*-78*
Al	mg/kg/wk	0.00011	0.000047	0.000021	*-56*	*-80*	0.000076	0.000021	0.000017	*-72*	*-77*
Sb	mg/kg/wk	0.00034	0.00012	0.000065	*-65*	*-81*	0.00031	0.000073	0.000048	*-77*	*-85*
As	mg/kg/wk	0.0095	0.0031	0.0014	*-68*	*-85*	0.014	0.0026	0.0012	*-81*	*-92*
Cd	mg/kg/wk	0.00000005	0.00000003	0.00000002	*-45*	*-63*	0.00000002	0.00000002	0.00000001	*-5*	*-42*
Cr	mg/kg/wk	0.000013	0.0000061	0.0000032	*-51*	*-75*	0.000014	0.0000043	0.0000034	*-70*	*-76*
Co	mg/kg/wk	0.000028	0.000013	0.0000073	*-55*	*-74*	0.000033	0.0000078	0.0000061	*-76*	*-81*
Cu	mg/kg/wk	0.000015	0.0000048	0.0000028	*-69*	*-82*	0.000012	0.0000045	0.0000022	*-62*	*-81*
Fe	mg/kg/wk	0.00021	0.00010	0.00010	*-54*	*-52*	0.00026	0.000060	0.000046	*-77*	*-82*
Pb	mg/kg/wk	0.00000049	0.00000011	0.00000012	*-78*	*-75*	0.00000016	0.00000008	0.00000007	*-52*	*-56*
Mn	mg/kg/wk	0.000015	0.0000080	0.0000025	*-46*	*-83*	0.0000057	0.0000036	0.0000061	*-37*	*8*
Hg	µg/kg/wk	0.00033	0.000089	0.000060	*-73*	*-82*	0.000081	0.000038	0.000036	*-54*	*-56*
Mo	mg/kg/wk	0.00015	0.000059	0.000034	*-60*	*-77*	0.00020	0.000052	0.000024	*-73*	*-88*
Ni	mg/kg/wk	0.0000016	0.00000094	0.00000060	*-41*	*-63*	0.0000017	0.00000038	0.00000036	*-77*	*-78*
Se*	mg/kg/wk	0.000003	0.0000013	0.00000090	*-54*	*-67*	0.0000026	0.00000086	0.00000068	*-67*	*-74*
Ag	mg/kg/wk	0.00000094	0.00000008	0.00000005	*-92*	*-94*	0.00000042	0.00000004	0.00000002	*-90*	*-94*
U	mg/kg/wk	0.0011	0.00048	0.00029	*-56*	*-73*	0.0012	0.00025	0.00021	*-79*	*-82*
Zn	mg/kg/wk	0.000016	0.0000089	0.0000060	*-45*	*-63*	0.0000081	0.0000038	0.0000036	*-54*	*-56*

Notes: Alkalinity is presented as mg $CaCO_3$/kg/wk; Hg is presented as ug/kg/wk; negative values represent a decrease in production rates; percent difference values are highlighted; * a high detection limit of 0.001 mg/L was often applied for Se analyses; as a result, the second to last cycle prior to the recirculation period (which provided a measurable value) was applied for calculation of percent differences.

Table 4-63:
Concentrations and Percent Differences for Recirculation Experiment for Leach Tailings Columns

Parameter	Unit	Col 1					Col 2				
		Loading Rates for Recirculation			*Percent Change*		Loading Rates for Recirculation			*Percent Change*	
		Cycle immediately before (Cycle 56)	Median (Cycles 57-89)	Final cycle (Cycle 89)	*Median for Recirc. Period*	*Final Recirc. Cycle*	Cycle immediately before (Cycle 56)	Median (Cycles 57-89)	Final cycle (Cycle 89)	*Median for Recirc. Period*	*Final Recirc. Cycle*
pH	s.u.	8.1	8.0	8.3	*NA*	*NA*	8.4	8.3	8.3	*NA*	*NA*
Alkalinity	mg/L	160	131	111	-18	-30	289	176	135	-39	-53
Sulphate	mg/L	13	9.0	9.0	-31	-31	20	12	10	-40	-50
Total CN	mg/L	0.020	0.020	0.020	0	0	0.080	0.040	0.030	-50	-63
WAD CN	mg/L	*<0.01*	0.010	*<0.01*	0	0	*<0.01*	0.010	*<0.01*	0	0
Ammonia-N	mg/L	0.40	0.60	0.10	50	-75	0.20	0.40	*<0.1*	100	-50
Nitrate-N	mg/L	*<0.06*	0.17	0.30	183	400	1.1	22	22	1865	1865
Nitrite-N	mg/L	0.25	13	13	5020	5020	0.060	0.030	*<0.03*	-50	-50
Al	mg/L	0.0065	0.0051	0.0035	-22	-46	0.0093	0.0057	0.0048	-39	-48
Sb	mg/L	0.021	0.014	0.011	-36	-48	0.039	0.020	0.014	-47	-65
As	mg/L	0.59	0.33	0.24	-44	-59	1.7	0.74	0.33	-57	-81
Cd	mg/L	*<0.000003*	0.0000030	*<0.000003*	0	0	0.0000030	0.0000060	0.0000040	100	33
Cr	mg/L	0.00077	0.00065	0.00053	-16	-31	0.0018	0.0012	0.00096	-33	-46
Co	mg/L	0.0018	0.0014	0.0012	-18	-30	0.0040	0.0022	0.0017	-46	-57
Cu	mg/L	0.00095	0.00070	0.00046	-26	-52	0.0015	0.0013	0.00062	-14	-58
Fe	mg/L	0.013	0.011	0.017	-15	31	0.032	0.016	0.013	-50	-59
Pb	mg/L	0.000030	0.000020	0.000020	-33	-33	0.000020	0.000020	0.000020	0	0
Mn	mg/L	0.00091	0.00091	0.00042	0	-54	0.00070	0.0010	0.0017	44	146
Hg	µg/L	0.020	0.010	*<0.01*	-50	-50	0.010	0.010	*<0.01*	0	0
Mo	mg/L	0.0091	0.0066	0.0057	-27	-38	0.024	0.014	0.0067	-42	-72
Ni	mg/L	0.00010	0.00010	0.00010	0	0	0.00020	0.00010	0.00010	-50	-50
Se*	mg/L	0.00017	0.00016	0.00015	-6	-12	0.00032	0.00025	0.00019	-22	-41
Ag	mg/L	0.000058	0.0000090	0.0000090	-84	-84	0.000052	0.000011	0.0000070	-79	-87
U	mg/L	0.067	0.053	0.049	-20	-26	0.15	0.070	0.060	-52	-59
Zn	mg/L	*<0.001*	0.0010	*<0.001*	0	0	*<0.001*	0.0010	*<0.001*	0	0

Notes: Alkalinity is presented as mg $CaCO_3$/L; negative values represent a decrease in production rates; percent difference values are highlighted; * a high detection limit of 0.001 mg/L was often applied for Se analyses; as a result, the second to last cycle prior to the recirculation period (which provided a measurable value) was applied for calculation of percent differences.

4.3.6.4 Field Kinetic Tests

Leachate chemistry for the leach tailings field kinetic tests (FB-LT1, FB-LT2 and FB-LT3) are presented in Table 4-62. It is important to note that the leach tailings were not subjected to a rinse down prior to initiation of the kinetic testwork and five pore volumes have not yet passed through the contents of the field bins. For discussion of the preliminary results, leachate results for the field bins are compared to MMER and 10 times the CCME water quality guidelines (presented Table 4-62) to highlight which parameters may be elevated in drainage from the HLF following rinse down. A summary of the water quality guidelines are provided I Table 4-14.

Total and WAD cyanide, ammonia-N, nitrite-N, dissolved Al, Sb, As, Cr, Cu, Fe, Hg, Ni and U, and radioisotope ^{226}Ra are indicated to exceed the MMER or 10x's the CCME guideline in at least one leachate sample from the field kinetic tests. In particular, As exceeds the MMER maximum authorized concentration in a grab sample (MGS) of 1 mg/L in every leachate sample collected to date from the field bins. Elevated concentrations of total and WAD cyanide are expected given that the contents of the kinetic tests were not subjected to a rinse down period prior to being placed in the field bins, Elevated concentrations of nitrogen species are anticipated from the natural degradation of cyanide compounds.

Leachate pH for the leach tailings field kinetic tests are slightly neutral, with slightly higher pH values measured in leachate from FB-LT2 and FB-LT3 (8.6-9.2). Concentrations are generally highest in the first sample from each field test. The exception is Zn, which reaches a maximum (0.047 mg/L) in FB-LT1 after 60 weeks of testwork. The overall highest concentrations of Al, Sb, Cr, Co, Fe, Pb, Mn, Hg, Mo and U were measured in leachate from the gneiss oxide (FB-LT2) and the overall highest concentrations of As, Cu, Ni, Se and Ag were measured in leachate from the schist oxide (FB-LT3). On-going monitoring of the field bins will provide an indication of which parameters may be of concern in drainage from the HLF after closure.

Table 4-64:
Leachate Results from Leach Tailings Field Kinetic Tests

	Lithology	Gneiss (82%) Schist (18%)					Gneiss		Schist	
	Weathering Facies	Oxide (90%) Transition (10%)					Oxide		Oxide	
	Field Bin	FBLT1					FBLT2		FBLT3	
	Date Sampled	17-Jun-14	25-Sep-14	4-Jun-15	10-Aug-15	22-Oct-15	10-Aug-15	22-Oct-15	10-Aug-15	22-Oct-15
pH	s.u.	8.5	8.5	8.6	8.4	8.5	8.7	9.2	8.9	8.6
Conductivity	uS/cm	716	991	709	529	692	595	490	780	734
T-Alkalinity	mg $CaCO_3$/L	227	15	193	*ND*	197	*ND*	254	*ND*	235
Cl	mg/L	20	18	8.4	2.1	3.7	8.3	6.2	15	16
F	mg/L	0.43	*ND*	0.31	0.36	0.35	0.35	0.27	0.54	0.60
SO_4	mg/L	119	243	135	88	118	9.89	6.2	18	24
DOC	mg/L	9	11	*ND*	*ND*	6.0	*ND*	26	*ND*	48
NH_3-N	mg/L	0.71	0.29	0.036	*ND*	*<0.005*	*ND*	5.0	*ND*	1.9
NO_3-N	mg/L	0.94	4.2	3.9	3.6	5.2	0.14	0.16	*<0.005*	0.85
NO_2-N	mg/L	2.0	*ND*	0.95	0.34	0.0046	0.18	0.080	*<0.001*	25
WAD CN	mg/L	0.18	0.019	0.34	0.010	0.017	0.047	0.052	*ND*	0.17
Total-CN	mg/L	1.6	0.34	0.83	0.27	0.38	1.5	2.6	*ND*	2.2
Dissolved Metals										
Al	mg/L	0.49	0.0084	0.0077	0.0084	0.012	10	0.85	0.30	1.7
Sb	mg/L	0.046	0.035	0.027	0.030	0.024	0.11	0.021	0.070	0.057
As	mg/L	1.2	1.8	1.6	1.3	1.4	1.2	1.1	2.3	3.2
Cd	mg/L	0.000020	*<0.00001*	*<0.000005*	*<0.000005*	*<0.000005*	*<0.00005*	0.0000089	*<0.000005*	0.0000057
Cr	mg/L	0.020	0.010	0.0015	0.003	0.0044	0.031	0.015	0.0018	0.0050
Co	mg/L	0.077	0.10	0.043	0.021	0.024	0.57	0.46	0.12	0.20
Cu	mg/L	0.0064	0.0023	0.0024	0.0020	0.0014	0.016	0.010	0.063	0.042
Fe	mg/L	1.0	0.81	0.24	0.12	0.19	15	2.2	0.32	2.9
Pb	mg/L	0.00053	*<0.0005*	*<0.00005*	0.00010	0.00007	0.0073	0.00049	0.000073	0.00088
Mn	mg/L	0.033	0.0094	0.010	0.013	0.0042	0.30	0.022	0.008	0.085
Hg	mg/L	0.00042	0.000052	0.000039	0.000019	0.000018	*ND*	0.00064	*ND*	0.00038
Mo	mg/L	0.054	0.089	0.043	0.058	0.061	0.22	0.17	0.034	0.048
Ni	mg/L	0.042	*<0.001*	0.00054	*<0.0005*	*<0.0005*	0.061	0.016	0.26	0.085
Se	mg/L	0.0019	0.0020	0.0010	0.00075	0.00082	0.0017	0.0017	0.0029	0.0024
Ag	mg/L	0.00020	*<0.00002*	0.000025	*<0.00001*	*<0.00001*	0.000043	0.000033	0.000075	0.00030
U	mg/L	0.21	0.36	0.23	0.16	0.21	0.46	0.67	0.036	0.027
Zn	mg/L	0.0016	0.019	0.0065	0.047	0.021	0.019	0.0019	*<0.001*	0.0066
Radioisotopes										
Ra226	Bq/L	*ND*	*ND*	0.012	0.020	0.012	*ND*	0.42	*ND*	0.03

Notes: ND = no date; values in blue italics are below the analytical detection limit. Values that exceed the MMER (2002) MGS water quality guideline are shaded in dark grey and the MMM guideline are shaded in light grey. Values that exceed 10 times the CCME (2007) water quality guidelines are shaded in blue; guidelines for Cu, Ni and Pb are based on the default value for when hardness is not known (which corresponds to the 25th percentile hardness value of ~55 mg $CaCO_3$/L calculated using available SW data (n=754, Jun-27-2014 - Jan-26-2016); guideline for Cd are calculated using the 25^{th} percentile hardness of ~55 mg $CaCO_3$/L; guideline for Cr is for hexavalent (VI); guidelines for sulphate, Co and Sb are derived from BC MOE water quality guidelines for protection of freshwater aquatic life for reference. Sulphate is hardness dependent and is based on a hardness of 55 mg CaC.

4.3.6.5 Comparison of Duplicates Kinetic Tests

Duplicate samples of leach tailings sample LT1 were submitted in multiple masses for kinetic testing under different operating conditions to assess scaling effects on metal leaching rates. This sample was submitted for a 10 kg column (Col 1) a 20 kg column (Col 2) and a 76 kg field bin (FB-LT1). A comparison of Col 1 (10 kg) and Col 2 (20 kg) indicates that these columns initially produce similar concentrations, but after the first few cycles Col 2 begins to produce lower loading rates, but greater concentrations of alkalinity, sulphate, total cyanide and dissolved As, Sb, Cr, Co, Fe, Mo, Se and U (Appendix D.3). Conversely, peak concentrations of alkalinity, sulphate, total cyanide, U and As are greater in Col 1 and Col 2 compared to the field bin (FB-LT1, 76.3 kg). In general, the differences between these duplicate samples can be related to variations in pH and alkalinity produced under different test conditions.

The relationship between As and pH, and U and alkalinity are shown in Figure 4-24 below. The results are generally similar to that of waste rock described in Section 4.1.5.5. Arsenic concentrations appear to be primarily related to pH in kinetic tests of different masses, consistent with As sorption to mineral surfaces which decreases with increasing pH (Pierce and Moore, 1982). The relationship between U and alkalinity is consistent for the different scale kinetic tests, while the field bin produces U concentrations within the concentration range observed from the column samples, but shows little relation to alkalinity. This variation in the relationship between U and alkalinity in the field bin experiment may be related to the relatively long storage time of field bin leachate in collection jugs before sample collection. That is, field bin drainage in collection jugs may be held for weeks to months in the collection jug between sampling events, over this time temperature fluctuations (including freezing conditions), and interaction with atmospheric CO_2 will affect alkalinity.

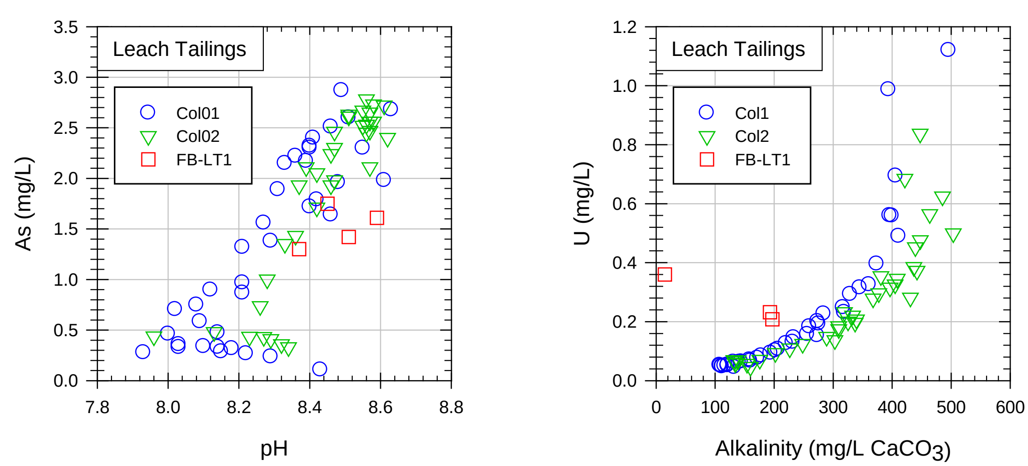

Figure 4-26: Comparison of As versus pH (left) and U versus alkalinity (right) in duplicate leach tailings kinetic test samples.

4.3.7 Radioisotopes

4.3.7.1 Occurrence

The NORM isotope results for leach tailings are expected to be analogous to that of ore because no solid separation will occur during ore processing (*e.g.*, sulphide flotation). That is, there is no potential for radioisotope enrichment in the leach tailings because the mass of ore on the leach pad is essentially unchanged by CN irrigation and Au recovery. The NORM results for ore samples are presented in Appendix D.1-5, and summarized in Section 4.1.5.

4.3.7.2 Kinetic Test Leachate

The activity of ^{226}Ra in leach tailings drainage was investigated by monitoring ^{226}Ra concentrations in field bin experiments and metallurgical columns (Table 4-56 and Table Table 4-64). The CN leach columns represent process water during mine life, while leach tailings field bins provide an indication of drainage chemistry at mine closure.

Field bins were monitored for ^{226}Ra starting in June 2015, however, not all samples subsequent to this time point had sufficient volume (1L) for ^{226}Ra analysis. Activities in FB-LT1 and FB-LT3 were an order of magnitude below the lowest MMER criteria (0.37 Bq/L), ranging from 0.012 to 0.03 Bq/L. The only exceedance of this MMER criteria was found in the single ^{226}Ra measurement in the gneiss oxide field bin (FB-LT2) of 0.42 Bq/L. Note that field bin samples of ^{226}Ra were not filtered, potentially leading to overestimate of dissolved activities due to incorporation of colloidal particles.

Dissolved ^{226}Ra was measured from the two large scale (718 to 741 kg) leach columns containing gneiss oxide ore samples during the metallurgical test program. These samples produced ^{226}Ra concentrations ranging from 0.1 Bq/L to 0.018 Bq/L in column 73022 and 73016, respectively (Table 4-55). It is interesting to note that the dissolved Ra concentrations follow dissolved Ba more closely than U in CN leach column samples. That is, column 73016 has a lower ^{226}Ra activity and Ba concentration, but considerably higher U concentrations than column 73022. Radium occurs as a radioactive decay product of ^{238}U, hence, the ^{226}Ra is expected to be elevated in the solid phase in samples with elevated U. However, in an aqueous system, ^{226}Ra forms a bivalent cation [Ra(II)] and behaves similar to other alkaline earth metals such as Mg, Sr, Ca and particularly Ba. The relationship between Ba and ^{226}Ra release from geologic material are described in more detail in Section 5.1.4.3.

4.4 Overburden and Borrow Material

Topsoil and overburden will be stripped from mine facilities and either stockpiled or used as fill depending on the source, ice content and material type. According to the JDS (2016) mine plan, approximately 1.5 Mm^3 of topsoil and 3.5 Mm^3 of inorganic overburden is planned to be excavated. Organic topsoil has an average depth of 0.3 m and will be stripped from the footprints of mine facilities and stored in the soil stockpile for later use as cover material at the end of mine life. Inorganic overburden has a depth ranging from 1.3 to 4.1 m and will either be used as fill within the mine facility footprint area that the material is sourced from or stored in the frozen soil stockpile. Note that overburden from pit shell areas is sent to WRSFs and are therefore not differentiated from waste rock.

Thirty samples of overburden were collected from test pits on the HLF and mine facility area footprints, while 75 samples were collected from drill cores from the pits and WRSF areas. The depth of overburden at the site is approximately 1.5 m in thickness. At each test pit and drill core site, a composite of the entire overburden profile was sampled for analyses. Locations of overburden samples in respect to mine facility footprints and surface geology is shown in Figure 3-2.

4.4.1 Overview of Test Results

Geochemical test results indicate that the mine site overburden has little or no potential for acid generation, owing to the low S content (median of 0.01%). The static test results demonstrate that the mine site overburden is at a highly weathered state, as indicated by the lack of carbonate or sulphide mineralization and the circumneutral to mildly acidic rinse-pH (5.2-8.9; median of 7.2) similar to that of rain water (~pH 5.6). Due to the lack of acid generating minerals, the mine site overburden is classified as non-PAG or unreactive.

The metal leaching potential from overburden is also considered to be low, with test samples indicated to be relatively deplete compared to ACA in a number of metals (Al, Cd, Co, Cr, Cu, Mn, Ni and Zn). Some samples showed enrichment in As, Bi, Hg, Sb and Se with respect to ACAs, consistent with solid phase element results for waste rock and ore. The most frequently elevated elements are Bi and Se; however, metal leaching results show concentrations of these metals are generally below the respective detection limits showing that these elements are not readily water.

4.4.2 Acid Base Accounting

Statistical summaries of select ABA results for overburden samples are presented by underlying geologic unit in Table 4-65. The complete set of ABA results are presented in

Appendix C.4-1. In general, ABA results indicate that the mine site overburden has little to no potential for acid generation, regardless of the location or underlying geology. This is primarily due to the overall low total-S and sulphide-S values for the overburden samples (<0.01-0.14 wt.% total-S; median = 0.01 wt.%) and the parent material. Total inorganic C is also low and generally below the detection limit (<0.05 wt.%C; <4.2 kg $CaCO_3$/t CaNP), particularly for the granite and gneiss (90^{th} an 75^{th} percentiles, respectively, below detection limit). Sobek NP values are also generally low, with median values of 3, 6, and 11 kg $CaCO_3$/t measured for overburden samples overlying granite, gneiss and schist bedrock, respectively (Table 4-65). NPR values were evaluated using sobek NP and AP calculated from total-S or sulphide-S, whichever was higher, and follow the same criteria as was applied to waste rock and ore for NPR values using sobek NP, as described in Section 4.1.2.4.

More than 95% of the overburden samples are classified as non-PAG (NPR>3) or neutral (total-S <0.02 wt.%), while none of the overburden samples are indicated to be PAG (NPR<1) when the most conservative S value is used to calculate AP. One sample from overburden overlying the meta-gabbro and two samples each from overburden overlying the schist and gneiss bedrock have NPRs between 1 and 3, indicating that they have an uncertain potential. The few samples with NPR values between 1 and 3 have measurable total-S >0.04 wt.%.

Of note is the general correlation between the ABA results for overburden with the ABA results for the respective underlying geologic unit, whereby overburden overlying granite bedrock has the overall lowest total-S and NP, while overburden overlying schist bedrock has slightly higher total-S and sulphide-S values and NP.

The ABA results demonstrate that the mine site overburden is highly weathered. This is shown by the relative absence of carbonate or sulphide mineralization, and the circum-neutral to mildly acidic rinse-pH values (5.2≤pH≤8.9; median = 7.2), which is higher than the pH of rain water (~pH 5.6). Due to the overall general lack of neutralizing or acid generating minerals in the samples, as well as high NPR values, the mine site overburden can be classified as non-PAG. Drainage from stockpiled overburden and from site pads comprising overburden can be expected to be similar to in-situ rinse pH measurements, as presented in Table 4-65.

Table 4-65:
Statistical Distribution of Acid Base Accounting Results for Mine Site Overburden

Underlying Geologic Unit	Rinse pH	Paste pH	Total S	Sulphide S	Sulphate S	TIC	Sobek NP	Sobek NNP	NPR
	s.u.	s.u.	wt.%	wt.%	wt.%	wt.%	kg $CaCO_3$/t	kg $CaCO_3$/t	obek NP/AP
Overburden overlying Granite (n = 28)									
Min	5.7	5.8	*<0.01*	*<0.01*	*<0.01*	*<0.05*	1	0.7	3.2
10th PCTL	6.1	6.0	0.01	*<0.01*	*<0.01*	*<0.05*	2	1.4	3.2
25th PCTL	6.3	6.3	0.01	*<0.01*	0.01	*<0.05*	2	1.7	4.7
Median	6.6	6.6	0.01	0.01	0.01	*<0.05*	3	2.4	6.4
75th PCTL	7.0	6.9	0.02	0.02	0.01	*<0.05*	4	3.7	12.8
90th PCTL	7.3	7.5	0.02	0.02	0.02	*<0.05*	4.6	4.3	14.7
Max	8.9	8.7	0.02	0.03	0.02	0.05	8	7.7	25.6
Overburden overlying Gneiss (n = 41)									
Min	5.5	5.3	*<0.01*	*<0.01*	*<0.01*	*<0.05*	1	0.7	2.4
10th PCTL	6.7	6.7	*<0.01*	*<0.01*	*<0.01*	*<0.05*	3	2.7	9.6
25th PCTL	7.0	6.9	*<0.01*	*<0.01*	0.01	*<0.05*	5	4.7	10.0
Median	7.5	7.5	0.01	*<0.01*	0.01	*<0.05*	6	5.7	16.7
75th PCTL	7.9	7.9	0.01	*<0.01*	0.02	*<0.05*	8	7.3	23.3
90th PCTL	8.1	8.1	0.01	0.01	0.02	0.07	11	10.7	35.2
Max	8.4	8.4	0.12	0.02	0.11	0.14	18	17.7	60.0
Overburden overlying Schist (n = 33)									
Min	6.0	5.9	*<0.01*	*<0.01*	*<0.01*	*<0.05*	3	1.8	2.4
10th PCTL	6.6	6.6	*<0.01*	*<0.01*	0.01	*<0.05*	5	4.4	8.6
25th PCTL	7.3	7.3	*<0.01*	*<0.01*	0.01	*<0.05*	7	6.7	13.3
Median	7.6	7.5	0.02	*<0.01*	0.02	0.05	11	10.1	22.4
75th PCTL	8.0	8.1	0.02	0.01	0.02	0.1	15	14.7	48.0
90th PCTL	8.3	8.3	0.038	0.02	0.02	0.89	90	89.4	141.0
Max	8.8	8.8	0.14	0.07	0.04	2.89	253	248.6	275.2
Overburden overlying Meta-gabbro (n = 3)									
17555	5.2	5.1	0.06	0.03	0.01	*<0.05*	3	1.1	1.6
R553404	9.2	9.2	*<0.01*	*<0.01*	0.02	1.3	138	137.7	460.0
R553602	7.4	7.4	0.01	*<0.01*	0.03	*<0.05*	8	7.7	25.6

Notes: Values in grey italics are below he analytical detection limit;
NP is neutralization potential;
NPR is sobek NP over acid potential (AP) calculated from total or sulphide-S, whichever was higher; and
NNP is net neutralization potential, calculated by subtracting AP from sobek NP

4.4.3 Shake Flask Extractions

Statistical summaries of shake flask extraction experiments for mine site overburden are presented by underlying geologic unit in Table 4-64 and compared to CCME freshwater quality guidelines for the protection of aquatic life (CCME, 2007). No water soluble parameters exceed the MMER guidelines. Concentrations of Al, As, Cr, Cu, Fe, Pb and

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Hg exceed the 30-day or maximum CCME guideline in at least one sample from overburden overlying the granite, gneiss and schist bedrock. The largest exceedances are associated with As, Al, Cu, Cr and Fe from overburden overlying gneiss and schist bedrock (25^{th} percentile exceed CCME guidelines). Overall, the highest median concentrations for metals (Al, As, Sb, Cr, Co, Cu, Fe, Mn, Ni) in SFEs are observed for overburden samples overlying schist bedrock. The overall lowest metal concentrations in SFEs are observed for overburden overlying meta-gabbro and granite bedrock; however, the overburden overlying the granite has the highest median and maximum Pb and U concentrations in SFEs.

Iron and Al are sparingly water soluble under neutral pH and aerobic conditions. Accordingly, the high Al and Fe values are likely caused by fine suspended solids carried through the 0.45µm filter during the extraction experiment. The exceedances observed for other metals (*e.g.,* As, Cr, Cu, Pb) in SFEs may also be associated with suspended solids given that the samples (i.e., CFR0864, SRK-15TP-41, -22 and -24, CFR0937 and CFR0984, Appendix C.4-2) which exhibit the highest concentrations of Al and Fe in SFEs also show elevated concentrations of As, Cr, Cu, Pb as well as other metals (*e.g.*, Sb, Co, Mn, Mo, Ni, Ag).

4.4.4 Trace Metal Enrichment

Statistical summaries of solid phase element results for mine site overburden are presented by underlying geologic unit in Table 4-65 and compared to average continental abundances (ACA; Price, 1997). The complete set of solid phase element results are presented in Appendix C.4-3. The results presented show that overburden is relatively deplete in a number of metals, with 90^{th} percentile values for Al, Cd, Co, Cr, Cu, Mn, Ni and Zn falling below ACAs. Consistent with solid phase element results for waste rock and ore, the overburden samples are enriched in As, Bi, Hg, Sb and Se with respect to 10 times the ACAs (dark shading in Table 4-65). In general, median concentrations of enriched metals are lowest in the overburden overlying granite bedrock and highest in the overburden overlying schist bedrock. This is consistent with the observed relative enrichment for waste rock samples, with the exception of Sb and As which are considerably higher in the oxide granite waste rock samples (Section 4.1.4). The most frequently elevated elements are Bi and Se; however, SFE concentrations (Table 4-64) were generally below the respective detection limits, indicating that this element is not in a readily water soluble form. Overall, the data suggest that elements of potential concern for stockpiled overburden are As and possibly Hg. These elements are indicated to be enriched in the solid phase and exceed CCME limits in extraction experiments.

Table 4-66:
Statistical Summary of Shake Flask Extraction Results for Mine Site Overburden

	Unit	CCME		Overburden overlying Granite (n = 11)					Overburden overlying Gneiss (n = 12)					Overburden overlying Schist (n = 7)					Meta-gabbro
		Max	30-day	Min	25th PCTL	Median	75th PCTL	Max	Min	25th PCTL	Median	75th PCTL	Max	Min	25th PCTL	Median	75th PCTL	Max	CFB030
T-Alk.	mg CaCO3/L	-	-	*<2*	3.0	4.9	5.0	5.8	4.8	8.3	12.9	22.3	47.8	5.3	7.0	8.0	25.4	45.2	35.0
F	mg/L	-	-	*<0.02*	0.03	0.08	0.10	0.17	0.05	0.13	0.15	0.18	0.23	0.06	0.11	0.19	0.24	0.28	0.17
pH	pH	-	6.5-9.0	5.9	6.1	6.3	6.5	6.5	6.1	6.6	7.2	7.7	8.4	6.2	6.8	7.1	7.5	7.7	9.3
SO_4	mg/L	-	**<u>218</u>**	*<0.5*	*<0.5*	*<0.5*	0.53	1.36	*<0.5*	0.5875	0.67	0.735	1.78	0.54	0.84	1	1.95	3.09	2.89
Al	mg/L	-	0.1	0.0808	0.423	0.899	1.35	1.94	0.16	0.547	0.845	1.0425	2.11	0.71	1.14	1.43	1.55	1.89	0.22
Sb	mg/L	**<u>0.009</u>**	-	0.00013	0.00016	0.00021	0.00026	0.00069	0.00035	0.00086	0.00106	0.00195	0.00841	0.00023	0.00054	0.0016	0.0029	0.0075	*<0.0001*
As	mg/L	-	0.005	*<0.001*	0.0011	0.0016	0.0024	0.0263	0.0041	0.006375	0.01255	0.017025	0.0962	0.002	0.0062	0.0131	0.01495	0.0414	0.0021
Bi	mg/L	-	-	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*
Cd	mg/L	0.0011	0.0001	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
Cr	mg/L	0.001	-	*<0.0005*	0.0010	0.0018	0.0028	0.0037	*<0.0005*	0.0016	0.0022	0.0030	0.0048	0.0012	0.0029	0.0031	0.0040	0.0043	*<0.0005*
Co	mg/L	**<u>0.11</u>**	**<u>0.004</u>**	*<0.0001*	0.00015	0.00043	0.00054	0.00096	*<0.0001*	0.00028	0.00055	0.0010	0.0029	0.00028	0.00078	0.00086	0.0009	0.001	*<0.0001*
Cu	mg/L	-	0.002	*<0.001*	0.0021	0.0040	0.0050	0.0077	0.0021	0.0046	0.0056	0.0071	0.0091	0.0044	0.0069	0.0078	0.0122	0.0187	*<0.001*
Fe	mg/L	-	0.3	*<0.03*	0.24	0.75	1.14	1.93	0.05	0.55	0.81	1.05	2.06	0.74	0.94	1.13	1.39	2.01	*<0.03*
Pb	mg/L	-	0.001	0.0001	0.0003	0.0007	0.0007	0.0016	*<0.0001*	0.0002	0.0004	0.0006	0.0010	0.0004	0.0005	0.0005	0.0011	0.0014	*<0.0001*
Mn	mg/L	**<u>1.15</u>**	**<u>0.85</u>**	0.002	0.023	0.052	0.078	0.153	0.015	0.026	0.037	0.065	0.198	0.038	0.040	0.049	0.089	0.318	*<0.0005*
Hg	mg/L	-	3E-05	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	0.000065	0.00005	*<0.00005*	*<0.00005*	*<0.00005*	0.00026	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	0.00012	*<0.00005*
Mo	mg/L	-	0.73	0.0001	0.0005	0.0011	0.0013	0.0027	0.0007	0.0017	0.0020	0.0024	0.0042	0.0008	0.0016	0.0017	0.0033	0.012	0.0057
Ni	mg/L	-	0.025	*<0.0005*	0.0010	0.0015	0.0022	0.0036	*<0.0005*	0.0014	0.0025	0.0053	0.0071	0.0014	0.0022	0.0051	0.0056	0.0056	*<0.0005*
Se	mg/L	-	0.001	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	0.00064	*<0.0005*
Ag	mg/L	-	0.0003	*<0.00005*	*<0.00005*	*<0.00005*	0.00006	0.00014	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*	*<0.00005*
U	mg/L	0.033	0.015	0.0011	0.0015	0.0023	0.0024	0.0041	0.0002	0.0002	0.0004	0.0006	0.0015	0.0001	0.0004	0.0007	0.0009	0.0011	0.00001
Zn	mg/L	-	0.03	*<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*	*<0.01*	*<0.01*	*<0.01*

Notes:
Values in grey italics are below the analytical detection limit; ND = no data.
Canadian Council of Ministers of the Environment (CCME, 2007); Water Quality Guidelines for the Protection of Freshwater Aquatic Life, sourced at st-ts.ccme.ca/en/index.html, March 2016.
Values that exceed the 30-day guideline are shaded in light grey, values that exceed the Max guideline are shaded in dark grey.
All guidelines are for total metals unless otherwise indicated.
Guidelines for Cu, Ni and Pb are based on the default value for when hardness is not known (which corresponds to the 25th percentile hardness value of ~55 mg CaCO3/L calculated using available SW data (n=754, Jun-27-2014 - Jan-26-2016).
Guideline for Cd are calculated using the 25th percentile hardness of ~55 mg CaCO3/L.
Guideline for Cr is for hexavalent (VI), which is the principal species found in surface waters.
Underlined guidelines for sulphate, Bi, Co and Sb are derived from BC MOE water quality guidelines for protection of freshwater aquatic life for reference. Sulphate is hardness dependent and is based on a hardness of 55 mg $CaCO_3$/L

Table 4-67:
Statistical Distribution of Solid Phase Element Results for Mine Site Overburden Samples

ACA	0.075	8.2	1.8	0.0085	0.15	25	102	60	5.6	0.085	950	1.2	84.0	14	0.2	0.05	9.6	2.7	70
Underlying Geologic Unit	**Ag**	**Al**	**As**	**Bi**	**Cd**	**Co**	**Cr**	**Cu**	**Fe**	**Hg**	**Mn**	**Mo**	**Ni**	**Pb**	**Sb**	**Se**	**Th**	**U**	**Zn**
	ppm	**%**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**%**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**
Overburden overlying Granite (n = 28)																			
Min	0.01	0.2	1.1	0.04	0.01	0.2	2	0.4	0.5	0.01	39	0.2	0.3	4.4	0.07	0.2	5.5	2.4	4
10th PCTL	0.02	0.4	4.1	0.06	0.01	0.51	4.1	1.4	0.6	0.01	126	0.6	1.8	6.8	0.16	0.34	14	2.8	10
25th PCTL	0.02	0.6	5.6	0.08	0.04	2.6	8.8	4.1	1.2	0.01	428	0.7	3.6	7.2	0.21	0.4	17	3.5	24
Median	0.03	0.8	10	0.11	0.06	4.0	13	6.8	1.5	0.04	567	0.8	5.6	8.5	0.28	0.5	21	3.8	31
75th PCTL	0.04	0.9	26	0.15	0.07	4.8	15	9.4	1.7	0.10	669	1.0	7.9	9.8	0.51	0.7	25	5.0	35
90th PCTL	0.05	1.2	547	0.22	0.09	5.8	19	13	2	0.39	803	1.4	11	16	4.6	0.8	37	6.2	38
Max	0.07	1.4	>10000	0.4	0.33	6.5	25	15	3	1.3	1240	3.2	12	27	86	1.1	44	15	51
Overburden overlying Gneiss (n = 41)																			
Min	0.01	0.3	15	0.07	0.01	1.5	8	5.4	0.9	0.01	179	0.6	4.1	4.2	0.57	0.3	5.4	0.69	11
10th PCTL	0.02	0.6	27	0.1	0.03	3.6	12	6.7	1.4	0.02	233	0.8	7.8	4.7	1.3	0.4	11	1.1	17
25th PCTL	0.02	0.7	44	0.12	0.04	5.1	17	8	1.5	0.03	294	1.1	9.2	6.0	2.2	0.4	15	1.3	20
Median	0.04	1.0	83	0.16	0.06	7.0	25	12	2	0.05	358	1.4	13	7.4	3.4	0.5	20	2.1	25
75th PCTL	0.05	1.5	117	0.25	0.08	9.6	34	14	2	0.09	409	1.7	19	9.3	6.3	0.6	24	2.6	35
90th PCTL	0.07	1.9	372	0.38	0.09	15	78	19	3	0.39	502	2.4	37	11	17	0.7	27	4.4	41
Max	0.18	2.2	894	0.63	0.17	19	345	89	3	1.4	666	3.9	266	18	42	0.9	31	12	47
Overburden overlying Schist (n = 33)																			
Min	0.01	0.5	7.2	0.04	0.01	3.9	13	7.2	1.4	*<0.01*	210	0.5	8.3	1.3	0.19	0.3	0.8	0.25	12
10th PCTL	0.03	0.8	23	0.09	0.03	4.6	18	8.8	1.7	*<0.01*	275	0.6	10	3.4	0.4	0.4	5.9	0.8	20
25th PCTL	0.03	1.0	39	0.13	0.05	6.6	23	14	2	0.02	319	0.7	13	5.4	1.0	0.6	8.6	1.1	27
Median	0.04	1.4	90	0.19	0.07	11	37	22	2	0.05	437	1.0	25	7.2	3.0	0.7	11	1.6	46
75th PCTL	0.07	1.9	190	0.26	0.1	14	59	26	3	0.18	525	1.4	34	13	8.4	0.8	17	2.3	57
90th PCTL	0.14	2.4	667	0.38	0.14	18	72	34	4	0.44	728	1.9	39	16	19	0.98	20	3.0	60
Max	0.25	3.1	2370	0.53	0.31	21	94	39	5	1.1	879	3.9	62	25	30	1.4	30	6.2	71
Overburden overlying Meta-gabbro (n = 3)																			
17555	0.1	2.2	9	0.22	0.1	6.9	49	19	2.3	0.03	270	0.9	21	8.9	1.3	0.6	3.8	1.6	51
R553404	0.01	2.3	3.8	0.09	0.01	14	29	14	3	*<0.01*	635	0.8	18	1.3	0.14	0.3	3	0.49	50
R553602	0.03	1.7	66	0.5	0.07	13	36	17	3	0.04	477	0.8	26	11	1.2	0.9	13	1.3	49

Notes:
Values in grey italics are below the analytical detection limit.
Average Continental Abundance (ACA) according to Price (1997).
Values shaded in light grey are 3x's the ACA, values shaded in dark grey are 10x's the ACA. Values shaded in blue are at the ACA

4.4.5 Radioisotopes

The NORM results for overburden samples are presented in Appendix D.1-5, and summarized in Section 4.1.5. Overall, the results show that overburden can be considered as unrestricted according to the Canadian NORM Guidelines.

5. Source Term Predictions

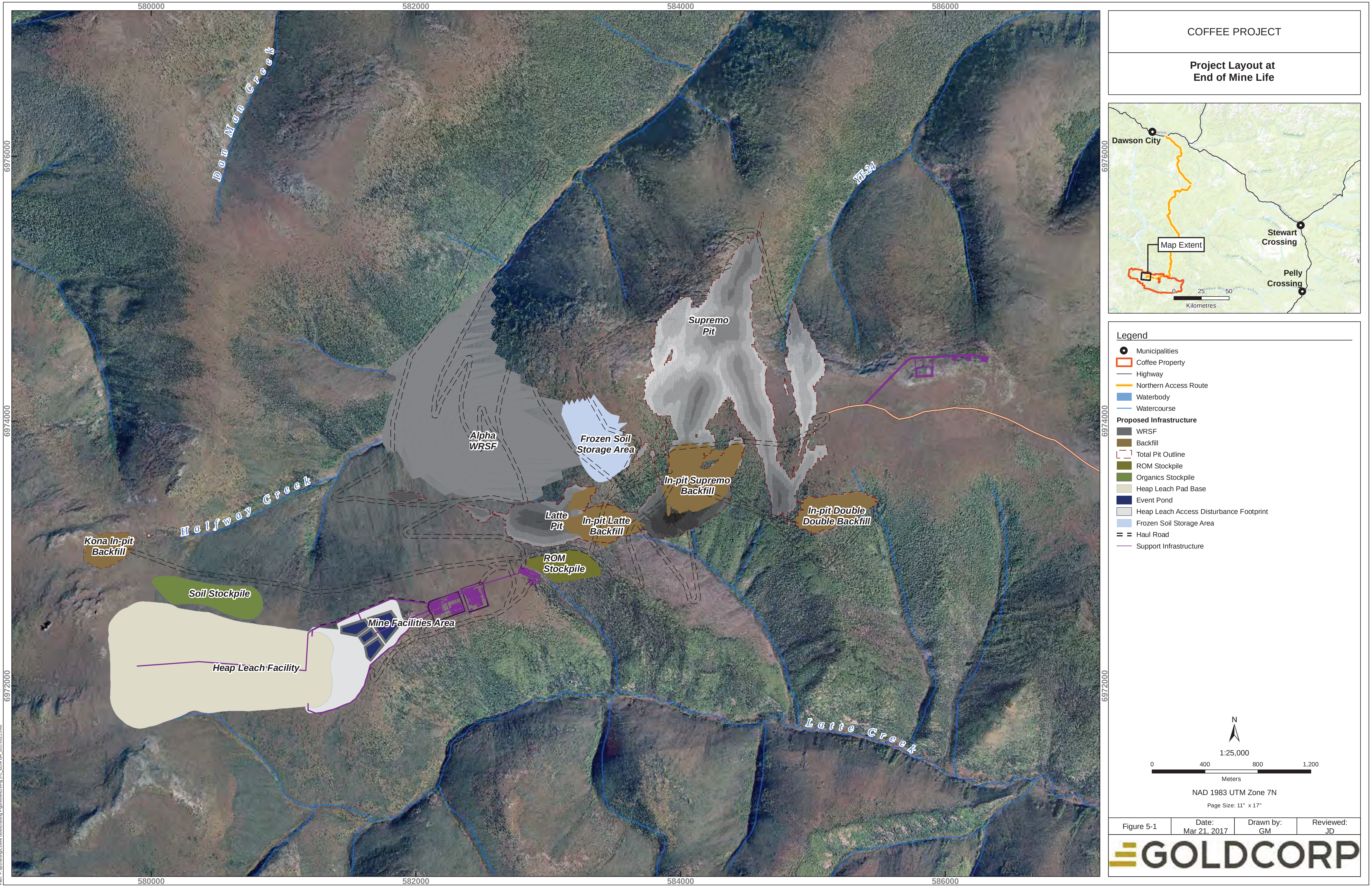
GOLDCORP

5. Source Term Predictions

In this chapter, the geochemical test results described in the previous sections are combined with site specific information, such as waste facility design, composition, climate and hydrology, to produce geochemical source term predictions. The geochemical characterization results used to develop source terms are described in Chapter 4. Nitrogen loadings from mine waste facilities are based primarily on information on explosive use and are described inAppendix E-1. The site climate and hydrology of mine facilities is presented in Appendix 12-C, and mine facility design and composition are provided in the JDS (2016).

Geochemical source terms are water quality predictions for water in contact with geologic material disturbed by mining activities. Individual source terms are developed for each mine component at end of mine life and considering the full mine footprint. These source terms therefore include: one out of pit waste rock storage facility (Alpa WRSF), four in-pit backfill WRSFs, pit wall rock exposures, the heap leach facility (HLF) and the mine facilities area. Geochemical source terms are not developed for facilities which only exist during mine life, such as run-of mine (ROM) stockpile, frozen materials stockpile, HLF pore water during operations, and Beta WRSF which is backfilled into the Kona Pit before mine closure. The Coffee Gold Mine site layout at the end of mine life is shown in Figure 5-1. This figure shows the location of the various mine facilities and pits. The the soil stockpile, is not assigned a geochemical source term as this facility will contain organic topsoil that will be used for reclamation at the end of mine life. While runoff from this facility may be elevated in total suspended solids (TSS), the runoff chemistry is expected to be similar to background water quality.

For each mine component, an upper case and a base case source term has been calculated. The base case source term is meant to reflect a best estimate, while the upper case is meant to reflect a reasonably conservative upper estimate. These predictions become inputs to the site wide water quality model used to assess potential effects of the Project on the receiving environment at the end of mine life and throughout all closure phases.



COFFEE PROJECT
Project Layout at End of Mine Life
Dawson City
Stewart Crossing
Pelly Crossing
Map Extent
0 25 50
Kilometres
Legend
Municipalities
Coffee Property
Highway
Northern Access Route
Waterbody
Watercourse
Proposed Infrastructure
WRSF
Backfill
Total Pit Outline
ROM Stockpile
Organics Stockpile
Heap Leach Pad Base
Event Pond
Heap Leach Access Disturbance Footprint
Frozen Soil Storage Area
Haul Road
Support Infrastructure
N
1:25,000
0 400 800 1,200
Meters
NAD 1983 UTM Zone 7N
Page Size: 11" x 17"
Figure 5-1
Date: Mar 21, 2017
Drawn by: GM
Reviewed: JD
GOLDCORP
580000
582000
584000
586000
6976000
6974000
6972000
Dan Man Creek
YT-24
Supremo Pit
Alpha WRSF
Frozen Soil Storage Area
In-pit Supremo Backfill
Latte Pit
In-pit Latte Backfill
In-pit Double Double Backfill
Halfway Creek
Kona In-pit Backfill
ROM Stockpile
Soil Stockpile
Mine Facilities Area
Heap Leach Facility
Latte Creek

5.1 Waste Rock Storage Facilities

Approximately 299 Mt of waste rock will be excavated from the Supremo, Double Double, Latte and Kona pits over the life of the Project. Waste rock produced from mine pits will be stored primarily in the Alpha WRSF. Waste rock will also be placed as backfill in the In-pit Kona, In-pit Latte, In-pit Supremo and In-pit Double Double WRSFs. Each of the WRSFs are described below.

The mass, lithology and oxidation state of waste rock to be excavated from the four mine pits is tabulated in Table 5-1 below. The composition of individual waste rock WRSFs is inferred from the year by year mine sequence. The general sequencing shows that the Latte pit which is geologically distinct, being the primary host of schist waste, is excavated in Year -1 to Year 3 of mine life, during which time the Alpha WRSF is the only waste rock storage area. Therefore, it is assumed that all of the waste rock from Latte pit is stored in the Alpha WRSF, while waste rock from Double Double and Supremo pits is equally distributed between the Alpha WRSF, and the Supremo, Double Double, and Latte In-pit WRSFs. The size and assumed composition of the WRSFs at the end of mine life is tabulated in Table 5-2. The surface area of each WRSF is provided in Table 5-4. Note that a minor amounts metabasalt waste rock be produced from the Supremo pit, Latte, and Double Double Pit. This waste type constitutes approximately 1.1 % of waste rock, and is therefore not explicitly considered in source term calculations. The mass associated with this minor lithology is assigned the same geochemical signature as gneiss, which is the dominant rock type in each of the WRSFs containing metabasalt.

Table 5-1:
Mass, lithology and oxidation of waste rock produced from the four mine pits.

Lithology	Facies	Mine Pit				
		Latte	Double Double	Kona	Supremo	Total
Gneiss	Oxide (Mt)	1.95	0.81	0.00	33.60	**36.36**
	Trans (Mt)	1.05	3.65	0.00	137.18	**141.87**
	Fresh (Mt)	0.22	10.72	0.00	67.38	**78.31**
	Total	**3.23**	**15.17**	**0.00**	**238.15**	**256.55**
Metabasalt	Oxide (Mt)	0.13	0.26	0.00	0.24	**0.64**
	Trans (Mt)	0.09	0.36	0.00	1.68	**2.14**
	Fresh (Mt)	0.00	0.11	0.00	0.25	**0.37**
	Total	**0.23**	**0.74**	**0.00**	**2.17**	**3.14**
Schist	Oxide (Mt)	10.64	0.00	0.00	0.14	**10.78**
	Trans (Mt)	15.71	0.00	0.00	0.66	**16.37**
	Fresh (Mt)	10.20	0.02	0.00	0.00	**10.21**
	Total	**32.76**	**0.03**	**0.00**	**1.09**	**33.88**
Granite	Oxide (Mt)	0.00	0.00	1.40	0.00	**1.40**
	Trans (Mt)	0.00	0.00	1.55	0.00	**1.55**
	Fresh (Mt)	0.00	0.00	2.34	0.00	**2.34**
	Total	**0.00**	**0.00**	**5.30**	**0.00**	**5.30**
All	**Total**	**36.21**	**15.94**	**5.30**	**241.41**	**298.86**

Table 5-2:
Mass, lithology and oxidation of waste rock stored waste rock storage areas.

Lithology	Facies	Waste Rock Storage Facilities				
		Alpha WRSF	In-Pit Kona	In-Pit Latte	In-Pit Supremo	In-Pit Double Double
Gneiss	Oxide (Mt)	29.84	-	0.98	4.22	1.23
	Trans (Mt)	116.43	-	3.82	16.48	4.79
	Fresh (Mt)	64.27	-	2.11	9.09	2.64
	Total	**210.55**	**-**	**6.91**	**29.79**	**8.66**
Meta	Oxide (Mt)	0.52	-	0.02	0.07	0.02
	Trans (Mt)	1.75	-	0.06	0.25	0.07
	Fresh (Mt)	0.30	-	0.01	0.04	0.01
	Total	**2.58**	**-**	**0.08**	**0.36**	**0.11**
Schist	Oxide (Mt)	10.78	-	-	-	-
	Trans (Mt)	12.89	-	-	-	-
	Fresh (Mt)	10.21	-	-	-	-
	Total	**33.88**	**-**	**-**	**-**	**-**
Granite	Oxide (Mt)	-	1.40	-	-	-
	Trans (Mt)	-	1.55	-	-	-
	Fresh (Mt)	-	2.34	-	-	-
	Total	**-**	**5.30**	**-**	**-**	**-**
All	Total	247.00	5.30	6.99	30.16	8.77

Table 5-3:
Surface area of mine facilities in each year of mine life

In-Pit Kona Backfill	Alpha WRSF	In-pit Double Double Backfill	In-pit Latte Backfill	In-Pit Supremo Backfill
(ha)	(ha)	(ha)	(ha)	(ha)
8.27	151	10.5	8.20	32.2

5.1.1 Approach

Source terms for WRSFs are calculated by upscaling geochemical loading rates observed in field bin experiments and applying empirical scaling factors from an analogue mine site. Empirical scaling factors are developed based on a comparison between field bin data to a full-scale waste rock seepage data. The scaled loading rates are then applied to the mass, footprint, hydrology and rock types stored in the various WRSFs. Solubility controls are then derived for a number of parameters that are not expected to behave conservatively.

These solubility controls are based on a combination of first principles (thermodynamic equilibria and aqueous speciation), experimental data and field monitoring data.

5.1.2 Data Sources

Geochemical loading rates for different lithologies and waste rock oxidation types are calculated from field bin data (Table 4-37). These loading rates are calculated from field bin data gathered between June 2014 to October 2016. The loading rates are scaled based on data from an analogue mine site provided in Altura (2009) and Lorax (2011). Hydrology of WRSFs is obtained from Appendix 12-C. The WRSFs composition, mass and surface area are provided in the Project Description.

5.1.3 Data Scaling

5.1.3.1 Waste Rock

Loading rates are scaled based on empirical observations from the Mount Nansen Mine (Mt. Nansen) site. This mine site is considered an appropriate analogue due to similarities in geology and climate. The Mt. Nansen is a former Au and Ag mine located in Central Yukon, approximately 60 km west of Carmacks. Both Mt. Nansen and the Coffee Project are located in the Dawson Range within Yukon-Tanana Terrane. The mineralization and geology at Mt. Nansen is generally similar to that of the Project. Gold is hosted in epithermal quartz/sulphide veins which have been weathered by infiltrating meteoric water to a depth of 70 m. As such, the waste rock is a mixture of oxide and sulphide weathering zones. The waste rock also has similar geology, with the primary lithologies being augen gneiss, quartz-feldspar-chlorite gneiss, amphibolite, quartz-chlorite schist and granodiorite. The waste rock at Mt. Nansen was placed in a single waste rock facility. The exact proportions of the oxidation types are unknown, but it is assumed that a majority of the waste facility consists of oxide material (Strathcona, 2001).

Geochemical characterization of the waste rock shows that it has a median total-S content of 0.3 wt.%, with most sulphur occuring as sulphide. Sulphide minerals identified in ore (in decreasing abundance) are pyrite, arsenopyrite, galena, sphalerite, chalcopyrite, stibnite and tetrehedrite. No description of sulphide mineralogy specific to waste rock is available. Waste rock contains the carbonate mineral calcite, with median a TIC content of 0.4 wt.% (Lorax, 2011).

Mt. Nansen was active from 1996 to 1999, over which time approximately 1.85 Mt of waste rock was produced from the Brown and McDade pits. A portion of this waste rock was used as fill or for road construction, and it is estimated that approximately 1 Mt remains in the waste rock facility adjacent to the mine pit with a surface area of approximately 9.02 ha (Altura, 2009). Drainage chemistry of the waste rock facility has been monitored from naturally occurring seeps from at least May 2009 to July 2010. Seepage pH over this time period has remained circumneutral to alkaline, with pH ranging from 8.1 to 6.5 (median of 7.5).

A waste rock field bin was constructed at Mt Nansen using a similar design as those constructed for the Project. The field bin consisted of HDPE barrels of the same dimensions (76 cm high, 56 cm diameter) containing a similar mass of waste rock (166 kg) which was collected from the existing waste rock pile. The waste rock field bin was constructed in July, 2009 and operated until August, 2010; over which time period, a total of 23.5 L of leachate was produced and seven samples were collected for chemical analysis (Lorax, 2011).

Scaling factors are developed by comparing loading rates measured in the field bin with loading rates estimated for the full scale WRSF. Loading rates for the full scale WRSF are estimated by assuming that the same runoff coefficient as used for WRSFs at the Project (runoff coefficient of 0.35) and using the 90th percentile and median concentrations measured in seeps at Mt. Nansen. Select loading rates from the field bin and the full scale WRSF for Mt. Nansen are shown in Table 5-4. The major ions, SO_4, Ca, Mg and K, are generally soluble and in high enough concentrations so that detection limit values do not effect estimated loading rates. In order to check what solubility controls might be effecting these parameters, waste rock seepage and field bin chemistry was speciated using the geochemical modeling program PHREEQC coupled to the Lawrence Livermore National Laboratories database (Parkhurst and Apello, 1999).

The saturation indices (SI) calculated for calcite and gypsum are presented in Figure 5-2 and Figure 5-3, respectively. An SI of 0 indicates that a mineral is in equilibrium with the solution, a mineral may be dissolving or precipitating to achieve equilibrium. A positive SI denotes that a mineral is oversaturated and therefore may be precipitated from solution. A negative SI denotes that a mineral is unsaturated; if the solid phase is present it will dissolve until equilibrium is reached. However, it should be noted that saturation indices are based on the thermodynamics of mineral formation/dissolution and do not account for kinetic limitations that affect mineral formation. These data show that calcite was saturated in one of the waste rock seeps (NW Seep-01), while gypsum remained below saturation. The PHREEQC input files used to develop Figure 5-2 and Figure 5-3 are provided in Appendix E.2.

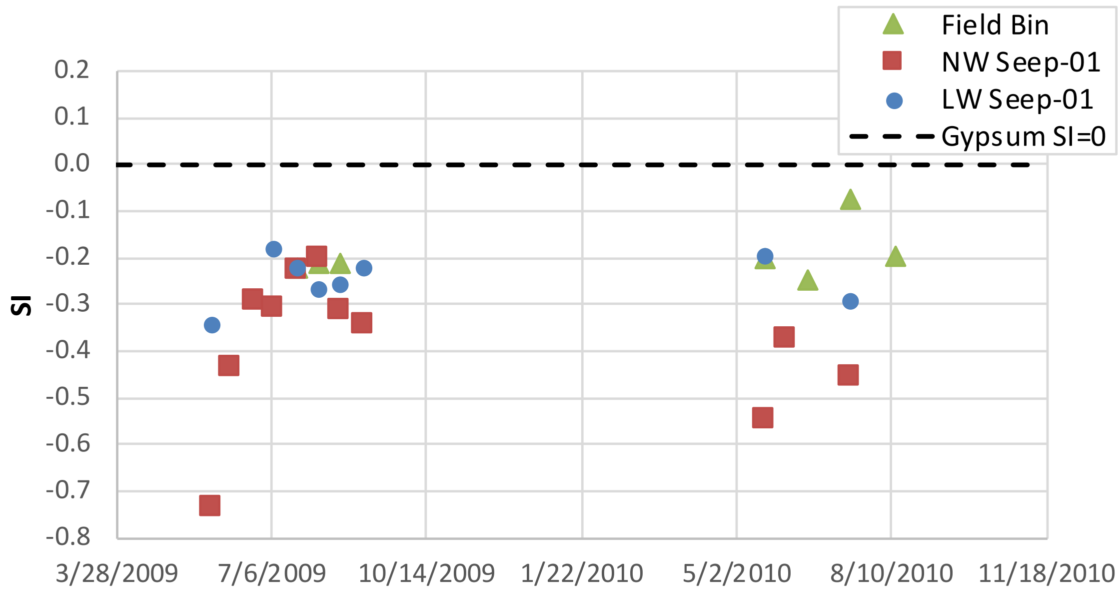


Figure 5-2: Gypsum Saturation indices (SI) calculated for analogue site

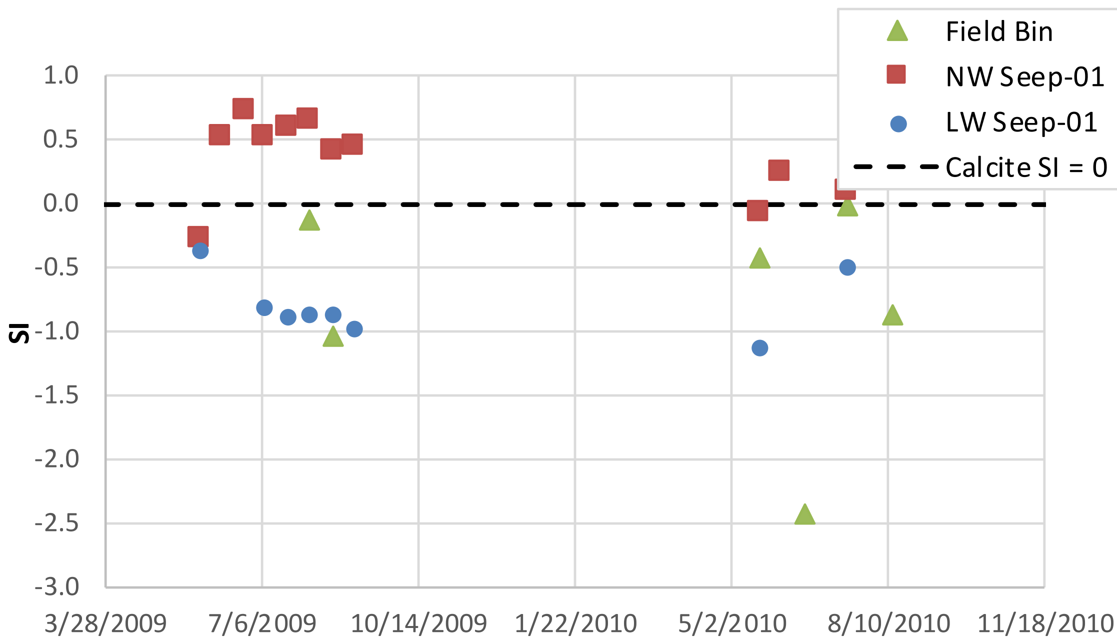


Figure 5-3: Calcite saturation indices (SI) calculated for analogue site

The ratio of the WRSF to field bin loading rates ranges from 0.052 to 0.089 when WRSF loading rates are calculated using median observed concentrations and range from 0.083 to 0.11 when 90th percentile concentrations are used to calculate WRSF loading rates.

Table 5-4:
Loading Rates from Field Bin and Full Scale WRSF at Analogue Mine Site

	units	SO_4	Ca	Mg	K
Field Bin	mg/kg/wk	4.38	1.01	0.435	0.0111
WRSF (Base)[1]	mg/kg/wk	0.28	0.09	0.023	0.00049
WRSF (Upper)[1]	mg/kg/wk	0.41	0.10	0.049	0.00093
WRSF (Base) / Field Bin	Ratio	0.065	0.089	0.052	0.044
WRSF (Upper) / Field Bin	Ratio	0.094	0.099	0.11	0.083

[1]Loading rates of analogue WRSF calculated assuming 90th percentile and median concentrations observed in seeps for base case and upper case estimates, respectively.

The ratio of field bin loading rates to full scale WRSFs loading rates provide an empirical scaling factor by which Project field bin results, presented in Table 5-4, can be related to full scale WRSFs. For the purpose of source term calculation, the empirical scaling factor observed for sulphate is applied. That is, a scaling factor of 0.065 is applied in the base case scenario and a scaling factor of 0.094 is applied in the upper case scenario. This scaling factor is applied to loading rates presented in Table 4-35 to estimate full scale WRSF source terms.

It is interesting to note that the scaling factors developed for SO_4 based on the analogue mine data are similar to what would be calculated based on differences in grain size between the field bin experiments and the full scale waste rock facility. The Project field bins contain relatively fine grained particles (< 0.25”), hence, material used in field bins have greater surface area to mass ratio than material in full scale WRSFs. The grain size distribution of granitic waste rock at Sudbury, found that 12% of the waste is <0.78”, while only 3% is < 0.24” (Fines *et al.*, 2003). This would produce a scaling factor of 0.12 to 0.03 which is similar to scaling factors derived at the analogue minesite (0.11 to 0.044 for major ions in Table 5-4).

To convert the loading rate into a concentration, the scaled loading rate is multiplied by the mass of the WRSF in each year of mine life and divided by the surplus water available for each facility. Surplus water is estimated by multiplying the mean annual precipitation (MAP) (485 mm) by the runoff coefficient for WRSFs (0.35) and the surface area in each year of mine life (Table 5-1).

5.1.3.2 Underdrain

An underdrain will be constructed beneath the Alpha WRSF to convey upgradient runoff under the WRSF. The underdrain will be constructed of waste rock, and will impart a geochemical load on water moving through the drain. The underdrain consists of waste rock >0.3 m in diameter and will be 5 to 10 m in height and 30 to 50 m in width. For the purposes of source term calculation, it is assumed that the underdrain is at the maximum width and height throughout the underdrain (50 m and 10 m, respectively). A density of 2.6 t/m^3 and porosity of 0.3 are assumed. These assumptions produce an estimated mass of 910 tonnes of rock per m of underdrain.

In order to calculate underdrain loading rates, field bin loading rates presented in Table 4-37, are scaled based on particle surface area. In order to weight field bin loading rates from different lithologies, the underdrain is assumed to have the same geologic composition as the Alpha WRSF itself. The differences in grain size distribution is calculated by assuming that material in the field bins has a particle size of 6.35 mm, and the underdrain consists of material that has a particle size of 0.3 m. By assuming spherical particles, the surface area per kg of the field bin material and underdrain material is 0.36 m^2/kg and 0.0078 m^2/kg, respectively. The ratio of these two values produces a scaling factor of 0.021. This is the only scaling factor that is applied to the underdrain source term.

Note that this is an underestimate of the surface area of field bin material, as most field bin material is at a finer grain size. This is done as a conservative approximation, in that an underestimate of particle surface area in field bins produces a more conservative scaling factor. This scaling approach is used for both the base case and upper case source term calculation.

5.1.4 Solubility Controls

Upscaling kinetic test loading rates often results in concentrations that exceed solubility controls, particularly in neutral pH environments where a number of solubility limitations can exert an influence on drainage chemistry. Metal solubility can be controlled by thermodynamic mineral solubility, sorption to mineral surfaces, and aqueous complexation reactions. In the following sections the solubility controls applied to source term predictions for WRSFs are discussed.

5.1.4.1 Arsenic

Arsenic is released by a combination of sulphide mineral oxidation (*e.g.*, arsenopyrite, arsenianpyrite, and orpiment) and dissolution of oxide minerals (scorodite, yukonite, Fe-oxide mineral surfaces). In pH-neutral aerobic environments the solubility of this metalloid is generally controlled by sorption to mineral surfaces. Unlike mineral saturation controls on solubility, sorption controls are determined by the availability and mineralogy of particle surfaces and solution chemistry. Given these complexities, solubility controls based on surface sorption are typically developed from site specific observations rather than thermodynamic data available in geochemical databases.

In aerobic neutral pH environments, arsenic speciates as the oxyanion arsenate ($HAsO4^{2-}$). Sorption of this aqueous species to mineral surfaces is controlled by a combination of pH and availability of Fe-oxide surfaces (Goldberg, 2002; Sharma and Sohn, 2009). Significant sorption of arsenate can take place on clays (Mn-oxides and Al-oxides), however, these minerals generally only become significant in Fe deficient systems (O'day, 2006). The degree of As sorption to Fe-oxides is highly pH sensitive, with maximum arsenate adsorption increasing as pH declines from 9 to 6 (Pierce and Moore, 1982).

Solubility controls for As are developed based on a scientific understanding of As behavior in mine waste environments which is supported by site specific geochemical characterization data. Data from kinetic testwork demonstrate two principles of As behaviour: As concentrations increase with increasing pH; and, the difference in As concentrations between different kinetic tests producing similar pH leachate can be related to the solid phase Fe content. The relationship between As concentrations and pH can be seen in geochemical kinetic testwork, as shown in Figure 4-15 and Figure 4-24. While the relationship between pH and arsenic is consistent between different scale kinetic tests using the same sample, the relationship varies considerably between different samples even within the same rock unit. For example, humidity cell tests using different samples of fresh gneiss waste rock (HC4 and HC8) and fresh schist waste rock (HC2 and HC7) show distinctly different relationships between pH and As (Figure 5-4). The difference can be related to the differences in solid phase As content, and more specifically, differences in As:Fe molar ratios. Specifically, the humidity cells with higher As:Fe ratios [HC7 and HC8 have As:Fe of 0.021 (mol/mol) and 0.032 (mol/mol), respectively] produce higher As compared to humidity cells of the same lithology and weathering with lower As:Fe ratios [HC2 and HC4 have As:Fe of 0.00080 (mol/mol) and 0.0037 (mol/mol)].

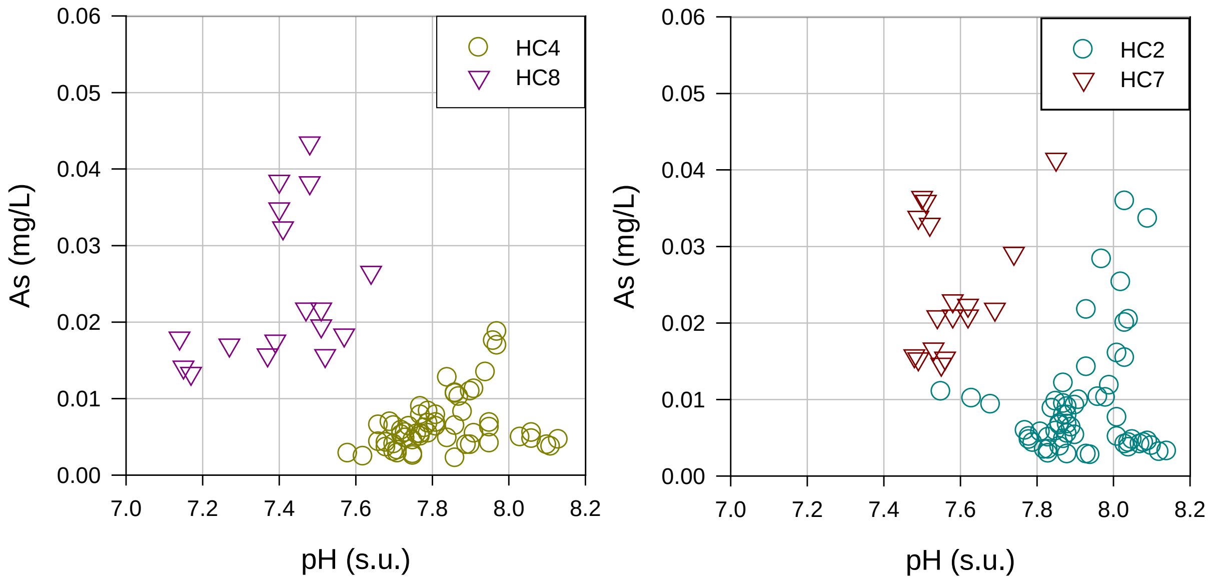


Figure 5-4: Comparison of the relationship between As and pH in two humidity cells containing different samples of the same lithology and weathering facies. Fresh gneiss waste rock humidity cells are shown on the left and fresh schist waste rock shown on the right

The relative abundance of available As and Fe-oxide mineral surfaces can be approximated based on the As:Fe molar ratios in kinetic test samples. The relationship between As concentrations produced at pH 8, and solid phase As:Fe molar ratios is shown in Figure 5-5. This result is consistent with results presented by Langmuir *et al.,* (1999), where it was shown that As concentrations in tailings pore water could be predicted based on As:Fe molar ratios. Figure 5-5. shows that a linear relationship exists over the range of As concentrations and As:Fe molar ratios in different ore and waste rock kinetic tests, with As concentrations increasing as the As:Fe molar ratio increases.

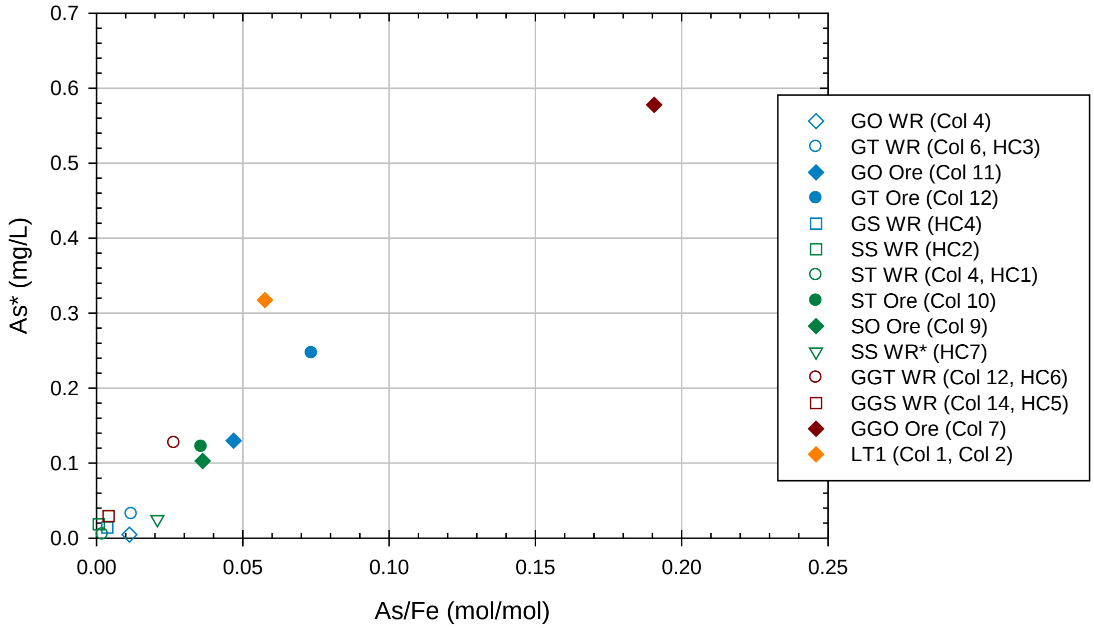


Figure 5-5: Observed arsenic concentrations at pH 8 plotted against As/Fe molar ratios measured by aqua regia analysis of kinetic test solids. Each data point represents an individual kinetic test sample.

This observed linear relationship only describe As solubility for a specific pH (8.0). In order to predict As concentrations at pHs other than 8, a relationship between As solubility and pH must be estimated. The increase in solubility of As(V) with increasing pH can be related to the shift in speciation from $H_2AsO_4^-$ to $HAsO_4^{2-}$ (Giménez *et al*., 2007), with the ratio of these two species being directly related to the concentration of H^+ ions ($H^+ = 10^{-pH}$). Consequently, changes in As solubility can be inversely related to changes in H^+ concentrations, that is, a decline in H^+ by an order of magnitude (*i.e.*, increase of 1 pH unit) will result in an order of magnitude increase in As concentrations. Arsenic solubility in gneiss, schist and granite waste rock and ore is represented by the following equations:

$$As_{(aq)} = m \times As_{(sl)}/Fe_{(sl)} \times 10^{-8}/H^+ \qquad (1)$$

Where $As_{(aq)}$ is the concentration of As in mg/L, As(sl) and Fe(sl) are moles of As and Fe in the solid sample, H^+ is the molar concentration of H^+ in solution (equal to 10^{-pH}) and m is the slope from the linear regressions developed from data shown in Figure 5-5 above (m equals 3.14, 2.85 and 3.06 for gneiss, schist and granite, respectively). This equation is used to define dissolved As concentrations based on As:Fe molar ratios and pH. The range of As:Fe ratios for each rock lithology broken down by weathering zone is presented in

Table 5-5 for ore and waste rock. The base case As source terms assume median As:Fe ratios, while the upper case source term calculations assumes 75th percentile As:Fe ratios.

Table 5-5:
Arsenic to Fe molar ratios in waste rock and ore lithologies and weathering zones

Statistic	Oxide	Transition	Fresh	Oxide	Transition
Gneiss		**Waste Rock**		**Ore**	
95th PCTL	3.77E-02	2.20E-02	3.10E-03	1.08E-01	1.94E-01
75th PCTL	1.92E-02	3.65E-03	7.37E-04	5.80E-02	7.60E-02
Median	1.11E-02	1.01E-03	3.22E-04	3.99E-02	4.81E-02
25th PCTL	4.24E-03	3.16E-04	1.49E-04	2.96E-02	3.13E-02
5th PCTL	9.29E-04	9.26E-05	6.33E-05	1.88E-02	1.22E-02
Schist		Waste Rock		Ore	
95th PCTL	2.02E-02	9.43E-03	1.85E-03	1.72E-01	1.98E-01
75th PCTL	2.88E-03	1.29E-03	5.08E-04	8.58E-02	1.01E-01
Median	9.13E-04	4.99E-04	2.55E-04	6.08E-02	6.92E-02
25th PCTL	3.26E-04	1.96E-04	1.37E-04	4.16E-02	3.70E-02
5th PCTL	9.95E-05	6.93E-05	5.95E-05	2.11E-02	1.00E-02
Granite		Waste Rock		Ore	
95th PCTL	1.42E-01	5.60E-02	4.92E-01	3.38E-01	4.24E-01
75th PCTL	4.53E-02	8.73E-03	1.87E-01	1.90E-01	2.68E-01
Median	2.23E-02	1.84E-03	1.19E-02	8.67E-02	1.69E-01
25th PCTL	3.98E-03	3.78E-04	1.35E-03	5.04E-02	7.42E-02
5th PCTL	6.20E-04	1.19E-04	2.87E-04	3.59E-02	3.69E-02

Note: Molar ratios calculated from ICP-OES database with the exception of the fresh granite unit, which combines both ICP-OES and ICP-MS databases due to limited number of samples

The relationship defined in equation 1 above is pH dependent, and the prediction of pH requires consideration of a variety of physical and geochemical conditions, as discussed below. Dissolution of carbonate minerals (primarily calcite and dolomite) are expected to control the pH and alkalinity WRSF pore water. Carbonate mineral equilibrium pH is determined by the partial pressure of carbon dioxide (pCO_2), temperature, and solution chemistry (*e.g.*, salinity and concentration of Ca and Mg). Waste rock field bins produced pH values from 7.7 to 8.2 in schist, and 7.7 to 8.3 in gneiss (Table 4-32 and Table 4-33). This is similar to the pH range reported for calcite and dolomite buffered full scale waste rock facilities in British Columbia. The combined dataset from Copper Mountain, Highland Valley Copper and Mount Polley waste rock facilities having 5th percentile, median and 95th percentile pHs of 7.6, 8.1 and 8.4 (SRK, 2015). For the purpose of calculating As solubility in WRSF source terms, a pH of 8.0 and 8.3 is assumed for the base case and upper case, respectively. This pH range is applied to all WRSFs.

The As solubility control is applied to WRSF source terms by calculating a concentration associated with each of the rock types within a WRSF and taking a weighted average. The same assumption regarding pore water pH is made for all rock types.

5.1.4.2 Uranium

Uranium solubility is dependent on redox potential, pH and availability of complexing ions such as CO_3, PO_4 or SO_4. Uranium primarily occurs in two oxidation states [U(IV) and U(VI)]. Uranium in the tetravalent form [U(IV)] is relatively insoluble and will typically precipitate as uraninite (UO_2). For U(IV) to be released into pore water, it must first be oxidized by atmospheric oxygen or another oxidizing agent such as Fe(III). Once oxidized to U(VI), U will speciate as a positively charged uranyl oxycation (UO_2^{2+}). In neutral pH environments the positively charged uranyl ion may be adsorbed onto negatively charged surfaces of sulfides, clays and organic matter as well as Fe, Mn and Al oxyhydroxide particles (Lottermoser, 2007). Uranyl ion solubility is enhanced by complexation with carbonate, which primarily occur with dissolved carbonate in neutral pH environments (Porcelli and Swarzenski, 2003).

Elemental associations observed with µXRF indicate that a portion of U(IV) occurs as brannerite minerals in gneiss waste rock, these mineral are generally considered relatively recalcitrant compared to other common U(IV) minerals such as uraninite and coffinite (Gilligan *et al*., 2015). X-ray adsorption near edge spectroscopy (XANES) analysis found that a portion of U is present in the oxidized U(VI) form, even in fresh (unweathered) waste rock samples (Table 4-7). This indicates that U can be mobilized to pore water by complexation with dissolved carbonate immediately, without requiring an intermediate oxidation step (*e.g.,* brannerite oxidation by oxygen) which would pose a kinetic limitation on U release.

In aerobic pH-neutral to alkaline environments U(VI) solubility is sensitive to pH and alkalinity (Dittrich and Reimus, 2015; Davis and Curtis, 2003; Waite *et al.,* 1994). Furthermore, Davis and Curtis (2003) found that alkalinity was the more influential of the two parameters controlling U(VI) solubility. This association between alkalinity and U(VI) solubility can be seen in laboratory kinetic test results (Figure 4-16 and Figure 4-24) and in site ground water and surface water quality data. The relationship between U and alkalinity in gneiss, schist and granite laboratory kinetic tests excluding the initial flushing period and ground water wells screened within the respective lithologies is shown in Figure 5-6. Note that field bin data is excluded from these plots due to uncertainties in the reliability of alkalinity measurements, as discussed in section 4.1.5.5. These plots show that there is some consistency between the relationship between alkalinity and U concentrations in both field and laboratory data. The fact that similar relationships are observed between alkalinity and U concentrations in both site water quality and field kinetic test data supports the use of alkalinity as a proxy for U concentrations in planned mine waste facilities.

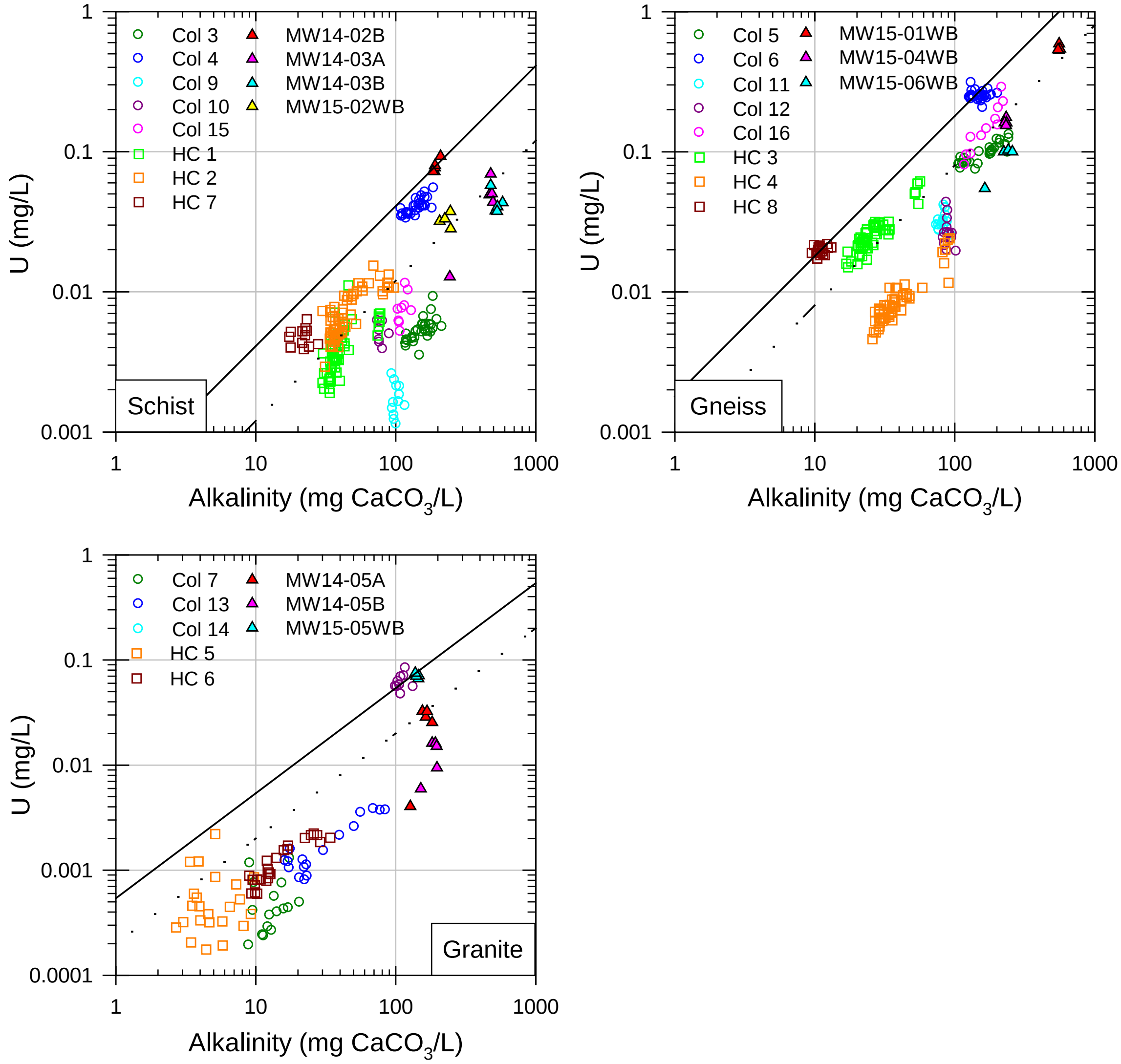


Figure 5-6: Relationship between U and alkalinity in groundwater monitoring wells and laboratory kinetic tests containing waste rock and ore. Data shown for kinetic tests containing, and groundwater wells screened in schist (upper left), gneiss (upper right) and granite (bottom left). Lines show relationship between alkalinity and U used to define base case solubility (dotted) and upper case (solid)

Source term predictions for U are based on the ratio of alkalinity to U observed in kinetic testwork and site water quality. Unlike As, variations in the relationship between U and alkalinity do not appear to be related to differences in solid phase U content. Considering that kinetic tests generally had elevated U compared to what was typical of site waste rock

(Figure 4-9), the relationship between alkalinity and U is expected to provide a conservative approximation of what can be expected from waste rock WRSFs. For source term prediction, the average and maximum U:Alk mass ratio observed in each kinetic test and groundwater sampling are presented in Table 5-6. The median ratio is used for the base case estimate and the maximum ratio is used for the upper case estimate. Note that these U:Alk ratios used to define the base case and upper case solubility are also illustrated in Figure 5-6 above.

Table 5-6:
Uranium to alkalinity ratio used to predict upper case and base case U solubility

	Base Case (mg/mg)	Upper Case (mg/mg)
Gneiss	8.0E-04	1.8E-03
Granite	2.8E-04	5.4E-04
Schist	1.2E-04	4.1E-04

In order to relate the U:Alk ratios presented in Table 5-6 to U concentration predictions requires an estimate of pore water alkalinity. The primary source of alkalinity in mine waste environments is from carbonate mineral dissolution. When present, carbonate minerals will dissolve until equilibrium is reached. The alkalinity produced by carbonate mineral equilibrium will depend primarily on the partial pressure of carbon dioxide (pCO_2), but will also be effected by temperature and solution chemistry. The interior of WRSFs generally have elevated pore gas pCO_2 compared to atmospheric concentrations due CO_2 generation from organic and inorganic processes. For the purposes of estimating alkalinity values produced from WRSFs, a range of conditions is considered. The relationship between alkalinity and pCO_2 at temperatures ranging from 10°C and 0.1°C, and TDS values ranging from 840 to 3400 mg/L are plotted in Figure 5-7. This figure was generated using the USGS geochemical modelling program PHREEQC, coupled to the Lawrence Livermore National Laboratories database (Parkhurst and Appelo, 1999). The PHREEQC input file is provided in Appendix E.2. In general, the modeled relationship shows that alkalinity is greater at lower temperatures and TDS values, and increases with pCO2 from 50 mg$CaCO_3$ (atmospheric CO_2) to 470 mg$CaCO_3$/L (5% CO_2). This range of CO_2 values is similar to what has been observed at other low sulphur carbonate buffered WRSFs (MacGrergor *et al.,* 2012; Birkham *et al.,* 2003). For the purpose of source term calculation, a pore gas pCO_2 of 5% is assumed, using calcite equilibrium calculated at low TDS and 0.1°C shown in Figure 5-7. This produces an estimated alkalinity of 470 mg$CaCO_3$/L and is used the base case and upper case source term predictions for U.

The U solubility control is applied to WRSF source terms by calculating a concentration associated with each of the rock types within a WRSF and taking a weighted average. The same assumptions regarding alkalinity are made for all rock types.

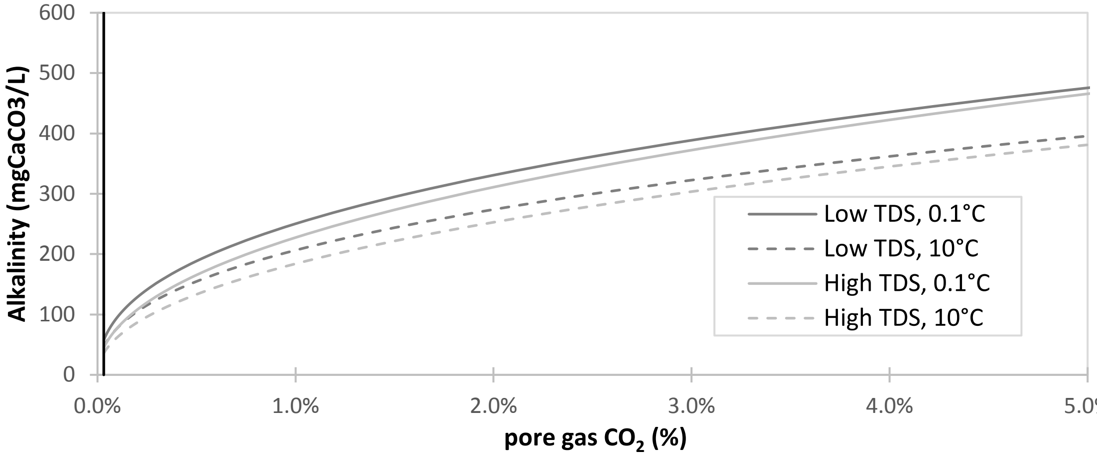


Figure 5-7: Relationship between pH and pore gas CO_2 at calcite equilibrium and varying temperatures and TDS.

5.1.4.3 Radium-226

Radium 226 is one of the main contributors to radiological doses in naturally occurring radioactive materials (NORM), and is the only radio-isotope regulated under MMER. This radio isotope is the fifth isotope of the ^{228}U decay chain and in most geologic material, the activity of ^{226}Ra in rock samples can be estimated directly from measurements of U concentrations. That is, daughter products of the ^{238}U series achieve equilibrium after about 1 million years. Secular equilibrium is a state in which the decay rate of all radioisotopes of a decay chain are equal. Analysis of naturally occurring radioactive materials (NORM) measured by gamma spectroscopy in ore, waste rock and overburden found that radioisotopes were in secular equilibrium, as is generally the case in geologic systems. This means that the activity of ^{226}Ra in host rock can be estimated based on the concentration of U. A concentration of 1 ppm of natural uranium (99.3% as ^{238}U) corresponds to 0.01235 Bq of ^{226}Ra per gram. Based on this relationship, the solid phase ^{226}Ra activity can be determined from the mass concentration of U.

In aqueous systems, Ra forms a bivalent cation [Ra(II)] and behaves similar to other alkaline earth metals such as Mg, Sr, Ca and Ba. There is abundant information from environmental radiochemical research which shows that the solubility of Ra(II) is mainly controlled by $BaSO_4$ solubility (Martin and Akber, 1999; Grandia *et al.*, 2008). The affinity of Ra to the barite crystal lattice is related to the similar ionic radius of Ra(II) and Ba(II) (1.36 Å and 1.43 Å, respectively), with $(Ba,Ra)SO_4$ behaving as a near ideal solid solution (Kulik *et al.*, 2003). The relationship between ^{226}Ra measured by alpha spectroscopy and dissolved Ba measured by ICP-MS is shown Table 5-11 below. There is some evidence that elevated ^{226}Ra values are associated with elevated Ba, however, the relationship is confounded by the low concentration of ^{226}Ra. That is, most Ra measurements are within 10x the analytical detection limit (0.01 Bq/L). Activities within this range have a relatively large uncertainty, having a precision of +/- 50% to 100%, making these measurements semi-quantitative in nature.

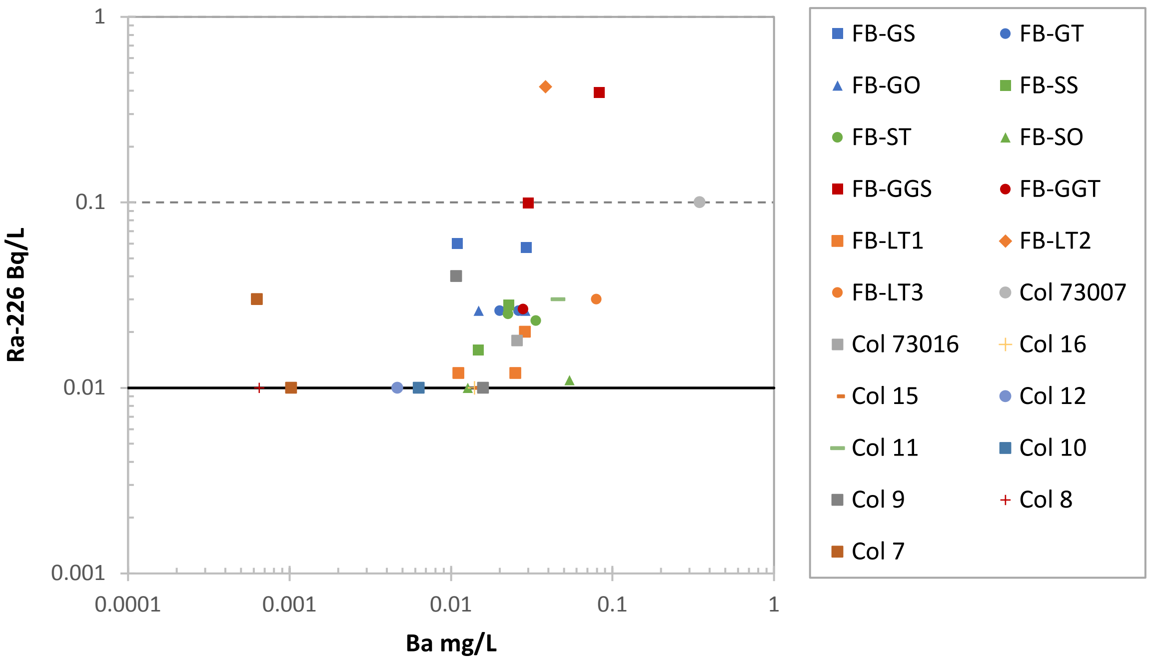


Figure 5-8: Barium concentration versus ^{226}Ra activity measured in field bins, laboratory kinetic test columns, and metallurgical cyanide leach columns. Black line shows detection limit, dotted line shows 10x detection limits for ^{226}Ra, data below this line can be considered semi-quantitative as the analytical precision is +/- 50 to 100%

Due to the large uncertainty in the relationship between Ba and ^{226}Ra in kinetic test leachate, the ratio of ^{226}Ra:Ba released into solution is assumed to be equivalent to the ratio which occurs in the solid phase. The median and 75th percentile ratios of ^{226}Ra:Ba ratios (Bq/ppm) for each of the respective rock types is presented in Table 5-7. In this table, the concentration of ^{226}Ra is calculated by assuming secular equilibrium with ^{238}U as described in section 4.1.7.

Table 5-7:
Ratio of Ra-226 to Ba measured in ICP-MS database for various lithologies, weathering types and ore/waste types.

Lithology	Weathering	Ore/Waste	Ra-226 / Ba (Bq/ppm)	
			P50	P75
Schist	Oxide	Waste	0.14	0.28
Schist	Transition	Waste	0.08	0.19
Schist	Fresh	Waste	0.07	0.12
Schist	Oxide	Ore	0.08	0.08
Schist	Transition	Ore	0.16	0.79
Gneiss	Oxide	Waste	0.84	1.16
Gneiss	Transition	Waste	0.69	1.16
Gneiss	Fresh	Waste	0.27	0.61
Gneiss	Oxide	Ore	0.73	0.97
Gneiss	Transition	Ore	0.71	0.82
Granite	Oxide	Waste	1.85	2.21
Granite	Transition	Waste	1.26	2.49
Granite	Fresh	Waste	1.01	1.34
Granite	Oxide	Ore	1.91	2.51
Granite	Transition	Ore	2.41	5.37

Thermodynamic calculations of barite saturation often underestimate barium concentrations observed in the natural environment (Martin et al., 2003). Barite solubility is graphed in Figure 5-9 and compared to metallurgical leach column data and field bin data (data presented in Table 4-32, Table 4-34, Table 4-36, Table 4-56 and Table 4-64). Note that first flush samples form field bins are excluded in this table. In this figure, barite solubility is calculated by assuming barite equilibrium (SI=0) and for barite under supersaturated conditions (SI=0.55). An SI of 0.55 is equivalent to the ion activity product (IAP) being 3.5 times the solubility product (Ksp). In other words, Ba concentrations are 3.5 times greater than what would be predicted by assuming barite equilibrium. Solubility calculations are done using the USGS geochemical modelling program PHREEQC coupled to the Lawerence Livermore National Laboratory database (Parkhusrt and Apello, 1999). The input file is provided in Appendix E.2. Most field bin data plots between the barite SI=0 and barite SI=0.55 solubility curves. This result is similar to results from Martin et al. (2003), who found that while barium generally conformed with expected behavior predicted by barite solubility (decreasing Ba with increasing SO4 concentrations), however, calculated SI values were generally greater than 0 (*i.e.*, greater than equilibrium). In order to predict Ba solubility for the purposes of source term calculations, a barite SI of 0.55 is assumed for both base case and upper case scenarios. This assumed barite SI conservatively predicts Ba concentrations in 23 of 26 field bin samples and 24 of the 26 met column samples (Figure 5-9).

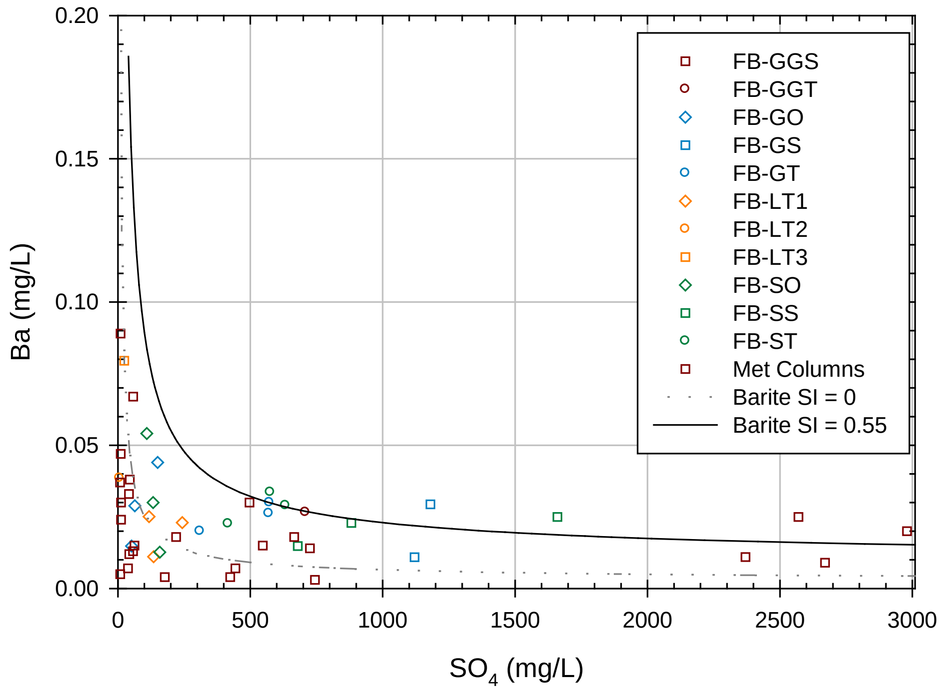


Figure 5-9: Relationship between barium and SO_4 in field bin and metallurgical leach column (met column) samples. The grey line indicates barite solubility at equilibrium (SI=0). The black line indicates barite at supersaturation (SI=0.55).

Source term predictions for ^{226}Ra are calculated by multiplying the ratio of ^{226}Ra to Ba in the solid phase by the predicted concentration of Ba assuming barite SI of 0.55. The ratio of ^{226}Ra to Ba is used as the sensitivity to differentiate the base case from the upper case. That is, the median ratio is used as the base case source term and the 75th percentile value is used in the upper case source term. Activities of ^{226}Ra, predicted by these assumptions, are plotted as a function of SO_4 concentrations for base case and upper case scenarios in Figure 5-10 and Figure 5-11, respectively. Due to the inverse relationship between Ra activities and SO_4, the base case source terms of SO_4 are used to calculate Ba solubility in both base case and upper case ^{226}Ra predictions to ensure conservative predictions. The ^{226}Ra solubility control is applied to WRSF source terms by calculating the ^{226}Ra:Ba ratio for each of the rock types within a WRSF and taking a weighted average.

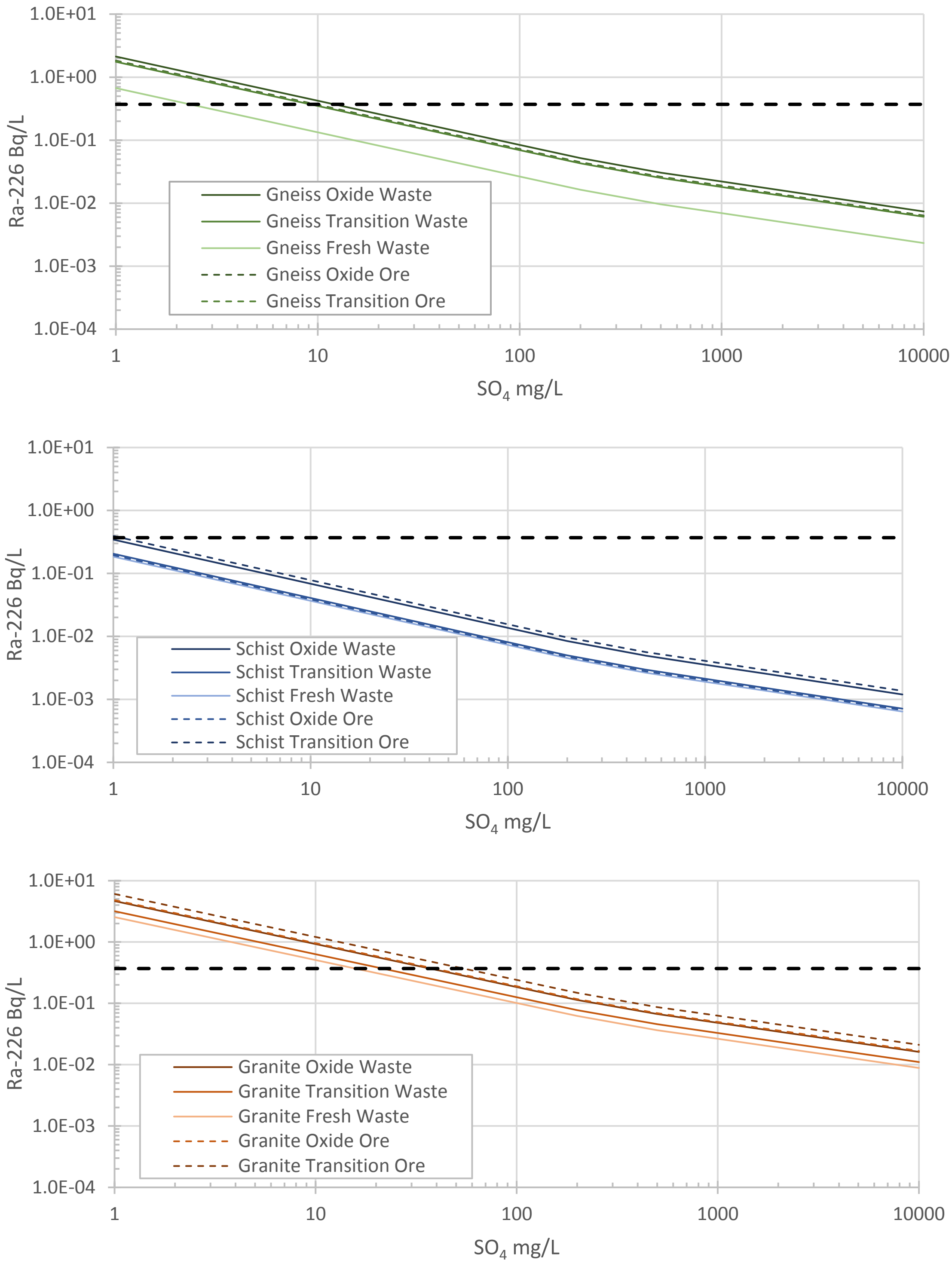


Figure 5-10: Base case solubility control of Ra-226 as a function of SO_4 concentrations. Plots show Ra-226 solubility for various gneiss (top), schist (middle), and granite (bottom) ore and waste rock units

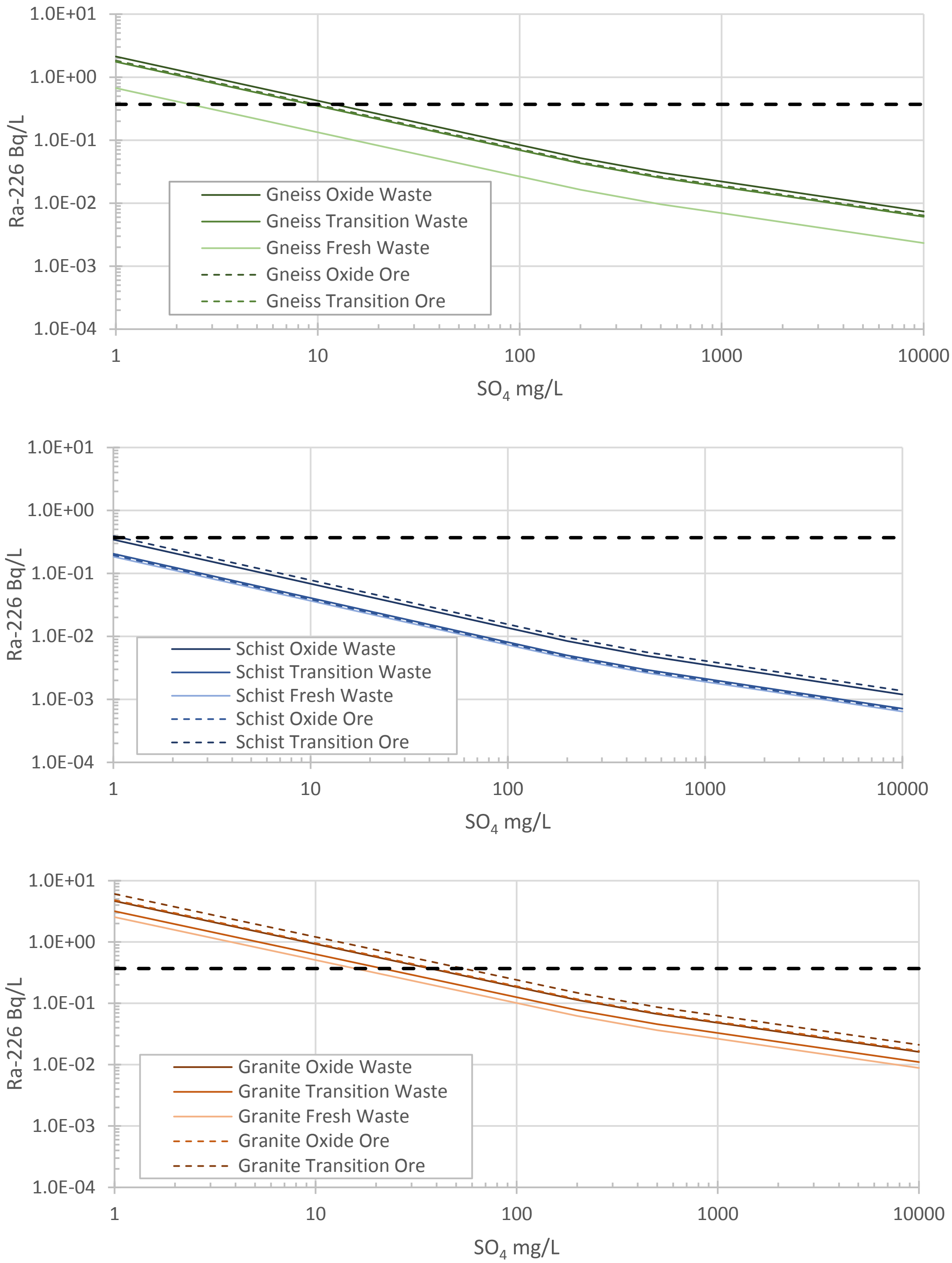


Figure 5-11: Upper case source term solubility of Ra-226 as a function of SO_4 concentrations. Plots show Ra-226 solubility for various gneiss (top), schist (middle), and granite (bottom) ore and waste rock units.

5.1.4.4 Other Parameters

Upscaling kinetic test loading rates often produces unrealistic concentrations due to detection limit values in kinetic test, or pH related solubility controls. The concentration of Hg and P were frequently at or below detection limits in kinetic testwork, and concentrations of Al and Fe are not expected to conservatively as they will precipitate as hydroxide or oxyhydroxide phases under neutral pH, aerobic conditions. Therefore, Hg, Fe and Al were set to median and 75th percentile concentrations observed in waste rock field bins for base case and upper case source term predictions, respectively. In the case of P, where all field bin values were below the relatively high detection limit value of 0.05 mg/L, the detection limit value is used in the upper case source term and the base case scenario is set at half the detection limit.

5.1.5 Source Term

Source terms for WRSFs are calculated for the maximum WRSF footprints and mass at end of mine life. Base case and upper case source term concentrations applied at end of mine life are presented in Table 5-8 and Table 5-9, respectively. The source term applied to the underdrain of the Alpha WRSF is provided in Table 5-10. The complete set of source terms is provided in Appendix E.3.

Table 5-8:
Base case source terms for WRSF for the final year of mine life,
Table 5-8closure and post-closure

Facility		Alpha WRSF	Kona Backfill	in Pit Latte	in Pit Supremo	in Pit Double Double
Sulfate	mg/L	1430	274	755	829	739
P	mg/L	0.0251	0.0267	0.025	0.025	0.025
Al	mg/L	0.00793	0.0143	0.00793	0.00793	0.00793
Ag	mg/L	0.0000387	0.0000181	0.0000199	0.0000218	0.0000195
As	mg/L	0.00631	0.0114	0.00702	0.00702	0.00702
Ca	mg/L	267	63.3	142	156	139
Cd	mg/L	0.0000241	0.0000722	0.0000126	0.0000139	0.0000124
Cr	mg/L	0.00292	0.000425	0.00155	0.00171	0.00152
Cu	mg/L	0.00397	0.000598	0.00209	0.00229	0.00204
Fe	mg/L	0.0215	0.0136	0.0214	0.0214	0.0214
Hg	mg/L	0.00000616	0.00000289	0.00000619	0.00000619	0.00000619
Mg	mg/L	162	12.1	85	93.3	83.2
Mn	mg/L	0.018	7.01	0.00647	0.00711	0.00634
Mo	mg/L	0.136	0.00437	0.0789	0.0866	0.0772
Ni	mg/L	0.00637	0.00497	0.00232	0.00255	0.00227
Pb	mg/L	0.000759	0.000213	0.000372	0.000408	0.000364
Sb	mg/L	0.0229	0.00433	0.0114	0.0125	0.0111
Se	mg/L	0.00206	0.000123	0.000911	0.001	0.000892
Tl	mg/L	0.000405	0.000145	0.00021	0.000231	0.000206
U	mg/L	0.332	0.132	0.376	0.376	0.376
Zn	mg/L	0.0898	0.063	0.0416	0.0457	0.0408
Ra-226	Bq/L	0.0114	0.0629	0.0174	0.0167	0.0176

Table 5-9:
Upper case source terms for WRSF in final year of mine life and closure

Facility		Alpha WRSF	Kona Backfill	in Pit Latte	in Pit Supremo	in Pit Double Double
Sulfate	mg/L	2090	401	1100	1210	1080
P	mg/L	0.0501	0.0782	0.05	0.05	0.05
Al	mg/L	0.015	0.021	0.0145	0.0145	0.0145
Ag	mg/L	0.0000566	0.0000264	0.0000291	0.0000319	0.0000285
As	mg/L	0.0282	0.595	0.0311	0.0311	0.0311
Ca	mg/L	391	92.6	207	227	203
Cd	mg/L	0.0000353	0.000106	0.0000185	0.0000203	0.0000181
Cr	mg/L	0.00428	0.000622	0.00227	0.0025	0.00222
Cu	mg/L	0.00581	0.000874	0.00305	0.00335	0.00299
Fe	mg/L	0.0336	0.0199	0.032	0.032	0.032
Hg	mg/L	0.0000245	4.22E-06	0.000012	0.0000132	0.0000117
Mg	mg/L	236	17.7	124	136	122
Mn	mg/L	0.0263	10.2	0.00946	0.0104	0.00927
Mo	mg/L	0.199	0.00639	0.115	0.127	0.113
Ni	mg/L	0.00931	0.00728	0.00339	0.00372	0.00332
Pb	mg/L	0.00111	0.000311	0.000544	0.000597	0.000532
Sb	mg/L	0.0335	0.00634	0.0166	0.0183	0.0163
Se	mg/L	0.00301	0.000179	0.00133	0.00146	0.0013
Tl	mg/L	0.000593	0.000211	0.000307	0.000337	0.000301
U	mg/L	0.769	0.254	0.86	0.86	0.86
Zn	mg/L	0.131	0.0921	0.0609	0.0669	0.0596
Ra-226	Bq/L	0.0195	0.0919	0.0295	0.0282	0.0298

Table 5-10:
Source term for Alpha WRSF underdrain applied in both base case and upper case.

Sulfate	mg/m/yr	439000
P	mg/m/yr	40.1
Al	mg/m/yr	9.55
Ag	mg/m/yr	0.0119
As	mg/m/yr	28.6
Ca	mg/m/yr	82200
Cd	mg/m/yr	0.00741
Cr	mg/m/yr	0.899
Cu	mg/m/yr	1.22
Fe	mg/m/yr	17.1
Hg	mg/m/yr	0.00514
Mg	mg/m/yr	49700
Mn	mg/m/yr	5.53
Mo	mg/m/yr	41.9
Ni	mg/m/yr	1.96
Pb	mg/m/yr	0.233
Sb	mg/m/yr	7.04
Se	mg/m/yr	0.632
Tl	mg/m/yr	0.125
U	mg/m/yr	245
Zn	mg/m/yr	27.6
Ra-226	Bq/m/yr	18.2

5.2 Pit Walls

Pit wall rock refers to rock exposures within the mining pit itself. This includes the pit floor, benches and blast damaged fractured rock. Pit walls are expected to be fractured as a result of blasting operations. Fracturing and slope ravelling of the pit walls exposes a greater proportion of the wall rock to weathering. Wall rock drainage chemistry will vary depending on the rock type exposed rock type. Pit wall rock will be composed of a combination of waste rock and ore, with the same associations between lithology and pit as described for waste rock and ore. A summary of the estimated percentages of different pit wall types that compose the pit walls at full exposure is provided in Table 5-11 below.

**Table 5-11:
Plan view surface areas of wall rock exposed in mine pit. Maximum values show peak wall rock surface areas exposed during mine life, final values are wall rock exposures at the end of mine life**

Pits	Primary	Ore		Waste		
	Lithology	Oxide	Transition	Oxide	Transition	Fresh
Supremo	Gneiss	12%	2%	6%	49%	32%
Double Double[1]	Gneiss	4%	8%	4%	21%	62%
Kona[1]	Granite	10%	11%	16%	21%	42%
Latte	Schist	4%	21%	12%	21%	41%

Notes: 1. Double Double and Kona pits are entirely backfilled with waste rock by the end of mine life

5.2.1 Data Sources

Pit wall source terms are calculated by scaling laboratory kinetic test work. A list of the kinetic tests and cycles used in development of pit wall source terms is presented in Table 5-12 below. The loading rates used are the median and 75th percentile measured after the first 10 cycles of testing for the base case and upper case source terms, respectively. Kinetic test loading rates are presented in Section 4.1.5.3 and 4.2.5.3 for waste rock and ore, respectively. The volume of runoff from pit wall is estimated based on an MAP of 485 mm, and a runoff coefficient of 0.65 (Appendix 12-C).

**Table 5-12:
Overview of Kinetic Tests Used for Pit Wall Source Term Calculation**

Kinetic Test ID	Mineralization	Lithology	Material Type	Cycles/Weeks
Col 3	Oxide	Schist	Waste	10-44
Col 4	Transition	Schist	Waste	10-44
Col 5	Oxide	Gneiss	Waste	10-44
Col 6	Transition	Gneiss	Waste	10-44
Col 7	Oxide	Granite	Ore	10-22
Col 8	Transition	Granite	Ore	10-22
Col 9	Oxide	Schist	Ore	10-23
Col 10	Transition	Schist	Ore	10-23
Col 11	Oxide	Gneiss	Ore	10-23
Col 12	Transition	Gneiss	Ore	10-23
Col 13	Transition	Granite	Waste	10-21
HC6	Fresh	Granite	Waste	10-42
HC2	Fresh	Schist	Waste	10-87
HC4	Fresh	Gneiss	Waste	10-87

Note: Median loading rates used for base case, and 75th percentile loadings used for upper case source terms.

5.2.2 Data Scaling

The loading rates measured in the laboratory kinetic tests were scaled to address the differences between laboratory and field conditions. Laboratory rates were adjusted to account for the expected flushing rate, fractures associated with blasting, and grain size distribution. A summary of scaling factors used to develop the source terms is provided below in Table 5-13. The assumptions used in developing these scaling factors are described below.

Table 5-13:
Pit Wall Physical Scaling Factors

Scaling Factors	Unit	Blast Damaged	Blast Fractured
Thickness (m)	m	0.9	2.9
Average Wall Slope	degree	45	45
Mass	t/m^2	3.2	10.3
Grain Size Correction	-	20%	5%
% of Material Flushed	-	75%	50%
% of Year Frozen	-	50%	50%

Geochemical loading from the pit wall is influenced by the fracture intensity of the walls induced by blasting. The blast effects in the pit wall can be subdivided into two zones; a blast influenced zone and a blast damaged zone. The blast damaged zone consists of highly fractured pit wall rock exposed on the pit wall face or ravel collected on benches. The blast influenced zone consists of more widely spaced fractures in to the pit wall behind the blast damaged zone that will become progressively more fractured over time. The blast damaged zone is estimated to extend 0.9 m into the final pit wall, and the blast influenced zone is estimated to extend another 2.9 m into the pit wall. The effective volume of material in a planar unit area of 1 m^2 is increased by a factor 1.41 to account for the average pit wall slope of 45 degrees. Finally, the mass of rock in each unit area is determined by multiplying the effective volume by density of 2.6 tonne/m^3. Based on these estimates, the blast damaged zone contains 3.2 tonnes and the blast fractured zone contains 10.3 tonnes of rock per m^2 (Table 5-13). The surface area associated with these masses of wall rock is described below.

Humidity cells and unsaturated columns contain relatively fine grained particles (<10 mm), hence, material used in humidity cells have a greater surface area to mass ratio than material in the blast damaged zone and blast influenced zone of the pit wall. Estimated grain size correction factors are 20% for the blast damaged zone and 5% for the blast influenced zone.

Laboratory kinetic tests are conducted at a relatively high flushing rate compared to field conditions. The high flushing rate ensures that mineral surfaces are in contact with the leachate solution, which prevents oxide weathering products from accumulating (armoring) mineral surfaces. Furthermore, preferential flow paths will develop in the heterogeneous pit wall rock and fracture zones, circumventing a portion of the exposed surface area. To account for these changes, a flushing factor is included in the source term calculation. It is assumed that 75% of rock surfaces on the blast damaged zone are flushed, and 50% of surfaces in the blast influenced zone are flushed (Table 5-13).

It is assumed that no metal loading or acid generation takes place on any of the pit wall units for the 6 months of the year with average temperatures below freezing. No additional temperature correction was incorporated into kinetic test loading rates because tests were operated in 4°C cold room rather then at room temperature.

5.2.3 Solubility Controls

The pit wall source terms are calculated by upscaling kinetic test loading rates. This approach to source term calculation frequently results in predicted concentrations that exceed thermodynamic solubility controls, particularly in neutral pH environments where numerous controls on dissolved concentrations influence drainage chemistry. Solubility controls for As, U and ^{226}Ra are calculated using the same approach as that described in Section 5.1.4. Concentrations of other parameters that are based on upscaling detection limit data or for parameters that have limited solubility in neutral-alkaline pH environments are also adjusted.

The As and U solubility control is partially based on an estimate of pH and alkalinity. For pit wall source terms, these values are estimated from kinetic tests representing the different respective rock types, with the median and 75th percentile used for base case and upper case source term predictions, respectively. The estimated pH and alkalinity values are presented in Other solubility controls applied to wall rock runoff source terms are restricted to unweathered (fresh) waste rock lithologies. This is largely due to the large number of detection limit concentrations produced by the relatively small humidity cell experiments. Loading rates for Fe, Hg, P and Se incorporate detection limit concentrations. Therefore, these parameters were set to median and 75th percentile concentrations observed in field bins (schist fresh and gneiss fresh) or in unsaturated laboratory columns (granite fresh) for base case and upper case source terms, respectively. Other parameters which were adjusted include Al in all three fresh waste rock lithologies, and Cu and Sb in the schist fresh and gneiss fresh lithologies. The upscaled concentration of these parameters exceeded field bin values, which incorporate a greater mass and infiltration rate than predicted for pit wall rock exposures, hence, field bin data represents an upper limit of what can reasonably be expected from wall rock runoff. Therefore, these concentrations were adjusted to median and 75th percentile concentrations observed in field bins.

Table 5-14. Solubility controls for As and U are not applied to the granite transition ore, due to the mildly acidic pH (medium pH 4.5) expected from this unit.

Other solubility controls applied to wall rock runoff source terms are restricted to unweathered (fresh) waste rock lithologies. This is largely due to the large number of detection limit concentrations produced by the relatively small humidity cell experiments. Loading rates for Fe, Hg, P and Se incorporate detection limit concentrations. Therefore, these parameters were set to median and 75th percentile concentrations observed in field bins (schist fresh and gneiss fresh) or in unsaturated laboratory columns (granite fresh) for base case and upper case source terms, respectively. Other parameters which were adjusted include Al in all three fresh waste rock lithologies, and Cu and Sb in the schist fresh and gneiss fresh lithologies. The upscaled concentration of these parameters exceeded field bin values, which incorporate a greater mass and infiltration rate than predicted for pit wall rock exposures, hence, field bin data represents an upper limit of what can reasonably be expected from wall rock runoff. Therefore, these concentrations were adjusted to median and 75th percentile concentrations observed in field bins.

Table 5-14:
Estimates of Wall Rock Runoff pH and Alkalinity Used to Calculate Arsenic and Uranium Solubility

Ore/Waste	Lithology	Weathering	Base Case		Upper Case	
			pH	Alkalinity	pH	Alkalinity
Waste	Gneiss	Oxide	8.2	148	8.3	114
		Transition	8	97	8.1	76
		Fresh	7.9	91	8	69
	Schist	Oxide	8.1	89	8.2	85
		Transition	7.9	70	8	51
		Fresh	8.1	146	8.1	91
	Granite	Oxide	7.5	22	7.8	21
		Transition	7.5	22	7.8	21
		Fresh	8.1	109	8.2	107
Ore	Gneiss	Oxide	8	148	8.1	114
		Transition	8	97	8.1	76
	Schist	Oxide	8	89	8.2	85
		Transition	8	70	8.1	51
	Granite	Oxide	7.4	22	7.8	21
		Transition	-	-	-	-

Note: No pH or alkalinity related solubility controls applied for granite transition ore.

5.2.4 Source Term

Wall rock source terms are calculated for each waste rock and ore unit that will be exposed on the pit wall during mine life and at closure. Base case and upper case source term predictions are provided in Table 5-15 and Table 5-16 respectively. The surface area of exposures of the different rock units on pit walls is presented in Table 5-11. Source terms for composite pit wall runoff from each of the mine pits are provided in Appendix E.3.

Table 5-15:
Base Case Estimates for Pit Wall Rock Source Terms

Lithology		Gneiss					Schist					Granite				
Material		Waste Rock			Ore		Waste Rock			Ore		Waste Rock			Ore	
Weathering Facies		Oxide	Transition	Fresh	Oxide	Transition	Oxide	Transition	Fresh	Oxide	Transition	Oxide	Transition	Fresh	Oxide	Transition
Sulphate	mg/L	6.2	20	62	18	129	12	63	62	125	369	29	29	62	11	166
Al	mg/L	0.0043	0.0060	0.0091	0.0090	0.011	0.0043	0.0048	0.0050	0.010	0.011	0.0031	0.0031	0.009	0.23	0.53
Sb	mg/L	0.0025	0.0088	0.012	0.014	0.080	0.0031	0.0019	0.034	0.0089	0.044	0.0057	0.0057	0.012	0.048	0.020
As	mg/L	0.054	0.0030	0.00089	0.14	0.16	0.0040	0.0011	0.00090	0.16	0.18	0.0020	0.0020	0.050	0.070	12
Ba	mg/L	0.070	0.054	0.14	0.15	0.014	0.050	0.032	0.14	0.054	0.023	0.0011	0.0011	0.074	0.0015	0.00080
Be	mg/L	0.0000063	0.0000063	0.00022	0.000019	0.000020	0.0000058	0.0000068	0.00022	0.000019	0.000018	0.0000053	0.0000053	0.00022	0.000019	0.0013
Bi	mg/L	0.0000063	0.0000063	0.00022	0.000019	0.000020	0.0000058	0.0000068	0.00022	0.000019	0.000018	0.0000053	0.0000053	0.00022	0.000019	0.000020
B	mg/L	0.032	0.020	0.063	0.017	0.020	0.015	0.024	0.080	0.021	0.012	0.050	0.050	0.061	0.027	0.024
Cd	mg/L	0.0000060	0.0000080	0.000093	0.0000080	0.000010	0.0000026	0.0000090	0.000090	0.000013	0.0000080	0.0000046	0.0000046	0.000090	0.0000080	0.00019
Ca	mg/L	27	31	237	63	98	31	33	293	100	178	3.1	3.1	86	6.2	44
Cr	mg/L	0.00042	0.000071	0.00093	0.00045	0.000090	0.00059	0.00045	0.00090	0.00027	0.000090	0.000028	0.000028	0.00093	0.00013	0.00017
Co	mg/L	0.000060	0.000048	0.00046	0.00014	0.00026	0.000037	0.000080	0.0013	0.00016	0.0010	0.00088	0.00088	0.0017	0.00022	0.19
Cu	mg/L	0.0012	0.00081	0.0012	0.0013	0.0013	0.00090	0.0011	0.00096	0.0019	0.0014	0.00052	0.00052	0.0080	0.0025	0.043
Fe	mg/L	0.0063	0.0063	0.020	0.019	0.020	0.0058	0.020	0.010	0.019	0.018	0.0053	0.0053	0.0070	0.032	0.33
Pb	mg/L	0.000031	0.000012	0.00031	0.000028	0.000028	0.000018	0.000038	0.00031	0.000060	0.000050	0.000033	0.000033	0.0025	0.00018	0.00020
Li	mg/L	0.0037	0.0035	0.017	0.0065	0.0069	0.0051	0.010	0.024	0.0074	0.0068	0.0041	0.0041	0.021	0.00088	0.0078
Mg	mg/L	10	15	78	17	30	13	17	90	38	46	0.76	0.76	14	1.7	11
Mn	mg/L	0.00056	0.00039	0.26	0.0021	0.051	0.00047	0.0018	0.37	0.0080	0.090	0.38	0.38	2.1	0.044	7.2
Hg	mg/L	0.0000090	0.0000090	0.0000055	0.000027	0.000028	0.0000083	0.000010	0.0000025	0.000027	0.000026	0.0000076	0.0000076	0.0000025	0.000028	0.000029
Mo	mg/L	0.020	0.028	0.021	0.025	0.038	0.0026	0.023	0.0080	0.0067	0.0078	0.0028	0.0028	0.020	0.0039	0.0010
Ni	mg/L	0.00036	0.00042	0.0031	0.00028	0.00090	0.00037	0.0013	0.013	0.0028	0.0078	0.00029	0.00029	0.0031	0.00028	0.047
P	mg/L	0.0033	0.0049	0.025	0.094	0.013	0.0025	0.0029	0.025	0.0081	0.0079	0.0023	0.0023	0.025	0.028	0.056
K	mg/L	7.0	9.5	43	9.3	13	5.7	12	51	9.6	11	5.6	5.6	30	3.6	12
Se	mg/L	0.00018	0.00016	0.0016	0.00020	0.00072	0.00033	0.00060	0.0020	0.0016	0.0027	0.000041	0.000041	0.0012	0.00017	0.0015
Si	mg/L	5.5	4.1	21	11	11	4.2	5.0	15	9.0	6.1	11	11	74	5.8	16
Ag	mg/L	0.0000019	0.0000018	0.000062	0.0000055	0.0000056	0.0000017	0.0000021	0.000062	0.0000070	0.0000053	0.0000016	0.0000016	0.000060	0.0000070	0.0000060
Na	mg/L	12	2.4	3.9	4.5	2.0	2.1	14	3.4	3.8	2.4	13	13	10	13	1.3
Sr	mg/L	0.16	0.23	1.4	0.28	0.44	0.21	3.8	18	0.65	0.90	0.014	0.014	0.21	0.040	0.22
S	mg/L	2.7	7.2	25	7.7	47	4.2	23	32	49	151	11	11	19	4.9	60
Tl	mg/L	0.000028	0.00014	0.00018	0.00031	0.00036	0.000066	0.000010	0.00019	0.00017	0.00031	0.000041	0.000041	0.00025	0.000080	0.00090
Sn	mg/L	0.00013	0.000060	0.012	0.00014	0.00016	0.000046	0.00045	0.0025	0.00016	0.00010	0.000080	0.000080	0.0019	0.00017	0.00012
Ti	mg/L	0.000070	0.000058	0.0026	0.00014	0.00014	0.000042	0.000066	0.0028	0.00014	0.00013	0.000041	0.000041	0.010	0.00060	0.00014
U	mg/L	0.085	0.060	0.060	0.083	0.061	0.0043	0.0060	0.011	0.0041	0.0060	0.00080	0.00080	0.026	0.0010	0.0034
V	mg/L	0.00016	0.00014	0.0075	0.00022	0.00021	0.00011	0.00034	0.010	0.00016	0.00030	0.00010	0.00010	0.011	0.00042	0.00029
Zn	mg/L	0.00090	0.00090	0.031	0.0027	0.0028	0.00080	0.0010	0.031	0.0027	0.0026	0.0023	0.0023	0.031	0.0028	0.28
Ra-226	Bq/L	0.035	0.018	0.013	0.060	0.0051	0.00070	0.00010	0.00070	0.00023	0.00	0.0012	0.0012	0.050	0.0040	0.0030

Table 5-16:
Upper Case Estimates for Pit Wall Rock Source Terms

Lithology		Gneiss					Schist					Granite				
Material		Waste Rock			Ore		Waste Rock			Ore		Waste Rock			Ore	
Weathering Facies		Oxide	Transition	Fresh	Oxide	Transition	Oxide	Transition	Fresh	Oxide	Transition	Oxide	Transition	Fresh	Oxide	Transition
Sulphate	mg/L	7.2	22	63	20	143	17	74	92	155	574	33	33	62	14	181
Al	mg/L	0.0055	0.0067	0.0091	0.011	0.018	0.0049	0.0062	0.013	0.014	0.014	0.0049	0.0049	0.021	0.41	0.59
Sb	mg/L	0.0026	0.010	0.017	0.016	0.10	0.0033	0.0021	0.059	0.0097	0.046	0.0064	0.0064	0.028	0.059	0.021
As	mg/L	0.015	0.013	0.00094	0.25	0.30	0.013	0.0038	0.0017	0.33	0.35	0.016	0.016	0.060	0.33	21
Ba	mg/L	0.078	0.056	0.14	0.16	0.015	0.058	0.041	0.11	0.061	0.025	0.0012	0.0012	0.080	0.0024	0.0023
Be	mg/L	0.0000072	0.0000066	0.00022	0.000020	0.000020	0.0000061	0.0000073	0.00022	0.000019	0.000019	0.0000062	0.0000062	0.00022	0.000034	0.0014
Bi	mg/L	0.0000072	0.0000066	0.00022	0.000020	0.000020	0.0000062	0.0000073	0.00022	0.000019	0.000019	0.0000062	0.0000062	0.00022	0.000020	0.000020
B	mg/L	0.041	0.025	0.077	0.020	0.022	0.018	0.028	0.11	0.024	0.015	0.061	0.061	0.065	0.037	0.027
Cd	mg/L	0.000010	0.000014	0.000094	0.000011	0.000016	0.0000039	0.000012	0.00014	0.000020	0.000010	0.0000053	0.0000053	0.00014	0.000011	0.00022
Ca	mg/L	28	32	268	66	106	34	35	315	106	211	3.1	3.1	102	6.7	47
Cr	mg/L	0.00059	0.000091	0.00094	0.00050	0.00018	0.00074	0.00066	0.0015	0.00031	0.00012	0.000049	0.000049	0.00094	0.00018	0.00024
Cu	mg/L	0.0013	0.00096	0.007	0.0015	0.0014	0.0012	0.0017	0.011	0.0022	0.0019	0.00079	0.00079	0.011	0.0039	0.046
Fe	mg/L	0.0072	0.0066	0.012	0.020	0.020	0.0061	0.0073	0.030	0.019	0.019	0.0062	0.0062	0.030	0.071	0.43
Pb	mg/L	0.000053	0.000032	0.00062	0.000070	0.000048	0.000042	0.000096	0.00094	0.00016	0.00017	0.000069	0.000069	0.0033	0.00027	0.00077
Li	mg/L	0.0041	0.0039	0.020	0.0073	0.0075	0.0060	0.011	0.030	0.0083	0.0076	0.0044	0.0044	0.030	0.00093	0.0096
Mg	mg/L	10	16	86	19	31	14	18	108	40	55	0.81	0.81	16	1.8	12
Mn	mg/L	0.00090	0.00065	0.29	0.0034	0.059	0.00065	0.0028	0.43	0.013	0.11	0.42	0.42	2.4	0.054	7.5
Hg	mg/L	0.000010	0.0000094	0.0000055	0.000028	0.000028	0.0000088	0.000010	0.0000050	0.000028	0.000027	0.0000088	0.0000088	0.000030	0.000054	0.000029
Mo	mg/L	0.022	0.032	0.026	0.028	0.045	0.0033	0.029	0.011	0.0076	0.0088	0.0030	0.0030	0.027	0.0062	0.0016
Ni	mg/L	0.00044	0.00047	0.0031	0.00054	0.0013	0.00044	0.0016	0.016	0.0033	0.0096	0.00032	0.00032	0.0031	0.00054	0.055
P	mg/L	0.0040	0.0077	0.050	0.097	0.021	0.0026	0.0031	0.050	0.0084	0.0081	0.0045	0.0045	0.05	0.036	0.063
K	mg/L	7.6	9.7	51	9.6	14	6.2	13	64	9.9	12	6.3	6.3	40	3.8	12
Se	mg/L	0.00083	0.00087	0.0060	0.00022	0.00094	0.00079	0.00088	0.0060	0.0018	0.0030	0.000055	0.000055	0.0014	0.00024	0.0016
Si	mg/L	6.2	4.2	23	11	11	4.6	5.2	18	9.2	6.5	14	14	84	6.2	19
Ag	mg/L	0.0000022	0.0000021	0.000062	0.0000056	0.0000057	0.0000018	0.0000028	0.000063	0.000010	0.0000054	0.0000023	0.0000023	0.00011	0.000011	0.000013
Na	mg/L	29	3.7	5.5	6.2	2.7	3.8	30	4.7	5.3	3.3	14	14	12	15	1.7
Sr	mg/L	0.17	0.24	1.5	0.29	0.46	0.25	4.6	20	0.67	1.1	0.014	0.014	0.24	0.042	0.23
S	mg/L	3.0	7.8	34	8.7	53	5.6	25	47	61	199	12	12	22	6.1	62
Tl	mg/L	0.000032	0.00014	0.00028	0.00035	0.00042	0.000075	0.000015	0.00030	0.00022	0.00040	0.000050	0.000050	0.00031	0.00012	0.0011
Sn	mg/L	0.00032	0.00011	0.015	0.00019	0.00026	0.000094	0.00057	0.0044	0.00024	0.00011	0.00012	0.00012	0.0024	0.00040	0.00016
Ti	mg/L	0.00011	0.000082	0.0040	0.00016	0.00017	0.000069	0.000082	0.0053	0.00017	0.00014	0.000058	0.000058	0.019	0.0019	0.00016
U	mg/L	0.091	0.18	0.17	0.086	0.074	0.0047	0.029	0.060	0.0055	0.020	0.00087	0.00087	0.030	0.0020	0.0036
V	mg/L	0.00017	0.00016	0.0082	0.00025	0.00023	0.00011	0.00036	0.013	0.00022	0.00035	0.00012	0.00012	0.014	0.00052	0.00036
Zn	mg/L	0.0011	0.0010	0.031	0.0028	0.0029	0.0013	0.0012	0.031	0.0031	0.0031	0.0031	0.0031	0.031	0.0053	0.30
Ra-226	Bq/L	0.074	0.053	0.066	0.10	0.0072	0.0032	0.0010	0.0027	0.00030	0.011	0.0054	0.0054	0.10	0.011	0.046

5.3 Heap Leach Facility

A cyanide heap leaching facility is planned for extraction and recovery of Au from oxide and transition ore. The ore will be crushed to 80% - 50 mm and stacked on the lined HLF pad using haul trucks in nominal 10 m lifts. The facility will reach a maximum mass (60 Mt) in year 11 of mine life and occupy a footprint of 109 ha. Ore will be leached with lime buffered NaCN solution applied with drip emitters. The leach solution will drain into collection pipes that will direct the pregnant solution to the process plant where precious metals will be recovered. The resulting barren solution will be amended with additional lime and NaCN as required and then recirculated to the heap to continue the leaching cycle. The mass and geologic composition of ore on the HLF at the end of operations is provided in Table 5-17.

Table 5-17:
Lithology, oxidation and source of ore stockpiled in the Heap Leach Facility.

Lithology	Facies	Deposit				
		Latte	Double Double	Kona	Supremo	Total
Gneiss	Oxide (Mt)	0.39	0.53	0.00	37.36	**38.29**
	Transition (Mt)	0.01	0.87	0.00	4.46	**5.34**
	Total	**0.41**	**1.40**	**0.00**	**41.82**	**43.63**
Metabasalt	Oxide (Mt)	0.08	0.03	0.00	0.09	**0.20**
	Transition (Mt)	0.00	0.07	0.00	0.02	**0.09**
	Total	**0.08**	**0.10**	**0.00**	**0.11**	**0.29**
Schist	Oxide (Mt)	8.87	0.00	0.00	0.07	**8.93**
	Transition (Mt)	5.67	0.00	0.00	0.00	**5.68**
	Total	**14.54**	**0.00**	**0.00**	**0.07**	**14.61**
Granite	Oxide (Mt)	0.00	0.00	1.24	0.00	**1.24**
	Transition (Mt)	0.00	0.00	0.38	0.00	**0.38**
	Total	**0.00**	**0.00**	**1.63**	**0.00**	**1.63**
All	**Total**	**15.03**	**1.50**	**1.63**	**42.00**	**60.15**

Following final leaching for gold recovery, heap closure will be initiated which involves the following steps:

- Rinsing leached ore with treated solution and fresh water;
- Irrigation with nutrients and soluble carbon source to stimulate in-situ bioremediation of CN and nitrogen species;

- Capping of the HLF with geosynthetic clay liner (GCL) and a store-and-release component overlying the GCL for the flat surfaces of the heap and a store-and-release cover for the slopes;
- Passive treatment of drainage to serve as a final polishing step of HLF drainage as contingency (*e.g.*, zero valent iron, coarse organic composted wood chips from tree clearing, suitable geologic material).

The HLF will be constructed in stages, as such, gold recovery from certain areas of the pad will be complete by Year 4 to 5 of mine life allowing closure measures to be initiated during operations. Discharge of any HLF solution during mine life or active closure will be treated prior to discharge. Treatment will consist of a two step process, where CN is first destroyed by H_2O_2 and then residual nitrate, metalloids and metals are treated with an biological system termed the Electrochemical Biological Reactor (EBR) system. A complete description of HLF closure activities and drainage treatment is provided in Appendix 31-R.

The chemistry of HLF pore water and drainage will vary widely depending on the stage of mine life. To reflect this, separate geochemical source terms have been developed for three different types of HLF water; process water, treated drainage, and passive discharge in post closure. Source term development for each of these scenarios is described below.

5.3.1 Process Water

5.3.1.1 Approach

During mine operations, HLF solution will initially be composed entirely of pregnant solution. After Y5 HLF pore water will be a combination of pregnant solution and rinse water from areas where progressive reclamation has been initiated. For the purpose of predicting an operations source term, it is assumed that all HLF pore water is pregnant solution during operations. The processing of heap leach ore for the Project will entail the use of cyanide solutions under pH conditions ranging between pH 10.0 and 11.0. While the dissolution of gold is the primary objective during cyanide leaching, other metals are liberated during the leaching process, both as a result of complexation reactions with cyanide (*e.g.* Cu-CN, Cd-CN, Zn-CN) and increased solubility under elevated pH conditions (*e.g.* As and U). The chemistry of pregnant solutions is estimated based on the final water quality measured in metallurgical cyanide leach columns (Table 4-54). The pregnant solution chemistry representing different ore types is weighted proportional to the mass of the different ore types that will be in the HLF in the final year of mine life (Table 5-17).

5.3.1.2 Data Sources

The composition of process water is estimated based on water quality samples collected from 26 metallurgical columns. These tests are described in Section 3.2.7 and water quality results are provided in section Table 4-54.

5.3.1.3 Data Scaling

The chemistry observed in metallurgical columns are weighted based on the proportion of ore types in the HLF in a given year (Figure 5-14). For instance, in transition material from the Supremo pit constitutes 7.45% of the ore in the HLF, hence, the chemistry observed in CN leach columns (columns 73040 and 73037). In this way, the operations source term for the HLF reflects the final of ore on the pad. For the purpose of water quality predictions, the maximum concentration observed for a given lithology or weathering type is used in the upper source term and the mean concentration is used for the base case source term.

5.3.1.4 Solubility Controls

The operations source term is based on concentrations measured in metallurgical leach column tests. Since this source term is based on averaging measured concentrations rather than upscaling kinetic test loading rates, concentrations generally do not exceed thermodynamic solubility constraints. The only parameter predicted based on a solubility calculation is ^{226}Ra as it was only measured in 2 of the 26 metallurgical columns (See Table 4-56). Therefore, the concentration of ^{226}Ra is calculated using the same approach described in Section 5.1.4.3.

5.3.2 Active Treatment

5.3.2.1 Approach

The proposed water treatment system is a two stage process. The first stage of the treatment process will be to add H_2O_2 to oxidize residual cyanide. The products of this process are cyanate and/or ammonia and carbon dioxide. The second stage of the process utilizes a biological treatment system termed EBR for denitrification and metalloid and metal removal. Bench-scale testing of the proposed EBR treatment system has been performed on leach solution as described in Appendix E.4.

5.3.2.2 Data Sources and Scaling

The results of EBR bench scale tests are used as the basis for estimating the composition of treated HLF effluent. The methodology and results of this bench scale study are presented in Appendix E.4. The median and 75th percentile concentrations produced by the EBR in the final two months of testing when chemistry had stabilized are used for the base case, and upper case source term predictions.

5.3.2.3 Solubility Controls

The active treatment source term is based on chemistry observed in bench scale EBR treatment testwork. It is assumed that this treatment of HLF solution will have no effect on ^{226}Ra, therefore, the activity of ^{226}Ra in EBR effluent so the maximum ^{226}Ra concentration for the HLF operations, which occurs in Y9, is applied. In addition to this solubility control, a final adjustment is made to nutrient concentrations in EBR effluent. As part of the EBR bench scale operations, nutrients such as NH_3 and PO_4 are added to stimulate microbial growth. The duration of the experiment was not sufficient to optimize nutrient addition rates, and the excess nutrient supplied to the EBR appeared in the system effluent. To correct for this, artificially high P concentrations were set equal to EBR influent concentration. Assumptions regarding nitrogen predictions are described in Appendix E.1.

5.3.3 Post Closure

5.3.3.1 Approach

In the post closure scenario, drainage will consist of meteoric water that infiltrates through the GCL liner or unlined slopes of the facility. The drainage chemistry from the HLF following rinsing is difficult to predict. The addition of microbes, carbon and nutrients to the heap during progressive rinsing and reclamation will foster reducing conditions within the heap pore waters allowing for *in situ* denitrification and ultimately reductive precipitation of metals. As such, the objective of *in situ* treatment is to treat constituents within the heap, as well as decreasing metals concentration to sufficiently low levels to either directly discharge, or at least provide water that is of sufficiently good quality to only require polishing in a passive treatment system. For the purposes of estimating post closure seepage water quality from the HLF, the use of additional polishing through passive treatment is assumed.

Additional contingency reclamation efforts will be afforded to providing for passive treatment polishing of heap seepage solutions prior to release to the environment. Permeable reactive barriers have been a successful passive treatment technology for treating mine waste solutions containing elevated nitrogen species, metalloids such as arsenic and metals including uranium and are assumed to be operative at closure.

A PRB is a passive, *in situ* technology that, under certain conditions, has a high potential to treat waters at a lower cost than traditional pump-and-treat methods (Blowes *et al.*, 2000). A PRB is designed to be more permeable than the surrounding media, such that water can easily flow through the reactive zone without significantly altering the natural flow system. PRBs have been extensively used in groundwater systems and in treating mine contact waters.

In PRBs, the reactive zone includes a permeable matrix (*e.g.*, gravel) amended with one or more materials that serve to create conditions conducive to contaminant removal. For example, zero-valent iron (ZVI) and/or carbon-based organic materials (e.g., straw, sawdust, wood chips, etc.) have been successful in treating both inorganic and organic contaminants (USEPA, 2005).

PRBs have been used for the treatment of groundwater contaminants since the 1980s, and there are numerous reports and publications available that summarize the extensive research, field trials and full-scale implementations (*e.g.*, USEPA 1998 and 2005; Blowes *et al*., 2000; ITRC 2005 and 2011). There are multiple examples of successful full-scale PRB installations that have been operating in excess of five to ten years. In this regard, PRBs are acknowledged as an appropriate and cost-effective technology for the treatment of mine-influenced water (ITRC, 2013). Site-specific considerations dictate the selection of a PRB as a treatment option, and a comprehensive understanding of site hydrogeochemistry is required for barrier design, placement configuration, and selection of reactive materials to effectively treat solutions. Given that PRBs are contained within the subsurface environment, they are minimally influenced by atmospheric temperature, and have been shown to function well in cold-interior climates (Benner *et al*., 1997).

For the Coffee heap leach facility, nitrate (NO_3^-), arsenic (As) and uranium (U) represent the primary parameters of potential environmental concern from the HLF. Nitrate represents a residual product of cyanide degradation, while As and U represent leached components from the ore. There has been considerable research focused on ZVI-type PRBs and its potential for removing As from water (*e.g.*, Bain *et al.*, 2006, Wilkin *et al.*, 2009). Results of these studies indicate that As removal occurs via adsorption onto corrosion products of ZVI, including iron hydroxides, oxyhydroxides, and mixed valance Fe(II)-Fe(III) green rusts (USEPA, 2008). systems. The precipitation of As as secondary arsenic sulfide minerals (*e.g.*, orpiment) and co-precipitation with pyrite also represent likely removal processes within PRB systems (USEPA, 1998).

Nitrate is a common groundwater contaminant related to agricultural activity, wastewater disposal, leachate from landfills, septic systems, and industrial processes (*e.g.*, use of cyanide in gold extraction). Treatment methods designed to foster microbially-mediated nitrate reduction (denitrification), such as PRBs, have been applied in a variety of forms and settings. In this regard, organic materials can provide an effective reactive media in PRBs to produce conditions conducive to bacterial denitrification (USEPA, 1998).

At circum-neutral pH, U exists in two major oxidation states: U(VI) and U(IV). The U(VI) species are highly soluble and therefore mobile, whereas U(IV) species are sparingly soluble at near-neutral pH. Reduction of U(VI) to U(IV) results in a significant decrease in the solubility of U and is the same process operative in the proposed water treatment system which reduces the uranyl ion to uraninite (U(IV)).

Remediation of contaminants using PRBs may be achieved through abiotic reduction, biotic reduction, chemical precipitation, or adsorption processes and numerous case studies exist demonstrating successful treatment of nitrate, arsenic, uranium and other metals (*e.g.,* Cu, Co, Cd, Ni, Zn) (Ludwig, et. al., 2002). Based on results in the published literature, the expected chemistry of the HLF seepage water following passive treatment is summarized in Table 5-18.

Table 5-18:
Upper Case and Base Case Source Term Predictions for HLF at Post Closure

		Base Case	Upper Case
T-CN	mg/L	0.4	0.8
Ammonia-N	mg/L	0.05	1.0
Nitrate-N	mg/L	5	25
Nitrite-N	mg/L	0.2	1.0
Sulphate	mg/L	250	500
P	mg/L	0.3	0.8
WAD-CN	mg/L	0.05	0.1
Al	mg/L	0.0084	0.13
Ag	mg/L	0.00016	0.00075
As	mg/L	0.01	0.05
Ca	mg/L	171	380
Cd	mg/L	0.000085	0.0003
Cr	mg/L	0.0065	0.01
Cu	mg/L	0.002	0.006
Fe	mg/L	0.5	1.0
Hg	mg/L	0.000045	0.00042
Mg	mg/L	52	70
Mn	mg/L	0.028	0.084
Mo	mg/L	0.2	0.75
Ni	mg/L	0.003	0.0.015
Pb	mg/L	0.00037	0.0016
Sb	mg/L	0.032	0.08
Se	mg/L	0.0066	0.017
Tl	mg/L	0.0017	0.0045
U	mg/L	0.01	0.05
Zn	mg/L	0.01	0.03
Ra-226	Bq/L	0.022	0.033

5.4 Mine Facilities Area

The mine facilities area will be constructed using inorganic overburden excavated from within or near the mine facilities area footprint. This pad has a footprint of approximately 7 ha, and will host the plant site area, mine camp and other mine infrastructure. The mine facilities area will be reclaimed at the end of active closure, hence, the source term only exists during operations and active closure time periods.

5.4.1 Approach

Overburden from the mine facilities areas has been characterized by ABA, SFE and total metals analysis, as described in Section 4.4. The ABA results demonstrate that the mine site overburden is highly weathered. This is shown by the relative absence of carbonate or sulphide mineralization, and the circumneutral to mildly acidic rinse-pH values ($5.2 \leq pH \leq 8.9$; median = 7.2), which is slightly higher than the pH of rain water (~pH 5.6). Due to the overall general lack of neutralizing or acid generating minerals in the samples, mine site overburden can be classified as non-PAG. The absence of sulphide mineralization shows that oxidation of the overburden material will not lead to release of metals or acidity, however, exposure of previously buried mineral surfaces may lead to rinsing of soluble metals by infiltrating meteoric waters.

5.4.2 Data Sources

The potential for metal leaching from rinsing of freshly exposed surfaces is measured by SFE testwork. Specifically, SFE tests conducted on 11 overburden samples collected from test pits on the plantsite and HLF area, as show in Figure 3-1. These samples include (test pit IDs) SRK-15TP-03, SRK-15TP-05, SRK-15TP-11, SRK-15TP-14, SRK-15TP-15, SRK-15TP-17, SRK-15TP-22, SRK-15TP-24, SRK-15TP-41, SRK-15TP-43 and SRK-15TP-46.

5.4.3 Solubility Controls

The minesite area source term is based on measured concentrations and not upscaled form kinetic test data, hence, thermodynamic solubility controls are generally not exceeded and few solubility controls are required. The solubility of ^{226}Ra was calculated for the mine facilities area using the approach described in Section 5.1.4.3. The only other parameters which were set to solubility controls are Al and Fe. Iron and Al are sparingly water soluble under neutral pH and aerobic conditions but were observed in relatively high values in SFE tests (median of 0.505 mg/L and 0.715 mg/L, respectively). Accordingly, the high Al and Fe values are likely caused by fine suspended solids carried through the 0.45µm filter during the extraction experiment. The concentration of these elements were set to the median and 75th percentile observed in gneiss oxide field bin for the base case and upper case source terms.

5.4.4 Source Term

The upper case and base case source terms for the mine facilities is presented in Table 5-19 below. The mine facilities area source term is constant throughout mine life.

Table 5-19:
Base Case and Upper Case Source Term Predictions for Mine Facilities Area

Parameter	Units	Base Case	Upper Case
Sulphate	mg/L	0.25	0.86
P	mg/L	0.025	0.025
Al	mg/L	0.017	0.048
Ag	mg/L	0.000025	0.000061
As	mg/L	0.0023	0.0034
Ca	mg/L	0.94	1.4
Cd	mg/L	0.000025	0.000050
Cr	mg/L	0.0029	0.0035
Cu	mg/L	0.0052	0.0074
Fe	mg/L	0.030	0.044
Hg	mg/L	0.000025	0.000050
Mg	mg/L	0.35	0.51
Mn	mg/L	0.054	0.081
Mo	mg/L	0.0011	0.0015
Ni	mg/L	0.0022	0.0031
Pb	mg/L	0.00070	0.0011
Sb	mg/L	0.00025	0.00027
Se	mg/L	0.00025	0.00050
Tl	mg/L	0.000050	0.00010
U	mg/L	0.0016	0.0024
Zn	mg/L	0.0050	0.010
Ra-226	Bq/L	0.012	0.018

6. Closure

6. Closure

We trust that this Report meets your present requirements. Please let us know if you have any questions or comments.

Respectfully submitted,

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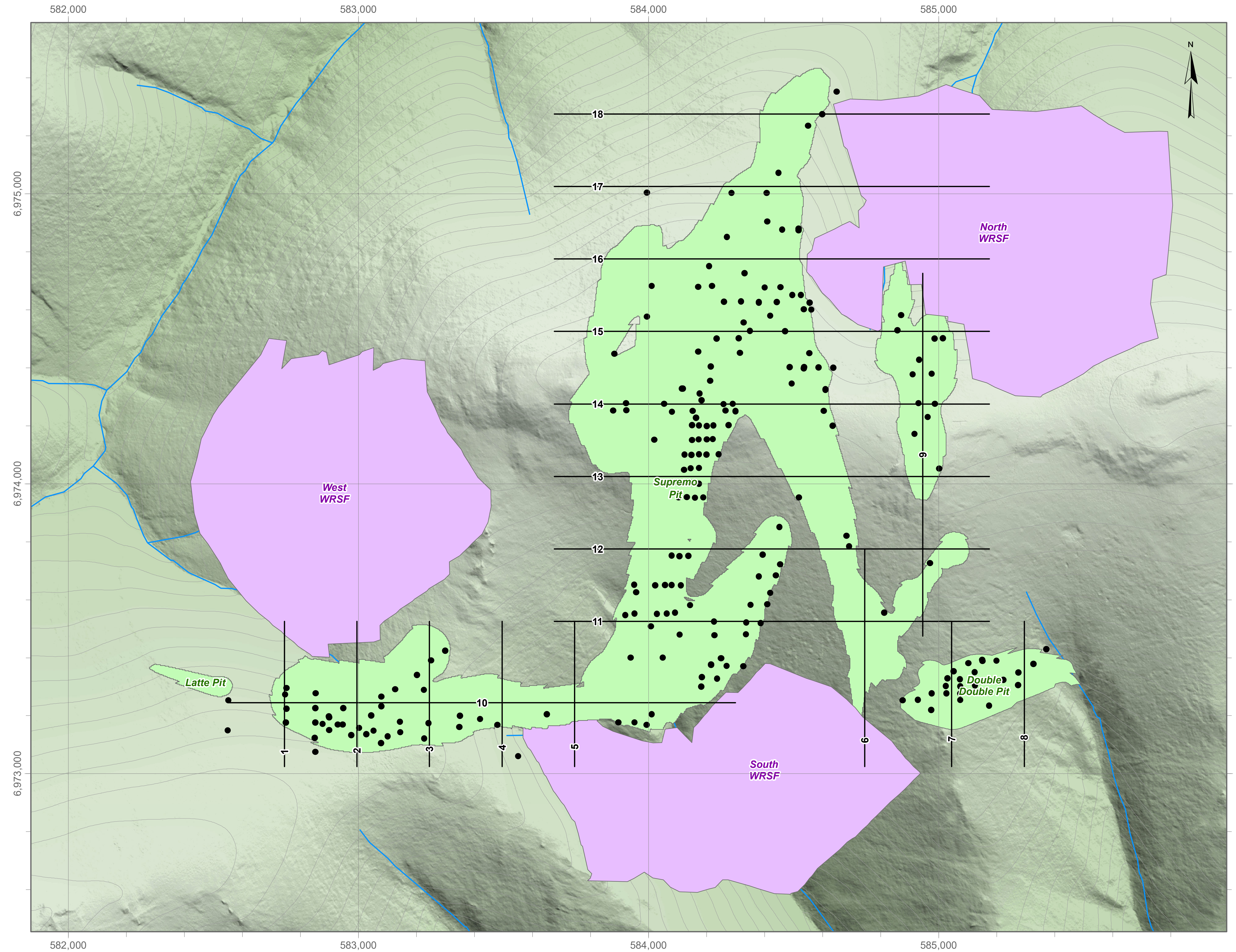
Appendix A: Geological Cross Sections

GOLDCORP



LEGEND

- Drill Collars
- Section Lines

Proposed Mine Infrastructure

- Pits
- WRSF
- Watercourses
- Waterbodies
- Surface Contours (20m)

Coordinate System: *NAD 1983 UTM Zone 7N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Meter*

1:12,500

0 200 400 Meters

DATE SAVED:	Feb 18, 2016
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REVIEWED:	JD
VERSION:	1

CLIENT:

KAMINAK GOLD CORPORATION

LORAX ENVIRONMENTAL

PROJECT:

Coffee Gold Project

TITLE:

Plan View

PROJECT #: A362-4

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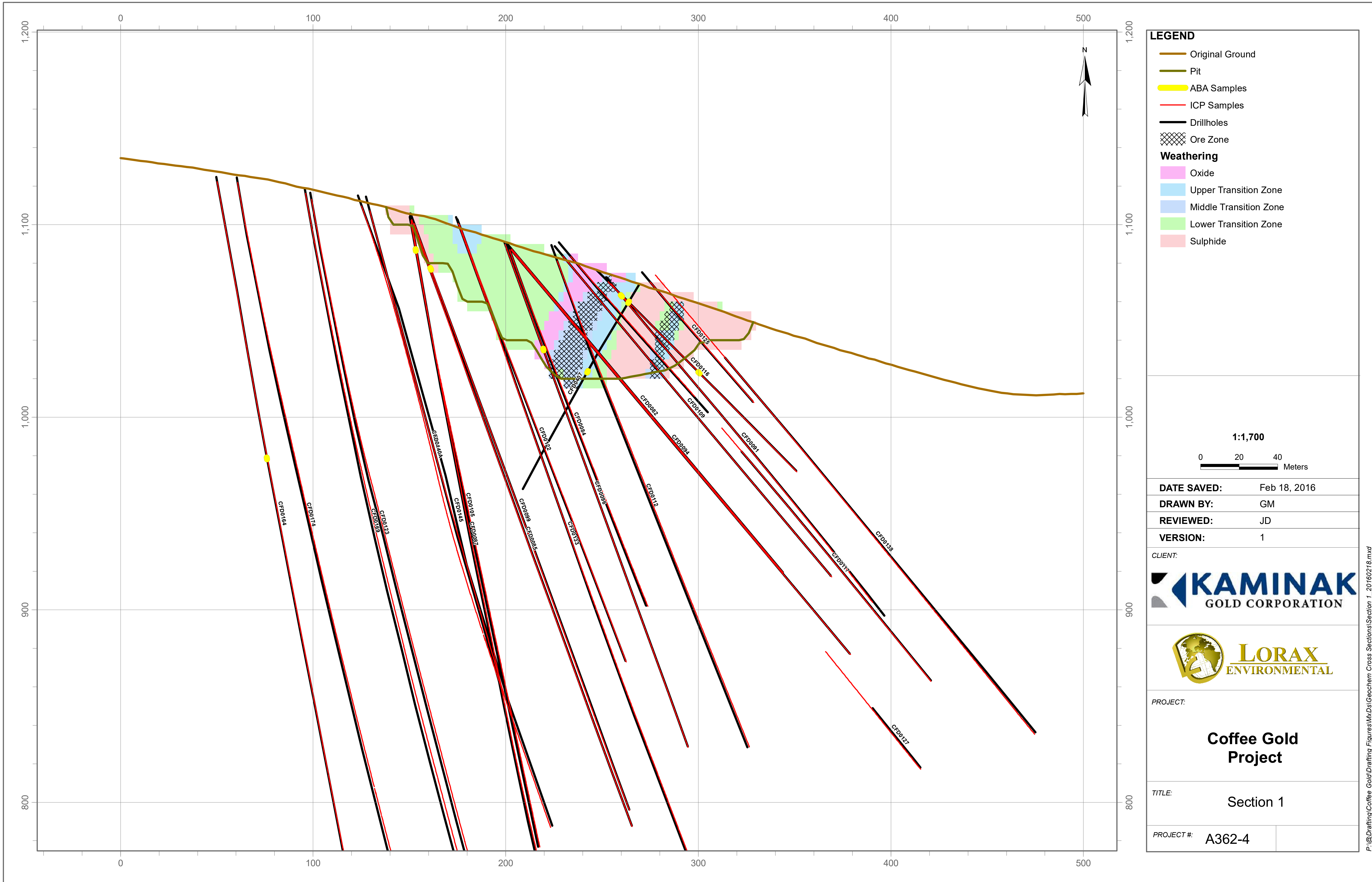

LEGEND
Original Ground
Pit
ABA Samples
ICP Samples
Drillholes
Ore Zone
Weathering
Oxide
Upper Transition Zone
Middle Transition Zone
Lower Transition Zone
Sulphide
1:1,700
0 20 40 Meters
N
0 100 200 300 400 500
800 900 1,000 1,100 1,200
CFD0164
CFD0174
CFD0123
CFD0145
CFD0105
CFD0099
CFD0085
CFD0133
CFD0122
CFD0084
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CFD0125
CFD0117
CFD0138
CFD0127
DATE SAVED: Feb 18, 2016
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VERSION: 1
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KAMINAK GOLD CORPORATION
LORAX ENVIRONMENTAL
PROJECT:
Coffee Gold Project
TITLE:
Section 1
PROJECT #: A362-4
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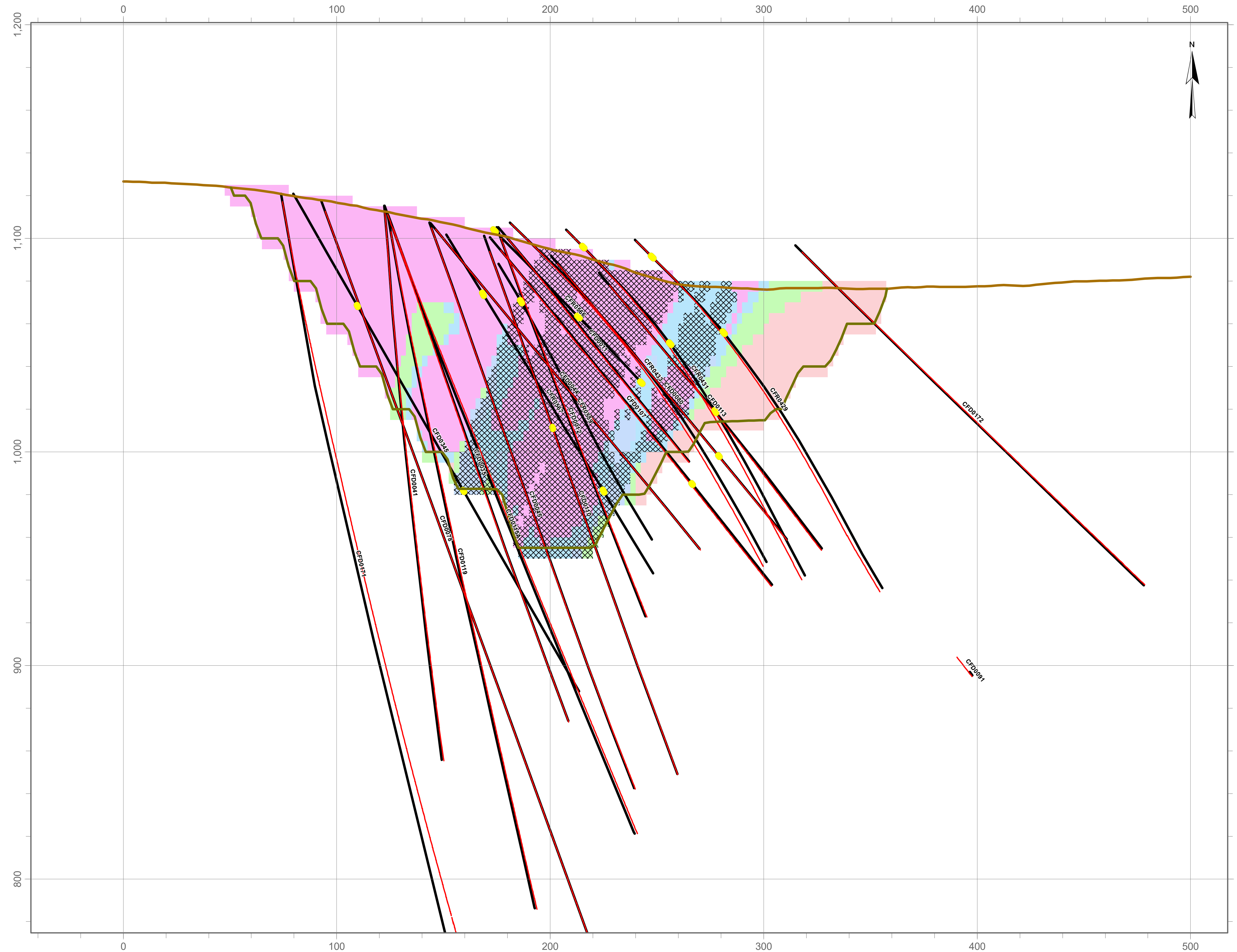

LEGEND

- Original Ground
- Pit
- ABA Samples
- ICP Samples
- Drillholes
- Ore Zone

Weathering

- Oxide
- Upper Transition Zone
- Middle Transition Zone
- Lower Transition Zone
- Sulphide

1:1,700

0 20 40 Meters

DATE SAVED:	Feb 18, 2016
DRAWN BY:	GM
REVIEWED:	JD
VERSION:	1

CLIENT:

KAMINAK GOLD CORPORATION

LORAX ENVIRONMENTAL

PROJECT:

Coffee Gold Project

TITLE: Section 2

PROJECT #: A362-4

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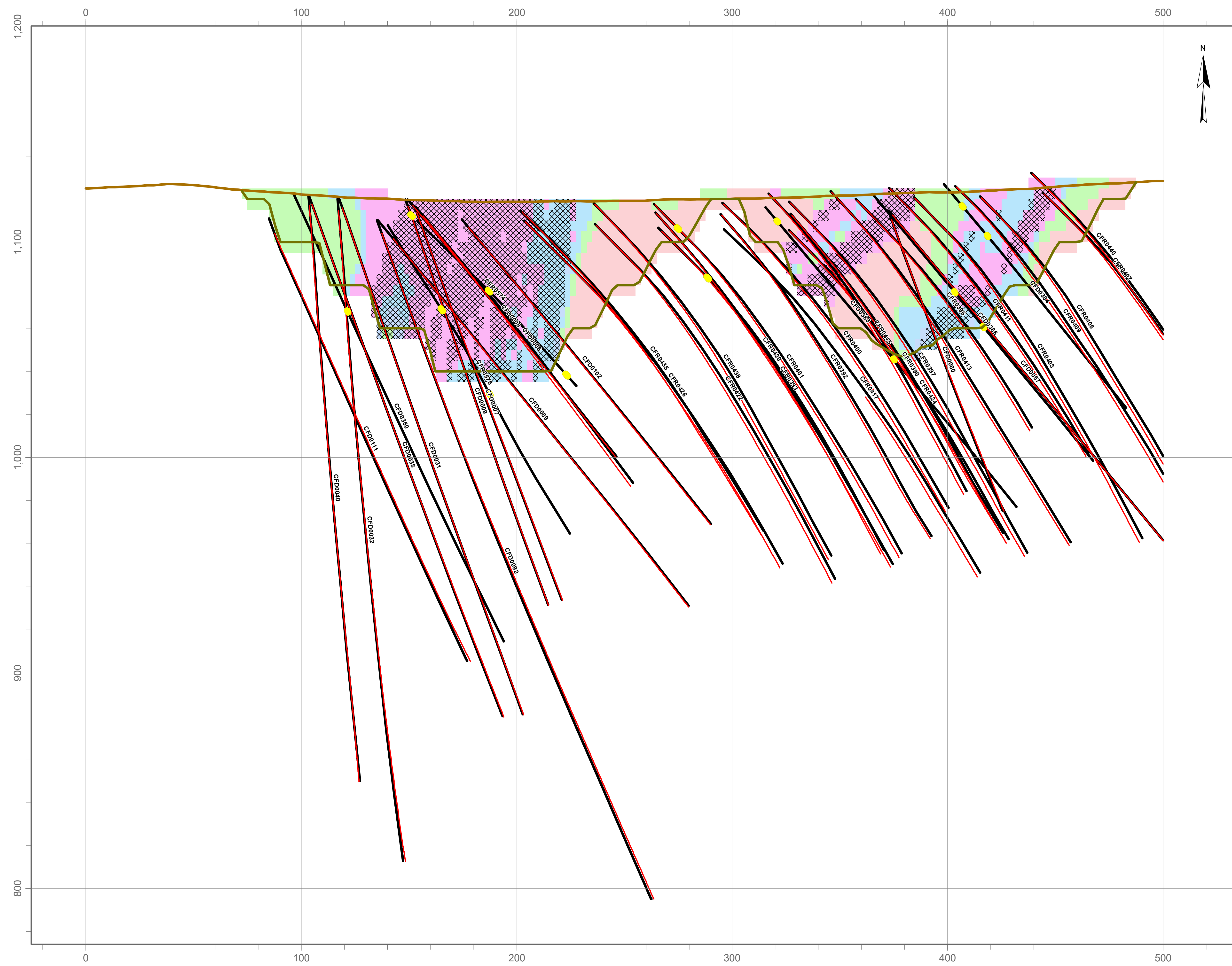

LEGEND

- Original Ground
- Pit
- ABA Samples
- ICP Samples
- Drillholes
- Ore Zone

Weathering

- Oxide
- Upper Transition Zone
- Middle Transition Zone
- Lower Transition Zone
- Sulphide

1:1,700

0 20 40 Meters

DATE SAVED:	Feb 18, 2016
DRAWN BY:	GM
REVIEWED:	JD
VERSION:	1

CLIENT:

KAMINAK GOLD CORPORATION

LORAX ENVIRONMENTAL

PROJECT:

Coffee Gold Project

TITLE: Section 3

PROJECT #: A362-4

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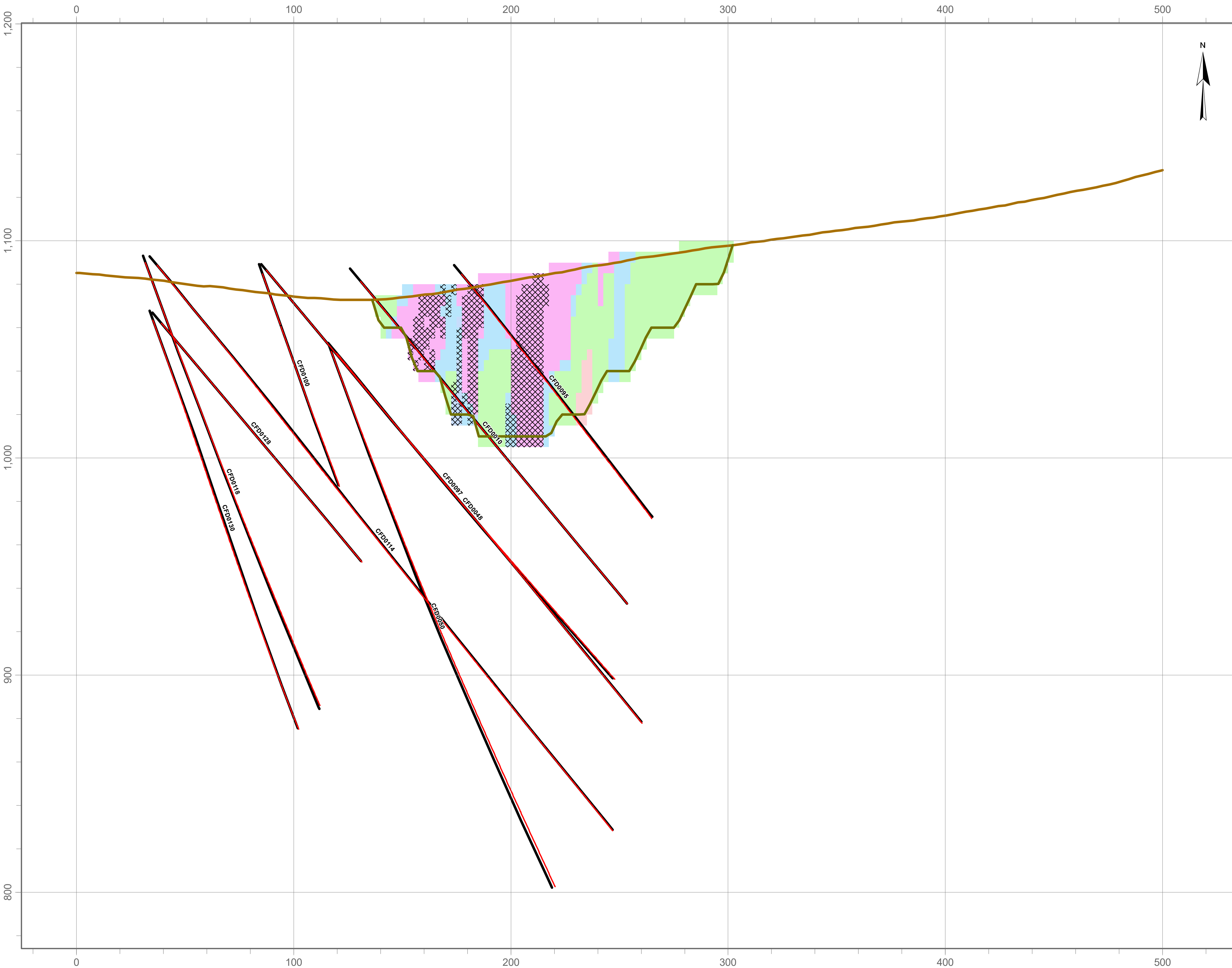

LEGEND

- Original Ground
- Pit
- ABA Samples
- ICP Samples
- Drillholes
- Ore Zone

Weathering

- Oxide
- Upper Transition Zone
- Middle Transition Zone
- Lower Transition Zone
- Sulphide

1:1,700

0 20 40 Meters

DATE SAVED:	Feb 18, 2016
DRAWN BY:	GM
REVIEWED:	JD
VERSION:	1

CLIENT:

KAMINAK GOLD CORPORATION

LORAX ENVIRONMENTAL

PROJECT:

Coffee Gold Project

TITLE: Section 4

PROJECT #: A362-4

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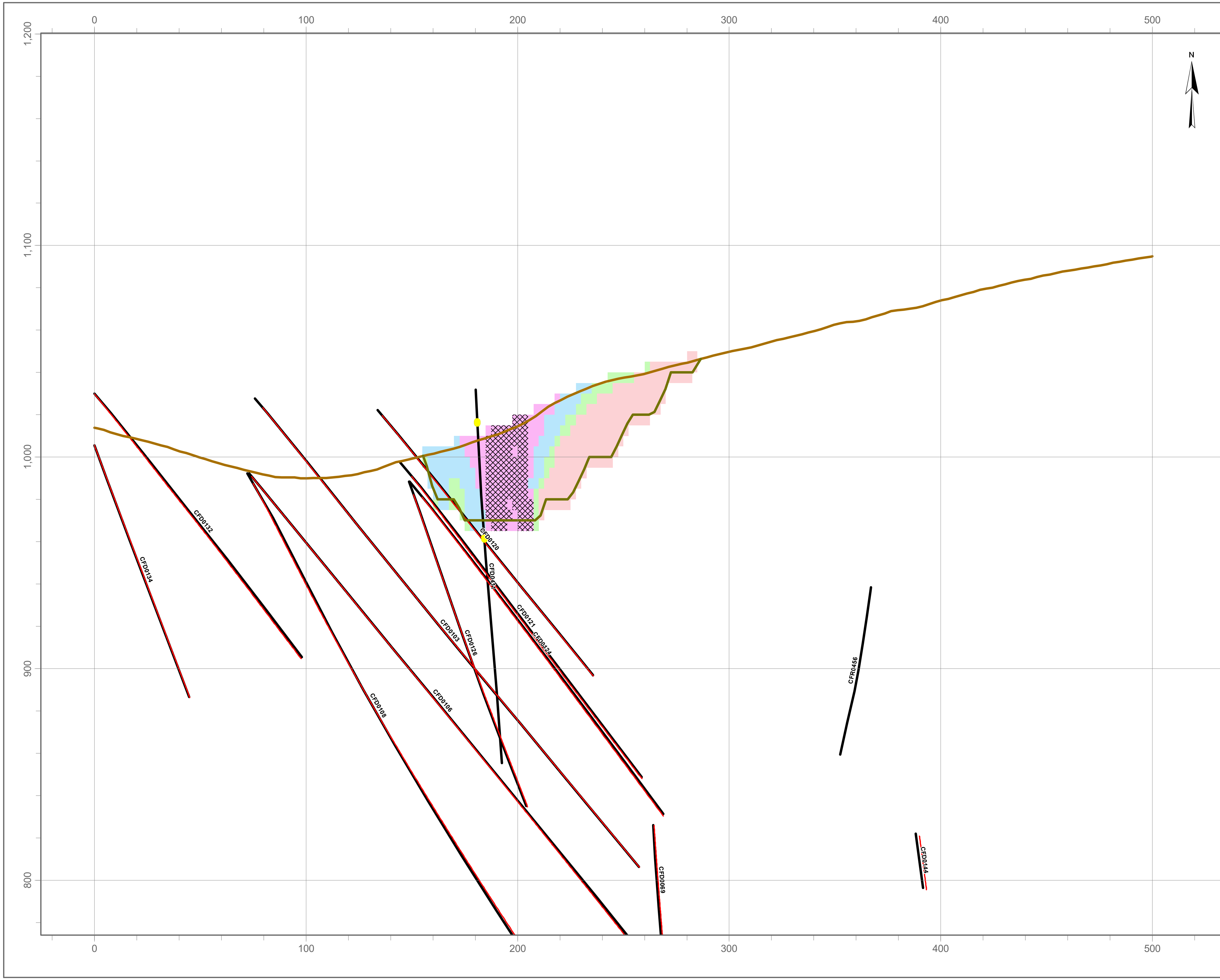

LEGEND

- Original Ground
- Pit
- ABA Samples
- ICP Samples
- Drillholes
- Ore Zone

Weathering

- Oxide
- Upper Transition Zone
- Middle Transition Zone
- Lower Transition Zone
- Sulphide

1:1,700

0 20 40 Meters

DATE SAVED:	Feb 18, 2016
DRAWN BY:	GM
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VERSION:	1

CLIENT:

KAMINAK GOLD CORPORATION

LORAX ENVIRONMENTAL

PROJECT:

Coffee Gold Project

TITLE:

Section 5

PROJECT #: A362-4

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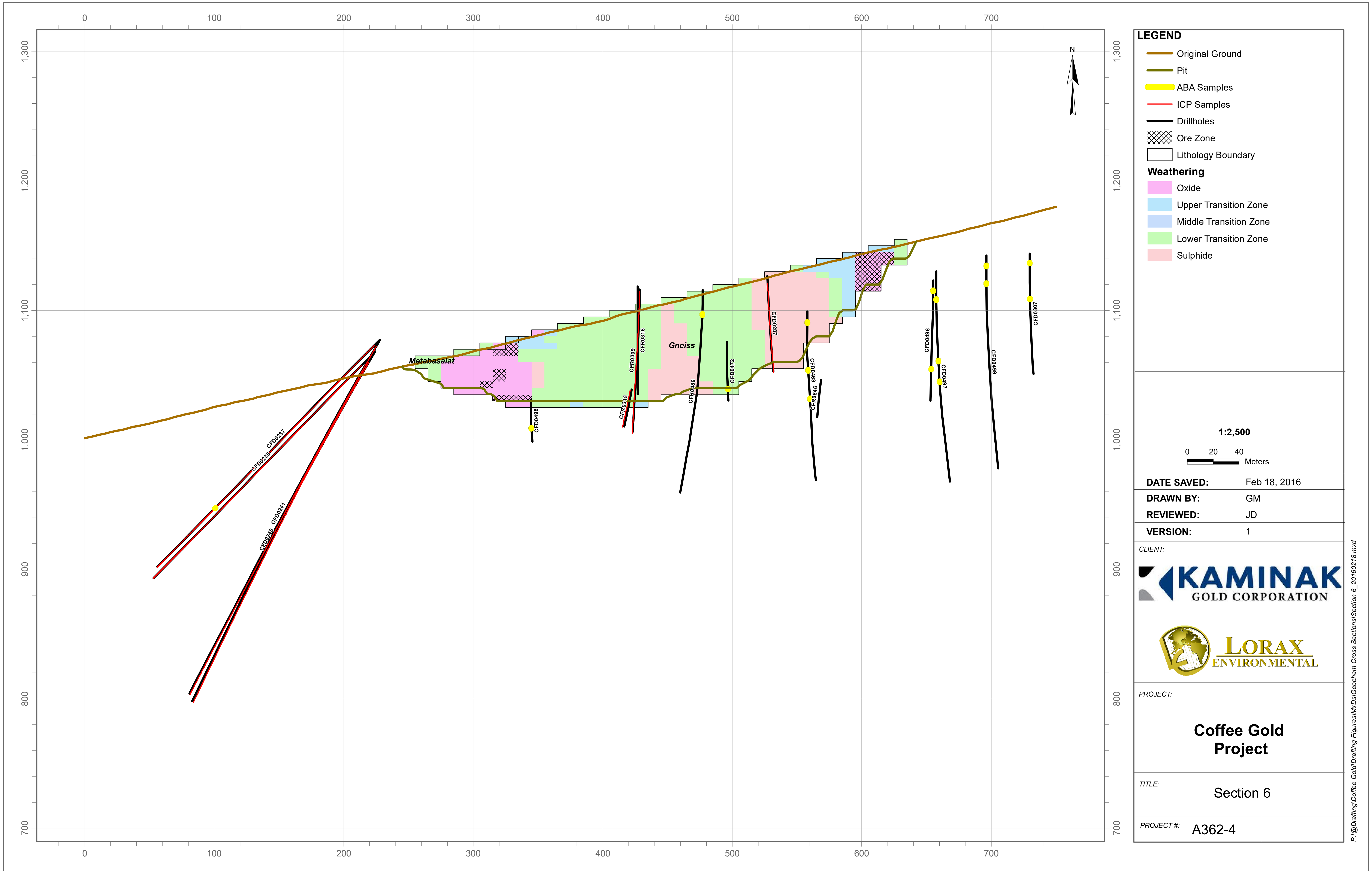

LEGEND
Original Ground
Pit
ABA Samples
ICP Samples
Drillholes
Ore Zone
Lithology Boundary
Weathering
Oxide
Upper Transition Zone
Middle Transition Zone
Lower Transition Zone
Sulphide
Metabasalat
Gneiss
CFD0237
CFD0236
CFD0241
CFD0240
CFD0498
CFR0309
CFR0316
CFR0315
CFR0486
CFD0472
CFD0287
CFD0468
CFR0546
CFD0496
CFD0497
CFD0499
CFD0307
N
1:2,500
0 20 40
Meters
DATE SAVED: Feb 18, 2016
DRAWN BY: GM
REVIEWED: JD
VERSION: 1
CLIENT:
KAMINAK GOLD CORPORATION
LORAX ENVIRONMENTAL
PROJECT:
Coffee Gold Project
TITLE:
Section 6
PROJECT #: A362-4
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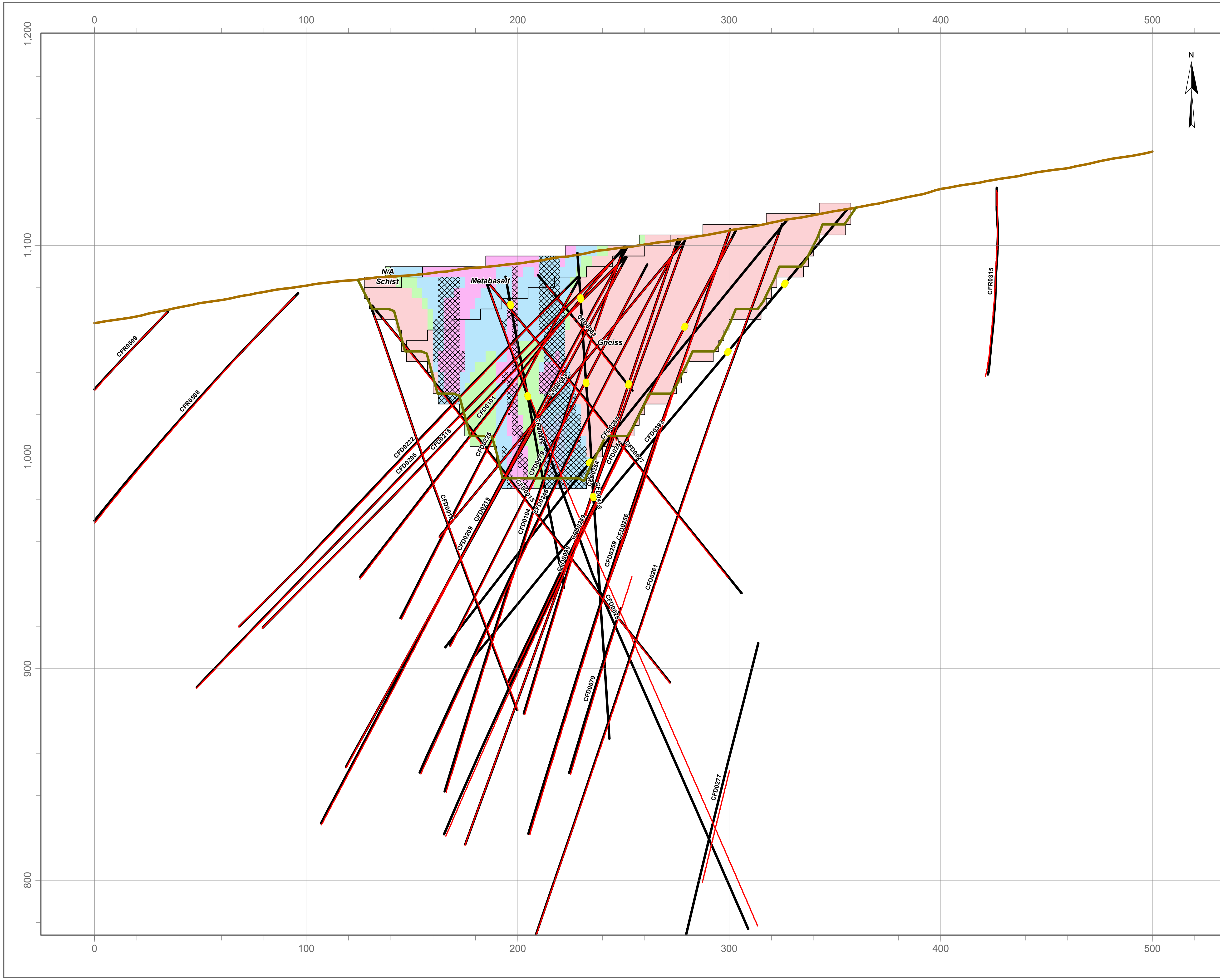

LEGEND

- Original Ground
- Pit
- ABA Samples
- ICP Samples
- Drillholes
- Ore Zone
- Geology Boundary

Weathering

- Oxide
- Upper Transition Zone
- Middle Transition Zone
- Lower Transition Zone
- Sulphide

1:1,700

0 20 40 Meters

DATE SAVED:	May 10, 2016
DRAWN BY:	GM
REVIEWED:	JD
VERSION:	1

CLIENT:

KAMINAK GOLD CORPORATION

LORAX ENVIRONMENTAL

PROJECT:

Coffee Gold Project

TITLE:

Section 7

PROJECT #: A362-4

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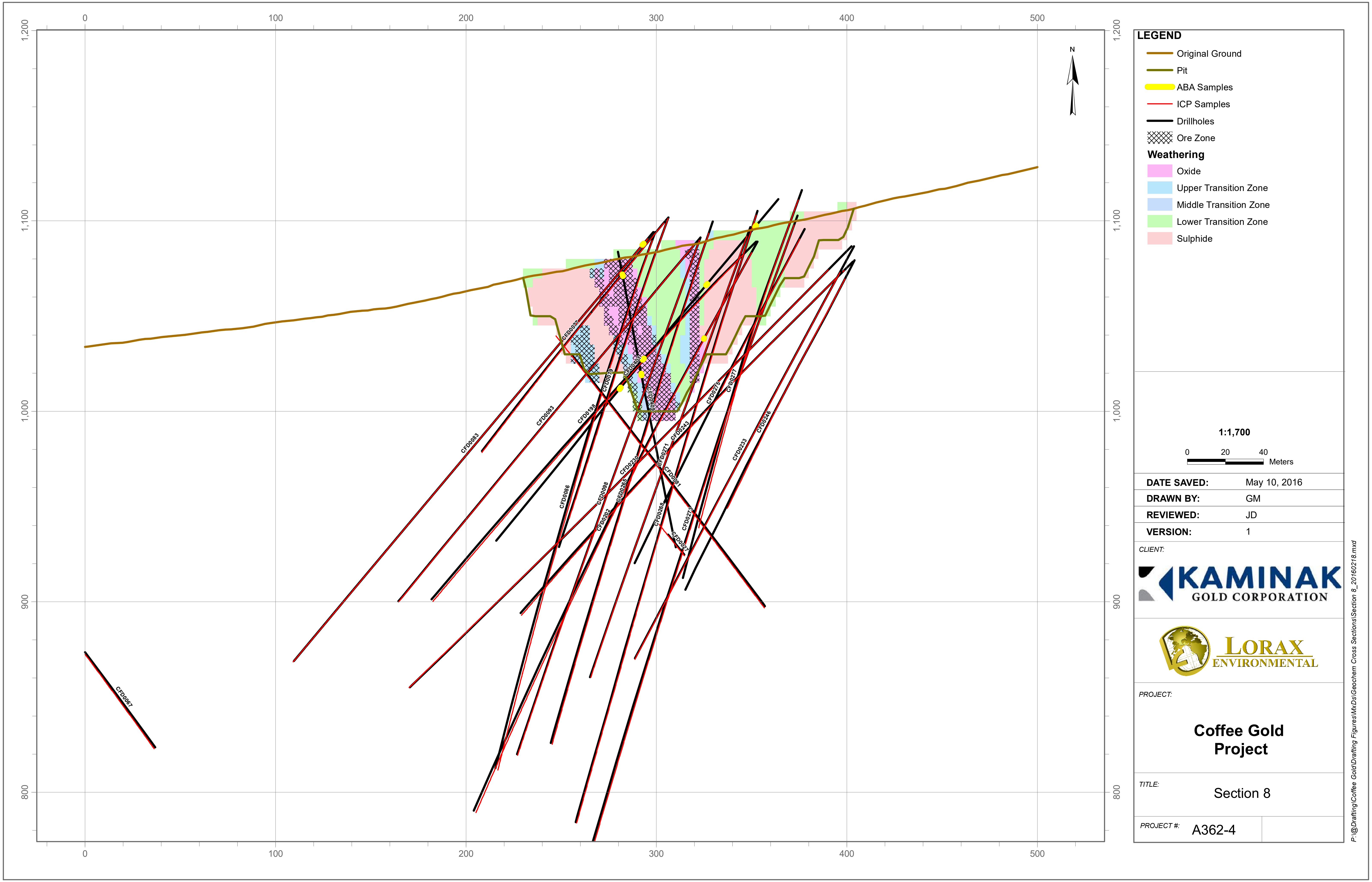

LEGEND
Original Ground
Pit
ABA Samples
ICP Samples
Drillholes
Ore Zone
Weathering
Oxide
Upper Transition Zone
Middle Transition Zone
Lower Transition Zone
Sulphide
1:1,700
0 20 40
Meters
DATE SAVED: May 10, 2016
DRAWN BY: GM
REVIEWED: JD
VERSION: 1
CLIENT:
KAMINAK GOLD CORPORATION
LORAX ENVIRONMENTAL
PROJECT:
Coffee Gold Project
TITLE:
Section 8
PROJECT #: A362-4
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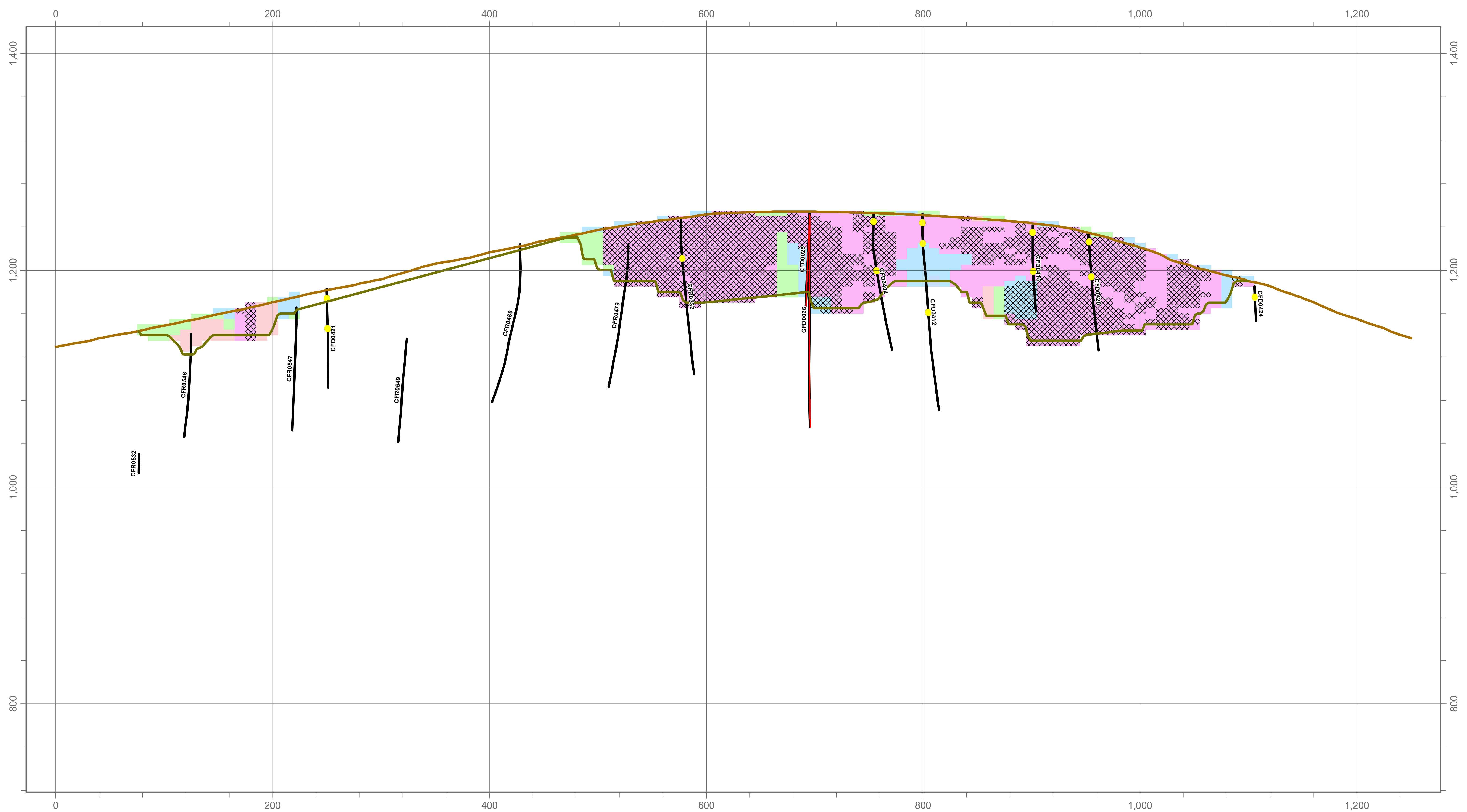

LEGEND

- Original Ground
- Pit
- ABA Samples
- ICP Samples
- Drillholes
- Ore Zone

Weathering

- Oxide
- Upper Transition Zone
- Middle Transition Zone
- Lower Transition Zone
- Sulphide

DATE SAVED:	Feb 18, 2016
DRAWN BY:	GM
REVIEWED:	JD
VERSION:	1

1:3,250

0 50 100 Meters

CLIENT: KAMINAK GOLD CORPORATION

LORAX ENVIRONMENTAL

PROJECT: **Coffee Gold Project**

TITLE: Section 09

PROJECT #: A362-1

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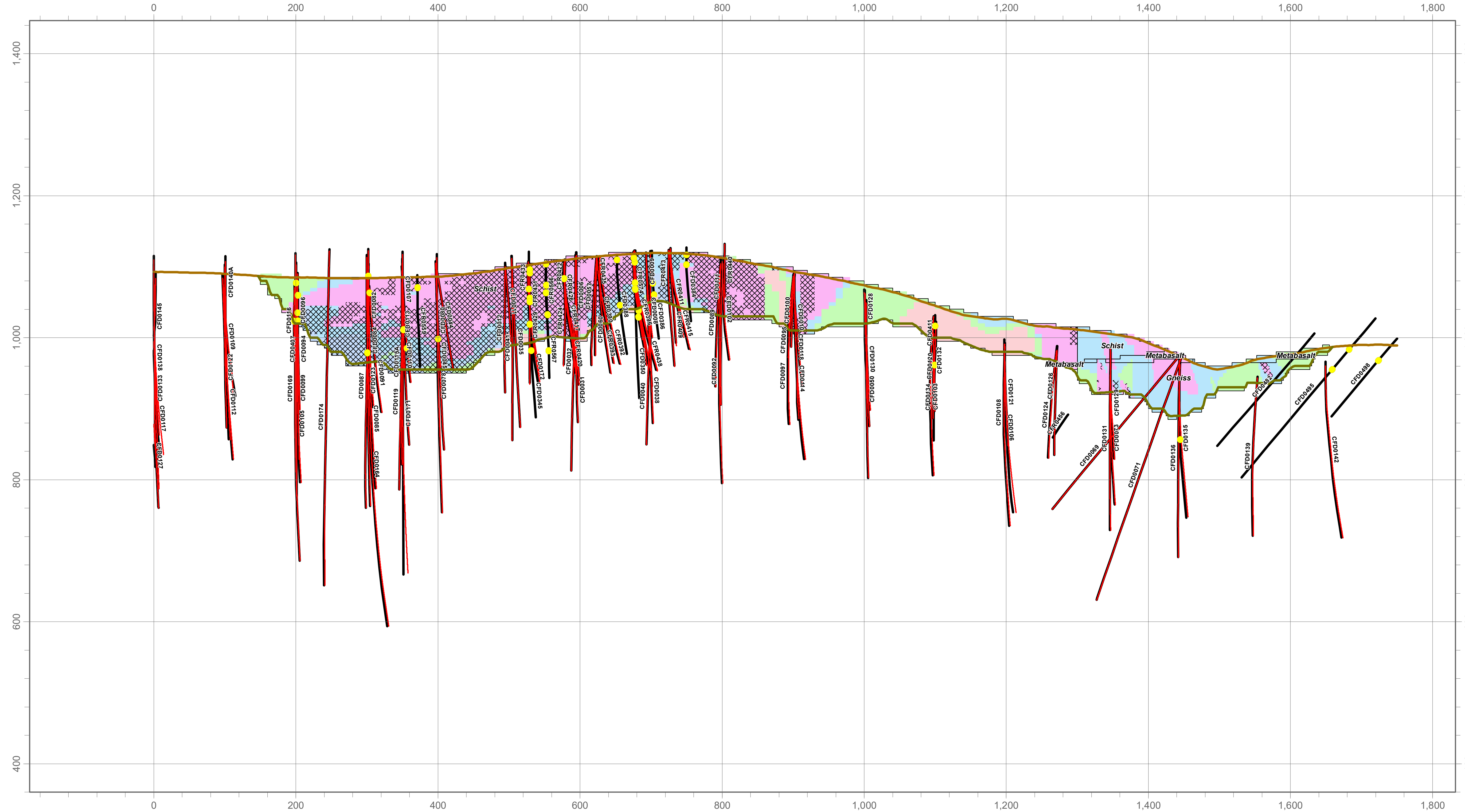

LEGEND

- Original Ground
- Pit
- ABA Samples
- ICP Samples
- Drillholes
- Lithology Boundary
- Ore Zone

Weathering

- Oxide
- Upper Transition Zone
- Middle Transition Zone
- Lower Transition Zone
- Sulphide

DATE SAVED:	Feb 18, 2016
DRAWN BY:	GM
REVIEWED:	JD
VERSION:	1

1:5,000

0 50 100
Meters

CLIENT:
KAMINAK GOLD CORPORATION

LORAX ENVIRONMENTAL

PROJECT:
Coffee Gold Project

TITLE:
Section 10

PROJECT #: A362-1

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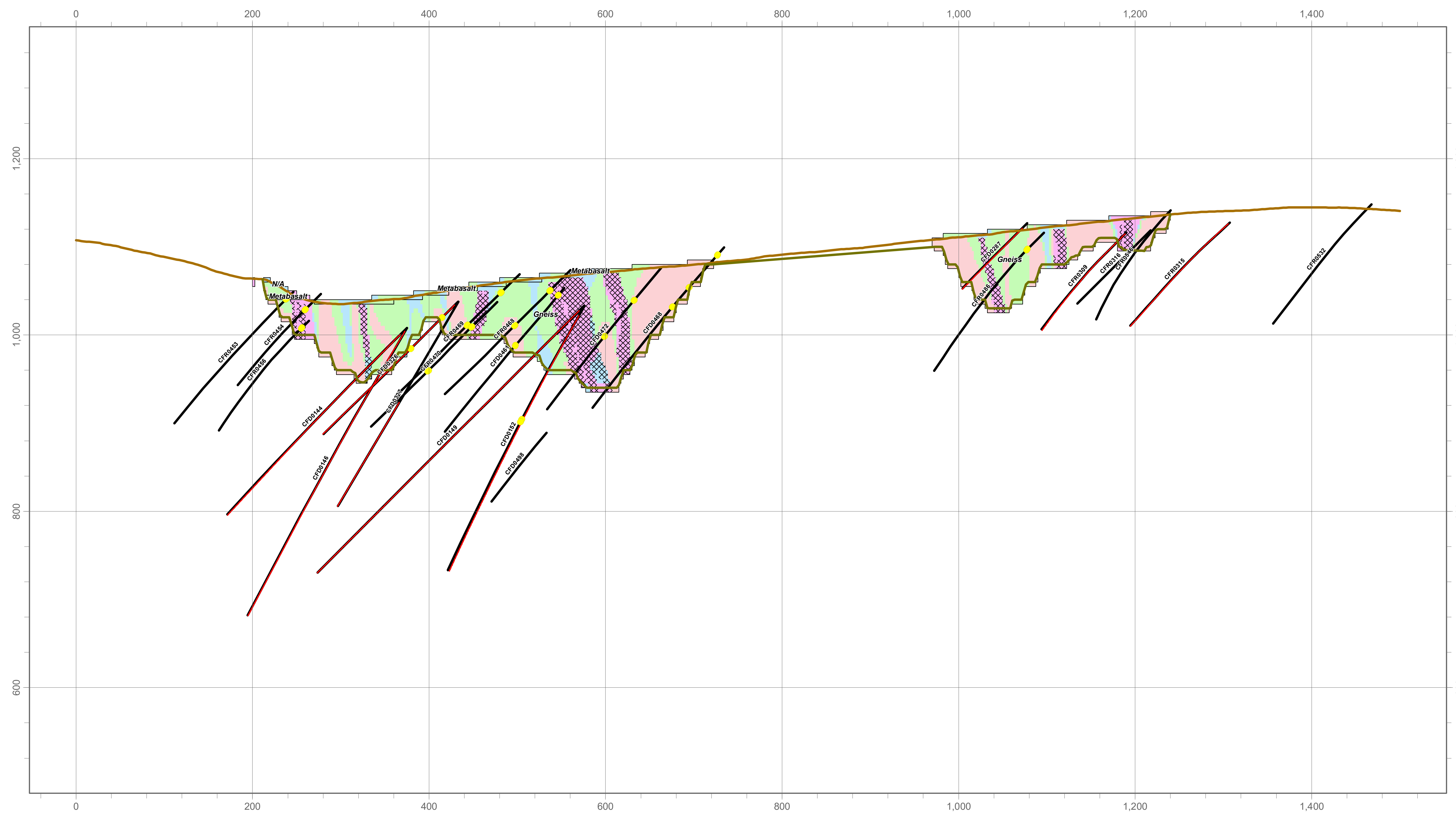

LEGEND

- Original Ground
- Pit
- ABA Samples
- ICP Samples
- Drillholes
- Ore Zone
- Geology Boundary

Weathering

- Oxide
- Upper Transition Zone
- Middle Transition Zone
- Lower Transition Zone
- Sulphide

DATE SAVED:	Feb 18, 2016
DRAWN BY:	GM
REVIEWED:	JD
VERSION:	1

1:4,000

0 50 100

Meters

CLIENT:

KAMINAK GOLD CORPORATION

LORAX ENVIRONMENTAL

PROJECT:

Coffee Gold Project

TITLE:

Section 11

PROJECT #: A362-1

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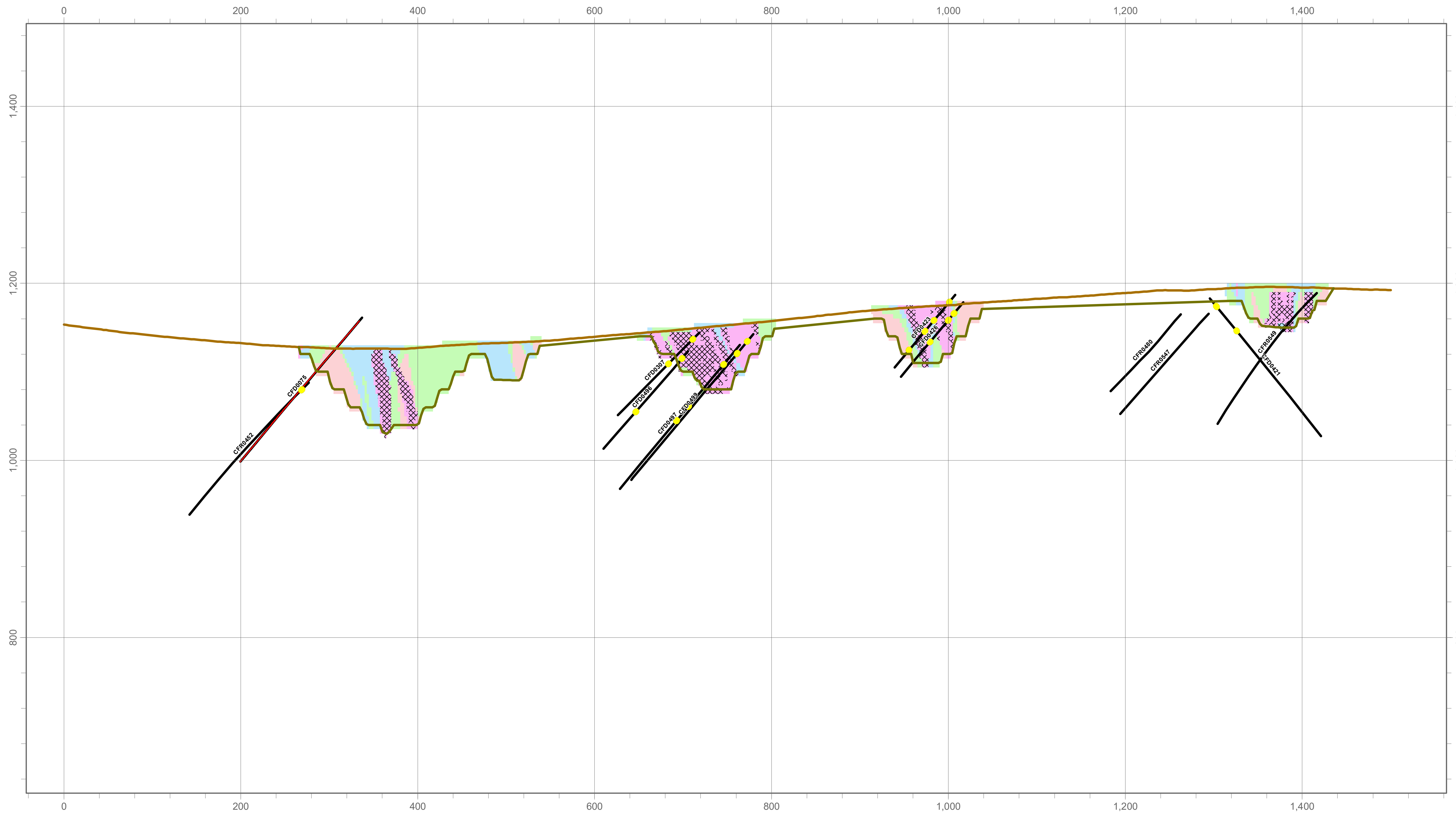

LEGEND

- Original Ground
- Pit
- ABA Samples
- ICP Samples
- Drillholes
- Ore Zone

Weathering

- Oxide
- Upper Transition Zone
- Middle Transition Zone
- Lower Transition Zone
- Sulphide

DATE SAVED:	Feb 18, 2016
DRAWN BY:	GM
REVIEWED:	JD
VERSION:	1

1:4,000

0 50 100
Meters

CLIENT:

KAMINAK GOLD CORPORATION

LORAX ENVIRONMENTAL

PROJECT:

Coffee Gold Project

TITLE:

Section 12

PROJECT #: A362-1

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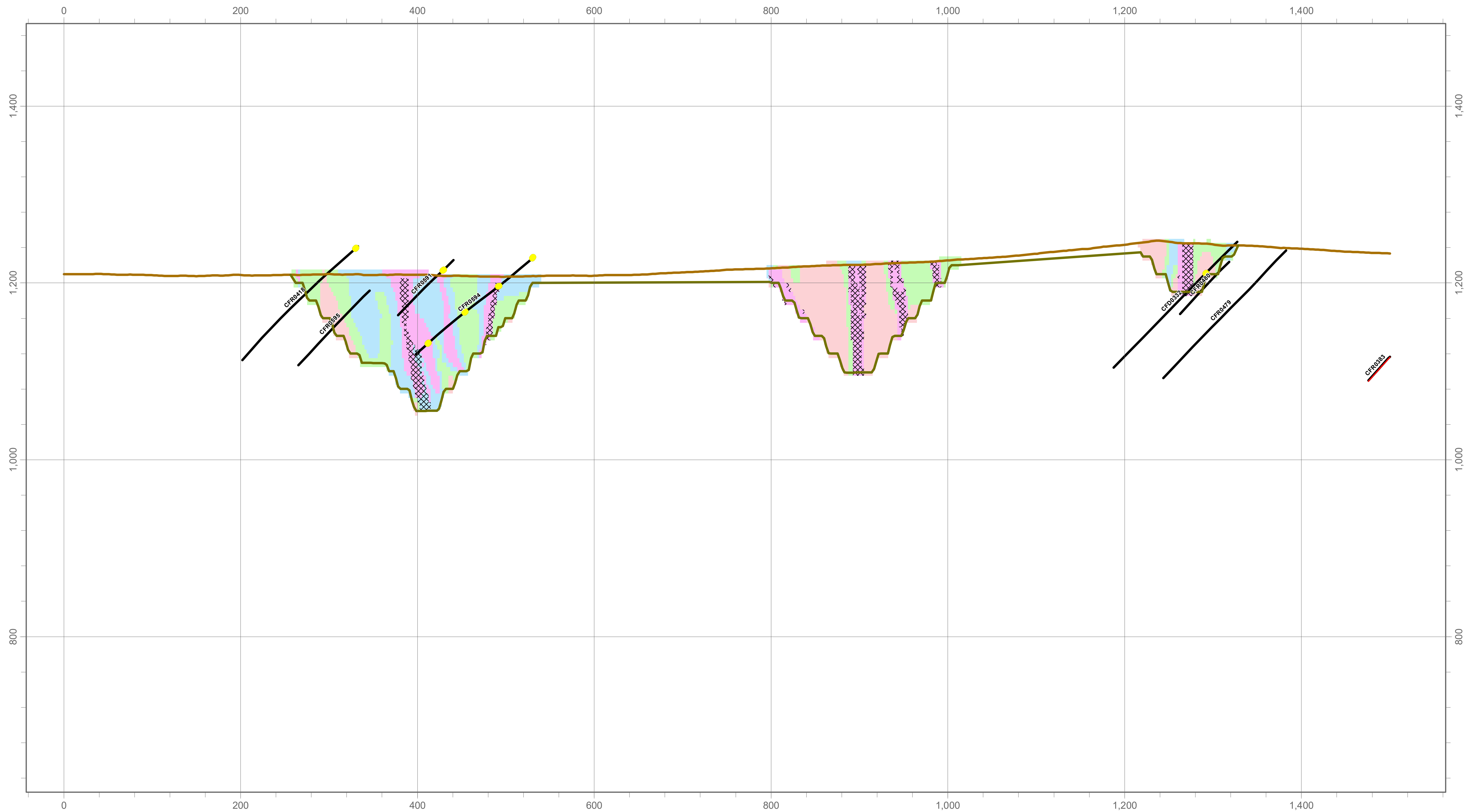

LEGEND

- Original Ground
- Pit
- ABA Samples
- ICP Samples
- Drillholes
- Ore Zone

Weathering

- Oxide
- Upper Transition Zone
- Middle Transition Zone
- Lower Transition Zone
- Sulphide

DATE SAVED:	Feb 18, 2016
DRAWN BY:	GM
REVIEWED:	JD
VERSION:	1

1:4,000

0 50 100
Meters

CLIENT:
KAMINAK GOLD CORPORATION

LORAX ENVIRONMENTAL

PROJECT:
Coffee Gold Project

TITLE:
Section 13

PROJECT #: A362-1

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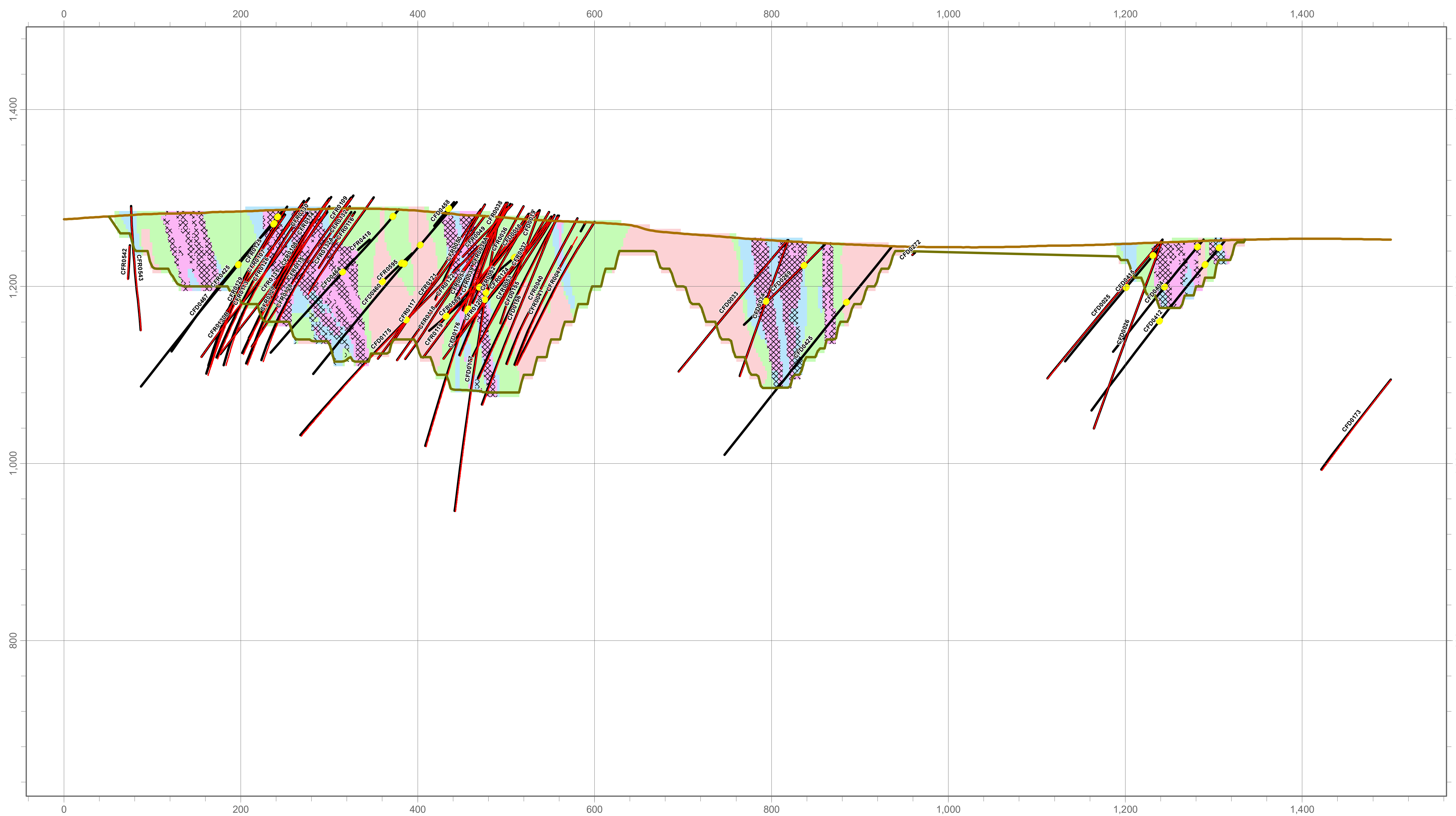

LEGEND

- Original Ground
- Pit
- ABA Samples
- ICP Samples
- Drillholes
- Ore Zone

Weathering

- Oxide
- Upper Transition Zone
- Middle Transition Zone
- Lower Transition Zone
- Sulphide

DATE SAVED:	Feb 18, 2016
DRAWN BY:	GM
REVIEWED:	JD
VERSION:	1

1:4,000

0 50 100
Meters

CLIENT:
KAMINAK GOLD CORPORATION

LORAX ENVIRONMENTAL

PROJECT:
Coffee Gold Project

TITLE:
Section 14

PROJECT #: A362-1

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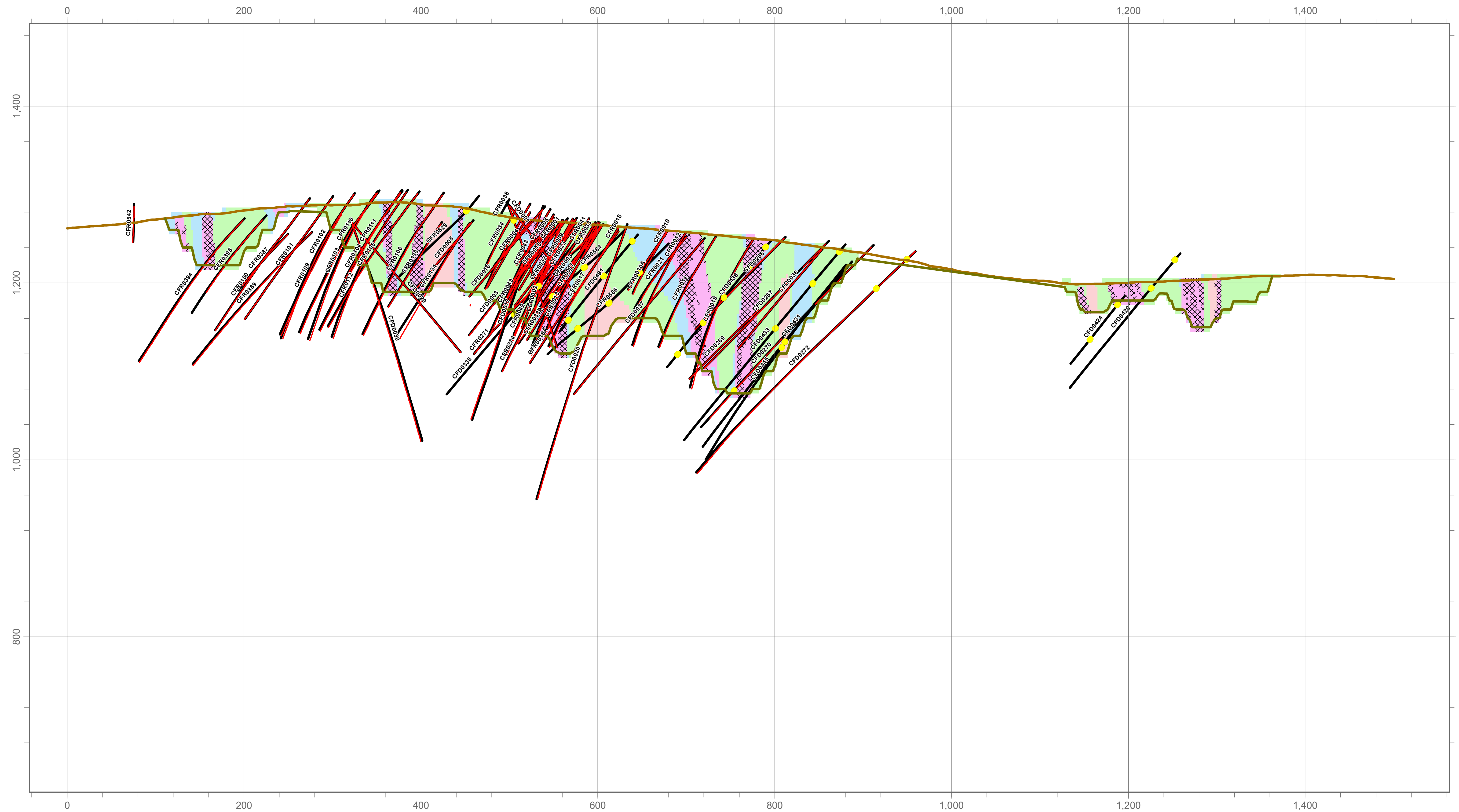

LEGEND

- Original Ground
- Pit
- ABA Samples
- ICP Samples
- Drillholes
- Ore Zone

Weathering

- Oxide
- Upper Transition Zone
- Middle Transition Zone
- Lower Transition Zone
- Sulphide

DATE SAVED:	Feb 18, 2016
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VERSION:	1

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0 50 100

Meters

CLIENT:

KAMINAK GOLD CORPORATION

LORAX ENVIRONMENTAL

PROJECT:

Coffee Gold Project

TITLE:

Section 15

PROJECT #: A362-1

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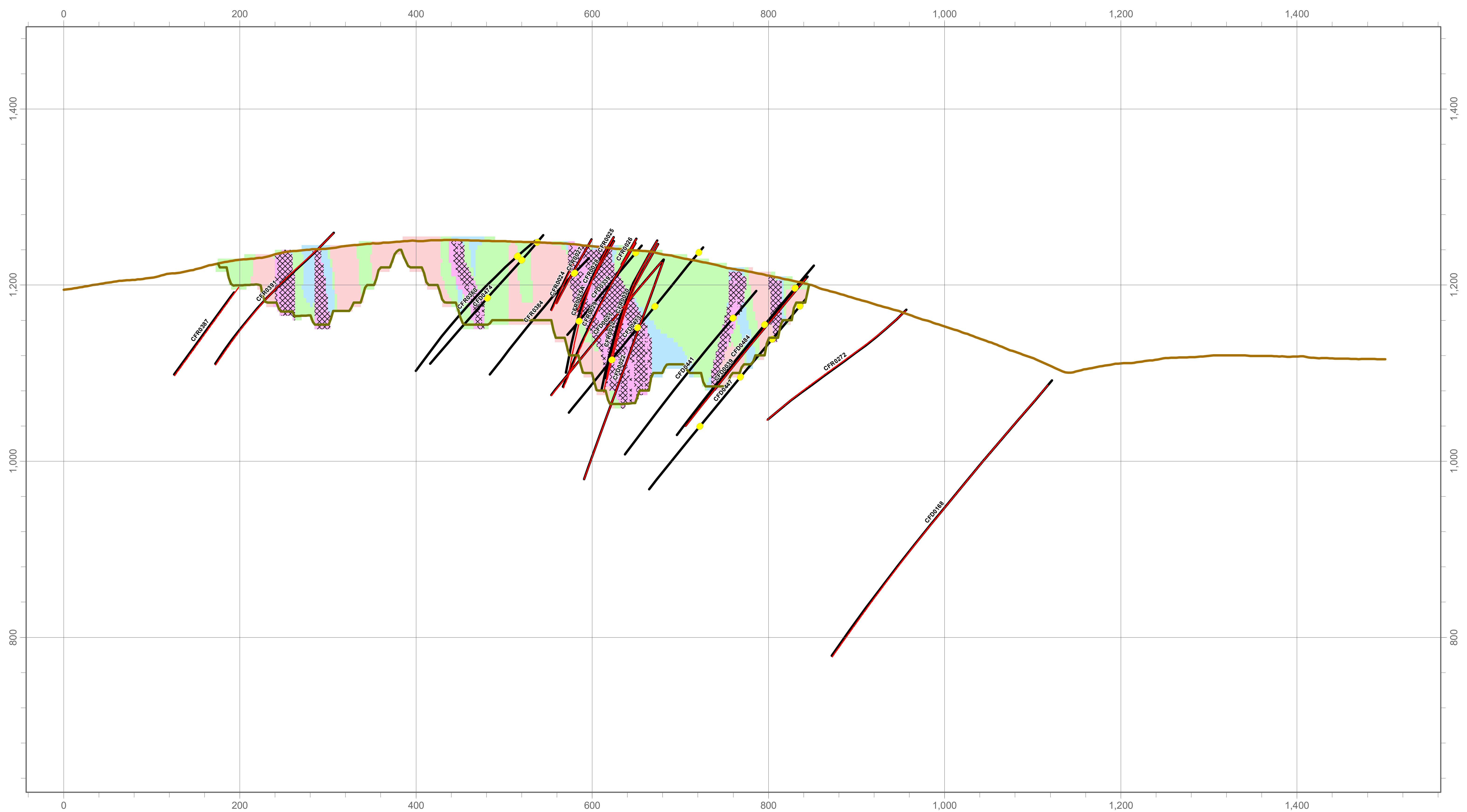

LEGEND

Original Ground	**Weathering**
Pit	Oxide
ABA Samples	Upper Transition Zone
ICP Samples	Middle Transition Zone
Drillholes	Lower Transition Zone
Ore Zone	Sulphide

DATE SAVED:	Feb 18, 2016
DRAWN BY:	GM
REVIEWED:	JD
VERSION:	1

1:4,000

0 50 100
Meters

CLIENT:
KAMINAK GOLD CORPORATION
LORAX ENVIRONMENTAL

PROJECT:
Coffee Gold Project

TITLE:
Section 16

PROJECT #: A362-1

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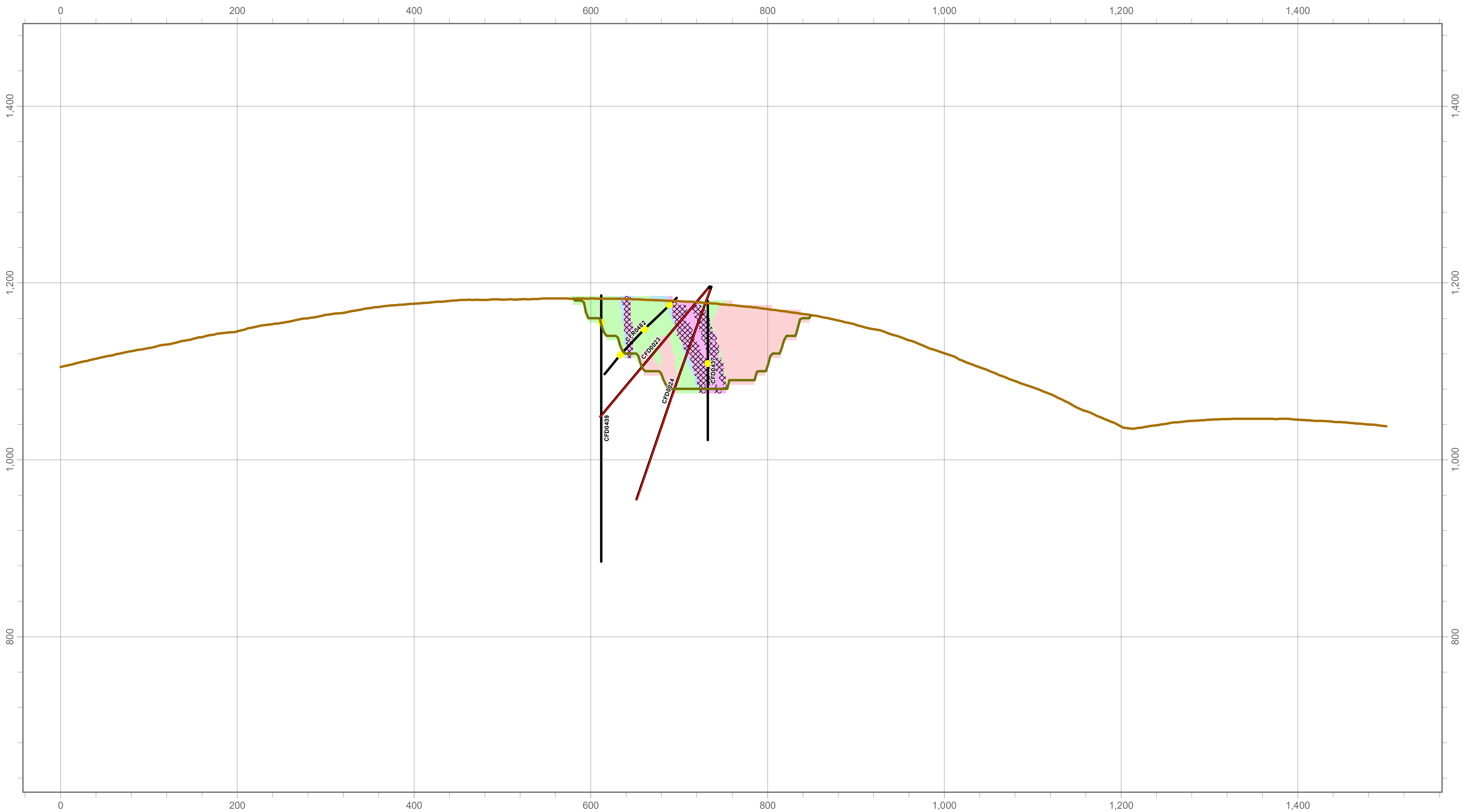

LEGEND

Original Ground
Pit
ABA Samples
ICP Samples
Drillholes
Ore Zone

Weathering

Oxide
Upper Transition Zone
Middle Transition Zone
Lower Transition Zone
Sulphide

DATE SAVED:	Feb 18, 2016
DRAWN BY:	GM
REVIEWED:	JD
VERSION:	1

1:4,000

0 50 100
Meters

CLIENT:
KAMINAK GOLD CORPORATION
LORAX ENVIRONMENTAL

PROJECT:
Coffee Gold Project

TITLE:
Section 17

PROJECT #: A362-1

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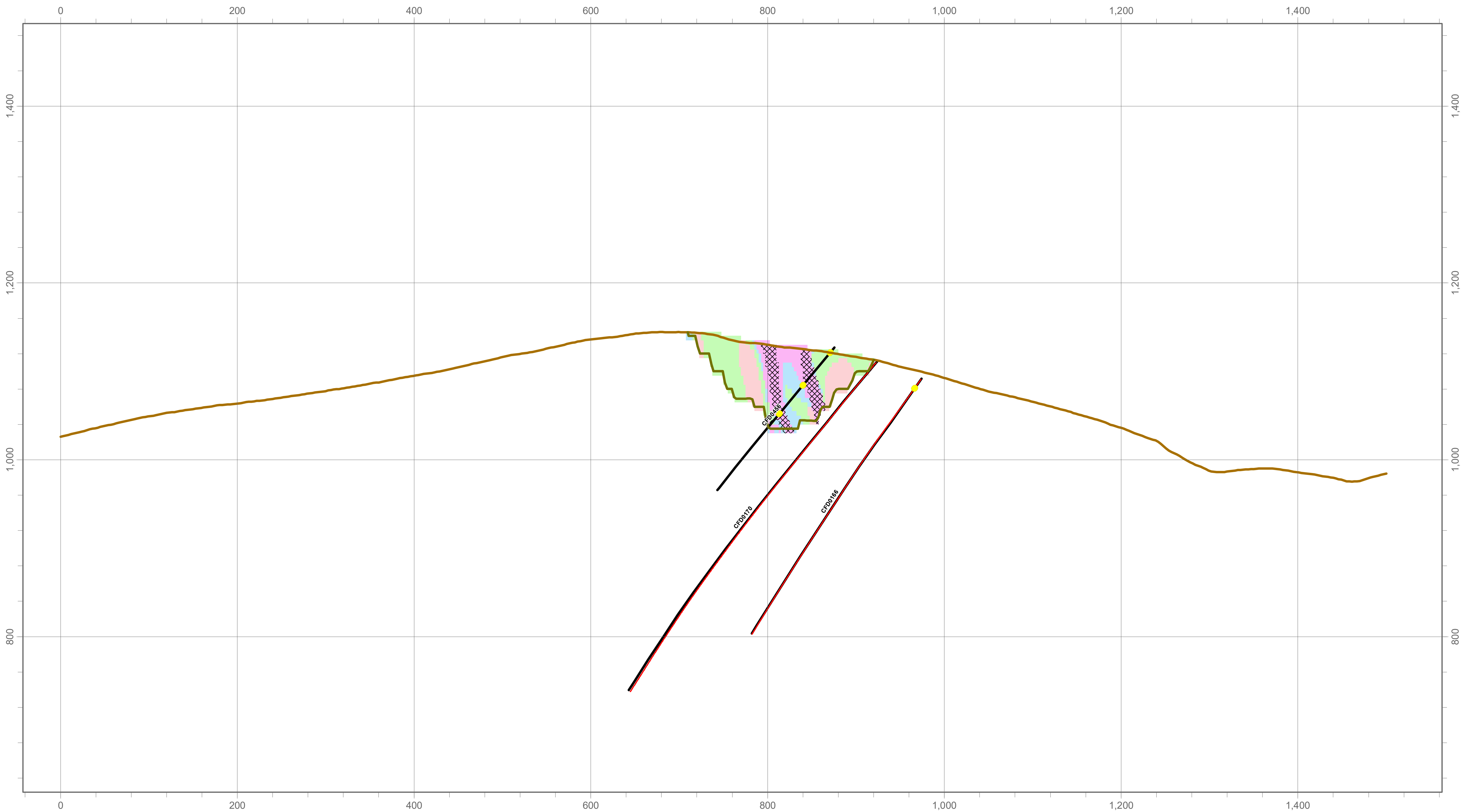

LEGEND

Original Ground
Pit
ABA Samples
ICP Samples
Drillholes
Ore Zone

Weathering

Oxide
Upper Transition Zone
Middle Transition Zone
Lower Transition Zone
Sulphide

DATE SAVED:	Feb 18, 2016
DRAWN BY:	GM
REVIEWED:	JD
VERSION:	1

1:4,000

0 50 100
Meters

CLIENT:

KAMINAK GOLD CORPORATION

LORAX ENVIRONMENTAL

PROJECT:

Coffee Gold Project

TITLE:

Section 18

PROJECT #: A362-1

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Appendix B: Mineralogy Reports

GOLDCORP

APPENDIX B.1: X-RAY DIFFRACTION ANALYSES

QUANTITATIVE PHASE ANALYSIS OF TEN POWDER SAMPLES USING THE RIETVELD METHOD AND X-RAY POWDER DIFFRACTION DATA.

Project: Kaminak #A362-1

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Lorax Environmental Services Ltd.
2289 Burrard Street
Vancouver, BC V6J 3H9

Mati Raudsepp, Ph.D.
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Edith Czech, M.Sc.
Jenny Lai, B.Sc.
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Dept. of Earth & Ocean Sciences
The University of British Columbia
6339 Stores Road
Vancouver, BC V6T 1Z4

January 14, 2015

EXPERIMENTAL METHOD

The ten samples of **Project Kaminak #A362-1** were reduced into fine powder to the optimum grain-size range for X-ray analysis (<10μm) by grinding under ethanol in a vibratory McCrone Micronising Mill for 10 minutes. Step-scan X-ray powder-diffraction data were collected over a range 3-80°2θ with CoKα radiation on a Bruker D8 Advance Bragg-Brentano diffractometer equipped with an Fe monochromator foil, 0.6 mm (0.3°) divergence slit, incident- and diffracted-beam Soller slits and a LynxEye-XE detector. The long fine-focus Co X-ray tube was operated at 35 kV and 40 mA, using a take-off angle of 6°.

RESULTS

The X-ray diffractograms were analyzed using the International Centre for Diffraction Database PDF-4 and Search-Match software by Bruker. X-ray powder-diffraction data of the samples were refined with Rietveld program Topas 4.2 (Bruker AXS). The results of quantitative phase analysis by Rietveld refinements are given in Table 1 (separate file, ***Lorax Environmental Results Jan 14 2015 – Proj Kaminak A362-1.xlsx***). These amounts represent the relative amounts of crystalline phases normalized to 100%. The Rietveld refinement plots are shown in Figures 1 to 10. The ideal formulae of phases present are given in Table 2.

In samples 1, 2, 4, 7, 8 and 9 the kaolinite is highly disordered and its contribution to the diffraction pattern was estimated with a model structure. Consider the results approximate.

Table 2. List and ideal formulae of present phases.

Mineral	**Ideal Formula**
Analcime	$Na[AlSi_2O_6]\cdot H_2O$
Anatase	TiO_2
Ankerite/Dolomite	$Ca(Fe^{2+},Mg,Mn)(CO_3)_2/CaMg(CO_3)_2$
Biotite	$K(Mg,Fe^{2+})_3AlSi_3O_{10}(OH)_2$
Cristobalite	SiO_2
Gorceixite	$BaAl_3(PO_4)(PO_3OH)(OH)_6$
Hematite	α-Fe_2O_3
Hydrocalumite	$Ca_4Al_2(OH)_{12}(Cl,CO_3,OH)_{2-x}\cdot 4H_2O$
Jarosite	$K_2Fe_6^{3+}(SO_4)_4(OH)_{12}$
Kaolinite	$Al_2Si_2O_5(OH)_4$
K-feldspar	$KAlSi_3O_8$
Muscovite/Illite	$KAl_2(AlSi_3O_{10})(OH)_2$/ $K_{0.65}Al_{2.0}Al_{0.65}Si_{3.35}O_{10}(OH)_2$
Phlogopite	$KMg_3AlSi_3O_{10}(OH)_2$
Plagioclase	$NaAlSi_3O_8$ – $CaAl_2Si_2O_8$
Pyrite	FeS_2
Quartz	SiO_2
Rutile	TiO_2
Siderite	$Fe^{2+}CO_3$

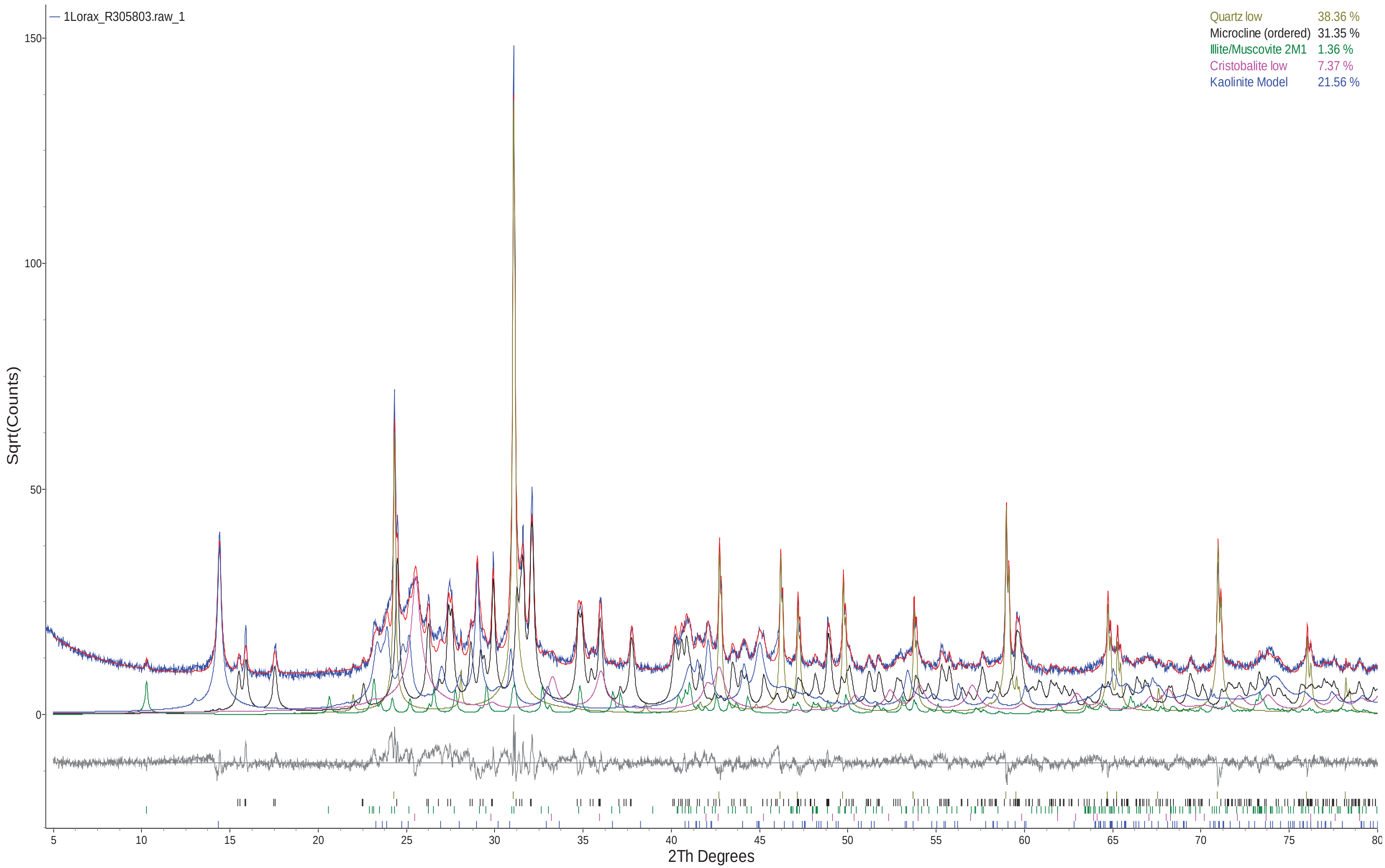

Figure 1. Rietveld refinement plot of sample **Lorax Environmental "R305803"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

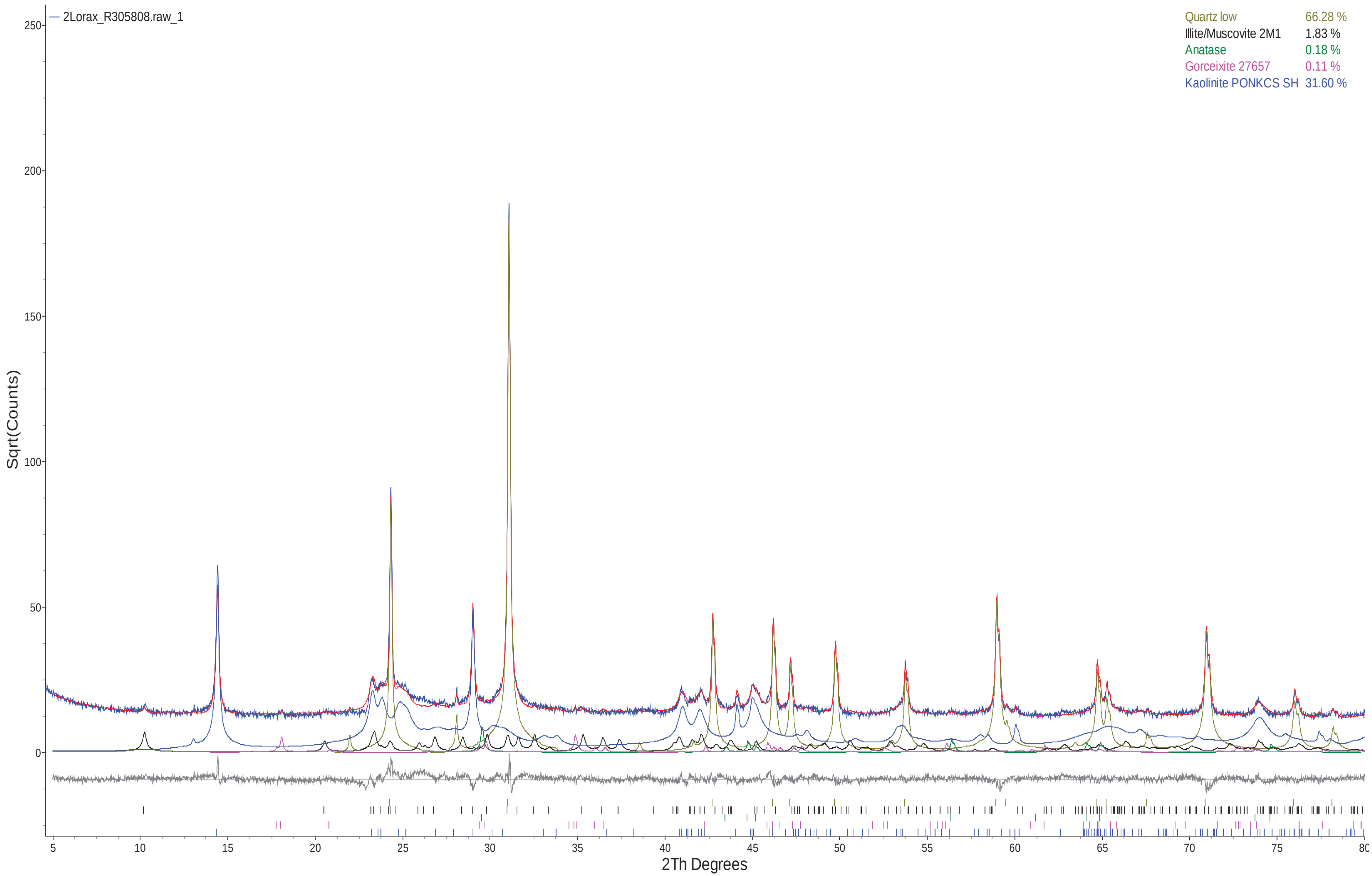

Figure 2. Rietveld refinement plot of sample **Lorax Environmental "R305808"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

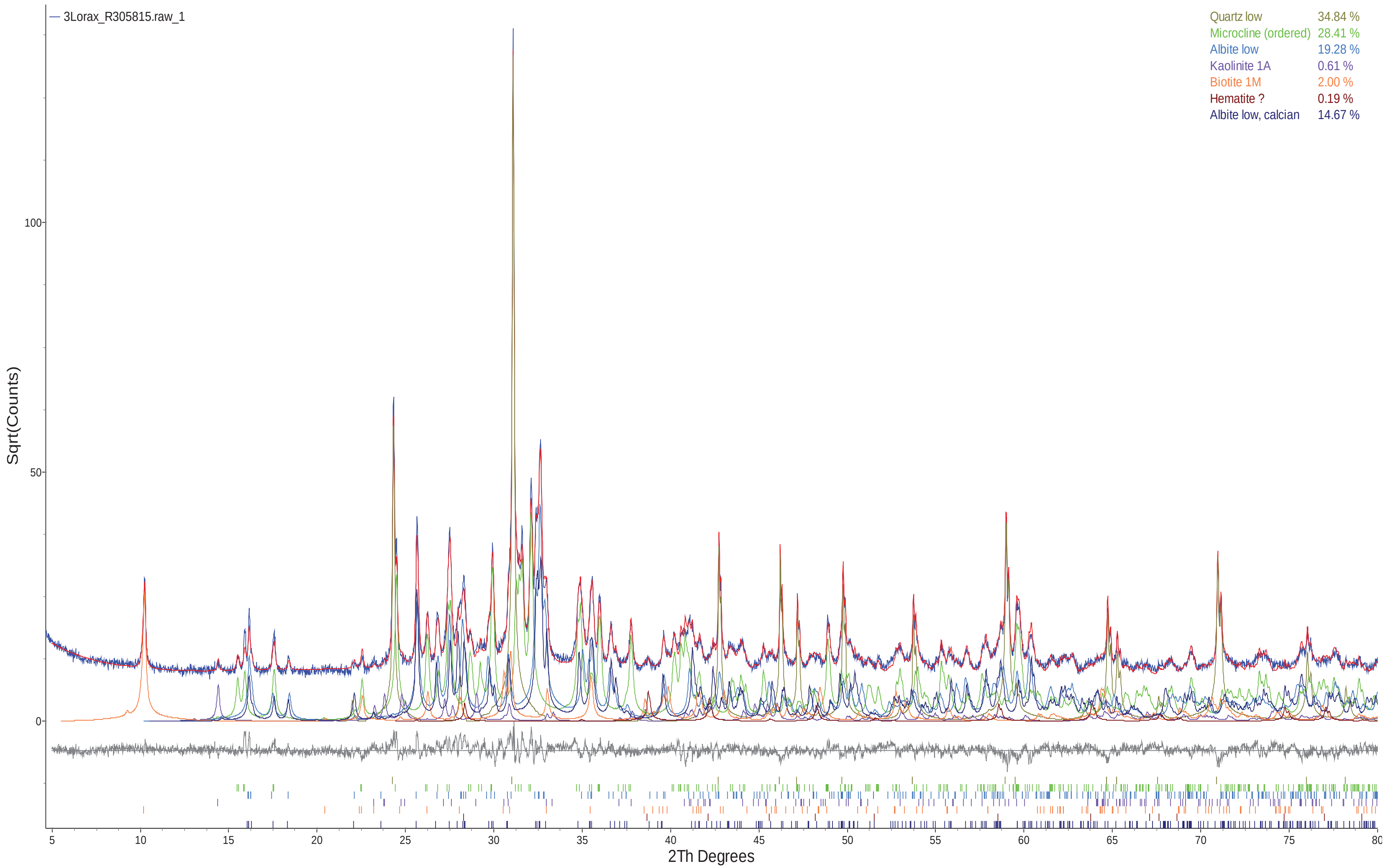

Figure 3. Rietveld refinement plot of sample **Lorax Environmental "R305815"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

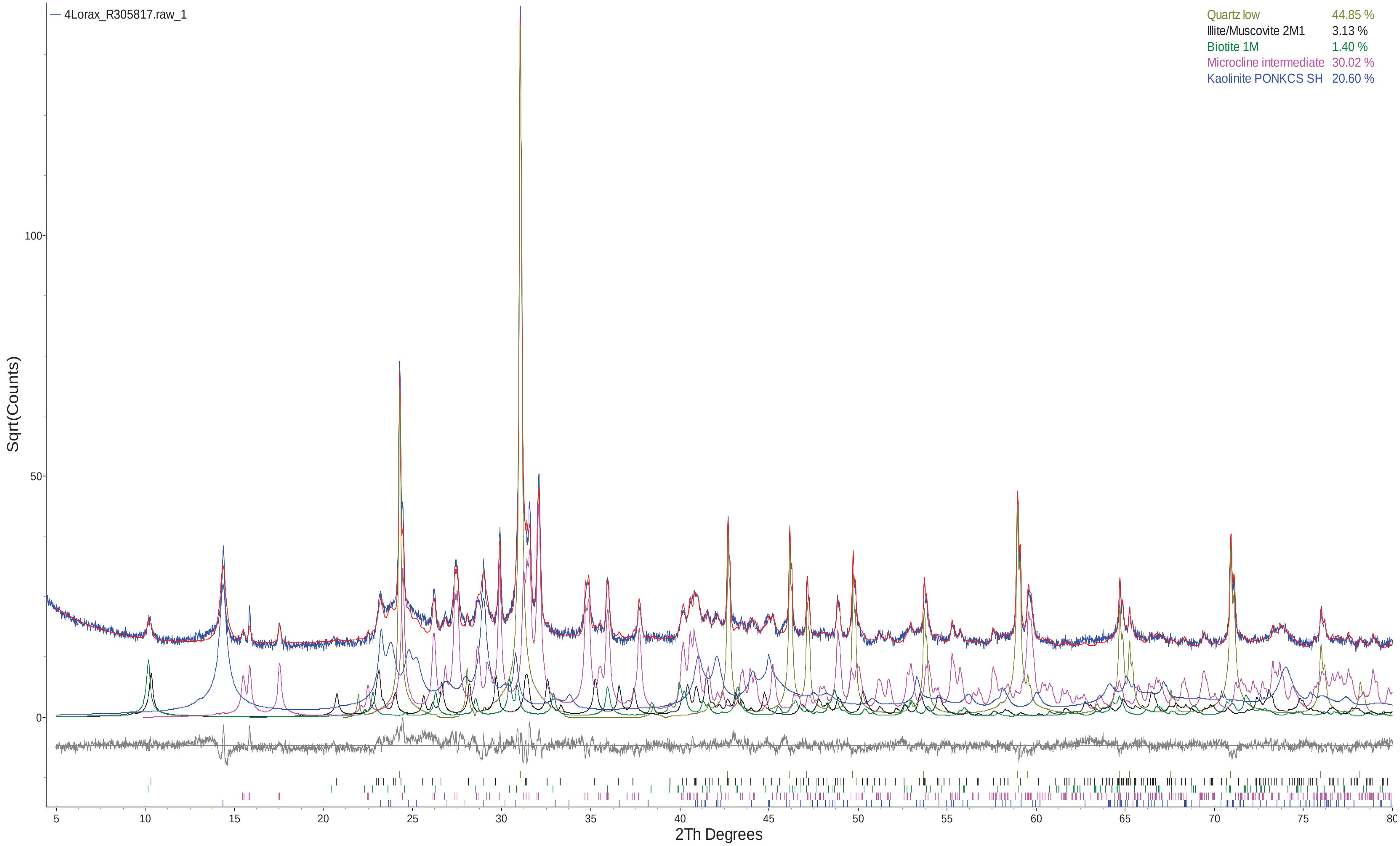

Figure 4. Rietveld refinement plot of sample **Lorax Environmental "R305817"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

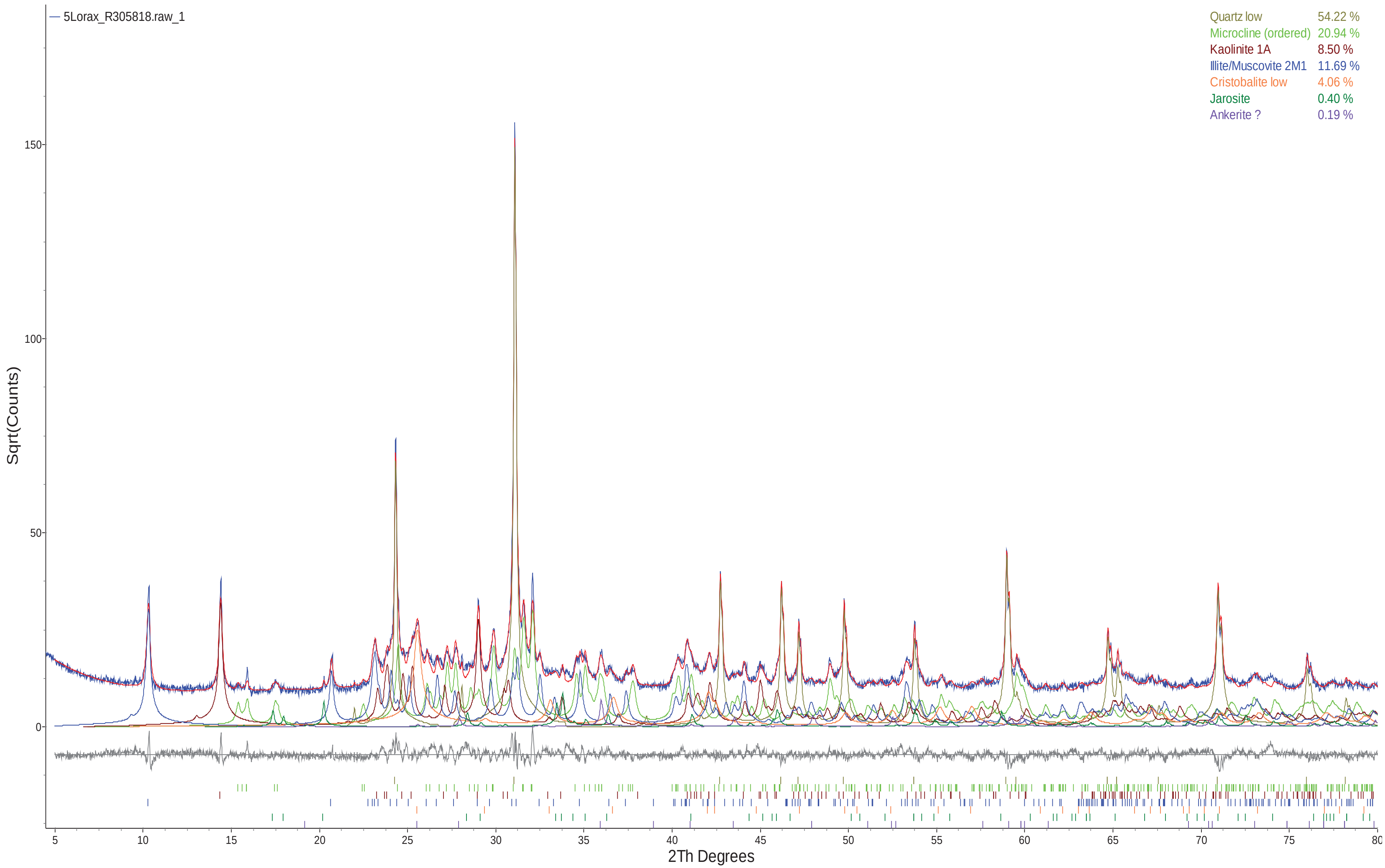

Figure 5. Rietveld refinement plot of sample **Lorax Environmental "R305818"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

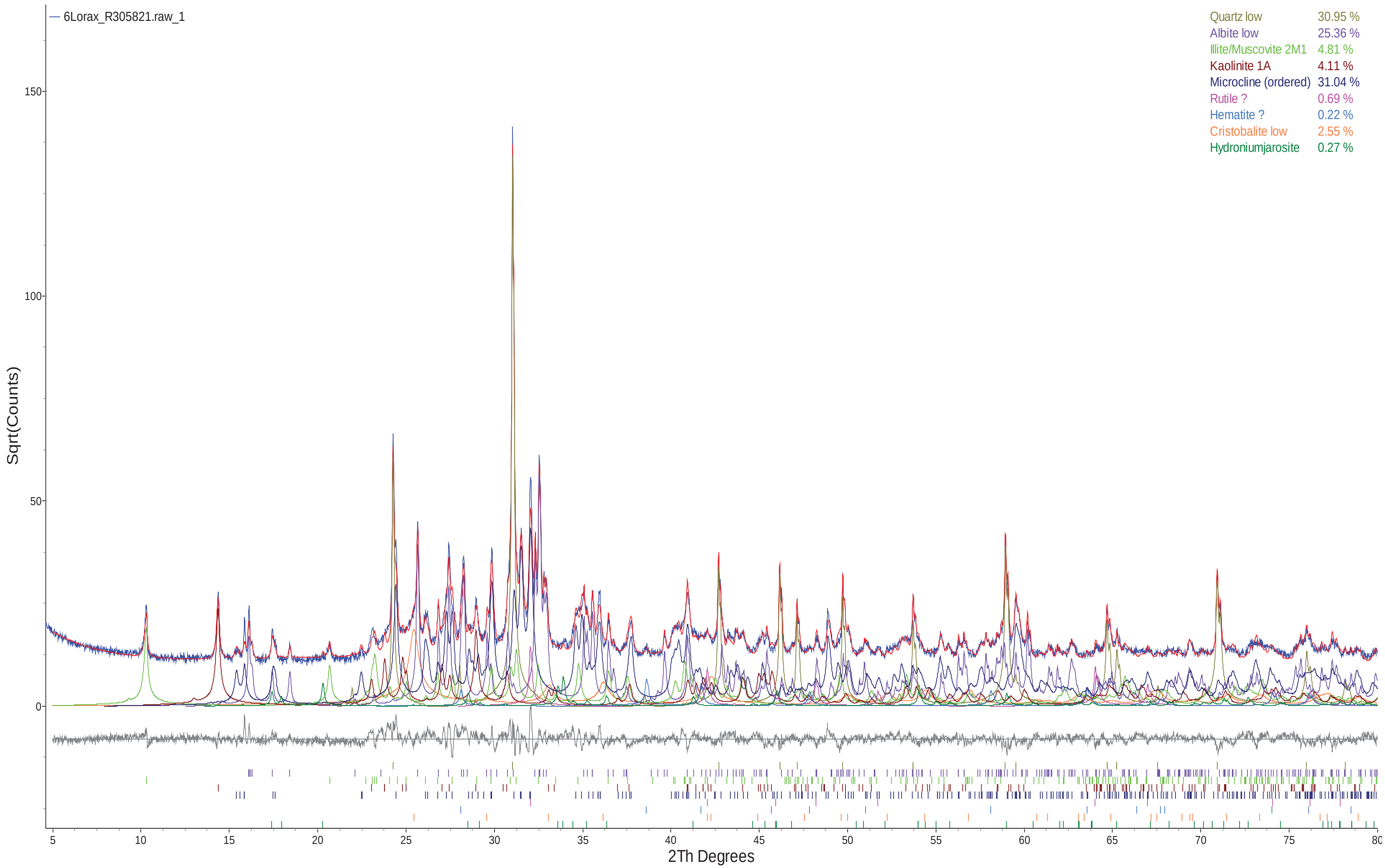

Figure 6. Rietveld refinement plot of sample **Lorax Environmental "R305821"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

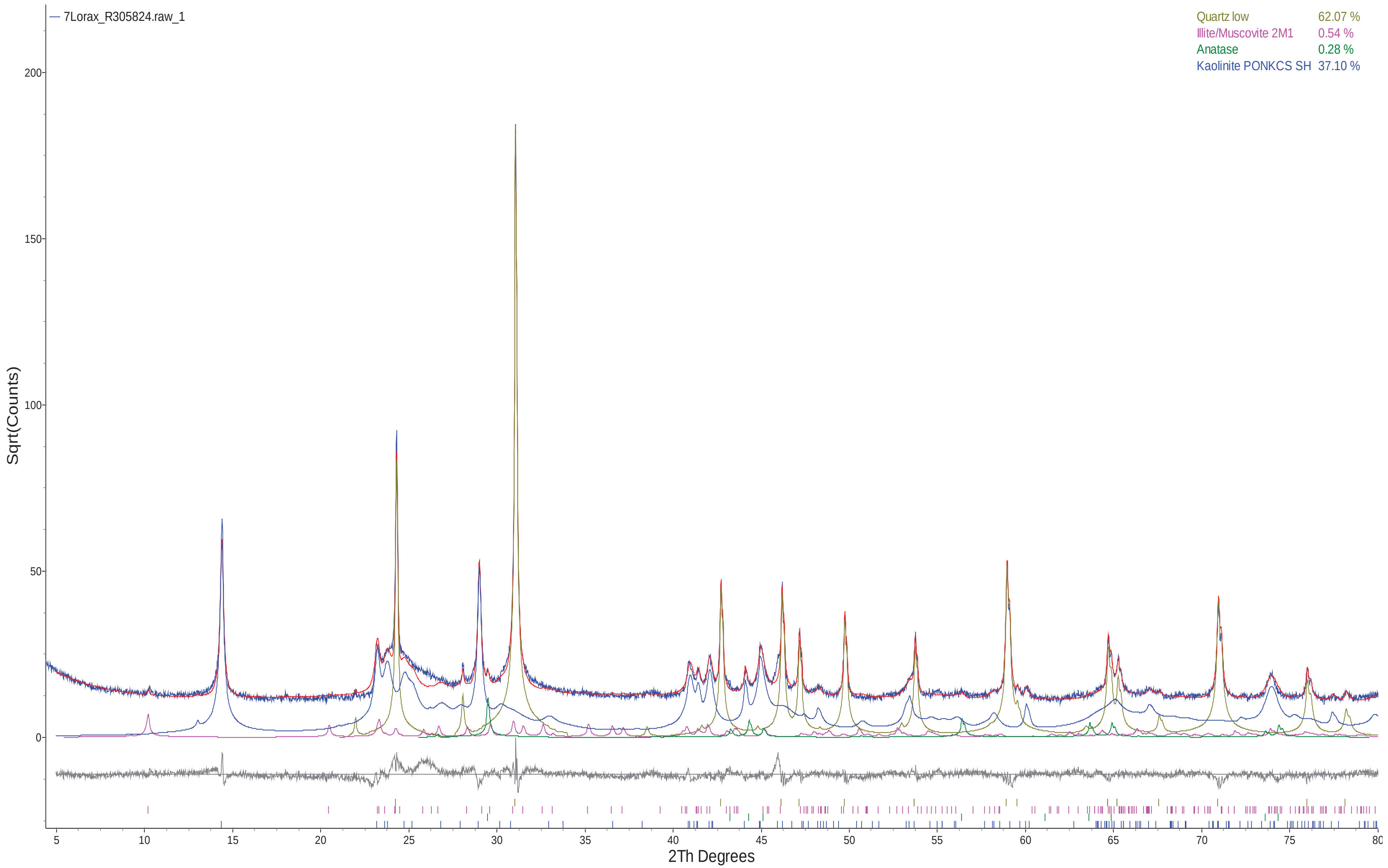

Figure 7. Rietveld refinement plot of sample **Lorax Environmental "R305824"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

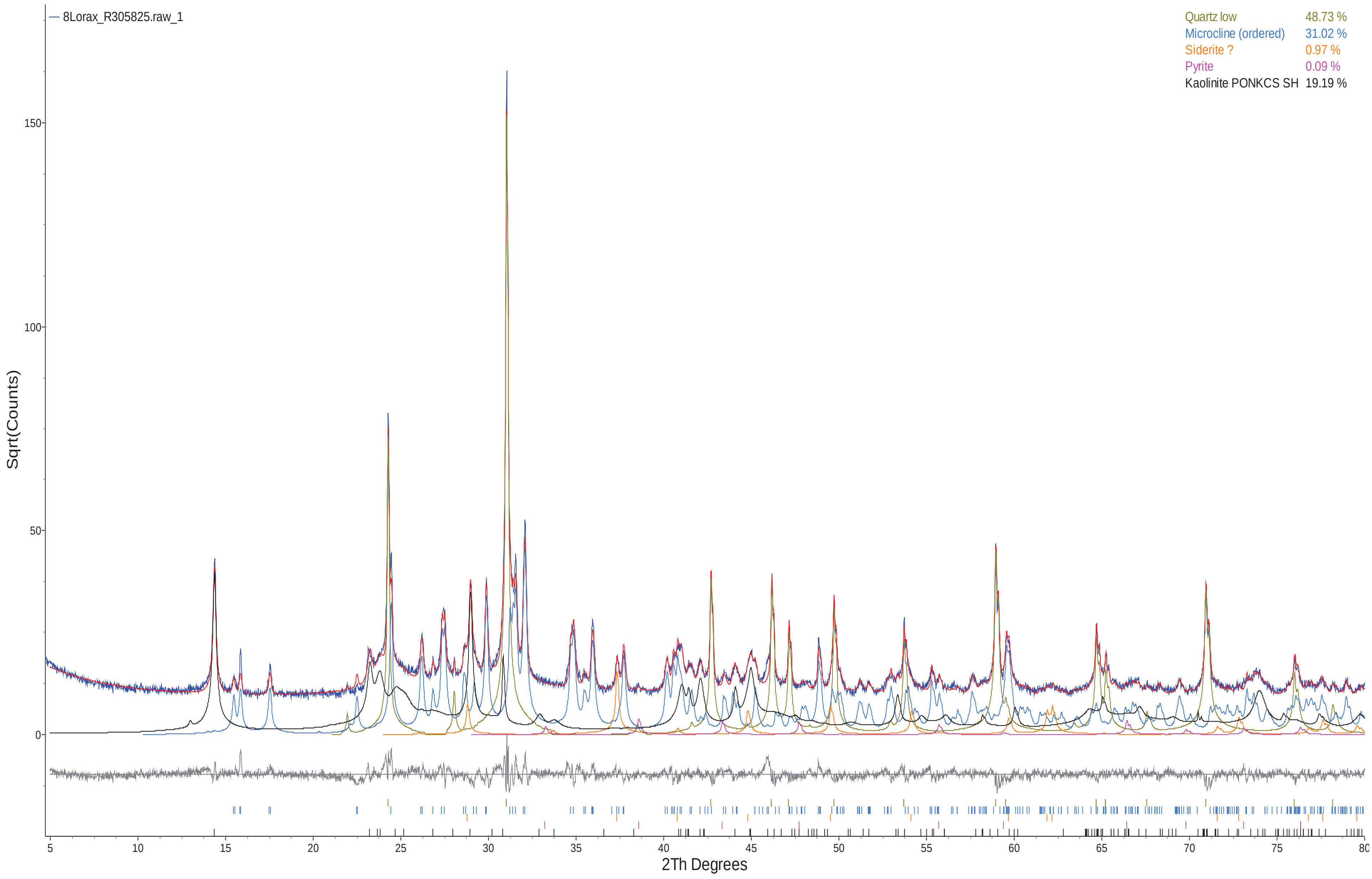

Figure 8. Rietveld refinement plot of sample **Lorax Environmental "R305825"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

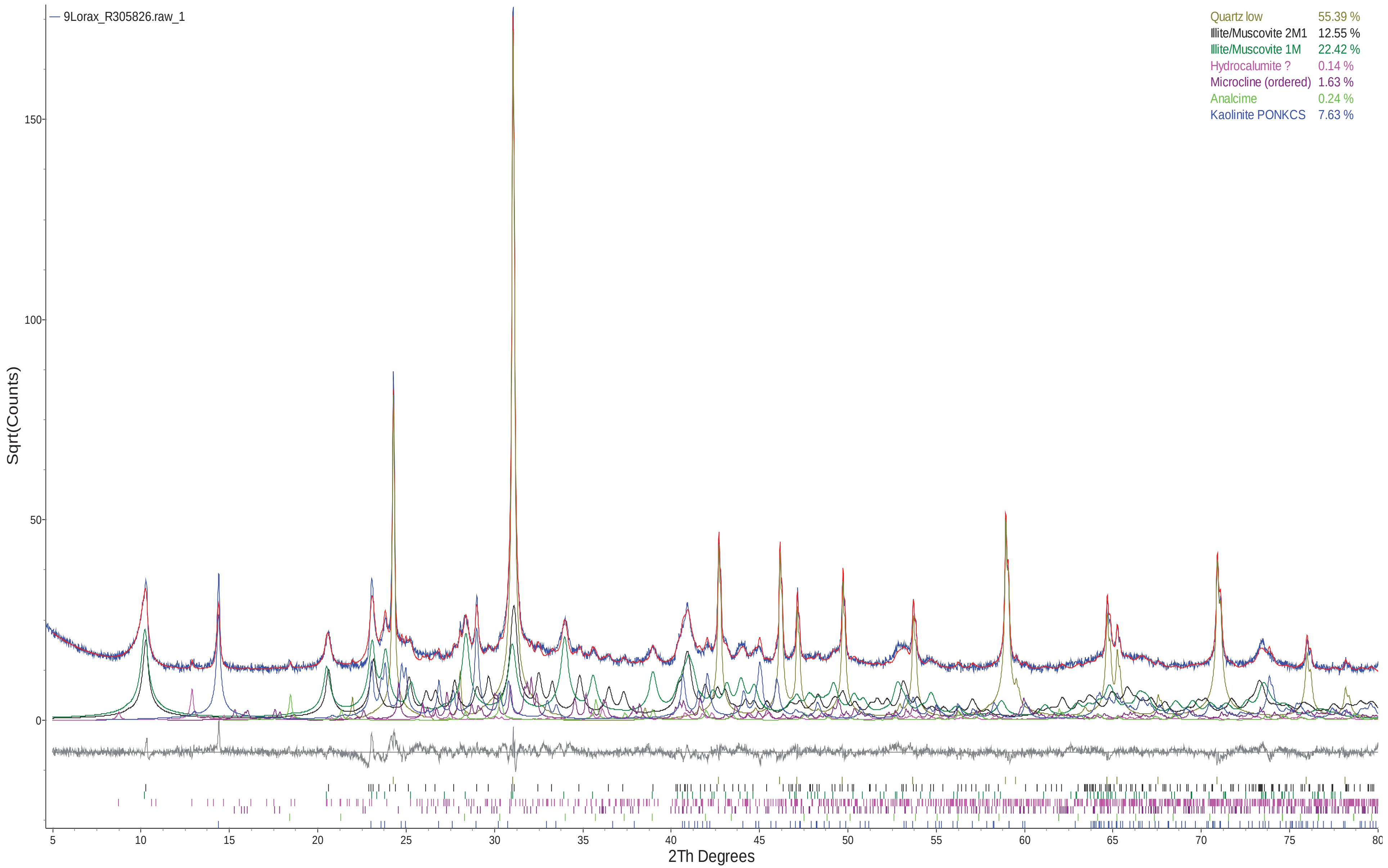

Figure 9. Rietveld refinement plot of sample **Lorax Environmental "R305826"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

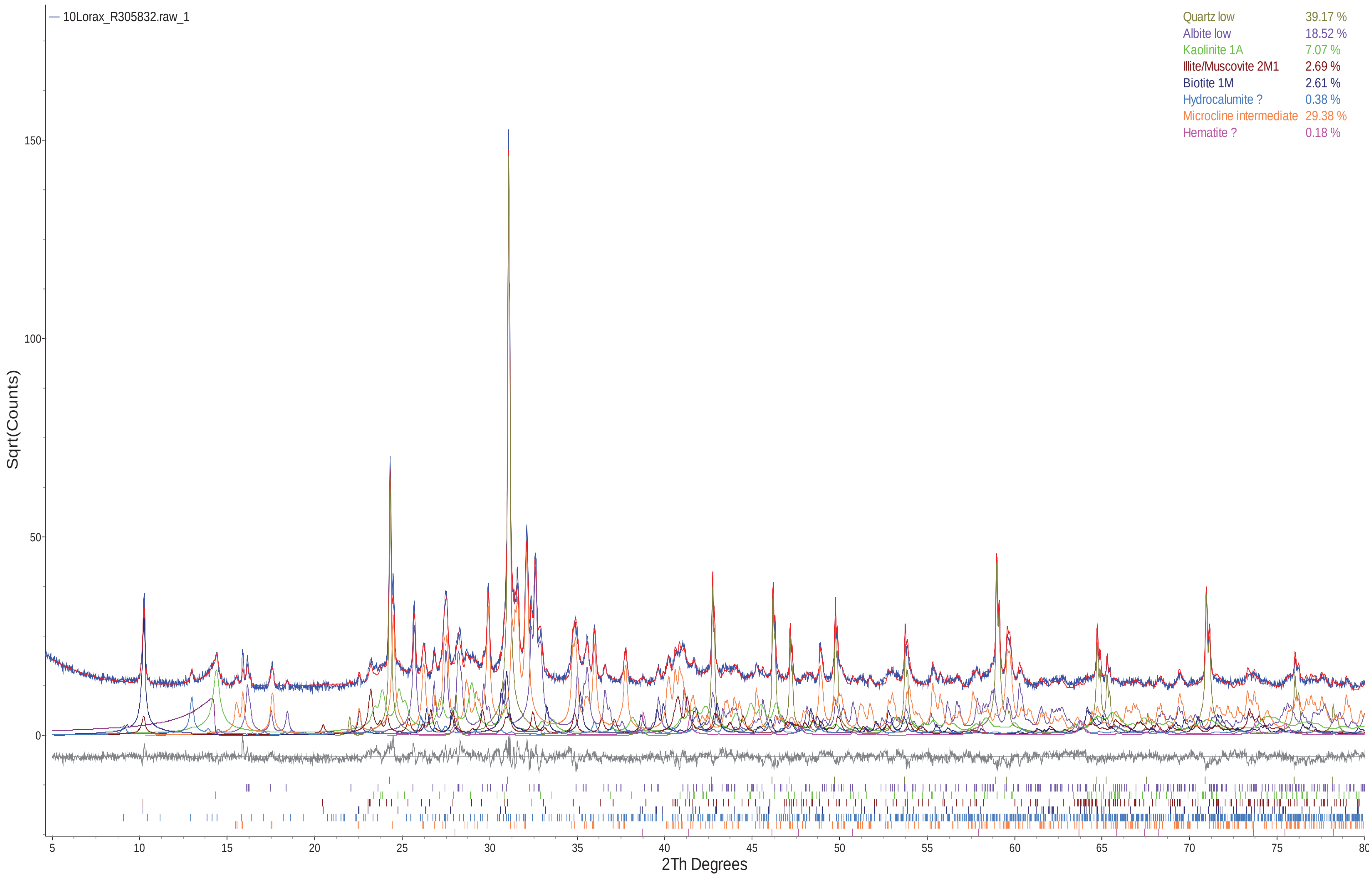

Figure 10. Rietveld refinement plot of sample **Lorax Environmental "R305832"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

QUANTITATIVE PHASE ANALYSIS OF TWENTY TWO POWDER SAMPLES USING THE RIETVELD METHOD AND X-RAY POWDER DIFFRACTION DATA.

Project: Coffee Gold A362-1

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May 1, 2014

EXPERIMENTAL METHOD

The twenty two samples of **Project Coffee Gold A362-1** were reduced into fine powder to the optimum grain-size range for X-ray analysis (<10μm) by grinding under ethanol in a vibratory McCrone Micronising Mill for 7 minutes. Step-scan X-ray powder-diffraction data were collected over a range 3-80°2θ with CoKα radiation on a Bruker D8 Advance Bragg-Brentano diffractometer equipped with an Fe monochromator foil, 0.6 mm (0.3°) divergence slit, incident- and diffracted-beam Soller slits and a LynxEye-XE detector. The long fine-focus Co X-ray tube was operated at 35 kV and 40 mA, using a take-off angle of 6°.

RESULTS

The X-ray diffractograms were analyzed using the International Centre for Diffraction Database PDF-4 and Search-Match software by Bruker. X-ray powder-diffraction data of the samples were refined with Rietveld program Topas 4.2 (Bruker AXS). The results of quantitative phase analysis by Rietveld refinements are given in Table 1 (separate file, ***Lorax Environmental Results May 1 2014 - proj Coffee Gold A362-1.xlsx***). These amounts represent the relative amounts of crystalline phases normalized to 100%. The Rietveld refinement plots are shown in Figures 1 to 22. The ideal formulae of phases present are given in Table 2.

In samples 5, 9, 10, 13, 21 and 22 the kaolinite is disordered and its contribution to the diffraction pattern was estimated with a model structure made from a 50:50 weighed standard mixture of kaolinite and quartz. Consider the results semi-quantitative.

Table 2. List and ideal formulae of present phases.

Mineral	**Ideal Formula**
Actinolite	$Ca_2(Mg,Fe^{2+})_5Si_8O_{22}(OH)_2$
Alunite	$K_2Al_6(SO_4)_4(OH)_{12}$
Anatase	TiO_2
Ankerite/Dolomite	$Ca(Fe^{2+},Mg,Mn)(CO_3)_2/CaMg(CO_3)_2$
Augite	$(Ca,Na)(Mg,Fe,Al,Ti)(Si,Al)_2O_6$
Calcite	$CaCO_3$
Clinochlore	$(Mg,Fe^{2+})_5Al(Si_3Al)O_{10}(OH)_8$
Clinozoisite	$Ca_2Al_3(SiO_4)_3(OH)$
Dawsonite	$NaAlCO_3(OH)_2$
Goethite	α-$Fe^{3+}O(OH)$
Grossular	$Ca_3Al_2(SiO_4)_3$
Hematite	α-Fe_2O_3
Iron	α-Fe
Jarosite	$K_2Fe_6^{3+}(SO_4)_4(OH)_{12}$
Kaolinite	$Al_2Si_2O_5(OH)_4$
K-feldspar	$KAlSi_3O_8$
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$
Muscovite/Illite	$KAl_2(AlSi_3O_{10})(OH)_2$/ $K_{0.65}Al_{2.0}Al_{0.65}Si_{3.35}O_{10}(OH)_2$
Phlogopite	$KMg_3AlSi_3O_{10}(OH)_2$
Plagioclase	$NaAlSi_3O_8$ – $CaAl_2Si_2O_8$
Pyrite	FeS_2
Pyrrhotite	$Fe_{1-x}S$
Quartz	SiO_2
Rutile	TiO_2
Siderite	$Fe^{2+}CO_3$

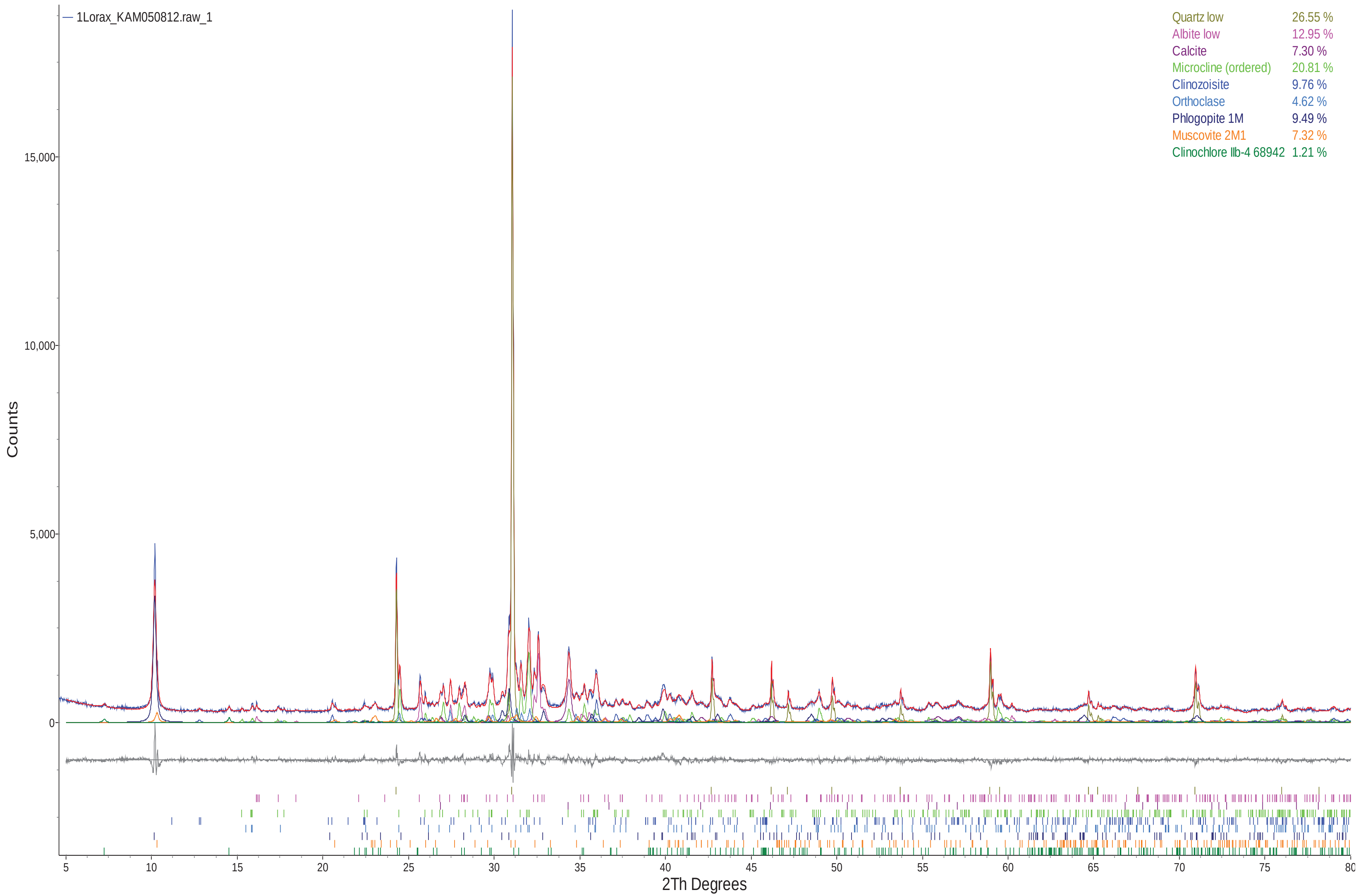

Figure 1. Rietveld refinement plot of sample **Lorax Environmental "KAM050812"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

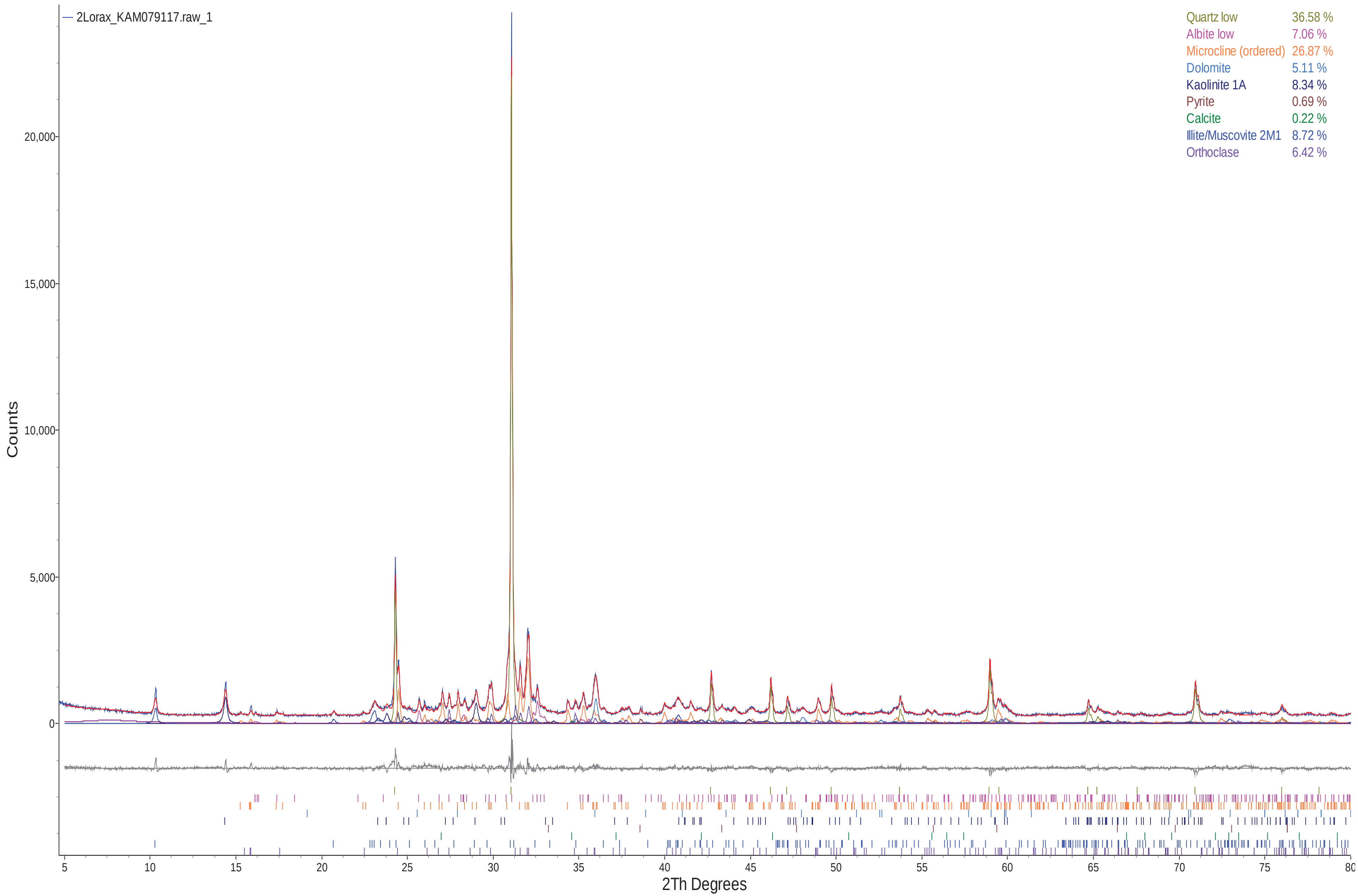

Figure 2. Rietveld refinement plot of sample **Lorax Environmental "KAM079117"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

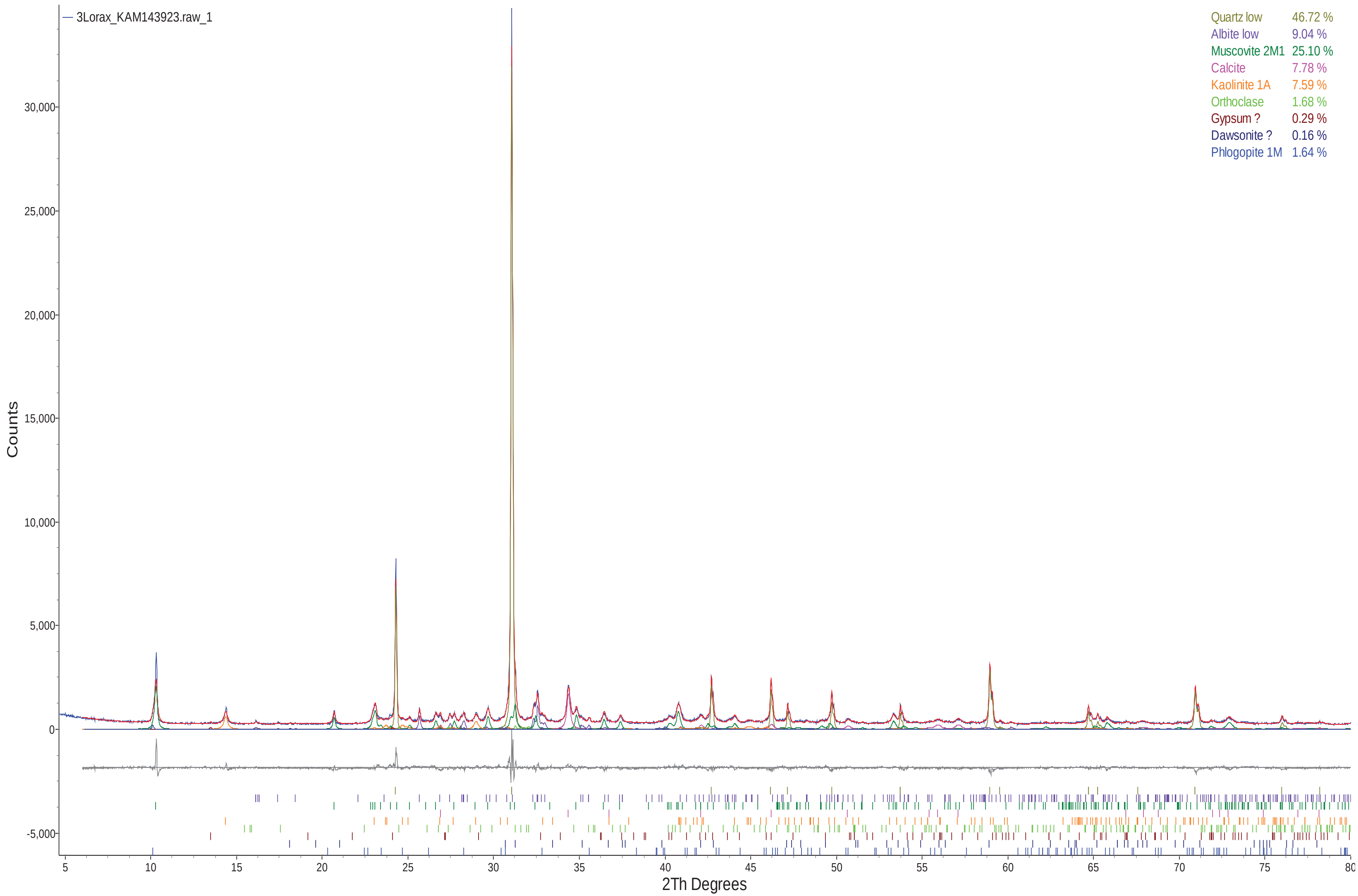

Figure 3. Rietveld refinement plot of sample **Lorax Environmental "KAM143923"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

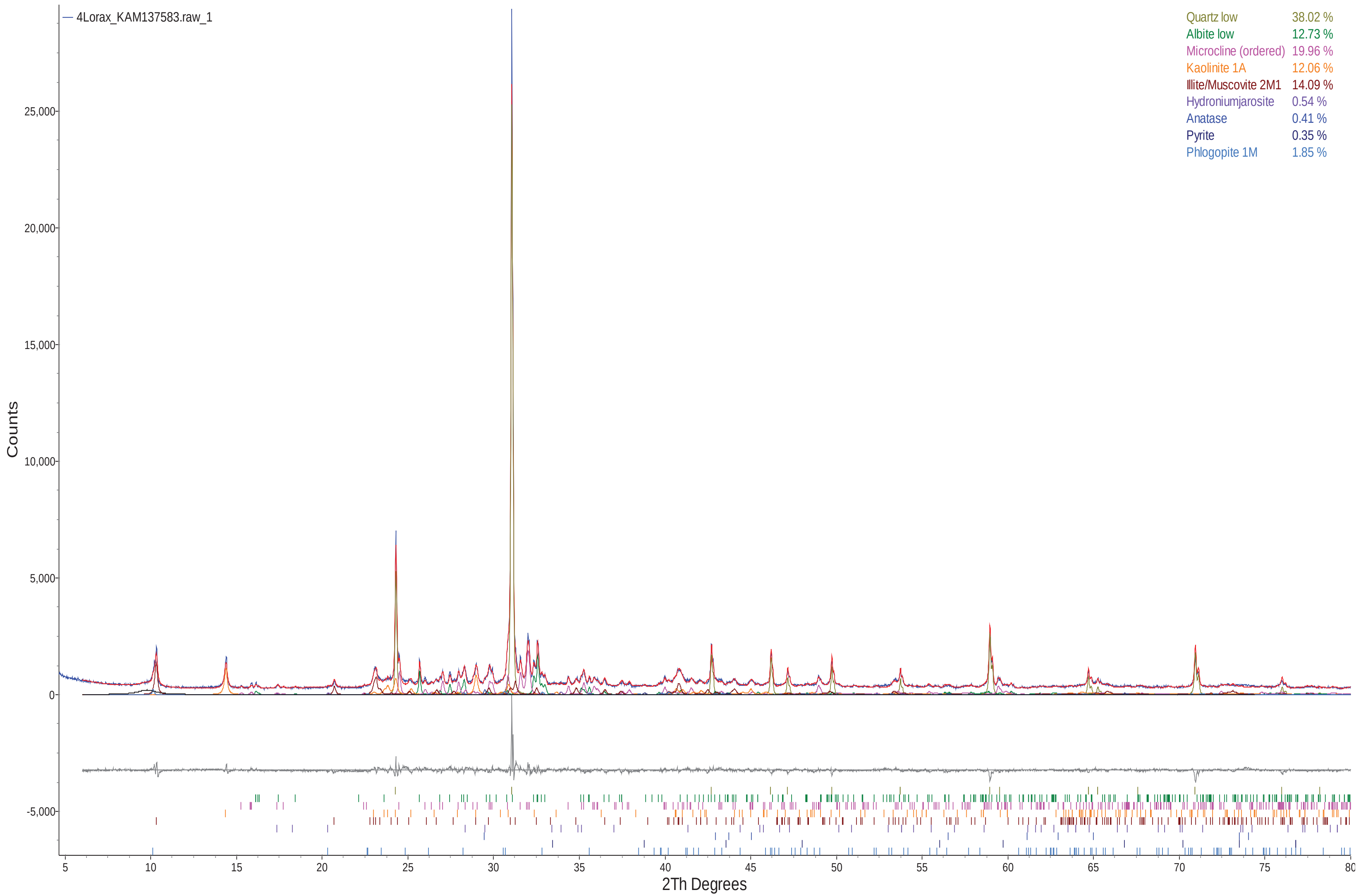

Figure 4. Rietveld refinement plot of sample **Lorax Environmental "KAM137583"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

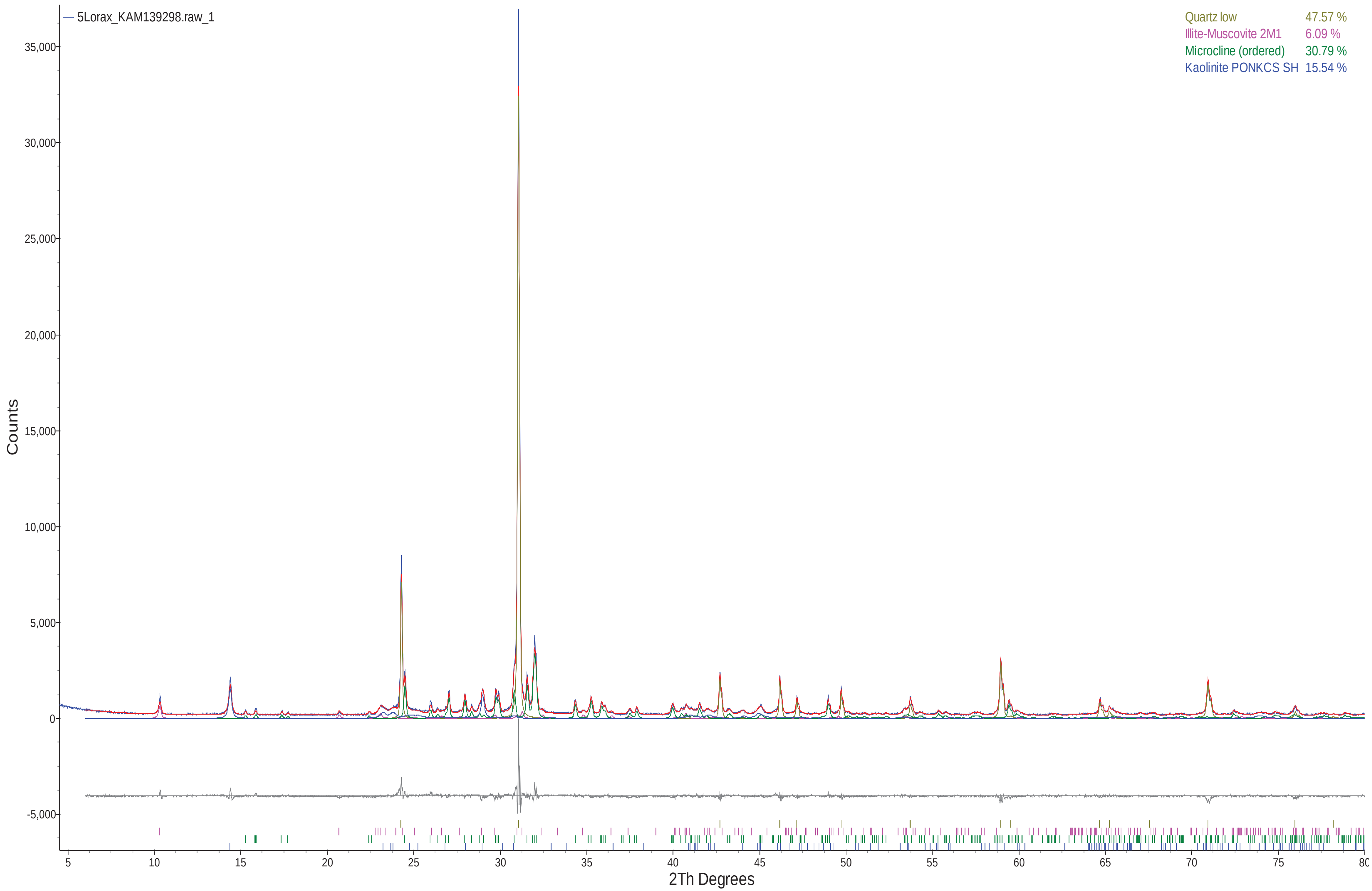

Figure 5. Rietveld refinement plot of sample **Lorax Environmental "KAM139298"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

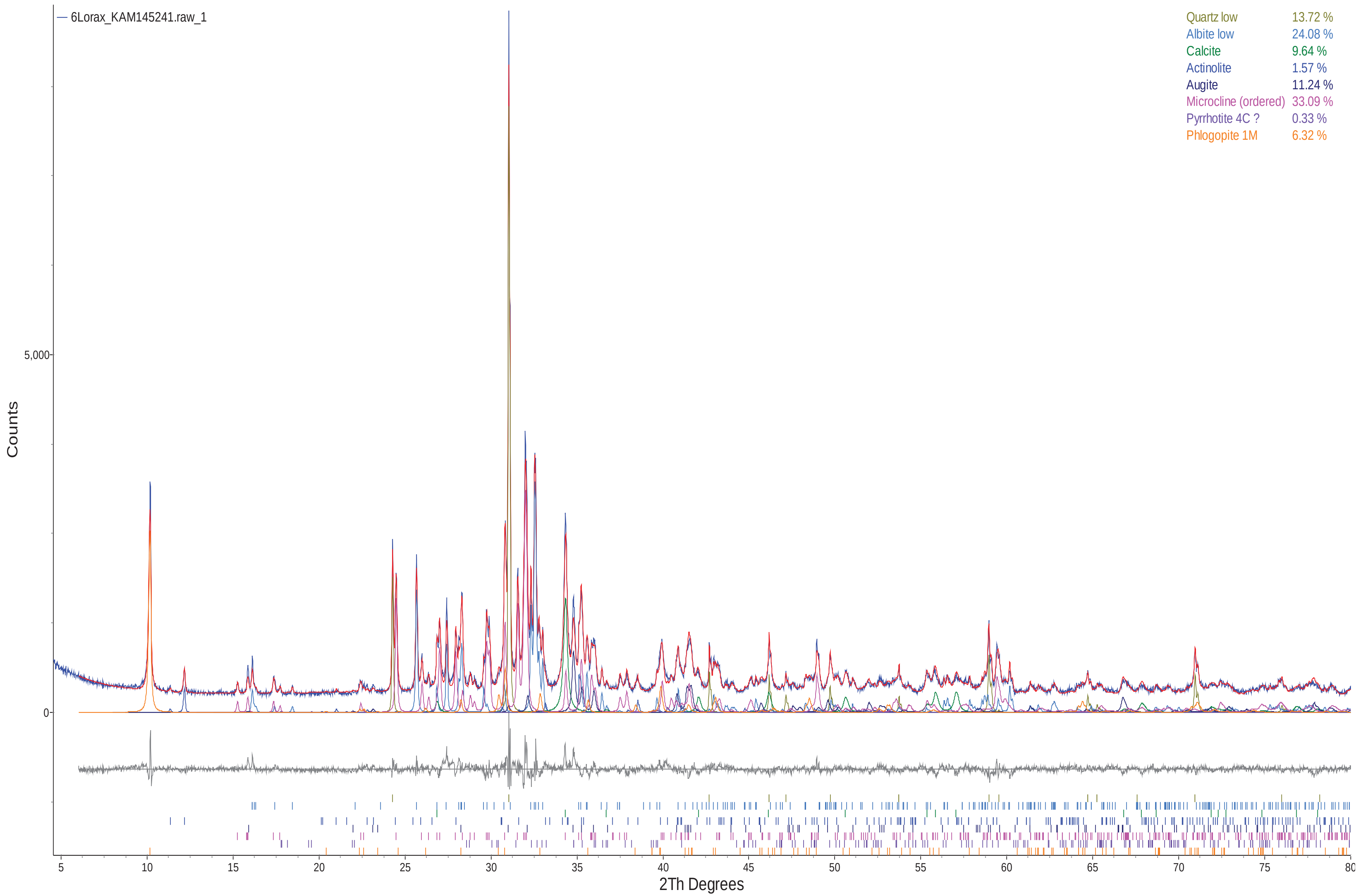

Figure 6. Rietveld refinement plot of sample **Lorax Environmental "KAM145241"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

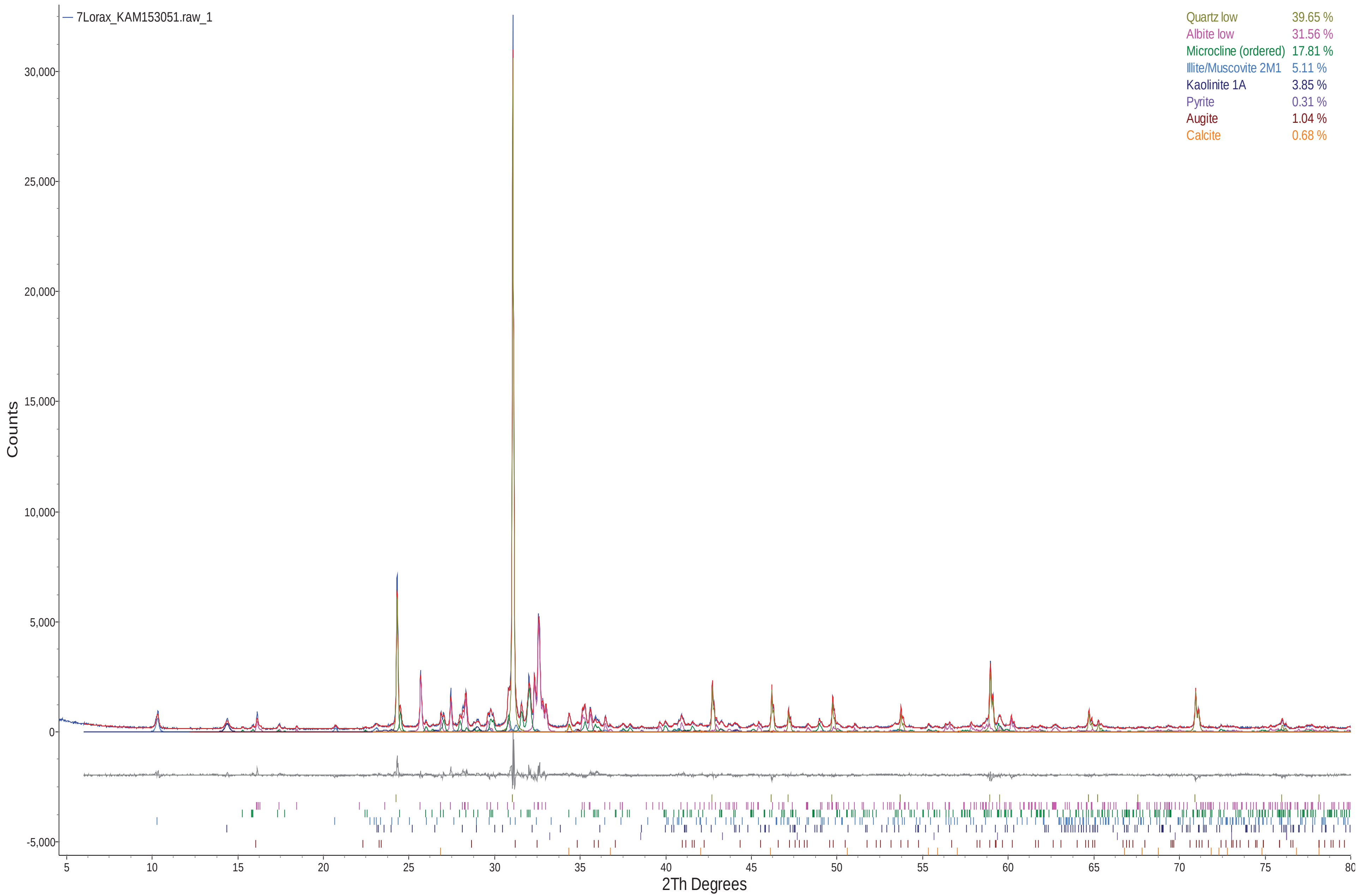

Figure 7. Rietveld refinement plot of sample **Lorax Environmental "KAM153051"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

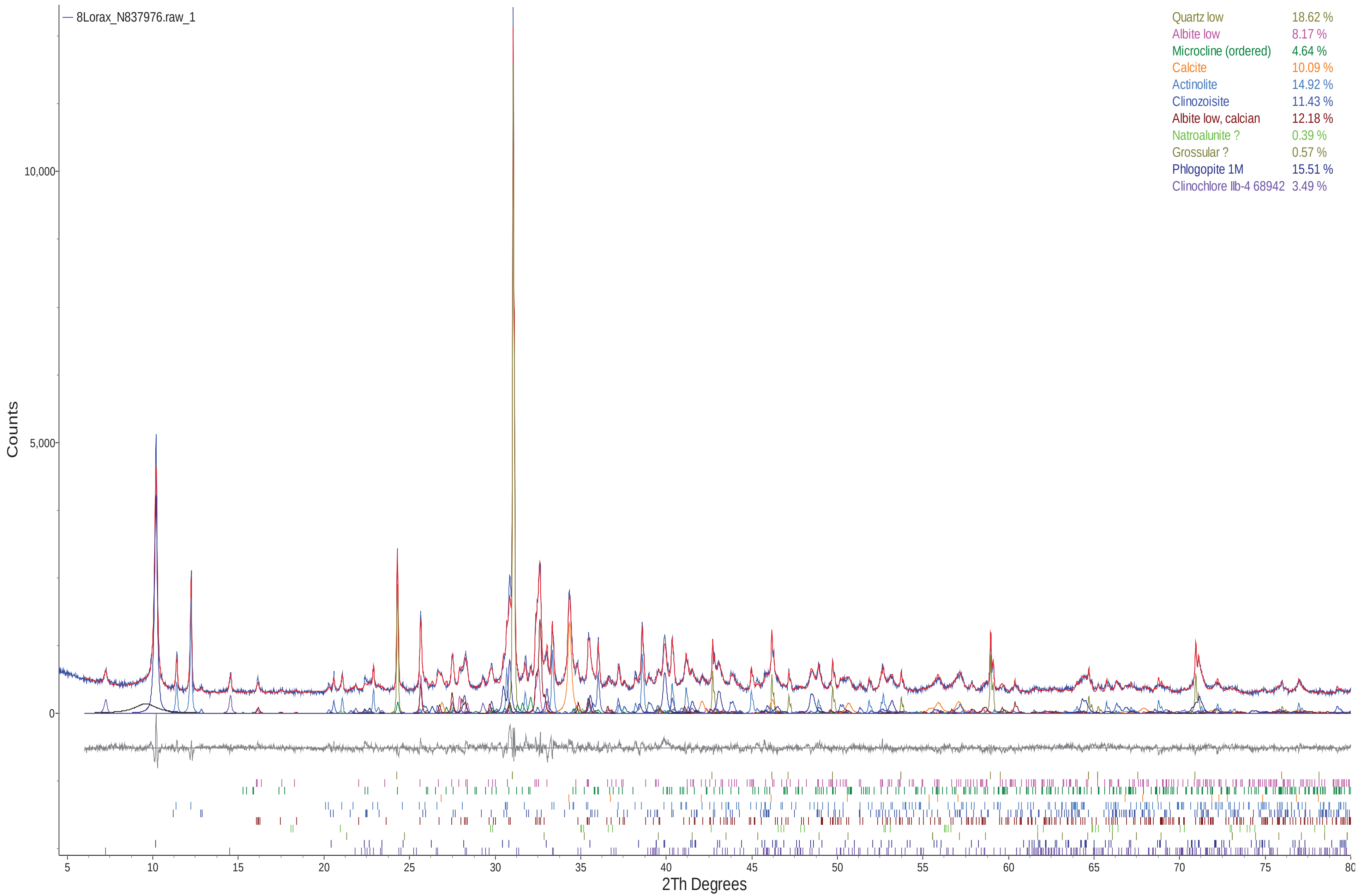

Figure 8. Rietveld refinement plot of sample **Lorax Environmental "N837976"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

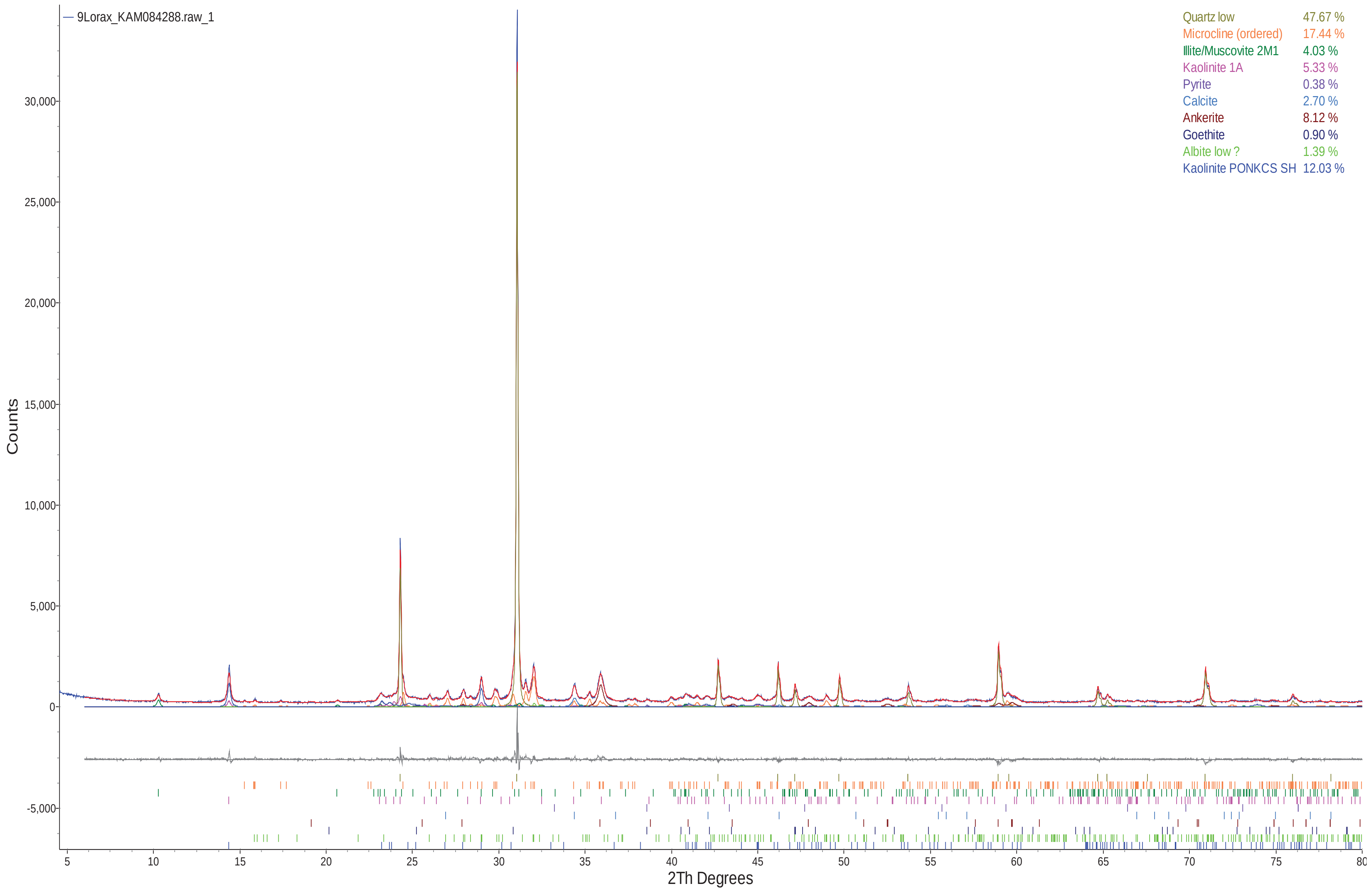

Figure 9. Rietveld refinement plot of sample **Lorax Environmental "KAM084288"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

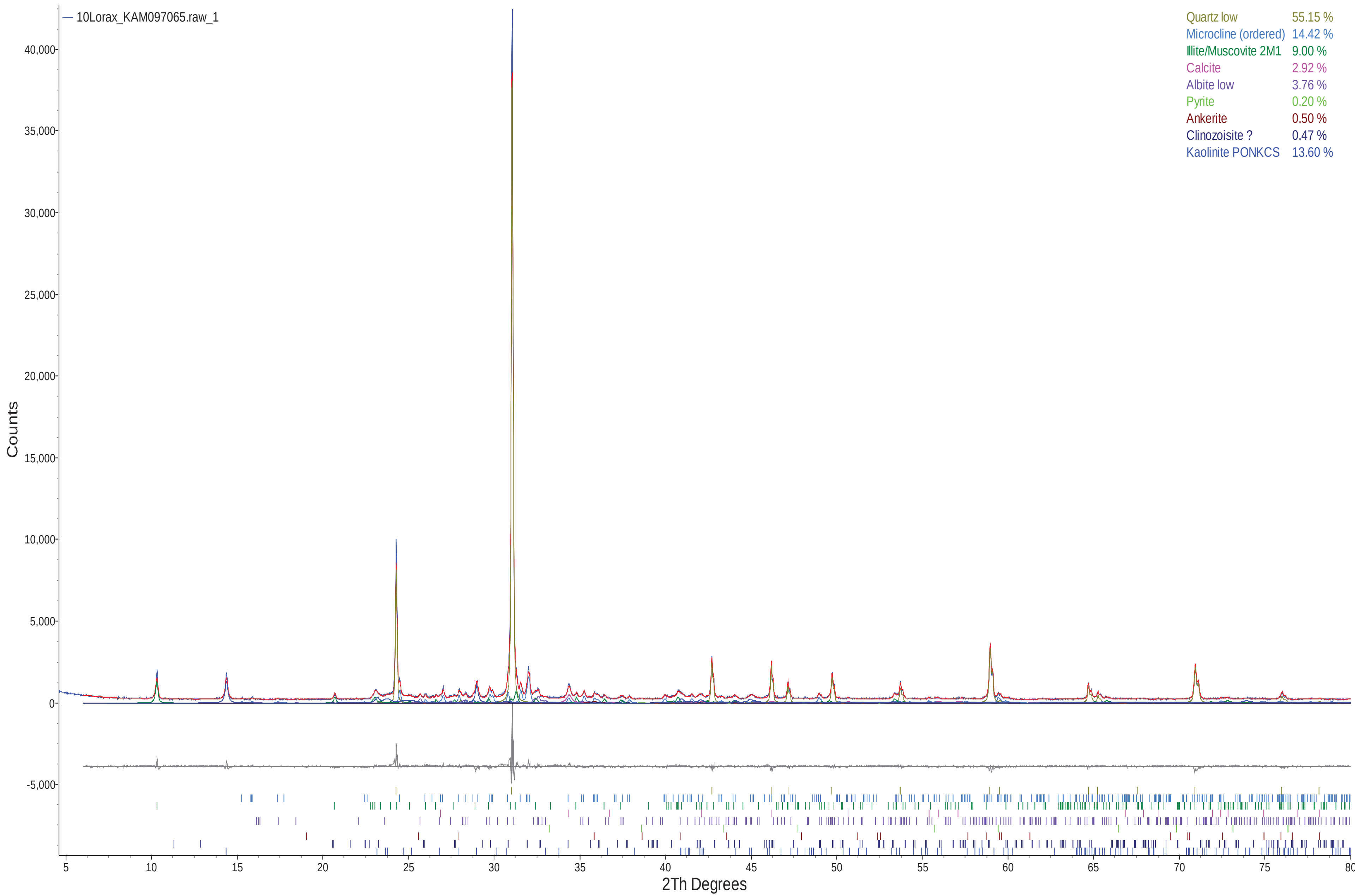

Figure 10. Rietveld refinement plot of sample **Lorax Environmental "KAM097065"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

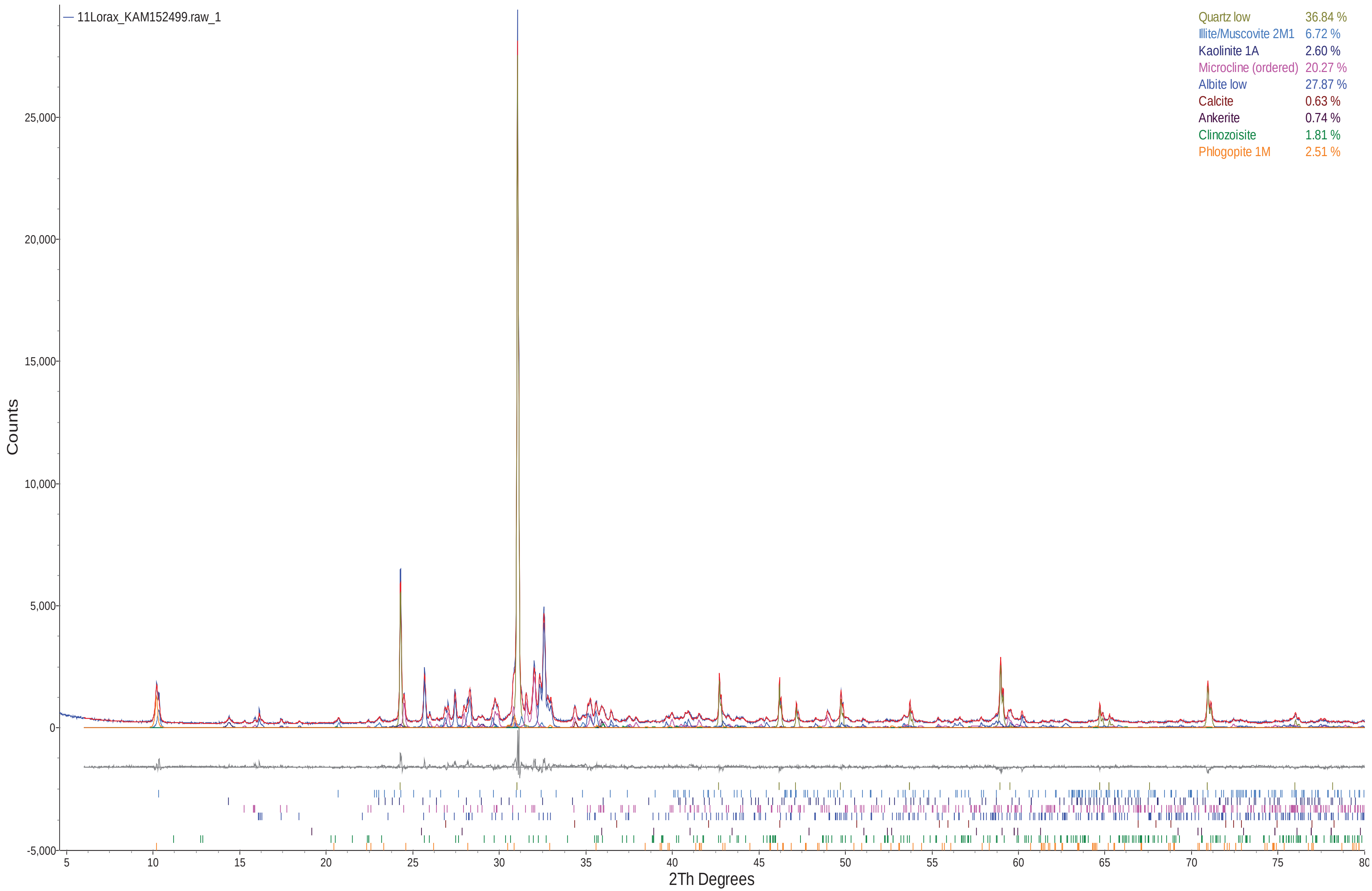

Figure 11. Rietveld refinement plot of sample **Lorax Environmental "KAM152499"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

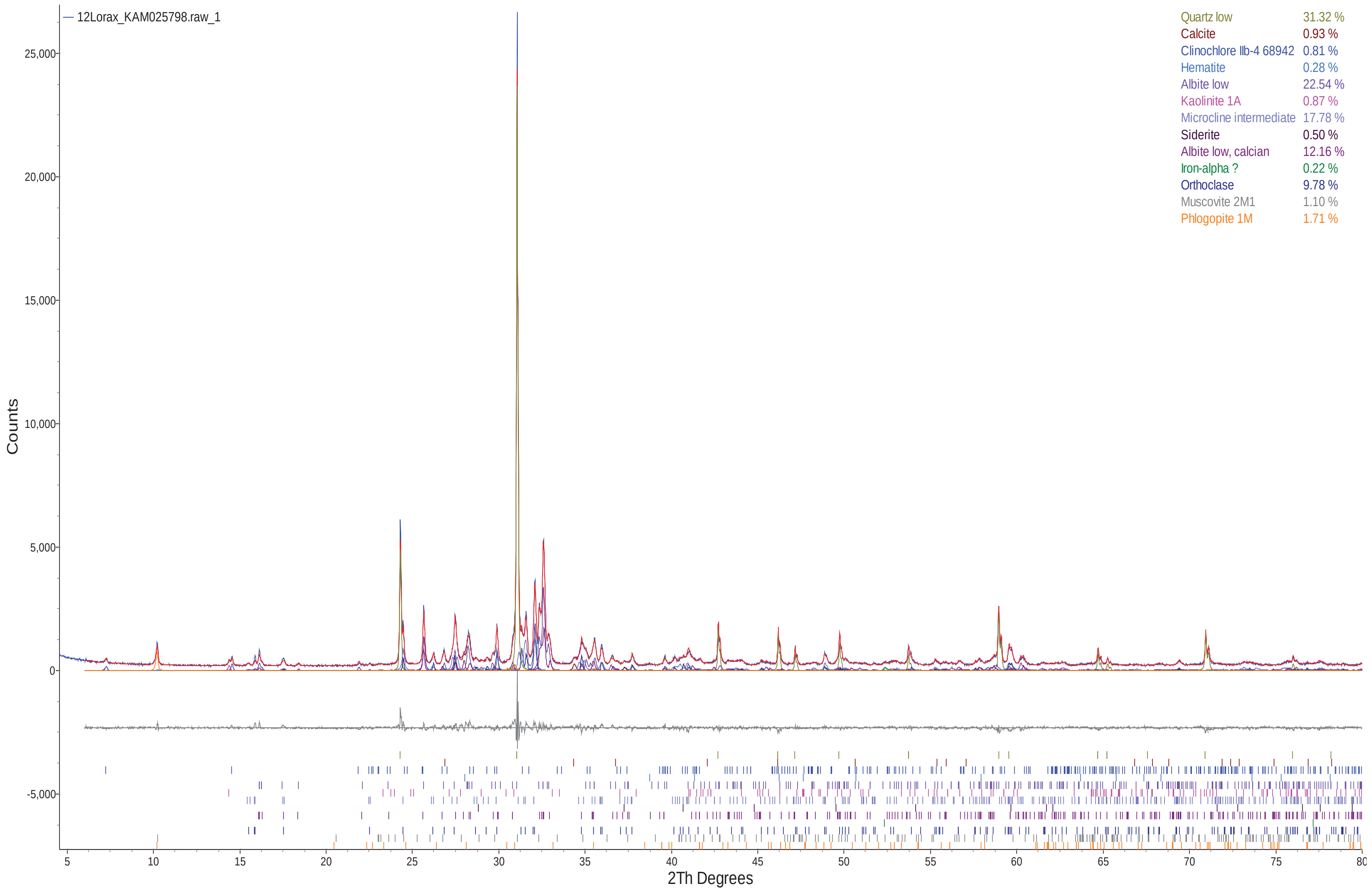

Figure 12. Rietveld refinement plot of sample **Lorax Environmental “KAM025798”** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

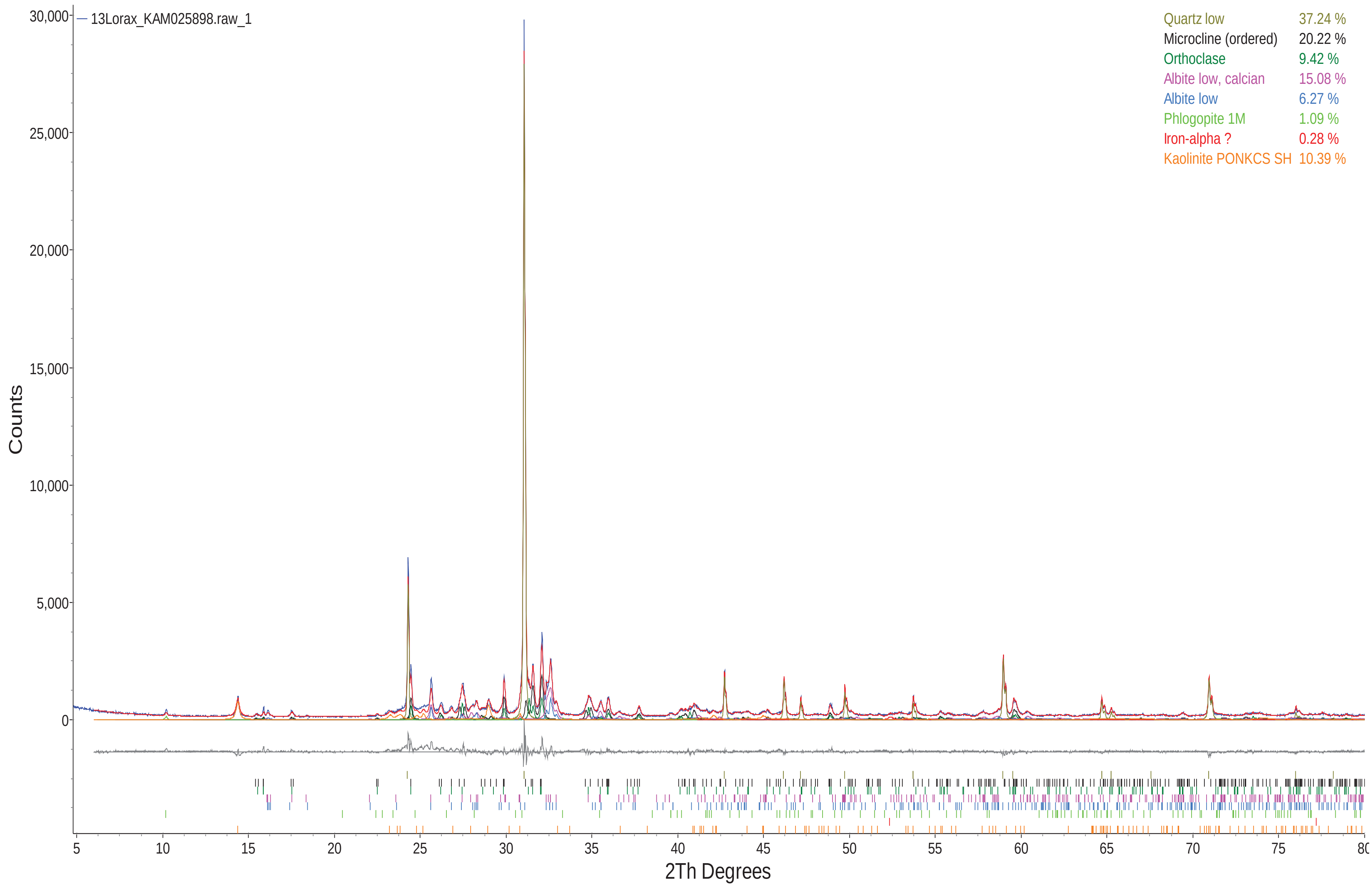

Figure 13. Rietveld refinement plot of sample **Lorax Environmental "KAM025898"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

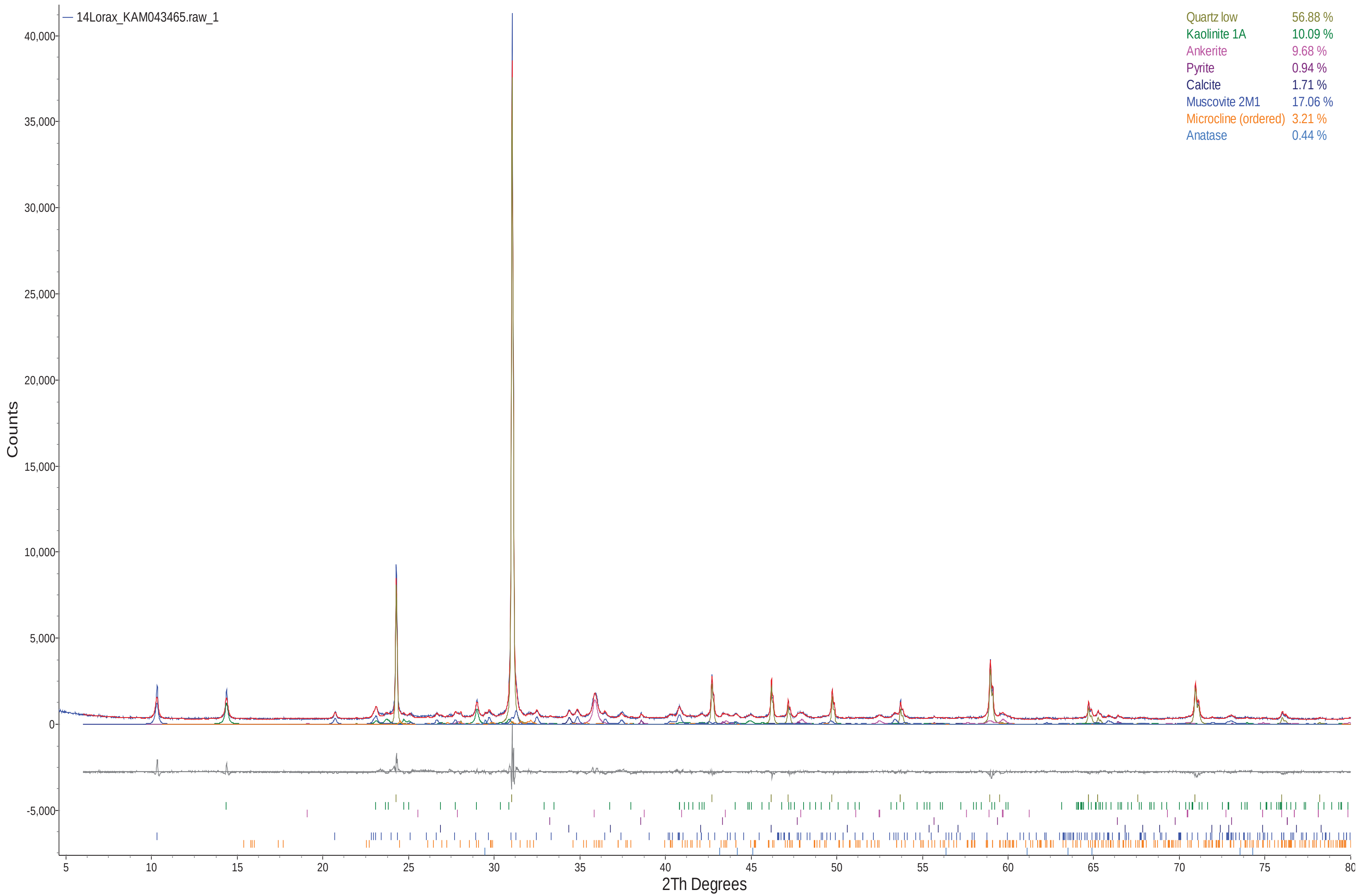

Figure 14. Rietveld refinement plot of sample **Lorax Environmental "KAM043465"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

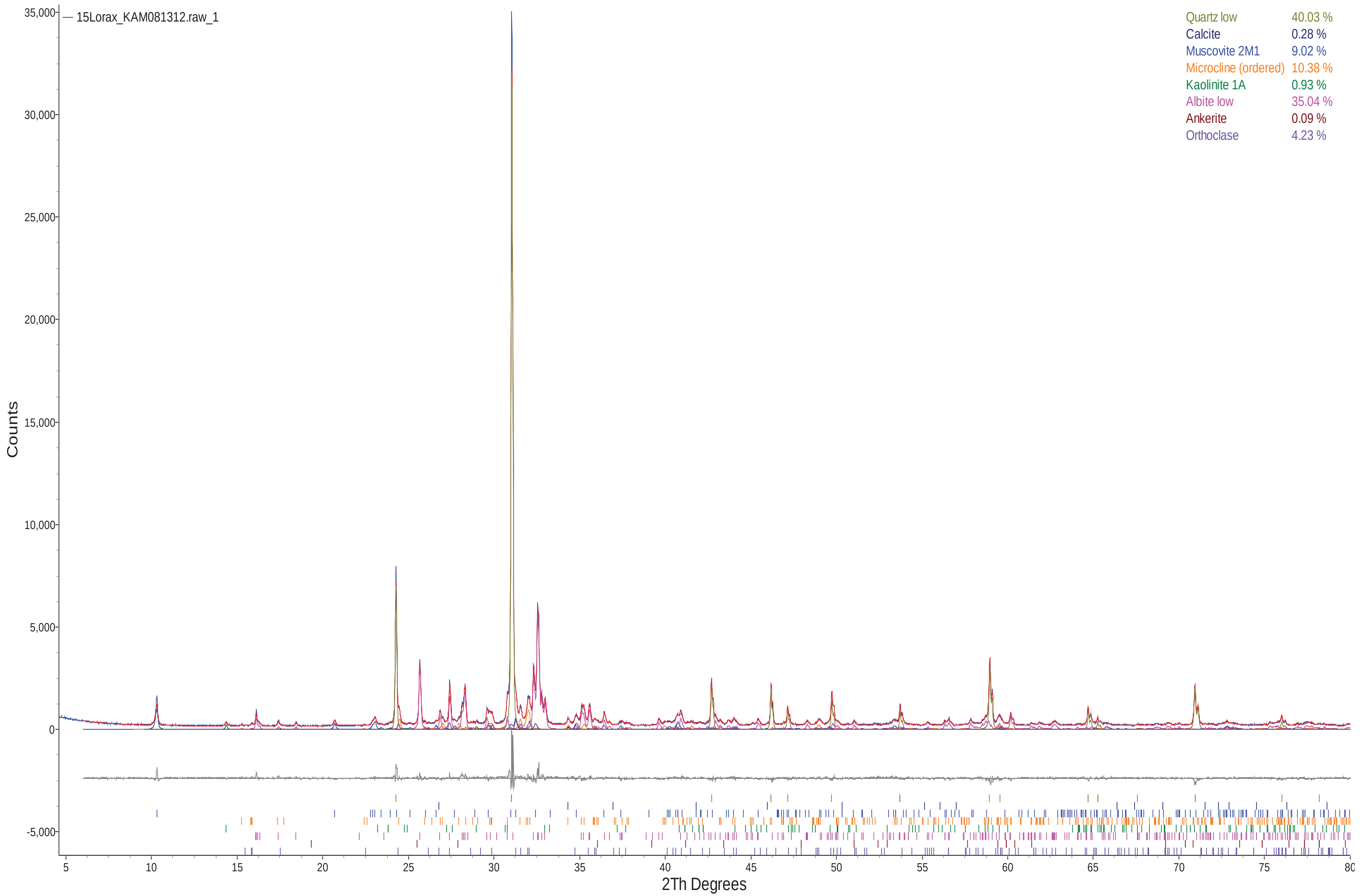

Figure 15. Rietveld refinement plot of sample **Lorax Environmental "KAM081312"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

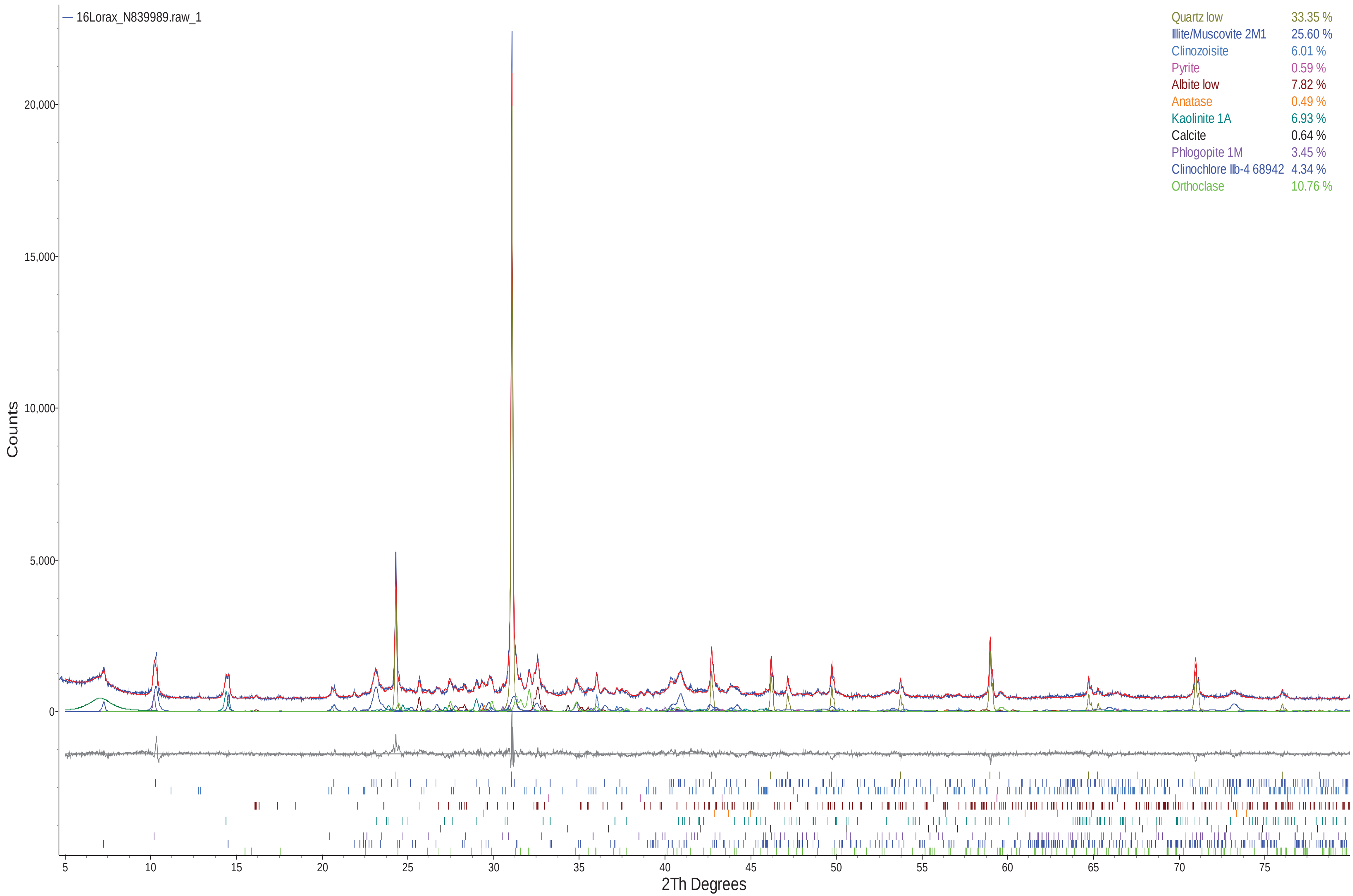

Figure 16. Rietveld refinement plot of sample **Lorax Environmental "N839989"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

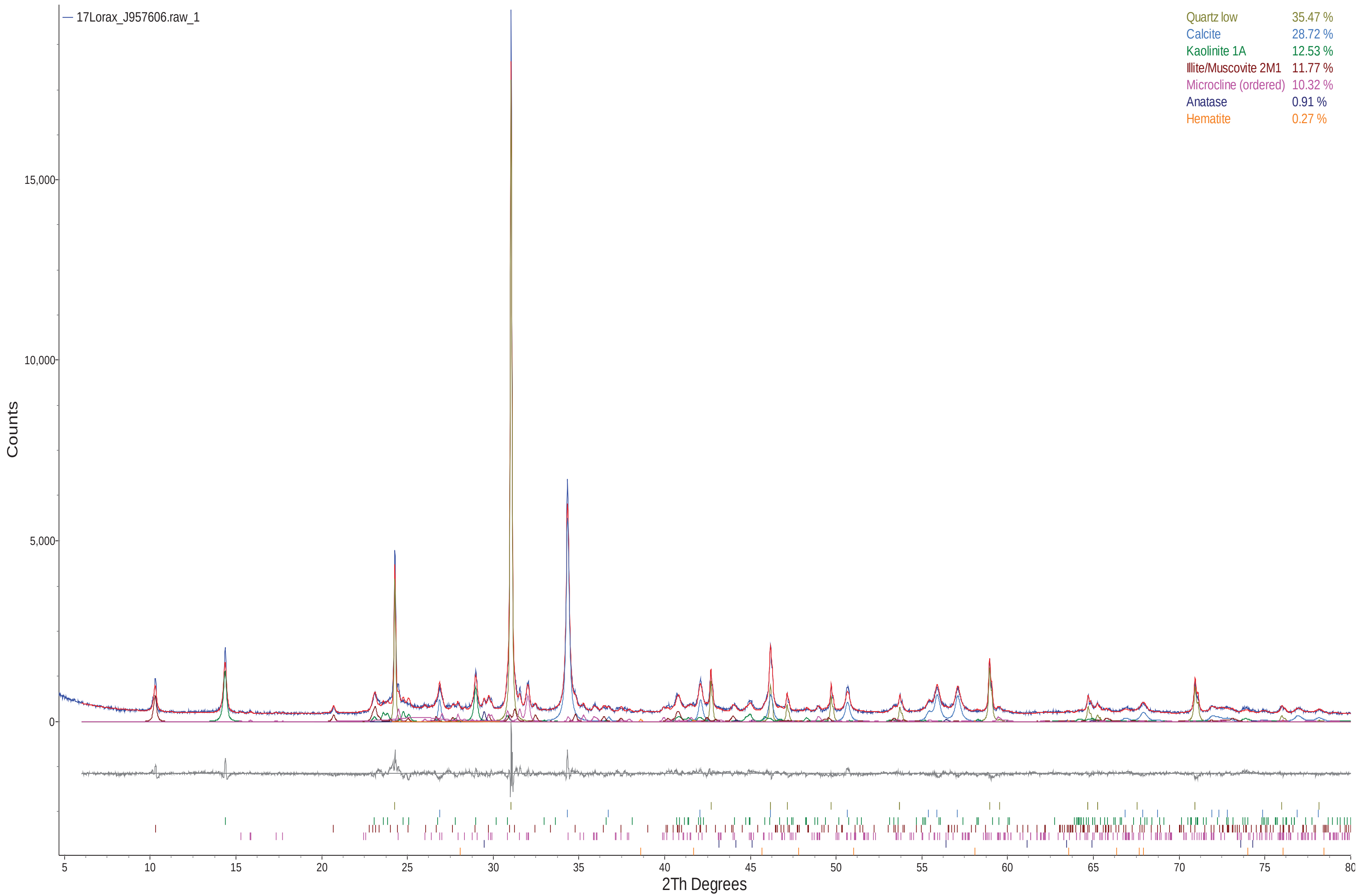

Figure 17. Rietveld refinement plot of sample **Lorax Environmental "J957606"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

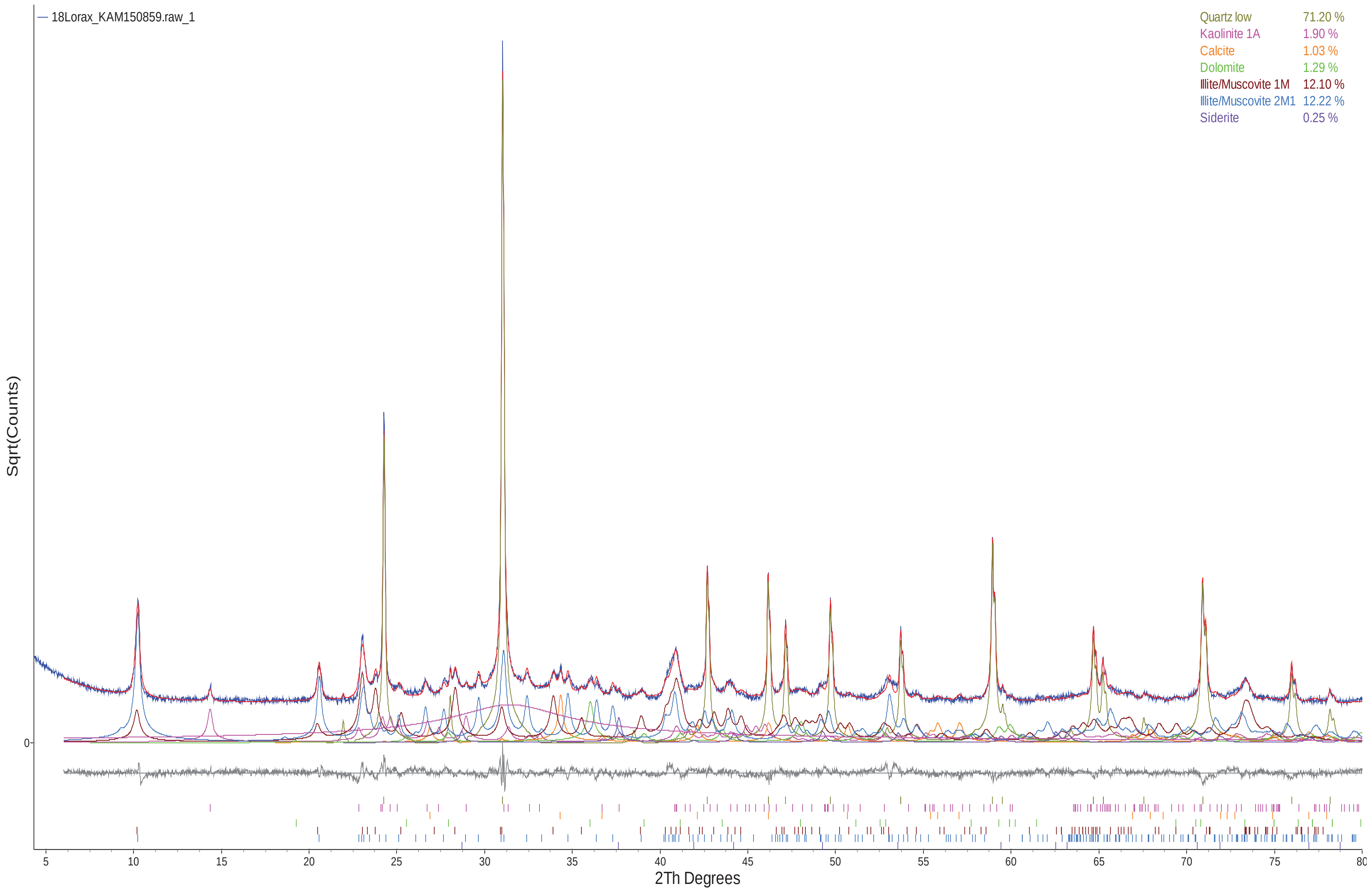

Figure 18. Rietveld refinement plot (y in sqrt) of sample **Lorax Environmental "KAM150859"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

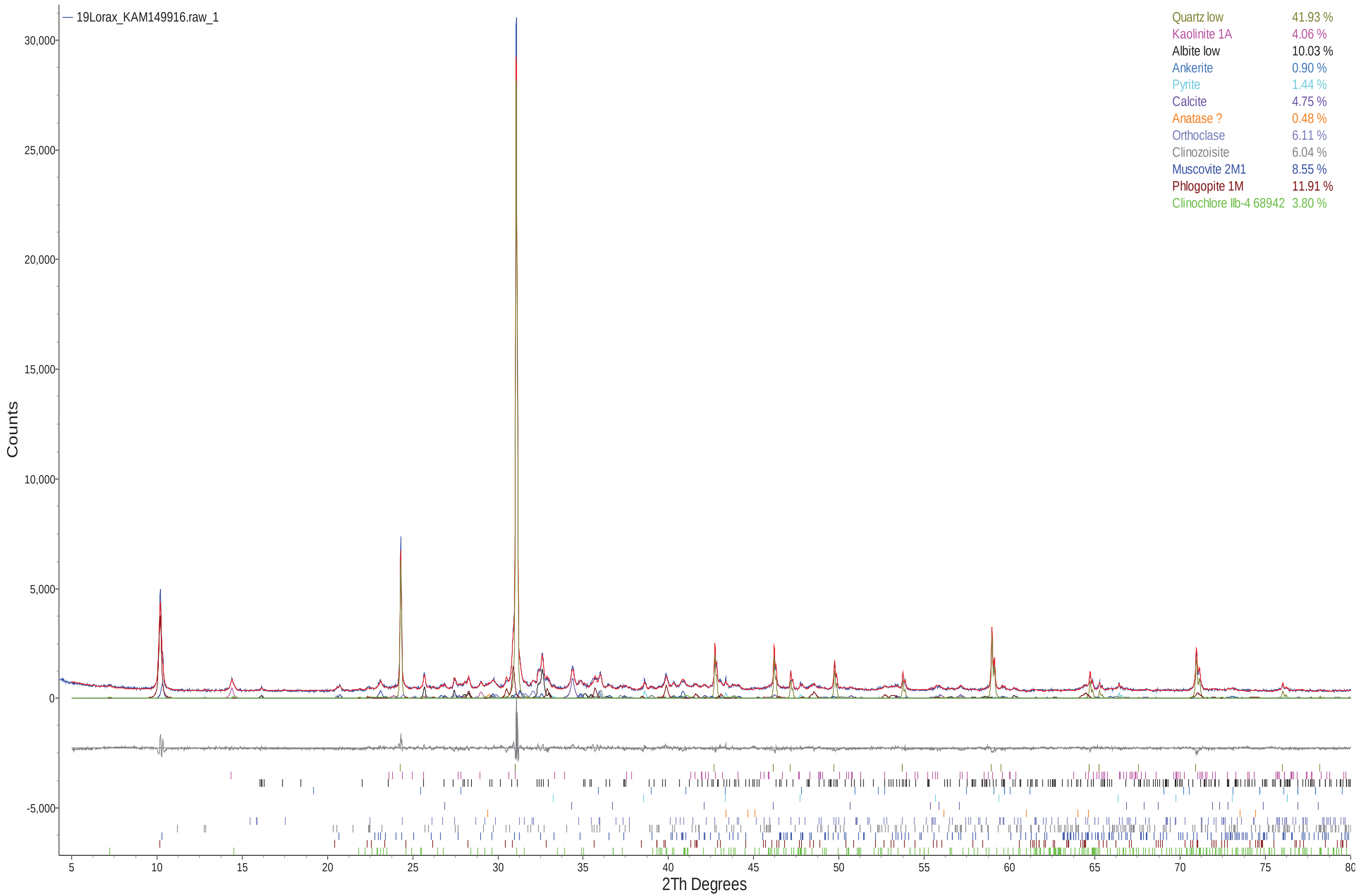

Figure 19. Rietveld refinement plot of sample **Lorax Environmental "KAM149916"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

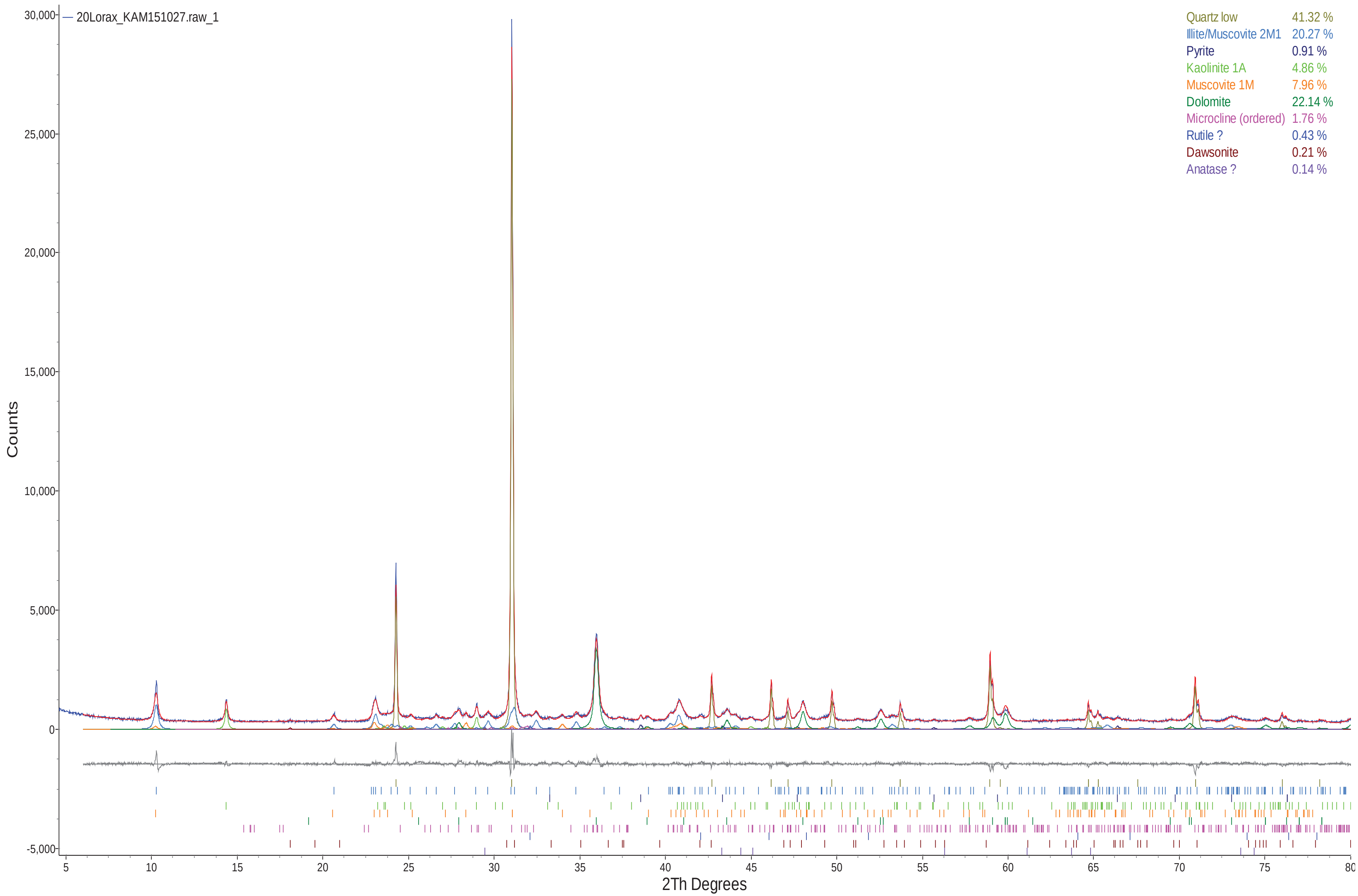

Figure 20. Rietveld refinement plot of sample **Lorax Environmental "KAM151027"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

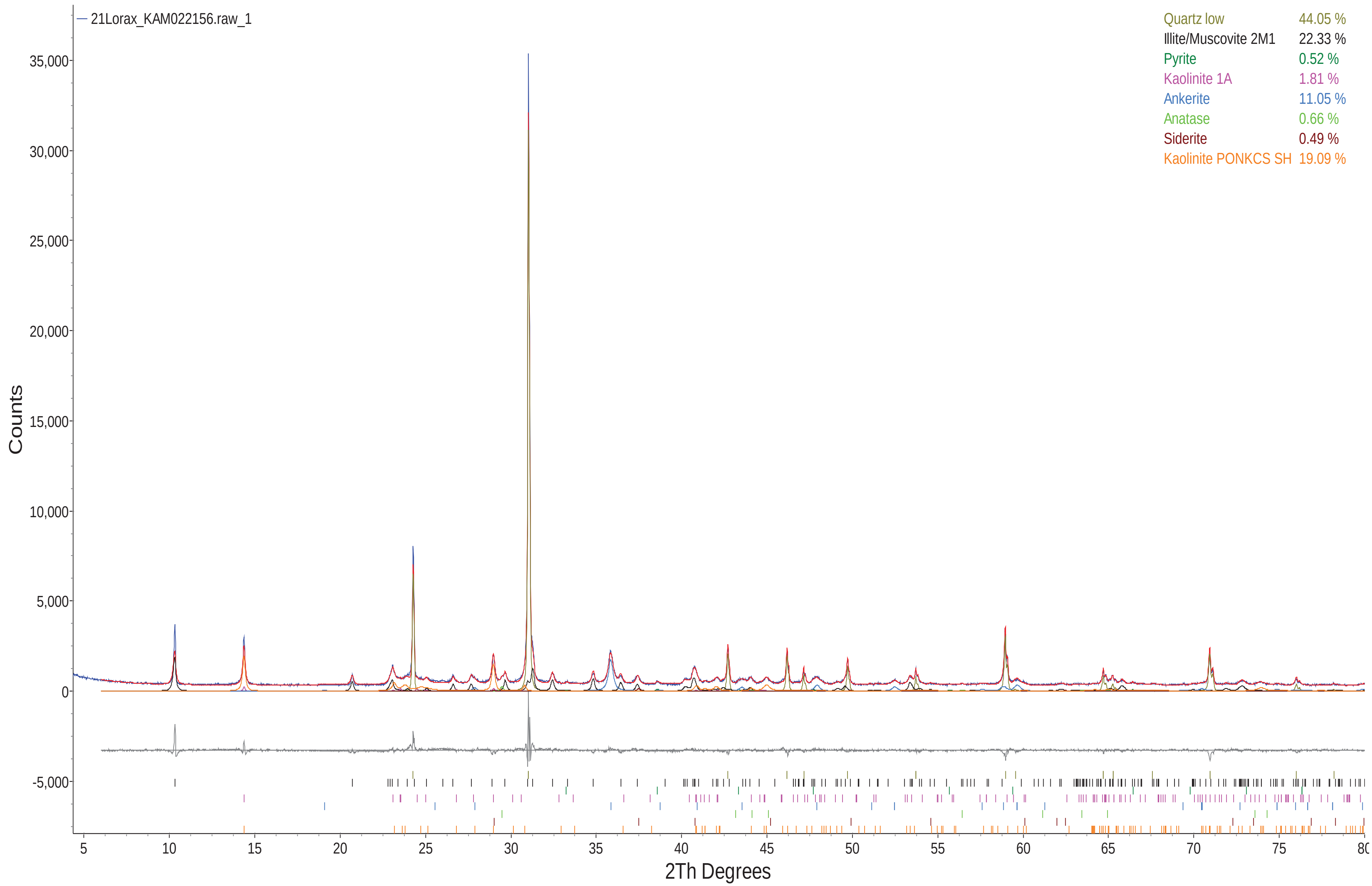

Figure 21. Rietveld refinement plot of sample **Lorax Environmental "KAM022156"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

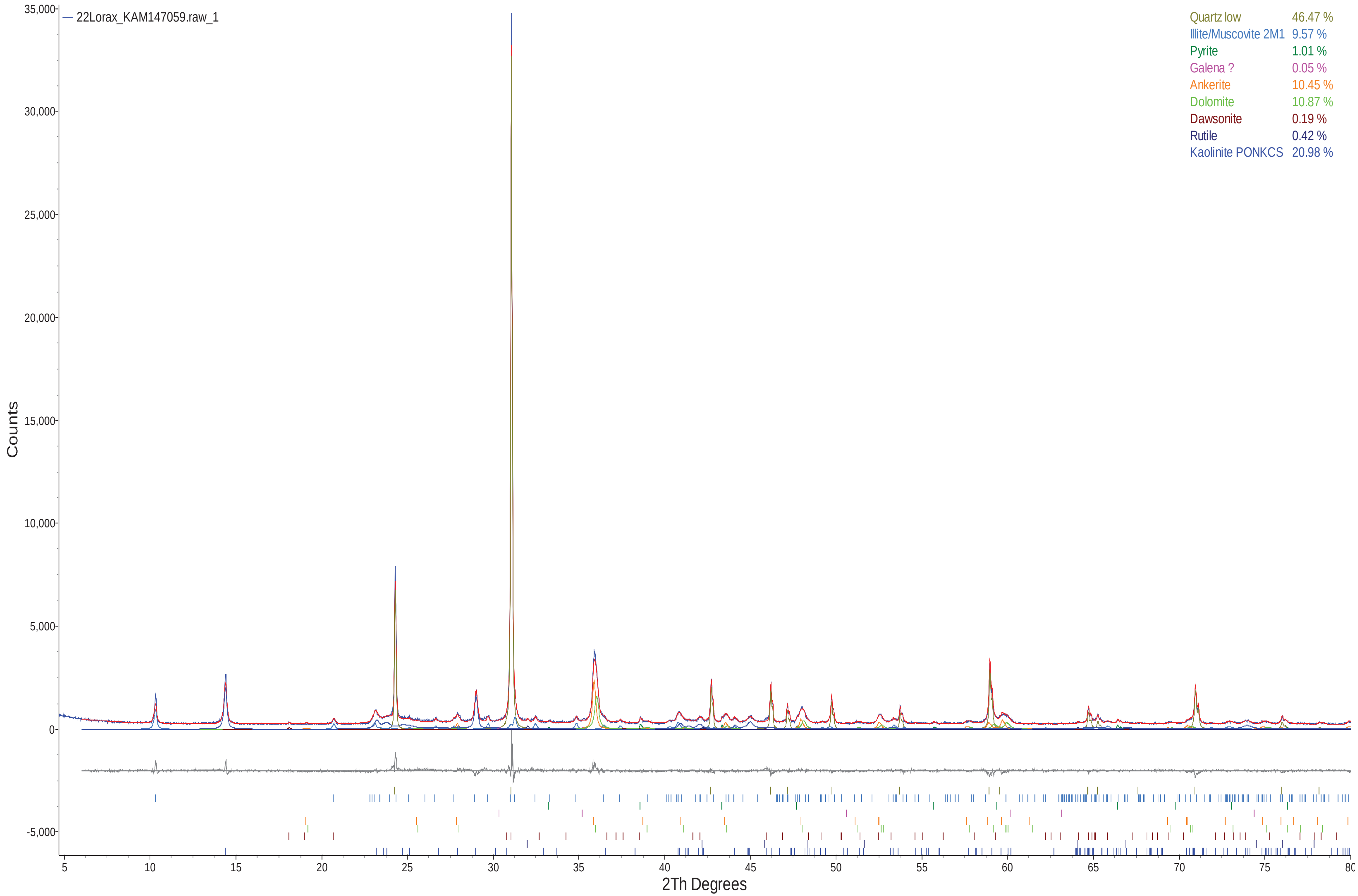

Figure 22. Rietveld refinement plot of sample **Lorax Environmental "KAM147059"** (blue line - observed intensity at each step; red line - calculated pattern; solid grey line below – difference between observed and calculated intensities; vertical bars - positions of all Bragg reflections). Coloured lines are individual diffraction patterns of all phases.

APPENDIX B.2: MINERALOGICAL ASSESSMENTS COMPLETED AT THE CANADIAN LIGHT SOURCE

Report: Kaminak sample analyses at the Canadian Light Source

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Version: 1.7 (final report)

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2 PROJECT OBJECTIVES

The main objective of this project was to evaluate uranium (U), arsenic (As) and antimony (Sb) in Yukon gold mine ore using synchrotron-based techniques.

To achieve these objectives, the following analyses have been conducted:

1. Crystalline phase identification with powder X-ray diffraction (PXRD) for 18 Yukon gold mine waste rock and ore samples.
2. Oxidation state analysis with X-ray absorption near-edge structure (XANES) spectroscopy of U and As in the waste rock and ore samples.
3. Micro X-ray fluorescence (μ-XRF) mapping of various elements of interest.

3 BACKGROUND AND METHODS

Table 3.1 Sample ID and description

Sample ID	Lithology	Oxidation	Waste rock/Ore	[U] (ppm)*	[As] (ppm)*
SO waste	Schist	Oxide	Waste Rock	2.55	369
ST waste	Schist	Transition	Waste Rock	2.7	67
SS waste	Schist	Sulfide	Waste Rock	3.2	30
GO waste	Gneiss	Oxide	Waste Rock	5.5	218
GT waste	Gneiss	Transition	Waste Rock	6.3	182
GS waste	Gneiss	Sulfide	Waste Rock	6.1	86
72139B GRO ore	Granite	Oxide	Ore	9.6	3080
72140B GRT ore	Granite	Transition	Ore	9.7	5770
72135B	Schist	Oxide	Ore	2.6	1430
72137B	Schist	Transition	Ore	2.6	1340
72144B	Gneiss	Oxide	Ore	13.1	789
72146B GT ore	Gneiss	Transition	Ore	11	1700
KAM029385	Schist	Oxide	High U Waste Rock	25.4	1150
KAM079346	Schist	Transition	High U Waste Rock	22.2	130
KAM047252	Schist	Sulfide	High U Waste Rock	40.3	288
KAM091516	Gneiss	Transition	High U Waste Rock	41	62
KAM078808	Gneiss	Sulfide	High U Waste Rock	15.1	98
KAM144308	Gneiss	Oxide	High U Waste Rock	30	469

* Uranium and arsenic measured by aqua regia digestion and ICP-MS data provided by Lorax

3.1 Powder X-ray Diffraction (PXRD)

PXRD is a powerful tool used to characterize the crystal structures of materials. Each mineral possesses a characteristic X-ray diffraction pattern that can be matched against a database of recorded phases. PXRD data is produced when a monochromatic beam is projected onto a sample at an angle; this produces diffraction pattern peaks, which can be used as “fingerprints” to identify the mineral phases present. In this work synchrotron powder diffraction was performed using Debye-Scherrer transmission geometry and an area detector (Figure 3.1).

High-energy synchrotron powder diffraction measurements were conducted using the Macromolecular Crystallography beamline (CMCF2) at the Canadian Light Source. CMCF2 is a bending magnet beamline with a Si (111) double crystal monochromator. The samples were ground and loaded into 1.5 cm long 0.032 inch polyimide capillary tubes and sealed at both ends with Loctite 454 gel epoxy. The samples and a lanthanum hexaboride (LaB_6) standard were analysed on CMCF2 at a wavelength of 0.68878Å (energy: 18 KeV). 2D diffraction patterns were collected on a Rayonix MX300HE detector at a distance of 200 mm. The 2D X-ray diffraction patterns were calibrated and integrated using GSASII software (Toby and Von Dreele, 2013). The LaB_6 was used to calibrate the sample-detector distance, detector centering, and detector tilt. The calibration parameters obtained were applied to the entire pattern before integration. Mineral phases were identified by matching the diffraction patterns of the samples to the patterns of reference single-phase mineral. The Inorganic Crystal Structure Database was used in combination with X’Pert HighScore Plus (PW3212) software. Elemental abundance ICP-MS data (provided by Lorax) were taken into consideration for the identification of the main phases present in the samples. Quantitative Reitveld refinement calculations were conducted on the data to provide quantitative estimates of identified mineral abundances in the samples. The synchrotron-based PXRD detection limit can be as low as 0.1% of total mineral phases; however, proportions of minor phases (1 % or less) are generally interpreted to be semi-quantitative, due to the influence of factors such as differing amorphous content between samples and sample inhomogeneity.

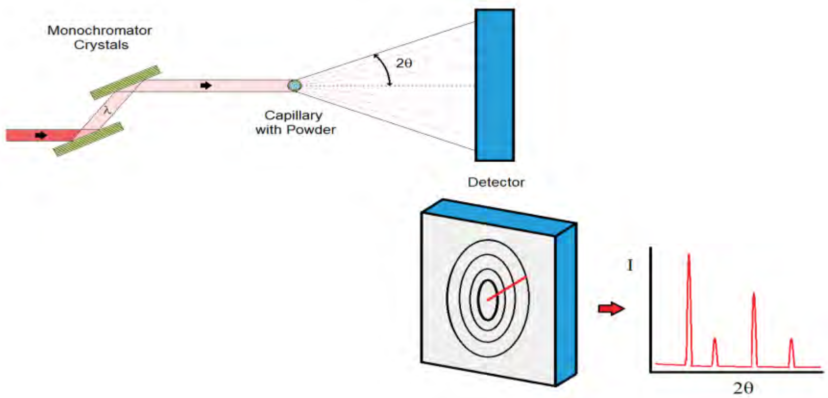


Figure 3.1 Schematic diagram of PXRD using Debye-Scherrer geometry

3.2 μ-X-ray fluorescence mapping (μXRF) mapping

Synchrotron X-ray fluorescence is a powerful approach for probing and mapping the distribution of a range of elements in a given sample. The principle of XRF is based on the detection of X-ray photons emitted from elements irradiated with X-rays. The emitted X-ray photon energies are element specific, providing a unique identification pattern for each element.

μ-XRF maps were collected on the Very Sensitive Elemental and Structural Probe Employing Radiation from a Synchrotron (VESPERS) beamline at the Canadian Light Source. Maps were collected using a pink beam (meaning the photon beam consists of a wide range of energies, max 20 keV) and several maps were collected monochromated for uranium (17199 eV). Maps were generally 300 x 300 μm in size (some smaller maps as well), collected with 5 x 5 um steps and a 1 s dwell time at each point. The beam spot size was on the order of 3 μm. μXRF spectra were collected for the following element regions of interest (ROIs), Ca K_α, Ti K_α, V K_α, Cr K_α, Mn K_α, Fe K_α – K_β, Ni K_α, Cu K_α, Zn K_α, Ga K_α, Ge K_α, As K_α-K_β, Se K_α, Rb K_α-K_β, Sr K_α-K_β, Pb L_α-L_β, Th L_α, and U L_α-L_β.It is important to note that elements with emission spectra that fall below the Ar emission energy (2950.7 eV), such P (2013.7 eV) cannot be detected on this beamline. The complete μ-XRF spectra were also collected for each map pixel and any additional peaks were identified in the integrated map spectrum. Antimony peaks were specifically searched manually in the integrated spectra. MicroAnalysis Toolkit (SMAK) was used for the XRF image analyses.

3.3 X-ray absorption near-edge spectroscopy (XANES)

Each element has a characteristic energy at which it absorbs X-rays, termed the X-ray absorption edge; features of this edge and the absorption features of the element on either side of the edge can provide us with information about the oxidation state and coordination environment of the element of study. X-ray absorption near-edge structure (XANES) is part of the X-ray absorption spectrum in general ranging from -50 eV and +100 eV relative to the absorption edge, and XANES provides information about the oxidation state of the element of interest.

Arsenic and uranium μXANES spectra were collected at the CLS VESPERS beamline. For arsenic, the beamline was calibrated to an arsenic foil at the arsenic K-edge (binding energy of the K-shell electrons of arsenic) (11871.7 eV). The XANES spectra were collected by scanning through the As Kα absorption edge over 3 energy regions: -100 eV to -30eV in 10 eV steps; -30 eV to +40 eV in 0.5 eV steps; and +40 eV to +5K in 0.05 K steps. The dwell time for each step was 5 s and four spectra were collected for each sample to improve the signal to noise ratio and check for beam damage of the sample (the position and morphology of the edge in consecutive scans may change if the beam damages the sample). For uranium, the beam was calibrated to a yttrium foil (17038 eV) and a small μXRF map was collected for each sample at an energy of 17166 eV to search for U hotspots. For samples where a U hotspot was identified, U L_3 data was collected over the following energy regions: -100 eV to -30eV in 10 eV steps; -30 eV to +40 eV in 0.5 eV steps; and +40 eV to +5K in 0.05 K steps. The dwell time varied between 5-30 s depending upon the intensity of the U signal in each sample. Between 3 and 5 spectra were collected for each sample.

The Hard X-ray Micro-Analysis (HXMA) beamline was also used to obtain U XANES spectra. HXMA has both a higher photon flux hitting the sample and a more sensitive detector, which generally allows detection of much lower concentrations of U and transition elements. However HXMA is used for bulk analyses, so for very localized spots of U VESPERS may sometimes be a more sensitive tool, because the beam can be focussed on a very small region on the sample. The HXMA beamline was calibrated to a yttrium foil at the first inflection point of the K absorption edge (17038 eV) and the uranium spectra were collected at the L_3 edge (17166 eV) over 5 energy regions: -200 eV to -160 eV, 10 eV steps; 160 eV to -100 eV, 0.5 eV steps (covering the yttrium foil calibration standard); -100 eV to -30 eV, 10 eV steps; -30 eV to +40 eV, 0.5 eV steps (uranium edge); and +40 eV to 14.2K, 0.05K steps. The dwell time for each step was 1 s.

XANES data analyses were performed using the ATHENA software suite (Demeter v. 0.9.22). In general, XANES spectra analyses provide information about the oxidation state of a given element and linear combination fitting (LCF) allow us to quantify relative abundance of species in a multi-species sample; however, the mineral phase of the element cannot be determined conclusively with this method alone. The oxidation state of each spectrum was extrapolated by comparing the absorption spectra of the samples to those of standards.

4 RESULTS AND INTERPRETATION

4.1 PXRD data

Detailed Reitveld analytical data diagrams are presented in the Appendix.

Table 4.1 Identified mineral phase in the ore samples

Sample ID	**72144B**	**72146B**	**72137B**	**72139B**	**72135B**	**72140B**
Lithology	**Gneiss**	**Gneiss**	**Schist**	**Granite**	**Schist**	**Granite**
Weathering	**Oxide**	**Transition**	**Transition**	**Oxide**	**Oxide**	**Transition**
Mineral	**Quant (wt. %)**					
Quartz	54.1	47.1	45.9	54.5	48.1	55.8
Microcline	8.5	12.3	4.1	10.5	17.7	7.3
Muscovite	11.9	10.4	13.1			18.1
Kaolinite	7.2	6.3	7.9	11.7	10.3	9.3
Phengite	18.2	7.7	7.3	21.8	9.2	
Albite		7.2			9.2	

Arsenopyrite		0.9			0.8	
Dolomite		3.4	15		3.5	
Scorodite				1.3		2.1
Barite*			0.5		0.2	
Calcite		2.5	4			
Orthoclase					0.9	7.3
Biotite			1.8			
Pyrite*		0.4	0.9	0.2	0.2	
Magnesiohornblende		1.7				

*Note: The synchrotron-based PXRD detection limit can be as low as 0.1% of total mineral phases; however, proportions of minor phases (1 % or less) are generally interpreted to be semi-quantitative, due to the influence of factors such as differing amorphous content between samples and sample inhomogeneity.

Table 4.2 Identified mineral phases in the waste samples

Sample ID	**SS**	**GS**	**GT**	**GO**	**SO**	**ST**
Lithology	**Schist**	**Gneiss**	**Gneiss**	**Gneiss**	**Schist**	**Schist**
Weathering	**Fresh**	**Fresh**	**Transition**	**Oxide**	**Oxide**	**Transition**
Mineral	**Quant (wt. %)**					
Pyrite*	1.3	0.2	0.2		0.4	0.2
Dolomite	14.4		3.6		3.5	
Quartz	29.8	38.5	49.9	46.2	53.2	28.2
Microcline	11.8	14.1	16.2	22	5.1	
Barite	0.3					
Calcite	5.1	2.3				10.6
Phengite	7.2		1.9		7.3	
Magnesium calcite	4.9	0.7	0.7		3.9	
Albite	12.8	22.3	8.4	11.3		18.5
Biotite	5.7					9.1
Muscovite		12.5	9	10.4	10.9	
Kaolinite	6.8	9.3	9.6	10.2	13.3	5.1
Arsenopyrite*			0.5			
Ankerite					2.3	
Orthoclase						11.1
Magnesiohornblende						3.3
Grossular						7.8
Diopside						6.2

*Note: The synchrotron-based PXRD detection limit can be as low as 0.1% of total mineral phases; however, proportions of minor phases (1 % or less) are generally interpreted to be semi-quantitative, due to the influence of factors such as differing amorphous content between samples and sample inhomogeneity.

Table 4.3 Identified mineral phases in the-high uranium waste rock (KAM) samples

Sample ID	**078808**	**091516**	**144308**	**047252**	**079346**	**029385**
Lithology	**Gneiss**	**Gneiss**	**Gneiss**	**Schist**	**Schist**	**Schist**
Weathering	**Fresh**	**Transition**	**Oxide**	**Fresh**	**Transition**	**Oxide**
Mineral	**Quant (wt. %)**					
Albite	55.9	7.3				
Quartz	29.1	15.5	55.6	41	34.9	50.2
Phengite			10.1	3.1	12.2	21
Kaolinite	1.7	12.7	9.6	10.9	21.2	20
Dolomite	4.9	6.3		7.9	11.5	
Pyrite*	0.7			0.6		
Microcline		27.9	24.4		10.4	6.5
Magnesium calcite		7.1				
Calcite	0.5	6.7		2		
Phlogopite		14.1				
Ankerite		2.4		11	9.8	
Barite*			0.2			
Muscovite	7.2			22.3		
Pyrite, arsenian				0.8		

Manganese sulfide*				0.4		
Diopside						2.2

*Note: The synchrotron-based PXRD detection limit can be as low as 0.1% of total mineral phases; however, proportions of minor phases (1 % or less) are generally interpreted to be semi-quantitative, due to the influence of factors such as differing amorphous content between samples and sample inhomogeneity.

4.1 μXRF maps

4.1.1 Uranium in μXRF maps

μXRF maps were collected using a pink beam (broad energy spectrum) for 18 samples and the distribution of 6 elements (U L_α, Zn K_α, Fe K_α, Ca K_α, As K_β, Sr K_α) is shown for each sample in Figure 4.1-4.3 and Figure 7.8- 7.23. Monochromated uranium μXRF maps were also collected prior to the μXANES analyses performed on the VESPERS beamline. It is important to note that the emission peaks of Rb L_α and U L_α partially overlap; therefore, U can be either masked or appear as a false positive when Rb is present in the sample. Potential presence of Rb is also indicated on the U XRF maps labeled as U L_α / Rb L_α. In addition, U and Rb often occur together, so each putative uranium hotspot region was inspected manually to ensure that the true uranium hotspots are correctly identified in the data. All the samples were examined, and true U hotspots were detected only in 5 KAM samples, 1 ore and 2 waste samples (Figure 4.4, 4.5, 7.1, U hotspot regions are highlighted in the U/Rb XRF maps). Though the concentration of U in the GO and GS waste samples was relatively low (5.5 and 6.1 ppm, respectively; ICP-MS data), we still observed verified U hotspots in these samples. This indicates that even though U concentrations were low, U occurred as highly concentrated particles. These particles are likely evenly dispersed in these ground samples since they were observed in duplicate XRF maps for the GS waste sample.

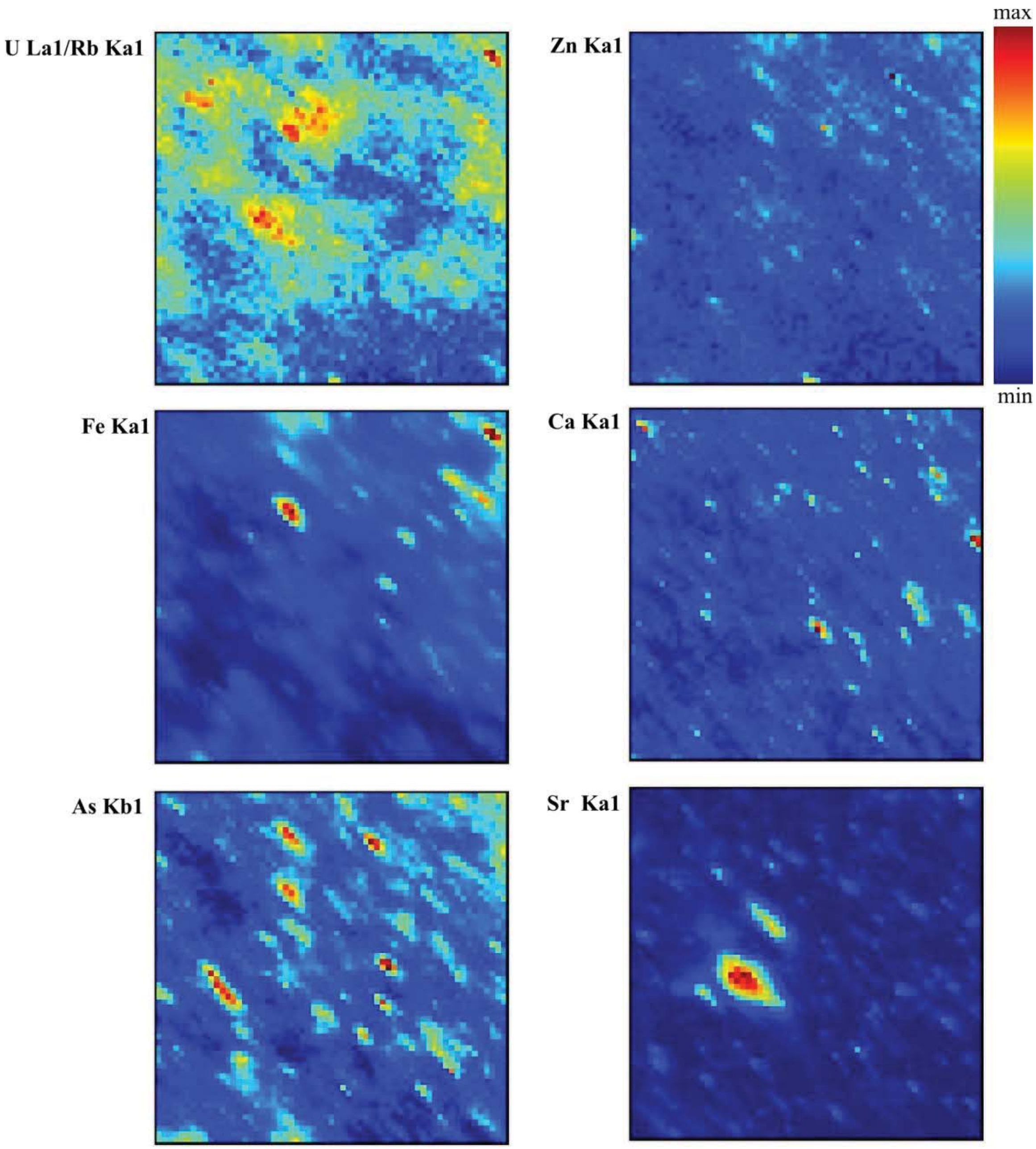


Figure 4.1 XRF elemental distribution maps of 72144B sample
X-ray fluorescence intensities of the elements are scaled between red (maximum) and blue (minimum).

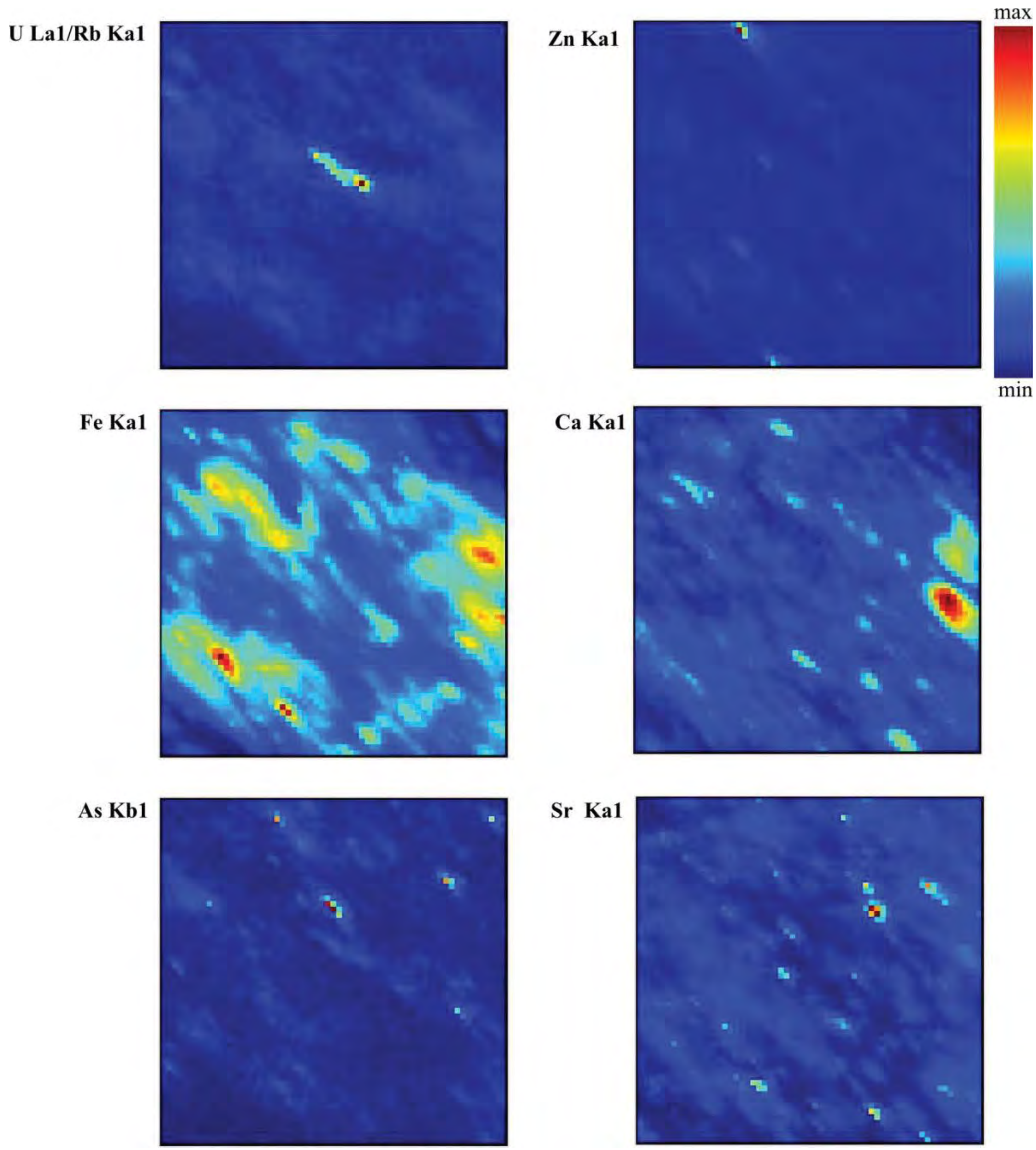

U La1/Rb Ka1
Zn Ka1
max
min
Fe Ka1
Ca Ka1
As Kb1
Sr Ka1

Figure 4.2 XRF elemental distribution maps of GS waste
X-ray fluorescence intensities of the elements are scaled between red (maximum) and blue (minimum).

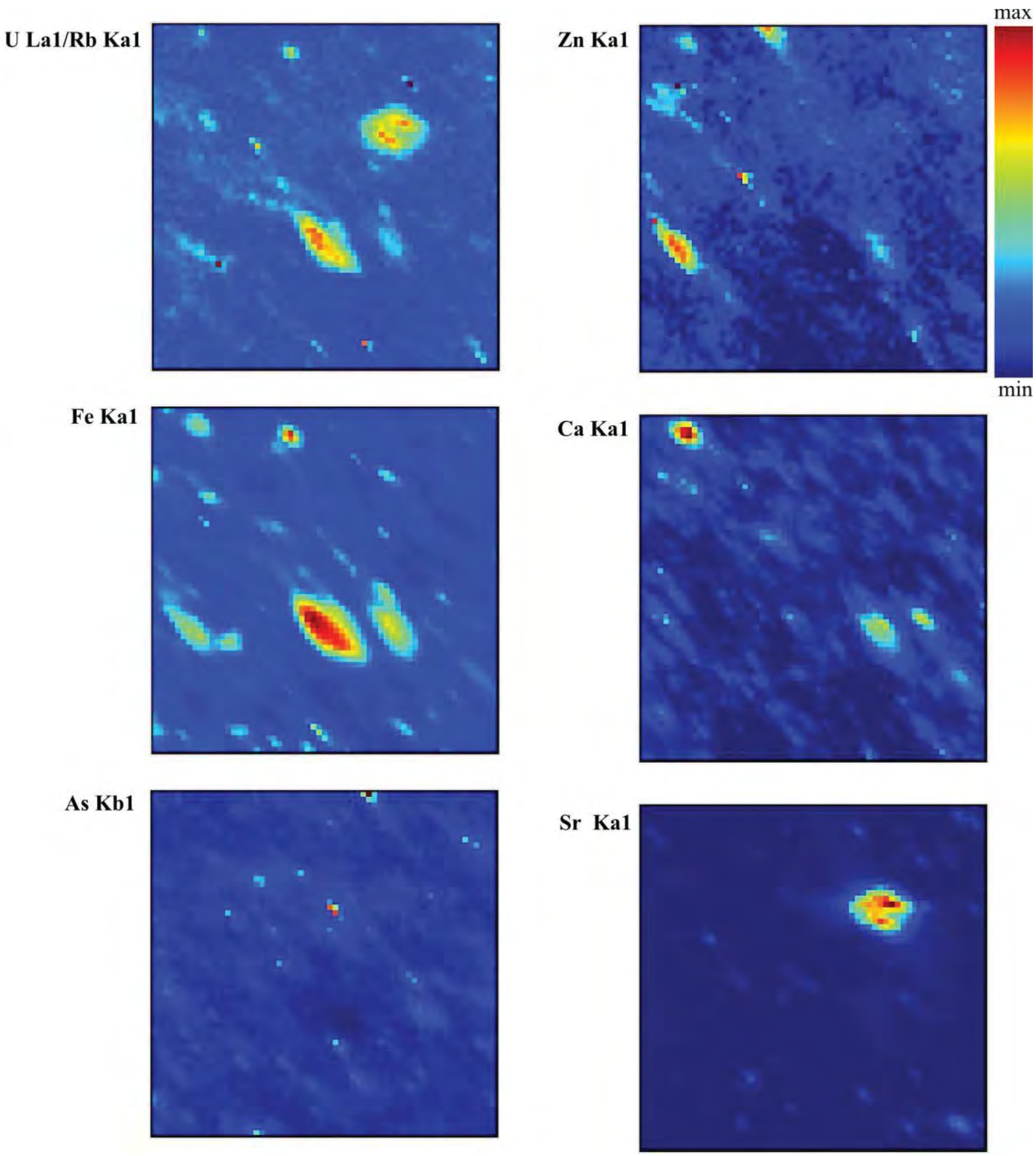
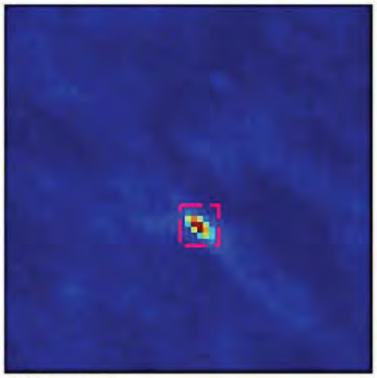
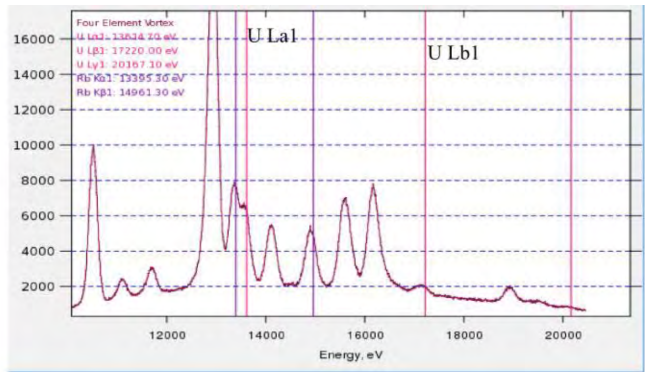
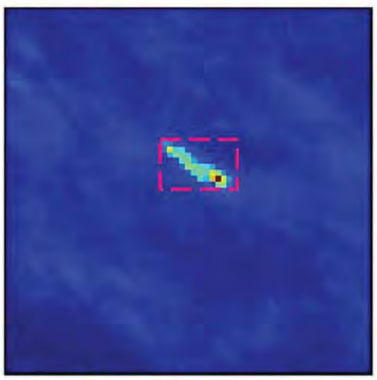


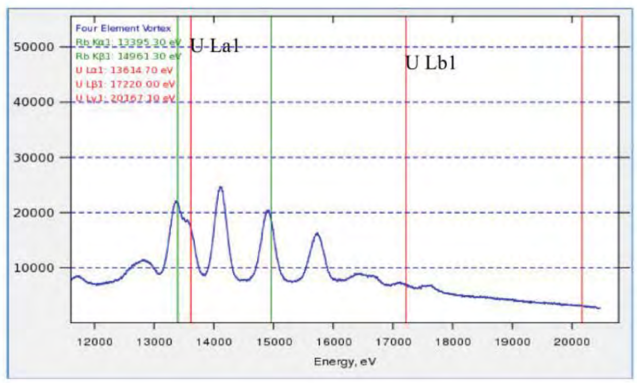
Figure 4.3 XRF elemental distribution maps of KAM078808 sample
X-ray fluorescence intensities of the elements are scaled between red (maximum) and blue (minimum).



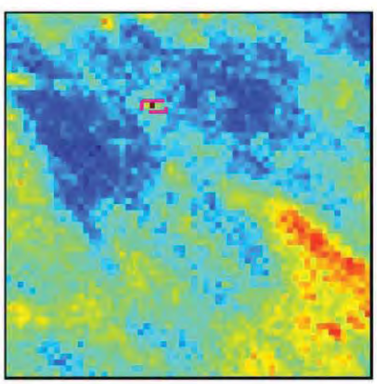


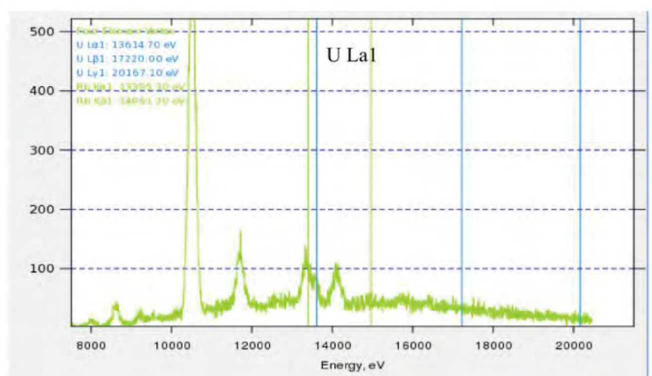
GO waste





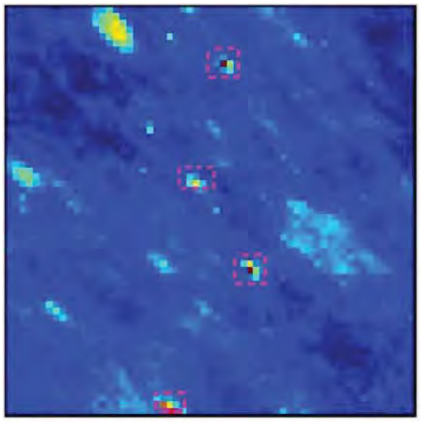
GS waste

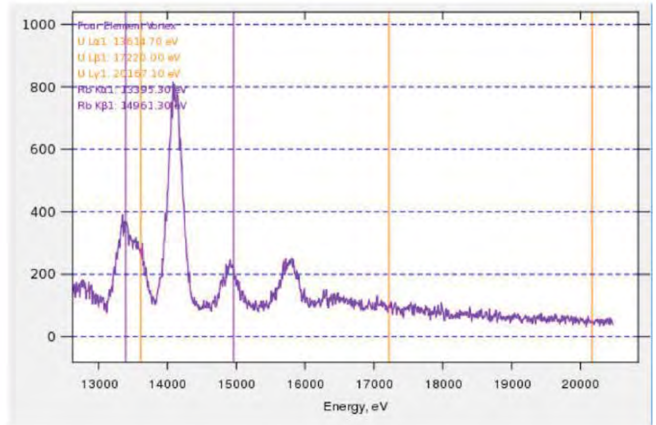




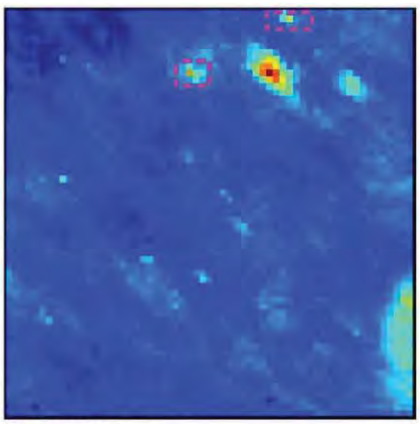
GT ore

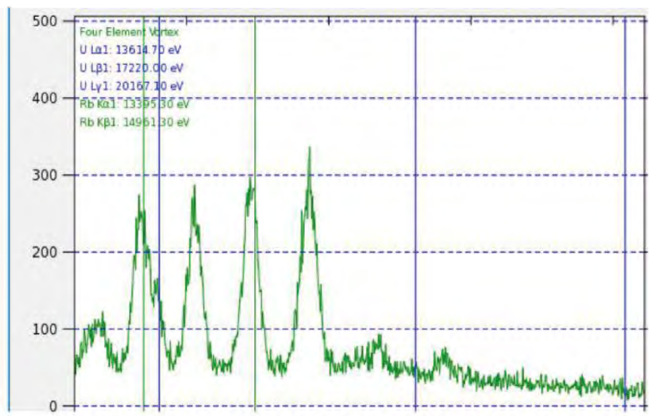
Figure 4.4 Verified U hotspots and corresponding spectra identified on the U/Rb XRF maps. These regions are marked with purple boxes**.**



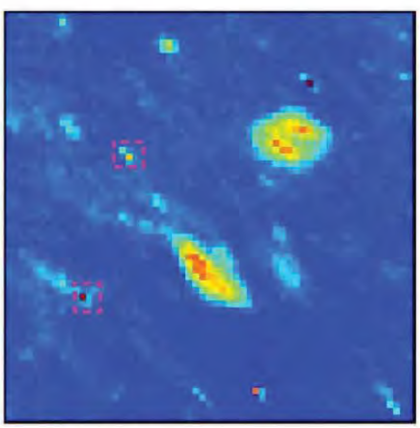


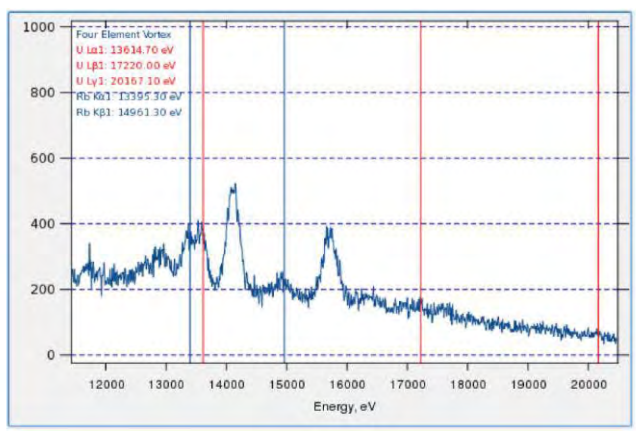
KAM047252





KAM091516





KAM078808

Figure 4.5 Verified U hotspot regions and corresponding spectra identified on the U/Rb XRF maps. These regions are marked with purple boxes.

4.1.2 Tri-colour µXRF maps

In order to investigate the presence of different types of primary (e.g. brannerite, thorite) and secondary (e.g. autunite, carnotite, torbernite, uranophane) uranium minerals in the samples, the co-occurrence of U with a range of elements (Ti, Th, V, Ca, Cu, As) was checked. Various As-bearing minerals were also checked by looking at potential association of As with Fe and Ca. Colour maps were prepared to illustrate the following co-localization patterns for elements that showed association with U and As: U/Fe/As, Ca/Fe/As, U/Th, and U/Ti.

Tri-colour plots illustrating co-localization of U with Fe and As are shown in Figure 4.6. From these images it is evident that U tends to co-occur with Fe, as indicated by purple coloured regions. Spatial overlapping of As with U and Fe is also visible (indicated with greenish/yellowish coloured regions) in GO waste and KAM047242 samples (Figure 4.6). The arsenic-bearing iron mineral phase arsenian pyrite has been identified in the KAM047242 using PXRD analysis (Table 4.3). Co-localization of U with Th and Ti is illustrated in Figure 4.7. Spatial overlap of U with Th is visible in KAM144308 and GO waste samples and of U with Ti in KAM091516 and GS waste samples.

To investigate the presence of Ca-Fe arsenate phases (such as yukonite) in the samples tri-colour plots were constructed for As, Ca and Fe (Figure 4.8; Figure 7.3). Distinct purple regions are visible in each sample, indicating that As tend to co-occur with Fe; however, distinct red regions in KAM091516, KAM078808, KAM047252, 72144B, 72135B, GS waste and GT waste samples indicate As is present at far higher concentrations than Fe in those regions (Figure 7.3). Only one whitish region was observed that indicates the co-occurrence of As, Ca, and Fe; this was in the 72137B sample (Figure 4.8). To test this apparently relationship, we sub-selected scatter-plotted data points from this map that had the following relationships: high As/high Fe, high As/high Ca, and high Fe/low Ca (Figure 4.10). This analysis confirmed that the whitish region was relatively high in Ca/Fe/As, and distinct from the surrounding region that was high in Fe but low in Ca (Figure 4.10, high Ca/Fe/As region outlined in red). For most of the samples, As was correlated with Fe.. An example of this Fe and As relationship is presented for the GRT ore sample (Figure 4.9). This is in agreement with the PXRD analysis where scorodite was identified in the sample (Table 4.2). Overall, these findings suggest that yukonite or other Ca/Fe/As phases could be present, however they are certainly not as prevalent in the samples as Fe/As phases, such as scorodite. A summary table of µXRF map data and spatial overlap of U and As with various elements are summarized in Table 4.4.

Table 4.4 Summary table of As and U microXRF analyses

Sample ID	micro XRF map	Verified Uranium spots	SPATIAL OVERLAP**							
			U/Fe	As/U/Fe	Ca/U	Cu/U	Ti/U	Th/U	Fe/As	As/Ca/Fe
SO waste	✓	**ND**							✓	
ST waste	✓	**ND**							✓	
SS waste	✓	**ND**							✓	
GO waste	✓	✓	✓	✓	✓	✓		✓	✓	
GT waste	✓	**ND**							✓	
GS waste	✓	✓	✓			✓	✓		✓	
GRO ore	✓	**ND**							✓	
GRT ore	✓	**ND**							✓	
72135B	✓	**ND**							✓	
72137B	✓	**ND**							✓	✓
72144B	✓	**ND**							✓	
GT ore	✓	✓							✓	
KAM029385	✓	**ND**							✓	
KAM079346	✓	✓	✓		✓				✓	
KAM047252	✓	☑	✓	✓	✓				✓	
KAM091516	✓	☑	✓		✓	✓	✓		✓	
KAM078808	✓	☑	✓			✓			✓	
KAM144308	✓	☑	✓		✓	✓		✓	✓	

*pink beam – broad energy spectrum
**spatial overlap- is not necessarily correlation
blank boxes indicate a lack of co-occurrence, all possible combinations in the table have been checked
☑- indicate multiple U spots were detected

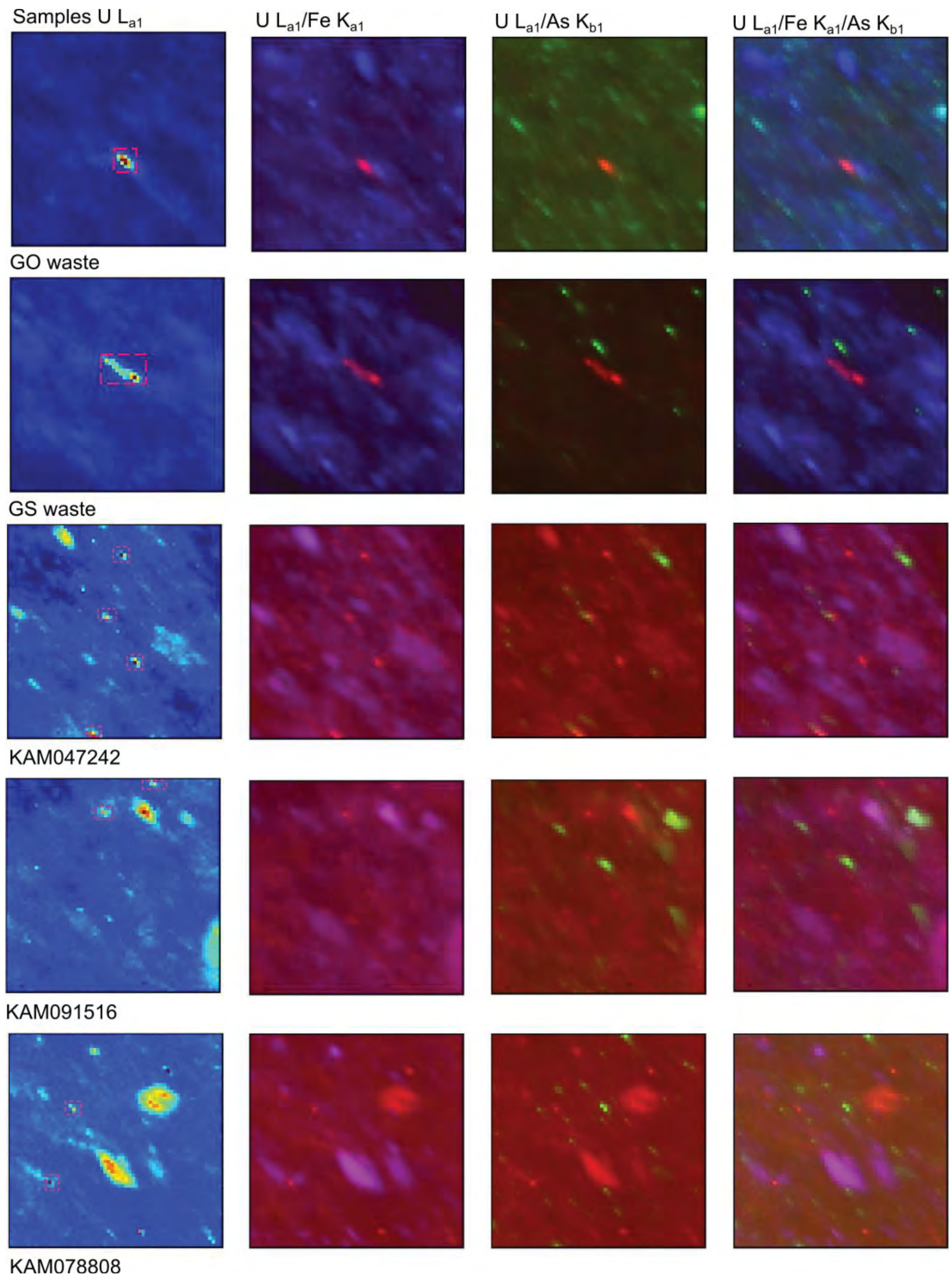

Samples U L_{a1}
U L_{a1}/Fe K_{a1}
U L_{a1}/As K_{b1}
U L_{a1}/Fe K_{a1}/As K_{b1}
GO waste
GS waste
KAM047242
KAM091516
KAM078808

Figure 4.6 Tri-colour mapping plot of U, As and Fe
(Red=U, Green=As, Blue=Fe)

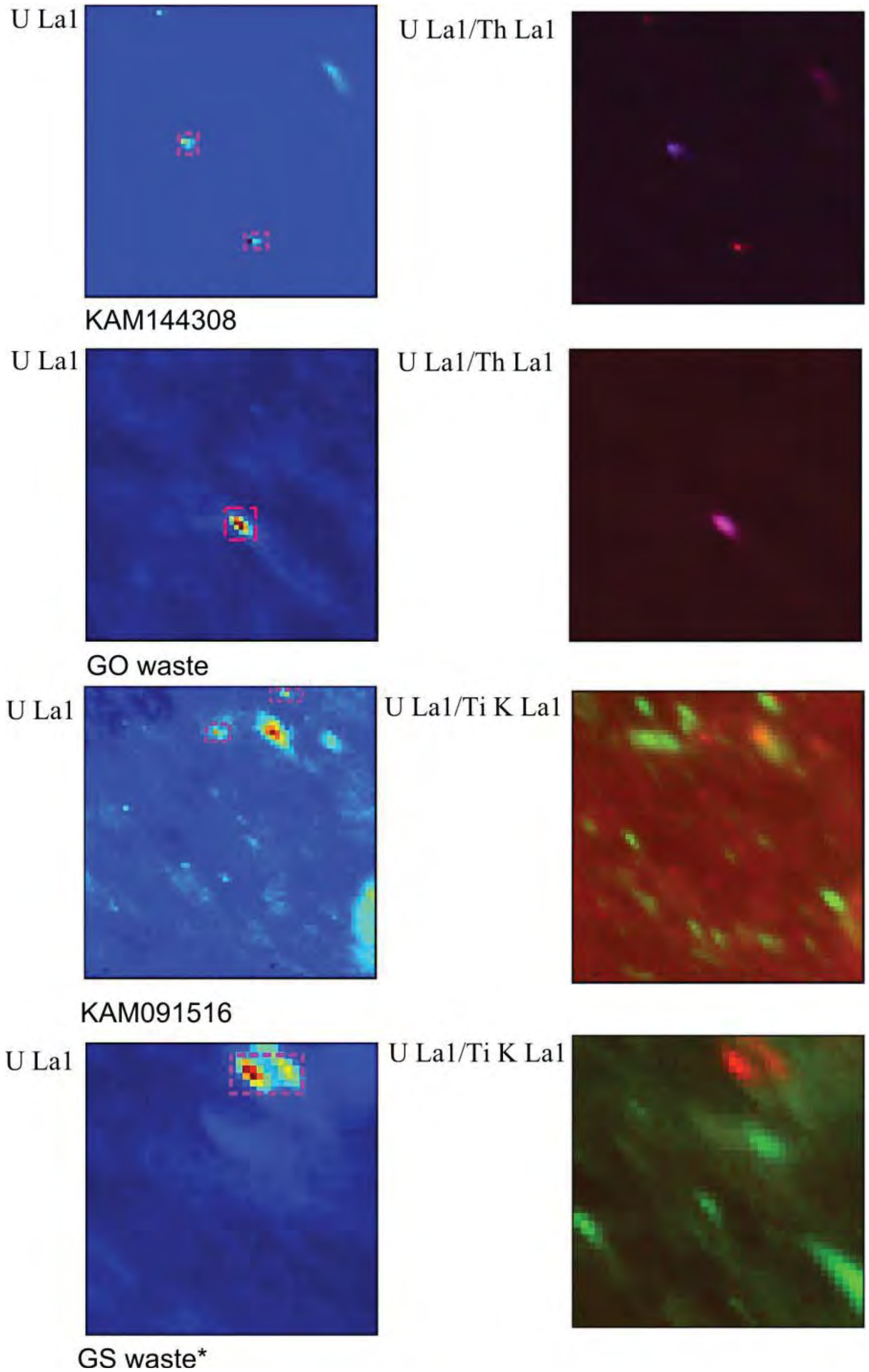
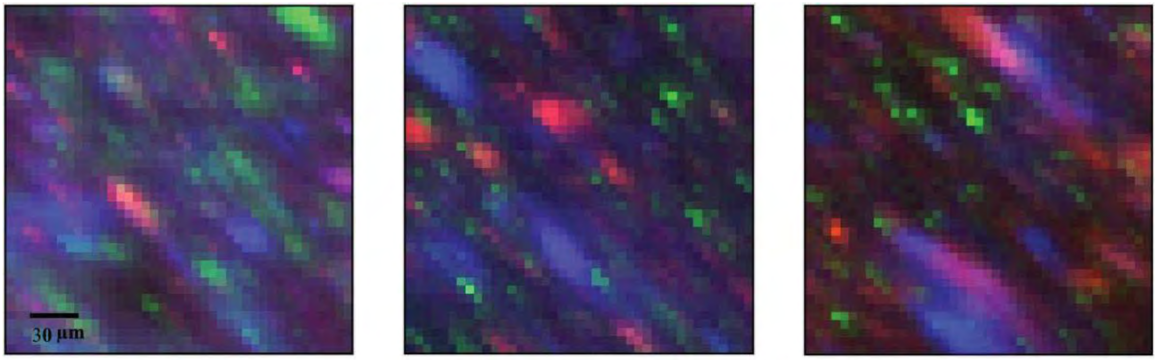


Figure 4.7 Colour map of U-Th and U-Ti

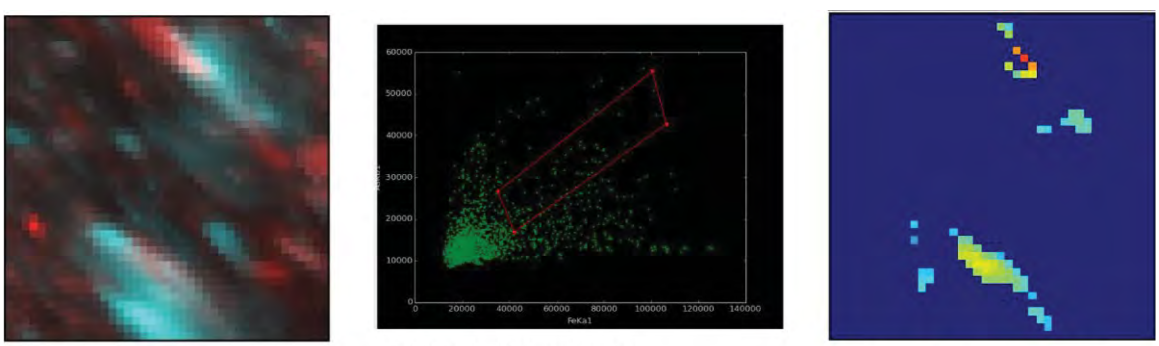
(Red=U, Blue=Th; Red=U, Green=Ti)



72137B GRO ore GRT ore

Figure 4.8 Tri-colour mapping plot of As, Fe and Ca

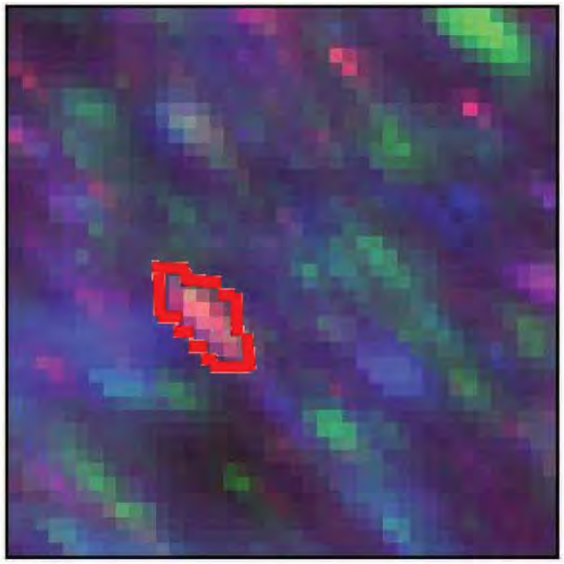
(Red=As, Green=Ca, Blue=Fe)



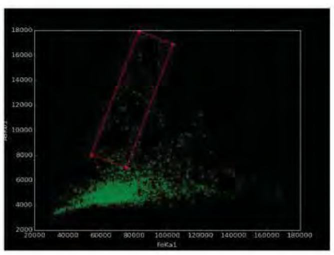
GRT ore Fe Ka1-As Kb1 scatter plot Fe Ka1-As Kb1 selected plot corresponding As region

Figure 4.9 Colour map and scatter plot of As and Fe

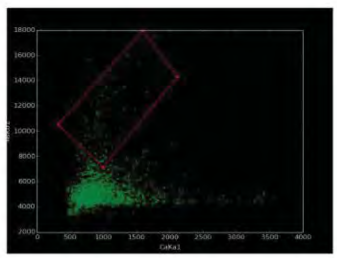
(Red=As, Cyan=Fe)



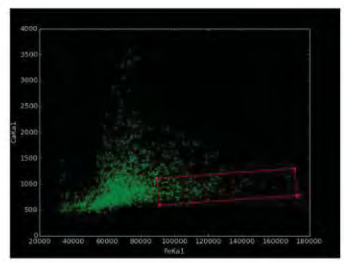
72137B



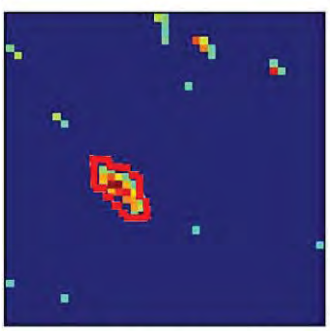
Fe Ka1-As Kb1 scatter plot



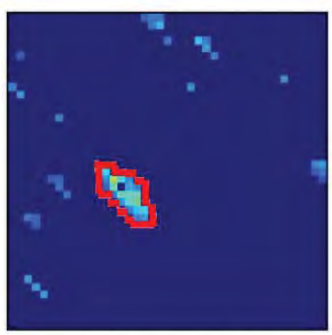
Ca Ka1-As Kb1 scatter plot



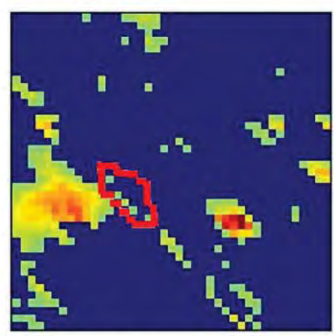
Fe Ka1-Ca Ka1 scatter plot



Fe Ka1-As Kb1 marked plot corresponding As region



Ca Ka1-As Kb1 marked plot corresponding Ca region



Fe Ka1-Ca Ka1 marked plot corresponding Fe region

Figure 4.10 Tri-color and scatter plot of As, Ca and Fe

(Red=As, Green=Ca, Blue=Fe)

4.2 Arsenic μXANES data

Figure 4.11 compares the As K-edge XANES spectra of 10 samples to 5 standards with known oxidation state. To extrapolate oxidation state of As the following standards were used: scorodite ($FeAsO_4 \cdot 2H_2O$; As^{+5}), Ca-arsenate ($Ca_3(AsO4)_2$; As^{+5}), and yukonite ($Ca_3Fe(AsO_4)_2(OH)_3 \cdot 5H_2O$; As^{+5}), orpiment (As_2S_3; As^{+3}), and arsenopyrite (FeAsS; As^{-1}). Comparison of these spectra indicates that As is in oxidized form (As^{+5}) in 6 samples, (KAM144308, KAM029385; 72139B, 72144B, 72135B, 72140B, Figure 4.11A). Four samples contain both oxidized and reduced As species (72137B, 72146B, KAM078808, GS waste, figure 4.11B).

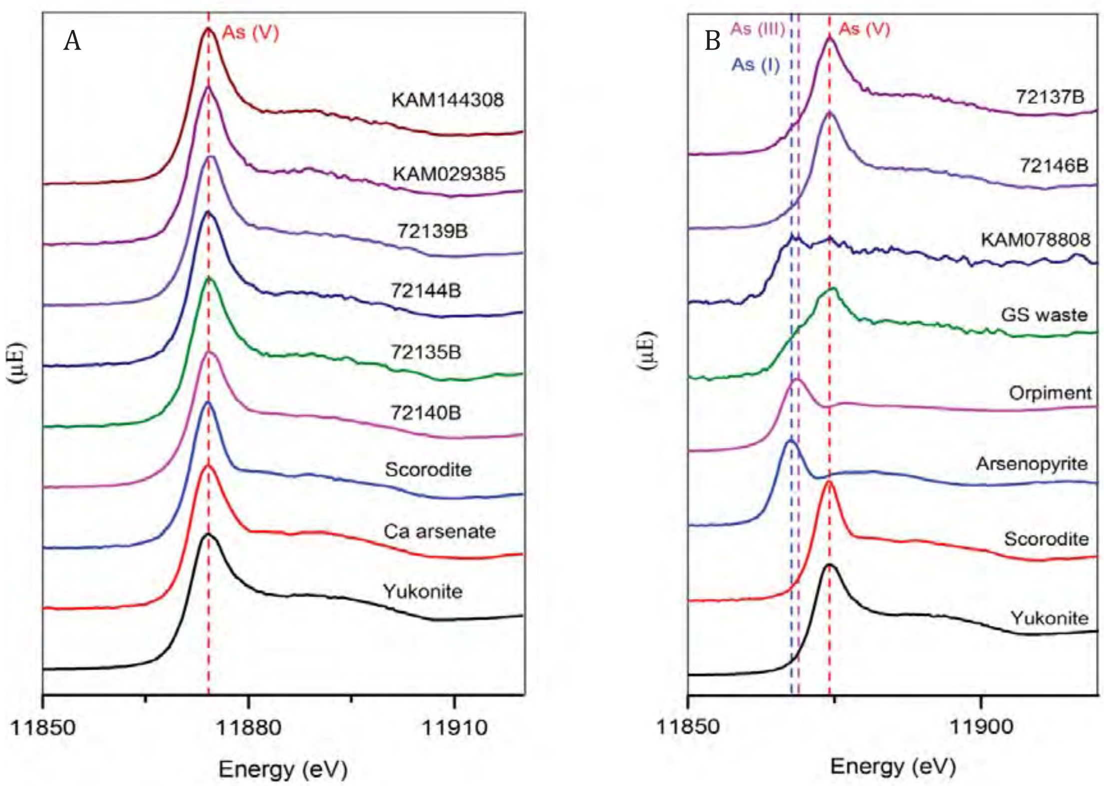


Figure 4.11 Arsenic K-edge μXANES spectra

The As K-edge spectra of the samples were further analyzed using the linear combination fitting (LCF) method. Since scorodite and arsenopyrite were identified in some of the samples using PXRD, we used these standards for the LCF analyses; orpiment was selected as the As^{3+} standard because it is a common As^{3+} mineral with a unique absorption edge energy that is different from other arsenic (III) oxides, therefore it is relatively easy to identify this oxidation state (examples of LCF results are shown in Figure 4.12). The relative abundance of As^{+5}, As^{+3}, and As^{-1} containing compounds represented by scorodite, orpiment, and arsenopyrite, respectively, are summarized in Table 4.5.

It is important to note that the XANES spectra analyses provide information about the oxidation state of As and allows quantification of relative abundance of the identified oxidation species; however, mineral phases cannot be determined unless additional complementary methods are used and there is detectable mineral phase present. Therefore, relative abundance of scorodite and arsenopyrite can be determined using XANES analyses in those samples in which these mineral phases were identified using PXRD (Table 4.5). Since orpiment was not identified by PXRD in any of the samples, and no other As^{+3} minerals were identified, orpiment was selected to represent the As^{+3} oxidation state and relative abundance of As^{+3} mineral phase.

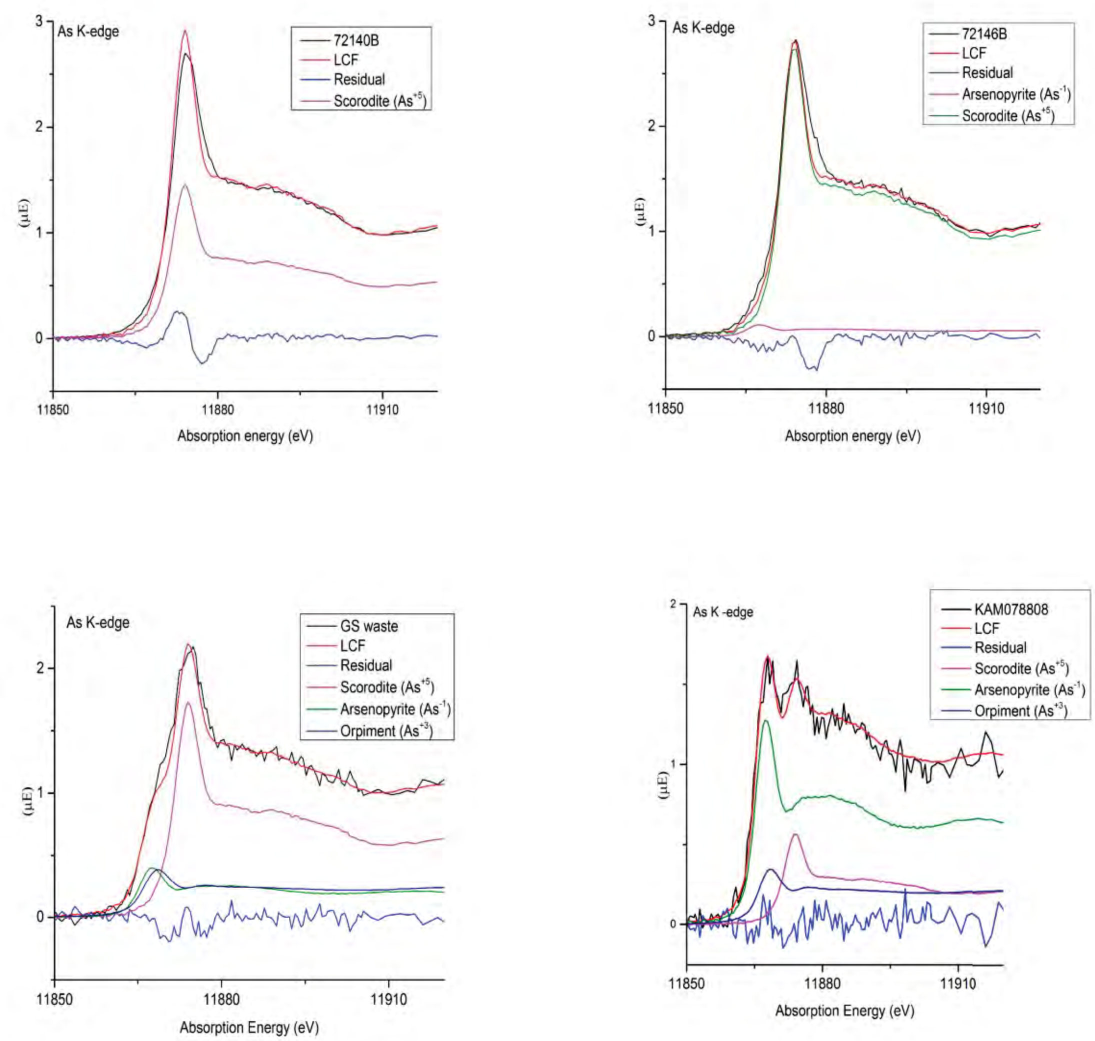


Figure 4.12 Arsenic spectra of samples compared to spectra calculated from linear combination fitting of the standards

Table 4.5 Relative abundance of As species estimated from the linear combination fits

Sample	Scorodite (As^{+5})	Arsenopyrite (As^{-1})	Orpiment (As^{+3})	R factor
GS waste	59.4	19.1	21.6	0.0087566
KAM078808	19.5	61	19.5	0.0197784
72140B*	100	-	-	0.0124062
72146B**	94.7	5.3	-	0.0133656
72137B	90.7	9.3	-	0.0188721
72135B	100	-	-	0.0147336
72144B	100	-	-	0.0170556
72139B*	100	-	-	0.0143326
KAM144308	100	-	-	0.0153481
KAM029385	100	-	-	0.0172278

* scorodite identified by PXRD
** arsenopyrite identified by PXRD

4.3 Uranium XANES data

Uranium L_3-edge XANES spectra were collected on the HXMA beamline for 8 samples (6 high uranium waste rock, 1 ore, and 1 waste rock sample). In general, all these samples are on the low end of bulk U concentrations that can be detected using the HXMA beamline (concentrations based on ICP-MS analyses provided by Lorax). To maximize the chances of obtaining U XANES spectra the high uranium waste rock samples were run first (U concentration ranging between 30 to 60 ppm). Then other samples were selected where verified U hotspots were detected with μXRF mapping; the U concentrations in these samples were between 6 and 10 ppm. U spectra were obtained for GS waste (6.1 ppm) and GT ore (11 ppm). Analyses of the GO waste sample were also attempted (5.5 ppm) however the concentration was below the detection capabilities of the beamline. Additional μXANES spectra were also collected for two of these high uranium waste rock samples (KAM091516, KAM078808) on the VESPERS beamline.

A limited number of U standards were run due to radiation regulation limitations placed on our analyses and standard acquisition. We selected a single standard for each of the two most common oxidation states observed in environmental samples: uraninite (UO_2; U^{+4}) and uranium nitrate ($UO_2(NO_3)_2$; U^{+6}). It is important to note that these standards were used to obtain spectra for the relevant oxidation states of U and it does not indicate that these phases would occur in these geological samples (the $UO_2(NO_3)_2$ is not expected to occur in a natural environment).

Note that the difference between uranium phases of similar oxidation states is minimal due to the broadness in line-shape of the U L3-edge. There is a distinct shift in the U L3-edge absorption edge energy between U^{4+} and U^{6+}, as illustrated in Figures 4.13 and 7.4. Therefore, LCF analysis can provide information on the relative amount of $U^{+4}$and U^{+6} species in each sample. For the LCF analysis, spectra were fitted to uraninite and uranyl nitrate as representatives of the U^{+4} and U^{+6} species, respectively, present in the samples. The U XANES spectra were fitted to the standards (Figure 4.14, 7.5) and the relative abundance of U^{+4} and U^{+6} species is summarized in Table 4.6.

Based on the absorption edge energy of the standards, the oxidation state of U in most of the samples analysed is between +4 and +6 (Figure 4.14). In one high uranium waste rock sample (KAM144308), uranium appears as +6 only. The predominant oxidation state of U (>50%) is +4 in most of the samples except for KAM029385 and GS waste rock samples (Table 4.6). Uranium μXANES spectra were also collected for two high uranium waste rock samples (KAM091516, KAM078808) using the VESPERS beamline, and the results were consistent with the other data (mixture of +4 and +6 oxidation states) Figure 7.7).

Visible verified U hotspots as well as U XANES data are available for a total of 6 samples: five high U waste rock and one gneiss waste rock. The fact that these samples contain U^{+6} and the spatial overlap of verified U regions with Fe (Figure 4.13) suggest that this form of U is associated with iron oxides in these samples. Distribution of P was not examined in these samples due to beamline energy limitations; however, spatial overlap of verified U regions with Ca and/or Cu, Ti, Th as well as presence of U^{+4} suggest that other U mineral phases are also possible.

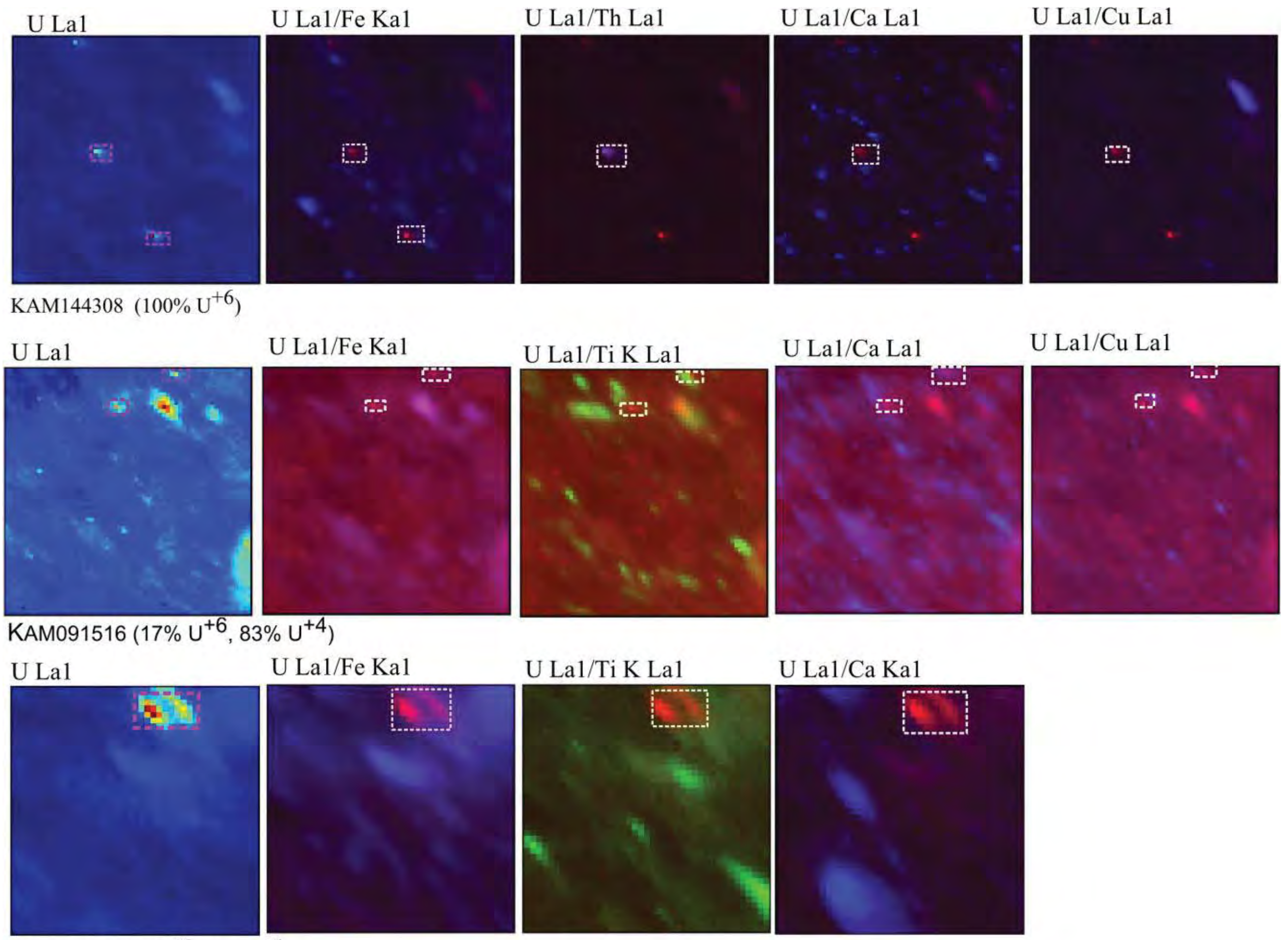


Figure 4.13 Spatial overlap of verified U spots with a range of elements that can be found in various U-bearing mineral phases (Red=U, Ti=green, Fe, Ca, Cu=green). This figure is divided in two panels for presentation purposes and it is continued on the next page.

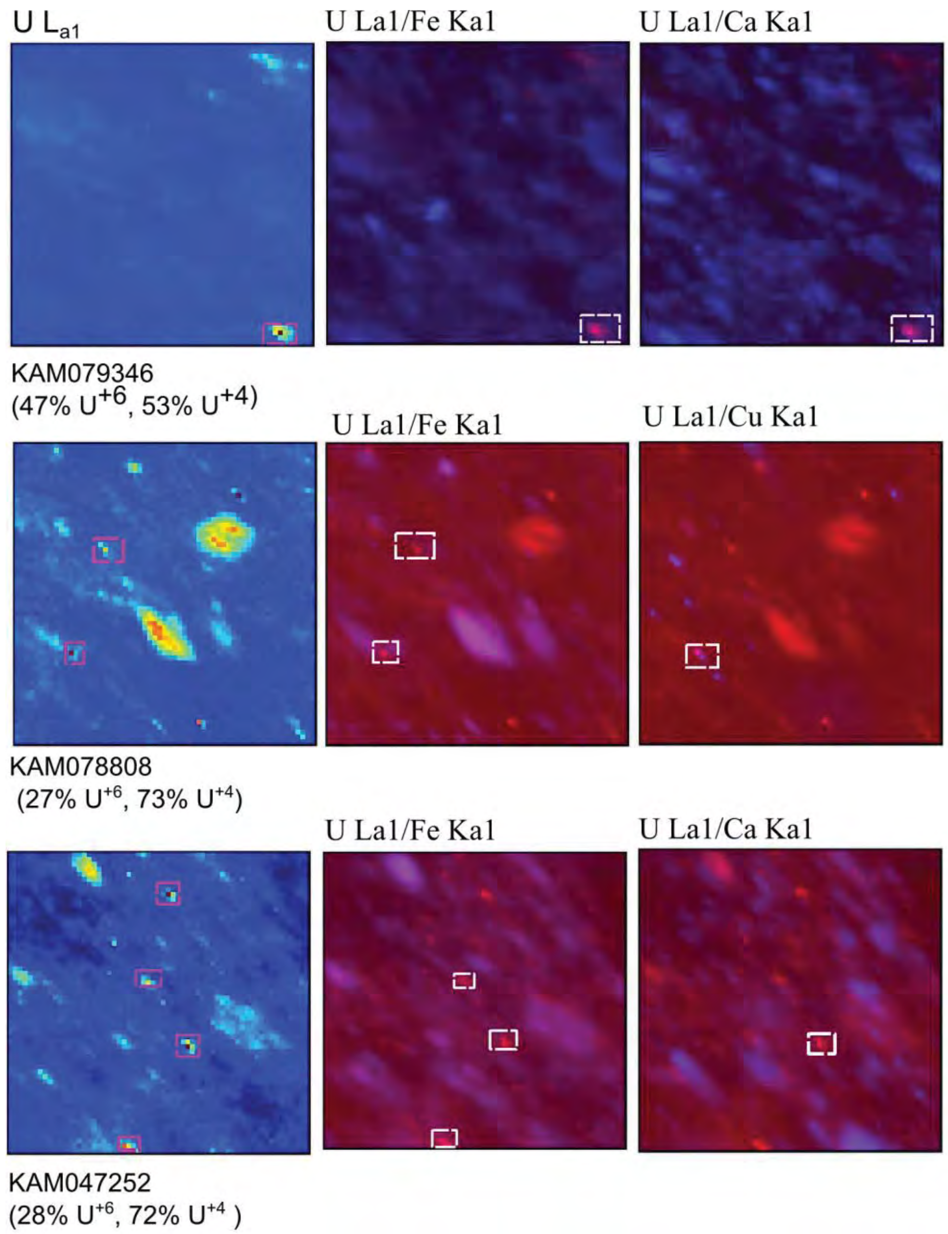


Figure 4.14 Spatial overlap of verified U spots with a range of elements that are that can be found in various U-bearing mineral phases (Red=U, Ti=green, Fe, Ca, Cu=green). This figure is divided in two panels for presentation purposes.

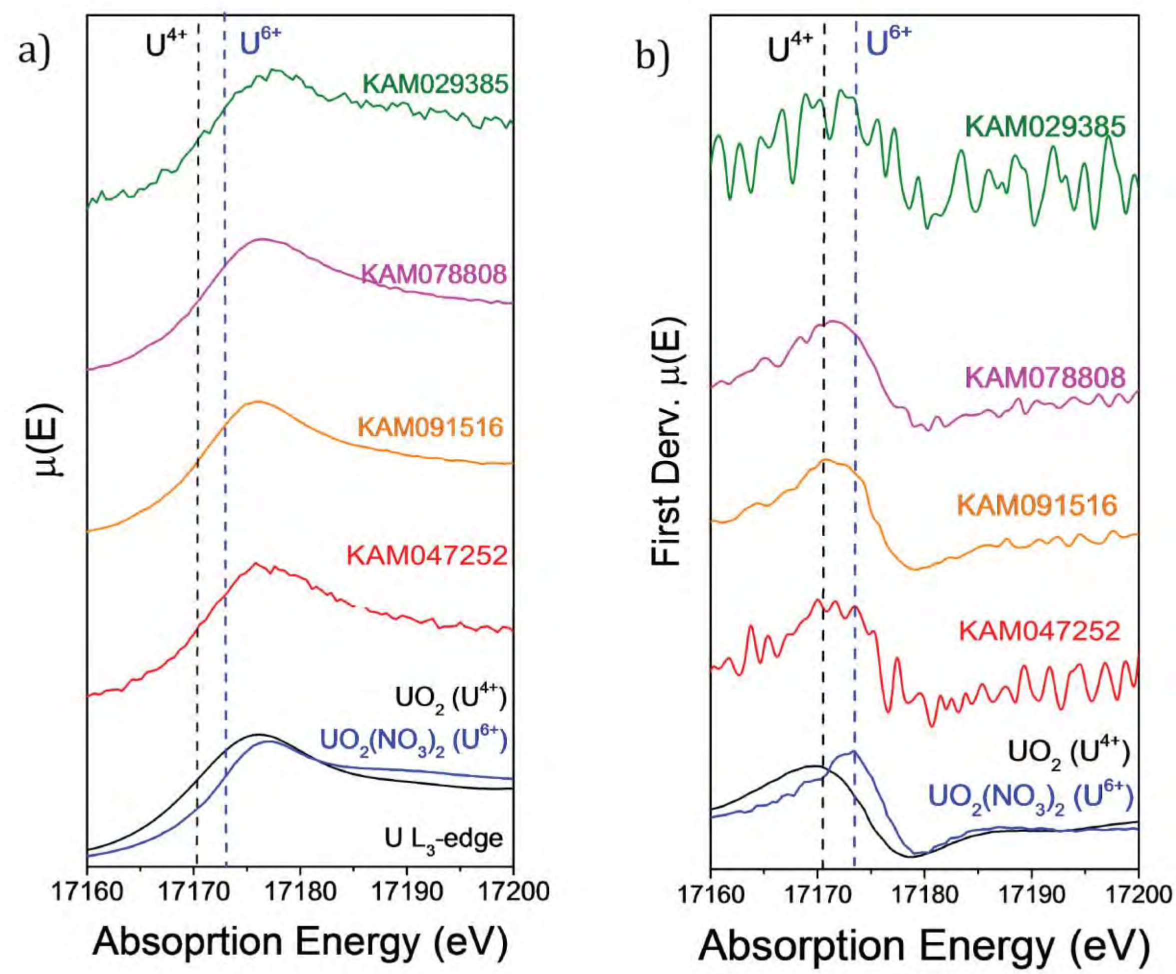


Figure 4.15 Uranium L_3-edge XANES spectra

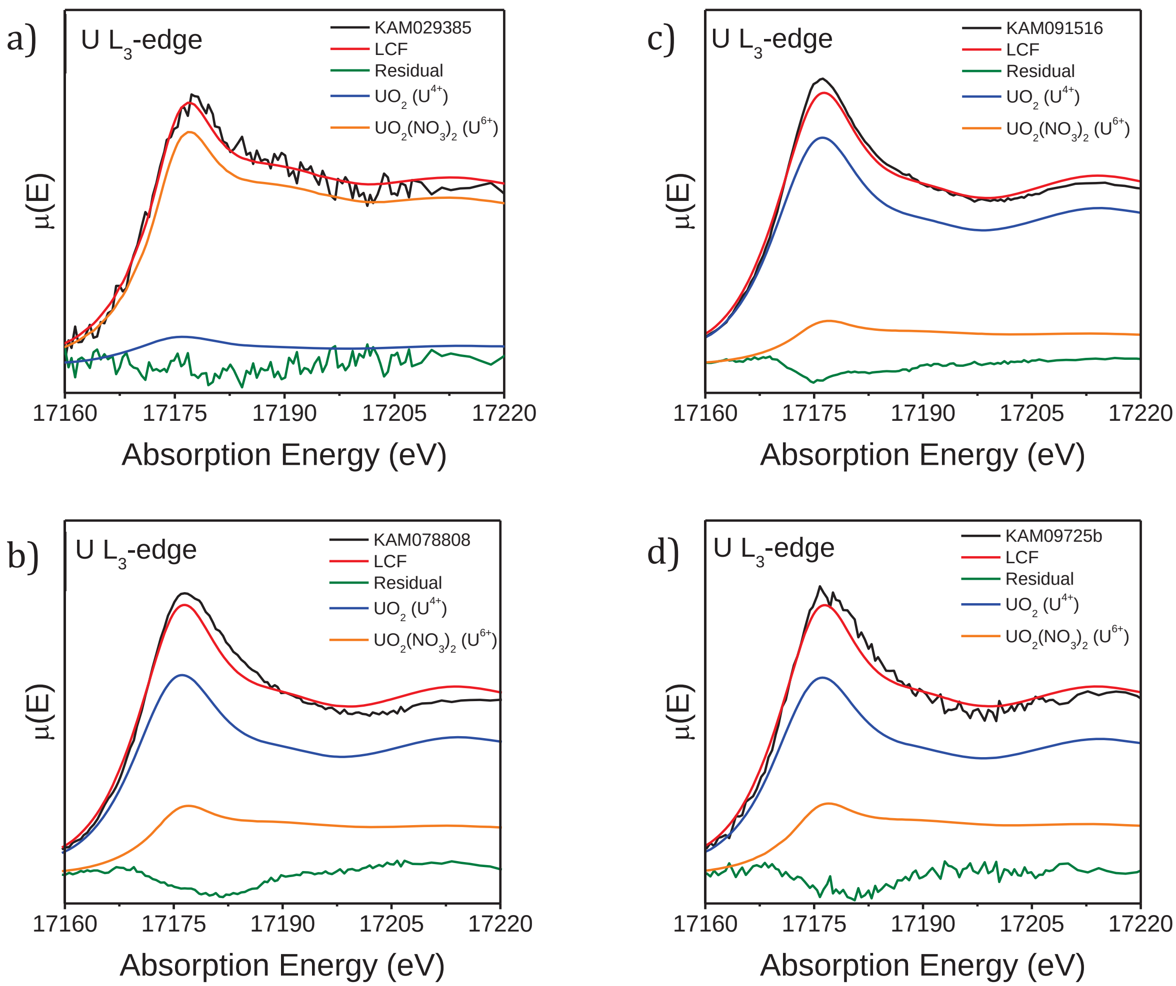


Figure 4.16 Linear combination fitting of Uranium

Table 4.6 Relative abundance of U species estimated from the linear combinations fits.

Sample	UO_2 (U^{4+}) at %	$UO+(NO_3)_2$ (U^{6+}) at %	R factor
KAM029385	11	89	0.0142021
KAM078808	73	27	0.0137348
KAM091516	83	17	0.0058184
KAM047252	72	28	0.0133641
KAM079346	53	47	0.0059290
KAM144308	0	100	0.0038118
GS waste	33	67	0.0250210
GT ore	51	49	0.0630183

5 Findings

Synchrotron-based analyses of the Yukon gold mine ore and waste rock samples revealed that the oxidation state and mineralogical phase of As vary among samples. A total of 3 oxidation states (As^{+5}, As^{+3}, As^{-1}) and 3 mineralogical phases (scorodite, arsenopyrite and arsenian pyrite) were identified in the samples using µXANES and PXRD methods, respectively. These complementary analyses further indicate that in both schist and one of the gneiss ore samples, As is a mix of the valence states As^{+5} and As^{-1}, and potentially in two mineral phases. The mineral phase containing As^{-1} is most likely arsenopyrite, since this phase was identified in one of the schist ore sample (72135B) using PXRD. All three oxidation states were found in two of the analysed waste rock samples of gneiss, however, the corresponding arsenic mineral phases cannot be extrapolated from the XANES data alone. Arsenic appeared in a single oxidation state (+5) in the granite ore samples, which was in agreement with the single mineral phase, scorodite, identified using PXRD analyses. µXRF analyses also revealed potential presence of yukonite in one of the schist ore sample (72137B). PXRD analyses cannot exclude the possibility that arsenic is present in an amorphous form in any of these samples, or in a mineral form that is below the detection limit for the method (on the order of 0.1 %).

Based on XANES analyses, the oxidation state of U in most of the samples analysed (8 in total) was between +4 and +6. The predominant oxidation state of U was +4 in all the analysed samples, except for two of the gneiss and one of the schist waste rock samples. Since no U phases were identified using PXRD, U mineral phases that could potentially be present in these samples remain highly speculative. μXRF analyses revealed that U tends to co-occur with Fe, this may indicate U^{+6} association with Fe oxides. Spatial overlap of U with Ca and/or Cu detected in the waste rock samples indicate that other U-bearing mineral phases, such as autunite, tobernite or uranophane could potentially be present. Association of U with Ti and Th was only visible in the gneiss waste rock samples; this may indicate the presence of thorite and brannerite U mineral phases, respectively. It is important to note, XANES data and spatial overlap detected by microXRF analyses are not sufficient to determine the U-bearing mineral phases with certainty.

6 Considerations for future analyses

Elucidation of the U mineral phases present in these materials is a challenge because of the low U concentrations in the samples. The detection limits of the analytical techniques such PXRD, XANES, μXRD could be improved if whole rock (unground) samples were used; unground samples could potentially be subsampled selectively to target more concentrated regions of the materials. Sequential chemical extraction of U should be also considered as an approach to investigate the U-bearing minerals present in these ore and waste rock samples.

Acknowledgments

The authors thank Drs. Renfei Feng, Ning Chen, and Weifeng Chen for assistance at the VESPER and HXMA beamlines, respectively. Industrial research scientists, Drs. Jeff Cutler and Joel Reid are also thanked for their constructive feedback on this report.

Table 6.1 Summary table of the completed sample analyses

Sample ID	PXRD	µXRF maps (pink beam – broad energy spectrum)	Arsenic-µXANES	Uranium-XANES
SO waste	✓	✓		
ST waste	✓	✓		
SS waste	✓	✓		
GO waste	✓	✓		
GT waste	✓	✓		
GS waste	✓	✓	✓	✓
GRO ore	✓	✓	✓	
GRT ore	✓	✓	✓	
72135B	✓	✓	✓	
72137B	✓	✓	✓	
72144B	✓	✓	✓	
GT ore	✓	✓	✓	✓
KAM029385	✓	✓	✓	✓
KAM079346	✓	✓		✓
KAM047252	✓	✓		✓
KAM091516	✓	✓		✓
KAM078808	✓	✓	✓	✓
KAM144308	✓	✓	✓	✓

7 Appendix

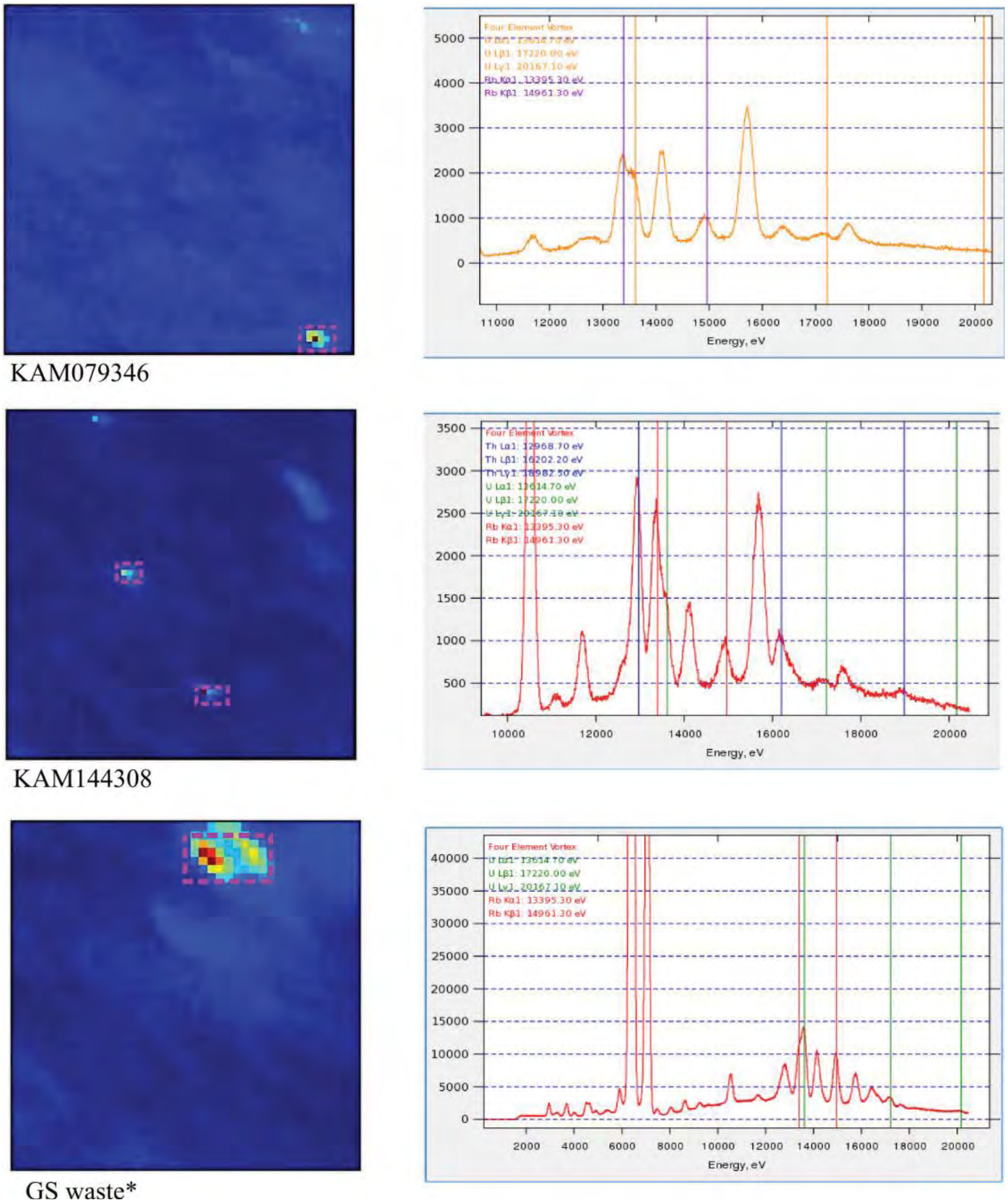


Figure 7.1 Verified U hotspot regions and corresponding spectra identified on the U/Rb XRF maps

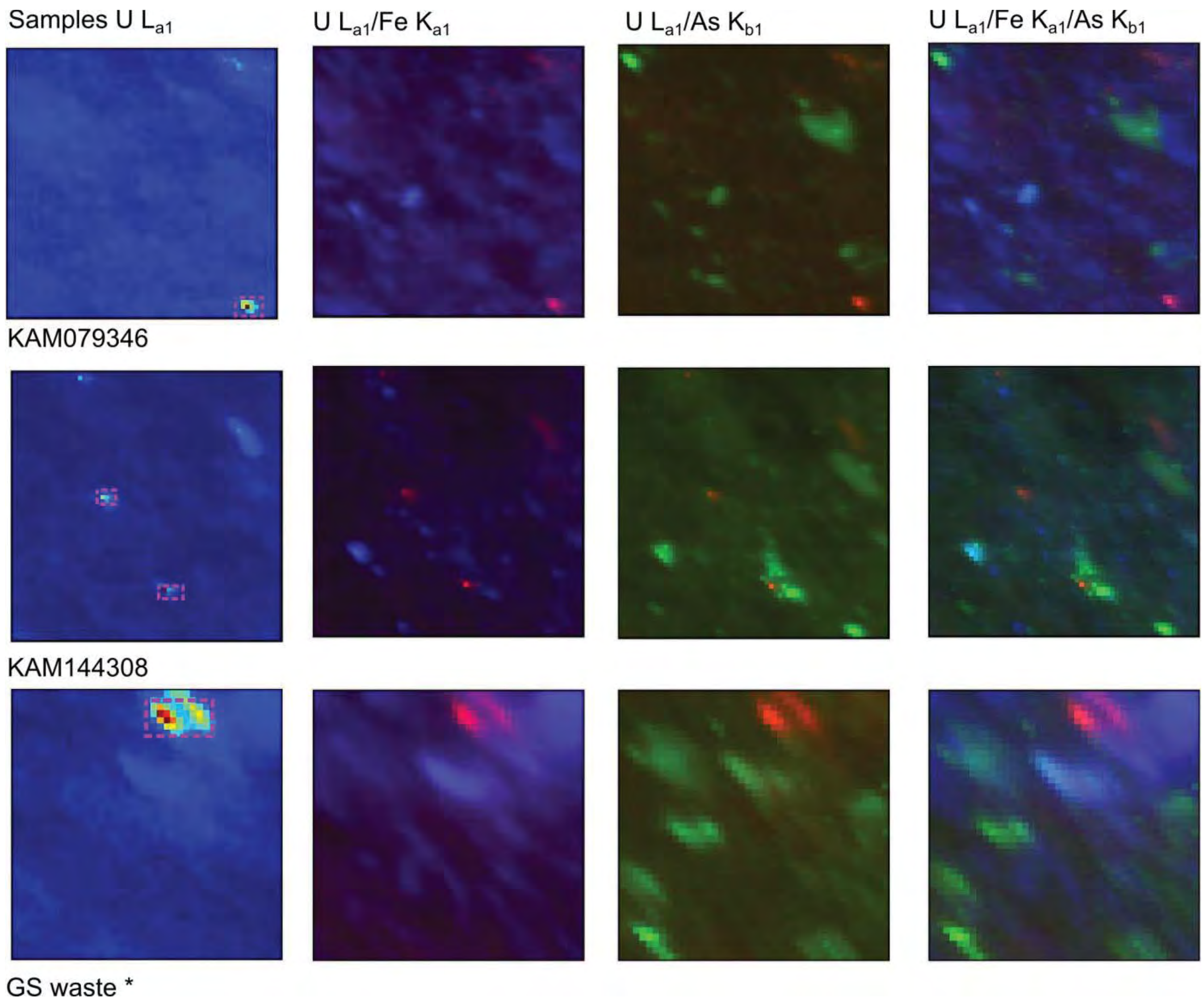
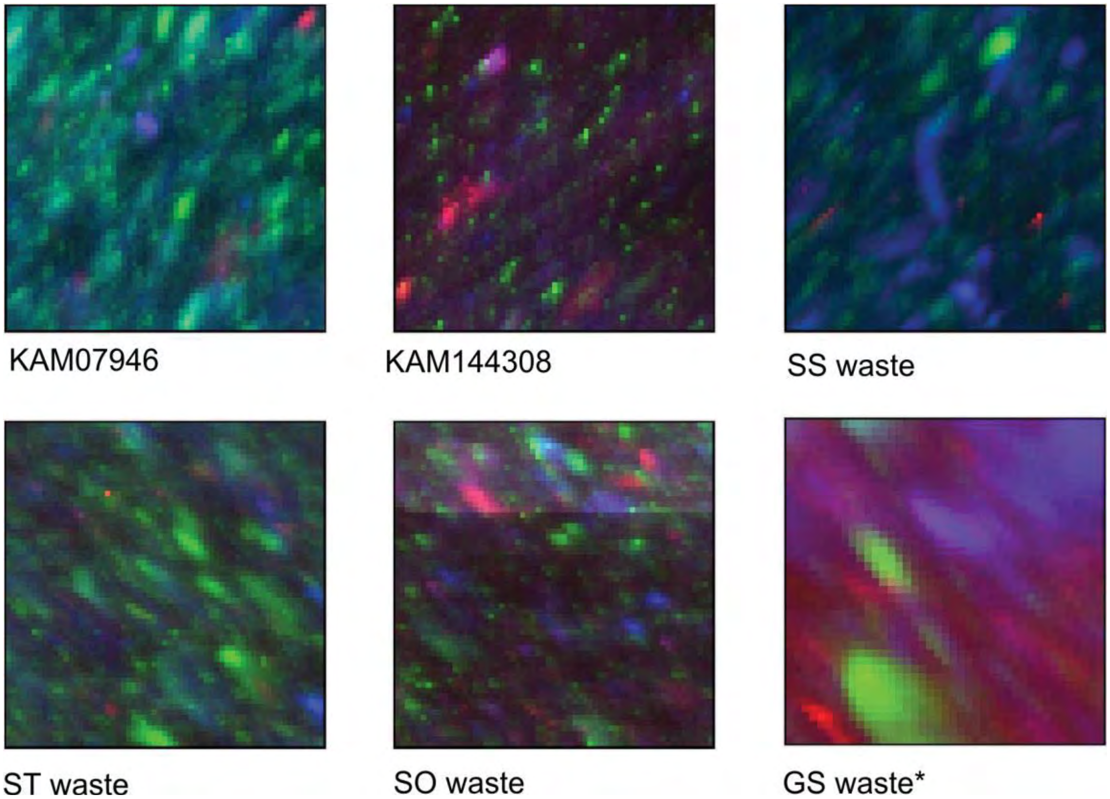


Figure 7.2 Tri-color mapping plot of U, As and Fe (Red=U, Green=As, Blue=Fe)


KAM07946
KAM144308
SS waste
ST waste
SO waste
GS waste*

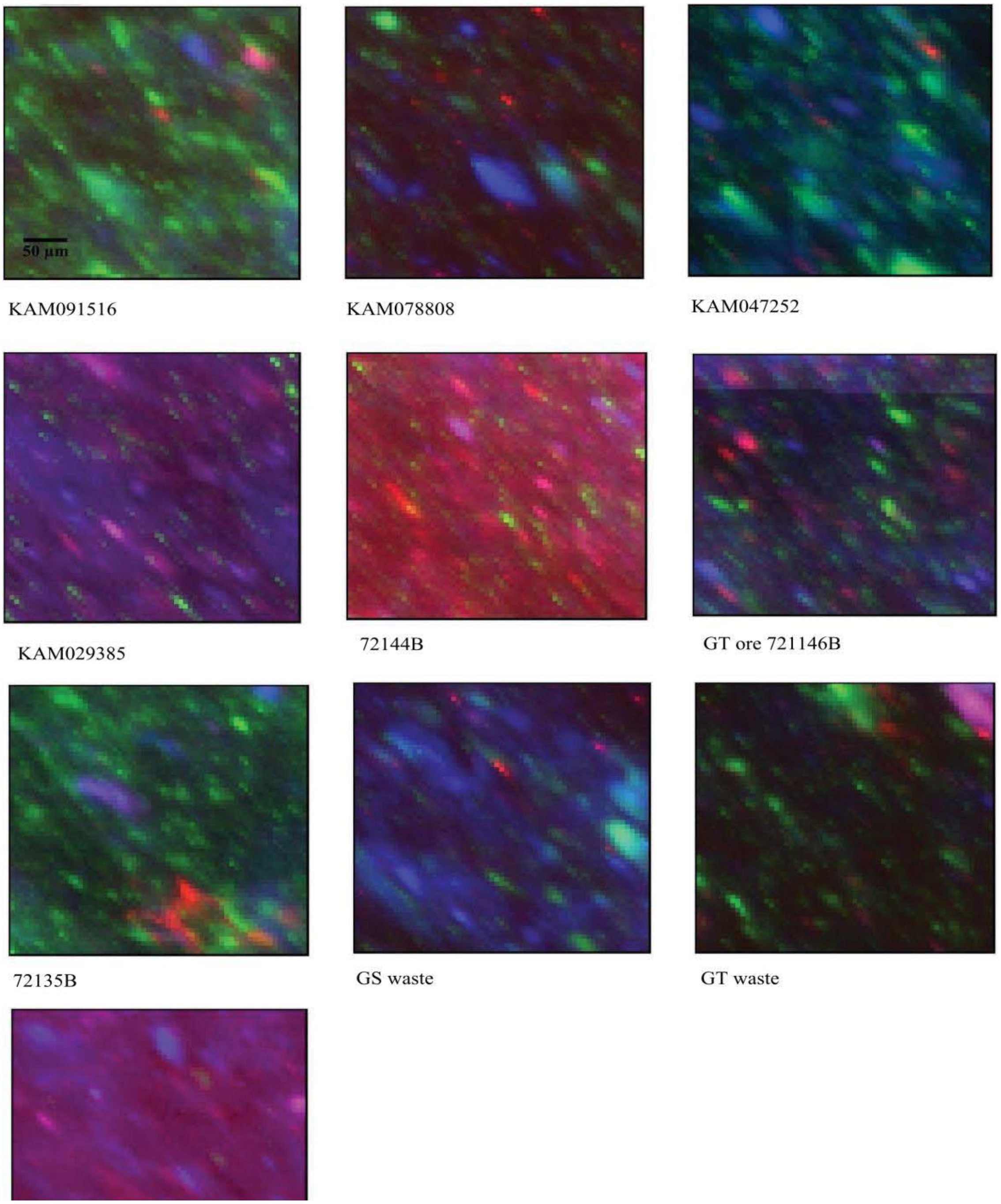
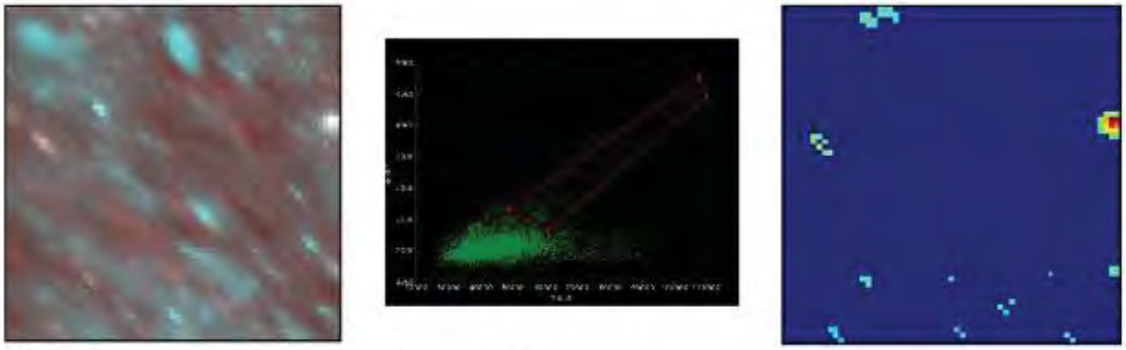


Figure 7.3 Tri-color mapping plot of As, Fe and Ca
(Red=As, Green=Ca, Blue=Fe)

GO waste



GO waste | Fe Ka1-As Kb1 scatter plot | Fe Ka1-As Kb1 selected plot corresponding As region

Figure 7.4 Colour map and scatter plot of As and Fe

(Red=As, Cyan=Fe)

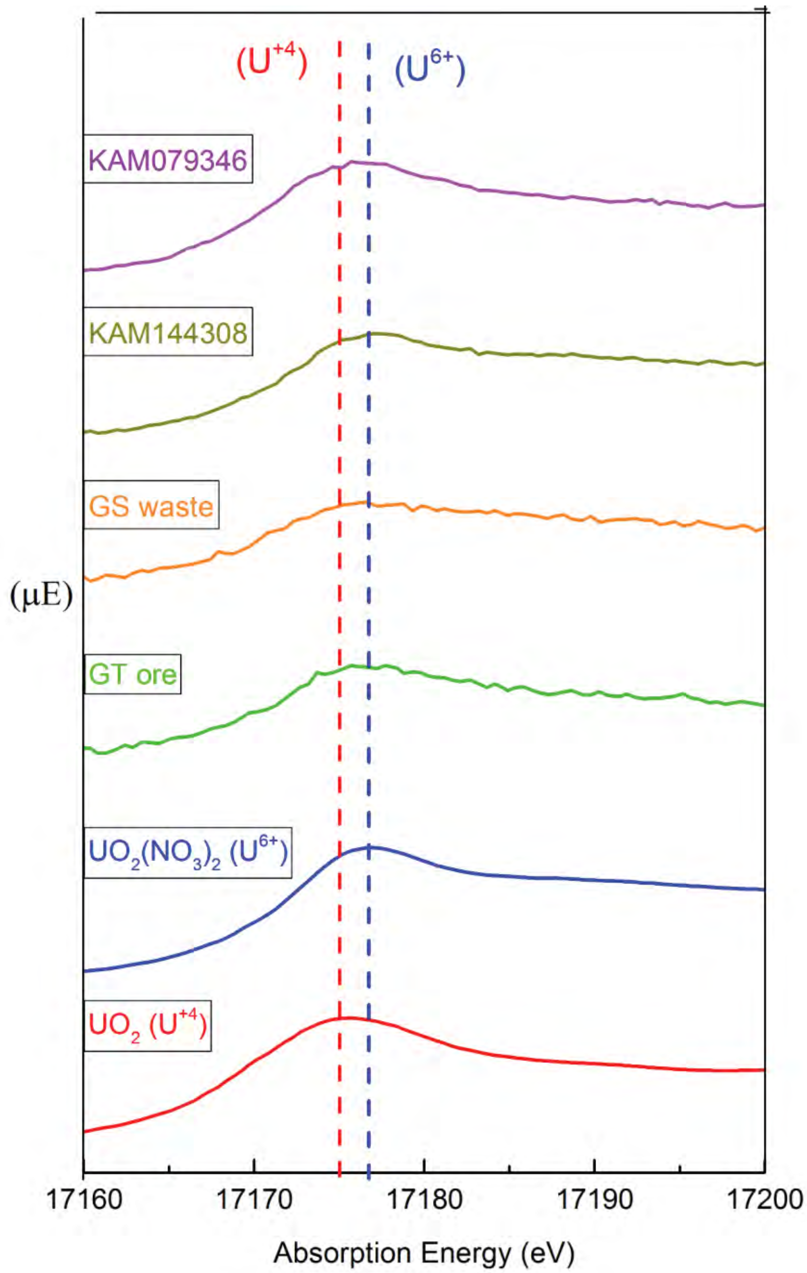


Figure 7.5 Uranium L3-edge XANES spectra

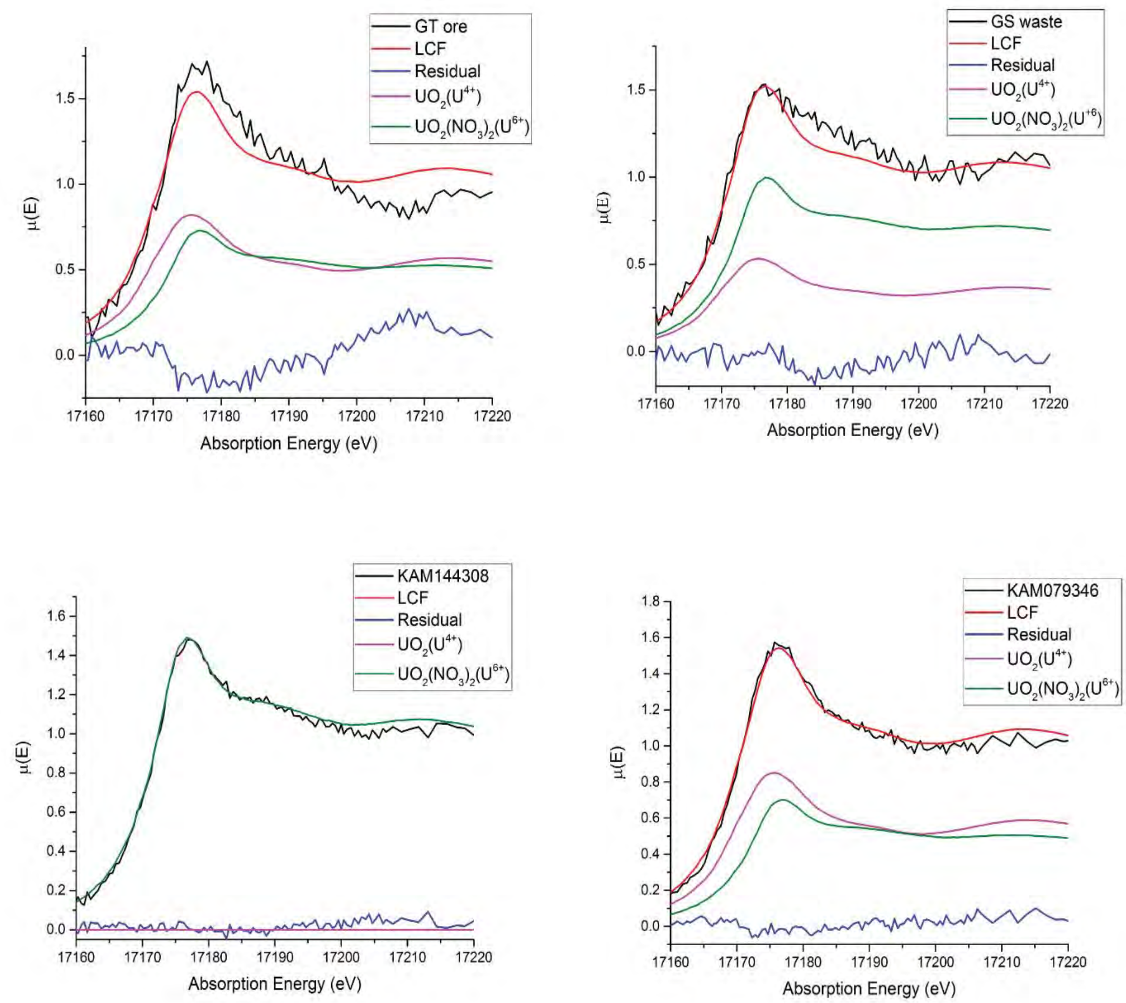


Figure 7.6 Linear combination fitting of Uranium

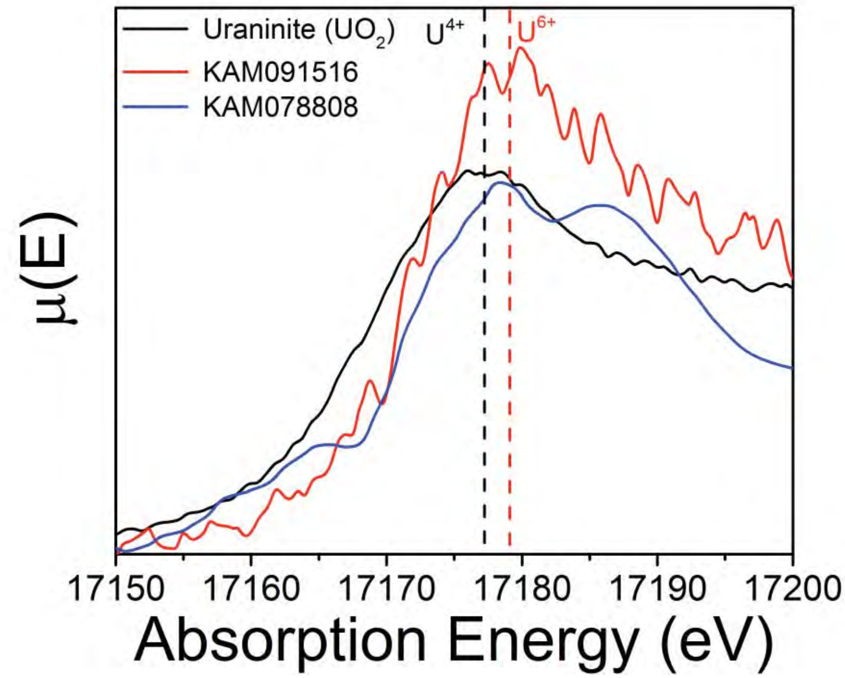


Figure 7.7 Uranium microXANES spectra

7 APPENDIX

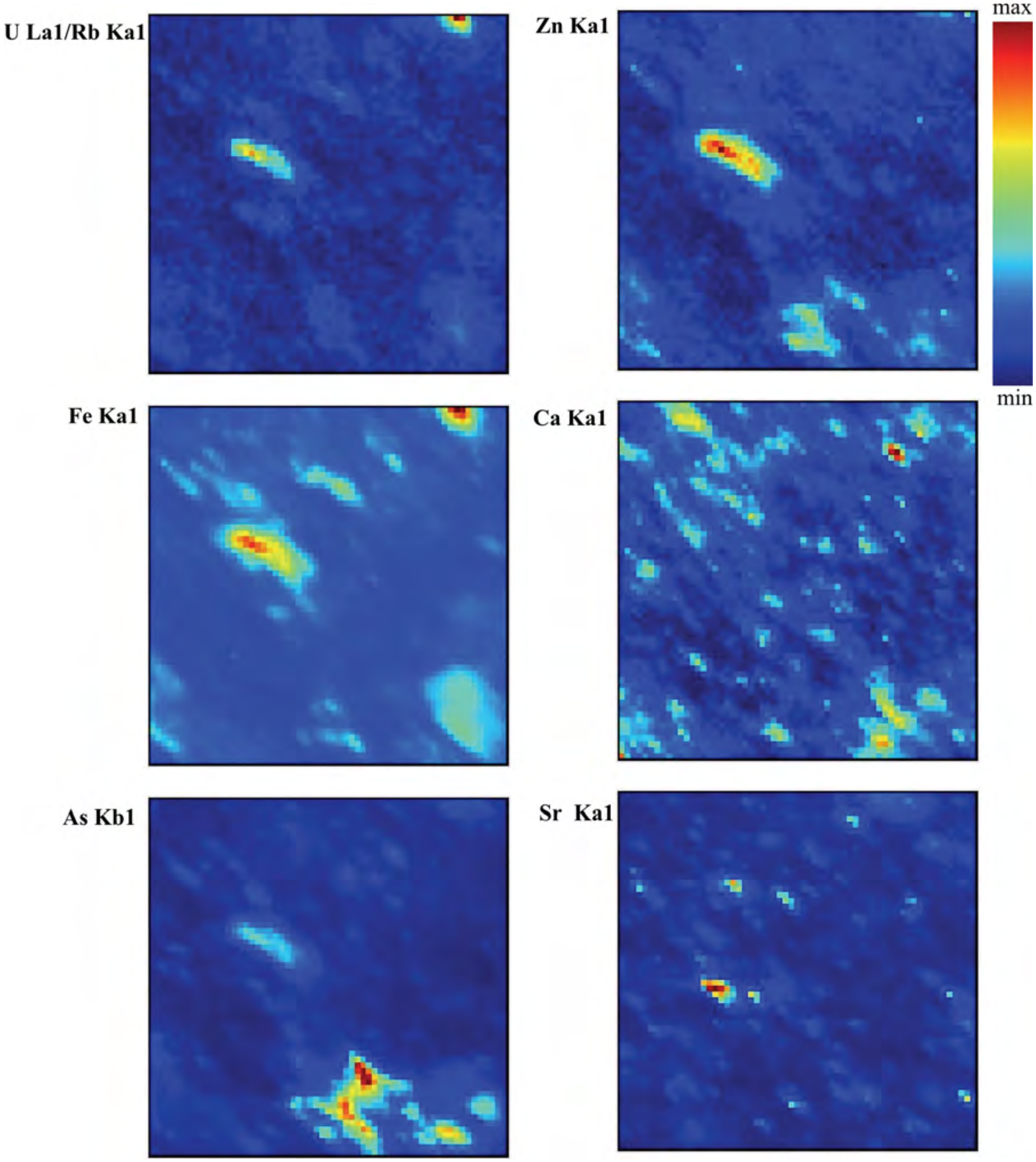


Figure 7.8 XRF elemental distribution maps of 72135B

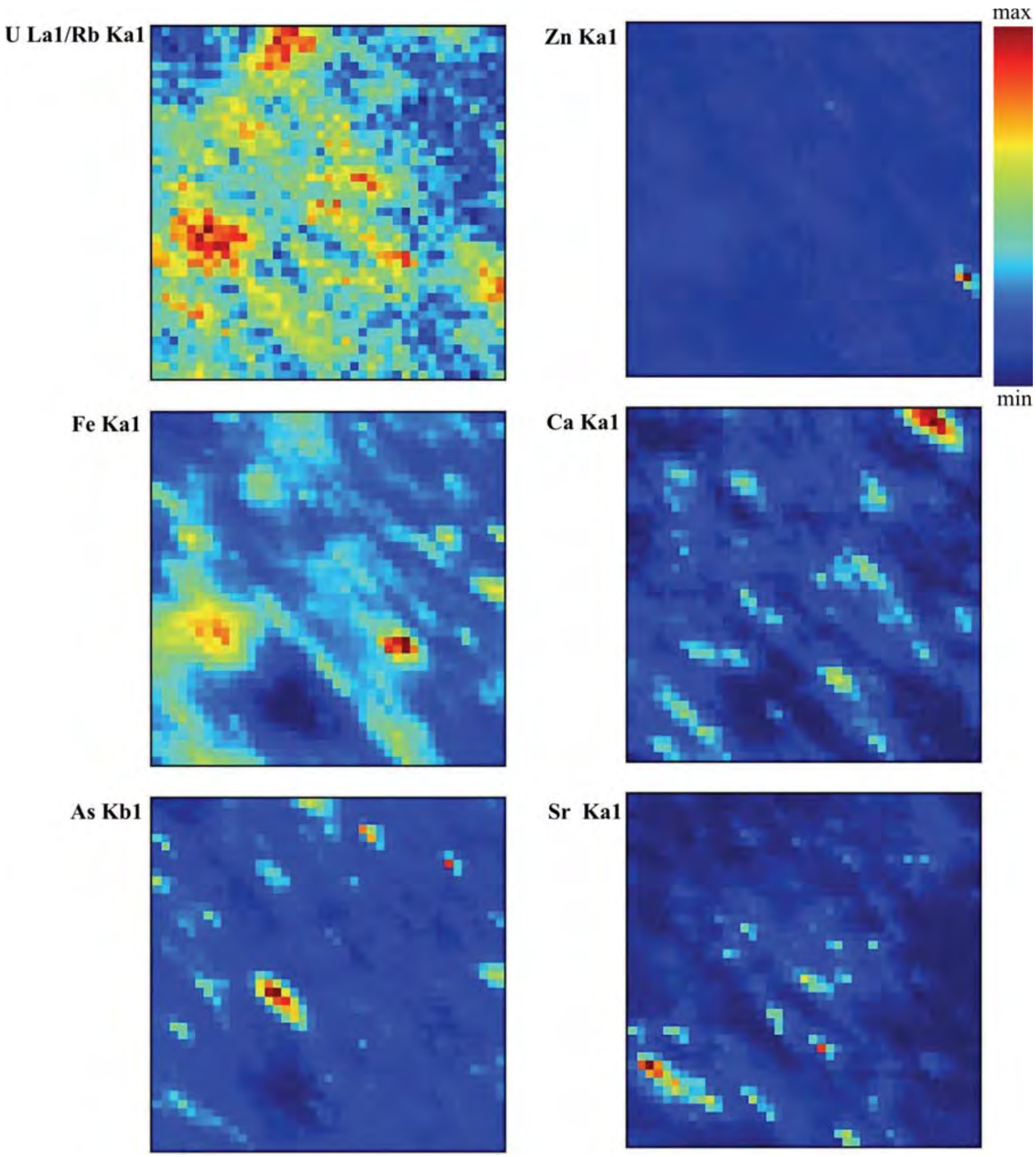


Figure 7.9 XRF elemental distribution maps of 72137B

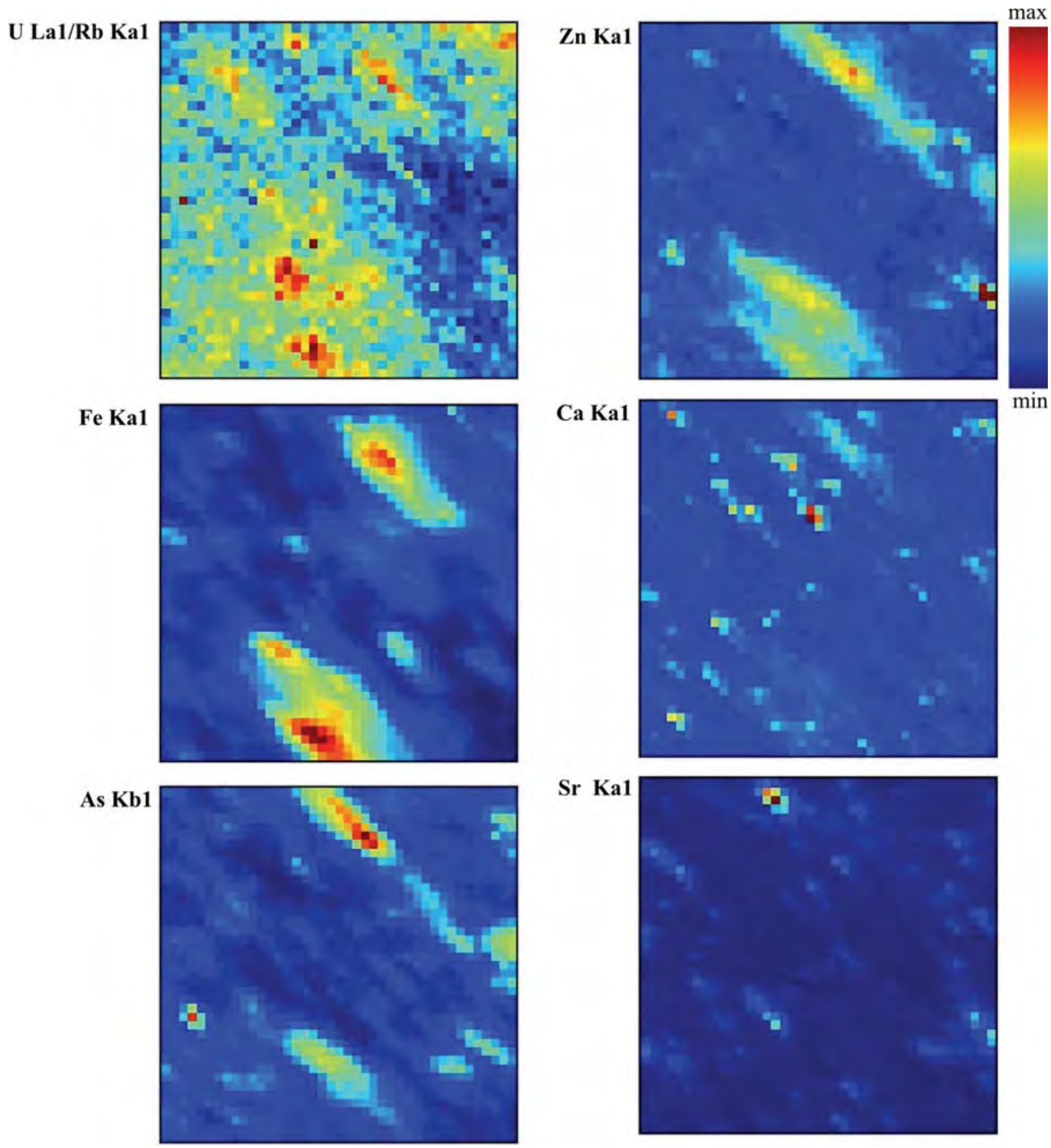


Figure 7.10 XRF elemental distribution maps of GRT

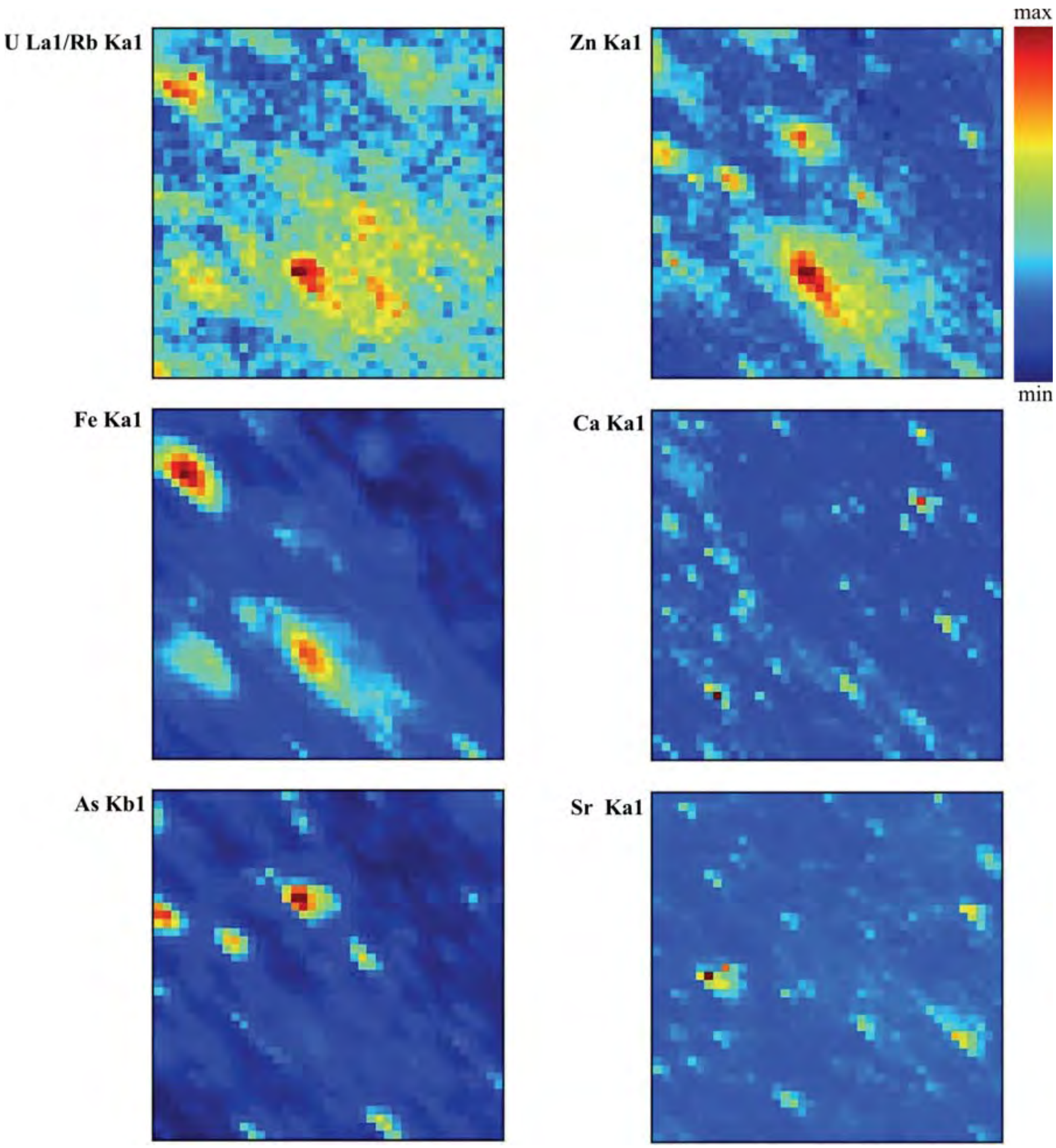


Figure 7.11 XRF elemental distribution maps of GRO ore

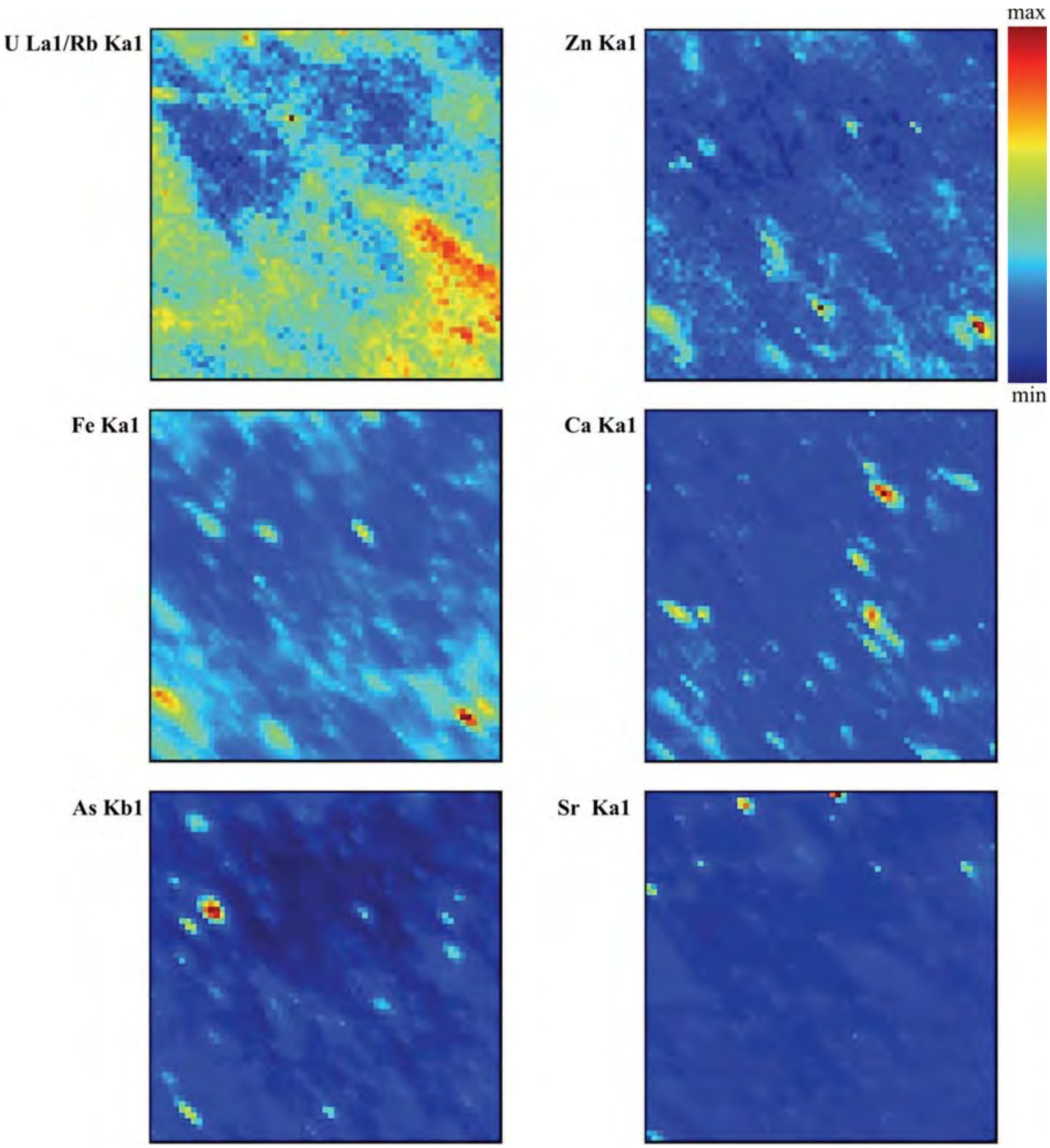


Figure 7.12 XRF elemental distribution maps of GT ore

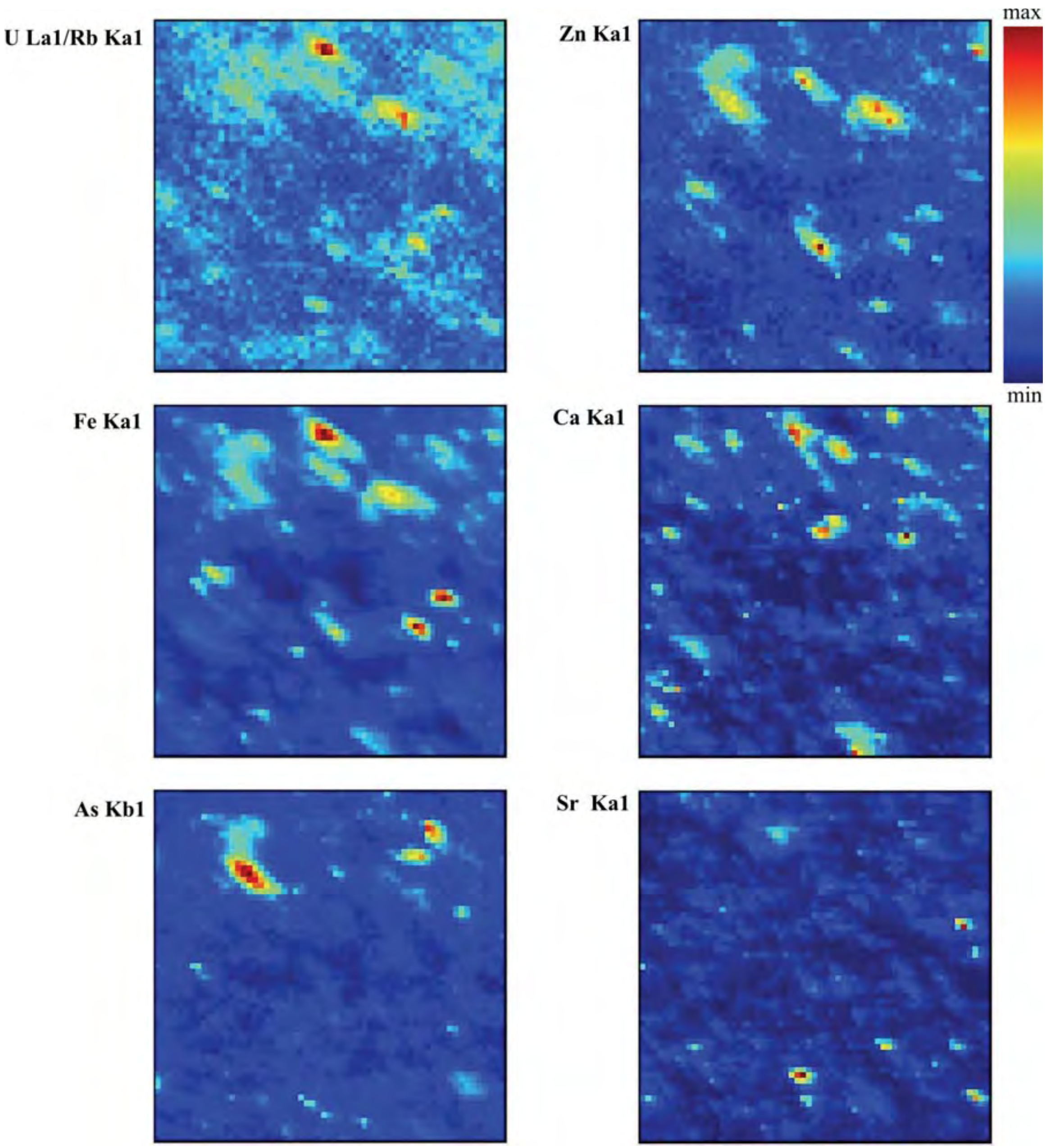


Figure 7.13 XRF elemental distribution maps of SO waste

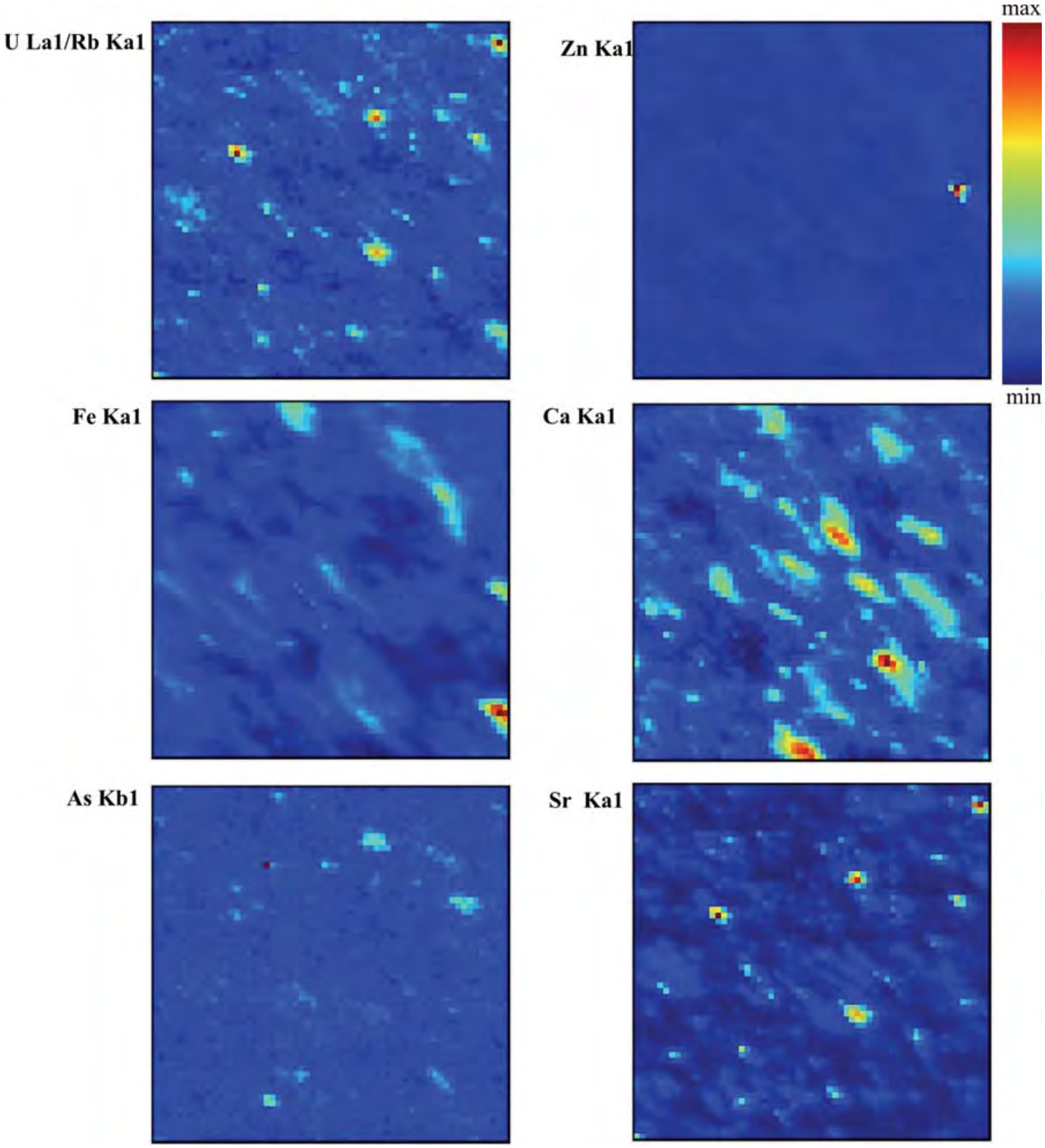


Figure 7.14 XRF elemental distribution maps of ST waste

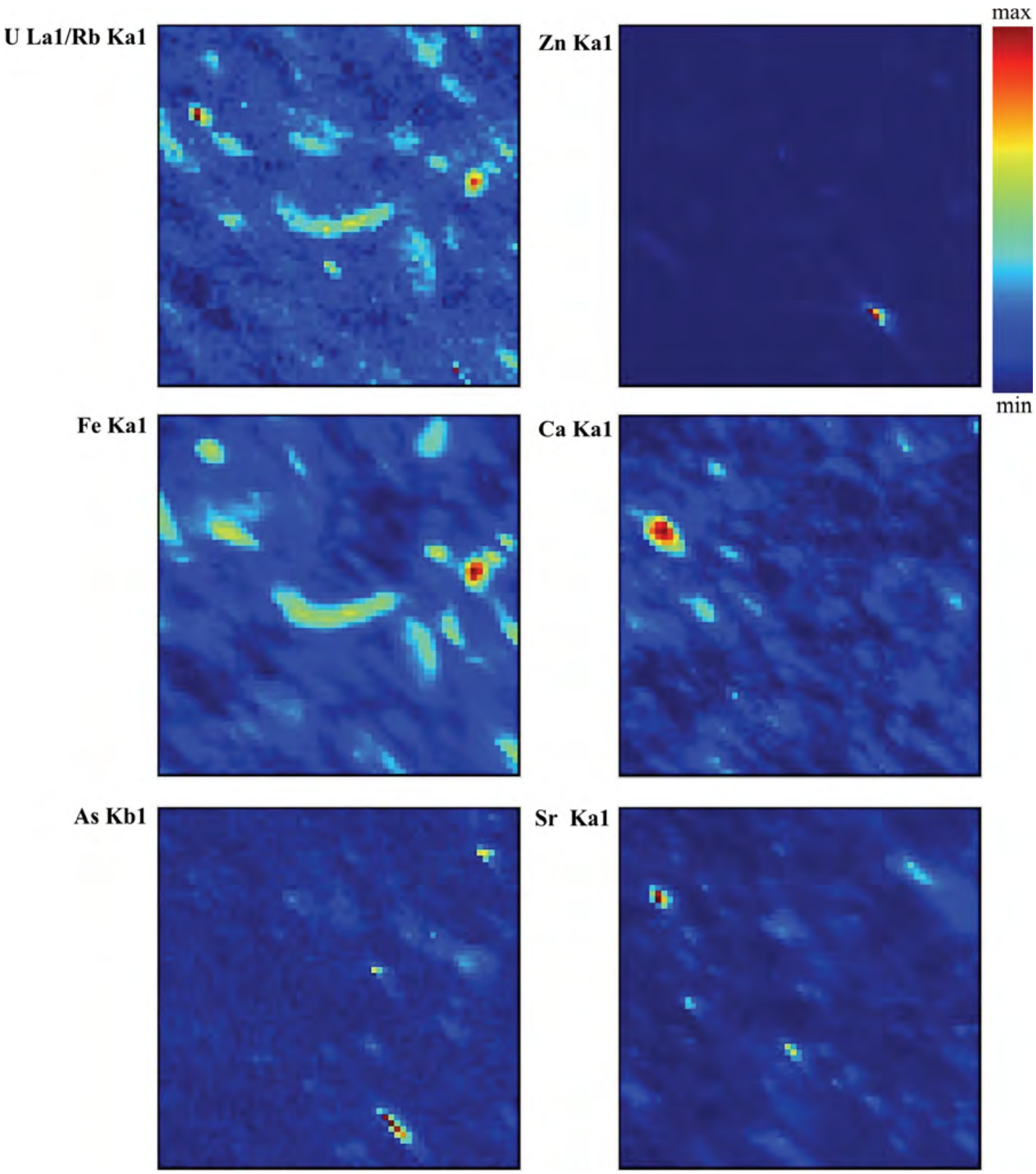


Figure 7.15 XRF elemental distribution maps of SS waste

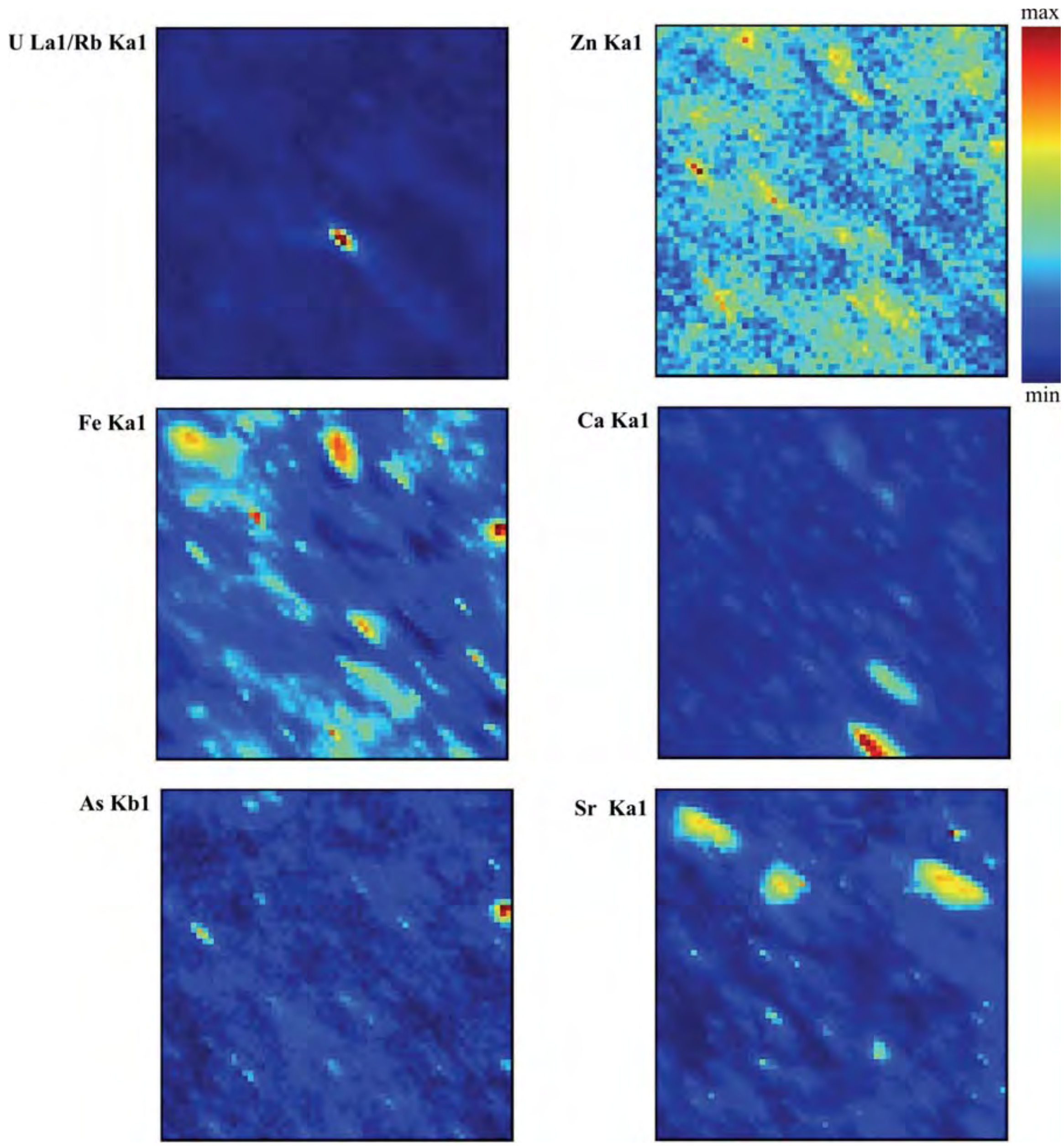


Figure 7.16 XRF elemental distribution maps of GO waste

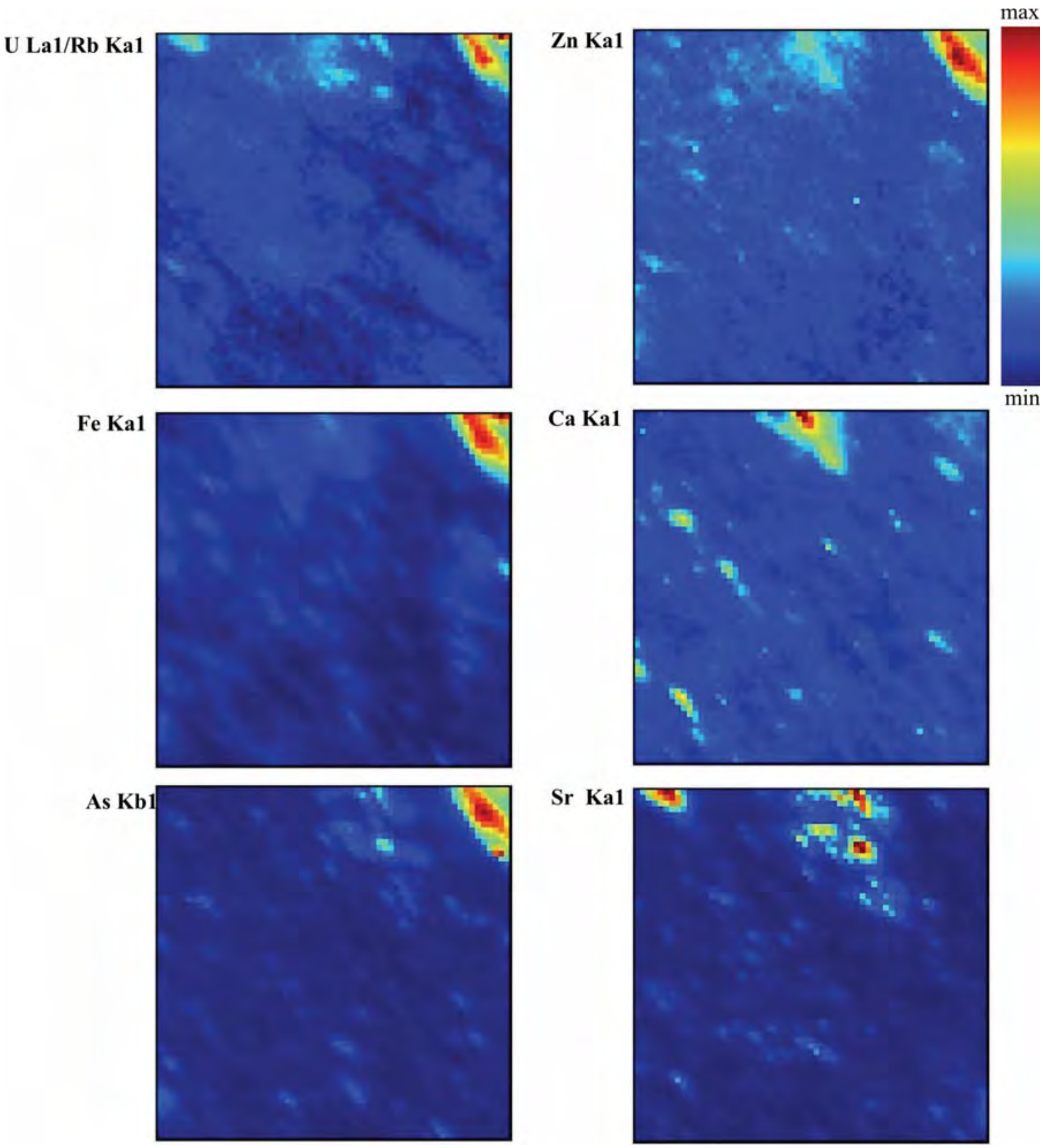


Figure 7.17 XRF elemental distribution maps of GT waste

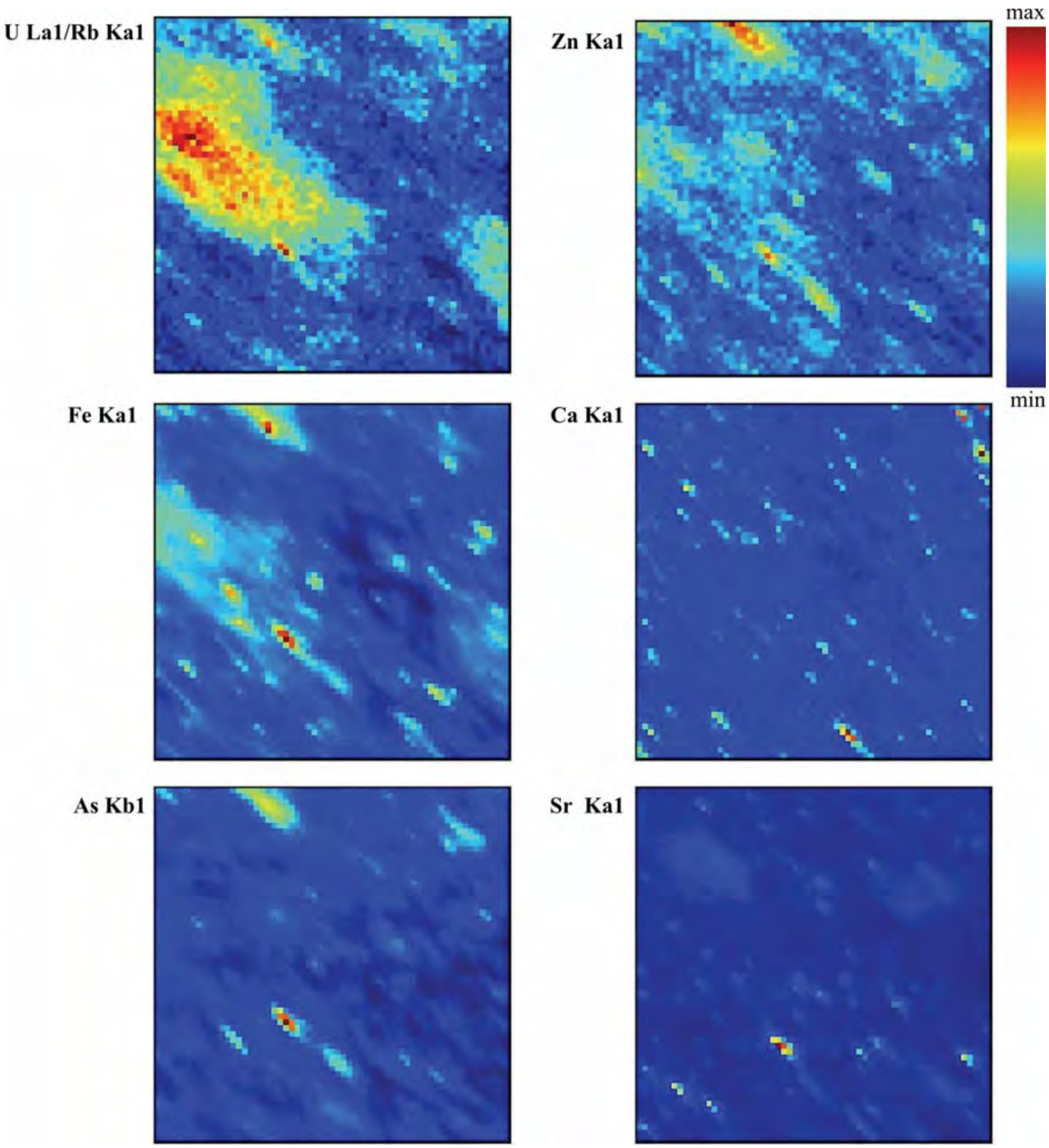


Figure 7.18 XRF elemental distribution maps of KAM029385

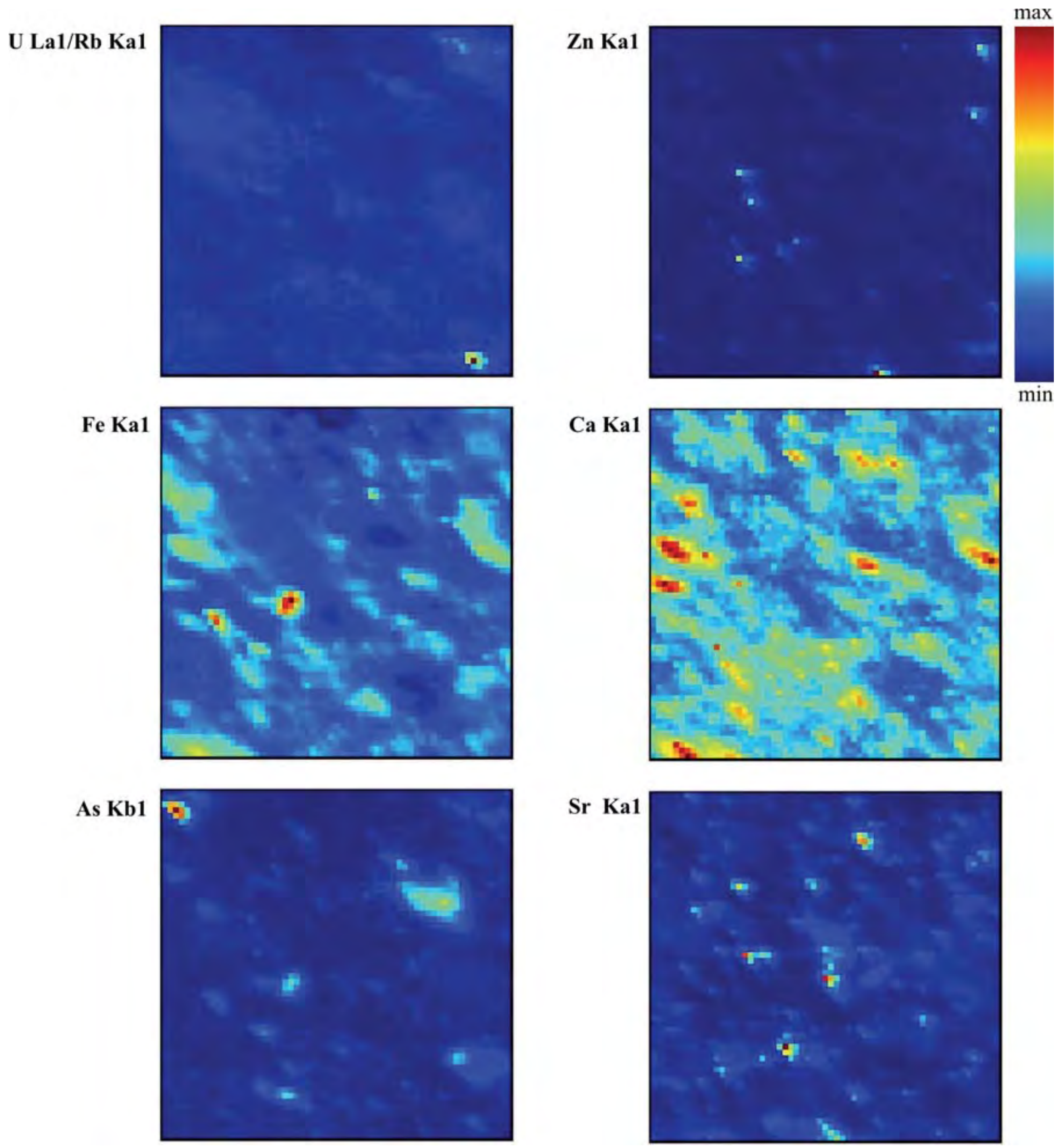


Figure 7.19 XRF elemental distribution maps of KAM079346

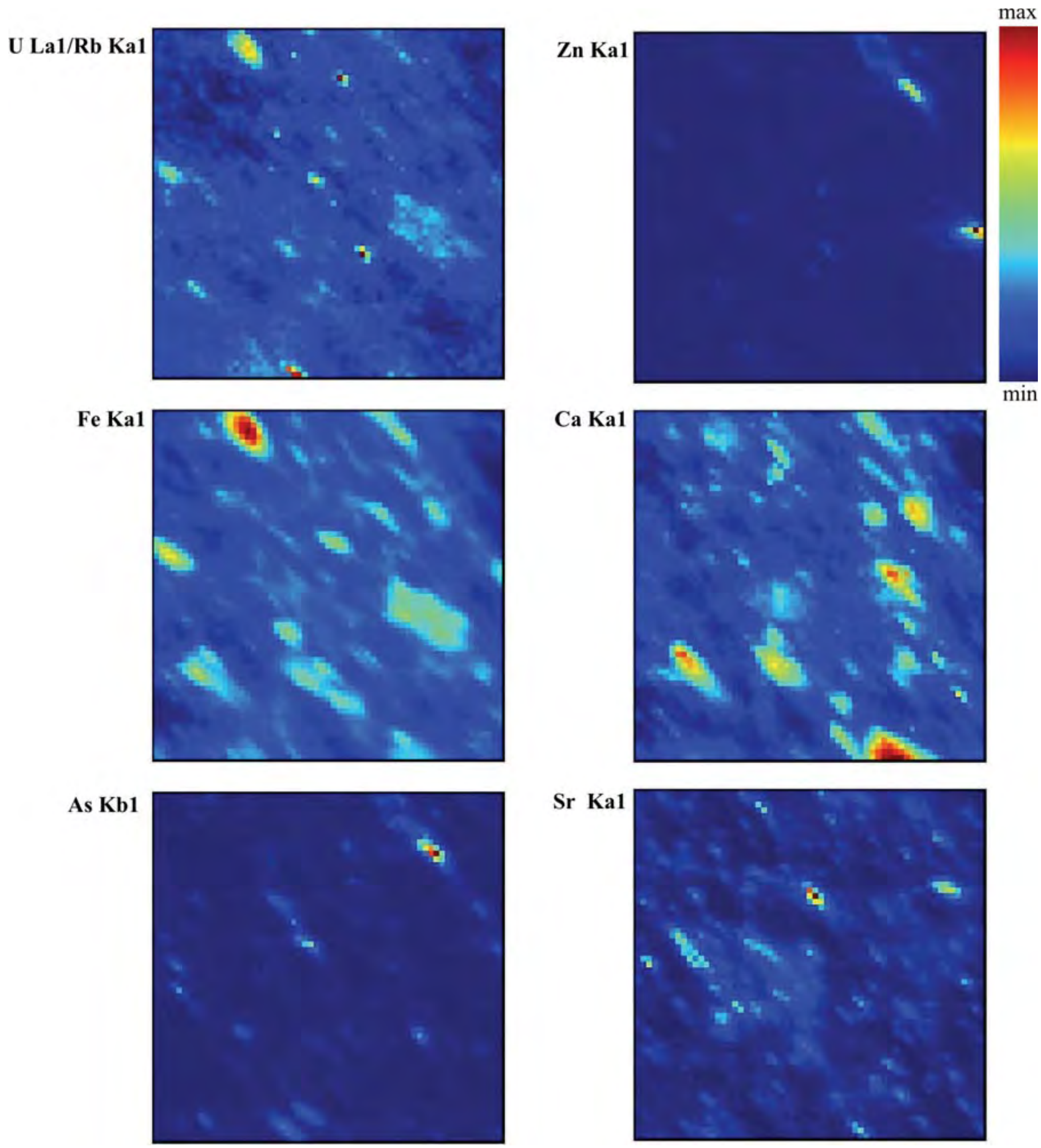


Figure 7.20 XRF elemental distribution maps of KAM047252

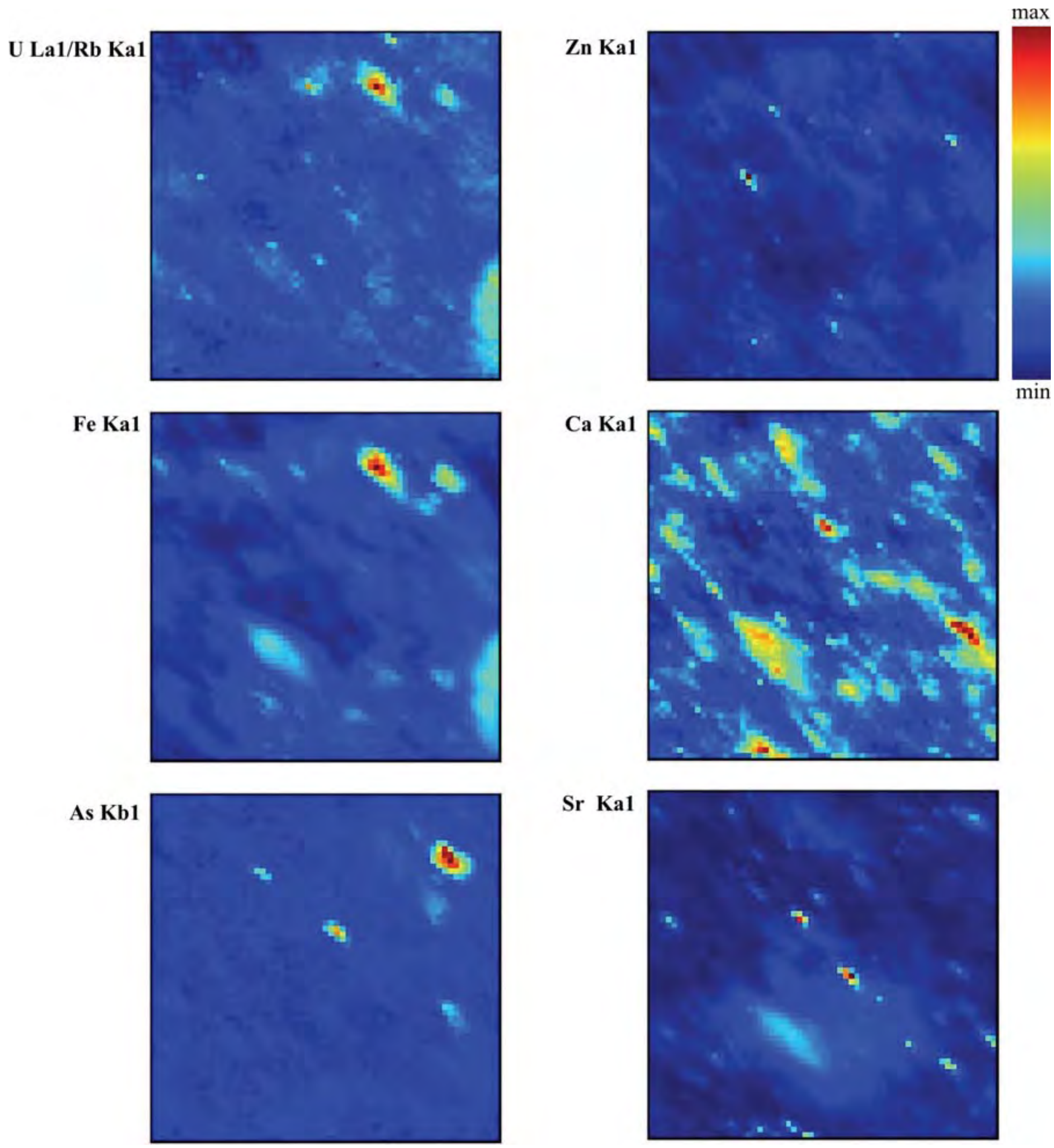


Figure 7.21 XRF elemental distribution maps of KAM091516

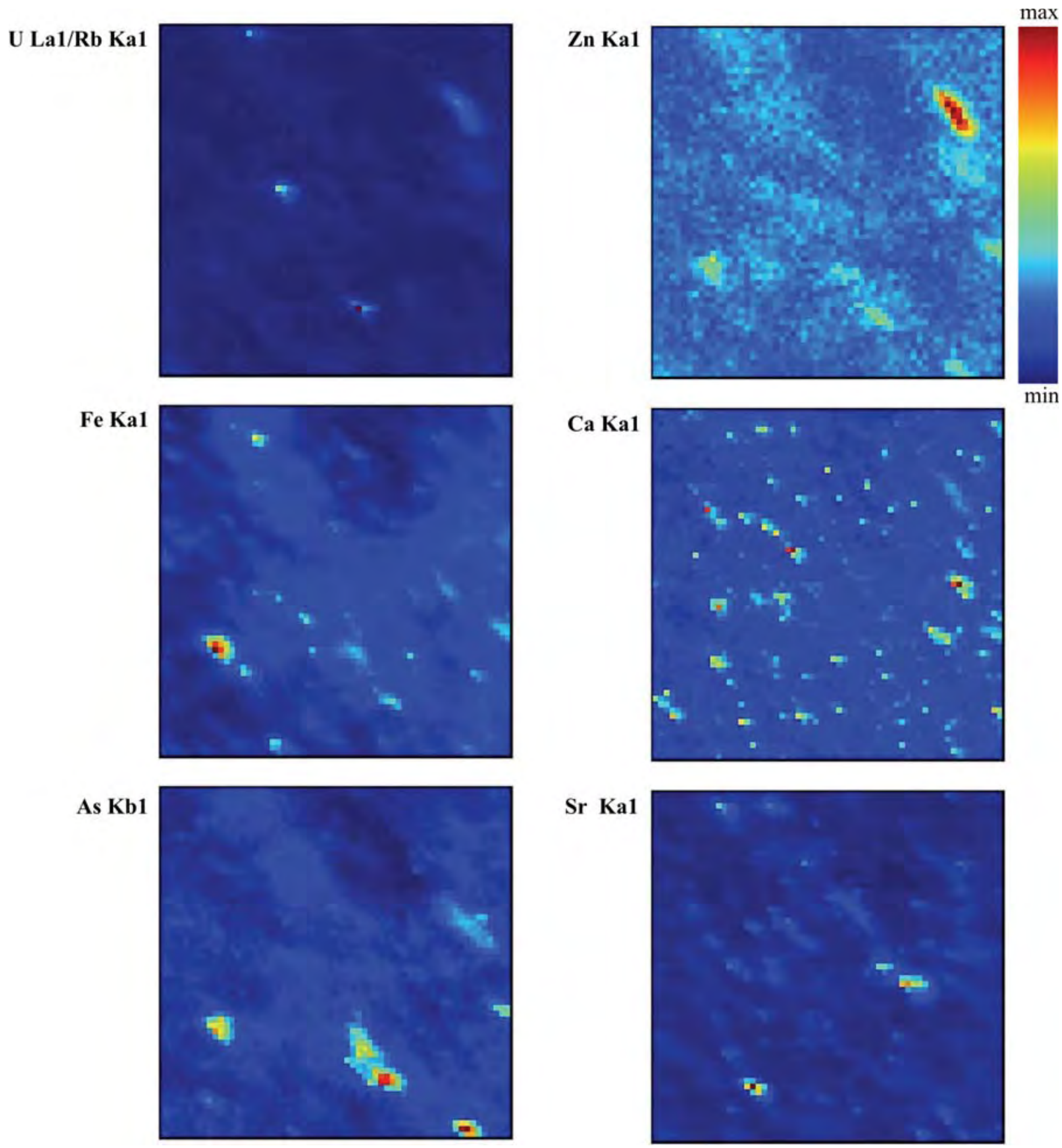


Figure 7.22 XRF elemental distribution maps of KAM144308

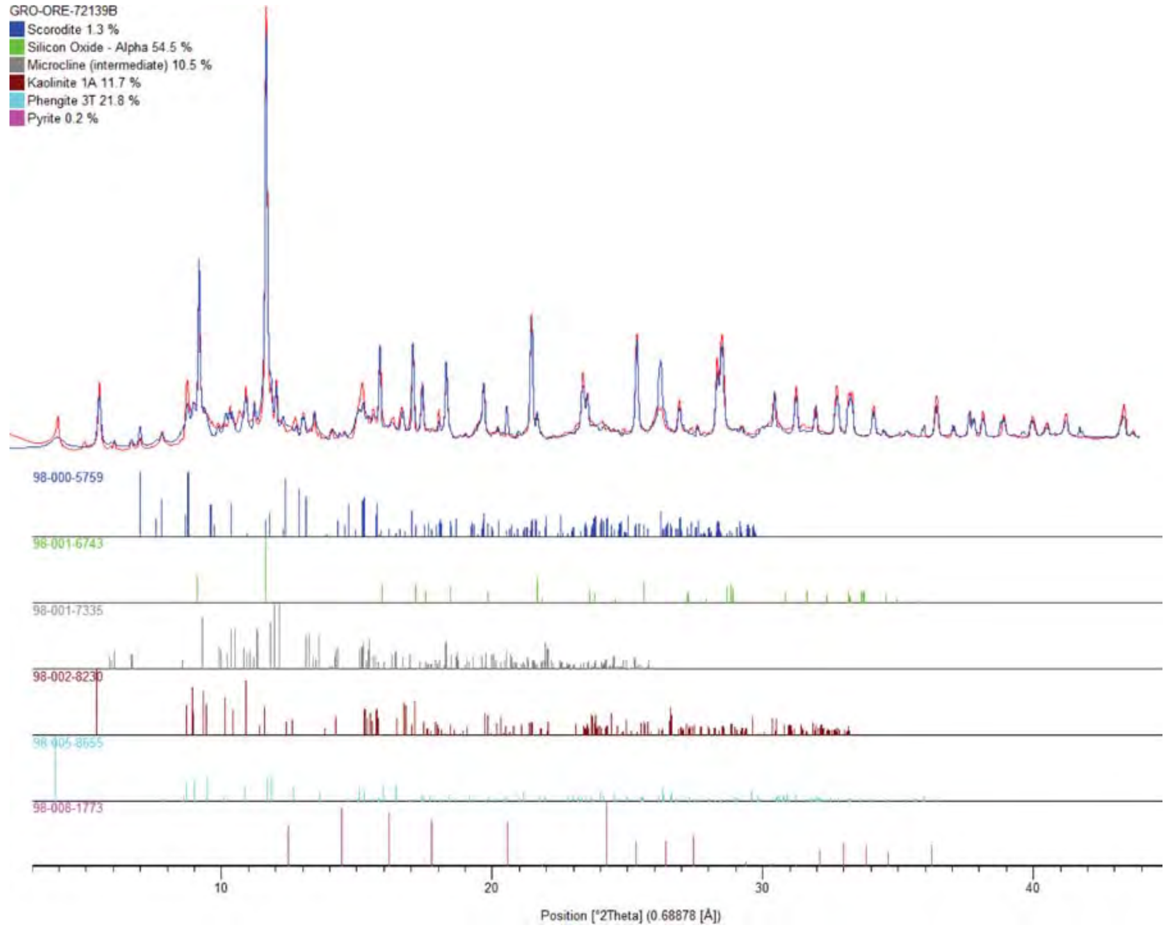


Figure 7.23 Diffraction pattern of GRO ore

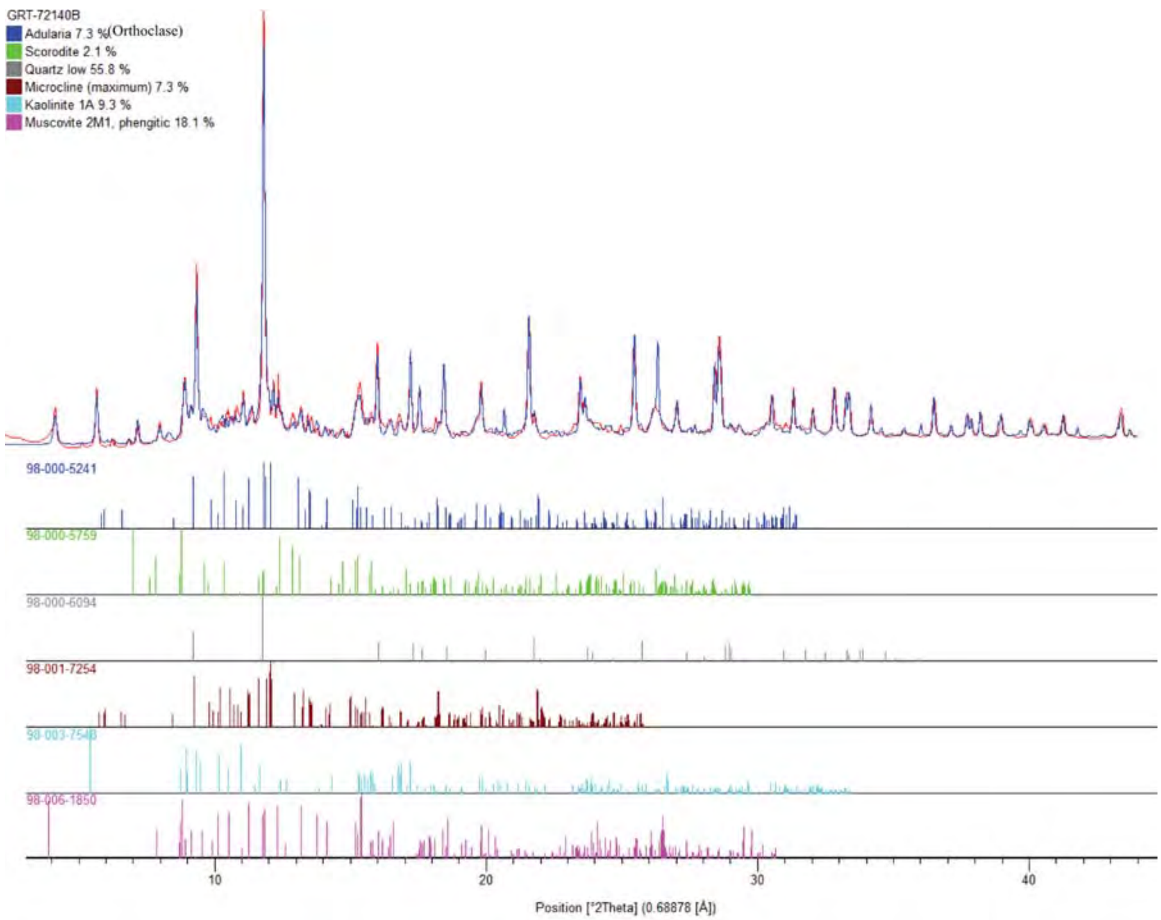


Figure 7.24 Diffraction pattern of GRT ore

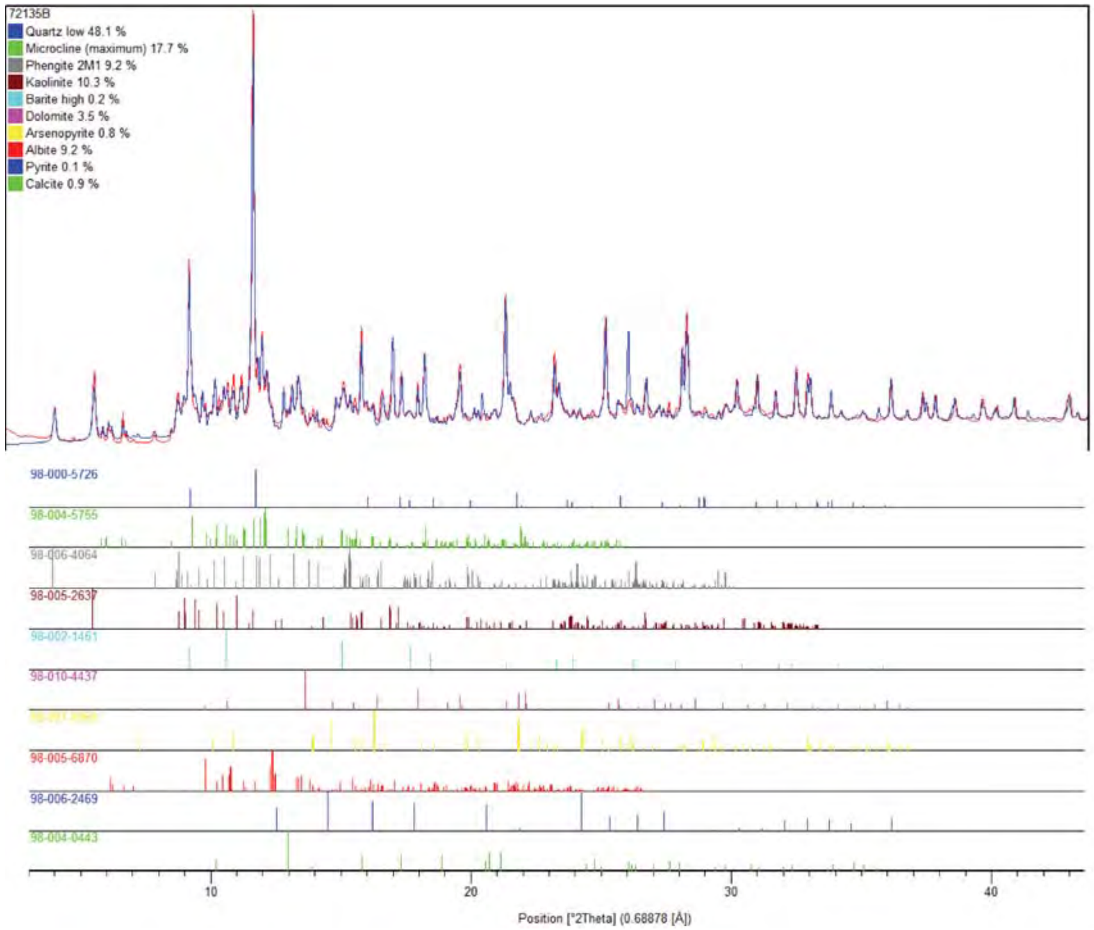


Figure 7.25 Diffraction pattern of 72135B

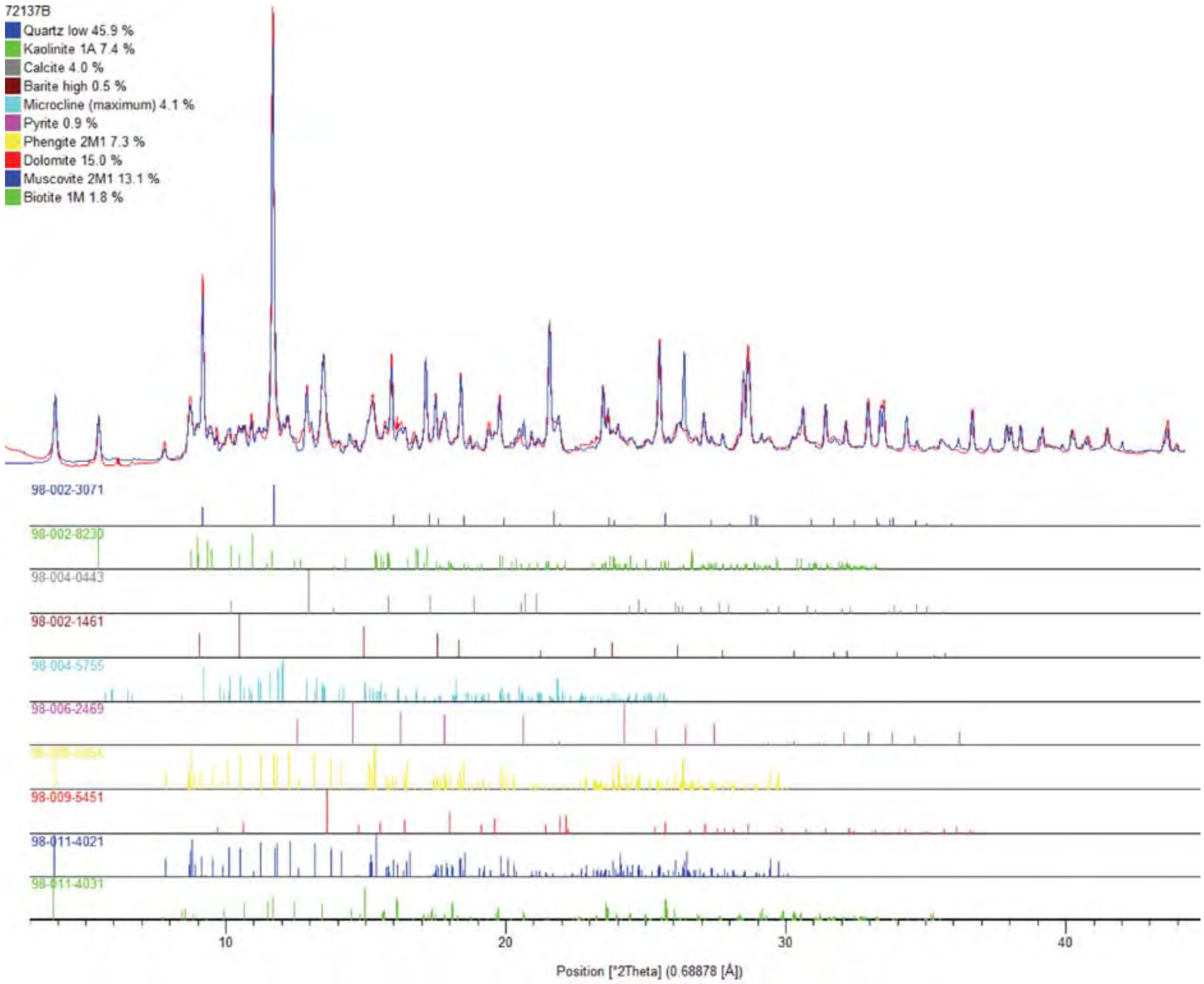


Figure 7.26 Diffraction pattern of 72137B

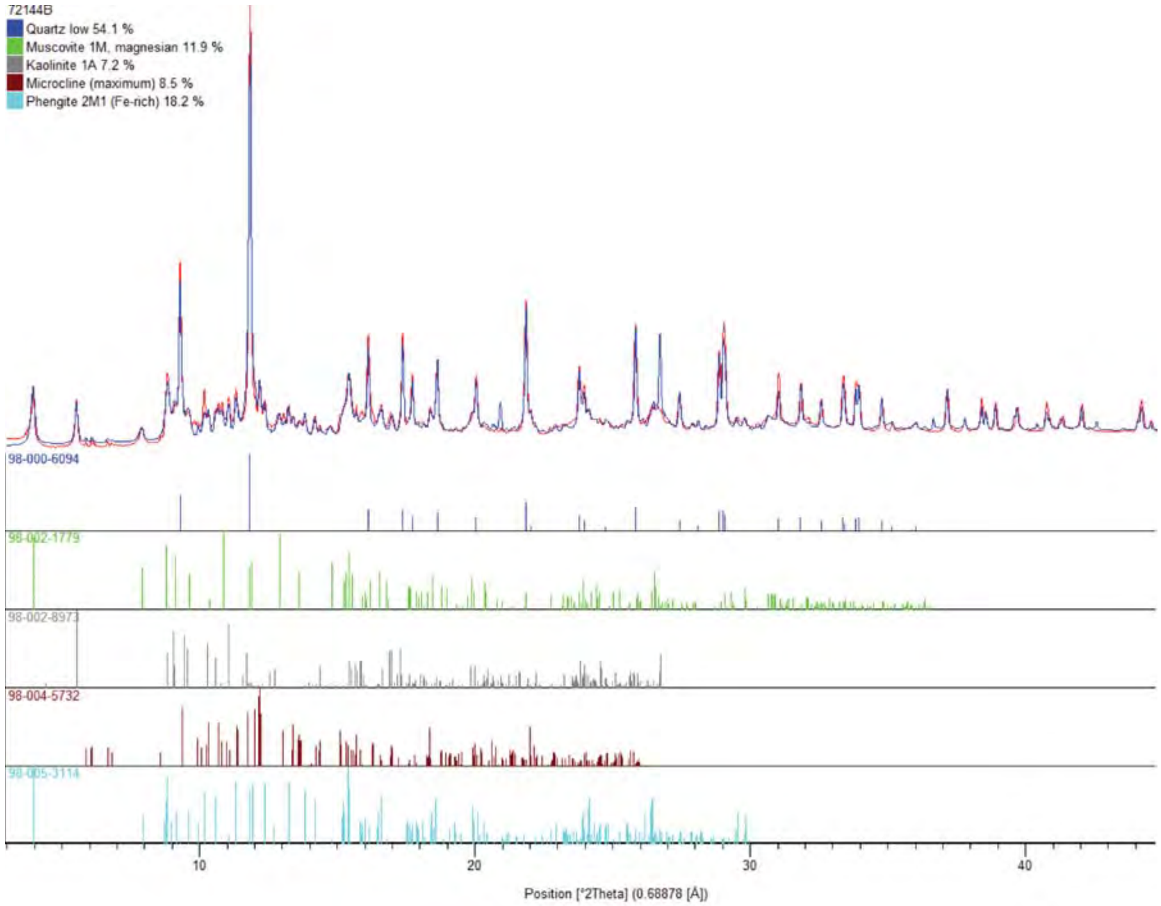


Figure 7.27 Diffraction pattern of 72144B

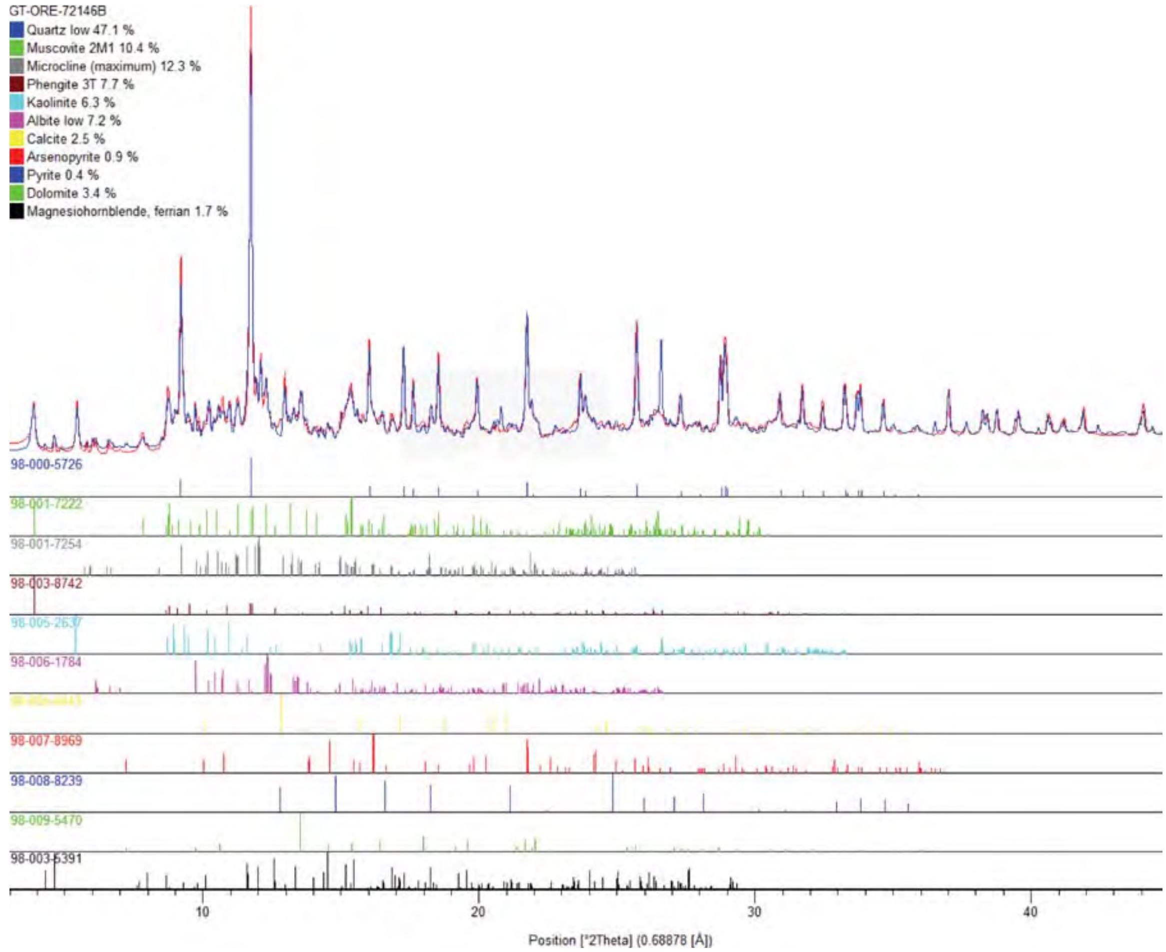


Figure 7.28 Diffraction pattern of GT ore

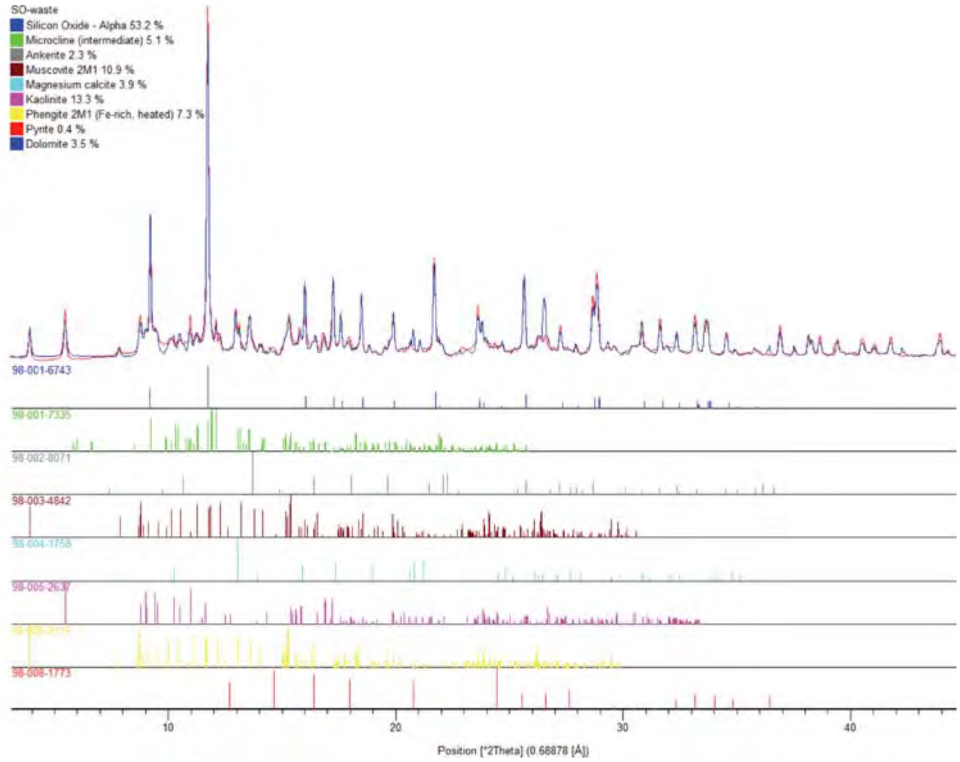


Figure 7.29 Diffraction pattern of SO waste

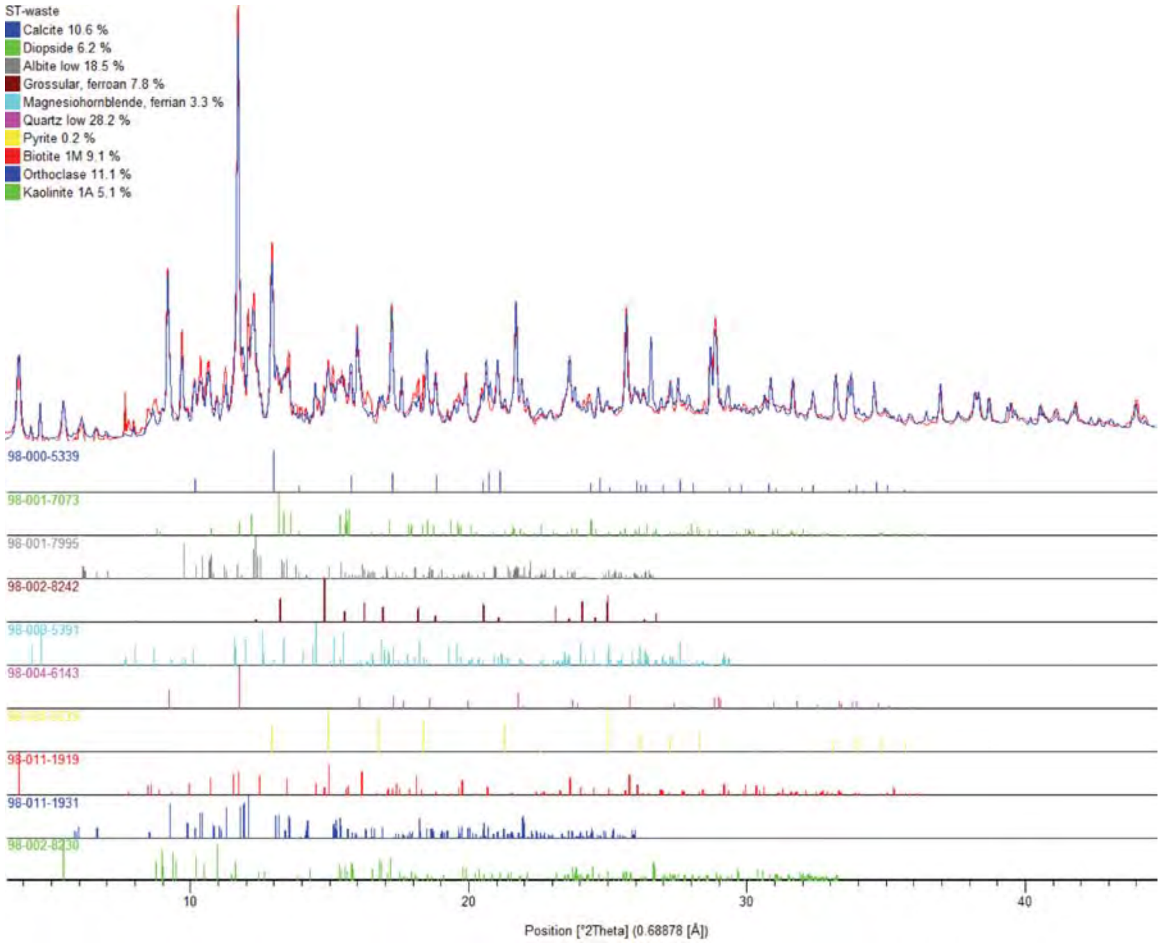


Figure 7.30 Diffraction pattern of ST waste

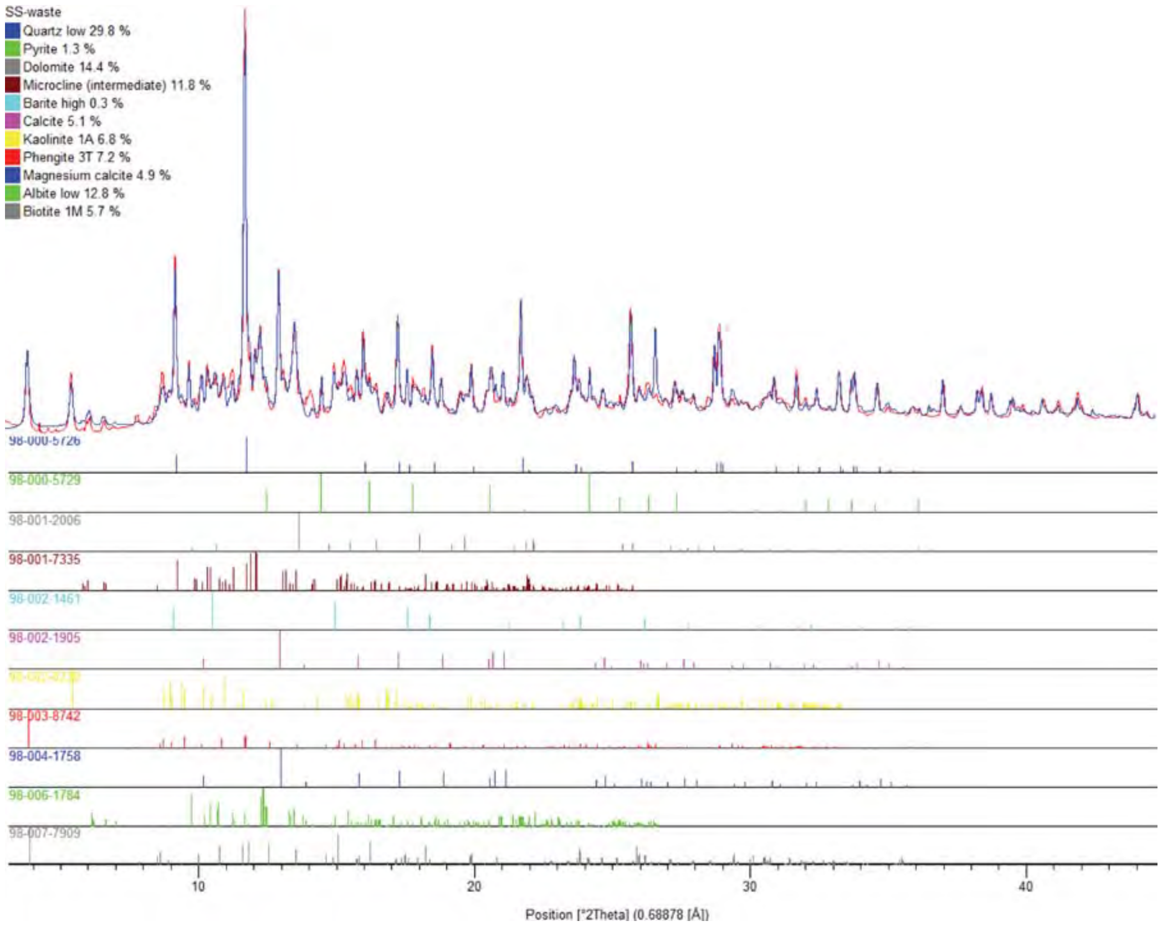


Figure 7.31 Diffraction pattern of SS waste

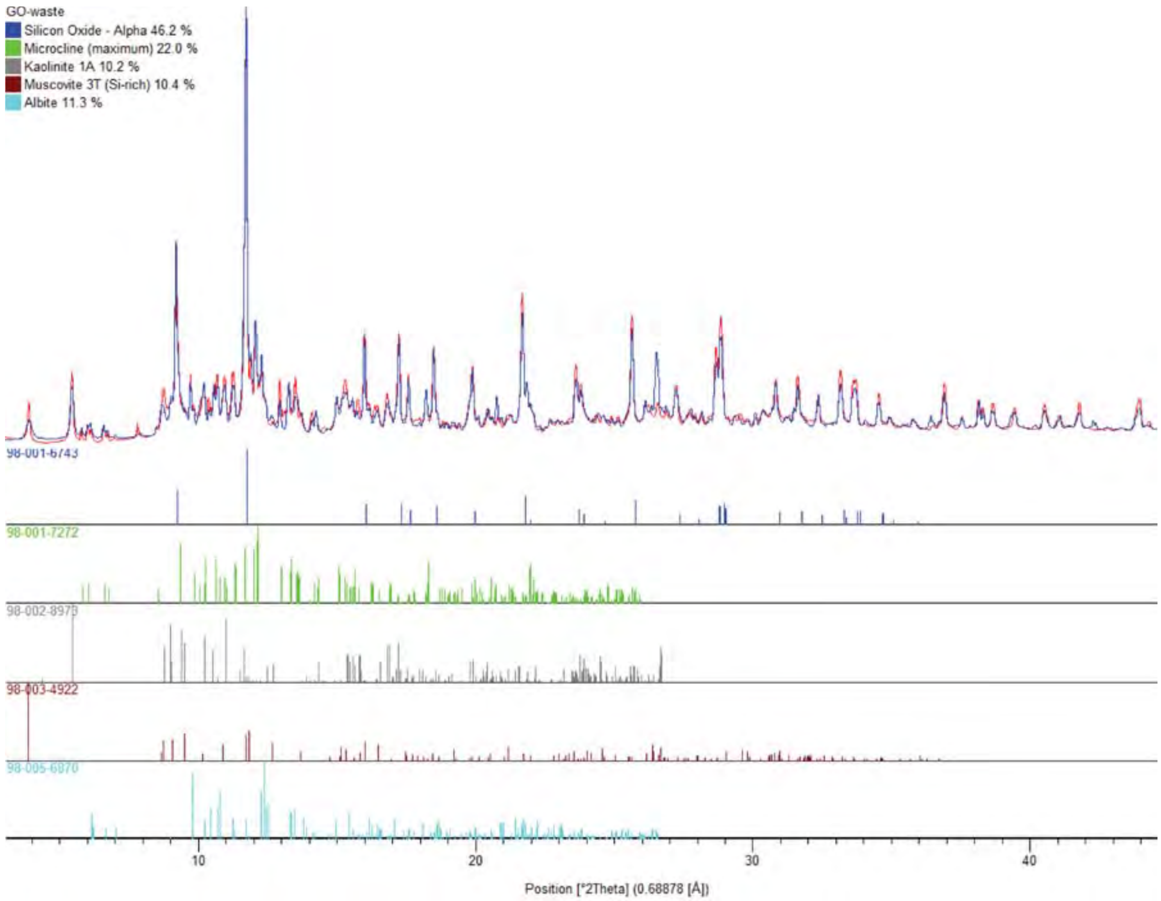


Figure 7.32 Diffraction pattern of GO waste

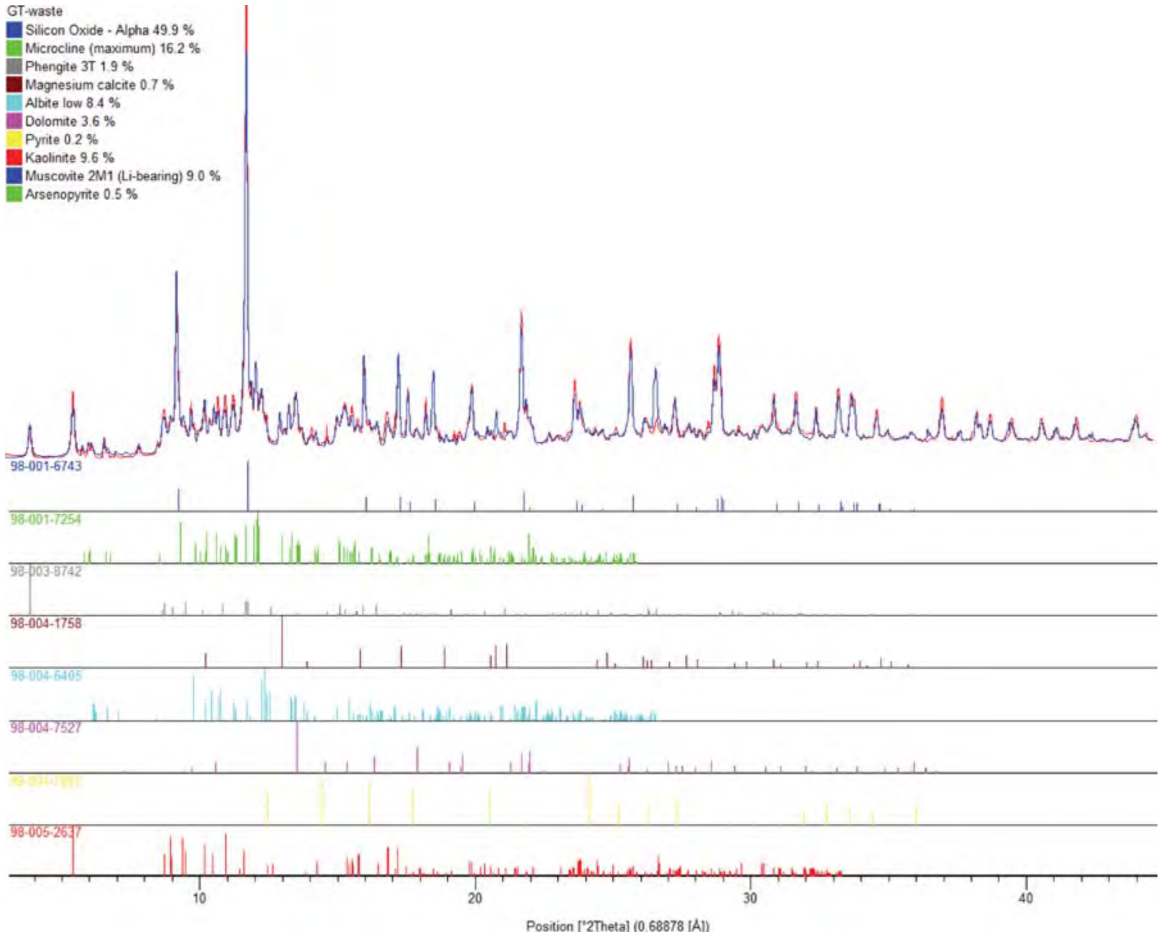


Figure 7.33 Diffraction pattern of GT waste

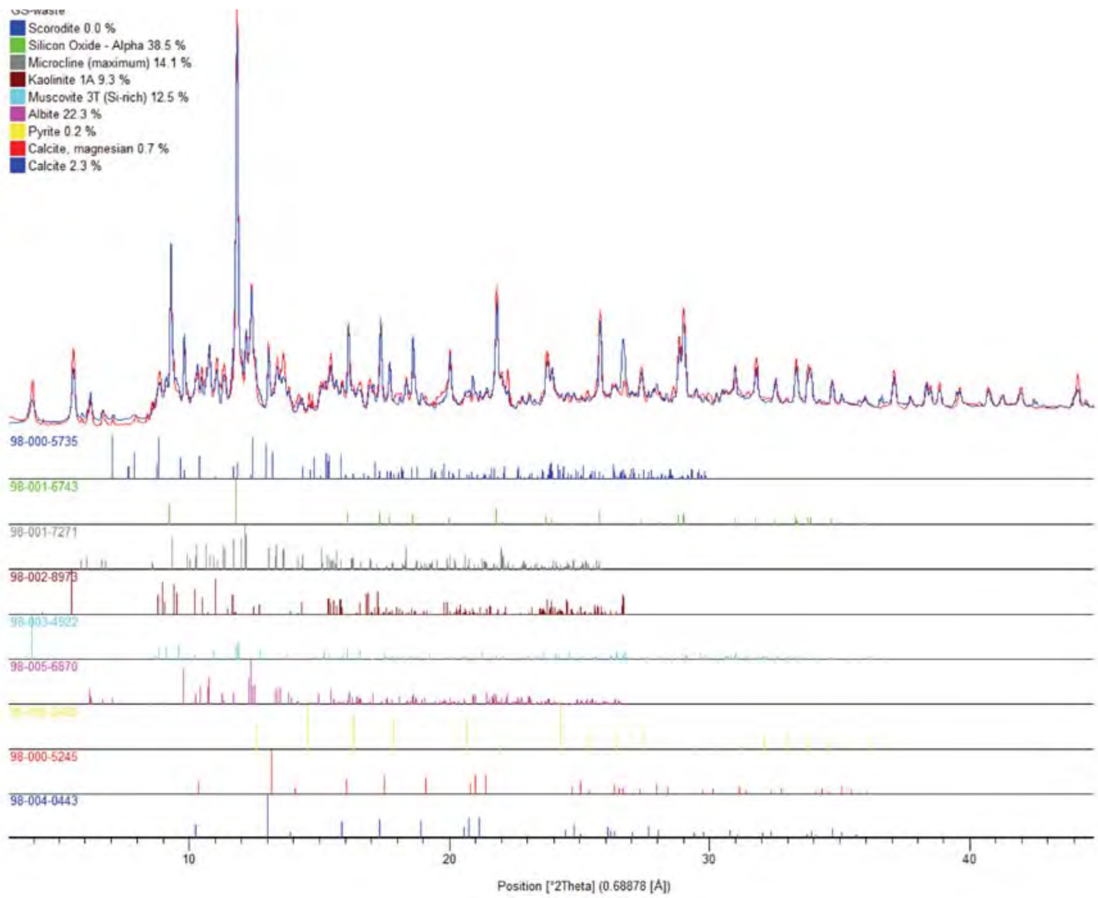


Figure 7.34 Diffraction pattern of GS waste

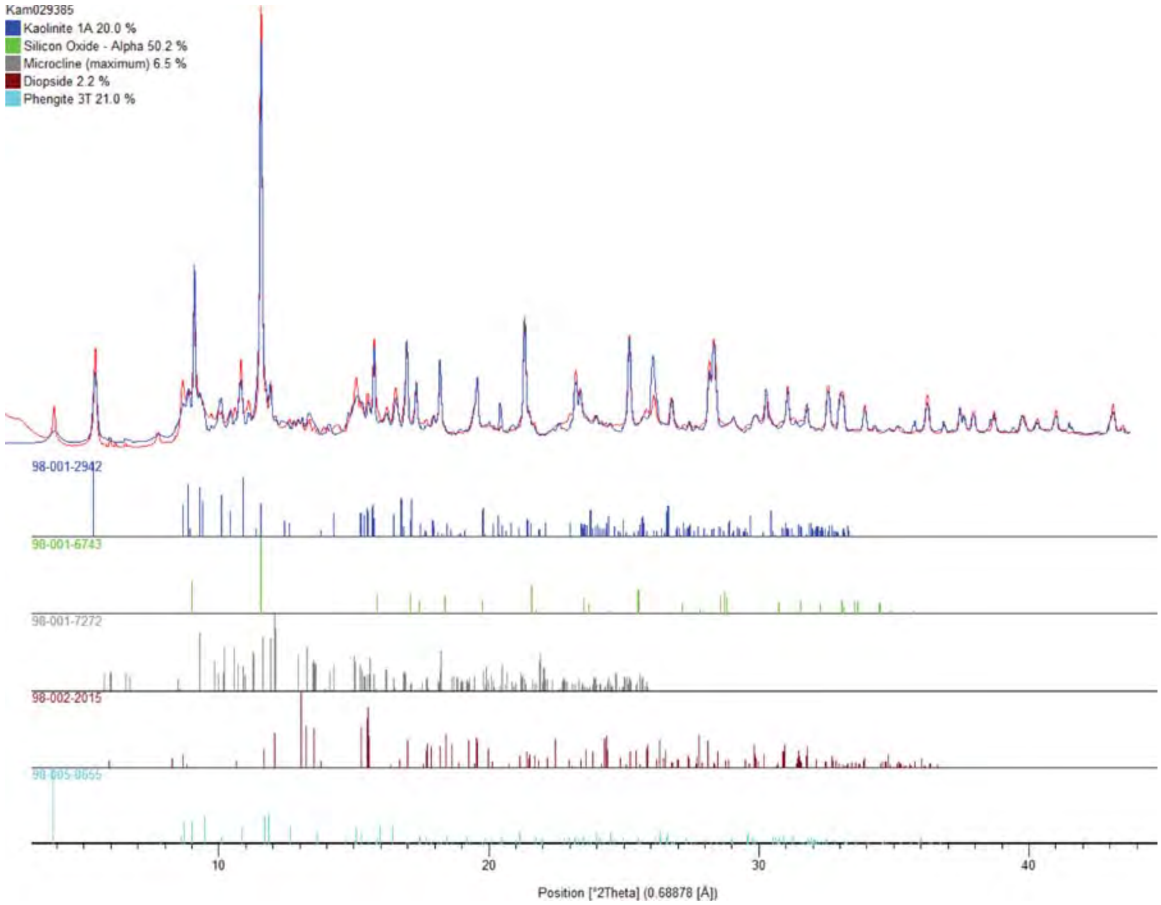


Figure 7.35 Diffraction pattern of KAM029385

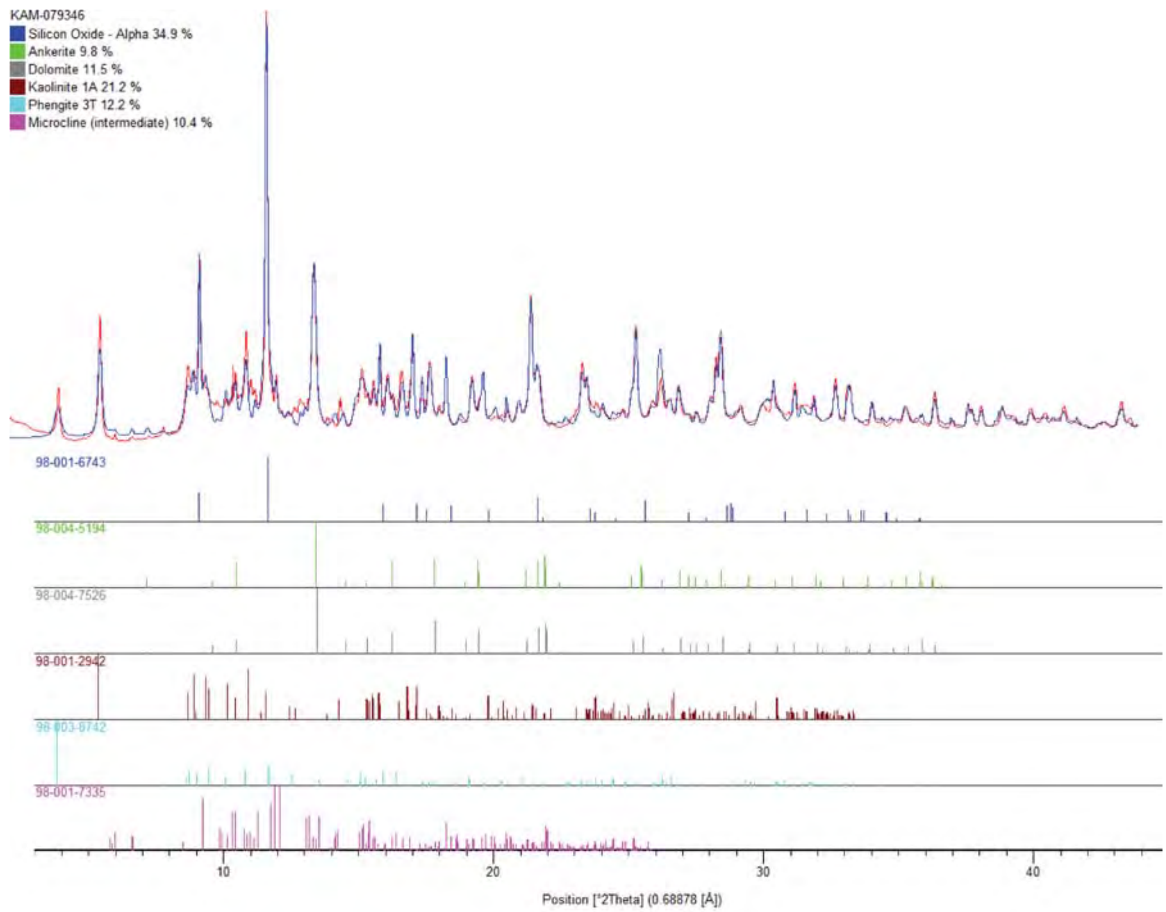


Figure 7.36 Diffraction pattern of KAM079346

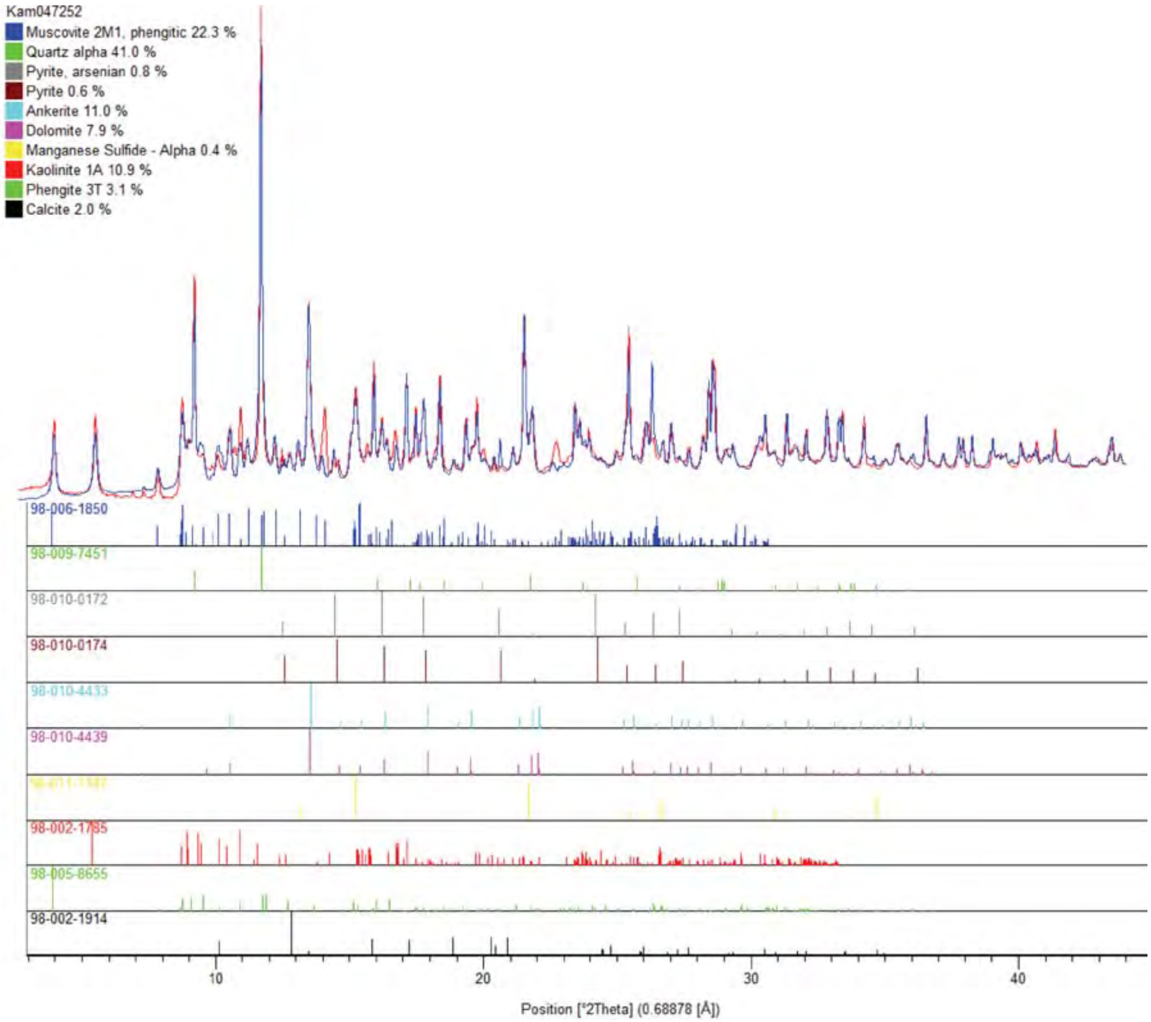


Figure 7.37 Diffraction pattern of KAM047252

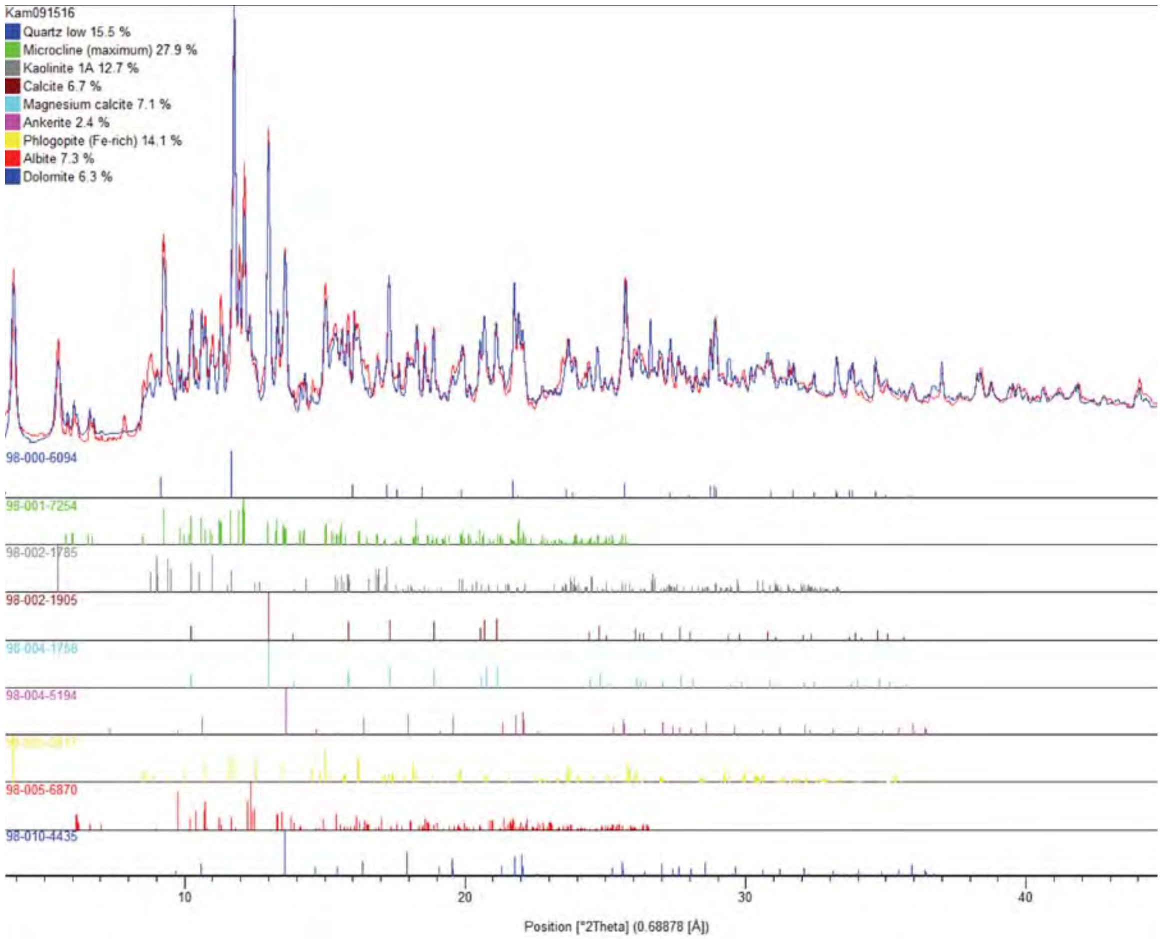


Figure 7.38 Diffraction pattern of KAM091516

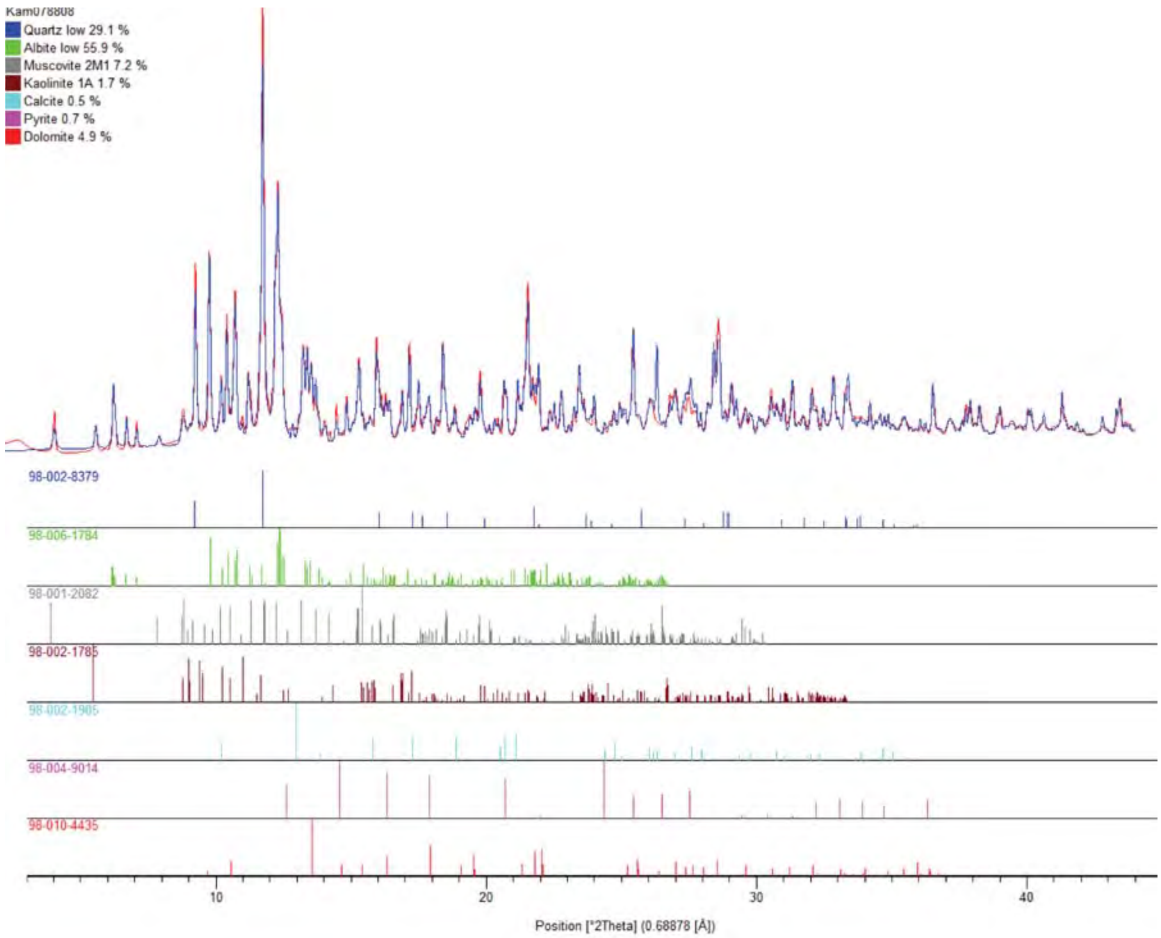


Figure 7.39 Diffraction pattern of KAM078808

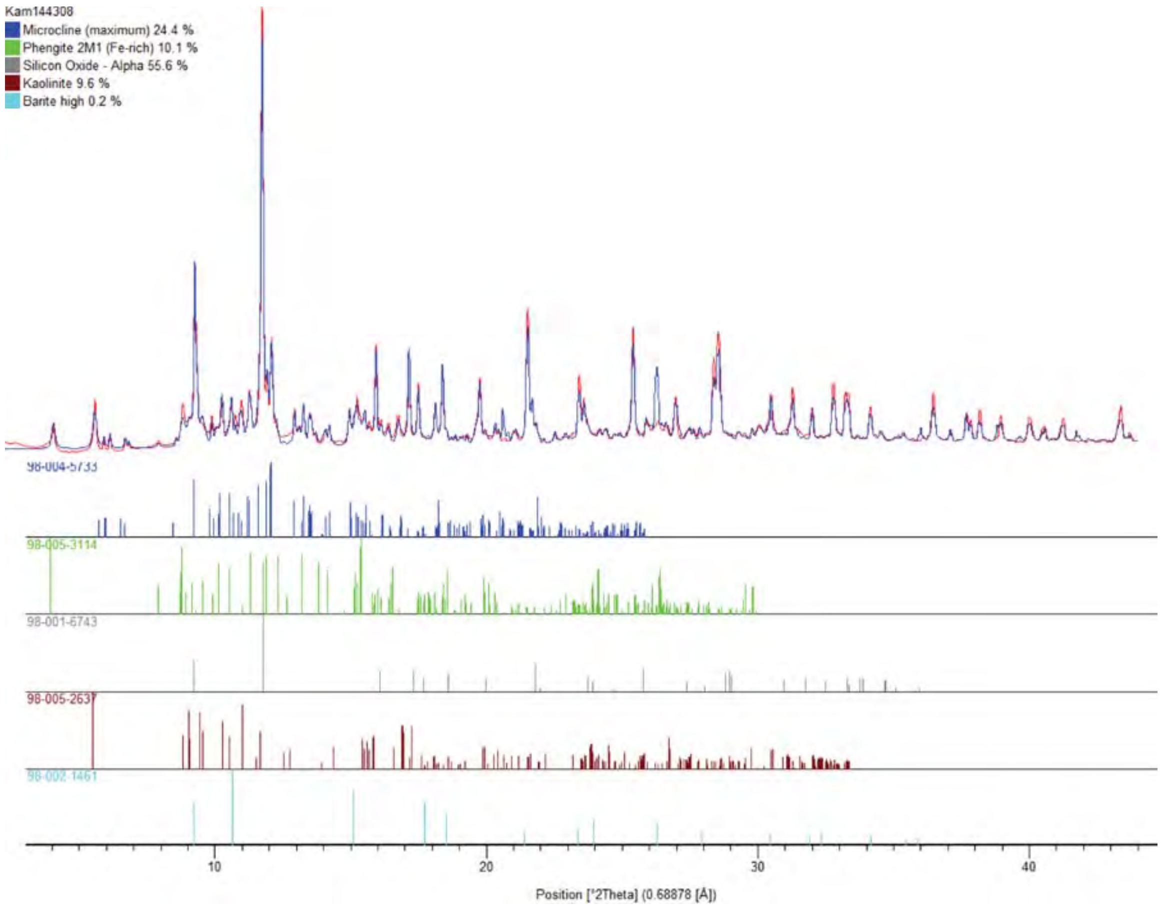


Figure 7.40 Diffraction pattern of KAM155308

Appendix C: Static Test Results

Appendix C.1: Static Test Results for Waste Rock

Appendix C.2: Static Test Results for Ore

Appendix C.3: Static Test Results for Leach Tailings

Appendix C.4: Static Test Results for Overburden

GOLDCORP

Appendix C.1: Static Test Results for Waste Rock

Appendix C.1-1: Acid-Base Accounting Results for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Rinse pH (1:1)	Paste pH	Total-S	Sulphate-S	Sulphide-S	T-AP	Total-C	Inorg. C (as CO_2)	T-C NP*	CaNP	Sobek-NP	Siderite-NP	T-C NNP*	Sobek NNP	Siderite NNP	NPR	NPR	NPR	NPR
									s.u.	s.u.	%	%	%	$kgCaCO_3/t$	%	%	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	T-CNP*/T-AP	CaNP/T-AP	SobekNP/T-AP	SideriteNP/T-AP
Oxide Facies for Gneiss Waste Rock																											
ABA001	KAM000219	CFD0002	21	22	Waste	Oxide	Gneiss	FG	7.1	7.3	<0.01	0.01	0.02	<0.3	0.040	<0.2	3.1	<4.5	3.0	4.0	2.8	3.0	3.7	10	15	10	13
ABA043	KAM050495	CFD0152	149	150	Waste	Oxide	Gneiss	MxF	7.1	8.2	<0.01	<0.01	0.01	<0.3	0.28	0.90	22	21	23	25	21	23	25	72	68	77	83
ABA052	KAM079466	CFD0254	72	73	Waste	Oxide	Gneiss	MxF	7.4	9.1	<0.01	0.01	0.01	<0.3	0.27	1.0	21	23	25	25	21	25	25	70	76	83	83
ABA063	KAM125214	CFD0307	10	11	Waste	Oxide	Gneiss	MxF	8.3	8.4	<0.01	<0.01	0.01	<0.3	0.020	<0.2	1.6	<4.5	8.0	8.0	1.3	8.0	7.7	5.2	15	27	27
ABA064	KAM125257	CFD0307	49	50	Waste	Oxide	Gneiss	MxF	7.4	7.5	0.01	<0.01	<0.01	0.30	0.020	<0.2	1.6	<4.5	4.0	5.0	1.2	4.0	4.7	5.0	14	13	16
ABA080	KAM115505	CFR0360	25.91	27.43	Waste	Oxide	Gneiss	MxF	7.5	7.2	<0.01	<0.01	<0.01	<0.3	0.10	0.20	7.8	4.5	4.0	5.0	7.5	4.0	4.7	26	15	13	17
ABA081	KAM117096	CFR0384	22.86	24.38	Waste	Oxide	Gneiss	MxF	7.3	7.4	<0.01	<0.01	<0.01	<0.3	0.060	0.20	4.7	4.5	5.0	5.0	4.4	5.0	4.7	16	15	17	17
ABA083	KAM119516	CFR0418	19.81	21.34	Waste	Oxide	Gneiss	MxF	8.6	8.5	0.01	<0.01	<0.01	0.30	0.050	0.20	3.9	4.5	6.0	7.0	3.6	6.0	6.7	12	15	19	22
ABA085	KAM120107	CFR0425	15.24	16.76	Waste	Oxide	Gneiss	MxM	7.2	7.9	<0.01	0.01	<0.01	<0.3	0.060	0.20	4.7	4.5	5.0	6.0	4.4	5.0	5.7	16	15	17	20
ABA096	KAM137284	CFR0468	32	33.53	Waste	Oxide	Gneiss	MxF	8.5	8.3	<0.01	<0.01	<0.01	<0.3	0.050	<0.2	3.9	<4.5	8.0	9.0	3.6	8.0	8.7	13	15	27	30
ABA104	KAM139298	CFR0482	10.67	12.19	Waste	Oxide	Gneiss	MxF	7.2	7.2	<0.01	<0.01	<0.01	<0.3	0.070	<0.2	5.4	<4.5	3.0	4.0	5.1	3.0	3.7	18	15	10	13
ABA136	KAM151967	CFR0584	109.73	111.25	Waste	Oxide	Gneiss	MxF	7.2	7.4	<0.01	<0.01	<0.01	<0.3	0.070	0.20	5.4	4.5	3.0	4.0	5.1	3.0	3.7	18	15	10	13
ABA137	KAM151932	CFR0584	60.96	62.48	Waste	Oxide	Gneiss	MxF	7.5	8.5	<0.01	0.01	<0.01	<0.3	0.060	0.20	4.7	4.5	7.0	8.0	4.4	7.0	7.7	16	15	23	27
ABA138	KAM152219	CFR0586	155.45	156.97	Waste	Oxide	Gneiss	MxF	7.2	8.1	<0.01	0.01	<0.01	<0.3	0.060	0.20	4.7	4.5	6.0	7.0	4.4	6.0	6.7	16	15	20	23
ABA144	KAM152716	CFR0591	30.48	32	Waste	Oxide	Gneiss	MxF	7.2	7.7	<0.01	0.01	<0.01	<0.3	0.30	1.0	23	23	24	25	23	24	25	78	76	80	83
ABA145	KAM153015	CFR0594	60.96	62.48	Waste	Oxide	Gneiss	MxF	7.4	8.5	0.08	0.01	0.10	2.5	0.25	0.80	19	18	20	21	17	18	19	7.8	7.3	8.0	8.4
ABA146	KAM153091	CFR0594	164.59	166.12	Waste	Oxide	Gneiss	MxF	7.0	7.2	0.01	0.02	<0.01	0.30	0.10	0.30	7.8	6.8	9.0	10	7.5	9.0	9.7	25	22	29	32
ABA149	KAM153152	CFR0595	60.96	62.48	Waste	Oxide	Gneiss	MxF	8.7	9.0	0.02	<0.01	0.03	0.60	0.28	1.0	22	23	21	23	21	20	22	35	36	34	37
ABA224	R277421	CFD0423	53	54	Waste	Oxide	Gneiss	MxM	-	6.8	<0.01	-	-	<0.3	0.010	-	0.80	-	-	-	0.48	-	-	2.6	-	-	-
ABA225	R272412	CFD0436	9	10	Waste	Oxide	Gneiss	FG	-	7.7	0.01	-	-	0.30	0.010	-	0.80	-	-	-	0.46	-	-	2.5	-	-	-
ABA226	R272445	CFD0436	38	39	Waste	Oxide	Gneiss	FG	-	7.8	0.01	-	-	0.30	0.020	-	1.6	-	-	-	1.2	-	-	5.0	-	-	-
ABA227	R272537	CFD0436	120	121	Waste	Oxide	Gneiss	MxF	-	8.4	0.01	-	-	0.30	0.010	-	0.80	-	-	-	0.46	-	-	2.5	-	-	-
ABA228	R271769	CFD0425	80	81	Waste	Oxide	Gneiss	MxF	-	9.3	<0.01	-	-	<0.3	0.15	-	12	-	-	-	11	-	-	39	-	-	-
ABA229	R272589	CFD0436	166	167	Waste	Oxide	Gneiss	MxF	-	7.5	0.01	-	-	0.30	0.010	-	0.80	-	-	-	0.46	-	-	2.5	-	-	-
ABA230	R280455	CFD0497	90	91	Waste	Oxide	Gneiss	MxM	-	8.6	0.10	-	-	3.1	0.26	-	20	-	-	-	17	-	-	6.5	-	-	-
ABA231	R277177	CFD0421	47	48	Waste	Oxide	Gneiss	MxM	-	7.5	0.01	-	-	0.30	0.030	-	2.3	-	-	-	2.0	-	-	7.5	-	-	-
ABA232	R277505	CFD0426	58	59	Waste	Oxide	Gneiss	MxM	-	7.2	<0.01	-	-	<0.3	<0.01	-	<0.8	-	-	-	0.48	-	-	2.6	-	-	-
ABA233	R277739	CFD0431	118	119	Waste	Oxide	Gneiss	MxF	-	7.6	0.01	-	-	0.30	0.010	-	0.80	-	-	-	0.46	-	-	2.5	-	-	-
ABA234	R277403	CFD0423	37	38	Waste	Oxide	Gneiss	MxM	-	8.4	<0.01	-	-	<0.3	0.020	-	1.6	-	-	-	1.3	-	-	5.2	-	-	-
ABA235	R277137	CFD0421	11	12	Waste	Oxide	Gneiss	MxM	-	7.7	0.01	-	-	0.30	0.030	-	2.3	-	-	-	2.0	-	-	7.5	-	-	-
ABA380	KAM075906	CFD0216	90	91	Waste	Oxide	Gneiss	MxF	7.8	7.1	0.01	0.01	0.01	0.30	0.020	<0.2	1.6	<4.5	-	-	1.2	-	-	5.0	14	-	-
ABA382	KAM067845	CFD0221	211	212	Waste	Oxide	Gneiss	FG	-	8.6	0.06	<0.01	0.06	1.9	0.52	1.6	40	36	-	-	38	-	-	22	19	-	-
ABA384	KAM068794	CFD0238	227	228	Waste	Oxide	Gneiss	FG	7.0	6.4	0.01	0.02	0.01	0.30	0.020	<0.2	1.6	<4.5	-	-	1.2	-	-	5.0	14	-	-
ABA393	KAM030104	CFR0109	50.9	52.43	Waste	Oxide	Gneiss	FG	6.6	6.6	0.02	0.01	0.01	0.60	0.020	<0.2	1.6	<4.5	-	-	0.93	-	-	2.5	7.2	-	-
Statistical Summary						**Oxide**	**Gneiss**	**n**	21	34	34	22	22	34	34	22	34	22	18	18	34	18	18	34	22	18	18
								Max	8.7	9.3	0.10	0.02	0.10	3.1	0.50	1.6	40	36	25	25	39	25	25	78	76	83	83
								90th PCTL	8.5	8.6	0.02	0.01	0.03	0.60	0.30	1.0	22	23	23	25	21	23	25	38	65	78	83
								75th PCTL	7.5	8.4	0.01	0.01	0.01	0.30	0.10	0.70	7.8	15	17	18	7.5	15	16	18	18	28	32
								Median	7.3	7.7	<0.01	<0.01	<0.01	<0.3	0.10	0.20	3.9	4.5	6.5	7.5	3.6	6.2	7.2	9.1	15	20	23
								25th PCTL	7.2	7.3	<0.01	<0.01	<0.01	<0.3	0.020	<0.2	1.6	<4.5	4.3	5.0	1.2	4.0	4.7	5.0	15	13	16
								10th PCTL	7.0	7.1	<0.01	<0.01	<0.01	<0.3	0.010	<0.2	0.80	<4.5	3.0	4.0	0.50	2.7	3.7	2.5	14	10	13
								Min	6.6	6.4	<0.01	<0.01	<0.01	<0.3	<0.01	<0.2	<0.8	<4.5	3.0	4.0	0.50	2.7	3.7	2.5	7.2	8.0	8.4
Upper Transition Facies for Gneiss Waste Rock																											
ABA016	KAM029087	CFD0175	145	146	Waste	Upper transition	Gneiss	MxF	7.1	7.5	0.01	0.01	<0.01	0.30	0.64	2.1	50	48	52	53	49	52	53	159	153	166	170
ABA042	KAM050492	CFD0152	146	147	Waste	Upper transition	Gneiss	MxF	7.3	8.1	<0.01	0.01	0.01	<0.3	0.35	1.2	27	27	30	30	27	30	30	91	91	100	100
ABA057	KAM096548	CFD0269	33	34	Waste	Upper transition	Gneiss	FG	7.5	8.5	0.94	<0.01	0.90	29	0.030	<0.2	2.3	<4.5	40	5.0	-27	11	-24	0.080	0.15	1.4	0.17
ABA059	KAM097012	CFD0272	17	18	Waste	Upper transition	Gneiss	FG	7.4	7.6	<0.01	0.01	0.01	<0.3	0.030	0.10	2.3	2.3	6.0	6.0	2.0	6.0	5.7	7.8	7.6	20	20
ABA060	KAM097065	CFD0272	65	66	Waste	Upper transition	Gneiss	FG	7.1	8	0.04	<0.01	0.04	1.3	0.42	1.4	33	32	34	36	31	33	35	26	25	27	29
ABA069	KAM145287	CFD0338	123	124	Waste	Upper transition	Gneiss	FG	7.4	7.4	0.01	<0.01	<0.01	0.30	0.020	<0.2	1.6	<4.5	3.0	5.0	1.2	3.0	4.7	5.0	14	9.6	16
ABA101	KAM137634	CFR0470	109.73	111.25	Waste	Upper transition	Gneiss	MxF	7.6	7.8	0.06	<0.01	0.04	1.9	0.35	1.1	27	25	26	27	25	24	25	14	13	14	14
ABA105	KAM139327	CFR0482	50.29	51.82	Waste	Upper transition	Gneiss	MxF	7.2	7	<0.01	<0.01	<0.01	<0.3	0.11	<0.2	8.5	<4.5	2.0	3.0	8.2	2.0	2.7	28	15	6.7	10
ABA141	KAM152499	CFR0589	77.72	79.25	Waste	Upper transition	Gneiss	MxF	7.6	8.8	0.03	0.02	0.03	0.90	0.44	1.2	34	27	30	31	33	29	30	36	29	32	33
ABA147	KAM152978	CFR0594	10.67	12.19	Waste	Upper transition	Gneiss	MxF	9.2	9.4	<0.01	0.01	<0.01	<0.3	0.27	0.90	21	21	22	23	21	22	23	70	68	73	77
ABA237	R270907	CFD0412	10	11	Waste	Upper transition	Gneiss	MxF	-	8.2	0.01	-	-	0.30	0.63	-	49	-	-	-	49	-	-	156	-	-	-
ABA238	R280433	CFD0497	28	29	Waste	Upper transition	Gneiss	MxM	-	7.7	0.01	-	-	0.30	0.010	-	0.80	-	-	-	0.46	-	-	2.5	-	-	-
ABA239	Q034712	CFD0473	7	8	Waste	Upper transition	Gneiss	FG	-	7.9	0.01	-	-	0.30	0.020	-	1.6	-	-	-	1.2	-	-	5.0	-	-	-
ABA240	Q034807	CFD0473	117	118	Waste	Upper transition	Gneiss	FG	-	7.6	0.01	-	-	0.30	0.020	-	1.6	-	-	-	1.2	-	-	5.0	-	-	-
ABA241	R272496	CFD0436	83	84	Waste	Upper transition	Gneiss	MxF	-	7.5	0.01	-	-	0.30	0.010	-	0.80	-	-	-	0.46	-	-	2.5	-	-	-
ABA242	R270718	CFD0404	69	70	Waste	Upper transition	Gneiss	MxF	-	7.5	<0.01	-	-	<0.3	0.010	-	0.80	-	-	-	0.48	-	-	2.6	-	-	-
ABA243	R271483	CFD0420	51	52	Waste	Upper transition	Gneiss	MxF	-	7.5	<0.01	-	-	<0.3	0.010	-	0.80	-	-	-	0.48	-	-	2.6	-	-	-
ABA244	R272865	CFD0441	40	41	Waste	Upper transition	Gneiss	MxF	-	7.1	<0.01	-	-	<0.3	0.010	-	0.80	-	-	-	0.48	-	-	2.6	-	-	-
ABA245	R278947	CFD0461	10	11	Waste	Upper transition	Gneiss	MxM	-	7	0.01	-	-	0.30	0.020	-	1.6	-	-	-	1.2	-	-	5.0	-	-	-
ABA353	R304081	CFD0525	10	11	Waste	Upper Transition	Gneiss	MxF	8.4	7.5	<0.01	0.01	0.01	0.30	0.010	<0.2	0.80	<4.5	-	-	0.46	-	-	2.5	14	-	-
ABA367	R545582	CFD0524	56	57	Waste	Upper Transition	Gneiss	MxF	7.9	7.2	0.01	<0.01	0.02	0.30	0.020	<0.2	1.6	<4.5	-	-	1.2	-	-	5.0	14	-	-
ABA373	R271332	CFD0417	58	59	Waste	Upper Transition	Gneiss	MxF	7.5	6.8	0.08	0.01	0.05	2.5	0.010	<0.2	0.80	<4.5	-	-	-1.7	-	-	0.31	1.8	-	-
ABA385	KAM068709	CFD0238	151	152	Waste	Upper Transition	Gneiss	MxF	-	-	<0.01	0.01	0.01	<0.3	0.050	<0.2	3.9	<4.5	-	-	3.6	-	-	13	15	-	-
ABA386	KAM069164	CFD0242	220.45	221	Waste	Upper Transition	Gneiss	FG	7.1	6.6	<0.01	0.01	0.02	<0.3	0.020	<0.2	1.6	<4.5	-	-	1.3	-	-	5.2	15	-	-
ABA407	R272624	CFD0438	17	18	Waste	Upper Transition	Gneiss	MxF	7.9	7.8	<0.01	0.02	<0.01	<0.3	0.030	<0.2	2.3	<4.5	-	-	2.0	-	-	7.8	15	-	-
ABA411	R544193	CFD0502	40	41	Waste	Upper Transition	Gneiss	MxF	7.4	6.9	<0.01	0.01	0.02	<0.3	0.030	<0.2	2.3	<4.5	-	-	2.0	-	-	7.8	15	-	-
Statistical Summary						**Upper Transition**	**Gneiss**	**n**	16	25	26	17	17	26	26	17	26	17	10	10	26	10	10	26	17	10	10
								Max	9.2	9.4	0.94	0.02	0.90	29	0.64	2.1	50	48	52	53	49	52	53	159	153	166	170
								90th PCTL	8.2	8.4	0.05	0.01	0.04	1.6	0.43	1.3	33	29	41	38	32	35	37	80	77	107	107
								75th PCTL	7.7	7.9	0.01	0.01	0.03	0.31	0.23	1.1	18	25	33	31	18	30	30	23	26	63	66
								Median	7.5	7.5	0.01	0.01	0.01	0.31	0.030	<0.2	1.9	<4.5	28	25	1.2	23	24	5.1	15	24	24
								25th PCTL	7.3	7.2	<0.01	<0.01	<0.01	<0.3	0.010	<0.2	1.0	<4.5	10	5.3	0.50	6.9	4.9	2.6	14	11	15
								10th PCTL	7.1	6.9	<0.01	<0.01	<0.01	<0.3	0.010	<0.2	0.80	<4.5	2.9	4.8	0.50	2.6	0	2.5	5.3	6.1	9.0
								Min	7.1	6.6	<0.01	<0.01	<0.01	<0.3	0.010	0.10	0.80	2.3	2.0	3.0	-27	1.7	-24	0.10	0.20	1.4	0.20

Appendix C.1-1: Acid-Base Accounting Results for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Rinse pH (1:1)	Paste pH	Total-S	Sulphate-S	Sulphide-S	T-AP	Total-C	Inorg. C (as CO_2)	T-C NP*	CaNP	Sobek-NP	Siderite-NP	T-C NNP*	Sobek NNP	Siderite NNP	NPR	NPR	NPR	NPR
									s.u.	s.u.	%	%	%	$kgCaCO_3/t$	%	%	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	T-CNP*/T-AP	CaNP/T-AP	SobekNP/T-AP	SideriteNP/T-AP
Lower Transition Facies for Gneiss Waste Rock																											
ABA019	KAM029649	CFD0177	73	74	Waste	Lower transition	Gneiss	MxM	9.5	9.3	0.02	0.02	0.01	0.60	0.14	0.50	11	11	20	20	10	19	19	17	18	32	32
ABA020	KAM029658	CFD0177	81	82	Waste	Lower transition	Gneiss	MxM	7.9	9.5	0.05	<0.01	0.07	1.6	1.1	4.0	86	91	127	121	85	125	119	55	58	81	77
ABA047	KAM051446	CFD0166	13	14	Waste	Lower transition	Gneiss	MxM	9.5	9.3	<0.01	<0.01	0.01	<0.3	0.12	0.50	9.3	11	28	23	9.0	28	23	31	38	93	77
ABA051	KAM079117	CFD0251	51	52	Waste	Lower transition	Gneiss	MxF	7.2	7.9	0.27	0.02	0.25	8.4	0.67	2.3	52	52	48	50	44	40	42	6.2	6.2	5.7	5.9
ABA058	KAM096948	CFD0270	230	231	Waste	Lower transition	Gneiss	MxF	7.2	8.2	0.10	<0.01	0.06	3.1	0.82	2.8	64	64	61	56	61	58	53	20	20	20	18
ABA067	KAM129499	CFD0332	50	51	Waste	Lower Transition	Gneiss	MxM	9.5	9.5	0.04	<0.01	0.04	1.3	0.12	0.40	9.3	9.1	15	17	8.1	14	16	7.5	7.3	12	14
ABA070	KAM099512	CFD0338	10	11	Waste	Lower transition	Gneiss	MxF	7.9	8	<0.01	<0.01	<0.01	<0.3	0.020	<0.2	1.6	<4.5	4.0	5.0	1.3	4.0	4.7	5.2	15	13	17
ABA073	KAM145537	CFD0339	111	112	Waste	Lower transition	Gneiss	MxF	9	9.1	0.01	<0.01	<0.01	0.30	0.12	0.50	9.3	11	13	15	9.0	13	15	30	36	42	48
ABA098	KAM137429	CFR0469	28.96	30.48	Waste	Lower transition	Gneiss	MxF	8.7	8.7	<0.01	<0.01	<0.01	<0.3	0.040	<0.2	3.1	<4.5	8.0	9.0	2.8	8.0	8.7	10	15	27	30
ABA106	KAM139356	CFR0482	89.92	91.44	Waste	Lower transition	Gneiss	MxF	7.2	8.3	<0.01	<0.01	<0.01	<0.3	0.28	0.80	22	18	30	34	21	30	34	72	61	100	113
ABA117	KAM122524	CFR0529	21.34	22.86	Waste	Lower transition	Gneiss	FG	9.5	9.6	<0.01	0.01	<0.01	<0.3	0.11	0.30	8.5	6.8	13	14	8.2	13	14	28	23	43	47
ABA142	KAM152462	CFR0589	25.91	27.43	Waste	Lower transition	Gneiss	MxF	8.3	9	0.01	0.02	0.01	0.30	0.17	0.60	13	14	19	20	13	19	20	42	44	61	64
ABA150	KAM153129	CFR0595	30.48	32	Waste	Lower transition	Gneiss	MxM	7.5	8.8	0.11	0.01	0.10	3.4	0.99	3.5	77	80	104	116	73	101	113	22	23	30	34
ABA246	R273797	CFD0458	9	10	Waste	Lower transition	Gneiss	FG	-	8.3	0.01	-	-	0.30	0.18	-	14	-	-	-	14	-	-	45	-	-	-
ABA247	R283019	CFD0484	33	34	Waste	Lower transition	Gneiss	FG	-	7.9	<0.01	-	-	<0.3	0.010	-	0.80	-	-	-	0.48	-	-	2.6	-	-	-
ABA249	R273398	CFD0447	188	189	Waste	Lower transition	Gneiss	MxF	-	8.5	0.01	-	-	0.30	0.010	-	0.80	-	-	-	0.46	-	-	2.5	-	-	-
ABA250	R279032	CFD0461	85	86	Waste	Lower transition	Gneiss	MxM	-	9	0.28	-	-	8.8	0.38	-	30	-	-	-	21	-	-	3.4	-	-	-
ABA251	R274019	CFD0464	10	11	Waste	Lower transition	Gneiss	FG	-	8.1	<0.01	-	-	<0.3	0.030	-	2.3	-	-	-	2.0	-	-	7.8	-	-	-
ABA252	R274341	CFD0467	80	81	Waste	Lower transition	Gneiss	MxF	-	8.9	<0.01	-	-	<0.3	0.020	-	1.6	-	-	-	1.3	-	-	5.2	-	-	-
ABA253	R282397	CFD0474	95	96	Waste	Lower transition	Gneiss	MxF	-	7.3	<0.01	-	-	<0.3	<0.01	-	<0.8	-	-	-	0.48	-	-	2.6	-	-	-
ABA254	R270666	CFD0404	10	11	Waste	Lower transition	Gneiss	MxF	-	8.9	<0.01	-	-	<0.3	0.050	-	3.9	-	-	-	3.6	-	-	13	-	-	-
ABA255	R271756	CFD0424	62	63	Waste	Lower transition	Gneiss	MxM	-	8.2	0.01	-	-	0.30	0.040	-	3.1	-	-	-	2.8	-	-	9.9	-	-	-
ABA256	R271112	CFD0415	8	9	Waste	Lower transition	Gneiss	MxM	-	8.9	0.08	-	-	2.5	0.26	-	20	-	-	-	18	-	-	8.1	-	-	-
ABA257	R273315	CFD0447	115	116	Waste	Lower transition	Gneiss	FG	-	8.5	0.01	-	-	0.30	0.090	-	7.0	-	-	-	6.7	-	-	22	-	-	-
ABA258	R276507	CFD0409	12	13	Waste	Lower transition	Gneiss	MxM	-	8	<0.01	-	-	<0.3	0.030	-	2.3	-	-	-	2.0	-	-	7.8	-	-	-
ABA259	R280545	CFD0499	10	11	Waste	Lower transition	Gneiss	MxM	-	8.4	0.02	-	-	0.60	0.010	-	0.80	-	-	-	0.15	-	-	1.2	-	-	-
ABA260	R280565	CFD0499	28	29	Waste	Lower transition	Gneiss	MxM	-	8.7	<0.01	-	-	<0.3	0.010	-	0.80	-	-	-	0.48	-	-	2.6	-	-	-
ABA261	R274115	CFD0464	95	96	Waste	Lower transition	Gneiss	MxF	-	8.6	0.12	-	-	3.8	1.1	-	85	-	-	-	81	-	-	23	-	-	-
ABA262	R274262	CFD0467	10	11	Waste	Lower transition	Gneiss	MxF	-	9.1	<0.01	-	-	<0.3	0.10	-	7.8	-	-	-	7.5	-	-	26	-	-	-
ABA263	R282302	CFD0474	10	11	Waste	Lower transition	Gneiss	FG	-	7.2	<0.01	-	-	<0.3	0.030	-	2.3	-	-	-	2.0	-	-	7.8	-	-	-
ABA264	R271435	CFD0420	9	10	Waste	Lower transition	Gneiss	MxF	-	8.6	<0.01	-	-	<0.3	0.010	-	0.80	-	-	-	0.48	-	-	2.6	-	-	-
ABA265	R271165	CFD0415	55	56	Waste	Lower transition	Gneiss	MxF	-	9.3	0.03	-	-	0.90	0.12	-	9.3	-	-	-	8.4	-	-	9.9	-	-	-
ABA267	R273694	CFD0456	97	98	Waste	Lower transition	Gneiss	MxM	-	8.2	0.30	-	-	9.4	0.58	-	45	-	-	-	36	-	-	4.8	-	-	-
ABA269	R279507	CFD0468	60	61	Waste	Lower transition	Gneiss	MxF	-	8.5	0.02	-	-	0.60	0.010	-	0.80	-	-	-	0.15	-	-	1.2	-	-	-
ABA270	R272186	CFD0433	10	11	Waste	Lower transition	Gneiss	MxF	-	7.6	0.01	-	-	0.30	0.020	-	1.6	-	-	-	1.2	-	-	5.0	-	-	-
ABA271	R283079	CFD0484	87	88	Waste	Lower transition	Gneiss	FG	-	8.6	<0.01	-	-	<0.3	0.010	-	0.80	-	-	-	0.48	-	-	2.6	-	-	-
ABA272	Q034772	CFD0473	86	87	Waste	Lower transition	Gneiss	MxF	-	8.5	0.01	-	-	0.30	0.020	-	1.6	-	-	-	1.2	-	-	5.0	-	-	-
ABA273	R282171	CFD0439	30	31	Waste	Lower transition	Gneiss	MxF	-	7.6	0.01	-	-	0.30	0.010	-	0.80	-	-	-	0.46	-	-	2.5	-	-	-
ABA274	R277372	CFD0423	10	11	Waste	Lower transition	Gneiss	MxM	-	9.3	<0.01	-	-	<0.3	0.010	-	0.80	-	-	-	0.48	-	-	2.6	-	-	-
ABA275	R283492	CFD0496	10	11	Waste	Lower transition	Gneiss	MxF	-	8.6	0.03	-	-	0.90	0.010	-	0.80	-	-	-	-0.16	-	-	0.83	-	-	-
ABA276	R273866	CFD0460	63	64	Waste	Lower transition	Gneiss	FG	-	9	0.04	-	-	1.3	0.23	-	18	-	-	-	17	-	-	14	-	-	-
ABA277	R273898	CFD0460	91	92	Waste	Lower transition	Gneiss	MxF	-	9.3	0.08	-	-	2.5	0.73	-	57	-	-	-	54	-	-	23	-	-	-
ABA278	Q035773	CFD0491	9	10	Waste	Lower transition	Gneiss	MxF	-	8.2	<0.01	-	-	<0.3	0.010	-	0.80	-	-	-	0.48	-	-	2.6	-	-	-
ABA279	Q035789	CFD0491	60	61	Waste	Lower transition	Gneiss	MxF	-	6.8	0.01	-	-	0.30	0.010	-	0.80	-	-	-	0.46	-	-	2.5	-	-	-
ABA280	R271699	CFD0424	12	13	Waste	Lower transition	Gneiss	MxF	-	9.2	<0.01	-	-	<0.3	0.010	-	0.80	-	-	-	0.48	-	-	2.6	-	-	-
ABA282	R282102	CFD0437	70	71	Waste	Lower transition	Gneiss	MxF	-	7.3	0.01	-	-	0.30	0.010	-	0.80	-	-	-	0.46	-	-	2.5	-	-	-
ABA283	R273302	CFD0447	59	60	Waste	Lower transition	Gneiss	FG	-	8.8	0.08	-	-	2.5	0.74	-	57	-	-	-	55	-	-	23	-	-	-
ABA284	R273593	CFD0456	7	8	Waste	Lower transition	Gneiss	MxF	-	8	<0.01	-	-	<0.3	0.010	-	0.80	-	-	-	0.48	-	-	2.6	-	-	-
ABA338	R270835	CFD0406	32	33	Waste	Lower Transition	Gneiss	MxF	9.2	9.3	0.01	0.02	0.01	0.30	0.64	2.1	50	48	-	-	49	-	-	159	153	-	-
ABA339	R270848	CFD0406	58	58.309	Waste	Lower Transition	Gneiss	MxF	9.4	9.4	<0.01	0.01	<0.01	<0.3	0.21	0.70	16	16	-	-	16	-	-	54	53	-	-
ABA340	R270686	CFD0404	27	28	Waste	Lower Transition	Gneiss	MxM	9	8.9	0.07	<0.01	0.05	2.2	0.34	1.1	26	25	-	-	24	-	-	12	11	-	-
ABA341	R270737	CFD0404	85	86	Waste	Lower Transition	Gneiss	FG	9.2	9.2	0.01	<0.01	<0.01	0.30	0.45	1.5	35	34	-	-	35	-	-	112	109	-	-
ABA342	R551085	CFD0563	10	11	Waste	Lower Transition	Gneiss	MxM	9.4	9.4	<0.01	<0.01	<0.01	<0.3	0.21	0.70	16	16	-	-	16	-	-	54	53	-	-
ABA343	R551107	CFD0563	30	31	Waste	Lower Transition	Gneiss	MxM	8.8	8.8	0.06	0.01	0.05	1.9	1.0	3.3	78	75	-	-	76	-	-	41	40	-	-
ABA344	R551131	CFD0563	50	51	Waste	Lower Transition	Gneiss	MxM	9.2	9.2	0.01	<0.01	<0.01	0.30	0.54	1.8	42	41	-	-	42	-	-	134	131	-	-
ABA348	R304313	CFD0541	56	57	Waste	Lower Transition	Gneiss	MxM	8.3	8.1	<0.01	0.01	<0.01	<0.3	0.020	<0.2	1.6	<4.5	-	-	1.3	-	-	5.2	15	-	-
ABA360	R623829	CFD0555	10	11	Waste	Lower Transition	Gneiss	MxF	9.2	9.2	0.01	<0.01	0.01	0.30	0.020	<0.2	1.6	<4.5	-	-	1.2	-	-	5.0	14	-	-
ABA361	R623933	CFD0555	102	103	Waste	Lower Transition	Gneiss	MxF	8.4	8.6	0.03	0.01	0.01	0.90	0.47	1.6	37	36	-	-	36	-	-	39	39	-	-
ABA362	R507027	CFD0555	185	186	Waste	Lower Transition	Gneiss	FG	9	8.9	0.03	0.01	0.04	0.90	0.57	1.9	44	43	-	-	43	-	-	47	46	-	-
ABA363	R545397	CFD0520	20	21	Waste	Lower Transition	Gneiss	FG	7.7	7	<0.01	<0.01	0.01	<0.3	0.020	<0.2	1.6	<4.5	-	-	1.3	-	-	5.2	15	-	-
ABA364	R545422	CFD0520	41	42	Waste	Lower Transition	Gneiss	FG	7.7	7.2	<0.01	0.01	0.01	<0.3	0.020	<0.2	1.6	<4.5	-	-	1.3	-	-	5.2	15	-	-
ABA366	R545552	CFD0524	30	31	Waste	Lower Transition	Gneiss	MxF	8.4	8.4	0.02	0.03	0.01	0.60	0.15	0.50	12	11	-	-	11	-	-	19	18	-	-
ABA369	R545644	CFD0526	81	82	Waste	Lower Transition	Gneiss	MxF	8.6	8.6	<0.01	<0.01	0.01	<0.3	0.050	<0.2	3.9	<4.5	-	-	3.6	-	-	13	15	-	-
ABA370	R545697	CFD0528	42	43	Waste	Lower Transition	Gneiss	MxF	8.2	7.8	<0.01	0.01	0.01	<0.3	0.010	<0.2	0.80	<4.5	-	-	0.48	-	-	2.6	15	-	-
ABA371	R271272	CFD0417	5	6	Waste	Lower Transition	Gneiss	MxF	9.8	9.7	<0.01	0.01	<0.01	<0.3	0.050	<0.2	3.9	<4.5	-	-	3.6	-	-	13	15	-	-
ABA372	R271299	CFD0417	30	30.7	Waste	Lower Transition	Gneiss	MxF	7.9	7.4	<0.01	<0.01	0.01	<0.3	0.020	<0.2	1.6	<4.5	-	-	1.3	-	-	5.2	15	-	-
ABA376	R279575	CFD0468	120	121	Waste	Lower Transition	Gneiss	MxF	9.2	9.1	0.01	0.01	<0.01	0.30	0.070	0.20	5.4	4.5	-	-	5.1	-	-	17	15	-	-
ABA390	R278608	CFD0450	10	11	Waste	Lower Transition	Gneiss	MxF	6.8	7.5	<0.01	0.01	<0.01	<0.3	0.020	<0.2	1.6	<4.5	-	-	1.3	-	-	5.2	15	-	-
ABA391	R278677	CFD0450	71	72	Waste	Lower Transition	Gneiss	MxF	7.4	7.6	<0.01	<0.01	<0.01	<0.3	0.020	<0.2	1.6	<4.5	-	-	1.3	-	-	5.2	15	-	-
ABA392	R278725	CFD0450	114	114.287	Waste	Lower Transition	Gneiss	MxF	7.3	7.6	0.01	0.01	0.01	0.30	0.030	<0.2	2.3	<4.5	-	-	2.0	-	-	7.5	14	-	-
ABA395	R545811	CFD0529	58	59	Waste	Lower Transition	Gneiss	FG	9.5	9.5	<0.01	0.01	0.01	<0.3	0.030	<0.2	2.3	<4.5	-	-	2.0	-	-	7.8	15	-	-
ABA399	R543714	CFD0549	30	31	Waste	Lower Transition	Gneiss	MxF	9.4	9.5	<0.01	0.01	<0.01	<0.3	0.090	0.20	7.0	4.5	-	-	6.7	-	-	23	15	-	-
ABA400	R543741	CFD0549	53	54	Waste	Lower Transition	Gneiss	MxF	8.1	8.1	<0.01	0.02	<0.01	<0.3	0.030	<0.2	2.3	<4.5	-	-	2.0	-	-	7.8	15	-	-
ABA402	R544003	CFD0553	80	81	Waste	Lower Transition	Gneiss	MxF	8.8	8.9	0.01	0.02	0.01	0.30	0.10	0.30	7.8	6.8	-	-	7.5	-	-	25	22	-	-
ABA405	R554003	CFD0501	10	11	Waste	Lower Transition	Gneiss	MxF	8.1	7.6	<0.01	0.02	<0.01	<0.3	0.020	<0.2	1.6	<4.5	-	-	1.3	-	-	5.2	15	-	-
ABA406	R554039	CFD0501	42	43	Waste	Lower Transition	Gneiss	MxF	9.2	9	<0.01	0.02	0.01	<0.3	0.11	0.30	8.5	6.8	-	-	8.2	-	-	28	23	-	-
ABA409	R272762	CFD0438	184	185	Waste	Lower Transition	Gneiss	FG	9	9.2	0.14	0.02	0.15	4.4	0.68	2.3	53	52	-	-	48	-	-	12	12	-	-
ABA410	R544159	CFD0502	10	11	Waste	Lower Transition	Gneiss	MxF	8.2	8	<0.01	0.01	0.01	<0.3	0.020	<0.2	1.6	<4.5	-	-	1.3	-	-	5.2	15	-	-
ABA412	R544228	CFD0502	70	71	Waste	Lower Transition	Gneiss	MxF	9.1	9.1	<0.01	<0.01	0.01	<0.3	0.67	2.1	52	48	-	-	52	-	-	173	159	-	-
Statistical Summary						**Lower Transition**	**Gneiss**	**n**	44	79	79	44	44	79	79	44	79	44	13	13	79	13	13	79	44	13	13
								Max	9.8	9.7	0.30	0.03	0.25	9.4	1.1	4.0	86	91	127	121	85	125	119	173	159	100	113
								90th PCTL	9.5	9.3	0.08	0.02	0.06	2.5	0.70	2.3	52	52	95	104	50	92	101	49	60	91	77
								75th PCTL	9.2	9.1	0.02	0.01	0.01	0.60	0.20	1.5	19	35	48	50	17	40	42	23	39	61	64
								Median	8.8	8.6	0.01	0.01	0.01	0.30	0.10	0.40	3.9	8.0	20	20	3.6	19	20	7.8	15	32	34
								25th PCTL	7.9	8.1	<0.01	<0.01	0.01	<0.3	0.00	<0.2	1.6	<4.5	13	15	1.2	13	15	5.0	15	20	18
								10th PCTL	7.3	7.6	<0.01	<0.01	0.01	<0.3	0.00	<0.2	0.80	<4.5	9.0	10	0.50	8.7	9.7	2.6	14	12	14
								Min	6.8	6.8	<0.01	<0.01	0.01	<0.3	<0.01	<0.2	<0.8	<4.5	4.0	5.0	-0.20	3.7	4.7	0.80	6.2	5.7	5.9

Appendix C.1-1: Acid-Base Accounting Results for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Rinse pH (1:1)	Paste pH	Total-S	Sulphate-S	Sulphide-S	T-AP	Total-C	Inorg. C (as CO_2)	T-C NP*	CaNP	Sobek-NP	Siderite-NP	T-C NNP*	Sobek NNP	Siderite NNP	NPR	NPR	NPR	NPR
									s.u.	s.u.	%	%	%	$kgCaCO_3/t$	%	%	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	T-CNP*/T-AP	CaNP/T-AP	SobekNP/T-AP	SideriteNP/T-AP
Fresh Facies for Gneiss Waste Rock																											
ABA065	KAM128393	CFD0326	25	26	Waste	Fresh	Gneiss	MxM	7.6	7.6	0.01	0.01	0.01	0.30	0.040	0.20	3.1	4.5	7.0	9.0	2.8	7.0	8.7	9.9	15	22	29
ABA066	KAM128504	CFD0326	75	76	Waste	Fresh	Gneiss	MxM	8.6	8.5	0.01	0.01	0.01	0.30	0.080	0.30	6.2	6.8	13	15	5.9	13	15	20	22	42	48
ABA071	KAM145241	CFD0338	81	82	Waste	Fresh	Gneiss	MxM	9.0	9.0	0.04	<0.01	0.02	1.3	1.2	4.3	93	98	128	140	92	127	139	75	78	102	112
ABA097	KAM137325	CFR0468	88.39	89.92	Waste	Fresh	Gneiss	MxM	8.7	8.8	0.03	<0.01	0.02	0.90	0.090	0.30	7.0	6.8	23	25	6.1	22	24	7.5	7.3	25	27
ABA099	KAM137468	CFR0469	82.3	83.82	Waste	Fresh	Gneiss	MxM	7.7	8.7	<0.01	0.01	<0.01	<0.3	0.96	3.1	75	71	117	120	74	117	120	248	235	390	400
ABA108	KAM139795	CFR0486	25.91	27.43	Waste	Fresh	Gneiss	MxM	8.4	8.5	<0.01	<0.01	<0.01	<0.3	0.050	<0.2	3.9	<4.5	8.0	8.0	3.6	8.0	7.7	13	15	27	27
ABA139	KAM152151	CFR0586	60.96	62.48	Waste	Fresh	Gneiss	MxF	7.9	8.7	<0.01	0.01	<0.01	<0.3	0.040	<0.2	3.1	<4.5	6.0	6.0	2.8	6.0	5.7	10	15	20	20
ABA140	KAM152186	CFR0586	109.73	111.25	Waste	Fresh	Gneiss	MxF	8.9	9.2	<0.01	0.01	<0.01	<0.3	0.14	0.50	11	11	12	13	11	12	13	36	38	40	43
ABA143	KAM152536	CFR0589	128.02	129.54	Waste	Fresh	Gneiss	FG	7.3	8.8	0.15	0.01	0.11	4.7	0.57	1.9	44	43	42	43	40	37	38	9.4	9.2	9.0	9.2
ABA148	KAM153051	CFR0594	109.73	111.25	Waste	Fresh	Gneiss	MxF	7.2	8.5	0.14	0.01	0.11	4.4	0.31	1.1	24	25	24	25	20	20	21	5.5	5.7	5.5	5.7
ABA285	R277457	CFD0426	16	17	Waste	Fresh	Gneiss	MxM	-	8.8	<0.01	-	-	<0.3	0.23	-	18	-	-	-	18	-	-	59	-	-	-
ABA286	R279452	CFD0468	11	12	Waste	Fresh	Gneiss	MxF	-	9.0	<0.01	-	-	<0.3	0.020	-	1.6	-	-	-	1.3	-	-	5.2	-	-	-
ABA287	R274861	CFD0472	100	101	Waste	Fresh	Gneiss	MxM	-	9.1	0.43	-	-	13	0.32	-	25	-	-	-	11	-	-	1.9	-	-	-
ABA288	R283657	CFD0498	82	83	Waste	Fresh	Gneiss	MxM	-	8.8	0.01	-	-	0.30	0.010	-	0.80	-	-	-	0.46	-	-	2.5	-	-	-
ABA289	Q035925	CFD0495	94	95	Waste	Fresh	Gneiss	MxM	-	8.5	0.01	-	-	0.30	0.21	-	16	-	-	-	16	-	-	52	-	-	-
ABA290	R272262	CFD0433	123	124	Waste	Fresh	Gneiss	MxF	-	8.6	0.01	-	-	0.30	0.020	-	1.6	-	-	-	1.2	-	-	5.0	-	-	-
ABA293	R276133	CFD0393	45	46	Waste	Fresh	Gneiss	MxM	-	9.0	0.06	-	-	1.9	0.78	-	61	-	-	-	59	-	-	32	-	-	-
ABA294	R276236	CFD0401	18	19	Waste	Fresh	Gneiss	MxM	-	8.6	0.01	-	-	0.30	0.45	-	35	-	-	-	35	-	-	112	-	-	-
ABA295	R271028	CFD0412	117	118	Waste	Fresh	Gneiss	MxF	-	8.8	<0.01	-	-	<0.3	0.19	-	15	-	-	-	14	-	-	49	-	-	-
ABA297	R279539	CFD0468	89	90	Waste	Fresh	Gneiss	MxF	-	9.4	0.03	-	-	0.90	0.41	-	32	-	-	-	31	-	-	34	-	-	-
ABA298	R275689	CFD0495	57	58	Waste	Fresh	Gneiss	MxM	-	9.1	0.05	-	-	1.6	0.44	-	34	-	-	-	33	-	-	22	-	-	-
ABA299	R272239	CFD0433	57	58	Waste	Fresh	Gneiss	MxF	-	8.9	0.07	-	-	2.2	0.35	-	27	-	-	-	25	-	-	12	-	-	-
ABA300	R278428	CFD0445	118	119	Waste	Fresh	Gneiss	MxF	-	9.3	<0.01	-	-	<0.3	0.10	-	7.8	-	-	-	7.5	-	-	26	-	-	-
ABA301	R273296	CFD0447	10	11	Waste	Fresh	Gneiss	FG	-	9.3	<0.01	-	-	<0.3	0.10	-	7.8	-	-	-	7.5	-	-	26	-	-	-
ABA302	R270935	CFD0412	35	36	Waste	Fresh	Gneiss	MxF	-	9.2	0.02	-	-	0.60	0.31	-	24	-	-	-	23	-	-	38	-	-	-
ABA346	R277538	CFD0426	87	88	Waste	Fresh	Gneiss	MxM	9.3	9.3	0.13	0.01	0.09	4.1	0.060	0.20	4.7	4.5	-	-	0.59	-	-	1.2	1.1	-	-
ABA347	R304284	CFD0541	30	31	Waste	Fresh	Gneiss	FG	9.0	9.0	<0.01	0.01	<0.01	<0.3	0.010	<0.2	0.80	<4.5	-	-	0.48	-	-	2.6	15	-	-
ABA350	R304041	CFD0539	10	11	Waste	Fresh	Gneiss	FG	9.5	9.1	<0.01	0.01	<0.01	<0.3	0.010	<0.2	0.80	<4.5	-	-	0.48	-	-	2.6	15	-	-
ABA351	R304231	CFD0539	45	46	Waste	Fresh	Gneiss	MxM	8.6	8.4	<0.01	0.01	<0.01	<0.3	0.010	<0.2	0.80	<4.5	-	-	0.48	-	-	2.6	15	-	-
ABA354	R304119	CFD0525	45	46	Waste	Fresh	Gneiss	MxM	8.8	9.2	0.02	<0.01	0.03	0.60	0.17	0.60	13	14	-	-	13	-	-	21	22	-	-
ABA355	R304173	CFD0525	91	92	Waste	Fresh	Gneiss	FG	9.7	9.8	<0.01	0.01	<0.01	<0.3	0.070	0.20	5.4	4.5	-	-	5.1	-	-	18	15	-	-
ABA356	R623617	CFD0548	10	11	Waste	Fresh	Gneiss	MxF	9.2	9.2	<0.01	0.01	0.02	<0.3	0.010	<0.2	0.80	<4.5	-	-	0.48	-	-	2.6	15	-	-
ABA357	R623685	CFD0548	70	71	Waste	Fresh	Gneiss	MxF	9.2	9.2	<0.01	0.01	<0.01	<0.3	0.27	0.90	21	21	-	-	21	-	-	70	68	-	-
ABA358	R623742	CFD0548	120	121	Waste	Fresh	Gneiss	MxF	9.2	9.3	0.02	0.01	<0.01	0.60	0.27	0.90	21	21	-	-	20	-	-	34	33	-	-
ABA365	R545443	CFD0520	60	61	Waste	Fresh	Gneiss	FG	9.5	9.3	<0.01	<0.01	<0.01	<0.3	0.010	<0.2	0.80	<4.5	-	-	0.48	-	-	2.6	15	-	-
ABA374	R271368	CFD0417	91	92	Waste	Fresh	Gneiss	FG	9.7	9.6	0.01	0.01	0.02	0.30	0.12	0.30	9.3	6.8	-	-	9.0	-	-	30	22	-	-
ABA378	R279593	CFD0468	135	136	Waste	Fresh	Gneiss	MxF	9.8	9.8	0.08	<0.01	0.05	2.5	0.52	1.7	40	39	-	-	38	-	-	16	15	-	-
ABA379	R279615	CFD0468	155	155.692	Waste	Fresh	Gneiss	MxF	9.9	9.8	0.09	0.03	0.09	2.8	0.22	0.70	17	16	-	-	14	-	-	6.1	5.7	-	-
ABA381	R511981	CFR0700	48.77	49.42	Waste	Fresh	Gneiss	MxM	8.5	8.6	0.17	0.01	0.16	5.3	1.1	3.6	88	82	-	-	82	-	-	17	15	-	-
ABA387	Q034442	CFD0469	19	20	Waste	Fresh	Gneiss	MxF	9.2	8.6	<0.01	0.01	<0.01	<0.3	0.010	<0.2	0.80	<4.5	-	-	0.48	-	-	2.6	15	-	-
ABA388	Q034516	CFD0469	102	103	Waste	Fresh	Gneiss	MxF	9.7	9.3	0.04	0.01	0.04	1.3	0.19	0.60	15	14	-	-	13	-	-	12	11	-	-
ABA389	Q034537	CFD0469	121	121.9	Waste	Fresh	Gneiss	MxF	8.9	8.5	<0.01	<0.01	<0.01	<0.3	0.010	<0.2	0.80	<4.5	-	-	0.48	-	-	2.6	15	-	-
ABA396	R545818	CFD0529	65	66	Waste	Fresh	Gneiss	MxF	9.7	9.7	<0.01	<0.01	0.01	<0.3	0.010	<0.2	0.80	<4.5	-	-	0.48	-	-	2.6	15	-	-
ABA398	R543692	CFD0549	10	11	Waste	Fresh	Gneiss	FG	9.1	9.2	<0.01	0.02	0.01	<0.3	0.020	<0.2	1.6	<4.5	-	-	1.3	-	-	5.2	15	-	-
ABA401	R543957	CFD0553	40	41	Waste	Fresh	Gneiss	MxF	8.7	8.9	0.15	0.02	0.14	4.7	1.3	4.0	98	91	-	-	93	-	-	21	19	-	-
ABA404	R550544	CFD0553	160	161	Waste	Fresh	Gneiss	MxF	8.9	8.9	0.02	0.01	<0.01	0.60	0.74	2.3	57	52	-	-	57	-	-	92	84	-	-
ABA408	R272713	CFD0438	96	97	Waste	Fresh	Gneiss	MxF	9.5	9.5	0.01	0.02	0.01	0.30	0.14	0.40	11	9.1	-	-	11	-	-	35	29	-	-
ABA413	R276141	CFD0393	127	128	Waste	Fresh	Gneiss	MxM	8.9	8.9	<0.01	0.02	0.01	<0.3	1.2	4.1	95	93	-	-	94	-	-	316	311	-	-
ABA414	R276153	CFD0393	170	171	Waste	Fresh	Gneiss	MxM	8.8	9.0	0.04	<0.01	0.06	1.3	1.2	3.9	90	89	-	-	89	-	-	72	71	-	-
Statistical Summary						Fresh	Gneiss	**n**	34	49	49	34	34	49	49	34	49	34	10	10	49	10	10	49	34	10	10
								Max	9.9	9.8	0.43	0.03	0.16	13	1.3	4.3	98	98	128	140	94	127	139	316	311	390	400
								90th PCTL	9.7	9.5	0.13	0.02	0.10	4.1	1.0	3.8	77	87	118	122	76	118	122	73	76	131	141
								75th PCTL	9.5	9.3	0.04	0.01	0.04	1.3	0.40	1.6	32	35	38	39	31	34	35	35	27	41	47
								Median	9.0	9.0	0.01	0.01	0.01	0.31	0.20	0.40	13	8.0	18	20	11	16	18	17	15	26	28
								25th PCTL	8.6	8.7	<0.01	0.01	<0.01	<0.3	0.00	<0.2	3.1	<4.5	9.0	10	1.3	8.7	9.7	5.2	15	21	22
								10th PCTL	7.8	8.5	<0.01	<0.01	<0.01	<0.3	0.00	<0.2	0.80	<4.5	6.9	7.8	0.50	6.6	7.5	2.6	7.9	8.6	8.8
								Min	7.2	7.6	<0.01	<0.01	<0.01	<0.3	0.00	<0.2	0.80	<4.5	6.0	6.0	0.50	5.7	5.7	1.1	1.1	5.5	5.7
Statistical Summary for Gneiss Waste Rock								**n**	115	187	188.00	117.00	117.00	188	188	117	188	117	51	51	188	51	51	188	117	51	51
								n < DL	-	-	88.00	44.00	48.00	88	2	46	2	46	0	0	0	0	0	0	0	0	0
								Max	9.9	9.8	0.94	0.03	0.90	29	1.3	4.3	98	98	128	140	94	127	139	303	298	390	400
								90th PCTL	9.5	9.3	0.08	0.02	0.06	2.5	0.64	2.3	50	52	52	53	48	52	53	62	73	93	83
								75th PCTL	9.2	9.1	0.02	0.01	0.02	0.60	0.27	1.0	21	23	29	26	20	26	25	26	29	43	48
								Median	8.4	8.5	0.01	0.01	0.01	0.30	0.060	0.20	4.7	4.5	15	15	4.4	13	15	9.9	15	27	27
								25th PCTL	7.4	7.7	<0.01	<0.01	<0.01	<0.3	0.020	<0.2	1.6	<4.5	6.0	6.5	1.2	5.7	6.2	5.0	14	13	16
								10th PCTL	7.2	7.3	<0.01	<0.01	<0.01	<0.3	0.010	<0.2	0.80	<4.5	4.0	5.0	0.50	3.7	4.7	2.5	10	9.0	10
								Min	6.6	6.4	<0.01	<0.01	<0.01	<0.3	<0.01	0.10	<0.8	2.3	2.0	3.0	-27	1.7	-24	0.10	0.20	1.4	0.20

Appendix C.1-1: Acid-Base Accounting Results for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Rinse pH (1:1)	Paste pH	Total-S	Sulphate-S	Sulphide-S	T-AP	Total-C	Inorg. C (as CO_2)	T-C NP*	CaNP	Sobek-NP	Siderite-NP	T-C NNP*	Sobek NNP	Siderite NNP	NPR	NPR	NPR	NPR
									s.u.	s.u.	%	%	%	$kgCaCO_3/t$	%	%	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	T-CNP*/T-AP	CaNP/T-AP	SobekNP/T-AP	SideriteNP/T-AP
Oxide Facies for Schist Waste Rock																											
ABA005	KAM022322	CFD0110	95	96	Waste	Oxide	Schist	RQM	6.8	7.6	0.42	0.06	0.29	13	2.0	6.9	155	157	135	154	142	122	141	12	12	10	12
ABA026	KAM037656	CFD0096	59	60	Waste	Oxide	Schist	BtS	6.8	7.4	0.26	0.01	0.18	8.1	2.0	6.9	154	157	134	144	146	126	136	19	19	16	18
ABA074	KAM146948	CFD0345	60	61	Waste	Oxide	Schist	BtS_carb	7.8	8	0.02	0.01	0.01	0.60	1.8	6.5	138	148	154	163	138	153	162	221	236	246	261
ABA077	J957606	CFD0350	60	61	Waste	Oxide	Schist	BtS_carb	7.3	7.8	0.01	<0.01	0.01	0.30	3.2	12	250	268	268	271	250	268	271	800	858	858	867
ABA090	KAM133632	CFR0431	71.63	73.15	Waste	Oxide	Schist	BtS	7	7.2	0.44	<0.01	0.34	14	0.81	2.4	63	55	47	44	49	33	30	4.6	4.0	3.4	3.2
ABA094	KAM135457	CFR0454	24.38	25.91	Waste	Oxide	Schist	BtS	7.6	7.3	0.01	<0.01	0.01	0.30	0.080	<0.2	6.2	<4.5	5.0	6.0	5.9	5.0	5.7	20	14	16	19
ABA125	KAM149844	CFR0566	10.67	12.19	Waste	Oxide	Schist	BtS	7.2	7.6	<0.01	<0.01	<0.01	<0.3	0.060	0.20	4.7	4.5	4.0	4.0	4.4	4.0	3.7	16	15	13	13
ABA128	KAM149954	CFR0567	47.24	48.77	Waste	Oxide	Schist	BtS	7.3	8.1	0.02	<0.01	<0.01	0.60	2.4	9.0	183	205	183	180	183	182	179	293	327	293	288
ABA129	KAM150033	CFR0567	155.45	156.97	Waste	Oxide	Schist	BtS	7	7.2	0.01	<0.01	<0.01	0.30	0.030	<0.2	2.3	<4.5	5.0	7.0	2.0	5.0	6.7	7.5	14	16	22
ABA130	KAM150823	CFR0574	10.67	12.19	Waste	Oxide	Schist	BtS	7.2	8	<0.01	<0.01	<0.01	<0.3	1.4	5.1	112	116	120	129	111	120	129	372	386	400	430
ABA131	KAM150859	CFR0574	60.96	62.48	Waste	Oxide	Schist	BtS	7.2	8.5	0.01	0.01	0.01	0.30	0.29	1.0	23	23	22	25	22	22	25	72	73	70	80
ABA133	KAM150951	CFR0575	60.96	62.48	Waste	Oxide	Schist	BtS	7.5	8	0.08	0.03	0.05	2.5	2.9	10	222	230	227	231	219	225	229	89	92	91	92
ABA201	R276929	CFD0416	13	14	Waste	Oxide	Schist	BtS	-	8.2	0.01	-	-	0.30	0.29	-	23	-	-	-	22	-	-	72	-	-	-
ABA202	R270012	CFD0384	13	14	Waste	Oxide	Schist	BtS_carb	-	7.5	0.05	-	-	1.6	0.12	-	9.3	-	-	-	7.8	-	-	6.0	-	-	-
ABA383	KAM068572	CFD0234	225.1	226	Waste	Oxide	Schist	MsS	7.1	6.6	<0.01	<0.01	0.02	<0.3	0.020	<0.2	1.6	<4.5	-	-	1.3	-	-	5.2	15	-	-
Statistical Summary						**Oxide**	**Schist**	**n**	13	15	15	13	13	15	15	13	15	13	12	12	15	12	12	15	13	12	12
								Max	7.8	8.5	0.44	0.06	0.34	14	3.2	12	250	268	268	271	250	268	271	800	858	858	867
								90th PCTL	7.6	8.2	0.36	0.03	0.27	11	2.7	9.9	206	225	223	226	205	220	224	341	375	389	416
								75th PCTL	7.3	8	0.07	0.01	0.05	2.0	2.0	6.9	155	157	161	167	144	161	167	155	236	258	268
								Median	7.2	7.6	0.01	<0.01	0.01	0.31	0.81	5.1	63	116	127	137	49	121	132	20	19	43	51
								25th PCTL	7	7.4	0.01	<0.01	0.01	0.31	0.10	0.20	7.8	4.5	18	21	6.8	17	20	9.6	14	15	17
								10th PCTL	6.8	7.2	<0.01	<0.01	<0.01	<0.3	0.042	<0.2	3.3	<4.5	5.0	6.1	3.0	4.7	5.8	5.5	12	11	12
								Min	6.8	6.6	<0.01	<0.01	<0.01	<0.3	0.020	<0.2	1.6	<4.5	4.0	4.0	1.3	3.7	3.7	4.6	4.0	3.4	3.2
Upper Transition Facies for Schist Waste Rock																											
ABA004	KAM022156	CFD0107	149	150	Waste	Upper transition	Schist	RQM	7.4	8.1	0.24	0.01	0.23	7.5	1.6	5.8	121	132	100	104	114	93	97	16	18	13	14
ABA027	KAM037928	CFD0099	30	31	Waste	Upper transition	Schist	BtS_carb	7.2	7.9	0.01	<0.01	0.02	0.30	1.5	5.4	120	123	135	134	119	135	134	382	393	432	429
ABA062	KAM081561	CFD0202	58	58.5	Waste	Upper transition	Schist	BtS	8.3	8.6	1.02	<0.01	0.97	32	2.2	8.0	172	182	209	202	140	177	170	5.4	5.7	6.6	6.3
ABA076	KAM147059	CFD0345	160	161	Waste	Upper transition	Schist	BtS	7.9	8.1	0.51	<0.01	0.51	16	2.7	9.8	209	223	205	198	193	189	182	13	14	13	12
ABA092	KAM135149	CFR0452	10.67	12.19	Waste	Upper Transition	Schist	BtS	8.3	8.4	<0.01	<0.01	<0.01	<0.3	0.030	<0.2	2.3	<4.5	6.0	7.0	2.0	6.0	6.7	7.8	15	20	23
ABA124	KAM149042	CFR0559	35.05	36.58	Waste	Upper transition	Schist	BtS	7.4	8.1	0.02	<0.01	<0.01	0.60	1.2	4.0	89	91	92	95	89	91	94	143	145	147	152
ABA204	R270174	CFD0388	8	9	Waste	Upper transition	Schist	MsS	-	7.7	0.03	-	-	0.90	0.46	-	36	-	-	-	35	-	-	38	-	-	-
ABA205	R276797	CFD0413	115	116	Waste	Upper transition	Schist	BtS	-	8.1	0.01	-	-	0.30	2.2	-	168	-	-	-	168	-	-	539	-	-	-
ABA206	Q033613	CFD0407	52	53	Waste	Upper transition	Schist	BtS	-	8.4	0.06	-	-	1.9	2.2	-	168	-	-	-	167	-	-	90	-	-	-
ABA316	R270207	CFD0390	5	6	Waste	Upper Transition	Schist	MsS	8.3	8.2	0.08	0.01	0.05	2.5	1.2	4.1	95	93	-	-	93	-	-	38	37	-	-
ABA317	R270258	CFD0390	50	51	Waste	Upper Transition	Schist	BtS_carb	8.5	8.3	0.07	0.03	0.01	2.2	0.70	2.3	54	52	-	-	52	-	-	25	24	-	-
ABA320	R270432	CFD0392	44	45	Waste	Upper Transition	Schist	BtS_carb	8.2	8.4	0.02	0.01	<0.01	0.60	0.96	3.0	75	68	-	-	74	-	-	119	109	-	-
ABA323	Q033713	CFD0411	24	25	Waste	Upper Transition	Schist	BtS_Carb	8.2	8.1	0.03	<0.01	0.02	0.90	2.4	7.8	185	177	-	-	184	-	-	197	189	-	-
ABA332	Q033589	CFD0407	32	33	Waste	Upper Transition	schist	BtS	8.5	8.4	0.04	0.01	0.01	1.3	1.0	3.3	79	75	-	-	78	-	-	63	60	-	-
Statistical Summary						**Upper Transition**	**Schist**	**n**	11	14	14	11	11	14	14	11	14	11	6	6	14	6	6	14	11	6	6
								Max	8.5	8.6	1.02	0.03	0.97	32	2.7	9.8	209	223	209	202	193	189	182	539	393	432	429
								90th PCTL	8.5	8.4	0.43	0.01	0.51	13	2.3	8.0	181	182	207	200	179	183	176	327	189	290	290
								75th PCTL	8.3	8.4	0.08	0.01	0.14	2.4	2.2	6.8	168	155	188	182	160	167	161	137	127	115	120
								Median	8.2	8.2	0.04	<0.01	0.02	1.1	1.4	4.1	108	93	118	119	103	114	115	51	37	17	19
								25th PCTL	7.7	8.1	0.02	<0.01	<0.01	0.63	0.98	3.2	76	72	94	97	75	92	95	18	16	13	13
								10th PCTL	7.4	8	0.01	<0.01	<0.01	0.31	0.53	2.3	41	52	49	51	40	49	51	9.4	14	9.7	9.4
								Min	7.2	7.7	<0.01	<0.01	<0.01	<0.3	0.030	<0.2	2.3	<4.5	6.0	7.0	2.0	5.7	6.7	5.4	5.7	6.6	6.3
Lower Transition Facies for Schist Waste Rock																											
ABA021	KAM033153	CFD0164	148	149	Waste	Lower transition	Schist	BtS	9.4	9.3	0.14	0.02	0.11	4.4	0.44	1.6	34	36	57	96	30	53	92	7.8	8.3	13	22
ABA024	KAM036666	CFD0087	17	18	Waste	Lower transition	Schist	BtS_carb	7.2	8.5	0.06	<0.01	0.05	1.9	0.43	1.4	33	32	48	85	31	46	83	18	17	26	45
ABA025	KAM037046	CFD0091	12	13	Waste	Lower transition	Schist	BtS	7.2	7.9	0.01	0.01	<0.01	0.30	0.84	2.8	65	64	100	104	65	100	104	209	204	320	333
ABA031	KAM039252	CFD0116	75	76	Waste	Lower transition	Schist	RQM	7.2	8.3	0.06	0.01	0.03	1.9	1.2	4.3	95	98	110	116	94	108	114	51	52	59	62
ABA038	KAM047995	CFD0135	153	154	Waste	Lower transition	Schist	BtS	7.3	8.5	0.09	0.02	0.07	2.8	1.2	4.1	90	93	115	123	87	112	120	32	33	41	44
ABA054	KAM081312	CFD0198	85	86	Waste	Lower transition	Schist	BtS	8.9	8.7	<0.01	<0.01	0.01	<0.3	0.070	0.20	5.4	4.5	7.0	7.0	5.1	7.0	6.7	18	15	23	23
ABA086	KAM133474	CFR0429	59.44	60.96	Waste	Lower transition	Schist	BtS	8.4	8.4	0.15	<0.01	0.13	4.7	0.78	2.5	61	57	60	63	56	55	58	13	12	13	13
ABA208	R276736	CFD0413	61	62	Waste	Lower transition	Schist	BtS	-	8.2	0.32	-	-	10	1.0	-	78	-	-	-	68	-	-	7.8	-	-	-
ABA209	R270032	CFD0384	31	32	Waste	Lower transition	Schist	BtS_carb	-	8.2	0.25	-	-	7.8	0.90	-	70	-	-	-	62	-	-	8.9	-	-	-
ABA210	R276281	CFD0401	58	59	Waste	Lower transition	Schist	BtS	-	8	0.01	-	-	0.30	1.4	-	109	-	-	-	109	-	-	350	-	-	-
ABA211	R276567	CFD0409	65	66	Waste	Lower transition	Schist	BtS	-	8	0.01	-	-	0.30	0.77	-	60	-	-	-	59	-	-	191	-	-	-
ABA318	R270302	CFD0390	88	89	Waste	Lower Transition	Schist	BtS_carb	7.2	8.6	0.03	0.01	0.01	0.90	3.0	9.5	230	216	-	-	229	-	-	245	230	-	-
ABA319	R270394	CFD0392	10	11	Waste	Lower Transition	Schist	BtS_carb	8	8.2	0.01	0.01	<0.01	0.30	0.79	2.5	61	57	-	-	61	-	-	196	182	-	-
ABA325	R512767	CFR0724	39.62	41.15	Waste	Lower Transition	schist	BtS	8.7	8.9	0.06	0.01	0.05	1.9	0.42	1.2	33	27	-	-	31	-	-	17	15	-	-
ABA333	R277487	CFD0426	43	44	Waste	Lower Transition	schist	BtS	8.2	7.5	<0.01	<0.01	<0.01	<0.3	0.010	<0.2	0.80	<4.5	-	-	0.48	-	-	2.6	15	-	-
ABA335	R550437	CFD0518	25	26	Waste	Lower Transition	schist	BtS	8.1	8.3	<0.01	0.01	<0.01	<0.3	0.020	<0.2	1.6	<4.5	-	-	1.3	-	-	5.2	15	-	-
ABA336	R550471	CFD0518	55	56	Waste	Lower Transition	Schist	BtS_carb	7.9	8	0.12	0.01	0.07	3.8	1.9	6.4	147	146	-	-	143	-	-	39	39	-	-
ABA337	R550494	CFD0518	75	75.032	Waste	Lower Transition	schist	BtS	8.6	8.5	0.01	0.01	<0.01	0.30	0.81	2.7	63	61	-	-	63	-	-	201	196	-	-
ABA345	R551151	CFD0563	68	69	Waste	Lower Transition	schist	BtS	8.8	8.5	0.02	<0.01	0.01	0.60	0.69	2.2	54	50	-	-	53	-	-	86	80	-	-
Statistical Summary						**Lower Transition**	**Schist**	**n**	15	19	19	15	15	19	19	15	19	15	7	7	19	7	7	19	15	7	7
								Max	9.4	9.3	0.32	0.02	0.13	10	3.0	9.5	230	216	115	123	229	112	120	350	230	320	333
								90th PCTL	8.9	8.7	0.17	0.02	0.09	5.3	1.5	5.6	117	126	112	119	116	110	117	216	201	163	170
								75th PCTL	8.7	8.5	0.11	0.01	0.06	3.3	1.1	3.5	84	78	105	110	77	104	109	194	131	50	54
								Median	8.1	8.3	0.03	0.01	0.01	0.94	0.79	2.5	61	57	60	96	61	55	92	32	33	26	44
								25th PCTL	7.3	8.1	0.01	<0.01	<0.01	0.31	0.44	1.3	34	30	53	74	31	49	71	11	15	18	23
								10th PCTL	7.2	8	<0.01	<0.01	<0.01	<0.3	0.060	<0.2	4.7	<4.5	32	41	4.4	30	38	7.2	13	13	19
								Min	7.2	7.5	<0.01	<0.01	<0.01	<0.3	0.010	<0.2	0.80	<4.5	7.0	7.0	0.48	6.7	6.7	2.6	8.3	13	13

Appendix C.1-1: Acid-Base Accounting Results for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Rinse pH (1:1)	Paste pH	Total-S	Sulphate-S	Sulphide-S	T-AP	Total-C	Inorg. C (as CO_2)	T-C NP*	CaNP	Sobek-NP	Siderite-NP	T-C NNP*	Sobek NNP	Siderite NNP	NPR	NPR	NPR	NPR
									s.u.	s.u.	%	%	%	$kgCaCO_3/t$	%	%	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	T-CNP*/T-AP	CaNP/T-AP	SobekNP/T-AP	SideriteNP/T-AP
Fresh Facies for Schist Waste Rock																											
ABA082	KAM131674	CFR0401	15.24	16.76	Waste	Fresh	Schist	BtS	8.2	8.1	0.01	<0.01	<0.01	0.30	0.42	1.4	33	32	47	51	32	47	51	104	102	150	163
ABA084	KAM132888	CFR0420	32	33.53	Waste	Fresh	Schist	BtS	8.1	8.6	0.01	<0.01	0.01	0.30	1.4	4.9	108	111	147	149	108	147	149	345	356	470	477
ABA091	KAM133659	CFR0431	109.73	111.25	Waste	Fresh	Schist	BtS	8.8	8.8	0.97	0.03	0.80	30	0.90	2.9	70	66	99	99	40	69	69	2.3	2.2	3.3	3.3
ABA093	KAM135298	CFR0453	10.67	12.19	Waste	Fresh	Schist	BtS	8.4	8.3	0.08	<0.01	0.04	2.5	0.77	2.6	60	59	122	125	57	120	123	24	24	49	50
ABA095	KAM135693	CFR0456	10.67	12.19	Waste	Fresh	Schist	BtS	8.7	8.6	0.01	<0.01	<0.01	0.30	0.030	<0.2	2.3	<4.5	11	12	2.0	11	12	7.5	14	35	38
ABA127	KAM149916	CFR0566	109.73	111.25	Waste	Fresh	Schist	BtS_carb	7.3	8.1	0.63	<0.01	0.53	20	1.1	3.3	82	75	108	107	62	88	87	4.1	3.8	5.5	5.4
ABA132	KAM150898	CFR0574	114.3	115.82	Waste	Fresh	Schist	BtS	7.3	8.2	0.61	<0.01	0.56	19	0.98	3.4	76	77	108	114	57	89	95	4.0	4.1	5.7	6.0
ABA134	KAM150984	CFR0575	106.68	108.2	Waste	Fresh	Schist	BtS	7.3	8.3	0.07	0.01	0.03	2.2	1.3	4.6	101	105	109	106	99	107	104	46	48	50	48
ABA212	Q033565	CFD0407	10	11	Waste	Fresh	Schist	BtS	-	8.8	0.09	-	-	2.8	0.54	-	42	-	-	-	39	-	-	15	-	-	-
ABA213	R280479	CFD0497	111	112	Waste	Fresh	Schist	BtS	-	8.9	0.02	-	-	0.60	0.17	-	13	-	-	-	13	-	-	21	-	-	-
ABA214	R274802	CFD0472	47	48	Waste	Fresh	Schist	BtS	-	8.5	<0.01	-	-	<0.3	<0.01	-	<0.8	-	-	-	0.48	-	-	2.6	-	-	-
ABA215	R275143	CFD0482	40	41	Waste	Fresh	Schist	BtS	-	8.1	0.01	-	-	0.30	1.2	-	93	-	-	-	93	-	-	298	-	-	-
ABA216	R276122	CFD0393	87	88	Waste	Fresh	Schist	BtS	-	8.7	<0.01	-	-	<0.3	0.22	-	17	-	-	-	17	-	-	57	-	-	-
ABA217	R270181	CFD0388	92	93	Waste	Fresh	Schist	BtS_carb	-	8.5	0.29	-	-	9.1	0.91	-	71	-	-	-	62	-	-	7.8	-	-	-
ABA218	R283622	CFD0498	28	29	Waste	Fresh	Schist	BtS	-	9	0.01	-	-	0.30	0.33	-	26	-	-	-	25	-	-	82	-	-	-
ABA219	R276979	CFD0416	57	58	Waste	Fresh	Schist	BtS	-	8.4	0.04	-	-	1.3	4.9	-	376	-	-	-	375	-	-	301	-	-	-
ABA220	R276002	CFD0387	148	149	Waste	Fresh	Schist	BtS	-	9.2	0.14	-	-	4.4	0.57	-	44	-	-	-	40	-	-	10	-	-	-
ABA221	R276317	CFD0401	129	130	Waste	Fresh	Schist	BtS	-	8.4	0.11	-	-	3.4	0.66	-	51	-	-	-	48	-	-	15	-	-	-
ABA222	R270104	CFD0386	59	60	Waste	Fresh	Schist	BtS_carb	-	8.5	0.21	-	-	6.6	0.74	-	57	-	-	-	51	-	-	8.8	-	-	-
ABA223	R270127	CFD0386	80	81	Waste	Fresh	Schist	MsS	-	8.6	0.14	-	-	4.4	1.3	-	100	-	-	-	96	-	-	23	-	-	-
ABA321	R270466	CFD0392	74	75	Waste	Fresh	Schist	BtS_carb	8.4	8.6	0.16	<0.01	0.12	5.0	0.74	2.3	57	52	-	-	52	-	-	11	10	-	-
ABA322	R270482	CFD0392	88	89	Waste	Fresh	Schist	BtS_carb	8.3	8.2	0.02	0.01	<0.01	0.60	1.9	6.2	149	141	-	-	148	-	-	238	225	-	-
ABA326	R512983	CFR0731	32	32.395	Waste	Fresh	schist	BtS	8.6	8.6	<0.01	<0.01	<0.01	<0.3	0.13	0.30	10	6.8	-	-	9.8	-	-	34	23	-	-
ABA329	R270202	CFD0388	110	110.2	Waste	Fresh	Schist	BtS_carb	9.2	9.3	0.19	0.01	0.17	5.9	1.7	5.8	135	132	-	-	129	-	-	23	22	-	-
ABA330	R276299	CFD0401	74	75	Waste	Fresh	schist	BtS	8.7	8.6	0.06	<0.01	0.04	1.9	0.68	2.1	53	48	-	-	51	-	-	28	25	-	-
ABA331	R276331	CFD0401	141	142	Waste	Fresh	schist	BtS	8.5	8.4	<0.01	<0.01	<0.01	<0.3	0.99	3.2	77	73	-	-	77	-	-	256	242	-	-
ABA377	R279587	CFD0468	131	132	Waste	Fresh	Schist	AmBtS	9	9	0.23	0.01	0.19	7.2	1.4	4.6	111	105	-	-	104	-	-	15	15	-	-
ABA415	R277001	CFD0398	49	50	Waste	Fresh	schist	BtS	8.8	8.9	<0.01	<0.01	0.01	<0.3	0.16	0.40	12	9.1	-	-	12	-	-	41	30	-	-
ABA416	R277017	CFD0398	64	65	Waste	Fresh	schist	BtS	9	9	<0.01	0.01	<0.01	<0.3	0.44	1.3	34	30	-	-	34	-	-	114	98	-	-
ABA417	R277021	CFD0398	124	125	Waste	Fresh	schist	BtS	9	9.2	<0.01	0.02	0.01	<0.3	0.62	1.9	48	43	-	-	48	-	-	160	144	-	-
ABA418	R277041	CFD0398	160	161	Waste	Fresh	schist	BtS	9.3	9.3	0.16	0.02	0.16	5.0	0.53	1.7	41	39	-	-	36	-	-	8.2	7.7	-	-
Statistical Summary						**Fresh**	**Schist**	**n**	19	31	31	19	19	31	31	19	31	19	8	8	31	8	8	31	19	8	8
								Max	9.3	9.3	1.00	0.00	0.80	30	4.9	6.2	376	141	147	149	375	147	149	345	356	470	477
								90th PCTL	9	9.2	0.30	0.00	0.50	9.1	1.4	5.1	111	116	130	132	108	128	130	256	229	246	257
								75th PCTL	8.9	8.9	0.20	0.00	0.20	5.0	1.1	4.0	87	91	112	117	85	110	109	93	100	75	78
								Median	8.6	8.6	0.10	<0.01	0.00	1.9	0.70	2.6	57	59	108	107	51	89	91	23	24	42	43
								25th PCTL	8.3	8.4	0.00	<0.01	<0.01	0.30	0.40	1.6	33	35	86	87	33	63	64	9.4	12	5.6	5.8
								10th PCTL	7.3	8.2	<0.01	<0.01	<0.01	<0.3	0.20	0.40	12	8.6	36	39	12	36	39	4.1	4.0	4.8	4.8
								Min	7.3	8.1	<0.01	<0.01	<0.01	<0.3	<0.01	<0.2	<0.8	<4.5	11	12	0.50	11	12	2.3	2.2	3.3	3.3
Statistical Summary for Schist Waste Rock								**n**	58	79	79	58	58	79	79	58	79	58	33	33	79	33	33	79	58	33	33
								n < DL	-	-	14	30	18	14	1	7	1	7	0	0	0	0	0	0	0	0	0
								Max	9.4	9.3	1.00	0.10	1.00	32	4.9	12	376	268	268	271	375	268	271	800	858	858	867
								90th PCTL	8.9	8.9	0.30	0.00	0.30	9.3	2.2	7.9	169	179	201	194	167	181	178	294	234	384	410
								75th PCTL	8.6	8.6	0.10	0.00	0.10	4.4	1.4	5.3	110	121	135	144	108	126	136	131	131	147	152
								Median	8.2	8.3	0.00	<0.01	0.00	0.90	0.80	2.9	63	65	108	106	59	93	97	28	25	26	38
								25th PCTL	7.3	8.1	0.00	<0.01	<0.01	0.30	0.40	1.4	33	32	47	51	31	46	51	11	14	13	13
								10th PCTL	7.2	7.6	<0.01	<0.01	<0.01	<0.3	0.10	<0.2	5.3	<4.5	6.2	7.0	5.0	5.9	6.7	5.3	8.1	5.8	6.1
								Min	6.8	6.6	<0.01	<0.01	<0.01	<0.3	<0.01	<0.2	<0.8	<4.5	4.0	4.0	0.50	3.7	3.7	2.3	2.2	3.3	3.2
Oxide Facies for Granite Waste Rock																											
ABA157	R305807	CFD0382	76	77	Waste	Oxide	Granite	GG	6.2	6	0.01	0.01	0.01	0.30	0.010	<0.2	0.80	<4.5	2.0	4.0	0.46	2.0	3.7	2.5	14	6.4	13
ABA158	R305808	CFD0382	79	80	Waste	Oxide	Granite	GG	6	5.9	0.01	0.01	0.01	0.30	0.010	<0.2	0.80	<4.5	1.0	3.0	0.46	1.0	2.7	2.5	14	3.2	9.6
ABA174	R305826	CFD0403	7	8	Waste	Oxide	Granite	GG	6.4	6.1	0.01	<0.01	0.01	0.30	0.020	<0.2	1.6	<4.5	2.0	4.0	1.2	2.0	3.7	5.0	14	6.4	13
ABA421	I354544	CFD0053	50.29	51	Waste	Oxide	Granite	GG	6.3	6.7	0.01	0.02	<0.01	0.30	0.030	<0.2	2.3	<4.5	2.0	-	2.0	2.0	-	7.5	14	6.4	-
ABA423	Q033319	CFD0403	7	7.8	Waste	Oxide	Granite	GG	6.6	6.8	<0.01	0.01	<0.01	<0.3	0.040	<0.2	3.1	<4.5	2.0	-	2.8	2.0	-	10	15	6.7	-
ABA429	Q032778	CFD0394	39.7	40	Waste	Oxide	Granite	GG	7.5	7.8	<0.01	0.02	<0.01	<0.3	0.040	<0.2	3.1	<4.5	4.0	-	2.8	4.0	-	10	15	13	-
Statistical Summary						**Oxide**	**Granite**	**n**	6	6	6	6	6	6	6	6	6	6	6	3	6	6	3	6	6	6	3
								Max	7.5	7.8	0.01	0.02	0.01	0.31	0.040	<0.2	3.1	<4.5	4.0	4.0	2.8	3.7	3.7	10	15	13	13
								90th PCTL	7.1	7.3	0.01	0.02	0.01	0.31	0.040	<0.2	3.1	<4.5	3.0	4.0	2.8	2.7	3.7	10	15	10	13
								75th PCTL	6.6	6.8	0.01	0.02	0.01	0.31	0.038	<0.2	2.9	<4.5	2.0	4.0	2.6	1.7	3.7	9.6	15	6.6	13
								Median	6.4	6.4	0.01	0.01	<0.01	0.31	0.025	<0.2	1.9	<4.5	2.0	4.0	1.6	1.7	3.7	6.2	14	6.4	13
								25th PCTL	6.2	6	<0.01	0.01	<0.01	<0.3	0.013	<0.2	0.97	<4.5	2.0	3.5	0.66	1.7	3.2	3.1	14	6.4	11
								10th PCTL	6.1	6	<0.01	<0.01	<0.01	<0.3	0.010	<0.2	0.78	<4.5	1.5	3.2	0.46	1.2	2.9	2.5	14	4.8	10
								Min	6	5.9	<0.01	<0.01	<0.01	<0.3	0.010	<0.2	0.78	<4.5	1.0	3.0	0.46	0.69	2.7	2.5	14	3.2	9.6

Appendix C.1-1: Acid-Base Accounting Results for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Rinse pH (1:1)	Paste pH	Total-S	Sulphate-S	Sulphide-S	T-AP	Total-C	Inorg. C (as CO_2)	T-C NP*	CaNP	Sobek-NP	Siderite-NP	T-C NNP*	Sobek NNP	Siderite NNP	NPR	NPR	NPR	NPR
									s.u.	s.u.	%	%	%	$kgCaCO_3/t$	%	%	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	T-CNP*/T-AP	CaNP/T-AP	SobekNP/T-AP	SideriteNP/T-AP
Upper Transition Facies for Granite Waste Rock																											
ABA013	KAM025898	CFD0150	81	82	Waste	Upper transition	Granite	GG	6.9	6.5	0.01	<0.01	<0.01	0.30	0.030	0.10	2.3	2.3	3.0	4.0	2.0	3.0	3.7	7.5	7.3	9.6	13
ABA151	R305801	CFD0381	13	14	Waste	Upper transition	Granite	GG	8.9	8.8	0.01	0.02	0.01	0.30	0.070	0.30	5.4	6.8	4.0	6.0	5.1	4.0	5.7	17	22	13	19
ABA152	R305802	CFD0381	35	36	Waste	Upper transition	Granite	GG	7	6.9	0.01	0.01	<0.01	0.30	0.030	<0.2	2.3	4.5	3.0	5.0	2.0	3.0	4.7	7.5	15	9.6	16
ABA167	R305818	CFD0394	30	31	Waste	Upper transition	Granite	GG	6.4	6.2	0.06	0.05	0.01	1.9	0.010	<0.2	0.80	<4.5	1.0	2.0	-1.1	-1.0	0.13	0.41	2.4	0.53	1.1
ABA169	R305821	CFD0399	20	21	Waste	Upper transition	Granite	GG	7.4	7.2	0.13	0.04	0.08	4.1	0.030	<0.2	2.3	<4.5	3.0	4.0	-1.7	-1.0	-0.060	0.57	1.1	0.74	0.98
ABA172	R305824	CFD0396	29	30	Waste	Upper transition	Granite	GG	5.7	5.8	0.01	<0.01	0.01	0.30	0.020	<0.2	1.6	<4.5	1.0	2.0	1.2	1.0	1.7	5.0	14	3.2	6.4
ABA178	R305831	CFD0400	11	12	Waste	Upper transition	Granite	GG	7.1	7	0.01	<0.01	0.01	0.30	0.030	<0.2	2.3	<4.5	2.0	4.0	2.0	2.0	3.7	7.5	14	6.4	13
ABA189	CFD0399_10_20	CFD0399	10	20	Waste	Upper transition	Granite	GG	-	6	0.12	0.01	0.11	3.8	-	-	-	-	1.0	-	-3.8	-3.0	-	-	-	0.27	-
ABA190	CFD0396_50_60	CFD0396	50	60	Waste	Upper transition	Granite	GG	-	7	<0.01	0.01	<0.01	<0.3	-	-	-	-	2.0	-	-0.30	2.0	-	-	-	6.7	-
ABA191	CFD0394_31_41	CFD0394	31	41	Waste	Upper transition	Granite	GG	-	6.9	0.01	<0.01	0.01	0.30	-	-	-	-	2.0	-	-0.31	2.0	-	-	-	6.4	-
ABA192	CFD0394_55_66	CFD0394	55	66	Waste	Upper transition	Granite	GG	-	7.3	<0.01	<0.01	<0.01	<0.3	-	-	-	-	3.0	-	-0.30	3.0	-	-	-	10	-
ABA195	CFD0381_4_13	CFD0381	4	13	Waste	Upper transition	Granite	GG	-	8.8	<0.01	0.02	<0.01	<0.3	-	-	-	-	6.0	-	-0.30	6.0	-	-	-	20	-
ABA196	CFD0380_36_50	CFD0380	36	50	Waste	Upper transition	Granite	GG	-	6.8	<0.01	0.01	<0.01	<0.3	-	-	-	-	2.0	-	-0.30	2.0	-	-	-	6.7	-
ABA431	Q041083	CFD0380	30	30.18	Waste	Upper Transition	Granite	GG	7.6	7.4	<0.01	<0.01	<0.01	<0.3	0.020	<0.2	1.6	<4.5	2.0	-	1.3	2.0	-	5.2	15	6.7	-
ABA434	Q032756	CFD0394	19.5	19.6	Waste	Upper Transition	Granite	GG	7.2	7.1	<0.01	<0.01	<0.01	<0.3	0.020	<0.2	1.6	<4.5	3.0	-	1.3	3.0	-	5.2	15	10	-
ABA435	Q032826	CFD0394	81.1	81.7	Waste	Upper Transition	Granite	GG	6.9	6.8	0.01	0.01	<0.01	0.30	0.010	<0.2	0.80	<4.5	1.0	-	0.46	1.0	-	2.5	14	3.2	-
ABA436	Q032927	CFD0396	65	65.528	Waste	Upper Transition	Granite	GG	6.8	6	0.01	0.01	<0.01	0.30	0.010	<0.2	0.80	<4.5	1.0	-	0.46	1.0	-	2.5	14	3.2	-
Statistical Summary						**Upper Tranistion**	**Granite**	**n**	11	17	17	17	17	17	11	11	11	11	17	7	17	17	7	11	11	17	7
								Max	8.9	8.8	0.13	0.05	0.11	4.1	0.070	0.30	5.4	6.8	6.0	6.0	5.1	5.7	5.7	17	22	20	19
								90th PCTL	7.6	8	0.08	0.03	0.04	2.6	0.030	0.20	2.3	4.5	3.4	5.4	2.0	3.1	5.1	7.4	15	11	17
								75th PCTL	7.3	7.2	0.01	0.01	0.01	0.31	0.030	0.20	2.3	4.5	3.0	4.5	1.3	2.7	4.2	7.4	15	9.6	14
								Median	7	6.9	0.01	0.01	<0.01	0.31	0.020	<0.2	1.6	<4.5	2.0	4.0	0.46	1.7	3.7	5.2	14	6.7	13
								25th PCTL	6.9	6.5	<0.01	<0.01	<0.01	<0.3	0.015	<0.2	1.2	<4.5	1.0	3.0	-0.30	0.69	0.91	2.5	11	3.2	3.7
								10th PCTL	6.4	6	<0.01	<0.01	<0.01	<0.3	0.010	<0.2	0.80	<4.5	1.0	2.0	-1.4	-0.95	0.050	0.57	2.4	0.66	1.0
								Min	5.7	5.8	<0.01	<0.01	<0.01	<0.3	0.010	<0.2	0.80	<4.5	1.0	2.0	-3.8	-2.8	-0.063	0.41	1.1	0.27	0.98
Lower Transition Facies for Granite Waste Rock																											
ABA010	KAM024598	CFD0137	49	50	Waste	Lower transition	Granite	GG	9	8.8	<0.01	0.01	<0.01	<0.3	0.11	0.40	8.5	9.1	7.0	7.0	8.2	7.0	6.7	28	30	23	23
ABA154	R305804	CFD0382	10	11	Waste	Lower transition	Granite	GG	8.5	8.4	0.01	0.02	0.01	0.30	0.080	0.30	6.2	6.8	5.0	6.0	5.9	5.0	5.7	20	22	16	19
ABA155	R305805	CFD0382	50	51	Waste	Lower transition	Granite	GG	7.2	7	0.01	0.01	0.01	0.30	0.030	<0.2	2.3	<4.5	3.0	5.0	2.0	3.0	4.7	7.5	14	9.6	16
ABA159	R305809	CFD0383	10	11	Waste	Lower transition	Granite	GG	8.7	8.5	0.01	0.01	<0.01	0.30	0.040	0.20	3.1	4.5	4.0	6.0	2.8	4.0	5.7	9.9	15	13	19
ABA160	R305811	CFD0383	48	49	Waste	Lower transition	Granite	GG	8.8	8.6	0.01	0.01	0.01	0.30	0.10	0.40	7.8	9.1	6.0	7.0	7.5	6.0	6.7	25	29	19	22
ABA164	R305815	CFD0389	10	11	Waste	Lower transition	Granite	GG	8.9	8.6	0.01	<0.01	<0.01	0.30	0.010	<0.2	0.80	<4.5	4.0	5.0	0.46	4.0	4.7	2.5	14	13	16
ABA166	R305817	CFD0389	45	46	Waste	Lower transition	Granite	GG	6.4	6.2	0.03	0.01	0.01	0.90	0.050	<0.2	3.9	<4.5	2.0	4.0	2.9	1.0	3.1	4.1	4.8	2.1	4.3
ABA193	CFD383_115_125	CFD0383	115	125	Waste	Lower transition	Granite	GG	-	8.6	<0.01	<0.01	<0.01	<0.3	-	-	-	-	7.0	-	-0.30	7.0	-	-	-	23	-
ABA194	CFD0382_84_94	CFD0382	84	94	Waste	Lower transition	Granite	GG	-	6.6	<0.01	0.02	<0.01	<0.3	-	-	-	-	3.0	-	-0.30	3.0	-	-	-	10	-
ABA424	Q041284	CFD0382	4	5	Waste	Lower Transition	Granite	GG	8.6	9	<0.01	0.01	<0.01	<0.3	0.050	<0.2	3.9	<4.5	5.0	-	3.6	5.0	-	13	15	17	-
ABA425	Q041377	CFD0382	87	88	Waste	Lower Transition	Granite	GG	7.4	7.1	<0.01	0.01	<0.01	<0.3	0.030	<0.2	2.3	<4.5	2.0	-	2.0	2.0	-	7.8	15	6.7	-
ABA426	Q041396	CFD0382	103	104	Waste	Lower Transition	Granite	GG	6.7	6.6	<0.01	0.01	<0.01	<0.3	0.020	<0.2	1.6	<4.5	1.0	-	1.3	1.0	-	5.2	15	3.3	-
ABA427	Q041404	CFD0382	110	111	Waste	Lower Transition	Granite	GG	6.8	6.9	<0.01	<0.01	<0.01	<0.3	0.030	<0.2	2.3	<4.5	3.0	-	2.0	3.0	-	7.8	15	10	-
ABA430	Q041069	CFD0380	18	18.1	Waste	Lower Transition	Granite	GG	6.3	5.9	0.05	0.02	0.01	1.6	0.030	<0.2	2.3	<4.5	2.0	-	0.77	0.00	-	1.5	2.9	1.3	-
Statistical Summary						**Lower Tranistion**	**Granite**	**n**	12	14	14	14	14	14	12	12	12	12	14	7	14	14	7	12	12	14	7
								Max	9	9	0.05	0.02	0.01	1.6	0.11	0.40	8.5	9.1	7.0	7.0	8.2	6.7	6.7	28	30	23	23
								90th PCTL	8.9	8.7	0.02	0.02	0.01	0.75	0.098	0.39	7.6	8.9	6.7	7.0	7.0	6.4	6.7	24	28	22	23
								75th PCTL	8.7	8.6	0.01	0.01	0.01	0.31	0.058	0.23	4.5	5.1	5.0	6.5	3.4	4.7	6.2	15	17	17	21
								Median	8	7.8	<0.01	0.01	<0.01	<0.3	0.035	<0.2	2.7	<4.5	3.5	6.0	2.0	3.2	5.7	7.8	15	11	19
								25th PCTL	6.8	6.7	<0.01	0.01	<0.01	<0.3	0.030	<0.2	2.3	<4.5	2.3	5.0	0.89	1.9	4.7	4.9	14	7.4	16
								10th PCTL	6.4	6.3	<0.01	<0.01	<0.01	<0.3	0.021	<0.2	1.6	<4.5	2.0	4.6	-0.071	0.81	4.0	2.6	5.8	2.5	11
								Min	6.3	5.9	<0.01	<0.01	<0.01	<0.3	0.010	<0.2	0.80	<4.5	1.0	4.0	-0.30	0.44	3.1	1.5	2.9	1.3	4.3
Fresh Facies for Granite Waste Rock																											
ABA012	KAM025798	CFD0147	260	261	Waste	Fresh	Granite	GG	8.8	8.7	0.01	<0.01	0.01	0.30	0.26	0.80	20	18	18	19	20	18	19	65	58	58	61
ABA162	R305813	CFD0385	10	11	Waste	Fresh	Granite	GG	9	8.7	0.01	0.01	0.01	0.30	0.040	0.20	3.1	4.5	4.0	5.0	2.8	4.0	4.7	9.9	15	13	16
ABA163	R305814	CFD0385	59	60	Waste	Fresh	Granite	GG	7.4	7.1	0.01	0.01	0.01	0.30	<0.01	<0.2	<0.8	<4.5	2.0	4.0	0.46	2.0	3.7	2.5	14	6.4	13
ABA165	R305816	CFD0389	30	31	Waste	Fresh	Granite	GG	8.5	8.4	0.05	<0.01	0.01	1.6	0.010	<0.2	0.80	<4.5	4.0	5.0	-0.79	2.0	3.4	0.50	2.9	2.6	3.2
ABA168	R305819	CFD0394	88	89	Waste	Fresh	Granite	GG	8.5	8.3	0.01	0.01	0.01	0.30	0.050	0.20	3.9	4.5	4.0	6.0	3.6	4.0	5.7	12	15	13	19
ABA179	R305832	CFD0400	60	61	Waste	Fresh	Granite	GG	6.8	6.7	0.01	0.01	0.01	0.30	0.020	<0.2	1.6	<4.5	2.0	3.0	1.2	2.0	2.7	5.0	14	6.4	9.6
ABA180	CFD0396_72_81	CFD0396	72	81	Waste	Fresh	Granite	GG	-	6.7	0.06	0.02	0.04	1.9	-	-	-	-	5.0	-	-1.9	3.0	-	-	-	2.7	-
ABA182	CFD0394_94_104	CFD0394	94	104	Waste	Fresh	Granite	GG	-	7.3	0.14	<0.01	0.14	4.4	-	-	-	-	6.0	-	-4.4	2.0	-	-	-	1.4	-
ABA186	CFD0380_2_17	CFD0380	2	17	Waste	Fresh	Granite	GG	-	8.8	<0.01	0.01	<0.01	<0.3	-	-	-	-	5.0	-	-0.30	5.0	-	-	-	17	-
ABA187	CFD0380_22_30	CFD0380	22	30	Waste	Fresh	Granite	GG	-	8.3	<0.01	0.01	<0.01	<0.3	-	-	-	-	3.0	-	-0.30	3.0	-	-	-	10	-
ABA198	CFD0385_28_38	CFD0385	28	38	Waste	Fresh	Granite	GG	-	9	0.03	<0.01	0.03	0.90	-	-	-	-	4.0	-	-0.94	3.0	-	-	-	4.3	-
ABA199	CFD0385_38_48	CFD0385	38	48	Waste	Fresh	Granite	GG	-	8.6	0.02	<0.01	0.02	0.60	-	-	-	-	3.0	-	-0.63	2.0	-	-	-	4.8	-
ABA200	CFD0385_48_58	CFD0385	48	58	Waste	Fresh	Granite	GG	-	8.3	0.03	<0.01	0.03	0.90	-	-	-	-	3.0	-	-0.94	2.0	-	-	-	3.2	-
ABA437	Q041055	CFD0380	5	6	Waste	Fresh	Granite	GG	9.2	9.3	<0.01	<0.01	<0.01	<0.3	0.090	0.20	7.0	4.5	6.0	-	6.7	6.0	-	23	15	20	-
ABA438	Q041063	CFD0380	12	13	Waste	Fresh	Granite	GG	9.1	9.2	<0.01	<0.01	<0.01	<0.3	0.070	0.20	5.4	4.5	6.0	-	5.1	6.0	-	18	15	20	-
ABA439	Q041678	CFD0385	8	9	Waste	Fresh	Granite	GG	9.2	9.3	<0.01	<0.01	<0.01	<0.3	0.040	<0.2	3.1	<4.5	6.0	-	2.8	6.0	-	10	15	20	-
ABA440	Q041699	CFD0385	27	28	Waste	Fresh	Granite	GG	9	8.8	<0.01	0.01	<0.01	<0.3	0.040	0.20	3.1	4.5	5.0	-	2.8	5.0	-	10	15	17	-
ABA441	Q032423	CFD0385	92	92.58	Waste	Fresh	Granite	GG	7.9	7.7	0.03	0.02	0.01	0.90	0.010	<0.2	0.80	<4.5	3.0	-	-0.16	2.0	-	0.83	4.8	3.2	-
ABA442	Q032601	CFD0391	3.35	3.879	Waste	Fresh	Granite	GG	8.3	8.5	<0.01	0.01	<0.01	<0.3	0.090	<0.2	7.0	<4.5	5.0	-	6.7	5.0	-	23	15	17	-
ABA443	Q033167	CFD0400	60	60.963	Waste	Fresh	Granite	GG	8	7.3	0.01	<0.01	<0.01	0.30	0.010	<0.2	0.80	<4.5	2.0	-	0.46	2.0	-	2.5	14	6.4	-
Statistical Summary						**Fresh**	**Granite**	**n**	13	20	20	20	20	20	13	13	13	13	20	6	20	20	6	13	13	20	6
								Max	9.2	9.3	0.14	0.02	0.14	4.4	0.26	0.80	20	18	18	19	20	18	19	65	58	58	61
								90th PCTL	9.2	9.2	0.05	0.01	0.03	1.6	0.090	0.20	7.0	4.5	6.0	13	6.7	5.7	12	23	15	20	40
								75th PCTL	9	8.8	0.03	0.01	0.01	0.94	0.070	0.20	5.4	4.5	5.3	5.8	3.0	4.7	5.4	18	15	17	18
								Median	8.5	8.5	0.01	<0.01	0.01	0.31	0.040	<0.2	3.1	<4.5	4.0	5.0	0.46	3.1	4.2	10	15	8.2	14
								25th PCTL	8	7.6	<0.01	<0.01	<0.01	<0.3	0.010	<0.2	0.80	<4.5	3.0	4.3	-0.67	2.1	3.5	2.5	14	4.0	10
								10th PCTL	7.5	7.1	<0.01	<0.01	<0.01	<0.3	0.010	<0.2	0.80	<4.5	2.0	3.5	-1.0	1.7	3.1	1.2	6.7	2.7	6.4
								Min	6.8	6.7	<0.01	<0.01	<0.01	<0.3	0.010	<0.2	0.80	<4.5	2.0	3.0	-4.4	1.6	2.7	0.50	2.9	1.4	3.2

Appendix C.1-1: Acid-Base Accounting Results for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Rinse pH (1:1)	Paste pH	Total-S	Sulphate-S	Sulphide-S	T-AP	Total-C	Inorg. C (as CO_2)	T-C NP*	CaNP	Sobek-NP	Siderite-NP	T-C NNP*	Sobek NNP	Siderite NNP	NPR	NPR	NPR	NPR
									s.u.	s.u.	%	%	%	$kgCaCO_3/t$	%	%	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	T-CNP*/T-AP	CaNP/T-AP	SobekNP/T-AP	SideriteNP/T-AP
Statistical Summary for Granite Waste Rock								**n**	42	57	57	57	38	57	42	42	42	42	57	23	42	57	23	42	42	57	3
								n < DL	-	-	22	21	13	22	1	30	1	30	0	0	0	0	0	0	0	0	0
								Max	9.2	9.3	0.14	0.05	0.14	4.4	0.26	0.80	20	18	18	19	20	18	19	65	58	58	61
								90th PCTL	9	8.8	0.05	0.02	0.03	1.6	0.089	0.29	6.9	6.6	6.0	6.8	6.6	5.7	6.5	22	21	19	53
								75th PCTL	8.7	8.6	0.01	0.01	0.01	0.31	0.048	0.20	3.7	4.5	5.0	6.0	2.9	3.7	5.7	9.9	15	13	42
								Median	7.4	7.3	0.01	0.01	0.01	0.31	0.030	*<0.2*	2.3	*<4.5*	3.0	5.0	2.0	2.7	3.7	7.4	14	6.7	23
								25th PCTL	6.8	6.7	*<0.01*	*<0.01*	*<0.01*	*<0.3*	0.020	*<0.2*	1.6	*<4.5*	2.0	4.0	0.54	1.7	3.3	2.5	14	3.2	18
								10th PCTL	6.3	6.06	*<0.01*	*<0.01*	*<0.01*	*<0.3*	0.010	*<0.2*	0.78	*<4.5*	1.0	3.0	0.46	0.69	1.9	1.6	4.8	2.4	15
								Min	5.7	5.8	*<0.01*	*<0.01*	*<0.01*	*<0.3*	0.010	0.10	0.78	2.3	1.0	2.0	-1.7	-2.8	-0.063	0.41	1.1	0.27	13
Oxide Facies for Other Lithologies Waste Rock																											
ABA017	KAM029389	CFD0176	96	97	Waste	Oxide	Dykes	FC	7.1	7.4	0.02	0.01	0.02	0.60	0.090	0.30	7.0	6.8	9.0	9.0	6.4	8.0	8.4	11	11	14	14
ABA018	KAM029393	CFD0176	99	100	Waste	Oxide	Dykes	FC	7	6.7	0.02	*<0.01*	0.01	0.60	0.040	0.10	3.1	2.3	6.0	6.0	2.5	5.0	5.4	5.0	3.6	9.6	9.6
ABA056	KAM084551	CFD0237	181	181.5	Waste	Oxide	HU	HU	7.1	7.6	0.03	*<0.01*	0.03	0.90	0.28	0.70	22	16	16	19	21	15	18	23	17	17	20
ABA306	R277468	CFD0426	26	27	Waste	Oxide	SZ	SZ	-	8	*<0.01*	-	-	*<0.3*	0.010	-	0.80	-	-	-	-	-	-	2.6	0.00	-	-
Statistical Summary						**Oxide**	**Other Lithologies**	**n**	3	4	4	3	3	4	4	3	4	3	3	3	3	3	3	4	4	3	3
								Max	7.1	8	0.03	0.01	0.03	0.94	0.28	0.70	22	16	16	19	21	15	18	23	17	17	20
								90th PCTL	7.1	7.9	0.03	0.01	0.03	0.84	0.22	0.62	17	14	15	17	18	14	16	20	15	17	19
								75th PCTL	7.1	7.7	0.02	0.01	0.03	0.70	0.14	0.50	11	11	13	14	14	12	13	14	12	16	17
								Median	7.1	7.5	0.02	*<0.01*	0.02	0.63	0.065	0.30	5.0	6.8	9.0	9.0	6.4	8.4	8.4	8.1	7.3	14	14
								25th PCTL	7.1	7.2	0.02	*<0.01*	0.02	0.54	0.033	0.20	2.5	4.5	7.5	7.5	4.4	6.9	6.9	4.4	2.7	12	12
								10th PCTL	7	6.9	*<0.01*	*<0.01*	0.01	*<0.3*	0.019	0.14	1.5	3.2	6.6	6.6	3.3	6.0	6.0	3.3	1.1	11	11
								Min	7	6.7	*<0.01*	*<0.01*	0.01	*<0.3*	0.010	0.10	0.80	2.3	6.0	6.0	2.5	5.4	5.4	2.6	0.00	9.6	9.6
Upper Transition Facies for Other Lithologies Waste Rock																											
ABA061	KAM019714	CFD0083	8	9	Waste	Upper transition	Metabasalt/	Amph	8.6	8.7	0.01	*<0.01*	*<0.01*	0.30	0.36	1.3	28	30	37	38	28	37	38	89	95	118	122
ABA303	Q033703	CFD0411	15	16	Waste	Upper transition	dykes	DIOR	-	7.5	0.01	-	-	0.30	0.020	-	1.6	-	-	-	1.2	-	-	5.0	-	-	-
ABA072	KAM145425	CFD0339	10	11	Waste	Upper transition	Dykes	FC	7.1	7	0.01	*<0.01*	0.01	0.30	0.030	*<0.2*	2.3	*<4.5*	5.0	7.0	2.0	5.0	6.7	7.5	14	16	22
ABA311	Q034859	CFD0473	164	165	Waste	Upper transition	dykes	FC	-	7.4	0.02	-	-	0.60	0.040	-	3.1	-	-	-	2.5	-	-	5.0	-	-	-
ABA305	R273647	CFD0456	55	56	Waste	Upper transition	Fault	FLT	-	7.3	*<0.01*	-	-	*<0.3*	0.030	-	2.3	-	-	-	2.0	-	-	7.8	-	-	-
ABA022	KAM035755	CFD0080	122	123	Waste	Upper transition	YO	YO	7.7	8.1	0.53	0.01	0.42	17	3.0	11	234	241	204	202	217	187	185	14	15	12	12
ABA368	R545623	CFD0524	92	92.6	Waste	Upper Transition	Yx	Yx	8.3	8.3	0.02	*<0.01*	*<0.01*	0.60	0.020	*<0.2*	1.6	*<4.5*	-	-	-	-	-	2.5	7.2	-	-
Statistical Summary						**Upper Transition**	**Other Lithologies**	**n**	4	7	7	4	4	7	7	4	7	4	3	3	6	3	3	7	4	3	3
								Max	8.6	8.7	0.53	0.01	0.42	17	3.0	11	234	241	204	202	217	187	185	89	95	118	122
								90th PCTL	8.5	8.5	0.22	0.01	0.30	7.0	1.4	7.8	110	178	171	169	122	157	156	44	71	98	102
								75th PCTL	8.4	8.2	0.02	*<0.01*	0.11	0.63	0.20	3.6	16	82	121	120	21	112	112	11	35	67	72
								Median	8	7.5	0.01	*<0.01*	*<0.01*	0.31	0.030	0.75	2.3	17	37	38	2.3	37	38	7.4	14	16	22
								25th PCTL	7.6	7.4	0.01	*<0.01*	*<0.01*	0.31	0.025	*<0.2*	1.9	*<4.5*	21	23	2.0	21	22	5.0	13	14	17
								10th PCTL	7.3	7.2	0.01	*<0.01*	*<0.01*	0.31	0.020	*<0.2*	1.6	*<4.5*	11	13	1.6	11	13	4.0	9.4	13	14
								Min	7.1	7	*<0.01*	*<0.01*	*<0.01*	*<0.3*	0.020	*<0.2*	1.6	*<4.5*	5.0	7.0	1.2	4.7	6.7	2.5	7.2	12	12
Lower Transition Facies for Other Lithologies Waste Rock																											
ABA449	R283583	CFD0496	90	91	Waste	Lower Transition	Metabasalt	MBSLT	8.6	8.7	0.34	0.01	-	11	2.4	8.2	187	186	192	-	176	181	-	18	18	18	-
ABA304	R283583	CFD0496	90	91	Waste	Lower transition	Metabasalt/	MBSLT	-	8.4	0.35	-	-	11	2.4	-	182	-	-	-	171	-	-	17	-	-	-
ABA312	R282332	CFD0474	37	38	Waste	Lower transition	dykes	IV	-	8.7	*<0.01*	-	-	*<0.3*	0.31	-	24	-	-	-	24	-	-	80	-	-	-
ABA313	Q035862	CFD0491	124	125	Waste	Lower transition	dykes	IV	-	6.9	0.02	-	-	0.60	0.020	-	1.6	-	-	-	0.93	-	-	2.5	-	-	-
ABA308	Q033764	CFD0411	70	71	Waste	Lower transition	YC	YC	-	8	0.12	-	-	3.8	2.5	-	192	-	-	-	188	-	-	51	-	-	-
ABA310	R276691	CFD0413	21	22	Waste	Lower transition	Ylim	Ylim	-	8.1	*<0.01*	-	-	*<0.3*	0.31	-	24	-	-	-	24	-	-	80	-	-	-
Statistical Summary						**Lower Transition**	**Other Lithologies**	**n**	1	6	6	1	0	6	6	1	6	1	1	0	6	1	0	6	1	1	0
								Max	-	8.7	0.35	-	-	11	2.5	8.2	192	-	-	-	188	-	-	80	-	-	-
								90th PCTL	-	8.7	0.35	-	-	11	2.4	8.2	189	-	-	-	182	-	-	80	-	-	-
								75th PCTL	-	8.6	0.29	-	-	8.9	2.4	8.2	186	-	-	-	175	-	-	73	-	-	-
								Median	-	8.3	0.07	-	-	2.2	1.3	8.2	103	-	-	-	98	-	-	34	-	-	-
								25th PCTL	-	8	0.01	-	-	0.38	0.31	8.2	24	-	-	-	24	-	-	17	-	-	-
								10th PCTL	-	7.5	*<0.01*	-	-	*<0.3*	0.17	8.2	13	-	-	-	12	-	-	9.6	-	-	-
								Min	-	6.9	*<0.01*	-	-	*<0.3*	0.020	8.2	1.6	-	-	-	0.93	-	-	2.5	-	-	-
Fresh Facies for Other Lithologies Waste Rock																											
ABA447	R274909	CFD0472	143.2	144	Waste	Fresh	Metabasalt	MBSLT	8	8.1	*<0.01*	0.02	-	*<0.3*	0.36	1.2	28	27	44	-	28	44	-	93	91	147	-
ABA448	R274918	CFD0472	150	151	Waste	Fresh	Metabasalt	MBSLT	8.6	8.9	0.07	*<0.01*	-	2.2	0.23	0.80	18	18	29	-	16	27	-	8.2	8.3	13	-
ABA450	R293475	CFR0730	91.44	92.96	Waste	Fresh	Metabasalt	MBSLT	8.6	8.7	0.21	0.03	-	6.6	0.88	2.9	68	66	80	-	62	73	-	10	10	12	-
ABA087	KAM133438	CFR0429	10.67	12.19	Waste	Fresh	Mafic/	RU	9	8.7	0.04	0.01	0.02	1.3	3.1	9.6	241	218	260	269	240	259	268	193	175	208	215
ABA307	R277453	CFD0423	81	82	Waste	Fresh	Mafic/	RU	-	8.2	0.01	-	-	0.30	0.90	-	70	-	-	-	70	-	-	223	-	-	-
ABA349	R304353	CFD0541	90	91	Waste	Fresh	IV	IV	8.7	8.8	*<0.01*	0.01	*<0.01*	*<0.3*	0.22	0.70	17	16	-	-	17	-	-	57	53	-	-
ABA352	R304282	CFD0539	90	91	Waste	Fresh	IV	IV	8.7	8.6	*<0.01*	*<0.01*	0.02	*<0.3*	0.86	2.9	67	66	-	-	66	-	-	222	220	-	-
Statistical Summary						**Fresh**	**Other Lithologies**	**n**	6	7	7	6	3	7	7	6	7	6	4	1	7	4	1	7	6	4	1
								Max	9	8.9	0.21	0.03	0.02	6.6	3.1	9.6	241	218	260	-	240	259	-	223	220	208	-
								90th PCTL	8.9	8.8	0.13	0.03	0.02	3.9	1.8	6.3	138	142	206	-	138	203	-	223	197	190	-
								75th PCTL	8.7	8.8	0.06	0.02	0.02	1.7	0.89	2.9	69	66	125	-	68	120	-	208	154	162	-
								Median	8.7	8.7	0.01	0.01	0.02	0.31	0.86	2.1	67	47	62	-	62	59	-	93	72	80	-
								25th PCTL	8.6	8.4	*<0.01*	*<0.01*	*<0.01*	*<0.3*	0.30	0.90	23	21	40	-	22	39	-	34	21	13	-
								10th PCTL	8.3	8.2	*<0.01*	*<0.01*	*<0.01*	*<0.3*	0.23	0.75	18	17	34	-	16	32	-	9.5	9.2	13	-
								Min	8	8.1	*<0.01*	*<0.01*	*<0.01*	*<0.3*	0.22	0.70	17	16	29	-	16	27	-	8.2	8.3	12	-
Statistical Summary for Other Lithologies Waste Rock								**n**	14	24	24	14	10	24	24	14	24	14	11	7	24	11	7	24	15	11	7
								n < DL	-	-	7	7	3	7	0	2	0	2	0	0	0	0	0	0	0	0	0
								Max	9	8.9	0.53	0.03	0.42	17	3.1	11	241	241	260	269	240	259	268	223	211	208	215
								90th PCTL	8.7	8.7	0.30	0.02	0.07	9.4	2.5	9.2	190	209	204	229	184	187	218	162	143	141	159
								75th PCTL	8.6	8.7	0.05	0.01	0.02	1.5	0.89	2.9	69	66	136	120	67	127	112	80	69	68	72
								Median	8.5	8.1	0.02	*<0.01*	0.02	0.63	0.30	1.0	23	23	37	19	22	37	18	15	15	16	20
								25th PCTL	7.3	7.475	*<0.01*	*<0.01*	*<0.01*	*<0.3*	0.038	0.40	2.9	9.1	13	8.0	2.4	12	7.5	6.8	9.2	13	13
								10th PCTL	7.1	7.09	*<0.01*	*<0.01*	*<0.01*	*<0.3*	0.020	*<0.2*	1.6	*<4.5*	6.0	6.6	1.0	5.4	6.2	3.3	5.1	12	11
								Min	7	6.7	*<0.01*	*<0.01*	*<0.01*	*<0.3*	0.010	0.10	0.80	2.3	5.0	6.0	0.48	4.7	5.4	2.5	0.00	9.6	9.6

Notes: all values in grey italics are below the analytical detection limit
n = number of samples included in statistical summary
n < DL = number of samples with values below the analytical detection limit
Sulphate Sulphur determined by 25% HCL with Gravimetric Finish.
Sulphide Sulphur determined by Sobek 1:7 Nitric Acid with S by ICP-MS Finish.
T-AP = Acid potential in tonnes $CaCO_3$ equivalent per 1000 tonnes of material, derived from Total S * 31.25.
NP = Neutralization potential in tonnes $CaCO_3$ equivalent per 1000 tonnes of material.
Carbonate NP (CaNP) is calculated from total inorganic carbon (TIC); T-C NP* calculated from Total-C * 77.6.
Net NP (NNP) = NP - AP; Neutralization potential ratio (NPR).

Appendix C.1-2: Shake Flask Extraction Results for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	pH	T-Alkalinity	Br	Cl	F	NO_3-N	NO_2-N	SO_4	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
										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
Oxide Facies for Gneiss Waste Rock																											
ABA043	KAM050495	CFD0152	149.0	150.0	Waste	Oxide	Gneiss	MxF	8.4	-	-	-	-	-	-	1.3	0.47	0.020	0.035	0.0073	0.00025	0.00025	0.13	0.000025	18	0.00025	0.000050
ABA064	KAM125257	CFD0307	49.0	50.0	Waste	Oxide	Gneiss	MxF	8.0	-	-	-	-	-	-	<0.5	3.6	0.041	0.19	0.069	<0.0005	<0.0005	0.014	<0.00005	0.84	0.0040	0.00073
ABA080	KAM115505	CFR0360	25.9	27.4	Waste	Oxide	Gneiss	MxF	7.2	-	-	-	-	-	-	<0.5	0.019	0.0028	0.0095	0.017	<0.0005	<0.0005	0.034	<0.00005	2.4	<0.0005	0.00020
ABA096	KAM137284	CFR0468	32.0	33.5	Waste	Oxide	Gneiss	MxF	8.3	-	-	-	-	-	-	0.52	3.8	0.0053	0.12	0.055	<0.0005	0.00063	0.010	<0.00005	0.57	0.0039	0.0010
ABA104	KAM139298	CFR0482	10.7	12.2	Waste	Oxide	Gneiss	MxF	7.4	-	-	-	-	-	-	0.80	3.0	0.021	0.18	0.085	<0.0005	<0.0005	0.022	<0.00005	0.67	0.0028	0.00071
ABA138	KAM152219	CFR0586	155.5	157.0	Waste	Oxide	Gneiss	MxF	8.8	-	-	-	-	-	-	3.5	0.26	0.0014	0.015	0.021	<0.0005	<0.0005	0.013	<0.00005	8.8	<0.0005	<0.0001
ABA144	KAM152716	CFR0591	30.5	32.0	Waste	Oxide	Gneiss	MxF	8.9	-	-	-	-	-	-	1.9	0.13	0.0069	0.17	0.025	<0.0005	<0.0005	0.017	<0.00005	12	<0.0005	<0.0001
ABA146	KAM153091	CFR0594	164.6	166.1	Waste	Oxide	Gneiss	MxF	8.3	-	-	-	-	-	-	16	0.036	0.047	1.2	0.0019	<0.0005	<0.0005	0.036	<0.00005	20	0.0029	<0.0001
ABA149	KAM153152	CFR0595	61.0	62.5	Waste	Oxide	Gneiss	MxF	9.4	-	-	-	-	-	-	1.4	0.43	0.0049	0.076	0.0052	<0.0005	<0.0005	0.016	<0.00005	6.6	<0.0005	<0.0001
Statistical Summary						**Oxide**	**Gneiss**	**n**	9	-	-	-	-	-	-	9	9	9	9	9	9	9	9	9	9	9	9
								Max	9.4	-	-	-	-	-	-	16	3.8	0.047	1.2	0.085	0.00050	0.00063	0.13	0.000050	20	0.0040	0.0010
								90th PCTL	9.0	-	-	-	-	-	-	6.0	3.7	0.042	0.39	0.072	0.00050	0.00053	0.054	0.000050	18	0.0039	0.00079
								75th PCTL	8.8	-	-	-	-	-	-	1.9	3.0	0.021	0.18	0.055	<0.0005	<0.0005	0.034	<0.00005	12	0.0029	0.00071
								Median	8.3	-	-	-	-	-	-	1.3	0.43	0.0069	0.12	0.021	<0.0005	<0.0005	0.017	<0.00005	6.6	0.00050	0.00010
								25th PCTL	8.0	-	-	-	-	-	-	0.52	0.13	0.0049	0.035	0.0073	<0.0005	<0.0005	0.014	<0.00005	0.84	<0.0005	<0.0001
								10th PCTL	7.4	-	-	-	-	-	-	<0.5	0.032	0.0025	0.014	0.0045	<0.0005	<0.0005	0.012	<0.00005	0.65	<0.0005	<0.0001
								Min	7.2	-	-	-	-	-	-	<0.5	0.019	0.0014	0.0095	0.0019	<0.0005	<0.0005	0.010	<0.00005	0.57	<0.0005	<0.0001
Upper Transition Facies for Gneiss Waste Rock																											
ABA016	KAM029087	CFD0175	145.0	146.0	Waste	Upper transition	Gneiss	MxF	8.1	-	-	-	-	-	-	1.7	0.11	0.0071	0.014	0.011	0.00025	0.00025	0.042	0.000025	28	0.0016	0.000050
ABA059	KAM097012	CFD0272	17.0	18.0	Waste	Upper transition	Gneiss	FG	8.6	-	-	-	-	-	-	0.55	7.6	0.028	0.20	0.11	0.00050	0.00050	0.043	0.000050	0.52	0.0029	0.0016
ABA060	KAM097065	CFD0272	65.0	66.0	Waste	Upper transition	Gneiss	FG	8.3	-	-	-	-	-	-	12	0.28	0.012	0.094	0.13	0.00025	0.00025	0.14	0.000025	23	0.00025	0.000050
ABA147	KAM152978	CFR0594	10.7	12.2	Waste	Upper transition	Gneiss	MxF	9.5	-	-	-	-	-	-	0.89	4.1	0.00045	0.015	0.048	<0.0005	<0.0005	<0.01	<0.00005	5.6	0.00069	0.00066
ABA353	R304081	CFD0525	10.0	11.0	Waste	Upper Transition	Gneiss	MxF	7.7	4.2	<0.05	<0.5	0.17	0.0098	0.0027	0.90	0.51	0.0019	0.046	0.031	<0.0005	<0.0005	<0.01	<0.00005	0.99	0.0013	0.00033
ABA367	R545582	CFD0524	56.0	57.0	Waste	Upper Transition	Gneiss	MxF	7.9	3.9	<0.05	<0.5	0.096	0.013	0.011	0.70	0.044	0.0049	0.079	0.0021	<0.0005	<0.0005	<0.01	<0.00005	0.37	<0.0005	<0.0001
ABA411	R544193	CFD0502	40.0	41.0	Waste	Upper Transition	Gneiss	MxF	7.3	3.3	<0.05	<0.5	0.069	0.021	0.011	<0.5	0.028	0.0013	0.0079	0.0027	<0.0005	<0.0005	<0.01	<0.00005	0.55	<0.0005	0.0017
Statistical Summary						**Upper Transition**	**Gneiss**	**n**	7	-	-	-	-	-	-	7	7	7	7	7	7	7	7	7	7	7	7
								Max	9.5	-	-	-	-	-	-	12	7.6	0.028	0.20	0.13	<0.0005	<0.0005	0.14	<0.00005	28	0.0029	0.0017
								90th PCTL	8.9	-	-	-	-	-	-	6.0	5.5	0.019	0.14	0.12	<0.0005	<0.0005	0.081	<0.00005	25	0.0021	0.0016
								75th PCTL	8.4	-	-	-	-	-	-	1.3	2.3	0.0097	0.087	0.078	<0.0005	<0.0005	0.043	<0.00005	14	0.0015	0.0011
								Median	8.1	-	-	-	-	-	-	0.89	0.28	0.0049	0.046	0.031	<0.0005	<0.0005	0.010	<0.00005	0.99	0.00069	0.00033
								25th PCTL	7.8	-	-	-	-	-	-	0.63	0.079	0.0016	0.014	0.0067	0.00038	0.00038	<0.01	0.000038	0.54	<0.0005	0.000075
								10th PCTL	7.5	-	-	-	-	-	-	0.53	0.038	0.00094	0.012	0.0025	0.00025	0.00025	<0.01	0.000025	0.46	0.00040	0.000050
								Min	7.3	-	-	-	-	-	-	<0.5	0.028	0.00045	0.0079	0.0021	0.00025	0.00025	<0.01	0.000025	0.37	0.00025	0.000050
Lower Transition Facies for Gneiss Waste Rock																											
ABA019	KAM029649	CFD0177	73.0	74.0	Waste	Lower transition	Gneiss	MxM	9.8	-	-	-	-	-	-	0.55	2.6	0.0026	0.015	0.011	0.00050	0.00050	0.026	0.000050	2.2	0.00050	0.00010
ABA058	KAM096948	CFD0270	230.0	231.0	Waste	Lower transition	Gneiss	MxF	8.6	-	-	-	-	-	-	15	0.64	0.0039	0.016	0.020	0.00025	0.00025	0.047	0.000025	25	0.00025	0.000050
ABA067	KAM129499	CFD0332	50.0	51.0	Waste	Lower Transition	Gneiss	MxM	9.7	-	-	-	-	-	-	1.1	4.1	0.0018	0.012	0.031	<0.0005	<0.0005	<0.01	<0.00005	3.8	<0.0005	0.00035
ABA070	KAM099512	CFD0338	10.0	11.0	Waste	Lower transition	Gneiss	MxF	9.2	33	<0.05	<0.5	0.16	0.0093	0.010	4.1	0.19	0.00020	0.0066	0.27	<0.0005	<0.0005	<0.01	<0.00005	7.1	<0.0005	<0.0001
ABA073	KAM145537	CFD0339	111.0	112.0	Waste	Lower transition	Gneiss	MxF	9.2	28	<0.05	<0.5	0.12	0.0073	0.0089	7.3	0.20	0.0037	0.029	0.30	<0.0005	<0.0005	<0.01	<0.00005	7.7	<0.0005	<0.0001
ABA098	KAM137429	CFR0469	29.0	30.5	Waste	Lower transition	Gneiss	MxF	9.4	26	<0.05	<0.5	0.13	<0.005	0.0041	<0.5	0.65	0.00017	0.019	0.0075	<0.0005	<0.0005	<0.01	<0.00005	5.6	<0.0005	<0.0001
ABA106	KAM139356	CFR0482	89.9	91.4	Waste	Lower transition	Gneiss	MxF	9.3	32	<0.05	<0.5	0.21	<0.005	0.0062	2.7	0.26	0.00011	0.0045	0.0048	<0.0005	<0.0005	<0.01	<0.00005	6.5	<0.0005	<0.0001
ABA117	KAM122524	CFR0529	21.3	22.9	Waste	Lower transition	Gneiss	FG	8.1	7.5	<0.05	<0.5	0.35	0.0081	0.0060	<0.5	2.0	0.0021	0.028	0.054	<0.0005	<0.0005	<0.01	<0.00005	0.85	0.011	0.00086
ABA142	KAM152462	CFR0589	25.9	27.4	Waste	Lower transition	Gneiss	MxF	9.3	27	<0.05	<0.5	0.098	<0.005	0.0045	8.8	0.17	0.00049	0.014	0.23	<0.0005	<0.0005	<0.01	<0.00005	6.6	<0.0005	<0.0001
ABA150	KAM153129	CFR0595	30.5	32.0	Waste	Lower transition	Gneiss	MxM	9.4	38	<0.05	<0.5	0.21	<0.005	0.0084	1.6	0.42	0.00082	0.056	0.0080	<0.0005	<0.0005	<0.01	<0.00005	6.6	<0.0005	<0.0001
ABA246	R273797	CFD0458	9.0	10.0	Waste	Lower transition	Gneiss	FG	7.7	4.5	<0.05	<0.5	0.098	<0.005	0.024	<0.5	0.027	0.0017	0.017	0.0036	<0.0005	<0.0005	<0.01	<0.00005	0.28	<0.0005	<0.0001
ABA247	R283019	CFD0484	33.0	34.0	Waste	Lower transition	Gneiss	FG	9.2	26	<0.05	<0.5	0.15	<0.005	0.011	0.72	0.24	0.00056	0.033	0.0079	<0.0005	<0.0005	<0.01	<0.00005	5.2	<0.0005	<0.0001
ABA249	R273398	CFD0447	188.0	189.0	Waste	Lower transition	Gneiss	MxF	9.3	20	<0.05	<0.5	0.095	<0.005	<0.001	<0.5	0.42	0.00084	0.043	0.0067	<0.0005	<0.0005	<0.01	<0.00005	3.2	<0.0005	<0.0001
ABA250	R279032	CFD0461	85.0	86.0	Waste	Lower transition	Gneiss	MxM	9.3	22	<0.05	<0.5	0.065	<0.005	0.0032	1.7	0.39	0.00027	0.021	0.0040	<0.0005	<0.0005	<0.01	<0.00005	4.7	<0.0005	<0.0001
ABA251	R274019	CFD0464	10.0	11.0	Waste	Lower transition	Gneiss	FG	7.6	4.0	<0.05	<0.5	0.091	<0.005	<0.001	0.66	0.25	0.0033	0.092	0.0016	<0.0005	<0.0005	<0.01	<0.00005	0.15	<0.0005	<0.0001
ABA252	R274341	CFD0467	80.0	81.0	Waste	Lower transition	Gneiss	MxF	9.2	24	<0.05	<0.5	0.11	<0.005	0.0027	0.97	0.24	0.00078	0.013	0.0026	<0.0005	<0.0005	<0.01	<0.00005	4.6	<0.0005	<0.0001
ABA253	R282397	CFD0474	95.0	96.0	Waste	Lower transition	Gneiss	MxF	7.4	3.8	<0.05	<0.5	0.054	0.0074	0.0067	<0.5	0.016	0.00063	0.0080	0.0033	<0.0005	<0.0005	<0.01	<0.00005	0.45	<0.0005	<0.0001
ABA254	R270666	CFD0404	10.0	11.0	Waste	Lower transition	Gneiss	MxF	7.5	3.3	<0.05	<0.5	0.11	<0.005	0.0037	1.1	1.2	0.0064	0.033	0.019	<0.0005	<0.0005	<0.01	<0.00005	0.77	0.00055	0.00039
ABA255	R271756	CFD0424	62.0	63.0	Waste	Lower transition	Gneiss	MxM	9.4	28	<0.05	<0.5	0.17	0.0054	0.011	1.2	0.34	0.00013	0.0071	<0.001	<0.0005	<0.0005	<0.01	<0.00005	5.8	<0.0005	<0.0001
ABA256	R271112	CFD0415	8.0	9.0	Waste	Lower transition	Gneiss	MxM	19	16	16	16	16	16	16	19	19	19	19	19	19	19	19	19	19	19	19
ABA257	R273315	CFD0447	115.0	116.0	Waste	Lower transition	Gneiss	FG	9.8	38	<0.05	<0.5	0.30	0.0090	0.024	15	4.1	0.0064	0.092	0.30	0.00050	0.00050	0.047	0.000050	25	0.011	0.00086
ABA258	R276507	CFD0409	12.0	13.0	Waste	Lower transition	Gneiss	MxM	9.4	33	<0.05	<0.5	0.20	0.0080	0.011	7.6	2.1	0.0038	0.046	0.24	<0.0005	<0.0005	<0.01	<0.00005	7.2	0.00051	0.00036
ABA259	R280545	CFD0499	10.0	11.0	Waste	Lower transition	Gneiss	MxM	9.3	28	<0.05	<0.5	0.20	0.0060	0.0090	2.2	0.65	0.0023	0.031	0.025	<0.0005	<0.0005	<0.01	<0.00005	6.5	<0.0005	0.00010
ABA260	R280565	CFD0499	28.0	29.0	Waste	Lower transition	Gneiss	MxM	9.2	25	<0.05	<0.5	0.10	<0.005	0.0060	1.1	0.34	0.00082	0.017	0.0079	<0.0005	<0.0005	<0.01	<0.00005	4.7	<0.0005	<0.0001
ABA261	R274115	CFD0464	95.0	96.0	Waste	Lower transition	Gneiss	MxF	8.4	6.8	<0.05	<0.5	0.10	<0.005	0.0040	<0.5	0.22	0.00038	0.013	0.0038	<0.0005	<0.0005	<0.01	<0.00005	1.5	<0.0005	<0.0001
ABA262	R274262	CFD0467	10.0	11.0	Waste	Lower transition	Gneiss	MxF	7.6	3.9	<0.05	<0.5	0.10	<0.005	0.0020	<0.5	0.14	0.00016	0.0070	0.0024	<0.0005	<0.0005	<0.01	<0.00005	0.42	<0.0005	<0.0001
ABA263	R282302	CFD0474	10.0	11.0	Waste	Lower transition	Gneiss	FG	7.4	3.3	<0.05	<0.5	0.10	<0.005	<0.001	<0.5	0.016	0.00011	0.0045	<0.001	0.00025	0.00025	0.010	0.000025	0.15	0.00025	0.000050
ABA264	R271435	CFD0420	9.0	10.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA265	R271165	CFD0415	55.0	56.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA267	R273694	CFD0456	97.0	98.0	Waste	Lower transition	Gneiss	MxM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA269	R279507	CFD0468	60.0	61.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA270	R272186	CFD0433	10.0	11.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA271	R283079	CFD0484	87.0	88.0	Waste	Lower transition	Gneiss	FG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA272	Q034772	CFD0473	86.0	87.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA273	R282171	CFD0439	30.0	31.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA274	R277372	CFD0423	10.0	11.0	Waste	Lower transition	Gneiss	MxM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix C.1-2: Shake Flask Extraction Results for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	pH	T-Alkalnity	Br	Cl	F	NO_3-N	NO_2-N	SO_4	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
										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
ABA275	R283492	CFD0496	10.0	11.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA276	R273866	CFD0460	63.0	64.0	Waste	Lower transition	Gneiss	FG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA277	R273898	CFD0460	91.0	92.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA278	Q035773	CFD0491	9.0	10.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA279	Q035789	CFD0491	60.0	61.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA280	R271699	CFD0424	12.0	13.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA282	R282102	CFD0437	70.0	71.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA283	R273302	CFD0447	59.0	60.0	Waste	Lower transition	Gneiss	FG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA284	R273593	CFD0456	7.0	8.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA338	R270835	CFD0406	32.0	33.0	Waste	Lower Transition	Gneiss	MxF	9.2	33	<0.05	<0.5	0.16	0.0093	0.010	4.1	0.19	0.00020	0.0066	0.27	<0.0005	<0.0005	<0.01	<0.00005	7.1	<0.0005	<0.0001
ABA340	R270686	CFD0404	27.0	28.0	Waste	Lower Transition	Gneiss	MxM	9.2	28	<0.05	<0.5	0.12	0.0073	0.0089	7.3	0.20	0.0037	0.029	0.30	<0.0005	<0.0005	<0.01	<0.00005	7.7	<0.0005	<0.0001
ABA342	R551085	CFD0563	10.0	11.0	Waste	Lower Transition	Gneiss	MxM	9.4	26	<0.05	<0.5	0.13	<0.005	0.0041	<0.5	0.65	0.00017	0.019	0.0075	<0.0005	<0.0005	<0.01	<0.00005	5.6	<0.0005	<0.0001
ABA344	R551131	CFD0563	50.0	51.0	Waste	Lower Transition	Gneiss	MxM	9.3	32	<0.05	<0.5	0.21	<0.005	0.0062	2.7	0.26	0.00011	0.0045	0.0048	<0.0005	<0.0005	<0.01	<0.00005	6.5	<0.0005	<0.0001
ABA348	R304313	CFD0541	56.0	57.0	Waste	Lower Transition	Gneiss	MxM	8.1	7.5	<0.05	<0.5	0.35	0.0081	0.0060	<0.5	2.0	0.0021	0.028	0.054	<0.0005	<0.0005	<0.01	<0.00005	0.85	0.011	0.00086
ABA361	R623933	CFD0555	102.0	103.0	Waste	Lower Transition	Gneiss	MxF	9.3	27	<0.05	<0.5	0.098	<0.005	0.0045	8.8	0.17	0.00049	0.014	0.23	<0.0005	<0.0005	<0.01	<0.00005	6.6	<0.0005	<0.0001
ABA362	R507027	CFD0555	185.0	186.0	Waste	Lower Transition	Gneiss	FG	9.4	38	<0.05	<0.5	0.21	<0.005	0.0084	1.6	0.42	0.00082	0.056	0.0080	<0.0005	<0.0005	<0.01	<0.00005	6.6	<0.0005	<0.0001
ABA363	R545397	CFD0520	20.0	21.0	Waste	Lower Transition	Gneiss	FG	7.7	4.5	<0.05	<0.5	0.098	<0.005	0.024	<0.5	0.027	0.0017	0.017	0.0036	<0.0005	<0.0005	<0.01	<0.00005	0.28	<0.0005	<0.0001
ABA369	R545644	CFD0526	81.0	82.0	Waste	Lower Transition	Gneiss	MxF	9.2	26	<0.05	<0.5	0.15	<0.005	0.011	0.72	0.24	0.00056	0.033	0.0079	<0.0005	<0.0005	<0.01	<0.00005	5.2	<0.0005	<0.0001
ABA395	R545811	CFD0529	58.0	59.0	Waste	Lower Transition	Gneiss	FG	9.3	20	<0.05	<0.5	0.095	<0.005	<0.001	<0.5	0.42	0.00084	0.043	0.0067	<0.0005	<0.0005	<0.01	<0.00005	3.2	<0.0005	<0.0001
ABA399	R543714	CFD0549	30.0	31.0	Waste	Lower Transition	Gneiss	MxF	9.3	22	<0.05	<0.5	0.065	<0.005	0.0032	1.7	0.39	0.00027	0.021	0.0040	<0.0005	<0.0005	<0.01	<0.00005	4.7	<0.0005	<0.0001
ABA400	R543741	CFD0549	53.0	54.0	Waste	Lower Transition	Gneiss	MxF	7.6	4.0	<0.05	<0.5	0.091	<0.005	<0.001	0.66	0.25	0.0033	0.092	0.0016	<0.0005	<0.0005	<0.01	<0.00005	0.15	<0.0005	<0.0001
ABA402	R544003	CFD0553	80.0	81.0	Waste	Lower Transition	Gneiss	MxF	9.2	24	<0.05	<0.5	0.11	<0.005	0.0027	0.97	0.24	0.00078	0.013	0.0026	<0.0005	<0.0005	<0.01	<0.00005	4.6	<0.0005	<0.0001
ABA405	R554003	CFD0501	10.0	11.0	Waste	Lower Transition	Gneiss	MxF	7.4	3.8	<0.05	<0.5	0.054	0.0074	0.0067	<0.5	0.016	0.00063	0.0080	0.0033	<0.0005	<0.0005	<0.01	<0.00005	0.45	<0.0005	<0.0001
ABA410	R544159	CFD0502	10.0	11.0	Waste	Lower Transition	Gneiss	MxF	7.5	3.3	<0.05	<0.5	0.11	<0.005	0.0037	1.1	1.2	0.0064	0.033	0.019	<0.0005	<0.0005	<0.01	<0.00005	0.77	0.00055	0.00039
ABA412	R544228	CFD0502	70.0	71.0	Waste	Lower Transition	Gneiss	MxF	9.4	28	<0.05	<0.5	0.17	0.0054	0.011	1.2	0.34	0.00013	0.0071	<0.001	<0.0005	<0.0005	<0.01	<0.00005	5.8	<0.0005	<0.0001
Statistical Summary						**Lower Transition**	**Gneiss**	**n**	19	16	16	16	16	16	16	19	19	19	19	19	19	19	19	19	19	19	19
								Max	9.8	38	<0.05	<0.5	0.30	0.0090	0.024	15	4.1	0.0064	0.092	0.30	0.00050	0.00050	0.047	0.000050	25	0.011	0.00086
								90th PCTL	9.4	33	<0.05	<0.5	0.20	0.0080	0.011	7.6	2.1	0.0038	0.046	0.24	<0.0005	<0.0005	<0.01	<0.00005	7.2	0.00051	0.00036
								75th PCTL	9.3	28	<0.05	<0.5	0.20	0.0060	0.0090	2.2	0.65	0.0023	0.031	0.025	<0.0005	<0.0005	<0.01	<0.00005	6.5	<0.0005	0.00010
								Median	9.2	25	<0.05	<0.5	0.10	<0.005	0.0060	1.1	0.34	0.00082	0.017	0.0079	<0.0005	<0.0005	<0.01	<0.00005	4.7	<0.0005	<0.0001
								25th PCTL	8.4	6.8	<0.05	<0.5	0.10	<0.005	0.0040	<0.5	0.22	0.00038	0.013	0.0038	<0.0005	<0.0005	<0.01	<0.00005	1.5	<0.0005	<0.0001
								10th PCTL	7.6	3.9	<0.05	<0.5	0.10	<0.005	0.0020	<0.5	0.14	0.00016	0.0070	0.0024	<0.0005	<0.0005	<0.01	<0.00005	0.42	<0.0005	<0.0001
								Min	7.4	3.3	<0.05	<0.5	0.10	<0.005	<0.001	<0.5	0.016	0.00011	0.0045	<0.001	0.00025	0.00025	0.010	0.000025	0.15	0.00025	0.000050
Fresh Facies for Gneiss Waste Rock																											
ABA065	KAM128393	CFD0326	25.0	26.0	Waste	Fresh	Gneiss	MxM	8.1	-	-	-	-	-	-	0.92	5.5	0.028	0.14	0.13	<0.0005	<0.0005	0.011	<0.00005	1.9	0.0046	0.0015
ABA097	KAM137325	CFR0468	88.4	89.9	Waste	Fresh	Gneiss	MxM	9.1	-	-	-	-	-	-	8.8	0.43	0.00093	0.024	0.029	<0.0005	<0.0005	<0.01	<0.00005	7.0	<0.0005	<0.0001
ABA139	KAM152151	CFR0586	61.0	62.5	Waste	Fresh	Gneiss	MxF	9.1	-	-	-	-	-	-	<0.5	3.2	0.0021	0.060	0.042	<0.0005	<0.0005	<0.01	<0.00005	2.2	0.0014	0.00073
ABA143	KAM152536	CFR0589	128.0	129.5	Waste	Fresh	Gneiss	FG	9.0	-	-	-	-	-	-	10	0.24	0.0087	0.064	0.095	<0.0005	<0.0005	0.023	<0.00005	9.5	<0.0005	<0.0001
ABA148	KAM153051	CFR0594	109.7	111.3	Waste	Fresh	Gneiss	MxF	8.9	-	-	-	-	-	-	7.3	0.15	0.015	0.16	0.021	<0.0005	<0.0005	0.017	<0.00005	11	<0.0005	<0.0001
ABA347	R304284	CFD0541	30.0	31.0	Waste	Fresh	Gneiss	FG	8.7	11	<0.05	<0.5	0.12	<0.005	0.0064	0.95	0.99	0.0012	0.016	0.0084	<0.0005	<0.0005	<0.01	<0.00005	1.1	<0.0005	0.0016
ABA350	R304041	CFD0539	10.0	11.0	Waste	Fresh	Gneiss	FG	8.8	9.8	<0.05	1.1	0.16	<0.005	<0.001	0.56	1.0	0.00053	0.012	0.013	<0.0005	<0.0005	<0.01	<0.00005	0.30	<0.0005	<0.0001
ABA354	R304119	CFD0525	45.0	46.0	Waste	Fresh	Gneiss	MxM	9.3	33	<0.05	<0.5	0.33	<0.005	0.0074	1.8	0.43	0.00021	0.0063	0.0014	<0.0005	<0.0005	<0.01	<0.00005	5.2	<0.0005	<0.0001
ABA356	R623617	CFD0548	10.0	11.0	Waste	Fresh	Gneiss	MxF	8.5	8.5	<0.05	<0.5	0.17	<0.005	0.0040	<0.5	0.57	0.00066	0.014	0.012	<0.0005	<0.0005	<0.01	<0.00005	0.70	<0.0005	0.00029
ABA358	R623742	CFD0548	120.0	121.0	Waste	Fresh	Gneiss	MxF	9.4	27	<0.05	<0.5	0.081	<0.005	0.0097	6.8	0.22	0.00037	0.0063	0.33	<0.0005	<0.0005	<0.01	<0.00005	6.0	<0.0005	<0.0001
ABA365	R545443	CFD0520	60.0	61.0	Waste	Fresh	Gneiss	FG	8.9	12	<0.05	0.51	0.20	<0.005	0.0025	1.1	0.46	0.00016	0.0041	0.012	<0.0005	<0.0005	<0.01	<0.00005	1.2	<0.0005	0.00011
ABA396	R545818	CFD0529	65.0	66.0	Waste	Fresh	Gneiss	MxF	9.3	16	<0.05	0.57	0.17	<0.005	0.0043	0.55	0.54	0.00036	0.013	0.011	<0.0005	<0.0005	<0.01	<0.00005	1.7	<0.0005	<0.0001
ABA398	R543692	CFD0549	10.0	11.0	Waste	Fresh	Gneiss	FG	8.9	11	<0.05	<0.5	0.12	<0.005	<0.001	0.62	0.50	0.00029	0.019	0.0051	<0.0005	<0.0005	<0.01	<0.00005	0.76	<0.0005	<0.0001
ABA401	R543957	CFD0553	40.0	41.0	Waste	Fresh	Gneiss	MxF	9.1	41	<0.05	<0.5	0.16	<0.005	0.0010	3.5	0.16	<0.0001	0.0053	0.0062	<0.0005	<0.0005	<0.01	<0.00005	6.3	<0.0005	<0.0001
ABA413	R276141	CFD0393	127.0	128.0	Waste	Fresh	Gneiss	MxM	9.1	36	<0.05	<0.5	0.28	0.0059	0.018	1.3	0.062	0.00012	0.0022	0.0013	<0.0005	<0.0005	<0.01	<0.00005	6.3	<0.0005	<0.0001
ABA414	R276153	CFD0393	170.0	171.0	Waste	Fresh	Gneiss	MxM	9.2	31	<0.05	1.6	0.17	0.0060	0.011	2.9	0.071	0.00052	0.0024	0.018	<0.0005	<0.0005	<0.01	<0.00005	6.8	<0.0005	<0.0001
Statistical Summary						**Fresh**	**Gneiss**	**n**	16	11	11	11	11	11	11	16	16	16	16	16	16	16	16	16	16	16	16
								Max	9.4	41	<0.05	1.6	0.33	0.0060	0.018	10	5.5	0.028	0.16	0.33	<0.0005	<0.0005	0.023	<0.00005	11	0.0046	0.0016
								90th PCTL	9.3	36	<0.05	1.1	0.28	0.0059	0.011	8.0	2.1	0.012	0.10	0.11	<0.0005	<0.0005	0.014	<0.00005	8.2	0.00093	0.0011
								75th PCTL	9.1	32	<0.05	0.54	0.19	<0.005	0.0086	4.3	0.68	0.0014	0.033	0.032	<0.0005	<0.0005	<0.01	<0.00005	6.5	<0.0005	0.00016
								Median	9.1	16	<0.05	<0.5	0.17	<0.005	0.0043	1.2	0.45	0.00053	0.014	0.012	<0.0005	<0.0005	<0.01	<0.00005	3.7	<0.0005	<0.0001
								25th PCTL	8.9	11	<0.05	<0.5	0.14	<0.005	0.0018	0.61	0.21	0.00027	0.0061	0.0079	<0.0005	<0.0005	<0.01	<0.00005	1.2	<0.0005	<0.0001
								10th PCTL	8.6	9.8	<0.05	<0.5	0.12	<0.005	0.0010	0.53	0.11	0.00014	0.0033	0.0033	<0.0005	<0.0005	<0.01	<0.00005	0.73	<0.0005	<0.0001
								Min	8.1	8.5	<0.05	<0.5	0.081	<0.005	<0.001	<0.5	0.062	<0.0001	0.0022	0.0013	<0.0005	<0.0005	<0.01	<0.00005	0.30	<0.0005	<0.0001
Statistical Summary for Gneiss Waste Rock								**n**	51	30	30	30	30	30	30	51	51	51	51	51	51	51	51	51	51	51	51
								n < DL	0	0	30	26	0	20	4	10	0	1	0	1	45	44	35	45	0	35	30
								Max	9.8	41	<0.05	1.6	0.35	0.021	0.024	16	7.6	0.047	1.2	0.33	0.00050	0.00063	0.14	0.000050	28	0.011	0.0017
								90th PCTL	9.4	33	<0.05	0.50	0.22	0.0094	0.011	8.8	3.6	0.020	0.16	0.13	0.00050	0.00050	0.036	0.000050	12	0.0029	0.00086
								75th PCTL	9.3	28	<0.05	<0.5	0.17	0.0060	0.010	2.8	0.82	0.0051	0.062	0.045	<0.0005	<0.0005	0.015	<0.00005	6.7	0.00050	0.00031
								Median	8.9	21	<0.05	<0.5	0.14	0.0050	0.0061	1.1	0.42	0.0014	0.019	0.012	<0.0005	<0.0005	<0.01	<0.00005	4.7	<0.0005	<0.0001
								25th PCTL	8.2	7.8	<0.05	<0.5	0.098	<0.005	0.0028	0.55	0.18	0.00047	0.012	0.0052	<0.0005	<0.0005	<0.01	<0.00005	0.85	<0.0005	<0.0001
								10th PCTL	7.6	3.9	<0.05	<0.5	0.080	<0.005	0.0010	<0.5	0.044	0.00017	0.0063	0.0021	<0.0005	<0.0005	<0.01	<0.00005	0.52	<0.0005	<0.0001
								Min	7.2	3.3	<0.05	<0.5	0.054	<0.005	<0.001	<0.5	0.016	<0.0001	0.0022	<0.001	0.00025	0.00025	<0.01	0.000025	0.15	0.00025	0.000050

Appendix C.1-2: Shake Flask Extraction Results for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	pH	T-Alkalnity	Br	Cl	F	NO_3-N	NO_2-N	SO_4	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
										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
Oxide Facies for Schist Waste Rock																											
ABA005	KAM022322	CFD0110	95.0	96.0	Waste	Oxide	Schist	RQM	8.0	-	-	-	-	-	-	925	0.17	0.0092	0.048	0.040	0.00050	0.00050	0.16	0.000050	222	0.00050	0.00010
ABA026	KAM037656	CFD0096	59.0	60.0	Waste	Oxide	Schist	BtS	8.3	-	-	-	-	-	-	546	0.22	0.0023	0.0010	0.036	0.00050	0.00050	0.058	0.000050	120	0.00050	0.00010
ABA074	KAM146948	CFD0345	60.0	61.0	Waste	Oxide	Schist	BtS_carb	8.5	-	-	-	-	-	-	4.5	0.088	0.0012	<0.001	0.030	<0.0005	<0.0005	0.012	<0.00005	16	0.0044	<0.0001
ABA077	J957606	CFD0350	60.0	61.0	Waste	Oxide	Schist	BtS_carb	8.4	-	-	-	-	-	-	1.8	0.048	0.0041	0.0060	0.021	<0.0005	<0.0005	<0.01	<0.00005	20	0.0022	<0.0001
ABA125	KAM149844	CFR0566	10.7	12.2	Waste	Oxide	Schist	BtS	8.6	-	-	-	-	-	-	4.3	0.069	0.012	0.056	0.070	<0.0005	<0.0005	<0.01	<0.00005	15	0.00077	<0.0001
ABA130	KAM150823	CFR0574	10.7	12.2	Waste	Oxide	Schist	BtS	8.5	-	-	-	-	-	-	2.2	0.061	0.0027	0.0070	0.036	<0.0005	<0.0005	<0.01	<0.00005	20	0.0044	<0.0001
ABA131	KAM150859	CFR0574	61.0	62.5	Waste	Oxide	Schist	BtS	8.8	-	-	-	-	-	-	20	0.090	0.010	0.16	0.059	<0.0005	<0.0005	0.036	<0.00005	12	<0.0005	<0.0001
Statistical Summary						**Oxide**	**Schist**	**n**	7	-	-	-	-	-	-	7	7	7	7	7	7	7	7	7	7	7	7
								Max	8.8	-	-	-	-	-	-	925	0.22	0.012	0.16	0.070	0.00050	0.00050	0.16	0.000050	222	0.0044	0.00010
								90th PCTL	8.7	-	-	-	-	-	-	698	0.19	0.011	0.098	0.063	0.00050	0.00050	0.10	0.000050	161	0.0044	0.00010
								75th PCTL	8.6	-	-	-	-	-	-	283	0.13	0.0098	0.052	0.049	0.00050	0.00050	0.047	0.000050	70	0.0033	0.00010
								Median	8.5	-	-	-	-	-	-	4.5	0.088	0.0041	0.0070	0.036	<0.0005	<0.0005	0.012	<0.00005	20	0.00077	<0.0001
								25th PCTL	8.3	-	-	-	-	-	-	3.2	0.065	0.0025	0.0035	0.033	<0.0005	<0.0005	<0.01	<0.00005	16	0.00050	<0.0001
								10th PCTL	8.2	-	-	-	-	-	-	2.0	0.056	0.0018	<0.001	0.027	<0.0005	<0.0005	<0.01	<0.00005	14	0.00050	<0.0001
								Min	8.0	-	-	-	-	-	-	1.8	0.048	0.0012	<0.001	0.021	<0.0005	<0.0005	<0.01	<0.00005	12	<0.0005	<0.0001
Upper Transition Facies for Schist Waste Rock																											
ABA027	KAM037928	CFD0099	30	31	Waste	Upper transition	Schist	BtS_carb	8.3	-	-	-	-	-	-	8.4	0.15	0.0028	0.00050	0.20	0.00025	0.00025	0.047	0.000025	22	0.00025	0.000050
ABA332	Q033589	CFD0407	32	33	Waste	Upper Transition	schist	BtS	8.8	46	<0.05	<0.5	0.51	0.0062	0.029	29	0.092	0.00011	<0.001	0.022	<0.0005	<0.0005	<0.01	<0.00005	10	0.00061	<0.0001
Lower Transition Facies for Schist Waste Rock																											
ABA031	KAM039252	CFD0116	75	76	Waste	Lower transition	Schist	RQM	8.6	-	-	-	-	-	-	12	0.40	0.00053	0.00050	0.25	0.00025	0.00025	0.055	0.000025	19	0.00061	0.000050
ABA038	KAM047995	CFD0135	153	154	Waste	Lower transition	Schist	BtS	8.7	-	-	-	-	-	-	8.6	0.23	0.016	0.011	0.059	0.00025	0.00025	0.048	0.000025	11	0.00025	0.000050
ABA054	KAM081312	CFD0198	85	86	Waste	Lower transition	Schist	BtS	9.3	-	-	-	-	-	-	<0.5	7.3	0.022	0.36	0.070	0.00050	0.00050	0.025	0.000050	2.5	0.0046	0.00099
ABA333	R277487	CFD0426	43	44	Waste	Lower Transition	schist	BtS	7.8	4.8	<0.05	<0.5	0.29	0.011	0.0018	1.1	1.1	0.0022	0.029	0.019	<0.0005	<0.0005	<0.01	<0.00005	0.65	0.0022	0.00049
ABA335	R550437	CFD0518	25	26	Waste	Lower Transition	schist	BtS	8.3	20	<0.05	<0.5	0.17	<0.005	0.0043	5.0	0.29	0.0012	0.0084	0.032	<0.0005	<0.0005	<0.01	<0.00005	7.0	0.0012	0.00022
ABA336	R550471	CFD0518	55	56	Waste	Lower Transition	Schist	BtS_carb	8.5	32	<0.05	<0.5	0.26	<0.005	0.012	130	0.055	0.0022	0.0031	0.045	<0.0005	<0.0005	<0.01	<0.00005	44	<0.0005	<0.0001
ABA337	R550494	CFD0518	75	75	Waste	Lower Transition	schist	BtS	9.0	33	<0.05	<0.5	0.21	0.0084	0.013	12	0.17	0.00076	0.0054	0.20	<0.0005	<0.0005	<0.01	<0.00005	11	<0.0005	<0.0001
ABA345	R551151	CFD0563	68	69	Waste	Lower Transition	schist	BtS	9.0	35	<0.05	<0.5	0.41	0.0051	0.0086	11	0.13	0.0014	0.015	0.27	<0.0005	<0.0005	<0.01	<0.00005	11	0.00079	<0.0001
Statistical Summary						**Lower Transition**	**Schist**	**n**	8	5	5	5	5	5	5	8	8	8	8	8	8	8	8	8	8	8	8
								Max	9.3	35	<0.05	<0.5	0.41	0.011	0.013	130	7.3	0.022	0.36	0.27	<0.0005	<0.0005	0.055	<0.00005	44	0.0046	0.00099
								90th PCTL	9.1	34	<0.05	<0.5	0.36	0.0098	0.012	48	3.0	0.018	0.13	0.26	<0.0005	<0.0005	0.050	<0.00005	27	0.0029	0.00064
								75th PCTL	9.0	33	<0.05	<0.5	0.29	0.0084	0.012	12	0.57	0.0057	0.019	0.22	<0.0005	<0.0005	0.031	<0.00005	13	0.0014	0.00029
								Median	8.7	32	<0.05	<0.5	0.26	0.0051	0.0086	9.9	0.26	0.0018	0.0098	0.065	<0.0005	<0.0005	<0.01	<0.00005	11	0.00070	<0.0001
								25th PCTL	8.4	20	<0.05	<0.5	0.21	<0.005	0.0043	4.0	0.16	0.0011	0.0048	0.041	0.00044	0.00044	<0.01	0.000044	5.9	<0.0005	<0.0001
								10th PCTL	8.2	11	<0.05	<0.5	0.19	<0.005	0.0028	0.92	0.11	0.00069	0.0023	0.028	0.00025	0.00025	<0.01	0.000025	1.9	0.00043	0.000050
								Min	7.8	4.8	<0.05	<0.5	0.17	<0.005	0.0018	<0.5	0.055	0.00053	0.00050	0.019	0.00025	0.00025	<0.01	0.000025	0.65	0.00025	0.000050
Fresh Facies for Schist Waste Rock																											
ABA132	KAM150898	CFR0574	114.3	115.8	Waste	Fresh	Schist	BtS	8.6	-	-	-	-	-	-	97	0.072	0.011	0.0060	0.045	<0.0005	<0.0005	<0.01	<0.00005	27	<0.0005	<0.0001
ABA330	R276299	CFD0401	74.0	75.0	Waste	Fresh	schist	BtS	8.9	25	<0.05	<0.5	0.090	0.0065	0.013	21	0.14	0.00017	0.0049	0.0020	<0.0005	<0.0005	<0.01	<0.00005	12	<0.0005	0.00013
ABA331	R276331	CFD0401	141.0	142.0	Waste	Fresh	schist	BtS	9.0	43	<0.05	<0.5	0.35	0.0056	0.016	0.93	0.090	0.00034	0.0078	0.0027	<0.0005	<0.0005	<0.01	<0.00005	7.5	<0.0005	<0.0001
ABA415	R277001	CFD0398	49.0	50.0	Waste	Fresh	schist	BtS	9.3	24	<0.05	<0.5	0.11	0.0087	0.0082	0.52	0.22	0.00038	0.0045	0.0018	<0.0005	<0.0005	<0.01	<0.00005	6.5	0.00087	0.00014
ABA416	R277017	CFD0398	64.0	65.0	Waste	Fresh	schist	BtS	9.3	27	<0.05	<0.5	0.14	0.0075	0.0069	0.54	0.16	0.00026	0.0066	0.0016	<0.0005	<0.0005	<0.01	<0.00005	5.8	<0.0005	<0.0001
ABA417	R277021	CFD0398	124.0	125.0	Waste	Fresh	schist	BtS	9.3	31	<0.05	<0.5	0.16	<0.005	0.0087	0.53	0.12	0.00026	0.0028	<0.001	<0.0005	<0.0005	<0.01	<0.00005	6.1	<0.0005	<0.0001
ABA418	R277041	CFD0398	160.0	161.0	Waste	Fresh	schist	BtS	9.4	29	<0.05	<0.5	0.21	0.0077	0.0077	2.3	0.17	0.00020	<0.001	0.0036	<0.0005	<0.0005	<0.01	<0.00005	5.2	<0.0005	<0.0001
Statistical Summary						**Fresh**	**Schist**	**n**	7	6	6	6	6	6	6	7	7	7	7	7	7	7	7	7	7	7	7
								Max	9.4	43	<0.05	<0.5	0.35	0.0087	0.016	97	0.20	0.00	0.00	0.00	<0.0005	<0.0005	<0.01	<0.00005	27	0.00087	0.00014
								90th PCTL	9.3	37	<0.05	<0.5	0.28	0.0082	0.014	51	0.20	0.00	0.00	0.00	<0.0005	<0.0005	<0.01	<0.00005	18	0.00065	0.00013
								75th PCTL	9.3	31	<0.05	<0.5	0.20	0.0077	0.012	11	0.20	0.00	0.00	0.00	<0.0005	<0.0005	<0.01	<0.00005	9.7	<0.0005	0.00012
								Median	9.3	28	<0.05	<0.5	0.15	0.0070	0.0085	0.90	0.10	0.00	0.00	0.00	<0.0005	<0.0005	<0.01	<0.00005	6.5	<0.0005	<0.0001
								25th PCTL	8.9	25	<0.05	<0.5	0.11	0.0058	0.0078	0.50	0.10	0.00	0.00	0.00	<0.0005	<0.0005	<0.01	<0.00005	6.0	<0.0005	<0.0001
								10th PCTL	8.8	25	<0.05	<0.5	0.098	0.0053	0.0073	0.50	0.10	0.00	0.00	0.00	<0.0005	<0.0005	<0.01	<0.00005	5.6	<0.0005	<0.0001
								Min	8.6	24	<0.05	<0.5	0.090	<0.005	0.0069	0.50	0.10	0.00	<0.001	<0.001	<0.0005	<0.0005	<0.01	<0.00005	5.2	<0.0005	<0.0001
Statistical Summary for Schist Waste Rock								**n**	24	12	12	12	12	12	12	24	24	24	24	24	24	24	24	24	24	24	24
								n < DL	0	0	12	12	0	3	0	1	0	0	3	1	18	18	16	18	0	9	14
								Max	9.4	46	<0.05	<0.5	0.51	0.011	0.029	925	7.3	0.022	0.36	0.27	0.00050	0.00050	0.16	0.000050	222	0.0046	0.00099
								90th PCTL	9.3	42	<0.05	<0.5	0.41	0.0087	0.015	120	0.36	0.012	0.054	0.20	0.00050	0.00050	0.053	0.000050	39	0.0037	0.00020
								75th PCTL	9.0	34	<0.05	<0.5	0.30	0.0079	0.013	20	0.22	0.0053	0.012	0.062	<0.0005	<0.0005	0.028	<0.00005	20	0.00094	0.00010
								Median	8.7	30	<0.05	<0.5	0.21	0.0064	0.0087	6.7	0.14	0.0018	0.0060	0.036	<0.0005	<0.0005	<0.01	<0.00005	11	0.00050	<0.0001
								25th PCTL	8.4	25	<0.05	<0.5	0.16	0.0051	0.0075	1.6	0.089	0.00037	0.0024	0.015	<0.0005	<0.0005	<0.01	<0.00005	6.9	<0.0005	<0.0001
								10th PCTL	8.3	20	<0.05	<0.5	0.11	<0.005	0.0046	0.53	0.063	0.00022	<0.001	0.0019	0.00033	0.00033	0.010	0.000033	5.4	<0.0005	0.000065
								Min	7.8	4.8	<0.05	<0.5	0.090	<0.005	0.0018	<0.5	0.048	0.00011	0.00050	<0.001	0.00025	0.00025	0.010	0.000025	0.65	0.00025	0.000050

Appendix C.1-2: Shake Flask Extraction Results for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	pH	T-Alkalnity	Br	Cl	F	NO_3-N	NO_2-N	SO_4	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
										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
Oxide Facies for Granite Waste Rock																											
ABA157	R305807	CFD0382	76	77	Waste	Oxide	Granite	GG	6.8	-	-	-	-	-	-	*<0.5*	0.11	0.029	0.25	*<0.001*	*<0.0005*	*<0.0005*	0.052	*<0.00005*	0.17	*<0.0005*	*<0.0001*
ABA158	R305808	CFD0382	79	80	Waste	Oxide	Granite	GG	6.6	-	-	-	-	-	-	*<0.5*	*<0.005*	0.017	0.096	*<0.001*	*<0.0005*	*<0.0005*	0.026	*<0.00005*	0.24	*<0.0005*	*<0.0001*
ABA174	R305826	CFD0403	7.0	8.0	Waste	Oxide	Granite	GG	6.7	-	-	-	-	-	-	1.7	5.2	0.018	3.5	0.013	*<0.0005*	*<0.0005*	0.10	*<0.00005*	0.94	*<0.0005*	0.0024
Upper Transition Facies for Granite Waste Rock																											
ABA013	KAM025898	CFD0150	81	82	Waste	Upper transition	Granite	GG	7.5	-	-	-	-	-	-	4.0	9.7	0.011	0.023	0.047	0.00050	0.00050	0.048	0.000050	0.43	0.00050	0.00027
ABA151	R305801	CFD0381	13	14	Waste	Upper transition	Granite	GG	8.8	-	-	-	-	-	-	*<0.5*	4.9	0.00034	0.020	0.054	*<0.0005*	*<0.0005*	0.041	*<0.00005*	1.5	0.00066	0.00082
ABA152	R305802	CFD0381	35	36	Waste	Upper transition	Granite	GG	8.4	-	-	-	-	-	-	4.6	15	0.0052	1.5	0.069	0.00070	*<0.0005*	0.038	*<0.00005*	2.9	0.00065	0.0012
ABA167	R305818	CFD0394	30	31	Waste	Upper transition	Granite	GG	6.8	-	-	-	-	-	-	5.2	3.3	0.035	0.46	0.029	*<0.0005*	*<0.0005*	0.052	*<0.00005*	0.52	*<0.0005*	*<0.0001*
ABA169	R305821	CFD0399	20	21	Waste	Upper transition	Granite	GG	7.4	-	-	-	-	-	-	16	4.2	0.0026	0.059	0.034	*<0.0005*	*<0.0005*	0.036	*<0.00005*	1.6	*<0.0005*	0.00092
ABA172	R305824	CFD0396	29	30	Waste	Upper transition	Granite	GG	6.5	-	-	-	-	-	-	*<0.5*	*<0.005*	0.010	0.018	*<0.001*	*<0.0005*	*<0.0005*	0.013	*<0.00005*	0.31	*<0.0005*	*<0.0001*
ABA178	R305831	CFD0400	11	12	Waste	Upper transition	Granite	GG	7.6	-	-	-	-	-	-	1.3	5.0	0.0055	0.76	0.048	0.0012	*<0.0005*	0.018	0.000050	1.2	*<0.0005*	0.0017
Statistical Summary						**Upper Transition**	**Granite**	**n**	7	-	-	-	-	-	-	7	7	7	7	7	7	7	7	7	7	7	7
								Max	8.8	-	-	-	-	-	-	16	15	0.035	1.5	0.069	0.0012	0.00050	0.052	0.000050	2.9	0.00066	0.0017
								90th PCTL	8.5	-	-	-	-	-	-	9.4	12	0.021	1.1	0.060	0.00090	0.00050	0.050	0.000050	2.1	0.00065	0.0014
								75th PCTL	8.0	-	-	-	-	-	-	4.9	7.3	0.011	0.61	0.051	0.00060	*<0.0005*	0.045	*<0.00005*	1.6	0.00058	0.0010
								Median	7.5	-	-	-	-	-	-	4.0	4.9	0.0055	0.059	0.047	*<0.0005*	*<0.0005*	0.038	*<0.00005*	1.2	*<0.0005*	0.00082
								25th PCTL	7.1	-	-	-	-	-	-	0.92	3.7	0.0039	0.021	0.031	*<0.0005*	*<0.0005*	0.027	*<0.00005*	0.48	*<0.0005*	0.00019
								10th PCTL	6.7	-	-	-	-	-	-	*<0.5*	2.0	0.0017	0.019	0.018	*<0.0005*	*<0.0005*	0.016	*<0.00005*	0.38	*<0.0005*	*<0.0001*
								Min	6.5	-	-	-	-	-	-	*<0.5*	*<0.005*	0.00034	0.018	*<0.001*	*<0.0005*	*<0.0005*	0.013	*<0.00005*	0.31	*<0.0005*	*<0.0001*
Lower Transition Facies for Granite Waste Rock																											
ABA154	R305804	CFD0382	10	11	Waste	Lower transition	Granite	GG	8.5	-	-	-	-	-	-	*<0.5*	4.5	0.0014	0.038	0.047	*<0.0005*	*<0.0005*	0.075	*<0.00005*	1.4	0.00056	0.0013
ABA155	R305805	CFD0382	50	51	Waste	Lower transition	Granite	GG	7.6	-	-	-	-	-	-	1.2	5.1	0.042	0.36	0.053	*<0.0005*	*<0.0005*	0.016	*<0.00005*	1.6	*<0.0005*	0.0045
ABA159	R305809	CFD0383	10	11	Waste	Lower transition	Granite	GG	8.8	-	-	-	-	-	-	0.55	5.2	0.00058	0.035	0.059	*<0.0005*	*<0.0005*	0.026	*<0.00005*	1.2	0.00071	0.00099
ABA160	R305811	CFD0383	48	49	Waste	Lower transition	Granite	GG	8.8	-	-	-	-	-	-	0.70	4.3	0.0017	0.018	0.050	*<0.0005*	*<0.0005*	0.031	*<0.00005*	1.6	0.00062	0.0012
ABA164	R305815	CFD0389	10	11	Waste	Lower transition	Granite	GG	8.9	-	-	-	-	-	-	*<0.5*	5.6	0.00093	0.13	0.065	*<0.0005*	*<0.0005*	0.030	*<0.00005*	1.1	0.0011	0.0022
ABA166	R305817	CFD0389	45	46	Waste	Lower transition	Granite	GG	6.4	-	-	-	-	-	-	0.97	6.5	0.16	2.5	0.0087	0.00066	*<0.0005*	0.012	*<0.00005*	0.98	*<0.0005*	0.0014
Statistical Summary						**Lower Transition**	**Granite**	**n**	6	-	-	-	-	-	-	6	6	6	6	6	6	6	6	6	6	6	6
								Max	8.9	-	-	-	-	-	-	1.2	6.5	0.16	2.5	0.065	0.00066	*<0.0005*	0.075	*<0.00005*	1.6	0.0011	0.0045
								90th PCTL	8.9	-	-	-	-	-	-	1.1	6.0	0.10	1.4	0.062	0.00058	*<0.0005*	0.053	*<0.00005*	1.6	0.00088	0.0034
								75th PCTL	8.8	-	-	-	-	-	-	0.90	5.5	0.032	0.30	0.058	*<0.0005*	*<0.0005*	0.031	*<0.00005*	1.6	0.00069	0.0020
								Median	8.6	-	-	-	-	-	-	0.63	5.1	0.0015	0.082	0.052	*<0.0005*	*<0.0005*	0.028	*<0.00005*	1.3	0.00059	0.0013
								25th PCTL	7.8	-	-	-	-	-	-	0.51	4.6	0.0010	0.036	0.048	*<0.0005*	*<0.0005*	0.019	*<0.00005*	1.1	0.00052	0.0012
								10th PCTL	7.0	-	-	-	-	-	-	*<0.5*	4.4	0.00076	0.026	0.028	*<0.0005*	*<0.0005*	0.014	*<0.00005*	1.0	*<0.0005*	0.0011
								Min	6.4	-	-	-	-	-	-	*<0.5*	4.3	0.00058	0.018	0.0087	*<0.0005*	*<0.0005*	0.012	*<0.00005*	0.98	*<0.0005*	0.00099
Fresh Facies for Granite Waste Rock																											
ABA012	KAM025798	CFD0147	260	261	Waste	Fresh	Granite	GG	9.2	-	-	-	-	-	-	4.4	0.42	0.00062	0.030	0.022	0.00025	0.00025	0.060	0.000025	3.5	0.00025	0.000050
ABA162	R305813	CFD0385	10	11	Waste	Fresh	Granite	GG	8.9	-	-	-	-	-	-	*<0.5*	5.2	0.00093	0.083	0.056	*<0.0005*	*<0.0005*	0.19	*<0.00005*	1.1	0.00073	0.0010
ABA163	R305814	CFD0385	59	60	Waste	Fresh	Granite	GG	7.6	-	-	-	-	-	-	*<0.5*	3.9	0.043	0.28	0.018	*<0.0005*	*<0.0005*	0.027	*<0.00005*	0.61	*<0.0005*	0.0050
ABA165	R305816	CFD0389	30	31	Waste	Fresh	Granite	GG	8.8	-	-	-	-	-	-	*<0.5*	5.0	0.0039	0.42	0.045	*<0.0005*	*<0.0005*	0.038	*<0.00005*	1.0	0.00088	0.00098
ABA168	R305819	CFD0394	88	89	Waste	Fresh	Granite	GG	8.5	-	-	-	-	-	-	3.7	7.5	0.0069	0.039	0.058	*<0.0005*	*<0.0005*	0.031	*<0.00005*	1.1	0.00075	0.0011
ABA179	R305832	CFD0400	60	61	Waste	Fresh	Granite	GG	7.0	-	-	-	-	-	-	1.9	2.9	0.064	1.3	0.013	*<0.0005*	*<0.0005*	0.019	*<0.00005*	0.32	*<0.0005*	0.00019
ABA439	Q041678	CFD0385	8.0	9.0	Waste	Fresh	Granite	GG	8.0	6.1	*<0.05*	*<0.5*	0.21	0.0088	0.0025	*<0.5*	0.35	0.00039	0.0031	0.0028	*<0.0005*	*<0.0005*	*<0.01*	*<0.00005*	0.41	*<0.0005*	*<0.0001*
ABA441	Q032423	CFD0385	92	93	Waste	Fresh	Granite	GG	6.6	2.5	*<0.05*	*<0.5*	0.20	0.0078	0.0043	27	0.0074	0.00053	0.0051	0.016	*<0.0005*	*<0.0005*	*<0.01*	*<0.00005*	4.7	*<0.0005*	0.0071
Statistical Summary						**Fresh**	**Granite**	**n**	8	-	-	-	-	-	-	8	8	8	8	8	8	8	8	8	8	8	8
								Max	9.2	-	-	-	-	-	-	27	7.5	0.064	1.3	0.058	*<0.0005*	*<0.0005*	0.19	*<0.00005*	4.7	0.00088	0.0071
								90th PCTL	9.0	-	-	-	-	-	-	11	5.8	0.049	0.68	0.057	*<0.0005*	*<0.0005*	0.099	*<0.00005*	3.8	0.00079	0.0056
								75th PCTL	8.8	-	-	-	-	-	-	3.9	5.0	0.016	0.31	0.048	*<0.0005*	*<0.0005*	0.044	*<0.00005*	1.7	0.00074	0.0021
								Median	8.2	-	-	-	-	-	-	1.2	3.4	0.0024	0.061	0.020	*<0.0005*	*<0.0005*	0.029	*<0.00005*	1.1	*<0.0005*	0.00099
								25th PCTL	7.4	-	-	-	-	-	-	*<0.5*	0.40	0.00060	0.024	0.016	*<0.0005*	*<0.0005*	0.017	*<0.00005*	0.56	*<0.0005*	0.00017
								10th PCTL	6.9	-	-	-	-	-	-	*<0.5*	0.24	0.00049	0.0045	0.010	0.00043	0.00043	*<0.01*	0.000043	0.38	0.00043	0.000085
								Min	6.6	-	-	-	-	-	-	*<0.5*	0.0074	0.00039	0.0031	0.0028	0.00025	0.00025	*<0.01*	0.000025	0.32	0.00025	0.000050
Statistical Summary for Granite Waste Rock								**n**	24	2	2	2	2	2	2	24	24	24	24	24	24	24	24	24	24	24	24
								n < DL	0	0	2	2	0	0	0	10	2	0	0	3	19	22	2	21	0	13	5
								Max	9.2	6.1	*<0.05*	*<0.5*	0.21	0.0090	0.0040	27	15	0.16	3.5	0.069	0.0012	0.00050	0.19	0.000050	4.7	0.0011	0.0071
								90th PCTL	8.9	5.7	*<0.05*	*<0.5*	0.21	0.0090	0.0040	5.0	7.2	0.042	1.5	0.059	0.00061	*<0.0005*	0.071	0.000050	2.5	0.00074	0.0039
								75th PCTL	8.8	5.2	*<0.05*	*<0.5*	0.21	0.0090	0.0040	3.8	5.2	0.021	0.43	0.053	*<0.0005*	*<0.0005*	0.049	*<0.00005*	1.6	0.00065	0.0015
								Median	7.6	4.3	*<0.05*	*<0.5*	0.21	0.0080	0.0030	0.84	4.7	0.0054	0.089	0.039	*<0.0005*	*<0.0005*	0.031	*<0.00005*	1.1	*<0.0005*	0.00100
								25th PCTL	6.8	3.4	*<0.05*	*<0.5*	0.20	0.0080	0.0030	*<0.5*	2.3	0.00093	0.028	0.013	*<0.0005*	*<0.0005*	0.019	*<0.00005*	0.50	*<0.0005*	0.00017
								10th PCTL	6.6	2.9	*<0.05*	*<0.5*	0.20	0.0080	0.0030	*<0.5*	*<0.005*	0.00055	0.018	0.0020	*<0.0005*	*<0.0005*	0.012	*<0.00005*	0.31	*<0.0005*	*<0.0001*
								Min	6.4	2.5	*<0.05*	*<0.5*	0.20	0.0080	0.0030	*<0.5*	*<0.005*	0.00034	0.0031	*<0.001*	0.00025	0.00025	0.010	0.000025	0.17	0.00025	0.000050
Oxide and Fresh Facies for Other Lithologies Waste Rock																											
ABA018	KAM029393	CFD0176	99	100	Waste	Oxide	Dykes	FC	7.5	-	-	-	-	-	-	1.5	0.032	0.0079	0.0065	0.026	0.00025	0.00025	0.091	0.000025	3.5	0.00025	0.000050
ABA056	KAM084551	CFD0237	181	182	Waste	Oxide	HU	HU	8.2	-	-	-	-	-	-	-	0.12	0.0096	0.55	0.0097	0.00025	0.00025	0.21	0.000025	13	0.00059	0.000050
ABA352	R304282	CFD0539	90	91	Waste	Fresh	IV	IV	9.2	32	*<0.05*	*<0.5*	0.14	*<0.005*	0.011	0.62	0.31	0.00063	0.0034	0.0048	*<0.0005*	*<0.0005*	*<0.01*	*<0.00005*	7.0	*<0.0005*	*<0.0001*

Notes: all values in grey italics are below the analytical detection limit
n = number of samples included in statistical summary
n < DL = number of samples with values below the analytical detection limit

Appendix C.1-2: Shake Flask Extraction Results for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	U	V	Zn
									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	mg/L	mg/L	mg/L	mg/L
Oxide Facies for Gneiss Waste Rock																														
ABA043	KAM050495	CFD0152	149.0	150.0	Waste	Oxide	Gneiss	MxF	0.00050	0.015	0.000050	0.0072	3.4	0.0046	0.000025	0.0091	0.00025	0.15	54	0.00025	3.0	0.000025	1.5	0.066	0.00012	0.00025	0.0050	0.000070	0.00050	0.0050
ABA064	KAM125257	CFD0307	49.0	50.0	Waste	Oxide	Gneiss	MxF	0.0018	5.7	0.0068	<0.005	0.47	0.13	0.00014	0.0028	0.0013	<0.3	3.0	<0.0005	17	0.00010	2.6	0.0055	0.00013	<0.0005	0.085	0.0018	0.0090	<0.01
ABA080	KAM115505	CFR0360	25.9	27.4	Waste	Oxide	Gneiss	MxF	<0.001	<0.03	<0.0001	<0.005	0.38	0.096	<0.00005	0.0014	<0.0005	<0.3	7.1	<0.0005	7.7	<0.00005	0.69	0.011	0.00021	<0.0005	<0.01	0.00018	<0.001	<0.01
ABA096	KAM137284	CFR0468	32.0	33.5	Waste	Oxide	Gneiss	MxF	0.0030	3.2	0.0097	<0.005	0.50	0.080	<0.00005	0.012	0.0016	<0.3	2.0	<0.0005	13	0.000092	5.4	0.0057	<0.0001	<0.0005	0.12	0.0036	0.0047	<0.01
ABA104	KAM139298	CFR0482	10.7	12.2	Waste	Oxide	Gneiss	MxF	0.0044	3.8	0.010	<0.005	0.27	0.15	0.00014	0.0074	0.0013	<0.3	12	<0.0005	12	<0.00005	0.87	0.0069	0.00063	<0.0005	0.033	0.0043	0.0032	<0.01
ABA138	KAM152219	CFR0586	155.5	157.0	Waste	Oxide	Gneiss	MxF	<0.001	0.33	0.00046	<0.005	1.8	0.011	<0.00005	0.0091	<0.0005	<0.3	7.4	<0.0005	6.5	<0.00005	4.6	0.046	<0.0001	<0.0005	<0.01	0.00051	<0.001	<0.01
ABA144	KAM152716	CFR0591	30.5	32.0	Waste	Oxide	Gneiss	MxF	<0.001	<0.03	<0.0001	<0.005	0.56	0.00062	<0.00005	0.0097	<0.0005	<0.3	9.3	<0.0005	4.3	<0.00005	0.56	0.042	<0.0001	<0.0005	<0.01	0.00011	<0.001	<0.01
ABA146	KAM153091	CFR0594	164.6	166.1	Waste	Oxide	Gneiss	MxF	<0.001	<0.03	<0.0001	0.011	4.7	0.00082	0.000065	0.064	<0.0005	<0.3	6.4	<0.0005	5.2	<0.00005	0.50	0.11	0.00013	<0.0005	<0.01	0.0034	<0.001	<0.01
ABA149	KAM153152	CFR0595	61.0	62.5	Waste	Oxide	Gneiss	MxF	<0.001	0.062	0.00013	<0.005	1.8	0.0023	<0.00005	0.0077	<0.0005	<0.3	5.3	<0.0005	5.3	<0.00005	12	0.049	<0.0001	<0.0005	<0.01	0.019	0.0023	<0.01
Statistical Summary						**Oxide**	**Gneiss**	**n**	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
								Max	0.0044	5.7	0.010	0.011	4.7	0.15	0.00014	0.064	0.0016	<0.3	54	<0.0005	17	0.00010	12	0.11	0.00063	0.00050	0.12	0.019	0.0090	<0.01
								90th PCTL	0.0033	4.2	0.0098	0.0079	3.6	0.13	0.00014	0.022	0.0014	<0.3	21	<0.0005	13	0.000094	6.7	0.074	0.00029	<0.0005	0.092	0.0072	0.0056	<0.01
								75th PCTL	0.0018	3.2	0.0068	<0.005	1.8	0.096	0.000065	0.0097	0.0013	<0.3	9.3	<0.0005	12	<0.00005	4.6	0.049	0.00013	<0.0005	0.033	0.0036	0.0032	<0.01
								Median	<0.001	0.062	0.00013	<0.005	0.56	0.011	<0.00005	0.0091	<0.0005	<0.3	7.1	<0.0005	6.5	<0.00005	1.5	0.042	0.00012	<0.0005	<0.01	0.0018	0.0010	<0.01
								25th PCTL	<0.001	0.030	0.00010	<0.005	0.47	0.0023	<0.00005	0.0074	<0.0005	<0.3	5.3	<0.0005	5.2	<0.00005	0.69	0.0069	<0.0001	<0.0005	<0.01	0.00018	<0.001	<0.01
								10th PCTL	<0.001	<0.03	<0.0001	<0.005	0.36	0.00078	<0.00005	0.0025	<0.0005	<0.3	2.8	<0.0005	4.1	<0.00005	0.55	0.0057	<0.0001	<0.0005	<0.01	0.00010	<0.001	<0.01
								Min	<0.001	<0.03	<0.0001	<0.005	0.27	0.00062	<0.00005	0.0014	<0.0005	0.15	2.0	0.00025	3.0	0.000025	0.50	0.0055	<0.0001	0.00025	0.0050	0.000070	0.00050	0.0050
Upper Transition Facies for Gneiss Waste Rock																														
ABA016	KAM029087	CFD0175	145.0	146.0	Waste	Upper transition	Gneiss	MxF	0.00050	0.015	0.000050	0.0025	4.0	0.0054	0.000025	0.0058	0.00025	0.15	19	0.00025	5.2	0.000025	2.3	0.11	0.000050	0.00025	0.0050	0.000069	0.0046	0.0050
ABA059	KAM097012	CFD0272	17.0	18.0	Waste	Upper transition	Gneiss	FG	0.0053	4.7	0.023	0.0050	0.49	0.28	0.000025	0.015	0.0025	0.15	16	0.00050	18	0.000050	14	0.010	0.00027	0.0011	0.11	0.0032	0.015	0.010
ABA060	KAM097065	CFD0272	65.0	66.0	Waste	Upper transition	Gneiss	FG	0.00050	0.015	0.000050	0.0096	3.6	0.0087	0.000025	0.018	0.00025	0.15	51	0.00025	2.8	0.000025	2.6	0.14	0.00014	0.00025	0.0050	0.0030	0.00050	0.0050
ABA147	KAM152978	CFR0594	10.7	12.2	Waste	Upper transition	Gneiss	MxF	0.0052	1.6	0.0053	<0.005	0.38	0.039	<0.00005	0.0029	<0.0005	<0.3	10	<0.0005	14	<0.00005	8.6	0.018	<0.0001	0.00060	0.058	0.0074	0.0041	<0.01
ABA353	R304081	CFD0525	10.0	11.0	Waste	Upper Transition	Gneiss	MxF	0.0016	1.2	0.00028	<0.005	0.20	0.031	<0.00005	0.0011	0.0023	<0.3	1.5	<0.0005	5.2	<0.00005	0.62	0.0033	<0.0001	<0.0005	<0.01	0.00013	0.0017	<0.01
ABA367	R545582	CFD0524	56.0	57.0	Waste	Upper Transition	Gneiss	MxF	<0.001	0.047	<0.0001	<0.005	0.055	0.0020	0.0056	0.00093	<0.0005	<0.3	3.0	<0.0005	2.4	<0.00005	0.43	0.0031	0.00021	<0.0005	<0.01	0.00039	<0.001	<0.01
ABA411	R544193	CFD0502	40.0	41.0	Waste	Upper Transition	Gneiss	MxF	<0.001	0.24	<0.0001	<0.005	0.23	0.0086	0.0012	0.00015	<0.0005	<0.3	0.99	<0.0005	2.9	<0.00005	0.48	0.0043	<0.0001	<0.0005	<0.01	0.00018	<0.001	<0.01
Statistical Summary						**Upper Transition**	**Gneiss**	**n**	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
								Max	0.0053	4.7	0.023	0.0096	4.0	0.28	0.0056	0.018	0.0025	<0.3	51	<0.0005	18	<0.00005	14	0.14	0.00027	0.0011	0.11	0.0074	0.015	<0.01
								90th PCTL	0.0052	2.8	0.012	0.0068	3.8	0.13	0.0029	0.017	0.0024	<0.3	32	<0.0005	16	<0.00005	11	0.12	0.00023	0.00080	0.079	0.0049	0.0089	<0.01
								75th PCTL	0.0034	1.4	0.0028	0.0050	2.0	0.035	0.00061	0.011	0.0014	<0.3	18	<0.0005	9.5	<0.00005	5.6	0.066	0.00018	0.00055	0.034	0.0031	0.0044	<0.01
								Median	<0.001	0.24	<0.0001	<0.005	0.38	0.0087	<0.00005	0.0029	<0.0005	0.30	10	<0.0005	5.2	<0.00005	2.3	0.010	<0.0001	<0.0005	<0.01	0.00039	0.0017	<0.01
								25th PCTL	0.00075	0.031	0.000075	<0.005	0.21	0.0070	0.000025	0.0010	<0.0005	0.15	2.2	0.00038	2.8	0.000038	0.55	0.0038	<0.0001	<0.0005	<0.01	0.00016	<0.001	0.0075
								10th PCTL	0.00050	0.015	0.000050	0.0040	0.14	0.0040	0.000025	0.00062	0.00025	0.15	1.3	0.00025	2.6	0.000025	0.46	0.0032	0.000080	0.00025	0.0050	0.00010	0.00080	0.0050
								Min	0.00050	0.015	0.000050	0.0025	0.055	0.0020	0.000025	0.00015	0.00025	0.15	0.99	0.00025	2.4	0.000025	0.43	0.0031	0.000050	0.00025	0.0050	0.000069	0.00050	0.0050
Lower Transition Facies for Gneiss Waste Rock																														
ABA019	KAM029649	CFD0177	73.0	74.0	Waste	Lower transition	Gneiss	MxM	0.0010	0.43	0.00049	0.0050	0.78	0.0061	0.000025	0.011	0.00050	0.15	42	0.00050	5.9	0.000050	47	0.0086	0.00010	0.00050	0.027	0.026	0.041	0.010
ABA058	KAM096948	CFD0270	230.0	231.0	Waste	Lower transition	Gneiss	MxF	0.00050	0.015	0.000050	0.0050	12	0.018	0.000025	0.012	0.00025	0.15	54	0.00025	1.7	0.000025	3.6	0.100	0.00014	0.00025	0.0050	0.0032	0.00050	0.0050
ABA067	KAM129499	CFD0332	50.0	51.0	Waste	Lower Transition	Gneiss	MxM	<0.001	2.1	0.0035	<0.005	0.96	0.035	<0.00005	0.026	<0.0005	<0.3	13	0.0012	14	<0.00005	7.7	0.014	<0.0001	0.00099	0.092	0.0094	0.0071	<0.01
ABA070	KAM099512	CFD0338	10.0	11.0	Waste	Lower transition	Gneiss	MxF	<0.001	<0.03	<0.0001	<0.005	2.4	0.00054	<0.00005	0.0049	<0.0005	<0.3	4.4	<0.0005	2.9	<0.00005	2.0	0.072	<0.0001	<0.0005	<0.01	0.0017	<0.001	<0.01
ABA073	KAM145537	CFD0339	111.0	112.0	Waste	Lower transition	Gneiss	MxF	<0.001	<0.03	<0.0001	<0.005	0.95	0.00051	<0.00005	0.011	<0.0005	<0.3	6.2	0.0021	3.5	<0.00005	1.6	0.051	<0.0001	<0.0005	<0.01	0.011	0.0066	<0.01
ABA098	KAM137429	CFR0469	29.0	30.5	Waste	Lower transition	Gneiss	MxF	<0.001	0.16	0.00010	<0.005	0.31	0.0037	<0.00005	0.0012	<0.0005	<0.3	3.0	<0.0005	3.8	<0.00005	2.4	0.013	<0.0001	<0.0005	<0.01	0.00037	0.0019	<0.01
ABA106	KAM139356	CFR0482	89.9	91.4	Waste	Lower transition	Gneiss	MxF	<0.001	<0.03	<0.0001	<0.005	1.1	<0.0005	<0.00005	0.0050	<0.0005	<0.3	6.1	<0.0005	3.6	<0.00005	2.5	0.020	<0.0001	<0.0005	<0.01	0.000038	0.0054	<0.01
ABA117	KAM122524	CFR0529	21.3	22.9	Waste	Lower transition	Gneiss	FG	<0.001	2.4	0.00020	<0.005	0.65	0.031	<0.00005	0.00090	0.0025	<0.3	1.1	<0.0005	12	<0.00005	1.9	0.0060	<0.0001	0.00067	0.043	0.00027	0.0063	<0.01
ABA142	KAM152462	CFR0589	25.9	27.4	Waste	Lower transition	Gneiss	MxF	<0.001	0.046	<0.0001	<0.005	1.7	0.0013	<0.00005	0.016	<0.0005	<0.3	7.2	<0.0005	3.6	<0.00005	1.1	0.11	<0.0001	<0.0005	<0.01	0.00082	0.0087	<0.01
ABA150	KAM153129	CFR0595	30.5	32.0	Waste	Lower transition	Gneiss	MxM	<0.001	<0.03	<0.0001	<0.005	2.3	0.0014	<0.00005	0.0055	<0.0005	<0.3	6.4	<0.0005	3.3	<0.00005	2.1	0.038	<0.0001	<0.0005	<0.01	0.00012	0.0014	<0.01
ABA246	R273797	CFD0458	9.0	10.0	Waste	Lower transition	Gneiss	FG	<0.001	0.084	0.00011	<0.005	0.065	0.0072	0.0014	0.00061	<0.0005	<0.3	2.8	<0.0005	2.7	<0.00005	0.32	0.0034	0.00025	<0.0005	<0.01	0.00021	<0.001	<0.01
ABA247	R283019	CFD0484	33.0	34.0	Waste	Lower transition	Gneiss	FG	<0.001	<0.03	<0.0001	<0.005	0.88	<0.0005	0.000065	0.0019	<0.0005	<0.3	3.7	<0.0005	4.6	<0.00005	2.4	0.019	<0.0001	<0.0005	<0.01	0.000046	<0.001	<0.01
ABA249	R273398	CFD0447	188.0	189.0	Waste	Lower transition	Gneiss	MxF	<0.001	0.13	0.00011	<0.005	0.16	0.0036	<0.00005	0.0033	<0.0005	<0.3	0.73	<0.0005	4.0	<0.00005	4.8	0.013	<0.0001	<0.0005	<0.01	0.0013	<0.001	<0.01
ABA250	R279032	CFD0461	85.0	86.0	Waste	Lower transition	Gneiss	MxM	<0.001	0.071	0.00016	<0.005	0.25	0.0017	<0.00005	0.0044	<0.0005	<0.3	1.5	<0.0005	3.5	<0.00005	4.0	0.016	<0.0001	<0.0005	<0.01	0.00052	<0.001	<0.01
ABA251	R274019	CFD0464	10.0	11.0	Waste	Lower transition	Gneiss	FG	<0.001	0.051	0.00045	<0.005	0.061	0.00055	<0.00005	0.0031	<0.0005	<0.3	2.9	<0.0005	2.0	<0.00005	0.39	0.0012	<0.0001	<0.0005	<0.01	0.00058	<0.001	<0.01
ABA252	R274341	CFD0467	80.0	81.0	Waste	Lower transition	Gneiss	MxF	<0.001	0.058	0.00032	<0.005	1.7	0.0019	<0.00005	0.026	<0.0005	<0.3	2.1	<0.0005	2.6	<0.00005	1.6	0.027	<0.0001	<0.0005	<0.01	0.00078	<0.001	<0.01
ABA253	R282397	CFD0474	95.0	96.0	Waste	Lower transition	Gneiss	MxF	<0.001	<0.03	<0.0001	<0.005	0.10	0.0069	<0.00005	0.00021	<0.0005	<0.3	1.7	<0.0005	1.4	<0.00005	0.44	0.0028	<0.0001	<0.0005	<0.01	0.00025	<0.001	<0.01
ABA254	R270666	CFD0404	10.0	11.0	Waste	Lower transition	Gneiss	MxF	0.0031	1.1	0.00087	<0.005	0.31	0.083	<0.00005	0.0030	<0.0005	<0.3	0.99	<0.0005	3.6	<0.00005	0.86	0.0060	<0.0001	<0.0005	0.015	0.0012	0.0020	<0.01
ABA255	R271756	CFD0424	62.0	63.0	Waste	Lower transition	Gneiss	MxM	<0.001	<0.03	<0.0001	<0.005	1.0	<0.0005	<0.00005	0.0089	<0.0005	<0.3	4.7	<0.0005	2.9	<0.00005	1.6	0.024	<0.0001	<0.0005	<0.01	0.00021	0.0027	<0.01
ABA256	R271112	CFD0415	8.0	9.0	Waste	Lower transition	Gneiss	MxM	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
ABA257	R273315	CFD0447	115.0	116.0	Waste	Lower transition	Gneiss	FG	0.0031	2.4	0.0035	0.0050	12	0.083	0.0014	0.026	0.0025	<0.3	54	0.0021	14	0.000050	47	0.11	0.00025	0.00099	0.092	0.026	0.041	0.010
ABA258	R276507	CFD0409	12.0	13.0	Waste	Lower transition	Gneiss	MxM	0.0010	1.3	0.00057	0.0050	2.3	0.032	0.000053	0.018	0.00050	<0.3	18	0.00063	7.2	<0.00005	5.4	0.078	0.00011	0.00053	0.030	0.0097	0.0074	<0.01
ABA259	R280545	CFD0499	10.0	11.0	Waste	Lower transition	Gneiss	MxM	<0.001	0.14	0.00026	<0.005	1.4	0.0070	<0.00005	0.011	<0.0005	<0.3	6.3	<0.0005	3.9	<0.00005	3.0	0.032	<0.0001	<0.0005	0.010	0.0015	0.0059	<0.01
ABA260	R280565	CFD0499	28.0	29.0	Waste	Lower transition	Gneiss	MxM	<0.001	0.051	0.00010	<0.005	0.88	0.0019	<0.00005	0.0049	<0.0005	<0.3	3.7	<0.0005	3.5	<0.00005	2.0	0.016	<0.0001	<0.0005	<0.01	0.00058	0.0014	<0.01
ABA261	R274115	CFD0464	95.0	96.0	Waste	Lower transition	Gneiss	MxF	<0.001	<0.03	<0.0001	<0.005	0.28	0.00055	<0.00005	0.0025	<0.0005	<0.3	1.9	<0.0005	2.8	<0.00005	1.3	0.0073	<0.0001	<0.0005	<0.01	0.00023	<0.001	<0.01
ABA262	R274262	CFD0467	10.0	11.0	Waste	Lower transition	Gneiss	MxF	<0.001	<0.03	<0.0001	<0.005	0.095	<0.0005	0.000045	0.00084	<0.0005	0.27	1.1	<0.0005	2.0	<0.00005	0.43	0.0032	<0.0001	<0.0005	<0.01	0.00011	<0.001	<0.01
ABA263	R282302	CFD0474	10.0	11.0	Waste	Lower transition	Gneiss	FG	0.00050	0.015	0.000050	<0.005	0.061	<0.0005	0.000025	0.00021	0.00025	0.15	0.73	0.00025	1.4	0.000025	0.32	0.0012	0.00010	0.00025	0.0050	0.000038	0.00050	0.0050
ABA264	R271435	CFD0420	9.0	10.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA265	R271165	CFD0415	55.0	56.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA267	R273694	CFD0456	97.0	98.0	Waste	Lower transition	Gneiss	MxM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA269	R279507	CFD0468	60.0	61.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA270	R272186	CFD0433	10.0	11.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA271	R283079	CFD0484	87.0	88.0	Waste	Lower transition	Gneiss	FG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA272	Q034772	CFD0473	86.0	87.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA273	R282171	CFD0439	30.0	31.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA274	R277372	CFD0423	10.0	11.0	Waste	Lower transition	Gneiss	MxM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix C.1-2: Shake Flask Extraction Results for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	U	V	Zn
									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	mg/L	mg/L	mg/L	mg/L
ABA275	R283492	CFD0496	10.0	11.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA276	R273866	CFD0460	63.0	64.0	Waste	Lower transition	Gneiss	FG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA277	R273898	CFD0460	91.0	92.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA278	Q035773	CFD0491	9.0	10.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA279	Q035789	CFD0491	60.0	61.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA280	R271699	CFD0424	12.0	13.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA282	R282102	CFD0437	70.0	71.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA283	R273302	CFD0447	59.0	60.0	Waste	Lower transition	Gneiss	FG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA284	R273593	CFD0456	7.0	8.0	Waste	Lower transition	Gneiss	MxF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ABA338	R270835	CFD0406	32.0	33.0	Waste	Lower Transition	Gneiss	MxF	<0.001	<0.03	<0.0001	<0.005	2.4	0.00054	<0.00005	0.0049	<0.0005	<0.3	4.4	<0.0005	2.9	<0.00005	2.0	0.072	<0.0001	<0.0005	<0.01	0.0017	<0.001	<0.01
ABA340	R270686	CFD0404	27.0	28.0	Waste	Lower Transition	Gneiss	MxM	<0.001	<0.03	<0.0001	<0.005	0.95	0.00051	<0.00005	0.011	<0.0005	<0.3	6.2	0.0021	3.5	<0.00005	1.6	0.051	<0.0001	<0.0005	<0.01	0.011	0.0066	<0.01
ABA342	R551085	CFD0563	10.0	11.0	Waste	Lower Transition	Gneiss	MxM	<0.001	0.16	0.00010	<0.005	0.31	0.0037	<0.00005	0.0012	<0.0005	<0.3	3.0	<0.0005	3.8	<0.00005	2.4	0.013	<0.0001	<0.0005	<0.01	0.00037	0.0019	<0.01
ABA344	R551131	CFD0563	50.0	51.0	Waste	Lower Transition	Gneiss	MxM	<0.001	<0.03	<0.0001	<0.005	1.1	<0.0005	<0.00005	0.0050	<0.0005	<0.3	6.1	<0.0005	3.6	<0.00005	2.5	0.020	<0.0001	<0.0005	<0.01	0.000038	0.0054	<0.01
ABA348	R304313	CFD0541	56.0	57.0	Waste	Lower Transition	Gneiss	MxM	<0.001	2.4	0.00020	<0.005	0.65	0.031	<0.00005	0.00090	0.0025	<0.3	1.1	<0.0005	12	<0.00005	1.9	0.0060	<0.0001	0.00067	0.043	0.00027	0.0063	<0.01
ABA361	R623933	CFD0555	102.0	103.0	Waste	Lower Transition	Gneiss	MxF	<0.001	0.046	<0.0001	<0.005	1.7	0.0013	<0.00005	0.016	<0.0005	<0.3	7.2	<0.0005	3.6	<0.00005	1.1	0.11	<0.0001	<0.0005	<0.01	0.00082	0.0087	<0.01
ABA362	R507027	CFD0555	185.0	186.0	Waste	Lower Transition	Gneiss	FG	<0.001	<0.03	<0.0001	<0.005	2.3	0.0014	<0.00005	0.0055	<0.0005	<0.3	6.4	<0.0005	3.3	<0.00005	2.1	0.038	<0.0001	<0.0005	<0.01	0.00012	0.0014	<0.01
ABA363	R545397	CFD0520	20.0	21.0	Waste	Lower Transition	Gneiss	FG	<0.001	0.084	0.00011	<0.005	0.065	0.0072	0.0014	0.00061	<0.0005	<0.3	2.8	<0.0005	2.7	<0.00005	0.32	0.0034	0.00025	<0.0005	<0.01	0.00021	<0.001	<0.01
ABA369	R545644	CFD0526	81.0	82.0	Waste	Lower Transition	Gneiss	MxF	<0.001	<0.03	<0.0001	<0.005	0.88	<0.0005	0.000065	0.0019	<0.0005	<0.3	3.7	<0.0005	4.6	<0.00005	2.4	0.019	<0.0001	<0.0005	<0.01	0.000046	<0.001	<0.01
ABA395	R545811	CFD0529	58.0	59.0	Waste	Lower Transition	Gneiss	FG	<0.001	0.13	0.00011	<0.005	0.16	0.0036	<0.00005	0.0033	<0.0005	<0.3	0.73	<0.0005	4.0	<0.00005	4.8	0.013	<0.0001	<0.0005	<0.01	0.0013	<0.001	<0.01
ABA399	R543714	CFD0549	30.0	31.0	Waste	Lower Transition	Gneiss	MxF	<0.001	0.071	0.00016	<0.005	0.25	0.0017	<0.00005	0.0044	<0.0005	<0.3	1.5	<0.0005	3.5	<0.00005	4.0	0.016	<0.0001	<0.0005	<0.01	0.00052	<0.001	<0.01
ABA400	R543741	CFD0549	53.0	54.0	Waste	Lower Transition	Gneiss	MxF	<0.001	0.051	0.00045	<0.005	0.061	0.00055	<0.00005	0.0031	<0.0005	<0.3	2.9	<0.0005	2.0	<0.00005	0.39	0.0012	<0.0001	<0.0005	<0.01	0.00058	<0.001	<0.01
ABA402	R544003	CFD0553	80.0	81.0	Waste	Lower Transition	Gneiss	MxF	<0.001	0.058	0.00032	<0.005	1.7	0.0019	<0.00005	0.026	<0.0005	<0.3	2.1	<0.0005	2.6	<0.00005	1.6	0.027	<0.0001	<0.0005	<0.01	0.00078	<0.001	<0.01
ABA405	R554003	CFD0501	10.0	11.0	Waste	Lower Transition	Gneiss	MxF	<0.001	<0.03	<0.0001	<0.005	0.10	0.0069	<0.00005	0.00021	<0.0005	<0.3	1.7	<0.0005	1.4	<0.00005	0.44	0.0028	<0.0001	<0.0005	<0.01	0.00025	<0.001	<0.01
ABA410	R544159	CFD0502	10.0	11.0	Waste	Lower Transition	Gneiss	MxF	0.0031	1.1	0.00087	<0.005	0.31	0.083	<0.00005	0.0030	<0.0005	<0.3	0.99	<0.0005	3.6	<0.00005	0.86	0.0060	<0.0001	<0.0005	0.015	0.0012	0.0020	<0.01
ABA412	R544228	CFD0502	70.0	71.0	Waste	Lower Transition	Gneiss	MxF	<0.001	<0.03	<0.0001	<0.005	1.0	<0.0005	<0.00005	0.0089	<0.0005	<0.3	4.7	<0.0005	2.9	<0.00005	1.6	0.024	<0.0001	<0.0005	<0.01	0.00021	0.0027	<0.01
Statistical Summary						**Lower Transition**	**Gneiss**	**n**	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
								Max	0.0031	2.4	0.0035	0.0050	12	0.083	0.0014	0.026	0.0025	<0.3	54	0.0021	14	0.000050	47	0.11	0.00025	0.00099	0.092	0.026	0.041	0.010
								90th PCTL	0.0010	1.3	0.00057	0.0050	2.3	0.032	0.000053	0.018	0.00050	<0.3	18	0.00063	7.2	<0.00005	5.4	0.078	0.00011	0.00053	0.030	0.0097	0.0074	<0.01
								75th PCTL	<0.001	0.14	0.00026	<0.005	1.4	0.0070	<0.00005	0.011	<0.0005	<0.3	6.3	<0.0005	3.9	<0.00005	3.0	0.032	<0.0001	<0.0005	0.010	0.0015	0.0059	<0.01
								Median	<0.001	0.051	0.00010	<0.005	0.88	0.0019	<0.00005	0.0049	<0.0005	<0.3	3.7	<0.0005	3.5	<0.00005	2.0	0.016	<0.0001	<0.0005	<0.01	0.00058	0.0014	<0.01
								25th PCTL	<0.001	<0.03	<0.0001	<0.005	0.28	0.00055	<0.00005	0.0025	<0.0005	<0.3	1.9	<0.0005	2.8	<0.00005	1.3	0.0073	<0.0001	<0.0005	<0.01	0.00023	<0.001	<0.01
								10th PCTL	<0.001	<0.03	<0.0001	<0.005	0.095	<0.0005	0.000045	0.00084	<0.0005	0.27	1.1	<0.0005	2.0	<0.00005	0.43	0.0032	<0.0001	<0.0005	<0.01	0.00011	<0.001	<0.01
								Min	0.00050	0.015	0.000050	<0.005	0.061	<0.0005	0.000025	0.00021	0.00025	0.15	0.73	0.00025	1.4	0.000025	0.32	0.0012	0.00010	0.00025	0.0050	0.000038	0.00050	0.0050
Fresh Facies for Gneiss Waste Rock																														
ABA065	KAM128393	CFD0326	25.0	26.0	Waste	Fresh	Gneiss	MxM	0.0066	3.1	0.0044	<0.005	1.2	0.15	0.000053	0.0086	0.0017	<0.3	3.8	<0.0005	14	<0.00005	3.2	0.014	<0.0001	0.00074	0.069	0.0026	0.0069	<0.01
ABA097	KAM137325	CFR0468	88.4	89.9	Waste	Fresh	Gneiss	MxM	<0.001	0.24	<0.0001	0.0068	1.6	0.0066	<0.00005	0.024	<0.0005	<0.3	6.2	0.00082	6.0	<0.00005	7.2	0.030	<0.0001	<0.0005	0.012	0.0015	0.0055	<0.01
ABA139	KAM152151	CFR0586	61.0	62.5	Waste	Fresh	Gneiss	MxF	0.0016	5.0	0.0039	<0.005	0.82	0.11	<0.00005	0.0047	<0.0005	<0.3	3.5	<0.0005	15	0.000052	8.0	0.014	<0.0001	0.0026	0.083	0.0036	0.0079	<0.01
ABA143	KAM152536	CFR0589	128.0	129.5	Waste	Fresh	Gneiss	FG	<0.001	<0.03	<0.0001	0.0056	2.1	0.0020	<0.00005	0.040	<0.0005	<0.3	7.0	<0.0005	3.0	<0.00005	12	0.11	<0.0001	<0.0005	<0.01	0.0053	<0.001	<0.01
ABA148	KAM153051	CFR0594	109.7	111.3	Waste	Fresh	Gneiss	MxF	<0.001	<0.03	<0.0001	0.0059	3.4	0.0030	<0.00005	0.045	<0.0005	<0.3	8.0	<0.0005	3.3	<0.00005	8.4	0.065	<0.0001	<0.0005	<0.01	0.059	<0.001	<0.01
ABA347	R304284	CFD0541	30.0	31.0	Waste	Fresh	Gneiss	FG	0.0027	0.63	0.0012	<0.005	0.30	0.015	<0.00005	0.0017	<0.0005	<0.3	2.9	<0.0005	6.5	<0.00005	2.4	0.0044	<0.0001	<0.0005	<0.01	0.00078	0.0016	<0.01
ABA350	R304041	CFD0539	10.0	11.0	Waste	Fresh	Gneiss	FG	0.0015	0.45	0.00051	<0.005	0.15	0.014	<0.00005	0.0010	<0.0005	<0.3	0.58	<0.0005	4.6	<0.00005	4.7	0.0018	<0.0001	<0.0005	<0.01	0.00097	0.0017	<0.01
ABA354	R304119	CFD0525	45.0	46.0	Waste	Fresh	Gneiss	MxM	<0.001	<0.03	<0.0001	<0.005	0.93	0.00098	<0.00005	0.0058	<0.0005	<0.3	6.6	<0.0005	3.2	<0.00005	4.0	0.027	<0.0001	<0.0005	<0.01	0.00044	0.0035	<0.01
ABA356	R623617	CFD0548	10.0	11.0	Waste	Fresh	Gneiss	MxF	<0.001	0.28	0.00020	<0.005	0.23	0.021	0.000076	0.0026	<0.0005	<0.3	1.8	<0.0005	3.5	<0.00005	2.6	0.0024	<0.0001	<0.0005	0.012	0.000097	0.0031	<0.01
ABA358	R623742	CFD0548	120.0	121.0	Waste	Fresh	Gneiss	MxF	<0.001	<0.03	<0.0001	<0.005	1.0	<0.0005	<0.00005	0.0031	<0.0005	<0.3	3.1	<0.0005	3.9	<0.00005	4.4	0.044	<0.0001	<0.0005	<0.01	0.0014	<0.001	<0.01
ABA365	R545443	CFD0520	60.0	61.0	Waste	Fresh	Gneiss	FG	<0.001	0.18	0.00039	<0.005	0.19	0.010	<0.00005	0.0060	<0.0005	<0.3	2.0	<0.0005	3.7	<0.00005	3.6	0.0055	<0.0001	<0.0005	<0.01	0.0012	<0.001	<0.01
ABA396	R545818	CFD0529	65.0	66.0	Waste	Fresh	Gneiss	MxF	<0.001	0.11	0.00012	<0.005	0.18	0.011	<0.00005	0.0055	<0.0005	<0.3	0.69	<0.0005	4.1	<0.00005	5.6	0.0082	<0.0001	<0.0005	<0.01	0.00041	0.0016	<0.01
ABA398	R543692	CFD0549	10.0	11.0	Waste	Fresh	Gneiss	FG	<0.001	0.17	0.00044	<0.005	0.14	0.0067	<0.00005	0.0028	<0.0005	<0.3	1.9	<0.0005	2.7	<0.00005	3.2	0.0033	<0.0001	<0.0005	<0.01	0.00077	<0.001	<0.01
ABA401	R543957	CFD0553	40.0	41.0	Waste	Fresh	Gneiss	MxF	<0.001	<0.03	<0.0001	<0.005	3.0	0.0015	<0.00005	0.012	<0.0005	<0.3	6.9	<0.0005	2.6	<0.00005	2.8	0.034	<0.0001	<0.0005	<0.01	0.0016	0.0052	<0.01
ABA413	R276141	CFD0393	127.0	128.0	Waste	Fresh	Gneiss	MxM	<0.001	<0.03	<0.0001	<0.005	2.7	0.00053	<0.00005	0.0059	<0.0005	<0.3	4.2	<0.0005	2.9	<0.00005	1.9	0.023	<0.0001	<0.0005	<0.01	0.000036	0.0022	<0.01
ABA414	R276153	CFD0393	170.0	171.0	Waste	Fresh	Gneiss	MxM	<0.001	<0.03	<0.0001	<0.005	2.7	0.00055	<0.00005	0.0015	<0.0005	<0.3	2.6	<0.0005	3.2	<0.00005	2.4	0.031	<0.0001	<0.0005	<0.01	0.000036	0.0053	<0.01
Statistical Summary						**Fresh**	**Gneiss**	**n**	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
								Max	0.0066	5.0	0.0044	0.0068	3.4	0.15	0.000076	0.045	0.0017	<0.3	8.0	0.00082	15	0.000052	12	0.11	<0.0001	0.0026	0.083	0.059	0.0079	<0.01
								90th PCTL	0.0022	1.9	0.0026	0.0058	2.8	0.066	0.000052	0.032	<0.0005	<0.3	6.9	<0.0005	10	<0.00005	8.2	0.054	<0.0001	0.00062	0.041	0.0045	0.0062	<0.01
								75th PCTL	0.0011	0.32	0.00046	<0.005	2.2	0.014	<0.00005	0.0095	<0.0005	<0.3	6.3	<0.0005	5.0	<0.00005	6.0	0.032	<0.0001	<0.0005	0.011	0.0018	0.0052	<0.01
								Median	<0.001	0.14	0.00011	<0.005	0.98	0.0066	<0.00005	0.0056	<0.0005	<0.3	3.3	<0.0005	3.6	<0.00005	3.8	0.018	<0.0001	<0.0005	<0.01	0.0011	0.0020	<0.01
								25th PCTL	<0.001	<0.03	<0.0001	<0.005	0.22	0.0013	<0.00005	0.0027	<0.0005	<0.3	1.9	<0.0005	3.1	<0.00005	2.7	0.0052	<0.0001	<0.0005	<0.01	0.00043	<0.001	<0.01
								10th PCTL	<0.001	<0.03	<0.0001	<0.005	0.16	0.00054	<0.00005	0.0016	<0.0005	<0.3	1.2	<0.0005	2.8	<0.00005	2.4	0.0029	<0.0001	<0.0005	<0.01	0.000067	<0.001	<0.01
								Min	<0.001	<0.03	<0.0001	<0.005	0.14	<0.0005	<0.00005	0.0010	<0.0005	<0.3	0.58	<0.0005	2.6	<0.00005	1.9	0.0018	<0.0001	<0.0005	<0.01	0.000036	<0.001	<0.01
Statistical Summary for Gneiss Waste Rock								**n**	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51
								n < DL	35	17	21	41	0	4	36	0	39	45	0	42	0	42	0	0	39	40	34	0	19	45
								Max	0.0066	5.7	0.023	0.011	12	0.28	0.0056	0.064	0.0025	0.30	54	0.0021	18	0.00010	47	0.14	0.00063	0.0026	0.12	0.059	0.041	0.010
								90th PCTL	0.0030	3.1	0.0044	0.0056	3.4	0.096	0.000076	0.024	0.0013	0.30	16	0.00050	14	0.000050	8.4	0.100	0.00014	0.00060	0.069	0.0074	0.0071	0.010
								75th PCTL	0.0010	0.44	0.00046	<0.005	1.8	0.020	0.000050	0.011	<0.0005	<0.3	7.1	<0.0005	5.9	<0.00005	4.7	0.043	<0.0001	<0.0005	0.011	0.0031	0.0050	<0.01
								Median	<0.001	0.062	0.00010	<0.005	0.82	0.0061	<0.00005	0.0055	<0.0005	<0.3	4.2	<0.0005	3.7	<0.00005	2.5	0.016	<0.0001	<0.0005	<0.01	0.00078	0.0017	<0.01
								25th PCTL	<0.001	<0.03	<0.0001	<0.005	0.26	0.0014	<0.00005	0.0027	<0.0005	<0.3	2.1	<0.0005	2.9	<0.00005	1.5	0.0059	<0.0001	<0.0005	<0.01	0.00021	<0.001	<0.01
								10th PCTL	<0.001	<0.03	<0.0001	<0.005	0.15	0.00053	0.000025	0.0010	0.00050	0.15	1.1	<0.0005	2.6	<0.00005	0.50	0.0033	<0.0001	<0.0005	<0.01	0.000070	<0.001	<0.01
								Min	0.00050	0.015	0.000050	0.0025	0.055	<0.0005	0.000025	0.00015	0.00025	0.15	0.58	0.00025	1.4	0.000025	0.32	0.0012	0.000050	0.00025	0.0050	0.000036	0.00050	0.0050

Appendix C.1-2: Shake Flask Extraction Results for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	U	V	Zn
									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	mg/L	mg/L	mg/L	mg/L
Oxide Facies for Schist Waste Rock																														
ABA005	KAM022322	CFD0110	95.0	96.0	Waste	Oxide	Schist	RQM	0.0010	0.015	0.00010	0.047	79	0.065	0.000025	0.0073	0.00050	0.15	106	0.0022	2.8	0.000050	5.4	0.79	0.00092	0.00050	0.025	0.012	0.0010	0.010
ABA026	KAM037656	CFD0096	59.0	60.0	Waste	Oxide	Schist	BtS	0.0010	0.015	0.00010	0.025	56	0.044	0.000025	0.0096	0.00050	0.15	57	0.0011	2.6	0.000050	2.0	0.63	0.00021	0.00050	0.017	0.0092	0.0010	0.010
ABA074	KAM146948	CFD0345	60.0	61.0	Waste	Oxide	Schist	BtS_carb	*<0.001*	*<0.03*	*<0.0001*	0.0050	6.3	0.00075	*<0.00005*	0.0036	*<0.0005*	*<0.3*	17	*<0.0005*	3.6	*<0.00005*	1.2	0.087	*<0.0001*	*<0.0005*	*<0.01*	0.000054	*<0.001*	*<0.01*
ABA077	J957606	CFD0350	60.0	61.0	Waste	Oxide	Schist	BtS_carb	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	2.5	0.0017	0.0017	0.0063	*<0.0005*	*<0.3*	10	*<0.0005*	4.7	*<0.00005*	0.60	0.22	*<0.0001*	*<0.0005*	*<0.01*	0.000019	*<0.001*	*<0.01*
ABA125	KAM149844	CFR0566	10.7	12.2	Waste	Oxide	Schist	BtS	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	0.54	0.0021	*<0.00005*	0.0060	*<0.0005*	*<0.3*	6.2	*<0.0005*	5.6	*<0.00005*	0.52	0.047	*<0.0001*	*<0.0005*	*<0.01*	0.000079	*<0.001*	*<0.01*
ABA130	KAM150823	CFR0574	10.7	12.2	Waste	Oxide	Schist	BtS	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	0.76	0.00087	*<0.00005*	0.0064	*<0.0005*	*<0.3*	9.7	*<0.0005*	4.6	*<0.00005*	0.50	0.040	0.00054	*<0.0005*	*<0.01*	0.000072	*<0.001*	*<0.01*
ABA131	KAM150859	CFR0574	61.0	62.5	Waste	Oxide	Schist	BtS	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	4.3	0.0017	0.000071	0.014	*<0.0005*	*<0.3*	18	*<0.0005*	3.7	*<0.00005*	0.58	0.12	*<0.0001*	*<0.0005*	*<0.01*	0.00030	*<0.001*	*<0.01*
Statistical Summary						**Oxide**	**Schist**	**n**	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
								Max	0.0010	*<0.03*	0.00010	0.047	79	0.065	0.0017	0.014	0.00050	*<0.3*	106	0.0022	5.6	0.000050	5.4	0.79	0.00092	0.00050	0.025	0.012	0.0010	0.010
								90th PCTL	0.0010	*<0.03*	0.00010	0.034	65	0.052	0.00071	0.011	0.00050	*<0.3*	77	0.0015	5.1	0.000050	3.3	0.69	0.00069	0.00050	0.020	0.010	0.0010	0.010
								75th PCTL	0.0010	*<0.03*	0.00010	0.015	31	0.023	0.000061	0.0084	0.00050	*<0.3*	38	0.00080	4.7	0.000050	1.6	0.42	0.00038	0.00050	0.014	0.0048	0.0010	0.010
								Median	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	4.3	0.0017	*<0.00005*	0.0064	*<0.0005*	*<0.3*	17	*<0.0005*	3.7	*<0.00005*	0.60	0.12	*<0.0001*	*<0.0005*	*<0.01*	0.000079	*<0.001*	*<0.01*
								25th PCTL	*<0.001*	0.023	*<0.0001*	*<0.005*	1.6	0.0013	*<0.00005*	0.0061	*<0.0005*	0.23	9.9	*<0.0005*	3.2	*<0.00005*	0.55	0.067	*<0.0001*	*<0.0005*	*<0.01*	0.000063	*<0.001*	*<0.01*
								10th PCTL	*<0.001*	0.015	*<0.0001*	*<0.005*	0.67	0.00082	0.000025	0.0050	*<0.0005*	0.15	8.3	*<0.0005*	2.7	*<0.00005*	0.51	0.044	*<0.0001*	*<0.0005*	*<0.01*	0.000040	*<0.001*	*<0.01*
								Min	*<0.001*	0.015	*<0.0001*	*<0.005*	0.54	0.00075	0.000025	0.0036	*<0.0005*	0.15	6.2	*<0.0005*	2.6	*<0.00005*	0.50	0.040	*<0.0001*	*<0.0005*	*<0.01*	0.000019	*<0.001*	*<0.01*
Upper Transition Facies for Schist Waste Rock																														
ABA027	KAM037928	CFD0099	30	31	Waste	Upper transition	Schist	BtS_carb	0.00050	0.015	0.000050	0.0066	5.0	0.0042	0.00014	0.014	0.00025	0.15	38	0.00025	3.6	0.000025	2.6	0.14	0.000050	0.00025	0.0050	0.00016	0.0015	0.0050
ABA332	Q033589	CFD0407	32	33	Waste	Upper Transition	schist	BtS	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	5.5	0.00080	*<0.00005*	0.0025	*<0.0005*	*<0.3*	3.2	*<0.0005*	2.5	*<0.00005*	9.9	0.079	*<0.0001*	*<0.0005*	*<0.01*	0.00035	*<0.001*	*<0.01*
Lower Transition Facies for Schist Waste Rock																														
ABA031	KAM039252	CFD0116	75	76	Waste	Lower transition	Schist	RQM	0.00050	0.015	0.000050	0.019	15	0.0076	0.000025	0.0096	0.00025	0.15	76	0.00025	2.6	0.000025	6.7	0.20	0.00015	0.00025	0.0050	0.00053	0.0044	0.0050
ABA038	KAM047995	CFD0135	153	154	Waste	Lower transition	Schist	BtS	0.00050	0.015	0.000050	0.021	8.9	0.0039	0.000025	0.017	0.00025	0.15	63	0.0011	3.7	0.000025	23	0.11	0.000050	0.00025	0.0050	0.0012	0.012	0.0050
ABA054	KAM081312	CFD0198	85	86	Waste	Lower transition	Schist	BtS	0.0037	4.6	0.0036	0.0050	0.60	0.072	0.000025	0.0094	0.0019	0.15	16	0.00050	25	0.000050	36	0.016	0.00010	0.00050	0.13	0.0041	0.021	0.010
ABA333	R277487	CFD0426	43	44	Waste	Lower Transition	schist	BtS	*<0.001*	1.5	0.00081	*<0.005*	0.41	0.038	0.00062	0.0075	0.00092	*<0.3*	1.6	*<0.0005*	6.6	*<0.00005*	1.3	0.0039	*<0.0001*	*<0.0005*	0.010	0.00059	0.0038	*<0.01*
ABA335	R550437	CFD0518	25	26	Waste	Lower Transition	schist	BtS	*<0.001*	0.33	0.00021	*<0.005*	0.74	0.013	0.000099	0.0064	0.00055	*<0.3*	2.1	*<0.0005*	4.6	*<0.00005*	2.0	0.029	*<0.0001*	*<0.0005*	0.013	0.000046	0.0011	*<0.01*
ABA336	R550471	CFD0518	55	56	Waste	Lower Transition	Schist	BtS_carb	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	8.8	0.0047	*<0.00005*	0.0043	*<0.0005*	*<0.3*	8.9	*<0.0005*	3.7	*<0.00005*	2.2	0.37	*<0.0001*	*<0.0005*	*<0.01*	0.00069	*<0.001*	*<0.01*
ABA337	R550494	CFD0518	75	75	Waste	Lower Transition	schist	BtS	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	1.8	0.0011	*<0.00005*	0.0021	*<0.0005*	*<0.3*	4.4	*<0.0005*	3.7	*<0.00005*	2.4	0.81	*<0.0001*	*<0.0005*	*<0.01*	0.00020	0.0025	*<0.01*
ABA345	R551151	CFD0563	68	69	Waste	Lower Transition	schist	BtS	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	2.1	0.00081	*<0.00005*	0.021	*<0.0005*	*<0.3*	4.3	*<0.0005*	4.4	*<0.00005*	2.5	0.061	*<0.0001*	*<0.0005*	*<0.01*	0.00033	0.0045	*<0.01*
Statistical Summary						**Lower Transition**	**Schist**	**n**	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
								Max	0.0037	4.6	0.0036	0.021	15	0.072	0.00062	0.021	0.0019	*<0.3*	76	0.0011	25	0.000050	36	0.81	0.00015	0.00050	0.13	0.0041	0.021	0.010
								90th PCTL	0.0018	2.4	0.0017	0.019	11	0.048	0.00025	0.018	0.0012	*<0.3*	67	0.00068	12	*<0.00005*	27	0.50	0.00012	*<0.0005*	0.048	0.0020	0.014	*<0.01*
								75th PCTL	0.0010	0.61	0.00036	0.0085	8.8	0.019	0.000062	0.011	0.00064	*<0.3*	27	0.00050	5.1	*<0.00005*	11	0.24	0.00010	*<0.0005*	0.011	0.00081	0.0063	*<0.01*
								Median	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	1.9	0.0061	*<0.00005*	0.0085	*<0.0005*	*<0.3*	6.6	*<0.0005*	4.1	*<0.00005*	2.4	0.085	*<0.0001*	*<0.0005*	*<0.01*	0.00056	0.0041	*<0.01*
								25th PCTL	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	0.70	0.0032	0.000025	0.0058	0.00044	0.15	3.7	*<0.0005*	3.7	0.000044	2.1	0.025	*<0.0001*	0.00044	0.0088	0.00030	0.0022	0.0088
								10th PCTL	0.00050	0.015	0.000050	*<0.005*	0.54	0.0010	0.000025	0.0036	0.00025	0.15	1.9	0.00043	3.3	0.000025	1.8	0.012	0.000085	0.00025	0.0050	0.00015	0.0011	0.0050
								Min	0.00050	0.015	0.000050	*<0.005*	0.41	0.00081	0.000025	0.0021	0.00025	0.15	1.6	0.00025	2.6	0.000025	1.3	0.0039	0.000050	0.00025	0.0050	0.000046	*<0.001*	0.0050
Fresh Facies for Schist Waste Rock																														
ABA132	KAM150898	CFR0574	114.3	115.8	Waste	Fresh	Schist	BtS	*<0.001*	*<0.03*	*<0.0001*	0.0098	12	0.0074	*<0.00005*	0.065	*<0.0005*	*<0.3*	28	0.00073	2.7	*<0.00005*	4.6	0.22	*<0.0001*	*<0.0005*	*<0.01*	0.0080	*<0.001*	*<0.01*
ABA330	R276299	CFD0401	74.0	75.0	Waste	Fresh	schist	BtS	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	1.4	0.0016	*<0.00005*	0.024	*<0.0005*	*<0.3*	3.7	*<0.0005*	3.1	*<0.00005*	1.7	0.025	*<0.0001*	*<0.0005*	*<0.01*	0.00027	*<0.001*	*<0.01*
ABA331	R276331	CFD0401	141.0	142.0	Waste	Fresh	schist	BtS	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	3.3	0.00073	*<0.00005*	0.0056	*<0.0005*	*<0.3*	5.5	*<0.0005*	3.8	*<0.00005*	1.6	0.031	*<0.0001*	*<0.0005*	*<0.01*	0.000097	0.0046	*<0.01*
ABA415	R277001	CFD0398	49.0	50.0	Waste	Fresh	schist	BtS	*<0.001*	0.090	*<0.0001*	*<0.005*	0.75	0.0020	*<0.00005*	0.0030	*<0.0005*	*<0.3*	3.1	*<0.0005*	3.0	*<0.00005*	1.8	0.015	*<0.0001*	*<0.0005*	*<0.01*	0.000052	0.0033	*<0.01*
ABA416	R277017	CFD0398	64.0	65.0	Waste	Fresh	schist	BtS	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	1.1	0.00073	*<0.00005*	0.0028	*<0.0005*	*<0.3*	3.1	*<0.0005*	2.2	*<0.00005*	2.0	0.017	*<0.0001*	*<0.0005*	*<0.01*	0.000078	0.0025	*<0.01*
ABA417	R277021	CFD0398	124.0	125.0	Waste	Fresh	schist	BtS	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	1.5	*<0.0005*	*<0.00005*	0.0013	*<0.0005*	*<0.3*	3.7	*<0.0005*	2.9	*<0.00005*	2.2	0.020	*<0.0001*	*<0.0005*	*<0.01*	0.000032	0.0029	*<0.01*
ABA418	R277041	CFD0398	160.0	161.0	Waste	Fresh	schist	BtS	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	1.6	*<0.0005*	*<0.00005*	0.0040	*<0.0005*	*<0.3*	5.7	*<0.0005*	2.4	*<0.00005*	1.9	0.018	*<0.0001*	*<0.0005*	*<0.01*	0.000022	0.0038	*<0.01*
Statistical Summary						**Fresh**	**Schist**	**n**	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
								Max	*<0.001*	0.090	*<0.0001*	0.0098	12	0.0074	*<0.00005*	0.065	*<0.0005*	*<0.3*	28	0.00073	3.8	*<0.00005*	4.6	0.22	*<0.0001*	*<0.0005*	*<0.01*	0.0080	0.0046	*<0.01*
								90th PCTL	*<0.001*	0.054	*<0.0001*	0.0069	6.6	0.0042	*<0.00005*	0.041	*<0.0005*	*<0.3*	15	0.00059	3.4	*<0.00005*	3.1	0.11	*<0.0001*	*<0.0005*	*<0.01*	0.0034	0.0041	*<0.01*
								75th PCTL	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	2.4	0.0018	*<0.00005*	0.015	*<0.0005*	*<0.3*	5.6	*<0.0005*	3.0	*<0.00005*	2.1	0.028	*<0.0001*	*<0.0005*	*<0.01*	0.00018	0.0036	*<0.01*
								Median	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	1.5	0.00073	*<0.00005*	0.0040	*<0.0005*	*<0.3*	3.7	*<0.0005*	2.9	*<0.00005*	1.9	0.020	*<0.0001*	*<0.0005*	*<0.01*	0.000078	0.0029	*<0.01*
								25th PCTL	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	1.3	0.00062	*<0.00005*	0.0029	*<0.0005*	*<0.3*	3.4	*<0.0005*	2.5	*<0.00005*	1.7	0.017	*<0.0001*	*<0.0005*	*<0.01*	0.000042	0.0018	*<0.01*
								10th PCTL	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	0.97	*<0.0005*	*<0.00005*	0.0022	*<0.0005*	*<0.3*	3.1	*<0.0005*	2.3	*<0.00005*	1.6	0.016	*<0.0001*	*<0.0005*	*<0.01*	0.000028	*<0.001*	*<0.01*
								Min	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	0.75	*<0.0005*	*<0.00005*	0.0013	*<0.0005*	*<0.3*	3.1	*<0.0005*	2.2	*<0.00005*	1.6	0.015	*<0.0001*	*<0.0005*	*<0.01*	0.000022	*<0.001*	*<0.01*
Statistical Summary for Schist Waste Rock								**n**	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
								n < DL	18	15	16	16	0	2	14	0	16	18	0	17	0	18	0	0	17	18	16	0	9	18
								Max	0.0037	4.6	0.0036	0.047	79	0.072	0.0017	0.065	0.0019	0.30	106	0.0022	25	0.000050	36	0.81	0.00092	0.00050	0.13	0.012	0.021	0.010
								90th PCTL	0.0010	0.26	0.00018	0.020	14	0.042	0.00013	0.020	0.00054	0.30	61	0.00099	5.3	0.000050	8.9	0.55	0.00019	0.00050	0.016	0.0068	0.0046	0.010
								75th PCTL	*<0.001*	0.030	0.00010	0.0054	6.9	0.0074	0.000050	0.011	0.00050	*<0.3*	21	0.00050	4.4	*<0.00005*	3.1	0.20	0.00010	*<0.0005*	0.010	0.00061	0.0038	*<0.01*
								Median	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	2.3	0.0019	*<0.00005*	0.0064	*<0.0005*	*<0.3*	7.5	*<0.0005*	3.6	*<0.00005*	2.0	0.070	*<0.0001*	*<0.0005*	*<0.01*	0.00024	0.0013	*<0.01*
								25th PCTL	*<0.001*	*<0.03*	*<0.0001*	*<0.005*	1.0	0.00081	*<0.00005*	0.0039	*<0.0005*	*<0.3*	3.7	*<0.0005*	2.8	*<0.00005*	1.5	0.024	*<0.0001*	*<0.0005*	*<0.01*	0.000068	*<0.001*	*<0.01*
								10th PCTL	0.00065	0.015	0.000065	*<0.005*	0.64	0.00073	0.000025	0.0026	0.00033	0.15	3.1	*<0.0005*	2.5	0.000033	0.59	0.016	*<0.0001*	0.00033	0.0065	0.000036	*<0.001*	0.0065
								Min	0.00050	0.015	0.000050	*<0.005*	0.41	*<0.0005*	0.000025	0.0013	0.00025	0.15	1.6	0.00025	2.2	0.000025	0.50	0.0039	0.000050	0.00025	0.0050	0.000019	*<0.001*	0.0050

Appendix C.1-2: Shake Flask Extraction Results for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	U	V	Zn
									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	mg/L	mg/L	mg/L	mg/L
Oxide Facies for Granite Waste Rock																														
ABA157	R305807	CFD0382	76	77	Waste	Oxide	Granite	GG	<0.001	0.29	0.00022	<0.005	<0.05	0.016	0.00024	0.00013	<0.0005	<0.3	2.9	<0.0005	12	<0.00005	0.93	0.0014	<0.0001	<0.0005	<0.01	0.00015	<0.001	<0.01
ABA158	R305808	CFD0382	79	80	Waste	Oxide	Granite	GG	<0.001	0.034	<0.0001	<0.005	0.056	0.0022	0.00017	<0.0001	<0.0005	<0.3	1.4	<0.0005	9.4	<0.00005	1.1	0.0023	<0.0001	<0.0005	<0.01	0.000046	<0.001	<0.01
ABA174	R305826	CFD0403	7.0	8.0	Waste	Oxide	Granite	GG	0.0032	8.5	0.017	<0.005	0.23	0.015	0.00029	0.00033	0.00060	<0.3	4.4	<0.0005	22	0.000080	2.1	0.015	0.0013	<0.0005	<0.01	0.0083	<0.001	<0.01
Upper Transition Facies for Granite Waste Rock																														
ABA013	KAM025898	CFD0150	81	82	Waste	Upper transition	Granite	GG	0.0010	2.3	0.0075	0.0050	0.28	0.044	0.000025	0.011	0.00050	0.15	7.7	0.00050	37	0.000050	9.1	0.0072	0.00023	0.00050	0.11	0.0073	0.0076	0.010
ABA151	R305801	CFD0381	13	14	Waste	Upper transition	Granite	GG	<0.001	6.1	0.013	0.027	0.71	0.48	<0.00005	0.0083	<0.0005	<0.3	9.6	<0.0005	24	0.000058	10	0.012	0.00021	<0.0005	0.24	0.012	0.010	0.024
ABA152	R305802	CFD0381	35	36	Waste	Upper transition	Granite	GG	0.0091	13	0.026	<0.005	1.2	0.36	0.000096	0.0048	0.00053	0.50	1.8	<0.0005	40	0.000065	12	0.030	0.00015	<0.0005	0.13	0.022	0.0061	0.066
ABA167	R305818	CFD0394	30	31	Waste	Upper transition	Granite	GG	<0.001	1.3	0.0022	<0.005	0.24	0.0086	0.00055	0.0038	<0.0005	<0.3	6.8	<0.0005	26	0.000082	1.4	0.0049	0.00018	<0.0005	<0.01	0.0044	<0.001	<0.01
ABA169	R305821	CFD0399	20	21	Waste	Upper transition	Granite	GG	<0.001	5.4	0.0065	<0.005	0.54	0.46	<0.00005	0.0030	0.00057	<0.3	10	<0.0005	24	0.000053	9.7	0.012	0.00011	<0.0005	0.024	0.0031	0.0030	0.011
ABA172	R305824	CFD0396	29	30	Waste	Upper transition	Granite	GG	<0.001	<0.03	<0.0001	<0.005	0.064	0.0073	<0.00005	<0.0001	<0.0005	<0.3	0.89	<0.0005	8.7	<0.00005	1.2	0.0023	<0.0001	<0.0005	<0.01	0.000035	<0.001	<0.01
ABA178	R305831	CFD0400	11	12	Waste	Upper transition	Granite	GG	0.0029	4.1	0.027	<0.005	0.44	0.47	0.00015	0.0034	0.0015	<0.3	2.6	<0.0005	18	0.000067	6.5	0.0096	0.00012	<0.0005	0.097	0.013	0.0061	0.044
Statistical Summary						**Upper Transition**	**Granite**	**n**	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
								Max	0.0091	13	0.027	0.027	1.2	0.48	0.00055	0.011	0.0015	0.50	10	0.00050	40	0.000082	12	0.030	0.00023	0.00050	0.24	0.022	0.010	0.066
								90th PCTL	0.0054	8.9	0.026	0.014	0.90	0.47	0.00031	0.0094	0.00094	0.38	9.9	0.00050	38	0.000073	11	0.019	0.00022	0.00050	0.17	0.016	0.0086	0.053
								75th PCTL	0.0020	5.8	0.019	0.0050	0.62	0.46	0.00012	0.0065	0.00055	<0.3	8.6	<0.0005	31	0.000066	9.8	0.012	0.00020	<0.0005	0.12	0.012	0.0069	0.034
								Median	<0.001	4.1	0.0075	<0.005	0.44	0.36	<0.00005	0.0038	0.00050	<0.3	6.8	<0.0005	24	0.000058	9.1	0.0096	0.00015	<0.0005	0.097	0.0073	0.0061	0.011
								25th PCTL	<0.001	1.8	0.0043	<0.005	0.26	0.026	<0.00005	0.0032	<0.0005	<0.3	2.2	<0.0005	21	0.000052	3.9	0.0060	0.00012	<0.0005	0.017	0.0038	0.0020	0.010
								10th PCTL	<0.001	0.79	0.0013	<0.005	0.17	0.0081	0.000040	0.0019	<0.0005	0.24	1.4	<0.0005	14	<0.00005	1.3	0.0038	0.00011	<0.0005	<0.01	0.0019	<0.001	<0.01
								Min	<0.001	<0.03	<0.0001	<0.005	0.064	0.0073	0.000025	<0.0001	<0.0005	0.15	0.89	<0.0005	8.7	<0.00005	1.2	0.0023	<0.0001	<0.0005	<0.01	0.000035	<0.001	<0.01
Lower Transition Facies for Granite Waste Rock																														
ABA154	R305804	CFD0382	10	11	Waste	Lower transition	Granite	GG	<0.001	7.2	0.0075	0.023	0.70	0.32	<0.00005	0.0030	<0.0005	<0.3	8.8	<0.0005	24	0.000051	9.7	0.0098	0.00016	<0.0005	0.21	0.0062	0.0086	0.035
ABA155	R305805	CFD0382	50	51	Waste	Lower transition	Granite	GG	0.0029	4.3	0.0043	0.0089	0.75	0.20	0.00010	0.0067	0.00071	<0.3	4.3	<0.0005	29	0.00016	6.7	0.0080	0.00032	<0.0005	0.15	0.0051	0.0034	0.029
ABA159	R305809	CFD0383	10	11	Waste	Lower transition	Granite	GG	<0.001	6.6	0.0099	0.029	0.81	0.34	<0.00005	0.0023	<0.0005	<0.3	7.9	<0.0005	23	0.000065	8.9	0.011	0.00022	0.00052	0.32	0.016	0.017	0.022
ABA160	R305811	CFD0383	48	49	Waste	Lower transition	Granite	GG	<0.001	5.3	0.0078	0.030	0.89	0.35	<0.00005	0.00094	<0.0005	<0.3	10	<0.0005	22	0.000052	10	0.0098	0.00020	<0.0005	0.22	0.0100	0.0082	0.025
ABA164	R305815	CFD0389	10	11	Waste	Lower transition	Granite	GG	0.0018	6.7	0.015	0.011	0.65	0.34	<0.00005	0.012	<0.0005	<0.3	5.0	<0.0005	21	0.00011	7.8	0.012	0.00017	<0.0005	0.26	0.015	0.010	0.023
ABA166	R305817	CFD0389	45	46	Waste	Lower transition	Granite	GG	0.0048	18	0.0020	<0.005	0.42	0.13	0.000094	0.0012	0.00097	<0.3	2.7	<0.0005	17	0.000058	3.5	0.0087	<0.0001	<0.0005	0.022	0.017	0.0047	0.023
Statistical Summary						**Lower Transition**	**Granite**	**n**	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
								Max	0.0048	18	0.015	0.030	0.89	0.35	0.00010	0.012	0.00097	<0.3	10	<0.0005	29	0.00016	10	0.012	0.00032	0.00052	0.32	0.017	0.017	0.035
								90th PCTL	0.0039	13	0.012	0.029	0.85	0.35	0.000097	0.0093	0.00084	<0.3	9.6	<0.0005	26	0.00013	10.0	0.011	0.00027	0.00051	0.29	0.016	0.014	0.032
								75th PCTL	0.0026	7.1	0.0094	0.027	0.80	0.34	0.000083	0.0058	0.00066	<0.3	8.6	<0.0005	24	0.00010	9.5	0.011	0.00022	<0.0005	0.25	0.016	0.0098	0.028
								Median	0.0014	6.6	0.0077	0.017	0.72	0.33	<0.00005	0.0027	<0.0005	<0.3	6.5	<0.0005	22	0.000062	8.3	0.0098	0.00019	<0.0005	0.21	0.012	0.0084	0.024
								25th PCTL	<0.001	5.6	0.0051	0.0093	0.66	0.23	<0.00005	0.0015	<0.0005	<0.3	4.5	<0.0005	21	0.000054	7.0	0.0090	0.00016	<0.0005	0.16	0.0071	0.0056	0.023
								10th PCTL	<0.001	4.8	0.0031	0.0070	0.53	0.16	<0.00005	0.0011	<0.0005	<0.3	3.5	<0.0005	19	0.000052	5.1	0.0083	0.00013	<0.0005	0.084	0.0057	0.0041	0.023
								Min	<0.001	4.3	0.0020	<0.005	0.42	0.13	<0.00005	0.00094	<0.0005	<0.3	2.7	<0.0005	17	0.000051	3.5	0.0080	<0.0001	<0.0005	0.022	0.0051	0.0034	0.022
Fresh Facies for Granite Waste Rock																														
ABA012	KAM025798	CFD0147	260	261	Waste	Fresh	Granite	GG	0.00050	0.015	0.000050	0.015	0.45	0.0059	0.000025	0.0014	0.00025	0.15	26	0.00025	6.1	0.000025	40	0.018	0.000050	0.00025	0.0050	0.0099	0.019	0.0050
ABA162	R305813	CFD0385	10	11	Waste	Fresh	Granite	GG	0.0059	5.6	0.013	0.022	0.68	0.46	<0.00005	0.0093	<0.0005	<0.3	7.7	<0.0005	18	0.000077	9.1	0.0095	0.00021	0.00071	0.25	0.017	0.015	0.030
ABA163	R305814	CFD0385	59	60	Waste	Fresh	Granite	GG	0.0035	2.9	0.0025	<0.005	0.35	0.074	<0.00005	0.00038	<0.0005	<0.3	3.0	<0.0005	23	<0.00005	4.3	0.0056	0.00018	0.00057	0.11	0.0030	0.0029	<0.01
ABA165	R305816	CFD0389	30	31	Waste	Fresh	Granite	GG	0.0013	5.8	0.010	0.0081	0.65	0.47	<0.00005	0.011	0.00052	<0.3	4.2	<0.0005	19	0.000056	7.5	0.010	0.00014	<0.0005	0.23	0.012	0.0096	0.038
ABA168	R305819	CFD0394	88	89	Waste	Fresh	Granite	GG	0.0011	3.6	0.0072	0.024	0.82	0.35	<0.00005	0.00073	<0.0005	<0.3	9.0	<0.0005	16	0.000058	9.0	0.0079	0.00022	0.00059	0.20	0.0036	0.014	0.030
ABA179	R305832	CFD0400	60	61	Waste	Fresh	Granite	GG	0.0034	5.8	0.0017	<0.005	0.16	0.031	<0.00005	0.0011	<0.0005	<0.3	3.4	<0.0005	19	<0.00005	5.5	0.0044	<0.0001	<0.0005	0.066	0.015	0.0023	<0.01
ABA439	Q041678	CFD0385	8.0	9.0	Waste	Fresh	Granite	GG	<0.001	0.29	0.00047	<0.005	0.13	0.026	<0.00005	0.0039	<0.0005	<0.3	1.5	<0.0005	2.8	<0.00005	2.0	0.0019	<0.0001	<0.0005	<0.01	0.0011	<0.001	<0.01
ABA441	Q032423	CFD0385	92	93	Waste	Fresh	Granite	GG	<0.001	<0.03	<0.0001	<0.005	1.8	0.58	<0.00005	0.00014	0.0014	<0.3	2.6	<0.0005	3.6	<0.00005	1.8	0.017	<0.0001	<0.0005	<0.01	0.00013	<0.001	<0.01
Statistical Summary						**Fresh**	**Granite**	**n**	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
								Max	0.0059	5.8	0.013	0.024	1.8	0.58	<0.00005	0.011	0.0014	<0.3	26	<0.0005	23	0.000077	40	0.018	0.00022	0.00071	0.25	0.017	0.019	0.038
								90th PCTL	0.0042	5.8	0.011	0.023	1.1	0.51	<0.00005	0.0099	0.00077	<0.3	14	<0.0005	20	0.000064	18	0.018	0.00021	0.00063	0.24	0.015	0.016	0.032
								75th PCTL	0.0034	5.6	0.0080	0.017	0.71	0.46	<0.00005	0.0052	0.00051	<0.3	8.0	<0.0005	19	0.000057	9.0	0.012	0.00019	0.00058	0.21	0.013	0.014	0.030
								Median	0.0012	3.3	0.0021	0.0066	0.55	0.21	<0.00005	0.0013	<0.0005	<0.3	3.8	<0.0005	17	<0.00005	6.5	0.0087	0.00012	<0.0005	0.087	0.0068	0.0063	<0.01
								25th PCTL	<0.001	0.23	0.00038	<0.005	0.30	0.030	<0.00005	0.00064	<0.0005	<0.3	2.9	<0.0005	5.5	<0.00005	3.7	0.0053	<0.0001	<0.0005	<0.01	0.0025	0.0020	<0.01
								10th PCTL	0.00085	0.026	0.000085	<0.005	0.15	0.020	0.000043	0.00031	0.00043	0.26	2.3	0.00043	3.4	0.000043	2.0	0.0037	0.000085	0.00043	0.0085	0.00079	<0.001	0.0085
								Min	0.00050	0.015	0.000050	<0.005	0.13	0.0059	0.000025	0.00014	0.00025	0.15	1.5	0.00025	2.8	0.000025	1.8	0.0019	0.000050	0.00025	0.0050	0.00013	<0.001	0.0050
Statistical Summary for Granite Waste Rock								**n**	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
								n < DL	11	2	3	13	1	0	14	2	14	21	0	22	0	7	0	0	7	18	7	0	7	9
								Max	0.0091	18	0.027	0.030	1.8	0.58	0.00055	0.012	0.0015	0.50	26	0.00050	40	0.00016	40	0.030	0.0013	0.00071	0.32	0.022	0.019	0.066
								90th PCTL	0.0044	8.1	0.016	0.026	0.87	0.47	0.00022	0.010	0.00089	0.30	10	<0.0005	28	0.000081	10	0.017	0.00023	0.00056	0.25	0.017	0.015	0.037
								75th PCTL	0.0030	6.2	0.011	0.017	0.72	0.39	0.000097	0.0052	0.00054	<0.3	8.1	<0.0005	24	0.000066	9.3	0.012	0.00021	<0.0005	0.21	0.013	0.0098	0.029
								Median	0.0010	4.8	0.0068	<0.005	0.50	0.26	<0.00005	0.0027	<0.0005	<0.3	4.3	<0.0005	20	0.000055	7.1	0.0095	0.00016	<0.0005	0.10	0.0078	0.0054	0.017
								25th PCTL	<0.001	1.0	0.0014	<0.005	0.23	0.024	<0.00005	0.00064	<0.0005	<0.3	2.7	<0.0005	15	<0.00005	2.0	0.0054	<0.0001	<0.0005	<0.01	0.0031	<0.001	<0.01
								10th PCTL	<0.001	0.031	<0.0001	<0.005	0.084	0.0077	<0.00005	0.00013	<0.0005	<0.3	1.6	<0.0005	6.9	<0.00005	1.3	0.0023	<0.0001	<0.0005	<0.01	0.00013	<0.001	<0.01
								Min	0.00050	0.015	0.000050	<0.005	0.050	0.0022	0.000025	<0.0001	0.00025	0.15	0.89	0.00025	2.8	0.000025	0.93	0.0014	0.000050	0.00025	0.0050	0.000035	<0.001	0.0050
Oxide and Fresh Facies for Other Lithologies Waste Rock																														
ABA018	KAM029393	CFD0176	99	100	Waste	Oxide	Dykes	FC	0.00050	0.015	0.000050	0.0025	1.0	0.031	0.000025	0.0031	0.00025	0.15	21	0.00025	8.3	0.000025	1.2	0.035	0.00011	0.00025	0.0050	0.0000050	0.0035	0.0050
ABA056	KAM084551	CFD0237	181	182	Waste	Oxide	HU	HU	0.00050	0.015	0.000050	0.018	5.3	0.0051	0.000025	0.017	0.00079	0.15	60	0.00061	4.6	0.000025	10	0.15	0.00045	0.00025	0.0050	0.0017	0.0011	0.0050
ABA352	R304282	CFD0539	90	91	Waste	Fresh	IV	IV	<0.001	<0.03	<0.0001	<0.005	1.0	0.0012	<0.00005	0.0040	<0.0005	<0.3	3.3	<0.0005	2.8	<0.00005	3.0	0.042	<0.0001	<0.0005	<0.01	0.000065	0.0040	<0.01

Notes: all values in grey italics are below the analytical detection limit
n = number of samples included in statistical summary
n < DL = number of samples with values below the analytical detection limit

Appendix C.1-3: Solid Phase Element by Aqua Regia Digestion for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La
									ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm
Oxide Facies for Gneiss Waste Rock																															
ABA001	KAM000219	CFD0002	21.0	22.0	Waste	Oxide	Gneiss	FG	0.060	0.82	578	<0.2	<10	160	0.87	0.13	0.050	0.060	67	9.5	11	0.77	8.2	1.6	2.1	0.080	0.12	0.27	0.0070	0.23	37
ABA043	KAM050495	CFD0152	149.0	150.0	Waste	Oxide	Gneiss	MxF	0.010	1.0	48	<0.2	<10	30	0.51	0.070	0.70	<0.01	28	0.60	4.0	0.48	1.9	0.48	2.4	0.050	0.31	0.080	<0.005	0.27	15
ABA052	KAM079466	CFD0254	72.0	73.0	Waste	Oxide	Gneiss	MxF	0.010	0.56	11	<0.2	<10	50	0.39	0.26	0.80	0.010	78	2.0	5.0	0.20	0.60	1.0	2.5	0.090	0.23	<0.01	0.0080	0.17	40
ABA063	KAM125214	CFD0307	10.0	11.0	Waste	Oxide	Gneiss	MxF	0.030	0.85	175	<0.2	<10	120	0.40	0.68	0.12	0.010	97	5.8	8.0	1.3	4.5	1.8	4.5	0.11	0.24	0.010	0.014	0.53	54
ABA064	KAM125257	CFD0307	49.0	50.0	Waste	Oxide	Gneiss	MxF	0.17	0.60	114	<0.2	<10	70	0.53	0.16	0.070	0.010	56	1.4	5.0	0.58	1.9	0.63	1.9	0.060	0.41	0.080	<0.005	0.20	31
ABA080	KAM115505	CFR0360	25.9	27.4	Waste	Oxide	Gneiss	MxF	0.010	0.81	100	<0.2	<10	50	0.49	0.11	0.15	0.010	60	2.0	11	0.32	2.7	0.73	2.3	0.060	0.19	0.080	0.021	0.10	34
ABA081	KAM117096	CFR0384	22.9	24.4	Waste	Oxide	Gneiss	MxF	0.020	0.72	138	<0.2	<10	180	0.69	0.13	0.080	0.020	89	1.6	5.0	0.91	2.4	1.3	2.6	0.080	0.070	0.090	0.011	0.16	51
ABA083	KAM119516	CFR0418	19.8	21.3	Waste	Oxide	Gneiss	MxF	<0.01	0.44	14	<0.2	<10	40	0.41	0.060	0.13	<0.01	43	0.90	7.0	1.1	2.7	0.79	2.3	0.060	0.45	0.010	0.011	0.19	23
ABA085	KAM120107	CFR0425	15.2	16.8	Waste	Oxide	Gneiss	MxM	0.020	0.64	43	<0.2	<10	110	0.71	0.080	0.11	0.050	44	2.6	5.0	0.60	3.9	0.97	1.9	0.060	0.21	0.020	<0.005	0.26	24
ABA096	KAM137284	CFR0468	32.0	33.5	Waste	Oxide	Gneiss	MxF	0.24	1.1	44	<0.2	<10	150	0.55	2.1	0.25	0.020	106	4.2	14	1.4	9.5	1.8	5.5	0.080	0.21	0.040	0.015	0.62	49
ABA104	KAM139298	CFR0482	10.7	12.2	Waste	Oxide	Gneiss	MxF	0.020	0.77	256	<0.2	<10	120	1.1	0.15	0.030	0.020	88	1.8	8.0	0.38	12	1.1	2.5	0.070	0.080	0.33	0.0090	0.23	49
ABA136	KAM151967	CFR0584	109.7	111.3	Waste	Oxide	Gneiss	MxF	0.020	0.81	307	<0.2	<10	100	0.71	0.18	0.080	0.030	82	2.1	12	0.36	2.7	1.4	2.4	0.070	0.14	0.25	0.017	0.14	49
ABA137	KAM151932	CFR0584	61.0	62.5	Waste	Oxide	Gneiss	MxF	0.040	0.70	12	<0.2	<10	80	0.46	0.080	0.20	0.010	60	3.0	20	2.7	17	1.2	3.1	0.060	0.22	0.030	0.0080	0.32	34
ABA138	KAM152219	CFR0586	155.5	157.0	Waste	Oxide	Gneiss	MxF	0.030	0.55	48	<0.2	<10	90	0.55	0.10	0.14	0.030	88	1.6	14	0.45	4.9	1.2	1.8	0.070	0.18	0.040	0.0070	0.22	54
ABA144	KAM152716	CFR0591	30.5	32.0	Waste	Oxide	Gneiss	MxF	0.030	0.86	201	<0.2	<10	60	0.69	0.13	0.92	0.020	49	0.70	5.0	0.50	1.9	0.49	1.9	0.050	0.27	0.090	0.012	0.19	28
ABA145	KAM153015	CFR0594	61.0	62.5	Waste	Oxide	Gneiss	MxF	0.040	0.59	72	<0.2	<10	90	0.57	0.27	0.69	0.020	38	1.1	10	0.50	3.1	0.95	2.0	<0.05	0.30	0.14	0.031	0.17	22
ABA146	KAM153091	CFR0594	164.6	166.1	Waste	Oxide	Gneiss	MxF	0.030	1.1	2100	<0.2	<10	110	1.5	0.12	0.27	0.050	54	9.2	39	0.69	8.0	1.3	2.8	0.060	0.16	0.18	0.024	0.14	30
ABA149	KAM153152	CFR0595	61.0	62.5	Waste	Oxide	Gneiss	MxF	0.020	0.45	22	<0.2	<10	20	0.51	0.13	0.61	0.010	55	0.90	10	0.63	2.3	0.53	1.7	0.050	0.24	0.010	0.011	0.17	32
ABA224	R277421	CFD0423	53.0	54.0	Waste	Oxide	Gneiss	MxM	0.020	1.3	823	<0.2	<10	240	1.7	1.2	0.26	0.020	80	21	52	9.4	9.4	4.0	4.4	0.12	0.060	0.91	0.097	0.36	38
ABA225	R272412	CFD0436	9.0	10.0	Waste	Oxide	Gneiss	FG	0.040	1.1	35	<0.2	<10	90	1.2	0.070	0.050	<0.01	70	2.4	5.0	4.7	2.3	1.2	3.6	0.12	0.21	0.050	0.014	0.30	46
ABA226	R272445	CFD0436	38.0	39.0	Waste	Oxide	Gneiss	FG	0.030	1.9	103	<0.2	<10	160	1.8	0.10	0.18	0.030	67	13	114	5.6	13	2.5	5.0	0.14	0.24	0.060	0.022	0.84	39
ABA227	R272537	CFD0436	120.0	121.0	Waste	Oxide	Gneiss	MxF	0.040	0.57	53	<0.2	<10	70	0.69	0.36	0.060	0.030	86	1.4	5.0	1.0	2.0	1.2	2.3	0.11	0.16	0.040	0.018	0.25	44
ABA228	R271769	CFD0425	80.0	81.0	Waste	Oxide	Gneiss	MxF	0.010	0.46	2.7	<0.2	<10	40	0.34	0.060	0.61	0.010	68	1.7	8.0	1.0	2.4	0.87	2.7	0.080	0.38	<0.01	0.015	0.24	43
ABA229	R272589	CFD0436	166.0	167.0	Waste	Oxide	Gneiss	MxF	0.020	0.63	411	<0.2	<10	150	0.51	0.11	0.040	0.030	67	1.8	4.0	0.66	1.9	1.0	1.7	0.090	0.090	0.51	0.0070	0.21	39
ABA230	R280455	CFD0497	90.0	91.0	Waste	Oxide	Gneiss	MxM	0.020	0.33	23	<0.2	<10	220	0.57	0.10	0.72	0.010	37	1.0	8.0	0.58	4.2	0.92	1.6	0.10	0.47	0.020	<0.005	0.22	21
ABA231	R277177	CFD0421	47.0	48.0	Waste	Oxide	Gneiss	MxM	0.020	0.90	54	<0.2	<10	90	0.64	0.14	0.10	0.010	84	2.8	7.0	0.23	5.2	1.2	2.2	0.10	0.22	0.13	0.0080	0.22	46
ABA232	R277505	CFD0426	58.0	59.0	Waste	Oxide	Gneiss	MxM	0.010	0.38	40	<0.2	<10	70	0.37	0.10	0.020	0.010	35	1.6	4.0	0.090	5.3	0.51	1.1	<0.05	0.20	0.11	<0.005	0.10	20
ABA233	R277739	CFD0431	118.0	119.0	Waste	Oxide	Gneiss	MxF	0.050	0.82	154	<0.2	<10	130	0.91	0.14	0.020	0.030	95	1.8	6.0	0.29	2.0	1.2	2.2	0.10	0.17	0.21	<0.005	0.30	58
ABA234	R277403	CFD0423	37.0	38.0	Waste	Oxide	Gneiss	MxM	0.020	0.34	14	<0.2	<10	50	0.45	0.13	0.050	0.010	53	1.5	5.0	0.59	10	0.80	1.6	<0.05	0.30	0.010	<0.005	0.18	24
ABA235	R277137	CFD0421	11.0	12.0	Waste	Oxide	Gneiss	MxM	0.050	1.3	166	<0.2	<10	120	0.82	1.3	0.25	0.020	131	8.0	4.0	2.7	7.9	1.8	4.0	0.15	0.18	0.25	0.023	0.36	72
ABA380	KAM075906	CFD0216	90.0	91.0	Waste	Oxide	Gneiss	MxF	0.090	0.39	434	0.30	10	30	0.53	0.090	0.050	0.030	40	1.4	3.0	1.7	3.8	0.55	0.99	0.080	0.11	0.15	<0.005	0.19	22
ABA382	KAM067845	CFD0221	211.0	212.0	Waste	Oxide	Gneiss	FG	0.010	0.56	96	<0.2	<10	20	0.57	0.060	1.0	0.010	52	1.1	3.0	0.59	1.7	0.78	1.8	0.080	0.53	0.21	<0.005	0.17	30
ABA384	KAM068794	CFD0238	227.0	228.0	Waste	Oxide	Gneiss	FG	0.010	0.65	233	<0.2	<10	70	0.48	0.050	0.040	0.010	53	3.5	4.0	0.23	12	1.0	2.0	0.080	0.52	0.14	0.014	0.070	31
ABA393	KAM030104	CFR0109	50.9	52.4	Waste	Oxide	Gneiss	FG	0.070	0.48	1240	0.40	10	1280	0.58	0.23	0.060	0.030	68	1.4	5.0	0.74	3.1	1.1	1.7	0.080	0.12	0.61	0.016	0.16	42
Statistical Summary						**Oxide**	**Gneiss**	**n**	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
								Max	0.24	1.9	2100	0.40	10	1280	1.8	2.1	1.0	0.060	131	21	114	9.4	17	4.0	5.5	0.15	0.53	0.91	0.097	0.84	72
								90th PCTL	0.067	1.1	535	0.20	10	174	1.1	0.58	0.71	0.030	93	8.8	18	2.7	12	1.8	4.3	0.12	0.44	0.31	0.023	0.36	53
								75th PCTL	0.040	0.86	225	0.20	10	128	0.71	0.18	0.27	0.030	84	3.0	11	1.1	8.0	1.3	2.7	0.098	0.29	0.20	0.016	0.27	46
								Median	0.020	0.68	98	0.20	10	90	0.57	0.13	0.13	0.020	67	1.8	6.5	0.62	3.5	1.0	2.3	0.080	0.21	0.085	0.011	0.22	37
								25th PCTL	0.020	0.55	41	0.20	10	53	0.50	0.093	0.053	0.010	52	1.4	5.0	0.46	2.3	0.79	1.8	0.060	0.16	0.033	0.0050	0.17	29
								10th PCTL	0.010	0.41	14	0.20	10	33	0.40	0.063	0.040	0.010	38	0.93	4.0	0.25	1.9	0.54	1.6	0.050	0.096	0.010	0.0050	0.14	22
								Min	0.010	0.33	2.7	0.20	10	20	0.34	0.050	0.020	0.010	28	0.60	3.0	0.090	0.60	0.48	0.99	0.050	0.060	0.010	0.0050	0.070	15
Upper Transition Facies for Gneiss Waste Rock																															
ABA016	KAM029087	CFD0175	145.0	146.0	Waste	Upper transition	Gneiss	MxF	0.070	1.0	65	<0.2	<10	70	0.75	0.17	2.0	0.050	73	5.6	37	0.81	14	1.5	3.4	0.080	0.52	0.13	0.030	0.16	42
ABA042	KAM050492	CFD0152	146.0	147.0	Waste	Upper transition	Gneiss	MxF	0.010	0.73	40	<0.2	<10	50	0.48	0.020	1.1	0.020	40	0.40	3.0	0.38	1.6	0.43	1.5	0.050	0.23	0.050	<0.005	0.29	22
ABA057	KAM096548	CFD0269	33.0	34.0	Waste	Upper transition	Gneiss	FG	0.12	0.81	177	<0.2	<10	220	0.60	0.13	0.030	0.030	62	1.3	9.0	0.43	4.2	0.91	2.5	0.060	0.16	0.060	<0.005	0.36	38
ABA059	KAM097012	CFD0272	17.0	18.0	Waste	Upper transition	Gneiss	FG	0.040	0.87	56	<0.2	<10	140	0.95	0.040	0.060	0.030	76	2.6	6.0	1.1	5.9	1.0	3.1	0.060	0.24	0.040	0.0070	0.35	34
ABA060	KAM097065	CFD0272	65.0	66.0	Waste	Upper transition	Gneiss	FG	0.080	1.1	368	<0.2	10	130	0.79	0.33	1.2	0.040	62	1.7	4.0	0.74	4.8	1.0	2.7	0.070	0.22	0.58	0.011	0.29	38
ABA069	KAM145287	CFD0338	123.0	124.0	Waste	Upper transition	Gneiss	FG	0.070	0.53	1150	0.20	10	140	1.1	0.66	0.090	0.020	86	2.0	5.0	1.2	3.6	1.0	1.5	0.070	0.10	0.50	0.013	0.30	52
ABA101	KAM137634	CFR0470	109.7	111.3	Waste	Upper transition	Gneiss	MxF	0.070	0.73	100	<0.2	<10	110	0.66	0.55	0.83	0.050	105	4.5	13	2.0	4.8	2.0	3.9	0.090	0.30	0.10	0.030	0.19	57
ABA105	KAM139327	CFR0482	50.3	51.8	Waste	Upper transition	Gneiss	MxF	0.030	0.63	230	<0.2	<10	150	0.84	0.10	0.010	0.020	76	1.6	7.0	0.26	6.6	1.0	2.1	0.060	0.080	0.67	0.011	0.21	40
ABA141	KAM152499	CFR0589	77.7	79.3	Waste	Upper transition	Gneiss	MxF	0.010	0.85	18	<0.2	<10	80	0.67	0.070	0.87	0.010	67	4.2	13	1.6	3.1	1.3	3.2	0.060	0.40	0.010	0.0060	0.49	40
ABA147	KAM152978	CFR0594	10.7	12.2	Waste	Upper transition	Gneiss	MxF	0.050	0.36	3.7	<0.2	<10	40	0.35	0.16	0.77	0.020	42	0.60	8.0	0.16	5.4	0.32	1.2	<0.05	0.32	0.010	0.0050	0.25	24
ABA237	R270907	CFD0412	10.0	11.0	Waste	Upper transition	Gneiss	MxF	0.090	0.63	202	<0.2	<10	60	0.78	0.40	2.2	0.030	71	3.8	22	0.73	3.7	1.5	1.7	0.10	0.20	0.060	0.0060	0.25	42
ABA238	R280433	CFD0497	28.0	29.0	Waste	Upper transition	Gneiss	MxM	0.030	0.57	81	<0.2	<10	70	0.54	2.1	0.040	0.020	48	1.7	5.0	0.30	4.1	0.85	2.0	0.090	0.32	0.020	0.0050	0.21	22
ABA239	Q034712	CFD0473	7.0	8.0	Waste	Upper transition	Gneiss	FG	0.030	0.80	13	<0.2	<10	50	0.62	0.30	0.040	<0.01	46	1.2	7.0	0.17	3.7	0.50	2.2	0.10	0.40	0.020	0.021	0.19	26
ABA240	Q034807	CFD0473	117.0	118.0	Waste	Upper transition	Gneiss	FG	0.020	0.67	383	<0.2	<10	130	0.55	0.16	0.050	0.020	76	2.7	7.0	0.88	5.1	1.3	2.1	0.10	0.080	0.52	0.0080	0.21	46
ABA241	R272496	CFD0436	83.0	84.0	Waste	Upper transition	Gneiss	MxF	0.020	0.62	118	<0.2	<10	40	0.53	0.10	0.080	0.010	66	2.1	5.0	0.88	3.7	0.87	1.9	0.090	0.24	0.11	0.0090	0.17	39
ABA242	R270718	CFD0404	69.0	70.0	Waste	Upper transition	Gneiss	MxF	0.030	0.39	518	<0.2	<10	20	0.70	0.13	0.070	0.050	59	2.1	5.0	0.50	7.5	1.3	1.3	0.060	0.23	0.19	0.0090	0.10	36
ABA243	R271483	CFD0420	51.0	52.0	Waste	Upper transition	Gneiss	MxF	0.010	0.61	345	<0.2	<10	40	0.65	0.080	0.13	<0.01	52	12	3.0	2.9	13	0.87	2.2	0.070	0.14	0.79	0.0080	0.19	54
ABA244	R272865	CFD0441	40.0	41.0	Waste	Upper transition	Gneiss	MxF	0.090	1.1	1235	<0.2	<10	160	1.8	0.070	0.11	0.090	85	5.1	41	1.6	11	2.1	3.4	0.12	0.070	0.92	0.014	0.34	54
ABA245	R278947	CFD0461	10.0	11.0	Waste	Upper transition	Gneiss	MxM	0.060	0.79	1140	0.20	<10	110	0.78	0.46	0.10	0.070	124	4.6	13	0.92	7.8	1.9	2.9	0.12	0.15	2.1	0.030	0.19	63
ABA353	R304081	CFD0525	10.0	11.0	Waste	Upper Transition	Gneiss	MxF	0.15	2.4	252	<0.2	10	510	1.9	0.49	0.39	0.030	60	16	59	3.3	9.4	3.9	7.6	0.090	0.040	0.14	0.020	1.0	21
ABA367	R545582	CFD0524	56.0	57.0	Waste	Upper Transition	Gneiss	MxF	0.070	0.67	663	<0.2	<10	60	0.56	0.17	0.040	0.020	42	1.2	8.0	0.24	4.2	0.99	1.8	<0.05	0.13	2.1	0.0090	0.14	22
ABA373	R271332	CFD0417	58.0	59.0	Waste	Upper Transition	Gneiss	MxF	0.050	0.66	2110	<0.2	<10	170	0.55	0.040	0.040	0.020	72	1.6	5.0	0.79	2.8	1.1	2.1	0.060	0.050	5.2	0.012	0.17	40
ABA385	KAM068709	CFD0238	151.0	152.0	Waste	Upper Transition	Gneiss	MxF	0.090	0.57	217	<0.2	<10	40	0.56	0.10	0.040	0.030	41	0.80	6.0	0.31	4.5	0.72	1.4	0.070	0.39	1.9	<0.005	0.20	23
ABA386	KAM069164	CFD0242	220.5	221.0	Waste	Upper Transition	Gneiss	FG	0.020	0.55	720	0.20	<10	60	0.73	0.12	0.050	0.030	37	5.7	3.0	1.9	5.4	1.4	1.6	0.070	0.25	0.20	0.021	0.16	21
ABA407	R272624	CFD0438	17.0	18.0	Waste	Upper Transition	Gneiss	MxF	0.050	3.1	294	<0.2	<10	340	2.1	0.22	0.46	0.12	75	31	60	5.1	27	4.6	8.2	0.16	0.11	0.10	0.041	1.4	36
ABA411	R544193	CFD0502	40.0	41.0	Waste	Upper Transition	Gneiss	MxF	0.020	1.2	277	<0.2	<10	80	1.9	0.60	0.020	0.010	33	20	28	0.46	12	3.4	4.0	0.10	0.090	1.3	0.10	0.090	14
Statistical Summary						**Upper Transition**	**Gneiss**	**n**	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
								Max	0.15	3.1	2110	0.20	10	510	2.1	2.1	2.2	0.12	124	31	60	5.1	27	4.6	8.2	0.16	0.52	5.2	0.10	1.4	63
								90th PCTL	0.090	1.2	1145	0.20	10	195	1.8	0.58	1.1	0.060	85	14	39	2.4	12	2.7	3.9	0.11	0.40	2.0	0.030	0.43	54
								75th PCTL	0.070	0.87	484	<0.2	<10	140	0.83	0.38	0.69	0.038	75	5.0	13	1.5	7.7	1.5	3.2	0.098	0.29	0.76	0.021	0.30	42
								Median	0.050	0.70	241	<0.2	<10	80	0.69	0.16	0.085	0.025	64	2.4	7.0	0.80	5.0	1.0	2.1	0.070	0.21	0.17	0.010	0.21	38
								25th PCTL	0.023	0.61	85	<0.2	<10	53	0.56	0.10	0.040	0.020	47	1.6	5.0	0.39	3.8	0.88	1.7	0.060	0.10	0.060	0.0063	0.18	23
								10th PCTL	0.015	0.54	29	<0.2	<10	40	0.54	0.055	0.035	0.010	40	1.0	3.5	0.25	3.4	0.61	1.4	0.055	0.075	0.020	<0.005	0.15	21
								Min	0.010	0.36	3.7	<0.2	<10	20	0.35	0.020	0.010	<0.01	33	0.40	3.0	0.16	1.6	0.32	1.2	0.050	<0.05	0.010	<0.005	0.090	14

Appendix C.1-3: Solid Phase Element by Aqua Regia Digestion for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La
									ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm
Lower Transition Facies for Gneiss Waste Rock																															
ABA019	KAM029649	CFD0177	73.0	74.0	Waste	Lower transition	Gneiss	MxM	0.030	0.72	3.6	<0.2	<10	50	0.38	0.080	0.53	0.010	80	1.9	6.0	0.57	2.9	1.1	3.8	0.080	0.38	<0.01	0.0050	0.38	51
ABA020	KAM029658	CFD0177	81.0	82.0	Waste	Lower transition	Gneiss	MxM	0.040	2.0	2.6	<0.2	<10	140	0.80	0.090	3.1	0.030	53	14	77	1.8	12	2.8	7.0	0.090	0.26	<0.01	0.018	1.1	30
ABA047	KAM051446	CFD0166	13.0	14.0	Waste	Lower transition	Gneiss	MxM	0.010	1.8	2.7	<0.2	<10	170	0.40	0.050	1.1	0.010	18	12	43	0.63	2.8	2.4	6.6	0.12	0.090	<0.01	0.016	0.59	9.9
ABA051	KAM079117	CFD0251	51.0	52.0	Waste	Lower transition	Gneiss	MxF	0.030	1.3	13	<0.2	<10	60	0.69	0.48	1.2	0.020	95	4.0	6.0	0.73	2.6	2.0	4.3	0.10	0.26	0.020	0.013	0.27	54
ABA058	KAM096948	CFD0270	230.0	231.0	Waste	Lower transition	Gneiss	MxF	0.070	1.1	42	<0.2	<10	70	0.69	0.41	1.5	0.020	81	1.4	3.0	0.37	1.1	1.1	2.9	0.080	0.20	0.12	<0.005	0.31	50
ABA067	KAM129499	CFD0332	50.0	51.0	Waste	Lower Transition	Gneiss	MxM	0.030	0.61	4.7	<0.2	<10	30	0.33	0.22	0.37	<0.01	66	1.7	6.0	0.54	3.0	0.91	3.5	0.060	0.24	0.010	<0.005	0.39	40
ABA070	KAM099512	CFD0338	10.0	11.0	Waste	Lower transition	Gneiss	MxF	0.010	0.58	14	<0.2	<10	60	0.70	0.20	0.030	<0.01	60	1.8	3.0	0.83	1.7	0.62	2.1	0.050	0.24	0.010	0.015	0.29	22
ABA073	KAM145537	CFD0339	111.0	112.0	Waste	Lower transition	Gneiss	MxF	0.020	0.54	8.8	<0.2	<10	280	0.42	0.14	0.42	<0.01	92	1.1	6.0	1.4	1.4	0.86	2.5	0.080	0.20	0.010	0.0070	0.36	54
ABA098	KAM137429	CFR0469	29.0	30.5	Waste	Lower transition	Gneiss	MxF	0.010	0.98	11	<0.2	<10	190	0.59	0.35	0.30	0.010	120	4.6	11	1.0	6.3	1.8	6.1	0.15	0.22	0.010	0.012	0.67	88
ABA106	KAM139356	CFR0482	89.9	91.4	Waste	Lower transition	Gneiss	MxF	0.030	1.6	37	<0.2	<10	360	1.2	0.22	1.1	0.010	62	14	46	3.8	17	2.3	4.4	0.070	0.18	0.050	0.013	0.98	34
ABA117	KAM122524	CFR0529	21.3	22.9	Waste	Lower transition	Gneiss	FG	<0.01	0.47	2.6	<0.2	<10	20	0.24	0.070	0.39	<0.01	55	0.90	9.0	0.35	2.0	0.55	2.4	0.070	0.26	<0.01	0.022	0.18	34
ABA142	KAM152462	CFR0589	25.9	27.4	Waste	Lower transition	Gneiss	MxF	0.020	0.67	6.5	<0.2	<10	30	0.59	0.090	0.52	<0.01	48	2.5	18	1.4	6.8	1.2	3.3	0.060	0.45	0.010	0.011	0.46	28
ABA150	KAM153129	CFR0595	30.5	32.0	Waste	Lower transition	Gneiss	MxM	0.040	1.8	13	<0.2	<10	130	0.74	0.40	3.1	0.020	39	11	67	5.7	4.9	2.8	6.1	0.11	0.080	0.010	0.028	1.1	19
ABA246	R273797	CFD0458	9.0	10.0	Waste	Lower transition	Gneiss	FG	0.010	0.81	35	<0.2	<10	80	0.66	0.060	0.65	0.030	67	2.2	5.0	0.70	1.8	1.3	2.8	0.11	0.53	0.070	0.016	0.26	40
ABA247	R283019	CFD0484	33.0	34.0	Waste	Lower transition	Gneiss	FG	0.040	1.2	69	<0.2	<10	130	1.2	0.22	0.36	0.030	55	11	56	4.7	19	2.2	3.4	0.060	0.13	0.040	0.028	0.51	24
ABA249	R273398	CFD0447	188.0	189.0	Waste	Lower transition	Gneiss	MxF	0.030	2.1	20	<0.2	<10	180	0.54	0.16	0.28	0.010	23	13	22	5.9	6.0	3.1	6.9	0.15	0.080	0.010	0.016	1.3	8.4
ABA250	R279032	CFD0461	85.0	86.0	Waste	Lower transition	Gneiss	MxM	0.030	1.3	152	<0.2	<10	110	0.64	1.0	1.4	0.060	61	11	22	2.0	9.2	2.5	4.4	0.14	0.34	0.010	0.0080	0.87	35
ABA251	R274019	CFD0464	10.0	11.0	Waste	Lower transition	Gneiss	FG	0.020	0.67	29	<0.2	<10	100	0.74	0.090	0.080	0.030	56	2.4	6.0	0.42	3.5	1.0	2.2	0.10	0.40	0.030	0.015	0.22	29
ABA252	R274341	CFD0467	80.0	81.0	Waste	Lower transition	Gneiss	MxF	0.010	0.35	9.9	<0.2	<10	80	0.43	0.31	0.030	0.010	51	1.3	7.0	0.48	3.0	0.76	1.5	0.090	0.49	<0.01	0.0090	0.18	23
ABA253	R282397	CFD0474	95.0	96.0	Waste	Lower transition	Gneiss	MxF	0.030	0.60	46	<0.2	<10	40	0.66	0.28	0.060	0.010	76	1.8	2.0	0.60	11	1.0	2.0	<0.05	0.29	0.060	0.062	0.13	20
ABA254	R270666	CFD0404	10.0	11.0	Waste	Lower transition	Gneiss	MxF	0.010	0.63	68	<0.2	<10	30	0.64	0.080	0.32	<0.01	41	4.4	22	2.1	5.1	1.4	3.5	0.080	0.39	0.020	<0.005	0.41	25
ABA255	R271756	CFD0424	62.0	63.0	Waste	Lower transition	Gneiss	MxM	0.010	0.67	20	<0.2	<10	70	0.51	0.060	0.15	0.030	87	2.1	5.0	0.30	3.0	1.3	2.1	0.11	0.24	0.010	0.010	0.17	51
ABA256	R271112	CFD0415	8.0	9.0	Waste	Lower transition	Gneiss	MxM	0.060	0.99	170	<0.2	<10	160	0.64	0.26	0.78	0.020	70	3.3	5.0	0.90	5.3	1.4	2.9	0.11	0.30	0.42	0.0090	0.49	43
ABA257	R273315	CFD0447	115.0	116.0	Waste	Lower transition	Gneiss	FG	0.020	0.67	25	<0.2	<10	180	0.66	0.070	0.28	<0.01	42	0.70	5.0	0.15	0.80	0.43	1.7	0.080	0.36	0.040	<0.005	0.23	23
ABA258	R276507	CFD0409	12.0	13.0	Waste	Lower transition	Gneiss	MxM	0.030	0.59	145	<0.2	<10	190	0.97	0.20	0.14	0.010	55	3.3	4.0	0.60	2.5	0.82	1.5	0.060	0.19	0.060	0.0060	0.34	30
ABA259	R280545	CFD0499	10.0	11.0	Waste	Lower transition	Gneiss	MxM	0.020	0.95	16	<0.2	<10	440	0.35	0.35	0.26	0.020	95	3.7	11	1.0	3.9	2.0	5.2	0.14	0.19	<0.01	0.017	0.65	47
ABA260	R280565	CFD0499	28.0	29.0	Waste	Lower transition	Gneiss	MxM	0.010	0.50	22	<0.2	<10	60	0.43	0.25	0.070	0.020	50	2.0	6.0	0.59	2.3	1.1	2.7	0.10	0.41	0.010	0.0080	0.29	24
ABA261	R274115	CFD0464	95.0	96.0	Waste	Lower transition	Gneiss	MxF	0.020	1.0	70	<0.2	<10	620	1.1	0.090	2.6	0.030	53	7.4	34	3.1	13	1.8	3.0	0.12	0.31	0.060	0.0090	0.61	31
ABA262	R274262	CFD0467	10.0	11.0	Waste	Lower transition	Gneiss	MxF	0.010	0.37	16	<0.2	<10	60	0.42	0.18	0.28	0.010	43	0.90	7.0	0.49	1.3	0.65	1.6	0.090	0.40	0.010	0.0070	0.25	24
ABA263	R282302	CFD0474	10.0	11.0	Waste	Lower transition	Gneiss	FG	0.050	1.3	90	<0.2	<10	70	0.81	0.070	0.020	0.020	61	1.1	5.0	0.24	2.0	0.82	3.1	0.050	0.14	0.11	0.0070	0.31	40
ABA264	R271435	CFD0420	9.0	10.0	Waste	Lower transition	Gneiss	MxF	0.020	0.51	166	<0.2	<10	60	0.83	0.070	0.11	0.010	79	4.4	13	2.9	4.8	1.2	2.3	0.070	0.27	0.060	<0.005	0.28	51
ABA265	R271165	CFD0415	55.0	56.0	Waste	Lower transition	Gneiss	MxF	0.020	0.57	4.8	<0.2	<10	60	0.36	0.21	0.45	0.010	93	1.6	6.0	1.6	1.3	1.7	3.4	0.11	0.21	0.010	0.018	0.32	57
ABA267	R273694	CFD0456	97.0	98.0	Waste	Lower transition	Gneiss	MxM	0.030	4.2	2.7	<0.2	<10	270	0.52	0.16	2.1	0.010	4.3	20	155	8.8	21	7.3	12	0.23	0.040	<0.01	0.030	2.2	2.1
ABA269	R279507	CFD0468	60.0	61.0	Waste	Lower transition	Gneiss	MxF	0.020	0.98	41	<0.2	<10	300	0.34	0.56	0.20	0.010	111	5.0	8.0	0.77	8.5	1.9	4.5	0.15	0.24	0.010	0.0070	0.62	59
ABA270	R272186	CFD0433	10.0	11.0	Waste	Lower transition	Gneiss	MxF	0.040	0.77	6.8	<0.2	<10	40	0.58	0.10	0.010	0.020	50	1.2	5.0	0.25	1.3	0.59	2.0	0.10	0.17	0.010	<0.005	0.28	31
ABA271	R283079	CFD0484	87.0	88.0	Waste	Lower transition	Gneiss	FG	0.010	0.86	13	<0.2	<10	90	0.64	0.060	0.23	0.020	84	6.1	18	3.0	7.4	1.6	2.7	0.070	0.19	0.010	0.014	0.49	49
ABA272	Q034772	CFD0473	86.0	87.0	Waste	Lower transition	Gneiss	MxF	0.020	1.3	42	<0.2	<10	160	0.87	0.10	0.53	0.030	76	14	23	4.2	17	2.5	4.4	0.13	0.14	<0.01	0.011	0.61	44
ABA273	R282171	CFD0439	30.0	31.0	Waste	Lower transition	Gneiss	MxF	0.020	0.97	56	<0.2	<10	100	0.95	0.070	0.030	0.020	95	2.1	4.0	2.1	2.6	1.2	2.9	0.12	0.11	0.070	0.0060	0.26	55
ABA274	R277372	CFD0423	10.0	11.0	Waste	Lower transition	Gneiss	MxM	0.010	0.43	4.2	<0.2	<10	50	0.26	0.25	0.13	0.030	54	4.1	6.0	0.83	5.3	0.79	2.3	0.050	0.18	0.010	0.0070	0.20	25
ABA275	R283492	CFD0496	10.0	11.0	Waste	Lower transition	Gneiss	MxF	0.020	0.93	27	<0.2	<10	200	0.34	0.47	0.21	<0.01	105	3.7	7.0	0.92	3.5	1.8	4.4	0.15	0.20	<0.01	0.012	0.59	62
ABA276	R273866	CFD0460	63.0	64.0	Waste	Lower transition	Gneiss	FG	0.010	0.81	17	<0.2	<10	40	0.65	0.19	0.76	0.010	58	4.4	18	1.6	4.2	1.7	3.4	0.11	0.53	<0.01	0.018	0.50	35
ABA277	R273898	CFD0460	91.0	92.0	Waste	Lower transition	Gneiss	MxF	0.020	1.2	16	<0.2	<10	200	0.60	0.15	2.6	0.020	98	8.1	5.0	0.66	14	2.5	4.5	0.15	0.45	<0.01	0.011	1.0	55
ABA278	Q035773	CFD0491	9.0	10.0	Waste	Lower transition	Gneiss	MxF	0.010	0.84	67	<0.2	<10	60	0.72	0.070	0.080	0.010	69	2.7	4.0	2.4	2.8	1.0	2.8	0.10	0.30	0.050	0.0050	0.32	43
ABA279	Q035789	CFD0491	60.0	61.0	Waste	Lower transition	Gneiss	MxF	0.080	1.5	190	<0.2	<10	70	0.71	0.52	0.060	0.090	74	1.7	3.0	0.78	22	0.97	3.9	0.10	0.21	0.13	0.074	0.14	41
ABA280	R271699	CFD0424	12.0	13.0	Waste	Lower transition	Gneiss	MxF	0.010	0.42	13	<0.2	<10	70	0.47	0.10	0.060	0.050	86	1.8	7.0	0.67	1.8	1.3	2.0	0.11	0.16	0.020	0.0090	0.26	50
ABA282	R282102	CFD0437	70.0	71.0	Waste	Lower transition	Gneiss	MxF	0.020	0.92	55	<0.2	<10	60	0.71	0.060	0.020	<0.01	44	1.2	4.0	0.19	4.1	0.49	2.0	0.10	0.26	0.070	<0.005	0.21	29
ABA283	R273302	CFD0447	59.0	60.0	Waste	Lower transition	Gneiss	FG	0.020	1.7	19	<0.2	<10	470	0.96	0.060	2.4	0.020	85	12	42	3.7	14	2.5	4.3	0.17	0.15	0.010	0.017	1.3	50
ABA284	R273593	CFD0456	7.0	8.0	Waste	Lower transition	Gneiss	MxF	0.010	1.8	17	<0.2	<10	300	0.62	0.080	0.21	0.010	46	11	50	2.7	4.0	2.5	5.3	0.13	0.17	0.040	0.017	1.1	20
ABA338	R270835	CFD0406	32.0	33.0	Waste	Lower Transition	Gneiss	MxF	0.020	0.42	17	<0.2	<10	180	0.84	0.10	1.9	0.050	63	4.2	13	1.7	6.2	1.3	2.7	0.070	0.53	<0.01	0.015	0.27	38
ABA339	R270848	CFD0406	58.0	58.3	Waste	Lower Transition	Gneiss	MxF	0.010	0.57	8.3	<0.2	<10	30	0.42	0.25	0.97	<0.01	80	1.8	4.0	1.8	5.6	0.93	3.1	0.10	0.37	<0.01	0.052	0.19	49
ABA340	R270686	CFD0404	27.0	28.0	Waste	Lower Transition	Gneiss	MxM	0.020	1.9	16	<0.2	<10	230	1.2	0.030	1.4	0.020	21	21	97	2.8	26	2.6	4.6	0.10	0.14	0.010	0.0060	1.5	12
ABA341	R270737	CFD0404	85.0	86.0	Waste	Lower Transition	Gneiss	FG	0.050	0.58	8.5	<0.2	<10	90	0.84	0.16	1.3	0.040	63	6.9	37	1.3	6.8	1.5	2.3	0.070	0.44	<0.01	0.0070	0.35	39
ABA342	R551085	CFD0563	10.0	11.0	Waste	Lower Transition	Gneiss	MxM	0.010	0.73	11	<0.2	<10	70	0.36	0.36	0.78	<0.01	52	3.9	11	1.9	3.0	1.3	3.0	0.070	0.27	<0.01	0.010	0.48	27
ABA343	R551107	CFD0563	30.0	31.0	Waste	Lower Transition	Gneiss	MxM	0.020	1.9	5.3	<0.2	<10	250	0.70	0.21	3.6	0.040	15	22	122	1.9	5.3	2.6	6.1	0.14	0.080	<0.01	0.010	1.1	7.6
ABA344	R551131	CFD0563	50.0	51.0	Waste	Lower Transition	Gneiss	MxM	0.010	2.2	2.6	<0.2	<10	430	0.81	0.050	2.3	0.020	12	17	96	2.6	6.7	3.1	6.0	0.12	0.080	<0.01	0.010	1.3	5.8
ABA348	R304313	CFD0541	56.0	57.0	Waste	Lower Transition	Gneiss	MxM	0.010	2.5	39	<0.2	<10	480	1.2	0.56	0.63	0.020	86	18	165	6.4	2.3	4.1	9.7	0.19	0.13	0.030	0.036	1.0	45
ABA360	R623829	CFD0555	10.0	11.0	Waste	Lower Transition	Gneiss	MxF	0.010	0.40	13	<0.2	<10	120	0.32	0.15	0.060	0.010	47	1.6	8.0	0.38	1.3	1.1	1.8	0.050	0.42	<0.01	<0.005	0.25	26
ABA361	R623933	CFD0555	102.0	103.0	Waste	Lower Transition	Gneiss	MxF	0.020	1.6	16	<0.2	<10	1320	2.2	0.050	1.9	0.050	29	16	62	2.4	13	3.4	7.3	0.14	0.18	<0.01	0.018	1.4	15
ABA362	R507027	CFD0555	185.0	186.0	Waste	Lower Transition	Gneiss	FG	0.010	0.63	12	<0.2	<10	40	0.96	0.070	1.2	0.010	72	1.5	10	1.3	2.5	0.94	2.3	0.070	0.25	0.010	0.0090	0.27	43
ABA363	R545397	CFD0520	20.0	21.0	Waste	Lower Transition	Gneiss	FG	0.010	0.60	141	<0.2	<10	60	0.50	0.15	0.040	0.010	58	1.4	5.0	0.17	1.7	0.94	1.9	0.050	0.12	1.7	0.031	0.10	33
ABA364	R545422	CFD0520	41.0	42.0	Waste	Lower Transition	Gneiss	FG	0.020	0.60	51	<0.2	<10	60	0.56	0.30	0.020	0.010	54	1.4	4.0	0.12	3.5	0.67	1.6	0.050	0.11	0.68	0.014	0.15	29
ABA366	R545552	CFD0524	30.0	31.0	Waste	Lower Transition	Gneiss	MxF	0.010	0.50	238	<0.2	<10	70	0.48	0.37	0.47	0.020	50	1.5	5.0	0.27	6.7	0.84	1.6	0.050	0.32	1.3	0.0060	0.13	29
ABA369	R545644	CFD0526	81.0	82.0	Waste	Lower Transition	Gneiss	MxF	0.020	0.54	50	<0.2	<10	50	0.70	0.29	0.18	<0.01	45	1.2	5.0	0.73	3.6	0.78	1.9	0.050	0.38	0.52	0.011	0.17	24
ABA370	R545697	CFD0528	42.0	43.0	Waste	Lower Transition	Gneiss	MxF	0.020	0.84	70	<0.2	<10	70	1.2	0.070	0.040	0.030	69	2.2	6.0	0.27	2.8	0.71	2.3	0.060	0.23	0.040	0.0070	0.20	42
ABA371	R271272	CFD0417	5.0	6.0	Waste	Lower Transition	Gneiss	MxF	0.020	0.57	3.8	<0.2	<10	70	0.43	0.16	0.20	0.010	91	1.5	5.0	0.84	2.6	1.0	3.0	0.080	0.33	<0.01	0.010	0.37	53
ABA372	R271299	CFD0417	30.0	30.7	Waste	Lower Transition	Gneiss	MxF	0.060	0.88	332	<0.2	<10	100	0.81	0.50	0.060	0.020	87	1.6	3.0	1.2	1.3	0.92	2.7	0.070	0.060	0.84	0.0080	0.24	50
ABA376	R279575	CFD0468	120.0	121.0	Waste	Lower Transition	Gneiss	MxF	0.020	1.1	29	<0.2	<10	40	1.1	0.050	0.42	0.010	47	6.6	47	2.3	9.2	1.7	4.8	0.12	0.48	0.010	0.0060	0.72	28
ABA390	R278608	CFD0450	10.0	11.0	Waste	Lower Transition	Gneiss	MxF	0.040	1.7	88	<0.2	<10	160	1.9	0.080	0.23	0.030	78	13	138	4.9	17	2.2	4.8	0.11	0.20	0.11	0.019	0.44	48
ABA391	R278677	CFD0450	71.0	72.0	Waste	Lower Transition	Gneiss	MxF	0.020	0.65	128	<0.2	<10	70	0.60	0.090	0.020	0.020	50	1.8	4.0	0.21	3.1	0.72	2.0	0.070	0.12	0.090	<0.005	0.18	29
ABA392	R278725	CFD0450	114.0	114.3	Waste	Lower Transition	Gneiss	MxF	0.040	0.91	98	<0.2	<10	80	0.61	0.32	0.040	0.020	65	1.3	7.0	0.25	1.9	0.76	2.5	0.080	0.16	0.21	0.012	0.27	37
ABA395	R545811	CFD0529	58.0	59.0	Waste	Lower Transition	Gneiss	FG	0.020	0.34	21	<0.2	<10	40	0.48	0.14	0.10	<0.01	75	0.60	5.0	0.45	1.6	0.58	1.5	0.080	0.31	0.010	0.013	0.12	43
ABA399	R543714	CFD0549	30.0	31.0	Waste	Lower Transition	Gneiss	MxF	0.010	0.27	11	<0.2	<10	30	0.45	0.090	0.28	<0.01	48	0.80	5.0	0.53	1.5	0.50	1.3	0.070	0.38	<0.01	0.0060	0.14	27
ABA400	R543741	CFD0549	53.0	54.0	Waste	Lower Transition	Gneiss	MxF	0.060	0.57	163	<0.2	<10	30	0.41	0.10	0.030	0.32	41	1.6	5.0	0.34	3.1	0.55	1.6	0.070	0.26	0.36	0.0050	0.21	23
ABA402	R544003	CFD0553	80.0	81.0	Waste	Lower Transition	Gneiss	MxF	0.040	0.37	27	<0.2	<10	40	0.64	0.10	0.25	0.040	64	1.4	6.0	0.76	3.7	1.0	1.7	0.090	0.46	0.020	<0.005	0.19	43
ABA405	R554003	CFD0501	10.0	11.0	Waste	Lower Transition	Gneiss	MxF	0.020	0.70	56	<0.2	<10	50	0.68	0.060	0.020	0.010	53	1.0	3.0	0.41	2.7	0.61	1.6	0.070	0.13	0.10	0.0050	0.15	28
ABA406	R554039	CFD0501	42.0	43.0	Waste	Lower Transition	Gneiss	MxF	0.030	0.36	7.6	<0.2	<10	390	0.39	0.14	0.37	0.14	84	2.0	4.0	0.66	2.1	0.57	1.5	0.10	0.27	0.010	<0.005	0.25	47
ABA409	R272762	CFD0438	184.0	185.0	Waste	Lower Transition	Gneiss	FG	0.020	0.41	26	<0.2	<10	140	0.58	0.14	1.5	0.040	84	1.7	6.0	0.46	1.1	1.4	1.9	0.090	0.29	0.010	0.013	0.23	51
ABA410	R544159	CFD0502	10.0	11.0	Waste	Lower Transition	Gneiss	MxF	0.060	1.5	214	<0.2	<10	150	1.3	0.14	0.16	0.030	73	10	8.0	2.4	19	2.1	4.3	0.13	0.15	0.050	0.022	0.76	40
ABA412	R544228	CFD0502	70.0	71.0	Waste	Lower Transition	Gneiss	MxF	0.030	1.4	19	<0.2	<10	70	1.8	0.21	2.2	0.040	76	11	44	2.7	14	2.1	4.6	0.13	0.39	0.010	0.026	1.0	41
Statistical Summary						**Lower Transition**	**Gneiss**	**n**	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79
								Max	0.080	4.2	332	<0.2	<10	1320	2.2	1.0	3.6	0.32	120	22	165	8.8	26	7.3	12	0.23	0.53	1.7	0.074	2.2	88
								90th PCTL	0.042	1.8	146	<0.2	<10	312	1.2	0.40	2.1	0.040	92	14	63	3.8	15	2.6	6.1	0.14	0.44	0.15	0.026	1.1	53
								75th PCTL	0.030	1.3	56	<0.2	<10	180	0.81	0.25	1.0	0.030	80	7.8	22	2.2	6.8	2.1	4.4	0.12	0.35	0.060	0.016	0.62	48
								Median	0.020	0.81	20	<0.2	<10	80	0.64	0.14	0.28	0.020	62	2.4	7.0	0.84	3.5	1.2	2.9	0.090	0.24	0.010	0.010	0.32	35
								25th PCTL	0.010	0.57	11	<0.2	<10	60	0.46	0.080	0.080	0.010	50	1.6	5.0	0.49	2.3	0.83	2.0	0.070	0.16	<0.01	0.0060	0.23	26
								10th PCTL	0.010	0.42	4.6	<0.2	<10	40	0.36	0.060	0.030	<0.01	40	1.2	4.0	0.27	1.4	0.61	1.6	0.050	0.11	<0.01	<0.005	0.17	19
								Min	<0.01	0.27	2.6	<0.2	<10	20	0.24	0.030	0.010	<0.01	4.3	0.60	2.0	0.12	0.80	0.43	1.3	<0.05	0.040	<0.01	<0.005	0.10	2.1

Appendix C.1-3: Solid Phase Element by Aqua Regia Digestion for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La
									ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm
Fresh Facies for Gneiss Waste Rock																															
ABA065	KAM128393	CFD0326	25.0	26.0	Waste	Fresh	Gneiss	MxM	0.030	1.1	125	<0.2	<10	190	0.73	0.68	0.19	0.030	133	5.8	9.0	1.2	12	1.9	5.0	0.12	0.18	0.070	0.022	0.49	78
ABA066	KAM128504	CFD0326	75.0	76.0	Waste	Fresh	Gneiss	MxM	0.020	0.98	16	<0.2	<10	80	0.45	1.5	0.30	0.010	104	4.2	7.0	2.4	2.3	2.0	5.2	0.090	0.31	0.020	0.012	0.66	58
ABA071	KAM145241	CFD0338	81.0	82.0	Waste	Fresh	Gneiss	MxM	0.010	1.1	5.1	<0.2	<10	190	1.4	0.040	4.0	0.050	68	9.7	183	3.6	3.9	2.0	6.3	0.11	0.24	0.020	0.031	1.0	35
ABA097	KAM137325	CFR0468	88.4	89.9	Waste	Fresh	Gneiss	MxM	0.020	1.6	22	<0.2	<10	220	0.73	0.20	0.61	0.020	63	13	31	1.7	8.9	2.6	5.9	0.090	0.21	0.010	0.0070	1.2	38
ABA099	KAM137468	CFR0469	82.3	83.8	Waste	Fresh	Gneiss	MxM	0.030	1.9	30	<0.2	<10	290	0.50	1.1	3.2	0.030	29	18	366	1.5	9.5	2.5	6.8	0.10	0.13	0.010	0.019	1.2	16
ABA108	KAM139795	CFR0486	25.9	27.4	Waste	Fresh	Gneiss	MxM	0.010	0.97	19	<0.2	<10	160	0.48	1.1	0.12	0.010	96	6.0	10	1.4	4.1	1.5	4.5	0.10	0.26	0.040	0.020	0.57	55
ABA139	KAM152151	CFR0586	61.0	62.5	Waste	Fresh	Gneiss	MxF	0.010	0.59	20	<0.2	<10	40	0.53	0.090	0.19	0.010	72	1.4	13	1.8	2.8	0.88	3.2	0.080	0.35	0.020	0.020	0.26	43
ABA140	KAM152186	CFR0586	109.7	111.3	Waste	Fresh	Gneiss	MxF	0.020	0.40	3.8	<0.2	<10	30	0.40	0.23	0.43	<0.01	48	0.60	13	0.47	2.9	0.58	1.8	0.050	0.37	0.010	0.021	0.25	27
ABA143	KAM152536	CFR0589	128.0	129.5	Waste	Fresh	Gneiss	FG	0.030	0.55	99	<0.2	<10	110	0.61	0.42	1.5	0.010	62	0.80	11	0.68	2.6	0.81	2.2	0.060	0.14	0.020	0.046	0.18	37
ABA148	KAM153051	CFR0594	109.7	111.3	Waste	Fresh	Gneiss	MxF	0.010	0.66	245	<0.2	<10	40	0.79	0.17	0.74	0.020	63	1.7	11	1.2	2.7	0.85	2.5	0.060	0.36	0.050	0.014	0.23	38
ABA285	R277457	CFD0426	16.0	17.0	Waste	Fresh	Gneiss	MxM	0.040	1.3	4.7	<0.2	<10	170	0.32	0.18	1.2	0.030	28	17	93	0.87	20	2.3	4.5	0.090	0.15	<0.01	0.0070	0.68	16
ABA286	R279452	CFD0468	11.0	12.0	Waste	Fresh	Gneiss	MxF	0.020	1.1	16	<0.2	<10	230	0.50	0.98	0.15	0.010	112	5.0	6.0	0.72	9.3	1.8	4.2	0.15	0.23	<0.01	0.015	0.73	54
ABA287	R274861	CFD0472	100.0	101.0	Waste	Fresh	Gneiss	MxM	0.030	1.1	7.4	<0.2	<10	120	0.37	0.24	1.3	0.010	42	11	33	0.86	19	2.0	3.1	0.060	0.17	<0.01	0.012	0.77	26
ABA288	R283657	CFD0498	82.0	83.0	Waste	Fresh	Gneiss	MxM	0.11	0.97	6.1	<0.2	<10	110	0.36	1.5	0.10	0.010	67	4.2	5.0	0.95	4.3	1.7	3.6	0.13	0.29	<0.01	0.011	0.68	34
ABA289	Q035925	CFD0495	94.0	95.0	Waste	Fresh	Gneiss	MxM	0.090	1.4	2.6	<0.2	<10	100	0.65	1.1	0.76	0.060	108	6.4	6.0	0.96	16	1.9	5.9	0.15	0.31	<0.01	0.013	0.79	65
ABA290	R272262	CFD0433	123.0	124.0	Waste	Fresh	Gneiss	MxF	0.020	0.56	23	<0.2	<10	90	0.57	0.13	0.080	0.020	89	1.8	6.0	0.80	2.2	1.3	2.4	0.11	0.24	0.020	0.0070	0.31	51
ABA293	R276133	CFD0393	45.0	46.0	Waste	Fresh	Gneiss	MxM	0.030	2.3	2.0	<0.2	<10	560	0.62	1.6	3.0	0.020	17	20	147	2.4	4.4	3.0	7.2	0.12	0.080	<0.01	0.012	1.2	8.2
ABA294	R276236	CFD0401	18.0	19.0	Waste	Fresh	Gneiss	MxM	0.080	1.9	2.3	<0.2	<10	470	0.48	8.4	2.2	0.050	9.8	19	86	1.8	8.3	2.6	4.7	0.090	0.060	0.010	0.011	0.97	5.1
ABA295	R271028	CFD0412	117.0	118.0	Waste	Fresh	Gneiss	MxF	0.010	0.48	26	<0.2	<10	140	0.51	0.070	0.54	0.030	86	1.4	5.0	0.65	2.2	1.3	2.3	0.12	0.30	<0.01	0.0080	0.30	52
ABA297	R279539	CFD0468	89.0	90.0	Waste	Fresh	Gneiss	MxF	0.010	1.4	8.9	<0.2	<10	120	0.47	0.21	1.5	0.010	58	5.0	35	1.6	3.3	1.9	4.5	0.11	0.37	<0.01	0.010	0.94	34
ABA298	R275689	CFD0495	57.0	58.0	Waste	Fresh	Gneiss	MxM	0.020	2.1	5.5	<0.2	<10	380	0.44	0.36	2.4	0.010	15	18	114	1.4	4.8	2.6	6.0	0.21	0.11	<0.01	0.016	1.1	7.3
ABA299	R272239	CFD0433	57.0	58.0	Waste	Fresh	Gneiss	MxF	0.020	0.41	14	<0.2	<10	60	0.49	0.070	0.80	0.030	56	1.5	5.0	0.53	4.5	0.97	1.9	0.10	0.28	0.010	0.0060	0.29	34
ABA300	R278428	CFD0445	118.0	119.0	Waste	Fresh	Gneiss	MxF	0.010	0.66	2.1	<0.2	<10	70	0.42	0.10	0.40	0.010	94	1.4	7.0	1.3	1.8	1.1	3.1	0.13	0.20	<0.01	0.012	0.40	55
ABA301	R273296	CFD0447	10.0	11.0	Waste	Fresh	Gneiss	FG	0.020	0.54	2.0	<0.2	<10	60	0.36	0.040	0.38	0.010	92	1.5	8.0	0.52	2.9	1.1	2.8	0.12	0.21	<0.01	0.0050	0.32	56
ABA302	R270935	CFD0412	35.0	36.0	Waste	Fresh	Gneiss	MxF	0.010	2.1	18	<0.2	<10	180	0.63	0.020	1.4	0.020	39	15	61	2.4	16	2.9	5.3	0.16	0.23	<0.01	0.0090	1.6	23
ABA346	R277538	CFD0426	87.0	88.0	Waste	Fresh	Gneiss	MxM	0.020	1.5	25	<0.2	<10	310	0.40	0.060	0.64	<0.01	20	16	63	1.9	29	2.5	5.1	0.10	0.080	<0.01	0.0080	0.83	10
ABA347	R304284	CFD0541	30.0	31.0	Waste	Fresh	Gneiss	FG	0.010	0.22	4.7	<0.2	<10	30	0.37	0.060	0.050	<0.01	48	2.2	7.0	0.24	5.6	0.44	0.88	0.050	0.25	<0.01	<0.005	0.13	28
ABA350	R304041	CFD0539	10.0	11.0	Waste	Fresh	Gneiss	FG	0.010	0.35	4.5	<0.2	<10	40	0.42	0.080	0.050	<0.01	51	1.1	6.0	0.18	4.1	0.68	1.7	0.050	0.22	<0.01	0.0060	0.17	26
ABA351	R304231	CFD0539	45.0	46.0	Waste	Fresh	Gneiss	MxM	0.030	2.3	8.5	<0.2	<10	330	0.47	0.12	0.34	0.010	52	15	66	1.9	7.8	3.3	6.8	0.10	0.030	<0.01	0.013	0.99	26
ABA354	R304119	CFD0525	45.0	46.0	Waste	Fresh	Gneiss	MxM	0.010	2.0	5.3	<0.2	<10	170	0.38	0.11	0.69	0.010	56	14	51	1.7	13	3.2	6.4	0.10	0.040	<0.01	0.013	0.87	29
ABA355	R304173	CFD0525	91.0	92.0	Waste	Fresh	Gneiss	FG	0.010	0.34	3.6	<0.2	<10	10	0.30	0.14	0.29	<0.01	43	1.2	9.0	0.30	2.6	0.61	1.8	0.060	0.29	<0.01	0.011	0.090	24
ABA356	R623617	CFD0548	10.0	11.0	Waste	Fresh	Gneiss	MxF	0.010	1.2	6.1	<0.2	<10	250	0.52	0.18	0.26	0.010	35	8.1	12	1.2	5.8	1.7	4.1	0.060	0.060	0.010	0.0070	0.82	18
ABA357	R623685	CFD0548	70.0	71.0	Waste	Fresh	Gneiss	MxF	0.010	1.2	6.1	<0.2	<10	60	0.80	0.030	0.99	0.010	57	8.2	48	1.4	8.5	1.8	4.5	0.090	0.37	<0.01	0.0080	0.80	33
ABA358	R623742	CFD0548	120.0	121.0	Waste	Fresh	Gneiss	MxF	0.030	0.40	6.2	<0.2	<10	670	0.40	0.090	0.87	0.010	40	1.3	7.0	0.20	3.5	0.99	1.6	<0.05	0.48	<0.01	<0.005	0.20	23
ABA365	R545443	CFD0520	60.0	61.0	Waste	Fresh	Gneiss	FG	0.020	0.47	2.4	<0.2	<10	80	0.35	0.69	0.12	<0.01	91	1.5	5.0	1.1	2.5	1.0	3.0	0.090	0.26	<0.01	0.0090	0.28	59
ABA374	R271368	CFD0417	91.0	92.0	Waste	Fresh	Gneiss	FG	0.020	0.52	4.2	<0.2	<10	60	0.45	0.050	0.42	0.010	93	2.4	6.0	2.4	5.6	1.3	4.0	0.12	0.39	<0.01	0.011	0.35	57
ABA378	R279593	CFD0468	135.0	136.0	Waste	Fresh	Gneiss	MxF	0.010	1.9	5.5	<0.2	<10	240	0.47	0.040	1.9	0.010	62	9.3	10	1.9	1.9	2.7	6.1	0.12	0.14	<0.01	0.012	1.3	36
ABA379	R279615	CFD0468	155.0	155.7	Waste	Fresh	Gneiss	MxF	0.040	2.2	7.9	<0.2	<10	390	0.48	0.51	1.1	0.010	49	15	45	2.0	16	3.2	7.1	0.18	0.090	<0.01	0.014	1.2	27
ABA381	R511981	CFR0700	48.8	49.4	Waste	Fresh	Gneiss	MxM	0.020	1.7	10	<0.2	<10	180	0.85	0.48	4.4	0.020	32	13	55	5.1	9.8	2.7	5.4	0.17	0.40	0.040	0.028	0.35	15
ABA387	Q034442	CFD0469	19.0	20.0	Waste	Fresh	Gneiss	MxF	0.050	1.1	6.1	<0.2	<10	90	1.2	0.23	0.20	0.020	88	6.7	56	2.0	6.8	1.7	4.3	0.13	0.43	0.020	0.017	0.67	51
ABA388	Q034516	CFD0469	102.0	103.0	Waste	Fresh	Gneiss	MxF	0.12	0.56	4.2	<0.2	<10	80	0.44	6.5	0.65	0.030	101	1.8	6.0	0.96	6.3	1.1	2.9	0.11	0.29	<0.01	0.0090	0.36	63
ABA389	Q034537	CFD0469	121.0	121.9	Waste	Fresh	Gneiss	MxF	0.010	0.54	44	<0.2	<10	70	0.67	0.11	0.080	<0.01	86	1.7	6.0	3.2	9.4	1.2	2.6	0.10	0.23	0.050	0.011	0.25	49
ABA396	R545818	CFD0529	65.0	66.0	Waste	Fresh	Gneiss	MxF	0.010	0.50	5.1	<0.2	<10	40	0.38	0.16	0.17	<0.01	65	1.3	8.0	0.32	5.2	0.80	3.2	0.090	0.30	0.010	0.028	0.11	36
ABA398	R543692	CFD0549	10.0	11.0	Waste	Fresh	Gneiss	FG	0.020	0.37	13	<0.2	<10	30	0.43	0.30	0.060	0.010	31	0.60	5.0	0.83	2.7	0.73	2.2	0.070	0.36	<0.01	<0.005	0.19	16
ABA401	R543957	CFD0553	40.0	41.0	Waste	Fresh	Gneiss	MxF	0.020	2.2	8.8	<0.2	<10	300	0.79	0.11	3.3	0.010	61	16	17	5.4	3.7	3.7	7.7	0.13	0.13	0.010	0.029	1.4	33
ABA404	R550544	CFD0553	160.0	161.0	Waste	Fresh	Gneiss	MxF	0.030	0.25	37	<0.2	<10	840	0.42	0.16	2.3	0.030	58	1.3	8.0	0.64	2.8	0.90	1.2	0.080	0.42	0.010	0.0070	0.12	39
ABA408	R272713	CFD0438	96.0	97.0	Waste	Fresh	Gneiss	MxF	0.010	0.45	5.1	<0.2	<10	70	0.56	0.060	0.44	0.020	74	1.4	6.0	0.57	0.90	0.80	2.3	0.090	0.33	<0.01	0.012	0.24	44
ABA413	R276141	CFD0393	127.0	128.0	Waste	Fresh	Gneiss	MxM	0.58	2.3	9.5	<0.2	<10	220	0.59	2.1	4.1	0.060	26	18	178	1.7	7.6	3.0	8.7	0.17	0.13	<0.01	0.029	0.64	14
ABA414	R276153	CFD0393	170.0	171.0	Waste	Fresh	Gneiss	MxM	0.030	1.4	6.3	<0.2	<10	80	0.70	0.31	4.2	0.060	25	13	63	0.99	11	2.2	6.1	0.20	0.21	<0.01	0.027	0.18	14
Statistical Summary						**Fresh**	**Gneiss**	**n**	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49
								Max	0.58	2.3	245	<0.2	<10	840	1.4	8.4	4.4	0.060	133	20	366	5.4	29	3.7	8.7	0.21	0.48	0.070	0.046	1.6	78
								90th PCTL	0.056	2.2	31	<0.2	<10	382	0.79	1.5	3.2	0.034	97	17	97	2.4	16	3.0	6.8	0.16	0.37	0.024	0.028	1.2	57
								75th PCTL	0.030	1.6	18	<0.2	<10	230	0.62	0.51	1.5	0.020	86	13	55	1.9	9.3	2.5	5.9	0.12	0.31	0.010	0.017	0.87	51
								Median	0.020	1.1	6.3	<0.2	<10	120	0.48	0.18	0.64	0.010	58	5.0	11	1.2	4.8	1.7	4.2	0.10	0.24	<0.01	0.012	0.57	34
								25th PCTL	0.010	0.52	4.7	<0.2	<10	70	0.42	0.090	0.20	0.010	40	1.5	6.0	0.72	2.8	0.99	2.5	0.090	0.14	<0.01	0.0080	0.25	23
								10th PCTL	0.010	0.39	2.6	<0.2	<10	40	0.37	0.048	0.096	<0.01	26	1.3	5.8	0.44	2.3	0.79	1.8	0.060	0.080	<0.01	0.0060	0.18	14
								Min	0.010	0.22	2.0	<0.2	<10	10	0.30	0.020	0.050	<0.01	9.8	0.60	5.0	0.18	0.90	0.44	0.88	<0.05	0.030	<0.01	<0.005	0.090	5.1
Statistical Summary for Gneiss Waste Rock								**n**	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
								n < DL	1	0	0	117	117	0	0	0	0	19	0	0	0	0	0	0	0	6	0	30	20	0	0
								Max	0.58	4.2	2110	0.40	10	1320	2.2	8.4	4.4	0.32	133	31	366	9.4	29	7.3	12	0.23	0.53	5.2	0.10	2.2	88
								90th PCTL	0.070	1.9	282	<0.2	<10	303	1.1	0.62	2.1	0.050	94	15	62	3.1	14	2.7	6.1	0.14	0.41	0.44	0.028	1.0	54
								75th PCTL	0.040	1.2	101	<0.2	<10	173	0.76	0.30	0.84	0.030	81	8.1	22	1.9	8.2	2.0	4.4	0.11	0.31	0.090	0.017	0.62	48
								Median	0.020	0.77	25	<0.2	<10	90	0.59	0.14	0.28	0.020	62	2.3	7.5	0.88	4.2	1.2	2.8	0.090	0.23	0.020	0.011	0.29	36
								25th PCTL	0.010	0.56	8.8	<0.2	<10	60	0.46	0.080	0.080	0.010	48	1.5	5.0	0.50	2.6	0.87	2.0	0.070	0.14	0.010	0.0070	0.19	24
								10th PCTL	0.010	0.40	4.2	<0.2	<10	40	0.38	0.060	0.040	<0.01	34	1.1	4.0	0.27	1.8	0.61	1.6	0.050	0.080	<0.01	<0.005	0.15	17
								Min	<0.01	0.22	2.0	<0.2	<10	10	0.24	0.020	0.010	<0.01	4.3	0.40	2.0	0.090	0.60	0.32	0.88	<0.05	0.030	<0.01	<0.005	0.070	2.1

Appendix C.1-3: Solid Phase Element by Aqua Regia Digestion for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La
									ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm
Oxide Facies for Schist Waste Rock																															
ABA005	KAM022322	CFD0110	95.0	96.0	Waste	Oxide	Schist	RQM	0.040	1.3	1025	<0.2	10	370	1.1	0.29	3.5	0.030	48	13	32	1.3	18	2.9	3.9	0.080	0.030	0.22	0.029	0.32	24
ABA026	KAM037656	CFD0096	59.0	60.0	Waste	Oxide	Schist	BtS	0.15	1.4	38	<0.2	<10	100	1.1	1.7	3.6	0.080	68	13	32	2.4	15	3.0	5.8	0.10	0.12	0.12	0.029	0.34	35
ABA074	KAM146948	CFD0345	60.0	61.0	Waste	Oxide	Schist	BtS_carb	0.030	1.4	25	<0.2	<10	150	0.86	0.32	5.0	0.040	73	13	46	3.1	11	3.0	5.1	0.080	0.050	0.14	0.030	0.53	39
ABA077	J957606	CFD0350	60.0	61.0	Waste	Oxide	Schist	BtS_carb	0.020	0.91	222	<0.2	<10	80	0.55	0.19	9.8	0.030	81	9.6	18	2.0	12	2.1	3.4	0.11	0.060	0.44	0.029	0.23	45
ABA090	KAM133632	CFR0431	71.6	73.2	Waste	Oxide	Schist	BtS	0.040	0.90	182	<0.2	<10	310	0.71	0.29	1.3	0.030	69	19	42	0.18	30	4.3	3.2	0.080	0.060	0.75	0.074	0.10	34
ABA094	KAM135457	CFR0454	24.4	25.9	Waste	Oxide	Schist	BtS	0.090	0.80	537	0.20	<10	350	0.72	0.80	0.13	0.020	114	5.2	9.0	0.54	4.8	1.7	2.7	0.090	0.14	0.40	0.016	0.33	64
ABA125	KAM149844	CFR0566	10.7	12.2	Waste	Oxide	Schist	BtS	0.020	0.73	153	<0.2	<10	100	0.47	0.12	0.11	<0.01	49	2.9	14	0.27	6.7	1.1	2.2	0.060	0.31	0.47	0.010	0.15	22
ABA128	KAM149954	CFR0567	47.2	48.8	Waste	Oxide	Schist	BtS	0.050	0.88	230	<0.2	<10	80	0.88	0.39	4.5	0.030	44	8.1	22	0.66	14	2.2	2.5	0.050	0.14	0.38	0.024	0.12	24
ABA129	KAM150033	CFR0567	155.5	157.0	Waste	Oxide	Schist	BtS	0.11	1.1	1405	<0.2	<10	550	0.85	0.26	0.19	0.10	110	15	30	1.2	15	3.3	3.0	0.11	0.030	0.30	0.022	0.30	54
ABA130	KAM150823	CFR0574	10.7	12.2	Waste	Oxide	Schist	BtS	0.010	0.72	163	<0.2	<10	220	0.68	0.23	4.5	0.030	54	9.4	40	0.37	4.8	2.7	2.1	0.060	0.080	0.28	0.024	0.18	30
ABA131	KAM150859	CFR0574	61.0	62.5	Waste	Oxide	Schist	BtS	0.38	0.50	543	0.20	10	150	0.44	0.15	0.67	0.040	64	3.4	8.0	0.96	33	1.2	1.3	0.070	0.26	0.70	0.0080	0.31	30
ABA133	KAM150951	CFR0575	61.0	62.5	Waste	Oxide	Schist	BtS	0.060	0.91	238	<0.2	<10	690	0.96	0.42	7.4	0.080	55	14	41	0.94	57	2.7	2.6	0.080	0.030	0.32	0.031	0.28	27
ABA201	R276929	CFD0416	13.0	14.0	Waste	Oxide	Schist	BtS	0.060	0.81	165	<0.2	<10	100	1.1	0.20	1.0	0.060	47	19	35	1.2	24	4.3	2.6	0.090	0.020	0.080	0.015	0.18	23
ABA202	R270012	CFD0384	13.0	14.0	Waste	Oxide	Schist	BtS_carb	0.050	1.1	136	<0.2	<10	1730	0.60	0.15	0.54	0.050	95	7.8	8.0	0.68	5.9	2.5	3.0	0.070	0.25	0.34	0.026	0.16	47
ABA383	KAM068572	CFD0234	225.1	226.0	Waste	Oxide	Schist	MsS	0.020	0.61	191	<0.2	<10	60	0.43	0.090	0.040	0.010	36	1.1	4.0	0.38	1.0	0.68	1.6	0.070	0.33	0.33	0.012	0.11	21
								n	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
								Max	0.38	1.4	1405	0.20	10	1730	1.1	1.7	9.8	0.10	114	19	46	3.1	57	4.3	5.8	0.11	0.33	0.75	0.074	0.53	64
								90th PCTL	0.13	1.3	832	0.20	10	634	1.1	0.65	6.4	0.080	104	17	42	2.2	32	3.9	4.6	0.11	0.29	0.61	0.031	0.34	51
								75th PCTL	0.075	1.1	388	<0.2	<10	360	0.92	0.36	4.5	0.055	77	13	38	1.3	21	3.0	3.3	0.090	0.20	0.42	0.029	0.32	42
-						**Oxide**	**Schist**	**Median**	0.050	0.90	191	<0.2	<10	150	0.72	0.26	1.3	0.030	64	9.6	30	0.94	14	2.7	2.7	0.080	0.080	0.33	0.024	0.23	30
								25th PCTL	0.025	0.77	158	<0.2	<10	100	0.58	0.17	0.37	0.030	49	6.5	12	0.46	6.3	1.9	2.4	0.070	0.040	0.25	0.016	0.16	24
								10th PCTL	0.020	0.65	77	<0.2	<10	80	0.45	0.13	0.12	0.014	45	3.1	8.0	0.31	4.8	1.1	1.8	0.060	0.030	0.13	0.011	0.11	23
								Min	0.010	0.50	25	<0.2	<10	60	0.43	0.090	0.040	<0.01	36	1.1	4.0	0.18	1.0	0.68	1.3	0.050	0.020	0.080	0.0080	0.10	21
Upper Transition Facies for Schist Waste Rock																															
ABA004	KAM022156	CFD0107	149.0	150.0	Waste	Upper transition	Schist	RQM	0.030	1.1	144	<0.2	<10	110	0.66	0.090	2.6	0.040	70	8.2	17	0.33	11	2.6	3.0	0.10	0.090	0.16	0.022	0.28	36
ABA027	KAM037928	CFD0099	30.0	31.0	Waste	Upper transition	Schist	BtS_carb	0.50	1.6	14	<0.2	<10	450	1.4	0.15	4.4	0.040	75	10	27	3.1	8.9	3.1	6.8	0.10	0.060	0.26	0.033	0.44	39
ABA062	KAM081561	CFD0202	58.0	58.5	Waste	Upper transition	Schist	BtS	0.10	2.4	6.4	<0.2	<10	280	1.4	3.9	4.0	0.12	55	29	134	4.0	15	4.7	8.0	0.16	0.060	0.010	0.044	1.8	26
ABA076	KAM147059	CFD0345	160.0	161.0	Waste	Upper transition	Schist	BtS	0.070	0.94	160	<0.2	<10	190	0.75	0.27	4.5	0.070	26	12	37	0.51	17	2.3	2.3	0.050	0.050	0.32	0.022	0.17	12
ABA092	KAM135149	CFR0452	10.7	12.2	Waste	Upper Transition	Schist	BtS	0.040	0.85	50	<0.2	<10	120	0.43	2.2	0.17	0.020	115	5.0	8.0	0.54	18	1.8	4.7	0.10	0.17	0.020	0.016	0.50	68
ABA124	KAM149042	CFR0559	35.1	36.6	Waste	Upper transition	Schist	BtS	0.11	1.2	9.9	<0.2	<10	680	0.45	0.23	2.4	0.030	77	9.4	35	1.4	106	2.6	4.4	0.090	0.25	0.030	0.031	0.39	39
ABA204	R270174	CFD0388	8.0	9.0	Waste	Upper transition	Schist	MsS	0.050	1.5	223	<0.2	<10	610	1.4	0.15	1.7	0.090	72	13	40	3.1	29	4.0	4.6	0.13	0.050	0.19	0.035	0.45	36
ABA205	R276797	CFD0413	115.0	116.0	Waste	Upper transition	Schist	BtS	0.020	0.81	272	<0.2	<10	60	1.0	0.24	5.1	0.030	29	11	48	1.2	5.2	2.4	2.2	0.090	0.080	0.070	0.023	0.18	16
ABA206	Q033613	CFD0407	52.0	53.0	Waste	Upper transition	Schist	BtS	0.030	2.0	44	<0.2	<10	290	1.1	0.19	3.9	0.020	62	11	27	0.58	25	2.4	5.2	0.080	0.070	0.23	0.033	0.24	32
ABA316	R270207	CFD0390	5.0	6.0	Waste	Upper Transition	Schist	MsS	0.090	1.3	22	<0.2	<10	100	0.80	0.85	3.7	0.16	58	17	28	0.75	37	3.9	3.7	0.080	0.040	0.12	0.036	0.32	29
ABA317	R270258	CFD0390	50.0	51.0	Waste	Upper Transition	Schist	BtS_carb	0.020	1.2	24	<0.2	<10	2410	1.1	0.46	2.4	0.020	109	8.2	25	4.8	8.6	2.4	5.1	0.12	0.33	0.010	0.021	0.48	63
ABA320	R270432	CFD0392	44.0	45.0	Waste	Upper Transition	Schist	BtS_carb	0.030	0.97	312	<0.2	10	560	0.88	0.31	3.1	0.030	105	9.0	10	1.6	11	2.5	4.2	0.11	0.25	0.18	0.020	0.32	61
ABA323	Q033713	CFD0411	24.0	25.0	Waste	Upper Transition	Schist	BtS_Carb	0.030	1.0	131	<0.2	10	50	1.3	0.48	6.8	0.22	56	12	51	1.7	21	3.3	3.6	0.090	0.12	0.11	0.067	0.17	27
ABA332	Q033589	CFD0407	32.0	33.0	Waste	Upper Transition	schist	BtS	0.060	1.4	25	<0.2	<10	170	1.2	0.29	2.1	0.030	73	19	35	0.91	48	3.6	4.6	0.10	0.050	0.010	0.026	0.30	36
								n	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
								Max	0.50	2.4	312	<0.2	10	2410	1.4	3.9	6.8	0.22	115	29	134	4.8	106	4.7	8.0	0.16	0.33	0.32	0.067	1.8	68
								90th PCTL	0.11	1.9	257	<0.2	10	659	1.4	1.8	4.9	0.15	107	18	50	3.7	45	4.0	6.3	0.13	0.25	0.25	0.042	0.49	62
								75th PCTL	0.085	1.5	156	<0.2	<10	533	1.3	0.48	4.3	0.085	77	13	39	2.7	28	3.5	5.0	0.11	0.16	0.19	0.035	0.45	39
Statistical Summary						**Upper Transition**	**Schist**	**Median**	0.045	1.2	47	<0.2	<10	235	1.0	0.28	3.4	0.035	71	11	32	1.3	17	2.6	4.5	0.10	0.075	0.12	0.029	0.32	36
								25th PCTL	0.030	0.98	23	<0.2	<10	113	0.76	0.20	2.4	0.030	57	9.1	26	0.62	11	2.4	3.6	0.090	0.053	0.023	0.022	0.25	27
								10th PCTL	0.023	0.88	11	<0.2	<10	72	0.51	0.15	1.8	0.020	36	8.2	12	0.52	8.7	2.3	2.5	0.080	0.050	0.010	0.020	0.17	19
								Min	0.020	0.81	6.4	<0.2	<10	50	0.43	0.090	0.17	0.020	26	5.0	8.0	0.33	5.2	1.8	2.2	0.050	0.040	0.010	0.016	0.17	12
Lower Transition Facies for Schist Waste Rock																															
ABA021	KAM033153	CFD0164	148.0	149.0	Waste	Lower transition	Schist	BtS	0.020	2.7	4.1	<0.2	<10	460	0.29	0.090	1.8	0.010	18	17	103	1.4	7.6	3.4	8.7	0.12	0.050	<0.01	0.015	1.8	9.0
ABA024	KAM036666	CFD0087	17.0	18.0	Waste	Lower transition	Schist	BtS_carb	0.060	2.7	11	<0.2	<10	750	0.80	0.27	1.5	0.070	71	14	32	3.4	28	4.2	13	0.16	0.070	<0.01	0.037	1.6	38
ABA025	KAM037046	CFD0091	12.0	13.0	Waste	Lower transition	Schist	BtS	0.10	2.7	20	<0.2	<10	190	1.2	0.80	2.7	0.10	63	14	60	3.3	15	3.3	9.7	0.14	0.070	0.010	0.024	1.0	34
ABA031	KAM039252	CFD0116	75.0	76.0	Waste	Lower transition	Schist	RQM	0.020	2.3	8.3	<0.2	<10	1430	1.3	0.30	2.9	0.020	88	12	78	7.3	14	3.2	9.0	0.13	0.15	0.040	0.068	1.1	47
ABA038	KAM047995	CFD0135	153.0	154.0	Waste	Lower transition	Schist	BtS	0.040	2.2	20	<0.2	<10	270	1.1	1.5	2.9	0.090	67	14	78	4.2	9.2	2.8	8.1	0.14	0.090	0.020	0.026	1.2	36
ABA054	KAM081312	CFD0198	85.0	86.0	Waste	Lower transition	Schist	BtS	0.080	0.39	41	<0.2	<10	50	0.29	0.19	0.17	0.020	49	2.3	6.0	0.30	4.3	0.91	1.4	0.060	0.37	0.020	<0.005	0.21	26
ABA086	KAM133474	CFR0429	59.4	61.0	Waste	Lower transition	Schist	BtS	0.060	1.6	27	<0.2	<10	230	0.66	0.11	2.0	0.080	90	13	47	2.7	17	2.6	5.8	0.10	0.090	0.030	0.022	1.1	48
ABA208	R276736	CFD0413	61.0	62.0	Waste	Lower transition	Schist	BtS	0.050	2.3	5.3	<0.2	<10	260	1.1	0.91	2.3	0.070	78	22	41	3.8	43	4.4	7.5	0.15	0.060	0.010	0.035	1.1	40
ABA209	R270032	CFD0384	31.0	32.0	Waste	Lower transition	Schist	BtS_carb	0.060	1.2	8.6	<0.2	<10	450	0.72	2.4	2.4	0.080	83	7.3	32	3.3	6.1	2.6	4.8	0.080	0.10	0.020	0.030	0.74	44
ABA210	R276281	CFD0401	58.0	59.0	Waste	Lower transition	Schist	BtS	0.050	1.9	35	<0.2	<10	120	1.0	0.43	4.6	0.090	68	13	122	2.0	3.7	3.2	7.6	0.10	0.090	0.010	0.030	0.58	38
ABA211	R276567	CFD0409	65.0	66.0	Waste	Lower transition	Schist	BtS	0.050	2.3	24	<0.2	<10	210	0.74	0.44	2.7	0.050	45	20	87	2.6	3.2	3.5	8.9	0.11	0.050	0.010	0.026	0.35	25
ABA318	R270302	CFD0390	88.0	89.0	Waste	Lower Transition	Schist	BtS_carb	0.070	1.5	3.5	<0.2	<10	10	0.55	0.86	10	0.060	25	9.4	36	1.0	24	1.9	4.5	0.10	0.16	<0.01	0.023	0.060	13
ABA319	R270394	CFD0392	10.0	11.0	Waste	Lower Transition	Schist	BtS_carb	0.030	2.1	13	<0.2	<10	430	0.81	0.33	2.8	0.030	73	18	79	3.9	26	3.6	8.0	0.11	0.040	0.070	0.028	0.60	39
ABA325	R512767	CFR0724	39.6	41.2	Waste	Lower Transition	schist	BtS	0.12	1.6	15	<0.2	<10	150	0.67	0.55	1.8	0.080	56	13	63	2.5	7.3	2.4	6.2	0.12	0.23	<0.01	0.019	0.62	30
ABA333	R277487	CFD0426	43.0	44.0	Waste	Lower Transition	schist	BtS	0.050	1.6	39	<0.2	<10	180	1.1	0.46	0.16	<0.01	82	8.3	41	2.5	3.9	1.7	4.1	0.10	0.12	0.32	0.027	0.62	45
ABA335	R550437	CFD0518	25.0	26.0	Waste	Lower Transition	schist	BtS	0.050	1.7	48	<0.2	<10	160	0.95	0.27	1.4	0.080	30	15	42	2.9	22	2.5	7.7	0.16	0.31	0.070	0.023	0.090	14
ABA336	R550471	CFD0518	55.0	56.0	Waste	Lower Transition	Schist	BtS_carb	0.090	1.8	38	<0.2	<10	810	0.61	0.46	6.4	0.16	69	17	35	6.2	34	3.7	6.9	0.12	0.070	<0.01	0.050	0.68	36
ABA337	R550494	CFD0518	75.0	75.0	Waste	Lower Transition	schist	BtS	0.070	1.9	15	<0.2	<10	550	0.66	0.20	2.9	0.050	75	15	65	2.7	38	3.3	7.7	0.12	0.070	<0.01	0.019	1.1	38
ABA345	R551151	CFD0563	68.0	69.0	Waste	Lower Transition	schist	BtS	0.070	1.8	22	<0.2	<10	1050	0.72	0.30	2.8	0.15	14	17	149	4.0	7.2	2.5	5.9	0.14	0.11	<0.01	0.029	0.55	6.8
								n	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
								Max	0.12	2.7	48	<0.2	<10	1430	1.3	2.4	10	0.16	90	22	149	7.3	43	4.4	13	0.16	0.37	0.32	0.068	1.8	48
								90th PCTL	0.092	2.7	40	<0.2	<10	858	1.1	1.0	5.0	0.11	84	18	107	4.6	35	3.8	9.2	0.15	0.25	0.070	0.040	1.3	45
								75th PCTL	0.070	2.3	31	<0.2	<10	505	1.1	0.68	2.9	0.085	77	17	79	3.8	25	3.4	8.4	0.14	0.14	0.025	0.030	1.1	39
Statistical Summary						**Lower Transition**	**Schist**	**Median**	0.060	1.9	20	<0.2	<10	260	0.74	0.43	2.7	0.070	68	14	60	2.9	14	3.2	7.6	0.12	0.090	0.010	0.026	0.68	36
								25th PCTL	0.050	1.6	9.6	<0.2	<10	170	0.66	0.27	1.8	0.040	47	12	39	2.5	6.7	2.5	5.8	0.10	0.070	<0.01	0.023	0.57	25
								10th PCTL	0.028	1.4	5.1	<0.2	<10	106	0.50	0.17	1.1	0.018	23	8.1	32	1.3	3.9	1.9	4.4	0.096	0.050	<0.01	0.018	0.19	12
								Min	0.020	0.39	3.5	<0.2	<10	10	0.29	0.090	0.16	<0.01	14	2.3	6.0	0.30	3.2	0.91	1.4	0.060	0.040	<0.01	<0.005	0.060	6.8

Appendix C.1-3: Solid Phase Element by Aqua Regia Digestion for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La
									ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm
Fresh Facies for Schist Waste Rock																															
ABA082	KAM131674	CFR0401	15.2	16.8	Waste	Fresh	Schist	BtS	0.030	2.3	21	<0.2	<10	1060	0.75	0.10	1.8	0.040	35	22	34	3.2	33	4.0	7.9	0.10	0.050	0.010	0.016	1.3	17
ABA084	KAM132888	CFR0420	32.0	33.5	Waste	Fresh	Schist	BtS	0.060	1.7	6.8	<0.2	<10	160	0.62	0.26	4.3	0.050	74	10	22	1.6	13	2.5	6.3	0.080	0.18	0.010	0.015	1.3	40
ABA091	KAM133659	CFR0431	109.7	111.3	Waste	Fresh	Schist	BtS	0.38	1.5	22	<0.2	<10	200	0.54	0.89	2.5	0.19	60	14	27	1.2	23	2.9	6.6	0.060	0.040	0.010	0.015	1.1	31
ABA093	KAM135298	CFR0453	10.7	12.2	Waste	Fresh	Schist	BtS	0.030	2.9	41	<0.2	<10	1900	0.71	0.040	3.1	0.040	28	23	231	6.8	48	3.2	7.0	0.10	0.50	0.030	0.011	1.4	14
ABA095	KAM135693	CFR0456	10.7	12.2	Waste	Fresh	Schist	BtS	0.020	2.3	28	<0.2	<10	530	0.55	0.10	0.19	0.27	51	17	68	3.0	24	3.7	8.3	0.080	0.040	0.010	0.041	1.6	26
ABA127	KAM149916	CFR0566	109.7	111.3	Waste	Fresh	Schist	BtS_carb	0.050	2.0	19	<0.2	<10	260	0.85	0.21	2.5	0.020	65	18	67	3.5	39	3.7	6.7	0.10	0.070	0.020	0.027	1.3	31
ABA132	KAM150898	CFR0574	114.3	115.8	Waste	Fresh	Schist	BtS	0.040	2.0	40	<0.2	<10	310	0.80	0.14	2.6	0.030	52	19	91	4.6	22	3.5	7.5	0.10	0.060	0.030	0.026	1.3	25
ABA134	KAM150984	CFR0575	106.7	108.2	Waste	Fresh	Schist	BtS	0.010	1.5	25	<0.2	<10	1670	0.75	0.26	2.3	0.010	98	10	25	6.5	9.2	3.0	6.2	0.10	0.060	0.010	0.027	0.40	54
ABA212	Q033565	CFD0407	10.0	11.0	Waste	Fresh	Schist	BtS	0.040	2.9	10	<0.2	<10	360	0.70	0.35	2.0	0.090	68	20	61	2.8	21	4.6	11	0.13	0.050	<0.01	0.054	1.6	36
ABA213	R280479	CFD0497	111.0	112.0	Waste	Fresh	Schist	BtS	0.020	2.1	20	<0.2	<10	430	0.72	0.33	1.1	0.010	33	13	28	2.2	5.1	2.8	6.3	0.14	0.080	<0.01	0.0070	1.1	19
ABA214	R274802	CFD0472	47.0	48.0	Waste	Fresh	Schist	BtS	0.050	0.81	72	<0.2	<10	90	0.39	0.96	0.18	0.010	94	4.2	10	0.65	4.5	1.9	3.6	0.080	0.22	<0.01	0.014	0.48	44
ABA215	R275143	CFD0482	40.0	41.0	Waste	Fresh	Schist	BtS	0.050	2.0	133	<0.2	<10	390	1.7	0.41	4.1	0.060	53	19	170	7.2	36	3.2	4.8	0.090	0.22	0.060	0.044	1.3	28
ABA216	R276122	CFD0393	87.0	88.0	Waste	Fresh	Schist	BtS	0.020	2.7	9.8	<0.2	<10	200	1.0	0.14	1.3	0.020	14	21	153	3.1	4.6	3.2	8.7	0.12	0.080	<0.01	0.011	1.0	7.2
ABA217	R270181	CFD0388	92.0	93.0	Waste	Fresh	Schist	BtS_carb	0.020	2.2	12	<0.2	<10	540	0.68	0.15	2.7	0.040	98	14	42	2.8	18	3.7	7.2	0.18	0.050	<0.01	0.028	1.6	51
ABA218	R283622	CFD0498	28.0	29.0	Waste	Fresh	Schist	BtS	0.060	1.6	11	<0.2	<10	240	0.30	18	2.0	0.020	16	14	84	1.1	10	2.1	5.2	0.15	0.12	<0.01	0.0080	0.71	7.4
ABA219	R276979	CFD0416	57.0	58.0	Waste	Fresh	Schist	BtS	0.010	1.2	15	<0.2	<10	130	2.3	0.090	9.1	0.090	19	28	143	12	4.1	3.8	3.2	0.070	0.090	<0.01	0.020	0.40	9.9
ABA220	R276002	CFD0387	148.0	149.0	Waste	Fresh	Schist	BtS	0.040	2.1	1.4	<0.2	<10	250	0.37	0.15	2.4	0.050	14	19	166	3.1	12	2.5	5.9	0.18	0.090	<0.01	0.012	0.71	6.4
ABA221	R276317	CFD0401	129.0	130.0	Waste	Fresh	Schist	BtS	0.020	0.94	1.7	<0.2	<10	40	0.33	0.16	2.6	0.020	11	8.3	63	1.1	8.0	1.4	4.0	0.13	0.12	0.010	0.010	0.49	4.4
ABA222	R270104	CFD0386	59.0	60.0	Waste	Fresh	Schist	BtS_carb	0.030	1.9	22	<0.2	<10	290	0.57	0.24	2.4	0.040	77	13	40	2.3	17	3.4	6.3	0.12	0.060	0.010	0.031	1.4	42
ABA223	R270127	CFD0386	80.0	81.0	Waste	Fresh	Schist	MsS	0.050	1.6	64	<0.2	<10	310	0.90	0.22	3.4	0.070	75	13	42	2.1	20	3.3	5.8	0.11	0.070	0.020	0.031	0.93	40
ABA321	R270466	CFD0392	74.0	75.0	Waste	Fresh	Schist	BtS_carb	0.060	2.2	48	<0.2	<10	250	0.95	0.52	1.9	0.040	90	13	44	4.3	15	3.4	7.9	0.13	0.050	<0.01	0.030	1.4	48
ABA322	R270482	CFD0392	88.0	89.0	Waste	Fresh	Schist	BtS_carb	0.040	2.2	62	<0.2	<10	460	0.80	0.75	6.0	0.050	51	14	72	3.6	27	3.4	7.5	0.11	0.050	<0.01	0.025	1.3	28
ABA326	R512983	CFR0731	32.0	32.4	Waste	Fresh	schist	BtS	0.030	2.4	30	<0.2	<10	90	0.63	0.21	1.3	0.040	20	25	199	4.5	25	3.3	7.1	0.12	0.14	<0.01	0.022	0.44	10
ABA329	R270202	CFD0388	110.0	110.2	Waste	Fresh	Schist	BtS_carb	0.020	1.7	28	<0.2	<10	200	0.59	0.34	5.9	0.030	42	13	66	1.9	10	2.5	6.3	0.13	0.17	<0.01	0.026	1.0	21
ABA330	R276299	CFD0401	74.0	75.0	Waste	Fresh	schist	BtS	0.090	1.2	21	<0.2	<10	140	0.48	0.45	3.1	0.010	21	16	45	0.71	5.8	3.0	4.5	0.26	0.28	<0.01	0.031	0.45	11
ABA331	R276331	CFD0401	141.0	142.0	Waste	Fresh	schist	BtS	0.030	3.0	30	<0.2	<10	460	1.1	0.16	3.5	0.090	33	23	180	5.8	17	4.4	11	0.17	0.080	<0.01	0.030	1.8	18
ABA377	R279587	CFD0468	131.0	132.0	Waste	Fresh	Schist	AmBtS	0.020	0.81	1.9	<0.2	<10	110	0.49	0.16	4.8	0.010	25	9.0	19	1.8	8.4	2.6	3.0	0.18	0.090	<0.01	0.045	0.35	14
ABA415	R277001	CFD0398	49.0	50.0	Waste	Fresh	schist	BtS	0.040	1.6	9.9	<0.2	<10	80	0.39	0.050	1.2	0.010	10	19	157	3.7	14	2.2	4.5	0.13	0.080	0.010	0.0090	0.57	5.3
ABA416	R277017	CFD0398	64.0	65.0	Waste	Fresh	schist	BtS	0.020	2.0	15	<0.2	<10	300	0.56	0.13	1.9	0.020	26	14	96	2.1	8.3	3.1	7.4	0.15	0.080	<0.01	0.013	1.2	14
ABA417	R277021	CFD0398	124.0	125.0	Waste	Fresh	schist	BtS	0.020	1.6	7.4	<0.2	<10	50	0.53	0.080	2.5	0.35	17	15	99	1.4	8.5	2.2	5.8	0.17	0.13	<0.01	0.016	0.59	8.7
ABA418	R277041	CFD0398	160.0	161.0	Waste	Fresh	schist	BtS	0.030	2.2	1.7	<0.2	<10	320	0.47	0.090	2.1	0.040	10	18	120	2.2	9.4	2.7	6.4	0.14	0.080	<0.01	0.0090	1.3	5.6
								n	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
								Max	0.38	3.0	133	<0.2	<10	1900	2.3	18	9.1	0.35	98	28	231	12	48	4.6	11	0.26	0.50	0.060	0.054	1.8	54
								90th PCTL	0.060	2.7	62	<0.2	<10	540	1.0	0.75	4.8	0.090	90	23	170	6.5	33	3.8	8.3	0.18	0.22	0.020	0.041	1.6	44
								75th PCTL	0.050	2.2	30	<0.2	<10	410	0.80	0.35	3.2	0.055	66	19	132	4.0	22	3.4	7.4	0.15	0.13	0.010	0.030	1.3	33
Statistical Summary						**Fresh**	**Schist**	**Median**	0.030	2.0	21	<0.2	<10	260	0.63	0.21	2.5	0.040	35	15	67	2.8	14	3.2	6.3	0.12	0.080	<0.01	0.022	1.1	19
								25th PCTL	0.020	1.6	10.0	<0.2	<10	150	0.51	0.14	1.9	0.020	20	13	41	1.8	8.5	2.6	5.5	0.10	0.060	<0.01	0.013	0.58	10
								10th PCTL	0.020	1.2	1.9	<0.2	<10	90	0.39	0.090	1.2	0.010	14	10	25	1.1	5.1	2.2	4.0	0.080	0.050	<0.01	0.0090	0.44	6.4
								Min	0.010	0.81	1.4	<0.2	<10	40	0.30	0.040	0.18	0.010	10	4.2	10	0.65	4.1	1.4	3.0	0.060	0.040	<0.01	0.0070	0.35	4.4
								n	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79
								Max	0.50	3.0	1405	0.20	10	2410	2.3	18	10	0.35	115	29	231	12	106	4.7	13	0.26	0.50	0.75	0.074	1.8	68
								90th PCTL	0.10	2.4	224	0.20	10	762	1.2	0.89	5.3	0.10	94	20	144	4.6	36	4.0	8.4	0.16	0.25	0.32	0.042	1.4	48
								75th PCTL	0.060	2.1	102	<0.2	<10	455	1.0	0.46	3.8	0.080	75	18	78	3.4	24	3.4	7.4	0.13	0.14	0.13	0.031	1.1	39
Statistical Summary for Schist Waste Rock								**Median**	0.040	1.6	25	<0.2	<10	250	0.72	0.27	2.5	0.040	58	13	42	2.2	15	3.0	5.8	0.10	0.080	0.010	0.026	0.55	30
								25th PCTL	0.030	1.1	14	<0.2	<10	125	0.56	0.15	1.7	0.020	33	9.9	28	1.1	8.2	2.5	3.7	0.085	0.060	0.010	0.016	0.32	17
								10th PCTL	0.020	0.81	6.7	<0.2	<10	80	0.43	0.098	0.19	0.010	18	7.7	13	0.54	4.8	1.9	2.6	0.070	0.048	<0.01	0.011	0.17	8.9
								Min	0.010	0.39	1.4	<0.2	<10	10	0.29	0.040	0.040	<0.01	10	1.1	4.0	0.18	1.0	0.68	1.3	0.050	0.020	<0.01	<0.005	0.060	4.4
Oxide Facies for Granite Waste Rock																															
ABA157	R305807	CFD0382	76.0	77.0	Waste	Oxide	Granite	GG	0.020	0.73	1900	<0.2	<10	100	0.54	0.070	0.030	0.020	27	1.5	4.0	0.45	3.0	2.0	1.8	0.090	0.23	0.84	0.012	0.10	15
ABA158	R305808	CFD0382	79.0	80.0	Waste	Oxide	Granite	GG	0.020	0.72	1600	<0.2	<10	50	0.52	0.060	0.030	0.030	21	2.4	3.0	0.24	2.2	2.0	1.7	0.10	0.30	0.71	0.015	0.040	11
ABA174	R305826	CFD0403	7.0	8.0	Waste	Oxide	Granite	GG	0.050	0.47	2960	<0.2	<10	30	0.35	0.070	0.060	0.040	31	1.1	3.0	1.1	1.7	1.6	1.6	0.090	0.28	0.20	0.0080	0.18	17
ABA421	I354544	CFD0053	50.3	51.0	Waste	Oxide	Granite	GG	0.060	0.43	2840	0.20	10	30	0.36	0.77	0.080	0.060	44	0.70	2.0	2.1	1.8	1.0	1.5	0.080	0.11	0.84	0.010	0.21	25
ABA423	Q033319	CFD0403	7.0	7.8	Waste	Oxide	Granite	GG	0.050	0.60	2830	<0.2	10	40	0.43	0.070	0.060	0.030	31	11	2.0	1.3	14	1.6	1.9	0.070	0.23	0.21	0.0080	0.23	18
ABA429	Q032778	CFD0394	39.7	40.0	Waste	Oxide	Granite	GG	0.030	0.54	81	<0.2	<10	100	0.63	0.10	0.050	0.010	82	2.6	5.0	3.2	2.7	1.6	2.8	0.12	0.41	0.010	0.013	0.25	45
								n	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
								Max	0.060	0.73	2960	0.20	10	100	0.63	0.77	0.080	0.060	82	11	5.0	3.2	14	2.0	2.8	0.12	0.41	0.84	0.015	0.25	45
								90th PCTL	0.055	0.73	2900	0.20	10	100	0.59	0.44	0.070	0.050	63	6.6	4.5	2.7	8.7	2.0	2.4	0.11	0.36	0.84	0.014	0.24	35
								75th PCTL	0.050	0.69	2838	<0.2	<10	88	0.54	0.093	0.060	0.038	41	2.6	3.8	1.9	2.9	1.9	1.9	0.098	0.30	0.81	0.013	0.23	24
Statistical Summary						**Oxide**	**Granite**	**Median**	0.040	0.57	2365	<0.2	<10	45	0.48	0.070	0.055	0.030	31	2.0	3.0	1.2	2.5	1.6	1.7	0.090	0.26	0.46	0.011	0.20	17
								25th PCTL	0.023	0.49	1675	<0.2	<10	33	0.38	0.070	0.035	0.023	28	1.2	2.3	0.61	1.9	1.6	1.6	0.083	0.23	0.20	0.0085	0.12	15
								10th PCTL	0.020	0.45	841	<0.2	<10	30	0.36	0.065	0.030	0.015	24	0.90	2.0	0.35	1.8	1.3	1.5	0.075	0.17	0.11	0.0080	0.070	13
								Min	0.020	0.43	81	<0.2	<10	30	0.35	0.060	0.030	0.010	21	0.70	2.0	0.24	1.7	1.0	1.5	0.070	0.11	0.010	0.0080	0.040	11

Appendix C.1-3: Solid Phase Element by Aqua Regia Digestion for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La
									ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm
Upper Transition Facies for Granite Waste Rock																															
ABA013	KAM025898	CFD0150	81.0	82.0	Waste	Upper transition	Granite	GG	0.020	0.78	17	<0.2	<10	30	0.44	0.10	0.040	<0.01	73	0.60	5.0	1.2	1.1	0.70	2.7	0.15	0.38	0.020	0.013	0.16	36
ABA151	R305801	CFD0381	13.0	14.0	Waste	Upper transition	Granite	GG	0.030	0.46	2.7	<0.2	<10	90	0.13	0.090	0.080	0.010	55	1.1	8.0	2.6	3.8	1.2	2.5	0.13	0.66	<0.01	0.016	0.32	31
ABA152	R305802	CFD0381	35.0	36.0	Waste	Upper transition	Granite	GG	0.030	1.1	132	<0.2	<10	100	0.57	0.13	0.090	0.010	49	0.90	3.0	14	5.2	0.96	3.7	0.13	0.35	0.030	0.014	0.19	25
ABA167	R305818	CFD0394	30.0	31.0	Waste	Upper transition	Granite	GG	0.080	0.41	196	<0.2	<10	50	0.27	0.18	0.020	0.020	29	0.10	4.0	0.47	1.5	0.36	0.96	0.090	0.31	0.29	0.011	0.19	16
ABA169	R305821	CFD0399	20.0	21.0	Waste	Upper transition	Granite	GG	0.060	0.33	90	<0.2	<10	30	0.71	0.17	0.050	0.020	50	1.6	5.0	0.62	1.6	1.2	1.2	0.12	0.55	0.050	0.011	0.13	28
ABA172	R305824	CFD0396	29.0	30.0	Waste	Upper transition	Granite	GG	0.020	0.82	365	<0.2	<10	60	0.45	0.13	0.020	0.020	34	0.50	4.0	0.23	1.5	1.3	2.1	0.10	0.36	0.18	0.016	0.020	17
ABA178	R305831	CFD0400	11.0	12.0	Waste	Upper transition	Granite	GG	0.020	0.54	108	<0.2	<10	50	0.56	0.070	0.050	0.020	37	1.0	5.0	1.5	1.5	0.67	2.2	0.13	0.52	0.030	0.012	0.13	20
ABA189	CFD0399_10_20	CFD0399	10.0	20.0	Waste	Upper transition	Granite	GG	0.080	0.73	1005	<0.2	<10	50	0.80	0.13	0.050	0.050	48	1.3	2.0	0.68	2.3	1.4	2.1	0.090	0.59	0.28	0.014	0.17	27
ABA190	CFD0396_50_60	CFD0396	50.0	60.0	Waste	Upper transition	Granite	GG	0.030	0.44	156	<0.2	<10	40	0.50	0.10	0.040	0.010	36	0.80	4.0	2.0	2.3	0.93	1.7	0.090	0.33	0.070	0.0080	0.16	21
ABA191	CFD0394_31_41	CFD0394	31.0	41.0	Waste	Upper transition	Granite	GG	0.050	0.61	408	<0.2	<10	60	0.55	0.15	0.030	0.020	46	0.90	4.0	1.6	2.5	1.2	1.9	0.080	0.30	0.15	0.011	0.23	25
ABA192	CFD0394_55_66	CFD0394	55.0	66.0	Waste	Upper transition	Granite	GG	0.030	0.48	201	<0.2	<10	50	0.53	0.090	0.050	0.020	53	0.90	5.0	2.2	1.7	0.88	1.8	0.090	0.35	0.21	0.010	0.16	31
ABA195	CFD0381_4_13	CFD0381	4.0	13.0	Waste	Upper transition	Granite	GG	0.020	0.49	8.6	<0.2	<10	90	0.17	0.11	0.080	0.010	49	1.3	7.0	3.0	1.4	1.4	2.8	0.10	0.61	0.020	0.016	0.34	27
ABA196	CFD0380_36_50	CFD0380	36.0	50.0	Waste	Upper transition	Granite	GG	0.040	0.70	457	<0.2	<10	30	0.44	0.13	0.020	0.020	46	0.50	5.0	0.47	4.2	0.83	1.8	0.080	0.30	0.21	0.0070	0.16	25
ABA431	Q041083	CFD0380	30.0	30.2	Waste	Upper Transition	Granite	GG	0.010	0.66	213	<0.2	<10	30	0.42	0.27	0.050	<0.01	34	1.1	4.0	1.3	8.7	0.80	2.4	0.080	0.35	0.020	0.012	0.11	17
ABA434	Q032756	CFD0394	19.5	19.6	Waste	Upper Transition	Granite	GG	0.080	0.76	3020	0.30	10	120	0.61	0.12	0.070	0.030	58	1.4	3.0	1.3	9.2	1.3	2.4	0.090	0.17	0.79	0.0090	0.26	32
ABA435	Q032826	CFD0394	81.1	81.7	Waste	Upper Transition	Granite	GG	0.020	0.54	138	<0.2	<10	30	0.40	0.080	0.040	<0.01	41	0.80	4.0	1.3	7.8	0.67	2.1	0.090	0.30	0.13	0.0090	0.13	22
ABA436	Q032927	CFD0396	65.0	65.5	Waste	Upper Transition	Granite	GG	0.040	0.66	215	<0.2	<10	40	0.37	0.11	0.010	0.010	44	0.40	4.0	0.55	4.7	0.49	2.0	0.090	0.32	0.20	0.0090	0.13	24
Statistical Summary						**Upper Transition**	**Granite**	**n**	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
								Max	0.080	1.1	3020	0.30	10	120	0.80	0.27	0.090	0.050	73	1.6	8.0	14	9.2	1.4	3.7	0.15	0.66	0.79	0.016	0.34	36
								90th PCTL	0.080	0.80	676	<0.2	<10	94	0.65	0.17	0.080	0.024	56	1.3	5.8	2.8	8.2	1.4	2.7	0.13	0.60	0.28	0.016	0.28	31
								75th PCTL	0.050	0.73	365	<0.2	<10	60	0.56	0.13	0.050	0.020	50	1.1	5.0	2.0	4.7	1.2	2.4	0.12	0.52	0.21	0.014	0.19	28
								Median	0.030	0.61	196	<0.2	<10	50	0.45	0.12	0.050	0.020	46	0.90	4.0	1.3	2.3	0.93	2.1	0.090	0.35	0.13	0.011	0.16	25
								25th PCTL	0.020	0.48	108	<0.2	<10	30	0.40	0.10	0.030	0.010	37	0.60	4.0	0.62	1.5	0.70	1.8	0.090	0.31	0.030	0.0090	0.13	21
								10th PCTL	0.020	0.43	13	<0.2	<10	30	0.23	0.086	0.020	<0.01	34	0.46	3.0	0.47	1.5	0.60	1.5	0.080	0.30	0.020	0.0086	0.12	17
								Min	0.010	0.33	2.7	<0.2	<10	30	0.13	0.070	0.010	<0.01	29	0.10	2.0	0.23	1.1	0.36	0.96	0.080	0.17	<0.01	0.0070	0.020	16
Lower Transition Facies for Granite Waste Rock																															
ABA010	KAM024598	CFD0137	49.0	50.0	Waste	Lower transition	Granite	GG	0.030	0.55	2.1	<0.2	<10	90	0.16	0.080	0.11	0.010	59	1.5	7.0	3.9	1.6	1.5	3.1	0.13	0.63	<0.01	0.017	0.39	33
ABA154	R305804	CFD0382	10.0	11.0	Waste	Lower transition	Granite	GG	0.020	0.45	9.5	<0.2	<10	90	0.31	0.090	0.080	0.010	54	1.3	8.0	3.7	1.7	1.2	2.5	0.12	0.61	0.010	0.015	0.30	29
ABA155	R305805	CFD0382	50.0	51.0	Waste	Lower transition	Granite	GG	0.14	0.82	41	<0.2	<10	110	0.35	0.070	0.060	0.010	66	4.6	3.0	4.0	2.5	0.95	3.3	0.14	0.44	0.020	0.013	0.27	32
ABA159	R305809	CFD0383	10.0	11.0	Waste	Lower transition	Granite	GG	0.020	0.53	26	<0.2	<10	100	0.15	0.070	0.080	0.010	52	1.2	7.0	3.8	1.5	1.2	2.9	0.12	0.70	0.010	0.018	0.35	29
ABA160	R305811	CFD0383	48.0	49.0	Waste	Lower transition	Granite	GG	0.020	0.49	8.2	<0.2	<10	90	0.25	0.060	0.090	0.010	51	1.5	8.0	3.5	1.2	1.3	2.7	0.14	0.63	0.010	0.015	0.34	28
ABA164	R305815	CFD0389	10.0	11.0	Waste	Lower transition	Granite	GG	0.020	0.43	11	<0.2	<10	70	0.15	0.060	0.070	0.010	53	1.1	12	1.8	1.3	1.0	2.4	0.13	0.78	0.020	0.013	0.28	29
ABA166	R305817	CFD0389	45.0	46.0	Waste	Lower transition	Granite	GG	0.11	0.95	2320	<0.2	<10	70	1.4	1.0	0.090	0.46	41	2.4	4.0	4.8	13	2.8	3.3	0.13	0.47	0.050	0.11	0.12	22
ABA193	CFD383_115_125	CFD0383	115.0	125.0	Waste	Lower transition	Granite	GG	0.030	0.49	22	<0.2	<10	80	0.25	0.080	0.10	0.040	50	2.1	5.0	1.9	2.0	1.6	3.1	0.11	0.36	0.020	0.017	0.24	28
ABA194	CFD0382_84_94	CFD0382	84.0	94.0	Waste	Lower transition	Granite	GG	0.050	0.86	1060	<0.2	<10	140	1.2	0.060	0.030	0.030	42	3.8	3.0	2.6	1.8	2.5	2.8	0.080	0.27	0.39	0.012	0.15	20
ABA424	Q041284	CFD0382	4.0	5.0	Waste	Lower Transition	Granite	GG	0.030	0.59	22	<0.2	<10	110	0.20	0.090	0.090	0.020	52	2.3	6.0	3.5	2.5	1.4	3.0	0.10	0.60	<0.01	0.014	0.36	27
ABA425	Q041377	CFD0382	87.0	88.0	Waste	Lower Transition	Granite	GG	0.020	0.87	140	<0.2	<10	30	0.28	0.060	0.020	<0.01	35	1.3	3.0	0.35	1.9	0.48	2.5	0.090	0.32	0.11	0.011	0.12	17
ABA426	Q041396	CFD0382	103.0	104.0	Waste	Lower Transition	Granite	GG	0.020	0.94	240	<0.2	<10	30	0.38	0.080	0.020	0.020	41	1.3	3.0	0.37	1.8	0.52	2.5	0.090	0.30	0.62	0.011	0.080	21
ABA427	Q041404	CFD0382	110.0	111.0	Waste	Lower Transition	Granite	GG	0.050	0.94	461	<0.2	<10	150	0.63	0.060	0.070	0.010	29	5.0	2.0	4.8	6.2	1.8	3.7	0.070	0.25	0.25	0.012	0.14	11
ABA430	Q041069	CFD0380	18.0	18.1	Waste	Lower Transition	Granite	GG	0.12	0.41	2110	0.20	10	50	0.42	0.38	0.050	0.050	44	0.50	5.0	2.6	2.1	0.84	1.3	0.080	0.15	1.7	0.0070	0.22	24
Statistical Summary						**Lower Transition**	**Granite**	**n**	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
								Max	0.14	0.95	2320	0.20	10	150	1.4	1.0	0.11	0.46	66	5.0	12	4.8	13	2.8	3.7	0.14	0.78	1.7	0.11	0.39	33
								90th PCTL	0.12	0.94	1795	<0.2	<10	131	1.0	0.29	0.097	0.047	57	4.4	8.0	4.5	5.1	2.3	3.3	0.14	0.68	0.55	0.018	0.36	31
								75th PCTL	0.050	0.87	406	<0.2	<10	108	0.41	0.088	0.090	0.028	53	2.4	7.0	3.8	2.4	1.6	3.1	0.13	0.63	0.22	0.017	0.33	29
								Median	0.030	0.57	33	<0.2	<10	90	0.30	0.075	0.075	0.010	50	1.5	5.0	3.5	1.9	1.2	2.9	0.12	0.46	0.020	0.014	0.26	27
								25th PCTL	0.020	0.49	13	<0.2	<10	70	0.21	0.060	0.053	0.010	<0.01	1.3	3.0	2.1	1.6	0.97	2.5	0.090	0.31	0.010	0.012	0.14	21
								10th PCTL	0.020	0.44	8.6	<0.2	<10	36	0.15	0.060	0.023	0.010	36	1.1	3.0	0.79	1.4	0.62	2.4	0.080	0.26	<0.01	0.011	0.12	18
								Min	0.020	0.41	2.1	<0.2	<10	30	0.15	0.060	0.020	<0.01	29	0.50	2.0	0.35	1.2	0.48	1.3	0.070	0.15	<0.01	0.0070	0.080	11
Fresh Facies for Granite Waste Rock																															
ABA012	KAM025798	CFD0147	260.0	261.0	Waste	Fresh	Granite	GG	0.030	0.58	3.3	<0.2	<10	120	0.21	0.070	0.57	0.070	63	1.9	6.0	2.6	1.5	1.7	3.7	0.12	0.30	<0.01	0.026	0.27	37
ABA162	R305813	CFD0385	10.0	11.0	Waste	Fresh	Granite	GG	0.020	0.42	6.8	<0.2	<10	90	0.14	0.10	0.070	0.010	42	1.2	6.0	2.9	1.5	1.0	2.5	0.12	0.70	0.020	0.015	0.31	23
ABA163	R305814	CFD0385	59.0	60.0	Waste	Fresh	Granite	GG	0.020	0.77	80	<0.2	<10	70	0.32	0.10	0.040	<0.01	37	2.9	5.0	2.7	3.4	0.88	2.8	0.12	0.45	0.030	0.012	0.24	19
ABA165	R305816	CFD0389	30.0	31.0	Waste	Fresh	Granite	GG	0.030	0.43	27	<0.2	<10	70	0.22	1.3	0.080	0.35	54	1.2	7.0	1.9	7.2	0.96	2.4	0.13	0.61	0.020	0.097	0.26	30
ABA168	R305819	CFD0394	88.0	89.0	Waste	Fresh	Granite	GG	0.020	0.46	29	<0.2	<10	90	0.35	0.34	0.080	0.13	81	1.4	7.0	4.1	2.7	1.1	2.9	0.16	0.48	0.010	0.045	0.31	42
ABA179	R305832	CFD0400	60.0	61.0	Waste	Fresh	Granite	GG	0.010	0.98	1355	<0.2	<10	80	1.6	0.060	0.030	0.030	60	1.4	3.0	2.6	4.6	1.7	3.4	0.13	0.39	0.030	0.014	0.22	32
ABA180	CFD0396_72_81	CFD0396	72.0	81.0	Waste	Fresh	Granite	GG	0.040	0.54	42	<0.2	<10	20	0.46	0.060	0.080	<0.01	57	1.6	4.0	0.45	4.2	1.0	1.8	0.10	0.33	0.22	0.014	0.080	30
ABA182	CFD0394_94_104	CFD0394	94.0	104.0	Waste	Fresh	Granite	GG	0.040	0.53	652	<0.2	<10	40	0.58	0.060	0.080	0.030	40	1.4	4.0	1.4	2.1	1.4	1.7	0.080	0.28	0.13	0.012	0.19	21
ABA186	CFD0380_2_17	CFD0380	2.0	17.0	Waste	Fresh	Granite	GG	0.020	0.42	7.5	<0.2	<10	80	0.34	0.37	0.070	0.010	44	1.4	6.0	7.4	1.3	1.2	2.5	0.10	0.56	0.010	0.016	0.29	23
ABA187	CFD0380_22_30	CFD0380	22.0	30.0	Waste	Fresh	Granite	GG	0.020	0.44	14	<0.2	<10	70	0.35	0.38	0.060	<0.01	42	1.1	6.0	4.8	1.2	1.1	2.4	0.11	0.46	0.010	0.015	0.26	21
ABA198	CFD0385_28_38	CFD0385	28.0	38.0	Waste	Fresh	Granite	GG	0.030	0.50	5.4	<0.2	<10	100	0.14	0.080	0.070	0.010	51	1.5	8.0	2.8	4.0	1.2	2.9	0.12	0.68	<0.01	0.015	0.35	27
ABA199	CFD0385_38_48	CFD0385	38.0	48.0	Waste	Fresh	Granite	GG	0.020	0.40	48	<0.2	<10	80	0.29	0.080	0.070	0.010	49	2.2	7.0	2.8	2.3	1.3	2.4	0.060	0.57	0.010	0.017	0.26	26
ABA200	CFD0385_48_58	CFD0385	48.0	58.0	Waste	Fresh	Granite	GG	0.020	0.49	81	<0.2	<10	80	0.40	0.080	0.050	0.020	49	3.4	6.0	2.6	3.9	1.2	2.5	0.060	0.50	0.020	0.015	0.25	24
ABA437	Q041055	CFD0380	5.0	6.0	Waste	Fresh	Granite	GG	0.030	0.44	5.0	<0.2	<10	90	0.35	0.31	0.080	0.020	59	1.4	7.0	8.8	1.0	1.4	3.0	0.12	0.61	<0.01	0.016	0.32	34
ABA438	Q041063	CFD0380	12.0	13.0	Waste	Fresh	Granite	GG	0.030	0.47	5.9	<0.2	<10	90	0.33	0.35	0.080	0.020	49	2.5	6.0	8.8	1.7	1.4	3.1	0.11	0.65	0.010	0.019	0.33	27
ABA439	Q041678	CFD0385	8.0	9.0	Waste	Fresh	Granite	GG	0.020	0.53	3.4	<0.2	<10	90	0.23	0.11	0.080	0.030	43	1.6	10	2.6	3.2	1.3	2.7	0.090	0.65	<0.01	0.013	0.32	23
ABA440	Q041699	CFD0385	27.0	28.0	Waste	Fresh	Granite	GG	0.020	0.44	4.6	<0.2	<10	80	0.18	0.10	0.070	0.010	56	1.4	6.0	2.5	0.80	1.2	2.8	0.10	0.85	<0.01	0.012	0.29	32
ABA441	Q032423	CFD0385	92.0	92.6	Waste	Fresh	Granite	GG	0.010	0.44	82	<0.2	<10	100	0.35	0.050	0.070	0.010	64	2.6	5.0	2.1	3.5	1.3	2.6	0.12	0.36	0.030	0.011	0.25	33
ABA442	Q032601	CFD0391	3.4	3.9	Waste	Fresh	Granite	GG	0.060	0.46	7.7	<0.2	<10	120	0.24	0.17	0.070	0.080	48	1.6	9.0	2.2	3.6	1.4	2.6	0.10	0.55	<0.01	0.016	0.29	26
ABA443	Q033167	CFD0400	60.0	61.0	Waste	Fresh	Granite	GG	0.010	1.0	1040	<0.2	<10	90	1.5	0.060	0.030	0.010	71	1.5	4.0	2.4	4.6	1.4	3.8	0.13	0.37	0.020	0.0090	0.25	40
Statistical Summary						**Fresh**	**Granite**	**n**	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
								Max	0.10	1.0	1355	<0.2	<10	120	1.6	1.3	0.57	0.35	81	3.4	10	8.8	7.2	1.7	3.8	0.16	0.85	0.22	0.097	0.35	42
								90th PCTL	0.040	0.79	691	<0.2	<10	102	0.68	0.37	0.080	0.085	65	2.6	8.1	7.5	4.6	1.5	3.4	0.13	0.68	0.040	0.028	0.32	37
								75th PCTL	0.030	0.53	80	<0.2	<10	90	0.36	0.32	0.080	0.030	59	2.0	7.0	3.2	3.9	1.4	3.0	0.12	0.62	0.023	0.016	0.31	32
								Median	0.020	0.47	20	<0.2	<10	85	0.34	0.10	0.070	0.015	50	1.5	6.0	2.6	3.0	1.2	2.7	0.12	0.53	0.010	0.015	0.27	27
								25th PCTL	0.020	0.44	5.8	<0.2	<10	78	0.23	0.068	0.068	0.010	44	1.4	5.0	2.3	1.5	1.1	2.4	0.10	0.39	<0.01	0.013	0.25	23
								10th PCTL	0.010	0.42	4.5	<0.2	<10	67	0.18	0.060	0.039	<0.01	42	1.2	4.0	1.8	1.2	1.0	2.3	0.078	0.33	<0.01	0.012	0.22	21
								Min	0.010	0.40	3.3	<0.2	<10	20	0.14	0.050	0.030	<0.01	37	1.1	3.0	0.45	0.80	0.88	1.7	0.060	0.28	<0.01	0.0090	0.080	19

Appendix C.1-3: Solid Phase Element by Aqua Regia Digestion for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La
									ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm
Statistical Summary for Granite Waste Rock								**n**	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
								n < DL	0	0	0	54	53	0	0	0	0	7	0	0	0	0	0	0	0	0	0	9	0	0	0
								Max	0.14	1.1	3020	0.30	10	150	1.6	1.3	0.57	0.46	82	11	12	14	14	2.8	3.8	0.16	0.85	1.7	0.11	0.39	45
								90th PCTL	0.068	0.90	1984	*<0.2*	*<10*	110	0.66	0.36	0.090	0.054	64	2.7	8.0	4.8	6.6	1.7	3.3	0.13	0.65	0.48	0.017	0.33	33
								75th PCTL	0.040	0.73	457	*<0.2*	*<10*	90	0.53	0.13	0.080	0.030	54	1.9	6.0	3.2	3.9	1.4	2.9	0.12	0.60	0.20	0.016	0.29	30
								Median	0.030	0.53	82	*<0.2*	*<10*	80	0.36	0.090	0.070	0.020	49	1.4	5.0	2.4	2.3	1.2	2.5	0.10	0.39	0.030	0.013	0.24	26
								25th PCTL	0.020	0.45	11	*<0.2*	*<10*	50	0.25	0.070	0.040	0.010	41	1.1	4.0	1.3	1.6	0.96	2.0	0.090	0.30	0.010	0.011	0.16	21
								10th PCTL	0.020	0.43	5.2	*<0.2*	*<10*	30	0.17	0.060	0.026	*<0.01*	33	0.66	3.0	0.46	1.3	0.69	1.7	0.080	0.26	*<0.01*	0.0090	0.12	17
								Min	0.010	0.33	2.1	*<0.2*	*<10*	20	0.13	0.050	0.010	*<0.01*	21	0.10	2.0	0.23	0.80	0.36	0.96	0.060	0.11	*<0.01*	0.0070	0.020	11
Oxide Facies for Other Lithologies Waste Rock																															
KAM029389	ABA017	CFD0176	96.0	97.0	Waste	Oxide	Dykes	FC	*>100*	1.3	18	*<0.2*	*<10*	230	1.2	0.13	0.22	0.070	9.3	13	2.0	0.88	1065	2.4	2.6	*<0.05*	0.26	0.070	0.036	0.26	3.6
KAM029393	ABA018	CFD0176	99.0	100.0	Waste	Oxide	Dykes	FC	0.050	1.5	110	*<0.2*	*<10*	200	1.3	0.12	0.12	0.070	7.9	9.8	1.0	1.2	2.9	2.1	3.3	*<0.05*	0.16	0.13	0.040	0.25	3.3
KAM084551	ABA056	CFD0237	181.0	181.5	Waste	Oxide	HU	HU	0.090	1.1	1890	*<0.2*	10	50	0.99	0.47	0.40	0.090	15	16	21	2.0	25	3.3	2.9	0.050	0.030	2.0	0.025	0.33	6.7
R277468	ABA306	CFD0426	26.0	27.0	Waste	Oxide	SZ	SZ	0.050	0.79	20	*<0.2*	*<10*	110	0.63	0.37	0.21	0.020	66	6.5	22	1.1	7.9	1.4	2.5	0.070	0.23	0.050	*<0.005*	0.28	38
Statistical Summary						**Oxide**	**Other Lithologies**	**n**	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
								Max	100	1.5	1890	*<0.2*	10	230	1.3	0.47	0.40	0.090	66	16	22	2.0	1065	3.3	3.3	0.070	0.26	2.0	0.040	0.33	38
								90th PCTL	70	1.4	1356	*<0.2*	10	221	1.2	0.44	0.35	0.084	50	15	22	1.7	753	3.0	3.2	0.064	0.25	1.4	0.039	0.32	29
								75th PCTL	25	1.3	555	*<0.2*	*<10*	208	1.2	0.40	0.27	0.075	27	14	21	1.4	285	2.6	3.0	0.055	0.24	0.60	0.037	0.29	15
								Median	0.070	1.2	65	*<0.2*	*<10*	155	1.1	0.25	0.22	0.070	12	11	12	1.1	17	2.3	2.8	*<0.05*	0.20	0.10	0.031	0.27	5.2
								25th PCTL	0.050	0.99	19	*<0.2*	*<10*	95	0.90	0.13	0.19	0.058	9.0	9.0	1.8	1.0	6.7	2.0	2.6	*<0.05*	0.13	0.065	0.020	0.26	3.5
								10th PCTL	0.050	0.87	19	*<0.2*	*<10*	68	0.74	0.12	0.15	0.035	8.3	7.5	1.3	0.94	4.4	1.6	2.5	*<0.05*	0.069	0.056	0.011	0.25	3.4
								Min	0.050	0.79	18	*<0.2*	*<10*	50	0.63	0.12	0.12	0.020	7.9	6.5	1.0	0.88	2.9	1.4	2.5	*<0.05*	0.030	0.050	*<0.005*	0.25	3.3
Upper Transition Facies for Other Lithologies Waste Rock																															
KAM145425	ABA072	CFD0339	10.0	11.0	Waste	Upper transition	Dykes	FC	0.070	1.6	1165	*<0.2*	10	430	2.5	0.30	0.070	0.13	47	15	8.0	6.4	4.5	4.2	5.4	0.070	0.15	0.94	0.035	0.66	22
Q033703	ABA303	CFD0411	15.0	16.0	Waste	Upper transition	dykes	DIOR	0.15	0.80	194	*<0.2*	*<10*	280	0.59	0.44	0.10	0.31	63	0.80	2.0	1.9	6.3	1.6	3.4	0.11	1.2	0.070	0.020	0.22	34
Q034859	ABA311	CFD0473	164.0	165.0	Waste	Upper transition	dykes	FC	0.080	4.0	196	*<0.2*	*<10*	780	1.9	0.050	0.95	0.10	26	35	9.0	15	31	6.3	11	0.20	0.34	0.090	0.046	0.63	12
R273647	ABA305	CFD0456	55.0	56.0	Waste	Upper transition	Fault	FLT	0.060	2.7	450	*<0.2*	*<10*	200	1.5	0.13	0.28	0.020	17	17	66	12	13	3.2	6.0	0.14	0.040	0.12	0.033	0.81	6.5
KAM019714	ABA061	CFD0083	8.0	9.0	Waste	Upper transition	Metabasalt/ Amphibolite	Amph	0.030	1.3	8.1	*<0.2*	*<10*	190	0.54	0.13	1.2	0.060	76	9.2	25	1.1	7.9	2.1	4.3	0.10	0.15	*<0.01*	0.010	0.72	42
KAM035755	ABA022	CFD0080	122.0	123.0	Waste	Upper transition	YO	YO	0.10	1.3	1200	0.40	10	400	1.1	0.34	5.0	0.070	43	16	41	1.2	21	3.0	4.0	0.080	0.040	0.33	0.046	0.29	22
R545623	ABA368	CFD0524	92.0	92.6	Waste	Upper Transition	Yx	Yx	0.020	1.1	87	*<0.2*	*<10*	110	1.2	0.10	0.10	0.020	49	6.6	32	3.1	2.6	1.6	4.3	0.080	0.29	0.20	0.013	0.56	26
Statistical Summary						**Upper Transition**	**Other Lithologies**	**n**	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
								Max	0.15	4.0	1200	0.40	10	780	2.5	0.44	5.0	0.31	76	35	66	15	31	6.3	11	0.20	1.2	0.94	0.046	0.81	42
								90th PCTL	0.12	3.2	1179	0.28	10	570	2.1	0.38	2.7	0.20	68	24	51	13	25	5.0	8.1	0.16	0.70	0.57	0.046	0.76	37
								75th PCTL	0.090	2.1	808	*<0.2*	10	415	1.7	0.32	1.1	0.12	56	16	37	9.1	17	3.7	5.7	0.13	0.32	0.27	0.041	0.69	30
								Median	0.070	1.3	196	*<0.2*	*<10*	280	1.2	0.13	0.28	0.070	47	15	25	3.1	7.9	3.0	4.3	0.10	0.15	0.12	0.033	0.63	22
								25th PCTL	0.045	1.2	140	*<0.2*	*<10*	195	0.83	0.12	0.10	0.040	35	7.9	8.5	1.5	5.4	1.9	4.1	0.080	0.095	0.080	0.017	0.43	17
								10th PCTL	0.026	0.97	55	*<0.2*	*<10*	158	0.57	0.080	0.088	0.020	23	4.3	5.6	1.1	3.7	1.6	3.8	0.076	0.040	0.046	0.012	0.26	9.7
								Min	0.020	0.80	8.1	*<0.2*	*<10*	110	0.54	0.050	0.070	0.020	17	0.80	2.0	1.1	2.6	1.6	3.4	0.070	0.040	*0.010*	0.010	0.22	6.5
Lower Transition Facies for Other Lithologies Waste Rock																															
R282332	ABA312	CFD0474	37.0	38.0	Waste	Lower transition	dykes	IV	0.050	2.9	5.0	*<0.2*	*<10*	450	0.34	0.050	1.8	0.080	29	14	17	3.8	12	3.6	8.0	0.090	0.63	*<0.01*	0.021	0.47	16
Q035862	ABA313	CFD0491	124.0	125.0	Waste	Lower transition	dykes	IV	0.040	1.9	140	*<0.2*	*<10*	320	1.5	0.060	0.15	0.12	39	15	14	3.2	14	3.4	5.1	0.12	0.36	0.26	0.029	0.46	22
R283583	ABA449	CFD0496	90.0	91.0	Waste	Lower Transition	Metabasalt	MBSLT	0.43	0.76	78	*<0.2*	10	60	1.6	0.39	5.1	0.45	37	18	12	1.6	7.4	4.1	2.5	0.10	0.040	0.050	0.021	0.45	18
R283583	ABA304	CFD0496	90.0	91.0	Waste	Lower transition	Metabasalt/ Amphibolite	MBSLT	0.40	0.79	78	*<0.2*	*<10*	60	1.4	0.37	5.4	0.45	36	18	13	1.5	7.2	4.2	2.4	0.10	0.040	0.070	0.019	0.47	17
Q033764	ABA308	CFD0411	70.0	71.0	Waste	Lower transition	YC	YC	0.030	1.1	128	*<0.2*	*<10*	110	1.5	0.66	5.1	0.10	55	14	32	4.9	9.6	3.9	3.3	0.11	0.030	0.050	0.026	0.27	26
R276691	ABA310	CFD0413	21.0	22.0	Waste	Lower transition	Ylim	Ylim	0.010	0.72	84	*<0.2*	*<10*	160	0.87	0.18	1.1	0.060	82	6.5	6.0	0.59	4.0	1.7	1.7	0.11	0.15	0.12	0.0090	0.25	45
Statistical Summary						**Lower Transition**	**Other Lithologies**	**n**	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
								Max	0.43	2.9	140	*<0.2*	10	450	1.6	0.66	5.4	0.45	82	18	32	4.9	14	4.2	8.0	0.12	0.63	0.26	0.029	0.47	45
								90th PCTL	0.42	2.4	134	*<0.2*	10	385	1.6	0.53	5.2	0.45	68	18	25	4.3	13	4.1	6.5	0.12	0.50	0.19	0.028	0.47	35
								75th PCTL	0.31	1.7	117	*<0.2*	*<10*	280	1.5	0.39	5.1	0.37	51	17	16	3.7	12	4.0	4.6	0.11	0.31	0.11	0.025	0.47	25
								Median	0.045	0.93	81	*<0.2*	*<10*	135	1.4	0.28	3.5	0.11	38	14	14	2.4	8.5	3.8	2.9	0.11	0.095	0.060	0.021	0.46	20
								25th PCTL	0.033	0.77	78	*<0.2*	*<10*	73	0.99	0.090	1.2	0.085	36	14	12	1.5	7.3	3.5	2.4	0.10	0.040	0.050	0.020	0.32	17
								10th PCTL	0.020	0.74	42	*<0.2*	*<10*	60	0.61	0.055	0.60	0.070	32	10	9.0	1.0	5.6	2.6	2.0	0.095	0.035	0.030	0.014	0.26	16
								Min	0.010	0.72	5.0	*<0.2*	*<10*	60	0.34	0.050	0.15	0.060	29	6.5	6.0	0.59	4.0	1.7	1.7	0.090	0.030	*<0.01*	0.0090	0.25	16
Fresh Facies for Other Lithologies Waste Rock																															
R304353	ABA349	CFD0541	90.0	91.0	Waste	Fresh	IV	IV	0.020	1.6	28	*<0.2*	*<10*	120	0.41	0.040	0.83	0.040	33	12	2.0	0.71	3.4	2.9	4.8	0.060	0.47	*<0.01*	0.016	0.22	16
R304282	ABA352	CFD0539	90.0	91.0	Waste	Fresh	IV	IV	0.040	2.1	5.0	*<0.2*	*<10*	170	0.23	0.13	2.9	0.10	40	13	16	0.94	13	3.4	6.4	0.070	0.48	*<0.01*	0.028	0.35	21
KAM133438	ABA087	CFR0429	10.7	12.2	Waste	Fresh	Mafic/ Ultramafic	RU	0.030	1.5	9.0	*<0.2*	*<10*	600	0.76	0.26	2.4	0.020	43	33	324	8.4	14	3.2	6.3	0.080	0.030	0.010	0.023	1.1	24
R277453	ABA307	CFD0423	81.0	82.0	Waste	Fresh	Mafic/ Ultramafic	RU	0.030	3.0	29	*<0.2*	*<10*	690	1.2	0.13	3.1	0.030	46	30	413	11	11	3.7	9.2	0.13	0.060	0.010	0.021	1.5	26
R274909	ABA447	CFD0472	143.2	144.0	Waste	Fresh	Metabasalt	MBSLT	0.020	2.6	142	*<0.2*	*<10*	150	1.9	0.070	1.5	*<0.01*	23	20	340	6.2	5.7	3.3	7.6	0.11	0.13	0.070	0.018	1.0	13
R274918	ABA448	CFD0472	150.0	151.0	Waste	Fresh	Metabasalt	MBSLT	0.010	0.91	3.6	*<0.2*	*<10*	30	0.22	0.29	2.0	*<0.01*	14	2.4	15	0.75	6.0	1.2	2.6	0.23	0.22	*<0.01*	0.049	0.070	7.0
R293475	ABA450	CFR0730	91.4	93.0	Waste	Fresh	Metabasalt	MBSLT	0.040	3.1	3.6	*<0.2*	*<10*	300	0.52	0.20	3.3	0.060	30	16	23	5.9	13	4.4	9.4	0.13	0.28	*<0.01*	0.026	0.80	14
Statistical Summary						**Lower Transition**	**Other Lithologies**	**n**	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
								Max	0.040	3.1	142	*<0.2*	*<10*	690	1.9	0.29	3.3	0.10	46	33	413	11	14	4.4	9.4	0.23	0.48	0.070	0.049	1.5	26
								90th PCTL	0.040	3.0	74	*<0.2*	*<10*	636	1.5	0.27	3.2	0.076	44	31	369	9.3	13	4.0	9.3	0.17	0.47	0.034	0.036	1.3	24
								75th PCTL	0.035	2.8	29	*<0.2*	*<10*	450	0.98	0.23	3.0	0.050	42	25	332	7.3	13	3.6	8.4	0.13	0.38	0.010	0.027	1.0	22
								Median	0.030	2.1	9.0	*<0.2*	*<10*	170	0.52	0.13	2.4	0.030	33	16	23	5.9	11	3.3	6.4	0.11	0.22	*<0.01*	0.023	0.80	16
								25th PCTL	0.020	1.5	4.3	*<0.2*	*<10*	135	0.32	0.10	1.8	0.015	27	12	16	0.85	5.9	3.0	5.6	0.075	0.095	*<0.01*	0.020	0.29	13
								10th PCTL	0.016	1.3	3.6	*<0.2*	*<10*	84	0.23	0.058	1.2	*<0.01*	19	7.9	9.8	0.73	4.8	2.2	3.9	0.066	0.048	*<0.01*	0.017	0.16	10
								Min	0.010	0.91	3.6	*<0.2*	*<10*	30	0.22	0.040	0.83	*<0.01*	14	2.4	2.0	0.71	3.4	1.2	2.6	0.060	0.030	*<0.01*	0.016	0.070	7.0
Statistical Summary for Other Lithologies Waste Rock								**n**	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
								n < DL	0	0	0	23	20	0	0	0	0	2	0	0	0	0	0	0	0	2	0	6	1	0	0
								Max	100	4.0	1890	0.40	10	780	2.5	0.66	5.4	0.45	82	35	413	15	1065	6.3	11	0.23	1.2	2.0	0.049	1.5	45
								90th PCTL	0.33	2.9	951	*<0.2*	*<10*	555	1.8	0.43	5.1	0.26	65	27	247	9.9	24	4.2	8.8	0.14	0.48	0.31	0.044	0.96	37
								75th PCTL	0.083	2.2	155	*<0.2*	*<10*	340	1.5	0.35	3.0	0.10	47	17	32	6.0	13	3.8	6.4	0.11	0.30	0.12	0.034	0.68	26
								Median	0.045	1.4	81	*<0.2*	*<10*	195	1.1	0.16	1.1	0.070	38	14	17	1.9	8.8	3.2	4.3	0.10	0.16	0.070	0.024	0.46	20
								25th PCTL	0.030	1.0	16	*<0.2*	*<10*	110	0.58	0.12	0.22	0.028	25	9.7	8.8	1.1	5.9	2.1	2.8	0.070	0.040	*<0.01*	0.019	0.27	12
								10th PCTL	0.020	0.79	5.0	*<0.2*	*<10*	60	0.36	0.053	0.11	0.020	14	6.5	2.0	0.79	3.6	1.6	2.5	0.053	0.033	*<0.01*	0.011	0.23	6.6
								Min	0.010	0.72	3.6	*<0.2*	*<10*	30	0.22	0.040	0.070	*<0.01*	7.9	0.80	1.0	0.59	2.6	1.2	1.7	*<0.05*	0.030	*<0.01*	*<0.005*	0.070	3.3

Notes: all values in grey italics are below the analytical detection limit
n = number of samples included in statistical summary
n < DL = number of samples with values below the analytical detection limit

Appendix C.1-3: Solid Phase Element by Aqua Regia Digestion for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
									ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Oxide Facies for Gneiss Waste Rock																																				
ABA001	KAM000219	CFD0002	21.0	22.0	Waste	Oxide	Gneiss	FG	2.4	0.030	544	1.1	0.010	0.050	7.9	170	13	11	<0.001	<0.01	16	1.5	0.70	0.70	17	<0.01	0.010	30	<0.005	0.81	29	10	0.23	12	31	5.0
ABA043	KAM050495	CFD0152	149.0	150.0	Waste	Oxide	Gneiss	MxF	3.0	0.10	133	0.64	0.010	0.13	0.60	30	7.7	17	<0.001	<0.01	2.9	0.30	0.40	0.30	20	<0.01	<0.01	38	<0.005	0.11	2.4	1.0	0.33	11	5.0	10
ABA052	KAM079466	CFD0254	72.0	73.0	Waste	Oxide	Gneiss	MxF	1.3	0.060	136	0.45	0.11	0.10	1.9	80	3.2	9.5	<0.001	<0.01	0.63	1.3	0.70	0.30	12	<0.01	0.020	26	<0.005	0.060	1.8	4.0	0.090	14	8.0	7.2
ABA063	KAM125214	CFD0307	10.0	11.0	Waste	Oxide	Gneiss	MxF	3.9	0.31	380	1.6	0.080	0.34	2.6	390	2.1	47	0.0010	<0.01	1.1	2.0	0.80	1.4	8.9	<0.01	0.17	32	0.059	0.57	7.3	9.0	0.20	19	19	8.4
ABA064	KAM125257	CFD0307	49.0	50.0	Waste	Oxide	Gneiss	MxF	1.7	0.050	204	0.22	0.020	0.16	1.6	140	8.1	15	<0.001	<0.01	22	0.40	0.50	0.20	6.0	<0.01	0.060	38	<0.005	0.16	3.8	6.0	0.60	14	10	15
ABA080	KAM115505	CFR0360	25.9	27.4	Waste	Oxide	Gneiss	MxF	1.1	0.020	183	0.90	<0.01	<0.05	6.3	210	7.6	6.4	<0.001	<0.01	3.2	1.3	0.50	1.3	11	<0.01	<0.01	35	<0.005	0.16	11	8.0	0.58	13	8.0	7.1
ABA081	KAM117096	CFR0384	22.9	24.4	Waste	Oxide	Gneiss	MxF	2.2	0.040	489	1.9	0.010	0.060	1.9	220	13	12	<0.001	<0.01	2.0	1.3	0.40	0.40	9.9	<0.01	<0.01	33	0.0060	0.12	13	6.0	0.45	15	23	2.4
ABA083	KAM119516	CFR0418	19.8	21.3	Waste	Oxide	Gneiss	MxF	2.3	0.090	138	1.2	0.060	0.33	1.7	60	4.9	21	<0.001	<0.01	1.4	0.80	0.60	0.90	12	<0.01	<0.01	41	0.010	0.14	1.4	4.0	1.1	14	12	14
ABA085	KAM120107	CFR0425	15.2	16.8	Waste	Oxide	Gneiss	MxM	1.8	0.070	309	2.9	0.010	0.10	4.7	170	6.4	16	<0.001	<0.01	2.4	0.70	0.40	0.20	11	<0.01	0.010	35	0.0070	0.15	4.5	5.0	0.50	14	18	7.8
ABA096	KAM137284	CFR0468	32.0	33.5	Waste	Oxide	Gneiss	MxF	5.3	0.37	292	1.3	0.050	0.62	6.5	380	33	55	<0.001	0.010	3.1	2.1	0.60	1.4	22	<0.01	0.23	26	0.095	0.40	6.2	13	0.52	14	18	6.5
ABA104	KAM139298	CFR0482	10.7	12.2	Waste	Oxide	Gneiss	MxF	1.7	0.020	317	1.3	<0.01	0.10	3.6	120	22	14	<0.001	<0.01	14	1.0	0.50	0.40	9.0	<0.01	0.010	36	<0.005	0.28	12	5.0	0.69	13	21	2.9
ABA136	KAM151967	CFR0584	109.7	111.3	Waste	Oxide	Gneiss	MxF	1.5	0.020	363	1.5	<0.01	<0.05	6.0	160	11	8.7	<0.001	0.010	30	1.3	0.50	0.80	11	<0.01	0.010	37	<0.005	0.39	8.5	7.0	0.58	15	17	5.7
ABA137	KAM151932	CFR0584	61.0	62.5	Waste	Oxide	Gneiss	MxF	2.6	0.25	228	2.5	0.060	0.15	6.3	180	3.8	31	<0.001	0.010	1.3	1.6	0.20	1.5	17	<0.01	0.030	32	0.020	0.29	4.6	11	0.94	12	11	8.1
ABA138	KAM152219	CFR0586	155.5	157.0	Waste	Oxide	Gneiss	MxF	1.5	0.040	290	2.1	0.030	0.050	7.4	150	9.5	10	<0.001	0.020	1.7	0.60	0.40	0.30	14	<0.01	0.010	33	<0.005	0.10	2.4	3.0	0.69	7.7	17	5.8
ABA144	KAM152716	CFR0591	30.5	32.0	Waste	Oxide	Gneiss	MxF	1.4	0.020	129	1.4	<0.01	0.070	2.1	60	6.5	11	0.0010	0.020	3.3	0.30	0.40	0.90	23	<0.01	0.020	36	<0.005	0.10	3.6	1.0	0.39	12	5.0	10
ABA145	KAM153015	CFR0594	61.0	62.5	Waste	Oxide	Gneiss	MxF	2.0	0.090	190	2.0	0.060	0.20	2.0	70	3.8	12	<0.001	0.13	1.4	0.40	0.40	2.3	41	<0.01	0.060	35	0.0050	0.12	7.4	3.0	2.5	14	6.0	11
ABA146	KAM153091	CFR0594	164.6	166.1	Waste	Oxide	Gneiss	MxF	5.9	0.070	1160	2.9	<0.01	<0.05	19	180	5.8	9.5	<0.001	0.020	25	4.2	0.70	0.90	28	<0.01	0.010	33	<0.005	0.43	20	18	0.43	18	12	6.4
ABA149	KAM153152	CFR0595	61.0	62.5	Waste	Oxide	Gneiss	MxF	1.5	0.13	110	2.0	0.090	0.17	2.6	60	6.0	12	<0.001	0.060	0.70	0.40	0.30	0.70	37	<0.01	0.020	38	0.0050	0.060	7.7	2.0	2.1	13	5.0	9.1
ABA224	R277421	CFD0423	53.0	54.0	Waste	Oxide	Gneiss	MxM	5.2	0.31	605	1.5	<0.01	<0.05	34	680	11	39	0.0010	0.010	42	8.8	1.2	3.1	11	<0.01	0.10	15	0.029	2.3	19	47	0.39	28	45	2.0
ABA225	R272412	CFD0436	9.0	10.0	Waste	Oxide	Gneiss	FG	2.9	0.15	178	0.15	0.040	0.17	2.6	80	5.8	63	<0.001	0.010	4.1	1.2	0.60	1.7	9.5	<0.01	0.030	41	0.024	0.39	4.6	6.0	0.24	13	15	7.2
ABA226	R272445	CFD0436	38.0	39.0	Waste	Oxide	Gneiss	FG	6.0	1.2	475	0.47	0.030	<0.05	48	300	5.9	87	<0.001	0.010	2.4	6.3	0.50	2.2	15	<0.01	0.010	26	0.071	0.66	3.6	37	1.0	16	32	8.3
ABA227	R272537	CFD0436	120.0	121.0	Waste	Oxide	Gneiss	MxF	2.3	0.070	226	0.24	0.050	0.080	0.80	170	7.1	20	<0.001	0.010	2.6	0.80	0.40	1.2	8.9	<0.01	0.020	38	0.0070	0.16	6.7	3.0	0.19	11	16	4.7
ABA228	R271769	CFD0425	80.0	81.0	Waste	Oxide	Gneiss	MxF	3.3	0.21	171	0.24	0.050	0.89	1.7	180	6.4	26	<0.001	0.010	0.72	1.1	0.40	3.8	98	<0.01	<0.01	30	0.033	0.17	2.9	7.0	0.42	9.9	13	12
ABA229	R272589	CFD0436	166.0	167.0	Waste	Oxide	Gneiss	MxF	2.1	0.020	277	0.88	0.010	0.050	1.2	110	10	10	<0.001	0.010	5.6	0.70	0.20	0.40	31	<0.01	0.030	32	<0.005	0.13	9.9	3.0	0.17	8.6	7.0	2.6
ABA230	R280455	CFD0497	90.0	91.0	Waste	Oxide	Gneiss	MxM	1.2	0.10	164	4.2	0.040	0.38	2.1	50	6.8	14	<0.001	0.12	0.47	0.50	0.40	0.40	28	<0.01	0.030	36	0.0050	0.090	7.9	6.0	0.19	14	9.0	12
ABA231	R277177	CFD0421	47.0	48.0	Waste	Oxide	Gneiss	MxM	2.0	0.040	203	0.25	0.010	0.050	4.7	300	8.4	8.9	<0.001	<0.01	9.6	1.7	0.40	0.40	7.3	<0.01	0.030	32	<0.005	0.20	1.3	6.0	0.15	13	12	9.0
ABA232	R277505	CFD0426	58.0	59.0	Waste	Oxide	Gneiss	MxM	1.0	0.010	120	0.45	<0.01	0.10	1.4	70	7.1	5.5	<0.001	0.010	8.7	0.70	0.50	0.40	11	<0.01	0.020	40	<0.005	0.11	3.9	5.0	0.15	15	5.0	6.6
ABA233	R277739	CFD0431	118.0	119.0	Waste	Oxide	Gneiss	MxF	1.3	0.030	337	0.61	0.010	0.050	2.5	80	13	17	<0.001	0.010	14	0.50	0.30	0.30	6.8	<0.01	0.020	36	<0.005	0.26	9.1	5.0	0.50	9.6	12	5.1
ABA234	R277403	CFD0423	37.0	38.0	Waste	Oxide	Gneiss	MxM	1.5	0.060	153	0.83	0.030	0.28	1.0	100	7.7	18	<0.001	0.010	1.5	0.60	0.40	0.40	5.0	<0.01	0.020	41	0.0060	0.11	4.5	3.0	0.080	13	11	11
ABA235	R277137	CFD0421	11.0	12.0	Waste	Oxide	Gneiss	MxM	3.3	0.21	230	0.38	0.020	0.090	5.6	470	5.2	26	<0.001	<0.01	15	1.9	0.70	2.0	9.8	<0.01	0.31	34	0.016	0.36	2.2	8.0	0.22	19	19	5.8
ABA380	KAM075906	CFD0216	90.0	91.0	Waste	Oxide	Gneiss	MxF	0.90	0.020	35	3.9	0.010	0.080	0.50	40	20	11	<0.001	<0.01	52	0.20	0.30	0.20	11	<0.01	0.020	40	<0.005	0.29	8.7	<1	0.18	7.4	6.0	3.6
ABA382	KAM067845	CFD0221	211.0	212.0	Waste	Oxide	Gneiss	FG	1.6	0.29	196	1.7	0.010	0.090	0.40	80	18	14	<0.001	0.040	2.3	0.50	0.60	0.40	34	<0.01	0.010	40	<0.005	0.090	7.4	1.0	0.16	16	10	17
ABA384	KAM068794	CFD0238	227.0	228.0	Waste	Oxide	Gneiss	FG	1.5	0.010	224	0.43	0.010	<0.05	1.4	190	7.8	4.0	<0.001	<0.01	8.7	1.4	0.50	1.5	20	<0.01	<0.01	43	<0.005	0.29	14	8.0	0.19	14	13	17
ABA393	KAM030104	CFR0109	50.9	52.4	Waste	Oxide	Gneiss	FG	1.4	0.020	156	1.2	<0.01	<0.05	2.2	120	17	8.4	<0.001	0.010	6.6	0.90	0.40	0.80	22	<0.01	0.060	34	<0.005	0.24	18	4.0	0.71	11	9.0	5.0
Statistical Summary						**Oxide**	**Gneiss**	**n**	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
								Max	6.0	1.2	1160	4.2	0.11	0.89	48	680	33	87	0.0010	0.13	52	8.8	1.2	3.8	98	0.010	0.31	43	0.095	2.3	29	47	2.5	28	45	17
								90th PCTL	4.8	0.30	485	2.8	0.060	0.34	7.8	356	17	45	0.0010	0.034	24	2.1	0.70	2.1	33	0.010	0.088	41	0.032	0.53	17	12	1.00	17	22	13
								75th PCTL	2.8	0.15	315	1.8	0.048	0.17	5.9	188	11	21	0.0010	0.010	13	1.5	0.60	1.4	22	0.010	0.030	38	0.0093	0.34	9.7	8.0	0.60	15	18	10
								Median	1.9	0.065	214	1.2	0.010	0.090	2.4	145	7.7	14	0.0010	0.010	3.1	0.95	0.45	0.75	12	0.010	0.020	35	0.0050	0.17	7.0	5.5	0.41	13	12	7.2
								25th PCTL	1.5	0.023	158	0.46	0.010	0.050	1.6	80	5.9	10	0.0010	0.010	1.5	0.53	0.40	0.40	9.8	0.010	0.010	32	0.0050	0.11	3.7	3.0	0.19	12	8.3	5.3
								10th PCTL	1.2	0.020	130	0.24	0.010	0.050	0.86	60	4.1	8.5	0.0010	0.010	0.82	0.40	0.30	0.30	7.8	0.010	0.010	27	0.0050	0.093	2.2	1.3	0.15	9.7	5.3	3.1
								Min	0.90	0.010	35	0.15	0.010	0.050	0.40	30	2.1	4.0	0.0010	0.010	0.47	0.20	0.20	0.20	5.0	0.010	0.010	15	0.0050	0.060	1.3	1.0	0.080	7.4	5.0	2.0
Upper Transition Facies for Gneiss Waste Rock																																				
ABA016	KAM029087	CFD0175	145.0	146.0	Waste	Upper transition	Gneiss	MxF	2.2	0.080	365	0.45	0.010	<0.05	4.2	370	19	10	<0.001	<0.01	4.1	4.6	0.70	0.90	29	<0.01	0.030	31	<0.005	0.13	4.3	25	0.15	12	28	23
ABA042	KAM050492	CFD0152	146.0	147.0	Waste	Upper transition	Gneiss	MxF	1.4	0.030	137	0.16	0.010	0.15	0.60	40	5.2	17	<0.001	<0.01	1.8	0.20	0.30	0.20	27	<0.01	<0.01	38	<0.005	0.090	3.5	1.0	0.21	9.0	3.0	7.3
ABA057	KAM096548	CFD0269	33.0	34.0	Waste	Upper transition	Gneiss	FG	1.1	0.020	579	0.50	0.010	0.050	1.6	150	8.5	18	<0.001	<0.01	32	0.50	0.20	0.70	19	<0.01	0.010	32	<0.005	0.18	7.3	8.0	0.72	6.8	9.0	6.4
ABA059	KAM097012	CFD0272	17.0	18.0	Waste	Upper transition	Gneiss	FG	2.7	0.070	445	0.72	0.070	0.18	3.7	190	32	25	<0.001	<0.01	7.7	1.3	0.50	1.0	11	<0.01	<0.01	34	0.0080	0.34	6.0	7.0	0.50	14	14	9.9
ABA060	KAM097065	CFD0272	65.0	66.0	Waste	Upper transition	Gneiss	FG	4.6	0.090	257	2.0	0.010	0.060	0.90	170	12	18	<0.001	0.040	4.9	0.60	0.30	1.1	27	<0.01	0.010	29	<0.005	0.15	7.3	2.0	0.62	7.4	11	9.5
ABA069	KAM145287	CFD0338	123.0	124.0	Waste	Upper transition	Gneiss	FG	0.60	0.020	286	1.1	<0.01	<0.05	0.80	130	19	13	<0.001	0.020	5.4	0.50	0.50	0.60	11	<0.01	0.040	35	<0.005	0.24	22	2.0	0.21	15	22	4.0
ABA101	KAM137634	CFR0470	109.7	111.3	Waste	Upper transition	Gneiss	MxF	2.0	0.16	421	1.8	<0.01	0.080	6.4	460	21	11	<0.001	0.070	3.9	4.2	0.70	1.6	48	<0.01	0.080	22	0.0080	0.25	3.2	30	0.69	21	26	10
ABA105	KAM139327	CFR0482	50.3	51.8	Waste	Upper transition	Gneiss	MxF	1.7	0.020	295	1.5	<0.01	0.080	3.5	120	9.8	11	<0.001	<0.01	4.5	0.80	0.40	0.40	7.6	<0.01	0.010	34	<0.005	0.29	13	4.0	0.63	13	16	2.9
ABA141	KAM152499	CFR0589	77.7	79.3	Waste	Upper transition	Gneiss	MxF	3.2	0.43	236	2.2	0.050	0.26	7.9	280	4.1	43	<0.001	0.060	1.1	1.5	0.30	1.0	34	<0.01	0.020	32	0.052	0.24	4.4	14	1.2	13	18	16
ABA147	KAM152978	CFR0594	10.7	12.2	Waste	Upper transition	Gneiss	MxF	0.60	0.030	134	2.5	0.060	0.37	7.1	60	7.1	15	<0.001	0.020	0.11	0.20	0.40	0.60	20	<0.01	0.14	37	<0.005	0.080	2.9	1.0	1.1	10	2.0	12
ABA237	R270907	CFD0412	10.0	11.0	Waste	Upper transition	Gneiss	MxF	1.4	0.12	279	4.4	0.020	0.060	6.6	160	6.0	15	<0.001	0.010	1.8	2.2	0.30	0.30	17	<0.01	0.17	33	<0.005	0.10	2.7	15	0.070	11	14	6.2
ABA238	R280433	CFD0497	28.0	29.0	Waste	Upper transition	Gneiss	MxM	1.2	0.030	146	0.62	0.030	0.19	1.2	80	4.8	10	<0.001	0.010	1.4	0.50	0.30	0.50	11	<0.01	1.2	40	<0.005	0.15	4.8	3.0	0.090	11	7.0	8.8
ABA239	Q034712	CFD0473	7.0	8.0	Waste	Upper transition	Gneiss	FG	1.6	0.020	153	0.52	0.040	0.10	3.1	80	4.0	9.5	<0.001	<0.01	1.4	0.40	0.40	1.9	4.6	<0.01	0.020	41	<0.005	0.070	2.5	2.0	0.10	14	3.0	11
ABA240	Q034807	CFD0473	117.0	118.0	Waste	Upper transition	Gneiss	FG	2.1	0.020	331	0.61	0.010	<0.05	3.0	200	8.8	10	<0.001	0.010	3.6	1.4	0.30	0.60	27	<0.01	0.030	33	<0.005	0.16	6.4	5.0	0.13	13	10	2.5
ABA241	R272496	CFD0436	83.0	84.0	Waste	Upper transition	Gneiss	MxF	1.4	0.040	140	0.33	0.010	0.090	1.2	240	7.4	11	<0.001	0.010	8.3	0.90	0.20	1.3	6.2	<0.01	0.020	34	<0.005	0.23	5.3	3.0	0.36	11	12	8.4
ABA242	R270718	CFD0404	69.0	70.0	Waste	Upper transition	Gneiss	MxF	0.70	0.030	282	0.42	<0.01	<0.05	3.0	180	12	6.7	<0.001	0.010	83	0.70	0.30	0.70	9.0	<0.01	0.010	38	<0.005	0.32	2.2	5.0	0.44	12	15	8.2
ABA243	R271483	CFD0420	51.0	52.0	Waste	Upper transition	Gneiss	MxF	2.7	0.070	99	0.95	0.010	0.19	1.5	160	12	23	<0.001	<0.01	7.4	0.90	0.80	3.9	7.4	<0.01	<0.01	39	0.011	0.25	11	2.0	0.28	17	13	4.5
ABA244	R272865	CFD0441	40.0	41.0	Waste	Upper transition	Gneiss	MxF	2.4	0.19	72	1.4	0.010	<0.05	8.0	170	18	22	<0.001	<0.01	12	6.4	0.40	0.50	16	<0.01	0.020	26	0.0080	0.34	14	37	0.12	16	27	2.3
ABA245	R278947	CFD0461	10.0	11.0	Waste	Upper transition	Gneiss	MxM	2.5	0.050	226	1.1	<0.01	<0.05	4.4	250	10	9.8	<0.001	0.020	39	3.1	0.80	0.80	24	<0.01	0.070	27	<0.005	0.29	20	13	0.45	24	24	5.3
ABA353	R304081	CFD0525	10.0	11.0	Waste	Upper Transition	Gneiss	MxF	9.1	0.76	823	0.96	0.030	0.11	55	1120	5.2	64	<0.001	<0.01	16	6.4	0.50	2.7	15	<0.01	0.89	12	0.088	0.97	3.3	61	0.22	12	43	1.3
ABA367	R545582	CFD0524	56.0	57.0	Waste	Upper Transition	Gneiss	MxF	2.4	0.010	144	0.39	0.010	0.060	5.1	170	12	11	<0.001	<0.01	18	0.80	0.50	1.3	74	<0.01	0.010	31	<0.005	0.67	14	6.0	0.32	11	8.0	4.7
ABA373	R271332	CFD0417	58.0	59.0	Waste	Upper Transition	Gneiss	MxF	2.4	0.010	38	1.0	0.010	<0.05	1.0	80	16	10	0.0020	0.080	20	1.0	0.40	1.0	19	<0.01	<0.01	34	<0.005	3.2	12	2.0	0.17	8.0	13	1.4
ABA385	KAM068709	CFD0238	151.0	152.0	Waste	Upper Transition	Gneiss	MxF	1.3	0.020	127	0.18	0.010	0.080	1.2	70	13	11	<0.001	<0.01	3.9	0.40	0.40	0.30	15	<0.01	<0.01	41	<0.005	0.17	5.7	8.0	0.13	11	5.0	12
ABA386	KAM069164	CFD0242	220.5	221.0	Waste	Upper Transition	Gneiss	FG	1.4	0.020	67	0.90	0.010	<0.05	2.3	120	13	10	<0.001	<0.01	18	3.5	0.40	0.70	48	<0.01	0.010	34	<0.005	0.20	20	15	0.16	8.5	20	8.9
ABA407	R272624	CFD0438	17.0	18.0	Waste	Upper Transition	Gneiss	MxF	12	1.6	936	0.33	0.030	<0.05	25	1290	7.7	107	<0.001	<0.01	9.7	12	0.90	2.6	28	<0.01	0.11	17	0.14	1.9	14	96	0.67	18	70	3.5
ABA411	R544193	CFD0502	40.0	41.0	Waste	Upper Transition	Gneiss	MxF	6.4	0.040	431	0.71	0.010	<0.05	26	230	10	7.5	<0.001	<0.01	10	12	1.0	5.2	14	<0.01	0.010	25	<0.005	0.56	15	48	0.22	28	23	2.4
Statistical Summary						**Upper Transition**	**Gneiss**	**n**	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
								Max	12	1.6	936	4.4	0.070	0.37	55	1290	32	107	0.0020	0.080	83	12	1.0	5.2	74	<0.01	1.2	41	0.14	3.2	22	96	1.2	28	70	23
								90th PCTL	5.5	0.31	512	2.1	0.045	0.19	16	415	19	34	<0.001	0.050	26	6.4	0.80	2.7	41	<0.01	0.16	39	0.032	0.82	17	43	0.71	19	28	12
								75th PCTL	2.7	0.088	357	1.3	0.028	0.11	6.6	238	13	18	<0.001	0.018	15	3.4	0.50	1.3	27	<0.01	0.063	36	0.0073	0.34	13	15	0.59	14	23	9.8
								Median	2.1	0.035	247	0.81	0.010	0.060	3.3	170	10	11	<0.001	<0.01	6.4	0.95	0.40	0.85	18	<0.01	0.020	33	<0.005	0.24	6.2	6.5	0.25	12	14	6.9
								25th PCTL	1.4	0.020	138	0.46	0.010	<0.05	1.3	120	7.2	10	<0.001	<0.01	3.7	0.53	0.30	0.60	11	<0.01	0.010	29	<0.005	0.15	3.7	2.3	0.15	11	9.3	3.6
								10th PCTL	0.90	0.020	86	0.33	<0.01	<0.05	0.95	75	5.0	9.7	<0.001	<0.01	1.4	0.40	0.30	0.35	7.5	<0.01	<0.01	23	<0.005	0.095	2.8	2.0	0.11	8.3	4.0	2.4
								Min	0.60	0.010	38	0.16	<0.01	<0.05	0.60	40	4.0	6.7	<0.001	<0.01	0.11	0.20	0.20	0.20	4.6	<0.01	<0.01	12	<0.005	0.070	2.2	1.0	0.070	6.8	2.0	1.3

Appendix C.1-3: Solid Phase Element by Aqua Regia Digestion for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
									ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Transition Facies for Gneiss Waste Rock																																				
ABA019	KAM029649	CFD0177	73.0	74.0	Waste	Lower transition	Gneiss	MxM	4.6	0.26	175	0.74	0.10	0.60	1.0	240	7.0	36	<0.001	0.020	0.46	1.1	0.50	2.2	22	<0.01	0.010	33	0.047	0.19	3.0	8.0	0.17	12	13	14
ABA020	KAM029658	CFD0177	81.0	82.0	Waste	Lower transition	Gneiss	MxM	15	1.7	577	0.58	0.040	0.070	22	500	6.8	78	<0.001	0.060	0.15	7.9	0.70	0.60	69	<0.01	0.010	19	0.11	0.42	5.1	55	0.16	13	40	9.8
ABA047	KAM051446	CFD0166	13.0	14.0	Waste	Lower transition	Gneiss	MxM	8.4	1.3	287	0.75	0.18	0.22	16	580	1.3	37	<0.001	<0.01	0.53	5.7	0.30	2.6	41	<0.01	0.010	4.1	0.18	0.20	0.91	54	0.26	6.4	20	2.7
ABA051	KAM079117	CFD0251	51.0	52.0	Waste	Lower transition	Gneiss	MxF	4.5	0.45	228	1.3	0.020	<0.05	4.6	290	5.0	14	0.0010	0.29	1.2	2.0	0.80	0.40	41	<0.01	0.13	25	<0.005	0.090	4.9	10	0.14	16	23	9.3
ABA058	KAM096948	CFD0270	230.0	231.0	Waste	Lower transition	Gneiss	MxF	1.8	0.41	364	1.7	0.020	0.10	1.1	120	8.4	18	<0.001	0.10	0.66	0.60	0.40	0.50	31	<0.01	0.010	34	<0.005	0.26	5.9	2.0	0.26	9.9	14	5.9
ABA067	KAM129499	CFD0332	50.0	51.0	Waste	Lower Transition	Gneiss	MxM	4.9	0.27	163	6.9	0.060	0.73	0.80	150	7.2	40	0.0010	0.050	0.51	0.60	0.50	1.1	12	<0.01	0.010	33	0.036	0.24	5.2	5.0	0.12	13	14	8.2
ABA070	KAM099512	CFD0338	10.0	11.0	Waste	Lower transition	Gneiss	MxF	2.3	0.13	190	0.24	0.040	0.28	0.70	100	7.2	30	<0.001	<0.01	0.40	0.40	0.40	1.3	4.5	<0.01	<0.01	35	0.014	0.21	3.9	2.0	0.10	11	9.0	8.5
ABA073	KAM145537	CFD0339	111.0	112.0	Waste	Lower transition	Gneiss	MxF	3.2	0.14	311	0.97	0.060	0.44	0.60	130	7.2	34	<0.001	0.020	0.45	0.70	0.50	0.60	20	<0.01	0.010	36	0.024	0.21	2.6	2.0	0.14	14	20	6.6
ABA098	KAM137429	CFR0469	29.0	30.5	Waste	Lower transition	Gneiss	MxF	6.6	0.40	407	1.7	0.060	0.99	5.6	390	4.9	62	<0.001	<0.01	0.39	1.9	0.70	1.1	117	<0.01	0.13	25	0.12	0.38	4.1	15	0.66	16	19	6.6
ABA106	KAM139356	CFR0482	89.9	91.4	Waste	Lower transition	Gneiss	MxF	8.8	1.2	468	0.88	0.030	0.060	23	730	9.0	74	<0.001	0.010	3.1	5.1	0.50	0.30	27	<0.01	<0.01	17	0.14	0.51	2.7	39	0.38	13	41	6.1
ABA117	KAM122524	CFR0529	21.3	22.9	Waste	Lower transition	Gneiss	FG	2.7	0.20	94	1.6	0.11	1.7	2.9	150	1.3	16	<0.001	0.010	0.090	0.80	0.40	3.9	26	<0.01	<0.01	31	0.047	0.10	3.0	5.0	2.9	9.1	7.0	8.8
ABA142	KAM152462	CFR0589	25.9	27.4	Waste	Lower transition	Gneiss	MxF	4.2	0.32	233	1.9	0.070	0.40	3.3	140	7.0	51	<0.001	0.040	0.29	1.5	0.50	1.0	14	<0.01	0.010	39	0.038	0.29	6.0	11	2.1	14	16	15
ABA150	KAM153129	CFR0595	30.5	32.0	Waste	Lower transition	Gneiss	MxM	9.1	1.4	721	2.6	0.050	0.20	42	490	5.9	68	0.0010	0.15	0.51	5.0	0.50	2.3	118	<0.01	0.060	9.1	0.15	0.35	0.93	39	0.46	10	34	2.3
ABA246	R273797	CFD0458	9.0	10.0	Waste	Lower transition	Gneiss	FG	1.5	0.060	266	0.85	0.010	0.10	1.1	350	6.4	14	<0.001	0.020	1.5	1.5	0.30	1.1	28	<0.01	0.020	34	0.0080	0.13	2.9	20	0.13	14	16	20
ABA247	R283019	CFD0484	33.0	34.0	Waste	Lower transition	Gneiss	FG	3.4	0.60	343	0.53	0.040	0.070	28	400	5.3	56	<0.001	0.010	2.9	5.1	0.40	1.0	17	<0.01	<0.01	28	0.056	0.48	11	25	0.19	12	27	4.4
ABA249	R273398	CFD0447	188.0	189.0	Waste	Lower transition	Gneiss	MxF	13	1.6	465	0.30	0.060	0.050	14	460	1.9	117	<0.001	<0.01	1.6	8.1	0.50	3.6	18	<0.01	0.020	7.5	0.17	0.50	1.4	49	0.18	19	27	1.8
ABA250	R279032	CFD0461	85.0	86.0	Waste	Lower transition	Gneiss	MxM	5.8	0.94	381	2.6	0.060	0.13	47	430	3.3	57	0.0020	0.34	1.6	2.7	0.90	0.70	64	<0.01	0.51	27	0.086	0.42	3.9	26	0.22	12	27	9.9
ABA251	R274019	CFD0464	10.0	11.0	Waste	Lower transition	Gneiss	FG	1.7	0.040	286	0.31	0.080	0.070	3.0	170	9.2	12	<0.001	0.010	0.99	0.70	0.40	1.4	13	<0.01	0.050	38	<0.005	0.13	3.5	5.0	0.090	11	11	13
ABA252	R274341	CFD0467	80.0	81.0	Waste	Lower transition	Gneiss	MxF	1.2	0.050	151	0.61	0.10	0.28	0.90	60	4.3	17	<0.001	0.020	0.29	0.40	0.20	1.5	6.2	0.010	0.030	43	0.0050	0.070	2.1	2.0	0.11	11	8.0	14
ABA253	R282397	CFD0474	95.0	96.0	Waste	Lower transition	Gneiss	MxF	1.6	0.030	134	0.71	0.010	0.050	1.4	190	14	9.9	<0.001	0.010	3.4	1.3	0.40	2.3	5.6	<0.01	<0.01	38	<0.005	0.25	6.9	5.0	0.22	9.1	11	11
ABA254	R270666	CFD0404	10.0	11.0	Waste	Lower transition	Gneiss	MxF	4.6	0.39	229	0.97	0.020	0.47	5.4	180	6.8	55	<0.001	0.010	1.6	2.1	0.50	1.2	13	<0.01	<0.01	33	0.057	0.34	2.5	15	0.20	14	16	12
ABA255	R271756	CFD0424	62.0	63.0	Waste	Lower transition	Gneiss	MxM	1.6	0.040	239	0.47	0.030	0.050	1.6	150	4.3	8.7	<0.001	<0.01	1.5	0.80	0.60	1.0	8.7	<0.01	0.010	34	<0.005	0.18	2.5	4.0	0.23	7.6	9.0	6.7
ABA256	R271112	CFD0415	8.0	9.0	Waste	Lower transition	Gneiss	MxM	3.8	0.15	442	1.3	0.050	0.15	2.1	300	11	37	<0.001	0.070	3.6	1.3	0.50	0.70	23	<0.01	0.030	23	0.025	0.40	3.4	7.0	0.45	12	35	12
ABA257	R273315	CFD0447	115.0	116.0	Waste	Lower transition	Gneiss	FG	1.4	0.030	117	0.24	0.040	0.14	0.70	60	3.8	13	<0.001	0.010	0.93	0.30	0.20	0.40	10	<0.01	0.020	41	<0.005	0.080	2.6	1.0	0.32	17	3.0	9.4
ABA258	R276507	CFD0409	12.0	13.0	Waste	Lower transition	Gneiss	MxM	1.2	0.050	625	0.16	0.010	0.090	2.5	130	6.0	15	<0.001	<0.01	9.9	0.80	0.20	1.5	9.4	<0.01	0.040	24	<0.005	0.16	1.6	3.0	4.7	9.0	5.0	5.5
ABA259	R280545	CFD0499	10.0	11.0	Waste	Lower transition	Gneiss	MxM	5.1	0.35	315	0.99	0.060	0.85	3.2	370	4.2	66	<0.001	0.040	0.15	1.7	0.50	1.3	44	0.010	0.18	26	0.12	0.47	3.9	13	0.19	12	26	4.6
ABA260	R280565	CFD0499	28.0	29.0	Waste	Lower transition	Gneiss	MxM	2.7	0.16	206	0.55	0.070	0.61	1.5	110	2.4	25	<0.001	0.020	1.4	0.80	0.40	1.1	12	<0.01	0.070	39	0.017	0.16	3.7	4.0	0.12	14	9.0	10
ABA261	R274115	CFD0464	95.0	96.0	Waste	Lower transition	Gneiss	MxF	3.8	0.87	397	0.59	0.040	0.050	16	270	5.3	40	<0.001	0.15	0.86	4.7	0.20	0.60	124	<0.01	0.030	27	0.039	0.31	5.3	24	0.16	11	19	9.5
ABA262	R274262	CFD0467	10.0	11.0	Waste	Lower transition	Gneiss	MxF	1.0	0.040	118	0.53	0.070	0.32	0.70	70	5.4	14	<0.001	0.020	0.44	0.50	0.50	0.50	17	<0.01	0.030	40	0.0050	0.080	2.2	4.0	0.56	13	6.0	11
ABA263	R282302	CFD0474	10.0	11.0	Waste	Lower transition	Gneiss	FG	1.9	0.030	143	0.30	0.010	0.050	2.1	100	7.4	18	<0.001	0.010	3.8	0.80	0.20	1.0	10	<0.01	0.010	34	<0.005	0.22	9.6	5.0	0.40	9.7	8.0	5.4
ABA264	R271435	CFD0420	9.0	10.0	Waste	Lower transition	Gneiss	MxF	2.7	0.13	307	0.34	0.040	0.17	7.6	150	7.5	33	<0.001	0.010	28	1.2	0.60	0.80	9.3	<0.01	<0.01	35	0.017	0.36	3.3	4.0	0.14	15	23	8.6
ABA265	R271165	CFD0415	55.0	56.0	Waste	Lower transition	Gneiss	MxF	4.3	0.15	356	1.9	0.060	0.70	1.2	140	7.8	39	<0.001	0.030	0.090	1.1	0.40	1.5	29	<0.01	0.010	33	0.032	0.25	3.8	4.0	0.14	11	24	5.2
ABA267	R273694	CFD0456	97.0	98.0	Waste	Lower transition	Gneiss	MxM	31	3.6	662	1.1	0.080	<0.05	43	370	1.2	138	<0.001	0.29	0.89	20	0.50	2.0	24	<0.01	0.030	0.20	0.24	0.86	0.81	177	0.080	11	72	0.50
ABA269	R279507	CFD0468	60.0	61.0	Waste	Lower transition	Gneiss	MxF	5.3	0.38	263	1.4	0.070	0.46	3.4	430	2.9	52	<0.001	0.030	1.6	1.6	0.80	1.9	24	<0.01	0.24	30	0.088	0.37	4.4	10	0.65	18	13	6.8
ABA270	R272186	CFD0433	10.0	11.0	Waste	Lower transition	Gneiss	MxF	1.1	0.020	116	0.39	0.020	0.070	1.3	80	3.1	14	<0.001	0.010	0.63	0.40	<0.2	0.80	6.0	<0.01	0.020	35	<0.005	0.12	2.4	1.0	0.36	3.6	4.0	5.6
ABA271	R283079	CFD0484	87.0	88.0	Waste	Lower transition	Gneiss	FG	4.4	0.57	310	0.16	0.040	0.080	11	310	7.2	46	<0.001	0.010	2.3	2.5	0.40	0.40	15	<0.01	<0.01	35	0.061	0.31	2.0	17	0.20	12	27	6.0
ABA272	Q034772	CFD0473	86.0	87.0	Waste	Lower transition	Gneiss	MxF	4.8	0.81	438	0.33	0.060	0.11	12	660	7.8	62	<0.001	<0.01	1.9	4.3	0.40	1.1	47	<0.01	0.020	26	0.15	0.40	3.8	38	0.71	15	38	3.5
ABA273	R282171	CFD0439	30.0	31.0	Waste	Lower transition	Gneiss	MxF	3.3	0.10	195	0.44	0.020	0.13	2.9	90	6.2	33	<0.001	<0.01	3.5	0.80	0.40	0.60	6.4	<0.01	0.020	39	0.016	0.24	6.4	3.0	0.18	16	22	3.3
ABA274	R277372	CFD0423	10.0	11.0	Waste	Lower transition	Gneiss	MxM	3.0	0.19	86	0.91	0.070	0.16	1.9	260	2.1	17	0.0010	0.010	0.28	1.4	0.50	1.5	15	<0.01	0.020	37	0.015	0.12	2.3	4.0	<0.05	12	7.0	5.8
ABA275	R283492	CFD0496	10.0	11.0	Waste	Lower transition	Gneiss	MxF	4.5	0.29	202	3.5	0.080	0.58	3.6	390	3.8	55	<0.001	0.040	0.24	1.8	0.60	1.2	20	<0.01	0.19	28	0.083	0.40	6.1	10	0.16	15	16	6.2
ABA276	R273866	CFD0460	63.0	64.0	Waste	Lower transition	Gneiss	FG	4.3	0.37	236	1.0	0.090	0.26	5.3	190	3.2	52	<0.001	0.060	0.50	1.7	0.40	1.4	25	<0.01	0.020	33	0.043	0.31	4.3	12	0.11	13	14	14
ABA277	R273898	CFD0460	91.0	92.0	Waste	Lower transition	Gneiss	MxF	7.4	0.47	461	1.5	0.050	0.38	2.7	1010	9.2	68	<0.001	0.10	<0.05	2.5	0.90	0.50	92	<0.01	0.020	28	0.17	0.43	3.4	45	0.22	19	34	13
ABA278	Q035773	CFD0491	9.0	10.0	Waste	Lower transition	Gneiss	MxF	2.7	0.12	119	0.20	0.040	0.17	2.6	200	5.3	37	<0.001	<0.01	7.0	0.70	0.50	1.7	6.6	<0.01	0.010	38	0.016	0.38	4.5	4.0	0.24	15	11	9.8
ABA279	Q035789	CFD0491	60.0	61.0	Waste	Lower transition	Gneiss	MxF	2.2	0.030	204	0.42	0.010	<0.05	1.4	250	88	7.8	<0.001	<0.01	16	1.5	0.40	3.2	7.8	<0.01	0.10	37	<0.005	0.29	10	10	0.41	16	22	6.9
ABA280	R271699	CFD0424	12.0	13.0	Waste	Lower transition	Gneiss	MxF	1.2	0.050	292	1.5	0.080	0.16	1.5	170	5.9	18	<0.001	<0.01	1.3	0.80	<0.2	0.60	9.0	<0.01	0.020	34	0.010	0.10	3.1	4.0	0.46	12	13	5.0
ABA282	R282102	CFD0437	70.0	71.0	Waste	Lower transition	Gneiss	MxF	2.0	0.020	140	0.34	0.010	0.10	1.2	60	13	11	<0.001	<0.01	2.9	0.40	0.30	0.60	7.1	<0.01	0.020	40	<0.005	0.080	6.5	1.0	0.17	18	2.0	7.7
ABA283	R273302	CFD0447	59.0	60.0	Waste	Lower transition	Gneiss	FG	7.1	1.4	491	0.89	0.040	<0.05	21	520	7.3	79	0.0010	0.080	0.49	6.9	0.60	0.50	69	<0.01	0.010	21	0.084	0.48	7.8	38	0.10	17	35	4.6
ABA284	R273593	CFD0456	7.0	8.0	Waste	Lower transition	Gneiss	MxF	11	1.4	448	0.38	0.050	0.060	23	390	2.2	84	<0.001	0.010	1.6	7.5	0.30	2.0	11	<0.01	0.020	11	0.13	0.49	0.73	42	0.13	15	21	4.9
ABA338	R270835	CFD0406	32.0	33.0	Waste	Lower Transition	Gneiss	MxF	1.5	0.33	389	1.5	0.040	0.090	10	260	5.1	25	0.0010	0.040	0.37	2.3	0.30	1.5	62	<0.01	0.010	32	0.019	0.18	3.0	12	3.7	9.7	18	17
ABA339	R270848	CFD0406	58.0	58.3	Waste	Lower Transition	Gneiss	MxF	3.5	0.19	294	0.59	0.050	0.70	1.2	190	2.8	29	<0.001	0.040	3.8	0.90	0.30	15	85	<0.01	<0.01	35	0.029	0.19	2.9	4.0	0.24	9.6	13	13
ABA340	R270686	CFD0404	27.0	28.0	Waste	Lower Transition	Gneiss	MxM	12	1.9	490	3.4	0.020	<0.05	37	510	1.9	142	0.0010	0.13	1.1	3.0	0.30	0.40	22	<0.01	<0.01	13	0.19	0.95	3.7	53	0.25	8.5	38	4.2
ABA341	R270737	CFD0404	85.0	86.0	Waste	Lower Transition	Gneiss	FG	2.4	0.43	324	1.2	0.030	0.070	16	230	9.7	28	<0.001	0.080	1.6	2.1	0.40	0.90	45	<0.01	0.010	29	0.023	0.19	3.3	12	0.11	9.7	24	16
ABA342	R551085	CFD0563	10.0	11.0	Waste	Lower Transition	Gneiss	MxM	4.8	0.42	233	0.83	0.050	0.27	3.9	280	2.4	41	<0.001	0.050	0.17	2.2	0.50	1.0	19	<0.01	0.020	24	0.045	0.29	1.7	12	0.30	14	14	7.8
ABA343	R551107	CFD0563	30.0	31.0	Waste	Lower Transition	Gneiss	MxM	13	1.9	589	0.66	0.050	0.16	49	690	8.5	57	<0.001	0.11	0.20	3.1	0.20	1.0	143	<0.01	0.060	5.9	0.19	0.35	0.73	44	0.61	5.6	51	2.1
ABA344	R551131	CFD0563	50.0	51.0	Waste	Lower Transition	Gneiss	MxM	16	1.9	578	0.53	0.040	0.13	28	950	3.3	63	<0.001	0.030	0.11	3.1	0.30	0.80	76	<0.01	0.040	2.1	0.24	0.38	0.29	57	0.37	5.2	54	1.8
ABA348	R304313	CFD0541	56.0	57.0	Waste	Lower Transition	Gneiss	MxM	10	1.3	641	0.26	0.070	0.080	44	680	2.5	58	<0.001	<0.01	3.2	7.3	0.80	4.9	49	<0.01	0.060	17	0.12	0.99	2.9	48	0.11	16	53	4.4
ABA360	R623829	CFD0555	10.0	11.0	Waste	Lower Transition	Gneiss	MxF	2.9	0.12	123	3.8	0.050	0.25	1.4	140	5.7	23	<0.001	<0.01	0.80	0.60	0.30	0.70	6.7	<0.01	0.010	37	0.013	0.15	6.1	3.0	0.080	9.0	9.0	14
ABA361	R623933	CFD0555	102.0	103.0	Waste	Lower Transition	Gneiss	MxF	17	1.5	622	0.49	0.020	0.15	32	980	6.8	124	<0.001	0.020	1.6	6.9	0.40	2.1	195	<0.01	0.010	13	0.20	0.79	3.4	85	0.19	11	49	5.7
ABA362	R507027	CFD0555	185.0	186.0	Waste	Lower Transition	Gneiss	FG	3.4	0.32	221	1.4	0.030	0.14	1.2	140	4.1	26	<0.001	0.020	0.17	0.70	0.40	1.2	54	<0.01	0.010	33	0.012	0.17	2.3	3.0	0.29	11	10	8.9
ABA363	R545397	CFD0520	20.0	21.0	Waste	Lower Transition	Gneiss	FG	1.9	0.010	203	0.37	0.010	<0.05	1.9	210	11	5.1	<0.001	<0.01	5.7	1.4	0.40	1.1	24	<0.01	<0.01	32	<0.005	0.47	13	8.0	0.21	12	9.0	4.4
ABA364	R545422	CFD0520	41.0	42.0	Waste	Lower Transition	Gneiss	FG	1.9	0.010	176	0.29	0.010	0.050	1.5	110	14	9.0	<0.001	<0.01	2.0	0.70	0.60	0.90	10	<0.01	<0.01	35	<0.005	0.26	6.0	2.0	0.19	13	6.0	4.1
ABA366	R545552	CFD0524	30.0	31.0	Waste	Lower Transition	Gneiss	MxF	1.5	0.030	215	1.2	0.010	0.050	0.80	70	13	10	<0.001	0.010	4.1	0.80	0.50	0.60	20	<0.01	0.010	37	<0.005	0.21	4.5	2.0	0.18	14	9.0	11
ABA369	R545644	CFD0526	81.0	82.0	Waste	Lower Transition	Gneiss	MxF	2.1	0.070	167	0.48	0.030	0.14	0.90	90	14	15	<0.001	<0.01	1.7	0.60	0.50	0.60	11	<0.01	<0.01	38	0.0070	0.11	3.6	3.0	0.26	15	8.0	12
ABA370	R545697	CFD0528	42.0	43.0	Waste	Lower Transition	Gneiss	MxF	3.0	0.030	120	0.38	0.040	0.050	2.2	110	6.0	14	<0.001	<0.01	4.6	0.50	0.40	1.0	9.5	<0.01	0.010	38	<0.005	0.20	8.2	3.0	0.25	11	5.0	8.6
ABA371	R271272	CFD0417	5.0	6.0	Waste	Lower Transition	Gneiss	MxF	3.7	0.12	263	1.2	0.070	0.50	1.0	130	7.8	36	<0.001	<0.01	0.97	0.60	0.50	1.2	15	<0.01	<0.01	35	0.027	0.29	2.0	2.0	0.23	12	19	10
ABA372	R271299	CFD0417	30.0	30.7	Waste	Lower Transition	Gneiss	MxF	2.3	0.030	320	0.36	0.010	<0.05	1.6	180	8.3	15	<0.001	<0.01	17	0.90	0.50	0.50	9.7	<0.01	<0.01	37	<0.005	1.1	9.2	3.0	0.20	13	16	2.1
ABA376	R279575	CFD0468	120.0	121.0	Waste	Lower Transition	Gneiss	MxF	10	0.83	333	0.86	0.060	0.41	11	240	5.3	85	<0.001	<0.01	0.20	1.9	0.50	0.90	31	0.010	0.020	34	0.077	0.45	3.8	22	0.22	15	24	16
ABA390	R278608	CFD0450	10.0	11.0	Waste	Lower Transition	Gneiss	MxF	6.9	0.62	469	0.46	0.040	<0.05	52	390	8.9	42	<0.001	<0.01	5.2	6.8	0.70	1.3	12	<0.01	0.020	38	0.034	0.65	6.4	29	0.41	18	25	6.6
ABA391	R278677	CFD0450	71.0	72.0	Waste	Lower Transition	Gneiss	MxF	1.7	0.010	189	0.28	0.010	0.050	2.4	120	7.2	12	<0.001	<0.01	11	0.60	0.40	0.50	8.0	<0.01	<0.01	40	<0.005	0.19	8.7	3.0	0.33	12	7.0	3.9
ABA392	R278725	CFD0450	114.0	114.3	Waste	Lower Transition	Gneiss	MxF	1.3	0.020	170	0.79	0.010	0.070	1.0	170	7.7	16	<0.001	<0.01	8.6	0.60	0.50	1.0	12	<0.01	0.010	35	<0.005	0.25	5.0	3.0	0.35	9.1	9.0	6.0
ABA395	R545811	CFD0529	58.0	59.0	Waste	Lower Transition	Gneiss	FG	1.0	0.030	138	0.15	0.11	0.060	0.70	210	2.0	8.1	<0.001	<0.01	1.8	0.60	0.50	1.4	12	<0.01	<0.01	38	<0.005	0.030	2.3	2.0	0.36	12	4.0	11
ABA399	R543714	CFD0549	30.0	31.0	Waste	Lower Transition	Gneiss	MxF	1.4	0.070	129	0.24	0.060	0.27	0.60	90	5.7	13	<0.001	<0.01	0.39	0.40	0.50	0.50	10	<0.01	0.010	39	0.0050	0.080	2.0	1.0	0.15	17	3.0	12
ABA400	R543741	CFD0549	53.0	54.0	Waste	Lower Transition	Gneiss	MxF	1.4	0.020	36	1.5	0.010	0.090	2.9	80	21	12	<0.001	<0.01	4.2	0.50	0.40	0.20	12	<0.01	0.050	41	<0.005	0.19	7.0	2.0	0.16	9.3	6.0	9.6
ABA402	R544003	CFD0553	80.0	81.0	Waste	Lower Transition	Gneiss	MxF	2.0	0.060	275	3.7	0.040	0.17	1.0	120	35	16	0.0010	<0.01	3.9	0.40	0.40	0.50	12	<0.01	0.050	37	0.0050	0.13	4.4	2.0	0.23	17	10	15
ABA405	R554003	CFD0501	10.0	11.0	Waste	Lower Transition	Gneiss	MxF	3.9	0.010	126	0.22	0.010	0.050	0.90	70	12	9.8	<0.001	<0.01	1.8	0.30	0.20	0.40	8.5	<0.01	<0.01	41	<0.005	0.10	14	<1	0.15	7.0	3.0	4.4
ABA406	R554039	CFD0501	42.0	43.0	Waste	Lower Transition	Gneiss	MxF	1.2	0.040	296	0.31	0.030	0.10	1.1	230	6.8	15	<0.001	<0.01	0.51	0.60	0.40	0.50	15	0.010	<0.01	36	0.0050	0.11	2.6	2.0	0.17	14	9.0	11
ABA409	R272762	CFD0438	184.0	185.0	Waste	Lower Transition	Gneiss	FG	1.4	0.28	422	1.7	0.060	0.13	0.90	130	6.1	17	<0.001	0.17	0.26	0.90	0.40	0.60	50	<0.01	<0.01	38	0.0060	0.11	19	2.0	0.33	10	15	9.9
ABA410	R544159	CFD0502	10.0	11.0	Waste	Lower Transition	Gneiss	MxF	6.8	0.63	557	1.5	0.010	0.13	9.7	560	9.4	72	0.0020	<0.01	24	3.6	0.70	1.2	12	<0.01	0.020	29	0.062	0.61	7.5	20	0.99	18	35	6.9
ABA412	R544228	CFD0502	70.0	71.0	Waste	Lower Transition	Gneiss	MxF	8.0	0.97	399	1.9	0.040	0.080	21	360	5.2	89	0.0010	<0.01	1.8	5.8	1.0	1.6	36	<0.01	<0.01	28	0.073	0.57	2.3	28	0.12	25	32	14
Statistical Summary						**Lower Transition**	**Gneiss**	**n**	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79
								Max	31	3.6	721	6.9	0.18	1.7	52	1010	88	142	0.0020	0.34	28	20	1.0	15	195	0.010	0.51	43	0.24	1.1	19	177	4.7	25	72	20
								90th PCTL	10	1.4	561	1.9	0.080	0.58	29	564	12	78	0.0010	0.10	6.0	6.0	0.70	2.2	70	<0.01	0.062	39	0.15	0.52	8.3	46	0.62	17	38	14
								75th PCTL	5.6	0.61	403	1.4	0.060	0.27	12	390	8.1	57	<0.001	0.040	3.2	2.6	0.50	1.5	38	<0.01	0.030	37	0.080	0.40	5.9	23	0.36	15	26	11
								Median	3.4	0.20	275	0.74	0.040	0.13	2.6	200	6.2	33	<0.001	0.010	1.4	1.3	0.40	1.0	17	<0.01	0.010	34	0.023	0.25	3.7	5.0	0.22	12	16	7.8
								25th PCTL	1.9	0.045	176	0.38	0.020	0.060	1.2	130	4.2	15	<0.001	<0.01	0.45	0.65	0.40	0.60	10	<0.01	<0.01	26	<0.005	0.16	2.5	3.0	0.15	10	9.0	5.1
								10th PCTL	1.4	0.028	122	0.26	0.010	<0.05	0.88	88	2.4	11	<0.001	<0.01	0.19	0.48	<0.2	0.50	7.7	<0.01	<0.01	13	<0.005	0.10	1.7	2.0	0.11	9.0	5.8	3.5
								Min	1.0	0.010	36	0.15	0.010	0.050	0.60	60	1.2	5.1	<0.001	<0.01	<0.05	0.30	<0.2	0.20	4.5	<0.01	<0.01	0.20	<0.005	0.030	0.29	<1	<0.05	3.6	2.0	0.50

Appendix C.1-3: Solid Phase Element by Aqua Regia Digestion for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
									ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Fresh Facies for Gneiss Waste Rock																																				
ABA065	KAM128393	CFD0326	25.0	26.0	Waste	Fresh	Gneiss	MxM	4.5	0.35	329	0.71	0.020	0.12	4.2	440	7.5	39	<0.001	<0.01	14	2.7	0.90	1.0	18	<0.01	0.20	25	0.037	0.30	5.4	14	0.30	21	23	6.2
ABA066	KAM128504	CFD0326	75.0	76.0	Waste	Fresh	Gneiss	MxM	6.3	0.36	221	1.4	0.040	0.27	4.5	340	3.7	56	<0.001	0.010	1.8	2.2	1.0	0.80	18	<0.01	0.74	25	0.060	0.37	2.9	9.0	0.090	19	14	9.9
ABA071	KAM145241	CFD0338	81.0	82.0	Waste	Fresh	Gneiss	MxM	11	1.2	632	0.26	0.060	0.66	53	650	6.0	83	<0.001	0.050	0.53	4.8	0.80	6.3	763	0.010	<0.01	24	0.15	0.46	5.4	45	0.12	26	34	7.5
ABA097	KAM137325	CFR0468	88.4	89.9	Waste	Fresh	Gneiss	MxM	13	1.2	486	1.5	0.050	0.29	14	720	2.1	74	<0.001	0.040	0.77	2.2	0.60	1.1	34	<0.01	0.050	21	0.19	0.41	2.4	46	0.92	12	34	7.1
ABA099	KAM137468	CFR0469	82.3	83.8	Waste	Fresh	Gneiss	MxM	17	2.0	587	1.4	0.070	0.10	134	360	5.5	61	<0.001	<0.01	4.3	5.4	0.40	2.5	47	<0.01	0.40	11	0.15	0.36	1.8	50	0.43	9.5	37	4.0
ABA108	KAM139795	CFR0486	25.9	27.4	Waste	Fresh	Gneiss	MxM	5.5	0.48	341	1.3	0.070	0.22	3.8	360	2.7	35	<0.001	<0.01	1.4	2.1	0.80	1.5	9.9	<0.01	0.34	26	0.053	0.22	2.2	11	0.58	22	20	8.7
ABA139	KAM152151	CFR0586	61.0	62.5	Waste	Fresh	Gneiss	MxF	2.5	0.17	180	2.0	0.070	0.58	3.0	180	4.0	27	<0.001	0.010	1.4	1.1	0.50	3.8	30	<0.01	0.010	35	0.026	0.17	3.8	7.0	0.90	12	11	12
ABA140	KAM152186	CFR0586	109.7	111.3	Waste	Fresh	Gneiss	MxF	1.8	0.060	116	2.1	0.080	0.46	2.0	80	3.7	17	<0.001	0.010	0.22	0.60	0.40	3.4	13	<0.01	0.050	35	0.0080	0.090	2.8	2.0	0.82	16	6.0	13
ABA143	KAM152536	CFR0589	128.0	129.5	Waste	Fresh	Gneiss	FG	2.0	0.13	135	2.2	0.080	0.13	2.2	140	4.1	12	<0.001	0.20	1.0	0.70	0.40	3.5	111	<0.01	0.030	34	<0.005	0.060	6.8	3.0	1.9	12	4.0	5.3
ABA148	KAM153051	CFR0594	109.7	111.3	Waste	Fresh	Gneiss	MxF	2.3	0.15	151	3.6	0.060	0.14	2.3	160	4.9	18	<0.001	0.21	1.7	1.0	0.70	1.2	40	<0.01	0.010	37	0.0070	0.12	17	4.0	2.4	12	9.0	14
ABA285	R277457	CFD0426	16.0	17.0	Waste	Fresh	Gneiss	MxM	10	1.2	318	0.76	0.060	0.24	71	590	4.3	45	0.0010	0.010	0.34	2.4	0.90	2.1	26	<0.01	0.070	14	0.17	0.31	1.4	31	0.41	8.3	22	4.4
ABA286	R279452	CFD0468	11.0	12.0	Waste	Fresh	Gneiss	MxF	5.7	0.48	335	0.36	0.090	0.27	3.0	400	3.3	47	<0.001	0.020	0.91	1.9	0.60	1.1	14	<0.01	0.23	30	0.068	0.33	2.3	8.0	6.7	14	24	7.1
ABA287	R274861	CFD0472	100.0	101.0	Waste	Fresh	Gneiss	MxM	7.4	0.81	263	2.6	0.050	0.24	18	360	2.8	36	0.0010	0.47	0.19	1.7	1.3	1.1	35	<0.01	0.070	21	0.11	0.23	2.7	21	0.22	9.6	14	5.6
ABA288	R283657	CFD0498	82.0	83.0	Waste	Fresh	Gneiss	MxM	5.2	0.57	193	2.1	0.060	0.18	2.4	350	16	48	<0.001	0.020	0.47	1.7	0.50	0.70	9.9	<0.01	0.41	26	0.061	0.32	3.5	6.0	0.15	12	19	8.5
ABA289	Q035925	CFD0495	94.0	95.0	Waste	Fresh	Gneiss	MxM	8.7	0.84	218	4.4	0.060	0.16	2.9	390	5.8	52	<0.001	0.020	0.42	2.1	0.80	1.2	21	<0.01	0.38	27	0.061	0.32	2.2	10	0.26	22	22	9.5
ABA290	R272262	CFD0433	123.0	124.0	Waste	Fresh	Gneiss	MxF	2.5	0.080	288	0.43	0.050	0.17	1.2	190	5.8	25	<0.001	0.010	2.2	0.80	0.40	0.80	10	<0.01	0.020	36	0.013	0.17	3.4	5.0	0.28	11	17	7.1
ABA293	R276133	CFD0393	45.0	46.0	Waste	Fresh	Gneiss	MxM	15	2.4	672	0.69	0.040	0.14	47	680	3.1	61	0.0010	0.080	0.22	6.5	0.50	1.7	65	<0.01	0.92	5.8	0.22	0.38	0.72	55	0.21	8.7	53	1.6
ABA294	R276236	CFD0401	18.0	19.0	Waste	Fresh	Gneiss	MxM	12	1.7	524	1.0	0.060	0.18	56	810	18	47	<0.001	0.020	0.080	3.5	0.30	0.80	54	<0.01	6.1	2.6	0.23	0.28	0.27	46	0.22	4.2	56	1.2
ABA295	R271028	CFD0412	117.0	118.0	Waste	Fresh	Gneiss	MxF	1.4	0.060	216	0.63	0.050	0.14	1.1	140	4.9	17	<0.001	0.010	1.5	0.80	0.30	0.60	22	<0.01	0.010	34	0.0060	0.10	2.4	4.0	0.17	11	14	7.8
ABA297	R279539	CFD0468	89.0	90.0	Waste	Fresh	Gneiss	MxF	7.7	0.89	368	4.1	0.080	0.42	8.6	250	4.2	71	0.0060	0.040	0.11	1.7	0.50	1.0	43	0.010	0.10	31	0.088	0.42	11	18	0.47	14	18	12
ABA298	R275689	CFD0495	57.0	58.0	Waste	Fresh	Gneiss	MxM	12	1.8	550	1.4	0.090	0.29	61	780	5.2	49	<0.001	0.060	0.42	3.2	0.30	1.4	62	0.010	0.17	3.5	0.26	0.25	0.71	40	0.31	5.0	47	2.7
ABA299	R272239	CFD0433	57.0	58.0	Waste	Fresh	Gneiss	MxF	1.3	0.12	187	2.1	0.050	0.18	1.0	150	7.6	18	0.0030	0.080	0.18	0.70	0.40	1.6	47	<0.01	0.020	35	0.0050	0.10	20	4.0	0.34	11	11	8.3
ABA300	R278428	CFD0445	118.0	119.0	Waste	Fresh	Gneiss	MxF	4.2	0.17	278	0.35	0.10	0.53	1.1	150	5.9	42	<0.001	0.010	0.33	1.0	0.50	1.8	18	<0.01	0.020	35	0.032	0.21	2.0	3.0	0.17	12	18	5.6
ABA301	R273296	CFD0447	10.0	11.0	Waste	Fresh	Gneiss	FG	2.6	0.12	288	1.4	0.070	0.54	1.2	150	8.6	30	0.0010	0.010	0.050	0.60	0.40	0.70	20	<0.01	0.020	36	0.023	0.19	2.4	3.0	0.11	13	20	5.4
ABA302	R270935	CFD0412	35.0	36.0	Waste	Fresh	Gneiss	MxF	13	1.8	532	0.74	0.060	0.12	26	600	3.7	100	<0.001	0.020	0.42	3.0	0.50	0.50	33	<0.01	0.020	19	0.22	0.56	2.1	51	0.51	11	43	6.4
ABA346	R277538	CFD0426	87.0	88.0	Waste	Fresh	Gneiss	MxM	9.7	1.2	261	1.2	0.060	0.28	42	450	1.7	47	0.0010	0.18	0.30	3.0	0.40	1.1	25	<0.01	0.090	6.0	0.19	0.34	0.67	38	0.18	6.0	28	2.0
ABA347	R304284	CFD0541	30.0	31.0	Waste	Fresh	Gneiss	FG	0.90	0.040	126	0.61	0.030	0.18	1.0	100	6.0	11	<0.001	0.020	0.74	0.30	0.50	0.50	3.0	<0.01	<0.01	38	<0.005	0.070	3.1	1.0	1.3	13	5.0	7.7
ABA350	R304041	CFD0539	10.0	11.0	Waste	Fresh	Gneiss	FG	1.4	0.070	142	0.18	0.070	0.19	0.80	110	3.8	12	<0.001	<0.01	0.60	0.30	0.50	0.40	4.9	<0.01	0.020	40	<0.005	0.070	2.8	2.0	0.10	15	6.0	7.1
ABA351	R304231	CFD0539	45.0	46.0	Waste	Fresh	Gneiss	MxM	14	1.3	392	0.32	0.060	0.080	48	550	2.2	49	<0.001	<0.01	0.73	5.4	0.50	1.2	42	<0.01	0.040	12	0.12	0.30	0.89	47	0.13	13	32	0.80
ABA354	R304119	CFD0525	45.0	46.0	Waste	Fresh	Gneiss	MxM	10	1.1	436	0.75	0.050	0.10	45	480	3.3	55	<0.001	0.020	0.19	4.4	0.60	0.70	32	<0.01	0.020	13	0.091	0.33	1.6	33	0.11	14	36	1.4
ABA355	R304173	CFD0525	91.0	92.0	Waste	Fresh	Gneiss	FG	2.3	0.13	113	0.31	0.11	0.72	1.3	60	1.5	6.2	<0.001	<0.01	0.48	0.60	0.50	1.5	17	<0.01	<0.01	44	0.011	0.040	3.3	3.0	0.080	15	4.0	8.3
ABA356	R623617	CFD0548	10.0	11.0	Waste	Fresh	Gneiss	MxF	9.0	0.69	468	0.18	0.050	0.17	8.4	550	3.3	51	<0.001	<0.01	0.31	2.1	0.30	1.0	22	<0.01	0.020	6.7	0.11	0.32	1.1	17	0.16	5.3	27	1.8
ABA357	R623685	CFD0548	70.0	71.0	Waste	Fresh	Gneiss	MxF	11	0.93	391	0.21	0.070	0.16	17	270	6.3	69	<0.001	<0.01	0.19	2.4	0.40	1.9	29	<0.01	<0.01	29	0.10	0.42	1.9	24	0.11	13	26	12
ABA358	R623742	CFD0548	120.0	121.0	Waste	Fresh	Gneiss	MxF	1.2	0.080	210	0.28	0.080	0.16	1.7	70	9.8	14	<0.001	0.010	1.1	0.60	0.30	0.40	17	<0.01	<0.01	38	0.0050	0.090	4.7	3.0	0.18	9.8	7.0	15
ABA365	R545443	CFD0520	60.0	61.0	Waste	Fresh	Gneiss	FG	3.9	0.18	250	0.33	0.050	0.53	1.1	150	6.1	34	<0.001	<0.01	0.13	0.80	0.50	1.1	17	0.010	<0.01	34	0.029	0.29	2.6	4.0	0.25	13	19	8.1
ABA374	R271368	CFD0417	91.0	92.0	Waste	Fresh	Gneiss	FG	4.5	0.15	298	1.0	0.060	0.72	1.2	130	10	41	<0.001	<0.01	0.26	1.1	0.50	1.5	32	<0.01	<0.01	40	0.031	0.27	3.4	6.0	0.20	15	21	9.2
ABA378	R279593	CFD0468	135.0	136.0	Waste	Fresh	Gneiss	MxF	12	1.1	554	1.2	0.070	0.29	2.7	550	2.8	88	<0.001	0.070	<0.05	2.5	0.40	0.70	81	<0.01	0.010	19	0.16	0.59	4.0	29	0.24	11	36	5.5
ABA379	R279615	CFD0468	155.0	155.7	Waste	Fresh	Gneiss	MxF	13	1.5	649	3.2	0.10	0.20	19	610	2.5	62	<0.001	0.090	0.070	4.7	0.50	1.5	47	<0.01	0.19	16	0.16	0.34	2.9	48	0.48	11	48	2.5
ABA381	R511981	CFR0700	48.8	49.4	Waste	Fresh	Gneiss	MxM	7.0	0.86	553	1.4	0.040	0.52	42	650	8.6	22	<0.001	0.17	3.6	4.6	0.40	1.3	130	0.010	0.070	5.8	0.17	0.13	1.2	33	0.93	11	26	13
ABA387	Q034442	CFD0469	19.0	20.0	Waste	Fresh	Gneiss	MxF	6.6	0.69	332	0.67	0.080	0.19	24	330	8.8	71	<0.001	<0.01	0.66	2.2	0.50	3.0	14	<0.01	<0.01	33	0.076	0.48	4.1	18	0.29	14	23	16
ABA388	Q034516	CFD0469	102.0	103.0	Waste	Fresh	Gneiss	MxF	3.2	0.12	309	1.2	0.070	0.35	0.90	150	16	33	<0.001	0.030	0.55	0.80	0.70	0.60	23	<0.01	0.040	40	0.019	0.22	5.6	2.0	0.16	16	20	8.9
ABA389	Q034537	CFD0469	121.0	121.9	Waste	Fresh	Gneiss	MxF	2.7	0.10	142	0.30	0.060	0.22	1.4	170	7.0	25	<0.001	<0.01	3.5	1.2	0.40	1.3	8.4	<0.01	<0.01	40	0.015	0.16	3.5	5.0	0.18	14	13	6.6
ABA396	R545818	CFD0529	65.0	66.0	Waste	Fresh	Gneiss	MxF	3.5	0.24	172	0.28	0.11	0.73	1.7	210	1.5	9.0	<0.001	<0.01	0.56	1.0	0.50	5.7	22	<0.01	<0.01	34	0.030	0.040	2.5	7.0	0.16	13	7.0	9.9
ABA398	R543692	CFD0549	10.0	11.0	Waste	Fresh	Gneiss	FG	2.6	0.18	154	0.24	0.050	0.78	0.40	50	7.9	25	<0.001	<0.01	0.66	0.40	0.50	0.60	7.9	<0.01	0.010	43	0.0080	0.15	3.6	1.0	0.22	16	10	11
ABA401	R543957	CFD0553	40.0	41.0	Waste	Fresh	Gneiss	MxF	15	1.7	738	1.3	0.050	0.070	3.6	630	5.4	84	<0.001	0.16	0.15	8.9	0.60	0.90	49	<0.01	0.010	15	0.16	0.45	2.8	55	0.12	16	45	4.3
ABA404	R550544	CFD0553	160.0	161.0	Waste	Fresh	Gneiss	MxF	0.80	0.050	205	0.72	0.040	0.12	1.3	80	11	7.9	<0.001	0.010	1.7	0.60	0.50	0.60	374	<0.01	0.040	34	<0.005	0.050	2.0	7.0	0.15	18	6.0	14
ABA408	R272713	CFD0438	96.0	97.0	Waste	Fresh	Gneiss	MxF	2.3	0.12	208	0.19	0.090	0.14	0.80	190	4.5	18	<0.001	<0.01	0.50	0.60	0.30	1.4	17	<0.01	0.010	37	0.0090	0.11	3.4	3.0	0.44	9.1	6.0	12
ABA413	R276141	CFD0393	127.0	128.0	Waste	Fresh	Gneiss	MxM	16	2.5	781	0.81	0.030	0.11	56	670	43	35	<0.001	<0.01	0.37	8.2	0.40	1.7	71	<0.01	0.15	6.7	0.17	0.24	1.2	64	0.22	11	64	3.1
ABA414	R276153	CFD0393	170.0	171.0	Waste	Fresh	Gneiss	MxM	11	1.4	475	0.21	0.040	0.25	22	750	8.5	15	<0.001	0.060	3.5	4.2	0.40	1.6	111	<0.01	0.030	4.7	0.15	0.11	0.94	41	0.23	8.9	25	5.0
Statistical Summary						Fresh	Gneiss	n	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49
								Max	17	2.5	781	4.4	0.11	0.78	134	810	43	100	0.0060	0.47	14	8.9	1.3	6.3	763	0.010	6.1	44	0.26	0.59	20	64	6.7	26	64	16
								90th PCTL	13	1.7	596	2.2	0.090	0.60	54	672	10	72	0.0010	0.16	2.5	4.9	0.80	3.1	87	0.010	0.38	40	0.19	0.43	5.4	48	0.92	18	45	13
								75th PCTL	11	1.2	475	1.4	0.070	0.35	24	550	7.6	55	<0.001	0.050	1.1	3.0	0.60	1.6	47	<0.01	0.10	35	0.15	0.34	3.5	38	0.44	15	32	9.9
								Median	5.7	0.48	298	0.76	0.060	0.20	3.0	340	5.2	39	<0.001	0.010	0.50	1.9	0.50	1.2	26	<0.01	0.020	29	0.061	0.25	2.7	10	0.22	12	20	7.1
								25th PCTL	2.5	0.13	205	0.33	0.050	0.14	1.3	150	3.3	18	<0.001	<0.01	0.22	0.80	0.40	0.80	17	<0.01	0.010	15	0.013	0.12	1.9	4.0	0.16	11	11	5.0
								10th PCTL	1.4	0.078	142	0.23	0.040	0.12	1.0	96	2.4	12	<0.001	<0.01	0.13	0.60	0.30	0.60	9.9	<0.01	<0.01	6.0	0.0050	0.070	0.93	2.8	0.11	8.6	6.0	2.0
								Min	0.80	0.040	113	0.18	0.020	0.070	0.40	50	1.5	6.2	<0.001	<0.01	<0.05	0.30	0.30	0.40	3.0	<0.01	<0.01	2.6	<0.005	0.040	0.27	1.0	0.080	4.2	4.0	0.80
Statistical Summary for Gneiss Waste Rock								n	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
								n < DL	0	0	0	0	13	20	0	0	0	0	110	59	0	0	0	0	0	120	30	0	51	0	0	2	0	0	0	0
								Max	31	3.6	1160	6.9	0.18	1.7	134	1290	88	142	0.0060	0.47	83	20	1.3	15	763	0.010	6.1	44	0.26	3.2	29	177	6.7	28	72	23
								90th PCTL	11	1.4	563	2.3	0.080	0.53	38	616	14	71	0.0010	0.083	14	5.5	0.73	2.4	66	0.010	0.17	40	0.16	0.53	12	46	0.84	18	37	14
								75th PCTL	5.9	0.58	398	1.5	0.060	0.26	9.8	383	9.3	49	0.0010	0.030	3.9	2.5	0.50	1.5	34	0.010	0.043	37	0.072	0.37	6.6	21	0.45	15	24	10
								Median	2.7	0.15	265	0.83	0.040	0.13	2.8	180	6.7	23	<0.001	0.010	1.5	1.3	0.50	1.0	19	<0.01	0.020	34	0.014	0.24	3.7	6.5	0.23	13	16	7.3
								25th PCTL	1.6	0.040	169	0.39	0.010	0.060	1.2	120	4.3	12	<0.001	<0.01	0.48	0.60	0.40	0.60	11	<0.01	0.010	26	<0.005	0.13	2.4	3.0	0.16	11	9.0	5.0
								10th PCTL	1.3	0.020	126	0.24	0.010	<0.05	0.90	70	2.8	9.7	<0.001	<0.01	0.19	0.40	0.30	0.40	7.9	<0.01	<0.01	13	<0.005	0.090	1.5	2.0	0.11	8.7	5.7	2.5
								Min	0.60	0.010	35	0.15	<0.01	<0.05	0.40	30	1.2	4.0	<0.001	<0.01	0.050	0.20	0.20	0.20	3.0	<0.01	<0.01	0.20	<0.005	0.030	0.27	1.0	0.050	3.6	2.0	0.50

Appendix C.1-3: Solid Phase Element by Aqua Regia Digestion for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
									ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Oxide Facies for Schist Waste Rock																																				
ABA005	KAM022322	CFD0110	95.0	96.0	Waste	Oxide	Schist	RQM	4.8	1.3	486	0.57	0.010	<0.05	44	370	13	15	<0.001	0.45	10	4.9	0.80	0.40	114	<0.01	0.020	11	<0.005	0.30	3.3	24	0.25	15	50	1.1
ABA026	KAM037656	CFD0096	59.0	60.0	Waste	Oxide	Schist	BtS	6.3	1.3	570	0.63	0.010	<0.05	22	420	11	24	<0.001	0.26	3.1	7.1	1.2	0.80	80	<0.01	0.030	18	0.011	0.19	2.2	38	0.31	20	66	4.8
ABA074	KAM146948	CFD0345	60.0	61.0	Waste	Oxide	Schist	BtS_carb	4.6	0.51	635	0.50	<0.01	<0.05	19	490	6.7	28	<0.001	0.030	3.0	9.5	0.70	0.60	43	<0.01	0.030	15	0.041	0.26	2.1	51	0.14	19	44	1.9
ABA077	J957606	CFD0350	60.0	61.0	Waste	Oxide	Schist	BtS_carb	3.4	0.17	648	0.63	0.010	0.050	12	760	6.5	13	<0.001	<0.01	11	7.2	1.0	0.80	286	<0.01	0.010	17	0.014	0.25	1.3	28	0.30	21	33	2.1
ABA090	KAM133632	CFR0431	71.6	73.2	Waste	Oxide	Schist	BtS	3.6	0.37	583	1.3	<0.01	<0.05	54	850	10	3.8	0.0020	0.49	13	13	1.4	0.70	31	<0.01	0.020	9.6	<0.005	1.4	3.4	49	1.2	26	63	1.9
ABA094	KAM135457	CFR0454	24.4	25.9	Waste	Oxide	Schist	BtS	1.9	0.070	494	1.9	<0.01	0.090	5.8	360	8.7	15	<0.001	0.010	44	1.7	0.70	0.40	18	<0.01	0.22	27	0.0050	0.28	8.1	9.0	0.64	18	26	6.3
ABA125	KAM149844	CFR0566	10.7	12.2	Waste	Oxide	Schist	BtS	2.2	0.040	159	0.77	<0.01	0.090	6.6	90	2.4	5.9	<0.001	0.020	8.5	2.3	0.50	0.20	9.1	0.010	<0.01	24	<0.005	0.15	0.63	10	0.66	13	12	9.1
ABA128	KAM149954	CFR0567	47.2	48.8	Waste	Oxide	Schist	BtS	4.5	1.4	434	1.0	<0.01	<0.05	21	140	8.8	6.3	<0.001	0.020	7.0	3.9	0.40	0.40	93	<0.01	0.020	13	<0.005	0.15	1.9	22	0.16	12	40	5.6
ABA129	KAM150033	CFR0567	155.5	157.0	Waste	Oxide	Schist	BtS	3.7	0.090	308	0.61	<0.01	<0.05	67	600	9.7	12	<0.001	0.030	28	5.0	1.0	0.40	49	<0.01	0.020	20	<0.005	0.53	4.3	24	2.2	25	67	1.2
ABA130	KAM150823	CFR0574	10.7	12.2	Waste	Oxide	Schist	BtS	2.0	0.12	738	0.94	<0.01	<0.05	22	380	4.3	5.5	<0.001	0.020	4.6	5.0	0.40	0.30	39	<0.01	0.010	15	<0.005	0.78	1.1	30	0.32	16	30	3.5
ABA131	KAM150859	CFR0574	61.0	62.5	Waste	Oxide	Schist	BtS	0.60	0.15	272	1.3	<0.01	0.050	7.1	120	7.7	12	<0.001	0.030	11	1.1	0.30	<0.2	50	<0.01	0.020	22	<0.005	0.21	0.84	3.0	0.38	5.8	19	7.5
ABA133	KAM150951	CFR0575	61.0	62.5	Waste	Oxide	Schist	BtS	3.7	0.93	659	1.2	<0.01	<0.05	57	390	11	15	<0.001	0.090	11	4.7	0.80	0.20	109	<0.01	0.030	12	<0.005	0.36	2.0	23	0.27	19	61	1.3
ABA201	R276929	CFD0416	13.0	14.0	Waste	Oxide	Schist	BtS	3.1	0.090	411	0.51	0.010	<0.05	52	430	12	12	<0.001	0.010	5.6	5.4	0.80	0.30	23	<0.01	0.010	11	<0.005	0.14	2.7	34	0.35	15	59	0.90
ABA202	R270012	CFD0384	13.0	14.0	Waste	Oxide	Schist	BtS_carb	2.9	0.050	364	0.34	<0.01	<0.05	7.7	650	19	7.5	<0.001	0.040	3.9	4.4	0.30	0.40	54	<0.01	<0.01	24	0.0050	0.61	2.0	23	0.59	17	56	9.8
ABA383	KAM068572	CFD0234	225.1	226.0	Waste	Oxide	Schist	MsS	1.3	0.010	166	0.26	0.010	0.050	1.0	120	10	7.9	<0.01	<0.01	9.1	0.70	0.30	0.70	19	<0.01	<0.01	38	<0.005	0.15	9.6	6.0	0.28	9.8	5.0	11
-						**Oxide**	**Schist**	**n**	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
								Max	6.3	1.4	738	1.9	0.010	0.090	67	850	19	28	0.0020	0.49	44	13	1.4	0.80	286	0.010	0.22	38	0.041	1.4	9.6	51	2.2	26	67	11
								90th PCTL	4.7	1.3	655	1.3	0.010	0.074	56	716	12	21	<0.01	0.37	22	8.6	1.1	0.76	112	<0.01	0.030	26	0.013	0.71	6.6	45	0.97	23	65	9.5
								75th PCTL	4.1	0.72	609	1.1	0.010	0.050	48	545	11	15	<0.01	0.065	11	6.3	0.90	0.65	86	<0.01	0.025	23	0.0050	0.45	3.3	32	0.62	20	60	6.9
								Median	3.4	0.15	486	0.63	<0.01	<0.05	21	390	9.7	12	<0.01	0.030	9.1	4.9	0.70	0.40	49	<0.01	0.020	17	<0.005	0.26	2.1	24	0.32	17	44	3.5
								25th PCTL	2.1	0.080	336	0.54	<0.01	<0.05	7.4	250	7.2	6.9	<0.01	0.015	5.1	3.1	0.40	0.30	27	<0.01	0.010	13	<0.005	0.17	1.6	16	0.28	14	28	1.6
								10th PCTL	1.5	0.044	208	0.40	<0.01	<0.05	6.1	120	5.2	5.7	<0.01	0.010	3.4	1.3	0.30	0.20	19	<0.01	<0.01	11	<0.005	0.15	0.93	7.2	0.20	11	15	1.1
								Min	0.60	0.010	159	0.26	<0.01	<0.05	1.0	90	2.4	3.8	<0.01	0.010	3.0	0.70	0.30	0.20	9.1	<0.01	<0.01	9.6	<0.005	0.14	0.63	3.0	0.14	5.8	5.0	0.90
Upper Transition Facies for Schist Waste Rock																																				
ABA004	KAM022156	CFD0107	149.0	150.0	Waste	Upper transition	Schist	RQM	3.3	0.80	463	0.90	0.020	0.060	23	360	8.6	11	<0.001	0.24	3.3	5.1	1.0	0.40	59	<0.01	0.020	18	0.0060	0.18	1.2	22	0.21	18	51	3.7
ABA027	KAM037928	CFD0099	30.0	31.0	Waste	Upper transition	Schist	BtS_carb	6.5	0.32	611	1.2	0.010	0.050	15	560	10	32	<0.001	0.010	2.1	6.8	0.90	0.80	89	<0.01	<0.01	17	0.026	0.20	2.4	35	1.4	22	54	1.7
ABA062	KAM081561	CFD0202	58.0	58.5	Waste	Upper transition	Schist	BtS	9.8	3.5	909	3.1	0.030	<0.05	35	1270	37	76	0.0060	1.1	4.1	22	1.1	1.9	60	<0.01	2.6	7.0	0.14	0.47	1.2	165	0.15	18	141	1.8
ABA076	KAM147059	CFD0345	160.0	161.0	Waste	Upper transition	Schist	BtS	4.3	1.9	533	0.45	0.010	<0.05	20	150	26	7.2	<0.001	0.61	8.9	4.6	0.70	0.30	108	<0.01	0.020	9.0	<0.005	0.070	2.2	28	0.24	13	52	2.9
ABA092	KAM135149	CFR0452	10.7	12.2	Waste	Upper Transition	Schist	BtS	5.2	0.32	232	2.0	0.060	0.38	4.8	370	7.3	39	<0.001	<0.01	0.95	1.8	1.0	0.70	16	<0.01	0.41	26	0.059	0.24	4.3	8.0	0.55	19	16	5.6
ABA124	KAM149042	CFR0559	35.1	36.6	Waste	Upper transition	Schist	BtS	4.5	0.78	435	1.4	<0.01	0.090	20	340	7.1	21	<0.001	0.040	3.6	5.3	0.70	0.80	45	<0.01	0.030	21	0.033	0.12	1.0	36	0.43	17	41	7.9
ABA204	R270174	CFD0388	8.0	9.0	Waste	Upper transition	Schist	MsS	5.0	0.38	426	0.53	0.010	<0.05	37	450	11	27	<0.001	0.030	4.1	9.0	0.60	0.70	35	<0.01	0.040	13	0.034	0.57	1.4	43	0.19	22	72	1.5
ABA205	R276797	CFD0413	115.0	116.0	Waste	Upper transition	Schist	BtS	2.9	1.0	481	0.49	0.010	<0.05	32	100	4.9	9.3	<0.001	0.010	66	5.5	0.40	0.50	87	<0.01	0.020	12	<0.005	0.11	3.5	29	0.81	11	28	2.5
ABA206	Q033613	CFD0407	52.0	53.0	Waste	Upper transition	Schist	BtS	8.7	1.6	377	0.73	0.010	<0.05	25	310	6.8	12	0.0010	0.080	6.8	7.0	0.70	0.70	89	<0.01	<0.01	20	0.0050	0.19	2.1	31	0.11	20	40	2.0
ABA316	R270207	CFD0390	5.0	6.0	Waste	Upper Transition	Schist	MsS	3.0	0.29	618	0.53	0.020	<0.05	36	450	12	15	<0.001	0.080	5.8	7.2	0.90	0.40	34	<0.01	0.030	11	0.0070	0.12	2.0	39	0.64	20	83	1.3
ABA317	R270258	CFD0390	50.0	51.0	Waste	Upper Transition	Schist	BtS_carb	4.4	0.42	286	1.2	0.050	0.060	9.8	570	4.7	41	<0.001	0.080	1.9	5.6	0.70	1.0	99	<0.01	0.020	31	0.032	0.23	1.8	32	0.080	15	36	13
ABA320	R270432	CFD0392	44.0	45.0	Waste	Upper Transition	Schist	BtS_carb	2.8	0.11	420	1.2	0.010	<0.05	7.0	450	8.1	16	<0.001	0.010	14	4.8	0.50	0.80	73	<0.01	<0.01	28	0.0070	0.15	2.6	29	0.64	16	36	9.7
ABA323	Q033713	CFD0411	24.0	25.0	Waste	Upper Transition	Schist	BtS_Carb	6.3	0.37	590	0.49	0.020	<0.05	31	520	11	12	<0.001	0.020	17	10	1.0	2.8	105	<0.01	0.010	11	0.0090	0.15	1.9	54	0.42	25	81	3.3
ABA332	Q033589	CFD0407	32.0	33.0	Waste	Upper Transition	schist	BtS	5.1	0.80	470	0.84	0.060	<0.05	35	420	5.9	17	<0.001	0.030	3.9	6.2	0.60	1.6	48	<0.01	0.010	15	0.0090	0.090	2.6	40	0.12	18	45	2.9
Statistical Summary						**Upper Transition**	**Schist**	**n**	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
								Max	9.8	3.5	909	3.1	0.060	0.38	37	1270	37	76	0.0060	1.1	66	22	1.1	2.8	108	<0.01	2.6	31	0.14	0.57	4.3	165	1.4	25	141	13
								90th PCTL	8.0	1.8	616	1.9	0.057	0.081	36	567	21	40	0.0010	0.50	16	9.7	1.0	1.8	103	<0.01	0.30	27	0.052	0.40	3.3	51	0.76	22	82	9.2
								75th PCTL	6.0	0.96	576	1.2	0.028	0.058	34	503	11	30	<0.001	0.080	8.4	7.2	0.98	0.95	89	<0.01	0.030	21	0.033	0.22	2.6	40	0.62	20	68	5.1
								Median	4.8	0.60	467	0.87	0.015	<0.05	24	435	8.4	16	<0.001	0.035	4.1	5.9	0.70	0.75	67	<0.01	0.020	16	0.0090	0.17	2.1	34	0.33	18	48	2.9
								25th PCTL	3.6	0.33	422	0.53	0.010	<0.05	16	345	6.9	12	<0.001	0.013	3.4	5.2	0.63	0.55	46	<0.01	0.010	12	0.0063	0.12	1.5	29	0.16	16	37	1.9
								10th PCTL	2.9	0.30	313	0.49	0.010	<0.05	7.8	198	5.2	9.7	<0.001	0.010	2.0	4.7	0.53	0.40	35	<0.01	<0.01	9.5	<0.005	0.096	1.2	24	0.11	14	30	1.6
								Min	2.8	0.11	232	0.45	<0.01	<0.05	4.8	100	4.7	7.2	<0.001	<0.01	0.95	1.8	0.40	0.30	16	<0.01	<0.01	7.0	<0.005	0.070	1.0	8.0	0.080	11	16	1.3
Lower Transition Facies for Schist Waste Rock																																				
ABA021	KAM033153	CFD0164	148.0	149.0	Waste	Lower transition	Schist	BtS	14	2.2	584	0.42	0.11	0.090	39	630	1.6	89	<0.001	0.16	0.17	6.7	0.40	1.0	54	<0.01	0.010	4.7	0.23	0.48	1.4	72	0.27	7.2	60	1.6
ABA024	KAM036666	CFD0087	17.0	18.0	Waste	Lower transition	Schist	BtS_carb	17	1.4	551	0.61	0.10	0.17	17	990	4.9	97	<0.001	0.060	0.66	9.7	1.1	1.7	103	0.010	0.030	12	0.21	0.54	1.7	84	0.14	19	72	2.1
ABA025	KAM037046	CFD0091	12.0	13.0	Waste	Lower transition	Schist	BtS	15	1.3	510	0.70	0.030	0.070	26	610	8.8	73	<0.001	<0.01	0.81	8.4	0.80	0.80	154	<0.01	0.040	14	0.099	0.37	1.1	62	0.77	18	58	2.1
ABA031	KAM039252	CFD0116	75.0	76.0	Waste	Lower transition	Schist	RQM	16	1.3	582	0.53	0.020	0.12	30	660	7.4	78	<0.001	0.070	0.24	8.7	1.0	1.8	92	<0.01	0.020	21	0.11	0.50	1.8	49	0.14	22	49	5.0
ABA038	KAM047995	CFD0135	153.0	154.0	Waste	Lower transition	Schist	BtS	13	1.8	484	0.98	0.040	0.050	32	570	14	58	<0.001	0.10	2.2	6.9	0.70	1.2	65	<0.01	0.14	14	0.098	0.35	1.8	56	0.26	15	46	2.8
ABA054	KAM081312	CFD0198	85.0	86.0	Waste	Lower transition	Schist	BtS	0.70	0.030	127	0.32	0.080	0.25	3.6	100	4.3	10	<0.001	<0.01	4.9	0.70	0.50	0.30	8.7	<0.01	0.040	33	<0.005	0.060	2.3	4.0	0.35	12	7.0	11
ABA086	KAM133474	CFR0429	59.4	61.0	Waste	Lower transition	Schist	BtS	8.5	0.98	428	1.4	0.030	0.11	27	510	9.3	58	<0.001	0.18	1.4	5.3	0.60	0.60	61	<0.01	0.020	19	0.10	0.35	1.6	33	0.33	19	49	2.7
ABA208	R276736	CFD0413	61.0	62.0	Waste	Lower transition	Schist	BtS	16	1.2	620	0.74	0.020	0.090	33	650	8.9	67	0.0010	0.36	2.5	8.5	0.90	1.3	52	<0.01	0.070	13	0.12	0.41	1.7	56	0.14	20	57	1.5
ABA209	R270032	CFD0384	31.0	32.0	Waste	Lower transition	Schist	BtS_carb	8.3	0.69	523	10	0.040	0.14	18	580	7.2	43	0.0030	0.26	0.060	4.9	0.40	1.1	78	<0.01	0.16	16	0.090	0.28	2.2	24	0.12	19	41	3.2
ABA210	R276281	CFD0401	58.0	59.0	Waste	Lower transition	Schist	BtS	8.1	1.5	832	0.28	0.030	0.070	40	580	8.2	37	<0.001	<0.01	3.5	8.7	0.30	0.90	79	<0.01	0.17	17	0.037	0.31	3.2	50	0.46	21	49	2.6
ABA211	R276567	CFD0409	65.0	66.0	Waste	Lower transition	Schist	BtS	10	2.1	610	0.34	0.040	0.080	58	620	12	19	<0.001	0.020	1.2	11	0.20	0.50	58	<0.01	0.080	7.6	0.034	0.14	1.4	63	<0.05	9.9	53	1.4
ABA318	R270302	CFD0390	88.0	89.0	Waste	Lower Transition	Schist	BtS_carb	7.8	0.91	602	0.26	0.020	0.41	25	410	7.6	8.1	<0.001	0.020	0.14	3.1	0.30	2.0	355	0.010	0.030	5.0	0.11	0.050	1.2	21	0.32	7.9	48	3.9
ABA319	R270394	CFD0392	10.0	11.0	Waste	Lower Transition	Schist	BtS_carb	15	1.3	540	0.33	0.030	0.18	52	470	5.3	37	<0.001	<0.01	2.0	7.2	0.80	1.1	59	<0.01	0.010	13	0.060	0.22	0.93	46	0.080	19	58	1.2
ABA325	R512767	CFR0724	39.6	41.2	Waste	Lower Transition	schist	BtS	12	1.2	391	1.9	0.080	0.23	15	540	33	43	<0.001	0.060	1.7	5.4	0.60	1.2	53	<0.01	0.040	23	0.13	0.27	1.9	45	0.67	13	42	6.9
ABA333	R277487	CFD0426	43.0	44.0	Waste	Lower Transition	schist	BtS	8.1	0.71	393	0.49	0.030	0.10	19	380	5.7	54	<0.001	<0.01	3.3	3.0	0.70	3.3	14	<0.01	0.21	35	0.054	0.41	3.7	19	0.47	17	19	4.4
ABA335	R550437	CFD0518	25.0	26.0	Waste	Lower Transition	schist	BtS	9.8	0.88	591	0.31	0.030	0.35	40	860	12	9.1	<0.001	<0.01	2.9	6.0	0.40	1.7	273	<0.01	0.020	5.2	0.15	0.080	1.5	45	1.8	11	66	11
ABA336	R550471	CFD0518	55.0	56.0	Waste	Lower Transition	Schist	BtS_carb	11	0.92	681	0.30	0.030	0.11	35	1150	16	46	<0.001	0.13	19	7.2	1.3	2.0	231	<0.01	0.020	9.6	0.075	0.25	1.6	41	0.17	26	88	2.1
ABA337	R550494	CFD0518	75.0	75.0	Waste	Lower Transition	schist	BtS	16	1.1	526	0.12	0.040	0.13	46	660	12	80	<0.001	<0.01	0.94	4.9	0.70	1.2	1630	<0.01	0.030	12	0.13	0.52	0.89	48	0.34	16	67	2.2
ABA345	R551151	CFD0563	68.0	69.0	Waste	Lower Transition	schist	BtS	8.4	1.7	711	0.91	0.070	0.14	57	780	49	38	<0.001	0.050	3.0	6.2	0.30	2.0	54	<0.01	0.050	2.6	0.16	0.52	0.81	44	0.23	7.4	99	2.1
Statistical Summary						**Lower Transition**	**Schist**	**n**	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
								Max	17	2.2	832	10	0.11	0.41	58	1150	49	97	0.0030	0.36	19	11	1.3	3.3	1630	0.010	0.21	35	0.23	0.54	3.7	84	1.8	26	99	11
								90th PCTL	16	1.8	687	1.5	0.084	0.27	53	886	19	82	0.0010	0.20	3.8	8.9	1.0	2.0	289	0.010	0.16	25	0.17	0.52	2.4	65	0.69	21	75	7.6
								75th PCTL	15	1.5	606	0.83	0.055	0.18	40	660	12	70	<0.001	0.12	3.0	8.5	0.80	1.8	129	<0.01	0.075	18	0.13	0.45	1.9	56	0.41	19	63	4.2
								Median	11	1.2	551	0.49	0.030	0.12	32	610	8.8	46	<0.001	0.050	1.7	6.7	0.60	1.2	65	<0.01	0.040	13	0.10	0.35	1.6	46	0.27	17	53	2.6
								25th PCTL	8.4	0.92	497	0.32	0.030	0.090	22	525	6.5	37	<0.001	<0.01	0.74	5.1	0.40	0.95	54	<0.01	0.020	8.6	0.068	0.24	1.3	37	0.14	11	47	2.1
								10th PCTL	8.0	0.71	393	0.28	0.020	0.070	17	404	4.8	9.8	<0.001	<0.01	0.16	3.1	0.30	0.58	44	<0.01	0.018	4.9	0.036	0.076	0.92	21	0.11	7.8	37	1.5
								Min	0.70	0.030	127	0.12	0.020	0.050	3.6	100	1.6	8.1	<0.001	<0.01	0.060	0.70	0.20	0.30	8.7	<0.01	0.010	2.6	<0.005	0.050	0.81	4.0	<0.05	7.2	7.0	1.2

Appendix C.1-3: Solid Phase Element by Aqua Regia Digestion for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
									ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Fresh Facies for Schist Waste Rock																																				
ABA082	KAM131674	CFR0401	15.2	16.8	Waste	Fresh	Schist	BtS	16	1.7	548	0.73	0.040	<0.05	27	1570	4.2	62	<0.001	0.010	1.4	7.5	0.50	0.50	51	<0.01	0.020	6.4	0.21	0.35	0.55	75	0.22	12	60	1.5
ABA084	KAM132888	CFR0420	32.0	33.5	Waste	Fresh	Schist	BtS	11	1.4	539	1.2	0.020	0.12	20	630	6.8	75	<0.001	0.010	0.22	3.8	0.80	0.80	94	<0.01	0.020	16	0.13	0.43	1.4	27	0.28	16	40	6.6
ABA091	KAM133659	CFR0431	109.7	111.3	Waste	Fresh	Schist	BtS	10	1.1	423	1.8	0.050	0.13	19	750	30	56	<0.001	1.1	0.36	3.7	0.70	1.2	136	<0.01	0.070	13	0.099	0.30	2.0	36	0.59	12	45	1.0
ABA093	KAM135298	CFR0453	10.7	12.2	Waste	Fresh	Schist	BtS	16	2.3	586	0.76	0.10	0.060	102	1760	2.8	95	0.0010	0.090	3.7	8.7	0.60	0.50	169	<0.01	0.010	8.6	0.21	0.79	2.1	101	0.27	12	41	22
ABA095	KAM135693	CFR0456	10.7	12.2	Waste	Fresh	Schist	BtS	17	1.5	452	0.88	0.030	0.10	53	450	2.2	77	<0.001	0.010	1.6	5.0	0.70	0.50	22	<0.01	0.040	11	0.18	0.45	0.70	48	0.40	12	77	1.2
ABA127	KAM149916	CFR0566	109.7	111.3	Waste	Fresh	Schist	BtS_carb	17	1.3	434	1.3	0.020	0.080	54	440	4.6	68	0.0010	0.70	3.2	7.0	1.1	0.60	125	<0.01	0.020	11	0.13	0.37	1.4	56	0.54	20	64	2.4
ABA132	KAM150898	CFR0574	114.3	115.8	Waste	Fresh	Schist	BtS	17	1.6	434	1.1	0.030	<0.05	60	520	4.9	72	0.0010	0.70	4.0	9.3	0.90	1.0	104	0.010	0.020	9.3	0.10	0.42	2.2	59	0.36	18	56	1.7
ABA134	KAM150984	CFR0575	106.7	108.2	Waste	Fresh	Schist	BtS	9.4	1.4	536	2.3	0.020	0.050	11	750	6.3	25	<0.001	0.090	0.69	6.1	0.80	0.80	126	<0.01	<0.01	22	0.021	0.12	2.8	42	0.27	19	46	1.8
ABA212	Q033565	CFD0407	10.0	11.0	Waste	Fresh	Schist	BtS	22	2.1	702	0.28	0.050	0.050	45	890	16	88	0.0010	0.13	0.23	10	1.0	2.1	59	<0.01	0.010	12	0.16	0.54	1.5	73	0.16	21	86	1.6
ABA213	R280479	CFD0497	111.0	112.0	Waste	Fresh	Schist	BtS	15	1.4	724	0.98	0.070	0.13	15	860	3.0	54	<0.001	0.030	0.39	2.6	0.20	0.70	51	<0.01	0.080	7.9	0.16	0.28	1.1	36	0.14	5.9	40	2.5
ABA214	R274802	CFD0472	47.0	48.0	Waste	Fresh	Schist	BtS	5.5	0.32	243	1.8	0.040	0.42	5.7	370	6.0	38	0.0010	0.010	1.4	1.4	0.50	0.80	15	<0.01	0.12	27	0.053	0.30	6.2	7.0	0.22	14	12	6.8
ABA215	R275143	CFD0482	40.0	41.0	Waste	Fresh	Schist	BtS	6.7	1.5	550	0.83	0.010	<0.05	76	1040	13	98	0.0010	0.020	10	17	0.70	0.80	53	<0.01	0.050	21	0.076	0.99	4.2	102	0.38	18	32	6.7
ABA216	R276122	CFD0393	87.0	88.0	Waste	Fresh	Schist	BtS	19	3.3	691	0.13	0.040	0.17	35	640	6.1	88	<0.001	<0.01	0.98	5.6	0.20	1.6	51	<0.01	0.010	3.2	0.26	0.54	0.65	67	0.25	7.0	63	1.8
ABA217	R270181	CFD0388	92.0	93.0	Waste	Fresh	Schist	BtS_carb	17	1.5	603	1.6	0.040	0.11	24	860	8.7	84	0.0010	0.35	0.11	8.6	0.90	1.0	75	<0.01	0.020	19	0.18	0.42	3.1	57	0.12	23	54	1.6
ABA218	R283622	CFD0498	28.0	29.0	Waste	Fresh	Schist	BtS	9.1	1.3	362	0.25	0.070	0.44	32	720	7.9	46	<0.001	0.020	0.32	2.9	0.40	0.70	89	0.010	11	8.1	0.25	0.26	0.71	45	0.57	5.3	31	2.3
ABA219	R276979	CFD0416	57.0	58.0	Waste	Fresh	Schist	BtS	4.7	4.1	914	0.41	0.020	<0.05	56	320	11	32	0.0010	0.040	4.2	12	0.40	0.60	164	<0.01	0.010	4.3	0.034	0.29	1.3	51	<0.05	12	58	1.6
ABA220	R276002	CFD0387	148.0	149.0	Waste	Fresh	Schist	BtS	15	2.1	438	0.70	0.070	0.21	78	530	11	41	<0.001	0.15	0.17	4.4	0.20	0.70	69	0.010	0.050	4.2	0.25	0.22	0.58	50	0.23	6.2	43	1.5
ABA221	R276317	CFD0401	129.0	130.0	Waste	Fresh	Schist	BtS	4.4	0.99	304	0.42	0.030	0.46	32	520	4.6	38	<0.001	0.13	0.24	2.0	<0.2	1.8	175	<0.01	0.050	9.9	0.15	0.26	1.6	26	0.26	6.1	20	2.1
ABA222	R270104	CFD0386	59.0	60.0	Waste	Fresh	Schist	BtS_carb	15	1.1	521	0.72	0.030	0.10	33	610	8.0	72	0.0010	0.27	0.27	7.0	0.90	0.90	62	<0.01	0.010	15	0.16	0.41	1.7	38	0.11	22	59	1.8
ABA223	R270127	CFD0386	80.0	81.0	Waste	Fresh	Schist	MsS	6.4	0.87	468	0.65	0.030	0.090	39	370	15	54	<0.001	0.18	0.53	6.4	0.90	1.0	201	<0.01	<0.01	17	0.082	0.38	3.5	33	0.070	21	58	2.5
ABA321	R270466	CFD0392	74.0	75.0	Waste	Fresh	Schist	BtS_carb	18	1.3	489	0.68	0.040	0.12	27	670	7.5	88	0.0010	0.14	1.6	8.4	1.0	1.2	83	<0.01	0.020	17	0.16	0.50	6.0	46	0.090	21	54	1.8
ABA322	R270482	CFD0392	88.0	89.0	Waste	Fresh	Schist	BtS_carb	17	1.3	516	0.49	0.030	0.11	39	550	8.0	79	<0.001	<0.01	2.8	5.9	0.70	1.5	298	<0.01	0.020	11	0.14	0.48	1.1	44	0.12	15	58	1.7
ABA326	R512983	CFR0731	32.0	32.4	Waste	Fresh	schist	BtS	15	2.2	528	0.68	0.040	0.15	103	630	3.7	40	<0.001	<0.01	4.8	7.7	0.40	1.1	66	<0.01	0.080	5.1	0.22	0.32	0.62	56	0.27	9.0	43	3.5
ABA329	R270202	CFD0388	110.0	110.2	Waste	Fresh	Schist	BtS_carb	11	1.4	551	1.3	0.070	0.73	54	1440	4.5	62	0.0010	0.19	0.83	4.0	0.50	3.5	202	0.010	0.020	8.3	0.29	0.33	2.3	53	0.32	13	38	4.5
ABA330	R276299	CFD0401	74.0	75.0	Waste	Fresh	schist	BtS	4.5	0.78	744	3.1	0.060	0.90	39	640	2.2	30	<0.001	0.050	0.45	2.4	0.40	2.5	94	0.010	0.13	5.4	0.18	0.18	0.98	30	0.76	6.9	38	7.9
ABA331	R276331	CFD0401	141.0	142.0	Waste	Fresh	schist	BtS	30	3.0	928	0.38	0.030	0.060	41	780	13	104	<0.001	<0.01	1.7	9.5	0.50	1.5	138	<0.01	0.020	6.6	0.17	0.59	3.4	109	0.11	13	134	2.0
ABA377	R279587	CFD0468	131.0	132.0	Waste	Fresh	Schist	AmBtS	4.0	0.60	741	2.6	0.050	0.62	24	340	3.1	23	<0.001	0.23	0.12	1.2	0.20	3.9	380	0.010	0.040	7.2	0.079	0.13	0.93	16	0.98	5.8	18	2.0
ABA415	R277001	CFD0398	49.0	50.0	Waste	Fresh	schist	BtS	11	1.6	429	0.27	0.040	0.21	62	730	2.9	46	<0.001	<0.01	1.0	2.9	0.20	0.40	46	<0.01	0.070	3.6	0.22	0.32	0.34	35	0.30	4.1	34	1.7
ABA416	R277017	CFD0398	64.0	65.0	Waste	Fresh	schist	BtS	16	1.8	622	0.29	0.050	0.16	29	1000	4.1	70	<0.001	<0.01	0.81	3.9	0.20	1.2	63	<0.01	0.030	7.4	0.21	0.45	1.1	63	0.33	7.0	57	2.5
ABA417	R277021	CFD0398	124.0	125.0	Waste	Fresh	schist	BtS	9.8	1.7	396	0.16	0.040	0.23	27	870	7.0	43	<0.001	<0.01	0.66	4.2	0.30	1.2	87	<0.01	0.030	6.2	0.21	0.29	0.70	41	0.30	7.1	41	2.8
ABA418	R277041	CFD0398	160.0	161.0	Waste	Fresh	schist	BtS	18	2.1	574	1.2	0.040	0.13	48	560	8.6	65	<0.001	0.18	0.17	3.4	0.20	0.90	40	<0.01	0.040	3.7	0.20	0.40	0.51	49	0.23	3.9	53	2.3
Statistical Summary						**Fresh**	**Schist**	**n**	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
								Max	30	4.1	928	3.1	0.10	0.90	103	1760	30	104	0.0010	1.1	10	17	1.1	3.9	380	0.010	11	27	0.29	0.99	6.2	109	0.98	23	134	22
								90th PCTL	18	2.3	741	1.8	0.070	0.46	76	1040	13	88	0.0010	0.35	4.0	9.5	0.90	2.1	201	0.010	0.080	19	0.25	0.54	3.5	75	0.57	21	64	6.7
								75th PCTL	17	2.0	613	1.3	0.050	0.21	54	860	8.7	78	<0.001	0.18	1.7	8.1	0.80	1.4	137	<0.01	0.050	14	0.21	0.45	2.2	58	0.35	18	58	2.7
								Median	15	1.5	536	0.73	0.040	0.12	39	640	6.3	62	<0.001	0.050	0.81	5.6	0.50	1.0	87	<0.01	0.020	8.6	0.16	0.37	1.4	48	0.27	12	46	2.0
								25th PCTL	9.3	1.3	436	0.42	0.030	0.070	27	525	4.2	42	<0.001	0.010	0.30	3.6	0.25	0.70	56	<0.01	0.020	6.3	0.12	0.29	0.71	36	0.15	7.0	39	1.7
								10th PCTL	4.7	0.87	396	0.27	0.020	<0.05	19	370	2.9	32	<0.001	<0.01	0.17	2.4	0.20	0.50	46	<0.01	0.010	4.2	0.076	0.22	0.58	27	0.11	5.8	31	1.5
								Min	4.0	0.32	243	0.13	0.010	<0.05	5.7	320	2.2	23	<0.001	<0.01	0.11	1.2	<0.2	0.40	15	<0.01	0.010	3.2	0.021	0.12	0.34	7.0	<0.05	3.9	12	1.0
Statistical Summary for Schist Waste Rock								**n**	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79
								Max	30	4.1	928	10	0.11	0.90	103	1760	49	104	0.0060	1.1	66	22	1.4	3.9	1630	0.010	11	38	0.29	1.4	9.6	165	2.2	26	141	22
								90th PCTL	17	2.1	714	1.8	0.070	0.36	57	910	15	84	0.0010	0.35	11	9.5	1.0	2.0	201	0.010	0.13	25	0.21	0.54	3.6	68	0.69	22	73	8.1
								75th PCTL	15	1.6	607	1.2	0.040	0.14	44	725	11	67	0.0010	0.15	4.8	7.6	0.90	1.2	106	0.010	0.045	19	0.16	0.44	2.4	52	0.45	19	60	4.7
								Median	8.4	1.2	526	0.70	0.030	0.090	32	560	8.0	39	<0.001	0.030	2.5	5.6	0.70	0.80	69	<0.01	0.020	13	0.082	0.30	1.7	41	0.28	16	49	2.3
								25th PCTL	4.5	0.56	429	0.44	0.010	<0.05	19	400	5.1	15	<0.001	0.010	0.75	4.0	0.40	0.55	50	<0.01	0.015	8.2	0.0090	0.19	1.1	28	0.16	12	39	1.7
								10th PCTL	2.9	0.12	307	0.28	<0.01	<0.05	7.6	318	3.6	8.9	<0.001	<0.01	0.23	2.2	0.20	0.40	23	<0.01	0.010	5.1	<0.005	0.12	0.70	18	0.11	6.8	20	1.4
								Min	0.60	0.010	127	0.12	<0.01	<0.05	1.0	90	1.6	3.8	<0.001	<0.01	0.060	0.70	0.20	0.20	8.7	<0.01	<0.01	2.6	<0.005	0.050	0.34	3.0	<0.05	3.9	5.0	0.90
Oxide Facies for Granite Waste Rock																																				
ABA157	R305807	CFD0382	76.0	77.0	Waste	Oxide	Granite	GG	2.8	0.010	2360	1.2	<0.01	0.090	1.0	180	17	6.1	<0.001	<0.01	35	1.3	0.30	0.30	72	<0.01	0.020	23	<0.005	2.1	6.5	3.0	2.4	6.6	36	6.3
ABA158	R305808	CFD0382	79.0	80.0	Waste	Oxide	Granite	GG	2.5	<0.01	1150	1.2	<0.01	0.090	1.0	190	22	3.0	<0.001	<0.01	38	1.0	0.20	0.40	112	<0.01	<0.01	23	<0.005	0.94	8.0	3.0	3.3	6.7	31	6.9
ABA174	R305826	CFD0403	7.0	8.0	Waste	Oxide	Granite	GG	0.80	0.010	21	0.61	<0.01	0.25	0.70	70	21	10	<0.001	<0.01	12	0.50	0.20	0.20	14	<0.01	<0.01	31	<0.005	1.2	5.6	1.0	0.080	2.9	5.0	6.8
ABA421	I354544	CFD0053	50.3	51.0	Waste	Oxide	Granite	GG	0.70	0.020	135	0.58	0.010	0.18	1.0	80	27	12	<0.001	0.010	7.5	0.60	0.40	0.30	56	<0.01	0.010	16	<0.005	0.35	22	2.0	0.090	13	19	3.3
ABA423	Q033319	CFD0403	7.0	7.8	Waste	Oxide	Granite	GG	1.3	0.020	34	0.72	0.010	0.20	1.6	60	21	15	<0.001	<0.01	8.8	0.60	<0.2	3.3	17	<0.01	0.010	35	<0.005	2.0	5.6	1.0	0.070	3.1	5.0	7.0
ABA429	Q032778	CFD0394	39.7	40.0	Waste	Oxide	Granite	GG	6.5	0.080	982	0.97	0.050	0.82	0.90	220	7.7	31	<0.001	<0.01	0.82	1.8	0.40	1.0	7.3	<0.01	<0.01	32	0.039	0.50	5.3	6.0	0.060	10	28	10
Statistical Summary						**Oxide**	**Granite**	**n**	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
								Max	6.5	0.080	2360	1.2	0.050	0.82	1.6	220	27	31	<0.001	0.010	38	1.8	0.40	3.3	112	<0.01	0.020	35	0.039	2.1	22	6.0	3.3	13	36	10
								90th PCTL	4.7	0.050	1755	1.2	0.030	0.54	1.3	205	24	23	<0.001	0.010	36	1.6	0.40	2.2	92	<0.01	0.015	33	0.022	2.1	15	4.5	2.8	12	34	8.6
								75th PCTL	2.7	0.020	1108	1.1	0.010	0.24	1.0	188	22	14	<0.001	<0.01	29	1.2	0.38	0.85	68	<0.01	0.010	32	<0.005	1.8	7.6	3.0	1.8	9.3	30	7.0
								Median	1.9	0.015	559	0.85	<0.01	0.19	1.0	130	21	11	<0.001	<0.01	10	0.80	0.25	0.35	36	<0.01	<0.01	27	<0.005	1.1	6.0	2.5	0.085	6.6	24	6.9
								25th PCTL	0.93	0.010	59	0.64	<0.01	0.11	0.93	73	18	7.2	<0.001	<0.01	7.8	0.60	0.20	0.30	15	<0.01	<0.01	23	<0.005	0.61	5.6	1.3	0.073	4.0	8.5	6.4
								10th PCTL	0.75	0.010	28	0.60	<0.01	0.090	0.80	65	13	4.6	<0.001	<0.01	4.1	0.55	0.20	0.25	11	<0.01	<0.01	19	<0.005	0.43	5.4	1.0	0.065	3.0	5.0	4.8
								Min	0.70	<0.01	21	0.58	<0.01	0.090	0.70	60	7.7	3.0	<0.001	<0.01	0.82	0.50	0.20	0.20	7.3	<0.01	<0.01	16	<0.005	0.35	5.3	1.0	0.060	2.9	5.0	3.3

Appendix C.1-3: Solid Phase Element by Aqua Regia Digestion for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
									ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Upper Transition Facies for Granite Waste Rock																																				
ABA013	KAM025898	CFD0150	81.0	82.0	Waste	Upper transition	Granite	GG	4.4	0.040	136	0.80	0.040	0.27	1.1	150	9.9	12	<0.001	<0.01	0.53	1.6	0.80	0.80	6.7	<0.01	<0.01	34	0.0080	0.18	11	5.0	0.060	19	13	7.9
ABA151	R305801	CFD0381	13.0	14.0	Waste	Upper transition	Granite	GG	12	0.11	869	1.2	0.070	1.3	0.80	150	6.8	35	<0.001	<0.01	0.11	2.1	0.50	1.1	5.5	<0.01	0.010	33	0.054	0.38	6.4	7.0	1.7	13	30	14
ABA152	R305802	CFD0381	35.0	36.0	Waste	Upper transition	Granite	GG	6.0	0.090	506	0.45	0.020	0.48	0.70	70	14	49	<0.001	<0.01	1.0	2.0	0.50	1.1	11	<0.01	0.010	35	0.034	0.43	9.7	5.0	16	11	37	7.4
ABA167	R305818	CFD0394	30.0	31.0	Waste	Upper transition	Granite	GG	0.60	0.010	16	0.92	<0.01	0.060	0.60	70	11	11	<0.001	0.050	2.8	0.40	0.20	<0.2	8.7	<0.01	<0.01	28	<0.005	0.12	4.6	1.0	0.19	9.2	5.0	7.5
ABA169	R305821	CFD0399	20.0	21.0	Waste	Upper transition	Granite	GG	0.60	0.010	456	0.60	0.030	0.13	1.1	220	20	8.0	<0.001	0.12	0.83	0.70	0.40	0.20	9.0	<0.01	<0.01	34	<0.005	0.080	5.7	3.0	0.17	10	23	13
ABA172	R305824	CFD0396	29.0	30.0	Waste	Upper transition	Granite	GG	1.6	<0.01	56	1.5	<0.01	0.080	0.50	150	22	2.3	<0.001	<0.01	11	1.9	<0.2	0.40	18	<0.01	<0.01	31	<0.005	0.11	8.6	4.0	0.13	9.3	16	8.7
ABA178	R305831	CFD0400	11.0	12.0	Waste	Upper transition	Granite	GG	3.0	0.050	294	0.38	0.020	0.71	1.1	80	9.6	19	<0.001	<0.01	0.76	1.3	0.50	0.70	5.0	<0.01	<0.01	32	0.023	0.23	5.3	4.0	0.14	28	28	12
ABA189	CFD0399_10_20	CFD0399	10.0	20.0	Waste	Upper transition	Granite	GG	1.2	0.020	154	0.71	0.030	0.12	0.90	200	31	9.1	<0.001	0.15	3.8	1.0	0.40	0.40	17	<0.01	0.010	52	<0.005	0.18	46	3.0	0.12	12	22	17
ABA190	CFD0396_50_60	CFD0396	50.0	60.0	Waste	Upper transition	Granite	GG	2.5	0.030	319	0.74	0.040	0.48	0.50	130	15	16	<0.001	<0.01	1.2	0.90	0.40	0.60	4.1	<0.01	0.010	31	0.012	0.18	9.2	4.0	0.070	9.0	19	7.6
ABA191	CFD0394_31_41	CFD0394	31.0	41.0	Waste	Upper transition	Granite	GG	2.7	0.030	230	0.68	0.030	0.34	0.90	170	16	19	<0.001	0.050	1.9	1.2	0.30	0.60	6.6	<0.01	0.010	31	0.010	0.22	6.1	4.0	0.10	9.3	23	8.0
ABA192	CFD0394_55_66	CFD0394	55.0	66.0	Waste	Upper transition	Granite	GG	1.5	0.020	460	0.71	0.040	0.27	0.90	110	24	13	<0.001	0.010	2.0	1.0	0.40	0.50	15	<0.01	0.010	31	0.0070	0.29	7.8	4.0	0.050	12	15	7.9
ABA195	CFD0381_4_13	CFD0381	4.0	13.0	Waste	Upper transition	Granite	GG	12	0.11	853	0.94	0.080	1.4	1.4	170	7.2	39	<0.001	<0.01	0.13	2.2	0.50	1.2	6.0	<0.01	0.010	33	0.055	0.37	6.7	7.0	0.080	13	33	14
ABA196	CFD0380_36_50	CFD0380	36.0	50.0	Waste	Upper transition	Granite	GG	1.0	0.010	63	0.76	0.010	0.10	1.1	80	13	9.1	<0.001	0.010	1.3	0.90	0.30	0.70	8.1	<0.01	0.010	28	<0.005	0.10	6.4	2.0	0.10	8.2	7.0	7.8
ABA431	Q041083	CFD0380	30.0	30.2	Waste	Upper Transition	Granite	GG	1.4	0.020	114	0.74	0.040	0.18	0.70	70	11	8.3	<0.001	<0.01	1.2	1.5	0.20	1.6	5.6	<0.01	<0.01	34	<0.005	0.23	5.2	4.0	0.050	7.5	13	8.3
ABA434	Q032756	CFD0394	19.5	19.6	Waste	Upper Transition	Granite	GG	1.2	0.020	73	1.1	0.010	0.12	1.3	100	39	15	<0.001	<0.01	28	0.90	0.40	1.1	25	<0.01	<0.01	32	<0.005	1.4	11	3.0	0.17	8.1	20	4.7
ABA435	Q032826	CFD0394	81.1	81.7	Waste	Upper Transition	Granite	GG	1.7	0.030	133	0.73	0.030	0.23	0.70	110	6.9	11	<0.001	0.020	1.0	1.2	0.30	1.3	4.9	<0.01	0.010	36	0.0090	0.12	7.8	3.0	0.050	8.6	10	7.8
ABA436	Q032927	CFD0396	65.0	65.5	Waste	Upper Transition	Granite	GG	1.3	0.010	97	0.64	0.010	0.070	0.50	70	13	8.1	<0.001	0.010	1.0	1.0	0.40	0.80	4.6	<0.01	<0.01	36	<0.005	0.25	5.6	3.0	0.090	10	7.0	8.4
Statistical Summary						**Upper Transition**	**Granite**	**n**	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
								Max	12	0.11	869	1.5	0.080	1.4	1.4	220	39	49	<0.001	0.15	28	2.2	0.80	1.6	25	<0.01	0.010	52	0.055	1.4	46	7.0	16	28	37	17
								90th PCTL	8.2	0.098	645	1.1	0.052	0.96	1.2	182	27	37	<0.001	0.078	6.7	2.0	0.50	1.2	17	<0.01	0.010	36	0.042	0.40	11	5.8	0.80	15	31	14
								75th PCTL	3.0	0.040	456	0.92	0.040	0.48	1.1	150	20	19	<0.001	0.020	2.0	1.6	0.50	1.1	11	<0.01	0.010	34	0.012	0.29	9.2	4.0	0.17	12	23	12
								Median	1.6	0.020	154	0.74	0.030	0.23	0.90	110	13	12	<0.001	<0.01	1.2	1.2	0.40	0.70	6.7	<0.01	<0.01	33	<0.005	0.22	6.7	4.0	0.10	10	19	8.0
								25th PCTL	1.2	0.010	97	0.68	0.010	0.12	0.70	80	9.9	9.1	<0.001	<0.01	0.83	0.90	0.30	0.50	5.5	<0.01	<0.01	31	<0.005	0.12	5.7	3.0	0.070	9.0	13	7.8
								10th PCTL	0.84	0.010	60	0.54	0.010	0.076	0.50	70	7.1	8.1	<0.001	<0.01	0.37	0.82	0.20	0.32	4.8	<0.01	<0.01	30	<0.005	0.11	5.3	2.6	0.050	8.1	7.0	7.5
								Min	0.60	<0.01	16	0.38	<0.01	0.060	0.50	70	6.8	2.3	<0.001	<0.01	0.11	0.40	0.20	0.20	4.1	<0.01	<0.01	28	<0.005	0.080	4.6	1.0	0.050	7.5	5.0	4.7
Lower Transition Facies for Granite Waste Rock																																				
ABA010	KAM024598	CFD0137	49.0	50.0	Waste	Lower transition	Granite	GG	14	0.13	701	0.68	0.11	1.0	2.4	160	5.4	42	<0.001	<0.01	0.080	1.7	0.50	1.2	7.2	<0.01	0.010	35	0.057	0.37	6.0	8.0	0.12	16	30	14
ABA154	R305804	CFD0382	10.0	11.0	Waste	Lower transition	Granite	GG	11	0.11	668	0.97	0.060	1.5	0.90	190	5.7	34	<0.001	<0.01	0.31	1.9	0.40	1.0	4.9	<0.01	<0.01	32	0.052	0.33	6.5	7.0	19	13	37	13
ABA155	R305805	CFD0382	50.0	51.0	Waste	Lower transition	Granite	GG	11	0.11	465	0.49	0.030	0.90	1.1	70	8.8	41	<0.001	<0.01	1.8	1.6	0.20	1.1	4.9	<0.01	<0.01	33	0.052	0.94	4.4	6.0	1.1	9.4	34	9.8
ABA159	R305809	CFD0383	10.0	11.0	Waste	Lower transition	Granite	GG	14	0.13	577	0.80	0.070	1.5	0.80	190	5.4	41	<0.001	<0.01	0.69	2.1	0.50	1.1	6.6	<0.01	0.010	35	0.064	0.42	6.0	8.0	0.55	12	31	16
ABA160	R305811	CFD0383	48.0	49.0	Waste	Lower transition	Granite	GG	13	0.13	775	0.78	0.070	1.4	1.0	180	5.6	36	<0.001	<0.01	0.34	1.6	0.40	1.0	5.7	<0.01	<0.01	30	0.058	0.34	5.9	7.0	7.4	13	35	13
ABA164	R305815	CFD0389	10.0	11.0	Waste	Lower transition	Granite	GG	5.7	0.090	332	0.65	0.070	1.2	1.0	160	6.4	28	<0.001	<0.01	0.24	1.5	0.20	0.70	5.4	<0.01	<0.01	33	0.045	0.25	4.8	7.0	7.0	11	22	18
ABA166	R305817	CFD0389	45.0	46.0	Waste	Lower transition	Granite	GG	1.4	0.040	225	1.5	<0.01	0.38	4.6	220	12	36	0.0010	0.020	85	1.2	0.30	1.0	16	<0.01	0.030	34	0.014	0.34	26	6.0	1.9	12	88	10
ABA193	CFD383_115_125	CFD0383	115.0	125.0	Waste	Lower transition	Granite	GG	6.5	0.14	1000	1.0	0.070	0.72	1.7	260	9.2	24	<0.001	<0.01	0.30	1.8	0.40	0.70	6.1	<0.01	0.010	30	0.039	0.22	6.4	9.0	0.050	14	39	8.4
ABA194	CFD0382_84_94	CFD0382	84.0	94.0	Waste	Lower transition	Granite	GG	1.9	0.020	1720	1.1	0.010	0.14	1.8	240	15	20	<0.001	<0.01	6.1	1.2	0.40	0.60	17	<0.01	0.010	31	0.0050	0.84	10	5.0	0.080	13	39	7.1
ABA424	Q041284	CFD0382	4.0	5.0	Waste	Lower Transition	Granite	GG	13	0.12	612	0.91	0.10	1.2	2.2	170	5.6	40	<0.001	<0.01	0.31	2.2	0.40	1.3	7.8	<0.01	<0.01	33	0.059	0.39	4.5	8.0	0.18	12	31	16
ABA425	Q041377	CFD0382	87.0	88.0	Waste	Lower Transition	Granite	GG	1.1	0.010	55	0.69	0.010	0.060	1.7	50	7.6	6.3	<0.001	<0.01	1.4	1.2	0.40	0.60	8.6	<0.01	<0.01	34	<0.005	0.070	4.6	2.0	<0.05	9.6	4.0	8.5
ABA426	Q041396	CFD0382	103.0	104.0	Waste	Lower Transition	Granite	GG	2.3	<0.01	56	0.93	0.010	0.060	1.0	90	25	4.9	<0.001	<0.01	5.1	1.3	0.50	0.50	42	<0.01	0.010	34	<0.005	0.24	9.7	6.0	<0.05	11	7.0	8.7
ABA427	Q041404	CFD0382	110.0	111.0	Waste	Lower Transition	Granite	GG	2.8	0.040	1020	1.1	0.010	0.13	1.4	120	13	21	<0.01	<0.01	2.0	1.4	0.30	1.1	8.2	<0.01	<0.01	36	0.0080	1.5	6.1	5.0	0.050	10	29	6.1
ABA430	Q041069	CFD0380	18.0	18.1	Waste	Lower Transition	Granite	GG	0.60	0.020	86	0.76	0.010	0.11	0.70	70	19	13	<0.001	0.080	4.0	0.50	0.30	0.30	21	<0.01	0.010	27	<0.005	1.9	14	1.0	0.15	9.3	7.0	4.2
Statistical Summary						**Lower Transition**	**Granite**	**n**	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
								Max	14	0.14	1720	1.5	0.11	1.5	4.6	260	25	42	0.0010	0.080	85	2.2	0.50	1.3	42	<0.01	0.030	36	0.064	1.9	26	9.0	19	16	88	18
								90th PCTL	13	0.13	1014	1.1	0.091	1.4	2.3	234	18	41	0.0010	0.017	5.8	2.0	0.50	1.2	20	<0.01	0.010	35	0.059	1.3	13	8.0	7.3	14	39	16
								75th PCTL	12	0.13	757	0.99	0.070	1.2	1.8	190	13	39	<0.01	<0.01	3.5	1.8	0.40	1.1	14	<0.01	0.010	34	0.056	0.74	8.9	7.8	1.7	13	37	13
								Median	6.1	0.10	595	0.86	0.045	0.81	1.3	165	8.2	31	<0.01	<0.01	1.1	1.6	0.40	1.0	7.5	<0.01	<0.01	33	0.042	0.36	6.0	6.5	0.17	12	31	10
								25th PCTL	2.0	0.025	252	0.71	0.010	0.13	1.0	98	5.6	20	<0.01	<0.01	0.31	1.2	0.30	0.63	5.8	<0.01	<0.01	31	0.0058	0.27	5.1	5.3	0.058	10	24	8.4
								10th PCTL	1.2	0.013	65	0.66	0.010	0.075	0.83	70	5.5	8.2	<0.01	<0.01	0.26	1.2	0.23	0.53	5.1	<0.01	<0.01	30	<0.005	0.23	4.5	2.9	<0.05	9.5	7.0	6.4
								Min	0.60	0.010	55	0.49	<0.01	0.060	0.70	50	5.4	4.9	<0.01	<0.01	0.080	0.50	0.20	0.30	4.9	<0.01	<0.01	27	<0.005	0.070	4.4	1.0	<0.05	9.3	4.0	4.2
Fresh Facies for Granite Waste Rock																																				
ABA012	KAM025798	CFD0147	260.0	261.0	Waste	Fresh	Granite	GG	9.2	0.18	792	0.82	0.090	0.77	1.3	270	9.3	26	<0.001	<0.01	0.060	2.4	0.60	0.80	17	<0.01	0.010	26	0.030	0.21	6.3	11	0.070	17	39	6.2
ABA162	R305813	CFD0385	10.0	11.0	Waste	Fresh	Granite	GG	12	0.11	552	0.78	0.060	1.2	0.80	160	5.2	34	<0.001	<0.01	0.24	1.9	0.40	1.1	4.4	<0.01	<0.01	31	0.056	0.36	6.3	7.0	8.8	10	32	15
ABA163	R305814	CFD0385	59.0	60.0	Waste	Fresh	Granite	GG	5.8	0.090	278	0.21	0.030	0.60	1.5	50	7.9	29	<0.001	<0.01	3.0	1.5	0.20	1.5	6.1	<0.01	<0.01	33	0.043	0.68	4.4	6.0	0.26	8.1	19	9.7
ABA165	R305816	CFD0389	30.0	31.0	Waste	Fresh	Granite	GG	6.1	0.090	574	0.81	0.060	1.4	0.90	150	5.4	29	<0.001	0.040	0.63	1.4	0.50	0.90	5.7	<0.01	<0.01	32	0.046	0.26	6.6	7.0	3.8	18	72	14
ABA168	R305819	CFD0394	88.0	89.0	Waste	Fresh	Granite	GG	13	0.12	546	0.88	0.050	1.4	1.3	210	6.1	37	<0.001	0.010	1.8	1.7	0.40	1.1	4.3	<0.01	0.010	33	0.061	0.37	5.3	7.0	0.75	16	44	11
ABA179	R305832	CFD0400	60.0	61.0	Waste	Fresh	Granite	GG	3.2	0.080	201	0.80	0.020	0.57	1.0	150	8.4	38	<0.001	<0.01	16	1.3	0.40	1.1	7.0	<0.01	<0.01	36	0.041	0.46	29	9.0	0.13	12	30	8.4
ABA180	CFD0396_72_81	CFD0396	72.0	81.0	Waste	Fresh	Granite	GG	1.2	0.030	686	0.72	0.010	0.10	0.70	190	15	4.7	<0.001	0.090	0.73	1.4	0.30	0.70	3.2	<0.01	0.010	37	<0.005	0.50	5.4	5.0	0.19	14	26	8.5
ABA182	CFD0394_94_104	CFD0394	94.0	104.0	Waste	Fresh	Granite	GG	1.8	0.050	1140	0.76	0.030	0.22	1.0	160	13	13	<0.001	0.19	2.7	1.0	0.30	0.40	4.4	<0.01	0.010	29	0.0050	0.24	6.6	4.0	0.070	9.6	24	7.1
ABA186	CFD0380_2_17	CFD0380	2.0	17.0	Waste	Fresh	Granite	GG	18	0.10	753	0.78	0.060	1.6	1.0	150	6.6	37	<0.001	<0.01	0.20	2.1	0.40	1.4	4.4	<0.01	0.020	31	0.049	0.35	6.5	6.0	0.090	16	37	13
ABA187	CFD0380_22_30	CFD0380	22.0	30.0	Waste	Fresh	Granite	GG	12	0.080	345	0.75	0.060	1.6	1.0	170	14	33	<0.001	<0.01	0.52	1.8	0.40	1.3	4.5	<0.01	0.010	33	0.042	0.33	7.0	6.0	0.090	13	24	10
ABA198	CFD0385_28_38	CFD0385	28.0	38.0	Waste	Fresh	Granite	GG	16	0.12	509	1.4	0.080	1.3	1.1	170	6.1	38	<0.001	0.010	0.27	1.8	0.30	1.1	5.9	<0.01	<0.01	34	0.060	0.39	7.3	8.0	0.080	12	29	16
ABA199	CFD0385_38_48	CFD0385	38.0	48.0	Waste	Fresh	Granite	GG	12	0.11	553	1.1	0.040	1.9	1.4	160	4.9	33	0.0010	<0.01	1.1	1.7	0.40	1.3	4.1	<0.01	<0.01	33	0.055	0.31	7.6	7.0	0.090	13	29	14
ABA200	CFD0385_48_58	CFD0385	48.0	58.0	Waste	Fresh	Granite	GG	11	0.10	513	0.95	0.040	1.4	1.8	130	5.5	31	<0.001	<0.01	2.7	1.6	0.30	1.7	5.2	<0.01	<0.01	32	0.050	0.30	9.1	6.0	0.080	16	25	12
ABA437	Q041055	CFD0380	5.0	6.0	Waste	Fresh	Granite	GG	20	0.12	1080	0.78	0.070	1.4	1.2	160	5.9	43	<0.001	<0.01	0.10	2.4	0.60	1.6	4.9	<0.01	<0.01	33	0.057	0.43	7.4	7.0	0.080	17	37	14
ABA438	Q041063	CFD0380	12.0	13.0	Waste	Fresh	Granite	GG	21	0.13	1080	0.78	0.070	1.5	1.2	170	5.7	45	<0.001	<0.01	0.19	2.6	0.60	1.6	5.0	<0.01	<0.01	32	0.060	0.49	6.9	7.0	0.080	17	49	16
ABA439	Q041678	CFD0385	8.0	9.0	Waste	Fresh	Granite	GG	9.5	0.080	723	1.3	0.10	0.90	1.4	160	6.1	31	<0.001	<0.01	0.28	2.0	0.40	1.2	7.2	<0.01	<0.01	32	0.040	0.31	6.7	6.0	0.070	12	33	16
ABA440	Q041699	CFD0385	27.0	28.0	Waste	Fresh	Granite	GG	13	0.10	597	1.1	0.080	1.1	0.90	170	6.8	32	<0.001	<0.01	0.090	1.8	0.50	0.90	6.2	<0.01	<0.01	32	0.046	0.31	6.6	7.0	0.15	14	29	21
ABA441	Q032423	CFD0385	92.0	92.6	Waste	Fresh	Granite	GG	8.6	0.11	352	5.0	0.040	1.3	1.6	220	5.7	29	0.0010	0.030	0.44	1.6	0.70	1.3	8.0	<0.01	<0.01	39	0.050	0.29	10	7.0	0.070	16	27	9.1
ABA442	Q032601	CFD0391	3.4	3.9	Waste	Fresh	Granite	GG	12	0.11	581	0.91	0.080	1.5	1.9	170	9.7	33	<0.001	<0.01	0.12	1.8	0.40	1.1	6.1	<0.01	<0.01	34	0.052	0.35	4.6	8.0	0.69	13	29	15
ABA443	Q033167	CFD0400	60.0	61.0	Waste	Fresh	Granite	GG	4.6	0.080	227	0.55	0.040	0.45	1.1	110	7.6	40	<0.001	<0.01	6.8	1.5	0.40	1.1	8.1	<0.01	<0.01	38	0.044	0.49	19	8.0	0.060	12	24	9.5
Statistical Summary						**Fresh**	**Granite**	**n**	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
								Max	21	0.18	1140	5.0	0.10	1.9	1.9	270	15	45	0.0010	0.19	16	2.6	0.70	1.7	17	<0.01	0.020	39	0.061	0.68	29	11	8.8	18	72	21
								90th PCTL	18	0.12	1080	1.3	0.081	1.6	1.6	211	13	40	0.0010	0.045	3.4	2.4	0.60	1.6	8.0	<0.01	0.010	37	0.060	0.49	11	8.1	1.1	17	45	16
								75th PCTL	13	0.11	731	0.98	0.073	1.4	1.4	170	8.6	37	<0.01	0.010	2.0	1.9	0.50	1.3	6.4	<0.01	0.010	34	0.055	0.44	7.4	7.3	0.21	16	37	15
								Median	11	0.10	564	0.81	0.060	1.3	1.2	160	6.4	33	<0.01	<0.01	0.48	1.8	0.40	1.1	5.5	<0.01	<0.01	33	0.048	0.35	6.7	7.0	0.090	13	29	12
								25th PCTL	6.0	0.080	470	0.78	0.040	0.73	1.0	150	5.7	29	<0.01	<0.01	0.20	1.5	0.38	1.1	4.4	<0.01	<0.01	32	0.042	0.31	6.3	6.0	0.078	12	26	9.4
								10th PCTL	3.1	0.077	273	0.70	0.029	0.43	0.89	128	5.4	24	<0.01	<0.01	0.099	1.4	0.30	0.79	4.3	<0.01	<0.01	31	0.028	0.26	5.3	5.9	0.070	10	24	8.3
								Min	1.2	0.030	201	0.21	0.010	0.10	0.70	50	4.9	4.7	<0.01	<0.01	0.060	1.0	0.20	0.40	3.2	<0.01	<0.01	26	0.0050	0.21	4.4	4.0	0.060	8.1	19	6.2

Appendix C.1-3: Solid Phase Element by Aqua Regia Digestion for Waste Rock

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
									ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Statistical Summary for Granite Waste Rock								**n**	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
								n < DL	0	3	0	0	6	0	0	0	0	0	54	40	0	0	2	1	0	57	32	0	17	0	0	0	2	0	0	0
								Max	21	0.18	2360	5.0	0.11	1.9	4.6	270	39	49	0.0010	0.19	85	2.6	0.80	3.3	112	<0.01	0.030	52	0.064	2.1	46	11	19	28	88	21
								90th PCTL	13	0.12	1044	1.2	0.080	1.5	1.7	220	22	40	<0.01	0.050	11	2.1	0.50	1.4	19	<0.01	0.010	36	0.057	1.1	12	8.0	3.5	16	39	16
								75th PCTL	12	0.11	723	0.97	0.070	1.3	1.4	180	15	36	<0.01	<0.01	3.0	1.8	0.40	1.2	11	<0.01	<0.01	34	0.052	0.46	8.6	7.0	0.26	13	33	14
								Median	4.6	0.080	506	0.78	0.040	0.57	1.0	160	9.3	28	<0.01	<0.01	1.0	1.5	0.40	1.0	6.6	<0.01	<0.01	33	0.034	0.34	6.5	6.0	0.10	12	28	9.5
								25th PCTL	1.5	0.020	154	0.71	0.010	0.14	0.90	100	6.1	12	<0.01	<0.01	0.31	1.2	0.30	0.60	5.0	<0.01	<0.01	31	<0.005	0.24	5.6	4.0	0.070	9.4	19	7.8
								10th PCTL	1.1	0.010	60	0.59	<0.01	0.090	0.70	70	5.6	7.3	<0.01	<0.01	0.13	0.82	0.20	0.36	4.4	<0.01	<0.01	28	<0.005	0.16	4.7	2.0	0.050	8.1	7.0	6.6
								Min	0.60	<0.01	16	0.21	<0.01	0.060	0.50	50	4.9	2.3	<0.01	<0.01	0.060	0.40	0.20	0.20	3.2	<0.01	<0.01	16	<0.005	0.070	4.4	1.0	<0.05	2.9	4.0	3.3
Oxide Facies for Other Lithologies Waste Rock																																				
KAM029389	ABA017	CFD0176	96.0	97.0	Waste	Oxide	Dykes	FC	9.4	0.040	727	0.62	0.010	<0.05	98	110	11	14	0.0050	<0.01	1.9	7.7	0.70	0.20	43	<0.01	0.050	3.8	<0.005	0.14	6.3	34	500	12	55	12
KAM029393	ABA018	CFD0176	99.0	100.0	Waste	Oxide	Dykes	FC	7.2	0.050	655	0.47	0.010	<0.05	1.0	360	12	14	<0.001	<0.01	3.5	8.9	0.70	0.30	23	<0.01	0.030	4.5	<0.005	0.19	6.4	39	0.24	12	52	6.6
KAM084551	ABA056	CFD0237	181.0	181.5	Waste	Oxide	HU	HU	3.2	0.20	287	1.3	0.010	<0.05	42	50	11	16	<0.001	0.020	7.6	7.1	0.50	0.40	143	<0.01	0.050	6.0	<0.005	0.47	6.2	18	0.54	8.7	31	1.1
R277468	ABA306	CFD0426	26.0	27.0	Waste	Oxide	SZ	SZ	3.2	0.34	150	0.35	0.030	0.050	13	340	5.3	15	<0.001	0.010	2.1	1.4	0.80	0.90	13	<0.01	0.030	33	0.019	0.19	3.3	11	0.24	16	11	8.1
Statistical Summary						**Oxide**	**Other Lithologies**	**n**	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
								Max	9.4	0.34	727	1.3	0.030	0.050	98	360	12	16	0.0050	0.020	7.6	8.9	0.80	0.90	143	<0.01	0.050	33	0.019	0.47	6.4	39	500	16	55	12
								90th PCTL	8.7	0.30	705	1.1	0.024	0.050	81	354	11	15	0.0038	0.017	6.3	8.5	0.77	0.75	113	<0.01	0.050	25	0.015	0.39	6.4	38	350	15	54	11
								75th PCTL	7.8	0.24	673	0.80	0.015	<0.05	56	345	11	15	<0.001	0.013	4.5	8.0	0.73	0.53	68	<0.01	0.050	13	<0.005	0.26	6.3	35	125	13	53	9.1
								Median	5.2	0.13	471	0.55	0.010	<0.05	27	225	11	14	<0.001	<0.01	2.8	7.4	0.70	0.35	33	<0.01	0.040	5.3	<0.005	0.19	6.2	26	0.39	12	42	7.4
								25th PCTL	3.2	0.048	253	0.44	0.010	<0.05	9.9	95	9.4	14	<0.001	<0.01	2.0	5.7	0.65	0.28	21	<0.01	0.030	4.3	<0.005	0.18	5.5	16	0.24	11	26	5.2
								10th PCTL	3.2	0.043	191	0.39	0.010	<0.05	4.5	68	6.9	14	<0.001	<0.01	1.9	3.1	0.56	0.23	16	<0.01	0.030	4.0	<0.005	0.16	4.1	13	0.24	9.7	17	2.8
								Min	3.2	0.040	150	0.35	0.010	<0.05	1.0	50	5.3	14	<0.001	<0.01	1.9	1.4	0.50	0.20	13	<0.01	0.030	3.8	<0.005	0.14	3.3	11	0.24	8.7	11	1.1
Upper Transition Facies for Other Lithologies Waste Rock																																				
KAM145425	ABA072	CFD0339	10.0	11.0	Waste	Upper transition	Dykes	FC	3.6	0.30	1200	1.1	<0.01	<0.05	6.5	360	16	68	<0.001	0.020	77	11	0.60	0.80	138	<0.01	0.060	11	0.022	2.1	28	64	2.0	14	63	7.5
Q033703	ABA303	CFD0411	15.0	16.0	Waste	Upper transition	dykes	DIOR	2.7	0.040	480	0.63	<0.01	0.14	3.1	160	17	18	<0.001	0.010	17	3.0	0.70	0.40	14	<0.01	0.050	14	0.012	0.17	1.2	4.0	0.55	13	41	53
Q034859	ABA311	CFD0473	164.0	165.0	Waste	Upper transition	dykes	FC	21	1.3	941	0.29	0.050	<0.05	16	1640	6.6	58	<0.001	<0.01	9.0	21	0.50	0.70	77	<0.01	0.020	3.0	0.14	0.41	8.6	171	0.080	18	80	12
R273647	ABA305	CFD0456	55.0	56.0	Waste	Upper transition	Fault	FLT	15	1.0	555	0.51	0.020	<0.05	27	550	3.3	78	<0.001	0.010	68	14	0.40	1.2	16	<0.01	0.020	1.4	0.069	0.70	14	56	1.0	15	34	1.1
KAM019714	ABA061	CFD0083	8.0	9.0	Waste	Upper transition	Metabasalt/ Amphibolite	Amph	6.8	0.65	447	0.34	0.030	0.090	22	450	4.5	46	<0.001	<0.01	1.2	2.7	0.60	0.40	18	<0.01	0.020	19	0.072	0.32	1.3	28	0.20	10	43	6.8
KAM035755	ABA022	CFD0080	122.0	123.0	Waste	Upper transition	YO	YO	4.6	2.1	570	0.83	0.020	<0.05	146	280	11	19	<0.001	0.54	8.6	7.6	0.90	0.80	195	<0.01	0.020	9.8	0.0070	0.33	3.0	35	0.39	15	50	1.5
R545623	ABA368	CFD0524	92.0	92.6	Waste	Upper Transition	Yx	Yx	6.2	0.48	423	0.39	0.040	0.050	24	290	6.0	72	<0.001	<0.01	6.0	2.9	0.50	1.2	13	<0.01	<0.01	34	0.025	0.82	17	17	0.50	12	23	9.6
Statistical Summary						**Upper Transition**	**Other Lithologies**	**n**	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
								Max	21	2.1	1200	1.1	0.050	0.14	146	1640	17	78	<0.001	0.54	77	21	0.90	1.2	195	<0.01	0.060	34	0.14	2.1	28	171	2.0	18	80	53
								90th PCTL	17	1.6	1045	0.95	0.044	0.11	75	986	16	74	<0.001	0.23	72	16	0.78	1.2	160	<0.01	0.054	25	0.10	1.3	21	107	1.4	16	70	28
								75th PCTL	11	1.1	756	0.73	0.035	0.070	26	500	13	70	<0.001	0.015	43	12	0.65	1.0	107	<0.01	0.035	17	0.071	0.76	15	60	0.79	15	57	11
								Median	6.2	0.65	555	0.51	0.020	<0.05	22	360	6.6	58	<0.001	0.010	9.0	7.6	0.60	0.80	18	<0.01	0.020	11	0.025	0.41	8.6	35	0.50	14	43	7.5
								25th PCTL	4.1	0.39	464	0.37	0.015	<0.05	11	285	5.3	32	<0.001	<0.01	7.3	3.0	0.50	0.55	15	<0.01	0.020	6.4	0.017	0.33	2.1	23	0.30	13	38	4.2
								10th PCTL	3.2	0.20	437	0.32	<0.01	<0.05	5.1	232	4.0	18	<0.001	<0.01	4.1	2.8	0.46	0.40	14	<0.01	0.016	2.4	0.010	0.26	1.3	12	0.15	11	30	1.3
								Min	2.7	0.040	423	0.29	<0.01	<0.05	3.1	160	3.3	18	<0.001	<0.01	1.2	2.7	0.40	0.40	13	<0.01	<0.01	1.4	0.0070	0.17	1.2	4.0	0.080	10	23	1.1
Lower Transition Facies for Other Lithologies Waste Rock																																				
R282332	ABA312	CFD0474	37.0	38.0	Waste	Lower transition	dykes	IV	13	1.4	657	0.66	0.24	0.11	3.8	670	9.3	40	<0.001	0.020	0.50	11	0.50	0.50	116	<0.01	<0.01	9.3	0.097	0.35	2.0	97	0.18	13	60	26
Q035862	ABA313	CFD0491	124.0	125.0	Waste	Lower transition	dykes	IV	9.0	0.30	820	0.80	0.010	<0.05	4.5	660	15	41	<0.001	<0.01	7.1	15	0.40	0.80	11	<0.01	0.010	8.3	0.027	0.48	4.4	90	0.26	13	62	14
R283583	ABA449	CFD0496	90.0	91.0	Waste	Lower Transition	Metabasalt	MBSLT	2.5	0.97	982	3.8	0.010	<0.05	22	740	24	23	0.0030	0.36	2.6	4.4	0.30	1.0	188	<0.01	0.49	4.0	0.0060	0.24	5.4	17	1.0	9.2	70	1.2
R283583	ABA304	CFD0496	90.0	91.0	Waste	Lower transition	Metabasalt/ Amphibolite	MBSLT	2.3	1.0	981	3.8	0.010	<0.05	21	780	23	23	0.0020	0.39	3.0	4.4	0.50	1.0	193	<0.01	0.49	3.7	0.0060	0.21	4.9	17	1.1	8.1	72	1.1
Q033764	ABA308	CFD0411	70.0	71.0	Waste	Lower transition	YC	YC	5.0	1.5	558	0.31	0.020	<0.05	24	430	13	15	<0.001	0.13	3.1	6.7	0.90	0.90	163	<0.01	0.050	12	<0.005	0.12	2.7	38	0.23	21	68	1.1
R276691	ABA310	CFD0413	21.0	22.0	Waste	Lower transition	Ylim	Ylim	1.7	0.040	488	0.48	0.010	<0.05	5.7	310	6.6	12	<0.001	0.010	7.0	1.9	0.40	0.90	15	<0.01	0.020	21	<0.005	0.16	2.2	6.0	0.19	11	20	6.2
Statistical Summary						**Lower Transition**	**Other Lithologies**	**n**	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
								Max	13	1.5	982	3.8	0.24	0.11	24	780	24	41	0.0030	0.39	7.1	15	0.90	1.0	193	<0.01	0.49	21	0.097	0.48	5.4	97	1.1	21	72	26
								90th PCTL	11	1.4	982	3.8	0.13	0.080	23	760	24	41	0.0025	0.38	7.0	13	0.70	1.0	191	<0.01	0.49	17	0.062	0.42	5.1	94	1.1	17	71	20
								75th PCTL	8.0	1.3	941	3.1	0.018	0.050	21	723	21	36	0.0018	0.30	6.1	10	0.50	0.98	182	<0.01	0.38	11	0.022	0.32	4.8	77	0.82	13	70	12
								Median	3.8	0.99	739	0.73	0.010	0.050	13	665	14	23	<0.001	0.075	3.1	5.6	0.45	0.90	140	<0.01	0.035	8.8	0.0060	0.23	3.5	28	0.25	12	65	3.7
								25th PCTL	2.4	0.47	583	0.53	0.010	0.050	4.8	488	10	17	<0.001	0.013	2.7	4.4	0.40	0.83	40	<0.01	0.013	5.1	0.0053	0.17	2.3	17	0.20	9.8	61	1.1
								10th PCTL	2.0	0.17	523	0.40	0.010	0.050	4.2	370	8.0	13	<0.001	<0.01	1.6	3.2	0.35	0.65	13	<0.01	<0.01	3.9	0.0050	0.14	2.1	12	0.19	8.7	40	1.1
								Min	1.7	0.040	488	0.31	0.010	<0.05	3.8	310	6.6	12	<0.001	<0.01	0.50	1.9	0.30	0.50	11	<0.01	<0.01	3.7	0.0050	0.12	2.0	6.0	0.18	8.1	20	1.1
Fresh Facies for Other Lithologies Waste Rock																																				
R304353	ABA349	CFD0541	90.0	91.0	Waste	Fresh	IV	IV	10	0.99	788	0.24	0.060	<0.05	1.1	450	10	11	<0.001	<0.01	0.96	3.1	0.50	0.30	22	<0.01	0.010	4.4	0.0050	0.080	1.3	30	<0.05	12	57	22
R304282	ABA352	CFD0539	90.0	91.0	Waste	Fresh	IV	IV	9.5	1.3	675	0.22	0.080	<0.05	3.8	660	7.6	23	<0.001	<0.01	0.72	11	0.40	0.50	80	<0.01	0.010	9.7	0.027	0.23	1.4	94	0.060	13	55	23
KAM133438	ABA087	CFR0429	10.7	12.2	Waste	Fresh	Mafic/ Ultramafic	RU	16	6.8	430	0.25	0.010	<0.05	603	430	3.3	82	<0.001	0.040	0.090	6.3	0.20	0.60	111	<0.01	0.010	6.1	0.089	0.52	0.39	32	0.11	4.6	37	0.80
R277453	ABA307	CFD0423	81.0	82.0	Waste	Fresh	Mafic/ Ultramafic	RU	18	3.7	477	1.2	0.020	<0.05	373	400	5.0	112	0.0010	0.020	0.61	8.8	0.70	1.5	41	<0.01	0.090	11	0.17	0.76	1.3	58	0.21	12	44	2.0
R274909	ABA447	CFD0472	143.2	144.0	Waste	Fresh	Metabasalt	MBSLT	20	3.2	564	0.48	0.020	0.070	283	170	2.4	107	<0.001	<0.01	4.9	5.5	0.30	1.7	41	<0.01	0.010	16	0.13	0.91	3.0	44	0.31	12	29	4.2
R274918	ABA448	CFD0472	150.0	151.0	Waste	Fresh	Metabasalt	MBSLT	1.1	0.29	227	3.0	0.020	1.2	5.6	450	1.3	7.9	<0.001	0.080	0.71	1.6	<0.2	5.1	92	0.010	0.050	2.1	0.14	0.060	0.56	11	0.39	3.2	7.0	7.0
R293475	ABA450	CFR0730	91.4	93.0	Waste	Fresh	Metabasalt	MBSLT	24	2.0	776	1.1	0.13	<0.05	5.2	1290	8.1	54	<0.001	0.22	0.32	9.4	0.50	0.80	119	<0.01	0.020	3.7	0.11	0.48	0.91	121	0.19	15	63	12
Statistical Summary						**Lower Transition**	**Other Lithologies**	**n**	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
								Max	24	6.8	788	3.0	0.13	1.2	603	1290	10	112	0.0010	0.22	4.9	11	0.70	5.1	119	0.010	0.090	16	0.17	0.91	3.0	121	0.39	15	63	23
								90th PCTL	21	4.9	781	1.9	0.10	0.53	465	912	9.0	109	0.0010	0.14	2.5	10	0.58	3.1	114	0.010	0.066	13	0.15	0.82	2.1	105	0.34	14	59	22
								75th PCTL	19	3.5	726	1.2	0.070	0.060	328	555	7.9	94	<0.001	0.060	0.84	9.1	0.50	1.6	101	<0.01	0.035	10	0.13	0.64	1.4	76	0.26	13	56	17
								Median	16	2.0	564	0.48	0.020	<0.05	5.6	450	5.0	54	<0.001	0.020	0.71	6.3	0.40	0.80	80	<0.01	0.010	6.1	0.11	0.48	1.3	44	0.19	12	44	7.0
								25th PCTL	9.8	1.1	454	0.25	0.020	<0.05	4.5	415	2.9	17	<0.001	<0.01	0.47	4.3	0.25	0.55	41	<0.01	0.010	4.1	0.058	0.16	0.74	31	0.085	8.3	33	3.1
								10th PCTL	6.1	0.71	349	0.23	0.016	<0.05	2.7	308	2.0	9.6	<0.001	<0.01	0.23	2.5	0.20	0.42	33	<0.01	0.010	3.1	0.018	0.072	0.49	22	0.056	4.1	20	1.5
								Min	1.1	0.29	227	0.22	0.010	<0.05	1.1	170	1.3	7.9	<0.001	<0.01	0.090	1.6	0.20	0.30	22	<0.01	0.010	2.1	0.0050	0.060	0.39	11	<0.05	3.2	7.0	0.80
Statistical Summary for Other Lithologies Waste Rock								**n**	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
								n < DL	0	0	0	0	2	17	0	0	0	0	20	9	0	0	1	0	0	23	2	0	5	0	0	0	1	0	0	0
								Max	24	6.8	1200	3.8	0.24	1.2	603	1640	24	112	0.0050	0.54	77	21	0.90	5.1	195	0.010	0.49	34	0.17	2.1	28	171	500	21	80	53
								90th PCTL	19	2.9	969	2.5	0.074	0.10	242	768	17	81	0.0017	0.32	15	13	0.77	1.4	181	<0.01	0.081	21	0.13	0.80	12	96	1.1	16	69	23
								75th PCTL	13	1.4	779	1.1	0.033	0.050	31	660	12	60	<0.001	0.050	7.2	9.8	0.70	1.0	124	<0.01	0.050	12	0.091	0.49	6.2	60	0.54	14	62	12
								Median	7.0	0.98	567	0.57	0.020	<0.05	18	430	8.7	23	<0.001	0.010	3.1	6.9	0.50	0.80	60	<0.01	0.020	8.8	0.024	0.33	3.0	35	0.25	12	51	6.9
								25th PCTL	3.2	0.30	470	0.35	0.010	<0.05	5.0	305	5.2	15	<0.001	<0.01	0.90	3.1	0.40	0.48	18	<0.01	0.010	4.0	0.0058	0.19	1.3	17	0.19	11	33	1.4
								10th PCTL	2.4	0.043	328	0.26	0.010	<0.05	3.3	163	3.3	12	<0.001	<0.01	0.53	2.1	0.30	0.33	13	<0.01	0.010	3.2	<0.005	0.13	0.99	11	0.089	8.3	21	1.1
								Min	1.1	0.040	150	0.22	<0.01	<0.05	1.0	50	1.3	7.9	<0.001	<0.01	0.090	1.4	0.20	0.20	11	<0.01	<0.01	1.4	<0.005	0.060	0.39	4.0	<0.05	3.2	7.0	0.80

Notes: all values in grey italics are below the analytical detection limit
n = number of samples included in statistical summary
n < DL = number of samples with values below the analytical detection limit

Appendix C.1-4: Statistical Summary of Exploration Assay Database (Au < 0.3 ppm)

Lithology	Oxide Facies	Statistics	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	La	Mg	Mg	Mn	Mo	Na	Ni	P	Pb	S	Sb	Sc	Sr	Th	Ti	Tl	U	V	W	Zn	As/Fe	Surrogate Ca-NP (ICP-Ca)	Surrogate AP (ICP-S)	Surrogate NNP	Surrogate NPR
			ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	Num	%	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	Ratio	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$
Gneiss Waste Rock																																												
Gneiss	Oxide	**n**	3218	3218	3218	10661	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218	3218
		n <DL	2732	0	1	487	3210	8	252	2860	30	3161	60	0	89	0	3062	2364	0	3	5	5	0	1242	1039	337	0	24	1861	495	450	0	250	2084	3214	2070	18	3179	24	-	-	-	-	-
		Max	100	4.7	4240	0.30	10	3040	3.6	21	7.8	3.5	78	377	236	11	10	6.0	2.2	1700	46	3.1	5860	9.0	0.28	392	2980	1425	1.3	531	36	1415	630	0.35	10	110	272	450	157	1851	195	39	195	*Non-reactive*
		95th PCTL	0.20	1.8	1057	0.17	<10	430	1.9	2.0	2.3	<0.5	22	78	25	4.2	<10	1.0	0.74	50	27	1.0	955	3.0	0.060	37	760	23	0.070	52	13	59	40	0.090	<10	20	79	<10	62	487	57	2.2	56	*Non-reactive*
		90th PCTL	0.20	1.3	687	0.10	<10	280	1.5	2.0	1.3	<0.5	16	51	19	3.3	<10	1.0	0.46	50	21	0.57	732	2.0	0.040	26	570	17	0.030	35	9.0	41	40	0.040	<10	10	57	<10	49	379	33	0.94	31	*Non-reactive*
		75th PCTL	<0.2	0.88	349	0.035	<10	150	1.0	<2	0.30	<0.5	8.0	20	11	2.1	<10	1.0	0.24	40	9.0	0.14	446	1.0	0.020	12	330	12	0.010	16	4.0	22	40	0.010	<10	10	25	<10	29	248	7.5	0.31	6.9	*Non-reactive*
		Median	<0.2	0.64	179	0.010	<10	90	0.70	<2	0.070	<0.5	3.0	9.0	5.0	1.2	<10	<1	0.17	30	3.0	0.040	279	1.0	0.010	3.0	180	9.0	<0.01	7.0	1.0	13	30	<0.01	<10	<10	8.0	<10	16	144	1.8	0.31	1.4	*Non-reactive*
		25th PCTL	<0.2	0.49	66	0.0030	<10	60	0.60	<2	0.040	<0.5	1.0	6.0	3.0	0.92	<10	<1	0.13	30	2.0	0.020	187	<1	<0.01	1.0	120	6.0	<0.01	3.0	1.0	9.0	30	<0.01	<10	<10	4.0	<10	10	55	1.0	0.31	0.44	*Non-reactive*
		10th PCTL	<0.2	0.38	28	0.0010	<10	40	0.50	<2	0.020	<0.5	1.0	4.0	1.0	0.71	<10	<1	0.10	20	1.0	0.010	121	<1	<0.01	<1	90	4.0	<0.01	<2	<1	6.0	20	<0.01	<10	<10	2.0	<10	6.0	21	0.50	0.31	0.19	1.3
		5th PCTL	<0.2	0.34	15	0.0010	<10	30	<0.5	<2	0.020	<0.5	1.0	3.0	1.0	0.61	<10	<1	0.080	20	1.0	0.010	78	<1	<0.01	<1	70	3.0	<0.01	<2	<1	5.0	<20	<0.01	<10	<10	1.0	<10	5.0	12	0.50	0.31	-0.063	0.63
		Min	<0.2	0.11	<2	<0.001	<10	<10	<0.5	<2	<0.01	<0.5	<1	1.0	<1	0.24	<10	<1	0.030	<10	<1	<0.01	9.0	<1	<0.01	<1	20	<2	<0.01	<2	<1	2.0	<20	<0.01	<10	<10	<1	<10	<2	0.54	0.25	0.31	-11	0.63
Gneiss	Upper Transition	**n**	4367	4367	4367	16503	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367	4367
		n <DL	3846	0	109	1982	4359	19	614	3868	8	4312	113	0	137	0	4014	3570	0	10	2	2	0	1714	536	638	0	167	1951	1831	640	0	215	1560	4364	3727	28	4283	14	-	-	-	-	-
		Max	44	5.4	4240	0.30	10	4080	4.1	11	9.8	1.0	62	577	180	7.7	10	6.0	3.5	100	47	4.0	2060	46	0.18	150	2250	1005	0.67	107	31	633	1080	0.48	10	50	227	180	131	3521	245	21	244	*Non-reactive*
		95th PCTL	0.20	2.0	583	0.11	<10	410	1.6	2.0	2.4	<0.5	17	79	23	3.4	10	1.0	1.2	50	36	1.6	741	3.0	0.090	32	830	22	0.12	25	7.0	76	40	0.16	<10	10	66	<10	52	435	61	3.8	58	*Non-reactive*
		90th PCTL	0.20	1.6	337	0.053	<10	270	1.3	2.0	1.7	<0.5	13	53	16	2.8	<10	1.0	0.78	50	32	1.1	594	2.0	0.080	22	610	15	0.070	16	5.0	54	40	0.10	<10	10	47	<10	40	261	42	2.2	40	*Non-reactive*
		75th PCTL	<0.2	0.90	125	0.016	<10	140	0.90	<2	0.77	<0.5	7.0	20	9.0	1.8	<10	<1	0.40	40	21	0.43	390	2.0	0.060	9.0	350	11	0.020	6.0	3.0	32	40	0.040	<10	<10	21	<10	25	108	19	0.63	18	*Non-reactive*
		Median	<0.2	0.60	38	0.0040	<10	80	0.70	<2	0.24	<0.5	2.0	9.0	4.0	1.1	<10	<1	0.23	30	11	0.13	253	1.0	0.030	3.0	200	7.0	0.010	2.0	1.0	17	30	0.010	<10	<10	6.0	<10	15	33	6.0	0.31	5.4	*Non-reactive*
		25th PCTL	<0.2	0.45	13	0.0010	<10	50	0.50		0.070	<0.5	1.0	6.0	2.0	0.87	<10	<1	0.16	30	5.0	0.050	175	<1	0.010	1.0	130	5.0	<0.01	<2	1.0	10	30	<0.01	<10	<10	3.0	<10	10	10	1.8	0.31	1.2	3.1
		10th PCTL	<0.2	0.35	5.0	<0.001	<10	30	<0.5	<2	0.040	<0.5	1.0	4.0	1.0	0.67	<10	<1	0.12	20	2.0	0.020	127	<1	<0.01	<1	100	3.0	<0.01	<2	<1	7.0	20	<0.01	<10	<10	2.0	<10	6.0	3.6	1.0	0.31	0.44	0.94
		5th PCTL	<0.2	0.31	3.0	<0.001	<10	20	<0.5	<2	0.030	<0.5	1.0	3.0	1.0	0.57	<10	<1	0.10	20	2.0	0.020	101	<1	<0.01	<1	80	2.0	<0.01	<2	<1	6.0	20	<0.01	<10	<10	1.0	<10	5.0	2.1	0.75	0.31	0.19	0.63
		Min	<0.2	0.040	<2	<0.001	<10	<10	<0.5	<2	<0.01	<0.5	<1	1.0	<1	0.19	<10	<1	0.020	<10	<2	<0.01	14	<1	<0.01	<1	10	<2	<0.01	<2	<1	2.0	<20	<0.01	<10	<10	<1	<10	<2	0.32	0.25	0.31	-19	0.63
Gneiss	Lower Transition	**n**	5647	5647	5647	23440	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647	5647
		n <DL	5227	0	390	5701	5646	16	1422	4978	0	5581	92	0	137	0	4489	5035	0	60	1	1	0	2658	170	897	0	379	1871	3879	452	0	777	617	5643	5178	21	5415	17	-	-	-	-	-
		Max	2.2	4.4	3160	0.30	10	2440	3.3	25	11	2.6	50	589	3960	7.3	10	17	3.5	110	58	4.8	1500	131	0.23	446	2340	288	2.2	109	29	667	70	0.41	10	50	212	190	540	2150	280	69	280	*Non-reactive*
		95th PCTL	0.20	2.5	174	0.040	<10	430	1.4	2.0	3.0	<0.5	20	121	26	3.6	10	1.0	1.5	50	41	2.2	750	4.0	0.10	44	920	15	0.17	8.0	7.0	95	40	0.24	<10	10	74	<10	58	128	76	5.3	73	*Non-reactive*
		90th PCTL	<0.2	2.1	81	0.019	<10	310	1.2	2.0	2.4	<0.5	17	86	20	3.2	10	1.0	1.2	50	39	1.8	635	3.0	0.080	34	730	12	0.12	5.0	6.0	73	40	0.20	<10	<10	60	<10	49	60	59	3.8	56	*Non-reactive*
		75th PCTL	<0.2	1.5	29	0.0050	<10	170	0.80	<2	1.4	<0.5	12	48	13	2.4	<10	<1	0.82	40	33	1.2	469	1.0	0.070	19	500	8.0	0.050	2.0	3.0	47	30	0.12	<10	<10	40	<10	35	21	35	1.6	32	*Non-reactive*
		Median	<0.2	0.85	10	0.0020	<10	80	0.60	<2	0.68	<0.5	5.0	15	6.0	1.5	<10	<1	0.40	30	24	0.45	311	1.0	0.050	5.0	280	6.0	0.010	<2	2.0	28	30	0.040	<10	<10	16	<10	21	6.8	17	0.31	16	*Non-reactive*
		25th PCTL	<0.2	0.50	4.0	0.0010	<10	50	<0.5	<2	0.26	<0.5	2.0	7.0	3.0	0.95	<10	<1	0.22	20	14	0.15	206	<1	0.040	1.0	165	3.0	<0.01	<2	1.0	17	20	0.010	<10	<10	4.0	<10	12	2.8	6.5	0.31	5.9	2.2
		10th PCTL	<0.2	0.38	2.0	<0.001	<10	20	<0.5	<2	0.090	<0.5	1.0	5.0	2.0	0.73	<10	<1	0.16	20	8.0	0.080	146	<1	0.020	<1	116	2.0	<0.01	<2	1.0	10	<20	<0.01	<10	<10	2.0	<10	7.0	1.4	2.3	0.31	1.7	0.94
		5th PCTL	<0.2	0.33	<2	<0.001	<10	20	<0.5	<2	0.060	<0.5	1.0	4.0	1.0	0.62	<10	<1	0.13	10	5.0	0.040	116	<1	0.010	<1	90	<2	<0.01	<2	<1	8.0	<20	<0.01	<10	<10	2.0	<10	5.0	0.94	1.5	0.31	0.94	0.63
		Min	<0.2	0.12	<2	<0.001	<10	<10	<0.5	<2	0.010	<0.5	<1	1.0	<1	0.22	<10	<1	0.010	<10	<1	<0.01	16	<1	<0.01	<1	20	<2	<0.01	<2	<1	3.0	<20	<0.01	<10	<10	<1	<10	<2	0.37	0.25	0.31	-60	0.63
Gneiss	Transition	**n**	10014	10014	10014	39943	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014	10014
		n <DL	9073	0	499	7683	10005	35	2036	8846	8	9893	205	0	274	0	8503	8605	0	70	3	3	0	4372	706	1535	0	546	3822	5710	1092	0	992	2177	10007	8905	49	9698	31	-	-	-	-	-
		Max	44	5.4	4240	0.30	10	4080	4.1	25	11	2.6	62	589	3960	7.7	10	17	3.5	110	58	4.8	2060	131	0.23	446	2340	1005	2.2	109	31	667	1080	0.48	10	50	227	190	540	3521	280	69	280	*Non-reactive*
		95th PCTL	0.20	2.3	378	0.069	<10	420	1.4	2.0	2.8	<0.5	19	105	25	3.6	10	1.0	1.4	50	40	2.0	746	3.0	0.090	40	890	18	0.15	17	7.0	90	40	0.22	<10	10	71	<10	56	284	71	4.7	68	*Non-reactive*
		90th PCTL	<0.2	2.0	195	0.032	<10	290	1.2	2.0	2.1	<0.5	16	74	19	3.0	10	1.0	1.1	50	37	1.6	625	3.0	0.080	29	690	13	0.10	9.0	5.0	67	40	0.17	<10	10	56	<10	46	156	53	3.1	50	*Non-reactive*
		75th PCTL	<0.2	1.3	59	0.0090	<10	150	0.90	<2	1.1	<0.5	10	37	11	2.2	<10	<1	0.65	40	30	0.89	439	2.0	0.060	15	440	9.0	0.040	3.0	3.0	41	40	0.090	<10	<10	33	<10	31	47	28	1.3	26	*Non-reactive*
		Median	<0.2	0.68	17	0.0020	<10	80	0.60	<2	0.51	<0.5	4.0	11	5.0	1.3	<10	<1	0.30	30	17	0.24	282	1.0	0.050	4.0	230	6.0	0.010	<2	1.0	23	30	0.020	<10	<10	9.0	<10	18	13	13	0.31	12	*Non-reactive*
		25th PCTL	<0.2	0.47	6.0	0.0010	<10	50	0.50	<2	0.12	<0.5	2.0	6.0	3.0	0.91	<10	<1	0.19	20	9.0	0.090	190	<1	0.030	1.0	150	4.0	<0.01	<2	1.0	13	20	0.010	<10	<10	4.0	<10	11	4.1	3.0	0.31	2.4	2.2
		10th PCTL	<0.2	0.36	3.0	<0.001	<10	30	<0.5	<2	0.050	<0.5	1.0	5.0	1.0	0.71	<10	<1	0.14	20	4.0	0.030	137	<1	0.010	<1	100	2.0	<0.01	<2	<1	8.0	20	<0.01	<10	<10	2.0	<10	7.0	1.8	1.3	0.31	0.94	0.94
		5th PCTL	<0.2	0.31	2.0	<0.001	<10	20	<0.5	<2	0.030	<0.5	1.0	4.0	1.0	0.59	<10	<1	0.11	10	2.0	0.020	109	<1	<0.01	<1	80	<2	<0.01	<2	<1	7.0	<20	<0.01	<10	<10	2.0	<10	5.0	1.2	0.75	0.31	0.44	0.63
		Min	<0.2	0.040	<2	<0.001	<10	<10	<0.5	<2	<0.01	<0.5	<1	1.0	<1	0.19	<10	<1	0.010	<10	<2	<0.01	14	<1	<0.01	<1	10	<2	<0.01	<2	<1	2.0	<20	<0.01	<10	<10	<1	<10	<2	0.32	0.25	0.31	-60	0.63
Gneiss	Fresh	**n**	1073	1073	1073	7533	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073	1073
		n <DL	997	0	120	2608	1070	8	342	977	0	1073	15	0	38	0	741	992	0	11	0	0	0	632	12	132	0	54	410	787	57	0	234	19	1071	1014	0	1042	0	-	-	-	-	-
		Max	26	4.2	1580	40	10	2250	2.5	27	6.7	<0.5	56	636	49	7.8	10	1.0	3.2	70	60	4.2	4950	64	0.21	416	1640	69	1.0	111	22	670	60	0.38	10	20	203	100	175	665	168	33	166	*Non-reactive*
		95th PCTL	0.20	2.6	75	0.027	<10	400	1.3	2.0	3.1	<0.5	21	145	24	3.6	10	1.0	1.6	60	44	2.5	742	4.0	0.10	53	940	14	0.19	8.0	7.0	109	40	0.26	<10	10	74	<10	61	40	78	5.9	75	*Non-reactive*
		90th PCTL	<0.2	2.3	39	0.010	<10	290	1.1	<2	2.6	<0.5	18	109	19	3.1	10	<1	1.3	50	42	2.1	651	2.8	0.090	41	788	11	0.13	4.0	5.0	86	40	0.23	<10	<10	62	<10	52	23	64	4.1	61	*Non-reactive*
		75th PCTL	<0.2	1.7	14	0.0030	<10	190	0.80	<2	1.4	<0.5	13	57	12	2.5	10	<1	0.91	40	36	1.4	504	1.0	0.070	22	580	7.0	0.050	2.0	3.0	55	30	0.15	<10	<10	45	<10	39	9.5	35	1.6	33	*Non-reactive*
		Median	<0.2	1.1	6.0	0.0010	<10	90	0.60	<2	0.73	<0.5	6.0	18	6.0	1.8	<10	<1	0.55	30	27	0.64	342	<1	0.050	7.0	360	5.0	0.010	<2	2.0	33	30	0.070	<10	<10	21	<10	25	4.2	18	0.31	17	*Non-reactive*
		25th PCTL	<0.2	0.55	3.0	<0.001	<10	40	<0.5	<2	0.36	<0.5	2.0	8.0	3.0	1.1	<10	<1	0.27	20	17	0.22	231	<1	0.040	2.0	190	3.0	<0.01	<2	1.0	21	20	0.030	<10	<10	6.0	<10	15	1.9	9.0	0.31	8.2	2.2
		10th PCTL	<0.2	0.42	<2	<0.001	<10	20	<0.5	<2	0.17	<0.5	1.0	6.0	1.0	0.80	<10	<1	0.20	10	12	0.13	170	<1	0.030	<1	130	2.0	<0.01	<2	1.0	15	<20	0.010	<10	<10	3.0	<10	9.0	1.1	4.3	0.31	3.5	0.94
		5th PCTL	<0.2	0.37	<2	<0.001	<10	20	<0.5	<2	0.12	<0.5	1.0	5.0	1.0	0.69	<10	<1	0.16	10	10	0.090	137	<1	0.020	<1	110	0.40	<0.01	<2	<1	12	<20	0.010	<10	<10	2.0	<10	7.0	0.82	3.0	0.31	2.4	0.63
		Min	<0.2	0.25	<2	<0.001	<10	<10	<0.5	<2	0.030	<0.5	<1	3.0	<1	0.26	<10	<1	0.090	<10	1.0	0.020	67	<1	<0.01	<1	60	<2	<0.01	<2	<1	5.0	<20	<0.01	<10	<10	1.0	<10	2.0	0.40	0.75	0.31	-5.2	0.63
Gneiss	All	**n**	14305	14305	14305	58137	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305	14305
		n <DL	12802	0	620	10778	14285	51	2630	12683	38	14127	280	0	401	0	12306	11961	0	84	8	8	0	6246	1757	2004	0	624	6093	6992	1599	0	1476	4280	14292	11989	67	13919	55	-	-	-	-	-
		Max	100	5.4	4240	40	10	4080	4.1	27	11	3.5	78	636	3960	11	10	17	3.5	1700	60	4.8	5860	131	0.28	446	2980	1425	2.2	531	36	1415	1080	0.48	10	110	272	450	540	3521	280	69	280	*Non-reactive*
		95th PCTL	0.20	2.3	578	0.090	<10	420	1.6	2.0	2.8	<0.5	20	104	25	3.7	10	1.0	1.3	50	40	1.9	786	3.0	0.090	41	870	19	0.14	26	8.0	87	40	0.21	<10	10	73	<10	58	373	71	4.4	67	*Non-reactive*
		90th PCTL	0.20	1.9	337	0.041	<10	290	1.3	2.0	2.0	<0.5	16	72	19	3.1	10	1.0	1.1	50	37	1.5	644	3.0	0.080	30	680	14	0.090	16	6.0	64	40	0.16	<10	10	57	<10	47	245	51	2.8	49	*Non-reactive*
		75th PCTL	<0.2	1.2	118	0.011	<10	160	0.90	<2	1.0	<0.5	10	34	11	2.2	<10	<1	0.58	40	28	0.77	446	1.0	0.060	15	430	10	0.030	5.0	3.0	38	40	0.070	<10	<10	32	<10	31	94	25	0.94	24	*Non-reactive*
		Median	<0.2	0.68	26	0.0030	<10	80	0.60	<2	0.38	<0.5	4.0	11	5.0	1.3	<10	<1	0.26	30	15	0.18	284	1.0	0.040	4.0	220	7.0	0.010	2.0	1.0	21	30	0.020	<10	<10	9.0	<10	18	20	9.5	0.31	8.8	*Non-reactive*
		25th PCTL	<0.2	0.48	7.0	0.0010	<10	50	0.50	<2	0.080	<0.5	2.0	6.0	3.0	0.92	<10	<1	0.17	20	5.0	0.060	193	<1	0.010	1.0	140	4.0	<0.01	<2	1.0	12	20	<0.01	<10	<10	4.0	<10	11	4.9	2.0	0.31	1.7	24
		10th PCTL	<0.2	0.37	3.0	<0.001	<10	30	<0.5	<2	0.040	<0.5	1.0	4.0	1.0	0.71	<10	<1	0.13	20	2.0	0.020	135	<1	<0.01	<1	100	2.0	<0.01	<2	<1	8.0	<20	<0.01	<10	<10	2.0	<10	7.0	2.0	1.0	0.31	0.44	7.8
		5th PCTL	<0.2	0.32	2.0	<0.001	<10	20	<0.5	<2	0.020	<0.5	1.0	4.0	1.0	0.60	<10	<1	0.10	10	1.0	0.020	104	<1	<0.01	<1	80	2.0	<0.01	<2	<1	6.0	<20	<0.01	<10	<10	2.0	<10	5.0	1.3	0.50	0.31	0.19	4.4
		Min	<0.2	0.040	<2	<0.001	<10	<10	<0.5	<2	<0.01	<0.5	<1	1.0	<1	0.19	<10	<1	0.010	<10	<2	<0.01	9.0	<1	<0.01	<1	10	<2	<0.01	<2	<1	2.0	<20	<0.01	<10	<10	<1	<10	<2	0.32	0.25	0.31	-60	0.042

Appendix C.1-4: Statistical Summary of Exploration Assay Database (Au < 0.3 ppm)

Lithology	Oxide Facies	Statistics	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	La	Mg	Mg	Mn	Mo	Na	Ni	P	Pb	S	Sb	Sc	Sr	Th	Ti	Tl	U	V	W	Zn	As/Fe	Surrogate Ca-NP (ICP-Ca)	Surrogate AP (ICP-S)	Surrogate NNP	Surrogate NPR
			ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	Num	%	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	Ratio	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$
Schist Waste Rock																																												
Schist	Oxide	**n**	2355	2355	2355	4431	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355	2355
		n <DL	2020	0	3	338	2347	0	92	1957	0	2320	1	2	10	0	2066	1430	0	11	1	1	0	1592	471	29	0	13	443	246	37	0	1131	1247	2347	2251	0	2352	0	-	-	-	-	-
		Max	9.2	4.6	6950	0.30	10	3490	4.3	17	25	3.6	108	1105	535	8.8	10	8.0	3.2	80	72	8.2	5460	8.0	0.090	1930	2000	215	1.2	634	33	1225	170	0.33	10	30	238	10	781	1702	625	38	625	*Non-reactive*
		95th PCTL	0.30	1.9	1360	0.14	<10	1200	1.6	2.0	9.5	<0.5	23	102	57	4.5	10	2.0	0.80	50	39	2.1	975	2.0	0.040	59	910	20	0.22	61	15	272	33	0.080	<10	<10	84	<10	81	464	238	6.9	234	*Non-reactive*
		90th PCTL	0.20	1.6	920	0.070	<10	836	1.4	2.0	6.8	<0.5	19	67	42	4.1	10	1.0	0.59	40	34	1.6	820	1.0	0.030	46	770	16	0.15	33	12	177	30	0.056	<10	<10	68	<10	69	312	170	4.7	169	*Non-reactive*
		75th PCTL	<0.2	1.2	368	0.018	<10	460	1.1	<2	4.6	<0.5	15	45	28	3.5	<10	1.0	0.33	40	26	1.1	659	1.0	0.020	33	620	12	0.050	14	9.0	97	20	0.020	<10	<10	50	<10	55	147	116	1.6	114	*Non-reactive*
		Median	<0.2	0.91	116	0.0050	<10	210	0.90	<2	3.0	<0.5	12	28	18	3.0	<10	<1	0.22	30	14	0.46	527	<1	0.010	23	470	9.0	0.020	7.0	6.0	55	20	<0.01	<10	<10	35	<10	44	43	75	0.63	73	5.9
		25th PCTL	<0.2	0.71	37	0.0020	<10	90	0.70	<2	1.3	<0.5	8.0	15	10	2.4	<10	<1	0.15	20	4.0	0.12	392	<1	0.010	13	350	7.0	0.010	3.0	4.0	29	<20	<0.01	<10	<10	19	<10	33	13	34	0.31	31	1.3
		10th PCTL	<0.2	0.54	14	0.0010	<10	50	0.50	<2	0.22	<0.5	5.0	7.4	5.0	1.7	<10	<1	0.10	20	2.0	0.060	257	<1	<0.01	6.0	220	5.0	<0.01	<2	2.0	17	<20	<0.01	<10	<10	10	<10	22	4.6	5.5	0.31	4.9	0.63
		5th PCTL	<0.2	0.48	8.0	<0.001	<10	40	0.50	<2	0.10	<0.5	3.0	5.0	3.0	1.2	<10	<1	0.070	10	2.0	0.040	212	<1	<0.01	3.0	140	4.0	<0.01	<2	1.0	13	<20	<0.01	<10	<10	6.0	<10	14	2.8	2.5	0.31	2.2	0.63
		Min	<0.2	0.080	<2	<0.001	<10	10	<0.5	<2	0.010	<0.5	<1	<1	<1	0.42	<10	<1	0.010	<10	<1	<0.01	27	<1	<0.01	<1	20	<2	<0.01	<2	<1	3.0	<20	<0.01	<10	<10	1.0	<10	3.0	0.59	0.25	0.31	-2.0	0.63
Schist	Upper Transition	**n**	2175	2175	2175	3456	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175	2175
		n <DL	1833	0	19	479	2162	0	108	1869	0	2136	0	0	11	0	1296	1687	3	4	0	0	0	1405	237	17	0	36	229	582	23	1	985	301	2170	2148	1	2163	1	-	-	-	-	-
		Max	4.3	6.0	4000	0.30	10	3450	3.2	14	25	2.5	83	1340	2770	6.4	10	16	2.1	160	76	9.6	6280	18	0.35	1015	5350	323	2.6	130	32	10000	270	0.35	10	10	220	1140	217	1146	625	81	625	*Non-reactive*
		95th PCTL	0.30	2.5	633	0.096	<10	1249	1.5	2.0	10	<0.5	21	140	57	4.4	10	1.0	1.4	50	41	2.3	885	1.0	0.050	69	1000	22	0.64	18	13	428	30	0.16	<10	<10	84	<10	80	262	255	20	251	*Non-reactive*
		90th PCTL	0.20	2.2	326	0.050	<10	760	1.3	2.0	7.0	<0.5	18	95	43	4.0	10	1.0	1.2	50	37	1.8	778	1.0	0.040	50	820	15	0.38	11	10	297	20	0.14	<10	<10	73	<10	69	123	175	12	172	*Non-reactive*
		75th PCTL	<0.2	1.8	100	0.014	<10	400	1.0	<2	4.8	<0.5	15	59	28	3.5	10	<1	0.87	40	31	1.4	646	1.0	0.030	36	650	11	0.15	7.0	8.0	142	20	0.090	<10	<10	58	<10	57	37	121	4.7	117	46
		Median	<0.2	1.4	32	0.0040	<10	210	0.80	<2	3.2	<0.5	12	38	19	3.0	<10	<1	0.53	30	25	1.0	518	<1	0.020	25	520	8.0	0.040	3.0	6.0	81	20	0.050	<10	<10	42	<10	48	12	80	1.3	75	4.4
		25th PCTL	<0.2	0.96	13	0.0010	<10	120	0.70	<2	2.0	<0.5	9.0	23	11	2.5	<10	<1	0.28	30	18	0.63	405	<1	0.010	16	410	6.0	0.020	<2	4.0	49	<20	0.010	<10	<10	29	<10	38	4.2	51	0.63	47	1.3
		10th PCTL	<0.2	0.68	6.0	<0.001	<10	70	0.50	<2	1.1	<0.5	7.0	11	6.0	1.9	<10	<1	0.19	20	11	0.33	309	<1	<0.01	8.0	310	4.0	<0.01	<2	3.0	29	<20	<0.01	<10	<10	17	<10	27	1.9	27	0.31	23	0.63
		5th PCTL	<0.2	0.57	4.0	<0.001	<10	40	0.50	<2	0.47	<0.5	5.0	6.0	3.0	1.4	<10	<1	0.13	10	8.0	0.16	248	<1	<0.01	4.0	230	3.0	<0.01	<2	2.0	18	<20	<0.01	<10	<10	9.0	<10	21	1.3	12	0.31	11	0.63
		Min	<0.2	0.21	<2	<0.001	<10	10	<0.5	<2	0.020	<0.5	1.0	2.0	<1	0.36	<10	<1	<0.01	<10	1.0	0.010	40	<1	<0.01	<1	20	<2	<0.01	<2	<1	<1	<20	<0.01	<10	<10	<1	<10	<2	0.33	0.50	0.31	-46	0.63
Schist	Lower Transition	**n**	3330	3330	3330	6365	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330	3330
		n <DL	2968	0	152	932	3330	0	918	2818	0	3289	2	0	12	0	1379	2750	2	219	0	0	0	2329	45	30	3	248	748	1941	16	0	2219	75	3325	3306	3	3302	0	-	-	-	-	-
		Max	6.4	5.7	2320	0.29	<10	3470	2.7	197	25	2.6	81	1420	279	7.1	10	2.0	2.8	120	80	14	1700	29	0.34	1620	3300	288	2.3	166	24	10000	210	0.59	10	50	212	30	540	761	625	73	625	*Non-reactive*
		95th PCTL	0.20	2.8	133	0.050	<10	710	1.2	2.0	6.6	<0.5	22	174	37	4.1	10	1.0	1.6	40	46	2.6	847	2.0	0.080	73	1060	19	0.40	8.0	10	304	30	0.26	<10	<10	87	<10	75	45	165	13	162	*Non-reactive*
		90th PCTL	0.20	2.6	70	0.025	<10	510	1.1	2.0	5.2	<0.5	20	139	30	3.8	10	1.0	1.5	40	44	2.3	737	1.0	0.070	55	890	13	0.27	5.0	9.0	186	20	0.23	<10	<10	74	<10	67	24	129	8.4	124	*Non-reactive*
		75th PCTL	<0.2	2.2	28	0.0090	<10	320	0.80	<2	3.2	<0.5	17	97	21	3.4	10	<1	1.2	30	39	1.8	593	1.0	0.050	41	710	8.0	0.11	2.0	6.0	102	20	0.18	<10	<10	58	<10	55	11	79	3.4	75	*Non-reactive*
		Median	<0.2	1.9	12	0.0030	<10	210	0.60	<2	1.9	<0.5	14	56	13	2.9	10	<1	0.87	20	32	1.3	467	<1	0.040	30	540	5.0	0.020	<2	4.0	58	<20	0.13	<10	<10	44	<10	44	4.6	47	0.63	44	8.8
		25th PCTL	<0.2	1.4	5.0	0.0010	<10	130	<0.5	<2	1.0	<0.5	10	34	7.0	2.2	<10	<1	0.56	10	27	0.99	370	<1	0.030	18	420	3.0	0.010	<2	3.0	35	<20	0.080	<10	<10	31	<10	32	2.1	26	0.31	23	1.9
		10th PCTL	<0.2	0.99	3.0	<0.001	<10	70	<0.5	<2	0.52	<0.5	7.0	16	4.0	1.6	<10	<1	0.34	10	23	0.62	296	<1	0.020	8.0	320	2.0	<0.01	<2	2.0	22	<20	0.040	<10	<10	18	<10	22	1.1	13	0.31	11	0.94
		5th PCTL	<0.2	0.80	2.0	<0.001	<10	50	<0.5	<2	0.35	<0.5	5.0	9.0	2.0	1.3	<10	<1	0.24	<10	19	0.44	250	<1	0.010	4.0	255	<2	<0.01	<2	2.0	17	<20	0.020	<10	<10	12	<10	17	0.80	8.8	0.31	7.2	0.63
		Min	<0.2	0.14	<2	<0.001	<10	10	<0.5	<2	0.080	<0.5	<1	2.0	<1	0.31	<10	<1	<0.01	<10	2.0	0.020	92	<1	<0.01	<1	<10	<2	<0.01	<2	<1	6.0	<20	<0.01	<10	<10	<1	<10	3.0	0.45	2.0	0.31	-25	0.63
Schist	Transition	**n**	5505	5505	5505	9821	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505	5505
		n <DL	4801	0	171	1411	5492	0	1026	4687	0	5425	2	0	23	0	2675	4437	5	223	0	0	0	3734	282	47	3	284	977	2523	39	1	3204	376	5495	5454	4	5465	1	-	-	-	-	-
		Max	6.4	6.0	4000	0.30	10	3470	3.2	197	25	2.6	83	1420	2770	7.1	10	16	2.8	160	80	14	6280	29	0.35	1620	5350	323	2.6	166	32	10000	270	0.59	10	50	220	1140	540	1146	625	81	625	*Non-reactive*
		95th PCTL	0.30	2.7	342	0.070	<10	918	1.4	2.0	8.3	<0.5	22	163	46	4.2	10	1.0	1.6	50	45	2.5	865	2.0	0.070	72	1030	20	0.49	12	11	361	30	0.24	<10	<10	86	<10	76	122	207	15	205	*Non-reactive*
		90th PCTL	0.20	2.5	159	0.032	<10	600	1.2	2.0	6.0	<0.5	20	131	35	3.9	10	1.0	1.4	40	42	2.2	759	1.0	0.060	53	870	14	0.30	8.0	10	228	20	0.21	<10	<10	73	<10	68	52	151	9.4	148	*Non-reactive*
		75th PCTL	<0.2	2.1	48	0.010	<10	350	0.90	<2	3.9	<0.5	16	79	24	3.4	10	<1	1.1	30	36	1.7	615	1.0	0.050	39	690	9.0	0.12	4.0	7.0	117	20	0.15	<10	<10	58	<10	56	17	98	3.8	93	*Non-reactive*
		Median	<0.2	1.7	17	0.0030	<10	210	0.70	<2	2.4	<0.5	13	48	15	2.9	10	<1	0.74	30	29	1.2	485	<1	0.030	28	530	6.0	0.030	2.0	5.0	67	<20	0.10	<10	<10	44	<10	46	6.5	60	0.94	55	6.6
		25th PCTL	<0.2	1.2	7.0	0.0010	<10	120	0.50	<2	1.3	<0.5	10	28	9.0	2.4	<10	<1	0.44	20	24	0.80	383	<1	0.020	17	420	4.0	0.010	<2	3.0	39	<20	0.040	<10	<10	30	<10	34	2.5	32	0.31	30	1.6
		10th PCTL	<0.2	0.81	3.0	<0.001	<10	70	<0.5	<2	0.61	<0.5	7.0	13	4.0	1.7	<10	<1	0.24	10	17	0.47	300	<1	0.010	8.0	320	2.0	<0.01	<2	2.0	23	<20	0.010	<10	<10	18	<10	24	1.3	15	0.31	13	0.63
		5th PCTL	<0.2	0.64	2.0	<0.001	<10	50	<0.5	<2	0.38	<0.5	5.0	8.0	3.0	1.3	<10	<1	0.18	10	12	0.28	249	<1	<0.01	4.0	250	<2	<0.01	<2	2.0	17	<20	<0.01	<10	<10	10	<10	18	0.90	9.5	0.31	7.7	0.63
		Min	<0.2	0.14	<2	<0.001	<10	10	<0.5	<2	0.020	<0.5	<1	2.0	<1	0.31	<10	<1	<0.01	<10	1.0	0.010	40	<1	<0.01	<1	<10	<2	<0.01	<2	<1	<1	<20	<0.01	<10	<10	<1	<10	<2	0.33	0.50	0.31	-46	0.63
Schist	Fresh	**n**	862	861	861	2514	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861
		n <DL	791	0	46	474	860	1	236	701	0	856	0	0	3	0	257	739	0	73	0	0	0	513	10	0	1	66	96	640	0	0	641	13	861	852	0	859	0	-	-	-	-	-
		Max	2.6	3.9	5750	17	10	3220	2.2	38	25	4.6	60	967	84	7.0	20	3.0	2.7	80	80	11	2290	11	0.17	933	3420	396	3.4	10000	23	10000	50	0.39	<10	10	298	10	157	1837	625	106	620	*Non-reactive*
		95th PCTL	0.20	2.9	74	0.044	<10	830	1.2	2.0	9.1	<0.5	24	216	40	4.2	10	1.0	1.8	40	49	3.0	858	2.0	0.080	96	950	17	0.60	5.0	10	404	20	0.25	<10	<10	83	<10	75	24	228	19	220	*Non-reactive*
		90th PCTL	<0.2	2.6	42	0.017	<10	580	1.0	2.0	5.4	<0.5	20	163	34	3.8	10	1.0	1.6	40	46	2.6	744	1.0	0.070	56	850	13	0.48	3.0	8.0	253	20	0.24	<10	<10	70	<10	67	13	135	15	124	*Non-reactive*
		75th PCTL	<0.2	2.3	18	0.0060	<10	370	0.80	<2	3.9	<0.5	17	99	24	3.4	10	<1	1.3	30	40	1.8	587	1.0	0.050	40	680	9.0	0.31	2.0	7.0	126	20	0.19	<10	<10	58	<10	57	6.6	97	9.7	90	28
		Median	<0.2	1.9	10	0.0020	<10	260	0.60	<2	2.5	<0.5	14	56	17	3.0	10	<1	1.0	20	32	1.4	475	<1	0.040	31	560	6.0	0.11	<2	5.0	78	<20	0.13	<10	<10	45	<10	49	3.3	63	3.4	58	9.4
		25th PCTL	<0.2	1.6	5.0	0.0010	<10	170	<0.5	<2	1.6	<0.5	11	39	11	2.5	<10	<1	0.73	10	28	1.1	399	<1	0.030	22	450	3.0	0.020	<2	3.0	52	<20	0.10	<10	<10	34	<10	37	1.8	40	0.63	33	3.1
		10th PCTL	<0.2	1.2	2.0	<0.001	<10	90	<0.5	<2	0.87	<0.5	8.0	25	6.0	1.9	<10	<1	0.45	10	24	0.80	330	<1	0.020	13	380	2.0	<0.01	<2	2.0	33	<20	0.060	<10	<10	25	<10	27	0.99	22	0.31	16	0.94
		5th PCTL	<0.2	0.98	<2	<0.001	<10	60	<0.5	<2	0.53	<0.5	7.0	18	4.0	1.6	<10	<1	0.29	<10	22	0.65	289	<1	0.010	9.0	330	<2	<0.01	<2	2.0	25	<20	0.040	<10	<10	19	<10	22	0.77	13	0.31	9.9	0.63
		Min	<0.2	0.25	<2	<0.001	<10	<10	<0.5	<2	0.18	<0.5	3.0	4.0	<1	0.71	<10	<1	0.010	<10	2.0	0.060	119	<1	<0.01	2.0	<10	<2	<0.01	<2	1.0	9.0	<20	<0.01	<10	<10	5.0	<10	8.0	0.49	4.5	0.31	-30	0.63
Schist	All	**n**	8722	8721	8721	16766	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721
		n <DL	7612	0	220	2223	8699	1	1354	7345	0	8601	3	2	36	0	4998	6606	5	307	1	1	0	5839	763	76	4	363	1516	3409	76	1	4976	1636	8703	8557	4	8676	1	-	-	-	-	-
		Max	9.2	6.0	6950	17	10	3490	4.3	197	25	4.6	108	1420	2770	8.8	20	16	3.2	160	80	14	6280	29	0.35	1930	5350	396	3.4	10000	33	10000	270	0.59	10	50	298	1140	781	1837	625	106	625	*Non-reactive*
		95th PCTL	0.20	2.6	742	0.087	<10	980	1.4	2.0	8.8	<0.5	22	157	48	4.3	10	1.0	1.5	50	45	2.5	880	2.0	0.070	69	1010	20	0.45	25	12	335	30	0.23	<10	<10	85	<10	77	275	220	14	219	*Non-reactive*
		90th PCTL	0.20	2.4	361	0.038	<10	680	1.2	2.0	6.2	<0.5	19	124	37	3.9	10	1.0	1.3	40	42	2.1	773	1.0	0.060	52	840	15	0.29	13	10	213	20	0.20	<10	<10	72	<10	68	136	155	9.1	152	*Non-reactive*
		75th PCTL	<0.2	2.0	90	0.011	<10	380	1.0	<2	4.1	<0.5	16	70	25	3.5	10	<1	1.0	30	35	1.6	624	1.0	0.040	38	670	10	0.12	6.0	8.0	113	20	0.14	<10	<10	56	<10	56	33	103	3.8	99	*Non-reactive*
		Median	<0.2	1.5	24	0.0030	<10	210	0.70	<2	2.5	<0.5	13	43	16	3.0	<10	<1	0.59	30	28	1.1	496	<1	0.030	27	520	7.0	0.030	2.0	5.0	65	<20	0.070	<10	<10	42	<10	46	8.7	64	0.94	59	82
		25th PCTL	<0.2	0.96	8.0	0.0010	<10	120	0.50	<2	1.3	<0.5	9.0	24	9.0	2.4	<10	<1	0.26	20	19	0.60	385	<1	0.010	16	400	4.0	0.010	<2	3.0	38	<20	0.010	<10	<10	27	<10	34	3.1	33	0.31	30	17
		10th PCTL	<0.2	0.69	4.0	<0.001	<10	60	<0.5	<2	0.51	<0.5	6.0	11	5.0	1.7	<10	<1	0.16	10	7.0	0.16	292	<1	0.010	8.0	290	3.0	<0.01	<2	2.0	22	<20	<0.01	<10	<10	15	<10	23	1.5	13	0.31	11	6.8
		5th PCTL	<0.2	0.55	2.0	<0.001	<10	40	<0.5	<2	0.26	<0.5	4.0	7.0	3.0	1.3	<10	<1	0.11	10	3.0	0.080	237	<1	<0.01	4.0	210	2.0	<0.01	<2	2.0	16	<20	<0.01	<10	<10	9.0	<10	17	1.00	6.5	0.31	5.4	4.0
		Min	<0.2	0.080	<2	<0.001	<10	<10	<0.5	<2	0.010	<0.5	<1	<1	<1	0.31	<10	<1	<0.01	<10	<1	<0.01	27	<1	<0.01	<1	<10	<2	<0.01	<2	<1	<1	<20	<0.01	<10	<10	<1	<10	<2	0.33	0.25	0.31	-46	0.30

Appendix C.1-4: Statistical Summary of Exploration Assay Database (Au < 0.3 ppm)

Lithology	Oxide Facies	Statistics	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	La	Mg	Mg
			ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	Num	%
Granite Waste Rock																						
Granite	Oxide	**n**	578	578	578	583	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578
		n <DL	528	0	3	100	578	2	262	442	2	576	68	0	9	0	577	422	0	1	29	40
		Max	0.70	2.1	6330	0.30	<10	370	2.9	4.0	0.46	0.50	18	21	42	10	10	3.0	0.48	60	19	0.91
		95th PCTL	0.20	0.92	2715	0.19	<10	200	1.2	3.0	0.10	<0.5	5.0	13	8.0	2.9	<10	1.0	0.30	40	9.0	0.12
		90th PCTL	<0.2	0.82	1980	0.11	<10	130	0.90	2.0	0.080	<0.5	3.0	10	6.0	2.3	<10	1.0	0.27	30	8.0	0.11
		75th PCTL	<0.2	0.66	859	0.035	<10	90	0.70	<2	0.070	<0.5	2.0	8.0	3.0	1.5	<10	1.0	0.21	30	7.0	0.080
		Median	<0.2	0.53	288	0.010	<10	70	0.50	<2	0.050	<0.5	1.0	6.0	2.0	1.2	<10	<1	0.14	20	2.0	0.020
		25th PCTL	<0.2	0.43	60	0.0010	<10	40	<0.5	<2	0.030	<0.5	1.0	4.0	1.0	0.92	<10	<1	0.090	20	1.0	0.010
		10th PCTL	<0.2	0.38	18	<0.001	<10	30	<0.5	<2	0.020	<0.5	<1	2.0	1.0	0.68	<10	<1	0.070	10	0.00	0.010
		5th PCTL	<0.2	0.35	10	<0.001	<10	20	<0.5	<2	0.020	<0.5	<1	2.0	1.0	0.56	<10	<1	0.060	10	<0.15	<0.01
		Min	<0.2	0.25	<2	<0.001	<10	<10	<0.5	<2	<0.01	<0.5	<1	1.0	<1	0.29	<10	<1	0.020	<10	<3	<0.01
Granite	Upper Transition	**n**	140	140	140	341	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140
		n <DL	136	0	6	66	140	0	108	140	1	140	16	0	19	0	140	132	0	0	3	4
		Max	0.40	1.8	6150	0.29	<10	250	2.8	<2	0.18	<0.5	5.0	15	19	6.1	<10	2.0	0.40	70	11	0.18
		95th PCTL	<0.2	0.82	1460	0.094	<10	130	0.70	<2	0.12	<0.5	2.0	13	5.0	1.6	<10	1.0	0.34	40	10	0.14
		90th PCTL	<0.2	0.70	256	0.036	<10	110	0.70	<2	0.12	<0.5	2.0	12	4.0	1.5	<10	<1	0.33	30	10	0.13
		75th PCTL	<0.2	0.55	95	0.0080	<10	90	<0.5	<2	0.090	<0.5	2.0	10	3.0	1.4	<10	<1	0.31	30	9.0	0.12
		Median	<0.2	0.48	27	0.0020	<10	80	<0.5	<2	0.070	<0.5	1.0	7.0	2.0	1.2	<10	<1	0.28	30	8.0	0.11
		25th PCTL	<0.2	0.45	9.8	0.0010	<10	50	<0.5	<2	0.050	<0.5	1.0	5.0	1.0	0.98	<10	<1	0.13	20	5.0	0.048
		10th PCTL	<0.2	0.40	4.0	<0.001	<10	20	<0.5	<2	0.030	<0.5	<1	4.0	<1	0.59	<10	<1	0.070	20	1.0	0.010
		5th PCTL	<0.2	0.39	2.0	<0.001	<10	20	<0.5	<2	0.020	<0.5	<1	4.0	<1	0.41	<10	<1	0.060	10	1.0	0.010
		Min	<0.2	0.32	<2	<0.001	<10	10	<0.5	<2	<0.01	<0.5	<1	3.0	<1	0.27	<10	<1	0.040	10	<4	<0.01
Granite	Lower Transition	**n**	235	235	235	379	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235
		n <DL	224	0	11	90	234	0	169	194	13	235	8	0	9	0	233	212	0	0	17	19
		Max	0.20	2.4	10000	0.25	10	600	2.6	3.0	0.43	<0.5	72	16	16	6.8	10	4.0	0.51	60	11	0.19
		95th PCTL	<0.2	1.0	1617	0.028	<10	143	0.80	2.0	0.12	<0.5	5.0	9.0	5.0	2.0	<10	1.0	0.40	30	10	0.14
		90th PCTL	<0.2	0.95	493	0.014	<10	116	0.70	2.0	0.10	<0.5	4.0	8.0	4.0	1.7	<10	<1	0.37	30	10	0.14
		75th PCTL	<0.2	0.74	109	0.0040	<10	100	0.50	<2	0.090	<0.5	2.0	7.0	2.5	1.5	<10	<1	0.34	30	8.0	0.12
		Median	<0.2	0.56	32	0.0010	<10	90	<0.5	<2	0.070	<0.5	2.0	6.0	1.0	1.3	<10	<1	0.28	30	7.0	0.10
		25th PCTL	<0.2	0.48	6.0	0.0010	<10	60	<0.5	<2	0.050	<0.5	1.0	5.0	1.0	1.1	<10	<1	0.15	20	4.0	0.040
		10th PCTL	<0.2	0.42	2.0	<0.001	<10	40	<0.5	<2	0.020	<0.5	1.0	3.0	1.0	0.75	<10	<1	0.10	10	0.00	0.010
		5th PCTL	<0.2	0.39	2.0	<0.001	<10	30	<0.5	<2	<0.01	<0.5	1.0	3.0	1.0	0.54	<10	<1	0.080	10	<1	<0.01
		Min	<0.2	0.26	<2	<0.001	<10	20	<0.5	<2	<0.01	<0.5	<1	2.0	<1	0.30	<10	<1	0.040	10	<3	<0.01
Granite	Transition	**n**	375	375	375	720	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
		n <DL	360	0	17	156	374	0	277	334	14	375	24	0	28	0	373	344	0	0	20	23
		Max	0.4	2.36	10000	0.29	10	600	2.8	3	0.43	<0.5	72	16	19	6.84	10	4	0.51	70	11	0.19
		95th PCTL	<0.2	1.01	1616.5	0.06605	<10	130	0.8	2	0.12	<0.5	5	12	5	1.953	<10	1	0.39	40	10	0.14
		90th PCTL	<0.2	0.896	453	0.02	<10	110	0.7	2	0.11	<0.5	3	10	4	1.6	<10	<1	0.37	30	10	0.136
		75th PCTL	<0.2	0.665	103	0.005	<10	100	0.5	<2	0.09	<0.5	2	7	3	1.435	<10	<1	0.33	30	8	0.12
		Median	<0.2	0.52	30	0.002	<10	80	<0.5	<2	0.07	<0.5	1	6	1	1.25	<10	<1	0.28	30	7	0.1
		25th PCTL	<0.2	0.46	6	0.001	<10	60	<0.5	<2	0.05	<0.5	1	5	1	1.02	<10	<1	0.14	20	4	0.04
		10th PCTL	<0.2	0.414	3	<0.001	<10	30	<0.5	<2	0.02	<0.5	1	3	1	0.64	<10	<1	0.09	20	1	0.01
		5th PCTL	<0.2	0.39	2	<0.001	<10	20	<0.5	<2	0.02	<0.5	<1	3	<1	0.5	<10	<1	0.067	10	<1	<0.01
		Min	<0.2	0.26	<2	<0.001	<10	10	<0.5	<2	<0.01	<0.5	<1	2	<1	0.27	<10	<1	0.04	10	<4	<0.01
Granite	Fresh	**n**	24	24	24	143	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
		n <DL	24	0	0	55	20	0	17	22	3	24	8	0	0	0	24	15	0	0	2	2
		Max	<0.2	1.0	5690	7.0	10	90	0.90	2.0	0.12	<0.5	3.0	8.0	8.0	1.6	<10	1.0	0.24	40	6.0	0.10
		95th PCTL	<0.2	0.94	4242	0.20	10	70	0.80	1.4	0.11	<0.5	2.0	8.0	4.0	1.5	<10	1.0	0.20	30	5.0	0.079
		90th PCTL	<0.2	0.91	3662	0.037	10	70	0.80	<2	0.097	<0.5	2.0	8.0	4.0	1.4	<10	1.0	0.20	30	5.0	0.064
		75th PCTL	<0.2	0.82	3163	0.0040	<10	50	0.63	<2	0.050	<0.5	2.0	7.0	3.0	0.93	<10	1.0	0.18	23	3.0	0.025
		Median	<0.2	0.74	1648	0.0010	<10	40	<0.5	<2	0.020	<0.5	1.0	4.0	1.5	0.65	<10	<1	0.15	20	2.0	0.010
		25th PCTL	<0.2	0.49	685	<0.001	<10	30	<0.5	<2	0.010	<0.5	<1	4.0	1.0	0.51	<10	<1	0.12	20	1.0	0.010
		10th PCTL	<0.2	0.38	76	<0.001	<10	20	<0.5	<2	0.0040	<0.5	<1	3.0	1.0	0.46	<10	<1	0.11	10	1.0	0.010
		5th PCTL	<0.2	0.37	38	<0.001	<10	20	<0.5	<2	<0.01	<0.5	<1	3.0	1.0	0.46	<10	<1	0.093	10	1.55	0.0070
		Min	<0.2	0.29	23	<0.001	<10	10	<0.5	<2	<0.01	<0.5	<1	3.0	1.0	0.38	<10	<1	0.060	10	<2	<0.01
Granite	All	**n**	977	977	977	1446	977	977	977	977	977	977	977	977	977	977	977	977	977	977	977	977
		n <DL	912	0	20	311	972	2	556	798	19	975	100	0	37	0	974	781	0	1	51	65
		Max	0.70	2.4	10000	7.0	10	600	2.9	4.0	0.46	0.50	72	21	42	10	10	4.0	0.51	70	19	0.91
		95th PCTL	0.20	0.95	2616	0.14	<10	160	1.1	2.0	0.11	<0.5	5.0	12	7.0	2.5	<10	1.0	0.36	40	10	0.13
		90th PCTL	<0.2	0.86	1659	0.067	<10	120	0.80	2.0	0.090	<0.5	3.0	10	5.0	2.0	<10	1.0	0.33	30	9.0	0.13
		75th PCTL	<0.2	0.67	591	0.014	<10	90	0.60	<2	0.080	<0.5	2.0	8.0	3.0	1.5	<10	<1	0.28	30	8.0	0.11
		Median	<0.2	0.53	119	0.0030	<10	70	<0.5	<2	0.060	<0.5	1.0	6.0	2.0	1.2	<10	<1	0.17	20	5.0	0.050
		25th PCTL	<0.2	0.44	23	0.0010	<10	40	<0.5	<2	0.040	<0.5	1.0	4.0	1.0	0.92	<10	<1	0.11	20	1.0	0.010
		10th PCTL	<0.2	0.39	6.0	<0.001	<10	30	<0.5	<2	0.020	<0.5	<1	3.0	1.0	0.64	<10	<1	0.070	10	0.00	0.010
		5th PCTL	<0.2	0.36	3.0	<0.001	<10	20	<0.5	<2	0.020	<0.5	<1	2.0	1.0	0.52	<10	<1	0.060	10	<1	<0.01
		Min	<0.2	0.25	<2	<0.001	<10	<10	<0.5	<2	<0.01	<0.5	<1	1.0	<1	0.27	<10	<1	0.020	<10	<4	<0.01

Lithology	Oxide Facies	Statistics	Mn	Mo	Na	Ni	P	Pb	S	Sb	Sc	Sr	Th	Ti	Tl	U	V	W	Zn	As/Fe	Surrogate Ca-NP (ICP-Ca)	Surrogate AP (ICP-S)	Surrogate NNP	Surrogate NPR
			ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	Ratio	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$
Granite Waste Rock																								
Granite	Oxide	**n**	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578
		n <DL	0	100	198	142	0	0	406	196	14	0	29	313	575	342	1	576	3	-	-	-	-	-
		Max	16600	5.0	0.090	12	790	38	0.46	330	9.0	138	50	0.11	10	50	70	10	128	5990	12	14	11	*Non-reactive*
		95th PCTL	1855	3.0	0.060	3.0	310	24	0.021	36	4.0	51	40	0.060	<10	20	16	<10	52	1840	2.5	0.67	2.1	*Non-reactive*
		90th PCTL	1148	2.0	0.050	3.0	240	21	0.020	17	2.0	34	40	0.060	<10	10	9.0	<10	43	1151	2.0	0.63	1.7	*Non-reactive*
		75th PCTL	619	2.0	0.030	2.0	180	16	0.010	8.0	2.0	17	30	0.040	<10	10	7.0	<10	34	586	1.8	0.31	1.4	*Non-reactive*
		Median	371	2.0	0.010	1.0	140	10	<0.01	3.0	1.0	9.0	30	<0.01	<10	<10	5.0	<10	26	289	1.3	0.31	0.94	*Non-reactive*
		25th PCTL	97	1.0	<0.01	1.0	90	7.0	<0.01	<2	1.0	7.0	30	<0.01	<10	<10	3.0	<10	13	51	0.75	0.31	0.44	*Non-reactive*
		10th PCTL	37	<1	<0.01	<1	70	5.0	<0.01	<2	1.0	5.0	20	<0.01	<10	<10	2.0	<10	6.7	15	0.50	0.31	0.19	1.6
		5th PCTL	23	<1	<0.01	<1	60	4.0	<0.01	<2	1.0	4.0	14	<0.01	<10	<10	1.0	<10	4.0	8.0	0.50	0.31	-0.063	0.63
		Min	10	<1	<0.01	<1	50	2.0	<0.01	<2	<1	3.0	<20	<0.01	<10	<10	<1	<10	<2	1.5	0.25	0.31	-13	0.63
Granite	Upper Transition	**n**	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140
		n <DL	0	27	6	51	0	0	120	101	0	0	1	30	140	126	0	140	1	-	-	-	-	-
		Max	1340	5.0	0.11	5.0	930	30	0.31	50	5.0	123	40	0.090	<10	30	26	<10	53	8200	4.5	9.7	4.2	*Non-reactive*
		95th PCTL	865	3.0	0.080	3.0	241	16	0.020	13	2.0	20	40	0.070	<10	10	10	<10	42	623	3.0	0.64	2.7	*Non-reactive*
		90th PCTL	774	3.0	0.080	3.0	221	14	0.010	6.0	2.0	12	40	0.070	<10	<10	8.1	<10	39	394	3.0	0.31	2.2	*Non-reactive*
		75th PCTL	677	2.0	0.070	2.0	190	9.3	<0.01	2.0	2.0	8.0	30	0.060	<10	<10	8.0	<10	35	100	2.3	0.31	1.9	*Non-reactive*
		Median	545	2.0	0.050	1.0	170	6.0	<0.01	<2	2.0	7.0	30	0.050	<10	<10	7.0	<10	31	23	1.8	0.31	1.4	*Non-reactive*
		25th PCTL	290	1.0	0.020	<1	138	5.0	<0.01	<2	1.0	6.0	30	0.018	<10	<10	5.8	<10	22	7.3	1.3	0.31	0.94	*Non-reactive*
		10th PCTL	53	<1	0.010	<1	80	5.0	<0.01	<2	1.0	5.0	30	<0.01	<10	<10	4.0	<10	6.9	2.9	0.75	0.31	0.41	*Non-reactive*
		5th PCTL	31	<1	0.010	<1	70	5.0	<0.01	<2	1.0	5.0	30	<0.01	<10	<10	3.0	<10	4.0	1.7	0.50	0.31	-0.063	1.3
		Min	15	<1	<0.01	<1	60	4.0	<0.01	<2	1.0	3.0	<20	<0.01	<10	<10	2.0	<10	<2	1.4	0.25	0.31	-8.9	0.63
Granite	Lower Transition	**n**	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235
		n <DL	0	72	4	47	0	0	144	130	2	0	2	53	235	177	0	235	0	-	-	-	-	-
		Max	7720	4.0	0.15	9.0	560	31	0.22	169	9.0	78	50	0.090	<10	30	27	<10	80	8264	11	6.9	8.3	*Non-reactive*
		95th PCTL	1742	2.0	0.11	3.0	236	21	0.020	24	2.0	20	40	0.070	<10	10	9.0	<10	46	829	3.0	0.63	2.7	*Non-reactive*
		90th PCTL	935	2.0	0.10	2.0	200	13	0.020	12	2.0	12	40	0.070	<10	10	8.0	<10	40	395	2.5	0.63	2.2	*Non-reactive*
		75th PCTL	733	1.0	0.080	2.0	180	9.0	0.010	3.0	2.0	8.5	30	0.060	<10	<10	7.0	<10	35	116	2.3	0.31	1.9	*Non-reactive*
		Median	542	1.0	0.050	1.0	160	7.0	<0.01	<2	2.0	8.0	30	0.050	<10	<10	7.0	<10	30	28	1.8	0.31	1.4	*Non-reactive*
		25th PCTL	339	<1	0.030	1.0	130	5.0	<0.01	<2	1.0	6.0	30	0.010	<10	<10	5.0	<10	23	3.9	1.3	0.31	0.94	*Non-reactive*
		10th PCTL	93	<1	0.010	<1	70	5.0	<0.01	<2	1.0	6.0	30	<0.01	<10	<10	3.0	<10	8.8	1.7	0.50	0.31	0.19	4.3
		5th PCTL	45	<1	0.010	<1	60	5.0	<0.01	<2	1.0	5.0	30	<0.01	<10	<10	3.0	<10	5.7	1.4	0.25	0.31	-0.38	0.63
		Min	7.0	<1	<0.01	<1	40	4.0	<0.01	<2	<1	3.0	<20	<0.01	<10	<10	2.0	<10	2.0	1.3	0.25	0.31	-5.1	0.63
Granite	Transition	**n**	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
		n <DL	0	99	10	98	0	0	264	231	2	0	3	83	375	303	0	375	1	-	-	-	-	-
		Max	7720	5	0.15	9	930	31	0.31	169	9	123	50	0.09	<10	30	27	-10	80	8264	10.75	9.6875	8.25	*Non-reactive*
		95th PCTL	1240	3	0.11	3	243	18.3	0.02	23	2	20.6	40	0.07	<10	10	9	-10	43.9	724	3	0.625	2.6875	*Non-reactive*
		90th PCTL	885.2	2	0.09	3	210	14	0.01	8.6	2	12	40	0.07	<10	10	8	-10	39	397	2.75	0.3125	2.1875	*Non-reactive*
		75th PCTL	704.5	2	0.07	2	180	9	0.01	3	2	8	30	0.06	<10	-10	8	-10	35	113	2.25	0.3125	1.9375	*Non-reactive*
		Median	542	1	0.05	1	160	7	<0.01	<2	2	7	30	0.05	<10	-10	7	-10	30	24	1.75	0.3125	1.4375	*Non-reactive*
		25th PCTL	325.5	<1	0.025	<1	130	5	<0.01	<2	1	6	30	0.01	<10	-10	5	-10	22	4.9	1.25	0.3125	0.9375	*Non-reactive*
		10th PCTL	64.8	<1	0.01	<1	70	5	<0.01	<2	1	6	30	-0.01	<10	-10	3	-10	8	1.9	0.5	0.3125	0.1875	*Non-reactive*
		5th PCTL	34.4	<1	0.01	<1	60	5	<0.01	<2	1	5	30	-0.01	<10	-10	3	-10	4.7	1.5	0.5	0.3125	-0.375	0.84
		Min	7	<1	<0.01	<1	40	4	<0.01	<2	<1	3	-20	-0.01	<10	-10	2	-10	-2	1.3	0.25	0.3125	-8.9375	0.63
Granite	Fresh	**n**	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
		n <DL	0	8	1	2	0	0	13	2	1	0	0	18	24	21	0	24	12	-	-	-	-	-
		Max	1505	3.0	0.030	3.0	230	27	0.43	129	2.0	19	40	0.020	<10	20	6.0	<10	51	9483	3.0	13	1.8	*Non-reactive*
		95th PCTL	1317	2.0	0.029	2.9	219	25	0.15	74	1.0	17	40	0.019	<10	10	5.9	<10	45	7229	2.7	4.7	1.0	*Non-reactive*
		90th PCTL	1175	2.0	0.020	2.0	207	22	0.14	66	1.0	14	40	0.010	<10	4.0	5.0	<10	43	6587	2.4	4.5	0.92	*Non-reactive*
		75th PCTL	151	2.0	0.010	2.0	155	19	0.045	40	1.0	8.0	30	<0.005	<10	<10	4.0	<10	12	5303	1.3	1.4	0.25	*Non-reactive*
		Median	35	1.0	0.010	1.0	70	14	<0.01	33	1.0	5.5	30	<0.01	<10	<10	4.0	<10	0.00	2258	0.50	0.31	0.063	*Non-reactive*
		25th PCTL	30	<1	0.010	1.0	58	13	<0.01	6.0	1.0	4.8	30	<0.01	<10	<10	3.0	<10	<2	1058	0.25	0.31	-0.14	4.5
		10th PCTL	27	<1	0.010	1.0	50	10	<0.01	2.0	1.0	4.0	30	<0.01	<10	<10	3.0	<10	<2	73	0.25	0.31	-2.9	1.4
		5th PCTL	24	<1	0.010	0.70	50	8.3	<0.01	1.4	1.0	4.0	30	<0.01	<10	<10	2.2	<10	<2	30	0.25	0.31	-3.4	0.98
		Min	21	<1	<0.01	<1	50	7.0	<0.01	<2	<1	4.0	30	<0.01	<10	<10	2.0	<10	<2	15	0.25	0.31	-13	0.63
Granite	All	**n**	977	977	977	977	977	977	977	977	977	977	977	977	977	977	977	977	977	977	977	977	977	977
		n <DL	0	207	209	242	0	0	683	429	17	0	32	414	974	666	1	975	16	-	-	-	-	-
		Max	16600	5.0	0.15	12	930	38	0.46	330	9.0	138	50	0.11	10	50	70	10	128	9483	12	14	11	*Non-reactive*
		95th PCTL	1684	3.0	0.090	3.0	270	23	0.030	37	2.0	38	40	0.070	<10	20	12	<10	48	2150	2.8	0.94	2.4	*Non-reactive*
		90th PCTL	1029	2.0	0.074	3.0	230	19	0.020	18	2.0	25	40	0.060	<10	10	8.0	<10	41	1090	2.3	0.63	1.9	*Non-reactive*
		75th PCTL	670	2.0	0.050	2.0	180	14	0.010	6.0	2.0	13	30	0.050	<10	10	7.0	<10	34	486	2.0	0.31	1.7	*Non-reactive*
		Median	443	1.0	0.020	1.0	150	8.0	<0.01	2.0	2.0	8.0	30	0.020	<10	<10	6.0	<10	28	117	1.5	0.31	1.2	*Non-reactive*
		25th PCTL	138	1.0	0.010	1.0	100	6.0	<0.01	<2	1.0	6.0	30	<0.01	<10	<10	4.0	<10	15	19	1.0	0.31	0.44	*Non-reactive*
		10th PCTL	38	<1	<0.01	<1	70	5.0	<0.01	<2	1.0	5.0	20	<0.01	<10	<10	2.0	<10	6.0	4.1	0.50	0.31	0.19	2.8
		5th PCTL	27	<1	<0.01	<1	60	4.0	<0.01	<2	1.0	5.0	20	<0.01	<10	<10	2.0	<10	4.0	2.3	0.50	0.31	-0.14	0.80
		Min	7.0	<1	<0.01	<1	40	2.0	<0.01	<2	<1	3.0	<20	<0.01	<10	<10	<1	<10	<2	1.3	0.25	0.31	-13	0.053

Appendix C.1-4: Statistical Summary of Exploration Assay Database (Au < 0.3 ppm)

Lithology	Oxide Facies	Statistics	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	La	Mg	Mg	Mn	Mo	Na	Ni	P	Pb	S	Sb	Sc	Sr	Th	Ti	Tl	U	V	W	Zn	As/Fe	Surrogate Ca-NP (ICP-Ca)	Surrogate AP (ICP-S)	Surrogate NNP	Surrogate NPR
			ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	Num	%	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	Ratio	kgCaCO$_3$/t	kgCaCO$_3$/t	kgCaCO$_3$/t	kgCaCO$_3$/t
Other Lithologies																																													
Other	Oxide	**n**	1411	1411	1411	3165	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411	1411
		n <DL	1122	0	0	134	1406	0	84	1169	0	1390	15	8	6	0	1249	824	0	29	1	2	0	762	285	81	0	6	388	131	29	0	958	879	1406	1099	10	1387	1	-	-	-	-	-
		Max	20	4.9	5860	0.30	10	3350	4.2	18	24	2.5	87	618	314	14	10	14	1.8	1700	72	7.7	18250	9.0	0.27	643	2350	369	1.9	708	46	931	40	0.26	10	100	287	960	580	4614	593	60	592	*Non-reactive*
		95th PCTL	0.40	2.1	1995	0.22	*<10*	1220	2.3	3.0	7.9	*<0.5*	35	97	55	6.7	10	1.0	0.62	40	42	2.2	1483	2.0	0.040	63	1485	21	0.38	76	26	193	30	0.080	*<10*	30	180	*<10*	98	604	198	12	197	*Non-reactive*
		90th PCTL	0.20	1.6	1250	0.15	*<10*	890	1.9	2.0	6.4	*<0.5*	27	64	40	5.5	10	1.0	0.42	40	38	1.9	1070	2.0	0.040	47	1020	18	0.21	50	18	143	30	0.040	*<10*	20	128	*<10*	85	433	160	6.6	155	*Non-reactive*
		75th PCTL	*<0.2*	1.2	680	0.067	*<10*	460	1.3	*<2*	4.5	*<0.5*	16	39	29	3.8	*<10*	1.0	0.26	30	30	1.4	751	1.0	0.020	32	590	14	0.060	20	10	99	20	0.010	*<10*	*<10*	57	*<10*	66	252	114	1.9	111	*Non-reactive*
		Median	*<0.2*	0.85	284	0.019	*<10*	210	1.0	*<2*	2.2	*<0.5*	12	20	18	3.0	*<10*	*<1*	0.18	20	11	0.36	576	*<1*	0.010	19	370	10	0.020	8.0	7.0	51	*<20*	*<0.01*	*<10*	*<10*	37	*<10*	50	103	55	0.63	51	15
		25th PCTL	*<0.2*	0.61	70	0.0050	*<10*	90	0.70	*<2*	0.21	*<0.5*	6.0	8.0	8.0	2.1	*<10*	*<1*	0.13	10	2.0	0.060	400	*<1*	0.010	6.0	190	8.0	*<0.01*	4.0	4.0	25	*<20*	*<0.01*	*<10*	*<10*	18	*<10*	32	27	5.3	0.31	4.9	1.6
		10th PCTL	*<0.2*	0.49	26	0.0020	*<10*	50	0.50	*<2*	0.060	*<0.5*	2.0	3.0	3.0	1.3	*<10*	*<1*	0.090	10	1.0	0.030	217	*<1*	*<0.01*	1.0	110	6.0	*<0.01*	2.0	2.0	14	*<20*	*<0.01*	*<10*	*<10*	6.0	*<10*	17	8.5	1.5	0.31	0.94	0.63
		5th PCTL	*<0.2*	0.43	15	0.0010	*<10*	40	*<0.5*	*<2*	0.030	*<0.5*	1.0	1.0	2.0	0.95	*<10*	*<1*	0.070	10	1.0	0.020	127	*<1*	*<0.01*	*<1*	70	5.0	*<0.01*	*<2*	1.0	11	*<20*	*<0.01*	*<10*	*<10*	2.0	*<10*	10	4.8	0.75	0.31	0.44	0.63
		Min	*<0.2*	0.20	3.0	*<0.001*	*<10*	10	*<0.5*	*<2*	0.010	*<0.5*	*<1*	*<1*	*<1*	0.37	*<10*	*<1*	0.020	*<10*	*<1*	*<0.01*	8.0	*<1*	*<0.01*	*<1*	30	*<2*	*<0.01*	*<2*	*<1*	5.0	*<20*	*<0.01*	*<10*	*<10*	*<1*	*<10*	*<2*	0.94	0.25	0.31	-6.6	0.63
Other	Upper Transition	**n**	585	585	585	2943	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585	585
		n <DL	467	0	4	275	579	0	60	522	0	567	29	8	14	0	432	426	0	5	5	5	1	322	109	73	0	5	133	121	27	0	316	196	582	532	11	562	1	-	-	-	-	-
		Max	18	4.1	10000	0.30	10	3450	3.4	5.0	20	1.2	40	532	151	7.5	10	6.0	2.2	80	58	4.5	4440	6.0	0.22	912	2450	187	1.6	156	28	2940	50	0.46	10	30	203	110	171	7653	505	49	500	*Non-reactive*
		95th PCTL	0.40	2.5	1755	0.18	*<10*	1634	2.1	2.0	8.9	*<0.5*	25	151	37	4.8	10	1.0	1.2	50	41	2.4	1030	2.0	0.070	75	1580	28	0.38	45	17	239	40	0.16	*<10*	10	120	*<10*	88	727	223	12	219	*Non-reactive*
		90th PCTL	0.20	2.1	1157	0.12	*<10*	1176	1.7	2.0	7.6	*<0.5*	20	98	29	4.4	10	1.0	0.95	40	36	1.9	949	1.0	0.060	44	1020	20	0.26	24	13	196	30	0.11	*<10*	*<10*	97	*<10*	78	462	190	8.1	188	*Non-reactive*
		75th PCTL	*<0.2*	1.6	248	0.042	*<10*	400	1.2	*<2*	4.6	*<0.5*	15	47	19	3.5	10	1.0	0.57	30	28	1.3	743	1.0	0.040	26	700	14	0.090	9.0	10	103	20	0.070	*<10*	*<10*	66	*<10*	60	140	116	2.8	110	*Non-reactive*
		Median	*<0.2*	1.0	65	0.011	*<10*	180	0.80	*<2*	2.0	*<0.5*	10	19	11	2.7	*<10*	*<1*	0.28	30	20	0.63	548	*<1*	0.020	13	430	10	0.030	4.0	5.0	55	*<20*	0.020	*<10*	*<10*	37	*<10*	44	28	50	0.94	48	8.1
		25th PCTL	*<0.2*	0.68	23	0.0030	*<10*	90	0.60	*<2*	0.36	*<0.5*	5.0	7.0	6.0	1.7	*<10*	*<1*	0.18	20	9.0	0.18	354	*<1*	0.010	3.0	220	7.0	0.010	2.0	3.0	28	*<20*	*<0.01*	*<10*	*<10*	13	*<10*	28	9.6	9.0	0.31	7.4	1.9
		10th PCTL	*<0.2*	0.51	8.0	0.0010	*<10*	50	*<0.5*	*<2*	0.080	*<0.5*	1.0	3.0	2.0	1.1	*<10*	*<1*	0.12	10	3.0	0.040	193	*<1*	*<0.01*	*<1*	110	5.0	*<0.01*	*<2*	1.0	13	*<20*	*<0.01*	*<10*	*<10*	3.0	*<10*	12	2.7	2.0	0.31	1.2	0.94
		5th PCTL	*<0.2*	0.45	5.0	*<0.001*	*<10*	40	*<0.5*	*<2*	0.030	*<0.5*	1.0	1.2	1.0	0.75	*<10*	*<1*	0.080	10	2.0	0.020	101	*<1*	*<0.01*	*<1*	82	4.0	*<0.01*	*<2*	1.0	9.0	*<20*	*<0.01*	*<10*	*<10*	1.0	*<10*	8.0	1.5	0.75	0.31	0.19	0.63
		Min	*<0.2*	0.16	*<2*	*<0.001*	*<10*	10	*<0.5*	*<2*	0.010	*<0.5*	*<1*	*<1*	*<1*	0.39	*<10*	*<1*	0.010	*<10*	*<1*	*<0.01*	*<5*	*<1*	*<0.01*	*<1*	30	*<2*	*<0.01*	*<2*	*<1*	4.0	*<20*	*<0.01*	*<10*	*<10*	*<1*	*<10*	*<2*	0.59	0.25	0.31	-19	0.63
Other	Lower Transition	**n**	710	710	710	2387	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710	710
		n <DL	573	0	26	284	703	0	234	598	2	698	28	5	4	0	392	548	0	63	1	1	0	421	18	75	0	60	187	370	14	0	459	102	709	670	0	679	8	-	-	-	-	-
		Max	1930	6.4	7110	0.30	10	2460	2.9	9.0	22	1.5	81	521	7700	7.0	10	7.0	2.3	130	61	4.6	1370	11	0.39	653	2440	82	1.3	123	34	1410	50	0.33	10	20	250	2990	1980	7146	540	40	538	*Non-reactive*
		95th PCTL	0.50	3.1	460	0.12	*<10*	780	1.6	3.0	6.7	*<0.5*	24	207	45	4.6	10	1.0	1.5	40	50	2.8	942	2.0	0.13	88	1556	21	0.27	25	13	174	30	0.25	*<10*	10	125	*<10*	79	223	168	8.4	160	*Non-reactive*
		90th PCTL	0.20	2.9	160	0.060	*<10*	561	1.2	2.0	4.4	*<0.5*	21	151	36	3.9	10	1.0	1.4	40	46	2.5	840	1.0	0.10	65	1390	15	0.13	10	11	142	30	0.22	*<10*	*<10*	102	*<10*	69	85	111	4.1	106	*Non-reactive*
		75th PCTL	*<0.2*	2.4	56	0.019	*<10*	340	0.90	*<2*	3.0	*<0.5*	16	85	24	3.4	10	*<1*	1.0	30	38	1.9	676	1.0	0.070	39	830	10	0.030	4.0	8.0	95	20	0.15	*<10*	*<10*	78	*<10*	57	24	74	0.94	69	*Non-reactive*
		Median	*<0.2*	1.8	18	0.0050	*<10*	230	0.60	*<2*	1.4	*<0.5*	12	30	14	2.8	*<10*	*<1*	0.57	20	29	1.2	522	*<1*	0.040	14	560	6.0	0.010	*<2*	5.0	55	*<20*	0.080	*<10*	*<10*	49	*<10*	45	7.5	36	0.31	34	*Non-reactive*
		25th PCTL	*<0.2*	1.0	8.0	0.0020	*<10*	120	*<0.5*	*<2*	0.52	*<0.5*	8.0	9.0	8.0	1.9	*<10*	*<1*	0.30	10	21	0.62	356	*<1*	0.030	4.0	310	4.0	*<0.01*	*<2*	3.0	28	*<20*	0.030	*<10*	*<10*	26	*<10*	27	2.8	13	0.31	13	1.3
		10th PCTL	*<0.2*	0.62	3.0	*<0.001*	*<10*	70	*<0.5*	*<2*	0.20	*<0.5*	3.0	5.0	4.0	1.3	*<10*	*<1*	0.17	10	11	0.16	240	*<1*	0.010	*<1*	150	2.0	*<0.01*	*<2*	1.0	16	*<20*	*<0.01*	*<10*	*<10*	11	*<10*	15	1.3	5.0	0.31	4.7	0.63
		5th PCTL	*<0.2*	0.48	2.0	*<0.001*	*<10*	50	*<0.5*	*<2*	0.060	*<0.5*	1.0	3.0	2.0	0.97	*<10*	*<1*	0.14	*<10*	3.9	0.045	161	*<1*	0.010	*<1*	80	*<2*	*<0.01*	*<2*	1.0	13	*<20*	*<0.01*	*<10*	*<10*	4.0	*<10*	7.5	0.90	1.5	0.31	1.2	0.63
		Min	*<0.2*	0.24	*<2*	*<0.001*	*<10*	10	*<0.5*	*<2*	*<0.01*	*<0.5*	*<1*	*<1*	*<1*	0.30	*<10*	*<1*	0.030	*<10*	*<3*	*<0.01*	7.0	*<1*	*<0.01*	*<1*	30	*<2*	*<0.01*	*<2*	*<1*	4.0	*<20*	*<0.01*	*<10*	*<10*	1.0	*<10*	*<2*	0.35	0.25	0.31	-7.9	0.63
Other	Transition	**n**	1295	1295	1295	5330	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295	1295
		n <DL	1040	0	30	559	1282	0	294	1120	2	1265	57	13	18	0	824	974	0	68	6	6	1	743	127	148	0	65	320	491	41	0	775	298	1291	1202	11	1241	9	-	-	-	-	-
		Max	1930	6.4	10000	0.30	10	3450	3.4	9.0	22	1.5	81	532	7700	7.5	10	7.0	2.3	130	61	4.6	4440	11	0.39	912	2450	187	1.6	156	34	2940	50	0.46	10	30	250	2990	1980	7653	540	49	538	*Non-reactive*
		95th PCTL	0.40	3.0	1330	0.16	*<10*	1273	1.9	2.0	8.2	*<0.5*	24	184	42	4.8	10	1.0	1.4	40	48	2.7	1010	2.0	0.11	87	1570	24	0.32	29	15	217	30	0.23	*<10*	10	122	*<10*	83	554	205	10	199	*Non-reactive*
		90th PCTL	0.20	2.7	535	0.092	*<10*	690	1.5	2.0	6.2	*<0.5*	20	133	33	4.2	10	1.0	1.2	40	44	2.3	888	1.0	0.080	61	1320	18	0.19	17	12	156	30	0.19	*<10*	*<10*	100	*<10*	72	268	155	5.8	149	*Non-reactive*
		75th PCTL	*<0.2*	2.2	121	0.031	*<10*	370	1.0	*<2*	3.4	*<0.5*	16	62	21	3.4	10	*<1*	0.85	30	33	1.6	716	1.0	0.060	33	750	12	0.060	7.0	8.0	97	20	0.11	*<10*	*<10*	73	*<10*	58	56	85	1.9	83	*Non-reactive*
		Median	*<0.2*	1.4	33	0.0080	*<10*	210	0.70	*<2*	1.6	*<0.5*	11	24	12	2.8	*<10*	*<1*	0.43	20	26	0.98	530	*<1*	0.030	14	480	8.0	0.020	2.0	5.0	55	*<20*	0.050	*<10*	*<10*	44	*<10*	45	12	40	0.63	38	18
		25th PCTL	*<0.2*	0.79	11	0.0020	*<10*	100	0.50	*<2*	0.45	*<0.5*	7.0	8.0	7.0	1.8	*<10*	*<1*	0.22	10	15	0.38	356	*<1*	0.010	3.0	260	5.0	0.010	*<2*	3.0	28	*<20*	0.010	*<10*	*<10*	20	*<10*	28	4.2	11	0.31	11	1.6
		10th PCTL	*<0.2*	0.54	5.0	*<0.001*	*<10*	60	*<0.5*	*<2*	0.14	*<0.5*	2.0	4.0	3.0	1.1	*<10*	*<1*	0.14	10	5.0	0.070	210	*<1*	0.010	*<1*	120	3.0	*<0.01*	*<2*	1.0	15	*<20*	*<0.01*	*<10*	*<10*	6.0	*<10*	14	1.6	3.5	0.31	2.7	0.63
		5th PCTL	*<0.2*	0.46	3.0	*<0.001*	*<10*	50	*<0.5*	*<2*	0.040	*<0.5*	1.0	2.0	2.0	0.83	*<10*	*<1*	0.11	*<10*	2.0	0.020	112	*<1*	*<0.01*	*<1*	80	0.80	*<0.01*	*<2*	1.0	11	*<20*	*<0.01*	*<10*	*<10*	2.0	*<10*	8.0	1.1	1.0	0.31	0.44	0.63
		Min	*<0.2*	0.16	*<2*	*<0.001*	*<10*	10	*<0.5*	*<2*	*<0.01*	*<0.5*	*<1*	*<1*	*<1*	0.30	*<10*	*<1*	0.010	*<10*	*<3*	*<0.01*	*<5*	*<1*	*<0.01*	*<1*	30	*<2*	*<0.01*	*<2*	*<1*	4.0	*<20*	*<0.01*	*<10*	*<10*	*<1*	*<10*	*<2*	0.35	0.25	0.31	-19	0.63
Other	Fresh	**n**	247	241	241	796	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241
		n <DL	175	0	16	91	238	1	85	206	2	236	22	0	4	0	137	179	0	26	1	1	0	171	22	36	1	18	29	130	6	0	185	79	241	234	1	238	4	-	-	-	-	-
		Max	1.4	6.4	10000	9.3	10	1970	3.4	4.0	12	1.9	78	1475	61	5.9	10	2.0	2.3	50	81	15	7720	6.0	0.40	1505	1720	271	4.1	129	20	448	40	0.34	*<10*	10	196	10	237	9483	288	129	234	*Non-reactive*
		95th PCTL	0.60	3.9	4730	2.0	*<10*	1070	1.6	2.0	5.5	*<0.5*	63	1110	32	5.0	10	1.0	1.5	40	76	9.8	1020	2.0	0.27	991	1470	25	1.9	19	12	282	20	0.23	*<10*	*<10*	164	*<10*	76	2472	138	59	125	*Non-reactive*
		90th PCTL	0.50	3.2	3110	1.1	*<10*	700	1.3	2.0	5.0	*<0.5*	28	152	26	4.2	10	1.0	1.1	30	48	2.7	912	1.0	0.22	45	1320	16	1.5	11	11	230	20	0.19	*<10*	*<10*	123	*<10*	71	1493	125	48	110	*Non-reactive*
		75th PCTL	0.20	2.6	457	0.044	*<10*	410	1.0	*<2*	3.2	*<0.5*	16	36	17	3.6	10	1.0	0.81	20	35	1.8	683	1.0	0.12	24	690	12	0.35	5.0	8.0	133	*<20*	0.14	*<10*	*<10*	91	*<10*	58	408	79	11	57	*Non-reactive*
		Median	*<0.2*	1.4	23	0.0060	*<10*	260	0.60	*<2*	1.9	*<0.5*	12	18	11	2.8	*<10*	*<1*	0.38	20	29	1.4	537	*<1*	0.040	11	410	8.0	0.040	*<2*	5.0	82	*<20*	0.050	*<10*	*<10*	33	*<10*	40	8.5	46	1.3	39	42
		25th PCTL	*<0.2*	0.78	6.0	0.0020	*<10*	140	*<0.5*	*<2*	0.78	*<0.5*	6.0	9.0	5.0	2.2	*<10*	*<1*	0.25	10	22	0.68	371	*<1*	0.020	2.0	120	4.0	0.010	*<2*	3.0	36	*<20*	*<0.01*	*<10*	*<10*	15	*<10*	30	1.7	20	0.31	13	3.8
		10th PCTL	*<0.2*	0.56	3.0	*<0.001*	*<10*	60	*<0.5*	*<2*	0.27	*<0.5*	1.0	4.0	2.0	0.81	*<10*	*<1*	0.16	*<10*	12	0.15	242	*<1*	0.010	*<1*	50	2.0	*<0.01*	*<2*	1.0	20	*<20*	*<0.01*	*<10*	*<10*	3.0	*<10*	19	0.93	6.8	0.31	3.1	0.63
		5th PCTL	*<0.2*	0.48	*<2*	*<0.001*	*<10*	40	*<0.5*	*<2*	0.20	*<0.5*	*<1*	1.0	1.0	0.67	*<10*	*<1*	0.070	*<10*	9.0	0.10	133	*<1*	*<0.01*	*<1*	40	*<2*	*<0.01*	*<2*	1.0	17	*<20*	*<0.01*	*<10*	*<10*	2.0	*<10*	15	0.66	5.0	0.31	-7.2	0.63
		Min	*<0.2*	0.050	*<2*	*<0.001*	*<10*	*<10*	*<0.5*	*<2*	*<0.01*	*<0.5*	*<1*	1.0	*<1*	0.49	*<10*	*<1*	0.010	*<10*	*<2*	*<0.01*	21	*<1*	*<0.01*	*<1*	*<10*	*<2*	*<0.01*	*<2*	*<1*	2.0	*<20*	*<0.01*	*<10*	*<10*	*<1*	*<10*	*<2*	0.53	0.25	0.31	-67	0.63
Other	All	**n**	2953	2947	2947	9291	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947	2947
		n <DL	2337	0	46	784	2926	1	463	2495	4	2891	94	21	28	0	2210	1977	0	123	8	9	1	1676	434	265	1	89	737	752	76	0	1918	1256	2938	2535	22	2866	14	-	-	-	-	-
		Max	1930	6.4	10000	9.3	10	3450	4.2	18	24	2.5	87	1475	7700	14	10	14	2.3	1700	81	15	18250	11	0.40	1505	2450	369	4.1	708	46	2940	50	0.46	10	100	287	2990	1980	9483	593	129	592	*Non-reactive*
		95th PCTL	0.40	2.9	1914	0.21	*<10*	1230	2.1	2.0	7.9	*<0.5*	29	150	47	5.7	10	1.0	1.3	40	46	2.6	1154	2.0	0.11	74	1527	23	0.43	56	20	216	30	0.19	*<10*	20	151	*<10*	89	703	198	13	195	*Non-reactive*
		90th PCTL	0.20	2.5	1145	0.13	*<10*	810	1.7	2.0	6.1	*<0.5*	23	104	37	4.7	10	1.0	0.98	40	41	2.1	959	2.0	0.070	51	1230	18	0.26	31	14	156	30	0.15	*<10*	10	110	*<10*	79	430	153	8.1	147	*Non-reactive*
		75th PCTL	*<0.2*	1.6	446	0.043	*<10*	400	1.2	*<2*	4.1	*<0.5*	16	45	25	3.6	0.00	1.0	0.52	30	32	1.5	724	1.0	0.040	32	690	13	0.070	12	9.0	100	20	0.070	*<10*	*<10*	67	*<10*	62	176	102	2.2	97	*Non-reactive*
		Median	*<0.2*	1.0	90	0.010	*<10*	210	0.80	*<2*	1.7	*<0.5*	11	21	14	2.9	*<10*	*<1*	0.25	20	22	0.80	556	*<1*	0.020	16	420	9.0	0.020	5.0	6.0	55	*<20*	0.010	*<10*	*<10*	39	*<10*	47	36	43	0.63	40	153
		25th PCTL	*<0.2*	0.68	21	0.0020	*<10*	100	0.60	*<2*	0.34	*<0.5*	7.0	8.0	7.0	2.0	*<10*	*<1*	0.16	10	6.0	0.13	377	*<1*	0.010	4.0	215	6.0	0.00	*<2*	3.0	27	*<20*	*<0.01*	*<10*	*<10*	19	*<10*	30	7.8	8.5	0.31	7.7	25
		10th PCTL	*<0.2*	0.51	7.0	0.0010	*<10*	60	*<0.5*	*<2*	0.080	*<0.5*	2.0	3.0	3.0	1.2	*<10*	*<1*	0.10	10	2.0	0.040	217	*<1*	*<0.01*	1.0	100	4.0	*<0.01*	*<2*	1.0	15	*<20*	*<0.01*	*<10*	*<10*	6.0	*<10*	16	2.3	2.0	0.31	1.2	6.7
		5th PCTL	*<0.2*	0.45	4.0	*<0.001*	*<10*	40	*<0.5*	*<2*	0.040	*<0.5*	1.0	2.0	2.0	0.86	*<10*	*<1*	0.080	10	1.0	0.020	113	*<1*	*<0.01*	*<1*	70	2.0	*<0.01*	*<2*	1.0	11	*<20*	*<0.01*	*<10*	*<10*	2.0	*<10*	9.0	1.4	1.0	0.31	0.44	2.4
		Min	*<0.2*	0.050	*<2*	*<0.001*	*<10*	*<10*	*<0.5*	*<2*	*<0.01*	*<0.5*	*<1*	*<1*	*<1*	0.30	*<10*	*<1*	0.010	*<10*	*<3*	*<0.01*	*<5*	*<1*	*<0.01*	*<1*	*<10*	*<2*	*<0.01*	*<2*	*<1*	2.0	*<20*	*<0.01*	*<10*	*<10*	*<1*	*<10*	*<2*	0.35	0.25	0.31	-67	0.030

Notes: all values in grey italics are below the analytical detection limit
n = number of samples included in statistical summary
n < DL = number of samples with values below the analytical detection limit

Appendix C.2: Static Test Results for Ore

Appendix C.2-1: Acid-Base Accounting Results for Ore

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Rinse pH (1:1)	Paste pH	Total-S	Sulphate-S	Sulphide- S	T-AP	Total-C	TIC (as CO_2)	T-C NP*	CaNP	Sobek-NP	Siderite-NP	T-C NNP*	Sobek NNP	Siderite NNP	NPR	NPR	NPR	NPR
									s.u.	s.u.	%	%	%	$kgCaCO_3/t$	%	%	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	T-CNP*/T-AP	CaNP/T-AP	SobekNP/T-AP	SideriteNP/T-AP
Oxide Facies for Gneiss Ore																											
ABA100	KAM137583	CFR0470	39.62	41.15	Ore	Oxide	Gneiss	MxM	7.1	7.2	0.02	0.01	<0.01	0.60	0.040	<0.2	3.1	<4.5	6.0	8.0	2.5	5.0	7.4	5.0	7.2	9.6	13
Supremo Oxide T1	72144	Head	composite	-	Ore	Oxide	Gneiss		7.4	7.3	0.02	-	<0.01	0.70	0.030	0.11	2.3	2.5	5.7	11	1.6	5.0	11	3.2	3.5	7.9	16
Supremo Oxide T4	72145	Head	composite	-	Ore	Oxide	Gneiss		7.4	7.4	0.02	-	<0.01	0.80	0.12	0.33	8.9	7.5	11	18	8.2	11	18	12	10	15	25
ABA394	KAM030261	CFR0110	81.08	82.6	Ore	Oxide	Gneiss	MxF	6.7	6.7	0.11	0.06	0.01	3.4	0.030	<0.2	2.3	<4.5	-	-	-1.1	-	-	0.68	1.3	-	-
ABA397	L861523	CFR0134	105.16	105.187	Ore	Oxide	Gneiss	FG	7.3	7.0	0.01	<0.01	0.01	0.30	0.040	<0.2	3.1	<4.5	-	-	2.8	-	-	9.9	14	-	-
Statistical Summary						**Oxide**	**Gneiss**	**n**	5	5	5.00	3.00	5.00	5	5	5	5	5	3	3	5	3	3	5	5	3	3
								Max	7.4	7.4	0.11	0.06	0.01	3.4	0.12	0.30	8.9	7.5	11	18	8.2	11	18	12	14	15	25
								90th PCTL	7.4	7.3	0.08	0.05	0.01	2.4	0.090	0.30	6.6	6.3	10	17	6.0	9.0	16	11	13	14	23
								75th PCTL	7.4	7.3	0.02	0.04	0.01	0.80	0.040	<0.2	3.1	<4.5	8.6	15	2.8	7.9	14	10	10	12	20
								Median	7.3	7.2	0.02	0.01	<0.01	0.70	0.040	<0.2	3.1	<4.5	6.0	11	2.5	5.4	11	5.0	7.2	10	16
								25th PCTL	7.1	7.0	0.02	<0.01	<0.01	0.60	0.030	<0.2	2.3	<4.5	5.8	9.7	1.6	5.2	9.0	3.2	3.5	8.8	14
								10th PCTL	6.9	6.8	0.01	<0.01	<0.01	0.40	0.030	0.10	2.3	3.3	5.8	8.7	0.00	5.1	8.0	1.7	2.2	8.3	13
								Min	6.7	6.7	0.01	<0.01	<0.01	0.30	0.030	0.10	2.3	2.5	5.7	8.0	-1.1	5.0	7.4	0.70	1.3	7.9	13
Upper and Lower Transition Facies for Gneiss Ore																											
Supremo 80%	72146	Head	composite	-	Ore	Transition	Gneiss		7.3	7.5	0.13	-	0.09	4.0	0.44	1.5	34	33	38	44	30	34	40	8.5	8.3	9.4	11
ABA375	R271389	CFD0417	109.3	109.775	Ore	Lower Transition	Gneiss	MxF	8.7	8.6	0.01	0.01	0.01	0.30	0.31	1.0	24	23	-	-	24	-	-	77	73	-	-
ABA002	KAM004886	CFD0034	73	74	Ore	Upper transition	Gneiss	FG	7.0	6.8	<0.01	0.01	0.02	<0.3	0.10	<0.2	7.8	<4.5	4.0	5.0	7.5	4.0	4.7	26	15	13	17
ABA359	R623803	CFD0548	174	174.935	Ore	Upper Transition	Gneiss	MxF	7.3	7.4	<0.01	0.01	0.02	<0.3	0.020	<0.2	1.6	<4.5	-	-	1.3	-	-	5.2	15	-	-
ABA403	R544048	CFD0553	120	121	Ore	Upper Transition	Gneiss	MxF	8.1	7.6	<0.01	<0.01	0.01	<0.3	0.030	<0.2	2.3	<4.5	-	-	2.0	-	-	7.8	15	-	-
Statistical Summary						**Transition**	**Gneiss**	**n**	5	5	5	4	5	5	5	5	5	5	2	2	5	2	2	5	5	2	2
								Max	8.7	8.6	0.13	0.01	0.09	4.0	0.44	1.5	34	33	38	44	30	34	40	77	73	13	17
								90th PCTL	8.5	8.2	0.08	0.01	0.06	2.5	0.39	1.3	30	29	34	41	28	31	37	57	50	13	16
								75th PCTL	8.1	7.6	0.01	0.01	0.02	0.31	0.31	1.0	24	23	29	35	24	26	31	26	15	12	15
								Median	7.3	7.5	<0.01	0.01	0.02	<0.3	0.10	<0.2	7.8	<4.5	21	25	7.5	19	23	8.5	15	11	14
								25th PCTL	7.3	7.4	<0.01	0.01	0.01	<0.3	0.030	<0.2	2.3	<4.5	12	15	2.0	11	14	7.8	15	10	12
								10th PCTL	7.1	7.0	<0.01	<0.01	0.01	<0.3	0.020	<0.2	1.9	<4.5	7.4	8.9	1.6	6.7	8.3	6.2	11	9.8	12
								Min	7.0	6.8	<0.01	<0.01	0.01	<0.3	0.020	<0.2	1.6	<4.5	4.0	5.0	1.3	3.7	4.7	5.2	8.3	9.4	11
Statistical Summary for Gneiss Ore								**n**	10	10	10	7	10	10	10	10	10	10	5	5	10	5	5	10	10	5	5
								n < DL	-	-	3	2	3	3	0	6	0	6	0	0	0	0	0	0	0	0	0
								Max	8.7	8.6	0.13	0.06	0.09	4.0	0.44	1.5	34	33	38	44	30	34	40	77	73	15	25
								90th PCTL	8.2	7.7	0.11	0.03	0.03	3.5	0.32	1.1	25	24	27	34	24	24	31	31	21	14	21
								75th PCTL	7.4	7.5	0.02	0.01	0.02	0.74	0.11	0.30	8.6	6.8	11	18	8.0	11	18	11	15	13	17
								Median	7.3	7.3	0.02	0.01	0.01	0.47	0.040	<0.2	3.1	<4.5	6.0	11	2.6	5.4	11	8.1	12	9.6	16
								25th PCTL	7.2	7.1	<0.01	0.01	<0.01	<0.3	0.030	<0.2	2.3	<4.5	5.7	8.0	1.7	5.0	7.4	5.0	7.5	9.4	13
								10th PCTL	7.0	6.8	<0.01	<0.01	<0.01	<0.3	0.030	0.19	2.3	4.3	4.7	6.2	1.0	4.2	5.8	3.0	3.3	8.5	12
								Min	6.7	6.7	<0.01	<0.01	<0.01	<0.3	0.020	0.11	1.6	2.5	4.0	5.0	-1.1	3.7	4.7	0.68	1.3	7.9	11
Oxide Facies for Schist Ore																											
DD oxide	72141	Head	composite	-	-	Oxide	Gneiss/schist		7.5	7.5	0.13	-	0.09	3.9	0.96	3.5	74	78	76	77	70	72	73	19	20	19	20
ABA089	KAM133587	CFR0431	10.67	12.19	3	Oxide	Schist	BtS	7.8	7.5	0.01	<0.01	<0.01	0.30	0.090	0.30	7.0	6.8	10	13	6.7	10	13	22	22	32	42
Latte Oxide East	72136	Head	composite	-	-	Oxide	Schist		7.5	7.5	0.09	-	0.05	2.7	1.3	4.4	97	100	58	87	94	55	84	36	37	22	32
Latte Oxide West	72135	Head	composite	-	Ore	Oxide	Schist		7.4	7.5	0.20	-	0.13	6.2	1.9	6.6	144	149	100	124	137	94	118	23	24	16	20
ABA324	Q033726	CFD0411	36	37	Ore	Oxide	schist	BtS	8.1	7.8	0.42	0.05	0.25	13	0.84	2.6	65	59	-	-	52	-	-	5.0	4.5	-	-
ABA328	KAM001234	CFD0008	52	53	Ore	Oxide	schist	BtS	8.2	8.1	0.04	0.02	<0.01	1.3	1.2	3.7	90	84	-	-	89	-	-	72	67	-	-
Statistical Summary						**Oxide**	**Schist**	**n**	6	6	6	3	6	6	6	6	6	6	4	4	6	4	4	6	6	4	4
								Max	8.2	8.1	0.42	0.05	0.25	13	1.9	6.6	144	149	100	124	137	94	118	72	67	32	42
								90th PCTL	8.2	8.0	0.31	0.04	0.19	10	1.6	5.5	120	125	93	113	116	87	107	54	52	29	39
								75th PCTL	8.0	7.7	0.18	0.04	0.12	5.6	1.2	4.2	95	96	82	96	93	77	92	33	34	24	35
								Median	7.7	7.5	0.11	0.02	0.07	3.3	1.1	3.6	82	81	67	82	80	64	79	23	23	20	26
								25th PCTL	7.5	7.5	0.05	0.02	0.02	1.6	0.87	2.8	68	64	46	61	57	44	58	20	20	19	20
								10th PCTL	7.4	7.5	0.03	0.01	<0.01	0.78	0.47	1.5	36	33	24	32	29	23	31	12	12	17	20
								Min	7.4	7.5	0.01	<0.01	<0.01	0.31	0.090	0.30	7.0	6.8	10	13	7.0	9.7	13	5.0	4.5	16	20
Upper and Lower Transition Facies for Schist Ore																											
Latte 60%	72138	Head	composite	-	Ore	Transition	Schist		7.5	7.4	0.56	-	0.47	18	1.7	6.1	131	138	93	134	114	75	117	7.4	7.8	5.3	7.6
Latte 80%'	72137	Head	composite	-	Ore	Transition	Schist		7.4	7.5	0.52	-	0.41	16	2.0	6.9	153	157	107	123	137	91	107	9.4	9.7	6.6	7.6
ABA327	KAM001014	CFD0007	50.15	50.9	Ore	Lower Transition	schist	BtS	7.9	8.1	1.81	0.19	1.31	57	1.5	5.2	119	118	-	-	62	-	-	2.1	2.1	-	-
ABA314	KAM147294	CFD0346	107	107.5	Ore	Upper Transition	Schist	BtS_carb	-	7.9	0.61	0.02	0.44	19	2.7	8.4	207	191	-	-	188	-	-	11	10	-	-
ABA315	KAM147319	CFD0346	130.2	130.3	Ore	Upper Transition	Schist	BtS_carb	7.9	7.8	2.22	0.15	1.61	69	1.4	4.7	111	107	-	-	42	-	-	1.6	1.5	-	-
Statistical Summary						**Transition**	**Schist**	**n**	4	5	5	3	5	5	5	5	5	5	2	2	5	2	2	5	5	2	2
								Max	7.9	8.1	2.22	0.19	1.61	69	2.7	8.4	207	191	107	134	188	91	117	11	10	6.6	7.6
								90th PCTL	7.9	8.0	2.06	0.18	1.49	64	2.4	7.8	186	177	106	133	168	90	116	10	10	6.5	7.6
								75th PCTL	7.9	7.9	1.81	0.17	1.31	57	2.0	6.9	153	157	104	132	137	87	114	9.4	10	6.3	7.6
								Median	7.7	7.8	0.61	0.15	0.47	19	1.7	6.1	131	138	100	129	114	83	112	7.4	7.8	5.9	7.6
								25th PCTL	7.5	7.5	0.56	0.09	0.44	18	1.5	5.2	119	118	96	126	62	79	109	2.1	2.1	5.6	7.6
								10th PCTL	7.4	7.4	0.54	0.05	0.42	17	1.5	4.9	114	111	94	124	50	77	108	1.8	1.8	5.4	7.6
								Min	7.4	7.4	0.52	0.02	0.41	16	1.4	4.7	111	107	93	123	42	75	107	1.6	1.5	5.3	7.6
Statistical Summary for Schist Ore								**n**	10	11	11	6	11	11	11	11	11	11	6	6	11	6	6	11	11	6	6
								n < DL	-	-	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								Max	8.2	8.1	2.22	0.19	1.61	69	2.7	8.4	207	191	107	134	188	94	118	72	67	32	42
								90th PCTL	8.1	8.1	1.81	0.17	1.31	57	2.0	6.9	153	157	104	129	137	92	117	36	37	27	37
								75th PCTL	7.9	7.9	0.59	0.13	0.46	18	1.8	6.3	137	144	98	124	125	87	114	23	23	21	29
								Median	7.7	7.5	0.42	0.04	0.25	13	1.4	4.7	111	107	84	105	89	74	95	11	10	18	20
								25th PCTL	7.5	7.5	0.11	0.02	0.07	3.3	1.1	3.6	82	81	63	79	57	60	76	6.2	6.2	9.0	11
								10th PCTL	7.4	7.5	0.04	0.02	<0.01	1.3	0.84	2.6	65	59	34	45	42	33	43	2.1	2.1	5.9	7.6
								Min	7.4	7.4	0.01	<0.01	<0.01	0.31	0.090	0.30	7.0	6.8	10	13	6.7	9.7	13	1.6	1.5	5.3	7.6

Appendix C.2-1: Acid-Base Accounting Results for Ore

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Rinse pH (1:1)	Paste pH	Total-S	Sulphate-S	Sulphide- S	T-AP	Total-C	TIC (as CO_2)	T-C NP*	CaNP	Sobek-NP	Siderite-NP	T-C NNP*	Sobek NNP	Siderite NNP	NPR	NPR	NPR	NPR
									s.u.	s.u.	%	%	%	$kgCaCO_3/t$	%	%	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	T-CNP*/T-AP	CaNP/T-AP	SobekNP/T-AP	SideriteNP/T-AP
Oxide Facies for Granite Ore																											
ABA156	R305806	CFD0382	59	60	Ore	Oxide	Granite	GG	6.2	5.7	0.01	0.02	*<0.01*	0.30	*<0.01*	*<0.2*	*<0.8*	*<4.5*	1.0	3.0	0.46	1.0	2.7	2.5	14	3.2	9.6
ABA171	R305823	CFD0396	13	14	Ore	Oxide	Granite	GG	6.7	6.5	0.01	*<0.01*	0.01	0.30	0.030	*<0.2*	2.3	*<4.5*	2.0	4.0	2.0	2.0	3.7	7.5	14	6.4	13
Kona Oxide	72139	Head	composite	-	Ore	Oxide	Granite		5.7	5.9	0.03	-	0.01	0.80	0.020	0.070	1.9	1.7	0.70	7.1	1.0	0.00	6.3	2.2	2.0	0.86	8.5
ABA419	I308596	CFD0053	7	8	Ore	Oxide	Granite	GG	5.8	6.1	0.01	0.01	*<0.01*	0.30	0.030	*<0.2*	2.3	*<4.5*	1.0	-	2.0	1.0	-	7.5	14	3.2	-
ABA420	I354541	CFD0053	47	47.24	Ore	Oxide	Granite	GG	5.8	6.2	*<0.01*	0.01	*<0.01*	*<0.3*	0.080	*<0.2*	6.2	*<4.5*	5.0	-	5.9	5.0	-	21	15	17	-
ABA422	I354552	CFD0053	57.8	58	Ore	Oxide	Granite	GG	6.2	6.5	*<0.01*	0.01	*<0.01*	*<0.3*	0.040	*<0.2*	3.1	*<4.5*	4.0	-	2.8	4.0	-	10	15	13	-
Statistical Summary						**Oxide**	**Granite**	**n**	6	6	6	5	6	6	6	6	6	6	6	3	6	6	3	6	6	6	3
								Max	6.7	6.5	0.03	0.02	0.01	0.84	0.080	*<0.2*	6.2	*<4.5*	5.0	7.1	5.9	4.7	6.3	21	15	17	13
								90th PCTL	6.5	6.5	0.02	0.02	0.01	0.58	0.060	*<0.2*	4.7	*<4.5*	4.5	6.5	4.4	4.2	5.8	16	15	15	12
								75th PCTL	6.2	6.4	0.01	0.01	*<0.01*	0.31	0.040	*<0.2*	2.9	*<4.5*	3.5	5.6	2.6	3.2	5.0	9.6	15	12	11
								Median	6.0	6.2	0.01	0.01	*<0.01*	0.31	0.030	*<0.2*	2.3	*<4.5*	1.5	4.0	2.0	1.2	3.7	7.4	14	4.8	9.6
								25th PCTL	5.8	5.9	*<0.01*	0.01	*<0.01*	*<0.3*	0.030	*<0.2*	2.0	*<4.5*	1.0	3.5	1.3	0.70	3.2	3.7	14	3.2	9.0
								10th PCTL	5.7	5.8	*<0.01*	0.01	*<0.01*	*<0.3*	0.020	0.14	1.3	3.1	0.90	3.2	0.70	0.30	2.9	2.3	8.2	2.0	8.7
								Min	5.7	5.7	*<0.01*	*<0.01*	*<0.01*	*<0.3*	*<0.01*	0.070	*<0.8*	1.7	0.70	3.0	0.50	-0.10	2.7	2.2	2.0	0.90	8.5
Upper and Lower Transition Facies for Granite Ore																											
Kona 80% CN	72140	Head	composite	-	Ore	Transition	Granite		4.4	4.9	0.15	-	0.11	4.7	0.040	0.070	3.0	1.7	0.50	7.0	-1.7	-4.0	2.3	0.64	0.35	0.10	1.5
ABA161	R305812	CFD0383	84	85	Ore	Upper transition	Granite	GG	5.4	5.2	0.01	0.01	0.01	0.30	0.030	*<0.2*	2.3	*<4.5*	1.0	3.0	2.0	1.0	2.7	7.5	14	3.2	9.6
ABA428	Q041388	CFD0382	97	98	Ore	Lower Transition	Granite	GG	6.8	6.6	*<0.01*	0.02	*<0.01*	*<0.3*	0.020	*<0.2*	1.6	*<4.5*	3.0	-	1.3	3.0	-	5.2	15	10	-
ABA444	Q032413	CFD0385	83	83.75	Ore	Lower Transition	Granite	GG	5.4	5.1	0.02	0.01	*<0.01*	0.60	0.010	*<0.2*	0.80	*<4.5*	1.0	-	0.15	0.00	-	1.2	7.2	1.6	-
ABA445	Q032988	CFD0399	8.85	9	Ore	Lower Transition	Granite	GG	6.8	6.5	0.01	0.01	*<0.01*	0.30	0.040	*<0.2*	3.1	*<4.5*	2.0	-	2.8	2.0	-	9.9	14	6.4	-
ABA446	Q033347	CFD0403	32	33	Ore	Lower Transition	Granite	GG	5.7	5.0	*<0.01*	0.01	*<0.01*	*<0.3*	0.040	*<0.2*	3.1	*<4.5*	-	-	2.8	0.00	-	10	15	-	-
ABA432	Q041581	CFD0383	83.47	84	Ore	Upper Transition	Granite	GG	5.3	5.5	*<0.01*	0.01	*<0.01*	*<0.3*	0.050	*<0.2*	3.9	*<4.5*	2.0	-	3.6	2.0	-	13	15	6.7	-
ABA433	Q041589	CFD0383	91.9	92	Ore	Upper Transition	Granite	GG	6.8	6.6	*<0.01*	0.01	*<0.01*	*<0.3*	0.020	*<0.2*	1.6	*<4.5*	2.0	-	1.3	2.0	-	5.2	15	6.7	-
Statistical Summary						**Transition**	**Granite**	**n**	8	8	8	7	8	8	8	8	8	8	7	2	8	8	2	8	8	7	2
								Max	6.8	6.6	0.15	0.02	0.11	4.7	0.050	*<0.2*	3.9	*<4.5*	3.0	7.0	3.6	2.7	2.7	13	15	10	9.6
								90th PCTL	6.8	6.6	0.06	0.01	0.04	1.9	0.043	*<0.2*	3.3	*<4.5*	2.4	6.6	3.0	2.0	2.6	11	15	8.0	8.8
								75th PCTL	6.8	6.5	0.01	0.01	*<0.01*	0.40	0.040	*<0.2*	3.1	*<4.5*	2.0	6.0	2.8	1.7	2.6	10	15	6.7	7.6
								Median	5.6	5.4	*<0.01*	0.01	*<0.01*	*<0.3*	0.035	*<0.2*	2.7	*<4.5*	2.0	5.0	1.6	1.2	2.5	6.3	15	6.4	5.5
								25th PCTL	5.4	5.1	*<0.01*	0.01	*<0.01*	*<0.3*	0.020	*<0.2*	1.6	*<4.5*	1.0	4.0	1.0	0.20	2.4	4.2	13	2.4	3.5
								10th PCTL	5.0	5.0	*<0.01*	0.01	*<0.01*	*<0.3*	0.017	0.16	1.3	3.7	0.79	3.4	-0.40	-1.5	2.3	1.1	5.1	1.0	2.3
								Min	4.4	4.9	*<0.01*	0.01	*<0.01*	*<0.3*	0.010	0.070	0.80	1.7	0.48	3.0	-1.7	-4.2	2.3	0.60	0.40	0.10	1.5
Statistical Summary for Granite Ore								**n**	14	14	14	12	14	14	14	14	14	14	13	5	14	14	5	14	14	13	5
								n < DL	-	-	6	1	10	6	1	12	1	12	0	0	0	0	0	0	0	0	0
								Max	6.8	6.6	0.15	0.02	0.11	4.7	0.080	0.20	6.2	4.5	5.0	7.1	5.9	4.7	6.3	21	15	17	13
								90th PCTL	6.8	6.6	0.02	0.02	0.01	0.80	0.047	0.20	3.6	4.5	3.8	7.1	3.3	3.4	5.3	12	15	13	12
								75th PCTL	6.6	6.5	0.01	0.01	0.01	0.30	0.040	*<0.2*	3.1	*<4.5*	2.0	7.0	2.8	1.7	3.7	10	15	6.7	9.6
								Median	5.8	6.0	0.01	0.01	*<0.01*	0.30	0.030	*<0.2*	2.3	*<4.5*	2.0	4.0	2.0	1.2	2.7	7.4	14	6.4	9.6
								25th PCTL	5.5	5.3	*<0.01*	0.01	*<0.01*	*<0.3*	0.021	*<0.2*	1.6	*<4.5*	1.0	3.0	1.1	0.50	2.7	3.2	14	3.2	8.5
								10th PCTL	5.3	5.0	*<0.01*	0.01	*<0.01*	*<0.3*	0.013	0.10	1.0	2.5	0.80	3.0	0.20	-0.20	2.5	1.5	3.5	1.0	4.3
								Min	4.4	4.9	*<0.01*	*<0.01*	*<0.01*	*<0.3*	*<0.01*	0.10	*<0.8*	1.7	0.50	3.0	-1.7	-4.2	2.3	0.60	0.40	0.10	1.5
Oxide and Transition Facies for Other Lithologies Ore																											
ABA126	KAM149885	CFR0566	67.06	68.58	Ore	Oxide	Dykes	IV	7.1	7.7	*<0.01*	*<0.01*	*<0.01*	*<0.3*	0.090	0.20	7.0	4.5	21	24	6.7	21	24	23	15	70	80
ABA334	R550421	CFD0518	10	11	Ore	Upper Transition	HU	HU	-	7.4	*<0.01*	*<0.01*	*<0.01*	*<0.3*	0.050	*<0.2*	3.9	*<4.5*	-	-	3.6	-	-	13	15	-	-
ABA175	R305827	CFD0403	70	71	Ore	Lower transition	Dykes	DIOR	4.5	4.4	0.52	0.02	0.34	16	0.030	*<0.2*	2.3	*<4.5*	0.00	2.0	-14	-16	-14	0.14	0.28	0.00	-

Notes: all values in grey italics are below the analytical detection limit
n = number of samples included in the statistical summary
n < DL = number of samples with values below the analytical detection limit
Sulphate Sulphur determined by 25% HCL with Gravimetric Finish.
Sulphide Sulphur determined by Sobek 1:7 Nitric Acid with S by ICP-MS Finish.
T-AP = Acid potential in tonnes $CaCO_3$ equivalent per 1000 tonnes of material, derived from Total S * 31.25.
NP = Neutralization potential in tonnes $CaCO_3$ equivalent per 1000 tonnes of material.
Carbonate NP (CaNP) is calculated from total inorganic carbon (TIC); T-C NP* calculated from Total-C * 77.6.
Net NP (NNP) = NP - AP; Neutralization potential ratio (NPR).

Appendix C.2-2: Shake Flask Extraction Results for Ore

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	pH	T-Alkalnity	Br	Cl	F	NO_3-N	NO_2-N	SO_4	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	U	V	Zn
										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	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	mg/L	mg/L	mg/L	mg/L
Oxide Facies for Gneiss Ore																																																	
Supremo Oxide T1	72144	Head	composite		Ore	Oxide	Gneiss		7.9	-	-	-	-	-	-	2.0	0.049	0.0069	0.096	0.034	<0.000007	<0.000007	0.0077	0.0000030	4.9	0.000070	0.00022	0.0015	0.014	0.000040	0.0016	1.3	0.0047	0.00012	0.0083	0.00020	0.033	2.1	0.00011	2.1	0.0000030	3.9	0.026	0.000081	0.000070	0.00027	0.0022	0.00020	<0.001
Supremo Oxide T4	72145	Head	composite		Ore	Oxide	Gneiss		7.8	-	-	-	-	-	-	2.0	0.034	0.0052	0.13	0.058	<0.000007	<0.000007	0.0096	<0.000003	9.5	<0.00003	0.00022	0.0011	<0.007	<0.00001	0.0035	2.5	0.0090	0.00044	0.0051	0.00040	0.022	2.8	0.000040	2.1	0.0000030	3.1	0.042	0.00022	0.000040	0.00010	0.0072	0.00015	<0.001
Transition Facies for Gneiss Ore																																																	
Supremo 80%	72146	Head	composite		Ore	Transition	Gneiss		7.8	-	-	-	-	-	-	45	0.027	0.0083	0.18	0.011	<0.000007	<0.000007	0.0076	<0.000003	20	<0.00003	0.00035	0.00040	<0.007	<0.00001	0.0016	5.5	0.016	0.000040	0.0066	0.00070	0.010	3.4	0.00037	1.6	<0.000002	2.8	0.076	0.00022	0.000020	0.000080	0.0089	0.00012	<0.001
ABA359	R623803	CFD0548	174	174.935	Ore	Upper Transition	Gneiss	MxF	8.1	5.9	<0.050	<0.50	0.13	0.0062	0.021	7.9	0.086	0.049	0.54	0.075	<0.00050	<0.00050	0.016	<0.000050	2.2	<0.00050	<0.00010	<0.0010	<0.030	<0.00010	<0.0050	0.57	<0.00050	0.00046	0.0014	<0.00050	<0.30	3.8	<0.00050	4.2	<0.000050	0.67	0.012	0.00028	<0.00050	<0.010	0.000060	<0.0010	<0.010
ABA403	R544048	CFD0553	120	121	Ore	Upper Transition	Gneiss	MxF	7.5	4.8	<0.050	<0.50	0.13	0.0073	0.0035	0.80	0.37	0.042	0.14	0.0082	<0.00050	<0.00050	0.014	<0.000050	0.44	<0.00050	<0.00010	<0.0010	0.16	0.00064	<0.0050	0.26	0.025	0.00051	0.020	<0.00050	<0.30	2.6	<0.00050	2.8	<0.000050	0.38	0.0025	<0.00010	<0.00050	<0.010	0.00096	<0.0010	<0.010
Oxide Facies for Schist Ore																																																	
DD oxide	72141	Head	composite		Ore	Oxide	Gneiss/schist		7.8	-	-	-	-	-	-	10	0.026	0.0046	0.13	0.016	<0.000007	<0.000007	0.0081	0.0000050	10	<0.00003	0.00014	0.00041	<0.007	<0.00001	0.0011	4.2	0.0025	<0.00001	0.0045	0.00050	0.0030	2.7	0.00030	1.9	0.0000020	3.3	0.045	0.000046	0.000050	<0.00005	0.0011	0.00019	<0.001
Latte Oxide East	72136	Head	composite		Ore	Oxide	Schist		8.0	-	-	-	-	-	-	43	0.023	0.0048	0.12	0.044	<0.000007	<0.000007	0.0087	0.0000030	16	<0.00003	0.00016	0.0010	<0.007	<0.00001	0.0015	5.8	0.0042	<0.00001	0.0027	0.0018	0.010	2.9	0.00043	2.0	<0.000002	6.3	0.11	0.00011	0.000070	0.000060	0.00094	0.00013	<0.001
Latte Oxide West	72135	Head	composite		Ore	Oxide	Schist		7.8	-	-	-	-	-	-	225	0.0093	0.0037	0.086	0.017	<0.000007	<0.000007	0.0082	<0.000003	66	<0.00003	0.00035	0.0014	<0.007	<0.00001	0.0021	18	0.025	0.000020	0.0014	0.0055	<0.003	4.0	0.00094	1.6	0.0000020	7.6	0.33	0.00023	0.00011	<0.00005	0.0015	0.000050	<0.001
Transition Facies for Schist Ore																																																	
Latte 60%	72138	Head	composite		Ore	Transition	Schist		7.8	-	-	-	-	-	-	328	0.012	0.014	0.074	0.015	<0.000007	<0.000007	0.0074	<0.000003	106	<0.00003	0.00059	0.0015	<0.007	<0.00001	0.0022	21	0.057	<0.00001	0.0017	0.0033	<0.003	4.6	0.0010	1.5	0.0000060	5.2	0.46	0.00024	0.000070	<0.00005	0.0027	0.00015	<0.001
Latte 80%'	72137	Head	composite		Ore	Transition	Schist		7.7	-	-	-	-	-	-	208	0.022	0.011	0.15	0.018	<0.000007	<0.000007	0.0075	<0.000003	68	<0.00003	0.00046	0.0013	<0.007	<0.00001	0.0015	14	0.047	<0.00001	0.0011	0.0047	<0.003	3.6	0.0011	1.3	0.0000040	2.5	0.28	0.00033	0.000090	<0.00005	0.0020	0.00016	<0.001
Oxide Facies for Granite Ore																																																	
ABA156	R305806	CFD0382	59	60	Ore	Oxide	Granite	GG	6.2	-	-	-	-	-	-	9.6	3.2	0.045	1.00	0.0079	<0.0005	<0.0005	0.18	<0.00005	0.42	<0.0005	0.00024	<0.001	0.92	0.00052	0.0058	0.16	0.0031	0.00010	0.00058	<0.0005	<0.3	7	<0.0005	29	<0.00005	1.0	0.0038	0.00065	<0.0005	<0.01	0.0011	<0.001	<0.01
ABA171	R305823	CFD0396	13	14	Ore	Oxide	Granite	GG	7.4	-	-	-	-	-	-	1.7	18	0.17	1.8	0.077	0.00088	<0.0005	0.12	0.000085	0.75	0.00069	0.0017	0.0058	25	0.029	<0.005	0.37	0.48	0.0063	0.0084	0.0020	<0.3	7	<0.0005	34	0.00012	4.6	0.012	0.0023	0.00057	0.055	0.033	0.0041	0.042
Kona Oxide	72139	Head	composite		Ore	Oxide	Granite	-	6.1	-	-	-	-	-	-	3.0	0.092	0.020	0.51	0.00042	0.0000090	<0.000007	0.0099	0.0000060	0.060	<0.00003	0.000096	0.0042	0.019	0.00013	0.00056	0.026	0.0028	0.000030	0.00049	0.00030	0.022	0.6	0.000080	1.7	0.0000030	3.3	0.00071	0.000051	0.00010	0.00024	0.00025	0.00023	0.0040
Transition Facies for Granite Ore																																																	
Kona 80% CN	72140	Head	composite			Transition	Granite		5.7	-	-	-	-	-	-	40	0.074	0.0062	1.5	0.00037	0.00027	<0.000007	0.014	0.000053	6.8	<0.00003	0.034	0.017	0.94	0.00014	0.0029	1.9	0.87	<0.00001	0.000080	0.0089	<0.003	3.2	0.00043	1.1	<0.000002	2.9	0.025	0.00086	0.000030	<0.00005	0.0026	0.000040	0.033
ABA161	R305812	CFD0383	84	85	40	Upper transition	Granite	GG	5.6	-	-	-	-	-	-	14	0.0051	0.0040	0.13	<0.001	<0.0005	<0.0005	0.13	<0.00005	0.31	<0.0005	0.00083	<0.001	<0.03	<0.0001	<0.005	0.078	0.0037	<0.00005	<0.0001	<0.0005	<0.3	10	<0.0005	16	<0.00005	2.6	0.0016	0.00095	<0.0005	<0.01	0.00047	<0.001	<0.01
ABA444	Q032413	CFD0385	83	83.75	80	Lower Transition	Granite	GG	5.6	<2	<0.050	<0.50	0.031	0.018	<0.0010	2.8	1.4	0.023	0.22	0.0030	<0.0005	<0.0005	0.028	<0.000050	<0.10	<0.00050	0.00016	<0.0010	0.12	0.00058	<0.0050	<0.050	0.0072	0.000073	0.00053	<0.00050	<0.30	2.1	<0.00050	5.0	<0.000050	0.68	0.00081	0.00038	<0.00050	<0.010	0.00025	<0.0010	<0.010
Oxide and Transition Facies for Other Lithologies Ore																																																		
ABA126	KAM149885	CFR0566	67.06	68.58	Ore	Oxide	Dykes	IV	8.2	-	-	-	-	-	-	12	<0.005	0.088	0.073	0.12	<0.0005	<0.0005	<0.01	<0.00005	23	0.038	<0.0001	<0.001	<0.03	<0.0001	0.0067	9.9	0.0017	0.010	0.0067	0.0073	<0.3	5	<0.0005	11	<0.00005	0.68	0.17	0.00056	<0.0005	<0.01	0.00094	<0.001	<0.01
ABA175	R305827	CFD0403	70	71	Ore	Lower transition	Dykes	DIOR	4.2	-	-	-	-	-	-	138	2.3	0.054	25	0.072	<0.0025	<0.0025	0.18	<0.00025	5.7	<0.0025	0.52	<0.005	15	<0.0005	<0.025	2.1	0.11	<0.00005	<0.0005	0.083	<0.3	55	<0.0025	22	<0.00025	2.0	0.071	0.019	<0.0025	<0.01	0.0035	<0.005	<0.05

Notes: all values in grey italics are below the analytical detection limit
n = number of samples included in the statistical summary
n < DL = number of samples with values below the analytical detection limit

Appendix C.2-3: Solid Phase Element Results by Aqua Regia Digestion for Ore

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La
									ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm
Oxide Facies for Gneiss Ore																															
ABA100	KAM137583	CFR0470	39.62	41.15	Ore	Oxide	Gneiss	MxM	0.24	1.1	940	0.40	<10	590	1.2	0.91	0.17	0.040	134	6.2	12	1.7	21	2.3	4.5	0.12	0.28	0.48	0.031	0.46	77
Supremo Oxide T1	72144	Head	composite		Ore	Oxide	Gneiss		0.12	0.39	789	-	<10	223	1.0	0.28	0.21	0.070	53	6.5	79	1.8	5.6	1.6	1.2	<0.1	0.17	0.55	<0.02	0.19	32
Supremo Oxide T4	72145	Head	composite		Ore	Oxide	Gneiss		0.10	0.47	1090	-	<10	173	0.90	0.14	0.43	0.050	54	4.7	88	2.1	2.5	1.5	1.4	<0.1	0.16	1.4	<0.02	0.20	33
ABA394	KAM030261	CFR0110	81.08	82.6	Ore	Oxide	Gneiss	MxF	0.22	0.49	1095	4.9	10	240	0.74	0.23	0.090	0.10	69	3.1	6.0	1.5	58	1.9	1.7	0.10	0.11	1.8	0.011	0.29	39
ABA397	L861523	CFR0134	105.16	105.187	Ore	Oxide	Gneiss	FG	0.14	0.29	238	0.90	10	480	0.53	0.17	0.030	0.060	38	1.1	7.0	0.83	2.7	0.90	0.87	0.070	0.10	0.35	<0.005	0.18	21
Statistical Summary						**Oxide**	**Gneiss**	**n**	5	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
								Max	0.20	1.1	1095	4.9	10	590	1.2	0.90	0.40	0.10	134	6.5	88	2.1	58	2.3	4.5	0.10	0.30	1.8	0.00	0.50	77
								90th PCTL	0.20	0.90	1093	4.1	10	546	1.1	0.70	0.30	0.10	108	6.4	84	2.0	43	2.1	3.4	0.10	0.20	1.6	0.00	0.40	62
								75th PCTL	0.20	0.50	1090	2.9	10	480	1.0	0.30	0.20	0.10	69	6.2	79	1.8	21	1.9	1.7	0.10	0.20	1.4	0.00	0.30	39
								Median	0.10	0.50	940	0.90	<10	240	0.90	0.20	0.20	0.10	54	4.7	12	1.7	5.6	1.6	1.4	0.10	0.20	0.60	<0.02	0.20	33
								25th PCTL	0.10	0.40	789	0.70	<10	223	0.70	0.20	0.10	0.10	53	3.1	7.0	1.5	2.7	1.5	1.2	<0.1	0.10	0.50	<0.02	0.20	32
								10th PCTL	0.10	0.30	458	0.50	<10	193	0.60	0.20	0.10	0.00	44	1.9	6.4	1.1	2.6	1.1	1.0	<0.1	0.10	0.40	<0.02	0.20	25
								Min	0.10	0.30	238	0.40	<10	173	0.50	0.10	0.00	0.00	38	1.1	6.0	0.80	2.5	0.90	0.90	<0.1	0.10	0.40	<0.02	0.20	21
Transition Facies for Gneiss Ore																															
Supremo 80%	72146	Head	composite		Ore	Transition	Gneiss		0.16	0.56	1700	-	<10	191	0.90	0.30	1.1	0.040	57	6.6	107	2.4	3.5	1.8	1.9	<0.1	0.17	1.2	<0.02	0.26	34
ABA002	KAM004886	CFD0034	73	74	Ore	Upper transition	Gneiss	FG	0.050	1.1	882	0.50	10	290	0.81	0.16	0.080	0.030	55	1.1	6.0	0.54	1.8	1.1	2.8	0.060	0.16	1.4	0.014	0.18	33
ABA375	R271389	CFD0417	109.3	109.775	Ore	Lower Transition	Gneiss	MxF	0.070	0.50	1185	0.90	10	80	0.97	0.060	0.87	0.030	78	2.2	5.0	1.6	2.5	1.6	1.9	0.10	0.25	0.61	0.011	0.24	47
ABA359	R623803	CFD0548	174	174.935	Ore	Upper Transition	Gneiss	MxF	0.10	0.37	1570	1.6	10	320	1.3	0.29	0.13	0.020	42	2.1	6.0	2.8	15	1.9	1.0	<0.05	0.18	0.73	<0.005	0.17	23
ABA403	R544048	CFD0553	120	121	Ore	Upper Transition	Gneiss	MxF	0.30	0.36	333	8.9	10	430	0.56	0.29	0.040	0.050	47	2.7	6.0	1.4	7.2	0.88	1.1	0.070	0.11	0.27	<0.005	0.21	28
Statistical Summary						**Transition**	**Gneiss**	**n**	5	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
								Max	0.30	1.1	1700	8.9	10	430	1.3	0.30	1.1	0.10	78	6.6	107	2.8	15	1.9	2.8	0.10	0.30	1.4	<0.02	0.30	47
								90th PCTL	0.20	0.90	1648	6.7	10	386	1.2	0.30	1.0	0.00	70	5.0	67	2.6	12	1.9	2.4	<0.1	0.20	1.3	<0.02	0.30	42
								75th PCTL	0.20	0.60	1570	3.4	10	320	1.0	0.30	0.90	0.00	57	2.7	6.0	2.4	7.2	1.8	1.9	<0.1	0.20	1.2	0.010	0.20	34
								Median	0.10	0.50	1185	1.3	10	290	0.90	0.30	0.10	0.00	55	2.2	6.0	1.6	3.5	1.6	1.9	0.070	0.20	0.70	0.011	0.20	33
								25th PCTL	0.10	0.40	882	0.80	10	191	0.80	0.20	0.10	0.00	47	2.1	6.0	1.4	2.5	1.1	1.1	0.060	0.20	0.60	<0.005	0.20	28
								10th PCTL	0.10	0.40	553	0.60	<10	124	0.70	0.10	0.10	0.00	44	1.5	5.4	0.90	2.1	1.0	1.0	<0.05	0.10	0.40	<0.005	0.20	25
								Min	0.10	0.40	333	0.50	<10	80	0.60	0.10	0.00	0.00	42	1.1	5.0	0.50	1.8	0.90	1.0	<0.05	0.10	0.30	<0.005	0.20	23
Statistical Summary for Gneiss Ore								**n**	10	10	10	7	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10
								n < DL	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	6	0	0
								Max	0.30	1.1	1700	8.9	10	590	1.3	0.91	1.1	0.10	134	6.6	107	2.8	58	2.3	4.5	0.12	0.28	1.8	0.031	0.46	77
								90th PCTL	0.25	1.1	1583	6.5	10	491	1.2	0.36	0.90	0.073	84	6.5	90	2.4	24	1.9	2.9	0.10	0.25	1.4	0.022	0.31	50
								75th PCTL	0.21	0.55	1163	3.3	10	403	0.99	0.29	0.38	0.058	66	5.8	62	2.0	13	1.8	1.9	0.10	0.18	1.3	<0.02	0.26	38
								Median	0.13	0.48	1015	0.90	10	265	0.90	0.26	0.15	0.045	55	2.9	6.5	1.7	4.6	1.6	1.6	<0.1	0.17	0.67	0.014	0.21	33
								25th PCTL	0.10	0.38	812	0.70	<10	199	0.76	0.16	0.083	0.033	49	2.1	6.0	1.4	2.6	1.2	1.1	0.070	0.12	0.50	0.011	0.18	29
								10th PCTL	0.068	0.35	324	0.46	<10	164	0.56	0.13	0.039	0.029	41	1.1	5.9	0.80	2.4	0.90	1.00	0.059	0.11	0.34	<0.005	0.18	23
								Min	0.050	0.29	238	0.40	<10	80	0.53	0.060	0.030	0.020	38	1.1	5.0	0.54	1.8	0.88	0.87	0.050	0.10	0.27	<0.005	0.17	21
Oxide Facies for Schist Ore																															
ABA089	KAM133587	CFR0431	10.67	12.19	Ore	Oxide	Schist	BtS	0.080	0.83	1470	0.30	<10	450	0.93	1.3	0.42	0.060	66	16	25	1.6	14	3.4	2.6	0.080	0.060	0.41	0.018	0.25	32
DD oxide	72141	Head	composite		Ore	Oxide	Gneiss/schist		0.18	0.60	1430	-	<10	322	1.1	0.77	2.4	0.10	47	12	85	2.8	12	2.7	1.8	<0.1	0.11	0.45	0.030	0.24	26
Latte Oxide East	72136	Head	composite		Ore	Oxide	Schist		0.22	0.47	1100	-	<10	438	1.0	0.44	3.2	0.11	54	9.4	79	2.4	19	2.6	1.7	<0.1	0.13	0.49	0.020	0.23	30
Latte Oxide West	72135	Head	composite		Ore	Oxide	Schist		0.28	0.40	1430	-	<10	658	1.1	0.59	4.6	0.090	49	12	93	1.8	20	2.8	1.3	<0.1	0.12	0.46	0.020	0.19	27
ABA324	Q033726	CFD0411	36	37	Ore	Oxide	schist	BtS	0.27	0.90	5910	2.1	10	440	1.2	0.26	2.2	0.040	89	16	19	5.1	15	4.1	3.5	0.11	0.030	1.6	0.035	0.52	47
ABA328	KAM001234	CFD0008	52	53	Ore	Oxide	schist	BtS	0.59	0.38	2920	2.6	10	1270	0.67	0.23	3.2	0.080	67	15	14	1.9	14	3.3	1.2	0.080	0.080	0.45	0.021	0.24	34
Statistical Summary						**Oxide**	**Schist**	**n**	6	6	6	3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
								Max	0.60	0.90	5910	2.6	10	1270	1.2	1.3	4.6	0.11	89	16	93	5.1	20	4.1	3.5	0.11	0.13	1.6	0.035	0.52	47
								90th PCTL	0.40	0.87	4415	2.5	10	964	1.2	1.1	3.9	0.11	78	16	89	3.9	20	3.7	3.1	0.11	0.13	1.1	0.033	0.39	41
								75th PCTL	0.30	0.77	2558	2.4	10	606	1.1	0.73	3.2	0.098	66	15	84	2.7	18	3.4	2.4	<0.1	0.12	0.48	0.028	0.25	34
								Median	0.20	0.54	1450	2.1	<10	445	1.1	0.52	2.8	0.085	60	14	52	2.1	14	3.0	1.8	<0.1	0.095	0.46	0.021	0.24	31
								25th PCTL	0.20	0.42	1430	1.2	<10	439	0.95	0.31	2.2	0.065	51	12	21	1.8	14	2.7	1.4	<0.1	0.065	0.45	0.020	0.23	28
								10th PCTL	0.10	0.39	1265	0.66	<10	380	0.80	0.25	1.3	0.050	48	11	17	1.7	13	2.7	1.2	0.080	0.045	0.43	0.019	0.21	27
								Min	0.10	0.38	1100	0.30	<10	322	0.67	0.23	0.42	0.040	47	9.4	14	1.6	12	2.6	1.2	0.080	0.030	0.41	0.018	0.19	26
Transition Facies for Schist Ore																															
Latte 60%	72138	Head	composite		Ore	Transition	Schist		0.19	0.75	1090	-	<10	272	0.90	0.37	3.8	0.090	54	11	75	3.0	16	2.7	2.7	<0.1	0.12	0.33	0.020	0.30	30
Latte 80%'	72137	Head	composite		Ore	Transition	Schist		0.39	0.55	1340	-	<10	353	0.80	0.58	4.3	0.090	49	12	90	2.1	26	2.6	1.7	<0.1	0.090	0.60	0.020	0.24	27
ABA327	KAM001014	CFD0007	50.15	50.9	Ore	Lower Transition	schist	BtS	0.25	0.60	3150	1.0	10	140	0.46	0.16	3.0	0.070	42	12	12	0.77	13	2.9	1.7	0.060	0.030	0.20	0.017	0.41	21
ABA314	KAM147294	CFD0346	107	107.5	Ore	Upper Transition	Schist	BtS_carb	0.13	0.67	712	0.30	<10	30	1.2	0.74	4.9	0.080	30	14	30	1.0	21	2.7	2.5	0.050	0.11	0.17	0.032	0.16	15
ABA315	KAM147319	CFD0346	130.2	130.3	Ore	Upper Transition	Schist	BtS_carb	0.64	0.43	5130	4.0	10	50	0.84	0.24	2.8	0.070	54	8.8	7.0	3.9	10	2.6	1.4	0.070	0.26	0.50	0.027	0.23	27
Statistical Summary						**Transition**	**Schist**	**n**	5	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
								Max	0.60	0.75	5130	4.0	10	353	1.2	0.74	4.9	0.090	54	14	90	3.9	26	2.9	2.7	<0.1	0.26	0.60	0.032	0.41	30
								90th PCTL	0.50	0.72	4338	3.4	10	321	1.1	0.68	4.7	0.090	54	13	84	3.5	24	2.8	2.6	<0.1	0.20	0.56	0.030	0.37	29
								75th PCTL	0.40	0.67	3150	2.5	<10	272	0.90	0.58	4.3	0.090	54	12	75	3.0	21	2.7	2.5	<0.1	0.12	0.50	0.027	0.30	27
								Median	0.30	0.60	1340	1.0	<10	140	0.84	0.37	3.8	0.080	49	12	30	2.1	16	2.7	1.7	0.070	0.11	0.33	0.020	0.24	27
								25th PCTL	0.20	0.55	1090	0.65	<10	50	0.80	0.24	3.0	0.070	42	11	12	1.0	13	2.6	1.7	0.060	0.090	0.20	0.020	0.23	21
								10th PCTL	0.20	0.48	863	0.44	<10	38	0.60	0.19	2.9	0.070	35	9.5	9.0	0.88	11	2.6	1.5	0.054	0.054	0.18	0.018	0.19	17
								Min	0.10	0.43	712	0.30	<10	30	0.46	0.16	2.8	0.070	30	8.8	7.0	0.77	10	2.6	1.4	0.050	0.030	0.17	0.017	0.16	15
Statistical Summary for Schist Ore								**n**	11	11	11	6	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
								n < DL	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0
								Max	0.64	0.90	5910	4.0	10	1270	1.2	1.3	4.9	0.11	89	16	93	5.1	26	4.1	3.5	0.11	0.26	1.6	0.035	0.52	47
								90th PCTL	0.59	0.83	5130	3.3	10	658	1.2	0.77	4.6	0.10	67	16	90	3.9	21	3.4	2.7	<0.1	0.13	0.60	0.032	0.41	34
								75th PCTL	0.34	0.71	3035	2.5	10	445	1.1	0.67	4.0	0.090	60	14	82	2.9	20	3.1	2.6	<0.1	0.12	0.50	0.029	0.28	31
								Median	0.25	0.60	1430	1.6	<10	353	0.93	0.44	3.2	0.080	54	12	30	2.1	15	2.7	1.7	<0.1	0.11	0.45	0.020	0.24	27
								25th PCTL	0.19	0.45	1220	0.48	<10	206	0.82	0.25	2.6	0.070	48	11	17	1.7	14	2.6	1.5	0.075	0.070	0.37	0.020	0.23	27
								10th PCTL	0.13	0.40	1090	0.30	<10	50	0.67	0.23	2.2	0.060	42	9.4	12	1.0	12	2.6	1.3	0.060	0.030	0.20	0.018	0.19	21
								Min	0.080	0.38	712	0.30	<10	30	0.46	0.16	0.42	0.040	30	8.8	7.0	0.77	10	2.6	1.2	0.050	0.030	0.17	0.017	0.16	15

Appendix C.2-3: Solid Phase Element Results by Aqua Regia Digestion for Ore

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La
									ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm
Oxide Facies for Granite Ore																															
ABA156	R305806	CFD0382	59	60	Ore	Oxide	Granite	GG	0.12	0.46	3330	1.3	*<10*	40	0.24	0.16	0.050	0.020	31	0.50	5.0	1.2	1.8	0.82	1.3	0.10	0.22	0.34	0.010	0.19	18
ABA171	R305823	CFD0396	13	14	Ore	Oxide	Granite	GG	0.10	0.49	803	0.70	*<10*	90	0.51	0.19	0.060	0.060	38	1.1	4.0	1.3	2.6	1.3	1.4	0.10	0.24	8.5	0.0090	0.14	20
Kona Oxide	72139	Head	composite		Ore	Oxide	Granite		0.080	0.41	3080	-	*<10*	64	0.50	0.080	0.050	0.060	26	1.2	77	1.5	0.80	1.3	1.4	*<0.1*	0.32	0.83	*<0.02*	0.13	15
ABA419	I308596	CFD0053	7	8	Ore	Oxide	Granite	GG	0.12	0.44	7940	4.8	10	30	0.29	0.090	0.030	0.010	29	0.20	3.0	1.4	1.0	1.1	1.2	0.070	0.21	0.17	*<0.005*	0.23	17
ABA420	I354541	CFD0053	47	47.24	Ore	Oxide	Granite	GG	0.090	0.54	1070	0.90	10	70	0.71	0.090	0.060	0.090	41	6.8	2.0	1.1	2.1	1.6	1.5	0.080	0.17	1.1	0.0070	0.17	23
ABA422	I354552	CFD0053	57.8	58	Ore	Oxide	Granite	GG	0.080	0.54	714	0.90	10	80	0.67	0.070	0.070	0.040	33	5.5	2.0	1.5	1.8	1.0	1.6	0.080	0.15	1.4	0.0050	0.18	18
Statistical Summary						**Oxide**	**Granite**	**n**	6	6	6	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
								Max	0.10	0.50	7940	4.8	*<10*	90	0.70	0.20	0.10	0.10	41	6.8	77	1.5	2.6	1.6	1.6	0.10	0.30	8.5	*<0.02*	0.20	23
								90th PCTL	0.10	0.50	5635	3.4	*<10*	85	0.70	0.20	0.10	0.10	40	6.2	41	1.5	2.4	1.5	1.6	0.10	0.30	5.0	*<0.02*	0.20	22
								75th PCTL	0.10	0.50	3268	1.3	*<10*	78	0.60	0.10	0.10	0.10	37	4.4	4.8	1.5	2.0	1.3	1.5	*<0.1*	0.20	1.3	0.010	0.20	20
								Median	0.10	0.50	2075	0.90	*<10*	67	0.50	0.10	0.10	0.10	32	1.2	3.5	1.4	1.8	1.2	1.4	0.090	0.20	1.0	0.010	0.20	18
								25th PCTL	0.10	0.40	870	0.90	*<10*	46	0.30	0.10	0.10	0.00	30	0.70	2.3	1.2	1.2	1.0	1.3	0.080	0.20	0.50	0.010	0.10	17
								10th PCTL	0.10	0.40	759	0.80	*<10*	35	0.30	0.10	0.00	0.00	28	0.40	2.0	1.1	0.90	0.90	1.2	0.080	0.20	0.30	*<0.005*	0.10	16
								Min	0.10	0.40	714	0.70	*<10*	30	0.20	0.10	0.00	0.00	26	0.20	2.0	1.1	0.80	0.80	1.2	0.070	0.20	0.20	*<0.005*	0.10	15
Transition Facies for Granite Ore																															
Kona 80% CN	72140	Head	composite		Ore	Transition	Granite		0.090	0.34	5770	-	*<10*	44	0.40	0.10	0.050	0.040	24	1.9	76	1.4	3.8	1.5	1.2	*<0.1*	0.27	4.0	*<0.02*	0.12	14
ABA161	R305812	CFD0383	84	85	Ore	Upper transition	Granite	GG	0.060	0.57	2040	4.8	*<10*	20	0.50	0.050	0.020	0.15	31	1.2	4.0	1.4	3.5	3.9	1.4	0.11	0.18	0.29	0.0080	0.22	17
ABA432	Q041581	CFD0383	83.47	84	Ore	Upper Transition	Granite	GG	0.080	0.87	5690	4.6	*<10*	50	0.63	0.060	0.020	0.31	31	2.0	5.0	2.4	5.1	5.9	2.6	0.090	0.21	1.6	0.020	0.30	16
ABA428	Q041388	CFD0382	97	98	Ore	Lower Transition	Granite	GG	0.030	0.94	603	0.50	10	90	0.45	0.080	0.040	0.020	38	0.30	3.0	0.78	0.70	0.62	2.4	0.070	0.21	0.28	0.011	0.13	20
ABA444	Q032413	CFD0385	83	83.75	Ore	Lower Transition	Granite	GG	0.060	0.46	2350	1.8	10	70	0.37	0.040	0.030	0.010	49	0.80	5.0	1.7	1.5	1.0	1.5	0.090	0.19	0.42	0.0070	0.18	28
ABA445	Q032988	CFD0399	8.85	9	Ore	Lower Transition	Granite	GG	0.10	0.87	740	0.80	*<10*	90	0.76	0.090	0.040	0.050	34	1.1	7.0	0.67	3.6	1.4	2.5	0.080	0.29	0.16	0.012	0.15	19
ABA446	Q033347	CFD0403	32	33	Ore	Lower Transition	Granite	GG	0.090	0.67	*>10000*	3.5	10	40	0.20	0.080	0.010	0.020	43	11	6.0	1.3	17	1.1	2.9	0.080	0.31	0.91	0.013	0.18	25
ABA433	Q041589	CFD0383	91.9	92	Ore	Upper Transition	Granite	GG	0.040	0.93	1470	0.90	10	80	1.0	0.050	0.050	0.030	49	1.3	3.0	1.4	2.9	2.4	2.6	0.090	0.18	0.32	0.011	0.19	27
Statistical Summary						**Transition**	**Granite**	**n**	8	8	8	7	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
								Max	0.10	0.94	10000	4.8	10	90	1.0	0.10	0.050	0.31	49	11	76	2.4	17	5.9	2.9	0.11	0.31	4.0	0.020	0.30	28
								90th PCTL	0.10	0.93	7039	4.7	10	90	0.83	0.093	0.050	0.20	49	4.6	28	1.9	8.7	4.5	2.7	0.10	0.30	2.3	*<0.02*	0.24	27
								75th PCTL	0.10	0.89	5710	4.1	10	83	0.66	0.083	0.043	0.075	45	1.9	6.3	1.5	4.1	2.8	2.6	0.093	0.28	1.1	0.015	0.20	25
								Median	0.10	0.77	2195	1.8	*<10*	60	0.48	0.070	0.035	0.035	36	1.3	5.0	1.4	3.6	1.4	2.4	0.090	0.21	0.37	0.012	0.18	20
								25th PCTL	0.10	0.54	1288	0.85	*<10*	43	0.39	0.050	0.020	0.020	31	1.0	3.8	1.1	2.6	1.1	1.4	0.080	0.19	0.29	0.010	0.15	17
								10th PCTL	0.00	0.42	699	0.68	*<10*	34	0.32	0.047	0.017	0.017	29	0.70	3.0	0.75	1.3	0.91	1.3	0.077	0.18	0.24	0.0077	0.13	15
								Min	0.00	0.34	603	0.50	*<10*	20	0.20	0.040	0.010	0.010	24	0.30	3.0	0.67	0.70	0.62	1.2	0.070	0.18	0.16	0.0070	0.12	14
Statistical Summary for Granite Ore								**n**	14	14	14	12	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
								n < DL	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	3	0	0
								Max	0.12	0.94	10000	4.8	10	90	1.0	0.19	0.070	0.31	49	11	77	2.4	17	5.9	2.9	0.11	0.32	8.5	0.020	0.30	28
								90th PCTL	0.11	0.91	7289	4.8	10	90	0.75	0.14	0.060	0.13	47	6.4	55	1.6	4.7	3.4	2.6	0.10	0.30	3.2	0.020	0.23	26
								75th PCTL	0.098	0.82	5100	3.8	10	80	0.66	0.090	0.050	0.060	41	2.0	5.8	1.5	3.6	1.6	2.5	0.10	0.26	1.3	0.013	0.19	22
								Median	0.085	0.54	2195	1.1	*<10*	67	0.50	0.080	0.045	0.040	34	1.2	4.5	1.4	2.4	1.3	1.5	0.090	0.21	0.63	0.011	0.18	19
								25th PCTL	0.065	0.46	870	0.88	*<10*	41	0.38	0.063	0.030	0.020	31	0.88	3.0	1.2	1.6	1.0	1.4	0.080	0.18	0.30	0.0073	0.14	17
								10th PCTL	0.046	0.42	722	0.71	*<10*	33	0.26	0.050	0.020	0.013	27	0.36	2.3	0.88	0.86	0.87	1.2	0.073	0.17	0.20	0.0056	0.13	15
								Min	0.030	0.34	603	0.50	*<10*	20	0.20	0.040	0.010	0.010	24	0.20	2.0	0.67	0.70	0.62	1.2	0.070	0.15	0.16	*<0.005*	0.12	14
Oxide and Transition Facies for Other Lithologies Ore																															
ABA126	KAM149885	CFR0566	67.06	68.58	Ore	Oxide	Dykes	IV	0.19	0.58	1595	0.30	*<10*	350	2.3	0.14	0.82	0.060	16	124	512	2.6	6.9	6.0	3.7	0.060	0.020	1.4	0.010	0.050	8.2
ABA334	R550421	CFD0518	10	11	Ore	Upper Transition	HU	HU	0.95	0.44	2620	11	10	380	1.6	0.33	0.23	0.51	72	51	205	0.46	13	5.2	1.9	0.080	0.12	1.5	0.044	0.21	39
ABA175	R305827	CFD0403	70	71	Ore	Lower transition	Dykes	DIOR	0.090	0.58	*>10000*	1.1	*<10*	70	0.29	0.060	0.010	0.020	18	7.2	4.0	1.2	4.8	1.5	1.9	0.080	0.17	3.6	0.026	0.26	10

Notes: all values in grey italics are below the analytical detection limit
n = number of samples included in the statistical summary
n < DL = number of samples with values below the analytical detection limit

Appendix C.2-3: Solid Phase Element Results by Aqua Regia Digestion for Ore

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
									ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Oxide Facies for Gneiss Ore																																				
ABA100	KAM137583	CFR0470	39.62	41.15	Ore	Oxide	Gneiss	MxM	5.1	0.29	435	1.6	0.010	0.12	6.4	440	22	35	<0.001	0.020	48	3.6	0.90	0.80	26	<0.01	0.15	32	0.019	0.51	11	15	1.1	25	41	11
Supremo Oxide T1	72144	Head	composite		Ore	Oxide	Gneiss		<1	0.070	333	2.0	0.010	<0.05	23	300	12	11	-	0.010	46	3.4	<1	0.40	26	<0.05	<0.05	24	<0.01	0.46	13	17	0.60	11	25	6.3
Supremo Oxide T4	72145	Head	composite		Ore	Oxide	Gneiss		1.0	0.13	267	2.1	0.010	<0.05	11	210	15	14	-	0.010	34	2.3	<1	0.70	23	<0.05	<0.05	26	<0.01	0.90	14	12	0.30	11	26	5.1
ABA394	KAM030261	CFR0110	81.08	82.6	Ore	Oxide	Gneiss	MxF	0.60	0.020	213	1.5	0.010	<0.05	2.4	240	29	10	<0.001	0.10	9.3	1.6	0.40	0.50	92	<0.01	0.11	27	<0.005	0.50	20	8.0	0.92	7.1	9.0	4.8
ABA397	L861523	CFR0134	105.16	105.187	Ore	Oxide	Gneiss	FG	0.40	0.010	144	1.8	0.010	0.080	2.5	70	52	10	<0.001	<0.01	19	0.30	0.30	0.50	21	<0.01	0.030	35	<0.005	0.43	19	2.0	0.80	6.0	11	3.3
Statistical Summary						**Oxide**	**Gneiss**	**n**	5	5	5	5	5	5	5	5	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
								Max	5.1	0.30	435	2.1	0.010	0.12	23	440	52	35	<0.001	0.10	48	3.6	<1	0.80	92	<0.05	0.20	35	0.019	0.90	20	17	1.1	25	41	11
								90th PCTL	3.5	0.20	394	2.1	0.010	0.10	18	384	43	26	<0.001	0.10	47	3.5	<1	0.80	66	<0.05	0.10	34	<0.01	0.70	19	16	1.0	19	35	9.0
								75th PCTL	1.0	0.10	333	2.0	0.010	0.080	11	300	29	14	<0.001	0.00	46	3.4	<1	0.70	26	<0.05	0.10	32	<0.01	0.50	19	15	0.90	11	26	6.3
								Median	1.0	0.10	267	1.8	0.010	<0.05	6.4	240	22	11	<0.001	0.00	34	2.3	0.90	0.50	26	<0.01	0.10	27	<0.01	0.50	14	12	0.80	11	25	5.1
								25th PCTL	0.60	0.00	213	1.6	0.010	<0.05	2.5	210	15	10	<0.001	0.00	19	1.6	0.40	0.50	23	<0.01	0.10	26	<0.005	0.50	13	8.0	0.60	7.1	11	4.8
								10th PCTL	0.50	0.00	172	1.5	0.010	<0.05	2.4	126	13	10	<0.001	<0.01	13	0.80	0.30	0.40	22	<0.01	<0.05	25	<0.005	0.40	12	4.4	0.40	6.4	9.8	3.9
								Min	0.40	0.00	144	1.5	0.010	<0.05	2.4	70	12	10	<0.001	<0.01	9.3	0.30	0.30	0.40	21	<0.01	<0.05	24	<0.005	0.40	11	2.0	0.30	6.0	9.0	3.3
Transition Facies for Gneiss Ore																																				
Supremo 80%	72146	Head	composite		Ore	Transition	Gneiss		2.0	0.42	396	3.1	0.010	0.070	12	300	14	17	-	0.12	20	2.8	<1	0.30	49	<0.05	0.060	25	<0.01	1.2	11	14	0.20	11	27	6.1
ABA002	KAM004886	CFD0034	73	74	Ore	Upper transition	Gneiss	FG	3.8	0.030	186	0.84	0.010	0.050	1.7	160	10	11	<0.001	<0.01	50	0.80	0.40	1.7	19	<0.01	0.010	35	<0.005	0.78	19	4.0	0.29	10	10	6.8
ABA375	R271389	CFD0417	109.3	109.775	Ore	Lower Transition	Gneiss	MxF	1.7	0.090	387	2.0	0.010	0.060	1.2	110	18	16	<0.001	<0.01	11	0.90	0.40	0.50	29	<0.01	0.010	37	<0.005	0.28	16	2.0	0.42	15	24	9.4
ABA359	R623803	CFD0548	174	174.935	Ore	Upper Transition	Gneiss	MxF	0.50	0.030	112	0.55	<0.01	<0.05	5.0	70	25	9.1	<0.001	<0.01	161	0.70	0.40	0.30	14	<0.01	0.070	36	<0.005	1.1	5.7	3.0	0.32	9.6	12	5.6
ABA403	R544048	CFD0553	120	121	Ore	Upper Transition	Gneiss	MxF	0.30	0.020	1490	1.6	0.010	<0.05	2.9	80	23	11	<0.001	<0.01	108	0.30	0.20	0.50	8.3	<0.01	0.090	32	<0.005	1.1	11	3.0	2.0	6.8	15	4.0
Statistical Summary						**Transition**	**Gneiss**	**n**	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
								Max	3.8	0.40	1490	3.1	0.010	0.070	12	300	25	17	<0.001	0.12	161	2.8	<1	1.7	49	<0.05	0.10	37	<0.01	1.2	19	14	2.0	15	27	9.4
								90th PCTL	3.1	0.30	1052	2.7	0.010	0.066	9.4	244	24	17	<0.001	<0.01	139	2.0	0.80	1.2	41	<0.05	0.10	36	<0.01	1.2	18	10	1.4	13	26	8.4
								75th PCTL	2.0	0.10	396	2.0	0.010	0.060	5.0	160	23	16	<0.001	<0.01	108	0.90	0.40	0.50	29	<0.01	0.10	36	<0.005	1.1	16	4.0	0.40	11	24	6.8
								Median	1.7	0.00	387	1.6	0.010	0.050	2.9	110	18	11	<0.001	<0.01	50	0.80	0.40	0.50	19	<0.01	0.10	35	<0.005	1.1	11	3.0	0.30	10	15	6.1
								25th PCTL	0.50	0.00	186	0.80	0.010	<0.05	1.7	80	14	11	<0.001	<0.01	20	0.70	0.40	0.30	14	<0.01	0.00	32	<0.005	0.80	11	3.0	0.30	9.6	12	5.6
								10th PCTL	0.40	0.00	142	0.70	<0.01	<0.05	1.4	74	12	9.7	<0.001	<0.01	14	0.50	0.30	0.30	11	<0.01	0.00	27	<0.005	0.50	7.8	2.4	0.20	7.9	11	4.6
								Min	0.30	0.00	112	0.60	<0.01	<0.05	1.2	70	10	9.1	<0.001	<0.01	11	0.30	0.20	0.30	8.3	<0.01	0.00	25	<0.005	0.30	5.7	2.0	0.20	6.8	10	4.0
Statistical Summary for Gneiss Ore								**n**	10	10	10	10	10	10	10	10	10	10	7	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
								n < DL	1	0	0	0	1	5	0	0	0	0	7	5	0	0	3	0	0	10	2	0	9	0	0	0	0	0	0	0
								Max	5.1	0.42	1490	3.1	0.010	0.12	23	440	52	35	<0.001	0.12	161	3.6	<1	1.7	92	<0.05	0.15	37	0.019	1.2	20	17	2.0	25	41	11
								90th PCTL	3.9	0.30	541	2.2	0.010	0.084	13	314	31	19	<0.001	0.10	113	3.4	<1	0.89	53	<0.05	0.11	36	0.011	1.1	19	15	1.2	16	28	9.5
								75th PCTL	1.9	0.12	394	2.0	0.010	0.068	9.9	285	25	15	<0.001	0.018	50	2.7	0.98	0.65	28	<0.05	0.085	35	<0.01	1.1	18	14	0.89	11	26	6.7
								Median	1.0	0.050	300	1.7	0.010	0.050	4.0	185	20	11	<0.001	0.010	40	1.3	0.40	0.50	24	<0.01	0.055	32	<0.005	0.65	13	6.0	0.51	11	20	5.9
								25th PCTL	0.53	0.023	193	1.5	0.010	<0.05	2.4	88	14	10	<0.001	0.010	19	0.73	0.40	0.43	20	<0.01	0.035	26	<0.005	0.47	11	3.0	0.31	7.7	11	4.9
								10th PCTL	0.39	0.019	141	0.81	0.010	<0.05	1.7	70	12	10	<0.001	0.010	11	0.30	0.29	0.30	13	<0.01	0.010	24	<0.005	0.42	10	2.0	0.28	6.7	9.9	3.9
								Min	0.30	0.010	112	0.55	<0.01	<0.05	1.2	70	10	9.1	<0.001	0.010	9.3	0.30	0.20	0.30	8.3	<0.01	0.010	24	<0.005	0.28	5.7	2.0	0.20	6.0	9.0	3.3
Oxide Facies for Schist Ore																																				
ABA089	KAM133587	CFR0431	10.67	12.19	Ore	Oxide	Schist	BtS	2.9	0.12	844	0.62	<0.01	<0.05	34	530	12	11	<0.001	0.010	15	5.2	0.80	0.30	22	<0.01	0.040	13	<0.005	0.61	2.8	34	0.80	18	43	2.3
DD oxide	72141	Head	composite		Ore	Oxide	Gneiss/schist		2.0	0.59	551	1.4	0.010	<0.05	30	320	16	14	-	0.11	41	5.9	<1	0.40	57	<0.05	0.13	13	<0.01	0.30	5.2	22	1.0	10	41	3.6
Latte Oxide East	72136	Head	composite		Ore	Oxide	Schist		1.0	0.54	467	1.4	0.010	<0.05	38	420	16	13	-	0.080	22	4.8	<1	<0.3	130	<0.05	<0.05	13	<0.01	0.33	3.0	19	0.90	14	52	4.6
Latte Oxide West	72135	Head	composite		Ore	Oxide	Schist		<1	0.92	622	1.5	0.010	<0.05	66	430	17	11	-	0.20	19	4.8	<1	0.40	139	<0.05	0.060	11	<0.01	0.33	2.6	17	0.50	14	57	4.1
ABA324	Q033726	CFD0411	36	37	Ore	Oxide	schist	BtS	1.6	0.58	616	1.0	0.010	<0.05	23	620	15	30	<0.001	0.43	15	4.9	0.90	0.90	93	<0.01	0.020	16	0.0070	1.5	6.0	14	0.46	16	43	1.8
ABA328	KAM001234	CFD0008	52	53	Ore	Oxide	schist	BtS	0.40	0.48	718	0.91	<0.01	<0.05	27	410	20	10	<0.001	0.030	6.0	4.3	0.60	0.30	150	<0.01	0.080	17	<0.005	0.42	2.4	6.0	0.33	13	53	3.4
Statistical Summary						**Oxide**	**Schist**	**n**	6	6	6	6	6	6	6	6	6	6	3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
								Max	2.9	0.92	844	1.5	0.010	<0.05	66	620	20	30	<0.001	0.43	41	5.9	<1	0.90	150	<0.05	0.13	17	<0.01	1.5	6.0	34	1.0	18	57	4.6
								90th PCTL	2.5	0.76	781	1.5	0.010	<0.05	52	575	19	22	<0.001	0.32	31	5.6	<1	0.65	145	<0.05	0.11	16	<0.01	1.1	5.6	28	0.95	17	55	4.4
								75th PCTL	1.9	0.59	694	1.4	0.010	<0.05	37	505	17	14	<0.001	0.18	21	5.1	<1	0.40	137	<0.05	0.075	15	<0.01	0.56	4.6	21	0.88	16	53	4.0
								Median	1.3	0.56	619	1.2	0.010	<0.05	32	425	16	12	<0.001	0.095	17	4.9	0.95	0.35	111	<0.01	0.055	13	0.0085	0.38	2.9	18	0.65	14	48	3.5
								25th PCTL	<1	0.50	567	0.94	<0.01	<0.05	28	413	15	11	<0.001	0.043	15	4.8	0.83	0.30	66	<0.01	0.043	13	<0.005	0.33	2.6	15	0.47	13	43	2.6
								10th PCTL	0.70	0.30	509	0.77	<0.01	<0.05	25	365	14	10	<0.001	0.020	10	4.6	0.70	0.30	40	<0.01	0.030	12	<0.005	0.32	2.5	10	0.40	12	42	2.1
								Min	0.40	0.12	467	0.62	<0.01	<0.05	23	320	12	10	<0.001	0.010	6.0	4.3	0.60	0.30	22	<0.01	0.020	11	<0.005	0.30	2.4	6.0	0.33	10	41	1.8
Transition Facies for Schist Ore																																				
Latte 60%	72138	Head	composite		Ore	Transition	Schist		3.0	1.1	506	2.3	0.020	0.070	32	450	14	18	-	0.53	49	5.4	<1	0.50	165	<0.05	<0.05	13	0.010	0.40	2.6	26	0.30	15	49	4.0
Latte 80%'	72137	Head	composite		Ore	Transition	Schist		2.0	1.4	497	3.3	0.010	<0.05	56	410	20	13	-	0.55	22	4.9	<1	0.40	164	<0.05	0.070	11	<0.01	0.73	2.6	19	0.20	13	46	2.8
ABA327	KAM001014	CFD0007	50.15	50.9	Ore	Lower Transition	schist	BtS	0.60	1.2	705	0.84	0.020	<0.05	29	380	6.8	18	0.0010	1.9	24	2.5	0.50	0.30	402	<0.01	0.060	11	<0.005	0.22	1.8	7.0	0.20	9.9	49	2.6
ABA314	KAM147294	CFD0346	107	107.5	Ore	Upper Transition	Schist	BtS_carb	4.1	1.6	469	0.69	0.020	0.050	34	270	29	9.6	0.0010	0.58	7.3	7.1	0.70	0.70	199	<0.01	0.050	9.4	<0.005	0.23	3.5	30	0.35	14	48	4.7
ABA315	KAM147319	CFD0346	130.2	130.3	Ore	Upper Transition	Schist	BtS_carb	0.30	1.2	567	1.1	0.010	<0.05	12	320	14	10	<0.001	2.1	8.7	3.6	0.50	0.30	209	<0.01	0.10	20	<0.005	0.64	3.2	6.0	0.46	14	43	11
Statistical Summary						**Transition**	**Schist**	**n**	5	5	5	5	5	5	5	5	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
								Max	4.1	1.6	705	3.3	0.020	0.070	56	450	29	18	0.0010	2.1	49	7.1	<1	0.70	402	<0.05	0.10	20	0.010	0.73	3.5	30	0.46	15	49	11
								90th PCTL	3.7	1.5	650	2.9	0.020	0.062	47	434	25	18	0.0010	2.0	39	6.4	<1	0.62	325	<0.05	0.088	17	<0.01	0.69	3.4	28	0.42	14	49	8.7
								75th PCTL	3.0	1.4	567	2.3	0.020	0.050	34	410	20	18	0.0010	1.9	24	5.4	<1	0.50	209	<0.05	0.070	13	<0.01	0.64	3.2	26	0.35	14	49	4.7
								Median	2.0	1.2	506	1.1	0.020	<0.05	32	380	14	13	0.0010	0.58	22	4.9	0.70	0.40	199	<0.01	0.060	11	<0.005	0.40	2.6	19	0.30	14	48	4.0
								25th PCTL	0.60	1.2	497	0.84	0.010	<0.05	29	320	14	10	<0.001	0.55	8.7	3.6	0.50	0.30	165	<0.01	0.050	11	<0.005	0.23	2.6	7.0	0.20	13	46	2.8
								10th PCTL	0.42	1.1	480	0.75	0.010	<0.05	19	290	9.7	9.9	<0.001	0.54	7.8	2.9	0.50	0.30	164	<0.01	0.050	9.9	<0.005	0.22	2.1	6.4	0.20	11	44	2.7
								Min	0.30	1.1	469	0.69	0.010	<0.05	12	270	6.8	9.6	<0.001	0.53	7.3	2.5	0.50	0.30	164	<0.01	0.050	9.4	<0.005	0.22	1.8	6.0	0.20	9.9	43	2.6
Statistical Summary for Schist Ore								**n**	11	11	11	11	11	11	11	11	11	11	6	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
								n < DL	1	0	0	0	2	9	0	0	0	0	4	0	0	0	5	1	0	11	2	0	9	0	0	0	0	0	0	0
								Max	4.1	1.6	844	3.3	0.020	0.070	66	620	29	30	0.0010	2.1	49	7.1	<1	0.90	402	<0.05	0.13	20	0.010	1.5	6.0	34	1.0	18	57	11
								90th PCTL	3.0	1.4	718	2.3	0.020	0.050	56	530	20	18	0.0010	1.9	41	5.9	<1	0.70	209	<0.05	0.10	17	<0.01	0.73	5.2	30	0.90	16	53	4.7
								75th PCTL	2.5	1.2	664	1.5	0.015	<0.05	36	440	18	16	<0.001	0.57	23	5.3	<1	0.45	182	<0.05	0.075	15	<0.01	0.63	3.4	24	0.65	14	51	4.4
								Median	1.6	0.92	567	1.1	0.010	<0.05	32	410	16	13	<0.001	0.43	19	4.9	0.90	0.40	150	<0.01	0.060	13	0.0070	0.40	2.8	19	0.46	14	48	3.6
								25th PCTL	0.80	0.56	502	0.88	0.010	<0.05	28	350	14	10	<0.001	0.095	12	4.6	0.65	0.30	111	<0.01	<0.05	11	<0.005	0.32	2.6	11	0.32	13	43	2.7
								10th PCTL	0.40	0.48	469	0.69	<0.01	<0.05	23	320	12	10	<0.001	0.030	7.3	3.6	0.50	0.30	57	<0.01	0.040	11	<0.005	0.23	2.4	6.0	0.20	10	43	2.3
								Min	0.30	0.12	467	0.62	<0.01	<0.05	12	270	6.8	9.6	<0.001	0.010	6.0	2.5	0.50	0.30	22	<0.01	0.020	9.4	<0.005	0.22	1.8	6.0	0.20	9.9	41	1.8

Appendix C.2-3: Solid Phase Element Results by Aqua Regia Digestion for Ore

ABA ID	Assay ID	Hole ID	From (m)	To (m)	Type	OxidationFacies	Lithology	Lith Code	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
									ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Oxide Facies for Granite Ore																																				
ABA156	R305806	CFD0382	59	60	Ore	Oxide	Granite	GG	1.0	0.010	20	1.2	*<0.01*	0.21	0.60	50	21	9.4	*<0.001*	0.010	26	0.40	*<0.2*	0.20	23	*<0.01*	0.010	26	*<0.005*	0.61	6.4	2.0	9.4	2.8	4.0	6.1
ABA171	R305823	CFD0396	13	14	Ore	Oxide	Granite	GG	0.90	0.010	404	1.3	*<0.01*	0.24	0.90	130	24	7.5	*<0.001*	*<0.01*	38	0.70	0.40	0.30	19	*<0.01*	0.020	26	*<0.005*	2.7	20	2.0	0.40	10	24	6.7
Kona Oxide	72139	Head	composite		Ore	Oxide	Granite		*<1*	0.020	114	1.9	*<0.01*	0.41	1.9	130	15	11	-	0.020	37	2.5	*<1*	*<0.3*	18	*<0.01*	*<0.05*	18	*<0.01*	0.56	9.6	10	0.20	7.2	18	12
ABA419	I308596	CFD0053	7	8	Ore	Oxide	Granite	GG	0.50	0.010	31	0.52	0.010	0.10	0.30	90	11	14	*<0.001*	0.010	24	0.90	*<0.2*	*<0.2*	15	*<0.01*	0.010	26	*<0.005*	0.69	1.8	6.0	0.14	1.5	3.0	7.1
ABA420	I354541	CFD0053	47	47.24	Ore	Oxide	Granite	GG	2.1	0.010	1740	0.90	0.010	0.17	3.7	160	42	8.8	*<0.001*	*<0.01*	9.0	1.2	0.50	0.20	50	*<0.01*	*<0.01*	28	*<0.005*	2.3	52	2.0	0.090	15	42	5.3
ABA422	I354552	CFD0053	57.8	58	Ore	Oxide	Granite	GG	1.2	0.020	1600	1.0	0.010	0.25	2.1	110	14	10	*<0.001*	*<0.01*	6.8	1.0	0.50	0.20	61	*<0.01*	0.020	19	*<0.005*	1.2	18	2.0	0.12	15	32	4.8
Statistical Summary						**Oxide**	**Granite**	**n**	6	6	6	6	6	6	6	6	6	6	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
								Max	2.1	0.00	1740	1.9	0.010	0.40	3.7	160	42	14	*<0.001*	0.020	38	2.5	*<1*	0.30	61	*<0.01*	*<0.05*	28	*<0.005*	2.7	52	10	9.4	15	42	12
								90th PCTL	1.7	0.00	1670	1.6	0.010	0.30	2.9	145	33	13	*<0.001*	0.020	38	1.9	0.80	0.30	56	*<0.01*	0.040	27	*<0.005*	2.5	36	8.0	4.9	15	37	9.4
								75th PCTL	1.2	0.00	1301	1.3	0.010	0.20	2.1	130	23	11	*<0.001*	0.010	35	1.2	0.50	*<0.3*	43	*<0.01*	0.020	26	*<0.005*	2.0	19	5.0	0.40	14	30	7.0
								Median	*<1*	0.00	259	1.1	*<0.01*	0.20	1.4	120	18	9.7	*<0.001*	*<0.01*	25	1.0	0.50	0.20	21	*<0.01*	0.020	26	*<0.005*	0.90	14	2.0	0.20	8.8	21	6.4
								25th PCTL	0.90	0.00	52	0.90	*<0.01*	0.20	0.70	95	14	9.0	*<0.001*	*<0.01*	13	0.80	0.30	0.20	18	*<0.01*	0.010	21	*<0.005*	0.60	7.2	2.0	0.10	3.9	7.5	5.5
								10th PCTL	0.70	0.00	26	0.70	*<0.01*	0.10	0.50	70	13	8.2	*<0.001*	*<0.01*	7.9	0.60	*<0.2*	*<0.2*	16	*<0.01*	0.010	19	*<0.005*	0.60	4.1	2.0	0.10	2.2	3.5	5.1
								Min	0.50	0.00	20	0.50	*<0.01*	0.10	0.30	50	11	7.5	*<0.001*	*<0.01*	6.8	0.40	*<0.2*	*<0.2*	15	*<0.01*	*<0.01*	18	*<0.005*	0.60	1.8	2.0	0.10	1.5	3.0	4.8
Transition Facies for Granite Ore																																				
Kona 80% CN	72140	Head	composite		Ore	Transition	Granite		*<1*	0.010	217	2.3	*<0.01*	0.34	2.3	140	16	8.8	-	0.14	128	2.3	*<1*	0.30	21	*<0.05*	*<0.05*	17	*<0.01*	1.2	9.7	8.0	0.10	6.3	19	11
ABA161	R305812	CFD0383	84	85	Ore	Upper transition	Granite	GG	0.50	0.010	54	1.7	*<0.01*	0.21	1.6	280	16	11	*<0.001*	*<0.01*	26	0.60	0.30	0.30	6.7	*<0.01*	0.030	26	*<0.005*	0.70	33	7.0	0.35	5.9	17	4.3
ABA432	Q041581	CFD0383	83.47	84	Ore	Upper Transition	Granite	GG	0.70	0.020	69	4.2	*<0.01*	0.21	2.6	460	24	18	*<0.001*	0.020	146	1.6	0.50	0.60	22	*<0.01*	0.050	13	*<0.005*	1.1	53	12	0.20	7.3	20	9.7
ABA428	Q041388	CFD0382	97	98	Ore	Lower Transition	Granite	GG	3.9	0.010	54	0.90	*<0.01*	0.080	0.80	70	26	7.4	*<0.001*	*<0.01*	4.1	0.90	0.30	0.20	20	*<0.01*	*<0.01*	31	*<0.005*	0.26	15	3.0	0.060	8.8	12	5.8
ABA444	Q032413	CFD0385	83	83.75	Ore	Lower Transition	Granite	GG	0.90	0.010	66	1.2	0.010	0.12	0.70	90	14	13	*<0.001*	0.010	20	0.40	*<0.2*	0.30	36	*<0.01*	0.010	36	*<0.005*	0.85	9.2	3.0	0.060	4.0	4.0	6.0
ABA445	Q032988	CFD0399	8.85	9	Ore	Lower Transition	Granite	GG	1.9	0.020	199	1.0	0.010	0.11	1.7	150	11	11	*<0.001*	0.010	3.2	1.9	0.30	0.40	30	*<0.01*	*<0.01*	23	*<0.005*	0.24	20	8.0	0.37	7.7	16	11
ABA446	Q033347	CFD0403	32	33	Ore	Lower Transition	Granite	GG	0.30	0.010	45	0.69	0.010	0.21	1.4	140	20	9.1	*<0.001*	*<0.01*	33	0.70	0.30	3.2	29	*<0.01*	0.040	27	*<0.005*	0.71	5.1	3.0	0.35	4.2	6.0	8.6
ABA433	Q041589	CFD0383	91.9	92	Ore	Upper Transition	Granite	GG	1.8	0.020	77	1.1	0.010	0.060	2.7	310	29	11	*<0.001*	*<0.01*	5.5	1.1	0.40	0.40	19	*<0.01*	0.010	34	*<0.005*	0.83	8.8	6.0	0.060	11	18	5.3
Statistical Summary						**Transition**	**Granite**	**n**	8	8	8	8	8	8	8	8	8	8	7	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
								Max	3.9	0.020	217	4.2	0.010	0.34	2.7	460	29	18	*<0.001*	0.14	146	2.3	*<1*	3.2	36	*<0.05*	0.050	36	*<0.01*	1.2	53	12	0.37	11	20	11
								90th PCTL	2.5	0.020	204	2.9	0.010	0.25	2.6	355	27	14	*<0.001*	0.056	133	2.0	0.65	1.4	31	*<0.01*	0.050	35	*<0.01*	1.1	39	9.2	0.36	9.3	19	11
								75th PCTL	1.8	0.020	108	1.9	0.010	0.21	2.4	288	24	12	*<0.001*	0.013	57	1.7	0.43	0.45	29	*<0.01*	0.043	32	*<0.005*	0.91	23	8.0	0.35	8.0	18	9.9
								Median	0.95	0.010	68	1.1	*<0.01*	0.17	1.7	145	18	11	*<0.001*	*<0.01*	23	1.0	0.30	0.35	22	*<0.01*	0.020	27	*<0.005*	0.77	12	6.5	0.15	6.8	17	7.3
								25th PCTL	0.65	0.010	54	0.99	*<0.01*	0.10	1.3	128	15	9.0	*<0.001*	*<0.01*	5.1	0.68	0.30	0.30	19	*<0.01*	0.010	21	*<0.005*	0.59	9.1	3.0	0.060	5.5	11	5.7
								10th PCTL	0.44	0.010	51	0.84	*<0.01*	0.074	0.77	84	13	8.4	*<0.001*	*<0.01*	3.8	0.54	0.27	0.27	15	*<0.01*	0.010	16	*<0.005*	0.25	7.7	3.0	0.060	4.1	5.4	5.0
								Min	0.30	0.010	45	0.69	*<0.01*	0.060	0.70	70	11	7.4	*<0.001*	*<0.01*	3.2	0.40	*<0.2*	0.20	6.7	*<0.01*	0.010	13	*<0.005*	0.24	5.1	3.0	0.060	4.0	4.0	4.3
Statistical Summary for Granite Ore								**n**	14	14	14	14	14	14	14	14	14	14	12	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
								n < DL	2	0	0	0	7	0	0	0	0	0	12	7	0	0	5	2	0	14	5	0	14	0	0	0	0	0	0	0
								Max	3.9	0.020	1740	4.2	0.010	0.41	3.7	460	42	18	*<0.001*	0.14	146	2.5	1.0	3.2	61	*<0.05*	0.050	36	*<0.01*	2.7	53	12	9.4	15	42	12
								90th PCTL	2.0	0.020	1241	2.2	0.010	0.31	2.7	301	28	14	*<0.001*	0.020	101	2.2	0.85	0.54	46	*<0.01*	0.050	33	*<0.01*	1.9	46	9.4	0.39	13	30	11
								75th PCTL	1.7	0.020	213	1.6	0.010	0.23	2.3	158	24	11	*<0.001*	0.010	36	1.5	0.50	0.38	29	*<0.01*	0.038	28	*<0.005*	1.2	20	7.8	0.35	10	20	9.4
								Median	1.0	0.010	73	1.1	*<0.01*	0.21	1.7	135	18	10	*<0.001*	*<0.01*	25	0.95	0.35	0.30	22	*<0.01*	0.015	26	*<0.005*	0.77	12	4.5	0.17	7.3	18	6.4
								25th PCTL	0.75	0.010	54	0.93	*<0.01*	0.11	0.83	95	15	8.9	*<0.001*	*<0.01*	7.3	0.70	0.30	0.20	19	*<0.01*	*<0.01*	20	*<0.005*	0.63	8.9	2.3	0.093	4.6	7.5	5.4
								10th PCTL	0.50	0.010	35	0.75	*<0.01*	0.086	0.63	76	12	7.9	*<0.001*	*<0.01*	4.5	0.46	*<0.2*	0.20	16	*<0.01*	*<0.01*	17	*<0.005*	0.35	5.5	2.0	0.060	3.2	4.0	5.0
								Min	0.30	0.010	20	0.52	*<0.01*	0.060	0.30	50	11	7.4	*<0.001*	*<0.01*	3.2	0.40	*<0.2*	0.20	6.7	*<0.01*	*<0.01*	13	*<0.005*	0.24	1.8	2.0	0.060	1.5	3.0	4.3
Oxide and Transition Facies for Other Lithologies Ore																																				
ABA126	KAM149885	CFR0566	67.06	68.58	Ore	Oxide	Dykes	IV	2.5	0.46	2400	2.0	*<0.01*	*<0.05*	2740	2570	3.3	4.1	*<0.001*	0.020	363	7.2	0.30	0.70	54	0.010	0.090	4.6	*<0.005*	2.7	3.6	29	2.9	12	25	0.60
ABA334	R550421	CFD0518	10	11	Ore	Upper Transition	HU	HU	0.80	0.11	1830	0.21	0.010	*<0.05*	727	560	22	8.9	*<0.001*	*<0.01*	47	8.1	0.60	0.30	56	*<0.01*	1.4	12	*<0.005*	0.67	3.0	56	25	17	149	6.2
ABA175	R305827	CFD0403	70	71	Ore	Lower transition	Dykes	DIOR	0.50	0.010	12	0.52	*<0.01*	0.080	2.5	150	14	15	*<0.001*	0.53	281	4.3	0.30	0.30	21	*<0.01*	0.030	3.2	*<0.005*	3.1	2.6	10	0.060	3.1	5.0	8.3

Notes: all values in grey italics are below the analytical detection limit
n = number of samples included in the statistical summary
n < DL = number of samples with values below the analytical detection limit

Appendix C.2-4: Statistical Summary of Exploration Assay Database (Au > 0.3 ppm)

Lithology	Oxide Facies	Statistics	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	La	Mg	Mg	Mn	Mo	Na	Ni	P	Pb	S	Sb	Sc	Sr	Th	Ti	Tl	U	V	W	Zn	As/Fe	Surrogate Ca-NP (ICP-Ca)	Surrogate AP (ICP-S)	Surrogate NNP	Surrogate NPR	Surrogate NPR
			ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	Num	%	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	Ratio	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$
Gneiss Ore																																														
Gneiss	Oxide	**n**	804	804	804	2864	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804
		n <DL	401	0	0	0	761	0	73	704	1	789	40	0	6	0	799	318	0	4	2	2	0	195	388	66	0	1	344	2	188	0	150	760	801	255	4	800	8	-	-	-	-	-	-
		Max	8.5	2.5	10000	87	10	3210	3.3	13	6.5	0.60	55	240	105	9.6	10	8.0	1.1	90	38	2.0	5630	30	0.070	158	1620	1190	1.3	1325	31	286	60	0.11	10	130	179	20	181	3300	163	42	161	325	*Non-reactive*
		95th PCTL	0.60	0.96	3766	8.3	10	858	1.9	2.0	1.7	<0.5	28	42	30	5.7	<10	3.0	0.37	50	14	0.37	1246	5.0	0.020	30	710	40	0.15	144	14	106	40	0.010	<10	40	66	<10	74	1401	42	4.6	35	33	*Non-reactive*
		90th PCTL	0.50	0.77	2834	5.5	<10	570	1.6	2.0	0.44	<0.5	17	32	21	4.4	<10	2.0	0.32	40	6.0	0.13	845	4.0	0.020	21	567	26	0.070	108	9.0	81	40	<0.01	<10	30	42	<10	59	1137	11	2.2	9.8	17	*Non-reactive*
		75th PCTL	0.30	0.60	1740	2.8	<10	280	1.1	<2	0.15	<0.5	9.0	16	12	2.8	<10	1.0	0.27	40	3.0	0.050	495	3.0	0.010	11	310	19	0.020	52	4.0	45	30	<0.01	<10	20	18	<10	34	750	3.8	0.63	2.9	8.0	*Non-reactive*
		Median	0.20	0.48	919	1.3	<10	150	0.80	<2	0.080	<0.5	4.0	9.0	6.0	1.6	<10	1.0	0.23	30	2.0	0.030	249	1.0	0.010	4.0	180	14	0.010	24	1.0	25	30	<0.01	<10	10	7.0	<10	18	515	2.0	0.31	1.4	4.8	*Non-reactive*
		25th PCTL	<0.2	0.40	498	0.63	<10	90	0.60	<2	0.050	<0.5	2.0	6.0	3.0	1.0	<10	<1	0.19	20	1.0	0.020	124	1.0	<0.01	2.0	110	10	<0.01	11	1.0	17	20	<0.01	<10	<10	3.0	<10	11	383	1.3	0.31	0.69	2.4	2.2
		10th PCTL	<0.2	0.34	312	0.40	<10	60	0.50	<2	0.030	<0.5	1.0	4.0	2.0	0.82	<10	<1	0.16	10	1.0	0.020	48	<1	<0.01	1.0	80	8.0	<0.01	7.0	<1	11	<20	<0.01	<10	<10	1.3	<10	7.0	284	0.75	0.31	0.063	1.1	0.63
		5th PCTL	<0.2	0.30	263	0.35	<10	50	<0.5	<2	0.030	<0.5	1.0	3.0	2.0	0.71	<10	<1	0.14	10	1.0	0.010	30	<1	<0.01	<1	70	6.0	<0.01	5.0	<1	10	<20	<0.01	<10	<10	1.0	<10	4.0	242	0.75	0.31	-0.87	0.67	0.63
		Min	<0.2	0.23	39	0.30	<10	10	<0.5	<2	<0.01	<0.5	<1	2.0	<1	0.46	<10	<1	0.090	<10	<1	<0.01	11	<1	<0.01	<1	40	<2	<0.01	<2	<1	5.0	<20	<0.01	<10	<10	<1	<10	<2	22	0.25	0.31	-13	0.10	0.63
Gneiss	Upper Transition	**n**	310	307	307	1983	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307	307
		n <DL	150	0	0	0	298	0	13	266	0	306	6	0	1	0	306	94	0	0	1	1	0	66	182	42	0	0	104	4	72	0	40	277	302	94	5	305	0	-	-	-	-	-	-
		Max	2.3	2.0	10000	42	10	2650	3.5	4.0	5.0	2.2	42	144	94	9.4	10	12	1.1	60	45	2.4	2300	27	0.070	74	1830	169	1.2	3190	22	233	70	0.15	10	70	132	30	107	4033	125	38	116	164	*Non-reactive*
		95th PCTL	0.70	0.88	3847	6.7	<10	877	1.9	2.0	3.1	<0.5	19	48	33	4.0	<10	4.0	0.37	50	21	0.76	802	4.7	0.020	32	721	29	0.45	124	9.7	116	40	0.010	<10	30	53	<10	60	2267	78	14	61	43	*Non-reactive*
		90th PCTL	0.50	0.74	3076	4.8	<10	514	1.6	2.0	1.7	<0.5	13	35	20	3.7	<10	3.0	0.31	50	13	0.28	686	3.4	0.020	19	496	24	0.24	84	7.0	81	40	<0.01	<10	20	33	<10	48	1871	41	7.6	38	24	*Non-reactive*
		75th PCTL	0.30	0.61	1930	2.6	<10	280	1.1	<2	0.31	<0.5	7.0	15	11	2.3	<10	2.0	0.26	40	5.5	0.070	444	2.0	0.010	8.0	290	20	0.080	41	3.0	44	30	<0.01	<10	10	15	<10	30	872	7.8	2.5	5.4	8.6	*Non-reactive*
		Median	0.20	0.46	1065	1.2	<10	160	0.90	<2	0.10	<0.5	3.0	8.0	6.0	1.4	<10	1.0	0.22	30	2.0	0.040	248	1.0	<0.01	3.0	170	16	0.020	21	1.0	26	30	<0.01	<10	10	5.0	<10	18	612	2.5	0.63	1.7	5.2	38
		25th PCTL	<0.2	0.39	568	0.60	<10	90	0.70	<2	0.060	<0.5	2.0	5.0	3.0	1.1	<10	<1	0.18	30	2.0	0.020	158	1.0	<0.01	1.0	120	12	<0.01	11	1.0	17	20	<0.01	<10	<10	3.0	<10	11	437	1.5	0.31	0.69	2.2	2.2
		10th PCTL	<0.2	0.33	301	0.38	<10	60	0.60	<2	0.040	<0.5	1.0	4.0	2.0	0.89	<10	<1	0.16	20	1.0	0.020	77	<1	<0.01	<1	90	10	<0.01	5.0	<1	11	<20	<0.01	<10	<10	1.0	<10	7.0	262	1.0	0.31	-1.4	0.66	0.94
		5th PCTL	<0.2	0.30	194	0.34	<10	43	0.50	<2	0.040	<0.5	1.0	3.0	1.0	0.73	<10	<1	0.14	20	1.0	0.010	46	<1	<0.01	<1	80	8.0	<0.01	3.3	<1	10	<20	<0.01	<10	<10	1.0	<10	4.0	232	1.0	0.31	-4.9	0.30	0.63
		Min	<0.2	0.22	15	0.30	<10	20	<0.5	<2	0.010	<0.5	<1	1.0	<1	0.45	<10	<1	0.10	10	<1	<0.01	20	<1	<0.01	<1	30	4.0	<0.01	<2	<1	3.0	<20	<0.01	<10	<10	<1	<10	2.0	6.0	0.25	0.31	-21	0.068	0.63
Gneiss	Lower Transition	**n**	140	140	140	917	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140
		n <DL	71	0	0	0	139	0	3	114	0	138	2	0	1	0	138	58	0	0	0	0	0	35	58	15	0	0	22	1	52	0	5	114	138	50	6	128	0	-	-	-	-	-	-
		Max	9.6	2.9	7530	50	10	2140	3.9	4.0	5.5	0.50	111	164	143	5.1	10	8.0	1.5	60	45	2.4	4920	11	0.060	85	1010	728	1.9	1690	20	244	50	0.12	10	60	95	10	125	3758	137	59	114	174	*Non-reactive*
		95th PCTL	1.8	1.1	4076	6.0	<10	1444	1.7	2.0	2.3	<0.5	17	62	30	3.2	<10	2.0	0.65	50	29	1.2	1017	3.0	0.050	30	530	29	1.1	72	6.0	104	40	0.051	<10	30	41	10	52	2680	57	34	51	36	*Non-reactive*
		90th PCTL	0.80	0.80	3225	4.3	<10	801	1.4	2.0	1.7	<0.5	13	21	18	3.0	<10	2.0	0.44	50	27	0.83	766	3.0	0.030	24	473	23	0.87	50	4.0	74	40	0.020	<10	20	28	<10	38	2410	44	27	33	23	*Non-reactive*
		75th PCTL	0.30	0.62	2230	2.3	<10	310	1.1	<2	0.84	<0.5	6.3	13	10	2.2	<10	1.0	0.29	40	19	0.29	451	2.0	0.020	8.0	290	18	0.48	21	3.0	49	30	<0.01	<10	10	10	<10	27	1361	21	15	16	6.9	*Non-reactive*
		Median	<0.2	0.50	1010	1.1	<10	120	0.85	<2	0.24	<0.5	2.0	6.0	4.0	1.3	<10	1.0	0.25	40	5.0	0.060	276	1.0	0.010	2.0	160	13	0.070	10	1.0	31	30	<0.01	<10	10	3.0	<10	16	640	5.9	2.2	1.0	2.6	18
		25th PCTL	<0.2	0.41	445	0.58	<10	60	0.70	<2	0.070	<0.5	1.0	4.0	3.0	1.0	<10	<1	0.21	30	2.0	0.030	157	0.50	<0.01	1.0	110	10	0.010	6.0	<1	22	30	<0.01	<10	<10	1.0	<10	10	325	1.8	0.31	-1.1	0.80	3.1
		10th PCTL	<0.2	0.31	268	0.38	<10	40	0.60	<2	0.050	<0.5	1.0	3.0	2.0	0.80	<10	<1	0.17	20	1.9	0.020	43	<1	<0.01	<1	90	7.0	<0.01	3.0	<1	15	20	<0.01	<10	<10	1.0	<10	7.0	153	1.3	0.31	-10	0.28	0.94
		5th PCTL	<0.2	0.27	143	0.34	<10	30	0.50	<2	0.040	<0.5	1.0	3.0	1.0	0.75	<10	<1	0.16	20	1.0	0.020	25	<1	<0.01	<1	80	6.0	<0.01	2.0	<1	12	20	<0.01	<10	<10	1.0	<10	5.0	101	1.0	0.31	-27	0.16	0.63
		Min	<0.2	0.25	24	0.30	<10	20	<0.5	<2	0.030	<0.5	<1	2.0	<1	0.56	<10	<1	0.12	10	1.0	0.010	20	<1	<0.01	<1	30	4.0	<0.01	<2	<1	7.0	<20	<0.01	<10	<10	<1	<10	3.0	33	0.75	0.31	-44	0.082	0.63
Gneiss	Transition	**n**	**450**	447	447	2900	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447
		n <DL	**221**	0	0	0	437	0	16	380	0	444	8	0	2	0	444	152	0	0	1	1	0	101	240	57	0	0	126	5	124	0	45	391	440	144	11	433	0	-	-	-	-	-	-
		Max	**9.6**	2.9	10000	50	10	2650	3.9	4.0	5.5	2.2	111	164	143	9.4	10	12	1.5	60	45	2.4	4920	27	0.070	85	1830	728	1.9	3190	22	244	70	0.15	10	70	132	30	125	4033	137	59	116	174	*Non-reactive*
		95th PCTL	**0.96**	1.1	3927	6.6	<10	927	1.9	2.0	3.1	<0.5	18	50	32	3.9	<10	4.0	0.43	50	27	0.93	886	4.0	0.030	32	617	29	0.78	107	8.0	116	40	0.020	<10	30	47	<10	59	2502	76	24	60	43	*Non-reactive*
		90th PCTL	0.50	0.75	3220	4.7	<10	622	1.5	2.0	1.7	<0.5	13	33	19	3.3	<10	3.0	0.34	50	21	0.47	698	3.0	0.020	20	488	23	0.48	77	6.0	78	40	0.010	<10	20	31	<10	45	2139	43	15	36	24	*Non-reactive*
		75th PCTL	0.30	0.62	2030	2.5	<10	280	1.1	<2	0.57	<0.5	7.0	15	11	2.3	<10	2.0	0.27	40	8.0	0.12	448	2.0	0.010	8.0	290	20	0.13	33	3.0	45	30	<0.01	<10	10	13	<10	30	982	14	4.1	7.1	8.0	*Non-reactive*
		Median	0.20	0.47	1055	1.1	<10	150	0.90	<2	0.11	<0.5	3.0	7.0	6.0	1.4	<10	1.0	0.23	30	3.0	0.040	253	1.0	<0.01	3.0	170	15	0.020	17	1.0	28	30	<0.01	<10	10	4.0	<10	17	622	2.8	0.63	1.4	4.0	22
		25th PCTL	<0.2	0.40	534	0.59	<10	80	0.70	<2	0.070	<0.5	1.0	5.0	3.0	1.1	<10	<1	0.19	30	2.0	0.030	157	1.0	<0.01	1.0	115	12	<0.01	9.0	<1	19	30	<0.01	<10	<10	2.0	<10	10	404	1.8	0.31	0.44	1.4	2.5
		10th PCTL	<0.2	0.33	280	0.38	<10	50	0.60	<2	0.040	<0.5	1.0	3.0	2.0	0.88	<10	<1	0.16	20	1.0	0.020	69	<1	<0.01	<1	90	9.0	<0.01	4.0	<1	12	4.0	<0.01	<10	<10	1.0	<10	7.0	251	1.0	0.31	-4.9	0.51	0.94
		5th PCTL	<0.2	0.28	188	0.34	<10	40	0.50	<2	0.040	<0.5	1.0	3.0	1.0	0.74	<10	<1	0.15	20	1.0	0.020	33	<1	<0.01	<1	80	7.0	<0.01	3.0	<1	11	<20	<0.01	<10	<10	1.0	<10	5.0	158	1.0	0.31	-9.4	0.23	0.63
		Min	<0.2	0.22	15	0.30	<10	20	<0.5	<2	0.010	<0.5	<1	1.0	<1	0.45	<10	<1	0.10	10	<1	<0.01	20	<1	<0.01	<1	30	4.0	<0.01	<2	<1	3.0	<20	<0.01	<10	<10	<1	<10	2.0	6.0	0.25	0.31	-44	0.068	0.63
Gneiss	All	**n**	1254	1251	1251	5764	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251	1251
		n <DL	622	0	0	0	1198	0	89	1084	1	1233	48	0	8	0	1243	470	0	4	3	3	0	296	628	123	0	1	470	7	312	0	195	1151	1241	399	15	1233	8	-	-	-	-	-	-
		Max	9.6	2.9	10000	87	10	3210	3.9	13	6.5	2.2	111	240	143	9.6	10	12	1.5	90	45	2.4	5630	30	0.070	158	1830	1190	1.9	3190	31	286	70	0.15	10	130	179	30	181	4033	163	59	161	325	*Non-reactive*
		95th PCTL	0.70	0.98	3840	7.3	<10	880	1.9	2.0	2.3	<0.5	22	48	30	5.2	<10	3.0	0.39	50	22	0.57	1093	5.0	0.020	32	700	33	0.44	141	12	112	40	0.010	<10	40	58	<10	71	1993	58	14	46	36	*Non-reactive*
		90th PCTL	0.50	0.76	2910	5.1	<10	580	1.6	2.0	1.1	<0.5	15	32	20	3.9	<10	2.0	0.32	40	13	0.25	795	4.0	0.020	21	530	25	0.18	94	8.0	80	40	<0.01	<10	30	39	<10	53	1358	27	5.6	22	18	*Non-reactive*
		75th PCTL	0.30	0.61	1840	2.6	<10	280	1.1	<2	0.18	<0.5	9.0	16	11	2.6	<10	1.0	0.27	40	4.0	0.060	462	2.0	0.010	10	300	19	0.040	47	4.0	45	30	<0.01	<10	15	16	<10	33	811	4.5	1.3	3.4	8.0	*Non-reactive*
		Median	0.20	0.48	966	1.2	<10	150	0.80	<2	0.090	<0.5	3.0	8.0	6.0	1.5	<10	1.0	0.23	30	2.0	0.030	250	1.0	<0.01	3.0	170	14	0.010	21	1.0	26	30	<0.01	<10	10	6.0	<10	18	545	2.3	0.31	1.4	4.8	*Non-reactive*
		25th PCTL	<0.2	0.40	507	0.61	<10	80	0.70	<2	0.060	<0.5	2.0	5.0	3.0	1.0	<10	<1	0.19	20	1.0	0.020	130	1.0	<0.01	1.0	110	11	<0.01	10	1.0	17	20	<0.01	<10	<10	3.0	<10	10	393	1.5	0.31	0.69	2.2	2.6
		10th PCTL	<0.2	0.34	306	0.39	<10	50	0.50	<2	0.040	<0.5	1.0	4.0	2.0	0.83	<10	<1	0.16	20	1.0	0.020	51	<1	<0.01	1.0	80	8.0	<0.01	6.0	<1	12	<20	<0.01	<10	<10	1.0	<10	7.0	275	1.0	0.31	-0.50	0.80	0.80
		5th PCTL	<0.2	0.30	235	0.34	<10	40	<0.5	<2	0.030	<0.5	1.0	3.0	1.0	0.73	<10	<1	0.14	10	1.0	0.010	31	<1	<0.01	<1	70	6.0	<0.01	4.0	<1	10	<20	<0.01	<10	<10	1.0	<10	4.0	228	0.75	0.31	-4.4	0.40	0.40
		Min	<0.2	0.22	15	0.30	<10	10	<0.5	<2	<0.01	<0.5	<1	1.0	<1	0.45	<10	<1	0.090	<10	<1	<0.01	11	<1	<0.01	<1	30	<2	<0.01	<2	<1	3.0	<20	<0.01	<10	<10	<1	<10	<2	6.0	0.25	0.31	-44	0.068	0.068

Appendix C.2-4: Statistical Summary of Exploration Assay Database (Au > 0.3 ppm)

Lithology	Oxide Facies	Statistics	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	La	Mg	Mg	Mn	Mo	Na	Ni	P	Pb	S	Sb	Sc	Sr	Th	Ti	Tl	U	V	W	Zn	As/Fe	Surrogate Ca-NP (ICP-Ca)	Surrogate AP (ICP-S)	Surrogate NNP	Surrogate NPR	Surrogate NPR
			ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	Num	%	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	Ratio	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$
Schist Ore																																													
Schist	Oxide	**n**	567	567	567	1201	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567
		n <DL	166	0	0	0	541	0	12	442	0	561	0	0	2	0	565	169	0	0	0	0	0	301	150	1	0	0	55	0	4	0	370	527	557	517	0	557	0	-	-	-	-	-	-
		Max	3.7	2.0	10000	63	10	3730	2.8	6.0	11	4.5	103	194	686	12	10	12	0.95	70	60	4.5	2810	7.0	0.070	501	2390	253	2.0	10000	14	676	40	0.090	10	40	108	20	253	3802	263	62	261	632	*Non-reactive*
		95th PCTL	1.4	1.0	8006	12	<10	2080	1.6	3.0	5.7	<0.5	21	52	55	4.7	<10	3.0	0.41	60	38	1.7	1020	2.0	0.030	60	840	37	0.54	514	9.0	293	30	0.010	<10	10	40	<10	78	2229	142	17	137	206	*Non-reactive*
		90th PCTL	0.80	0.89	5832	6.5	<10	1754	1.5	2.0	4.6	<0.5	18	38	42	4.2	<10	2.0	0.37	50	30	1.3	879	1.0	0.020	49	720	27	0.33	196	7.0	222	20	<0.01	<10	<10	34	<10	70	1752	116	10	109	121	*Non-reactive*
		75th PCTL	0.50	0.74	3610	3.0	<10	800	1.2	<2	2.9	<0.5	15	22	29	3.6	<10	1.0	0.33	40	18	0.62	663	1.0	0.010	35	560	18	0.10	72	5.0	129	20	<0.01	<10	<10	19	<10	57	1110	72	3.1	68	47	24
		Median	0.30	0.60	2450	1.5	<10	350	0.90	<2	1.3	<0.5	12	15	19	3.1	<10	1.0	0.28	30	5.0	0.14	506	<1	0.010	24	440	13	0.050	27	4.0	72	<20	<0.01	<10	<10	12	<10	47	786	33	1.6	26	17	2.8
		25th PCTL	<0.2	0.47	1340	0.69	<10	160	0.80	<2	0.33	<0.5	8.0	9.0	11	2.5	<10	<1	0.24	30	2.0	0.070	361	<1	<0.01	14	330	10	0.020	12	3.0	42	<20	<0.01	<10	<10	8.0	<10	35	538	8.3	0.63	6.4	5.6	1.3
		10th PCTL	<0.2	0.38	802	0.44	<10	98	0.60	<2	0.20	<0.5	5.0	6.0	6.8	1.7	<10	<1	0.21	20	2.0	0.050	252	<1	<0.01	5.0	198	8.0	0.010	7.0	2.0	29	<20	<0.01	<10	<10	5.0	<10	22	348	5.0	0.31	3.4	2.9	0.63
		5th PCTL	<0.2	0.34	584	0.38	<10	70	0.50	<2	0.14	<0.5	4.0	4.0	4.0	1.4	<10	<1	0.18	20	1.0	0.040	201	<1	<0.01	3.0	150	7.0	<0.01	5.0	1.0	21	<20	<0.01	<10	<10	3.0	<10	16	273	3.5	0.31	2.1	1.6	0.63
		Min	<0.2	0.23	184	0.30	<10	40	<0.5	<2	0.030	<0.5	1.0	2.0	<1	0.66	<10	<1	0.12	10	0.00	0.020	43	<1	<0.01	<1	40	4.0	<0.01	2.0	<1	12	<20	<0.01	<10	<10	1.0	<10	5.0	154	0.75	0.31	-16	0.48	0.63
Schist	Upper Transition	**n**	227	227	227	506	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227
		n <DL	69	0	0	0	209	0	11	201	0	225	0	0	0	0	222	108	0	0	0	0	0	113	60	4	0	0	6	5	3	0	141	183	227	220	0	217	0	-	-	-	-	-	-
		Max	206	3.7	10000	79	10	2030	2.1	7.0	15	1.8	37	324	1180	5.7	10	15	1.4	60	59	3.1	1575	10	0.040	274	1150	63	4.3	537	19	723	30	0.13	<10	10	120	1350	379	4831	380	135	364	176	*Non-reactive*
		95th PCTL	1.8	1.4	7693	11	10	1070	1.4	2.0	6.6	<0.5	24	87	86	4.4	<10	2.0	0.54	40	40	2.3	1055	2.0	0.030	71	774	33	2.5	121	10	443	20	0.047	<10	<10	45	<10	88	2582	165	77	142	64	118
		90th PCTL	1.3	1.1	6294	7.4	<10	686	1.3	2.0	5.4	<0.5	19	50	53	4.0	<10	2.0	0.41	40	38	2.1	873	2.0	0.020	52	704	26	2.3	64	8.0	324	20	0.010	<10	<10	38	<10	74	1970	136	70	107	36	74
		75th PCTL	0.60	0.81	4720	3.3	<10	340	1.1	<2	3.8	<0.5	15	25	26	3.6	<10	1.0	0.35	30	32	1.4	630	1.0	0.020	36	550	17	1.5	33	6.0	224	20	<0.01	<10	<10	27	<10	61	1331	95	46	66	8.8	49
		Median	0.30	0.60	2530	1.3	<10	200	0.90	<2	2.7	<0.5	11	15	17	3.0	<10	1.0	0.29	30	27	0.99	515	1.0	0.010	22	430	12	0.82	16	4.0	149	<20	<0.01	<10	<10	13	<10	45	916	68	26	39	2.5	28
		25th PCTL	<0.2	0.47	1433	0.61	<10	100	0.70	<2	2.1	<0.5	8.0	8.5	10	2.4	<10	<1	0.25	20	19	0.67	393	<1	<0.01	14	330	10	0.25	7.5	2.0	105	<20	<0.01	<10	<10	6.0	<10	34	547	53	7.7	18	1.6	8.8
		10th PCTL	<0.2	0.38	752	0.39	<10	70	0.50	<2	1.2	<0.5	6.0	6.0	6.0	1.9	<10	<1	0.23	10	12	0.36	300	<1	<0.01	6.2	210	7.0	0.050	5.0	1.6	65	<20	<0.01	<10	<10	4.0	<10	23	303	31	1.6	2.6	1.1	2.7
		5th PCTL	<0.2	0.33	404	0.35	<10	43	0.50	<2	0.85	<0.5	4.0	4.0	5.0	1.3	<10	<1	0.20	10	7.0	0.19	229	<1	<0.01	4.0	170	6.0	0.030	4.0	1.0	42	<20	<0.01	<10	<10	3.0	<10	18	231	21	0.94	-9.3	0.88	0.94
		Min	<0.2	0.26	116	0.31	<10	30	<0.5	<2	0.070	<0.5	1.0	2.0	2.0	0.67	<10	<1	0.080	10	2.0	0.030	93	<1	<0.01	<1	30	2.0	<0.01	<2	<1	11	<20	<0.01	<10	<10	1.0	<10	6.0	29	1.8	0.31	-36	0.51	0.63
Schist	Lower Transition	**n**	62	62	62	215	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
		n <DL	25	0	0	0	59	0	4	52	0	61	0	0	0	0	51	31	0	0	0	0	0	35	22	0	0	0	4	2	0	0	52	35	62	59	0	61	0	-	-	-	-	-	-
		Max	1.7	3.1	10000	66	10	1010	2.5	3.0	25	0.60	41	178	58	7.7	10	3.0	2.1	40	90	4.8	1135	20	0.080	133	1190	67	3.6	887	22	2680	20	0.20	<10	10	94	30	141	2618	625	111	623	429	*Non-reactive*
		95th PCTL	0.90	2.7	7908	11	<10	662	2.1	3.0	5.9	<0.5	23	102	48	4.5	10	2.0	1.7	40	46	2.8	1125	9.6	0.040	48	868	43	3.2	104	12	482	20	0.17	<10	<10	81	<10	102	2387	147	101	134	302	*Non-reactive*
		90th PCTL	0.80	2.5	5573	5.8	<10	416	1.5	2.0	5.3	<0.5	20	88	35	4.2	10	1.0	1.4	30	40	2.4	1119	1.0	0.030	47	697	38	3.0	68	11	385	20	0.14	<10	<10	77	<10	94	1897	132	95	102	249	*Non-reactive*
		75th PCTL	0.38	1.1	3650	2.6	<10	250	1.2	<2	3.7	<0.5	18	56	25	3.8	<10	1.0	0.47	30	34	1.7	754	1.0	0.030	35	560	19	2.0	35	8.0	291	<20	0.038	<10	<10	54	<10	62	1181	91	61	76	41	101
		Median	0.20	0.72	2100	0.94	<10	140	0.90	<2	3.0	<0.5	14	19	16	3.1	<10	0.00	0.36	20	28	1.2	615	<1	0.015	26	410	11	1.1	13	5.0	160	<20	<0.01	<10	<10	22	<10	48	624	74	35	38	2.6	52
		25th PCTL	<0.2	0.57	895	0.46	<10	90	0.80	<2	2.4	<0.5	10	11	9.0	2.7	<10	<1	0.28	20	24	0.95	487	<1	<0.01	19	333	8.0	0.023	7.0	3.0	108	<20	<0.01	<10	<10	12	<10	36	285	60	0.70	9.6	1.2	28
		10th PCTL	<0.2	0.50	293	0.36	<10	60	0.50	<2	1.4	<0.5	5.1	10	7.0	2.0	<10	<1	0.20	10	19	0.55	354	<1	<0.01	12	251	6.0	0.010	5.0	2.0	43	<20	<0.01	<10	<10	7.1	<10	26	73	34	0.31	-15	0.83	2.5
		5th PCTL	<0.2	0.43	25	0.33	<10	50	<0.5	<2	0.41	<0.5	4.0	6.0	6.0	1.5	<10	<1	0.17	10	3.5	0.27	294	<1	<0.01	7.2	230	3.1	<0.01	2.2	2.0	32	<20	<0.01	<10	<10	7.0	<10	21	6.0	10	0.31	-18	0.78	0.64
		Min	<0.2	0.15	7.0	0.30	<10	40	<0.5	<2	0.17	<0.5	1.0	4.0	1.0	0.51	<10	<1	0.080	10	2.0	0.050	212	<1	<0.01	3.0	110	3.0	<0.01	<2	1.0	13	<20	<0.01	<10	<10	4.0	<10	10	2.4	4.3	0.31	-67	0.31	0.63
Schist	Transition	**n**	289	289	289	721	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289
		n <DL	94	0	0	0	268	0	15	253	0	286	0	0	0	0	273	139	0	0	0	0	0	148	82	4	0	0	10	7	3	0	193	218	289	279	0	278	0	-	-	-	-	-	-
		Max	206	3.7	10000	79	10	2030	2.5	7.0	25	1.8	41	324	1180	7.7	10	15	2.1	60	90	4.8	1575	20	0.080	274	1190	67	4.3	887	22	2680	30	0.20	<10	10	120	1350	379	4831	625	135	623	429	*Non-reactive*
		95th PCTL	1.5	2.0	7990	11	10	1034	1.5	2.0	6.6	<0.5	24	90	77	4.5	10	2.0	0.84	40	41	2.5	1110	2.0	0.030	68	800	39	2.7	106	11	470	20	0.060	<10	<10	70	<10	97	2563	164	85	143	93	*Non-reactive*
		90th PCTL	1.0	1.3	6162	7.1	<10	650	1.3	2.0	5.4	<0.5	20	63	48	4.1	<10	2.0	0.50	40	38	2.2	965	2.0	0.030	48	700	26	2.3	68	9.0	342	20	0.032	<10	<10	51	<10	74	1953	134	70	107	62	101
		75th PCTL	0.60	0.88	4670	3.0	<10	320	1.1	<2	3.8	<0.5	15	26	26	3.6	<10	1.0	0.36	30	33	1.4	666	1.0	0.020	35	550	18	1.6	34	6.0	237	20	<0.01	<10	<10	29	<10	61	1306	95	49	67	11	56
		Median	0.20	0.63	2390	1.2	<10	180	0.90	<2	2.9	<0.5	11	15	17	3.0	<10	1.0	0.29	20	27	1.1	525	<1	0.010	24	430	12	0.83	14	4.0	156	<20	<0.01	<10	<10	14	<10	46	895	73	26	38	2.6	31
		25th PCTL	<0.2	0.49	1310	0.56	<10	100	0.70	<2	2.1	<0.5	8.0	9.0	10	2.4	<10	<1	0.25	20	20	0.67	412	<1	<0.01	15	330	9.0	0.21	7.0	2.0	107	<20	<0.01	<10	<10	7.0	<10	34	478	53	6.6	15	1.5	10
		10th PCTL	<0.2	0.41	521	0.38	<10	68	0.50	<2	1.3	<0.5	6.0	6.0	6.0	1.9	<10	<1	0.22	10	13	0.37	314	<1	<0.01	7.0	220	7.0	0.030	5.0	2.0	60	<20	<0.01	<10	<10	4.0	<10	23	246	32	0.94	1.0	1.0	2.5
		5th PCTL	<0.2	0.33	293	0.34	<10	44	<0.5	<2	0.60	<0.5	4.0	4.0	5.0	1.4	<10	<1	0.19	10	7.0	0.20	240	<1	<0.01	4.0	170	6.0	0.010	3.4	1.0	38	<20	<0.01	<10	<10	3.0	<10	18	130	15	0.31	-16	0.80	0.94
		Min	<0.2	0.15	7.0	0.30	<10	30	<0.5	<2	0.070	<0.5	1.0	2.0	1.0	0.51	<10	<1	0.080	10	2.0	0.030	93	<1	<0.01	<1	30	2.0	<0.01	<2	<1	11	<20	<0.01	<10	<10	1.0	<10	6.0	2.4	1.8	0.31	-67	0.31	0.63
Schist	All	**n**	856	856	856	1922	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856	856
		n <DL	260	0	0	0	809	0	27	695	0	847	0	0	2	0	838	308	0	0	0	0	0	449	232	5	0	0	65	7	7	0	563	745	846	796	0	835	0	-	-	-	-	-	-
		Max	206	3.7	10000	79	10	3730	2.8	7.0	25	4.5	103	324	1180	12	10	15	2.1	70	90	4.8	2810	20	0.080	501	2390	253	4.3	10000	22	2680	40	0.20	10	40	120	1350	379	4831	625	135	623	632	*Non-reactive*
		95th PCTL	1.4	1.2	8070	12	10	1903	1.6	3.0	6.1	<0.5	23	66	59	4.7	<10	3.0	0.47	50	40	2.2	1065	2.0	0.030	65	840	37	2.0	391	10	338	30	0.020	<10	10	47	<10	80	2351	154	62	139	174	*Non-reactive*
		90th PCTL	0.90	0.99	5900	6.7	<10	1380	1.4	2.0	5.1	<0.5	19	45	43	4.1	<10	2.0	0.40	40	35	1.6	888	2.0	0.020	48	710	27	1.5	150	8.0	266	20	0.010	<10	<10	38	<10	73	1768	126	46	107	100	*Non-reactive*
		75th PCTL	0.50	0.78	3805	3.0	<10	610	1.2	<2	3.4	<0.5	15	24	28	3.6	<10	1.0	0.34	40	27	1.1	665	1.0	0.010	35	560	18	0.49	54	6.0	170	20	<0.01	<10	<10	23	<10	59	1181	84	15	67	35	65
		Median	0.30	0.60	2450	1.3	<10	270	0.90	<2	2.1	<0.5	12	15	18	3.1	<10	1.0	0.29	30	14	0.48	515	<1	0.010	24	435	13	0.070	22	4.0	101	<20	<0.01	<10	<10	12	<10	46	808	51	2.2	33	9.9	11
		25th PCTL	<0.2	0.48	1315	0.64	<10	130	0.80	<2	0.60	<0.5	8.0	9.0	10	2.5	<10	<1	0.25	20	3.0	0.080	372	<1	<0.01	14	330	10	0.020	10	3.0	50	<20	<0.01	<10	<10	8.0	<10	34	522	15	0.63	7.4	2.9	2.9
		10th PCTL	<0.2	0.38	756	0.41	<10	80	0.60	<2	0.22	<0.5	5.0	6.0	6.0	1.8	<10	<1	0.21	20	2.0	0.050	267	<1	<0.01	5.0	210	8.0	0.010	6.0	2.0	32	<20	<0.01	<10	<10	4.0	<10	22	317	5.5	0.31	2.9	1.4	1.4
		5th PCTL	<0.2	0.33	516	0.36	<10	60	0.50	<2	0.18	<0.5	4.0	4.0	4.0	1.4	<10	<1	0.19	10	1.0	0.040	204	<1	<0.01	3.0	160	6.0	<0.01	5.0	1.0	24	<20	<0.01	<10	<10	3.0	<10	16	238	4.4	0.31	0.56	1.0	1.0
		Min	<0.2	0.15	7.0	0.30	<10	30	<0.5	<2	0.030	<0.5	1.0	2.0	<1	0.51	<10	<1	0.080	10	0.00	0.020	43	<1	<0.01	<1	30	2.0	<0.01	<2	<1	11	<20	<0.01	<10	<10	1.0	<10	5.0	2.4	0.75	0.31	-67	0.31	0.31

Appendix C.2-4: Statistical Summary of Exploration Assay Database (Au > 0.3 ppm)

Lithology	Oxide Facies	Statistics	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	La	Mg	Mg	Mn	Mo	Na	Ni	P	Pb	S	Sb	Sc	Sr	Th	Ti	Tl	U	V	W	Zn	As/Fe	Surrogate Ca-NP (ICP-Ca)	Surrogate AP (ICP-S)	Surrogate NNP	Surrogate NPR	Surrogate NPR
			ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	Num	%	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	Ratio	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$
Granite Ore																																													
Granite	Oxide	**n**	144	141	141	150	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141
		n <DL	99	0	0	0	131	1	59	114	8	141	27	0	3	0	140	47	0	0	5	5	0	25	97	29	0	0	58	0	35	0	22	141	140	44	1	141	7	-	-	-	-	-	-
		Max	9.4	1.2	10000	20	10	430	2.1	4.0	0.23	<0.5	11	10	21	11	10	5.0	0.33	30	4.0	0.060	23700	8.0	0.020	6.0	940	59	0.81	468	7.0	124	40	<0.01	10	160	24	<10	165	8543	5.8	25	3.4	11	*Non-reactive*
		95th PCTL	0.30	0.77	7410	8.3	10	190	1.1	2.0	0.10	<0.5	7.0	7.0	9.0	4.3	<10	3.0	0.25	30	2.0	0.020	2730	3.0	0.010	4.0	280	36	0.070	171	4.0	60	30	<0.01	<10	60	15	<10	58	4367	2.5	2.2	2.2	8.0	*Non-reactive*
		90th PCTL	0.20	0.68	4770	4.5	<10	150	0.90	2.0	0.090	<0.5	6.0	7.0	5.0	3.6	<10	2.0	0.23	30	2.0	0.020	1785	3.0	0.010	2.0	220	29	0.040	90	3.0	48	30	<0.01	<10	40	11	<10	48	3493	2.3	1.3	1.7	6.4	*Non-reactive*
		75th PCTL	0.20	0.55	3150	2.4	<10	100	0.70	<2	0.070	<0.5	3.0	6.0	3.0	2.2	<10	1.0	0.21	20	1.0	0.020	603	2.0	0.010	2.0	170	24	0.020	34	1.0	36	30	<0.01	<10	20	4.0	<10	33	2452	1.8	0.63	1.4	5.6	*Non-reactive*
		Median	<0.2	0.48	2030	1.2	<10	60	0.50	<2	0.060	<0.5	2.0	4.0	2.0	1.5	<10	1.0	0.17	20	1.0	0.010	138	1.0	<0.01	1.0	120	19	0.010	16	1.0	21	20	<0.01	<10	10	2.0	<10	20	1121	1.5	0.31	0.94	4.0	*Non-reactive*
		25th PCTL	<0.2	0.39	1185	0.64	<10	40	<0.5	<2	0.040	<0.5	1.0	3.0	2.0	1.1	<10	<1	0.14	20	1.0	0.010	45	1.0	<0.01	1.0	80	16	<0.01	10	1.0	14	20	<0.01	<10	<10	2.0	<10	8.0	651	1.0	0.31	0.31	1.6	1.3
		10th PCTL	<0.2	0.34	925	0.44	<10	30	<0.5	<2	0.010	<0.5	<1	2.0	1.0	0.85	<10	<1	0.12	10	0.00	0.010	24	<1	<0.01	<1	60	14	<0.01	7.0	<1	11	<20	<0.01	<10	<10	1.0	<10	3.0	511	0.25	0.31	-0.38	0.40	0.63
		5th PCTL	<0.2	0.32	711	0.34	<10	20	<0.5	<2	<0.01	<0.5	<1	1.0	1.0	0.78	<10	<1	0.10	10	0.00	0.010	19	<1	<0.01	<1	60	13	<0.01	5.0	<1	10	<20	<0.01	<10	<10	1.0	<10	2.0	464	0.25	0.31	-1.9	0.16	0.63
		Min	<0.2	0.17	581	0.30	<10	<10	<0.5	<2	<0.01	<0.5	<1	1.0	<1	0.38	<10	<1	0.060	10	<1	<0.01	11	<1	<0.01	<1	40	10	<0.01	2.0	<1	5.0	<20	<0.01	<10	<10	<1	<10	<2	341	0.25	0.31	-20	0.035	0.63
Granite	Upper Transition	**n**	28	20	20	60	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
		n <DL	13	0	0	0	11	0	8	18	7	20	4	0	3	0	20	7	0	0	0	0	0	9	13	8	0	0	2	0	11	3	1	20	20	6	2	20	1	-	-	-	-	-	-
		Max	6.9	1.1	10000	17	10	90	1.9	2.0	0.060	<0.5	4.0	8.0	8.0	5.8	<10	10	0.31	30	2.0	0.030	234	3.0	0.010	2.0	590	32	0.91	268	2.0	29	40	<0.01	<10	50	12	<10	60	8850	1.5	28	1.2	4.8	*Non-reactive*
		95th PCTL	4.2	0.97	6390	8.6	10	90	1.1	2.0	0.060	<0.5	3.1	8.0	4.2	4.5	<10	2.4	0.29	21	2.0	0.021	224	3.0	0.010	2.0	476	30	0.70	160	2.0	22	31	<0.01	<10	31	9.2	<10	37	4825	1.5	22	1.2	4.8	*Non-reactive*
		90th PCTL	2.2	0.96	5777	5.3	10	72	1.1	<2	0.060	<0.5	3.0	8.0	4.0	3.9	<10	1.1	0.29	20	2.0	0.020	201	3.0	0.010	2.0	344	30	0.52	48	1.1	21	30	<0.01	<10	21	7.2	<10	34	3949	1.5	16	0.96	4.1	*Non-reactive*
		75th PCTL	0.72	0.60	3325	2.7	10	50	0.83	<2	0.050	<0.5	2.3	6.3	2.0	1.8	<10	1.0	0.24	20	1.3	0.020	124	2.0	0.010	2.0	225	27	0.31	24	1.0	16	30	<0.01	<10	10	6.3	<10	20	3037	1.3	9.8	-0.047	1.0	2521
		Median	0.20	0.48	2008	1.3	<10	40	0.50	<2	0.020	<0.5	2.0	5.0	2.0	1.3	<10	1.0	0.22	20	1.0	0.010	69	1.0	<0.01	1.0	130	20	0.15	12	<1	9.5	30	<0.01	<10	10	2.0	<10	15	2148	0.50	4.7	-3.9	0.11	11
		25th PCTL	<0.2	0.43	1733	0.80	<10	30	<0.5	<2	<0.01	<0.5	1.0	3.8	1.8	0.99	<10	<1	0.20	18	1.0	0.010	31	<1	<0.01	<1	70	14	0.018	8.5	<1	5.8	28	<0.01	<10	<10	1.0	<10	4.5	1132	0.25	0.55	-9.5	0.034	4.8
		10th PCTL	<0.2	0.38	1510	0.43	<10	20	<0.5	<2	<0.01	<0.5	<1	2.0	<1	0.54	<10	<1	0.17	10	0.00	0.010	20	<1	<0.01	<1	60	12	0.0080	4.8	<1	<1	20	<0.01	<10	<10	0.80	<10	2.0	582	0.25	0.31	-16	0.028	1.8
		5th PCTL	<0.2	0.34	1470	0.40	<10	20	<0.5	<2	<0.01	<0.5	<1	2.0	<1	0.53	<10	<1	0.16	10	0.00	0.010	20	<1	<0.01	<1	59	12	<0.01	3.0	<1	<1	18	<0.01	<10	<10	<1	<10	1.8	470	0.25	0.31	-21	0.019	1.2
		Min	<0.2	0.32	719	0.35	<10	20	<0.5	<2	<0.01	<0.5	<1	2.0	<1	0.42	<10	<1	0.12	10	0.00	0.010	19	<1	<0.01	<1	40	9.0	<0.01	3.0	<1	<1	<20	<0.01	<10	<10	<1	<10	<2	396	0.25	0.31	-27	0.016	0.63
Granite	Lower Transition	**n**	17	7.0	7.0	33	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
		n <DL	5	0	0	0	5	0	4	7	3	7	1	0	1	0	7	3	0	0	3	3	0	1	1	0	0	0	0	0	0	0	2	7	7	4	0	7	0	-	-	-	-	-	-
		Max	8.9	0.94	5820	11	10	90	0.80	<2	0.51	<0.5	2.0	15	9.0	2.1	<10	5.0	0.19	30	8.0	0.13	719	3.0	0.030	2.0	220	34	0.36	117	8.0	30	30	<0.01	<10	70	13	<10	48	5578	13	11	6.5	5.6	*Non-reactive*
		95th PCTL	8.9	0.84	5697	10.0	10	84	0.74	<2	0.38	<0.5	2.0	13	8.4	1.9	<10	3.8	0.18	27	6.5	0.100	539	2.7	0.027	2.0	202	31	0.33	103	7.4	29	30	<0.01	<10	52	13	<10	41	5481	9.4	10	5.0	4.9	*Non-reactive*
		90th PCTL	8.9	0.75	5574	9.4	10	78	0.68	<2	0.25	<0.5	2.0	11	7.8	1.7	<10	2.6	0.18	24	5.0	0.070	359	2.4	0.024	2.0	184	27	0.29	89	6.8	27	30	<0.01	<10	34	13	<10	35	5383	6.2	9.2	3.5	4.2	*Non-reactive*
		75th PCTL	3.9	0.56	5020	4.6	0.00	70	0.55	<2	0.055	<0.5	1.5	8.5	5.5	1.3	<10	1.0	0.16	20	2.5	0.025	94	1.5	0.015	2.0	150	21	0.23	69	3.5	24	30	<0.01	<10	10	9.5	<10	19	5113	1.4	7.0	1.1	2.6	5006
		Median	1.2	0.48	3290	1.8	<10	50	<0.5	<2	0.040	<0.5	1.0	7.0	2.0	1.0	<10	1.0	0.13	20	1.0	0.010	54	1.0	0.010	2.0	110	18	0.19	62	1.0	21	20	<0.01	<10	<10	4.0	<10	11	4062	1.0	5.9	-0.69	0.27	7.8
		25th PCTL	<0.2	0.43	1048	0.67	<10	40	<0.5	<2	<0.01	<0.5	1.0	4.0	2.0	0.82	<10	<1	0.11	10	<1	<0.01	14	1.0	0.010	1.0	75	16	0.020	26	1.0	19	0.00	<0.01	<10	<10	3.0	<10	3.0	802	0.25	0.63	-6.6	0.065	6.1
		10th PCTL	<0.2	0.32	662	0.47	<10	36	<0.5	<2	<0.01	<0.5	0.20	2.6	0.80	0.75	<10	<1	0.096	10	<1	<0.01	11	0.20	0.0020	1.0	66	15	0.010	4.2	1.0	13	<20	<0.01	<10	<10	2.6	<10	3.0	600	0.25	0.31	-8.6	0.038	3.9
		5th PCTL	<0.2	0.28	632	0.43	<10	33	<0.5	<2	<0.01	<0.5	<0.4	2.3	<1	0.70	<10	<1	0.093	10	<1	<0.01	10	<0.4	<0.01	1.0	63	15	0.010	3.6	1.0	8.9	<20	<0.01	<10	<10	2.3	<10	3.0	542	0.25	0.31	-9.4	0.035	2.4
		Min	<0.2	0.23	603	0.30	<10	30	<0.5	<2	<0.01	<0.5	<1	2.0	<1	0.65	<10	<1	0.090	10	<1	<0.01	10	<1	<0.01	1.0	60	14	0.010	3.0	1.0	5.0	<20	<0.01	<10	<10	2.0	<10	3.0	483	0.25	0.31	-10	0.032	0.94
Granite	Transition	**n**	45	27	27	93	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
		n <DL	18	0	0	0	16	0	12	25	10	27	5	0	4	0	27	10	0	0	3	3	0	10	14	8	0	0	2	0	11	3	3	27	27	10	2	27	1	-	-	-	-	-	-
		Max	8.9	1.1	10000	17	10	90	1.9	2.0	0.51	<0.5	4.0	15	9.0	5.8	<10	10	0.31	30	8.0	0.13	719	3.0	0.030	2.0	590	34	0.91	268	8.0	30	40	<0.01	<10	70	13	<10	60	8850	13	28	6.5	5.6	*Non-reactive*
		95th PCTL	8.5	0.96	6086	10.0	10	90	1.1	0.80	0.067	<0.5	3.0	8.7	7.7	4.3	<10	4.1	0.29	27	2.7	0.030	231	3.0	0.017	2.0	428	31	0.63	143	4.8	28	30	<0.01	<10	44	13	<10	44	5481	1.7	20	1.4	4.8	*Non-reactive*
		90th PCTL	4.9	0.95	5766	6.9	10	78	0.98	<2	0.060	<0.5	3.0	8.0	5.2	3.0	<10	1.4	0.28	20	2.0	0.024	208	3.0	0.010	2.0	330	30	0.49	89	2.0	23	30	<0.01	<10	24	10	<10	35	5086	1.5	15	1.2	4.3	*Non-reactive*
		75th PCTL	2.1	0.61	3715	3.3	10	55	0.75	<2	0.050	<0.5	2.0	7.0	2.5	1.6	<10	1.0	0.23	20	2.0	0.020	119	2.0	0.010	2.0	205	27	0.27	42	1.0	21	30	<0.01	<10	10	6.5	<10	20	3465	1.3	8.3	0.19	1.6	5014
		Median	0.20	0.48	2200	1.5	<10	40	0.50	<2	0.020	<0.5	1.0	5.0	2.0	1.2	<10	1.0	0.21	20	1.0	0.010	67	1.0	<0.01	1.0	110	19	0.16	12	1.0	12	30	<0.01	<10	10	3.0	<10	12	2181	0.50	5.0	-3.4	0.12	8.8
		25th PCTL	<0.2	0.42	1650	0.72	<10	30	<0.5	<2	<0.01	<0.5	1.0	3.5	2.0	0.83	<10	<1	0.17	10	1.0	0.010	26	<1	<0.01	<1	70	15	0.015	8.0	<1	6.5	20	<0.01	<10	<10	1.0	<10	3.0	960	0.25	0.47	-8.0	0.038	5.5
		10th PCTL	<0.2	0.36	1125	0.44	<10	20	<0.5	<2	<0.01	<0.5	<1	2.0	<1	0.61	<10	<1	0.12	10	<1	0.0020	18	<1	<0.01	<1	60	12	0.010	4.2	<1	0.20	4.0	<0.01	<10	<10	1.0	<10	2.0	550	0.25	0.31	-15	0.031	1.6
		5th PCTL	<0.2	0.33	706	0.40	<10	20	<0.5	<2	<0.01	<0.5	<1	2.0	<1	0.54	<10	<1	0.11	10	<1	<0.01	13	<1	<0.01	<1	60	12	<0.01	3.0	<1	<1	<20	<0.01	<10	<10	<0.4	<10	2.0	477	0.25	0.31	-19	0.022	1.0
		Min	<0.2	0.23	603	0.30	<10	20	<0.5	<2	<0.01	<0.5	<1	2.0	<1	0.42	<10	<1	0.090	10	<1	<0.01	10	<1	<0.01	<1	40	9.0	<0.01	3.0	<1	<1	<20	<0.01	<10	<10	<1	<10	<2	396	0.25	0.31	-27	0.016	0.63
Granite	All	**n**	189	168	168	243	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168
		n <DL	117	0	0	0	147	1	71	139	18	168	32	0	7	0	167	57	0	0	8	8	0	35	111	37	0	0	60	0	46	3	25	168	167	54	3	168	8	-	-	-	-	-	-
		Max	9.4	1.2	10000	20	10	430	2.1	4.0	0.51	<0.5	11	15	21	11	10	10	0.33	30	8.0	0.13	23700	8.0	0.030	6.0	940	59	0.91	468	8.0	124	40	<0.01	10	160	24	<10	165	8850	13	28	6.5	11	*Non-reactive*
		95th PCTL	3.4	0.91	7190	8.9	10	177	1.1	2.0	0.10	<0.5	7.0	8.0	8.7	4.3	<10	3.0	0.27	30	2.7	0.030	2619	3.0	0.010	3.0	330	35	0.25	169	4.7	59	30	<0.01	<10	60	15	<10	57	4687	2.5	7.8	2.2	6.9	*Non-reactive*
		90th PCTL	0.94	0.69	5494	5.5	10	143	0.90	2.0	0.083	<0.5	5.0	7.0	5.0	3.7	<10	2.0	0.24	23	2.0	0.020	1551	3.0	0.010	2.0	233	30	0.15	93	3.0	48	30	<0.01	<10	40	11	<10	48	3867	2.1	4.8	1.7	6.4	*Non-reactive*
		75th PCTL	0.20	0.55	3293	2.7	<10	90	0.70	<2	0.070	<0.5	3.0	6.0	3.0	2.1	<10	1.0	0.21	20	1.0	0.020	485	2.0	0.010	2.0	170	24	0.030	36	1.0	32	30	<0.01	<10	20	4.0	<10	32	2606	1.8	0.94	1.4	5.6	*Non-reactive*
		Median	<0.2	0.48	2035	1.3	<10	55	0.50	<2	0.060	<0.5	2.0	4.5	2.0	1.5	<10	1.0	0.18	20	1.0	0.010	117	1.0	<0.01	1.0	120	19	0.010	15	1.0	20	30	<0.01	<10	10	2.0	<10	19	1201	1.5	0.31	0.94	3.2	*Non-reactive*
		25th PCTL	<0.2	0.39	1353	0.67	<10	40	<0.5	<2	0.030	<0.5	1.0	3.0	2.0	1.0	<10	<1	0.14	20	1.0	0.010	37	1.0	<0.01	1.0	80	16	<0.01	10	<1	13	20	<0.01	<10	<10	1.0	<10	5.8	674	0.75	0.31	-0.13	0.80	0.80
		10th PCTL	<0.2	0.34	901	0.44	<10	30	<0.5	<2	<0.01	<0.5	<1	2.0	1.0	0.80	<10	<1	0.12	10	0.00	0.010	21	<1	<0.01	<1	60	14	<0.01	6.7	<1	9.0	<20	<0.01	<10	<10	1.0	<10	3.0	509	0.25	0.31	-3.7	0.12	0.12
		5th PCTL	<0.2	0.32	707	0.38	<10	20	<0.5	<2	<0.01	<0.5	<1	2.0	1.0	0.74	<10	<1	0.10	10	0.00	0.010	18	<1	<0.01	<1	60	12	<0.01	5.0	<1	7.4	<20	<0.01	<10	<10	1.0	<10	2.0	464	0.25	0.31	-7.6	0.046	0.046
		Min	<0.2	0.17	581	0.30	<10	<10	<0.5	<2	<0.01	<0.5	<1	1.0	<1	0.38	<10	<1	0.060	10	<1	<0.01	10	<1	<0.01	<1	40	9.0	<0.01	2.0	<1	<1	<20	<0.01	<10	<10	<1	<10	<2	341	0.25	0.31	-27	0.016	0.016

Appendix C.2-4: Statistical Summary of Exploration Assay Database (Au > 0.3 ppm)

Lithology	Oxide Facies	Statistics	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	La	Mg	Mg	Mn	Mo	Na	Ni	P	Pb	S	Sb	Sc	Sr	Th	Ti	Tl	U	V	W	Zn	As/Fe	Surrogate Ca-NP (ICP-Ca)	Surrogate AP (ICP-S)	Surrogate NNP	Surrogate NPR	Surrogate NPR
			ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	Num	%	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	Ratio	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$
Other Lithologies																																													
Other	Oxide	**n**	902	901	901	2153	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901	901
		n <DL	288	0	0	0	859	0	76	760	0	879	27	2	5	0	894	321	0	16	0	0	0	319	288	76	0	2	236	1	63	0	630	840	896	503	5	875	3	-	-	-	-	-	-
		Max	4.3	2.9	10000	106	10	3480	5.3	5.0	12	1.1	111	193	148	11	10	8.0	1.5	60	68	5.1	28100	12	0.070	251	1890	194	4.0	10000	33	713	50	0.12	10	160	272	20	221	9178	290	125	289	712	*Non-reactive*
		95th PCTL	1.0	1.0	6270	21	*<10*	1190	2.1	2.0	6.5	*<0.5*	33	53	44	6.9	*<10*	3.0	0.38	40	42	2.1	1475	5.0	0.030	44	950	30	0.63	390	17	278	30	0.010	*<10*	50	89	*<10*	98	2027	163	20	154	218	*Non-reactive*
		90th PCTL	0.80	0.86	4700	12	*<10*	660	1.8	2.0	4.9	*<0.5*	27	41	35	5.9	*<10*	2.0	0.34	30	34	1.5	1135	4.0	0.020	36	740	24	0.32	232	14	205	30	*<0.01*	*<10*	30	67	*<10*	85	1357	121	10	117	136	*Non-reactive*
		75th PCTL	0.50	0.66	3310	4.5	*<10*	370	1.4	*<2*	2.4	*<0.5*	16	20	23	4.1	*<10*	1.0	0.29	30	14	0.47	760	2.0	0.010	22	540	17	0.080	103	7.0	124	20	*<0.01*	*<10*	20	32	*<10*	64	853	59	2.5	48	26	*Non-reactive*
		Median	0.20	0.52	1925	1.8	*<10*	200	1.0	*<2*	0.20	*<0.5*	10	12	12	2.8	*<10*	1.0	0.25	20	2.0	0.060	523	1.0	0.010	11	280	13	0.020	41	4.0	63	*<20*	*<0.01*	*<10*	*<10*	15	*<10*	39	588	5.0	0.63	3.7	7.0	23
		25th PCTL	*<0.2*	0.41	924	0.85	*<10*	110	0.60	*<2*	0.080	*<0.5*	4.0	6.0	6.0	1.9	*<10*	*<1*	0.20	10	1.0	0.030	243	*<1*	*<0.01*	3.0	160	10	*<0.01*	17	2.0	33	*<20*	*<0.01*	*<10*	*<10*	7.0	*<10*	21	421	2.0	0.31	1.2	2.7	1.9
		10th PCTL	*<0.2*	0.34	440	0.48	*<10*	60	0.50	*<2*	0.040	*<0.5*	2.0	4.0	3.0	1.1	*<10*	*<1*	0.16	10	1.0	0.020	63	*<1*	*<0.01*	1.0	90	7.0	*<0.01*	9.0	1.0	21	*<20*	*<0.01*	*<10*	*<10*	3.0	*<10*	11	306	1.0	0.31	0.063	1.1	0.63
		5th PCTL	*<0.2*	0.30	312	0.38	*<10*	50	*<0.5*	*<2*	0.030	*<0.5*	1.0	3.0	2.0	0.89	*<10*	*<1*	0.15	10	0.00	0.010	40	*<1*	*<0.01*	*<1*	70	6.0	*<0.01*	6.0	*<1*	16	*<20*	*<0.01*	*<10*	*<10*	2.0	*<10*	8.0	239	0.75	0.31	-1.8	0.48	0.63
		Min	*<0.2*	0.17	117	0.30	*<10*	20	*<0.5*	*<2*	0.010	*<0.5*	*<1*	*<1*	*<1*	0.42	*<10*	*<1*	0.080	*<10*	0.00	0.010	8.0	*<1*	*<0.01*	*<1*	30	*<2*	*<0.01*	*<2*	*<1*	4.0	*<20*	*<0.01*	*<10*	*<10*	*<1*	*<10*	*<2*	129	0.25	0.31	-52	0.0048	0.63
Other	Upper Transition	**n**	350	327	327	1204	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327	327
		n <DL	76	0	0	0	308	0	81	264	0	314	76	1	1	0	327	198	0	3	0	0	1	152	126	98	0	1	58	0	79	0	256	318	325	274	8	323	0	-	-	-	-	-	-
		Max	206	2.0	10000	109	10	1430	2.2	4.0	10	2.1	37	197	1180	5.8	*<10*	33	1.1	60	59	4.0	4130	34	0.040	342	1150	122	4.2	5020	18	509	40	0.10	10	110	64	1350	379	8772	250	132	250	800	*Non-reactive*
		95th PCTL	1.2	0.86	6367	9.5	10	570	1.6	3.0	6.8	*<0.5*	20	44	34	4.4	*<10*	2.0	0.40	40	46	2.8	912	3.0	0.030	53	771	53	1.6	595	8.7	340	20	*<0.01*	*<10*	20	32	*<10*	77	2189	171	48	149	168	*Non-reactive*
		90th PCTL	1.0	0.73	5418	6.9	*<10*	406	1.4	2.0	5.5	*<0.5*	17	33	28	3.9	*<10*	1.0	0.37	30	42	2.2	832	2.0	0.020	36	564	32	1.2	208	8.0	278	20	*<0.01*	*<10*	10	28	*<10*	63	1488	138	37	120	70	*Non-reactive*
		75th PCTL	0.60	0.61	2655	3.5	*<10*	255	1.0	*<2*	3.8	*<0.5*	11	16	17	2.9	*<10*	1.0	0.32	30	32	1.3	714	1.0	0.010	20	400	23	0.55	45	4.0	164	*<20*	*<0.01*	*<10*	*<10*	15	*<10*	48	928	96	17	70	14	*Non-reactive*
		Median	0.38	0.50	1465	1.5	*<10*	160	0.70	*<2*	0.52	*<0.5*	7.0	8.0	9.0	2.3	*<10*	*<1*	0.28	30	6.0	0.11	424	1.0	0.010	6.0	170	16	0.030	18	2.0	55	*<20*	*<0.01*	*<10*	*<10*	6.0	*<10*	35	669	13	0.94	11	4.0	34
		25th PCTL	0.20	0.45	452	0.79	*<10*	90	0.50	*<2*	0.060	*<0.5*	1.0	3.0	4.0	0.88	*<10*	*<1*	0.24	20	2.0	0.020	83	*<1*	*<0.01*	*<1*	80	12	0.010	10	1.0	21	*<20*	*<0.01*	*<10*	*<10*	2.0	*<10*	15	521	1.5	0.31	0.94	2.4	6.1
		10th PCTL	*<0.2*	0.35	259	0.47	*<10*	56	*<0.5*	*<2*	0.040	*<0.5*	*<1*	2.0	3.0	0.54	*<10*	*<1*	0.19	10	1.0	0.010	40	*<1*	*<0.01*	*<1*	70	8.0	*<0.01*	6.0	*<1*	14	*<20*	*<0.01*	*<10*	*<10*	1.0	*<10*	8.0	377	1.0	0.31	0.13	1.1	0.63
		5th PCTL	*<0.2*	0.30	218	0.38	*<10*	40	*<0.5*	*<2*	0.030	*<0.5*	*<1*	2.0	2.0	0.46	*<10*	*<1*	0.17	10	1.0	0.010	26	*<1*	*<0.01*	*<1*	60	7.0	*<0.01*	5.0	*<1*	11	*<20*	*<0.01*	*<10*	*<10*	1.0	*<10*	7.0	310	0.75	0.31	-1.7	0.44	0.63
		Min	*<0.2*	0.24	117	0.30	*<10*	20	*<0.5*	*<2*	0.010	*<0.5*	*<1*	*<1*	*<1*	0.37	*<10*	*<1*	0.080	*<10*	0.00	0.010	*<5*	*<1*	*<0.01*	*<1*	30	*<2*	*<0.01*	2.0	*<1*	5.0	*<20*	*<0.01*	*<10*	*<10*	*<1*	*<10*	2.0	66	0.25	0.31	-47	0.0053	0.63
Other	Lower Transition	**n**	111	76	76	368	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
		n <DL	24	0	0	0	66	0	9	67	2	76	2	0	0	0	74	26	0	1	0	0	0	33	24	21	0	0	2	1	4	0	68	62	73	56	4	75	0	-	-	-	-	-	-
		Max	19	2.9	10000	121	10	1450	2.7	3.0	5.4	*<0.5*	111	178	73	7.7	10	33	1.5	50	46	2.5	4920	4.0	0.080	71	1600	66	4.0	2180	22	449	40	0.19	10	140	95	10	125	5874	134	125	134	429	*Non-reactive*
		95th PCTL	10	1.5	10000	13	10	425	1.8	2.0	4.0	*<0.5*	28	56	58	5.0	*<10*	20	0.57	30	36	1.9	944	3.0	0.033	39	753	30	2.2	1275	17	233	23	0.090	*<10*	23	70	*<10*	63	5525	100	69	62	40	*Non-reactive*
		90th PCTL	4.5	1.2	9460	8.2	10	315	1.2	2.0	3.8	*<0.5*	16	30	46	3.9	*<10*	2.0	0.50	30	36	1.5	828	2.0	0.030	26	640	30	1.8	439	9.0	179	0.00	0.030	*<10*	20	52	*<10*	60	5318	96	57	55	31	*Non-reactive*
		75th PCTL	1.1	0.93	6300	3.8	*<10*	203	1.0	*<2*	3.5	*<0.5*	11	20	28	2.8	*<10*	1.0	0.40	20	31	1.3	702	1.0	0.020	15	563	20	1.5	109	6.3	129	*<20*	*<0.01*	*<10*	10	20	*<10*	48	3103	88	46	32	2.7	57
		Median	0.40	0.67	2720	1.7	*<10*	150	0.80	*<2*	0.45	*<0.5*	7.5	6.0	13	2.4	*<10*	1.0	0.31	20	12	0.28	380	1.0	0.010	2.0	250	14	1.1	39	4.0	59	*<20*	*<0.01*	*<10*	*<10*	12	*<10*	38	1049	11	35	6.9	1.3	43
		25th PCTL	0.20	0.55	1518	0.81	*<10*	98	0.50	*<2*	0.21	*<0.5*	2.0	2.0	6.8	1.9	*<10*	*<1*	0.24	10	3.0	0.10	70	*<1*	*<0.01*	*<1*	160	11	0.13	11	2.0	29	*<20*	*<0.01*	*<10*	*<10*	6.0	*<10*	24	541	5.3	3.9	-21	0.19	29
		10th PCTL	*<0.2*	0.45	208	0.42	*<10*	60	*<0.5*	*<2*	0.010	*<0.5*	1.0	1.0	4.5	1.5	*<10*	*<1*	0.18	10	1.0	0.010	22	*<1*	*<0.01*	*<1*	115	8.0	0.010	6.5	1.0	23	*<20*	*<0.01*	*<10*	*<10*	1.0	*<10*	5.5	151	0.25	0.31	-33	0.036	3.4
		5th PCTL	*<0.2*	0.44	111	0.36	*<10*	50	*<0.5*	*<2*	0.010	*<0.5*	1.0	1.0	2.0	1.1	*<10*	*<1*	0.16	10	1.0	0.010	17	*<1*	*<0.01*	*<1*	78	6.0	0.010	4.8	0.50	19	*<20*	*<0.01*	*<10*	*<10*	0.50	*<10*	3.8	47	0.25	0.31	-41	0.019	0.94
		Min	*<0.2*	0.40	7.0	0.31	*<10*	30	*<0.5*	*<2*	*<0.01*	*<0.5*	*<1*	1.0	2.0	0.67	*<10*	*<1*	0.10	*<10*	0.00	0.010	10	*<1*	*<0.01*	*<1*	40	3.0	*<0.01*	*<2*	*<1*	13	*<20*	*<0.01*	*<10*	*<10*	*<1*	*<10*	3.0	2.4	0.25	0.31	-43	0.0058	0.63
Other	Transition	**n**	461	403	403	1572	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403	403
		n <DL	100	0	0	0	374	0	90	331	2	390	78	1	1	0	401	224	0	4	0	0	1	185	150	119	0	1	60	1	83	0	324	380	398	330	12	398	0	-	-	-	-	-	-
		Max	206	2.9	10000	121	10	1450	2.7	4.0	10	2.1	111	197	1180	7.7	10	33	1.5	60	59	4.0	4920	34	0.080	342	1600	122	4.2	5020	22	509	40	0.19	10	140	95	1350	379	8772	250	132	250	800	*Non-reactive*
		95th PCTL	3.2	1.0	9249	11	10	570	1.6	2.0	6.7	*<0.5*	20	48	38	4.4	*<10*	3.0	0.47	40	45	2.7	933	3.0	0.030	51	777	47	1.8	715	9.0	312	20	0.010	*<10*	20	43	*<10*	76	4479	168	55	142	128	*Non-reactive*
		90th PCTL	1.2	0.84	6270	7.0	*<10*	390	1.4	2.0	5.2	*<0.5*	17	32	32	3.9	*<10*	2.0	0.40	30	39	2.2	835	2.0	0.020	36	600	31	1.5	254	8.0	267	20	*<0.01*	*<10*	10	31	*<10*	62	2464	131	46	113	57	*Non-reactive*
		75th PCTL	0.70	0.68	3275	3.6	*<10*	240	1.0	*<2*	3.7	*<0.5*	11	16	19	2.9	*<10*	1.0	0.33	30	32	1.3	710	1.0	0.020	20	415	22	0.84	54	5.0	158	*<20*	*<0.01*	*<10*	*<10*	15	*<10*	48	1107	93	26	59	11	*Non-reactive*
		Median	0.40	0.53	1570	1.5	*<10*	160	0.70	*<2*	0.46	*<0.5*	7.0	8.0	9.0	2.3	*<10*	*<1*	0.29	20	6.0	0.13	417	1.0	0.010	4.0	200	16	0.080	18	3.0	56	*<20*	*<0.01*	*<10*	*<10*	7.0	*<10*	36	675	12	2.5	9.2	3.9	39
		25th PCTL	0.20	0.46	512	0.79	*<10*	90	0.50	*<2*	0.060	*<0.5*	1.0	3.0	4.0	1.2	*<10*	*<1*	0.24	20	2.0	0.020	80	*<1*	*<0.01*	*<1*	80	12	0.010	10	1.0	26	*<20*	*<0.01*	*<10*	*<10*	2.0	*<10*	15	527	1.5	0.31	0.69	1.6	7.7
		10th PCTL	*<0.2*	0.37	254	0.47	*<10*	60	*<0.5*	*<2*	0.040	*<0.5*	*<1*	2.0	3.0	0.55	*<10*	*<1*	0.19	10	1.0	0.010	39	*<1*	*<0.01*	*<1*	70	8.0	*<0.01*	6.0	*<1*	15	*<20*	*<0.01*	*<10*	*<10*	1.0	*<10*	8.0	361	1.0	0.31	-3.6	0.33	0.94
		5th PCTL	*<0.2*	0.31	207	0.37	*<10*	40	*<0.5*	*<2*	0.010	*<0.5*	1.0	1.0	2.0	0.47	*<10*	*<1*	0.17	10	1.0	0.010	23	*<1*	*<0.01*	*<1*	60	7.0	*<0.01*	5.0	*<1*	12	*<20*	*<0.01*	*<10*	*<10*	1.0	*<10*	6.1	246	0.25	0.31	-24	0.12	0.63
		Min	*<0.2*	0.24	7.0	0.30	*<10*	20	*<0.5*	*<2*	*<0.01*	*<0.5*	*<1*	*<1*	*<1*	0.37	*<10*	*<1*	0.080	*<10*	0.00	0.010	*<5*	*<1*	*<0.01*	*<1*	30	*<2*	*<0.01*	*<2*	*<1*	5.0	*<20*	*<0.01*	*<10*	*<10*	*<1*	*<10*	2.0	2.4	0.25	0.31	-47	0.0053	0.63
Other	All	**n**	1363	1304	1304	3725	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304	1304
		n <DL	388	0	0	0	1233	0	166	1091	2	1269	105	3	6	0	1295	545	0	20	0	0	1	504	438	195	0	3	296	2	146	0	954	1220	1294	833	17	1273	3	-	-	-	-	-	-
		Max	206	2.9	10000	121	10	3480	5.3	5.0	12	2.1	111	197	1180	11	10	33	1.5	60	68	5.1	28100	34	0.080	342	1890	194	4.2	10000	33	713	50	0.19	10	160	272	1350	379	9178	290	132	289	800	*Non-reactive*
		95th PCTL	1.2	1.0	6762	17	10	920	2.0	2.0	6.6	*<0.5*	31	53	41	6.4	*<10*	3.0	0.40	40	43	2.3	1347	5.0	0.030	46	878	35	1.4	433	16	289	30	0.010	*<10*	50	78	*<10*	94	2747	165	45	152	214	*Non-reactive*
		90th PCTL	0.90	0.85	5190	9.6	*<10*	570	1.7	2.0	5.0	*<0.5*	23	39	34	5.3	*<10*	2.0	0.36	30	37	1.6	1035	3.0	0.020	36	710	26	0.87	242	11	221	20	*<0.01*	*<10*	30	53	*<10*	82	1518	125	27	117	111	*Non-reactive*
		75th PCTL	0.50	0.66	3315	4.1	*<10*	330	1.3	*<2*	3.0	*<0.5*	14	20	22	3.7	*<10*	1.0	0.30	30	23	0.85	745	2.0	0.010	22	500	19	0.17	93	7.0	132	20	*<0.01*	*<10*	10	27	*<10*	57	919	75	5.3	54	22	*Non-reactive*
		Median	0.30	0.52	1793	1.7	*<10*	180	0.90	*<2*	0.26	*<0.5*	9.0	10	11	2.6	*<10*	1.0	0.26	20	3.0	0.070	500	1.0	0.010	10	260	14	0.020	32	3.0	60	*<20*	*<0.01*	*<10*	*<10*	12	*<10*	37	620	6.4	0.63	4.3	6.0	59
		25th PCTL	*<0.2*	0.43	828	0.82	*<10*	110	0.60	*<2*	0.070	*<0.5*	3.0	6.0	5.0	1.7	*<10*	*<1*	0.21	10	1.0	0.030	172	*<1*	*<0.01*	2.0	130	11	0.010	14	2.0	29	*<20*	*<0.01*	*<10*	*<10*	6.0	*<10*	20	446	1.8	0.31	0.94	2.4	2.6
		10th PCTL	*<0.2*	0.34	340	0.47	*<10*	60	*<0.5*	*<2*	0.040	*<0.5*	1.0	3.0	3.0	0.89	*<10*	*<1*	0.17	10	1.0	0.020	50	*<1*	*<0.01*	*<1*	80	8.0	*<0.01*	8.0	*<1*	18	*<20*	*<0.01*	*<10*	*<10*	2.0	*<10*	9.3	318	1.0	0.31	-0.42	0.89	0.89
		5th PCTL	*<0.2*	0.31	255	0.38	*<10*	50	*<0.5*	*<2*	0.030	*<0.5*	*<1*	2.0	2.0	0.57	*<10*	*<1*	0.15	10	1.0	0.010	32	*<1*	*<0.01*	*<1*	60	6.0	*<0.01*	6.0	*<1*	14	*<20*	*<0.01*	*<10*	*<10*	1.0	*<10*	7.0	239	0.75	0.31	-4.1	0.28	0.28
		Min	*<0.2*	0.17	7.0	0.30	*<10*	20	*<0.5*	*<2*	*<0.01*	*<0.5*	*<1*	*<1*	*<1*	0.37	*<10*	*<1*	0.080	*<10*	0.00	0.010	*<5*	*<1*	*<0.01*	*<1*	30	*<2*	*<0.01*	*<2*	*<1*	4.0	*<20*	*<0.01*	*<10*	*<10*	*<1*	*<10*	*<2*	2.4	0.25	0.31	-52	0.0048	0.0048

Notes: all values in grey italics are below the analytical detection limit
n = number of samples included in statistical summary
n < DL = number of samples with values below the analytical detection limit

Appendix C.3: Static Test Results for Leach Tailings

Appendix C.3-1: Acid-Base Accounting Results for Leach Tailings Solids

Metallurgical ID (leach tailings)	Head Sample ID (ore)	Oxidation Facies	Lithology	Sample Description	Rinse pH	Paste pH	Total-S	Sulphide-S	Sulphate-S	Insoluble-S	T-AP	S-AP	Total-C	TIC	CaNP	Sobek NP	Siderite NP	CaNNP	Sobek NNP	Siderite NNP	NPR	NPR	NPR	NPR
					s.u.	s.u.	%	%	%	%	$kgCaCO_3/t$	$kgCaCO_3/t$	%	%	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	CaNP/T-AP	CaNP/S-AP	Sobek/T-AP	Siderite/T-AP
Tailings derived from Gneiss Oxide Ore																								
73004	72134	Oxide	Gneiss	Supremo Mine Block (1")	9.7	9.2	0.01	*<0.01*	*<0.01*	0.01	0.22	*<0.3*	0.042	0.020	1.7	3.5	12	1.4	3.5	12	7.6	5.6	16	55
73013	72142	Oxide	Gneiss	Supremo #1	9.6	9.3	0.01	*<0.01*	*<0.01*	0.01	0.44	*<0.3*	0.041	0.020	1.7	6.2	13	1.2	6.2	13	3.8	5.6	14	29
73022	72143	Oxide	Gneiss	Supremo #2	9.7	9.3	0.02	*<0.01*	*<0.01*	0.02	0.47	*<0.3*	0.041	0.020	1.7	2.2	8.7	1.2	2.2	8.7	3.6	5.6	4.7	19
73028	72144	Oxide	Gneiss	Supremo Oxide T1	9.6	9.3	0.03	0.01	*<0.01*	0.02	1.0	0.31	0.12	0.11	9.2	12	18	8.1	12	17	8.9	29	11	17
73034	72145	Oxide	Gneiss	Supremo Oxide T4	9.7	9.2	0.02	0.01	*<0.01*	0.01	0.69	0.31	0.37	0.36	30	30	36	29	29	36	44	96	43	53
Tailings derived from GneissTransition Ore																								
73040	72146	Transition	Gneiss	Supremo 80%	9.5	9.2	0.10	0.05	0.02	0.03	3.0	1.6	0.43	0.42	35	38	44	32	36	42	12	22	12	14
Tailings derived from Schist/Gneiss Oxide Ore																								
72186	72141	Oxide	Schist/Gneiss	DD oxide	9.6	9.3	0.13	0.1	0.01	0.02	4.0	3.1	1.0	1.0	84	79	83	80	76	80	21	27	20	21
Tailings derived from Schist Oxide Ore																								
72117	72101	Oxide	Schist	Latte -583150 Trench (6")	9.6	9.1	0.04	*<0.01*	0.02	0.02	1.1	*<0.3*	0.81	0.78	65	65	69	64	65	69	59	217	59	63
72123	72102	Oxide	Schist	Latte 583350 Trench (6")	9.7	9.2	0.05	0.02	0.02	0.01	1.5	0.63	1.2	1.2	97	96	119	95	95	118	64	155	64	79
73001	72133	Oxide	Schist	Latte mine block (1")	9.5	8.9	0.05	*<0.01*	0.04	0.01	1.6	*<0.3*	0.039	0.020	1.7	5.6	15	0.073	5.6	15	1.0	5.6	3.5	9.3
72150	72135	Oxide	Schist	Latte Oxide West	8.6	8.6	0.11	0.07	0.02	0.02	3.4	2.2	1.7	1.6	137	124	154	133	122	151	40	62	36	45
72156	72136	Oxide	Schist	Latte Oxide East	9.6	9.1	0.09	0.06	0.02	0.01	2.7	1.9	1.1	1.0	83	79	85	81	78	83	31	44	29	31
Tailings derived from Schist Transition Ore																								
72162	72137	Transition	Schist	Latte 80%'	8.9	8.4	0.41	0.33	0.04	0.04	13	10	2.1	1.9	158	146	175	146	136	165	12	15	11	14
72168	72138	Transition	Schist	Latte 60%	8.9	8.6	0.47	0.39	0.03	0.05	15	12	1.6	1.6	130	127	155	115	114	143	8.9	11	8.7	11
Tailings derived from Granite Oxide Ore																								
72174	72139	Oxide	Granite	Kona Oxide	9.7	9.2	0.03	0.02	*<0.01*	0.01	1.0	0.63	0.034	0.020	1.7	0.37	8.3	0.64	-0.26	7.7	1.6	2.7	0.35	8.1
Tailings derived from Granite Transition Ore																								
72180	72140	Transition	Granite	Kona 80% CN	9.7	8.9	0.18	0.14	0.01	0.03	5.5	4.4	0.045	0.030	2.5	0.61	7.6	-3.0	-3.8	3.2	0.45	0.57	0.11	1.4

Notes: all values in grey italics are below the analytical detection limit.
All samples are composed of the 12.5 mm particle size fraction of leach tailings
Sulphate Sulphur determined by 25% HCL with Gravimetric Finish.
Sulphide Sulphur determined by Sobek 1:7 Nitric Acid with S by ICP-MS Finish.
AP = Acid potential in tonnes CaCO3 equivalent per 1000 tonnes of material, T-AP is derived from Total-S*31.25 and S-AP is derived from Sulphide-S*31.25.
NP = Neutralization potential in tonnes CaCO3 equivalent per 1000 tonnes of material.
Carbonate NP (CaNP) is calculated from total inorganic carbon (TIC); T-C NP* calculated from Total-C * 77.6.
Net NP (NNP) = NP - AP; Neutralization potential ratio (NPR).

Appendix C.3-2: Solid Phase Element Results by Aqua Regia Digestion for Leach Tailings Solids

Metallurgical ID (leach tailings)	Head Sample ID (ore)	Oxidation Facies	Lithology	Sample Description	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La	Li	Lu	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	S	Sb	Sc	Se	Sn	Sr	Ta	Tb	Te	Th	Ti	Tl	U	V	W	Y	Yb	Zn	Zr
					ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Tailings derived from Gnaiess Oxide Ore																																																								
73004	72101	Oxide	Gneiss	Supremo Mine Block (1")	0.25	0.45	2660	*<10*	318	1.0	0.45	0.21	0.20	74	15	122	1.7	20	4.4	1.6	*<0.1*	0.070	1.4	0.030	0.29	38	*<1*	0.17	0.070	682	6.5	0.060	*<0.1*	58	0.040	9.3	14	*<0*	97	4.7	*<1*	0.50	17	*<0.1*	0.51	0.22	13	*<0*	3.3	23	26	0.60	11	1.1	40	2.5
73013	72102	Oxide	Gneiss	Supremo #1	0.12	0.77	1060	*<10*	337	0.90	0.23	0.22	0.12	47	13	137	1.9	8.5	2.9	2.4	*<0.1*	0.15	0.56	0.030	0.29	25	3.0	0.16	0.27	793	4.7	0.050	0.070	70	0.041	14	16	0.010	41	8.9	*<1*	0.50	19	*<0.1*	0.37	0.10	17	0.010	1.6	20	36	0.40	10	1.1	42	6.7
73022	72133	Oxide	Gneiss	Supremo #2	0.060	0.48	588	*<10*	147	0.80	0.49	0.12	0.070	49	6.3	93	0.82	11	1.8	1.6	*<0.1*	0.20	0.13	*<0.02*	0.17	27	2.0	0.14	0.10	281	5.0	0.030	0.080	12	0.026	11	10	*<0*	40	3.5	*<1*	0.40	20	*<0.1*	0.33	0.17	24	*<0*	0.28	6.9	25	0.40	9.7	1.0	21	7.5
73028	72135	Oxide	Gneiss	Supremo Oxide T1	0.090	0.49	969	*<10*	196	1.2	0.32	0.38	0.090	63	8.5	98	1.6	7.7	2.3	1.6	*<0.1*	0.18	0.60	*<0.02*	0.26	34	2.0	0.19	0.16	472	4.8	0.030	0.070	14	0.036	14	14	0.030	55	4.4	*<1*	0.50	42	*<0.1*	0.43	0.090	25	*<0*	0.56	18	24	0.80	12	1.3	41	6.5
73034	72136	Oxide	Gneiss	Supremo Oxide T4	0.15	0.46	1040	*<10*	187	1.0	0.18	1.3	0.060	58	4.4	110	2.0	6.6	1.5	1.5	*<0.1*	0.13	1.1	*<0.02*	0.22	34	1.0	0.16	0.14	315	5.4	0.040	0.060	16	0.020	13	13	0.020	31	2.3	*<1*	1.4	30	*<0.1*	0.34	*<0.1*	27	*<0*	1.0	12	11	0.40	11	1.1	21	4.5
Tailings derived from Gneiss Transition Ore																																																								
73040	72137	Transition	Gneiss	Supremo 80%	0.060	0.70	1760	*<10*	302	0.90	0.57	1.2	0.080	64	6.8	126	2.6	2.3	2.0	2.3	*<0.1*	0.16	1.1	0.020	0.37	36	4.0	0.17	0.52	488	6.4	0.040	0.12	23	0.029	13	22	0.090	22	2.8	*<1*	0.80	46	*<0.1*	0.39	0.23	25	0.020	2.0	12	18	0.40	11	1.1	29	5.7
Tailings derived from Schist/Gneiss Oxide Ore																																																								
72186	72138	Oxide	Schist/Gneiss	DD oxide	0.060	0.76	1410	*<10*	291	1.2	0.80	2.7	0.11	53	13	120	2.9	10	3.2	2.5	*<0.1*	0.12	0.41	0.030	0.29	29	3.0	0.16	0.81	569	4.1	0.050	0.050	34	0.032	14	17	0.12	43	5.9	*<1*	0.60	63	*<0.1*	0.41	0.16	16	*<0*	0.29	4.9	27	1.6	11	1.1	42	4.0
Tailings derived from Schist Oxide Ore																																																								
72117	72139	Oxide	Schist	Latte -583150 Trench (6")	0.070	0.76	1120	*<10*	822	0.90	0.82	2.3	0.080	70	14	102	2.2	33	3.3	2.5	*<0.1*	0.12	0.20	0.020	0.30	35	4.0	0.24	0.54	552	3.8	0.050	0.060	43	0.057	12	15	0.030	138	5.5	*<1*	0.30	62	*<0.1*	0.64	0.070	12	0.010	0.47	1.7	30	0.30	18	1.6	62	5.0
72123	72140	Oxide	Schist	Latte 583350 Trench (6")	0.080	0.53	1580	*<10*	926	0.60	0.50	3.7	0.15	66	13	88	1.7	25	3.2	2.0	*<0.1*	0.13	0.57	0.030	0.27	35	2.0	0.20	0.44	723	3.6	0.040	0.080	30	0.070	16	13	0.050	53	4.9	*<1*	*<0.3*	90	*<0.1*	0.51	0.080	13	*<0*	0.75	2.1	24	1.0	14	1.3	58	4.8
73001	72134	Oxide	Schist	Latte mine block (1")	0.64	0.44	9020	*<10*	636	0.90	0.50	0.50	0.13	85	11	90	2.4	25	3.9	1.2	*<0.1*	0.060	0.81	0.040	0.23	46	1.0	0.23	0.050	627	3.6	0.050	*<0.1*	33	0.058	16	10	0.040	243	5.3	*<1*	*<0.3*	103	*<0.1*	0.62	0.33	10	*<0*	1.4	4.5	13	0.50	16	1.5	75	1.7
72150	72142	Oxide	Schist	Latte Oxide West	0.13	0.40	1380	*<10*	310	1.1	0.37	4.1	0.10	54	12	126	1.6	21	2.7	1.3	*<0.1*	0.12	0.31	*<0.02*	0.21	29	1.0	0.16	1.0	488	4.0	0.030	*<0.1*	102	0.033	14	9.9	0.11	26	3.9	*<1*	*<0.3*	115	*<0.1*	0.40	0.070	12	*<0*	0.24	2.1	16	1.3	12	1.1	46	3.7
72156	72143	Oxide	Schist	Latte Oxide East	0.060	0.52	1280	*<10*	387	1.1	0.39	2.9	0.15	59	12	109	2.5	12	2.8	2.0	*<0.1*	0.12	0.26	0.020	0.26	31	2.0	0.20	0.56	501	4.3	0.040	*<0.1*	56	0.039	15	13	0.090	27	4.5	*<1*	0.50	92	*<0.1*	0.52	0.060	12	*<0*	0.31	2.6	21	1.2	16	1.4	55	4.0
Tailings derived from Schist Transition Ore																																																								
72162	72144	Transition	Schist	Latte 80%'	0.11	0.65	1710	*<10*	329	0.80	0.45	5.0	0.090	57	13	88	2.0	15	2.5	2.2	*<0.1*	0.080	0.36	0.020	0.27	29	3.0	0.19	1.0	466	3.4	0.030	0.070	59	0.045	15	13	0.43	21	4.3	*<1*	0.40	133	*<0.1*	0.50	0.060	12	*<0*	0.61	2.6	20	0.40	14	1.3	50	2.5
72168	72145	Transition	Schist	Latte 60%	0.080	0.83	932	*<10*	344	0.90	0.46	4.0	0.10	57	11	103	3.1	20	2.8	3.1	*<0.1*	0.16	0.28	0.030	0.35	30	5.0	0.19	1.1	518	4.3	0.040	0.14	41	0.044	13	18	0.48	56	5.4	*<1*	0.60	144	*<0.1*	0.48	0.060	15	0.020	0.35	2.4	28	0.40	13	1.3	49	5.0
Tailings derived from Granite Oxide Ore																																																								
72174	72146	Oxide	Granite	Kona Oxide	0.030	0.44	4170	*<10*	91	0.60	0.080	0.12	0.050	28	1.4	93	1.2	2.2	1.5	1.5	*<0.1*	0.34	0.55	0.020	0.13	14	1.0	0.12	0.020	97	4.8	0.040	0.31	5.0	0.015	16	9.4	0.030	48	3.4	*<1*	0.40	23	*<0.1*	0.22	*<0.1*	24	*<0*	0.65	8.8	14	0.20	6.4	0.70	17	12
Tailings derived from Granite Transition Ore																																																								
72180	72141	Transition	Granite	Kona 80% CN	0.060	0.34	5880	*<10*	44	0.30	0.11	0.090	0.040	25	1.4	103	1.2	1.6	1.2	1.1	*<0.1*	0.26	3.0	*<0.02*	0.14	13	1.0	0.090	0.010	194	5.5	0.040	0.29	5.4	0.013	20	8.0	0.17	86	2.1	*<1*	0.30	20	*<0.1*	0.19	*<0.1*	18	*<0*	1.2	7.4	8.0	0.20	5.3	0.60	12	9.7

Notes: all values in grey italics are below the analytical detection limit.
All samples are composed of the 12.5 mm particle size fraction of leach tailings

Appendix C.3-3: Total and Dissolved Elements in Final Leachate from Cyanide Leach Tailings Columns

Lithology	Pit/Weathering Facies	Column ID	Head Sample ID	Column Particle size (p80)	Column mass	Conductivity	Hardness (as $CaCO_3$)	pH	TSS	TDS	T-Alk.	NH_3-N	Br	Cl	F	NO_3-N	NO_2-N	T-N	SO_4	WAD-CN	Total CN	Cyanate	SCN	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-Bo	T-Cd	T-Ca	T-Cs
				mm	kg	uS/cm	mg/L	s.u.	mg/L	mg/L	mg$CaCO_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Gneiss	Supremo #1	73010	72142	80	83	2570	8.8	9.8	275	1710	517	68	*<1*	21	*<0.4*	0.55	0.77	125	9.6	98	100	159	2.4	0.19	0.030	0.90	0.089	*<0.0002*	*<0.0001*	*<0.02*	0.0047	17	0.00020
Gneiss	Supremo #1	73013	72142	12.5	43	1530	11	10	277	869	491	43	*<0.5*	22	0.89	0.50	0.28	127	12	166	172	150	1.1	0.080	0.020	0.70	0.030	*<0.0002*	*<0.0001*	*<0.02*	0.00020	19	0.00020
Gneiss	Supremo #1	73007	72142	150	718	2340	132	9.9	328	1540	468	50	*<1*	15	*<0.4*	0.66	0.32	140	6.9	171	168	80	1.4	0.27	0.010	0.20	0.35	*<0.0002*	*<0.0001*	*<0.02*	0.038	98	0.00010
Gneiss	Supremo #2	73019	72143	80	86	2910	13	9.9	498	1950	883	79	*<1*	22	0.52	0.93	0.66	139	11	86	90	131	2.5	0.40	0.050	2.0	0.047	*<0.0005*	*<0.00025*	*<0.05*	0.0035	50	0.00010
Gneiss	Supremo #2	73022	72143	12.5	44	2010	8.0	10	286	1120	473	56	*<1*	192	0.65	0.58	0.28	124	12	129	134	200	1.4	0.30	0.020	0.70	0.024	*<0.0002*	*<0.0001*	0.037	0.00	22	0.00010
Gneiss	Supremo #2	73016	72143	150	741	2360	15	9.9	76	1570	678	74	*<1*	16	0.41	1.6	0.40	143	8.1	119	124	84	1.8	0.43	0.030	1.1	0.037	*<0.0002*	*<0.0001*	*<0.02*	0.027	18	0.00
Gneiss	Supremo Oxide T1	73025	72144	80	99	2600	3.8	9.9	701	1640	738	68	*<1*	22	*<0.4*	0.27	0.65	140	45	123	124	127	2.1	0.21	0.13	5.2	0.038	*<0.0002*	*<0.0001*	0.028	0.0029	57	0.0024
Gneiss	Supremo Oxide T1	73028	72144	12.5	50	1540	3.9	10	270	894	492	43	*<0.5*	24	0.76	0.32	0.35	109	42	123	126	168	1.3	0.13	0.040	3.6	0.033	*<0.0002*	*<0.0001*	0.023	0.00030	67	0.00010
Gneiss	Supremo Oxide T4	73031	72145	80	95	3130	7.8	9.8	595	2040	644	75	*<1*	25	*<0.4*	0.28	0.65	175	58	167	170	138	3.1	0.070	0.070	2.9	0.067	*<0.0005*	*<0.00025*	*<0.05*	0.0019	38	0.0011
Gneiss	Supremo Oxide T4	73034	72145	12.5	49	1540	7.7	10	310	911	418	56	*<0.5*	25	0.50	0.20	0.66	142	63	157	161	192	1.3	0.050	0.030	2.9	0.015	*<0.0002*	*<0.0001*	*<0.02*	0.00030	11	0.00010
Gneiss	Supremo Mine Block (1")	73004	72134	12.5	46	1770	9.2	10	58	992	676	40	*<0.5*	18	0.95	0.20	0.23	105	8.8	109	113	132	1.5	0.060	0.030	1.5	0.0050	*<0.0002*	*<0.0001*	*<0.02*	0.00060	2.7	0.00010
Gneiss	Supremo 80%	73037	72146	80	94	4250	6.5	9.8	690	2810	1180	80	*<1*	27	0.67	0.31	0.75	158	444	128	136	96	13	0.090	0.27	14	0.0070	*<0.0005*	*<0.00025*	*<0.05*	0.00090	1.6	0.0061
Gneiss	Supremo 80%	73040	72146	12.5	50	2780	17	10	305	1760	374	53	*<1*	30	0.94	0.20	0.72	136	744	150	156	188	7.8	0.080	0.18	7.4	0.0030	*<0.0002*	*<0.0001*	*<0.02*	0.00010	5.6	0.0010
Gneiss/Schist	DD oxide	72183	72141	80	95	3250	9.6	9.8	541	2230	564	89	*<1*	41	0.47	0.37	0.91	175	220	132	134	222	6.1	0.030	0.090	2.6	0.018	*<0.0005*	*<0.00025*	*<0.05*	0.0034	4.7	0.0033
Gneiss/Schist	DD oxide	72186	72141	12.5	50	1810	4.5	10	337	1060	439	60	*<1*	30	0.53	0.22	0.48	133	177	141	142	204	1.8	0.060	0.030	1.9	0.0040	*<0.0002*	*<0.0001*	*<0.02*	0.00010	1.8	0.00010
Schist	Latte mine block (1")	73001	72133	12.5	48	1450	9.6	10	50	820	458	40	*<0.5*	19	0.69	0.25	0.35	98	43	105	101	166	1.1	0.060	0.080	16	0.012	*<0.0002*	*<0.0001*	*<0.02*	0.00010	11	0.00020
Schist	Latte Oxide East	72153	72136	80	101	4300	8.2	9.8	18	3040	590	77	*<1*	26	0.71	0.65	1.3	156	725	117	119	149	6.4	0.050	0.090	6.2	0.014	*<0.0005*	*<0.00025*	*<0.05*	0.0076	6.5	0.0024
Schist	Latte Oxide East	72156	72136	12.5	50	2410	11	9.9	279	1520	366	60	*<1*	23	0.76	0.45	0.43	143	547	145	144	214	3.3	0.090	0.030	2.5	0.015	*<0.0002*	*<0.0001*	*<0.02*	0.00060	73	0.00040
Schist	Latte 80%'	72159	72137	80	94	7380	295	9.5	317	5630	322	103	*<2.5*	27	*<1*	0.26	1.0	198	2980	112	125	114	15	0.14	0.16	3.8	0.020	*<0.001*	*<0.0005*	*<0.1*	0.0037	209	0.010
Schist	Latte 80%'	72162	72137	12.5	50	5420	814	9.8	264	4040	301	61	*<2.5*	*<25*	*<1*	*0.25*	0.35	146	2370	157	168	215	6.5	0.080	0.040	1.1	0.011	*<0.0005*	*<0.00025*	*<0.05*	0.00010	381	0.0010
Schist	Latte 60%	72165	72138	80	84	6730	609	9.5	348	5280	229	87	*<2.5*	*<25*	*<1*	0.55	0.82	172	2570	86	99	204	34	0.13	0.22	2.6	0.025	*<0.0005*	*<0.00025*	*<0.05*	0.0023	361	0.0027
Schist	Latte 60%	72168	72138	12.5	49	5760	745	9.6	155	4510	223	83	*<2.5*	*<25*	*<1*	*0.25*	0.37	167	2670	119	134	262	7.4	0.040	0.050	0.60	0.0090	*<0.0005*	*<0.00025*	*<0.05*	0.00010	337	0.00090
Granite	Kona Oxide	72171	72139	80	104	3380	7.1	9.8	147	2340	738	83	*<1*	27	3.4	1.0	0.85	173	57	114	139	139	6.8	0.38	0.27	56	0.013	*<0.001*	*<0.0005*	*<0.1*	0.0061	50	0.0038
Granite	Kona Oxide	72174	72139	12.5	50	1790	5.4	10	246	1130	580	42	*<0.5*	21	3.4	0.55	0.30	129	38	149	164	163	2.0	0.43	0.17	41	0.0070	*<0.0005*	*<0.00025*	*<0.05*	0.00020	87	0.00010
Granite	Kona 80% CN	72177	72140	80	98	4050	9.2	9.7	286	2960	661	69	*<1*	23	1.8	0.23	0.74	194	666	125	179	140	48	0.59	0.78	75	0.018	*<0.001*	*<0.0005*	*<0.1*	0.0028	87	0.0054
Granite	Kona 80% CN	72180	72140	12.5	50	2670	15	10	193	1890	570	47	*<1*	22	2.4	0.33	0.47	144	424	123	168	172	15	1.5	1.1	98	0.0040	*<0.002*	*<0.001*	*<0.2*	*<0.0001*	56	0.00030

Notes: all values in grey italics are below the analytical detection limit

Appendix C.3-3: Total and Dissolved Elements in Final Leachate from Cyanide Leach Tailings Columns

Lithology	Pit/Weathering Facies	Column ID	T-Cr	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	T-Mo	T-Ni	T-P	T-K	T-Rb	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Te	T-Tl	T-Sn	T-Ti	T-W	T-U	T-V	T-Zn	T-Zr	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-Bo
			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	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
Gneiss	Supremo #1	73010	0.014	0.35	0.60	1.0	0.00062	*<0.002*	0.34	0.0030	0.0015	0.22	0.0045	0.19	6.2	0.0016	0.0016	4.2	0.000050	582	0.071	5.9	*<0.0004*	*<0.00002*	*<0.0002*	*<0.0006*	0.010	0.16	0.0023	0.43	*<0.0006*	0.18	0.028	0.81	0.064	*<0.0002*	*<0.0001*	*<0.02*
Gneiss	Supremo #1	73013	0.014	0.080	0.17	1.2	0.00045	*<0.002*	0.79	0.71	0.00080	0.17	0.0053	0.55	14	0.026	0.00090	3.7	0.000040	315	0.049	5.4	*<0.0004*	*<0.00002*	*<0.0002*	0.00079	0.010	0.46	0.0023	0.038	*<0.0006*	0.056	0.015	0.71	0.0067	*<0.0002*	*<0.0001*	*<0.02*
Gneiss	Supremo #1	73007	0.037	0.67	1.8	0.54	0.0043	*<0.002*	0.26	0.010	0.060	0.19	0.16	0.10	6.9	0.0011	0.0016	3.7	0.0013	454	0.24	4.1	*<0.0004*	0.00013	0.00021	0.0016	0.010	0.0050	0.0013	1.1	*<0.0006*	0.19	0.0097	0.17	0.29	*<0.0002*	*<0.0001*	*<0.02*
Gneiss	Supremo #2	73019	0.025	0.56	0.61	1.2	0.0015	*<0.005*	0.29	0.010	0.00070	0.27	0.0028	1.1	11	0.0023	0.0040	5.5	0.000060	675	0.070	6.4	*<0.001*	*<0.00005*	*<0.0005*	*<0.0015*	0.040	0.75	0.012	0.43	*<0.0015*	0.34	0.047	2.0	0.014	*<0.0005*	*<0.00025*	*<0.05*
Gneiss	Supremo #2	73022	0.014	0.19	0.090	1.3	0.0013	0.0086	0.51	0.38	0.00010	0.15	*<0.001*	0.27	11	0.0034	0.0018	4.6	0.000040	387	0.042	5.8	*<0.0004*	*<0.00002*	*<0.0002*	0.0024	0.020	0.17	0.0072	0.022	*<0.0006*	0.18	0.020	0.67	0.0029	*<0.0002*	*<0.0001*	0.036
Gneiss	Supremo #2	73016	0.053	1.2	1.8	1.7	0.0051	*<0.002*	0.16	0.010	0.015	0.44	0.068	0.36	5.5	0.0013	0.0053	5.7	0.00064	498	0.040	5.0	*<0.0004*	0.000031	0.00026	0.0014	0.030	0.16	0.011	1.2	*<0.0006*	0.37	0.028	1.0	0.026	*<0.0002*	*<0.0001*	*<0.02*
Gneiss	Supremo Oxide T1	73025	0.023	0.53	1.1	0.42	0.0018	*<0.002*	0.33	0.030	0.0029	0.42	0.0029	0.59	13	0.013	0.00090	7.4	0.00024	551	0.071	19	*<0.0004*	0.000037	*<0.0002*	0.0011	0.12	0.42	0.0049	0.64	*<0.0006*	0.16	0.13	5.1	0.0097	*<0.0002*	*<0.0001*	0.026
Gneiss	Supremo Oxide T1	73028	0.021	0.31	0.32	0.32	0.00096	*<0.002*	0.32	0.080	0.0024	0.36	0.0027	0.46	9.2	0.0058	0.0010	6.2	0.00024	307	0.12	16	*<0.0004*	*<0.00002*	*<0.0002*	*<0.0006*	0.11	0.40	0.0049	0.062	*<0.0006*	0.11	0.036	3.6	0.0062	*<0.0002*	*<0.0001*	0.023
Gneiss	Supremo Oxide T4	73031	0.013	0.81	1.1	0.35	0.0011	*<0.005*	0.68	0.21	0.0043	0.24	*<0.0025*	0.23	15	0.0063	0.00090	6.3	0.000050	677	0.11	22	*<0.001*	*<0.00005*	*<0.0005*	*<0.0015*	0.080	0.16	*<0.0025*	0.69	*<0.0015*	0.052	0.073	2.8	0.038	*<0.0005*	*<0.00025*	*<0.05*
Gneiss	Supremo Oxide T4	73034	0.014	0.44	0.22	0.28	0.00072	0.0029	0.87	0.37	0.0038	0.19	*<0.001*	0.21	9.5	0.0061	0.00090	5.0	0.000050	317	0.056	23	*<0.0004*	0.000039	*<0.0002*	*<0.0006*	0.060	0.28	0.0015	0.028	*<0.0006*	0.040	0.033	2.8	0.0066	*<0.0002*	*<0.0001*	*<0.02*
Gneiss	Supremo Mine Block (1")	73004	0.010	0.080	0.28	1.9	*<0.0001*	*<0.002*	0.70	0.15	0.0044	0.13	0.0030	0.99	5.4	0.0068	0.0011	2.8	0.00014	375	0.016	4.5	*<0.0004*	0.000044	*<0.0002*	*<0.0006*	0.010	2.0	0.0011	0.054	*<0.0006*	0.054	0.026	1.4	0.0026	*<0.0002*	*<0.0001*	*<0.02*
Gneiss	Supremo 80%	73037	0.012	0.62	1.0	2.2	*<0.00025*	*<0.005*	1.0	0.020	0.0031	0.25	0.0040	1.0	31	0.034	0.0072	9.9	0.00046	909	0.025	157	*<0.001*	0.00012	*<0.0005*	*<0.0015*	0.040	0.46	0.0053	0.60	*<0.0015*	0.087	0.27	13	0.0068	*<0.0005*	*<0.00025*	*<0.05*
Gneiss	Supremo 80%	73040	0.0020	0.51	0.32	2.0	*<0.0001*	0.0027	1.1	0.62	0.0021	0.27	0.0018	0.11	19	0.012	0.0060	5.3	0.00022	551	0.080	240	*<0.0004*	*<0.00002*	*<0.0002*	*<0.0006*	0.030	0.059	0.0018	0.037	*<0.0006*	0.061	0.18	7.5	0.0025	*<0.0002*	*<0.0001*	*<0.02*
Gneiss/Schist	DD oxide	72183	0.0040	0.99	3.3	0.44	*<0.00025*	*<0.005*	0.63	0.020	0.0028	0.32	0.016	0.10	18	0.012	0.0096	5.3	0.00036	753	0.088	82	*<0.001*	*<0.00005*	*<0.0005*	*<0.0015*	0.82	0.0040	*<0.0025*	1.1	*<0.0015*	0.028	0.089	2.6	0.017	*<0.0005*	*<0.00025*	*<0.05*
Gneiss/Schist	DD oxide	72186	0.013	0.41	0.40	0.11	*<0.0001*	*<0.002*	0.20	0.020	0.00010	0.17	*<0.001*	0.12	9.2	0.0025	0.0061	5.4	0.000040	372	0.048	63	*<0.0004*	*<0.00002*	*<0.0002*	*<0.0006*	0.34	0.00	0.0021	0.068	*<0.0006*	0.058	0.035	1.9	0.0037	*<0.0002*	*<0.0001*	*<0.02*
Schist	Latte mine block (1")	73001	0.013	0.040	0.21	0.56	0.00047	*<0.002*	1.0	0.14	0.00080	0.030	0.0018	0.27	3.7	0.0054	0.00060	3.6	0.00038	291	0.038	17	*<0.0004*	*<0.00002*	*<0.0002*	*<0.0006*	0.00	0.032	*<0.001*	0.063	*<0.0006*	0.035	0.082	16	0.0044	*<0.0002*	*<0.0001*	*<0.02*
Schist	Latte Oxide East	72153	0.0060	0.65	2.8	0.89	*<0.00025*	*<0.005*	0.48	0.040	0.0057	0.15	0.021	0.21	17	0.011	0.0051	8.1	0.00041	978	0.11	233	*<0.001*	*<0.00005*	*<0.0005*	*<0.0015*	0.38	0.0060	0.0027	1.7	*<0.0015*	0.045	0.085	6.0	0.012	*<0.0005*	*<0.00025*	*<0.05*
Schist	Latte Oxide East	72156	0.0080	0.36	0.73	0.57	0.00071	*<0.002*	0.86	0.51	0.0050	0.090	0.025	0.16	14	0.0048	0.0038	3.5	0.0013	489	0.22	185	*<0.0004*	0.000044	*<0.0002*	*<0.0006*	0.17	0.0020	0.0017	0.16	*<0.0006*	0.064	0.036	2.4	0.0064	*<0.0002*	*<0.0001*	*<0.02*
Schist	Latte 80%'	72159	0.0030	1.1	5.2	4.4	0.0020	*<0.01*	2.9	0.030	0.0046	0.080	0.030	0.22	44	0.059	0.019	4.8	0.00034	1680	1.1	916	*<0.002*	*<0.0001*	*<0.001*	*<0.003*	0.090	0.00	*<0.005*	1.5	*<0.003*	0.074	0.15	3.0	0.0069	*<0.001*	*<0.0005*	*<0.1*
Schist	Latte 80%'	72162	0.0020	0.68	1.6	3.5	0.00063	*<0.005*	9.1	1.5	0.00060	0.060	0.0029	0.13	50	0.021	0.014	2.7	*<0.00005*	981	1.4	782	*<0.001*	*<0.00005*	*<0.0005*	0.0020	0.020	0.00	*<0.0025*	0.097	*<0.0015*	0.028	0.042	0.87	0.0055	*<0.0005*	*<0.00025*	*<0.05*
Schist	Latte 60%	72165	0.0020	0.86	5.1	6.3	0.0018	0.0060	2.5	0.020	0.0022	0.080	0.024	0.16	48	0.033	0.018	3.9	0.00020	1340	1.7	868	*<0.001*	*<0.00005*	*<0.0005*	*<0.0015*	0.070	0.00	0.0032	1.1	*<0.0015*	0.086	0.21	1.8	0.010	*<0.0005*	*<0.00025*	*<0.05*
Schist	Latte 60%	72168	0.0020	0.61	2.2	6.0	0.00034	*<0.005*	9.0	0.81	0.00030	0.070	0.0026	*<0.1*	44	0.016	0.0099	2.1	*<0.00005*	1090	1.5	828	*<0.001*	*<0.00005*	*<0.0005*	*<0.0015*	0.020	0.00	*<0.0025*	0.12	*<0.0015*	0.019	0.049	0.53	0.0049	*<0.0005*	*<0.00025*	*<0.05*
Granite	Kona Oxide	72171	0.0050	0.58	1.7	8.3	0.0019	*<0.01*	0.28	0.040	0.0049	0.080	*<0.005*	0.45	19	0.043	0.0023	4.2	*<0.0001*	704	0.077	23	*<0.002*	*<0.0001*	*<0.001*	*<0.003*	0.19	1.2	*<0.005*	1.9	*<0.003*	0.33	0.26	55	0.0035	*<0.001*	*<0.0005*	*<0.1*
Granite	Kona Oxide	72174	0.012	0.22	0.28	4.6	0.0013	*<0.005*	0.26	1.0	0.0014	0.040	*<0.0025*	0.42	11	0.011	0.0011	2.8	*<0.00005*	347	0.072	13	*<0.001*	*<0.00005*	*<0.0005*	*<0.0015*	0.10	0.57	0.0047	0.10	*<0.0015*	0.39	0.17	40	*<0.00025*	*<0.0005*	*<0.00025*	*<0.05*
Granite	Kona 80% CN	72177	0.0020	1.5	2.2	18	0.0026	*<0.01*	0.46	0.14	0.021	0.060	*<0.005*	0.56	25	0.050	0.0082	3.6	*<0.0001*	857	0.065	216	*<0.002*	*<0.0001*	*<0.001*	*<0.003*	0.18	0.83	0.0084	1.4	*<0.003*	0.53	0.78	75	0.0044	*<0.001*	*<0.0005*	*<0.1*
Granite	Kona 80% CN	72180	*<0.002*	1.1	0.64	15	*<0.001*	*<0.02*	0.25	1.9	0.0038	0.050	*<0.01*	0.31	16	0.015	0.0047	1.6	*<0.0002*	517	0.038	137	*<0.004*	*<0.0002*	*<0.002*	*<0.006*	0.15	0.52	0.015	0.14	*<0.006*	1.2	0.93	85	*<0.001*	*<0.002*	*<0.001*	*<0.2*

Notes: all values in grey italics are below the analytical detection limit

Appendix C.3-3: Total and Dissolved Elements in Final Leachate from Cyanide Leach Tailings Columns

Lithology	Pit/Weathering Facies	Column ID	D-Cd	D-Ca	D-Cs	D-Cr	D-Co	D-Cu	D-Fe	D-Pb	D-Li	D-Mg	D-Mn	D-Hg	D-Mo	D-Ni	D-P	D-K	D-Rb	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Te	D-Tl	D-Sn	D-Ti	D-W	D-U	D-V	D-Zn	D-Zr
			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	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
Gneiss	Supremo #1	73010	0.0046	3.0	0.00018	0.013	0.33	0.55	0.97	*<0.0001*	*<0.002*	0.31	0.0023	0.0015	0.21	0.0043	0.16	5.9	0.0015	0.0015	4.1	0.000038	561	0.048	5.6	*<0.0004*	*<0.00002*	*<0.0002*	*<0.0006*	0.012	0.14	0.0021	0.41	*<0.0006*
Gneiss	Supremo #1	73013	0.00017	3.1	0.00014	0.013	0.081	0.16	1.1	*<0.0001*	*<0.002*	0.73	0.32	0.00078	0.16	0.0049	0.52	14	0.027	0.00087	3.7	0.000036	311	0.030	5.4	*<0.0004*	*<0.00002*	*<0.0002*	*<0.0006*	0.012	0.47	0.0020	0.036	*<0.0006*
Gneiss	Supremo #1	73007	0.037	53	0.00012	0.037	0.67	1.9	0.40	*<0.0001*	*<0.002*	0.19	0.0082	0.060	0.18	0.15	*<0.05*	6.6	0.0011	0.0016	3.5	0.0011	447	0.19	3.9	*<0.0004*	0.00011	0.00023	*<0.0006*	0.0055	0.0045	*<0.001*	1.1	*<0.0006*
Gneiss	Supremo #2	73019	0.0033	4.9	0.000069	0.024	0.55	0.57	1.1	*<0.00025*	*<0.005*	0.25	0.0052	0.00065	0.27	0.0027	1.0	11	0.0020	0.0040	5.4	*<0.00005*	662	0.022	6.3	*<0.001*	*<0.00005*	*<0.0005*	*<0.0015*	0.037	0.74	0.012	0.41	*<0.0015*
Gneiss	Supremo #2	73022	0.000043	2.6	0.000035	0.013	0.20	0.090	1.1	*<0.0001*	0.0089	0.39	0.055	0.00011	0.15	*<0.001*	0.25	11	0.0032	0.0019	4.4	0.000022	396	0.023	5.8	*<0.0004*	*<0.00002*	*<0.0002*	*<0.0006*	0.019	0.17	0.0069	0.021	*<0.0006*
Gneiss	Supremo #2	73016	0.026	5.7	*<0.00002*	0.051	1.2	1.5	1.5	0.00011	*<0.002*	0.10	0.0087	0.015	0.40	0.065	0.33	5.3	0.0012	0.0050	5.4	0.00045	484	0.027	4.9	*<0.0004*	*<0.00002*	0.00024	*<0.0006*	0.024	0.15	0.0099	1.1	*<0.0006*
Gneiss	Supremo Oxide T1	73025	0.0029	1.2	0.0024	0.022	0.52	1.1	0.36	*<0.0001*	*<0.002*	0.22	0.026	0.0027	0.42	0.0028	0.51	13	0.012	0.00083	7.1	0.00022	546	0.020	18	*<0.0004*	0.000032	*<0.0002*	*<0.0006*	0.12	0.41	0.0045	0.64	*<0.0006*
Gneiss	Supremo Oxide T1	73028	0.00030	1.1	0.00011	0.021	0.31	0.32	0.29	*<0.0001*	*<0.002*	0.26	0.071	0.0023	0.36	0.0028	0.39	9.0	0.0056	0.0011	6.1	0.00019	312	0.022	16	*<0.0004*	*<0.00002*	*<0.0002*	*<0.0006*	0.11	0.41	0.0046	0.064	*<0.0006*
Gneiss	Supremo Oxide T4	73031	0.0019	2.1	0.0010	0.012	0.78	1.1	0.33	*<0.00025*	*<0.005*	0.63	0.19	0.0045	0.24	*<0.0025*	0.19	15	0.0059	0.00079	6.3	*<0.00005*	649	0.062	22	*<0.001*	*<0.00005*	*<0.0005*	*<0.0015*	0.076	0.15	*<0.0025*	0.66	*<0.0015*
Gneiss	Supremo Oxide T4	73034	0.00027	1.8	0.00012	0.013	0.42	0.21	0.25	*<0.0001*	0.0028	0.81	0.26	0.0040	0.18	*<0.001*	0.18	9.2	0.0056	0.00083	4.8	0.000044	305	0.037	22	*<0.0004*	0.000030	*<0.0002*	*<0.0006*	0.054	0.27	0.0014	0.027	*<0.0006*
Gneiss	Supremo Mine Block (1")	73004	0.00053	2.6	0.00012	0.0091	0.072	0.29	1.9	*<0.0001*	*<0.002*	0.66	0.019	0.0055	0.13	0.0031	0.97	5.2	0.0068	0.0012	2.7	0.00015	360	0.015	4.4	*<0.0004*	0.000040	*<0.0002*	*<0.0006*	0.0074	1.9	0.0011	0.056	*<0.0006*
Gneiss	Supremo 80%	73037	0.00096	1.2	0.0061	0.012	0.61	1.0	2.2	*<0.00025*	*<0.005*	0.88	0.019	0.0032	0.25	0.0041	1.0	30	0.034	0.0071	9.5	0.00041	898	0.025	153	*<0.001*	0.000084	*<0.0005*	*<0.0015*	0.045	0.46	0.0050	0.59	*<0.0015*
Gneiss	Supremo 80%	73040	0.000064	5.2	0.00099	0.0015	0.51	0.32	1.9	*<0.0001*	0.0028	1.1	0.57	0.0024	0.26	0.0019	0.12	19	0.011	0.0063	5.3	0.00021	553	0.078	220	*<0.0004*	*<0.00002*	*<0.0002*	*<0.0006*	0.027	0.058	0.0017	0.039	*<0.0006*
Gneiss/Schist	DD oxide	72183	0.0033	2.8	0.0030	0.0042	0.97	3.2	0.44	*<0.00025*	*<0.005*	0.61	0.017	0.0027	0.31	0.015	0.089	18	0.011	0.0098	5.2	0.00038	731	0.084	77	*<0.001*	*<0.00005*	*<0.0005*	*<0.0015*	0.81	0.0040	*<0.0025*	1.1	*<0.0015*
Gneiss/Schist	DD oxide	72186	0.000076	1.5	0.00014	0.013	0.39	0.39	0.098	*<0.0001*	*<0.002*	0.20	0.019	0.00012	0.17	*<0.001*	0.11	9.0	0.0024	0.0057	5.4	0.000041	365	0.049	61	*<0.0004*	*<0.00002*	*<0.0002*	*<0.0006*	0.35	0.00032	0.0020	0.068	*<0.0006*
Schist	Latte mine block (1")	73001	0.00011	2.3	0.00023	0.012	0.040	0.21	0.50	*<0.0001*	*<0.002*	0.97	0.020	0.0012	0.035	0.0016	0.24	3.5	0.0054	0.00059	3.5	0.00037	283	0.028	16	*<0.0004*	*<0.00002*	*<0.0002*	*<0.0006*	0.0051	0.033	*<0.001*	0.061	*<0.0006*
Schist	Latte Oxide East	72153	0.0075	2.5	0.0022	0.0060	0.63	2.8	0.84	*<0.00025*	*<0.005*	0.44	0.032	0.0069	0.14	0.020	0.19	16	0.011	0.0044	7.7	0.00034	941	0.095	223	*<0.001*	*<0.00005*	*<0.0005*	*<0.0015*	0.37	0.0059	*<0.0025*	1.6	*<0.0015*
Schist	Latte Oxide East	72156	0.00057	3.0	0.00042	0.0078	0.35	0.75	0.50	*<0.0001*	*<0.002*	0.75	0.48	0.0055	0.092	0.024	0.075	13	0.0047	0.0039	3.3	0.0013	476	0.11	175	*<0.0004*	0.000028	*<0.0002*	*<0.0006*	0.17	0.0015	0.0014	0.16	*<0.0006*
Schist	Latte 80%'	72159	0.0032	114	0.0093	0.0023	0.99	4.9	4.3	*<0.0005*	*<0.01*	2.8	0.014	0.0047	0.076	0.028	*<0.1*	43	0.056	0.018	4.7	0.00027	1590	0.95	909	*<0.002*	*<0.0001*	*<0.001*	*<0.003*	0.085	0.00026	*<0.005*	1.4	*<0.003*
Schist	Latte 80%'	72162	0.000089	311	0.00089	0.0014	0.67	1.5	3.3	*<0.00025*	*<0.005*	9.0	1.2	0.00069	0.055	0.0028	*<0.1*	49	0.021	0.014	2.6	*<0.00005*	965	1.3	768	*<0.001*	*<0.00005*	*<0.0005*	*<0.0015*	0.022	0.00012	*<0.0025*	0.096	*<0.0015*
Schist	Latte 60%	72165	0.0022	240	0.0026	0.0019	0.84	4.6	5.6	*<0.00025*	0.0054	2.2	0.0088	0.0024	0.079	0.022	*<0.1*	43	0.031	0.019	3.4	0.00016	1330	1.5	850	*<0.001*	*<0.00005*	*<0.0005*	*<0.0015*	0.067	0.000081	0.0027	1.0	*<0.0015*
Schist	Latte 60%	72168	0.00010	284	0.00083	0.0014	0.60	2.1	5.7	*<0.00025*	*<0.005*	8.7	0.52	0.00036	0.068	*<0.0025*	*<0.1*	42	0.016	0.010	2.1	*<0.00005*	1080	1.4	810	*<0.001*	*<0.00005*	*<0.0005*	*<0.0015*	0.017	0.000076	*<0.0025*	0.12	*<0.0015*
Granite	Kona Oxide	72171	0.0059	2.5	0.0036	0.0044	0.57	1.8	7.9	*<0.0005*	*<0.01*	0.20	0.019	0.0054	0.078	*<0.005*	0.37	18	0.041	0.0025	3.9	*<0.0001*	703	0.030	22	*<0.002*	*<0.0001*	*<0.001*	*<0.003*	0.18	1.1	*<0.005*	1.9	*<0.003*
Granite	Kona Oxide	72174	0.00020	1.9	0.000056	0.012	0.22	0.28	4.6	*<0.00025*	*<0.005*	0.17	0.20	0.0017	0.037	*<0.0025*	0.32	11	0.011	0.0012	2.8	*<0.00005*	349	0.0090	13	*<0.001*	*<0.00005*	*<0.0005*	*<0.0015*	0.096	0.58	0.0046	0.10	*<0.0015*
Granite	Kona 80% CN	72177	0.0026	3.1	0.0053	0.0017	1.5	2.3	19	*<0.0005*	*<0.01*	0.34	0.064	0.022	0.061	*<0.005*	0.40	24	0.050	0.0076	3.4	*<0.0001*	877	0.024	214	*<0.002*	*<0.0001*	*<0.001*	*<0.003*	0.18	0.83	0.0091	1.4	*<0.003*
Granite	Kona 80% CN	72180	*<0.0001*	5.8	*<0.0002*	*<0.002*	0.94	0.54	15	*<0.001*	*<0.02*	0.21	0.79	0.0048	0.039	*<0.01*	0.26	15	0.012	0.0043	1.4	*<0.0002*	456	0.014	135	*<0.004*	*<0.0002*	*<0.002*	*<0.006*	0.13	0.45	0.013	0.12	*<0.006*

Notes: all values in grey italics are below the analytical detection limit

Appendix C.4: Static Test Results for Overburden

Appendix C.4-1: Acid-Base Accounting Results for Overburden

Sample ID	Location Reference	Site Location	Underlying Geologic Unit	Fizz rating	Rinse-pH	Paste pH	Total-S	Sulphide-S	Sulphate-S	Insoluble-S	T-AP	S-AP	TIC	Inorg. CO_2	CaNP	Sobek NP	Sobek NNP	NPR	NPR
				Unity	s.u.	s.u.	%	%	%	%	$kgCaCO_3/t$	$kgCaCO_3/t$	%	%	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	Sobek/T-AP	Sobek/S-AP
Overburden Overlying Gneiss Bedrock																			
KAM106801	CFR0320	DD Pit	gneiss	1	8	8	0.12	0.01	0.11	0.01	3.8	0.30	0.070	0.30	5.8	11	7.0	2.9	35
R281758	CFR0836	DD Pit	gneiss	1	6.5	6.5	0.01	<0.01	<0.01	0.01	0.30	<0.3	<0.05	<0.2	<4.2	8.0	8.0	27	26
R283938	CFR0825	DD Pit	gneiss	1	7.7	7.7	0.01	0.01	0.02	<0.01	0.30	0.30	<0.05	<0.2	<4.2	10	10	33	32
R288218	CFR0694	DD Pit	gneiss	1	6.8	6.7	0.01	0.01	0.01	<0.01	0.30	0.30	<0.05	<0.2	<4.2	7.0	7.0	23	22
R298598	CFR0716	DD Pit	gneiss	1	7.5	7.5	<0.01	0.01	0.02	<0.01	<0.3	0.30	<0.05	<0.2	<4.2	12	12	40	38
KAM018321	CFR0102	Supremo Pit	gneiss	1	7	7	0.04	0.01	0.02	0.02	1.3	0.30	<0.05	<0.2	<4.2	3.0	2.0	2.3	9.6
KAM104165	CFR0288	Supremo Pit	gneiss	1	7.2	7.2	<0.01	0.01	<0.01	<0.01	<0.3	0.30	<0.05	<0.2	<4.2	3.0	3.0	10	9.6
R280751	CFR0805	Supremo Pit	gneiss	1	7.6	7.7	<0.01	<0.01	<0.01	<0.01	<0.3	<0.3	<0.05	<0.2	<4.2	3.0	3.0	10	9.6
R281909	CFR0839	Supremo Pit	gneiss	1	8.4	8.4	<0.01	<0.01	0.02	<0.01	<0.3	<0.3	<0.05	<0.2	<4.2	13	13	43	42
R281971	CFR0841	Supremo Pit	gneiss	1	6.7	6.8	0.01	<0.01	0.01	<0.01	0.30	<0.3	<0.05	<0.2	<4.2	7.0	7.0	23	22
R284001	CFR0804	Supremo Pit	gneiss	1	7.4	7.4	<0.01	0.02	<0.01	<0.01	<0.3	0.60	<0.05	<0.2	<4.2	7.0	7.0	23	11
R285461	CFR0757	Supremo Pit	gneiss	1	8.1	8	<0.01	<0.01	0.01	<0.01	<0.3	<0.3	<0.05	<0.2	<4.2	6.0	6.0	20	19
R285552	CFR0759	Supremo Pit	gneiss	1	7.5	7.5	<0.01	<0.01	0.02	<0.01	<0.3	<0.3	0.10	0.40	8.3	7.0	7.0	23	22
R286151	CFR0776	Supremo Pit	gneiss	1	7.9	7.8	<0.01	<0.01	0.01	<0.01	<0.3	<0.3	<0.05	<0.2	<4.2	6.0	6.0	20	19
R286219	CFR0779	Supremo Pit	gneiss	1	8.1	8.1	<0.01	<0.01	0.02	<0.01	<0.3	<0.3	<0.05	<0.2	<4.2	6.0	6.0	20	19
R286345	CFR0782	Supremo Pit	gneiss	1	8.4	8.3	0.01	<0.01	0.01	<0.01	0.30	<0.3	<0.05	<0.2	<4.2	7.0	7.0	23	22
R287156	CFR0802	Supremo Pit	gneiss	1	6.9	6.9	<0.01	<0.01	0.02	<0.01	<0.3	<0.3	<0.05	<0.2	<4.2	4.0	4.0	13	13
R513919	CFR0872	Supremo Pit	gneiss	1	7	6.9	<0.01	<0.01	0.03	<0.01	<0.3	<0.3	<0.05	<0.2	<4.2	5.0	5.0	17	16
R514753	CFR0783	Supremo Pit	gneiss	1	7	6.8	0.01	<0.01	0.02	<0.01	0.30	<0.3	<0.05	<0.2	<4.2	5.0	5.0	17	16
R514902	CFR0786	Supremo Pit	gneiss	1	8.3	8	<0.01	<0.01	0.01	<0.01	<0.3	<0.3	<0.05	<0.2	<4.2	11	11	37	35
R515335	CFR0797	Supremo Pit	gneiss	1	7.1	7.1	0.01	<0.01	<0.01	0.01	0.30	<0.3	<0.05	<0.2	<4.2	5.0	5.0	17	16
R515458	CFR0799	Supremo Pit	gneiss	1	7.1	7	0.01	<0.01	0.02	<0.01	0.30	<0.3	<0.05	<0.2	<4.2	7.0	7.0	23	22
R540708	CFR0864	Supremo Pit	gneiss	1	8.1	8	<0.01	<0.01	0.02	<0.01	<0.3	<0.3	<0.05	<0.2	<4.2	8.0	8.0	27	26
R540846	CFR0866	Supremo Pit	gneiss	1	7.6	7.5	0.01	<0.01	0.01	<0.01	0.30	<0.3	<0.05	<0.2	<4.2	7.0	7.0	23	22
R541274	CFR0877	Supremo Pit	gneiss	1	6.7	6.7	0.01	<0.01	0.02	<0.01	0.30	<0.3	<0.05	<0.2	<4.2	3.0	3.0	10	9.6
R541396	CFR0881	Supremo Pit	gneiss	1	6.9	6.8	0.01	<0.01	0.01	<0.01	0.30	<0.3	<0.05	<0.2	<4.2	3.0	3.0	10	9.6
R541524	CFR0884	Supremo Pit	gneiss	1	7.1	6.9	0.01	<0.01	0.02	<0.01	0.30	<0.3	<0.05	<0.2	<4.2	3.0	3.0	10	9.6
R542611	CFR0909	Supremo Pit	gneiss	1	7.7	7.6	<0.01	<0.01	0.02	<0.01	<0.3	<0.3	<0.05	<0.2	<4.2	3.0	3.0	10	9.6
R542736	CFR0912	Supremo Pit	gneiss	1	8.1	8	<0.01	0.02	0.02	<0.01	<0.3	0.60	<0.05	<0.2	<4.2	10	10	33	16
R543125	CFR0924	Supremo Pit	gneiss	1	7.7	7.6	<0.01	<0.01	0.02	<0.01	<0.3	<0.3	<0.05	<0.2	<4.2	5.0	5.0	17	16
R543393	CFR0933	Supremo Pit	gneiss	1	7.6	7.7	0.01	<0.01	0.01	<0.01	0.30	<0.3	0.14	0.50	12	3.0	3.0	10	9.6
R546991	CFR0905	Supremo Pit	gneiss	1	6.8	6.7	0.01	<0.01	0.01	<0.01	0.30	<0.3	<0.05	<0.2	<4.2	5.0	5.0	17	16
R547067	CFR0908	Supremo Pit	gneiss	1	8.3	8.2	0.01	<0.01	0.02	<0.01	0.30	<0.3	0.070	0.30	5.8	11	11	37	35
R548052	CFR0944	Supremo Pit	gneiss	1	6.2	6.1	0.02	<0.01	0.01	0.01	0.60	<0.3	<0.05	<0.2	<4.2	6.0	5.0	10	19
R618573	CFR0846	Supremo Pit	gneiss	1	7.1	7.1	0.01	<0.01	0.01	<0.01	0.30	<0.3	<0.05	<0.2	<4.2	11	11	37	35
R618876	CFR0860	Supremo Pit	gneiss	1	8.1	8.1	<0.01	<0.01	0.02	<0.01	<0.3	<0.3	0.10	0.40	8.3	18	18	60	58
R619123	CFR0867	Supremo Pit	gneiss	1	7.1	7	0.01	<0.01	0.01	<0.01	0.30	<0.3	<0.05	<0.2	<4.2	5.0	5.0	17	16
R620371	CFR0910	Supremo Pit	gneiss	1	7.9	7.9	<0.01	<0.01	0.01	<0.01	<0.3	<0.3	<0.05	<0.2	<4.2	7.0	7.0	23	22
R620448	CFR0911	Supremo Pit	gneiss	1	5.5	5.3	0.01	<0.01	<0.01	0.01	0.30	<0.3	<0.05	<0.2	<4.2	1.0	1.0	3.3	3.2
R620797	CFR0923	Supremo Pit	gneiss	1	5.9	5.9	0.02	0.02	<0.01	0.02	0.60	0.60	<0.05	<0.2	<4.2	6.0	5.0	10	9.6
R290225	CFR0614	West WRSF	gneiss	1	7.7	7.7	0.01	<0.01	0.01	<0.01	0.30	<0.3	<0.05	<0.2	<4.2	6.0	6.0	20	19
Statistical Summary for Overburden overlying Gneiss Bedrock (n = 41)			**Max**	-	8.4	8.4	0.12	0.02	0.11	0.02	3.8	0.60	0.14	0.50	12	18	18	60	58
			90th PCTL	-	8.1	8.1	0.01	0.01	0.02	0.01	0.30	0.30	0.070	0.30	5.8	11	11	37	35
			75th PCTL	-	7.9	7.9	0.01	<0.01	0.02	<0.01	0.30	<0.3	<0.05	<0.2	<4.2	8.0	7.0	23	22
			Median	-	7.5	7.5	0.01	<0.01	0.01	<0.01	0.30	<0.3	<0.05	<0.2	<4.2	6.0	6.0	20	19
			25th PCTL	-	7	6.9	<0.01	<0.01	0.01	<0.01	<0.3	<0.3	<0.05	<0.2	<4.2	5.0	5.0	10	11
			10th PCTL	-	6.7	6.7	<0.01	<0.01	<0.01	<0.01	<0.3	<0.3	<0.05	<0.2	<4.2	3.0	3.0	10	9.6
			Min	-	5.5	5.3	<0.01	<0.01	<0.01	<0.01	<0.3	<0.3	<0.05	<0.2	<4.2	1.0	1.0	2.3	3.2

Appendix C.4-1: Acid-Base Accounting Results for Overburden

Sample ID	Location Reference	Site Location	Underlying Geologic Unit	Fizz rating Unity	Rinse-pH s.u.	Paste pH s.u.	Total-S %	Sulphide-S %	Sulphate-S %	Insoluble-S %	T-AP $kgCaCO_3/t$	S-AP $kgCaCO_3/t$	TIC %	Inorg. CO_2 %	CaNP $kgCaCO_3/t$	Sobek NP $kgCaCO_3/t$	Sobek NNP $kgCaCO_3/t$	NPR Sobek/T-AP	NPR Sobek/S-AP
Overburden Overlying Schist Bedrock																			
R288438	CFR0698	DD Pit	schist	1	7.3	7.3	0.01	<0.01	0.02	<0.01	0.30	<0.3	<0.05	<0.2	<4.2	8.0	8.0	27	26
R298516	CFR0713	DD Pit	schist	1	7.7	7.6	<0.01	0.01	0.02	<0.01	<0.3	0.30	<0.05	<0.2	<4.2	7.0	7.0	23	22
R294148	CFR0624	Latte Pit	schist	2	8.3	8.3	0.01	<0.01	0.02	<0.01	0.30	<0.3	0.91	3.3	76	86	86	287	275
R297797	CFR0676	North WRSF	schist	2	8.4	8.4	0.02	0.01	0.01	0.01	0.60	0.30	0.20	0.80	17	31	30	52	99
R549926	CFR0981	North WRSF	schist	1	7.5	7.5	0.01	<0.01	0.02	<0.01	0.30	0.30	<0.05	<0.2	<4.2	11	11	37	35
R550015	CFR0984	North WRSF	schist	1	7.3	7.3	0.02	<0.01	<0.01	0.02	0.60	<0.3	<0.05	0.20	4.2	11	10	18	35
R550083	CFR0985	North WRSF	schist	1	8.2	8.2	0.02	0.01	0.02	<0.01	0.60	<0.3	<0.05	<0.2	<4.2	13	12	22	42
17551	SRK-15TP-47	ROM/Plant	schist	1	6.4	6.4	0.02	0.02	0.02	<0.01	0.60	0.60	<0.05	<0.2	<4.2	7.0	6.0	12	11
17552	SRK-15TP-46	ROM/Plant	schist	1	6.3	6.2	0.02	0.01	0.02	<0.01	0.60	0.30	<0.05	<0.2	<4.2	5.0	4.0	8.3	16
17553	SRK-15TP-45	ROM/Plant	schist	1	6	5.9	0.04	0.02	0.02	0.02	1.3	0.60	<0.05	<0.2	<4.2	3.0	2.0	2.3	4.8
17554	SRK-15TP-22	ROM/Plant	schist	1	6.8	6.9	0.02	0.02	0.01	0.01	0.60	0.60	<0.05	<0.2	<4.2	10	9.0	17	16
17556	SRK-15TP-24	ROM/Plant	schist	1	7.4	7.5	0.02	<0.01	0.01	0.01	0.60	<0.3	<0.05	<0.2	<4.2	11	10	18	35
R547969	CFR0939	South WRSF	schist	1	8.4	8.4	0.03	0.01	0.02	0.01	0.90	0.30	<0.05	<0.2	<4.2	11	10	12	35
R553319	CFB027	South WRSF	schist	3	7.4	7.4	0.03	0.02	0.03	<0.01	0.90	0.60	0.90	3.3	75	115	114	128	184
R281332	CFR0816	Supremo Pit	schist	1	7.6	7.6	<0.01	<0.01	0.01	<0.01	<0.3	<0.3	<0.05	<0.2	<4.2	5.0	5.0	17	16
R281383	CFR0818	Supremo Pit	schist	1	6.7	6.7	<0.01	<0.01	0.01	<0.01	<0.3	<0.3	<0.05	<0.2	<4.2	4.0	4.0	13	13
R294487	CFR0633	Supremo Pit	schist	1	7.4	7.3	0.07	0.05	0.02	0.05	2.2	1.6	0.050	0.20	4.2	14	12	6.4	9.0
R296213	CFR0651	Supremo Pit	schist	3	8.1	8.1	0.02	<0.01	0.02	<0.01	0.60	<0.3	1.1	3.9	88	134	133	223	429
R299233	CFR0737	Supremo Pit	schist	1	7.9	7.9	0.01	<0.01	0.02	<0.01	0.30	<0.3	<0.05	<0.2	<4.2	7.0	7.0	23	22
R299489	CFR0746	Supremo Pit	schist	1	7.6	7.5	<0.01	<0.01	0.02	<0.01	<0.3	<0.3	<0.05	<0.2	<4.2	11	11	37	35
R510641	CFR0752	Supremo Pit	schist	2	8.8	8.8	0.01	<0.01	0.02	<0.01	0.30	<0.3	0.15	0.60	13	75	75	250	240
R510976	CFR0761	Supremo Pit	schist	1	7.9	7.6	0.01	<0.01	0.02	<0.01	0.30	<0.3	<0.05	<0.2	<4.2	15	15	50	48
R511133	CFR0680	Supremo Pit	schist	3	8.2	8.1	0.02	<0.01	0.01	0.01	0.60	<0.3	0.85	3.1	71	91	90	152	291
R511474	CFR0686	Supremo Pit	schist	3	8.3	8.3	0.14	0.03	0.04	0.10	4.4	0.90	2.9	11	241	253	249	58	270
R511702	CFR0693	Supremo Pit	schist	1	8	7.9	0.01	<0.01	0.01	<0.01	0.30	<0.3	<0.05	<0.2	<4.2	8.0	8.0	27	26
R511762	CFR0695	Supremo Pit	schist	1	8	7.9	0.01	0.01	0.02	<0.01	0.30	0.30	<0.05	<0.2	<4.2	9.0	9.0	30	29
R620878	CFR0925	Supremo Pit	schist	2	-	8.2	<0.01	<0.01	0.01	<0.01	<0.3	<0.3	0.16	0.60	13	24	24	80	77
R622028	CFR0956	Supremo Pit	schist	1	7.2	7.1	0.02	0.02	0.02	<0.01	0.60	0.60	<0.05	<0.2	<4.2	11	10	18	18
R622095	CFR0957	Supremo Pit	schist	1	6.6	6.6	0.02	<0.01	0.01	0.01	0.60	<0.3	<0.05	<0.2	<4.2	8.0	7.0	13	26
R289071	CFR0599	West WRSF	schist	1	7.4	7.4	0.01	<0.01	0.01	<0.01	0.30	<0.3	<0.05	<0.2	<4.2	4.0	4.0	13	13
R290074	CFR0612	West WRSF	schist	1	7.4	7.3	<0.01	<0.01	0.01	<0.01	<0.3	<0.3	0.10	0.40	8.3	10	10	33	32
R549729	CFR0978	West WRSF	schist	1	6.6	6.6	0.09	0.07	0.01	0.08	2.8	2.2	0.10	0.40	8.3	8.0	5.0	2.9	3.7
R621156	CFR0937	West WRSF	schist	1	7.9	7.9	<0.01	<0.01	0.01	<0.01	<0.3	<0.3	<0.05	<0.2	<4.2	7.0	7.0	23	22
Statistical Summary for Overburden overlying Schist Bedrock (n = 33)			**Max**	-	8.8	8.8	0.14	0.07	0.04	0.10	4.4	2.2	2.9	11	241	253	249	287	429
			90th PCTL	-	8.3	8.3	0.04	0.02	0.02	0.02	1.2	0.60	0.89	3.3	74	90	89	147	264
			75th PCTL	-	8.0	8.1	0.02	0.01	0.02	0.01	0.60	0.30	0.10	0.40	8.3	15	15	50	48
			Median	-	7.6	7.5	0.02	<0.01	0.02	<0.01	0.60	<0.3	0.050	0.20	4.2	11	10	23	29
			25th PCTL	-	7.3	7.3	<0.01	<0.01	0.01	<0.01	<0.3	<0.3	<0.05	<0.2	<4.2	7.0	7.0	13	16
			10th PCTL	-	6.6	6.6	<0.01	<0.01	0.01	<0.01	<0.3	<0.3	<0.05	<0.2	<4.2	5.0	4.2	9.0	12
			Min	-	6.0	5.9	<0.01	<0.01	<0.01	<0.01	<0.3	<0.3	<0.05	<0.2	<4.2	3.0	2.0	2.3	3.7

Appendix C.4-1: Acid-Base Accounting Results for Overburden

Sample ID	Location Reference	Site Location	Underlying Geologic Unit	Fizz rating	Rinse-pH	Paste pH	Total-S	Sulphide-S	Sulphate-S	Insoluble-S	T-AP	S-AP	TIC	Inorg. CO_2	CaNP	Sobek NP	Sobek NNP	NPR	NPR
				Unity	s.u.	s.u.	%	%	%	%	$kgCaCO_3/t$	$kgCaCO_3/t$	%	%	$kgCaCO_3/t$	$kgCaCO_3/t$	$kgCaCO_3/t$	Sobek/T-AP	Sobek/S-AP
Overburden Overlying Granite Bedrock																			
17557	SRK-15TP-07	Event Pond	granite	1	5.8	5.8	0.02	0.02	0.01	0.01	0.60	0.60	*<0.05*	*<0.2*	*<4.2*	3.0	2.0	5.0	4.8
KNB-1	KNB-1	Event Pond	granite	1	7.4	7.8	0.01	0.01	0.02	*<0.01*	0.30	0.30	*<0.05*	*<0.2*	*<4.2*	2.0	2.0	6.7	6.4
KNB-2	KNB-2	Event Pond	granite	1	6.9	7.4	0.01	0.02	0.01	*<0.01*	0.30	0.60	*<0.05*	*<0.2*	*<4.2*	2.0	2.0	6.7	3.2
KNB-3	KNB-3	Event Pond	granite	1	7.8	7.7	0.01	0.02	0.01	*<0.01*	0.30	0.60	*<0.05*	*<0.2*	*<4.2*	2.0	2.0	6.7	3.2
KAM013553	CFR0055	Kona Pit	granite	1	7.1	6.8	0.01	*<0.01*	*<0.01*	0.01	0.30	*<0.3*	*<0.05*	*<0.2*	*<4.2*	4.0	4.0	13	13
R297165	CFR0663	Kona Pit	granite	1	6.5	6.3	0.01	*<0.01*	0.01	*<0.01*	0.30	*<0.3*	*<0.05*	*<0.2*	*<4.2*	1.0	1.0	3.3	3.2
R297232	CFR0665	Kona Pit	granite	1	8.9	8.7	*<0.01*	0.01	*<0.01*	*<0.01*	*<0.3*	0.30	*<0.05*	*<0.2*	*<4.2*	6.0	6.0	20	19
R297375	CFR0666	Kona Pit	granite	1	7	6.9	0.01	0.01	0.01	*<0.01*	0.30	0.30	*<0.05*	*<0.2*	*<4.2*	8.0	8.0	27	26
17558	SRK-15TP-44	Leach Pad	granite	1	6.4	6.2	0.01	0.01	0.02	*<0.01*	0.30	0.30	*<0.05*	*<0.2*	*<4.2*	2.0	2.0	6.7	6.4
17559	SRK-15TP-06	Leach Pad	granite	1	6.8	6.8	0.02	0.03	*<0.01*	0.02	0.60	0.90	*<0.05*	*<0.2*	*<4.2*	3.0	2.0	5.0	3.2
17560	SRK-15TP-43	Leach Pad	granite	1	6.4	6.5	0.01	*<0.01*	0.02	*<0.01*	0.30	*<0.3*	*<0.05*	*<0.2*	*<4.2*	4.0	4.0	13	13
17561	SRK-15TP-05	Leach Pad	granite	1	6.6	6.6	0.01	0.02	*<0.01*	0.01	0.30	0.60	*<0.05*	*<0.2*	*<4.2*	3.0	3.0	10	4.8
17562	SRK-15TP-04	Leach Pad	granite	1	6.8	6.8	0.02	0.01	0.01	0.01	0.60	0.30	*<0.05*	*<0.2*	*<4.2*	3.0	2.0	5.0	9.6
17565	SRK-15TP-03	Leach Pad	granite	1	6.2	6.1	0.02	0.01	0.01	0.01	0.60	0.30	*<0.05*	*<0.2*	*<4.2*	3.0	2.0	5.0	9.6
17566	SRK-15TP-17	Leach Pad	granite	1	6.6	6.6	0.01	0.01	0.01	*<0.01*	0.30	0.30	*<0.05*	*<0.2*	*<4.2*	4.0	4.0	13	13
17567	SRK-15TP-02	Leach Pad	granite	1	6.3	6.3	0.02	0.03	0.01	0.01	0.60	0.90	*<0.05*	*<0.2*	*<4.2*	4.0	3.0	6.7	4.3
17570	SRK-15TP-16	Leach Pad	granite	1	6.5	6.7	0.01	*<0.01*	0.01	*<0.01*	0.30	*<0.3*	*<0.05*	*<0.2*	*<4.2*	4.0	4.0	13	13
17571	SRK-15TP-15	Leach Pad	granite	1	6.2	6.4	0.01	0.01	0.01	*<0.01*	0.30	0.30	*<0.05*	*<0.2*	*<4.2*	3.0	3.0	10	9.6
17572	SRK-15TP-14	Leach Pad	granite	1	5.7	5.9	0.02	0.01	0.01	0.01	0.60	0.30	0.050	0.20	4.2	2.0	1.0	3.3	6.4
17573	SRK-15TP-13	Leach Pad	granite	1	6.2	6.6	0.01	0.01	0.01	*<0.01*	0.30	0.30	*<0.05*	*<0.2*	*<4.2*	2.0	2.0	6.7	6.4
17574	SRK-15TP-12	Leach Pad	granite	1	6.2	6	0.02	0.02	0.01	0.01	0.60	0.60	*<0.05*	*<0.2*	*<4.2*	2.0	1.0	3.3	3.2
17575	SRK-15TP-11	Leach Pad	granite	1	7.3	7.2	0.02	*<0.01*	0.02	*<0.01*	0.60	*<0.3*	*<0.05*	*<0.2*	*<4.2*	4.0	3.0	6.7	13
17576	SRK-15TP-18	Leach Pad	granite	1	6	6	0.01	*<0.01*	*<0.01*	0.01	0.30	*<0.3*	*<0.05*	*<0.2*	*<4.2*	4.0	4.0	13	13
17577	SRK-15TP-42	Leach Pad	granite	1	7	6.9	0.01	0.02	0.01	*<0.01*	0.30	0.60	*<0.05*	*<0.2*	*<4.2*	3.0	3.0	10	4.8
17578	SRK-15TP-10	Leach Pad	granite	1	6.6	6.5	0.01	*<0.01*	0.01	*<0.01*	0.30	*<0.3*	*<0.05*	*<0.2*	*<4.2*	4.0	4.0	13	13
17579	SRK-15TP-09	Leach Pad	granite	1	6.5	6.4	0.01	0.02	*<0.01*	0.01	0.30	0.60	*<0.05*	*<0.2*	*<4.2*	4.0	4.0	13	6.4
17580	SRK-15TP-41	Leach Pad	granite	1	7	6.9	0.01	*<0.01*	0.02	*<0.01*	0.30	*<0.3*	*<0.05*	*<0.2*	*<4.2*	6.0	6.0	20	19
17581	SRK-15TP-08	Leach Pad	granite	1	6.5	6.5	0.02	0.02	0.01	0.01	0.60	0.60	*<0.05*	*<0.2*	*<4.2*	3.0	2.0	5.0	4.8
Statistical Summary for Overburden overlying Granite Bedrock (n = 28)			**Max**	-	8.9	8.7	0.02	0.03	0.02	0.02	0.60	0.90	0.050	0.20	4.2	8.0	8.0	27	26
			90th PCTL	-	7.3	7.5	0.02	0.02	0.02	0.01	0.60	0.60	*<0.05*	*<0.2*	*<4.2*	4.6	4.6	15	15
			75th PCTL	-	7.0	6.9	0.02	0.02	0.01	0.01	0.60	0.60	*<0.05*	*<0.2*	*<4.2*	4.0	4.0	13	13
			Median	-	6.6	6.6	0.01	0.01	0.01	*<0.01*	0.30	0.30	*<0.05*	*<0.2*	*<4.2*	3.0	3.0	6.7	6.4
			25th PCTL	-	6.3	6.3	0.01	*<0.01*	0.01	*<0.01*	0.30	*<0.3*	*<0.05*	*<0.2*	*<4.2*	2.0	2.0	5.0	4.8
			10th PCTL	-	6.1	6.0	0.01	*<0.01*	*<0.01*	*<0.01*	0.30	*<0.3*	*<0.05*	*<0.2*	*<4.2*	2.0	1.7	4.5	3.2
			Min	-	5.7	5.8	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.3*	*<0.3*	*<0.05*	*<0.2*	*<4.2*	1.0	1.0	3.3	3.2
Overburden Overlying Meta-Gabbro Bedrock (n = 3)																			
17555	SRK-15TP-23	ROM/Plant	meta-gabbro	1	5.2	5.1	0.06	0.03	0.01	0.05	1.9	0.90	*<0.05*	*<0.2*	*<4.2*	3.0	1.0	1.6	3.2
R553404	CFB030	South WRSF	meta-gabbro	3	9.2	9.2	*<0.01*	*<0.01*	0.02	*<0.01*	*<0.3*	*<0.3*	1.3	4.8	108	138	138	460	442
R553602	CFB035	South WRSF	meta-gabbro	1	7.4	7.4	0.01	*<0.01*	0.03	*<0.01*	0.30	*<0.3*	*<0.05*	*<0.2*	*<4.2*	8.0	8.0	27	26

Notes: all values in grey italics are below the analytical detection limit.
n = number of samples included in the statistical summary
Sulphate Sulphur determined by 25% HCL with Gravimetric Finish.
Sulphide Sulphur determined by Sobek 1:7 Nitric Acid with S by ICP-MS Finish.
AP = Acid potential in tonnes $CaCO_3$ equivalent per 1000 tonnes of material, T-AP derived from Total S * 31.25; S-AP derived from Sulphide-S *31.25.
NP = Neutralization potential in tonnes $CaCO_3$ equivalent per 1000 tonnes of material; carbonate NP (CaNP) is calculated from inorganic CO2.
Net NP (NNP) = NP - AP; Neutralization potential ratio (NPR)

Appendix C.4-2: Shake Flask Extraction Results for Overburden

Sample ID	Location Reference	Site Location	Underlying Geologic Unit	Moisture	T-Alkalinity	Br	Cl	F	Nitrate-N	Nitrite-N	pH	Sulfate	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	U	V	Zn
				%	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	pH	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	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
Overburden overlying Gneiss Bedrock																																													
R281758	CFR0836	DD Pit	gneiss	<0.25	14	<0.05	<0.5	0.18	0.92	0.033	6.1	1.8	0.88	0.0012	0.013	0.053	<0.0005	<0.0005	<0.01	<0.00005	6.2	0.0034	0.0029	0.0058	0.81	0.00034	<0.005	1.4	0.20	<0.00005	0.0012	0.0053	<0.3	2.0	<0.0005	4.5	<0.00005	1.9	0.026	<0.0001	<0.0005	0.021	0.00018	0.0020	<0.01
R283938	CFR0825	DD Pit	gneiss	<0.25	17	<0.05	<0.5	0.23	0.027	0.0054	7.3	0.75	1.2	0.0025	0.0054	0.040	<0.0005	<0.0005	<0.01	<0.00005	5.6	0.0026	0.00070	0.0047	1.0	0.00054	<0.005	0.67	0.032	<0.00005	0.0018	0.0030	<0.3	1.6	<0.0005	4.7	<0.00005	2.1	0.014	<0.0001	<0.0005	0.031	0.00019	0.0031	<0.01
R280751	CFR0805	Supremo Pit	gneiss	<0.25	11	<0.05	<0.5	0.15	0.060	0.0030	7.8	1.0	0.56	0.0024	0.026	0.026	<0.0005	<0.0005	<0.01	<0.00005	2.6	0.00074	0.00022	0.0075	0.58	0.00046	<0.005	0.65	0.028	<0.00005	0.0028	0.00086	<0.3	1.9	<0.0005	3.1	<0.00005	1.7	0.013	<0.0001	<0.0005	<0.01	0.00045	0.0015	<0.01
R281971	CFR0841	Supremo Pit	gneiss	<0.25	15	<0.05	<0.5	0.048	0.19	0.0059	6.1	0.69	1.0	0.0015	0.013	0.078	<0.0005	<0.0005	<0.01	<0.00005	6.4	0.0029	0.0025	0.0069	0.91	0.00023	<0.005	1.1	0.18	<0.00005	0.0015	0.0055	<0.3	2.1	<0.0005	5.2	<0.00005	2.1	0.027	<0.0001	<0.0005	0.024	0.00042	0.0021	<0.01
R513919	CFR0872	Supremo Pit	gneiss	<0.25	6.6	<0.05	<0.5	0.061	0.083	0.0051	6.3	0.55	0.66	0.00035	0.0046	0.024	<0.0005	<0.0005	<0.01	<0.00005	1.4	0.0017	0.00051	0.0058	0.42	0.00027	<0.005	0.32	0.088	<0.00005	0.0018	0.0019	<0.3	0.96	<0.0005	3.9	<0.00005	2.8	0.0095	<0.0001	<0.0005	0.013	0.00031	0.0013	<0.01
R540708	CFR0864	Supremo Pit	gneiss	<0.25	6.0	<0.05	<0.5	0.16	0.018	0.0029	7.0	0.66	2.1	0.00085	0.010	0.045	<0.0005	<0.0005	<0.01	<0.00005	1.0	0.0048	0.0010	0.0091	2.1	0.0010	<0.005	0.65	0.050	<0.00005	0.0036	0.0058	<0.3	1.1	<0.0005	6.6	<0.00005	2.7	0.0068	<0.0001	<0.0005	0.065	0.00059	0.0067	<0.01
R540846	CFR0866	Supremo Pit	gneiss	<0.25	39	<0.05	<0.5	0.14	0.035	0.0052	7.3	0.60	0.51	0.00095	0.012	0.044	<0.0005	<0.0005	<0.01	<0.00005	11	0.0012	0.00030	0.0040	0.81	0.00045	<0.005	1.8	0.041	<0.00005	0.0020	0.0020	<0.3	1.7	<0.0005	4.0	<0.00005	2.1	0.054	<0.0001	<0.0005	0.016	0.00027	0.0023	<0.01
R542611	CFR0909	Supremo Pit	gneiss	<0.25	8.9	<0.05	<0.5	0.14	0.031	0.013	8.1	0.68	0.94	0.0084	0.096	0.025	<0.0005	<0.0005	<0.01	<0.00005	2.5	0.0018	0.00038	0.0021	1.1	0.00094	<0.005	0.32	0.021	0.000066	0.0023	0.0010	<0.3	2.0	<0.0005	5.3	<0.00005	0.62	0.0090	<0.0001	<0.0005	0.020	0.0014	0.0020	<0.01
R543125	CFR0924	Supremo Pit	gneiss	<0.25	11	<0.05	<0.5	0.20	0.019	0.0025	7.2	0.64	1.1	0.00035	0.0041	0.024	<0.0005	<0.0005	<0.01	<0.00005	2.6	0.0024	0.0010	0.0081	1.2	0.00072	<0.005	0.62	0.057	<0.00005	0.0023	0.0029	<0.3	0.96	<0.0005	5.0	<0.00005	3.5	0.011	<0.0001	<0.0005	0.036	0.00080	0.0036	<0.01
R547067	CFR0908	Supremo Pit	gneiss	<0.25	41	<0.05	<0.5	0.18	1.0	0.010	8.4	0.73	0.16	0.00090	0.014	0.045	<0.0005	<0.0005	<0.01	<0.00005	13	<0.0005	<0.0001	0.0044	0.049	<0.0001	<0.005	1.3	0.028	<0.00005	0.0042	<0.0005	<0.3	2.0	<0.0005	2.8	<0.00005	4.0	0.056	<0.0001	<0.0005	<0.01	0.0015	0.0032	<0.01
R618876	CFR0860	Supremo Pit	gneiss	<0.25	48	<0.05	<0.5	0.14	0.013	0.0039	7.7	<0.5	0.26	0.00086	0.0067	0.037	<0.0005	<0.0005	<0.01	<0.00005	9.5	0.0045	0.00016	0.0053	0.46	0.00019	<0.005	2.9	0.019	<0.00005	0.0021	0.0071	<0.3	7.3	<0.0005	3.1	<0.00005	2.4	0.021	<0.0001	<0.0005	<0.01	0.00016	0.0013	<0.01
R619123	CFR0867	Supremo Pit	gneiss	<0.25	4.8	<0.05	<0.5	0.097	0.020	0.0028	6.6	0.53	0.81	0.0018	0.053	0.013	<0.0005	<0.0005	<0.01	<0.00005	0.87	0.0021	0.00059	0.0050	0.60	0.00024	<0.005	0.30	0.015	0.00026	0.00069	0.0015	<0.3	1.9	<0.0005	5.2	<0.00005	1.5	0.0065	<0.0001	<0.0005	0.011	0.00046	0.0016	<0.01
Statistical Summary forOverburden overlying Gneiss bedrock (n = 11)			**Max**	-	48	<0.05	<0.5	0.23	1.0	0.033	8.4	1.8	2.1	0.0084	0.096	0.078	<0.0005	<0.0005	<0.01	<0.00005	13	0.0048	0.0029	0.0091	2.1	0.0010	<0.005	2.9	0.20	0.00026	0.0042	0.0071	<0.3	7.3	<0.0005	6.6	<0.00005	4.0	0.056	<0.0001	<0.0005	0.065	0.0015	0.0067	<0.01
			90th PCTL	-	40	<0.05	<0.5	0.20	0.84	0.013	8.1	1.0	1.1	0.0025	0.050	0.052	<0.0005	<0.0005	<0.01	<0.00005	11	0.0044	0.0023	0.0080	1.1	0.00092	<0.005	1.8	0.17	0.000064	0.0036	0.0058	<0.3	2.1	<0.0005	5.3	<0.00005	3.4	0.051	<0.0001	<0.0005	0.036	0.0013	0.0036	<0.01
			75th PCTL	-	22	<0.05	<0.5	0.18	0.11	0.0070	7.7	0.74	1.0	0.0019	0.017	0.045	<0.0005	<0.0005	<0.01	<0.00005	7.2	0.0030	0.0010	0.0071	1.1	0.00059	<0.005	1.3	0.065	<0.00005	0.0024	0.0053	<0.3	2.0	<0.0005	5.2	<0.00005	2.7	0.026	<0.0001	<0.0005	0.026	0.00064	0.0031	<0.01
			Median	-	13	<0.05	<0.5	0.15	0.033	0.0052	7.2	0.67	0.85	0.0011	0.013	0.039	<0.0005	<0.0005	<0.01	<0.00005	4.1	0.0022	0.00055	0.0056	0.81	0.00040	<0.005	0.66	0.037	<0.00005	0.0020	0.0025	<0.3	1.9	<0.0005	4.6	<0.00005	2.1	0.014	<0.0001	<0.0005	0.018	0.00044	0.0021	<0.01
			25th PCTL	-	8.3	<0.05	<0.5	0.13	0.020	0.0030	6.6	0.59	0.55	0.00086	0.0064	0.025	<0.0005	<0.0005	<0.01	<0.00005	2.3	0.0016	0.00028	0.0046	0.55	0.00024	<0.005	0.55	0.026	<0.00005	0.0017	0.0014	<0.3	1.5	<0.0005	3.7	<0.00005	1.9	0.0094	<0.0001	<0.0005	0.011	0.00025	0.0016	<0.01
			10th PCTL	-	6.1	<0.05	<0.5	0.065	0.018	0.0028	6.1	0.53	0.29	0.00040	0.0047	0.024	<0.0005	<0.0005	<0.01	<0.00005	1.1	0.00079	0.00017	0.0040	0.43	0.00019	<0.005	0.32	0.019	<0.00005	0.0012	0.00088	<0.3	0.97	<0.0005	3.1	<0.00005	1.5	0.0070	<0.0001	<0.0005	<0.01	0.00018	0.0013	<0.01
			Min	-	4.8	<0.05	<0.5	0.048	0.013	0.0025	6.1	<0.5	0.16	0.00035	0.0041	0.013	<0.0005	<0.0005	<0.01	<0.00005	0.87	<0.0005	<0.0001	0.0021	0.049	<0.0001	<0.005	0.30	0.015	0.000050	0.00069	<0.0005	<0.3	0.96	<0.0005	2.8	<0.00005	0.62	0.0065	<0.0001	<0.0005	<0.01	0.00016	0.0013	<0.01
Overburden overlying Schist Bedrock																																													
17552	SRK-15TP-46	ROM/Plant	schist	<0.25	7.6	<0.05	<0.5	0.064	0.016	0.0018	6.2	0.84	1.5	0.00025	0.0039	0.030	<0.0005	<0.0005	<0.01	<0.00005	2.3	0.0031	0.00096	0.0070	0.98	0.00050	<0.005	0.59	0.079	<0.00005	0.00077	0.0021	<0.3	2.1	<0.0005	12	<0.00005	1.9	0.015	<0.0001	<0.0005	0.036	0.0011	0.0026	<0.01
17554	SRK-15TP-22	ROM/Plant	schist	<0.25	5.3	<0.05	<0.5	0.11	<0.005	0.0013	6.5	2.7	1.9	0.00023	0.0020	0.032	<0.0005	<0.0005	<0.01	<0.00005	1.5	0.0043	0.0010	0.0089	1.4	0.0011	<0.005	0.64	0.038	<0.00005	0.0015	0.0051	<0.3	2.2	<0.0005	13	<0.00005	1.7	0.011	<0.0001	<0.0005	0.054	0.00078	0.0034	<0.01
17556	SRK-15TP-24	ROM/Plant	schist	<0.25	27	<0.05	<0.5	0.28	<0.005	<0.001	7.7	3.1	1.6	0.0016	0.0085	0.052	<0.0005	<0.0005	<0.01	<0.00005	10	0.0043	0.00087	0.0078	2.0	0.0012	<0.005	0.75	0.042	0.00012	0.0016	0.0056	<0.3	2.6	0.00064	9.6	<0.00005	1.3	0.026	<0.0001	<0.0005	0.041	0.00014	0.0053	<0.01
R622028	CFR0956	Supremo Pit	schist	<0.25	23	<0.05	<0.5	0.19	0.033	0.0063	7.1	1.0	1.1	0.0026	0.015	0.10	<0.0005	<0.0005	<0.01	<0.00005	12	0.0028	0.00086	0.0067	1.1	0.00042	<0.005	0.68	0.10	<0.00005	0.0045	0.0056	<0.3	1.1	<0.0005	5.5	<0.00005	1.2	0.039	<0.0001	<0.0005	0.032	0.00011	0.0031	<0.01
R281332	CFR0816	Supremo Pit	schist	<0.25	6.3	<0.05	<0.5	0.11	0.030	0.0028	7.0	0.54	1.2	0.0031	0.015	0.023	<0.0005	<0.0005	<0.01	<0.00005	0.68	0.0012	0.00028	0.0044	0.74	0.00049	<0.005	0.23	0.039	<0.00005	0.0021	0.0014	<0.3	1.2	<0.0005	4.5	<0.00005	2.9	0.0038	<0.0001	<0.0005	0.018	0.0011	0.0021	<0.01
R621156	CFR0937	West WRSF	schist	<0.25	8.0	<0.05	<0.5	0.22	0.049	0.0013	7.4	0.84	1.4	0.00083	0.013	0.037	<0.0005	<0.0005	<0.01	<0.00005	1.7	0.0030	0.00078	0.019	1.4	0.0014	<0.005	0.57	0.049	<0.00005	0.0017	0.0023	<0.3	1.1	<0.0005	5.9	<0.00005	3.2	0.0085	<0.0001	<0.0005	0.050	0.00068	0.0043	<0.01
R550015	CFR0984	North WRSF	schist	<0.25	45	<0.05	<0.5	0.25	0.028	0.0047	7.6	1.2	0.71	0.0075	0.041	0.061	<0.0005	<0.0005	<0.01	<0.00005	14	0.0038	0.00078	0.016	0.90	0.00035	<0.005	2.2	0.32	<0.00005	0.012	0.0056	<0.3	3.1	<0.0005	4.6	<0.00005	4.6	0.042	<0.0001	<0.0005	0.026	0.00063	0.0091	<0.01
Statistical Summary forOverburden overlying Schist bedrock (n = 11)			**Max**	-	*45*	<0.05	<0.5	*0.28*	*0.049*	*0.0063*	*7.7*	*3.1*	*1.9*	*0.0075*	*0.041*	*0.10*	<0.0005	<0.0005	<0.01	<0.00005	*14*	*0.0043*	*0.0010*	*0.019*	*2.0*	*0.0014*	<0.005	*2.2*	*0.32*	*0.00012*	*0.012*	*0.0056*	<0.3	*3.1*	*0.00064*	*13*	<0.00005	*4.6*	*0.042*	<0.0001	<0.0005	*0.054*	*0.0011*	*0.0091*	<0.01
			90th PCTL	-	*35*	<0.05	<0.5	*0.26*	*0.039*	*0.0053*	*7.6*	*2.9*	*1.7*	*0.0048*	*0.026*	*0.078*	<0.0005	<0.0005	<0.01	<0.00005	*13*	*0.0043*	*0.00098*	*0.017*	*1.7*	*0.0013*	<0.005	*1.3*	*0.19*	*0.000077*	*0.0073*	*0.0056*	<0.3	*2.8*	*0.00056*	*12*	<0.00005	*3.7*	*0.040*	<0.0001	<0.0005	*0.052*	*0.0011*	*0.0068*	<0.01
			75th PCTL	-	*25*	<0.05	<0.5	*0.24*	*0.031*	*0.0038*	*7.5*	*2.0*	*1.6*	*0.0029*	*0.015*	*0.057*	<0.0005	<0.0005	<0.01	<0.00005	*11*	*0.0040*	*0.00092*	*0.012*	*1.4*	*0.0011*	<0.005	*0.72*	*0.089*	<0.00005	*0.0033*	*0.0056*	<0.3	*2.4*	<0.0005	*11*	<0.00005	*3.0*	*0.033*	<0.0001	<0.0005	*0.046*	*0.00092*	*0.0048*	<0.01
			Median	-	*8.0*	<0.05	<0.5	*0.19*	*0.028*	*0.0018*	*7.1*	*1.0*	*1.4*	*0.0016*	*0.013*	*0.037*	<0.0005	<0.0005	<0.01	<0.00005	*2.3*	*0.0031*	*0.00086*	*0.0078*	*1.1*	*0.00050*	<0.005	*0.64*	*0.049*	<0.00005	*0.0017*	*0.0051*	<0.3	*2.1*	<0.0005	*5.9*	<0.00005	*1.9*	*0.015*	<0.0001	<0.0005	*0.036*	*0.00068*	*0.0034*	<0.01
			25th PCTL	-	*7.0*	<0.05	<0.5	*0.11*	*0.011*	*0.0013*	*6.8*	*0.84*	*1.1*	*0.00054*	*0.0062*	*0.031*	<0.0005	<0.0005	<0.01	<0.00005	*1.6*	*0.0029*	*0.00078*	*0.0069*	*0.94*	*0.00046*	<0.005	*0.58*	*0.040*	<0.00005	*0.0016*	*0.0022*	<0.3	*1.2*	<0.0005	*5.0*	<0.00005	*1.5*	*0.0097*	<0.0001	<0.0005	*0.029*	*0.00038*	*0.0029*	<0.01
			10th PCTL	-	*5.9*	<0.05	<0.5	*0.090*	<0.005	*0.0012*	*6.4*	*0.72*	*0.95*	*0.00024*	*0.0031*	*0.027*	<0.0005	<0.0005	<0.01	<0.00005	*1.2*	*0.0022*	*0.00058*	*0.0058*	*0.84*	*0.00039*	<0.005	*0.44*	*0.038*	<0.00005	*0.0012*	*0.0018*	<0.3	*1.1*	<0.0005	*4.5*	<0.00005	*1.2*	*0.0066*	<0.0001	<0.0005	*0.023*	*0.00013*	*0.0024*	<0.01
			Min	-	*5.3*	<0.05	<0.5	*0.064*	<0.005	<0.001	*6.2*	*0.54*	*0.71*	*0.00023*	*0.0020*	*0.023*	<0.0005	<0.0005	<0.01	<0.00005	*0.68*	*0.0012*	*0.00028*	*0.0044*	*0.74*	*0.00035*	<0.005	*0.23*	*0.038*	<0.00005	*0.00077*	*0.0014*	<0.3	*1.1*	<0.0005	*4.5*	<0.00005	*1.2*	*0.0038*	<0.0001	<0.0005	*0.018*	*0.00011*	*0.0021*	<0.01
Overburden overlying Granite Bedrock																																													
17560	SRK-15TP-43	Leach Pad	granite	<0.25	5.2	<0.05	<0.5	0.17	<0.005	<0.001	6.1	<0.5	1.4	0.00025	0.0011	0.019	<0.0005	<0.0005	<0.01	<0.00005	1.0	0.0033	0.00046	0.0068	1.3	0.00075	<0.005	0.36	0.045	<0.00005	0.0011	0.0026	<0.3	0.79	<0.0005	11	<0.00005	2.2	0.0077	<0.0001	<0.0005	0.072	0.0016	0.0038	<0.01
17561	SRK-15TP-05	Leach Pad	granite	<0.25	4.1	<0.05	<0.5	0.079	<0.005	<0.001	6.2	0.56	0.98	0.00015	0.0011	0.014	<0.0005	<0.0005	<0.01	<0.00005	0.59	0.0019	0.00049	0.0031	0.74	0.00062	<0.005	0.16	0.072	<0.00005	0.0011	0.0015	<0.3	0.90	<0.0005	7.5	0.000071	2.5	0.0051	<0.0001	<0.0005	0.029	0.0023	0.0018	<0.01
17565	SRK-15TP-03	Leach Pad	granite	<0.25	4.9	<0.05	<0.5	0.084	0.0098	0.0017	5.9	0.87	1.7	0.00021	0.0028	0.025	<0.0005	<0.0005	<0.01	<0.00005	1.3	0.0029	0.00096	0.0052	1.6	0.0011	<0.005	0.35	0.15	<0.00005	0.00052	0.0022	<0.3	0.98	<0.0005	10	0.000079	2.3	0.011	<0.0001	<0.0005	0.054	0.0035	0.0034	<0.01
17566	SRK-15TP-17	Leach Pad	granite	<0.25	4.9	<0.05	<0.5	0.083	<0.005	<0.001	6.4	<0.5	0.90	0.00023	0.0016	0.013	<0.0005	<0.0005	<0.01	<0.00005	0.86	0.0018	0.00029	0.0045	0.99	0.00070	<0.005	0.25	0.052	0.000065	0.0011	0.0022	<0.3	1.1	<0.0005	9.3	<0.00005	1.9	0.0077	<0.0001	<0.0005	0.033	0.0024	0.0022	<0.01
17571	SRK-15TP-15	Leach Pad	granite	<0.25	5.0	<0.05	<0.5	0.066	0.0080	0.0010	6.1	<0.5	1.3	0.00019	0.0023	0.025	<0.0005	<0.0005	<0.01	<0.00005	0.94	0.0027	0.00079	0.0048	1.0	0.00070	<0.005	0.27	0.15	<0.00005	0.00054	0.0020	<0.3	0.94	<0.0005	10	<0.00005	2.1	0.0087	<0.0001	<0.0005	0.049	0.0015	0.0028	<0.01
17572	SRK-15TP-14	Leach Pad	granite	<0.25	3.9	<0.05	<0.5	0.047	0.058	0.0022	5.9	<0.5	0.74	0.00069	0.026	0.014	<0.0005	<0.0005	0.024	<0.00005	0.64	0.0015	0.00043	0.0040	0.44	0.00032	<0.005	0.17	0.054	<0.00005	0.00040	0.0015	<0.3	1.8	<0.0005	7.4	<0.00005	1.1	0.0059	<0.0001	<0.0005	0.011	0.0025	0.0010	<0.01
17575	SRK-15TP-11	Leach Pad	granite	<0.25	5.0	<0.05	<0.5	0.11	<0.005	0.0017	6.5	<0.5	0.79	0.00027	0.0025	0.012	<0.0005	<0.0005	<0.01	<0.00005	0.38	0.0017	0.00020	0.0035	0.75	0.00069	<0.005	0.11	0.042	<0.00005	0.0015	0.0014	<0.3	0.91	<0.0005	7.4	<0.00005	2.2	0.0032	<0.0001	<0.0005	0.026	0.0041	0.0020	<0.01
17580	SRK-15TP-41	Leach Pad	granite	<0.25	5.8	<0.05	<0.5	0.13	<0.005	<0.001	6.5	<0.5	1.9	0.00027	0.0016	0.025	<0.0005	<0.0005	<0.01	<0.00005	0.84	0.0037	0.00059	0.0077	1.9	0.0016	<0.005	0.44	0.084	<0.00005	0.0025	0.0036	<0.3	0.89	<0.0005	13	0.00014	2.3	0.0069	<0.0001	<0.0005	0.077	0.0015	0.0059	<0.01
KNB-1	KNB-1	Event Pond	granite	<0.25	<2	<0.05	<0.5	<0.02	0.13	<0.001	6.5	<0.5	0.11	0.00016	<0.001	<0.001	<0.0005	<0.0005	<0.01	<0.00005	<0.1	<0.0005	<0.0001	<0.001	<0.03	0.00010	<0.005	<0.05	0.0016	<0.00005	0.0027	<0.0005	<0.3	0.53	<0.0005	2.0	<0.00005	0.55	<0.0005	<0.0001	<0.0005	<0.01	0.0023	<0.001	<0.01
KNB-2	KNB-2	Event Pond	granite	<0.25	<2	<0.05	<0.5	0.022	0.029	<0.001	6.4	<0.5	0.11	0.00015	<0.001	<0.001	<0.0005	<0.0005	<0.01	<0.00005	<0.1	<0.0005	<0.0001	<0.001	0.046	0.00023	<0.005	<0.05	0.0025	<0.00005	0.00084	<0.0005	<0.3	0.48	<0.0005	2.2	<0.00005	0.61	<0.0005	<0.0001	<0.0005	<0.01	0.0017	<0.001	<0.01
KNB-3	KNB-3	Event Pond	granite	<0.25	<2	<0.05	<0.5	<0.02	0.41	<0.001	6.3	1.4	0.081	0.00013	0.0011	0.0029	<0.0005	<0.0005	<0.01	<0.00005	<0.1	<0.0005	<0.0001	<0.001	<0.03	0.00031	<0.005	<0.05	0.0034	<0.00005	0.00012	<0.0005	<0.3	0.98	<0.0005	2.5	<0.00005	0.75	<0.0005	<0.0001	<0.0005	<0.01	0.0011	<0.001	<0.01
Statistical Summary forOverburden overlying Granite bedrock (n = 11)			**Max**	-	5.8	<0.05	<0.5	0.17	0.41	0.0022	6.5	1.4	1.9	0.00069	0.026	0.025	<0.0005	<0.0005	0.024	<0.00005	1.3	0.0037	0.00096	0.0077	1.9	0.0016	<0.005	0.44	0.15	0.000065	0.0027	0.0036	<0.3	1.8	<0.0005	13	0.00014	2.5	0.011	<0.0001	<0.0005	0.077	0.0041	0.0059	<0.01
			90th PCTL	-	5.2	<0.05	<0.5	0.13	0.13	0.0017	6.5	0.87	1.7	0.00027	0.0028	0.025	<0.0005	<0.0005	<0.01	<0.00005	1.0	0.0033	0.00079	0.0068	1.6	0.0011	<0.005	0.36	0.15	<0.00005	0.0025	0.0026	<0.3	1.1	<0.0005	11	0.000079	2.3	0.0087	<0.0001	<0.0005	0.072	0.0035	0.0038	<0.01
			75th PCTL	-	5.0	<0.05	<0.5	0.098	0.043	0.0014	6.5	0.53	1.4	0.00026	0.0024	0.022	<0.0005	<0.0005	<0.01	<0.00005	0.90	0.0028	0.00054	0.0050	1.1	0.00073	<0.005	0.31	0.078	<0.00005	0.0013	0.0022	<0.3	0.98	<0.0005	10	0.000061	2.2	0.0077	<0.0001	<0.0005	0.052	0.0024	0.0031	<0.01
			Median	-	4.9	<0.05	<0.5	0.079	<0.008	<0.001	6.3	<0.5	0.90	0.00021	0.0016	0.014	<0.0005	<0.0005	<0.01	<0.00005	0.64	0.0018	0.00043	0.0040	0.75	0.00069	<0.005	0.17	0.052	<0.00005	0.0011	0.0015	<0.3	0.91	<0.0005	7.5	<0.00005	2.1	0.0059	<0.0001	<0.0005	0.029	0.0023	0.0020	<0.01
			25th PCTL	-	3.0	<0.05	<0.5	0.035	<0.005	<0.001	6.1	<0.5	0.42	0.00016	0.0011	0.0073	<0.0005	<0.0005	<0.01	<0.00005	0.24	0.0010	0.00015	0.0021	0.24	0.00032	<0.005	0.081	0.023	<0.00005	0.00053	0.00096	<0.3	0.84	<0.0005	4.9	<0.00005	0.93	0.0019	<0.0001	<0.0005	0.011	0.0015	0.0010	<0.01
			10th PCTL	-	<2	<0.05	<0.5	0.020	<0.005	<0.001	5.9	<0.5	0.11	0.00015	<0.001	<0.001	<0.0005	<0.0005	<0.01	<0.00005	<0.1	<0.0005	<0.0001	<0.001	<0.03	0.00023	<0.005	<0.05	0.0025	<0.00005	0.00040	<0.0005	<0.3	0.53	<0.0005	2.2	<0.00005	0.61	<0.0005	<0.0001	<0.0005	<0.01	0.0015	<0.001	<0.01
			Min	-	<2	<0.05	<0.5	<0.02	<0.005	<0.001	5.9	<0.5	0.081	0.00013	<0.001	<0.001	<0.0005	<0.0005	<0.01	<0.00005	<0.1	<0.0005	<0.0001	<0.001	<0.03	0.00010	<0.005	<0.05	0.0016	<0.00005	0.00012	<0.0005	<0.3	0.48	<0.0005	2.0	<0.00005	0.55	<0.0005	<0.0001	<0.0005	<0.01	0.0011	<0.001	<0.01
Overburden overlying Meta-Gabbro Bedrock																																													
R553404	CFB030	South WRSF	meta-gabbro	<0.25	35	<0.05	<0.5	0.17	<0.005	0.0060	9.3	2.9	0.22	<0.0001	0.0021	0.0085	<0.0005	<0.0005	<0.01	<0.00005	5.6	<0.0005	<0.0001	<0.001	<0.03	<0.0001	<0.005	1.9	<0.0005	<0.00005	0.0057	<0.0005	<0.3	8.0	<0.0005	2.7	<0.00005	2.2	0.052	<0.0001	<0.0005	<0.01	0.000014	0.0038	<0.01

Notes: all values in grey italics are below the analytical detection limit
n = number of samples included in statistical summary
n < DL = number of samples with values below the analytical detection limit

Appendix C.4-3: Solid Phase Element Results by Aqua Regia Digestion for Overburden

Sample ID	Location Reference	Site Location	Underlying Geologic Unit	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K
				ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%
Overburden Overlying Gneiss Bedrock																									
KAM106801	CFR0320	DD Pit	gneiss	0.18	0.58	481	2.8	<10	3100	0.99	0.22	0.52	0.020	56	5.8	9.0	1.7	5.4	1.5	1.4	0.060	0.060	0.48	0.011	0.26
R281758	CFR0836	DD Pit	gneiss	0.070	1.5	106	<0.2	<10	210	0.43	0.25	0.49	0.080	27	14	69	1.1	16	2.6	4.9	0.090	0.020	0.090	0.018	0.26
R283938	CFR0825	DD Pit	gneiss	0.050	1.6	39	<0.2	<10	190	0.54	0.25	0.53	0.050	36	12	53	1.1	12	2.4	5.3	0.090	0.060	0.030	0.017	0.33
R288218	CFR0694	DD Pit	gneiss	0.040	1.5	47	<0.2	<10	150	0.40	0.63	0.51	0.030	25	13	79	1.4	14	2.5	4.1	0.060	0.020	0.030	0.015	0.24
R298598	CFR0716	DD Pit	gneiss	0.030	1.8	44	<0.2	<10	220	0.76	0.31	0.34	0.050	62	10	33	2.1	10	2.7	6.3	0.12	0.13	0.020	0.019	0.61
KAM018321	CFR0102	Supremo Pit	gneiss	0.18	0.81	894	1.2	<10	180	0.68	0.14	0.18	0.12	49	6.0	17	1.3	14	2.0	2.7	0.070	0.070	0.86	0.019	0.22
KAM104165	CFR0288	Supremo Pit	gneiss	0.060	0.45	372	1.3	<10	130	0.89	0.10	0.090	0.080	79	2.0	8.0	0.67	5.4	1.1	2.2	0.090	0.070	0.57	0.016	0.20
R280751	CFR0805	Supremo Pit	gneiss	0.030	0.55	145	<0.2	<10	100	0.52	0.17	0.080	0.080	67	3.6	18	1.1	22	1.4	2.2	0.080	0.17	0.050	0.011	0.17
R281909	CFR0839	Supremo Pit	gneiss	0.020	2.2	33	<0.2	<10	350	0.55	0.38	0.79	0.050	35	18	94	1.5	12	2.7	7.4	0.10	0.070	0.020	0.016	0.81
R281971	CFR0841	Supremo Pit	gneiss	0.050	1.2	83	<0.2	<10	170	0.40	0.36	0.34	0.040	44	8.4	28	0.88	13	2.1	4.2	0.070	0.030	0.13	0.017	0.23
R284001	CFR0804	Supremo Pit	gneiss	0.050	0.97	87	0.20	<10	130	0.70	0.11	0.24	0.080	62	5.6	25	1.0	23	1.8	3.6	0.10	0.070	0.080	0.016	0.24
R285461	CFR0757	Supremo Pit	gneiss	0.070	0.94	15	<0.2	<10	100	0.33	0.20	0.34	0.090	28	6.6	30	0.49	7.2	1.7	3.0	0.060	0.14	0.010	0.012	0.27
R285552	CFR0759	Supremo Pit	gneiss	0.020	2.0	104	<0.2	<10	230	0.84	0.47	0.36	0.040	89	12	55	2.5	11	2.9	7.0	0.18	0.13	0.050	0.016	1.1
R286151	CFR0776	Supremo Pit	gneiss	0.020	1.0	27	<0.2	<10	110	0.38	0.14	0.27	0.050	32	7.4	34	0.59	19	1.9	3.6	0.070	0.050	0.010	0.011	0.28
R286219	CFR0779	Supremo Pit	gneiss	0.030	0.87	228	<0.2	<10	110	0.48	0.34	0.23	0.10	44	7.2	23	0.83	11	1.7	3.3	0.080	0.23	0.040	0.013	0.22
R286345	CFR0782	Supremo Pit	gneiss	0.020	0.88	38	<0.2	<10	100	0.34	0.24	0.27	0.030	85	5.1	12	0.87	9.5	1.8	4.5	0.10	0.19	0.020	0.011	0.45
R287156	CFR0802	Supremo Pit	gneiss	0.040	0.94	121	<0.2	<10	110	0.61	0.19	0.18	0.070	55	6.5	19	1.1	8.9	1.9	2.9	0.080	0.12	0.040	0.015	0.21
R513919	CFR0872	Supremo Pit	gneiss	0.030	1.1	91	<0.2	<10	120	0.49	0.090	0.18	0.070	38	8.1	27	1.0	12	1.8	3.1	0.060	0.12	0.060	0.013	0.19
R514753	CFR0783	Supremo Pit	gneiss	0.040	0.89	117	<0.2	<10	160	0.42	0.12	0.25	0.10	36	7.4	21	0.54	12	1.9	2.8	0.060	0.20	0.030	0.015	0.15
R514902	CFR0786	Supremo Pit	gneiss	0.020	1.9	43	<0.2	<10	220	0.52	0.14	0.65	0.040	17	15	84	0.94	8.0	2.6	4.7	0.090	0.22	0.020	0.011	0.68
R515335	CFR0797	Supremo Pit	gneiss	0.040	1.0	71	<0.2	<10	120	0.49	0.12	0.24	0.070	46	6.9	20	0.78	13	1.8	3.2	0.060	0.080	0.060	0.015	0.17
R515458	CFR0799	Supremo Pit	gneiss	0.040	1.4	45	<0.2	<10	150	0.50	0.10	0.32	0.060	46	8.4	33	0.84	14	2.0	4.3	0.060	0.030	0.030	0.014	0.26
R540708	CFR0864	Supremo Pit	gneiss	0.040	1.5	44	<0.2	<10	150	0.62	0.090	0.42	0.030	41	9.6	42	1.2	18	2.4	4.3	0.090	0.14	0.050	0.013	0.35
R540846	CFR0866	Supremo Pit	gneiss	0.050	1.2	108	<0.2	<10	110	1.0	0.38	0.31	0.050	53	7.0	26	1.6	13	1.9	5.1	0.15	0.17	0.12	0.016	0.20
R541274	CFR0877	Supremo Pit	gneiss	0.030	0.70	83	<0.2	<10	80	0.39	0.10	0.11	0.070	39	5.2	16	0.64	7.8	1.4	2.2	0.050	0.030	0.040	0.0090	0.16
R541396	CFR0881	Supremo Pit	gneiss	0.020	0.50	99	<0.2	<10	60	0.40	0.11	0.070	0.090	31	2.8	15	0.38	5.4	0.85	1.6	0.050	0.040	0.030	0.0060	0.15
R541524	CFR0884	Supremo Pit	gneiss	0.030	0.58	53	<0.2	<10	70	0.36	0.10	0.12	0.080	32	3.8	15	0.45	7.6	1.2	2.0	0.050	0.080	0.090	0.010	0.13
R542611	CFR0909	Supremo Pit	gneiss	0.040	0.88	562	<0.2	<10	110	0.69	0.11	0.15	0.050	61	4.2	18	0.77	6.7	1.5	2.4	0.070	0.17	0.39	0.010	0.19
R542736	CFR0912	Supremo Pit	gneiss	0.020	1.1	27	<0.2	<10	200	0.80	0.19	0.45	0.020	69	8.7	28	2.0	9.8	1.8	3.5	0.090	0.20	0.030	0.016	0.31
R543125	CFR0924	Supremo Pit	gneiss	0.020	0.85	16	<0.2	<10	90	0.31	0.16	0.23	0.050	31	6.6	24	0.49	8.0	1.5	2.7	0.050	0.090	0.010	0.011	0.22
R543393	CFR0933	Supremo Pit	gneiss	0.020	0.44	150	<0.2	<10	50	0.35	0.14	0.11	0.090	35	3.5	12	0.74	6.0	1.4	1.7	0.050	0.090	0.10	0.0080	0.13
R546991	CFR0905	Supremo Pit	gneiss	0.050	1.3	165	<0.2	<10	150	0.68	0.12	0.26	0.17	53	7.0	25	0.83	16	1.9	3.8	0.080	0.11	0.18	0.015	0.18
R547067	CFR0908	Supremo Pit	gneiss	0.040	0.67	32	<0.2	<10	90	0.44	0.14	0.44	0.040	57	4.2	17	0.75	11	1.4	2.7	0.060	0.28	0.030	0.012	0.19
R548052	CFR0944	Supremo Pit	gneiss	0.070	1.4	50	<0.2	<10	170	0.82	0.39	0.31	0.080	59	7.2	22	2.6	13	2.2	4.6	0.10	0.080	0.070	0.019	0.18
R618573	CFR0846	Supremo Pit	gneiss	0.040	2.2	94	<0.2	<10	220	0.81	0.22	0.57	0.040	45	16	78	2.3	19	3.2	7.1	0.14	0.20	0.070	0.024	0.49
R618876	CFR0860	Supremo Pit	gneiss	0.020	1.9	72	<0.2	<10	150	0.56	0.16	0.46	0.030	46	19	345	3.7	22	2.2	5.2	0.11	0.12	0.030	0.014	0.70
R619123	CFR0867	Supremo Pit	gneiss	0.040	1.5	880	0.20	<10	150	0.96	0.35	0.15	0.020	54	17	50	4.7	17	3.0	5.7	0.13	0.070	1.4	0.027	0.55
R620371	CFR0910	Supremo Pit	gneiss	0.010	0.34	20	<0.2	<10	40	0.24	0.070	0.23	0.010	51	1.5	10	0.78	7.7	0.97	2.0	0.060	0.12	0.030	0.0060	0.17
R620448	CFR0911	Supremo Pit	gneiss	0.030	0.69	64	<0.2	<10	50	0.32	0.16	0.090	0.080	26	4.5	15	0.65	9.3	1.6	2.7	0.060	0.020	0.050	0.013	0.12
R620797	CFR0923	Supremo Pit	gneiss	0.070	0.94	64	<0.2	<10	100	0.38	0.16	0.20	0.060	30	5.9	30	0.59	89	2.1	3.1	0.060	0.040	0.060	0.014	0.13
R290225	CFR0614	West WRSF	gneiss	0.040	0.71	84	<0.2	<10	140	0.43	0.57	0.19	0.080	45	3.7	14	0.80	12	1.6	3.1	0.060	0.030	0.040	0.016	0.21
Statistical Summary for Overburden overlying Gneiss Bedrock (n = 41)			**Max**	0.18	2.2	894	2.8	<10	3100	1.0	0.63	0.79	0.17	89	19	345	4.7	89	3.2	7.4	0.18	0.28	1.4	0.027	1.1
			90th PCTL	0.070	1.9	372	0.20	<10	220	0.84	0.38	0.52	0.090	67	15	78	2.3	19	2.7	5.7	0.12	0.20	0.39	0.019	0.61
			75th PCTL	0.050	1.5	117	<0.2	<10	170	0.69	0.25	0.42	0.080	56	9.6	34	1.4	14	2.2	4.6	0.090	0.14	0.090	0.016	0.31
			Median	0.040	0.97	83	<0.2	<10	130	0.50	0.16	0.26	0.060	45	7.0	25	0.88	12	1.9	3.3	0.070	0.090	0.050	0.014	0.22
			25th PCTL	0.020	0.71	44	<0.2	<10	100	0.40	0.12	0.18	0.040	35	5.1	17	0.74	8.0	1.5	2.7	0.060	0.060	0.030	0.011	0.18
			10th PCTL	0.020	0.55	27	<0.2	<10	70	0.34	0.10	0.11	0.030	28	3.6	12	0.54	6.7	1.4	2.0	0.050	0.030	0.020	0.010	0.15
			Min	0.010	0.34	15	<0.2	<10	40	0.24	0.070	0.070	0.010	17	1.5	8.0	0.38	5.4	0.85	1.4	0.050	0.020	0.010	0.0060	0.12

Sample ID	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
KAM106801	32	0.90	0.090	352	0.63	0.010	<0.05	11	310	11	12	<0.001	0.080	5.9	2.2	0.40	0.30	54	<0.01	0.12	20	<0.005	0.29	1.2	7.0	0.71	8.5	11	2.6
R281758	14	9.1	0.84	530	1.7	0.040	1.2	27	520	10	22	<0.001	0.010	6.1	3.9	0.30	1.1	34	<0.01	0.090	5.4	0.092	0.21	0.94	48	2.2	6.4	39	0.90
R283938	19	9.0	0.82	442	1.2	0.060	1.2	22	470	8.2	30	<0.001	0.010	5.8	4.0	0.60	1.0	38	<0.01	0.050	11	0.11	0.20	1.2	43	2.0	8.5	35	2.8
R288218	13	7.7	0.84	500	0.69	0.040	0.89	37	510	6.0	22	<0.001	0.010	2.6	3.1	0.60	0.80	29	<0.01	0.28	6.1	0.095	0.17	0.69	37	0.52	6.0	33	0.70
R298598	32	10	0.81	502	1.2	0.050	0.94	20	610	9.3	43	<0.001	0.010	3.4	4.3	0.60	0.80	21	0.010	0.040	15	0.075	0.31	0.85	36	0.84	11	44	5.0
KAM018321	27	3.8	0.12	379	1.3	0.020	0.22	9.2	300	14	14	<0.001	0.040	17	3.4	0.50	0.80	33	<0.01	0.050	25	0.012	0.96	8.3	21	1.2	8.5	30	4.4
KAM104165	45	1.5	0.050	363	1.2	0.010	0.30	4.1	140	15	17	<0.001	<0.01	25	1.1	0.40	0.50	11	<0.01	0.040	27	<0.005	0.55	8.7	7.0	1.3	7.0	16	3.6
R280751	38	2.4	0.10	336	3.2	0.020	0.39	11	180	8.8	17	0.0010	0.010	8.9	1.4	0.40	0.80	9.7	<0.01	0.010	25	0.018	0.19	4.3	13	3.3	8.5	36	3.6
R281909	18	11	1.9	404	0.90	0.080	0.36	44	690	7.4	43	<0.001	0.010	3.2	3.7	0.40	1.8	34	<0.01	0.14	8.2	0.17	0.32	1.0	48	1.6	6.8	47	2.7
R281971	24	7.0	0.39	358	1.3	0.050	1.1	15	340	6.0	23	<0.001	0.010	5.6	2.6	0.60	1.3	25	<0.01	0.14	14	0.061	0.18	1.5	30	2.3	9.3	25	1.1
R284001	41	4.8	0.21	403	3.1	0.060	1.2	12	310	9.4	23	<0.001	0.010	8.1	2.5	0.60	1.2	23	0.020	0.010	20	0.051	0.20	4.4	27	1.7	11	38	3.1
R285461	16	4.0	0.38	294	1.1	0.060	0.50	15	360	7.9	20	<0.001	<0.01	0.58	1.8	0.60	1.1	28	<0.01	0.050	15	0.080	0.14	1.3	25	0.34	6.1	25	6.7
R285552	49	11	1.3	453	0.79	0.040	0.86	13	590	6.4	84	<0.001	<0.01	2.2	3.7	0.80	1.6	27	0.010	0.12	20	0.14	0.61	2.6	43	0.71	16	41	6.2
R286151	15	5.7	0.43	326	2.4	0.060	0.74	19	310	8.3	25	0.0010	<0.01	0.73	2.6	0.40	0.90	29	<0.01	0.030	16	0.071	0.14	1.3	30	1.3	7.0	23	3.2
R286219	25	4.0	0.27	262	1.4	0.050	0.55	13	340	5.2	18	<0.001	<0.01	4.4	2.6	0.70	1.0	23	0.030	0.14	22	0.046	0.16	2.0	24	1.2	8.7	20	10
R286345	43	4.8	0.31	267	1.4	0.050	0.75	6.6	400	4.4	46	<0.001	<0.01	1.4	1.9	0.70	0.90	22	<0.01	0.13	23	0.094	0.34	4.3	17	0.79	11	21	7.6
R287156	34	4.4	0.21	409	0.81	0.040	0.45	9.9	350	7.5	19	<0.001	<0.01	4.6	2.6	0.40	0.70	18	<0.01	0.010	21	0.041	0.19	2.3	29	0.69	9.0	27	3.2
R513919	20	5.3	0.30	372	1.5	0.040	0.24	17	240	8.8	15	<0.001	<0.01	3.3	2.6	0.50	0.80	16	<0.01	0.020	22	0.047	0.14	1.8	28	1.9	8.2	24	6.7
R514753	19	4.7	0.23	414	1.2	0.030	0.48	13	290	6.7	12	<0.001	0.010	4.4	2.5	0.60	0.90	20	<0.01	0.030	17	0.044	0.090	1.9	31	1.5	7.3	23	2.2
R514902	9.1	11	1.4	537	0.82	0.060	0.24	25	540	4.2	43	<0.001	<0.01	7.6	3.0	0.40	1.1	30	<0.01	0.050	11	0.15	0.30	1.1	42	0.78	5.6	30	5.2
R515335	25	5.2	0.27	343	0.76	0.050	0.41	12	360	5.6	14	<0.001	<0.01	4.5	3.0	0.50	1.1	20	<0.01	0.030	21	0.054	0.11	2.4	31	0.87	9.4	24	4.3
R515458	26	8.6	0.54	315	0.68	0.060	0.80	17	410	5.3	20	<0.001	0.010	3.1	3.2	0.60	1.0	24	<0.01	0.030	16	0.089	0.16	1.8	40	2.1	8.9	28	1.7
R540708	23	8.4	0.63	408	3.9	0.060	0.57	19	390	6.5	32	0.0010	0.010	3.4	3.9	0.50	0.90	27	0.010	0.020	20	0.11	0.23	2.2	42	1.1	14	31	5.8
R540846	28	5.9	0.30	381	1.6	0.040	0.79	15	280	8.5	27	<0.001	<0.01	3.4	4.2	0.70	1.4	21	0.060	0.020	31	0.045	0.28	2.4	29	0.93	13	25	8.8
R541274	20	3.4	0.18	326	1.7	0.030	0.44	9.8	190	11	13	<0.001	<0.01	3.9	1.4	0.60	0.60	12	<0.01	0.020	20	0.032	0.11	2.1	20	1.9	6.7	19	1.8
R541396	18	1.9	0.060	221	1.8	0.020	0.34	8.2	150	6.6	12	0.0010	<0.01	6.3	0.90	0.40	0.40	9.4	<0.01	0.010	27	0.011	0.090	2.9	10	0.59	8.0	13	3.1
R541524	17	3.1	0.15	233	1.2	0.030	0.41	8.6	160	5.5	12	<0.001	<0.01	3.4	1.3	0.40	0.50	12	<0.01	0.020	25	0.033	0.10	2.1	18	1.1	8.8	17	4.1
R542611	38	3.8	0.13	246	1.3	0.010	0.11	8.6	270	10	17	<0.001	<0.01	42	1.7	0.60	0.70	16	<0.01	0.020	29	0.021	0.57	12	16	2.0	12	19	9.3
R542736	41	6.2	0.47	366	1.0	0.050	0.36	15	340	4.4	32	<0.001	0.010	1.9	2.9	0.60	1.3	27	<0.01	0.020	24	0.079	0.26	1.5	27	1.4	13	25	11
R543125	15	4.6	0.34	305	1.1	0.050	0.52	13	280	4.6	18	<0.001	<0.01	0.57	1.9	0.40	0.80	15	<0.01	0.060	20	0.052	0.11	2.0	25	3.0	7.4	20	4.6
R543393	21	2.0	0.090	203	1.5	0.030	0.42	5.8	220	6.7	12	<0.001	<0.01	6.9	1.1	0.30	0.80	9.6	<0.01	0.020	25	0.017	0.12	2.1	11	2.9	6.7	17	4.3
R546991	31	7.0	0.30	380	1.2	0.040	0.63	14	340	18	15	<0.001	0.010	3.2	3.5	0.70	0.60	35	<0.01	0.040	20	0.062	0.26	4.4	38	3.5	12	34	6.2
R547067	35	4.7	0.25	289	1.6	0.050	0.42	8.1	270	10	18	<0.001	0.010	1.6	2.0	0.50	1.3	24	<0.01	0.030	27	0.043	0.14	2.3	20	2.8	13	22	14
R548052	33	7.9	0.28	666	1.7	0.040	1.8	12	360	9.2	26	<0.001	0.010	2.2	3.3	0.90	1.5	23	0.030	0.040	16	0.057	0.24	10	33	3.2	15	45	2.9
R618573	22	12	1.3	630	2.5	0.070	1.2	41	530	5.2	41	<0.001	0.010	20	5.2	0.60	2.0	40	0.030	0.060	13	0.16	0.34	1.1	54	2.0	9.9	41	5.0
R618876	24	12	2.2	427	2.0	0.040	0.55	266	210	6.5	51	0.0010	<0.01	1.6	6.4	0.60	2.2	17	0.030	0.020	21	0.063	0.42	1.7	33	1.1	11	26	5.8
R619123	26	6.1	0.51	319	1.9	0.030	0.37	38	280	4.7	36	<0.001	0.020	20	5.7	0.80	2.1	31	0.010	0.060	9.9	0.050	0.75	2.9	34	0.80	11	40	2.5
R620371	29	2.4	0.10	194	1.7	0.030	1.2	5.3	130	7.4	19	<0.001	<0.01	1.1	0.60	0.30	1.3	12	<0.01	0.010	31	0.018	0.16	2.2	5.0	2.5	8.6	12	5.4
R620448	15	3.7	0.13	251	1.4	0.030	0.75	7.8	280	7.6	11	<0.001	0.010	2.9	1.4	0.30	1.0	18	<0.01	0.020	14	0.030	0.10	2.1	23	1.1	6.5	19	0.90
R620797	18	12	0.23	357	1.8	0.040	0.94	12	430	13	12	<0.001	0.010	9.8	2.1	0.40	7.5	16	0.030	0.020	12	0.046	0.12	2.0	32	1.0	6.5	37	1.4
R290225	25	3.4	0.19	179	1.9	0.020	0.75	8.7	280	6.3	19	0.0010	0.010	1.3	2.0	0.40	0.80	27	<0.01	0.14	16	0.032	0.14	1.3	17	1.3	8.2	24	1.8
Max	49	12	2.2	666	3.9	0.080	1.8	266	690	18	84	0.0010	0.080	42	6.4	0.90	7.5	54	0.060	0.28	31	0.17	0.96	12	54	3.5	16	47	14
90th PCTL	41	11	1.3	502	2.4	0.060	1.2	37	530	11	43	0.0010	0.010	17	4.2	0.70	1.8	34	0.030	0.14	27	0.11	0.55	4.4	43	2.9	13	41	8.8
75th PCTL	32	8.4	0.54	409	1.7	0.050	0.86	19	400	9.3	30	<0.001	0.010	6.3	3.5	0.60	1.3	29	<0.01	0.060	24	0.080	0.30	2.6	36	2.0	11	35	5.8
Median	25	5.2	0.30	358	1.4	0.040	0.55	13	310	7.4	19	<0.001	0.010	3.4	2.6	0.50	1.0	23	<0.01	0.030	20	0.051	0.19	2.1	29	1.3	8.6	25	4.1
25th PCTL	18	3.8	0.18	294	1.1	0.030	0.39	9.2	270	6.0	15	<0.001	<0.01	2.2	1.9	0.40	0.80	16	<0.01	0.020	15	0.032	0.14	1.3	20	0.87	7.0	20	2.6
10th PCTL	15	2.4	0.10	233	0.79	0.020	0.24	7.8	180	4.7	12	<0.001	<0.01	1.3	1.3	0.40	0.60	12	<0.01	0.010	11	0.017	0.11	1.1	11	0.71	6.5	17	1.4
Min	9.1	0.90	0.050	179	0.63	0.010	<0.05	4.1	130	4.2	11	<0.001	<0.01	0.57	0.60	0.30	0.30	9.4	<0.01	0.010	5.4	<0.005	0.090	0.69	5.0	0.34	5.6	11	0.70

Appendix C.4-3: Solid Phase Element Results by Aqua Regia Digestion for Overburden

Sample ID	Location Reference	Site Location	Underlying Geologic Unit	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
				ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Overburden Overlying Schist Bedrock																																																						
R288438	CFR0698	DD Pit	schist	0.050	1.8	160	0.20	<10	180	0.58	0.22	0.45	0.080	57	12	69	1.8	15	2.5	4.8	0.070	0.040	0.050	0.016	0.51	26	11	1.1	591	0.85	0.030	0.36	33	460	9.9	34	0.0010	0.010	9.8	3.7	0.70	0.70	18	<0.01	0.030	10	0.063	0.31	1.0	30	7.5	8.4	58	1.9
R298516	CFR0713	DD Pit	schist	0.040	0.54	1440	<0.2	<10	190	0.67	0.13	0.25	0.060	93	4.3	14	1.3	7.2	1.8	2.3	0.11	0.11	0.26	0.010	0.22	59	1.9	0.14	308	1.5	0.010	0.28	9.8	240	13	16	0.0010	0.010	11	2.1	0.90	0.30	19	<0.01	0.030	27	0.0060	0.23	3.1	11	2.5	12	20	5.3
R294148	CFR0624	Latte Pit	schist	0.030	1.7	130	<0.2	<10	210	0.51	0.16	3.7	0.080	45	13	53	1.2	21	2.8	6.7	0.13	0.15	0.030	0.020	0.65	28	10	0.85	469	0.69	0.040	1.1	31	640	4.9	51	<0.001	0.010	1.9	5.8	1.0	0.90	130	0.020	0.020	9.4	0.13	0.31	0.76	46	0.86	13	46	4.5
R297797	CFR0676	North WRSF	schist	0.010	1.0	7.2	<0.2	<10	170	0.33	0.050	0.99	0.010	35	5.8	13	1.0	14	1.7	3.9	0.060	0.080	<0.01	0.0080	0.69	19	5.9	0.63	210	1.8	0.070	0.27	8.3	380	1.3	41	<0.001	0.020	0.61	2.2	0.40	1.2	23	<0.01	<0.01	9.1	0.098	0.23	1.5	21	3.0	8.1	12	2.6
R549926	CFR0981	North WRSF	schist	0.030	0.90	69	<0.2	<10	110	0.43	0.17	0.28	0.070	38	4.7	15	0.60	7.7	1.7	3.2	0.060	0.020	0.070	0.012	0.24	24	4.3	0.26	253	1.0	0.050	0.77	8.3	270	4.3	18	<0.001	<0.01	5.3	2.0	0.60	1.0	19	<0.01	0.010	18	0.040	0.13	2.3	21	2.5	9.1	20	1.0
R550015	CFR0984	North WRSF	schist	0.030	1.3	85	<0.2	<10	190	0.69	0.25	0.42	0.11	33	9.6	38	1.6	13	2.3	4.3	0.070	0.030	0.070	0.018	0.39	18	6.5	0.55	328	1.1	0.040	0.55	19	520	4.5	28	<0.001	0.010	9.6	5.2	0.60	1.6	19	<0.01	0.040	12	0.067	0.23	1.6	45	4.1	9.4	30	1.3
R550083	CFR0985	North WRSF	schist	0.040	2.5	34	<0.2	<10	470	0.89	0.14	0.72	0.050	16	21	86	1.1	27	3.8	8.4	0.15	0.090	0.010	0.026	1.2	7.6	18	2.0	663	1.2	0.080	0.41	40	830	2.5	74	<0.001	<0.01	1.2	7.4	0.70	5.2	29	<0.01	0.020	3.6	0.21	0.42	1.3	94	1.2	9.4	51	3.7
17551	SRK-15TP-47	ROM/Plant	schist	0.050	1.5	300	<0.2	<10	180	0.62	0.33	0.37	0.10	43	14	36	1.3	24	2.3	4.8	0.13	0.040	0.59	0.031	0.10	22	8.0	0.38	525	0.61	0.030	0.79	30	410	15	9.9	<0.001	0.010	8.4	4.8	0.70	0.60	22	<0.01	0.030	5.7	0.057	0.48	1.0	47	0.72	12	58	1.5
17552	SRK-15TP-46	ROM/Plant	schist	0.040	1.9	22	<0.2	<10	110	0.87	0.15	0.33	0.080	55	8.3	29	1.3	14	2.3	7.2	0.15	0.060	0.010	0.027	0.39	30	14	0.87	415	0.83	0.040	2.0	14	430	7.3	40	<0.001	0.010	0.25	4.5	0.70	1.2	28	<0.01	0.020	13	0.11	0.30	1.7	43	0.40	13	48	2.5
17553	SRK-15TP-45	ROM/Plant	schist	0.14	1.5	48	<0.2	<10	110	0.97	0.24	0.11	0.090	42	6.8	29	1.5	14	1.8	4.5	0.11	0.16	0.020	0.017	0.22	24	11	0.44	300	2.2	0.020	0.83	13	170	15	26	<0.001	0.040	0.44	2.4	0.40	0.70	14	<0.01	0.010	17	0.042	0.35	2.5	24	0.17	4.8	52	7.2
17554	SRK-15TP-22	ROM/Plant	schist	0.040	2.4	9.3	<0.2	<10	150	1.6	0.22	0.71	0.070	71	9.6	82	2.6	19	2.0	8.3	0.16	0.090	<0.01	0.022	0.58	37	19	1.2	392	0.46	0.13	1.1	36	540	17	65	<0.001	0.020	0.19	4.5	0.70	1.6	58	<0.01	0.010	18	0.14	0.47	1.9	38	0.26	10	61	3.6
17556	SRK-15TP-24	ROM/Plant	schist	0.070	2.4	63	<0.2	<10	230	1.3	0.23	0.84	0.14	60	18	73	3.3	34	3.3	8.4	0.16	0.090	0.29	0.039	0.41	27	12	0.79	508	0.55	0.090	0.80	61	570	13	43	<0.001	0.010	1.7	10	0.80	1.1	47	<0.01	0.020	11	0.12	0.68	1.2	58	0.27	14	71	3.6
R547969	CFR0939	South WRSF	schist	0.16	1.8	29	0.20	<10	290	0.50	0.26	0.34	0.070	34	13	59	2.8	25	2.9	6.5	0.090	0.070	<0.01	0.018	1.1	16	14	1.2	397	1.3	0.020	0.16	39	620	5.8	72	<0.001	0.020	1.0	3.9	0.70	0.90	19	<0.01	0.020	6.2	0.13	0.41	1.1	40	0.93	11	57	2.1
R553319	CFB027	South WRSF	schist	0.070	2.0	28	<0.2	<10	300	0.53	0.090	4.6	0.14	42	14	59	1.5	24	2.6	6.5	0.10	0.050	0.040	0.017	0.45	23	12	1.0	407	0.67	0.040	2.3	34	650	8.5	42	<0.001	0.030	0.92	4.4	0.70	0.70	159	<0.01	0.030	6.1	0.12	0.25	1.3	47	3.2	9.3	52	2.0
R281332	CFR0816	Supremo Pit	schist	0.030	1.0	48	<0.2	<10	130	0.76	0.090	0.14	0.030	69	4.3	18	0.86	8.0	1.4	3.2	0.080	0.14	0.050	0.0090	0.35	37	5.2	0.25	294	0.85	0.050	0.43	12	270	5.1	28	<0.001	<0.01	5.4	1.7	0.60	1.5	12	<0.01	0.010	30	0.038	0.19	3.5	16	1.3	14	18	7.0
R281383	CFR0818	Supremo Pit	schist	0.060	1.0	264	0.20	<10	150	0.83	0.12	0.14	0.11	38	6.6	20	0.78	11	2.1	3.0	0.060	0.030	0.16	0.016	0.22	24	4.2	0.17	347	1.3	0.030	0.54	12	300	6.4	16	<0.001	0.010	24	3.2	0.60	1.1	19	<0.01	0.020	18	0.031	0.17	6.2	32	1.7	11	27	1.4
R294487	CFR0633	Supremo Pit	schist	0.030	1.5	110	<0.2	<10	230	0.34	0.13	0.59	0.070	40	8.8	52	1.1	17	2.9	6.0	0.090	0.080	0.060	0.018	0.53	20	11	0.88	441	1.3	0.050	1.3	24	570	5.4	29	<0.001	0.060	3.7	4.2	0.60	1.1	29	<0.01	0.020	10	0.094	0.23	0.99	50	0.49	9.2	41	3.4
R296213	CFR0651	Supremo Pit	schist	0.040	1.8	39	<0.2	<10	350	0.81	0.21	3.1	0.060	69	11	46	4.0	25	3.3	7.4	0.16	0.080	0.13	0.034	0.77	40	10	1.1	502	1.9	0.020	0.47	24	590	9.8	44	<0.001	<0.01	4.3	7.9	0.90	1.1	72	<0.01	0.010	13	0.082	0.29	1.3	44	1.9	18	59	3.6
R299233	CFR0737	Supremo Pit	schist	0.040	0.87	123	<0.2	<10	120	0.39	0.38	0.27	0.060	38	5.9	22	0.84	8.3	1.9	3.0	0.070	0.17	0.050	0.013	0.26	23	4.0	0.27	270	1.6	0.040	0.69	9.7	320	7.4	20	<0.001	<0.01	3.5	1.9	0.50	1.1	20	<0.01	0.11	17	0.050	0.18	1.7	22	0.71	7.3	22	5.8
R299489	CFR0746	Supremo Pit	schist	0.020	2.4	190	<0.2	<10	370	0.54	0.14	0.49	0.030	38	18	47	2.9	26	3.7	6.2	0.090	0.070	0.020	0.011	1.1	20	15	1.6	750	1.4	0.030	0.14	27	610	3.2	64	<0.001	<0.01	3.0	4.5	0.70	0.50	20	<0.01	0.040	7.7	0.14	0.40	2.3	58	0.49	10	58	2.5
R510641	CFR0752	Supremo Pit	schist	0.020	2.2	99	<0.2	<10	250	0.30	0.040	1.2	0.020	2.5	20	66	2.2	35	3.2	4.3	0.070	0.040	0.010	0.010	0.95	1.2	10	1.7	542	0.59	0.080	<0.05	36	180	1.5	37	<0.001	<0.01	1.0	7.2	0.30	0.60	28	<0.01	0.010	0.80	0.095	0.29	0.25	68	0.16	2.8	35	1.0
R510976	CFR0761	Supremo Pit	schist	0.090	3.1	348	<0.2	<10	530	0.93	0.30	0.64	0.020	60	20	94	12	28	5.3	10	0.18	0.28	0.18	0.041	0.94	33	20	1.8	879	0.46	0.040	0.34	62	1560	7.1	55	<0.001	<0.01	30	15	1.2	0.90	34	<0.01	0.050	8.6	0.090	1.5	2.2	116	0.29	18	60	17
R511133	CFR0680	Supremo Pit	schist	0.030	1.4	747	<0.2	<10	340	1.1	0.15	3.0	0.040	63	11	41	1.3	15	2.8	5.4	0.18	0.060	0.45	0.027	0.31	33	7.1	0.34	499	0.71	0.020	0.88	24	450	10	21	<0.001	0.010	7.0	6.3	1.1	0.80	49	0.040	0.020	13	0.031	0.37	2.0	39	0.83	19	41	3.2
R511474	CFR0686	Supremo Pit	schist	0.060	0.83	90	<0.2	<10	2220	1.1	0.19	6.0	0.13	59	15	64	0.67	29	3.8	3.8	0.16	0.040	0.44	0.050	0.13	30	3.6	1.4	801	0.67	0.020	0.36	29	790	25	7.1	0.0010	0.11	5.2	17	1.4	0.80	187	<0.01	0.030	8.7	0.0090	0.17	0.75	122	3.0	23	65	1.6
R511702	CFR0693	Supremo Pit	schist	0.14	0.91	274	<0.2	<10	360	0.72	0.38	0.40	0.18	68	13	24	0.95	39	3.0	3.2	0.12	0.10	0.42	0.022	0.30	38	4.6	0.28	602	0.69	0.020	0.28	29	790	16	21	<0.001	<0.01	18	4.5	0.80	0.50	59	<0.01	0.040	10	0.031	0.28	1.5	32	5.3	13	46	2.9
R511762	CFR0695	Supremo Pit	schist	0.25	0.79	2370	0.60	<10	350	0.79	0.27	0.32	0.15	62	17	27	1.7	25	3.8	3.1	0.12	0.13	0.36	0.023	0.39	32	2.0	0.10	744	0.98	0.010	0.18	39	630	13	23	<0.001	<0.01	20	4.3	0.70	0.40	45	0.020	0.060	11	0.0060	0.44	2.6	17	1.0	12	51	1.8
R620878	CFR0925	Supremo Pit	schist	0.050	1.4	64	<0.2	<10	320	0.78	0.11	0.72	0.040	53	3.9	18	0.64	34	1.6	3.8	0.070	0.12	0.080	0.012	0.45	32	5.4	0.13	319	3.9	0.070	0.54	14	210	6.5	27	<0.001	0.010	3.0	1.5	0.70	3.2	23	<0.01	0.010	26	0.024	0.20	3.3	14	5.1	15	16	5.9
R622028	CFR0956	Supremo Pit	schist	0.060	1.3	132	<0.2	<10	350	0.54	0.21	0.63	0.080	44	12	37	1.6	22	2.8	4.7	0.080	0.050	0.070	0.021	0.27	25	8.1	0.43	503	1.0	0.030	0.85	26	420	8.5	23	<0.001	0.010	2.9	3.7	0.70	1.0	47	<0.01	0.030	6.7	0.060	0.18	1.0	37	2.3	14	40	2.1
R622095	CFR0957	Supremo Pit	schist	0.040	1.0	13	<0.2	<10	80	0.39	0.14	0.20	0.060	27	4.6	26	0.57	11	2.0	3.6	0.090	0.070	0.020	0.011	0.18	10	5.0	0.27	227	1.4	0.050	1.3	11	260	6.5	20	<0.001	0.010	0.43	2.1	0.50	0.70	17	0.010	0.030	16	0.051	0.12	1.5	25	1.7	5.0	22	2.6
R289071	CFR0599	West WRSF	schist	0.15	0.76	1630	0.20	<10	150	0.91	0.41	0.19	0.31	62	10	23	0.46	23	2.3	2.4	0.090	0.070	1.1	0.021	0.28	33	1.9	0.15	497	1.1	0.010	0.060	25	280	25	15	0.0010	<0.01	26	5.4	0.80	0.50	25	<0.01	0.020	14	<0.005	0.35	2.7	28	1.4	12	42	3.9
R290074	CFR0612	West WRSF	schist	0.030	2.6	36	<0.2	<10	420	0.44	0.080	0.36	0.040	17	18	51	1.8	39	3.0	6.9	0.070	0.040	<0.01	0.010	1.0	11	16	1.6	437	0.84	0.050	0.18	35	210	6.0	68	<0.001	<0.01	0.42	4.3	0.30	0.50	72	<0.01	0.020	5.8	0.11	0.43	0.45	47	0.86	2.6	46	1.5
R549729	CFR0978	West WRSF	schist	0.13	0.95	122	<0.2	<10	100	0.48	0.36	0.28	0.050	34	5.8	22	0.60	14	2.1	3.4	0.070	0.020	<0.01	0.015	0.15	20	4.6	0.25	317	2.8	0.030	0.88	13	330	6.9	13	0.0020	0.080	1.2	2.9	0.60	0.70	21	<0.01	0.26	11	0.037	0.16	1.7	27	220	8.0	24	0.60
R621156	CFR0937	West WRSF	schist	0.030	1.1	59	<0.2	<10	130	0.58	0.53	0.31	0.050	75	7.2	27	1.2	23	1.9	4.6	0.12	0.14	0.030	0.015	0.37	44	6.5	0.51	326	1.0	0.040	0.76	11	430	7.2	35	<0.001	<0.01	1.7	3.2	0.90	1.7	30	0.020	0.20	21	0.075	0.24	2.2	27	1.7	14	29	7.1
Statistical Summary for Overburden overlying Schist Bedrock (n = 33)			**Max**	0.25	3.1	2370	0.60	<10	2220	1.6	0.53	6.0	0.31	93	21	94	12	39	5.3	10	0.18	0.28	1.1	0.050	1.2	59	20	2.0	879	3.9	0.13	2.3	62	1560	25	74	0.0020	0.11	30	17	1.4	5.2	187	0.040	0.26	30	0.21	1.5	6.2	122	220	23	71	17
			90th PCTL	0.14	2.4	667	0.20	<10	410	1.1	0.38	3.1	0.14	69	18	72	2.9	34	3.7	8.1	0.16	0.15	0.44	0.033	1.0	38	16	1.6	728	1.9	0.078	1.2	39	762	16	65	0.0010	0.038	19	7.8	0.98	1.6	72	0.018	0.058	20	0.13	0.46	3.0	66	4.9	17	60	6.8
			75th PCTL	0.070	1.9	190	<0.2	<10	350	0.87	0.26	0.72	0.10	62	14	59	1.8	26	3.0	6.5	0.13	0.11	0.18	0.023	0.65	33	12	1.1	525	1.4	0.050	0.85	34	610	13	43	<0.001	0.010	8.4	5.4	0.80	1.1	47	<0.01	0.030	17	0.11	0.40	2.3	47	2.5	14	57	3.9
			Median	0.040	1.4	90	<0.2	<10	210	0.67	0.19	0.42	0.070	44	11	37	1.3	22	2.5	4.6	0.090	0.070	0.050	0.018	0.39	25	8.0	0.55	437	1.0	0.040	0.54	25	430	7.2	28	<0.001	0.010	3.0	4.3	0.70	0.90	28	<0.01	0.020	11	0.063	0.29	1.6	38	1.3	11	46	2.6
			25th PCTL	0.030	1.0	39	<0.2	<10	150	0.50	0.13	0.28	0.050	38	6.6	23	0.86	14	2.0	3.4	0.070	0.040	0.020	0.012	0.26	20	4.6	0.27	319	0.69	0.020	0.28	13	280	5.4	20	<0.001	<0.01	1.0	2.9	0.60	0.70	19	<0.01	0.020	8.6	0.037	0.20	1.1	25	0.71	9.1	27	1.8
			10th PCTL	0.030	0.84	23	<0.2	<10	110	0.39	0.090	0.19	0.030	28	4.6	18	0.61	8.8	1.7	3.0	0.070	0.032	<0.01	0.010	0.19	12	3.7	0.15	275	0.59	0.020	0.16	10.0	216	3.4	15	<0.001	<0.01	0.43	2.0	0.42	0.50	18	<0.01	0.010	5.9	0.012	0.17	0.81	18	0.27	5.5	20	1.3
			Min	0.010	0.54	7.2	<0.2	<10	80	0.30	0.040	0.11	0.010	2.5	3.9	13	0.46	7.2	1.4	2.3	0.060	0.020	<0.01	0.0080	0.10	1.2	1.9	0.10	210	0.46	0.010	<0.05	8.3	170	1.3	7.1	<0.001	<0.01	0.19	1.5	0.30	0.30	12	<0.01	<0.01	0.80	<0.005	0.12	0.25	11	0.16	2.6	12	0.60

Appendix C.4-3: Solid Phase Element Results by Aqua Regia Digestion for Overburden

Sample ID	Location Reference	Site Location	Underlying Geologic Unit	Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
				ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Overburden Overlying Granite Bedrock																																																						
17557	SRK-15TP-07	Event Pond	granite	0.050	1.4	12	<0.2	<10	110	0.43	0.15	0.22	0.060	37	6.4	25	0.98	13	1.8	4.3	0.12	0.060	0.12	0.023	0.070	19	8.2	0.30	450	1.0	0.030	1.5	12	320	8.5	7.7	<0.001	0.010	0.33	4.4	0.60	0.60	18	<0.01	0.010	17	0.074	0.16	4.0	42	0.17	10	39	2.3
KNB-1	KNB-1	Event Pond	granite	0.010	0.30	1.6	<0.2	<10	10	0.12	0.050	0.010	0.010	21	0.30	2.0	1.4	0.50	0.50	1.5	0.090	0.92	0.010	0.013	0.14	11	2.2	0.020	182	1.1	0.060	3.3	0.50	30	4.4	18	<0.001	<0.01	0.070	1.4	0.20	0.90	1.0	<0.01	<0.01	40	0.015	0.16	5.8	1.0	0.12	3.8	11	22
KNB-2	KNB-2	Event Pond	granite	0.010	0.23	1.1	<0.2	<10	10	0.090	0.040	0.010	0.010	21	0.20	2.0	0.73	0.40	0.46	1.1	0.090	0.53	0.010	0.0070	0.10	12	1.1	0.010	79	0.32	0.050	2.0	0.30	20	5.0	6.8	<0.001	<0.01	0.070	1.2	0.20	0.50	0.80	<0.01	<0.01	37	0.0050	0.060	2.6	1.0	0.16	4.7	6.0	14
KNB-3	KNB-3	Event Pond	granite	0.020	0.31	2.8	<0.2	<10	10	0.32	0.060	0.010	0.010	44	0.20	2.0	0.43	0.60	0.51	1.0	0.11	0.52	0.010	0.017	0.10	22	0.40	<0.01	39	0.18	0.070	0.82	0.80	60	8.5	5.4	<0.001	<0.01	0.16	1.4	0.40	0.80	1.1	<0.01	<0.01	44	<0.005	0.060	4.9	1.0	0.12	8.2	8.0	13
KAM013553	CFR0055	Kona Pit	granite	0.070	0.54	>10000	3.1	<10	110	0.37	0.090	0.14	0.070	19	2.1	9.0	0.85	7.4	2.2	2.9	0.080	0.25	1.3	0.033	0.13	11	3.3	0.080	146	1.6	0.010	0.26	2.8	250	12	14	<0.001	<0.01	86	7.0	0.40	0.30	50	<0.01	0.030	5.5	0.0060	0.74	3.5	28	0.83	4.7	16	12
R297165	CFR0663	Kona Pit	granite	0.020	1.2	1665	<0.2	<10	90	0.37	0.080	0.030	0.010	25	0.60	6.0	0.21	1.8	0.65	2.8	0.070	0.40	0.86	0.016	0.030	13	5.0	0.010	50	1.4	0.010	0.11	2.4	140	25	2.3	<0.001	<0.01	7.7	1.5	0.20	0.40	59	<0.01	<0.01	25	<0.005	0.17	3.6	4.0	1.3	4.1	4.0	11
R297232	CFR0665	Kona Pit	granite	0.030	0.49	11	<0.2	<10	110	0.26	0.060	0.080	0.020	51	1.8	5.0	2.7	14	1.5	3.3	0.14	0.59	<0.01	0.017	0.31	28	17	0.12	1200	1.4	0.060	1.9	2.2	160	7.0	45	<0.001	<0.01	0.21	2.6	0.50	1.3	14	0.070	<0.01	30	0.055	0.39	4.3	8.0	2.0	12	36	17
R297375	CFR0666	Kona Pit	granite	0.060	1.0	923	0.40	10	180	0.93	0.11	0.070	0.080	38	5.7	14	0.99	15	2.6	2.9	0.090	0.18	0.59	0.011	0.33	18	2.9	0.040	1240	3.2	0.010	0.25	5.3	230	17	22	<0.001	<0.01	8.7	2.3	0.40	0.50	24	0.010	<0.01	21	<0.005	0.81	15	9.0	1.5	7.7	28	9.2
17558	SRK-15TP-44	Leach Pad	granite	0.020	0.77	5.3	<0.2	<10	60	0.33	0.14	0.13	0.060	28	4.3	14	1.1	6.6	1.3	2.9	0.11	0.030	0.010	0.016	0.080	15	4.6	0.16	453	0.68	0.040	2.1	6.9	220	8.6	8.7	<0.001	<0.01	0.20	2.3	0.60	0.70	11	<0.01	0.010	17	0.046	0.10	3.0	23	0.14	10	28	1.0
17559	SRK-15TP-06	Leach Pad	granite	0.030	0.52	6.5	<0.2	<10	70	0.31	0.12	0.090	0.080	31	3.0	10	0.89	4.1	0.99	2.1	0.11	0.080	0.010	0.011	0.080	16	3.2	0.10	563	0.60	0.040	1.6	4.4	150	8.4	8.7	<0.001	<0.01	0.18	1.7	0.50	0.60	7.8	<0.01	0.010	23	0.030	0.11	3.8	14	0.14	12	22	3.1
17560	SRK-15TP-43	Leach Pad	granite	0.030	0.99	4.6	<0.2	<10	110	0.45	0.23	0.21	0.060	38	5.8	17	3.3	8.3	1.7	4.1	0.13	0.070	0.010	0.025	0.15	22	14	0.26	705	0.76	0.040	3.2	9.0	330	6.7	31	<0.001	0.010	0.24	3.8	0.70	1.6	16	<0.01	<0.01	17	0.083	0.34	3.5	30	0.19	14	37	3.1
17561	SRK-15TP-05	Leach Pad	granite	0.030	0.56	4.8	<0.2	<10	70	0.34	0.13	0.10	0.030	32	3.8	10	1.7	3.9	1.2	2.5	0.090	0.040	0.25	0.017	0.11	13	7.2	0.12	667	0.70	0.040	2.2	3.8	200	7.2	16	<0.001	<0.01	0.16	1.9	0.40	0.80	8.1	<0.01	<0.01	16	0.040	0.21	3.6	16	0.15	9.4	25	1.3
17562	SRK-15TP-04	Leach Pad	granite	0.020	0.65	6.0	<0.2	<10	70	0.35	0.21	0.12	0.030	27	3.2	11	1.4	4.0	1.2	2.6	0.10	0.10	0.050	0.016	0.11	16	7.1	0.14	363	0.72	0.040	1.6	4.4	220	7.3	15	0.0010	<0.01	0.19	2.2	0.40	0.80	11	<0.01	0.010	22	0.044	0.16	4.9	18	0.14	9.6	24	4.1
17565	SRK-15TP-03	Leach Pad	granite	0.050	0.77	9.3	<0.2	<10	70	0.32	0.13	0.13	0.050	31	4.3	13	1.3	6.2	1.5	3.2	0.10	0.030	0.050	0.017	0.10	20	6.0	0.15	516	0.85	0.040	2.3	5.3	300	7.7	13	<0.001	0.010	0.24	2.7	0.50	0.70	12	<0.01	0.010	14	0.042	0.16	4.2	21	0.14	11	29	1.2
17566	SRK-15TP-17	Leach Pad	granite	0.030	0.68	9.2	<0.2	<10	70	0.57	0.090	0.15	0.060	48	3.2	12	1.3	6.5	1.5	2.7	0.11	0.15	0.090	0.020	0.10	24	4.5	0.13	673	0.82	0.030	0.85	6.0	260	9.3	13	<0.001	<0.01	0.26	2.9	0.60	0.60	12	<0.01	<0.01	23	0.042	0.27	3.9	19	0.090	14	35	6.2
17567	SRK-15TP-02	Leach Pad	granite	0.040	1.1	26	<0.2	<10	130	0.42	0.11	0.22	0.090	44	6.5	19	1.2	13	1.9	4.0	0.13	0.070	0.020	0.020	0.10	23	7.0	0.27	647	0.74	0.030	1.3	12	400	7.7	12	<0.001	0.010	0.42	4.3	0.70	0.60	18	<0.01	0.010	17	0.071	0.21	3.1	35	0.13	12	37	2.8
17570	SRK-15TP-16	Leach Pad	granite	0.030	0.76	28	<0.2	<10	90	0.48	0.060	0.17	0.080	47	4.2	13	1.3	9.2	1.5	3.2	0.11	0.10	0.050	0.020	0.11	24	6.6	0.18	588	1.1	0.040	1.3	9.1	290	9.6	17	<0.001	<0.01	0.53	3.1	0.80	0.70	15	<0.01	<0.01	22	0.058	0.25	3.7	24	0.13	13	35	4.0
17571	SRK-15TP-15	Leach Pad	granite	0.020	0.90	8.9	<0.2	<10	90	0.35	0.080	0.14	0.070	41	4.4	15	1.2	7.3	1.5	3.5	0.11	0.080	0.040	0.017	0.11	21	8.2	0.19	542	0.83	0.040	2.2	7.4	240	7.1	17	<0.001	<0.01	0.23	2.8	0.60	0.60	12	<0.01	<0.01	19	0.065	0.20	2.4	26	0.12	12	31	3.1
17572	SRK-15TP-14	Leach Pad	granite	0.050	0.70	386	0.30	<10	130	0.52	0.090	0.090	0.33	40	4.5	12	0.67	6.1	1.3	2.2	0.10	0.030	0.19	0.014	0.13	21	2.9	0.10	763	1.0	0.020	1.1	5.5	190	15	7.9	<0.001	0.010	3.3	1.6	0.40	0.30	13	<0.01	<0.01	20	0.015	0.22	6.1	16	0.13	7.9	32	1.1
17573	SRK-15TP-13	Leach Pad	granite	0.030	0.52	19	<0.2	<10	80	0.79	0.060	0.040	0.040	53	1.4	6.0	1.3	2.1	0.82	1.8	0.11	0.22	0.30	0.010	0.12	31	1.3	0.020	551	0.93	0.010	0.20	2.2	120	27	8.7	<0.001	<0.01	0.56	1.3	0.50	0.30	9.1	<0.01	<0.01	37	<0.005	0.14	6.5	4.0	0.060	12	19	7.4
17574	SRK-15TP-12	Leach Pad	granite	0.030	0.83	43	<0.2	<10	90	0.51	0.080	0.11	0.10	37	4.7	13	1.0	6.9	1.5	3.3	0.11	0.020	0.090	0.016	0.090	20	5.2	0.16	642	0.72	0.030	1.5	7.2	260	9.0	11	<0.001	0.010	1.0	2.1	0.40	0.50	11	<0.01	0.010	12	0.046	0.22	3.5	25	0.15	9.7	33	0.60
17575	SRK-15TP-11	Leach Pad	granite	0.020	0.59	15	<0.2	<10	110	0.57	0.20	0.10	0.050	65	2.7	8.0	2.4	4.4	1.4	2.9	0.12	0.34	0.010	0.015	0.15	37	4.3	0.11	895	0.86	0.050	0.96	4.0	200	9.7	20	<0.001	<0.01	0.50	2.0	0.70	0.70	10	<0.01	0.010	30	0.037	0.24	5.8	13	0.15	16	34	10
17576	SRK-15TP-18	Leach Pad	granite	0.030	1.4	6.1	<0.2	<10	140	0.53	0.15	0.20	0.050	47	5.8	21	2.6	12	1.9	4.3	0.13	0.080	0.030	0.023	0.12	27	11	0.31	546	0.79	0.030	2.0	11	340	7.1	21	<0.001	0.010	0.28	4.7	0.90	0.90	17	<0.01	0.010	18	0.078	0.24	3.4	37	0.16	15	37	2.8
17577	SRK-15TP-42	Leach Pad	granite	0.030	0.71	15	<0.2	<10	90	0.75	0.21	0.13	0.050	53	3.1	11	4.2	5.6	1.3	3.6	0.15	0.17	0.020	0.049	0.15	27	9.2	0.14	616	0.64	0.050	3.6	5.6	190	9.2	45	<0.001	<0.01	0.38	4.6	1.1	2.2	13	<0.01	<0.01	23	0.044	0.46	5.1	17	0.20	26	51	5.6
17578	SRK-15TP-10	Leach Pad	granite	0.030	0.86	15	<0.2	<10	100	0.58	0.40	0.16	0.040	44	4.1	13	4.1	7.3	1.5	3.4	0.11	0.15	0.040	0.022	0.13	22	11	0.20	570	0.81	0.040	1.9	6.9	240	6.8	22	<0.001	<0.01	0.34	3.3	0.50	1.5	13	<0.01	<0.01	20	0.061	0.30	2.6	25	0.17	12	31	5.6
17579	SRK-15TP-09	Leach Pad	granite	0.040	1.0	5.4	<0.2	<10	100	0.59	0.25	0.17	0.050	41	5.7	17	2.1	9.9	1.7	4.0	0.13	0.040	0.020	0.020	0.10	22	9.4	0.25	575	0.58	0.040	2.1	9.5	260	8.1	15	<0.001	0.010	0.28	3.6	0.70	1.0	15	<0.01	0.010	15	0.068	0.18	3.5	32	0.18	16	33	1.5
17580	SRK-15TP-41	Leach Pad	granite	0.040	0.90	5.6	<0.2	<10	90	0.45	0.10	0.26	0.12	45	5.2	19	1.1	11	1.7	3.4	0.14	0.15	0.030	0.020	0.11	25	5.5	0.24	727	1.2	0.050	1.5	11	330	10	13	<0.001	<0.01	0.25	4.0	0.80	0.60	20	<0.01	0.010	25	0.071	0.14	3.9	32	0.15	15	39	6.2
17581	SRK-15TP-08	Leach Pad	granite	0.050	0.87	110	<0.2	<10	80	0.50	0.14	0.17	0.070	36	3.9	16	1.3	8.4	1.4	3.2	0.11	0.090	0.070	0.019	0.11	21	7.1	0.18	334	0.58	0.030	1.5	7.5	230	15	14	<0.001	0.010	0.36	3.3	0.60	0.70	15	<0.01	<0.01	23	0.052	0.18	8.5	24	0.14	14	31	3.7
Statistical Summary for Overburden overlying Granite Bedrock (n = 28)			**Max**	0.070	1.4	10000	3.1	10	180	0.93	0.40	0.26	0.33	65	6.5	25	4.2	15	2.6	4.3	0.15	0.92	1.3	0.049	0.33	37	17	0.31	1240	3.2	0.070	3.6	12	400	27	45	0.0010	0.010	86	7.0	1.1	2.2	59	0.070	0.030	44	0.083	0.81	15	42	2.0	26	51	22
			90th PCTL	0.050	1.2	547	0.23	<10	130	0.64	0.22	0.21	0.093	51	5.8	19	2.9	13	1.9	4.1	0.13	0.52	0.39	0.024	0.15	27	11	0.26	803	1.4	0.053	2.6	11	330	16	25	<0.001	0.010	4.6	4.5	0.80	1.4	21	<0.01	0.010	37	0.072	0.41	6.2	33	0.96	15	38	13
			75th PCTL	0.040	0.92	26	<0.2	<10	110	0.54	0.15	0.17	0.073	46	4.8	15	1.8	9.4	1.7	3.4	0.12	0.23	0.098	0.020	0.13	24	8.2	0.19	669	1.0	0.043	2.1	7.9	268	9.8	18	<0.001	0.010	0.51	3.7	0.70	0.83	16	<0.01	0.010	25	0.062	0.26	5.0	27	0.17	14	35	9.4
			Median	0.030	0.77	10	<0.2	<10	90	0.44	0.11	0.13	0.055	39	4.0	13	1.3	6.8	1.5	3.1	0.11	0.10	0.040	0.017	0.11	21	5.8	0.14	567	0.82	0.040	1.5	5.6	230	8.5	14	<0.001	<0.01	0.28	2.7	0.50	0.70	13	<0.01	<0.01	21	0.044	0.21	3.8	20	0.15	12	31	4.1
			25th PCTL	0.020	0.56	5.6	<0.2	<10	70	0.34	0.080	0.088	0.038	31	2.6	8.8	0.99	4.1	1.2	2.6	0.10	0.068	0.010	0.016	0.10	16	3.3	0.095	428	0.70	0.030	1.0	3.6	183	7.2	8.7	<0.001	<0.01	0.21	1.9	0.40	0.58	11	<0.01	<0.01	17	0.015	0.16	3.5	12	0.13	9.1	24	2.7
			10th PCTL	0.020	0.44	4.1	<0.2	<10	45	0.30	0.060	0.024	0.010	24	0.51	4.1	0.71	1.4	0.61	1.7	0.090	0.030	0.010	0.011	0.080	12	1.9	0.017	126	0.58	0.010	0.26	1.8	102	6.8	7.4	<0.001	<0.01	0.16	1.4	0.34	0.37	5.8	<0.01	<0.01	14	<0.005	0.11	2.8	3.1	0.12	4.7	10	1.2
			Min	0.010	0.23	1.1	<0.2	<10	10	0.090	0.040	0.010	0.010	19	0.20	2.0	0.21	0.40	0.46	1.0	0.070	0.020	0.010	0.0070	0.030	11	0.40	<0.01	39	0.18	0.010	0.11	0.30	20	4.4	2.3	<0.001	<0.01	0.070	1.2	0.20	0.30	0.80	<0.01	<0.01	5.5	<0.005	0.060	2.4	1.0	0.060	3.8	4.0	0.60
Overburden Overlying Meta-Gabbro Bedrock (n = 3)																																																						
17555	SRK-15TP-23	ROM/Plant	meta-gabbro	0.10	2.2	9.0	<0.2	<10	130	0.60	0.22	0.49	0.10	33	6.9	49	1.6	19	2.3	7.4	0.13	0.020	0.030	0.023	0.24	19	11	0.70	270	0.89	0.080	1.9	21	550	8.9	29	<0.001	0.050	1.3	5.0	0.60	1.0	33	<0.01	0.030	3.8	0.11	0.24	1.6	53	0.36	7.7	51	0.50
R553404	CFB030	South WRSF	meta-gabbro	0.010	2.3	3.8	<0.2	<10	590	0.30	0.090	4.0	0.010	16	14	29	2.3	14	3.5	6.4	0.080	0.030	<0.01	0.0060	1.6	7.6	17	1.5	635	0.76	0.020	0.12	18	970	1.3	75	<0.001	<0.01	0.14	2.5	0.30	0.50	125	<0.01	0.020	3.0	0.22	0.40	0.49	66	0.29	4.2	50	0.70
R553602	CFB035	South WRSF	meta-gabbro	0.030	1.7	66	<0.2	<10	220	0.85	0.50	0.29	0.070	47	13	36	3.3	17	2.9	5.6	0.070	0.040	0.040	0.023	0.57	18	8.8	0.59	477	0.83	0.020	0.59	26	540	11	44	<0.001	<0.01	1.2	5.7	0.90	0.90	19	<0.01	0.040	13	0.086	0.30	1.3	40	1.3	11	49	2.1

Notes: all values in grey italics are below the analytical detection limit.
n = number of samples included in the statistical summary

Appendix D: Kinetic Test Results

Appendix D.1: Kinetic Test Results for Waste Rock

Appendix D.2: Kinetic Test Results for Ore

Appendix D.3: Kinetic Test Results for Leach Tailings

GOLDCORP

APPENDIX D.1: KINETIC TEST RESULTS FOR WASTE ROCK

Appendix D.1-1: Overview of Operating Procedures for the Coffee Gold Mine Waste Rock Kinetic Tests

Test ID	Test Sample Description	Duplicate Tests	Type of Test	Lithology	Weathering Facies	Column Dimensions			Dry Wt. of Sample (kg)	Temp (°C)	Operation Procedure	Sampling Frequency	Total Volume of Initial Flushings (mL)	Flushing Rate/ Weekly Input* (mL)	Start Date	Test Status	Cycles/ Weeks	Recirculation Cycles
						Inner Diameter (cm)	Length (cm)	Height (cm)										
Col 3	SO	-	Unsaturated Column	Schist	Oxide	21.0	20.5		10	4°	Trickle Leach	Biweekly	1500	variable	16-Jul-14	active	86	45-77
Col 4	ST	-	Unsaturated Column	Schist	Transition	21.0	20.5		10	4°	Trickle Leach	Biweekly	1300	variable	16-Jul-14	active	86	45-77
Col 5	GO	-	Unsaturated Column	Gneiss	Oxide	21.0	20.5		10	4°	Trickle Leach	Biweekly	1500	variable	16-Jul-14	active	86	45-77
Col 6	GT	-	Unsaturated Column	Gneiss	Transition	21.0	20.5		10	4°	Trickle Leach	Biweekly	1200	variable	30-Jul-14	active	84	43-75
Col 13	OKY Master	-	Unsaturated Column	Granite	Transition	21.0	20.5		10	4°	Trickle Leach	Biweekly	2000	variable	20-May-15	active	41	-
Col 14	OKY Master (Fresh)	-	Unsaturated Column	Granite	Fresh	21.0	20.5		10	4°	Trickle Leach	Biweekly	2000	variable	20-May-15	active	41	-
HC 1	ST	Col 4	Humidity Cell	Schist	Transition		10.2	25.5	1	4°	Flood Leach	Weekly	500	500	25-Jun-14	terminated	87	46-73
HC 2	SS	-	Humidity Cell	Schist	Fresh		10.2	25.5	1	4°	Flood Leach	Weekly	500	500	25-Jun-14	terminated	87	46-73
HC 3	GT	Col 6	Humidity Cell	Gneiss	Transition		10.2	25.5	1	4°	Flood Leach	Weekly	500	500	25-Jun-14	terminated	87	46-73
HC 4	GS	-	Humidity Cell	Gneiss	Fresh		10.2	25.5	1	4°	Flood Leach	Weekly	500	500	25-Jun-14	terminated	87	46-73
HC 5	OKY Master	Col 13	Humidity Cell	Granite	Transition		10.2	25.5	1	4°	Flood Leach	Weekly	500	500	6-May-15	active	42	-
HC 6	OKY Master (Fresh)	Col 14	Humidity Cell	Granite	Fresh		10.2	25.5	1	4°	Flood Leach	Weekly	500	500	6-May-15	active	42	-
HC 7	KAM036824	-	Humidity Cell	Schist	Fresh		10.2	25.5	1	4°	Flood Leach	Weekly	500	500	12-Aug-15	active	28	-
HC 8	KAM092488	-	Humidity Cell	Gneiss	Fresh		10.2	25.5	1	4°	Flood Leach	Weekly	500	500	12-Aug-15	active	28	-
FB-GO	Gneiss Oxide composite	Col 5	Field Bin	Gneiss	Oxide	45.0		80	183.1	site conditions	natural precipitation	3x's / field season	28	natural precipitation	17-Jun-14	active	70	-
FB-GT	Gneiss Transition composite	Col 6 & HC3	Field Bin	Gneiss	Transition	45.0		80	229.4				28		17-Jun-14	active	70	-
FB-GS	Gneiss Fresh composite	HC4	Field Bin	Gneiss	Fresh	45.0		80	190.1				28		17-Jun-14	active	70	-
FB-SO	Schist Oxide composite	Col 3	Field Bin	Schist	Oxide	45.0		80	171.3				28		17-Jun-14	active	70	-
FB-ST	Schist Transition composite	Col 4 & HC1	Field Bin	Schist	Transition	45.0		80	164.8				27.6		17-Jun-14	active	70	-
FB-SS	Schist Fresh composite	HC2	Field Bin	Schist	Fresh	45.0		80	201.5				28		17-Jun-14	active	70	-
FB-GGT	Granite Transition composite	Col 13 & HC5	Field Bin	Granite	Transition	45.0		80	165.5				26		17-Jun-15	active	18	-
FB-GGS	Granite Fresh composite	Col 14 & HC6	Field Bin	Granite	Fresh	45.0		80	134.4				22		17-Jun-15	active	18	-

Notes:
Columns and humidity cells are composed of Plexiglas with an acrylic perforated disk & nylon mesh
No sample preparation was conducted prior to leachate sampling for any tests
* generally 400-500 mL for columns, see individual leachate results in Appendix D.1-3 for specific input volumes

Appendix D.1-1: Overview of Operating Procedures for the Coffee Gold Mine Waste Rock Kinetic Tests

Construction of Field Bins

Field Bin ID	Bag #	Hole ID	Length (m)	Lithology	% Fresh	Weight (Kg)
FB-GO	20	CFD0152	48-52, 92-95, 96-100	65% MG, 35% FG	0	32
	25	CFD0149	170-175, 211-213	76% MG, 24% MxM	0	23
	34	CFD0175	126-130, 193-196	100% FG	0	24
	35	CFD0175	205-211,230-233	100% FG	0	28
	46	CFD0004	20.86-26.86	100% FG	0	21
	47	CFD0004	43-49	100% FG	0	19
	48	CFD0004	76-83	100% FG	0	23
	49	CFD0003	163-167	100% FG	0	13
	62	CFD0209	66-72, 15-19	100% MxM	2.3	20
	63	CFD0209	52.5-58	100% MxM	0	14
	64	CFD0176	12-18, 149-152	100% MxF	0	23
	79	CFD0267	109-122	100% MxF	0	20
	83	CFD0176	164-170	100% MxF	0	17
	84	CFD0176	170-175	100% MxF	0	22
FB-GT	16	CFD0142	134-139	100% MG	30	17
	17	CFD0142	139-144	100% MG	30	17
	26	CFD0175	47-54	100% FG	70	21
	27	CFD0175	54-61	100% FG	70	23
	28	CFD0175	61-68	100% FG	47	23
	29	CFD0175	68-75	100% FG	30	23
	30	CFD0175	75-82	100% FG	30	25
	31	CFD0175	82-89	100% FG	53	26
	32	CFD0175	89-93	100% FG	70	16
	33	CFD0175	44-46	100% FG	70	7
	65	CFD0270	252-258	100% MxF	70	25
	66	CFD0270	258-264	100% MxF	43	24
	67	CFD0270	264-271	100% MxF	36	19
	68	CFD0270	237-240, 241-243	40% FG, 60% MxF	30	16
	91	CFD0272	89-92, 93-95, 96-97, 98-99	100% FG	30	20
	92	CFD0272	76-80, 224-225, 239-245	46% FG, 54% MxF	30	24
	93	CFD0272	228-238	100% MxF	30	27
FB-GS	56	CFD0020	263-270	100% FG	100	23
	57	CFD0020	270-277	100% FG	100	22
	58	CFD0020	277-283	100% FG	100	18
	59	CFD0071	187-195	100% FG	100	27
	60	CFD0071	202-210	100% FG	100	33
	61	CFD0071	210-217	100% FG	100	27
	69	CFD0249	234.5-239	100% MxM	99.3	27
	70	CFD0249	262-269	100% MxM	98.4	18
	71	CFD0249	271-280.5	46% MxM, 54% MxF	99.4	20
	72	CFD0249	286-290	100% MxM	100	18
	73	CFD0249	271-280.5	46% MxM, 54% MxF	99.4	21
	74	CFD0249	292-298	100% MxF	100	35
	75	CFD0249	298-304	17% FG, 83% MxF	100	27
	76	CFD0273	245-254	100% MxM	70	28
	77	CFD0273	240-243	100% MxM	70	8
	78	CFD0170	391-399	100% MxM	100	30
FB-SO	1	CFD0131	57-63	100% MsS	0	19
	2	CFD0131	63-69	31% MsS, 69% RQM	0	21
	3	CFD0131	69-74	100% RQM	0	17
	4	CFD0131	77-81	100% RQM	0	13
	5	CFD0131	87-93	50% MsS, 50% RQM	0	20
	6	CFD0131	93-99	100% MsS	0	20
	7	CFD0131	99-105	41% MsS, 59% RQM	0	21
	36	CFD0084	43-49	100% RQM	0	19
	37	CFD0084	49-55	100% RQM	0	19
	38	CFD0084	55-61	100% RQM	0	22
	39	CFD0008	2.13-9	100% BtS	0	13
	40	CFD0008	42248	100% BtS	0	19
	41	CFD0008	15-21	100% BtS	0	21
	42	CFD0007	2.13-10	100% BtS	0	27
	43	CFD0007	42644	100% BtS	0	21
	44	CFD0007	16-21	100% BtS	0	18
	45	CFD0007	31-36	100% BtS	0	16

Appendix D.1-1: Overview of Operating Procedures for the Coffee Gold Mine Waste Rock Kinetic Tests

Construction of Field Bins

Field Bin ID	Bag #	Hole ID	Length (m)	Lithology	% Fresh	Weight (Kg)
FB-ST	18	CFD0146	57-62	100% BtS	70	17
	19	CFD0146	65-72	100% BtS	70	21
	21	CFD0145	70-80	100% BtS_Carb	30	37
	22	CFD0145	43009	100% BtS_Carb	70	25
	23	CFD0145	17-25	80% BtS_Carb, 20% YO	44	28
	24	CFD0145	25-32	15% BtS_Carb, 85% YO	4.3	23
	80	CFD0172	123-129	100% BtS	50	23
	81	CFD0172	129-135	100% BtS	50	21
	82	CFD0172	160-166	100% BtS	50	20
	85	CFD0142	16-22	100% BtS	70	25
	86	CFD0142	22-28	100% BtS	70	20
	87	CFD0142	28-34	100% BtS	70	18
	88	CFD0142	34-39	100% BtS	70	19
	89	CFD0265	246-256	100% BtS	54	30
	90	CFD0265	212-215, 220-228	100% BtS	70	30
FB-SS	8	CFD0096	167-173, 203-205	74% RQM, 26% BtS	100	16
	9	CFD0096	220-233	100% RQM	100	25
	10	CFD0096	233-239	100% RQM	100	13
	11	CFD0127	276-283	100% BtS	100	21
	12	CFD0127	283-290	100% BtS	100	23
	13	CFD0127	290-297	100% BtS	100	22
	14	CFD0127	297-304	100% BtS	100	18
	15	CFD0127	304-309	100% BtS	100	15
	50	CFD0040	230-237.4	100% BtS	100	24
	51	CFD0040	237.4-244	100% BtS	100	22
	52	CFD0040	244-250	100% BtS	100	24
	53	CFD0040	256-262	100% BtS	100	21
	54	CFD0040	262-268	100% BtS	100	21
	55	CFD0040	268-273	100% BtS	100	16
FB-GGT	1	CFD0380_36-50 (Bag 1 + 2)	*NA*	granite	10	13.59
	2	CFD0380_36-50 (Bag 3 +4)	*NA*	granite	10	16.761
	3	CFD0383_115-125 (Bag 1)	*NA*	granite	76	12.231
	4	CFD0383_115-125 (Bag 2)	*NA*	granite	76	14.496
	5	CFD0381_4-13 (Bag 1)	*NA*	granite	37	9.06
	6	CFD0381_4-13 (Bag 2)	*NA*	granite	37	12.684
	7	CFD0403_204-217 (Bag 1)	*NA*	granite	80	9.966
	8	CFD0403_204-217 (Bag 2)	*NA*	granite	80	13.137
	9	CFD0403_204-217 (Bag 3)	*NA*	granite	80	10.419
	10	CFD0396_50-60 (Bag 1)	*NA*	granite	40	13.59
	11	CFD0396_50-60 (Bag 2)	*NA*	granite	40	9.513
	12	CFD0394_31-41 (Bag 1)	*NA*	granite	38	13.137
	13	CFD0394_31-41 (Bag 2)	*NA*	granite	38	13.137
	14	CFD0394_55-66 (Bag 1)	*NA*	granite	50	12.231
	15	CFD0394_55-66 (Bag 2)	*NA*	granite	50	14.043
		CFD0389_34_38	*NA*	granite	100	6.3
		CFD0396_81_87	*NA*	granite	100	14.9
FB-GGS	1	CFD0380_22-30 (Bag 1 +2)	*NA*	granite	100	17.214
	2	CFD0383_182-194 (Bag 1)	*NA*	granite	99	10.872
	3	CFD0383_182-194 (Bag 2)	*NA*	granite	99	10.872
	4	CFD0383_182-194 (Bag 3)	*NA*	granite	99	12.231
	5	CFD0381_69-79 (Bag 1)	*NA*	granite	95	15.855
	6	CFD0381_69-79 (Bag 2)	*NA*	granite	95	11.325
	7	CFD0385_28-38 (Bag 1)	*NA*	granite	95	12.684
	8	CFD0385_28-38 (Bag 2)	*NA*	granite	95	14.043
	9	CFD0385_38-48 (Bag 1)	*NA*	granite	95	13.137
	13	CFD0394_99-104 (Bag 1)	*NA*	granite	95	11.325
	14	CFD0396_91-101 (Bag 1)	*NA*	granite	100	9.513
	15	CFD0396_91-101 (Bag 2)	*NA*	granite	100	11.778
	16	CFD0396_72-81 (Bag 1)	*NA*	granite	100	6.795
	17	CFD0396_72-81 (Bag 2)	*NA*	granite	100	10.872

Quantitative X-Ray Diffraction by Rietveld Refinement

Report Prepared for: *SGS Canada Inc*

Project Number/ LIMS No. *14094-101A/MI4521-JUN14*

ARD Number *1416 Kaminak Coffee Proj*

Reporting Date: *June 30, 2014*

Instrument: BRUKER AXS D8 Advance Diffractometer

Test Conditions: Co radiation, 40 kV, 35 mA
Regular Scanning: Step: 0.02°, Step time: 1s, 2θ range: 3-80°

Interpretations : PDF2/PDF4 powder diffraction databases issued by the International Center for Diffraction Data (ICDD). DiffracPlus Eva and Topas software.

Detection Limit : 0.5-2%. Strongly dependent on crystallinity.

Contents:

1) Method Summary
2) Summary of Mineral Asemblages
3) Semi-Quantitative XRD Results
4) XRD Pattern(s)

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Bernie C. Yeung, B.Sc.
Mineralogist

Huyun Zhou, Ph.D., P.Geo.
Senior Mineralogist

Method Summary

Mineral Identification and Interpretation:

Mineral identification and interpretation involves matching the diffraction pattern of an unknown material to patterns of single-phase reference materials. The reference patterns are compiled by the Joint Committee on Powder Diffraction Standards - International Center for Diffraction Data (JCPDS-ICDD) database and released on software as Powder Diffraction Files (PDF).

Interpretations do not reflect the presence of non-crystalline and/or amorphous compounds, except when internal standards have been added by request. Mineral proportions may be strongly influenced by crystallinity, crystal structure and preferred orientations. Mineral or compound identification and quantitative analysis results should be accompanied by supporting chemical assay data or other additional tests.

Quantitative Rietveld Analysis:

Quantitative Rietveld Analysis is performed by using Topas 4.2 (Bruker AXS), a graphics based profile analysis program built around a non-linear least squares fitting system, to determine the amount of different phases present in a multicomponent sample. Whole pattern analyses are predicated by the fact that the X-ray diffraction pattern is a total sum of both instrumental and specimen factors. Unlike other peak intensity-based methods, the Rietveld method uses a least squares approach to refine a theoretical line profile until it matches the obtained experimental patterns.

Rietveld refinement is completed with a set of minerals specifically identified for the sample. Zero values indicate that the mineral was included in the refinement calculations, but the calculated concentration was less than 0.05wt%. Minerals not identified by the analyst are not included in refinement calculations for specific samples and are indicated with a dash.

Summary of Rietveld Quantitative Analysis X-ray Diffraction Results

Quantitative X-ray Diffraction Results

Mineral/Compound	ST JUN4521-01 (wt %)	GO JUN4521-02 (wt %)	SO JUN4521-03 (wt %)	GS JUN4521-04 (wt %)	GT JUN4521-05 (wt %)	SS JUN4521-06 (wt %)
Quartz	31.1	46.8	55.2	39.4	45.7	32.9
Microcline	7.8	19.0	0.7	12.2	16.3	11.1
Albite	20.3	7.5	1.2	17.2	9.7	8.7
Biotite	7.0	1.0	1.3	3.0	1.2	4.4
Muscovite	6.2	7.9	13.9	9.6	5.3	10.6
Chlorite	3.5	4.1	5.3	2.8	3.6	5.0
Actinolite	2.3	0.3	0.4	0.4	0.0	0.3
Diopside	3.9	1.7	0.6	2.1	1.3	1.8
Calcite	14.6	1.7	3.9	2.3	1.0	10.6
Ankerite	1.8	1.3	4.3	4.5	4.4	9.0
Kaolinite	1.4	8.7	13.1	6.7	11.6	5.6
TOTAL	100	100	100	100	100	100

Zero values indicate that the mineral was included in the refinement, but the calculated concentration is below a measurable value.
Dashes indicate that the mineral was not identifed by the analyst and not included in the refinement calculation for the sample.

Mineral/Compound	Formula
Quartz	SiO_2
Microcline	$KAlSi_3O_8$
Albite	$NaAlSi_3O_8$
Biotite	$K(Mg,Fe)_3(AlSi_3O_{10})(OH)_2$
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$
Chlorite	$(Fe,(Mg,Mn)_5,Al)(Si_3Al)O_{10}(OH)_8$
Actinolite	$Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$
Diopside	$CaMgSi_2O_6$
Calcite	$CaCO_3$
Ankerite	$CaFe(CO_3)_2$
Kaolinite	$Al_2Si_2O_5(OH)_4$

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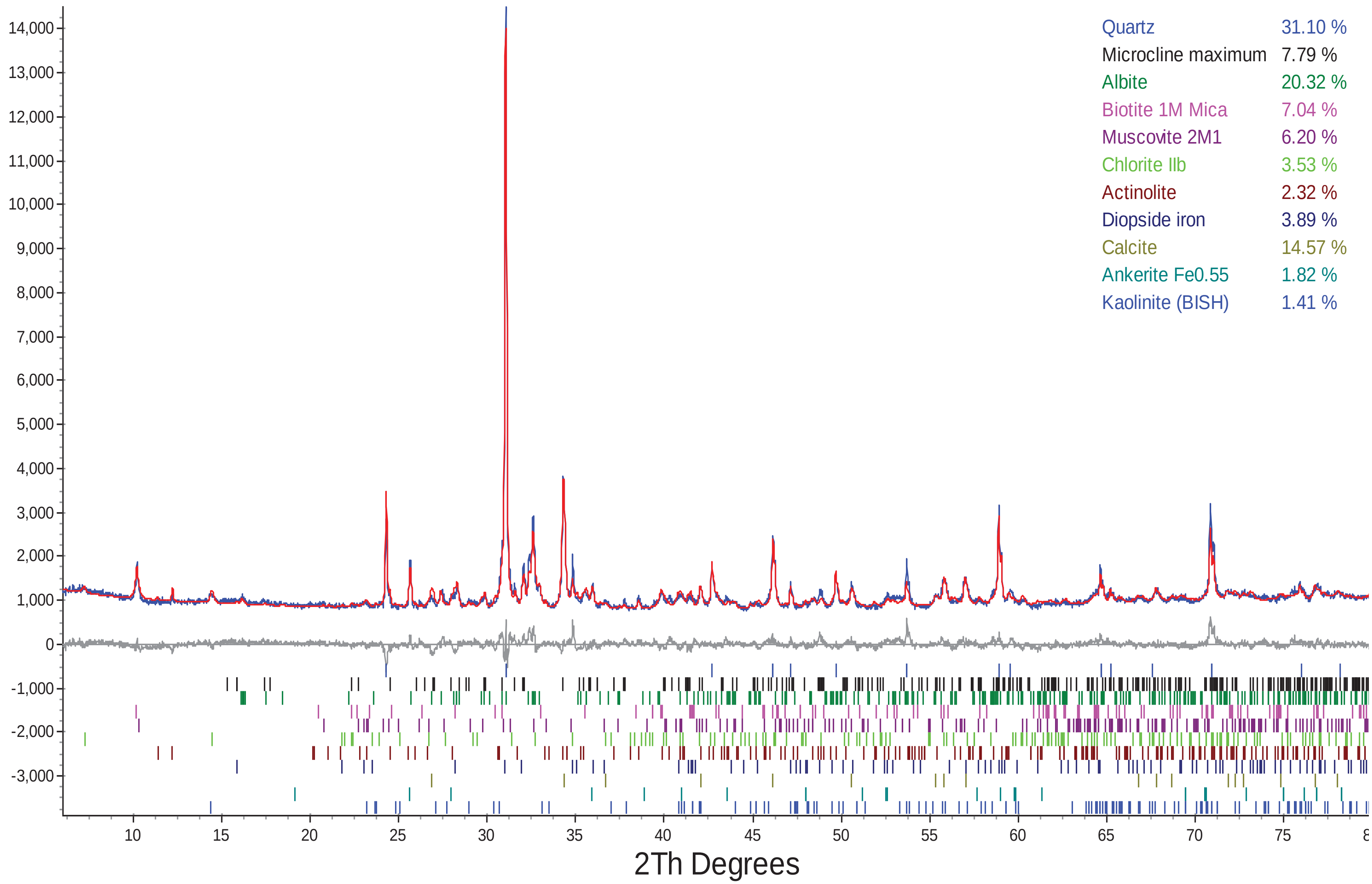

The Qualitative XRD method (METH # 8-8-1) used by SGS Minerals Services, P.O. Box 4300, 185 Concession Street, Lakefield, Ontario, Canada K0L 2H0.
Tel: (705) 652-2000 Fax: (705) 652-6365 Mini-method available upon request.

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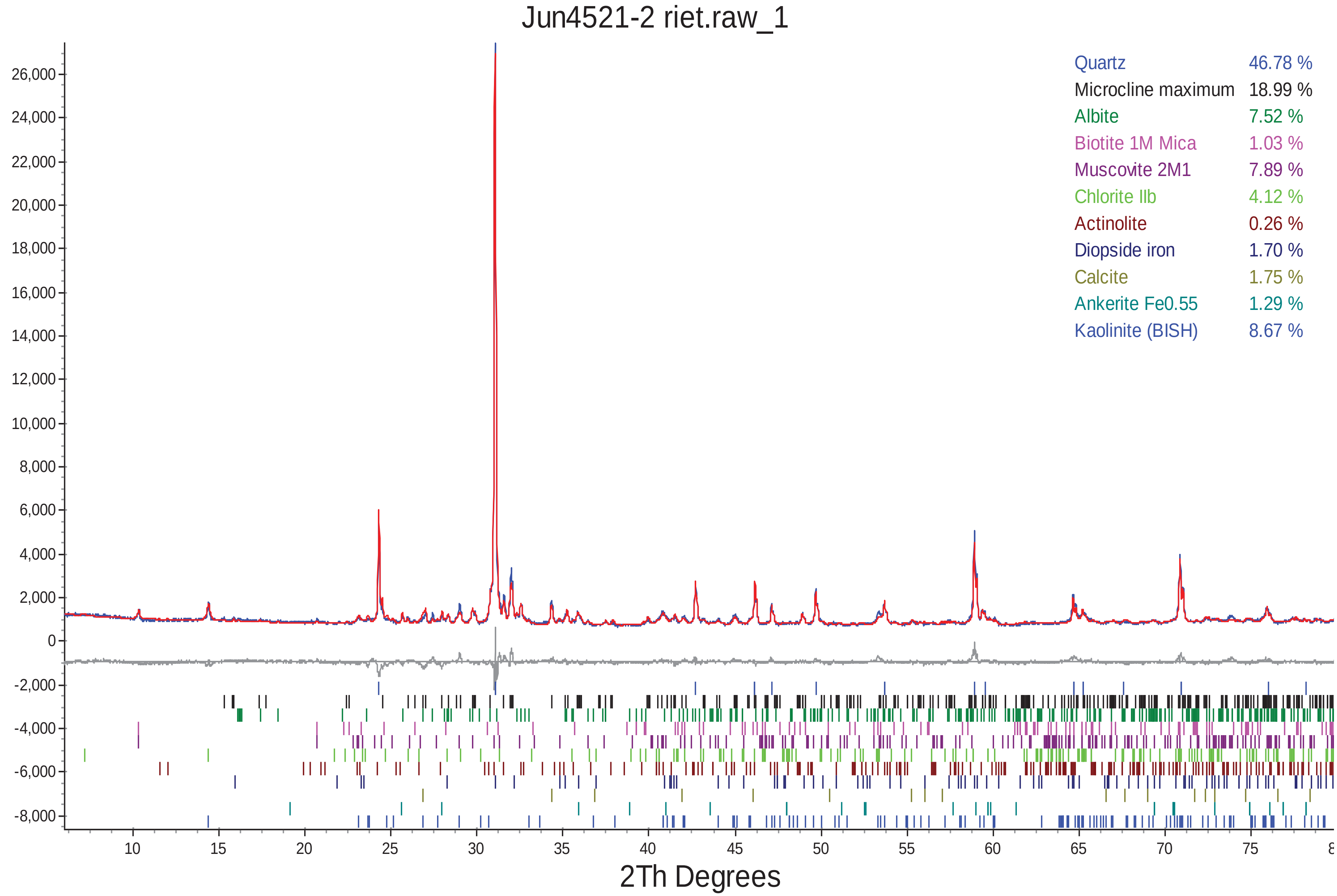

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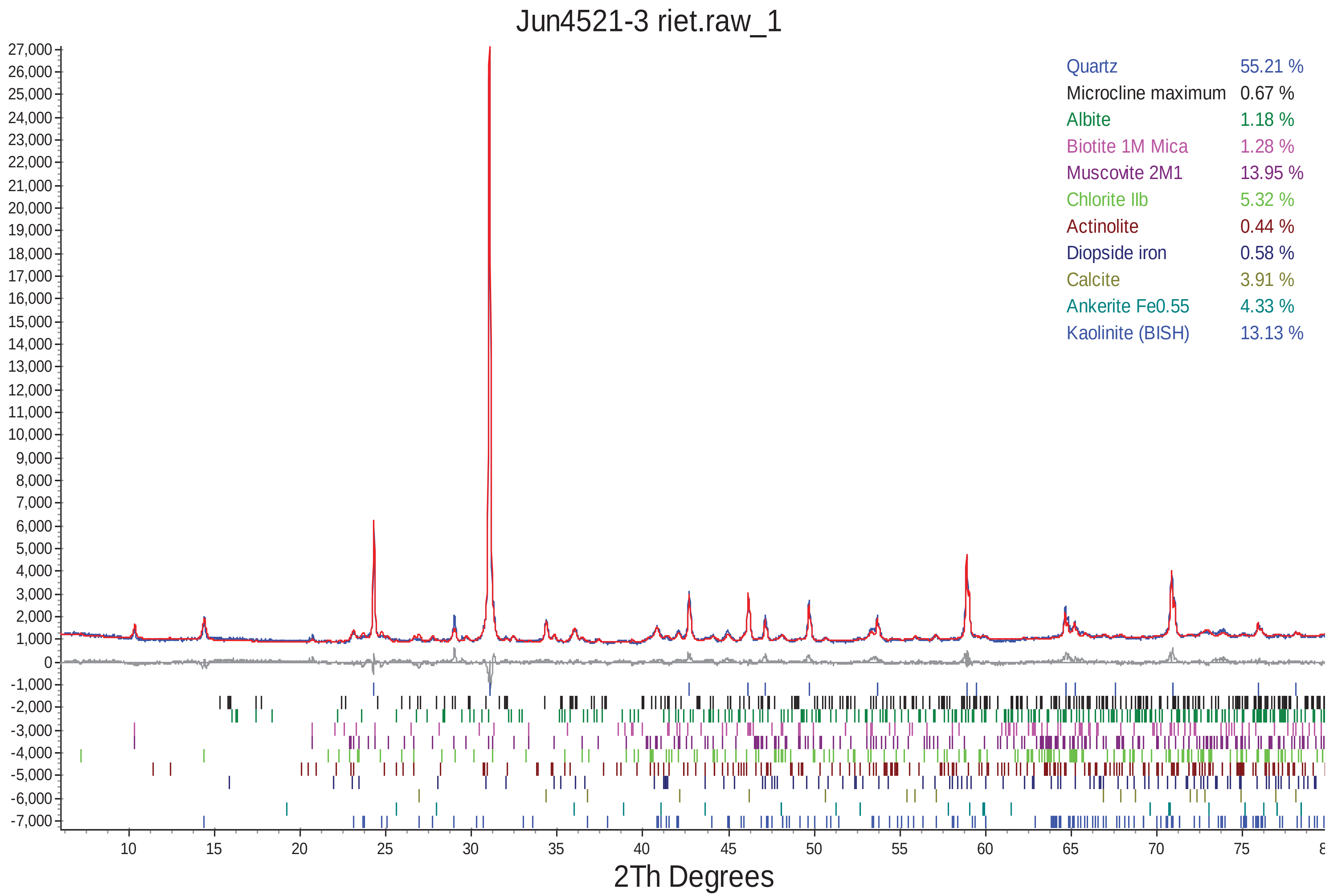

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06/30/2014

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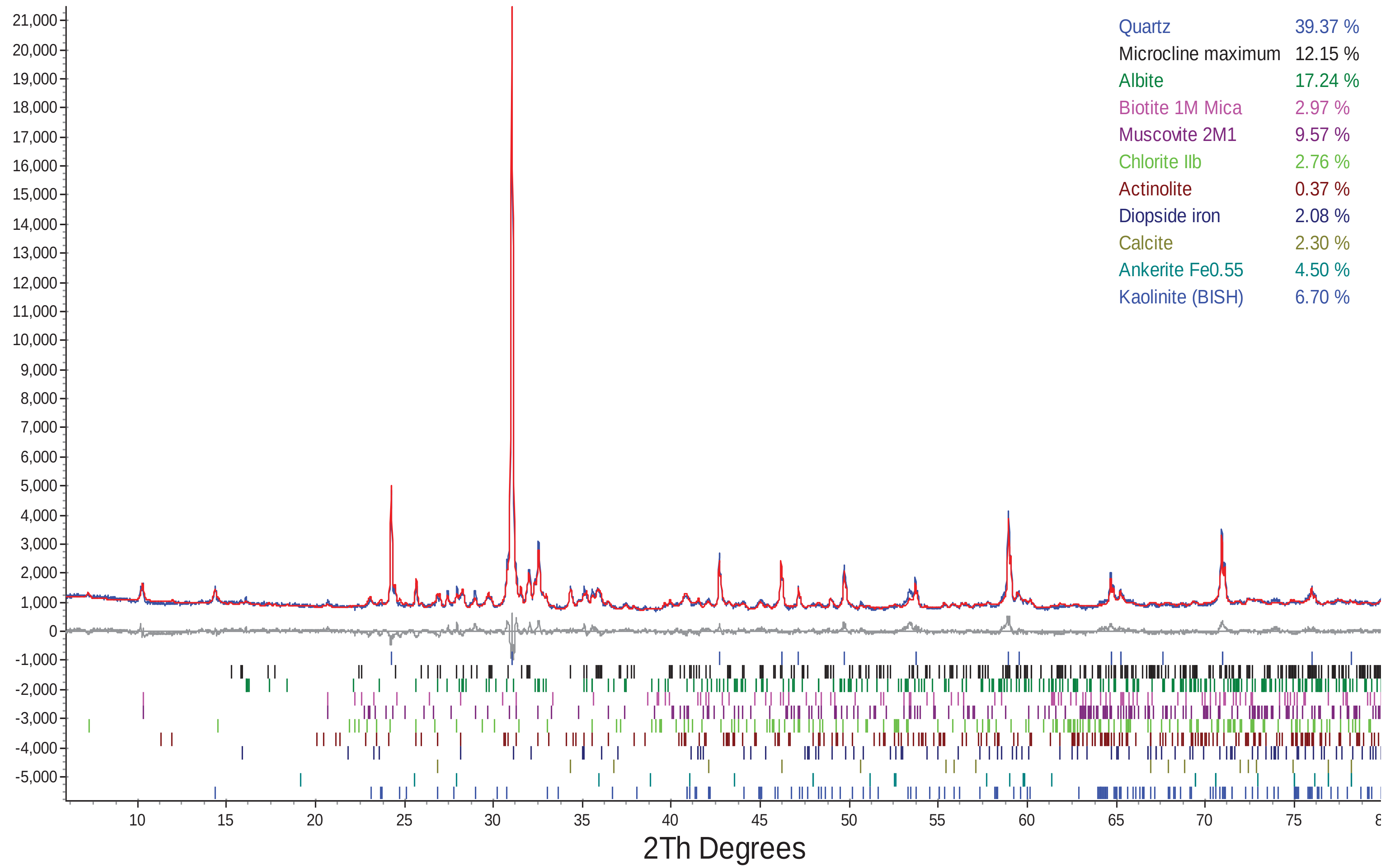

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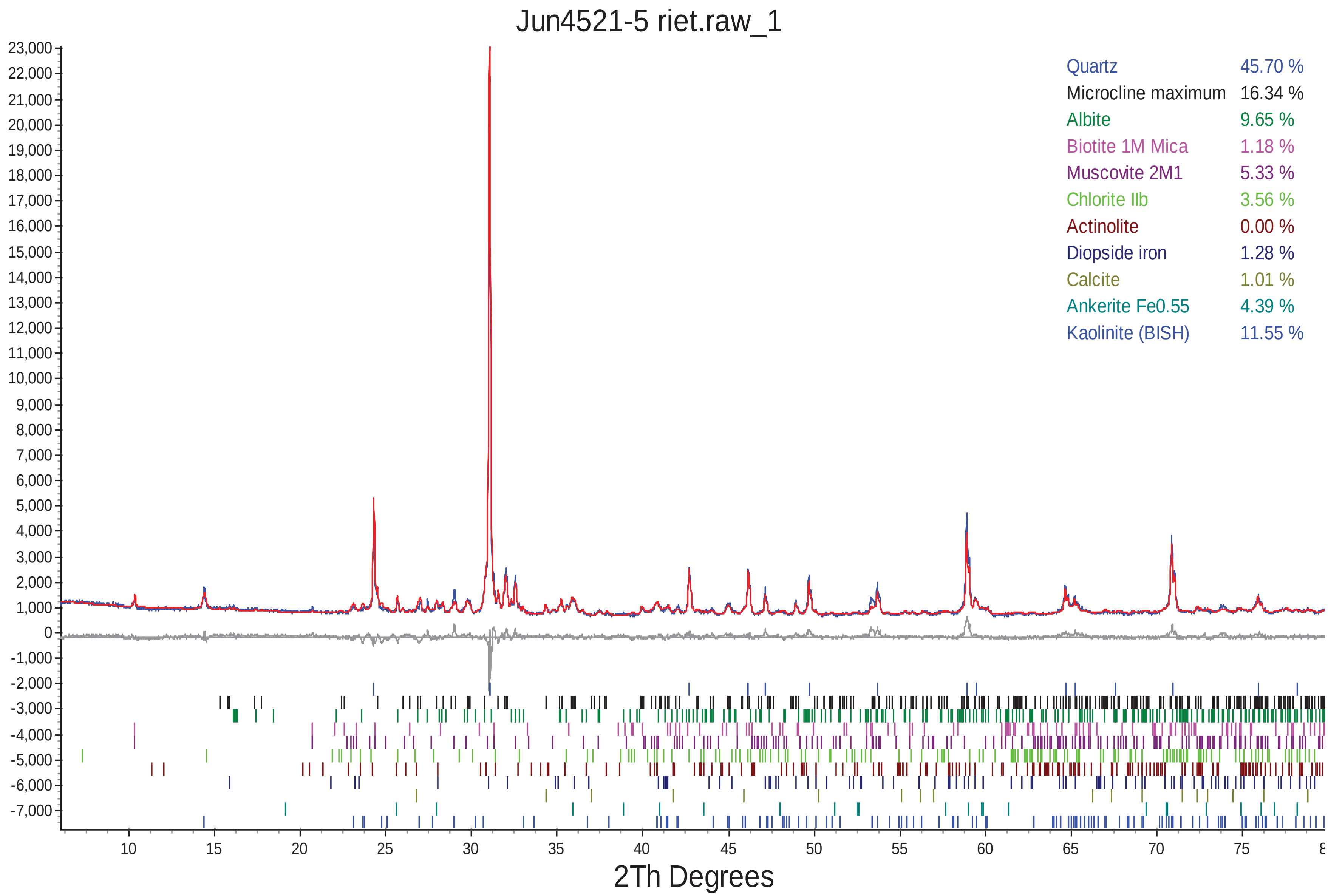

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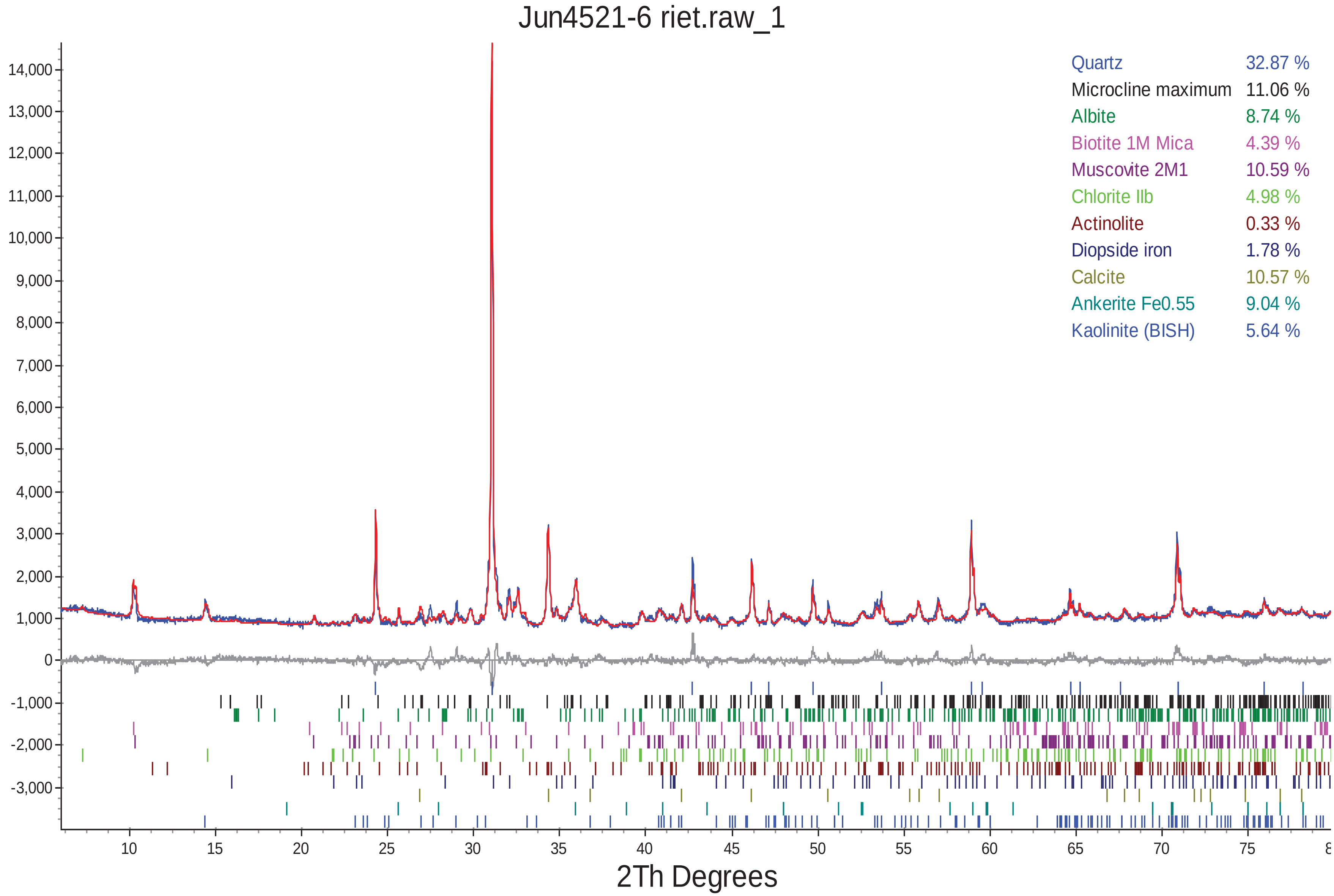
14094-101A/MI4521-JUN14
06/30/2014



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Tel: (705) 652-2000 Fax: (705) 652-6365 Mini-method available upon request.

SGS

Quantitative X-Ray Diffraction by Rietveld Refinement

Report Prepared for:	*SGS Canada Inc*
Project Number/ LIMS No.	*14094-101B/MI4511-AUG15*
Batch No.	*1416 Kaminak*
Sample Receipt:	*August 14, 2015*
Sample Analysis:	*August 17, 2015*
Reporting Date:	*September 10, 2015*

Instrument:	BRUKER AXS D8 Advance Diffractometer
Test Conditions:	Co radiation, 40 kV, 35 mA Regular Scanning: Step: 0.02°, Step time: 1s, 2θ range: 3-80°
Interpretations:	PDF2/PDF4 powder diffraction databases issued by the International Center for Diffraction Data (ICDD). DiffracPlus Eva and Topas software.
Detection Limit:	0.5-2%. Strongly dependent on crystallinity.

Contents:

1) Method Summary
2) Summary of Mineral Assemblages
3) Quantitative XRD Results
4) XRD Pattern(s)

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Signature REDACTED

Kim Gibbs, H.B.Sc., P.Geo.
Senior Mineralogist

Huyun Zhou, Ph.D., P.Geo.
Senior Mineralogist

ACCREDITATION: SGS Minerals Services Lakefield is accredited to the requirements of ISO/IEC 17025 for specific tests as listed on our scope of accreditation, including geochemical, mineralogical and trade mineral tests. To view a list of the accredited methods, please visit the following website and search SGS Canada - Minerals Services - Lakefield: http://palcan.scc.ca/SpecsSearch/GLSearchForm.do.

SGS

Method Summary

The Rietveld Method of Mineral Identification by XRD (ME-LR-MIN-MET-MN-D05) method used by SGS Minerals Services is accredited to the requirements of ISO/IEC 17025.

Mineral Identification and Interpretation:

Mineral identification and interpretation involves matching the diffraction pattern of an unknown material to patterns of single-phase reference materials. The reference patterns are compiled by the Joint Committee on Powder Diffraction Standards - International Center for Diffraction Data (JCPDS-ICDD) database and released on software as Powder Diffraction Files (PDF).

Interpretations do not reflect the presence of non-crystalline and/or amorphous compounds, except when internal standards have been added by request. Mineral proportions may be strongly influenced by crystallinity, crystal structure and preferred orientations. Mineral or compound identification and quantitative analysis results should be accompanied by supporting chemical assay data or other additional tests.

Quantitative Rietveld Analysis:

Quantitative Rietveld Analysis is performed by using Topas 4.2 (Bruker AXS), a graphics based profile analysis program built around a non-linear least squares fitting system, to determine the amount of different phases present in a multicomponent sample. Whole pattern analyses are predicated by the fact that the X-ray diffraction pattern is a total sum of both instrumental and specimen factors. Unlike other peak intensity-based methods, the Rietveld method uses a least squares approach to refine a theoretical line profile until it matches the obtained experimental patterns.

Rietveld refinement is completed with a set of minerals specifically identified for the sample. Zero values indicate that the mineral was included in the refinement calculations, but the calculated concentration was less than 0.05wt%. Minerals not identified by the analyst are not included in refinement calculations for specific samples and are indicated with a dash.

Summary of Rietveld Quantitative Analysis X-ray Diffraction Results

Quantitative X-ray Diffraction Results

Mineral/Compound	KAM036824 AUG4511-01 (wt %)	KAM092488 AUG4511-02 (wt %)
Quartz	49.1	48.9
Microcline	1.6	22.5
Muscovite	14.1	14.5
Kaolinite	14.7	9.6
Dolomite	9.3	4.1
Ankerite	5.5	0.0
Pyrite	1.3	0.5
Siderite	4.5	-
TOTAL	100	100

Zero values indicate that the mineral was included in the refinement, but the calculated concentration is below a measurable value.
Dashes indicate that the mineral was not identifed by the analyst and not included in the refinement calculation for the sample.

Mineral/Compound	Formula
Quartz	SiO_2
Microcline	$KAlSi_3O_8$
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$
Kaolinite	$Al_2Si_2O_5(OH)_4$
Dolomite	$CaMg(CO_3)_2$
Ankerite	$CaFe(CO_3)_2$
Pyrite	FeS_2
Siderite	$FeCO_3$

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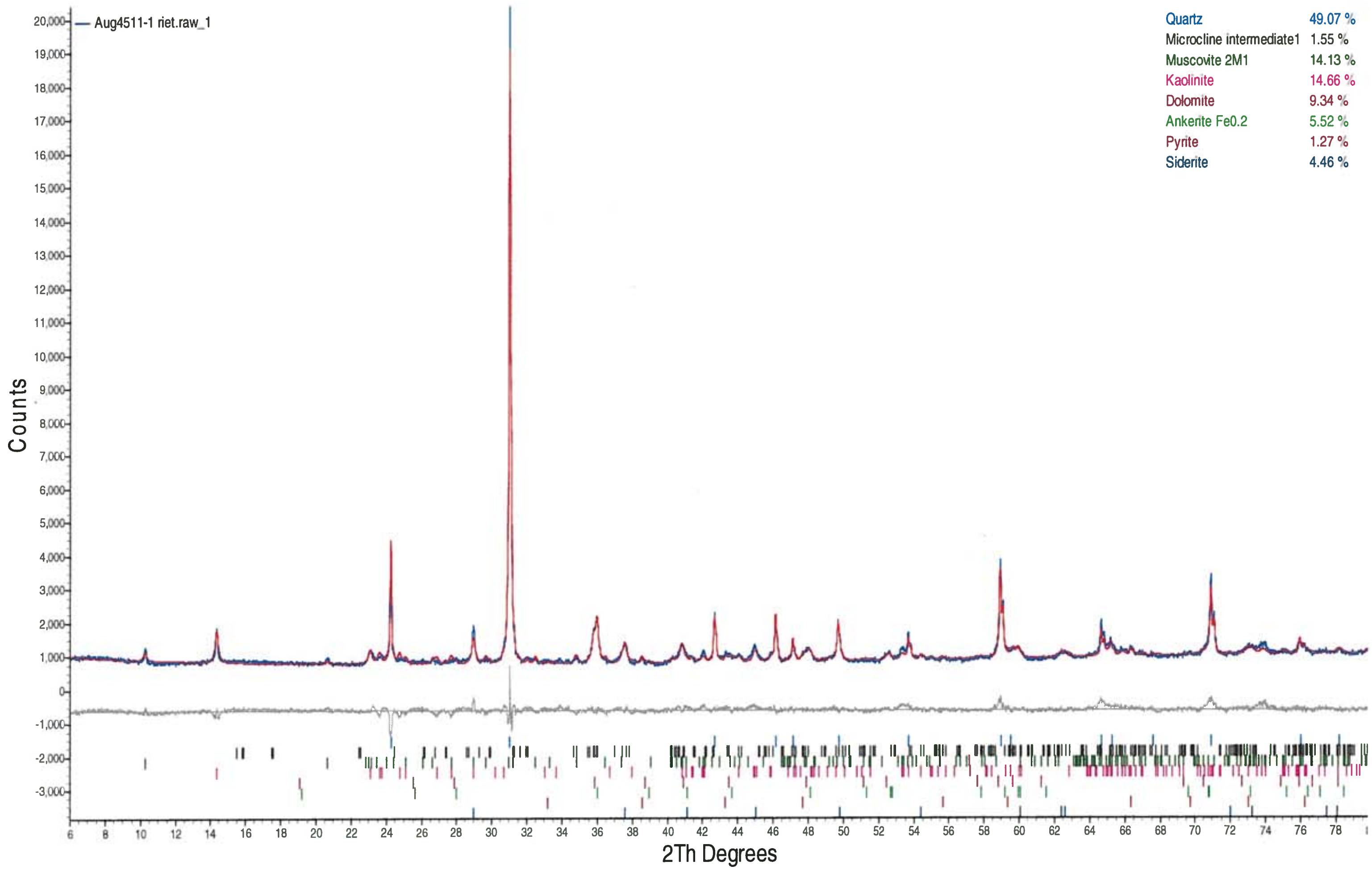
14094-101B/MI4511-AUG15
10-Sep-15

KAM036824



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10-Sep-15

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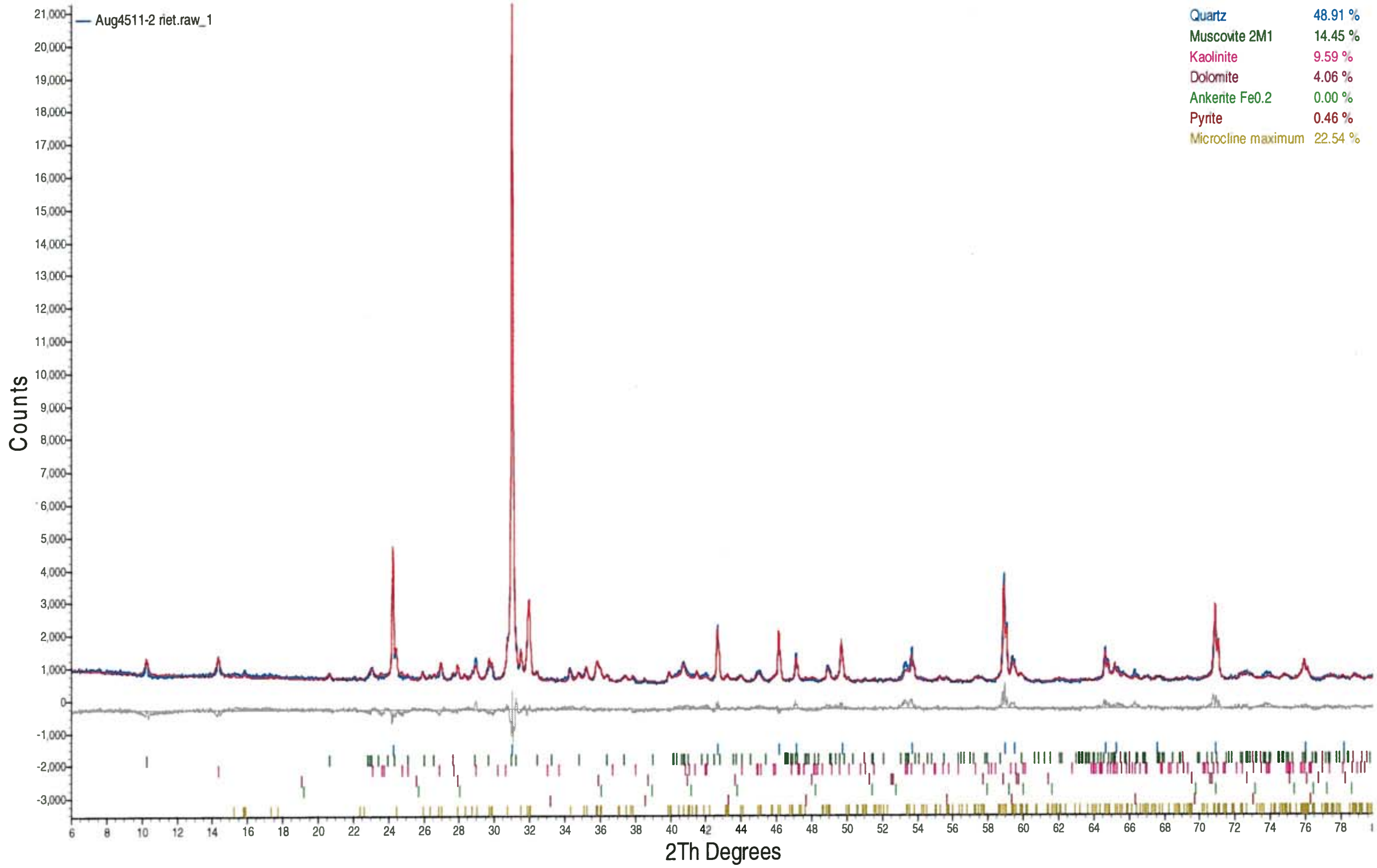


SGS

Quantitative X-Ray Diffraction by Rietveld Refinement

Report Prepared for:	*SGS Canada Inc*
Project Number/ LIMS No.	*14094-101B/MI4522-APR15*
Batch No.	*1416 Kaminak Coffee*
Sample Receipt:	*April 24, 2015*
Sample Analysis:	*April 29, 2015*
Reporting Date:	*May 1, 2015*

Instrument:	BRUKER AXS D8 Advance Diffractometer
Test Conditions:	Co radiation, 40 kV, 35 mA Regular Scanning: Step: 0.02°, Step time: 1s, 2θ range: 3-80°
Interpretations:	PDF2/PDF4 powder diffraction databases issued by the International Center for Diffraction Data (ICDD). DiffracPlus Eva and Topas software.
Detection Limit:	0.5-2%. Strongly dependent on crystallinity.

Contents:

Signature REDACTED

Signature REDACTED

Kim Gibbs, H.B.Sc., P.Geo.
Senior Mineralogist

Huyun Zhou, Ph.D., P.Geo.
Senior Mineralogist

ACCREDITATION: SGS Minerals Services Lakefield is accredited to the requirements of ISO/IEC 17025 for specific tests as listed on our scope of accreditation, including geochemical, mineralogical and trade mineral tests. To view a list of the accredited methods, please visit the following website and search SGS Canada - Minerals Services - Lakefield: http://palcan.scc.ca/SpecsSearch/GLSearchForm.do.

Method Summary

The Rietveld Method of Mineral Identification by XRD (ME-LR-MIN-MET-MN-D05) method used by SGS Minerals Services is accredited to the requirements of ISO/IEC 17025.

Mineral Identification and Interpretation:

Mineral identification and interpretation involves matching the diffraction pattern of an unknown material to patterns of single-phase reference materials. The reference patterns are compiled by the Joint Committee on Powder Diffraction Standards - International Center for Diffraction Data (JCPDS-ICDD) database and released on software as Powder Diffraction Files (PDF).

Interpretations do not reflect the presence of non-crystalline and/or amorphous compounds, except when internal standards have been added by request. Mineral proportions may be strongly influenced by crystallinity, crystal structure and preferred orientations. Mineral or compound identification and quantitative analysis results should be accompanied by supporting chemical assay data or other additional tests.

Quantitative Rietveld Analysis:

Quantitative Rietveld Analysis is performed by using Topas 4.2 (Bruker AXS), a graphics based profile analysis program built around a non-linear least squares fitting system, to determine the amount of different phases present in a multicomponent sample. Whole pattern analyses are predicated by the fact that the X-ray diffraction pattern is a total sum of both instrumental and specimen factors. Unlike other peak intensity-based methods, the Rietveld method uses a least squares approach to refine a theoretical line profile until it matches the obtained experimental patterns.

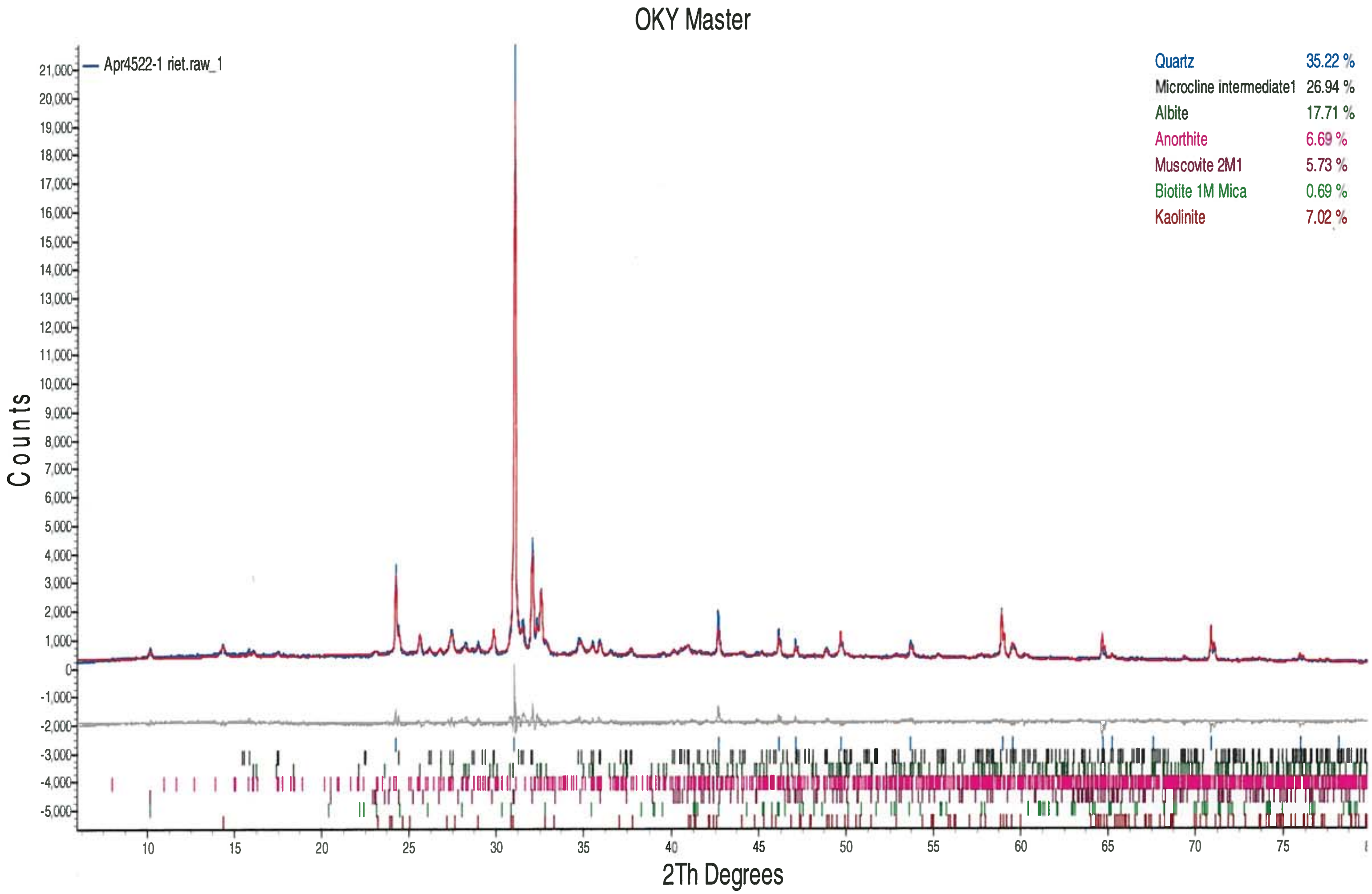
Rietveld refinement is completed with a set of minerals specifically identified for the sample. Zero values indicate that the mineral was included in the refinement calculations, but the calculated concentration was less than 0.05wt%. Minerals not identified by the analyst are not included in refinement calculations for specific samples and are indicated with a dash.

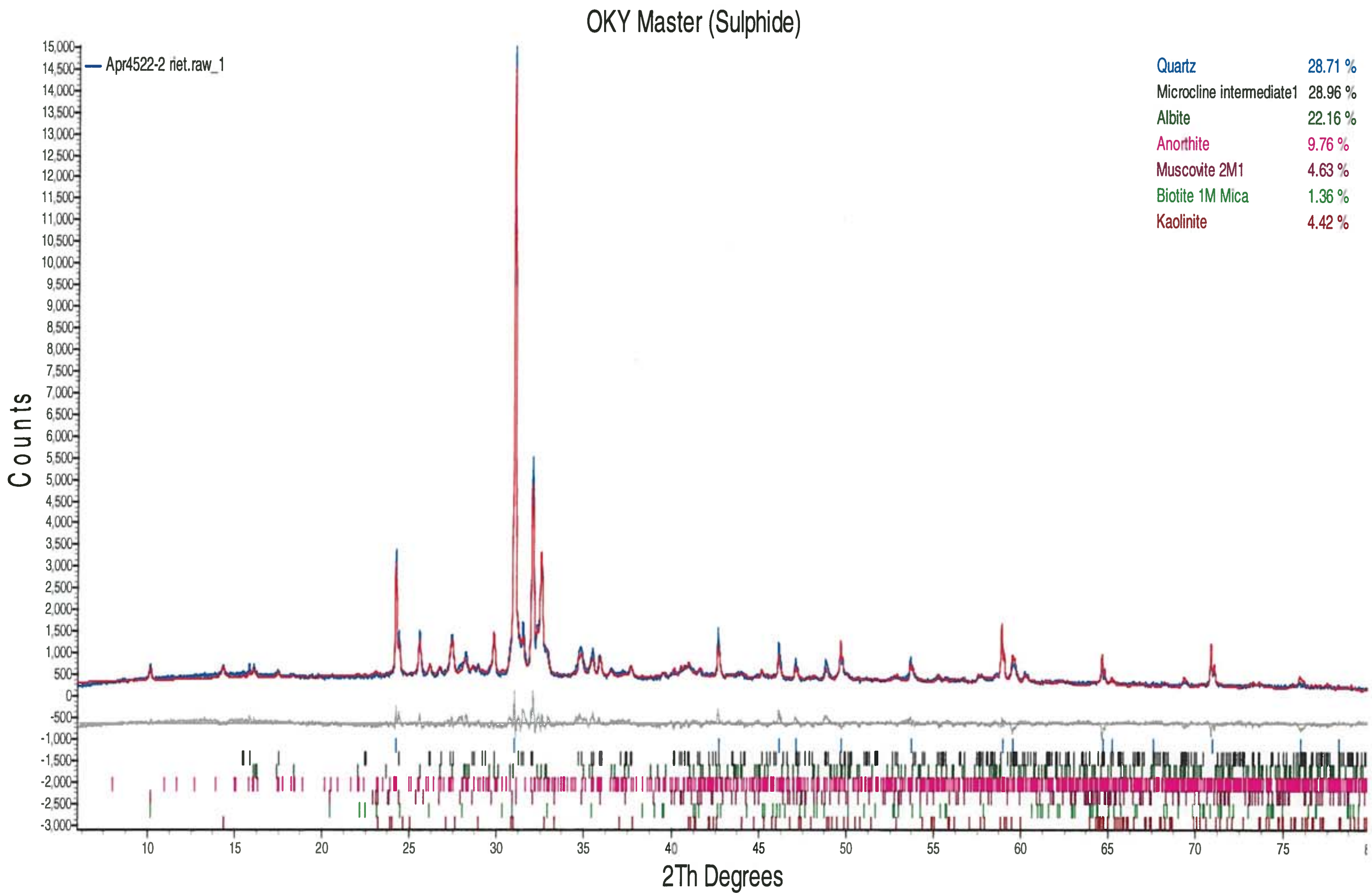
Summary of Rietveld Quantitative Analysis X-ray Diffraction Results

Quantitative X-ray Diffraction Results

Mineral/Compound	OKY Master APR4522-01 (wt %)	OKY Master (Sulphide) APR4522-02 (wt %)
Quartz	35.2	28.7
Microcline	26.9	29.0
Albite	17.7	22.2
Anorthite	6.7	9.8
Muscovite	5.7	4.6
Biotite	0.7	1.4
Kaolinite	7.0	4.4
TOTAL	100	100

Mineral/Compound	Formula
Quartz	SiO_2
Microcline	$KAlSi_3O_8$
Albite	$NaAlSi_3O_8$
Anorthite	$CaAl_2Si_2O_8$
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$
Biotite	$K(Mg,Fe)_3(AlSi_3O_{10})(OH)_2$
Kaolinite	$Al_2Si_2O_5(OH)_4$


OKY Master
Apr4522-1 riet.raw_1
Quartz 35.22 %
Microcline intermediate1 26.94 %
Albite 17.71 %
Anorthite 6.69 %
Muscovite 2M1 5.73 %
Biotite 1M Mica 0.69 %
Kaolinite 7.02 %
Counts
2Th Degrees


OKY Master (Sulphide)
Apr4522-2 riet.raw_1
Counts
2Th Degrees
Quartz 28.71 %
Microcline intermediate1 28.96 %
Albite 22.16 %
Anorthite 9.76 %
Muscovite 2M1 4.63 %
Biotite 1M Mica 1.36 %
Kaolinite 4.42 %

Appendix D.1-2 Static Test Results for Waste Rock Kinetic Test Samples

Acid-Base Accounting Results

Kinetic Tests	**Description**	**Lithology**	**Weathering Facies**	**Rinse pH**	**Paste pH**	**TIC**	**CaNP**	**Total C**	**Total S**	**S(SO4)**	**S(S-2)**	**Insoluble S**	**AP**	**Sobek NP**	**Siderite NP**	**Sobek NNP**	**Siderite NNP**	**Fizz Test**
				s.u.	s.u.	%	kg $CaCO_3$/t	%	%	%	%	%	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	
			Method Code	*Sobek*	*Sobek*	*CSB02V*	*Calc.*	*CSA06V*	*CSA06V*	*CSA07V*	*CSA08D*	*Calc.*	*Calc.*	*Sobek*	*Siderite Corr.*	*Calc.*	*Calc.*	*Sobek*
			Limit of Detection	*0.20*	*0.20*	*0.01*	*#N/A*	*0.005*	*0.005*	*0.01*	*0.01*	*#N/A*	*#N/A*	*0.5*	*0.5*	*#N/A*	*#N/A*	*#N/A*
Col 5, FB-GO	GO	Gneiss	Oxide	8.46	8.43	0.23	19.2	0.258	0.016	*<0.01*	0.01	0.006	0.3	22.7	26.5	22.4	26.2	Slight
Col 6, HC3, FB-GT	GT	Gneiss	Transition	8.00	8.59	0.48	40.0	0.488	0.083	*<0.01*	0.07	0.013	2.2	32.9	40.8	30.7	38.6	Slight
HC4, FB-GS	GS	Gneiss	Fresh	8.22	8.28	0.66	55.0	0.672	0.21	*<0.01*	0.18	0.03	5.6	51.7	56.9	46.1	51.3	Slight
HC8	KAM092488	Gneiss	Fresh		8.58	0.24	20.0	0.24	0.386	*<0.01*	0.38	<0.01	11.9	20.2		8.3		Slight
Col 3, FB-SO	SO	Schist	Oxide	8.35	8.25	0.93	77.5	0.958	0.031	*<0.01*	0.01	0.021	0.3	74.9	75.9	74.6	75.6	Slight
Col 4, HC1, FB-ST	ST	Schist	Transition	8.41	8.28	1.58	131.7	1.62	0.101	0.01	0.05	0.041	1.6	172.9	192.6	171.3	191.0	Moderate
HC2, FB-SS	SS	Schist	Fresh	8.49	8.40	2.09	174.2	2.13	0.421	*<0.01*	0.35	0.071	10.9	180.5	200.1	169.6	189.2	Moderate
HC7	KAM036824	Schist	Fresh		8.18	1.81	150.8	1.83	1.1	0.02	1.06	0.02	33.1	127.2		94.1		Moderate
Col 13, HC5, FB-GGT	OKY Master	Granite	Transition	7.12	7.49	0.01	0.8	0.02	0.035	*<0.01*	<0.01	0.035	<0.3	2.8	7.6	2.8	7.6	None
Col 14, HC6, FB-GGS	OKY Master (Fresh)	Granite	Fresh	8.59	8.48	0.11	9.2	0.122	0.045	*<0.01*	0.03	0.015	0.9	5.7	9.9	4.8	9.0	None

Notes:
Values in grey italics are below the analytical detection limit
CaNP = carbonate NP calculated from total inorganic carbon (TIC)
NNP = net neutralization potential, derived by subtracting AP from NP

Appendix D.1-2 Static Test Results for Waste Rock Kinetic Test Samples

Solid Phase Elements by Aqua Regia Digestion

Kinetic Tests	Description	Lithology	Weathering Facies	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La	Li	Lu	Mg	Mn	Mo
				ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm
			Method Code	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*
			Limit of Detection	*0.01*	*0.01*	*1*	*10*	*5*	*0.1*	*0.02*	*0.01*	*0.01*	*0.05*	*0.1*	*1*	*0.05*	*0.5*	*0.01*	*0.1*	*0.1*	*0.05*	*0.01*	*0.02*	*0.01*	*0.1*	*1*	*0.01*	*0.01*	*2*	*0.05*
Col 5, FB-GO	GO	Gneiss	Oxide	0.17	0.58	218	30	106	0.8	0.35	0.68	0.07	62.7	6.2	142	1.57	9.8	1.5	2.3	*<0.1*	0.32	0.15	*<0.02*	0.21	33.3	2	0.23	0.21	339	4.98
Col 6, HC3, FB-GT	GT	Gneiss	Transition	0.03	0.47	182	30	162	0.7	0.2	0.96	0.05	58.8	4.1	122	1.21	5.9	1.18	1.9	*<0.1*	0.28	0.24	*<0.02*	0.19	32.1	2	0.19	0.35	280	4.89
HC4, FB-GS	GS	Gneiss	Fresh	0.03	0.92	86	20	120	0.7	0.47	1.57	0.03	65.4	8	112	2.07	6.7	1.81	3.6	*<0.1*	0.22	0.07	*<0.02*	0.41	33.4	5	0.22	0.6	373	4.49
HC8	KAM092488	Gneiss	Fresh	0.06	0.34	248	50	63	0.5	0.06	0.47	0.07	36.3	1	100	0.36	2	0.6	0.9	*<0.1*	0.23	0.11	*<0.02*	0.18	22.5	2	0.11	0.19	102	5.42
Col 3, FB-SO	SO	Schist	Oxide	0.17	0.49	369	20	336	0.8	0.48	2.33	0.14	55.6	12.6	125	1.21	24.1	2.89	1.9	*<0.1*	0.14	0.44	0.03	0.16	27.3	2	0.24	0.48	530	3.84
Col 4, HC1, FB-ST	ST	Schist	Transition	0.05	1.52	67	30	542	0.7	0.25	4.86	0.07	38.7	15.1	190	3.7	16.1	2.57	5.8	*<0.1*	0.17	0.03	0.02	0.83	22.7	13	0.19	1.21	589	5.49
HC2, FB-SS	SS	Schist	Fresh	0.11	1.37	30	20	327	0.9	0.45	5.03	0.1	57.5	14.2	145	3.62	18	2.87	5.9	*<0.1*	0.08	0.12	0.04	0.68	28	10	0.23	1.44	660	3.25
HC7	KAM036824	Schist	Fresh	0.05	0.57	989	50	182	1.1	0.21	2.65	0.13	47.1	17	111	1.87	26.9	3.68	2.7	*<0.1*	*<0.05*	0.51	0.04	0.21	24.2	2	0.24	1.11	733	3.64
Col 13, HC5, FB-GGT	OKY Master	Granite	Transition	0.04	0.4	298	*<10*	54	0.4	0.21	0.05	0.05	46.7	1.6	132	3.25	7.6	0.87	1.9	*<0.1*	0.38	0.14	*<0.02*	0.16	25.1	6	0.2	0.06	384	6.68
Col 14, HC6, FB-GGS	OKY Master (Sulphide)	Granite	Fresh	0.03	0.38	59	*<10*	63	0.4	0.15	0.1	0.05	48	1.6	125	3	5.6	1.1	2.2	*<0.1*	0.43	0.08	*<0.02*	0.2	25.7	8	0.23	0.12	678	6.21

Notes:
Values in grey italics are below the analytical detection limit

Appendix D.1-2 Static Test Results for Waste Rock Kinetic Test Samples

Solid Phase Elements by Aqua Regia Digestion

Kinetic Tests	Description	Lithology	Weathering Facies	Na	Nb	Ni	P	Pb	Rb	S	Sb	Sc	Se	Sn	Sr	Ta	Tb	Te	Th	Ti	Tl	U	V	W	Y	Yb	Zn	Zr
				%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
			Method Code	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*
			Limit of Detection	*0.01*	*0.05*	*0.5*	*0.005*	*0.2*	*0.2*	*0.01*	*0.05*	*0.1*	*1*	*0.3*	*0.5*	*0.05*	*0.02*	*0.05*	*0.1*	*0.01*	*0.02*	*0.05*	*1*	*0.1*	*0.05*	*0.1*	*1*	*0.5*
Col 5, FB-GO	GO	Gneiss	Oxide	0.02	0.1	9.7	0.03	10.8	18	0.01	12.1	3	*<1*	0.6	25	*<0.05*	0.49	0.1	35.2	*<0.01*	0.32	5.53	17	1.3	13	1.5	21	11.2
Col 6, HC3, FB-GT	GT	Gneiss	Transition	0.02	0.11	5.7	0.022	7.4	15.7	0.07	6.89	2	*<1*	0.6	38.1	*<0.05*	0.41	*<0.05*	30.6	*<0.01*	0.26	6.32	9	0.2	11	1.3	16	8.9
HC4, FB-GS	GS	Gneiss	Fresh	0.02	0.27	12.8	0.034	6	29.9	0.2	2.58	3.7	*<1*	0.7	55.3	*<0.05*	0.55	0.13	21.5	0.03	0.27	6.05	18	0.2	14.3	1.5	19	6.7
HC8	KAM092488	Gneiss	Fresh	0.01	0.09	5.7	0.006	6	12.5	0.35	2.18	0.4	2	*<0.3*	24.9	*<0.05*	0.19	0.09	36.1	*<0.01*	0.08	12.4	1	0.2	3.94	0.6	4	6.5
Col 3, FB-SO	SO	Schist	Oxide	0.01	*<0.05*	27.4	0.048	17	8.4	0.01	32.6	7	*<1*	0.4	56.9	*<0.05*	0.63	0.06	11.8	*<0.01*	0.44	2.55	32	0.4	15	1.6	41	4.5
Col 4, HC1, FB-ST	ST	Schist	Transition	0.04	0.73	49.6	0.048	9.3	52.2	0.09	1.86	5.7	*<1*	1.1	778	*<0.05*	0.41	0.07	15.1	0.11	0.48	2.71	42	1.4	11.9	1.3	43	4.8
HC2, FB-SS	SS	Schist	Fresh	0.03	0.29	53.9	0.063	15	43.1	0.43	2.59	6.8	*<1*	1.1	243	*<0.05*	0.61	*<0.05*	12.3	0.06	0.37	3.24	43	0.6	16.2	1.6	58	3
HC7	KAM036824	Schist	Fresh	0.02	0.07	43.1	0.048	42.5	13.3	1.09	6.4	8.6	3	0.4	70.9	*<0.05*	0.6	*<0.05*	11.7	*<0.01*	0.3	3.77	34	0.2	15.3	1.6	91	1.5
Col 13, HC5, FB-GGT	OKY Master	Granite	Transition	0.03	1.56	6.4	0.017	16.3	16.5	0.02	1.52	1.7	*<1*	0.7	7.6	*<0.05*	0.39	*<0.05*	30.3	0.02	0.24	7.64	6	0.1	11	1.3	29	8.3
Col 14, HC6, FB-GGS	OKY Master (Sulphide)	Granite	Fresh	0.04	2.38	5.8	0.019	8	22	0.04	0.51	2.1	*<1*	0.9	4	*<0.05*	0.41	*<0.05*	33.7	0.04	0.33	6.24	7	0.1	12.1	1.5	32	8.7

Notes:
Values in grey italics are below the analytical detection limit

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 3 (SO)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	mgCaCO$_3$/L	mgCaCO$_3$/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
16-Jul-14	1	1	1500	440	7.9	2529	#N/A	8.6	284	600	49	0.26	1.0	748	0.11	0.0088	0.028	0.050	0.000014	< 0.000007	0.032	0.000025	188	0.0032	0.0076
30-Jul-14	2	3	400	295	8.3	938	#N/A	2.5	203	240	7.5	0.36	< 0.3	209	0.0090	0.0065	0.018	0.019	< 0.000007	< 0.000007	0.023	< 0.000003	50	0.00088	0.00091
13-Aug-14	3	5	400	300	8.2	720	#N/A	3.4	208	129	2.6	0.32	< 0.3	164	0.0022	0.0060	0.014	0.024	< 0.000007	< 0.000007	0.024	< 0.000003	39	0.00074	0.00038
27-Aug-14	4	7	400	315	8.2	551	#N/A	8.0	187	91	< 2	0.40	< 0.3	133	0.0065	0.0052	0.015	0.022	< 0.000007	< 0.000007	0.028	< 0.000003	32	0.00063	0.00021
10-Sep-14	5	9	400	310	8.2	497	#N/A	3.8	181	65	0.50	0.43	< 0.3	118	0.0048	0.0049	0.016	0.024	< 0.000007	< 0.000007	0.023	< 0.000003	29	0.00065	0.00015
24-Sep-14	6	11	400	215	8.2	476	#N/A	4.7	198	57	0.30	0.36	< 0.3	133	0.0023	0.0049	0.011	0.032	< 0.000007	< 0.000007	0.021	< 0.000003	32	0.00074	0.00020
8-Oct-14	7	13	300	200	8.2	426	#N/A	4.2	159	48	< 1	0.42	< 0.3	129	0.0066	0.0043	0.015	0.031	< 0.000007	< 0.000007	0.019	< 0.000003	32	0.00072	0.00011
22-Oct-14	8	15	400	260	8.2	385	#N/A	6.1	158	42	< 1	0.44	< 0.3	126	0.0077	0.0043	0.013	0.034	< 0.000007	< 0.000007	0.021	0.000014	30	0.00076	0.000086
5-Nov-14	9	17	400	270	-	378	#N/A	#N/A	175	36	< 1	0.39	< 0.3	141	0.0050	0.0039	0.011	0.040	< 0.000007	< 0.000007	0.022	< 0.000003	33	0.00079	0.00011
19-Nov-14	10	19	400	260	8.1	351	#N/A	6.8	156	29	< 0.2	0.39	< 0.3	148	0.0049	0.0036	0.012	0.048	< 0.000007	< 0.000007	0.021	0.0000030	34	0.00073	0.000088
3-Dec-14	11	21	400	335	8.2	342	#N/A	2.7	161	27	< 1	0.35	< 0.3	161	0.0048	0.0036	0.011	0.051	< 0.000007	< 0.000007	0.020	0.0000040	39	0.00070	0.000074
17-Dec-14	12	23	400	280	8.2	362	#N/A	3.0	164	21	< 0.2	0.38	< 0.3	161	0.0052	0.0037	0.012	0.058	< 0.000007	< 0.000007	0.022	< 0.000003	37	0.00057	0.000067
31-Dec-14	13	25	400	280	8.4	353	#N/A	#N/A	215	20	< 1	0.37	< 0.3	154	0.0082	0.0035	0.012	0.057	< 0.000007	< 0.000007	0.020	< 0.000003	37	0.00091	0.00011
14-Jan-15	14	27	400	265	8.2	311	#N/A	3.4	145	21	< 1	0.44	< 0.3	145	0.0061	0.0040	0.014	0.051	< 0.000007	< 0.000007	0.020	0.0000050	34	0.00091	0.000073
28-Jan-15	15	29	400	275	8.2	334	#N/A	3.3	154	18	< 1	0.38	< 0.3	156	0.0087	0.0035	0.011	0.060	< 0.000007	0.0000090	0.017	0.000030	36	0.00086	0.000052
11-Feb-15	16	31	400	255	8.2	357	#N/A	3.2	164	21	< 1	0.41	< 0.3	163	0.0061	0.0040	0.011	0.062	< 0.000007	< 0.000007	0.022	0.0000080	39	0.00078	0.000066
25-Feb-15	17	33	400	235	8.2	343	#N/A	4.2	172	15	< 1	0.34	< 0.3	165	0.0024	0.0034	0.0071	0.066	< 0.000007	< 0.000007	0.020	< 0.000003	41	0.00076	0.000049
11-Mar-15	18	35	400	295	8.2	349	#N/A	2.9	180	17	< 1	0.39	< 0.3	169	0.0053	0.0035	0.0074	0.067	< 0.000007	< 0.000007	0.019	< 0.000003	42	0.00087	0.000074
25-Mar-15	19	37	400	260	8.1	366	#N/A	5.1	181	13	< 1	0.37	< 0.3	180	0.0051	0.0040	0.0082	0.077	< 0.000007	< 0.000007	0.018	< 0.000003	42	0.00090	0.000047
8-Apr-15	20	39	400	315	8.1	354	#N/A	5.0	187	13	< 1	0.37	< 0.3	172	0.0038	0.0045	0.012	0.077	< 0.000007	< 0.000007	0.019	< 0.000003	43	0.00063	0.000049
22-Apr-15	21	41	400	275	8.1	324	#N/A	5.4	166	14	< 1	0.42	< 0.3	161	0.0051	0.0039	0.0088	0.068	< 0.000007	< 0.000007	0.021	0.000028	39	0.00080	0.000032
6-May-15	22	43	400	265	8.1	318	#N/A	3.9	171	11	< 1	0.37	< 0.3	161	0.0054	0.0039	0.0083	0.075	< 0.000007	< 0.000007	0.019	< 0.000003	39	0.00060	0.000030
20-May-15	23	45	500	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	24	47	420	295	8.1	283	#N/A	4.7	135	11	< 1	0.46	< 0.3	135	0.0082	0.0034	0.0086	0.065	< 0.000007	< 0.000007	0.017	< 0.000003	33	0.00074	0.000026
17-Jun-15	25	49	500	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	26	51	420	280	8.1	304	#N/A	5.6	140	10	< 1	0.46	< 0.3	136	0.0044	0.0041	0.014	0.077	< 0.000007	< 0.000007	0.019	0.0000040	32	0.00082	0.000042
15-Jul-15	27	53	500	360	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	28	55	360	280	8.2	269	#N/A	2.1	132	12	< 1	0.50	< 0.3	125	0.0065	0.0036	0.0098	0.070	< 0.000007	< 0.000007	0.018	< 0.000003	30	0.00084	0.000035
12-Aug-15	29	57	500	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	30	59	400	270	8.2	259	#N/A	2.0	131	10	< 1	0.46	< 0.3	125	0.0079	0.0038	0.011	0.079	< 0.000007	< 0.000007	0.017	0.0000060	30	0.00096	0.000038
9-Sep-15	31	61	500	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	32	63	400	340	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	33	65	340	230	8.2	273	#N/A	3.3	138	8.0		0.48		123	0.0083	0.0041	0.012	0.077	< 0.000007	< 0.000007	0.015	0.0000030	29	0.00082	0.000026
21-Oct-15	34	67	500	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	35	69	450	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	36	71	420	305	8.4	264	#N/A	#N/A	149	7.0		0.52		125	0.0040	0.0037	0.0088	0.079	< 0.000007	< 0.000007	0.011	< 0.000003	30	0.00091	0.000023
2-Dec-15	37	73	500	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	38	75	460	405	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	39	77	405	380	8.3	263	#N/A	#N/A	119	7.0	-	0.48	-	123	0.0061	0.0035	0.0097	0.083	< 0.000007	< 0.000007	0.014	< 0.000003	29	0.00083	0.000051
6-Jan-16	40	78	400	330	8.3	255	#N/A	0.90	120	8.0	-	0.54	-	134	0.0057	0.0038	0.011	0.085	< 0.000007	< 0.000007	0.015	< 0.000003	32	0.00095	0.000031
20-Jan-16	41	80	400	260	8.3	255	#N/A	1.7	120	8.0	-	0.53	-	132	0.0054	0.0043	0.012	0.093	< 0.000007	< 0.000007	0.014	0.0000040	32	0.00099	0.00012
3-Feb-16	42	82	400	375	8.2	245	#N/A	2.0	119	7.0	-	0.37	-	122	0.0041	0.0040	0.0094	0.091	< 0.000007	< 0.000007	0.012	< 0.000003	30	0.00092	0.000023
17-Feb-16	43	84	400	285	8.2	262	#N/A	4.0	122	7.0	-	0.59	-	134	0.0018	0.0040	0.0097	0.096	< 0.000007	< 0.000007	0.012	< 0.000003	33	0.0011	0.000021
2-Mar-16	44	86	400	350	8.2	251	#N/A	1.3	117	7.0	-	0.56	-	126	0.0022	0.0043	0.012	0.094	< 0.000007	< 0.000007	0.011	< 0.000003	29	0.0010	0.000040

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 3 (SO)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cu**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.		Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
16-Jul-14	1	1	1500	440	7.9	0.043	0.015	0.000090	0.020	68	0.052	0.34	0.0039	0.016	0.050	21	0.0081	5.0	0.000021	229	0.93	215	0.00019	0.00085	0.00054	0.025	0.0074	0.016	< 0.002
30-Jul-14	2	3	400	295	8.3	0.0079	2.7	0.000010	0.011	21	0.029	0.060	0.0046	0.0042	< 0.009	9.5	0.0034	4.8	< 0.000002	103	0.29	92	0.000096	0.000050	0.00039	0.013	0.00098	0.0030	< 0.002
13-Aug-14	3	5	400	300	8.2	0.0025	< 0.002	< 0.00001	0.011	16	0.011	0.020	0.0050	0.0021	< 0.009	7.9	0.0020	5.0	< 0.000002	46	0.23	49	0.000083	0.000020	0.00020	0.012	0.000020	0.0010	< 0.002
27-Aug-14	4	7	400	315	8.2	0.0014	< 0.002	0.000020	0.0089	13	0.0040	< 0.01	0.0049	0.0012	0.013	7.3	0.0013	4.9	< 0.000002	50	0.19	33	0.000082	0.00024	0.000070	0.0092	0.00019	< 0.001	< 0.002
10-Sep-14	5	9	400	310	8.2	0.0012	< 0.007	< 0.00001	0.0082	11	0.0021	< 0.01	0.0050	0.0010	< 0.003	6.5	0.0011	5.8	< 0.000002	56	0.20	27	0.000073	0.00017	< 0.00005	0.0074	0.00015	< 0.001	< 0.002
24-Sep-14	6	11	400	215	8.2	0.0015	< 0.002	0.000040	0.0091	13	0.0023	0.010	0.0034	0.0014	0.013	7.2	0.00045	5.0	0.000039	45	0.19	18	0.000080	0.000050	0.00033	0.0063	0.00011	0.0020	< 0.002
8-Oct-14	7	13	300	200	8.2	0.00098	< 0.007	0.00012	0.0090	12	0.0011	< 0.01	0.0046	0.00070	< 0.003	6.5	0.00080	5.1	< 0.000002	40	0.21	16	0.000077	0.000060	0.000090	0.0066	0.00014	< 0.001	< 0.002
22-Oct-14	8	15	400	260	8.2	0.0010	< 0.007	0.000030	0.0078	13	0.0017	< 0.01	0.0043	0.00070	< 0.003	7.4	0.00064	5.4	< 0.000002	30	0.19	15	0.000077	0.000060	0.00012	0.0058	0.00018	0.0010	< 0.002
5-Nov-14	9	17	400	270	-	0.00085	0.026	0.000060	0.0080	14	0.0016	< 0.01	0.0041	0.00060	< 0.003	6.3	0.00057	5.0	< 0.000002	24	0.24	12	0.000083	0.000030	0.00010	0.0058	0.000090	< 0.001	< 0.002
19-Nov-14	10	19	400	260	8.1	0.00096	< 0.007	< 0.00001	0.0082	15	0.00025	< 0.01	0.0037	0.00050	0.0060	6.6	0.00050	5.3	< 0.000002	17	0.26	9.4	0.00010	0.000070	0.00011	0.0058	0.00011	< 0.001	< 0.002
3-Dec-14	11	21	400	335	8.2	0.0011	< 0.007	0.000010	0.0074	15	0.0013	< 0.01	0.0032	0.00060	< 0.003	6.5	0.00043	5.0	< 0.000002	12	0.28	8.8	0.000089	0.000020	0.000070	0.0056	0.00010	< 0.001	< 0.002
17-Dec-14	12	23	400	280	8.2	0.00083	< 0.007	< 0.00001	0.0078	16	0.00018	< 0.01	0.0037	0.00050	< 0.003	7.3	0.00039	5.2	< 0.000002	9.2	0.29	7.7	0.000085	< 0.00001	0.000060	0.0058	0.00016	< 0.001	< 0.002
31-Dec-14	13	25	400	280	8.4	0.00082	< 0.007	0.00047	0.0071	15	0.0014	< 0.01	0.0042	0.00050	< 0.003	6.7	0.00035	5.1	0.0000020	6.3	0.28	7.2	0.000093	0.000070	0.000090	0.0056	0.00012	0.0020	< 0.002
14-Jan-15	14	27	400	265	8.2	0.0015	< 0.007	0.000050	0.0064	14	0.0012	< 0.01	0.0047	0.00050	< 0.003	6.7	0.00033	5.2	0.0000020	5.3	0.25	6.9	0.000078	0.000070	0.000090	0.0053	0.00014	0.0020	< 0.002
28-Jan-15	15	29	400	275	8.2	0.00071	< 0.007	0.000080	0.0057	16	0.00075	< 0.01	0.0041	0.00050	< 0.003	6.9	0.00043	4.7	< 0.000002	4.7	0.22	6.7	0.000083	0.00010	0.00012	0.0051	0.00022	0.0020	< 0.002
11-Feb-15	16	31	400	255	8.2	0.00067	< 0.007	0.000090	0.0067	16	0.00065	< 0.01	0.0036	0.00050	< 0.003	6.6	< 0.001	5.0	< 0.000002	3.6	0.27	6.4	0.000084	0.00039	< 0.00005	0.0053	0.00012	< 0.001	< 0.002
25-Feb-15	17	33	400	235	8.2	0.0013	< 0.007	0.000020	0.0068	16	0.00062	< 0.01	0.0026	0.00040	< 0.003	7.1	< 0.001	5.0	< 0.000002	3.0	0.27	5.4	0.000087	0.00013	< 0.00005	0.0052	0.000090	< 0.001	< 0.002
11-Mar-15	18	35	400	295	8.2	0.0016	< 0.007	0.000030	0.0068	16	0.00080	< 0.01	0.0028	0.00060	< 0.003	6.6	< 0.001	4.6	< 0.000002	2.6	0.29	5.3	0.000080	0.000020	< 0.00005	0.0051	0.00012	0.0020	< 0.002
25-Mar-15	19	37	400	260	8.1	0.0021	< 0.007	0.000010	0.0067	18	0.00060	< 0.01	0.0031	0.00060	< 0.003	7.7	< 0.001	5.7	0.0000020	2.7	0.31	5.5	0.000092	0.00068	0.000050	0.0058	0.00014	0.0010	< 0.002
8-Apr-15	20	39	400	315	8.1	0.0012	< 0.007	< 0.00001	0.0065	16	0.00039	< 0.01	0.0034	0.00040	< 0.003	7.2	< 0.001	5.8	< 0.000002	1.9	0.31	4.4	0.000080	0.00013	< 0.00005	0.0054	0.00011	< 0.001	< 0.002
22-Apr-15	21	41	400	275	8.1	0.0011	< 0.007	0.00027	0.0059	16	0.00075	< 0.01	0.0034	0.00040	< 0.003	7.1	0.00029	5.3	0.0000040	1.8	0.28	4.7	0.000086	0.00010	< 0.00005	0.0052	0.00013	0.0010	< 0.002
6-May-15	22	43	400	265	8.1	0.0015	< 0.007	< 0.00001	0.0060	15	0.00055	< 0.01	0.0031	0.00040	< 0.003	7.1	< 0.001	5.3	0.0000030	1.5	0.27	4.4	0.000071	0.000040	0.00012	0.0048	0.00018	0.0010	< 0.002
20-May-15	23	45	500	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	24	47	420	295	8.1	0.0020	< 0.007	0.000090	0.0048	13	0.00025	< 0.01	0.0034	0.00030	< 0.003	6.5	0.00015	4.9	0.0000020	1.1	0.24	4.5	0.000065	< 0.00001	< 0.00005	0.0044	0.00015	< 0.001	< 0.002
17-Jun-15	25	49	500	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	26	51	420	280	8.1	0.0044	< 0.007	0.000050	0.0052	14	0.0014	0.010	0.0041	0.00030	< 0.003	6.4	0.00029	5.2	< 0.000002	0.98	0.24	4.1	0.000074	0.00076	0.000080	0.0052	0.00012	0.0030	< 0.002
15-Jul-15	27	53	500	360	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	28	55	360	280	8.2	0.00046	< 0.007	0.000060	0.0048	12	0.00022	< 0.01	0.0043	0.00020	< 0.003	5.9	0.00012	4.4	< 0.000002	0.83	0.22	3.8	0.000063	0.000050	< 0.00005	0.0047	0.00013	0.0010	< 0.002
12-Aug-15	29	57	500	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	30	59	400	270	8.2	0.0010	< 0.007	0.00010	0.0043	12	0.0012	< 0.01	0.012	0.00020	< 0.003	5.9	0.00018	4.7	0.000087	0.87	0.23	3.9	0.000081	0.000090	< 0.00005	0.0046	0.00016	0.0020	< 0.002
9-Sep-15	31	61	500	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	32	63	400	340	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	33	65	340	230	8.2	0.0062	< 0.007	0.00066	0.0038	12	0.00053	0.020	0.0037	0.00030	< 0.003	5.8	0.00017	4.2	< 0.000002	0.66	0.20	3.5	0.000060	0.00030	< 0.00005	0.0047	0.00016	0.0010	< 0.002
21-Oct-15	34	67	500	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	35	69	450	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	36	71	420	305	8.4	0.00055	< 0.007	0.000060	0.0037	12	0.00024	< 0.01	0.0032	< 0.0001	< 0.003	6.0	0.00025	4.3	< 0.000002	0.59	0.20	3.1	0.000061	0.000030	0.000050	0.0035	0.000080	< 0.001	< 0.002
2-Dec-15	37	73	500	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	38	75	460	405	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	39	77	405	380	8.3	0.00098	< 0.007	0.00042	0.0033	12	0.00017	< 0.01	0.0040	0.00020	< 0.003	5.9	0.00013	4.2	< 0.000002	0.60	0.17	2.9	0.000043	0.00013	0.000060	0.0041	0.00013	< 0.001	< 0.002
6-Jan-16	40	78	400	330	8.3	0.0012	< 0.007	0.00048	0.0036	13	0.00057	< 0.01	0.0038	0.00020	< 0.003	6.6	0.00071	4.6	0.0000020	0.61	0.19	3.1	0.000023	0.00030	< 0.00005	0.0045	0.00010	< 0.001	< 0.002
20-Jan-16	41	80	400	260	8.3	0.00069	< 0.007	0.00019	0.0037	12	0.0062	< 0.01	0.0044	0.00030	< 0.003	6.2	0.00033	4.8	< 0.000002	0.57	0.22	3.1	0.00011	0.00010	< 0.00005	0.0050	0.00011	0.0020	< 0.002
3-Feb-16	42	82	400	375	8.2	0.00085	< 0.007	0.000080	0.0036	11	0.000040	< 0.01	0.0039	0.00020	< 0.003	6.0	0.00036	4.4	0.000011	0.56	0.22	3.0	0.000070	0.000040	< 0.00005	0.0043	0.00010	< 0.001	< 0.002
17-Feb-16	43	84	400	285	8.2	0.00045	< 0.007	0.000050	0.0036	13	0.00023	< 0.01	0.0040	0.00020	0.0050	6.3	0.000080	4.5	< 0.000002	0.61	0.21	3.0	0.000069	< 0.00001	< 0.00005	0.0044	0.000070	< 0.001	< 0.002
2-Mar-16	44	86	400	350	8.2	0.00024	< 0.007	0.000070	0.0036	13	0.00025	< 0.01	0.0041	0.00020	< 0.003	6.1	0.000080	4.5	< 0.000002	0.59	0.21	3.3	0.000076	0.000010	< 0.00005	0.0047	0.000070	< 0.001	< 0.002

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Calculated Loading Rates for Col 3 (SO)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
16-Jul-14	1	1	1500	440	7.9	2529	#N/A	0.38	12	26	2.2	0.011	0.044	33	0.0050	0.00039	0.0012	0.0022	0.00000062	0.00000031	0.0014	0.0000011	8.3	0.00014	0.00034
30-Jul-14	2	3	400	295	8.3	938	#N/A	0.036	3.0	3.5	0.11	0.0053	0.0044	3.1	0.00013	0.000096	0.00027	0.00028	0.00000010	0.00000010	0.00033	0.000000044	0.73	0.000013	0.000013
13-Aug-14	3	5	400	300	8.2	720	#N/A	0.051	3.1	1.9	0.039	0.0048	0.0045	2.5	0.000033	0.000090	0.00022	0.00036	0.00000011	0.00000011	0.00036	0.000000045	0.59	0.000011	0.0000057
27-Aug-14	4	7	400	315	8.2	551	#N/A	0.13	2.9	1.4	0.032	0.0063	0.0047	2.1	0.00010	0.000082	0.00023	0.00034	0.00000011	0.00000011	0.00045	0.000000047	0.50	0.0000099	0.0000032
10-Sep-14	5	9	400	310	8.2	497	#N/A	0.058	2.8	1.0	0.0078	0.0067	0.0047	1.8	0.000074	0.000076	0.00024	0.00038	0.00000011	0.00000011	0.00036	0.000000047	0.45	0.000010	0.0000023
24-Sep-14	6	11	400	215	8.2	476	#N/A	0.050	2.1	0.61	0.0032	0.0039	0.0032	1.4	0.000025	0.000053	0.00012	0.00034	0.000000075	0.000000075	0.00022	0.000000032	0.34	0.0000080	0.0000021
8-Oct-14	7	13	300	200	8.2	426	#N/A	0.042	1.6	0.48	0.010	0.0042	0.0030	1.3	0.000066	0.000043	0.00015	0.00031	0.000000070	0.000000070	0.00019	0.000000030	0.32	0.0000072	0.0000011
22-Oct-14	8	15	400	260	8.2	385	#N/A	0.080	2.1	0.55	0.013	0.0057	0.0039	1.6	0.00010	0.000056	0.00017	0.00044	0.000000091	0.000000091	0.00027	0.00000018	0.38	0.0000099	0.0000011
5-Nov-14	9	17	400	270		378	#N/A	#N/A	2.4	0.49	0.014	0.0053	0.0041	1.9	0.000068	0.000053	0.00015	0.00054	0.000000095	0.000000095	0.00029	0.000000041	0.44	0.000011	0.0000014
19-Nov-14	10	19	400	260	8.1	351	#N/A	0.088	2.0	0.38	0.0026	0.0051	0.0039	1.9	0.000064	0.000047	0.00015	0.00062	0.000000091	0.000000091	0.00028	0.000000039	0.44	0.0000095	0.0000011
3-Dec-14	11	21	400	335	8.2	342	#N/A	0.046	2.7	0.45	0.017	0.0059	0.0050	2.7	0.000080	0.000060	0.00018	0.00086	0.00000012	0.00000012	0.00033	0.000000067	0.65	0.000012	0.0000012
17-Dec-14	12	23	400	280	8.2	362	#N/A	0.042	2.3	0.29	0.0028	0.0053	0.0042	2.3	0.000073	0.000052	0.00016	0.00082	0.000000098	0.000000098	0.00030	0.000000042	0.52	0.0000080	0.00000094
31-Dec-14	13	25	400	280	8.4	353	#N/A	#N/A	3.0	0.28	0.014	0.0052	0.0042	2.2	0.00011	0.000049	0.00017	0.00080	0.000000098	0.000000098	0.00029	0.000000042	0.51	0.000013	0.0000015
14-Jan-15	14	27	400	265	8.2	311	#N/A	0.045	1.9	0.28	0.013	0.0058	0.0040	1.9	0.000081	0.000053	0.00018	0.00068	0.000000093	0.000000093	0.00026	0.000000066	0.45	0.000012	0.00000097
28-Jan-15	15	29	400	275	8.2	334	#N/A	0.045	2.1	0.25	0.014	0.0052	0.0041	2.1	0.00012	0.000048	0.00015	0.00082	0.000000096	0.00000012	0.00024	0.00000041	0.50	0.000012	0.00000072
11-Feb-15	16	31	400	255	8.2	357	#N/A	0.041	2.1	0.27	0.013	0.0052	0.0038	2.1	0.000078	0.000051	0.00014	0.00079	0.000000089	0.000000089	0.00027	0.00000010	0.50	0.0000099	0.00000084
25-Feb-15	17	33	400	235	8.2	343	#N/A	0.049	2.0	0.18	0.012	0.0040	0.0035	1.9	0.000028	0.000040	0.000083	0.00077	0.000000082	0.000000082	0.00023	0.000000035	0.48	0.0000089	0.00000058
11-Mar-15	18	35	400	295	8.2	349	#N/A	0.042	2.6	0.25	0.015	0.0058	0.0044	2.5	0.000078	0.000052	0.00011	0.00099	0.00000010	0.00000010	0.00027	0.000000044	0.62	0.000013	0.0000011
25-Mar-15	19	37	400	260	8.1	366	#N/A	0.066	2.4	0.17	0.013	0.0048	0.0039	2.3	0.000066	0.000052	0.00011	0.0010	0.000000091	0.000000091	0.00024	0.000000039	0.54	0.000012	0.00000061
8-Apr-15	20	39	400	315	8.1	354	#N/A	0.078	2.9	0.20	0.016	0.0058	0.0047	2.7	0.000060	0.000071	0.00018	0.0012	0.00000011	0.00000011	0.00030	0.000000047	0.68	0.0000099	0.00000077
22-Apr-15	21	41	400	275	8.1	324	#N/A	0.074	2.3	0.19	0.014	0.0058	0.0041	2.2	0.000070	0.000054	0.00012	0.00094	0.000000096	0.000000096	0.00029	0.00000039	0.54	0.000011	0.00000044
6-May-15	22	43	400	265	8.1	318	#N/A	0.052	2.3	0.15	0.013	0.0049	0.0040	2.1	0.000072	0.000052	0.00011	0.00099	0.000000093	0.000000093	0.00025	0.000000040	0.52	0.0000080	0.00000040
20-May-15	23	45	500	420																					
3-Jun-15	24	47	420	295	8.1	283	#N/A	0.035	0.99	0.081	0.0074	0.0034	0.0022	1.00	0.000060	0.000025	0.000063	0.00048	0.000000052	0.000000052	0.00012	0.000000022	0.24	0.0000055	0.00000019
17-Jun-15	25	49	500	420																					
1-Jul-15	26	51	420	280	8.1	304	#N/A	0.039	0.98	0.070	0.0070	0.0032	0.0021	0.95	0.000031	0.000029	0.000095	0.00054	0.000000049	0.000000049	0.00013	0.000000028	0.23	0.0000057	0.00000029
15-Jul-15	27	53	500	360																					
29-Jul-15	28	55	360	280	8.2	269	#N/A	0.015	0.92	0.084	0.0070	0.0035	0.0021	0.88	0.000046	0.000025	0.000069	0.00049	0.000000049	0.000000049	0.00012	0.000000021	0.21	0.0000059	0.00000025
12-Aug-15	29	57	500	400																					
26-Aug-15	30	59	400	270	8.2	259	#N/A	0.013	0.89	0.068	0.0068	0.0031	0.0020	0.84	0.000053	0.000026	0.000075	0.00053	0.000000047	0.000000047	0.00011	0.000000041	0.21	0.0000065	0.00000026
9-Sep-15	31	61	500	400																					
23-Sep-15	32	63	400	340																					
7-Oct-15	33	65	340	230	8.2	273	#N/A	0.013	0.53	0.031		0.0018		0.47	0.000032	0.000016	0.000045	0.00029	0.000000027	0.000000027	0.000058	0.000000012	0.11	0.0000031	0.000000100
21-Oct-15	34	67	500	450																					
4-Nov-15	35	69	450	420																					
18-Nov-15	36	71	420	305	8.4	264	#N/A		0.76	0.036		0.0026		0.64	0.000020	0.000019	0.000045	0.00040	0.000000036	0.000000036	0.000055	0.000000015	0.15	0.0000046	0.00000012
2-Dec-15	37	73	500	460																					
16-Dec-15	38	75	460	405																					
30-Dec-15	39	77	405	380	8.3	263	#N/A		0.76	0.044		0.0030		0.78	0.000039	0.000022	0.000061	0.00052	0.000000044	0.000000044	0.000087	0.000000019	0.19	0.0000053	0.00000032
6-Jan-16	40	78	400	330	8.3	255	#N/A	0.015	2.0	0.13		0.0089		2.2	0.000094	0.000063	0.00018	0.0014	0.00000012	0.00000012	0.00025	0.000000050	0.52	0.000016	0.00000051
20-Jan-16	41	80	400	260	8.3	255	#N/A	0.022	1.6	0.10		0.0069		1.7	0.000070	0.000056	0.00015	0.0012	0.000000091	0.000000091	0.00018	0.000000052	0.42	0.000013	0.0000016
3-Feb-16	42	82	400	375	8.2	245	#N/A	0.037	2.2	0.13		0.0069		2.3	0.000077	0.000075	0.00018	0.0017	0.00000013	0.00000013	0.00023	0.000000056	0.56	0.000017	0.00000043
17-Feb-16	43	84	400	285	8.2	262	#N/A	0.057	1.7	0.100		0.0084		1.9	0.000026	0.000057	0.00014	0.0014	0.000000100	0.000000100	0.00017	0.000000043	0.46	0.000015	0.00000030
2-Mar-16	44	86	400	350	8.2	251	#N/A	0.023	2.0	0.12		0.0098		2.2	0.000039	0.000075	0.00020	0.0016	0.00000012	0.00000012	0.00019	0.000000053	0.51	0.000018	0.00000070

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Calculated Loading Rates for Col 3 (SO)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cu**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.		Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
16-Jul-14	1	1	1500	440	7.9	0.0019	0.00066	0.0000040	0.00089	3.0	0.0023	0.015	0.00017	0.00070	0.0022	0.93	0.00036	0.22	0.00000092	10	0.041	9.5	0.0000082	0.000037	0.000024	0.0011	0.00032	0.00070	0.000088
30-Jul-14	2	3	400	295	8.3	0.00012	0.039	0.00000015	0.00017	0.30	0.00043	0.00089	0.000068	0.000062	0.00013	0.14	0.000051	0.071	0.000000030	1.5	0.0042	1.4	0.0000014	0.00000074	0.0000058	0.00020	0.000014	0.000044	0.000030
13-Aug-14	3	5	400	300	8.2	0.000037	0.000030	0.00000015	0.00017	0.24	0.00017	0.00030	0.000075	0.000032	0.00014	0.12	0.000029	0.075	0.000000030	0.69	0.0034	0.74	0.0000012	0.00000030	0.0000030	0.00017	0.00000030	0.000015	0.000030
27-Aug-14	4	7	400	315	8.2	0.000023	0.000032	0.00000032	0.00014	0.20	0.000063	0.00016	0.000077	0.000019	0.00020	0.12	0.000020	0.077	0.000000032	0.79	0.0029	0.52	0.0000013	0.0000038	0.0000011	0.00014	0.0000030	0.000016	0.000032
10-Sep-14	5	9	400	310	8.2	0.000019	0.00011	0.00000016	0.00013	0.17	0.000032	0.00016	0.000078	0.000016	0.000047	0.100	0.000017	0.089	0.000000031	0.87	0.0030	0.41	0.0000011	0.0000026	0.00000078	0.00011	0.0000023	0.000016	0.000031
24-Sep-14	6	11	400	215	8.2	0.000016	0.000022	0.00000043	0.000098	0.14	0.000025	0.00011	0.000037	0.000015	0.00014	0.078	0.0000048	0.053	0.00000042	0.48	0.0021	0.19	0.00000086	0.00000054	0.0000035	0.000068	0.0000012	0.000022	0.000022
8-Oct-14	7	13	300	200	8.2	0.0000098	0.000070	0.0000012	0.000090	0.12	0.000011	0.00010	0.000046	0.0000070	0.000030	0.065	0.0000080	0.051	0.000000020	0.40	0.0021	0.16	0.00000077	0.00000060	0.00000090	0.000066	0.0000014	0.000010	0.000020
22-Oct-14	8	15	400	260	8.2	0.000013	0.000091	0.00000039	0.00010	0.16	0.000022	0.00013	0.000056	0.0000091	0.000039	0.096	0.0000083	0.070	0.000000026	0.39	0.0025	0.20	0.0000010	0.00000078	0.0000016	0.000075	0.0000023	0.000013	0.000026
5-Nov-14	9	17	400	270		0.000011	0.00035	0.00000081	0.00011	0.19	0.000021	0.00014	0.000055	0.0000081	0.000041	0.085	0.0000077	0.068	0.000000027	0.32	0.0033	0.16	0.0000011	0.00000041	0.0000014	0.000078	0.0000012	0.000014	0.000027
19-Nov-14	10	19	400	260	8.1	0.000012	0.000091	0.00000013	0.00011	0.20	0.0000033	0.00013	0.000048	0.0000065	0.000078	0.085	0.0000065	0.069	0.000000026	0.22	0.0034	0.12	0.0000014	0.00000091	0.0000014	0.000075	0.0000014	0.000013	0.000026
3-Dec-14	11	21	400	335	8.2	0.000018	0.00012	0.00000017	0.00012	0.26	0.000022	0.00017	0.000054	0.000010	0.000050	0.11	0.0000072	0.083	0.000000034	0.20	0.0047	0.15	0.0000015	0.00000034	0.0000012	0.000094	0.0000017	0.000017	0.000034
17-Dec-14	12	23	400	280	8.2	0.000012	0.000098	0.00000014	0.00011	0.23	0.0000025	0.00014	0.000051	0.0000070	0.000042	0.10	0.0000055	0.073	0.000000028	0.13	0.0040	0.11	0.0000012	0.00000014	0.00000084	0.000081	0.0000022	0.000014	0.000028
31-Dec-14	13	25	400	280	8.4	0.000011	0.000098	0.0000066	0.000099	0.21	0.000019	0.00014	0.000058	0.0000070	0.000042	0.094	0.0000049	0.072	0.000000028	0.089	0.0039	0.10	0.0000013	0.00000098	0.0000013	0.000078	0.0000017	0.000028	0.000028
14-Jan-15	14	27	400	265	8.2	0.000020	0.000093	0.00000066	0.000085	0.19	0.000015	0.00013	0.000062	0.0000066	0.000040	0.089	0.0000044	0.069	0.000000027	0.070	0.0033	0.091	0.0000010	0.00000093	0.0000012	0.000070	0.0000019	0.000027	0.000027
28-Jan-15	15	29	400	275	8.2	0.0000098	0.000096	0.0000011	0.000079	0.22	0.000010	0.00014	0.000057	0.0000069	0.000041	0.094	0.0000059	0.065	0.000000028	0.064	0.0030	0.092	0.0000011	0.0000014	0.0000017	0.000071	0.0000030	0.000028	0.000028
11-Feb-15	16	31	400	255	8.2	0.0000085	0.000089	0.0000011	0.000085	0.20	0.0000083	0.00013	0.000046	0.0000064	0.000038	0.084	0.000013	0.064	0.000000026	0.046	0.0035	0.082	0.0000011	0.0000050	0.00000064	0.000068	0.0000015	0.000013	0.000026
25-Feb-15	17	33	400	235	8.2	0.000015	0.000082	0.00000024	0.000079	0.18	0.0000073	0.00012	0.000030	0.0000047	0.000035	0.083	0.000012	0.059	0.000000024	0.036	0.0032	0.063	0.0000010	0.0000015	0.00000059	0.000061	0.0000011	0.000012	0.000024
11-Mar-15	18	35	400	295	8.2	0.000023	0.00010	0.00000044	0.00010	0.23	0.000012	0.00015	0.000042	0.0000089	0.000044	0.098	0.000015	0.067	0.000000030	0.038	0.0042	0.078	0.0000012	0.00000030	0.00000074	0.000075	0.0000018	0.000030	0.000030
25-Mar-15	19	37	400	260	8.1	0.000027	0.000091	0.00000013	0.000087	0.24	0.0000078	0.00013	0.000041	0.0000078	0.000039	0.10	0.000013	0.075	0.000000026	0.035	0.0040	0.072	0.0000012	0.0000088	0.00000065	0.000075	0.0000018	0.000013	0.000026
8-Apr-15	20	39	400	315	8.1	0.000018	0.00011	0.00000016	0.00010	0.25	0.0000061	0.00016	0.000054	0.0000063	0.000047	0.11	0.000016	0.092	0.000000032	0.030	0.0049	0.069	0.0000013	0.0000020	0.00000079	0.000086	0.0000017	0.000016	0.000032
22-Apr-15	21	41	400	275	8.1	0.000015	0.000096	0.0000037	0.000081	0.21	0.000010	0.00014	0.000047	0.0000055	0.000041	0.097	0.0000040	0.073	0.000000055	0.024	0.0038	0.065	0.0000012	0.0000014	0.00000069	0.000071	0.0000018	0.000014	0.000028
6-May-15	22	43	400	265	8.1	0.000020	0.000093	0.00000013	0.000080	0.20	0.0000073	0.00013	0.000041	0.0000053	0.000040	0.095	0.000013	0.071	0.000000040	0.020	0.0035	0.058	0.00000094	0.00000053	0.0000016	0.000063	0.0000024	0.000013	0.000027
20-May-15	23	45	500	420																									
3-Jun-15	24	47	420	295	8.1	0.000015	0.000052	0.00000066	0.000035	0.094	0.0000018	0.000074	0.000025	0.0000022	0.000022	0.048	0.0000011	0.036	0.000000015	0.0080	0.0017	0.033	0.00000048	0.000000074	0.00000037	0.000032	0.0000011	0.0000074	0.000015
17-Jun-15	25	49	500	420																									
1-Jul-15	26	51	420	280	8.1	0.000031	0.000049	0.00000035	0.000036	0.095	0.0000097	0.000070	0.000029	0.0000021	0.000021	0.045	0.0000020	0.036	0.000000014	0.0069	0.0017	0.029	0.00000052	0.0000053	0.00000056	0.000036	0.00000084	0.000021	0.000014
15-Jul-15	27	53	500	360																									
29-Jul-15	28	55	360	280	8.2	0.0000032	0.000049	0.00000042	0.000034	0.084	0.0000015	0.000070	0.000030	0.0000014	0.000021	0.041	0.00000084	0.031	0.000000014	0.0058	0.0015	0.027	0.00000044	0.00000035	0.00000035	0.000033	0.00000091	0.0000070	0.000014
12-Aug-15	29	57	500	400																									
26-Aug-15	30	59	400	270	8.2	0.0000068	0.000047	0.00000068	0.000029	0.080	0.0000080	0.000068	0.000081	0.0000014	0.000020	0.040	0.0000012	0.031	0.00000059	0.0059	0.0015	0.026	0.00000055	0.00000061	0.00000034	0.000031	0.0000011	0.000014	0.000014
9-Sep-15	31	61	500	400																									
23-Sep-15	32	63	400	340																									
7-Oct-15	33	65	340	230	8.2	0.000024	0.000027	0.0000025	0.000015	0.046	0.0000020	0.000077	0.000014	0.0000012	0.000012	0.022	0.00000065	0.016	0.0000000077	0.0025	0.00076	0.013	0.00000023	0.0000012	0.00000019	0.000018	0.00000061	0.0000038	0.0000077
21-Oct-15	34	67	500	450																									
4-Nov-15	35	69	450	420																									
18-Nov-15	36	71	420	305	8.4	0.0000028	0.000036	0.00000031	0.000019	0.062	0.0000012	0.000051	0.000016	0.00000051	0.000015	0.031	0.0000013	0.022	0.000000010	0.0030	0.0010	0.016	0.00000031	0.00000015	0.00000025	0.000018	0.00000041	0.0000051	0.000010
2-Dec-15	37	73	500	460																									
16-Dec-15	38	75	460	405																									
30-Dec-15	39	77	405	380	8.3	0.0000062	0.000044	0.0000027	0.000021	0.076	0.0000011	0.000063	0.000025	0.0000013	0.000019	0.037	0.00000082	0.027	0.000000013	0.0038	0.0011	0.018	0.00000027	0.00000082	0.00000038	0.000026	0.00000082	0.0000063	0.000013
6-Jan-16	40	78	400	330	8.3	0.000020	0.00012	0.0000079	0.000060	0.22	0.0000094	0.00017	0.000063	0.0000033	0.000050	0.11	0.000012	0.075	0.000000033	0.010	0.0032	0.051	0.00000038	0.0000050	0.00000083	0.000074	0.0000017	0.000017	0.000033
20-Jan-16	41	80	400	260	8.3	0.0000090	0.000091	0.0000025	0.000048	0.16	0.000080	0.00013	0.000057	0.0000039	0.000039	0.080	0.0000043	0.063	0.000000026	0.0074	0.0029	0.040	0.0000014	0.0000013	0.00000065	0.000064	0.0000014	0.000026	0.000026
3-Feb-16	42	82	400	375	8.2	0.000016	0.00013	0.0000015	0.000068	0.21	0.00000075	0.00019	0.000073	0.0000038	0.000056	0.11	0.0000068	0.083	0.00000021	0.011	0.0041	0.056	0.0000013	0.00000075	0.00000094	0.000080	0.0000019	0.000019	0.000038
17-Feb-16	43	84	400	285	8.2	0.0000064	0.000100	0.00000071	0.000051	0.18	0.0000033	0.00014	0.000058	0.0000029	0.000071	0.089	0.0000011	0.065	0.000000029	0.0087	0.0030	0.043	0.00000098	0.00000014	0.00000071	0.000063	0.00000100	0.000014	0.000029
2-Mar-16	44	86	400	350	8.2	0.0000042	0.00012	0.0000012	0.000064	0.22	0.0000044	0.00018	0.000071	0.0000035	0.000053	0.11	0.0000014	0.079	0.000000035	0.010	0.0036	0.058	0.0000013	0.00000018	0.00000088	0.000083	0.0000012	0.000018	0.000035

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 4 (ST)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
16-Jul-14	1	1	1300	315	7.8	3419	#N/A	9.6	138	1704	24	0.27	0.40	1720	0.062	0.0032	0.021	0.071	< 0.000007	< 0.000007	0.038	0.000018	360	0.0017	0.0084
30-Jul-14	2	3	400	335	8.0	1594	#N/A	4.4	116	711	3.0	0.34	< 0.3	615	0.0057	0.0026	0.014	0.021	< 0.000007	< 0.000007	0.033	0.0000030	135	0.00029	0.0017
13-Aug-14	3	5	400	340	8.0	1176	#N/A	5.2	113	434	1.2	0.38	< 0.3	403	0.0022	0.0025	0.010	0.022	< 0.000007	< 0.000007	0.036	0.0000070	86	0.00022	0.00089
27-Aug-14	4	7	400	340	8.1	882	#N/A	7.3	125	333	0.60	0.41	< 0.3	304	0.0037	0.0023	0.0089	0.019	< 0.000007	< 0.000007	0.040	0.0000060	65	0.00015	0.00053
10-Sep-14	5	9	400	355	8.1	756	#N/A	6.7	126	237	0.20	0.49	< 0.3	285	0.0081	0.0020	0.0093	0.022	< 0.000007	< 0.000007	0.036	0.000018	71	0.00021	0.00037
24-Sep-14	6	11	400	255	8.2	671	#N/A	5.8	163	183	0.20	0.44	< 0.3	205	0.0017	0.0022	0.0092	0.026	< 0.000007	< 0.000007	0.036	0.0000060	43	0.00026	0.00045
8-Oct-14	7	13	300	225	8.1	673	#N/A	5.4	163	170	< 1	0.42	< 0.3	275	0.0059	0.0020	0.0098	0.027	< 0.000007	< 0.000007	0.036	< 0.000003	71	0.00021	0.00030
22-Oct-14	8	15	400	315	8.2	653	#N/A	7.7	188	142	< 1	0.43	< 0.3	217	0.0042	0.0021	0.0082	0.030	< 0.000007	< 0.000007	0.041	0.000052	45	0.00017	0.00027
5-Nov-14	9	17	400	320	-	561	#N/A	#N/A	170	119	< 1	0.48	< 0.3	166	0.0045	0.0021	0.0084	0.028	< 0.000007	< 0.000007	0.037	0.0000060	35	0.00024	0.00021
19-Nov-14	10	19	400	290	8.0	521	#N/A	7.1	154	118	< 0.2	0.57	< 0.3	153	0.0047	0.0022	0.0087	0.028	< 0.000007	< 0.000007	0.036	0.000047	31	0.00028	0.00018
3-Dec-14	11	21	400	350	8.2	481	#N/A	2.5	151	109	< 0.2	0.53	< 0.3	146	0.0056	0.0022	0.0073	0.029	< 0.000007	< 0.000007	0.032	0.000012	32	0.00032	0.00015
17-Dec-14	12	23	400	310	8.2	502	#N/A	3.0	141	99	< 0.2	0.66	< 0.3	143	0.0073	0.0023	0.0083	0.030	< 0.000007	< 0.000007	0.035	0.000012	29	0.00026	0.00013
31-Dec-14	13	25	400	300	8.3	475	#N/A	1.0	183	78	< 1	0.57	< 0.3	135	0.0076	0.0021	0.0069	0.030	< 0.000007	< 0.000007	0.030	0.000013	29	0.00023	0.00013
14-Jan-15	14	27	400	300	8.2	457	#N/A	2.9	155	81	< 1	0.56	< 0.3	146	0.0056	0.0022	0.0065	0.033	< 0.000007	< 0.000007	0.032	0.000017	32	0.00040	0.00011
28-Jan-15	15	29	400	295	8.1	461	#N/A	3.4	149	85	< 1	0.55	< 0.3	142	0.0069	0.0021	0.0069	0.030	< 0.000007	< 0.000007	0.026	0.0000070	29	0.00049	0.000089
11-Feb-15	16	31	400	270	8.2	454	#N/A	3.6	136	87	< 1	0.61	< 0.3	139	0.0070	0.0025	0.0078	0.030	< 0.000007	< 0.000007	0.032	0.000012	29	0.00045	0.000096
25-Feb-15	17	33	400	270	8.1	420	#N/A	4.2	147	65	< 1	0.50	< 0.3	144	0.0025	0.0019	0.0051	0.034	< 0.000007	< 0.000007	0.028	0.0000070	32	0.00047	0.000083
11-Mar-15	18	35	400	305	8.2	412	#N/A	3.1	149	69	< 1	0.57	< 0.3	150	0.0047	0.0019	0.0055	0.032	< 0.000007	< 0.000007	0.025	0.0000040	34	0.00050	0.000080
25-Mar-15	19	37	400	280	8.1	437	#N/A	4.8	158	67	< 1	0.53	< 0.3	177	0.0044	0.0022	0.0066	0.039	< 0.000007	< 0.000007	0.025	0.0000040	37	0.00062	0.000092
8-Apr-15	20	39	400	370	8.1	417	#N/A	5.7	164	60	< 1	0.51	< 0.3	167	0.0041	0.0025	0.0063	0.039	< 0.000007	< 0.000007	0.026	< 0.000003	38	0.00040	0.000087
22-Apr-15	21	41	400	260	8.1	380	#N/A	5.0	140	65	< 1	0.60	< 0.3	156	0.0054	0.0022	0.0061	0.033	< 0.000007	< 0.000007	0.027	0.000022	33	0.00051	0.000065
6-May-15	22	43	400	325	8.1	375	#N/A	4.3	140	57	< 1	0.61	< 0.3	157	0.0064	0.0022	0.0063	0.035	< 0.000007	< 0.000007	0.024	0.0000030	33	0.00044	0.000070
20-May-15	23	45	500	445	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	24	47	445	340	8.1	348	#N/A	4.4	124	47	< 1	0.58	< 0.3	146	0.0087	0.0017	0.0054	0.037	< 0.000007	< 0.000007	0.023	0.0000090	32	0.00054	0.000056
17-Jun-15	25	49	500	440	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	26	51	440	315	8.1	378	#N/A	5.7	124	55	< 1	0.55	< 0.3	145	0.0064	0.0018	0.0072	0.038	< 0.000007	< 0.000007	0.021	0.0000090	31	0.00063	0.000064
15-Jul-15	27	53	500	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	28	55	420	325	8.1	346	#N/A	3.6	121	56	< 1	0.56	< 0.3	146	0.0054	0.0017	0.0057	0.035	< 0.000007	< 0.000007	0.020	0.0000050	31	0.00061	0.000039
12-Aug-15	29	57	500	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	30	59	450	335	8.2	350	#N/A	2.2	120	60	< 1	0.53	< 0.3	147	0.0080	0.0017	0.0060	0.038	< 0.000007	< 0.000007	0.018	0.000010	32	0.00062	0.000055
9-Sep-15	31	61	500	445	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	32	63	445	395	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	33	65	395	305	8.1	378	#N/A	3.3	130	63		0.50		149	0.0073	0.0017	0.0058	0.035	< 0.000007	< 0.000007	0.015	0.0000040	32	0.00057	0.000037
21-Oct-15	34	67	500	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	35	69	450	440	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	36	71	440	350	8.3	368	#N/A	#N/A	139	64		0.48		158	0.0051	0.0014	0.0054	0.036	< 0.000007	< 0.000007	0.010	0.0000040	33	0.00061	0.000032
2-Dec-15	37	73	500	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	38	75	460	430	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	39	77	430	425	8.3	365	#N/A	#N/A	112	53	-	0.47	-	151	0.0051	0.0014	0.0049	0.036	< 0.000007	< 0.000007	0.013	< 0.000003	33	0.00059	0.000019
6-Jan-16	40	78	400	330	8.3	366	#N/A	1.1	114	60	-	0.42	-	168	0.0054	0.0016	0.0055	0.042	< 0.000007	< 0.000007	0.014	0.000056	36	0.00064	0.000025
20-Jan-16	41	80	400	310	8.2	366	#N/A	2.0	109	65	-	0.44	-	169	0.0045	0.0016	0.0064	0.042	< 0.000007	< 0.000007	0.012	0.000010	36	0.00073	0.000053
3-Feb-16	42	82	400	340	8.2	336	#N/A	2.1	111	52	-	0.44	-	146	0.0042	0.0016	0.0059	0.038	< 0.000007	< 0.000007	0.011	0.0000030	32	0.00066	0.000035
17-Feb-16	43	84	400	330	8.2	335	#N/A	3.8	119	42	-	0.50	-	155	0.0019	0.0016	0.0057	0.040	< 0.000007	< 0.000007	0.010	< 0.000003	34	0.00079	0.000034
2-Mar-16	44	86	400	360	8.3	318	#N/A	1.3	116	41	-	0.49	-	142	0.0027	0.0017	0.0072	0.038	< 0.000007	< 0.000007	0.010	0.0000080	30	0.00084	0.000066

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 4 (ST)

Date	Cycle	Weeks	Volume (mL)		pH	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.		Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
16-Jul-14	1	1	1300	315	7.8	0.056	0.017	0.00010	0.037	200	0.14	0.040	0.018	0.054	0.040	37	0.039	5.5	0.000035	187	7.1	632	0.000053	0.00036	0.00060	0.18	0.0045	0.016	< 0.002
30-Jul-14	2	3	400	335	8.0	0.0093	1.0	0.000020	0.020	68	0.084	< 0.01	0.019	0.023	0.012	22	0.011	5.2	< 0.000002	95	3.9	263	0.000038	< 0.00001	0.00051	0.074	0.00051	0.0030	< 0.002
13-Aug-14	3	5	400	340	8.0	0.0054	< 0.002	0.000010	0.019	46	0.046	< 0.01	0.023	0.013	< 0.009	18	0.0052	5.2	< 0.000002	46	3.6	164	0.000024	< 0.00001	0.00023	0.063	0.00013	0.0020	< 0.002
27-Aug-14	4	7	400	340	8.1	0.0032	< 0.002	0.000010	0.015	34	0.028	< 0.01	0.029	0.0067	< 0.009	17	0.0023	5.3	< 0.000002	50	3.3	115	0.000025	0.00021	0.000070	0.054	0.00027	< 0.001	< 0.002
10-Sep-14	5	9	400	355	8.1	0.0030	< 0.007	0.000020	0.014	26	0.017	< 0.01	0.034	0.0037	< 0.003	14	0.0014	6.0	< 0.000002	57	3.9	93	0.000018	0.00016	0.000080	0.048	0.00031	< 0.001	< 0.002
24-Sep-14	6	11	400	255	8.2	0.0029	< 0.002	0.000070	0.014	24	0.018	< 0.01	0.030	0.0039	< 0.009	14	0.00086	5.1	0.000016	47	3.1	60	0.000019	0.000040	0.00041	0.047	0.00029	0.0020	< 0.002
8-Oct-14	7	13	300	225	8.1	0.0025	< 0.007	0.000020	0.017	24	0.016	< 0.01	0.027	0.0032	< 0.003	14	0.00098	5.5	< 0.000002	52	4.3	59	0.000021	0.000040	0.00011	0.051	0.00029	< 0.001	< 0.002
22-Oct-14	8	15	400	315	8.2	0.0021	< 0.007	0.00059	0.015	25	0.018	< 0.01	0.027	0.0029	< 0.003	15	0.00084	6.1	< 0.000002	51	4.2	55	0.000020	0.000020	0.00014	0.055	0.00030	0.0010	< 0.002
5-Nov-14	9	17	400	320	-	0.0019	< 0.007	0.000050	0.013	20	0.011	< 0.01	0.030	0.0023	< 0.003	12	0.00070	5.3	< 0.000002	44	3.5	42	0.000020	0.0098	0.00012	0.047	0.00028	< 0.001	< 0.002
19-Nov-14	10	19	400	290	8.0	0.0018	< 0.007	0.00020	0.014	19	0.0064	< 0.01	0.038	0.0022	0.0050	11	0.00059	5.5	< 0.000002	44	3.5	40	0.000042	0.0018	0.000090	0.048	0.00033	< 0.001	< 0.002
3-Dec-14	11	21	400	350	8.2	0.0025	< 0.007	0.000040	0.011	16	0.0062	< 0.01	0.034	0.0020	< 0.003	11	0.00056	5.0	< 0.000002	39	3.4	36	0.000018	0.00098	0.000060	0.043	0.00034	0.0010	< 0.002
17-Dec-14	12	23	400	310	8.2	0.0019	< 0.007	< 0.00001	0.013	17	0.0019	< 0.01	0.038	0.0018	< 0.003	13	0.00055	5.1	< 0.000002	40	3.6	37	0.000013	0.00058	0.00014	0.046	0.00046	< 0.001	< 0.002
31-Dec-14	13	25	400	300	8.3	0.0014	< 0.007	0.000050	0.011	15	0.0037	< 0.01	0.032	0.0016	< 0.003	11	0.00055	5.2	0.0000020	33	3.4	29	0.000020	0.00048	0.00015	0.039	0.00040	< 0.001	< 0.002
14-Jan-15	14	27	400	300	8.2	0.0014	< 0.007	0.000020	0.011	17	0.0042	< 0.01	0.030	0.0017	< 0.003	11	0.00064	5.4	0.0000030	32	3.6	27	0.000014	0.00040	0.000080	0.040	0.00035	< 0.001	< 0.002
28-Jan-15	15	29	400	295	8.1	0.0013	< 0.007	0.000020	0.0097	17	0.0030	< 0.01	0.031	0.0013	< 0.003	12	0.00060	4.8	0.0000020	32	2.9	27	0.000014	0.00040	0.000080	0.045	0.00037	0.0010	< 0.002
11-Feb-15	16	31	400	270	8.2	0.0020	< 0.007	0.00018	0.011	16	0.0022	< 0.01	0.031	0.0015	< 0.003	12	< 0.001	4.9	0.0000020	27	3.7	30	0.000021	0.00055	0.000070	0.041	0.00039	0.0020	< 0.002
25-Feb-15	17	33	400	270	8.1	0.0016	< 0.007	0.000010	0.011	15	0.0021	< 0.01	0.024	0.0014	< 0.003	12	< 0.001	4.9	< 0.000002	21	3.7	22	0.000012	0.00038	< 0.00005	0.042	0.00031	< 0.001	< 0.002
11-Mar-15	18	35	400	305	8.2	0.0016	< 0.007	0.000040	0.012	16	0.0022	< 0.01	0.024	0.0014	< 0.003	11	< 0.001	4.5	0.0000040	16	3.8	23	< 0.000005	0.0058	0.00010	0.039	0.00032	0.0010	< 0.002
25-Mar-15	19	37	400	280	8.1	0.0016	< 0.007	< 0.00001	0.011	20	0.0029	< 0.01	0.027	0.0019	< 0.003	13	< 0.001	5.9	0.0000020	16	4.5	23	< 0.000005	0.00069	0.000090	0.041	0.00040	< 0.001	< 0.002
8-Apr-15	20	39	400	370	8.1	0.0013	< 0.007	< 0.00001	0.012	18	0.0025	< 0.01	0.020	0.0015	< 0.003	13	< 0.001	5.8	< 0.000002	9.3	4.7	20	< 0.000005	0.00039	< 0.00005	0.041	0.00031	< 0.001	< 0.002
22-Apr-15	21	41	400	260	8.1	0.0016	< 0.007	0.00020	0.011	18	0.0013	< 0.01	0.026	0.0013	< 0.003	13	0.00046	5.3	0.0000070	8.1	4.4	21	0.0000090	0.0047	0.00010	0.041	0.00042	0.0020	< 0.002
6-May-15	22	43	400	325	8.1	0.0017	< 0.007	0.000030	0.011	18	0.0013	< 0.01	0.026	0.0013	< 0.003	14	< 0.001	5.4	0.0000080	6.3	4.3	23	< 0.000005	0.00052	0.000090	0.038	0.00035	0.0010	< 0.002
20-May-15	23	45	500	445	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	24	47	445	340	8.1	0.00097	0.013	0.00012	0.0099	16	0.00086	< 0.01	0.023	0.0011	< 0.003	12	0.00035	5.1	0.0000080	3.4	4.2	18	< 0.000005	0.00067	0.000060	0.035	0.00038	0.0070	< 0.002
17-Jun-15	25	49	500	440	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	26	51	440	315	8.1	0.0017	< 0.007	< 0.00001	0.0100	17	0.0011	0.010	0.022	0.0011	< 0.003	12	0.00045	5.2	0.0000050	2.5	4.3	18	0.000011	0.00034	0.00017	0.036	0.00041	0.0030	< 0.002
15-Jul-15	27	53	500	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	28	55	420	325	8.1	0.00078	< 0.007	0.000060	0.011	16	0.00050	< 0.01	0.018	0.0010	< 0.003	11	0.00030	4.7	0.0000030	1.9	4.4	19	< 0.000005	0.00014	< 0.00005	0.036	0.00035	0.0010	< 0.002
12-Aug-15	29	57	500	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	30	59	450	335	8.2	0.0015	< 0.007	0.000080	0.0098	16	0.00094	0.010	0.022	0.00090	< 0.003	12	0.00036	5.0	0.000065	1.7	4.4	19	0.000012	0.00017	< 0.00005	0.036	0.00040	0.0010	< 0.002
9-Sep-15	31	61	500	445	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	32	63	445	395	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	33	65	395	305	8.1	0.0013	< 0.007	0.000060	0.0092	17	0.00034	0.030	0.013	0.0010	< 0.003	11	0.00038	4.4	< 0.000002	1.4	4.3	20	0.0000070	0.00085	< 0.00005	0.036	0.00030	0.0010	< 0.002
21-Oct-15	34	67	500	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	35	69	450	440	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	36	71	440	350	8.3	0.0011	< 0.007	0.000030	0.0090	18	0.00040	< 0.01	0.014	0.00080	< 0.003	13	0.00053	4.7	< 0.000002	1.4	4.6	23	0.000020	0.00012	< 0.00005	0.035	0.00030	< 0.001	< 0.002
2-Dec-15	37	73	500	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	38	75	460	430	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	39	77	430	425	8.3	0.0010	< 0.007	0.00033	0.0086	17	0.00021	< 0.01	0.013	0.00080	< 0.003	12	0.00033	4.5	< 0.000002	1.3	3.6	20	< 0.000005	0.00012	< 0.00005	0.036	0.00029	< 0.001	< 0.002
6-Jan-16	40	78	400	330	8.3	0.0020	< 0.007	0.00028	0.0097	19	0.00048	< 0.01	0.012	0.00090	< 0.003	13	0.0018	4.9	< 0.000002	1.5	4.4	23	< 0.000005	0.00037	< 0.00005	0.035	0.00030	< 0.001	< 0.002
20-Jan-16	41	80	400	310	8.2	0.0011	< 0.007	0.00012	0.010	19	0.0018	< 0.01	0.014	0.0010	< 0.003	13	0.00056	5.1	< 0.000002	1.5	5.1	23	0.000027	0.00013	< 0.00005	0.039	0.00034	0.0020	< 0.002
3-Feb-16	42	82	400	340	8.2	0.0012	< 0.007	0.000090	0.0097	16	0.00010	< 0.01	0.015	0.00090	< 0.003	12	0.00052	4.6	0.000015	1.4	4.6	19	0.0000080	0.00012	< 0.00005	0.034	0.00032	< 0.001	< 0.002
17-Feb-16	43	84	400	330	8.2	0.00079	< 0.007	0.000010	0.0091	17	0.00032	< 0.01	0.016	0.00090	< 0.003	13	0.00020	4.8	< 0.000002	1.5	4.3	16	0.000010	0.000050	< 0.00005	0.033	0.00029	< 0.001	< 0.002
2-Mar-16	44	86	400	360	8.3	0.00068	< 0.007	0.000040	0.0094	17	0.0015	< 0.01	0.016	0.00090	< 0.003	12	0.00018	4.8	< 0.000002	1.5	4.3	14	0.000013	0.000090	< 0.00005	0.031	0.00033	0.0020	< 0.002

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Calculated Loading Rates for Col 4 (ST)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
16-Jul-14	1	1	1300	315	7.8	3419	#N/A	0.30	4.4	54	0.76	0.0085	0.013	54	0.0019	0.00010	0.00067	0.0022	0.00000022	0.00000022	0.0012	0.00000057	11	0.000053	0.00027
30-Jul-14	2	3	400	335	8.0	1594	#N/A	0.073	1.9	12	0.050	0.0057	0.0050	10	0.000095	0.000044	0.00024	0.00035	0.00000012	0.00000012	0.00054	0.000000050	2.3	0.0000049	0.000028
13-Aug-14	3	5	400	340	8.0	1176	#N/A	0.088	1.9	7.4	0.020	0.0065	0.0051	6.9	0.000037	0.000043	0.00018	0.00038	0.00000012	0.00000012	0.00062	0.00000012	1.5	0.0000037	0.000015
27-Aug-14	4	7	400	340	8.1	882	#N/A	0.12	2.1	5.7	0.010	0.0070	0.0051	5.2	0.000063	0.000039	0.00015	0.00032	0.00000012	0.00000012	0.00068	0.00000010	1.1	0.0000026	0.0000090
10-Sep-14	5	9	400	355	8.1	756	#N/A	0.12	2.2	4.2	0.0036	0.0087	0.0053	5.1	0.00014	0.000036	0.00017	0.00039	0.00000012	0.00000012	0.00064	0.00000032	1.3	0.0000037	0.0000066
24-Sep-14	6	11	400	255	8.2	671	#N/A	0.074	2.1	2.3	0.0026	0.0056	0.0038	2.6	0.000022	0.000028	0.00012	0.00033	0.000000089	0.000000089	0.00046	0.000000077	0.55	0.0000033	0.0000057
8-Oct-14	7	13	300	225	8.1	673	#N/A	0.061	1.8	1.9	0.011	0.0047	0.0034	3.1	0.000066	0.000023	0.00011	0.00031	0.000000079	0.000000079	0.00041	0.000000034	0.80	0.0000024	0.0000033
22-Oct-14	8	15	400	315	8.2	653	#N/A	0.12	3.0	2.2	0.016	0.0068	0.0047	3.4	0.000066	0.000033	0.00013	0.00048	0.00000011	0.00000011	0.00064	0.00000082	0.71	0.0000027	0.0000042
5-Nov-14	9	17	400	320		561	#N/A	#N/A	2.7	1.9	0.016	0.0077	0.0048	2.7	0.000072	0.000034	0.00013	0.00044	0.00000011	0.00000011	0.00060	0.000000096	0.55	0.0000038	0.0000034
19-Nov-14	10	19	400	290	8.0	521	#N/A	0.10	2.2	1.7	0.0029	0.0083	0.0044	2.2	0.000068	0.000032	0.00013	0.00040	0.00000010	0.00000010	0.00052	0.00000068	0.45	0.0000041	0.0000026
3-Dec-14	11	21	400	350	8.2	481	#N/A	0.044	2.6	1.9	0.0035	0.0093	0.0053	2.6	0.000098	0.000039	0.00013	0.00050	0.00000012	0.00000012	0.00055	0.00000021	0.55	0.0000056	0.0000026
17-Dec-14	12	23	400	310	8.2	502	#N/A	0.047	2.2	1.5	0.0031	0.010	0.0047	2.2	0.00011	0.000036	0.00013	0.00047	0.00000011	0.00000011	0.00053	0.00000019	0.45	0.0000040	0.0000020
31-Dec-14	13	25	400	300	8.3	475	#N/A	0.015	2.7	1.2	0.015	0.0086	0.0045	2.0	0.00011	0.000032	0.00010	0.00045	0.00000011	0.00000011	0.00045	0.00000020	0.44	0.0000035	0.0000020
14-Jan-15	14	27	400	300	8.2	457	#N/A	0.044	2.3	1.2	0.015	0.0084	0.0045	2.2	0.000084	0.000033	0.000098	0.00049	0.00000011	0.00000011	0.00049	0.00000026	0.47	0.0000060	0.0000017
28-Jan-15	15	29	400	295	8.1	461	#N/A	0.051	2.2	1.3	0.015	0.0081	0.0044	2.1	0.00010	0.000031	0.00010	0.00045	0.00000010	0.00000010	0.00039	0.00000010	0.42	0.0000072	0.0000013
11-Feb-15	16	31	400	270	8.2	454	#N/A	0.049	1.8	1.2	0.014	0.0082	0.0041	1.9	0.000095	0.000034	0.00011	0.00041	0.000000095	0.000000095	0.00043	0.00000016	0.39	0.0000061	0.0000013
25-Feb-15	17	33	400	270	8.1	420	#N/A	0.056	2.0	0.88	0.014	0.0068	0.0041	1.9	0.000034	0.000026	0.000069	0.00046	0.000000095	0.000000095	0.00038	0.000000095	0.43	0.0000063	0.0000011
11-Mar-15	18	35	400	305	8.2	412	#N/A	0.047	2.3	1.1	0.015	0.0087	0.0046	2.3	0.000072	0.000029	0.000084	0.00049	0.00000011	0.00000011	0.00038	0.000000061	0.52	0.0000076	0.0000012
25-Mar-15	19	37	400	280	8.1	437	#N/A	0.067	2.2	0.94	0.014	0.0074	0.0042	2.5	0.000062	0.000031	0.000092	0.00055	0.000000098	0.000000098	0.00034	0.000000056	0.52	0.0000087	0.0000013
8-Apr-15	20	39	400	370	8.1	417	#N/A	0.10	3.0	1.1	0.019	0.0094	0.0056	3.1	0.000076	0.000046	0.00012	0.00071	0.00000013	0.00000013	0.00047	0.000000056	0.70	0.0000074	0.0000016
22-Apr-15	21	41	400	260	8.1	380	#N/A	0.065	1.8	0.85	0.013	0.0078	0.0039	2.0	0.000070	0.000029	0.000079	0.00043	0.000000091	0.000000091	0.00036	0.00000029	0.43	0.0000066	0.00000085
6-May-15	22	43	400	325	8.1	375	#N/A	0.070	2.3	0.93	0.016	0.0099	0.0049	2.6	0.00010	0.000036	0.00010	0.00057	0.00000011	0.00000011	0.00039	0.000000049	0.54	0.0000072	0.0000011
20-May-15	23	45	500	445																					
3-Jun-15	24	47	445	340	8.1	348	#N/A	0.037	1.1	0.40	0.0085	0.0049	0.0026	1.2	0.000074	0.000014	0.000046	0.00032	0.000000060	0.000000060	0.00019	0.000000077	0.28	0.0000046	0.00000048
17-Jun-15	25	49	500	440																					
1-Jul-15	26	51	440	315	8.1	378	#N/A	0.045	0.98	0.43	0.0079	0.0043	0.0024	1.1	0.000050	0.000014	0.000057	0.00030	0.000000055	0.000000055	0.00016	0.000000071	0.24	0.0000050	0.00000050
15-Jul-15	27	53	500	420																					
29-Jul-15	28	55	420	325	8.1	346	#N/A	0.029	0.98	0.46	0.0081	0.0046	0.0024	1.2	0.000044	0.000014	0.000046	0.00029	0.000000057	0.000000057	0.00016	0.000000041	0.26	0.0000050	0.00000032
12-Aug-15	29	57	500	450																					
26-Aug-15	30	59	450	335	8.2	350	#N/A	0.019	1.0	0.50	0.0084	0.0044	0.0025	1.2	0.000067	0.000014	0.000050	0.00032	0.000000059	0.000000059	0.00015	0.000000084	0.27	0.0000052	0.00000046
9-Sep-15	31	61	500	445																					
23-Sep-15	32	63	445	395																					
7-Oct-15	33	65	395	305	8.1	378	#N/A	0.017	0.66	0.32		0.0025		0.76	0.000037	0.0000086	0.000029	0.00018	0.000000036	0.000000036	0.000077	0.000000020	0.16	0.0000029	0.00000019
21-Oct-15	34	67	500	450																					
4-Nov-15	35	69	450	440																					
18-Nov-15	36	71	440	350	8.3	368	#N/A	#N/A	0.81	0.37		0.0028		0.92	0.000030	0.0000082	0.000032	0.00021	0.000000041	0.000000041	0.000060	0.000000023	0.19	0.0000036	0.00000019
2-Dec-15	37	73	500	460																					
16-Dec-15	38	75	460	430																					
30-Dec-15	39	77	430	425	8.3	365	#N/A	#N/A	0.79	0.38		0.0033		1.1	0.000036	0.0000099	0.000035	0.00026	0.000000050	0.000000050	0.000089	0.000000021	0.23	0.0000042	0.00000013
6-Jan-16	40	78	400	330	8.3	366	#N/A	0.018	1.9	0.99		0.0069		2.8	0.000089	0.000026	0.000091	0.00069	0.00000012	0.00000012	0.00023	0.00000092	0.59	0.000011	0.00000041
20-Jan-16	41	80	400	310	8.2	366	#N/A	0.030	1.7	1.0		0.0068		2.6	0.000070	0.000025	0.000099	0.00065	0.00000011	0.00000011	0.00019	0.00000016	0.56	0.000011	0.00000082
3-Feb-16	42	82	400	340	8.2	336	#N/A	0.036	1.9	0.88		0.0075		2.5	0.000071	0.000027	0.00010	0.00065	0.00000012	0.00000012	0.00019	0.000000051	0.54	0.000011	0.00000060
17-Feb-16	43	84	400	330	8.2	335	#N/A	0.063	2.0	0.69		0.0083		2.6	0.000031	0.000026	0.000094	0.00065	0.00000012	0.00000012	0.00017	0.000000050	0.56	0.000013	0.00000056
2-Mar-16	44	86	400	360	8.3	318	#N/A	0.024	2.1	0.74		0.0088		2.6	0.000049	0.000031	0.00013	0.00069	0.00000013	0.00000013	0.00018	0.00000014	0.53	0.000015	0.0000012

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Calculated Loading Rates for Col 4 (ST)

Date	Cycle	Weeks	Volume (mL)		pH	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.		Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
16-Jul-14	1	1	1300	315	7.8	0.0017	0.00054	0.0000032	0.0012	6.3	0.0043	0.0013	0.00056	0.0017	0.0013	1.2	0.0012	0.17	0.0000011	5.9	0.22	20	0.0000017	0.000011	0.000019	0.0057	0.00014	0.00050	0.000063
30-Jul-14	2	3	400	335	8.0	0.00016	0.017	0.00000034	0.00034	1.1	0.0014	0.00017	0.00032	0.00039	0.00020	0.37	0.00018	0.088	0.000000034	1.6	0.065	4.4	0.00000064	0.00000017	0.0000085	0.0012	0.0000085	0.000050	0.000034
13-Aug-14	3	5	400	340	8.0	0.000092	0.000034	0.00000017	0.00032	0.78	0.00078	0.00017	0.00038	0.00022	0.00015	0.31	0.000088	0.088	0.000000034	0.78	0.062	2.8	0.00000041	0.00000017	0.0000039	0.0011	0.0000022	0.000034	0.000034
27-Aug-14	4	7	400	340	8.1	0.000055	0.000034	0.00000017	0.00026	0.58	0.00048	0.00017	0.00049	0.00011	0.00015	0.29	0.000038	0.089	0.000000034	0.86	0.055	2.0	0.00000043	0.0000036	0.0000012	0.00092	0.0000046	0.000017	0.000034
10-Sep-14	5	9	400	355	8.1	0.000053	0.00012	0.00000036	0.00024	0.46	0.00031	0.00018	0.00060	0.000066	0.000053	0.24	0.000025	0.11	0.000000036	1.0	0.069	1.7	0.00000032	0.0000028	0.0000014	0.00084	0.0000055	0.000018	0.000036
24-Sep-14	6	11	400	255	8.2	0.000037	0.000026	0.00000089	0.00018	0.30	0.00023	0.00013	0.00038	0.000050	0.00011	0.18	0.000011	0.065	0.00000020	0.60	0.040	0.77	0.00000024	0.00000051	0.0000052	0.00060	0.0000037	0.000026	0.000026
8-Oct-14	7	13	300	225	8.1	0.000028	0.000079	0.00000023	0.00019	0.27	0.00018	0.00011	0.00030	0.000036	0.000034	0.15	0.000011	0.062	0.000000023	0.58	0.048	0.67	0.00000024	0.00000045	0.0000012	0.00057	0.0000033	0.000011	0.000023
22-Oct-14	8	15	400	315	8.2	0.000032	0.00011	0.0000093	0.00023	0.40	0.00028	0.00016	0.00043	0.000046	0.000047	0.23	0.000013	0.096	0.000000032	0.81	0.067	0.86	0.00000032	0.00000032	0.0000022	0.00086	0.0000047	0.000016	0.000032
5-Nov-14	9	17	400	320		0.000031	0.00011	0.00000080	0.00021	0.31	0.00018	0.00016	0.00049	0.000037	0.000048	0.18	0.000011	0.085	0.000000032	0.70	0.056	0.66	0.00000032	0.00016	0.0000019	0.00075	0.0000045	0.000016	0.000032
19-Nov-14	10	19	400	290	8.0	0.000027	0.00010	0.0000029	0.00020	0.27	0.000093	0.00015	0.00055	0.000032	0.000073	0.17	0.0000086	0.079	0.000000029	0.64	0.051	0.58	0.00000061	0.000025	0.0000013	0.00070	0.0000048	0.000015	0.000029
3-Dec-14	11	21	400	350	8.2	0.000043	0.00012	0.00000070	0.00020	0.29	0.00011	0.00018	0.00059	0.000035	0.000053	0.19	0.0000098	0.087	0.000000035	0.68	0.060	0.62	0.00000032	0.000017	0.0000011	0.00075	0.0000060	0.000018	0.000035
17-Dec-14	12	23	400	310	8.2	0.000029	0.00011	0.00000016	0.00020	0.26	0.000030	0.00016	0.00059	0.000028	0.000047	0.19	0.0000085	0.080	0.000000031	0.63	0.056	0.58	0.00000020	0.0000090	0.0000022	0.00071	0.0000071	0.000016	0.000031
31-Dec-14	13	25	400	300	8.3	0.000021	0.00011	0.00000075	0.00016	0.23	0.000056	0.00015	0.00048	0.000024	0.000045	0.16	0.0000083	0.078	0.000000030	0.50	0.051	0.43	0.00000030	0.0000072	0.0000023	0.00059	0.0000060	0.000015	0.000030
14-Jan-15	14	27	400	300	8.2	0.000021	0.00011	0.00000030	0.00017	0.25	0.000063	0.00015	0.00045	0.000026	0.000045	0.17	0.0000096	0.081	0.000000045	0.49	0.054	0.40	0.00000021	0.0000060	0.0000012	0.00061	0.0000053	0.000015	0.000030
28-Jan-15	15	29	400	295	8.1	0.000020	0.00010	0.00000030	0.00014	0.25	0.000044	0.00015	0.00046	0.000019	0.000044	0.17	0.0000089	0.070	0.000000030	0.48	0.042	0.40	0.00000021	0.0000059	0.0000012	0.00066	0.0000055	0.000015	0.000030
11-Feb-15	16	31	400	270	8.2	0.000027	0.000095	0.0000024	0.00015	0.22	0.000029	0.00014	0.00041	0.000020	0.000041	0.16	0.000014	0.066	0.000000027	0.36	0.050	0.40	0.00000028	0.0000074	0.00000095	0.00055	0.0000053	0.000027	0.000027
25-Feb-15	17	33	400	270	8.1	0.000022	0.000095	0.00000014	0.00015	0.21	0.000028	0.00014	0.00032	0.000019	0.000041	0.16	0.000014	0.066	0.000000027	0.28	0.049	0.29	0.00000016	0.0000051	0.00000068	0.00056	0.0000042	0.000014	0.000027
11-Mar-15	18	35	400	305	8.2	0.000025	0.00011	0.00000061	0.00018	0.24	0.000033	0.00015	0.00036	0.000021	0.000046	0.17	0.000015	0.068	0.000000061	0.24	0.058	0.35	0.000000076	0.000089	0.0000015	0.00060	0.0000049	0.000015	0.000031
25-Mar-15	19	37	400	280	8.1	0.000023	0.000098	0.00000014	0.00016	0.29	0.000041	0.00014	0.00038	0.000027	0.000042	0.18	0.000014	0.083	0.000000028	0.22	0.062	0.32	0.000000070	0.0000097	0.0000013	0.00057	0.0000056	0.000014	0.000028
8-Apr-15	20	39	400	370	8.1	0.000025	0.00013	0.00000019	0.00022	0.33	0.000046	0.00019	0.00037	0.000028	0.000056	0.23	0.000019	0.11	0.000000037	0.17	0.088	0.37	0.000000093	0.0000072	0.00000093	0.00075	0.0000057	0.000019	0.000037
22-Apr-15	21	41	400	260	8.1	0.000021	0.000091	0.0000026	0.00015	0.23	0.000016	0.00013	0.00034	0.000017	0.000039	0.17	0.0000060	0.068	0.000000091	0.11	0.057	0.27	0.00000012	0.000061	0.0000013	0.00053	0.0000055	0.000026	0.000026
6-May-15	22	43	400	325	8.1	0.000027	0.00011	0.00000049	0.00018	0.29	0.000021	0.00016	0.00043	0.000021	0.000049	0.22	0.000016	0.088	0.00000013	0.10	0.069	0.37	0.000000081	0.0000085	0.0000015	0.00061	0.0000057	0.000016	0.000033
20-May-15	23	45	500	445																									
3-Jun-15	24	47	445	340	8.1	0.0000082	0.00011	0.0000010	0.000084	0.13	0.0000073	0.000085	0.00019	0.0000094	0.000026	0.11	0.0000030	0.043	0.000000068	0.029	0.036	0.15	0.000000043	0.0000057	0.00000051	0.00030	0.0000032	0.000060	0.000017
17-Jun-15	25	49	500	440																									
1-Jul-15	26	51	440	315	8.1	0.000013	0.000055	0.000000079	0.000078	0.13	0.0000084	0.000079	0.00017	0.0000087	0.000024	0.091	0.0000035	0.041	0.000000039	0.020	0.034	0.14	0.000000087	0.0000027	0.0000013	0.00029	0.0000032	0.000024	0.000016
15-Jul-15	27	53	500	420																									
29-Jul-15	28	55	420	325	8.1	0.0000063	0.000057	0.00000049	0.000088	0.13	0.0000041	0.000081	0.00015	0.0000081	0.000024	0.093	0.0000024	0.038	0.000000024	0.016	0.036	0.16	0.000000041	0.0000011	0.00000041	0.00029	0.0000028	0.0000081	0.000016
12-Aug-15	29	57	500	450																									
26-Aug-15	30	59	450	335	8.2	0.000013	0.000059	0.00000067	0.000082	0.14	0.0000079	0.000084	0.00018	0.0000075	0.000025	0.100	0.0000030	0.042	0.00000054	0.014	0.037	0.16	0.00000010	0.0000014	0.00000042	0.00030	0.0000034	0.0000084	0.000017
9-Sep-15	31	61	500	445																									
23-Sep-15	32	63	445	395																									
7-Oct-15	33	65	395	305	8.1	0.0000065	0.000036	0.00000031	0.000047	0.084	0.0000017	0.00015	0.000067	0.0000051	0.000015	0.057	0.0000019	0.023	0.000000010	0.0069	0.022	0.10	0.000000036	0.0000043	0.00000025	0.00018	0.0000015	0.0000051	0.000010
21-Oct-15	34	67	500	450																									
4-Nov-15	35	69	450	440																									
18-Nov-15	36	71	440	350	8.3	0.0000066	0.000041	0.00000018	0.000053	0.11	0.0000023	0.000058	0.000083	0.0000047	0.000018	0.077	0.0000031	0.027	0.000000012	0.0081	0.027	0.13	0.00000012	0.00000070	0.00000029	0.00020	0.0000018	0.0000058	0.000012
2-Dec-15	37	73	500	460																									
16-Dec-15	38	75	460	430																									
30-Dec-15	39	77	430	425	8.3	0.0000071	0.000050	0.0000023	0.000061	0.12	0.0000015	0.000071	0.000092	0.0000057	0.000021	0.084	0.0000023	0.032	0.000000014	0.0094	0.026	0.14	0.000000035	0.00000085	0.00000035	0.00025	0.0000021	0.0000071	0.000014
6-Jan-16	40	78	400	330	8.3	0.000033	0.00012	0.0000046	0.00016	0.31	0.0000079	0.00017	0.00020	0.000015	0.000050	0.22	0.000030	0.081	0.000000033	0.025	0.073	0.38	0.000000083	0.0000061	0.00000083	0.00057	0.0000050	0.000017	0.000033
20-Jan-16	41	80	400	310	8.2	0.000017	0.00011	0.0000019	0.00016	0.29	0.000028	0.00016	0.00022	0.000016	0.000047	0.21	0.0000087	0.079	0.000000031	0.023	0.079	0.35	0.00000042	0.0000020	0.00000078	0.00060	0.0000053	0.000031	0.000031
3-Feb-16	42	82	400	340	8.2	0.000020	0.00012	0.0000015	0.00017	0.28	0.0000017	0.00017	0.00025	0.000015	0.000051	0.21	0.0000088	0.078	0.00000026	0.023	0.079	0.32	0.00000014	0.0000020	0.00000085	0.00058	0.0000054	0.000017	0.000034
17-Feb-16	43	84	400	330	8.2	0.000013	0.00012	0.00000017	0.00015	0.28	0.0000053	0.00017	0.00026	0.000015	0.000050	0.21	0.0000033	0.079	0.000000033	0.024	0.071	0.26	0.00000017	0.00000083	0.00000083	0.00055	0.0000048	0.000017	0.000033
2-Mar-16	44	86	400	360	8.3	0.000012	0.00013	0.00000072	0.00017	0.30	0.000027	0.00018	0.00029	0.000016	0.000054	0.22	0.0000032	0.087	0.000000036	0.026	0.078	0.26	0.00000023	0.0000016	0.00000090	0.00056	0.0000059	0.000036	0.000036

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 5 (GO)

Date	Cycle	Weeks	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
	No.		Input	Output		umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
16-Jul-14	1	1	1500	280	8.2	1228	#N/A	2.7	218	145	58	0.31	0.90	219	0.045	0.0049	0.045	0.073	0.000012	< 0.000007	0.059	< 0.000003	55	0.0028	0.0040
30-Jul-14	2	3	400	290	8.3	667	#N/A	#N/A	264	68	6.6	0.37	< 0.3	89	0.0061	0.0047	0.038	0.016	< 0.000007	< 0.000007	0.052	< 0.000003	22	0.0012	0.00060
13-Aug-14	3	5	400	305	8.3	525	#N/A	#N/A	226	32	1.6	0.42	< 0.3	69	0.0046	0.0040	0.032	0.031	< 0.000007	< 0.000007	0.055	< 0.000003	17	0.00058	0.00042
27-Aug-14	4	7	400	305	8.3	465	#N/A	#N/A	219	27	0.70	0.44	< 0.3	66	0.0078	0.0036	0.031	0.029	< 0.000007	< 0.000007	0.061	0.000012	16	0.00060	0.00028
10-Sep-14	5	9	400	265	8.3	445	#N/A	#N/A	213	17	0.40	0.46	< 0.3	61	0.0079	0.0034	0.033	0.032	< 0.000007	< 0.000007	0.052	0.000020	15	0.00057	0.00022
24-Sep-14	6	11	400	240	8.3	455	#N/A	4.1	232	17	0.30	0.39	< 0.3	72	0.0024	0.0035	0.025	0.040	< 0.000007	< 0.000007	0.052	< 0.000003	18	0.00064	0.00027
8-Oct-14	7	13	300	225	8.3	477	#N/A	4.1	212	12	< 1	0.35	< 0.3	84	0.0060	0.0031	0.021	0.048	< 0.000007	< 0.000007	0.054	0.0000040	21	0.00047	0.00017
22-Oct-14	8	15	400	290	8.3	492	#N/A	5.2	245	13	< 1	0.33	< 0.3	92	0.0067	0.0030	0.020	0.055	< 0.000007	< 0.000007	0.061	0.000023	23	0.00046	0.00015
5-Nov-14	9	17	400	275		463	#N/A	#N/A	245	10	< 1	0.35	< 0.3	89	0.0044	0.0030	0.019	0.056	< 0.000007	< 0.000007	0.060	0.0000050	22	0.00044	0.00014
19-Nov-14	10	19	400	275	8.3	437	#N/A	#N/A	202	11	< 0.2	0.35	< 0.3	93	0.0040	0.0029	0.018	0.060	< 0.000007	< 0.000007	0.057	0.000026	23	0.00041	0.00012
3-Dec-14	11	21	400	345	8.3	401	#N/A	#N/A	210	9.0	< 0.2	0.32	< 0.3	96	0.0038	0.0029	0.016	0.062	< 0.000007	< 0.000007	0.049	0.0000090	25	0.00039	0.00011
17-Dec-14	12	23	400	285	8.3	394	#N/A	2.7	193	8.0	< 0.2	0.34	< 0.3	96	0.0044	0.0028	0.016	0.065	< 0.000007	< 0.000007	0.046	0.0000030	24	0.00028	0.000099
31-Dec-14	13	25	400	295	8.4	398	#N/A	#N/A	240	5.0	< 1	0.31	< 0.3	103	0.0062	0.0026	0.015	0.066	< 0.000007	< 0.000007	0.045	0.000011	26	0.00057	0.000093
14-Jan-15	14	27	400	285	8.2	368	#N/A	2.7	188	8.0	< 1	0.31	< 0.3	108	0.0082	0.0029	0.014	0.075	< 0.000007	< 0.000007	0.046	0.000015	27	0.00038	0.000082
28-Jan-15	15	29	400	280	8.2	375	#N/A	3.5	186	8.0	< 1	0.29	< 0.3	113	0.0060	0.0026	0.013	0.076	< 0.000007	< 0.000007	0.035	0.0000080	27	0.00035	0.000069
11-Feb-15	16	31	400	275	8.2	374	#N/A	3.5	181	8.0	< 1	0.29	< 0.3	119	0.0064	0.0029	0.013	0.078	< 0.000007	< 0.000007	0.047	0.000011	30	0.00032	0.000082
25-Feb-15	17	33	400	255	8.2	348	#N/A	3.7	180	6.0	< 1	0.27	< 0.3	125	0.0022	0.0027	0.011	0.086	< 0.000007	< 0.000007	0.041	0.000018	32	0.00030	0.000072
11-Mar-15	18	35	400	265	8.2	352	#N/A	2.6	183	7.0	< 1	0.31	< 0.3	133	0.0049	0.0026	0.012	0.086	< 0.000007	< 0.000007	0.038	0.0000050	34	0.00036	0.000069
25-Mar-15	19	37	400	280	8.1	356	#N/A	4.1	183	7.0	< 1	0.28	< 0.3	152	0.0039	0.0028	0.012	0.096	< 0.000007	< 0.000007	0.036	0.0000040	38	0.00045	0.000072
8-Apr-15	20	39	400	350	8.1	336	#N/A	5.6	179	5.0	< 1	0.29	< 0.3	143	0.0062	0.0032	0.011	0.095	< 0.000007	< 0.000007	0.039	< 0.000003	37	0.00038	0.000067
22-Apr-15	21	41	400	270	8.1	288	#N/A	5.9	151	9.0	< 1	0.36	< 0.3	127	0.0043	0.0031	0.015	0.075	< 0.000007	< 0.000007	0.038	0.000027	32	0.00044	0.000057
6-May-15	22	43	400	290	8.1	278	#N/A	4.1	148	7.0	< 1	0.32	< 0.3	123	0.0051	0.0028	0.012	0.077	< 0.000007	< 0.000007	0.033	0.0000030	31	0.00059	0.000056
20-May-15	23	45	500	455	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	24	47	445	340	8.1	259	#N/A	4.7	123	7.0	< 1	0.40	< 0.3	118	0.0068	0.0026	0.015	0.071	< 0.000007	< 0.000007	0.034	0.0000080	31	0.00043	0.000047
17-Jun-15	25	49	500	440	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	26	51	440	335	8.1	267	#N/A	5.2	122	9.0	< 1	0.39	< 0.3	107	0.0051	0.0027	0.016	0.071	< 0.000007	< 0.000007	0.030	0.000010	27	0.00046	0.000054
15-Jul-15	27	53	500	380	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	28	55	380	280	8.1	243	#N/A	3.2	118	10	< 1	0.41	< 0.3	109	0.0069	0.0024	0.014	0.066	< 0.000007	0.0000070	0.028	0.000013	28	0.00061	0.000051
12-Aug-15	29	57	500	425	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	30	59	425	305	8.2	240	#N/A	2.0	117	9.0	< 1	0.39	< 0.3	110	0.0066	0.0025	0.016	0.070	< 0.000007	< 0.000007	0.027	0.000015	28	0.00059	0.000050
9-Sep-15	31	61	500	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	32	63	420	345	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	33	65	345	305	8.1	260	#N/A	3.0	129	8.0		0.36		109	0.0073	0.0025	0.014	0.066	< 0.000007	< 0.000007	0.022	0.000022	28	0.00058	0.000037
21-Oct-15	34	67	500	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	35	69	480	435	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	36	71	435	335	8.3	255	#N/A	1.2	142	8.0		0.36		115	0.0038	0.0024	0.016	0.061	< 0.000007	< 0.000007	0.018	< 0.000003	28	0.00062	0.000046
2-Dec-15	37	73	500	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	38	75	475	425	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	39	77	425	410	8.3	256	#N/A	#N/A	114	8.0	-	0.33	-	113	0.0058	0.0022	0.012	0.070	< 0.000007	< 0.000007	0.021	< 0.000003	28	0.00062	0.000028
6-Jan-16	40	78	400	340	8.3	244	#N/A	1.0	110	8.0	-	0.33	-	117	0.0044	0.0023	0.014	0.074	< 0.000007	< 0.000007	0.022	0.0000030	30	0.00063	0.000018
20-Jan-16	41	80	400	280	8.2	239	#N/A	1.9	111	7.0	-	0.35	-	118	0.0049	0.0026	0.016	0.079	< 0.000007	< 0.000007	0.020	0.0000070	30	0.00068	0.000068
3-Feb-16	42	82	400	325	8.2	228	#N/A	2.3	107	6.0	-	0.36	-	104	0.0058	0.0025	0.016	0.076	< 0.000007	< 0.000007	0.018	< 0.000003	27	0.00058	0.000032
17-Feb-16	43	84	400	300	8.2	234	#N/A	3.5	109	6.0	-	0.37	-	111	0.0040	0.0024	0.017	0.077	< 0.000007	< 0.000007	0.018	0.0000060	29	0.00070	0.000037
2-Mar-16	44	86	400	330	8.2	231	#N/A	1.4	109	6.0	-	0.37	-	110	0.0021	0.0026	0.019	0.077	< 0.000007	< 0.000007	0.017	0.000010	28	0.00063	0.000041

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 5 (GO)

Date	Cycle	Weeks	Volume (mL)		pH	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.		Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
16-Jul-14	1	1	1500	280	8.2	0.029	0.024	0.000040	0.0080	20	0.056	0.19	0.037	0.0095	0.062	12	0.0068	5.8	< 0.000002	153	0.27	54	0.000048	0.00033	0.00057	0.17	0.0025	0.0070	< 0.002
30-Jul-14	2	3	400	290	8.3	0.0069	1.9	< 0.00001	0.0053	8.5	0.018	0.040	0.054	0.0046	0.018	7.8	0.0026	5.9	< 0.000002	100	0.12	29	0.000014	< 0.00001	0.00051	0.15	0.00027	< 0.001	< 0.002
13-Aug-14	3	5	400	305	8.3	0.0092	0.0020	0.000020	0.0048	6.4	0.0042	< 0.01	0.050	0.0026	0.021	6.6	0.00073	5.7	< 0.000002	46	0.092	13	0.000029	0.000050	0.00019	0.14	0.00012	< 0.001	< 0.002
27-Aug-14	4	7	400	305	8.3	0.0029	< 0.002	< 0.00001	0.0042	6.1	0.0020	< 0.01	0.054	0.0015	0.011	6.8	0.00034	5.9	< 0.000002	53	0.089	9.0	0.000026	0.00021	< 0.00005	0.13	0.00024	< 0.001	< 0.002
10-Sep-14	5	9	400	265	8.3	0.0024	< 0.007	0.000020	0.0037	5.4	0.00066	< 0.01	0.054	0.0010	0.012	6.1	0.00031	6.8	< 0.000002	74	0.086	8.1	0.000028	0.00011	0.000060	0.12	0.00025	< 0.001	< 0.002
24-Sep-14	6	11	400	240	8.3	0.0024	< 0.002	0.000020	0.0044	6.6	0.0013	0.010	0.043	0.0012	< 0.009	7.1	< 0.00004	5.9	0.0000090	52	0.099	5.9	0.000029	0.000080	0.00011	0.11	0.00019	0.0020	< 0.002
8-Oct-14	7	13	300	225	8.3	0.0018	< 0.007	< 0.00001	0.0056	7.6	0.00070	< 0.01	0.035	0.0011	< 0.003	7.0	0.00016	6.3	< 0.000002	73	0.12	5.2	0.000032	0.000020	0.00012	0.12	0.00018	< 0.001	< 0.002
22-Oct-14	8	15	400	290	8.3	0.0019	< 0.007	0.000020	0.0049	8.5	0.00089	< 0.01	0.032	0.00080	< 0.003	7.9	0.00024	7.1	< 0.000002	73	0.13	5.6	0.000036	0.000020	0.00018	0.13	0.00020	< 0.001	< 0.002
5-Nov-14	9	17	400	275		0.0017	< 0.007	0.000040	0.0049	8.4	0.0012	< 0.01	0.028	0.00070	< 0.003	6.7	0.00019	6.4	< 0.000002	68	0.14	4.1	0.000035	0.00013	0.00012	0.12	0.00017	< 0.001	< 0.002
19-Nov-14	10	19	400	275	8.3	0.0018	< 0.007	0.00022	0.0055	8.9	0.00020	< 0.01	0.027	0.00060	0.014	6.9	0.00013	6.9	< 0.000002	65	0.16	4.0	0.000042	0.000040	0.00021	0.12	0.00017	< 0.001	< 0.002
3-Dec-14	11	21	400	345	8.3	0.0015	< 0.007	0.000020	0.0046	8.5	0.00059	< 0.01	0.025	0.00060	0.0030	6.8	0.00014	6.1	< 0.000002	53	0.16	3.9	0.000035	0.000030	0.000090	0.11	0.00016	< 0.001	< 0.002
17-Dec-14	12	23	400	285	8.3	0.0014	< 0.007	< 0.00001	0.0046	9.0	0.00021	< 0.01	0.024	0.00060	0.0030	7.6	0.00020	6.0	< 0.000002	48	0.15	3.7	0.000031	0.000010	0.00010	0.11	0.00018	< 0.001	< 0.002
31-Dec-14	13	25	400	295	8.4	0.0011	< 0.007	0.00031	0.0045	9.1	0.00099	< 0.01	0.023	0.00050	0.0060	7.1	0.00014	6.7	< 0.000002	42	0.17	3.4	0.000034	0.000050	0.000070	0.098	0.00019	< 0.001	< 0.002
14-Jan-15	14	27	400	285	8.2	0.0019	< 0.007	0.000020	0.0045	9.9	0.00051	< 0.01	0.024	0.00050	0.0030	7.4	0.00016	6.6	0.0000020	36	0.17	3.0	0.000035	0.000060	0.00014	0.10	0.00016	0.0010	< 0.002
28-Jan-15	15	29	400	280	8.2	0.00090	< 0.007	0.000060	0.0039	11	0.0010	< 0.01	0.021	0.00040	0.0040	7.6	0.00025	5.7	< 0.000002	33	0.15	3.3	0.000031	0.000040	0.00012	0.10	0.00018	0.0020	< 0.002
11-Feb-15	16	31	400	275	8.2	0.0016	< 0.007	0.00015	0.0045	11	0.00065	< 0.01	0.019	0.00050	0.0040	7.5	< 0.001	6.2	< 0.000002	25	0.20	3.0	0.000035	0.00015	0.00015	0.099	0.00021	< 0.001	< 0.002
25-Feb-15	17	33	400	255	8.2	0.0012	< 0.007	0.00015	0.0046	11	0.0012	< 0.01	0.017	0.00040	0.0050	8.4	< 0.001	6.0	< 0.000002	20	0.20	2.6	0.000041	0.00010	0.000090	0.11	0.00014	0.0030	< 0.002
11-Mar-15	18	35	400	265	8.2	0.0011	< 0.007	< 0.00001	0.0046	12	0.00051	< 0.01	0.018	0.00050	< 0.003	8.0	< 0.001	5.3	< 0.000002	16	0.21	2.8	0.000025	0.000050	0.000080	0.100	0.00017	< 0.001	< 0.002
25-Mar-15	19	37	400	280	8.1	0.0025	< 0.007	0.000040	0.0045	14	0.00089	< 0.01	0.020	0.00050	< 0.003	9.0	< 0.001	7.3	< 0.000002	14	0.23	3.0	0.000038	0.00044	0.00012	0.096	0.00019	< 0.001	< 0.002
8-Apr-15	20	39	400	350	8.1	0.0011	< 0.007	< 0.00001	0.0046	12	0.00094	< 0.01	0.017	0.00040	< 0.003	8.3	< 0.001	7.2	< 0.000002	8.8	0.22	2.5	0.000026	0.00011	0.000060	0.095	0.00016	0.0010	< 0.002
22-Apr-15	21	41	400	270	8.1	0.0080	< 0.007	0.00036	0.0039	11	0.00027	< 0.01	0.024	0.00040	< 0.003	8.5	0.000090	6.3	0.0000050	7.5	0.18	3.2	0.000030	0.0067	< 0.00005	0.099	0.00017	0.0060	< 0.002
6-May-15	22	43	400	290	8.1	0.0012	< 0.007	< 0.00001	0.0038	11	0.00061	< 0.01	0.021	0.00040	< 0.003	8.2	< 0.001	6.1	0.0000040	5.5	0.18	2.9	0.000026	0.00019	0.00012	0.081	0.00021	0.0010	< 0.002
20-May-15	23	45	500	455	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	24	47	445	340	8.1	0.0022	< 0.007	0.000050	0.0032	10	0.00043	< 0.01	0.026	0.00030	< 0.003	7.9	0.000060	6.2	0.0000070	3.7	0.17	3.3	0.000015	0.0037	0.00011	0.085	0.00016	< 0.001	< 0.002
17-Jun-15	25	49	500	440	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	26	51	440	335	8.1	0.00085	< 0.007	< 0.00001	0.0030	9.5	0.00094	0.010	0.026	0.00030	0.0040	6.9	0.000070	6.0	0.0000020	2.7	0.17	3.1	0.000028	0.0016	0.00010	0.084	0.00016	< 0.001	< 0.002
15-Jul-15	27	53	500	380	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	28	55	380	280	8.1	0.00092	< 0.007	0.000050	0.0030	9.6	0.00025	0.020	0.027	0.00030	< 0.003	6.9	< 0.00004	5.6	0.0000040	2.3	0.18	3.4	0.000020	0.0011	0.000080	0.089	0.00020	< 0.001	< 0.002
12-Aug-15	29	57	500	425	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	30	59	425	305	8.2	0.0011	< 0.007	0.00016	0.0027	9.6	0.00062	0.010	0.029	0.00020	< 0.003	7.0	0.000070	6.0	0.000040	2.3	0.17	3.6	0.000027	0.0012	< 0.00005	0.083	0.00016	< 0.001	< 0.002
9-Sep-15	31	61	500	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	32	63	420	345	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	33	65	345	305	8.1	0.0011	< 0.007	0.000020	0.0024	9.8	0.00027	0.020	0.021	0.00020	< 0.003	6.7	0.000050	5.1	< 0.000002	1.9	0.16	3.1	0.000022	0.00069	0.000060	0.084	0.00020	< 0.001	< 0.002
21-Oct-15	34	67	500	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	35	69	480	435	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	36	71	435	335	8.3	0.00072	< 0.007	0.00012	0.0023	11	0.00020	< 0.01	0.023	< 0.0001	< 0.003	7.5	0.00017	5.6	< 0.000002	1.9	0.16	3.2	0.000022	0.00047	< 0.00005	0.074	0.00014	< 0.001	< 0.002
2-Dec-15	37	73	500	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	38	75	475	425	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	39	77	425	410	8.3	0.0011	< 0.007	0.00035	0.0023	10	0.00019	< 0.01	0.022	0.00020	< 0.003	7.3	0.000070	5.4	< 0.000002	1.7	0.14	3.0	< 0.000005	0.00045	< 0.00005	0.082	0.00016	< 0.001	< 0.002
6-Jan-16	40	78	400	340	8.3	0.0012	< 0.007	0.000020	0.0023	10	0.00017	< 0.01	0.019	0.00020	0.0060	8.0	0.00025	5.8	0.0000020	1.9	0.15	2.9	< 0.000005	0.00051	< 0.00005	0.076	0.00014	< 0.001	< 0.002
20-Jan-16	41	80	400	280	8.2	0.00091	< 0.007	0.000040	0.0025	10	0.0021	< 0.01	0.023	0.00030	0.0050	7.6	0.000080	6.1	0.0000020	1.8	0.17	3.1	0.000042	0.00040	< 0.00005	0.090	0.00017	< 0.001	< 0.002
3-Feb-16	42	82	400	325	8.2	0.0011	< 0.007	0.000030	0.0024	9.2	< 0.00001	< 0.01	0.022	0.00020	< 0.003	7.4	0.00015	5.5	0.000013	1.7	0.16	2.7	0.000026	0.00031	< 0.00005	0.081	0.00016	< 0.001	< 0.002
17-Feb-16	43	84	400	300	8.2	0.00090	< 0.007	< 0.00001	0.0022	9.7	0.00014	< 0.01	0.024	0.00020	0.0060	7.5	< 0.00004	5.5	< 0.000002	1.8	0.15	2.4	0.000028	0.00030	< 0.00005	0.082	0.00016	< 0.001	< 0.002
2-Mar-16	44	86	400	330	8.2	0.00052	< 0.007	0.000030	0.0023	10	0.00050	< 0.01	0.024	0.00020	< 0.003	7.6	< 0.00004	5.7	< 0.000002	1.8	0.16	2.9	0.000026	0.00026	< 0.00005	0.082	0.00015	< 0.001	< 0.002

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Calculated Loading Rates for Col 5 (GO)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	$mgCaCO_3$/kg/wk	$mgCaCO_3$/kg/wk	$mgCaCO_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
16-Jul-14	1	1	1500	280	8.2	1228	#N/A	0.074	6.1	4.1	1.6	0.0087	0.025	6.1	0.0013	0.00014	0.0013	0.0020	0.00000034	0.00000020	0.0016	0.000000084	1.5	0.000078	0.00011
30-Jul-14	2	3	400	290	8.3	667	#N/A	#N/A	3.8	0.99	0.096	0.0054	0.0044	1.3	0.000088	0.000068	0.00055	0.00023	0.00000010	0.00000010	0.00076	0.000000044	0.32	0.000017	0.0000087
13-Aug-14	3	5	400	305	8.3	525	#N/A	#N/A	3.4	0.49	0.024	0.0064	0.0046	1.0	0.000070	0.000061	0.00049	0.00048	0.00000011	0.00000011	0.00084	0.000000046	0.26	0.0000088	0.0000064
27-Aug-14	4	7	400	305	8.3	465	#N/A	#N/A	3.3	0.41	0.011	0.0067	0.0046	1.0	0.00012	0.000055	0.00047	0.00044	0.00000011	0.00000011	0.00094	0.00000018	0.25	0.0000092	0.0000043
10-Sep-14	5	9	400	265	8.3	445	#N/A	#N/A	2.8	0.23	0.0053	0.0061	0.0040	0.80	0.00010	0.000045	0.00044	0.00043	0.000000093	0.000000093	0.00068	0.00000027	0.20	0.0000076	0.0000030
24-Sep-14	6	11	400	240	8.3	455	#N/A	0.049	2.8	0.20	0.0036	0.0047	0.0036	0.86	0.000029	0.000042	0.00030	0.00048	0.000000084	0.000000084	0.00063	0.000000036	0.22	0.0000077	0.0000032
8-Oct-14	7	13	300	225	8.3	477	#N/A	0.046	2.4	0.14	0.011	0.0039	0.0034	0.95	0.000068	0.000035	0.00024	0.00054	0.000000079	0.000000079	0.00060	0.000000045	0.24	0.0000053	0.0000019
22-Oct-14	8	15	400	290	8.3	492	#N/A	0.075	3.6	0.19	0.015	0.0048	0.0044	1.3	0.000097	0.000044	0.00029	0.00079	0.00000010	0.00000010	0.00088	0.00000033	0.33	0.0000066	0.0000021
5-Nov-14	9	17	400	275		463	#N/A	#N/A	3.4	0.14	0.014	0.0048	0.0041	1.2	0.000061	0.000041	0.00026	0.00077	0.000000096	0.000000096	0.00082	0.000000069	0.30	0.0000061	0.0000019
19-Nov-14	10	19	400	275	8.3	437	#N/A	#N/A	2.8	0.15	0.0028	0.0048	0.0041	1.3	0.000055	0.000040	0.00024	0.00083	0.000000096	0.000000096	0.00079	0.00000036	0.31	0.0000056	0.0000016
3-Dec-14	11	21	400	345	8.3	401	#N/A	#N/A	3.6	0.16	0.0035	0.0055	0.0052	1.7	0.000066	0.000050	0.00028	0.0011	0.00000012	0.00000012	0.00084	0.00000016	0.42	0.0000067	0.0000018
17-Dec-14	12	23	400	285	8.3	394	#N/A	0.038	2.8	0.11	0.0029	0.0048	0.0043	1.4	0.000063	0.000040	0.00023	0.00093	0.000000100	0.000000100	0.00065	0.000000043	0.34	0.0000040	0.0000014
31-Dec-14	13	25	400	295	8.4	398	#N/A	#N/A	3.5	0.074	0.015	0.0046	0.0044	1.5	0.000091	0.000038	0.00022	0.00097	0.00000010	0.00000010	0.00066	0.00000016	0.38	0.0000084	0.0000014
14-Jan-15	14	27	400	285	8.2	368	#N/A	0.038	2.7	0.11	0.014	0.0044	0.0043	1.5	0.00012	0.000041	0.00020	0.0011	0.000000100	0.000000100	0.00066	0.00000021	0.38	0.0000054	0.0000012
28-Jan-15	15	29	400	280	8.2	375	#N/A	0.049	2.6	0.11	0.014	0.0041	0.0042	1.6	0.000084	0.000036	0.00018	0.0011	0.000000098	0.000000098	0.00049	0.00000011	0.38	0.0000049	0.00000097
11-Feb-15	16	31	400	275	8.2	374	#N/A	0.048	2.5	0.11	0.014	0.0040	0.0041	1.6	0.000088	0.000040	0.00018	0.0011	0.000000096	0.000000096	0.00064	0.00000015	0.41	0.0000044	0.0000011
25-Feb-15	17	33	400	255	8.2	348	#N/A	0.047	2.3	0.077	0.013	0.0034	0.0038	1.6	0.000028	0.000034	0.00014	0.0011	0.000000089	0.000000089	0.00052	0.00000023	0.40	0.0000038	0.00000092
11-Mar-15	18	35	400	265	8.2	352	#N/A	0.034	2.4	0.093	0.013	0.0041	0.0040	1.8	0.000065	0.000034	0.00015	0.0011	0.000000093	0.000000093	0.00050	0.000000066	0.44	0.0000048	0.00000091
25-Mar-15	19	37	400	280	8.1	356	#N/A	0.057	2.6	0.098	0.014	0.0039	0.0042	2.1	0.000055	0.000039	0.00017	0.0013	0.000000098	0.000000098	0.00050	0.000000056	0.53	0.0000063	0.0000010
8-Apr-15	20	39	400	350	8.1	336	#N/A	0.098	3.1	0.088	0.018	0.0051	0.0053	2.5	0.00011	0.000056	0.00020	0.0017	0.00000012	0.00000012	0.00069	0.000000053	0.65	0.0000067	0.0000012
22-Apr-15	21	41	400	270	8.1	288	#N/A	0.079	2.0	0.12	0.014	0.0049	0.0041	1.7	0.000058	0.000042	0.00021	0.0010	0.000000095	0.000000095	0.00052	0.00000036	0.43	0.0000059	0.00000077
6-May-15	22	43	400	290	8.1	278	#N/A	0.060	2.1	0.10	0.015	0.0046	0.0044	1.8	0.000074	0.000041	0.00017	0.0011	0.00000010	0.00000010	0.00047	0.000000044	0.45	0.0000086	0.00000081
20-May-15	23	45	500	455																					
3-Jun-15	24	47	445	340	8.1	259	#N/A	0.040	1.0	0.060	0.0085	0.0034	0.0026	1.0	0.000058	0.000022	0.00013	0.00061	0.000000060	0.000000060	0.00029	0.000000068	0.26	0.0000037	0.00000040
17-Jun-15	25	49	500	440																					
1-Jul-15	26	51	440	335	8.1	267	#N/A	0.043	1.0	0.075	0.0084	0.0033	0.0025	0.90	0.000043	0.000023	0.00014	0.00060	0.000000059	0.000000059	0.00025	0.000000084	0.23	0.0000039	0.00000045
15-Jul-15	27	53	500	380																					
29-Jul-15	28	55	380	280	8.1	243	#N/A	0.022	0.83	0.070	0.0070	0.0029	0.0021	0.76	0.000048	0.000017	0.000099	0.00046	0.000000049	0.000000049	0.00019	0.000000091	0.19	0.0000043	0.00000036
12-Aug-15	29	57	500	425																					
26-Aug-15	30	59	425	305	8.2	240	#N/A	0.015	0.89	0.069	0.0076	0.0030	0.0023	0.84	0.000050	0.000019	0.00012	0.00054	0.000000053	0.000000053	0.00020	0.00000011	0.22	0.0000045	0.00000038
9-Sep-15	31	61	500	420																					
23-Sep-15	32	63	420	345																					
7-Oct-15	33	65	345	305	8.1	260	#N/A	0.015	0.66	0.041		0.0018		0.55	0.000037	0.000013	0.000073	0.00034	0.000000036	0.000000036	0.00011	0.00000011	0.14	0.0000029	0.00000019
21-Oct-15	34	67	500	480																					
4-Nov-15	35	69	480	435																					
18-Nov-15	36	71	435	335	8.3	255	#N/A	0.0064	0.79	0.045		0.0020		0.64	0.000021	0.000013	0.000087	0.00034	0.000000039	0.000000039	0.00010	0.000000017	0.16	0.0000035	0.00000026
2-Dec-15	37	73	500	475																					
16-Dec-15	38	75	475	425																					
30-Dec-15	39	77	425	410	8.3	256	#N/A	#N/A	0.78	0.055		0.0023		0.77	0.000040	0.000015	0.000084	0.00048	0.000000048	0.000000048	0.00014	0.000000021	0.19	0.0000042	0.00000019
6-Jan-16	40	78	400	340	8.3	244	#N/A	0.017	1.9	0.14		0.0056		2.0	0.000075	0.000039	0.00024	0.0013	0.00000012	0.00000012	0.00037	0.000000051	0.50	0.000011	0.00000031
20-Jan-16	41	80	400	280	8.2	239	#N/A	0.026	1.6	0.098		0.0049		1.7	0.000069	0.000036	0.00022	0.0011	0.000000098	0.000000098	0.00028	0.000000098	0.42	0.0000095	0.00000095
3-Feb-16	42	82	400	325	8.2	228	#N/A	0.037	1.7	0.098		0.0059		1.7	0.000094	0.000041	0.00026	0.0012	0.00000011	0.00000011	0.00029	0.000000049	0.43	0.0000094	0.00000052
17-Feb-16	43	84	400	300	8.2	234	#N/A	0.052	1.6	0.090		0.0056		1.7	0.000060	0.000036	0.00025	0.0012	0.00000011	0.00000011	0.00027	0.000000090	0.43	0.000011	0.00000056
2-Mar-16	44	86	400	330	8.2	231	#N/A	0.023	1.8	0.099		0.0061		1.8	0.000035	0.000043	0.00031	0.0013	0.00000012	0.00000012	0.00028	0.00000017	0.45	0.000010	0.00000068

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Calculated Loading Rates for Col 5 (GO)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cu**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.		Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
16-Jul-14	1	1	1500	280	8.2	0.00081	0.00067	0.0000011	0.00023	0.55	0.0016	0.0053	0.0010	0.00027	0.0017	0.33	0.00019	0.16	0.000000056	4.3	0.0077	1.5	0.0000013	0.0000092	0.000016	0.0047	0.000069	0.00020	0.000056
30-Jul-14	2	3	400	290	8.3	0.00010	0.027	0.00000015	0.000077	0.12	0.00027	0.00058	0.00078	0.000067	0.00026	0.11	0.000038	0.086	0.000000029	1.5	0.0017	0.42	0.00000020	0.00000015	0.0000074	0.0022	0.0000039	0.000015	0.000029
13-Aug-14	3	5	400	305	8.3	0.00014	0.000031	0.00000031	0.000073	0.097	0.000064	0.00015	0.00075	0.000040	0.00032	0.10	0.000011	0.086	0.000000031	0.70	0.0014	0.19	0.00000044	0.00000076	0.0000029	0.0021	0.0000018	0.000015	0.000031
27-Aug-14	4	7	400	305	8.3	0.000043	0.000031	0.00000015	0.000064	0.093	0.000031	0.00015	0.00082	0.000023	0.00017	0.10	0.0000052	0.090	0.000000031	0.81	0.0014	0.14	0.00000040	0.0000032	0.00000076	0.0019	0.0000037	0.000015	0.000031
10-Sep-14	5	9	400	265	8.3	0.000032	0.000093	0.00000027	0.000049	0.072	0.0000087	0.00013	0.00072	0.000013	0.00016	0.081	0.0000041	0.090	0.000000027	0.98	0.0011	0.11	0.00000037	0.0000015	0.00000080	0.0016	0.0000033	0.000013	0.000027
24-Sep-14	6	11	400	240	8.3	0.000029	0.000024	0.00000024	0.000053	0.079	0.000016	0.00012	0.00051	0.000014	0.00011	0.085	0.00000048	0.070	0.00000011	0.63	0.0012	0.070	0.00000035	0.00000096	0.0000013	0.0013	0.0000023	0.000024	0.000024
8-Oct-14	7	13	300	225	8.3	0.000021	0.000079	0.00000011	0.000063	0.085	0.0000079	0.00011	0.00039	0.000012	0.000034	0.079	0.0000018	0.071	0.000000023	0.82	0.0014	0.059	0.00000036	0.00000023	0.0000014	0.0014	0.0000020	0.000011	0.000023
22-Oct-14	8	15	400	290	8.3	0.000028	0.00010	0.00000029	0.000072	0.12	0.000013	0.00015	0.00046	0.000012	0.000044	0.11	0.0000035	0.10	0.000000029	1.1	0.0018	0.081	0.00000052	0.00000029	0.0000026	0.0019	0.0000029	0.000015	0.000029
5-Nov-14	9	17	400	275		0.000023	0.000096	0.00000055	0.000068	0.12	0.000017	0.00014	0.00039	0.0000096	0.000041	0.092	0.0000026	0.088	0.000000028	0.93	0.0020	0.056	0.00000048	0.0000018	0.0000017	0.0017	0.0000023	0.000014	0.000028
19-Nov-14	10	19	400	275	8.3	0.000024	0.000096	0.0000030	0.000075	0.12	0.0000028	0.00014	0.00037	0.0000083	0.00019	0.095	0.0000018	0.094	0.000000028	0.89	0.0021	0.055	0.00000058	0.00000055	0.0000029	0.0017	0.0000023	0.000014	0.000028
3-Dec-14	11	21	400	345	8.3	0.000026	0.00012	0.00000035	0.000079	0.15	0.000010	0.00017	0.00042	0.000010	0.000052	0.12	0.0000024	0.11	0.000000035	0.92	0.0027	0.067	0.00000060	0.00000052	0.0000016	0.0020	0.0000028	0.000017	0.000035
17-Dec-14	12	23	400	285	8.3	0.000020	0.000100	0.00000014	0.000066	0.13	0.0000030	0.00014	0.00034	0.0000086	0.000043	0.11	0.0000029	0.086	0.000000029	0.68	0.0021	0.053	0.00000044	0.00000014	0.0000014	0.0015	0.0000026	0.000014	0.000029
31-Dec-14	13	25	400	295	8.4	0.000016	0.00010	0.0000046	0.000066	0.13	0.000015	0.00015	0.00033	0.0000074	0.000089	0.11	0.0000021	0.099	0.000000030	0.61	0.0024	0.050	0.00000050	0.00000074	0.0000010	0.0015	0.0000028	0.000015	0.000030
14-Jan-15	14	27	400	285	8.2	0.000028	0.000100	0.00000029	0.000065	0.14	0.0000073	0.00014	0.00034	0.0000071	0.000043	0.10	0.0000023	0.094	0.000000029	0.52	0.0025	0.043	0.00000050	0.00000086	0.0000020	0.0014	0.0000023	0.000014	0.000029
28-Jan-15	15	29	400	280	8.2	0.000013	0.000098	0.00000084	0.000055	0.15	0.000014	0.00014	0.00030	0.0000056	0.000056	0.11	0.0000035	0.080	0.000000028	0.46	0.0021	0.046	0.00000043	0.00000056	0.0000017	0.0014	0.0000025	0.000028	0.000028
11-Feb-15	16	31	400	275	8.2	0.000021	0.000096	0.0000021	0.000062	0.15	0.0000089	0.00014	0.00026	0.0000069	0.000055	0.10	0.000014	0.085	0.000000028	0.35	0.0027	0.041	0.00000048	0.0000021	0.0000021	0.0014	0.0000029	0.000014	0.000028
25-Feb-15	17	33	400	255	8.2	0.000015	0.000089	0.0000019	0.000058	0.14	0.000015	0.00013	0.00022	0.0000051	0.000064	0.11	0.000013	0.077	0.000000026	0.26	0.0026	0.033	0.00000052	0.0000013	0.0000011	0.0014	0.0000018	0.000038	0.000026
11-Mar-15	18	35	400	265	8.2	0.000015	0.000093	0.00000013	0.000061	0.16	0.0000068	0.00013	0.00024	0.0000066	0.000040	0.11	0.000013	0.070	0.000000027	0.21	0.0028	0.037	0.00000033	0.00000066	0.0000011	0.0013	0.0000023	0.000013	0.000027
25-Mar-15	19	37	400	280	8.1	0.000036	0.000098	0.00000056	0.000063	0.19	0.000012	0.00014	0.00028	0.0000070	0.000042	0.13	0.000014	0.10	0.000000028	0.20	0.0032	0.042	0.00000053	0.0000062	0.0000017	0.0013	0.0000027	0.000014	0.000028
8-Apr-15	20	39	400	350	8.1	0.000020	0.00012	0.00000018	0.000080	0.21	0.000016	0.00018	0.00029	0.0000070	0.000053	0.15	0.000018	0.13	0.000000035	0.15	0.0038	0.044	0.00000046	0.0000019	0.0000011	0.0017	0.0000028	0.000018	0.000035
22-Apr-15	21	41	400	270	8.1	0.00011	0.000095	0.0000049	0.000052	0.15	0.0000036	0.00014	0.00032	0.0000054	0.000041	0.11	0.0000012	0.084	0.000000068	0.10	0.0025	0.043	0.00000041	0.000090	0.00000068	0.0013	0.0000023	0.000081	0.000027
6-May-15	22	43	400	290	8.1	0.000017	0.00010	0.00000015	0.000055	0.16	0.0000088	0.00015	0.00030	0.0000058	0.000044	0.12	0.000015	0.088	0.000000058	0.079	0.0026	0.042	0.00000038	0.0000028	0.0000017	0.0012	0.0000030	0.000015	0.000029
20-May-15	23	45	500	455																									
3-Jun-15	24	47	445	340	8.1	0.000019	0.000060	0.00000043	0.000027	0.086	0.0000037	0.000085	0.00022	0.0000026	0.000026	0.067	0.00000051	0.053	0.000000060	0.032	0.0015	0.028	0.00000013	0.000031	0.00000094	0.00072	0.0000014	0.0000085	0.000017
17-Jun-15	25	49	500	440																									
1-Jul-15	26	51	440	335	8.1	0.0000071	0.000059	0.000000084	0.000025	0.079	0.0000079	0.000084	0.00022	0.0000025	0.000034	0.057	0.00000059	0.050	0.000000017	0.022	0.0014	0.026	0.00000023	0.000013	0.00000084	0.00070	0.0000013	0.0000084	0.000017
15-Jul-15	27	53	500	380																									
29-Jul-15	28	55	380	280	8.1	0.0000064	0.000049	0.00000035	0.000021	0.067	0.0000018	0.00014	0.00019	0.0000021	0.000021	0.048	0.00000028	0.039	0.000000028	0.016	0.0012	0.024	0.00000014	0.0000078	0.00000056	0.00063	0.0000014	0.0000070	0.000014
12-Aug-15	29	57	500	425																									
26-Aug-15	30	59	425	305	8.2	0.0000086	0.000053	0.0000012	0.000021	0.073	0.0000047	0.000076	0.00022	0.0000015	0.000023	0.053	0.00000053	0.046	0.00000031	0.017	0.0013	0.027	0.00000021	0.0000093	0.00000038	0.00063	0.0000012	0.0000076	0.000015
9-Sep-15	31	61	500	420																									
23-Sep-15	32	63	420	345																									
7-Oct-15	33	65	345	305	8.1	0.0000056	0.000036	0.00000010	0.000012	0.050	0.0000014	0.00010	0.00011	0.0000010	0.000015	0.034	0.00000025	0.026	0.000000010	0.0096	0.00080	0.016	0.00000011	0.0000035	0.00000031	0.00043	0.0000010	0.0000051	0.000010
21-Oct-15	34	67	500	480																									
4-Nov-15	35	69	480	435																									
18-Nov-15	36	71	435	335	8.3	0.0000040	0.000039	0.00000067	0.000013	0.060	0.0000011	0.000056	0.00013	0.00000056	0.000017	0.042	0.00000095	0.031	0.000000011	0.011	0.00091	0.018	0.00000012	0.0000026	0.00000028	0.00042	0.00000078	0.0000056	0.000011
2-Dec-15	37	73	500	475																									
16-Dec-15	38	75	475	425																									
30-Dec-15	39	77	425	410	8.3	0.0000077	0.000048	0.0000024	0.000015	0.069	0.0000013	0.000068	0.00015	0.0000014	0.000021	0.050	0.00000048	0.037	0.000000014	0.012	0.00092	0.021	0.000000034	0.0000031	0.00000034	0.00056	0.0000011	0.0000068	0.000014
6-Jan-16	40	78	400	340	8.3	0.000020	0.00012	0.00000034	0.000040	0.18	0.0000029	0.00017	0.00033	0.0000034	0.00010	0.14	0.0000043	0.099	0.000000034	0.031	0.0026	0.049	0.000000085	0.0000087	0.00000085	0.0013	0.0000024	0.000017	0.000034
20-Jan-16	41	80	400	280	8.2	0.000013	0.000098	0.00000056	0.000035	0.15	0.000029	0.00014	0.00032	0.0000042	0.000070	0.11	0.0000011	0.085	0.000000028	0.025	0.0024	0.043	0.00000059	0.0000056	0.00000070	0.0013	0.0000024	0.000014	0.000028
3-Feb-16	42	82	400	325	8.2	0.000019	0.00011	0.00000049	0.000039	0.15	0.00000016	0.00016	0.00035	0.0000033	0.000049	0.12	0.0000024	0.090	0.00000021	0.027	0.0026	0.044	0.00000042	0.0000050	0.00000081	0.0013	0.0000026	0.000016	0.000033
17-Feb-16	43	84	400	300	8.2	0.000014	0.00011	0.00000015	0.000033	0.15	0.0000021	0.00015	0.00036	0.0000030	0.000090	0.11	0.00000060	0.082	0.000000030	0.027	0.0023	0.036	0.00000042	0.0000045	0.00000075	0.0012	0.0000024	0.000015	0.000030
2-Mar-16	44	86	400	330	8.2	0.0000086	0.00012	0.00000050	0.000038	0.17	0.0000083	0.00017	0.00039	0.0000033	0.000050	0.13	0.00000066	0.094	0.000000033	0.029	0.0026	0.048	0.00000043	0.0000043	0.00000083	0.0013	0.0000025	0.000017	0.000033

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 6 (GT)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
30-Jul-14	1	1	1200	370	8.1	1431	#N/A	4.8	197	443	23	0.35	0.30	366	0.010	0.011	0.078	0.029	< 0.000007	0.000012	0.040	< 0.000003	83	0.00095	0.0015
13-Aug-14	2	3	400	300	8.2	776	#N/A	4.2	172	180	4.3	0.41	< 0.3	165	0.0039	0.012	0.084	0.022	< 0.000007	< 0.000007	0.036	< 0.000003	36	0.00033	0.00069
27-Aug-14	3	5	400	310	8.2	576	#N/A	4.9	174	120	< 2	0.45	< 0.3	135	0.0066	0.011	0.083	0.024	< 0.000007	< 0.000007	0.044	0.000010	30	0.000050	0.00035
10-Sep-14	4	7	400	310	8.3	492	#N/A	3.8	174	73	0.50	0.51	< 0.3	119	0.0067	0.0098	0.088	0.030	< 0.000007	< 0.000007	0.035	0.000022	27	0.00010	0.00024
24-Sep-14	5	9	400	240	8.2	449	#N/A	4.4	181	65	0.20	0.50	< 0.3	127	0.0039	0.010	0.074	0.038	< 0.000007	< 0.000007	0.033	< 0.000003	28	0.00012	0.00027
8-Oct-14	6	11	300	220	8.2	424	#N/A	6.5	158	43	< 1	0.46	< 0.3	140	0.0076	0.0093	0.069	0.041	< 0.000007	< 0.000007	0.035	0.000018	32	0.000080	0.00014
22-Oct-14	7	13	400	295	8.3	491	#N/A	5.6	245	45	< 1	0.48	< 0.3	138	0.0068	0.0091	0.069	0.044	< 0.000007	< 0.000007	0.036	0.000048	30	0.000033	0.00014
5-Nov-14	8	15	400	275		366	#N/A	#N/A	165	40	< 1	0.50	< 0.3	139	0.0067	0.0091	0.064	0.046	< 0.000007	< 0.000007	0.034	0.000017	29	0.000080	0.00012
19-Nov-14	9	17	400	270	8.3	368	#N/A	#N/A	204	33	< 0.2	0.50	< 0.3	153	0.0065	0.0088	0.062	0.054	< 0.000007	< 0.000007	0.035	0.00010	32	0.000050	0.000072
3-Dec-14	10	19	400	335	8.3	335	#N/A	2.9	155	30	< 0.2	0.45	< 0.3	151	0.0065	0.0086	0.058	0.056	< 0.000007	< 0.000007	0.028	0.000015	34	0.000060	0.000081
17-Dec-14	11	21	400	290	8.2	346	#N/A	2.9	150	27	< 1	0.54	< 0.3	156	0.0065	0.0091	0.061	0.053	< 0.000007	< 0.000007	0.029	0.0000080	35	< 0.00003	0.000065
31-Dec-14	12	23	400	290	8.2	333	#N/A	3.7	151	24	< 1	0.50	< 0.3	150	0.0090	0.0089	0.058	0.056	< 0.000007	< 0.000007	0.027	0.000015	33	< 0.00003	0.000083
14-Jan-15	13	25	400	275	8.2	351	#N/A	3.2	154	24	< 1	0.52	< 0.3	153	0.0069	0.0099	0.059	0.060	< 0.000007	< 0.000007	0.029	0.000018	33	0.000070	0.000070
28-Jan-15	14	27	400	285	8.2	347	#N/A	3.1	150	24	< 1	0.52	< 0.3	151	0.010	0.0090	0.055	0.059	< 0.000007	< 0.000007	0.022	0.000010	31	0.000090	0.000053
11-Feb-15	15	29	400	300	8.2	334	#N/A	4.2	157	26	< 1	0.52	< 0.3	151	0.0097	0.010	0.061	0.058	< 0.000007	< 0.000007	0.027	0.000015	33	0.000090	0.000058
25-Feb-15	16	31	400	275	8.2	335	#N/A	2.6	160	24	< 1	0.46	< 0.3	156	0.0040	0.0093	0.051	0.063	< 0.000007	< 0.000007	0.025	0.000019	35	0.00024	0.000058
11-Mar-15	17	33	400	300	8.3	355	#N/A	#N/A	184	20	< 1	0.53	< 0.3	148	0.0075	0.0096	0.051	0.058	< 0.000007	< 0.000007	0.021	0.000010	34	0.000090	0.000052
25-Mar-15	18	35	400	275	8.2	331	#N/A	3.8	151	21	< 1	0.50	< 0.3	154	0.0069	0.011	0.061	0.065	< 0.000007	< 0.000007	0.021	0.0000090	32	0.00014	0.000056
8-Apr-15	19	37	400	335	8.1	322	#N/A	4.3	153	25	< 1	0.50	< 0.3	146	0.0062	0.013	0.056	0.060	< 0.000007	< 0.000007	0.024	0.0000040	34	0.000070	0.000050
22-Apr-15	20	39	400	270	8.1	338	#N/A	5.2	165	25	< 1	0.47	< 0.3	164	0.0062	0.011	0.048	0.066	< 0.000007	< 0.000007	0.025	0.0000070	38	0.000080	0.000046
6-May-15	21	41	400	240	8.2	343	#N/A	4.4	170	23	< 1	0.39	< 0.3	163	0.0085	0.010	0.042	0.066	< 0.000007	< 0.000007	0.022	< 0.000003	37	< 0.00003	0.000039
20-May-15	22	43	500	435	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	23	45	435	315	8.1	307	#N/A	4.9	138	21	< 1	0.45	< 0.3	142	0.011	0.010	0.046	0.057	< 0.000007	< 0.000007	0.022	< 0.000003	33	0.000060	0.000037
17-Jun-15	24	47	500	435	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	25	49	435	315	8.1	319	#N/A	4.6	135	22	< 1	0.42	< 0.3	136	0.0081	0.011	0.053	0.059	< 0.000007	< 0.000007	0.017	0.0000060	31	0.000080	0.000052
15-Jul-15	26	51	500	375	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	27	53	375	270	8.1	298	#N/A	3.0	133	27	< 1	0.42	< 0.3	135	0.0087	0.010	0.045	0.054	< 0.000007	< 0.000007	0.018	0.0000070	31	0.000080	0.000035
12-Aug-15	28	55	500	430	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	29	57	430	270	8.2	299	#N/A	1.9	133	26	< 1	0.41	< 0.3	135	0.010	0.010	0.048	0.056	< 0.000007	< 0.000007	0.016	0.0000060	31	0.00010	0.000045
9-Sep-15	30	59	500	425	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	31	61	425	335	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	32	63	335	245	8.2	321	#N/A	3.2	148	23		0.39		137	0.0085	0.011	0.045	0.049	< 0.000007	< 0.000007	0.013	0.0000090	31	0.00013	0.000029
21-Oct-15	33	65	500	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	34	67	485	375	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	35	69	375	280	8.4	310	#N/A	#N/A	159	21		0.35		140	0.0086	0.0099	0.051	0.044	< 0.000007	< 0.000007	0.0098	0.0000090	32	0.00010	0.00045
2-Dec-15	36	71	500	455	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	37	73	455	410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	38	75	410	350	8.4	316	#N/A	#N/A	130	22	-	0.32	-	143	0.0075	0.0094	0.039	0.051	< 0.000007	< 0.000007	0.012	< 0.000003	33	0.00010	0.000019
6-Jan-16	39	76	400	355	8.3	315	#N/A	#N/A	131	28	-	0.29	-	156	0.0065	0.0097	0.043	0.058	< 0.000007	< 0.000007	0.013	0.000026	36	0.000070	< 0.000004
20-Jan-16	40	78	400	255	8.3	321	#N/A	1.6	132	32	-	0.33	-	157	0.0059	0.012	0.052	0.059	< 0.000007	< 0.000007	0.012	0.0000060	36	0.000080	0.000042
3-Feb-16	41	80	400	310	8.3	292	#N/A	1.9	128	20	-	0.32	-	142	0.0067	0.011	0.052	0.053	< 0.000007	< 0.000007	0.011	0.0000060	32	0.000070	0.000033
17-Feb-16	42	82	400	285	8.3	318	#N/A	3.2	142	18	-	0.34	-	160	0.0064	0.012	0.055	0.072	< 0.000007	< 0.000007	0.012	0.0000030	37	0.00012	0.000028
2-Mar-16	43	84	400	335	8.3	296	#N/A	1.1	131	14	-	0.35	-	146	0.0044	0.011	0.060	0.061	< 0.000007	< 0.000007	0.010	0.000013	32	0.00012	0.000027

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 6 (GT)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cu**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.		Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
30-Jul-14	1	1	1200	370	8.1	0.016	0.31	0.000070	0.011	39	0.070	0.41	0.054	0.0086	0.051	24	0.0065	4.6	0.000084	146	0.42	169	0.00021	0.00051	0.00059	0.44	0.00038	0.0030	*< 0.002*
13-Aug-14	2	3	400	300	8.2	0.0059	*< 0.002*	0.000070	0.0073	18	0.026	*< 0.01*	0.065	0.0072	0.024	14	0.0022	4.5	*< 0.000002*	43	0.21	67	0.00015	0.000030	0.00019	0.41	0.000050	0.0010	*< 0.002*
27-Aug-14	3	5	400	310	8.2	0.0027	*< 0.002*	0.000040	0.0060	15	0.010	*< 0.01*	0.068	0.0039	0.026	13	0.0012	4.6	*< 0.000002*	51	0.18	40	0.00014	0.00019	0.000050	0.33	0.00014	0.0010	*< 0.002*
10-Sep-14	4	7	400	310	8.3	0.0020	*< 0.007*	0.000030	0.0053	13	0.0070	*< 0.01*	0.064	0.0014	0.020	11	0.00076	5.5	*< 0.000002*	53	0.19	29	0.00016	0.000060	0.000050	0.28	0.00017	*< 0.001*	*< 0.002*
24-Sep-14	5	9	400	240	8.2	0.0020	*< 0.002*	0.000030	0.0060	14	0.0052	*< 0.01*	0.057	0.0017	0.013	12	0.00034	4.5	0.0000070	42	0.18	19	0.00016	0.00012	0.00033	0.25	0.00015	0.0030	*< 0.002*
8-Oct-14	6	11	300	220	8.2	0.0015	*< 0.007*	0.000080	0.0066	15	0.0028	*< 0.01*	0.050	0.00090	0.015	11	0.00034	4.6	*< 0.000002*	32	0.22	17	0.00016	0.000040	0.00010	0.25	0.00015	*< 0.001*	*< 0.002*
22-Oct-14	7	13	400	295	8.3	0.0012	*< 0.007*	0.00019	0.0051	15	0.0046	*< 0.01*	0.050	0.00080	0.015	12	0.00029	5.1	*< 0.000002*	26	0.20	16	0.00016	*< 0.00001*	0.00011	0.25	0.00014	*< 0.001*	*< 0.002*
5-Nov-14	8	15	400	275		0.0013	*< 0.007*	0.000060	0.0051	16	0.0036	*< 0.01*	0.048	0.00070	0.011	10	0.00024	4.7	*< 0.000002*	17	0.24	13	0.00015	0.000060	0.00013	0.25	0.00013	*< 0.001*	*< 0.002*
19-Nov-14	9	17	400	270	8.3	0.0011	*< 0.007*	0.00013	0.0057	18	0.00018	*< 0.01*	0.042	0.00060	0.014	11	0.00020	4.9	*< 0.000002*	13	0.25	12	0.00023	0.000030	0.000090	0.26	0.00014	0.0020	*< 0.002*
3-Dec-14	10	19	400	335	8.3	0.0015	*< 0.007*	*< 0.00001*	0.0046	16	0.0018	*< 0.01*	0.038	0.00070	0.0090	10	0.00019	4.5	*< 0.000002*	8.9	0.26	10	0.00016	0.000020	0.000090	0.23	0.00014	0.0010	*< 0.002*
17-Dec-14	11	21	400	290	8.2	0.0011	*< 0.007*	*< 0.00001*	0.0048	17	0.00010	*< 0.01*	0.040	0.00060	0.0040	12	0.00018	4.5	*< 0.000002*	7.6	0.26	10	0.00015	*< 0.00001*	0.000080	0.24	0.00016	*< 0.001*	*< 0.002*
31-Dec-14	12	23	400	290	8.2	0.0010	*< 0.007*	*< 0.00001*	0.0044	17	0.0014	*< 0.01*	0.038	0.00060	0.013	11	0.00016	4.8	*< 0.000002*	5.9	0.26	8.9	0.00015	0.000080	0.00011	0.24	0.00015	*< 0.001*	*< 0.002*
14-Jan-15	13	25	400	275	8.2	0.00083	*< 0.007*	0.000030	0.0045	17	0.0013	*< 0.01*	0.040	0.00060	0.0030	11	0.00016	4.8	0.0000020	4.9	0.26	8.3	0.00015	0.000050	0.000090	0.25	0.00015	0.0010	*< 0.002*
28-Jan-15	14	27	400	285	8.2	0.00063	*< 0.007*	0.00012	0.0037	18	0.0011	*< 0.01*	0.036	0.00040	*< 0.003*	11	0.00018	4.3	*< 0.000002*	4.5	0.20	8.1	0.00014	0.000060	0.00012	0.25	0.00022	0.0020	*< 0.002*
11-Feb-15	15	29	400	300	8.2	0.0012	*< 0.007*	*< 0.00001*	0.0043	17	0.00069	0.010	0.034	0.00050	0.0060	11	*< 0.001*	4.4	*< 0.000002*	3.8	0.26	8.7	0.00014	0.00018	0.00010	0.25	0.00018	*< 0.001*	*< 0.002*
25-Feb-15	16	31	400	275	8.2	0.0011	*< 0.007*	0.000030	0.0044	17	0.00075	*< 0.01*	0.031	0.00050	*< 0.003*	11	*< 0.001*	4.7	*< 0.000002*	3.4	0.26	7.9	0.00017	0.00013	0.000060	0.27	0.00011	0.0010	*< 0.002*
11-Mar-15	17	33	400	300	8.3	0.0023	*< 0.007*	*< 0.00001*	0.0041	16	0.00048	*< 0.01*	0.031	0.00050	0.0080	10	*< 0.001*	3.9	*< 0.000002*	2.7	0.25	7.8	0.00015	0.000020	0.000060	0.25	0.00017	0.0020	*< 0.002*
25-Mar-15	18	35	400	275	8.2	0.0011	*< 0.007*	0.000010	0.0040	18	0.00044	*< 0.01*	0.036	0.00050	0.0070	11	*< 0.001*	4.8	*< 0.000002*	3.1	0.26	8.3	0.00016	0.00018	0.00011	0.25	0.00021	*< 0.001*	*< 0.002*
8-Apr-15	19	37	400	335	8.1	0.00062	*< 0.007*	*< 0.00001*	0.0040	15	0.00025	*< 0.01*	0.028	0.00040	0.011	11	*< 0.001*	5.0	*< 0.000002*	2.2	0.25	7.7	0.00015	0.000060	0.000070	0.25	0.00014	*< 0.001*	*< 0.002*
22-Apr-15	20	39	400	270	8.1	0.0019	*< 0.007*	0.00021	0.0042	17	0.00046	*< 0.01*	0.025	0.00050	0.0090	11	0.00017	4.9	0.0000030	2.2	0.28	7.6	0.00017	0.00041	0.000070	0.25	0.00016	*< 0.001*	*< 0.002*
6-May-15	21	41	400	240	8.2	0.0012	*< 0.007*	*< 0.00001*	0.0043	17	0.00073	*< 0.01*	0.022	0.00050	0.0050	11	*< 0.001*	4.8	0.0000030	2.0	0.27	8.0	0.00015	*< 0.00001*	0.000060	0.24	0.00021	0.0010	*< 0.002*
20-May-15	22	43	500	435	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	23	45	435	315	8.1	0.0013	*< 0.007*	0.00013	0.0037	15	0.00030	*< 0.01*	0.023	0.00040	0.010	10	0.00014	4.6	0.0000020	1.5	0.24	7.7	0.00012	0.000030	0.000070	0.24	0.00017	*< 0.001*	*< 0.002*
17-Jun-15	24	47	500	435	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	25	49	435	315	8.1	0.00060	*< 0.007*	*< 0.00001*	0.0034	15	0.00079	0.010	0.021	0.00030	0.012	9.1	0.00014	4.6	*< 0.000002*	1.3	0.23	7.5	0.00015	0.000080	0.000070	0.25	0.00016	0.0010	*< 0.002*
15-Jul-15	26	51	500	375	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	27	53	375	270	8.1	0.00091	*< 0.007*	0.000070	0.0035	14	0.00017	0.010	0.020	0.00030	0.0040	9.1	0.00010	4.1	*< 0.000002*	1.2	0.24	8.7	0.00014	0.000050	*< 0.00005*	0.27	0.00017	0.0010	*< 0.002*
12-Aug-15	28	55	500	430	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	29	57	430	270	8.2	0.00058	*< 0.007*	0.000060	0.0032	14	0.00056	*< 0.01*	0.023	0.00030	0.0060	8.7	0.00013	4.3	0.000026	1.2	0.24	8.5	0.00013	0.000020	*< 0.00005*	0.25	0.00018	*< 0.001*	*< 0.002*
9-Sep-15	30	59	500	425	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	31	61	425	335	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	32	63	335	245	8.2	0.00058	*< 0.007*	*< 0.00001*	0.0028	15	0.00016	*< 0.01*	0.015	0.00030	0.0050	8.4	0.00010	3.9	*< 0.000002*	1.1	0.22	7.7	0.000096	0.00013	*< 0.00005*	0.23	0.00017	0.0020	*< 0.002*
21-Oct-15	33	65	500	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	34	67	485	375	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	35	69	375	280	8.4	0.0014	0.017	0.00028	0.0026	15	0.0078	*< 0.01*	0.018	0.00080	0.0070	8.8	0.00027	4.1	0.000012	1.1	0.23	8.7	0.00012	0.000060	*< 0.00005*	0.21	0.00016	0.0010	*< 0.002*
2-Dec-15	36	71	500	455	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	37	73	455	410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	38	75	410	350	8.4	0.00070	*< 0.007*	0.00028	0.0025	15	0.00010	*< 0.01*	0.016	0.00020	0.0090	8.2	0.00011	4.0	*< 0.000002*	1.0	0.19	7.4	0.000095	0.00011	*< 0.00005*	0.24	0.00014	*< 0.001*	*< 0.002*
6-Jan-16	39	76	400	355	8.3	0.0010	*< 0.007*	0.00011	0.0027	16	0.000080	*< 0.01*	0.014	0.00020	0.0070	9.1	0.00032	4.5	0.0000020	1.1	0.22	9.3	0.000085	0.00032	*< 0.00005*	0.25	0.00011	*< 0.001*	*< 0.002*
20-Jan-16	40	78	400	255	8.3	0.00054	*< 0.007*	0.000050	0.0028	16	0.0011	*< 0.01*	0.018	0.00030	0.0060	8.9	0.00014	4.7	*< 0.000002*	1.1	0.26	9.6	0.00013	0.000030	*< 0.00005*	0.31	0.00014	*< 0.001*	*< 0.002*
3-Feb-16	41	80	400	310	8.3	0.00065	*< 0.007*	0.000030	0.0027	15	*< 0.00001*	*< 0.01*	0.015	0.00030	0.0080	8.8	0.00021	4.4	0.000014	1.0	0.24	7.9	0.00014	0.000040	*< 0.00005*	0.24	0.00014	*< 0.001*	*< 0.002*
17-Feb-16	42	82	400	285	8.3	0.00074	*< 0.007*	*< 0.00001*	0.0030	17	0.00014	*< 0.01*	0.017	0.00030	0.010	9.3	0.000070	4.5	*< 0.000002*	1.2	0.25	6.9	0.00016	0.000080	*< 0.00005*	0.28	0.00014	*< 0.001*	*< 0.002*
2-Mar-16	43	84	400	335	8.3	0.00036	*< 0.007*	0.00017	0.0026	16	0.00013	*< 0.01*	0.017	0.00020	0.0040	8.8	0.000070	4.5	*< 0.000002*	1.1	0.23	6.4	0.00014	0.000020	*< 0.00005*	0.22	0.00012	*< 0.001*	*< 0.002*

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Calculated Loading Rates for Col 6 (GT)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	$mgCaCO_3$/kg/wk	$mgCaCO_3$/kg/wk	$mgCaCO_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
30-Jul-14	1	1	1200	370	8.1	1431	#N/A	0.18	7.3	16	0.85	0.013	0.011	14	0.00037	0.00041	0.0029	0.0011	0.00000026	0.00000044	0.0015	0.00000011	3.1	0.000035	0.000054
13-Aug-14	2	3	400	300	8.2	776	#N/A	0.062	2.6	2.7	0.065	0.0062	0.0045	2.5	0.000059	0.00017	0.0013	0.00033	0.00000011	0.00000011	0.00054	0.000000045	0.54	0.0000050	0.000010
27-Aug-14	3	5	400	310	8.2	576	#N/A	0.076	2.7	1.9	0.031	0.0070	0.0047	2.1	0.00010	0.00016	0.0013	0.00037	0.00000011	0.00000011	0.00068	0.00000016	0.46	0.00000078	0.0000054
10-Sep-14	4	7	400	310	8.3	492	#N/A	0.058	2.7	1.1	0.0078	0.0079	0.0047	1.8	0.00010	0.00015	0.0014	0.00047	0.00000011	0.00000011	0.00053	0.00000034	0.41	0.0000016	0.0000037
24-Sep-14	5	9	400	240	8.2	449	#N/A	0.052	2.2	0.78	0.0024	0.0060	0.0036	1.5	0.000047	0.00012	0.00089	0.00045	0.000000084	0.000000084	0.00040	0.000000036	0.33	0.0000014	0.0000032
8-Oct-14	6	11	300	220	8.2	424	#N/A	0.072	1.7	0.47	0.011	0.0051	0.0033	1.5	0.000084	0.00010	0.00076	0.00045	0.000000077	0.000000077	0.00039	0.00000020	0.35	0.00000088	0.0000015
22-Oct-14	7	13	400	295	8.3	491	#N/A	0.082	3.6	0.66	0.015	0.0071	0.0044	2.0	0.00010	0.00013	0.0010	0.00064	0.00000010	0.00000010	0.00053	0.00000071	0.44	0.00000049	0.0000020
5-Nov-14	8	15	400	275		366	#N/A	#N/A	2.3	0.55	0.014	0.0069	0.0041	1.9	0.000092	0.00013	0.00087	0.00064	0.000000096	0.000000096	0.00046	0.00000023	0.40	0.0000011	0.0000017
19-Nov-14	9	17	400	270	8.3	368	#N/A	#N/A	2.7	0.45	0.0027	0.0068	0.0041	2.1	0.000088	0.00012	0.00083	0.00072	0.000000095	0.000000095	0.00047	0.0000014	0.43	0.00000068	0.00000097
3-Dec-14	10	19	400	335	8.3	335	#N/A	0.049	2.6	0.50	0.0034	0.0075	0.0050	2.5	0.00011	0.00014	0.00097	0.00093	0.00000012	0.00000012	0.00046	0.00000025	0.56	0.0000010	0.0000014
17-Dec-14	11	21	400	290	8.2	346	#N/A	0.042	2.2	0.39	0.015	0.0078	0.0044	2.3	0.000094	0.00013	0.00088	0.00077	0.00000010	0.00000010	0.00042	0.00000012	0.50	0.00000044	0.00000094
31-Dec-14	12	23	400	290	8.2	333	#N/A	0.054	2.2	0.35	0.015	0.0073	0.0044	2.2	0.00013	0.00013	0.00084	0.00082	0.00000010	0.00000010	0.00039	0.00000022	0.48	0.00000044	0.0000012
14-Jan-15	13	25	400	275	8.2	351	#N/A	0.044	2.1	0.33	0.014	0.0072	0.0041	2.1	0.000095	0.00014	0.00082	0.00082	0.000000096	0.000000096	0.00039	0.00000025	0.46	0.00000096	0.00000096
28-Jan-15	14	27	400	285	8.2	347	#N/A	0.045	2.1	0.34	0.014	0.0074	0.0043	2.2	0.00014	0.00013	0.00078	0.00084	0.000000100	0.000000100	0.00031	0.00000014	0.44	0.0000013	0.00000076
11-Feb-15	15	29	400	300	8.2	334	#N/A	0.063	2.4	0.39	0.015	0.0078	0.0045	2.3	0.00015	0.00016	0.00091	0.00087	0.00000011	0.00000011	0.00040	0.00000023	0.49	0.0000014	0.00000087
25-Feb-15	16	31	400	275	8.2	335	#N/A	0.035	2.2	0.33	0.014	0.0063	0.0041	2.1	0.000055	0.00013	0.00070	0.00086	0.000000096	0.000000096	0.00034	0.00000026	0.49	0.0000033	0.00000080
11-Mar-15	17	33	400	300	8.3	355	#N/A	#N/A	2.8	0.30	0.015	0.0080	0.0045	2.2	0.00011	0.00014	0.00077	0.00087	0.00000011	0.00000011	0.00032	0.00000015	0.50	0.0000014	0.00000078
25-Mar-15	18	35	400	275	8.2	331	#N/A	0.052	2.1	0.29	0.014	0.0069	0.0041	2.1	0.000095	0.00015	0.00084	0.00089	0.000000096	0.000000096	0.00029	0.00000012	0.44	0.0000019	0.00000077
8-Apr-15	19	37	400	335	8.1	322	#N/A	0.072	2.6	0.42	0.017	0.0084	0.0050	2.4	0.00010	0.00022	0.00093	0.00100	0.00000012	0.00000012	0.00041	0.000000067	0.56	0.0000012	0.00000084
22-Apr-15	20	39	400	270	8.1	338	#N/A	0.070	2.2	0.34	0.014	0.0063	0.0041	2.2	0.000084	0.00015	0.00065	0.00090	0.000000095	0.000000095	0.00034	0.000000095	0.51	0.0000011	0.00000062
6-May-15	21	41	400	240	8.2	343	#N/A	0.053	2.0	0.28	0.012	0.0047	0.0036	2.0	0.00010	0.00012	0.00050	0.00079	0.000000084	0.000000084	0.00026	0.000000036	0.44	0.00000036	0.00000047
20-May-15	22	43	500	435																					
3-Jun-15	23	45	435	315	8.1	307	#N/A	0.039	1.1	0.17	0.0079	0.0035	0.0024	1.1	0.000083	0.000080	0.00036	0.00045	0.000000055	0.000000055	0.00017	0.000000024	0.26	0.00000047	0.00000029
17-Jun-15	24	47	500	435																					
1-Jul-15	25	49	435	315	8.1	319	#N/A	0.036	1.1	0.17	0.0079	0.0033	0.0024	1.1	0.000064	0.000087	0.00042	0.00046	0.000000055	0.000000055	0.00013	0.000000047	0.24	0.00000063	0.00000041
15-Jul-15	26	51	500	375																					
29-Jul-15	27	53	375	270	8.1	298	#N/A	0.020	0.90	0.18	0.0068	0.0028	0.0020	0.91	0.000059	0.000070	0.00030	0.00037	0.000000047	0.000000047	0.00012	0.000000047	0.21	0.00000054	0.00000024
12-Aug-15	28	55	500	430																					
26-Aug-15	29	57	430	270	8.2	299	#N/A	0.013	0.90	0.18	0.0068	0.0028	0.0020	0.91	0.000070	0.000070	0.00032	0.00038	0.000000047	0.000000047	0.00011	0.000000041	0.21	0.00000068	0.00000030
9-Sep-15	30	59	500	425																					
23-Sep-15	31	61	425	335																					
7-Oct-15	32	63	335	245	8.2	321	#N/A	0.013	0.60	0.094	0.00	0.0016	0.00	0.56	0.000035	0.000045	0.00018	0.00020	0.000000029	0.000000029	0.000054	0.000000037	0.13	0.00000053	0.00000012
21-Oct-15	33	65	500	485																					
4-Nov-15	34	67	485	375																					
18-Nov-15	35	69	375	280	8.4	310	#N/A	#N/A	0.74	0.098	0.00	0.0016	0.00	0.65	0.000040	0.000046	0.00024	0.00021	0.000000033	0.000000033	0.000046	0.000000042	0.15	0.00000047	0.0000021
2-Dec-15	36	71	500	455																					
16-Dec-15	37	73	455	410																					
30-Dec-15	38	75	410	350	8.4	316	#N/A	#N/A	0.76	0.13	0.00	0.0019	0.00	0.83	0.000044	0.000055	0.00023	0.00030	0.000000041	0.000000041	0.000072	0.000000018	0.19	0.00000058	0.00000011
6-Jan-16	39	76	400	355	8.3	315	#N/A	#N/A	0.77	0.17	0.00	0.0017	0.00	0.92	0.000038	0.000057	0.00026	0.00034	0.000000041	0.000000041	0.000077	0.00000015	0.21	0.00000041	0.000000024
20-Jan-16	40	78	400	255	8.3	321	#N/A	0.0067	0.56	0.14	0.00	0.0014	0.00	0.67	0.000025	0.000049	0.00022	0.00025	0.000000030	0.000000030	0.000051	0.000000026	0.15	0.00000034	0.00000018
3-Feb-16	41	80	400	310	8.3	292	#N/A	0.030	2.0	0.31	0.00	0.0050	0.00	2.2	0.00010	0.00017	0.00081	0.00082	0.00000011	0.00000011	0.00017	0.000000093	0.50	0.0000011	0.00000051
17-Feb-16	42	82	400	285	8.3	318	#N/A	0.046	2.0	0.26	0.00	0.0048	0.00	2.3	0.000091	0.00017	0.00078	0.0010	0.000000100	0.000000100	0.00017	0.000000043	0.52	0.0000017	0.00000040
2-Mar-16	43	84	400	335	8.3	296	#N/A	0.018	2.2	0.23	0.00	0.0059	0.00	2.4	0.000074	0.00019	0.0010	0.0010	0.00000012	0.00000012	0.00017	0.00000022	0.54	0.0000020	0.00000045

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Calculated Loading Rates for Col 6 (GT)

Date	Cycle	Weeks	Volume (mL)		pH	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.		Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
30-Jul-14	1	1	1200	370	8.1	0.00060	0.011	0.0000026	0.00041	1.4	0.0026	0.015	0.0020	0.00032	0.0019	0.88	0.00024	0.17	0.0000031	5.4	0.016	6.3	0.0000077	0.000019	0.000022	0.016	0.000014	0.00011	0.000074
13-Aug-14	2	3	400	300	8.2	0.000088	0.000030	0.0000011	0.00011	0.28	0.00039	0.00015	0.00097	0.00011	0.00036	0.21	0.000033	0.068	0.000000030	0.65	0.0032	1.0	0.0000023	0.00000045	0.0000029	0.0062	0.00000075	0.000015	0.000030
27-Aug-14	3	5	400	310	8.2	0.000042	0.000031	0.00000062	0.000093	0.23	0.00016	0.00016	0.0011	0.000060	0.00040	0.20	0.000019	0.071	0.000000031	0.78	0.0028	0.63	0.0000021	0.0000029	0.00000078	0.0051	0.0000022	0.000016	0.000031
10-Sep-14	4	7	400	310	8.3	0.000031	0.00011	0.00000047	0.000082	0.20	0.00011	0.00016	0.00100	0.000022	0.00031	0.17	0.000012	0.085	0.000000031	0.82	0.0029	0.44	0.0000024	0.00000093	0.00000078	0.0043	0.0000026	0.000016	0.000031
24-Sep-14	5	9	400	240	8.2	0.000024	0.000024	0.00000036	0.000072	0.17	0.000062	0.00012	0.00068	0.000020	0.00016	0.14	0.0000041	0.054	0.000000084	0.51	0.0021	0.23	0.0000020	0.0000014	0.0000040	0.0030	0.0000018	0.000036	0.000024
8-Oct-14	6	11	300	220	8.2	0.000016	0.000077	0.00000088	0.000073	0.16	0.000030	0.00011	0.00055	0.0000099	0.00017	0.12	0.0000037	0.051	0.000000022	0.36	0.0025	0.18	0.0000018	0.00000044	0.0000011	0.0028	0.0000017	0.000011	0.000022
22-Oct-14	7	13	400	295	8.3	0.000018	0.00010	0.0000028	0.000075	0.23	0.000068	0.00015	0.00074	0.000012	0.00022	0.17	0.0000043	0.075	0.000000030	0.39	0.0030	0.23	0.0000023	0.00000015	0.0000016	0.0037	0.0000021	0.000015	0.000030
5-Nov-14	8	15	400	275		0.000018	0.000096	0.00000083	0.000070	0.22	0.000049	0.00014	0.00066	0.0000096	0.00015	0.14	0.0000033	0.064	0.000000028	0.24	0.0032	0.17	0.0000021	0.00000083	0.0000018	0.0034	0.0000018	0.000014	0.000028
19-Nov-14	9	17	400	270	8.3	0.000015	0.000095	0.0000018	0.000077	0.24	0.0000024	0.00014	0.00057	0.0000081	0.00019	0.15	0.0000027	0.066	0.000000027	0.17	0.0034	0.16	0.0000032	0.00000041	0.0000012	0.0035	0.0000019	0.000027	0.000027
3-Dec-14	10	19	400	335	8.3	0.000026	0.00012	0.00000017	0.000077	0.27	0.000029	0.00017	0.00063	0.000012	0.00015	0.17	0.0000032	0.075	0.000000034	0.15	0.0043	0.17	0.0000026	0.00000034	0.0000015	0.0038	0.0000023	0.000017	0.000034
17-Dec-14	11	21	400	290	8.2	0.000016	0.00010	0.00000015	0.000069	0.25	0.0000015	0.00015	0.00057	0.0000087	0.000058	0.17	0.0000026	0.065	0.000000029	0.11	0.0038	0.15	0.0000022	0.00000015	0.0000012	0.0035	0.0000023	0.000015	0.000029
31-Dec-14	12	23	400	290	8.2	0.000015	0.00010	0.00000015	0.000063	0.24	0.000020	0.00015	0.00055	0.0000087	0.00019	0.15	0.0000023	0.069	0.000000029	0.085	0.0037	0.13	0.0000022	0.0000012	0.0000016	0.0035	0.0000022	0.000015	0.000029
14-Jan-15	13	25	400	275	8.2	0.000011	0.000096	0.00000041	0.000062	0.24	0.000018	0.00014	0.00055	0.0000083	0.000041	0.15	0.0000022	0.065	0.000000028	0.067	0.0036	0.11	0.0000021	0.00000069	0.0000012	0.0034	0.0000021	0.000014	0.000028
28-Jan-15	14	27	400	285	8.2	0.0000090	0.000100	0.0000017	0.000053	0.25	0.000016	0.00014	0.00051	0.0000057	0.000043	0.15	0.0000026	0.061	0.000000029	0.064	0.0029	0.12	0.0000020	0.00000086	0.0000017	0.0036	0.0000031	0.000029	0.000029
11-Feb-15	15	29	400	300	8.2	0.000018	0.00011	0.00000015	0.000064	0.26	0.000010	0.00015	0.00051	0.0000075	0.000090	0.16	0.000015	0.066	0.000000030	0.057	0.0038	0.13	0.0000021	0.0000027	0.0000015	0.0037	0.0000027	0.000015	0.000030
25-Feb-15	16	31	400	275	8.2	0.000015	0.000096	0.00000041	0.000060	0.23	0.000010	0.00014	0.00043	0.0000069	0.000041	0.16	0.000014	0.065	0.000000028	0.046	0.0036	0.11	0.0000023	0.0000018	0.00000083	0.0037	0.0000015	0.000014	0.000028
11-Mar-15	17	33	400	300	8.3	0.000034	0.00011	0.00000015	0.000062	0.23	0.0000072	0.00015	0.00047	0.0000075	0.00012	0.15	0.000015	0.058	0.000000030	0.040	0.0037	0.12	0.0000023	0.00000030	0.00000090	0.0038	0.0000026	0.000030	0.000030
25-Mar-15	18	35	400	275	8.2	0.000015	0.000096	0.00000014	0.000054	0.24	0.0000061	0.00014	0.00049	0.0000069	0.000096	0.15	0.000014	0.066	0.000000028	0.042	0.0035	0.11	0.0000022	0.0000025	0.0000015	0.0035	0.0000029	0.000014	0.000028
8-Apr-15	19	37	400	335	8.1	0.000010	0.00012	0.00000017	0.000067	0.25	0.0000042	0.00017	0.00047	0.0000067	0.00018	0.18	0.000017	0.084	0.000000034	0.037	0.0042	0.13	0.0000025	0.0000010	0.0000012	0.0043	0.0000023	0.000017	0.000034
22-Apr-15	20	39	400	270	8.1	0.000025	0.000095	0.0000028	0.000057	0.23	0.0000062	0.00014	0.00034	0.0000068	0.00012	0.15	0.0000023	0.066	0.000000041	0.030	0.0037	0.10	0.0000023	0.0000055	0.00000095	0.0034	0.0000022	0.000014	0.000027
6-May-15	21	41	400	240	8.2	0.000014	0.000084	0.00000012	0.000051	0.21	0.0000088	0.00012	0.00027	0.0000060	0.000060	0.13	0.000012	0.058	0.000000036	0.024	0.0032	0.096	0.0000018	0.00000012	0.00000072	0.0029	0.0000025	0.000012	0.000024
20-May-15	22	43	500	435																									
3-Jun-15	23	45	435	315	8.1	0.000010	0.000055	0.0000010	0.000029	0.12	0.0000024	0.000079	0.00018	0.0000032	0.000079	0.079	0.0000011	0.036	0.000000016	0.012	0.0019	0.061	0.00000098	0.00000024	0.00000055	0.0019	0.0000013	0.0000079	0.000016
17-Jun-15	24	47	500	435																									
1-Jul-15	25	49	435	315	8.1	0.0000047	0.000055	0.000000079	0.000027	0.11	0.0000062	0.000079	0.00017	0.0000024	0.000095	0.072	0.0000011	0.036	0.000000016	0.010	0.0018	0.059	0.0000012	0.00000063	0.00000055	0.0019	0.0000013	0.0000079	0.000016
15-Jul-15	26	51	500	375																									
29-Jul-15	27	53	375	270	8.1	0.0000061	0.000047	0.00000047	0.000024	0.097	0.0000011	0.000068	0.00014	0.0000020	0.000027	0.061	0.00000068	0.028	0.000000014	0.0078	0.0016	0.059	0.00000092	0.00000034	0.00000034	0.0018	0.0000011	0.0000068	0.000014
12-Aug-15	28	55	500	430																									
26-Aug-15	29	57	430	270	8.2	0.0000039	0.000047	0.00000041	0.000021	0.096	0.0000038	0.000068	0.00015	0.0000020	0.000041	0.059	0.00000088	0.029	0.00000018	0.0080	0.0016	0.057	0.00000088	0.00000014	0.00000034	0.0017	0.0000012	0.0000068	0.000014
9-Sep-15	30	59	500	425																									
23-Sep-15	31	61	425	335																									
7-Oct-15	32	63	335	245	8.2	0.0000024	0.000029	0.000000041	0.000011	0.060	0.00000065	0.000041	0.000060	0.0000012	0.000020	0.034	0.00000041	0.016	0.0000000082	0.0043	0.00088	0.031	0.00000039	0.00000053	0.00000020	0.00095	0.00000069	0.0000082	0.0000082
21-Oct-15	33	65	500	485																									
4-Nov-15	34	67	485	375																									
18-Nov-15	35	69	375	280	8.4	0.0000066	0.000079	0.0000013	0.000012	0.069	0.000037	0.000047	0.000082	0.0000037	0.000033	0.041	0.0000013	0.019	0.000000056	0.0051	0.0011	0.041	0.00000056	0.00000028	0.00000023	0.00096	0.00000075	0.0000047	0.0000093
2-Dec-15	36	71	500	455																									
16-Dec-15	37	73	455	410																									
30-Dec-15	38	75	410	350	8.4	0.0000041	0.000041	0.0000016	0.000014	0.087	0.00000058	0.000058	0.000094	0.0000012	0.000053	0.048	0.00000064	0.024	0.000000012	0.0060	0.0011	0.043	0.00000055	0.00000064	0.00000029	0.0014	0.00000082	0.0000058	0.000012
6-Jan-16	39	76	400	355	8.3	0.0000059	0.000041	0.00000065	0.000016	0.096	0.00000047	0.000059	0.000083	0.0000012	0.000041	0.054	0.0000019	0.027	0.000000012	0.0062	0.0013	0.055	0.00000050	0.0000019	0.00000030	0.0015	0.00000065	0.0000059	0.000012
20-Jan-16	40	78	400	255	8.3	0.0000023	0.000030	0.00000021	0.000012	0.070	0.0000045	0.000043	0.000075	0.0000013	0.000026	0.038	0.00000060	0.020	0.0000000085	0.0046	0.0011	0.041	0.00000057	0.00000013	0.00000021	0.0013	0.00000060	0.0000043	0.0000085
3-Feb-16	41	80	400	310	8.3	0.000010	0.00011	0.00000047	0.000042	0.23	0.00000016	0.00016	0.00023	0.0000047	0.00012	0.14	0.0000033	0.068	0.00000022	0.016	0.0036	0.12	0.0000021	0.00000062	0.00000078	0.0038	0.0000022	0.000016	0.000031
17-Feb-16	42	82	400	285	8.3	0.000011	0.000100	0.00000014	0.000043	0.24	0.0000020	0.00014	0.00025	0.0000043	0.00014	0.13	0.00000100	0.064	0.000000029	0.017	0.0035	0.098	0.0000023	0.0000011	0.00000071	0.0039	0.0000020	0.000014	0.000029
2-Mar-16	43	84	400	335	8.3	0.0000060	0.00012	0.0000028	0.000044	0.26	0.0000022	0.00017	0.00028	0.0000034	0.000067	0.15	0.0000012	0.075	0.000000034	0.019	0.0039	0.11	0.0000023	0.00000034	0.00000084	0.0038	0.0000020	0.000017	0.000034

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 13 (OKY Master)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	mgCaCO$_3$/L	mgCaCO$_3$/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
20-May-15	1	1	2000	415	7.0	1431	#N/A	9.4	80	333	36	#N/A	< 0.3	272	0.012	0.0046	0.057	0.031	0.000037	< 0.000007	0.12	0.000062	77	0.000060	0.020
3-Jun-15	2	3	400	360	7.7	301	#N/A	6.8	83	67	6.0	0.18	< 0.3	29	0.0050	0.0069	0.20	0.0034	0.0000090	< 0.000007	0.16	< 0.000003	8.2	0.000060	0.0025
17-Jun-15	3	5	300	260	7.7	282	#N/A	5.2	85	45	< 1	0.18	< 0.3	30	0.0042	0.0071	0.23	0.0034	0.000010	< 0.000007	0.14	0.0000040	8.5	0.000040	0.0026
1-Jul-15	4	7	300	280	7.8	300	#N/A	6.6	78	52	8.0	0.20	< 0.3	31	0.0050	0.0066	0.14	0.0033	0.0000090	< 0.000007	0.16	0.000012	8.5	0.000080	0.0028
15-Jul-15	5	9	300	265	7.8	293	#N/A	5.8	70	66	4.0	0.20	< 0.3	32	0.0043	0.0064	0.10	0.0038	< 0.000007	< 0.000007	0.16	0.0000040	8.8	0.000060	0.0034
29-Jul-15	6	11	300	250	7.7	307	#N/A	3.5	57	87	2.0	0.20	< 0.3	35	0.0049	0.0060	0.081	0.0036	0.0000070	< 0.000007	0.13	0.000010	10	0.00011	0.0032
12-Aug-15	7	13	300	295	7.7	301	#N/A	3.8	51	90	< 1	0.19	< 0.3	36	0.0044	0.0060	0.086	0.0037	< 0.000007	0.0000090	0.13	0.000011	10	0.00024	0.0033
26-Aug-15	8	15	300	250	7.6	262	#N/A	3.8	40	81	< 1	0.22	< 0.3	29	0.0043	0.0066	0.096	0.0028	< 0.000007	< 0.000007	0.13	0.000012	8.2	< 0.00003	0.0023
9-Sep-15	9	17	300	235	7.5	230	#N/A	3.9	31	69	< 1	0.25	< 0.3	24	0.0038	0.0071	0.11	0.0023	< 0.000007	< 0.000007	0.12	0.0000030	6.8	0.000050	0.0018
23-Sep-15	10	19	300	250	7.5	197	#N/A	3.0	23	63	< 1	0.25	-	19	0.0039	0.0076	0.12	0.0018	< 0.000007	< 0.000007	0.12	< 0.000003	5.5	0.00017	0.0013
7-Oct-15	11	21	300	230	7.5	181	#N/A	3.1	22	55	< 1	0.27	-	15	0.0047	0.0077	0.10	0.0014	< 0.000007	< 0.000007	0.089	0.0000040	4.3	0.000030	0.0011
21-Oct-15	12	23	350	275	7.8	164	#N/A	1.5	24	41	< 1	0.28	-	14	0.0075	0.0069	0.11	0.0016	< 0.000007	< 0.000007	0.070	0.0000050	3.9	0.00020	0.00095
4-Nov-15	13	25	300	230	7.4	152	#N/A	2.3	17	39	< 1	0.26	-	15	0.0073	0.0076	0.12	0.0015	< 0.000007	< 0.000007	0.091	0.0000070	4.2	0.000070	0.0013
18-Nov-15	14	27	300	245	7.6	146	#N/A	1.4	22	42	< 1	0.26	-	13	0.0025	0.0070	0.11	0.0011	< 0.000007	< 0.000007	0.068	< 0.000003	3.6	< 0.00003	0.0012
2-Dec-15	15	29	300	240	7.3	137	#N/A	3.6	17	39	< 1	0.29	-	13	0.0052	0.0077	0.13	0.0015	< 0.000007	< 0.000007	0.063	0.000010	3.6	0.00028	0.00098
16-Dec-15	16	31	300	235	7.6	129	#N/A	4.1	18	39	< 1	0.24	-	13	0.0039	0.0073	0.11	0.0014	< 0.000007	< 0.000007	0.066	0.0000070	3.6	0.000060	0.0012
30-Dec-15	17	33	300	385	7.5	126	#N/A	2.8	16	31	< 1	0.28	-	13	0.0039	0.0073	0.12	0.0014	< 0.000007	< 0.000007	0.070	0.0000040	3.5	0.000040	0.0011
13-Jan-16	18	35	300	290	7.4	118	#N/A	2.8	17	31	< 1	0.26	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	19	37	300	300	7.5	120	#N/A	3.7	21	32	< 1	0.29	-	12	0.020	0.0069	0.10	0.0016	< 0.000007	< 0.000007	0.057	0.0000080	3.3	< 0.00003	0.00095
10-Feb-16	20	39	300	275	7.5	119	#N/A	3.4	23	30	< 1	0.26	-	13	0.0033	0.0073	0.11	0.0013	< 0.000007	< 0.000007	0.047	0.0000050	3.6	< 0.00003	0.0011
24-Feb-16	21	41	300	300	7.5	119	#N/A	3.4	22	28	< 1	0.26	-	12	0.0022	0.0073	0.11	0.0013	< 0.000007	< 0.000007	0.050	0.0000060	3.3	< 0.00003	0.0011
9-Mar-16	22	43	300	335	7.5	119	#N/A	3.0	22	23															

Calculated Loading Rates for Col 13 (OKY Master)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	mgCaCO$_3$/kg/wk	mgCaCO$_3$/kg/wk	mgCaCO$_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mgCaCO$_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
20-May-15	1	1	2000	415	7.0	1431	#N/A	0.39	3.3	14	1.5	#N/A	0.012	11	0.00048	0.00019	0.0023	0.0013	0.0000015	0.00000029	0.0049	0.0000026	3.2	0.0000025	0.00081
3-Jun-15	2	3	400	360	7.7	301	#N/A	0.12	1.5	1.2	0.11	0.0032	0.0054	0.52	0.000090	0.00012	0.0036	0.000062	0.00000016	0.00000013	0.0028	0.000000054	0.15	0.0000011	0.000045
17-Jun-15	3	5	300	260	7.7	282	#N/A	0.067	1.1	0.59	0.013	0.0023	0.0039	0.39	0.000055	0.000092	0.0029	0.000044	0.00000013	0.000000091	0.0018	0.000000052	0.11	0.00000052	0.000034
1-Jul-15	4	7	300	280	7.8	300	#N/A	0.093	1.1	0.73	0.11	0.0028	0.0042	0.43	0.000070	0.000092	0.0020	0.000046	0.00000013	0.000000098	0.0022	0.00000017	0.12	0.0000011	0.000040
15-Jul-15	5	9	300	265	7.8	293	#N/A	0.077	0.92	0.87	0.053	0.0027	0.0040	0.43	0.000057	0.000085	0.0014	0.000050	0.000000093	0.000000093	0.0021	0.000000053	0.12	0.00000080	0.000045
29-Jul-15	6	11	300	250	7.7	307	#N/A	0.044	0.71	1.1	0.025	0.0025	0.0038	0.44	0.000061	0.000075	0.0010	0.000045	0.000000088	0.000000088	0.0017	0.00000013	0.13	0.0000014	0.000040
12-Aug-15	7	13	300	295	7.7	301	#N/A	0.056	0.75	1.3	0.015	0.0028	0.0044	0.53	0.000065	0.000089	0.0013	0.000054	0.00000010	0.00000013	0.0018	0.00000016	0.15	0.0000035	0.000049
26-Aug-15	8	15	300	250	7.6	262	#N/A	0.048	0.50	1.0	0.013	0.0028	0.0038	0.36	0.000054	0.000083	0.0012	0.000035	0.000000088	0.000000088	0.0016	0.00000015	0.10	0.00000038	0.000029
9-Sep-15	9	17	300	235	7.5	230	#N/A	0.045	0.36	0.81	0.012	0.0029	0.0035	0.28	0.000045	0.000083	0.0013	0.000027	0.000000082	0.000000082	0.0015	0.000000035	0.080	0.00000059	0.000022
23-Sep-15	10	19	300	250	7.5	197	#N/A	0.037	0.29	0.79	0.013	0.0031	0.00	0.24	0.000049	0.000095	0.0015	0.000023	0.000000088	0.000000088	0.0015	0.000000038	0.068	0.0000021	0.000017
7-Oct-15	11	21	300	230	7.5	181	#N/A	0.035	0.25	0.63	0.012	0.0031	0.00	0.17	0.000054	0.000089	0.0012	0.000016	0.000000081	0.000000081	0.0010	0.000000046	0.049	0.00000035	0.000012
21-Oct-15	12	23	350	275	7.8	164	#N/A	0.020	0.32	0.56	0.014	0.0039	0.00	0.19	0.00010	0.000095	0.0015	0.000022	0.000000096	0.000000096	0.00096	0.000000069	0.054	0.0000028	0.000013
4-Nov-15	13	25	300	230	7.4	152	#N/A	0.027	0.20	0.45	0.012	0.0030	0.00	0.17	0.000084	0.000087	0.0013	0.000018	0.000000081	0.000000081	0.0010	0.000000081	0.049	0.00000081	0.000015
18-Nov-15	14	27	300	245	7.6	146	#N/A	0.018	0.27	0.51	0.012	0.0032	0.00	0.16	0.000031	0.000086	0.0014	0.000014	0.000000086	0.000000086	0.00083	0.000000037	0.044	0.00000037	0.000015
2-Dec-15	15	29	300	240	7.3	137	#N/A	0.043	0.21	0.47	0.012	0.0035	0.00	0.16	0.000062	0.000092	0.0015	0.000017	0.000000084	0.000000084	0.00075	0.00000012	0.043	0.0000034	0.000012
16-Dec-15	16	31	300	235	7.6	129	#N/A	0.048	0.21	0.46	0.012	0.0028	0.00	0.15	0.000046	0.000086	0.0013	0.000017	0.000000082	0.000000082	0.00077	0.000000082	0.042	0.00000071	0.000014
30-Dec-15	17	33	300	385	7.5	126	#N/A	0.054	0.31	0.60	0.019	0.0054	0.00	0.24	0.000075	0.00014	0.0022	0.000028	0.00000013	0.00000013	0.0014	0.000000077	0.068	0.00000077	0.000021
13-Jan-16	18	35	300	290	7.4	118	#N/A	0.041	0.24	0.45	0.015	0.0038	0.00												
27-Jan-16	19	37	300	300	7.5	120	#N/A	0.056	0.31	0.48	0.015	0.0044	0.00	0.18	0.00030	0.00010	0.0016	0.000024	0.00000011	0.00000011	0.00086	0.00000012	0.050	0.00000045	0.000014
10-Feb-16	20	39	300	275	7.5	119	#N/A	0.047	0.31	0.41	0.014	0.0036	0.00	0.17	0.000045	0.00010	0.0016	0.000018	0.000000096	0.000000096	0.00065	0.000000069	0.050	0.00000041	0.000015
24-Feb-16	21	41	300	300	7.5	119	#N/A	0.051	0.33	0.42	0.015	0.0039	0.00	0.18	0.000033	0.00011	0.0017	0.000019	0.00000011	0.00000011	0.00075	0.000000090	0.050	0.00000045	0.000016
9-Mar-16	22	43	300	335	7.5	119	#N/A	0.050	0.36	0.39															

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 13 (OKY Master)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cu**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.		Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
20-May-15	1	1	2000	415	7.0	0.0011	0.056	0.00014	0.023	19	2.3	0.050	0.0011	0.0042	0.023	31	0.0020	14	0.000056	120	0.36	125	0.00024	0.000070	0.00020	0.0030	0.00010	0.049	*< 0.002*
3-Jun-15	2	3	400	360	7.7	0.0013	*< 0.007*	0.000070	0.0096	2.1	0.54	0.030	0.0015	0.00080	0.0080	12	*< 0.001*	14	0.000032	42	0.036	22	0.000070	0.00011	0.00017	0.0029	0.00013	0.0070	*< 0.002*
17-Jun-15	3	5	300	260	7.7	0.00059	*< 0.007*	*< 0.00001*	0.0085	2.1	0.66	*< 0.01*	0.0023	0.00070	0.0060	12	0.00021	15	0.000010	40	0.038	26	0.000078	0.000090	0.00021	0.0037	0.00011	0.0060	*< 0.002*
1-Jul-15	4	7	300	280	7.8	0.00077	*< 0.007*	*< 0.00001*	0.0093	2.3	0.79	0.020	0.0022	0.00080	*< 0.003*	11	0.00020	15	0.000017	39	0.041	26	0.000074	0.00015	0.00022	0.0037	0.00013	0.0060	*< 0.002*
15-Jul-15	5	9	300	265	7.8	0.0034	*< 0.007*	0.000060	0.0099	2.5	1.0	*< 0.01*	0.0022	0.00090	*< 0.003*	11	0.00019	15	0.000017	41	0.045	29	0.000082	0.00044	0.00025	0.0038	0.00012	0.0070	*< 0.002*
29-Jul-15	6	11	300	250	7.7	0.00059	*< 0.007*	0.000020	0.011	2.5	1.1	0.010	0.0023	0.00080	*< 0.003*	12	0.00014	14	0.000010	37	0.046	30	0.000069	0.000060	*< 0.00005*	0.0035	0.00011	0.0050	*< 0.002*
12-Aug-15	7	13	300	295	7.7	0.00055	*< 0.007*	0.000010	0.0095	2.6	1.1	*< 0.01*	0.0025	0.00090	0.0030	12	0.00013	15	0.000012	36	0.047	27	0.000087	0.000090	*< 0.00005*	0.0026	0.00010	0.0050	*< 0.002*
26-Aug-15	8	15	300	250	7.6	0.00090	*< 0.007*	0.00010	0.0091	1.9	0.90	0.010	0.0022	0.00060	0.0040	10	0.00013	15	0.0000090	31	0.037	24	0.000065	0.00013	*< 0.00005*	0.0021	0.00012	0.0040	*< 0.002*
9-Sep-15	9	17	300	235	7.5	0.00093	*< 0.007*	0.000040	0.0071	1.7	0.75	*< 0.01*	0.0038	0.00060	*< 0.003*	10	0.00010	14	0.0000080	28	0.029	27	0.000066	0.00015	*< 0.00005*	0.0015	0.00014	0.0030	*< 0.002*
23-Sep-15	10	19	300	250	7.5	0.00092	*< 0.007*	0.000020	0.0065	1.3	0.60	*< 0.01*	0.0021	0.00040	*< 0.003*	8.6	0.000090	15	0.000086	24	0.024	21	0.000042	0.00010	0.00015	0.0011	0.00010	0.0030	*< 0.002*
7-Oct-15	11	21	300	230	7.5	0.00061	*< 0.007*	0.000020	0.0057	1.1	0.51	*< 0.01*	0.0037	0.00040	*< 0.003*	7.5	0.000050	13	0.000010	20	0.019	18	0.000059	0.00016	*< 0.00005*	0.0012	0.000090	0.0020	*< 0.002*
21-Oct-15	12	23	350	275	7.8	0.0014	*< 0.007*	0.000030	0.0047	0.97	0.45	*< 0.01*	0.0034	0.00040	0.0050	7.3	*< 0.00004*	14	0.0000060	17	0.016	15	0.000066	0.00016	0.000070	0.00087	0.00018	0.0020	*< 0.002*
4-Nov-15	13	25	300	230	7.4	0.00065	*< 0.007*	*< 0.00001*	0.0057	1.1	0.53	*< 0.01*	0.0040	0.00040	*< 0.003*	6.9	0.000070	14	0.0000020	18	0.019	17	0.000067	0.00016	0.00013	0.0012	0.00030	0.0030	*< 0.002*
18-Nov-15	14	27	300	245	7.6	0.00096	*< 0.007*	0.000070	0.0052	0.95	0.46	*< 0.01*	0.0039	0.00040	*< 0.003*	7.2	0.00011	14	*< 0.000002*	17	0.017	15	0.000052	0.000090	*< 0.00005*	0.0011	0.00010	0.0030	*< 0.002*
2-Dec-15	15	29	300	240	7.3	0.0013	*< 0.007*	0.000060	0.0050	0.98	0.45	*< 0.01*	0.0046	0.00030	0.0030	7.6	0.000090	14	0.0000020	18	0.016	15	0.000037	0.00018	*< 0.00005*	0.0010	0.00014	0.0040	*< 0.002*
16-Dec-15	16	31	300	235	7.6	0.00043	*< 0.007*	0.00017	0.0054	0.95	0.49	*< 0.01*	0.0043	0.00040	*< 0.003*	7.2	0.000060	15	*< 0.000002*	16	0.017	13	0.000075	0.000080	*< 0.00005*	0.0016	0.00012	0.0030	*< 0.002*
30-Dec-15	17	33	300	385	7.5	0.00061	*< 0.007*	0.00015	0.0058	0.94	0.49	0.010	0.0039	0.00040	0.0040	7.0	*< 0.00004*	14	0.0000030	16	0.016	12	0.000051	0.000040	0.000090	0.0012	0.00012	0.0030	*< 0.002*
13-Jan-16	18	35	300	290	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	19	37	300	300	7.5	0.00056	*< 0.007*	0.000030	0.0047	0.84	0.46	*< 0.01*	0.0021	0.00030	0.0060	6.7	*< 0.00004*	15	0.0000020	14	0.015	11	0.000046	0.00014	*< 0.00005*	0.00084	0.00012	0.0030	*< 0.002*
10-Feb-16	20	39	300	275	7.5	0.0026	*< 0.007*	0.00013	0.0050	0.85	0.48	*< 0.01*	0.0023	0.00030	0.0030	6.6	0.00017	16	*< 0.000002*	13	0.016	10	0.000043	0.00011	*< 0.00005*	0.00080	0.00012	0.0040	*< 0.002*
24-Feb-16	21	41	300	300	7.5	0.00054	*< 0.007*	0.000040	0.0051	0.86	0.49	0.020	0.0022	0.00040	0.0070	6.8	0.000040	16	0.0000020	12	0.015	9.6	0.000041	0.000050	0.000060	0.00089	0.000080	0.0050	*< 0.002*
9-Mar-16	22	43	300	335	7.5																								

Calculated Loading Rates for Col 13 (OKY Master)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cu**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.		Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
20-May-15	1	1	2000	415	7.0	0.000046	0.0023	0.0000058	0.00097	0.80	0.096	0.0021	0.000045	0.00017	0.00095	1.3	0.000083	0.60	0.0000023	5.0	0.015	5.2	0.000010	0.0000029	0.0000083	0.00012	0.0000042	0.0020	0.000083
3-Jun-15	2	3	400	360	7.7	0.000023	0.00013	0.0000013	0.00017	0.037	0.0097	0.00054	0.000028	0.000014	0.00014	0.21	0.000018	0.25	0.00000058	0.76	0.00065	0.39	0.0000013	0.0000020	0.0000031	0.000052	0.0000023	0.00013	0.000036
17-Jun-15	3	5	300	260	7.7	0.0000077	0.000091	0.00000013	0.00011	0.027	0.0086	0.00013	0.000030	0.0000091	0.000078	0.15	0.0000027	0.19	0.00000013	0.52	0.00049	0.34	0.0000010	0.0000012	0.0000027	0.000048	0.0000014	0.000078	0.000026
1-Jul-15	4	7	300	280	7.8	0.000011	0.000098	0.00000014	0.00013	0.032	0.011	0.00028	0.000031	0.000011	0.000042	0.16	0.0000028	0.21	0.00000024	0.55	0.00058	0.36	0.0000010	0.0000021	0.0000031	0.000052	0.0000018	0.000084	0.000028
15-Jul-15	5	9	300	265	7.8	0.000045	0.000093	0.00000080	0.00013	0.034	0.014	0.00013	0.000029	0.000012	0.000040	0.14	0.0000025	0.20	0.00000023	0.54	0.00059	0.38	0.0000011	0.0000058	0.0000033	0.000050	0.0000016	0.000093	0.000027
29-Jul-15	6	11	300	250	7.7	0.0000074	0.000088	0.00000025	0.00013	0.031	0.014	0.00013	0.000029	0.000010	0.000038	0.15	0.0000018	0.18	0.00000013	0.46	0.00057	0.38	0.00000086	0.00000075	0.00000063	0.000044	0.0000014	0.000063	0.000025
12-Aug-15	7	13	300	295	7.7	0.0000081	0.00010	0.00000015	0.00014	0.038	0.017	0.00015	0.000037	0.000013	0.000044	0.18	0.0000019	0.22	0.00000018	0.53	0.00069	0.40	0.0000013	0.0000013	0.00000074	0.000038	0.0000015	0.000074	0.000030
26-Aug-15	8	15	300	250	7.6	0.000011	0.000088	0.0000013	0.00011	0.024	0.011	0.00013	0.000028	0.0000075	0.000050	0.13	0.0000016	0.18	0.00000011	0.39	0.00046	0.29	0.00000081	0.0000016	0.00000063	0.000027	0.0000015	0.000050	0.000025
9-Sep-15	9	17	300	235	7.5	0.000011	0.000082	0.00000047	0.000083	0.020	0.0089	0.00012	0.000044	0.0000071	0.000035	0.12	0.0000012	0.16	0.000000094	0.32	0.00034	0.32	0.00000078	0.0000018	0.00000059	0.000018	0.0000016	0.000035	0.000024
23-Sep-15	10	19	300	250	7.5	0.000012	0.000088	0.00000025	0.000081	0.016	0.0075	0.00013	0.000026	0.0000050	0.000038	0.11	0.0000011	0.19	0.0000011	0.30	0.00030	0.27	0.00000053	0.0000013	0.0000019	0.000014	0.0000013	0.000038	0.000025
7-Oct-15	11	21	300	230	7.5	0.0000070	0.000081	0.00000023	0.000066	0.012	0.0058	0.00012	0.000043	0.0000046	0.000035	0.087	0.00000058	0.15	0.00000012	0.23	0.00022	0.21	0.00000068	0.0000018	0.00000058	0.000014	0.0000010	0.000023	0.000023
21-Oct-15	12	23	350	275	7.8	0.000019	0.000096	0.00000041	0.000064	0.013	0.0061	0.00014	0.000047	0.0000055	0.000069	0.100	0.00000055	0.19	0.000000083	0.24	0.00022	0.21	0.00000091	0.0000022	0.00000096	0.000012	0.0000025	0.000028	0.000028
4-Nov-15	13	25	300	230	7.4	0.0000075	0.000081	0.00000012	0.000065	0.013	0.0061	0.00012	0.000046	0.0000046	0.000035	0.079	0.00000081	0.16	0.000000023	0.21	0.00022	0.19	0.00000077	0.0000018	0.0000015	0.000014	0.0000035	0.000035	0.000023
18-Nov-15	14	27	300	245	7.6	0.000012	0.000086	0.00000086	0.000063	0.012	0.0056	0.00012	0.000047	0.0000049	0.000037	0.088	0.0000013	0.17	0.000000025	0.20	0.00020	0.18	0.00000064	0.0000011	0.00000061	0.000013	0.0000012	0.000037	0.000025
2-Dec-15	15	29	300	240	7.3	0.000015	0.000084	0.00000072	0.000060	0.012	0.0054	0.00012	0.000055	0.0000036	0.000036	0.091	0.0000011	0.17	0.000000024	0.21	0.00020	0.18	0.00000044	0.0000022	0.00000060	0.000012	0.0000017	0.000048	0.000024
16-Dec-15	16	31	300	235	7.6	0.0000051	0.000082	0.0000020	0.000063	0.011	0.0057	0.00012	0.000051	0.0000047	0.000035	0.084	0.00000071	0.18	0.000000024	0.18	0.00020	0.15	0.00000088	0.00000094	0.00000059	0.000018	0.0000014	0.000035	0.000024
30-Dec-15	17	33	300	385	7.5	0.000012	0.00013	0.0000029	0.00011	0.018	0.0094	0.00019	0.000075	0.0000077	0.000077	0.13	0.00000077	0.27	0.000000058	0.30	0.00031	0.22	0.00000098	0.00000077	0.0000017	0.000023	0.0000023	0.000058	0.000039
13-Jan-16	18	35	300	290	7.4																								
27-Jan-16	19	37	300	300	7.5	0.0000084	0.00011	0.00000045	0.000071	0.013	0.0070	0.00015	0.000031	0.0000045	0.000090	0.10	0.00000060	0.23	0.000000030	0.20	0.00023	0.16	0.00000069	0.0000021	0.00000075	0.000013	0.0000018	0.000045	0.000030
10-Feb-16	20	39	300	275	7.5	0.000036	0.000096	0.0000018	0.000069	0.012	0.0066	0.00014	0.000032	0.0000041	0.000041	0.091	0.0000023	0.22	0.000000028	0.18	0.00021	0.14	0.00000059	0.0000015	0.00000069	0.000011	0.0000017	0.000055	0.000028
24-Feb-16	21	41	300	300	7.5	0.0000081	0.00011	0.00000060	0.000077	0.013	0.0073	0.00030	0.000033	0.0000060	0.00011	0.10	0.00000060	0.24	0.000000030	0.18	0.00023	0.14	0.00000062	0.00000075	0.00000090	0.000013	0.0000012	0.000075	0.000030
9-Mar-16	22	43	300	335	7.5																								

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 14 (OKY Master (Fresh))

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
20-May-15	1	1	2000	575	8.0	782	#N/A	7.5	210	431	48	#N/A	*< 0.3*	569	0.0057	0.0062	0.050	0.043	*< 0.000007*	*< 0.000007*	0.048	0.000034	174	0.000050	0.0068
3-Jun-15	2	3	400	395	8.1	556	#N/A	6.0	200	78	9.0	0.80	*< 0.3*	119	0.0070	0.0085	0.057	0.022	*< 0.000007*	*< 0.000007*	0.075	0.000014	35	0.000060	0.0014
17-Jun-15	3	5	300	270	8.1	582	#N/A	5.4	193	79	*< 1*	0.70	*< 0.3*	140	0.0044	0.0085	0.048	0.027	*< 0.000007*	*< 0.000007*	0.074	0.000019	43	0.000050	0.0016
1-Jul-15	4	7	300	230	8.1	666	#N/A	6.1	187	126	7.0	0.70	*< 0.3*	159	0.0068	0.0076	0.041	0.032	*< 0.000007*	*< 0.000007*	0.084	0.000013	48	0.000040	0.0022
15-Jul-15	5	9	300	300	8.1	701	#N/A	6.0	192	175	*< 1*	0.65	*< 0.3*	188	0.0065	0.0071	0.034	0.041	*< 0.000007*	*< 0.000007*	0.092	0.000018	54	0.000090	0.0030
29-Jul-15	6	11	300	240	8.1	700	#N/A	5.1	181	173	*< 1*	0.66	*< 0.3*	202	0.0057	0.0065	0.025	0.037	0.0000070	*< 0.000007*	0.073	*< 0.000003*	61	0.00012	0.0027
12-Aug-15	7	13	300	335	8.1	665	#N/A	5.2	179	159	*< 1*	0.65	*< 0.3*	201	0.0055	0.0066	0.025	0.035	*< 0.000007*	*< 0.000007*	0.076	0.000025	59	0.000090	0.0029
26-Aug-15	8	15	300	280	8.1	572	#N/A	3.5	152	133	*< 1*	0.87	*< 0.3*	166	0.0077	0.0068	0.032	0.027	*< 0.000007*	*< 0.000007*	0.074	0.000019	50	*< 0.00003*	0.0015
9-Sep-15	9	17	300	285	8.1	354	#N/A	2.0	118	57	-	1.2	-	115	0.13	0.0072	0.031	0.019	*< 0.000007*	*< 0.000007*	0.059	0.000016	35	0.00015	0.00098
23-Sep-15	10	19	300	290	8.2	353	#N/A	1.4	134	53	-	1.2	-	113	0.0042	0.0062	0.033	0.014	*< 0.000007*	*< 0.000007*	0.045	0.0000090	34	0.000050	0.00081
7-Oct-15	11	21	300	280	8.2	342	#N/A	2.0	115	48	-	1.3	-	126	0.0076	0.0066	0.032	0.019	*< 0.000007*	*< 0.000007*	0.045	0.000012	38	0.00020	0.0010
21-Oct-15	12	23	300	290	8.3	333	#N/A	3.5	109	48	-	1.3	-	125	0.0059	0.0066	0.032	0.020	*< 0.000007*	*< 0.000007*	0.049	0.0000080	38	0.000050	0.00092
4-Nov-15	13	25	300	285	8.2	340	#N/A	1.4	109	40	-	1.3	-	131	0.0038	0.0066	0.032	0.021	*< 0.000007*	*< 0.000007*	0.050	0.000012	39	0.000040	0.0010
18-Nov-15	14	27	300	295	8.2	315	#N/A	1.2	107	45	-	1.3	-	121	0.0050	0.0061	0.026	0.018	0.0000080	*< 0.000007*	0.041	0.0000070	37	*< 0.00003*	0.00083
2-Dec-15	15	29	300	260	8.1	308	#N/A	3.0	105	46	-	1.4	-	114	0.0074	0.0061	0.030	0.020	*< 0.000007*	*< 0.000007*	0.043	0.000016	34	*< 0.00003*	0.00079
16-Dec-15	16	31	300	290	8.3	333	#N/A	3.5	109	48	-	1.3	-	125	0.0059	0.0066	0.032	0.020	*< 0.000007*	*< 0.000007*	0.049	0.0000080	38	0.000050	0.00092
30-Dec-15	17	33	300	285	8.2	340	#N/A	1.4	109	40	-	1.3	-	131	0.0038	0.0066	0.032	0.021	*< 0.000007*	*< 0.000007*	0.050	0.000012	39	0.000040	0.0010
13-Jan-16	18	35	300	295	8.2	315	#N/A	1.2	107	45	-	1.3	-	121	0.0050	0.0061	0.026	0.018	0.0000080	*< 0.000007*	0.041	0.0000070	37	*< 0.00003*	0.00083
27-Jan-16	19	37	300	260	8.1	308	#N/A	3.0	105	46	-	1.4	-	114	0.0074	0.0061	0.030	0.020	*< 0.000007*	*< 0.000007*	0.043	0.000016	34	*< 0.00003*	0.00079
10-Feb-16	20	39	300	280	8.2	300	#N/A	2.4	103	42	-	1.5	-	112	0.0057	0.0067	0.034	0.020	*< 0.000007*	*< 0.000007*	0.033	0.0000080	34	*< 0.00003*	0.00083
24-Feb-16	21	41	300	290	8.1	301	#N/A	2.2	100	42	-	1.5	-	119	0.0042	0.0065	0.034	0.020	*< 0.000007*	*< 0.000007*	0.036	0.000010	36	0.000050	0.00075
9-Mar-16	22	43	301	265	8.1	291	#N/A	2.3	97	40															

Calculated Loading Rates for Col 14 (OKY Master (Fresh))

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
20-May-15	1	1	2000	575	8.0	782	#N/A	0.43	12	25	2.8	#N/A	0.017	33	0.00033	0.00036	0.0029	0.0025	0.00000040	0.00000040	0.0028	0.0000020	10	0.0000029	0.00039
3-Jun-15	2	3	400	395	8.1	556	#N/A	0.12	3.9	1.5	0.18	0.016	0.0059	2.4	0.00014	0.00017	0.0011	0.00044	0.00000014	0.00000014	0.0015	0.00000028	0.70	0.0000012	0.000028
17-Jun-15	3	5	300	270	8.1	582	#N/A	0.073	2.6	1.1	0.014	0.0095	0.0041	1.9	0.000059	0.00011	0.00065	0.00037	0.000000095	0.000000095	0.00099	0.00000026	0.58	0.00000068	0.000022
1-Jul-15	4	7	300	230	8.1	666	#N/A	0.070	2.1	1.4	0.081	0.0081	0.0035	1.8	0.000078	0.000087	0.00047	0.00037	0.000000081	0.000000081	0.00096	0.00000015	0.55	0.00000046	0.000025
15-Jul-15	5	9	300	300	8.1	701	#N/A	0.090	2.9	2.6	0.015	0.0098	0.0045	2.8	0.000098	0.00011	0.00051	0.00061	0.00000011	0.00000011	0.0014	0.00000027	0.81	0.0000014	0.000045
29-Jul-15	6	11	300	240	8.1	700	#N/A	0.061	2.2	2.1	0.012	0.0079	0.0036	2.4	0.000068	0.000078	0.00030	0.00044	0.000000084	0.000000084	0.00087	0.000000036	0.73	0.0000014	0.000033
12-Aug-15	7	13	300	335	8.1	665	#N/A	0.087	3.0	2.7	0.017	0.011	0.0050	3.4	0.000092	0.00011	0.00042	0.00059	0.00000012	0.00000012	0.0013	0.00000042	0.99	0.0000015	0.000048
26-Aug-15	8	15	300	280	8.1	572	#N/A	0.049	2.1	1.9	0.014	0.012	0.0042	2.3	0.00011	0.000095	0.00044	0.00038	0.000000098	0.000000098	0.0010	0.00000027	0.70	0.00000042	0.000021
9-Sep-15	9	17	300	285	8.1	354	#N/A	0.028	1.7	0.81		0.017	0.00	1.6	0.0019	0.00010	0.00044	0.00027	0.000000100	0.000000100	0.00084	0.00000023	0.50	0.0000021	0.000014
23-Sep-15	10	19	300	290	8.2	353	#N/A	0.020	1.9	0.77		0.018	0.00	1.6	0.000061	0.000090	0.00047	0.00020	0.00000010	0.00000010	0.00065	0.00000013	0.49	0.00000073	0.000012
7-Oct-15	11	21	300	280	8.2	342	#N/A	0.028	1.6	0.67		0.018	0.00	1.8	0.00011	0.000092	0.00045	0.00026	0.000000098	0.000000098	0.00063	0.00000017	0.53	0.0000028	0.000014
21-Oct-15	12	23	300	290	8.3	333	#N/A	0.050	1.6	0.70		0.019	0.00	1.8	0.000086	0.000096	0.00046	0.00029	0.00000010	0.00000010	0.00070	0.00000012	0.55	0.00000073	0.000013
4-Nov-15	13	25	300	285	8.2	340	#N/A	0.019	1.6	0.57		0.018	0.00	1.9	0.000054	0.000094	0.00045	0.00030	0.000000100	0.000000100	0.00071	0.00000017	0.56	0.00000057	0.000014
18-Nov-15	14	27	300	295	8.2	315	#N/A	0.018	1.6	0.66		0.019	0.00	1.8	0.000074	0.000090	0.00038	0.00027	0.00000012	0.00000010	0.00060	0.00000010	0.54	0.00000044	0.000012
2-Dec-15	15	29	300	260	8.1	308	#N/A	0.039	1.4	0.60		0.018	0.00	1.5	0.000096	0.000079	0.00039	0.00026	0.000000091	0.000000091	0.00056	0.00000021	0.45	0.00000039	0.000010
16-Dec-15	16	31	300	290	8.3	333	#N/A	0.050	1.6	0.70		0.019	0.00	1.8	0.000086	0.000096	0.00046	0.00029	0.00000010	0.00000010	0.00070	0.00000012	0.55	0.00000073	0.000013
30-Dec-15	17	33	300	285	8.2	340	#N/A	0.019	1.6	0.57		0.018	0.00	1.9	0.000054	0.000094	0.00045	0.00030	0.000000100	0.000000100	0.00071	0.00000017	0.56	0.00000057	0.000014
13-Jan-16	18	35	300	295	8.2	315	#N/A	0.018	1.6	0.66		0.019	0.00	1.8	0.000074	0.000090	0.00038	0.00027	0.00000012	0.00000010	0.00060	0.00000010	0.54	0.00000044	0.000012
27-Jan-16	19	37	300	260	8.1	308	#N/A	0.039	1.4	0.60		0.018	0.00	1.5	0.000096	0.000079	0.00039	0.00026	0.000000091	0.000000091	0.00056	0.00000021	0.45	0.00000039	0.000010
10-Feb-16	20	39	300	280	8.2	300	#N/A	0.033	1.4	0.59		0.021	0.00	1.6	0.000080	0.000094	0.00047	0.00027	0.000000098	0.000000098	0.00046	0.00000011	0.47	0.00000042	0.000012
24-Feb-16	21	41	300	290	8.1	301	#N/A	0.031	1.4	0.61		0.021	0.00	1.7	0.000061	0.000094	0.00049	0.00028	0.00000010	0.00000010	0.00052	0.00000015	0.52	0.00000073	0.000011
9-Mar-16	22	43	301	265	8.1	291	#N/A	0.030	1.3	0.53															

Note:

Values in grey italics are below the analytical detection limit

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 14 (OKY Master (Fresh))

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cu**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.		Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
20-May-15	1	1	2000	575	8.0	0.0021	*< 0.007*	0.000040	0.058	33	1.5	0.010	0.024	0.0024	0.025	31	*< 0.001*	6.9	0.000068	107	0.46	165	0.00014	*< 0.00001*	0.00015	0.40	0.00043	0.0020	*< 0.002*
3-Jun-15	2	3	400	395	8.1	0.0012	*< 0.007*	0.000060	0.037	7.4	0.47	*< 0.01*	0.038	0.00080	0.0070	17	*< 0.001*	6.7	0.000046	58	0.097	32	0.000075	0.000030	0.00012	0.084	0.00050	0.0010	*< 0.002*
17-Jun-15	3	5	300	270	8.1	0.0013	*< 0.007*	0.000010	0.033	8.1	0.64	*< 0.01*	0.036	0.00080	0.0090	18	0.00014	7.5	0.000010	53	0.11	44	0.000098	0.00011	0.00017	0.13	0.00042	0.0020	*< 0.002*
1-Jul-15	4	7	300	230	8.1	0.00081	*< 0.007*	0.000010	0.035	9.7	0.86	0.030	0.033	0.00090	0.0050	18	0.00011	7.6	0.000016	53	0.14	47	0.000094	0.00010	0.00012	0.21	0.00040	0.0010	*< 0.002*
15-Jul-15	5	9	300	300	8.1	0.0015	*< 0.007*	0.000060	0.037	13	1.3	*< 0.01*	0.028	0.0011	*< 0.003*	18	0.000080	8.0	0.0000050	57	0.17	56	0.00012	0.00022	0.00018	0.34	0.00042	0.0020	*< 0.002*
29-Jul-15	6	11	300	240	8.1	0.00092	*< 0.007*	0.000030	0.038	12	1.3	*< 0.01*	0.026	0.00090	*< 0.003*	19	0.000070	7.4	0.000034	50	0.18	59	0.00011	0.000060	0.000060	0.33	0.00039	0.0020	*< 0.002*
12-Aug-15	7	13	300	335	8.1	0.00045	*< 0.007*	0.000020	0.030	13	1.4	*< 0.01*	0.025	0.00090	0.0030	21	0.000070	8.0	0.000013	50	0.17	54	0.00011	0.000040	0.000090	0.26	0.00037	0.0020	*< 0.002*
26-Aug-15	8	15	300	280	8.1	0.0011	*< 0.007*	0.00015	0.027	9.7	1.0	*< 0.01*	0.027	0.00050	0.0040	17	0.000070	7.3	0.0000060	40	0.14	41	0.000096	0.00019	*< 0.00005*	0.21	0.00040	0.0020	*< 0.002*
9-Sep-15	9	17	300	285	8.1	0.0012	*< 0.007*	0.000010	0.016	6.7	0.72	*< 0.01*	0.026	0.00030	0.0030	12	0.000060	6.5	0.0000030	18	0.090	24	0.000082	0.00018	*< 0.00005*	0.083	0.00044	0.0040	*< 0.002*
23-Sep-15	10	19	300	290	8.2	0.00043	*< 0.007*	0.000030	0.014	7.1	0.73	*< 0.01*	0.020	*< 0.0001*	*< 0.003*	14	0.00017	6.6	*< 0.000002*	16	0.091	19	0.000059	0.000050	*< 0.00005*	0.055	0.00035	*< 0.001*	*< 0.002*
7-Oct-15	11	21	300	280	8.2	0.00057	*< 0.007*	0.00017	0.014	7.7	0.80	*< 0.01*	0.020	0.00030	*< 0.003*	14	0.000050	6.5	0.0000020	16	0.095	19	0.000060	0.000080	*< 0.00005*	0.070	0.00042	0.0020	*< 0.002*
21-Oct-15	12	23	300	290	8.3	0.00052	*< 0.007*	0.00038	0.014	7.4	0.82	*< 0.01*	0.018	0.00030	0.0060	14	0.000070	7.0	*< 0.000002*	14	0.096	17	0.000081	0.00011	0.000080	0.068	0.00035	0.0010	*< 0.002*
4-Nov-15	13	25	300	285	8.2	0.00067	*< 0.007*	0.00013	0.015	8.0	0.93	0.010	0.010	0.00040	0.0030	14	*< 0.00004*	6.8	*< 0.000002*	14	0.10	16	0.000065	*< 0.00001*	*< 0.00005*	0.047	0.00033	0.0020	*< 0.002*
18-Nov-15	14	27	300	295	8.2	0.00046	*< 0.007*	0.00025	0.014	7.3	0.83	*< 0.01*	0.012	0.00020	0.0030	14	0.00020	6.9	0.000012	12	0.086	15	0.000042	0.00018	*< 0.00005*	0.057	0.00032	0.0010	*< 0.002*
2-Dec-15	15	29	300	260	8.1	0.00047	*< 0.007*	0.000040	0.012	6.8	0.78	*< 0.01*	0.012	0.00020	0.0040	13	*< 0.00004*	6.7	0.0000020	10	0.092	15	0.000075	0.00011	0.000090	0.062	0.00035	0.0010	*< 0.002*
16-Dec-15	16	31	300	290	8.3	0.00052	*< 0.007*	0.00038	0.014	7.4	0.82	*< 0.01*	0.018	0.00030	0.0060	14	0.000070	7.0	*< 0.000002*	14	0.096	17	0.000081	0.00011	0.000080	0.068	0.00035	0.0010	*< 0.002*
30-Dec-15	17	33	300	285	8.2	0.00067	*< 0.007*	0.00013	0.015	8.0	0.93	0.010	0.010	0.00040	0.0030	14	*< 0.00004*	6.8	*< 0.000002*	14	0.10	16	0.000065	*< 0.00001*	*< 0.00005*	0.047	0.00033	0.0020	*< 0.002*
13-Jan-16	18	35	300	295	8.2	0.00046	*< 0.007*	0.00025	0.014	7.3	0.83	*< 0.01*	0.012	0.00020	0.0030	14	0.00020	6.9	0.000012	12	0.086	15	0.000042	0.00018	*< 0.00005*	0.057	0.00032	0.0010	*< 0.002*
27-Jan-16	19	37	300	260	8.1	0.00047	*< 0.007*	0.000040	0.012	6.8	0.78	*< 0.01*	0.012	0.00020	0.0040	13	*< 0.00004*	6.7	0.0000020	10	0.092	15	0.000075	0.00011	0.000090	0.062	0.00035	0.0010	*< 0.002*
10-Feb-16	20	39	300	280	8.2	0.0018	*< 0.007*	0.00014	0.012	6.8	0.80	*< 0.01*	0.012	0.00020	0.0060	13	0.000060	6.6	*< 0.000002*	9.6	0.090	15	0.000070	0.000080	*< 0.00005*	0.055	0.00037	0.0020	*< 0.002*
24-Feb-16	21	41	300	290	8.1	0.00019	*< 0.007*	0.000050	0.012	7.2	0.81	0.020	0.011	0.00020	0.0080	13	*< 0.00004*	7.1	*< 0.000002*	8.3	0.089	13	0.000073	0.000020	*< 0.00005*	0.056	0.00034	0.0010	*< 0.002*
9-Mar-16	22	43	301	265	8.1																								

Calculated Loading Rates for Col 14 (OKY Master (Fresh))

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cu**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.		Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
20-May-15	1	1	2000	575	8.0	0.00012	0.00040	0.0000023	0.0033	1.9	0.089	0.00058	0.0014	0.00014	0.0014	1.8	0.000058	0.40	0.0000039	6.2	0.027	9.5	0.0000082	0.00000058	0.0000086	0.023	0.000025	0.00012	0.00012
3-Jun-15	2	3	400	395	8.1	0.000024	0.00014	0.0000012	0.00073	0.15	0.0093	0.00020	0.00075	0.000016	0.00014	0.34	0.000020	0.13	0.00000091	1.1	0.0019	0.63	0.0000015	0.00000059	0.0000024	0.0017	0.0000099	0.000020	0.000040
17-Jun-15	3	5	300	270	8.1	0.000018	0.000095	0.00000014	0.00045	0.11	0.0087	0.00014	0.00048	0.000011	0.00012	0.24	0.0000019	0.10	0.00000014	0.71	0.0015	0.59	0.0000013	0.0000015	0.0000023	0.0017	0.0000057	0.000027	0.000027
1-Jul-15	4	7	300	230	8.1	0.0000093	0.000081	0.00000012	0.00040	0.11	0.0099	0.00035	0.00038	0.000010	0.000058	0.21	0.0000013	0.087	0.00000018	0.61	0.0016	0.54	0.0000011	0.0000012	0.0000014	0.0024	0.0000046	0.000012	0.000023
15-Jul-15	5	9	300	300	8.1	0.000023	0.00011	0.00000090	0.00055	0.19	0.020	0.00015	0.00042	0.000017	0.000045	0.27	0.0000012	0.12	0.000000075	0.86	0.0025	0.83	0.0000018	0.0000033	0.0000027	0.0051	0.0000063	0.000030	0.000030
29-Jul-15	6	11	300	240	8.1	0.000011	0.000084	0.00000036	0.00045	0.15	0.016	0.00012	0.00031	0.000011	0.000036	0.23	0.00000084	0.089	0.00000041	0.60	0.0021	0.71	0.0000013	0.00000072	0.00000072	0.0040	0.0000047	0.000024	0.000024
12-Aug-15	7	13	300	335	8.1	0.0000075	0.00012	0.00000034	0.00051	0.22	0.024	0.00017	0.00042	0.000015	0.000050	0.36	0.0000012	0.13	0.00000022	0.83	0.0029	0.90	0.0000019	0.00000067	0.0000015	0.0043	0.0000062	0.000034	0.000034
26-Aug-15	8	15	300	280	8.1	0.000016	0.000098	0.0000021	0.00037	0.14	0.014	0.00014	0.00038	0.0000070	0.000056	0.24	0.00000098	0.10	0.000000084	0.55	0.0019	0.58	0.0000013	0.0000027	0.00000070	0.0029	0.0000056	0.000028	0.000028
9-Sep-15	9	17	300	285	8.1	0.000018	0.000100	0.00000014	0.00022	0.096	0.010	0.00014	0.00037	0.0000043	0.000043	0.18	0.00000086	0.092	0.000000043	0.26	0.0013	0.34	0.0000012	0.0000026	0.00000071	0.0012	0.0000063	0.000057	0.000029
23-Sep-15	10	19	300	290	8.2	0.0000062	0.00010	0.00000044	0.00020	0.10	0.011	0.00015	0.00029	0.0000015	0.000044	0.20	0.0000025	0.096	0.000000029	0.23	0.0013	0.28	0.00000086	0.00000073	0.00000073	0.00080	0.0000051	0.000015	0.000029
7-Oct-15	11	21	300	280	8.2	0.0000080	0.000098	0.0000024	0.00019	0.11	0.011	0.00014	0.00028	0.0000042	0.000042	0.20	0.00000070	0.091	0.000000028	0.23	0.0013	0.26	0.00000084	0.0000011	0.00000070	0.00098	0.0000059	0.000028	0.000028
21-Oct-15	12	23	300	290	8.3	0.0000075	0.00010	0.0000055	0.00021	0.11	0.012	0.00015	0.00025	0.0000044	0.000087	0.20	0.0000010	0.10	0.000000029	0.20	0.0014	0.24	0.0000012	0.0000016	0.0000012	0.00099	0.0000051	0.000015	0.000029
4-Nov-15	13	25	300	285	8.2	0.0000095	0.000100	0.0000019	0.00022	0.11	0.013	0.00014	0.00015	0.0000057	0.000043	0.20	0.00000057	0.097	0.000000029	0.20	0.0015	0.23	0.00000093	0.00000014	0.00000071	0.00067	0.0000047	0.000029	0.000029
18-Nov-15	14	27	300	295	8.2	0.0000068	0.00010	0.0000037	0.00020	0.11	0.012	0.00015	0.00018	0.0000030	0.000044	0.20	0.0000030	0.10	0.00000018	0.17	0.0013	0.22	0.00000062	0.0000027	0.00000074	0.00085	0.0000047	0.000015	0.000030
2-Dec-15	15	29	300	260	8.1	0.0000061	0.000091	0.00000052	0.00016	0.088	0.010	0.00013	0.00016	0.0000026	0.000052	0.17	0.00000052	0.087	0.000000026	0.13	0.0012	0.20	0.00000098	0.0000014	0.0000012	0.00081	0.0000046	0.000013	0.000026
16-Dec-15	16	31	300	290	8.3	0.0000075	0.00010	0.0000055	0.00021	0.11	0.012	0.00015	0.00025	0.0000044	0.000087	0.20	0.0000010	0.10	0.000000029	0.20	0.0014	0.24	0.0000012	0.0000016	0.0000012	0.00099	0.0000051	0.000015	0.000029
30-Dec-15	17	33	300	285	8.2	0.0000095	0.000100	0.0000019	0.00022	0.11	0.013	0.00014	0.00015	0.0000057	0.000043	0.20	0.00000057	0.097	0.000000029	0.20	0.0015	0.23	0.00000093	0.00000014	0.00000071	0.00067	0.0000047	0.000029	0.000029
13-Jan-16	18	35	300	295	8.2	0.0000068	0.00010	0.0000037	0.00020	0.11	0.012	0.00015	0.00018	0.0000030	0.000044	0.20	0.0000030	0.10	0.00000018	0.17	0.0013	0.22	0.00000062	0.0000027	0.00000074	0.00085	0.0000047	0.000015	0.000030
27-Jan-16	19	37	300	260	8.1	0.0000061	0.000091	0.00000052	0.00016	0.088	0.010	0.00013	0.00016	0.0000026	0.000052	0.17	0.00000052	0.087	0.000000026	0.13	0.0012	0.20	0.00000098	0.0000014	0.0000012	0.00081	0.0000046	0.000013	0.000026
10-Feb-16	20	39	300	280	8.2	0.000026	0.000098	0.0000020	0.00017	0.096	0.011	0.00014	0.00016	0.0000028	0.000084	0.18	0.00000084	0.092	0.000000028	0.13	0.0013	0.21	0.00000098	0.0000011	0.00000070	0.00077	0.0000052	0.000028	0.000028
24-Feb-16	21	41	300	290	8.1	0.0000028	0.00010	0.00000073	0.00017	0.10	0.012	0.00029	0.00016	0.0000029	0.00012	0.19	0.00000058	0.10	0.000000029	0.12	0.0013	0.19	0.0000011	0.00000029	0.00000073	0.00081	0.0000049	0.000015	0.000029
9-Mar-16	22	43	301	265	8.1																								

Note:

Values in grey italics are below the analytical detection limit

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for HC1 (ST)

Date	Cycle	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu
	No.	Input	Output		umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
25-Jun-14	0	500	345	7.7	484	#N/A	6.4	54	136	2.2	0.38	< 0.3	137	0.018	0.0011	0.011	0.036	< 0.000007	< 0.000007	0.020	< 0.000003	31	0.00015	0.00048	0.0064
2-Jul-14	1	500	500	7.7	295	#N/A	8.1	53	77	0.50	0.23	< 0.3	107	0.018	0.0013	0.0086	0.025	< 0.000007	< 0.000007	0.014	< 0.000003	24	0.00019	0.00064	0.0026
9-Jul-14	2	500	485	7.9	192	#N/A	2.5	48	39	< 0.2	0.18	< 0.3	59	0.023	0.00060	0.0071	0.032	< 0.000007	< 0.000007	0.012	< 0.000003	14	0.000040	0.00010	0.0010
16-Jul-14	3	500	485	7.8	146	#N/A	2.4	46	19	< 0.2	0.13	< 0.3	47	0.023	0.0011	0.0062	0.032	< 0.000007	< 0.000007	0.0080	0.0000030	11	0.00021	0.00046	0.00081
23-Jul-14	4	500	485	7.8	108	#N/A	2.3	39	11	< 0.2	0.10	< 0.3	40	0.027	0.00050	0.0048	0.042	< 0.000007	< 0.000007	0.0066	< 0.000003	9.8	< 0.00003	0.00017	0.0014
30-Jul-14	5	500	480	8.1	79	#N/A	1.6	37	6.0	< 0.2	< 0.06	< 0.3	30	0.034	0.00060	0.0051	0.034	< 0.000007	< 0.000007	0.0043	< 0.000003	7.8	0.00020	0.00030	0.0015
6-Aug-14	6	500	485	7.8	76	#N/A	2.1	30	5.0	< 0.2	< 0.06	< 0.3	29	0.038	0.00030	0.0034	0.036	< 0.000007	< 0.000007	0.0068	< 0.000003	7.6	0.000030	0.000032	0.00037
13-Aug-14	7	500	490	8.2	109	#N/A	2.2	43	9.0	< 0.2	0.10	< 0.3	42	0.057	0.00040	0.0053	0.061	< 0.000007	< 0.000007	0.0067	< 0.000003	10	0.00026	0.000056	0.00053
20-Aug-14	8	500	485	7.9	85	#N/A	1.8	36	8.0	< 0.2	0.060	< 0.3	36	0.044	< 0.0002	0.0048	0.049	< 0.000007	< 0.000007	0.0048	< 0.000003	9.2	0.000090	0.000057	0.00091
27-Aug-14	9	500	500	8.1	117	#N/A	3.9	49	9.0	< 0.2	0.11	< 0.3	44	0.036	0.00040	0.0049	0.053	< 0.000007	< 0.000007	0.011	< 0.000003	11	0.00010	0.000035	0.00038
3-Sep-14	10	500	490	7.8	101	#N/A	4.4	42	9.0	< 0.2	0.090	< 0.3	53	0.030	0.0011	0.0060	0.052	< 0.000007	< 0.000007	0.0076	0.0000030	15	< 0.00003	0.000032	0.00072
10-Sep-14	11	500	500	8.2	98	#N/A	3.0	41	5.0	< 0.2	0.080	< 0.3	44	0.039	0.00040	0.0041	0.051	< 0.000007	< 0.000007	0.0064	< 0.000003	13	0.00010	0.000025	0.00037
17-Sep-14	12	500	475	8.0	77	#N/A	7.3	37	4.0	< 0.2	< 0.06	< 0.3	28	0.037	0.00020	0.0031	0.044	< 0.000007	< 0.000007	0.0062	< 0.000003	7.5	0.000070	0.000017	0.00025
24-Sep-14	13	500	485	8.2	75	#N/A	3.1	36	5.0	< 0.2	< 0.06	< 0.3	30	0.029	< 0.0002	0.0028	0.040	< 0.000007	< 0.000007	0.0035	< 0.000003	7.8	< 0.00003	0.00011	0.00044
1-Oct-14	14	500	485	7.8	72	#N/A	9.4	37	3.0	< 0.2	< 0.06	< 0.3	30	0.034	< 0.0002	0.0025	0.040	< 0.000007	< 0.000007	0.0030	0.000044	8.0	< 0.00003	0.00	< 0.00002
8-Oct-14	15	500	480	8.1	87	#N/A	2.7	35	4.0	< 0.2	0.060	< 0.3	44	0.036	0.00030	0.0036	0.052	< 0.000007	< 0.000007	0.024	< 0.000003	13	0.000070	0.000025	0.00031
15-Oct-14	16	500	485	7.7	94	#N/A	5.8	38	5.0	< 0.2	0.060	< 0.3	48	0.028	0.00040	0.0037	0.047	< 0.000007	< 0.000007	0.0057	0.000011	14	0.000040	0.000018	0.00034
22-Oct-14	17	500	490	8.1	92	#N/A	4.1	41	5.0	< 0.2	0.060	< 0.3	37	0.024	0.00040	0.0035	0.050	< 0.000007	< 0.000007	0.016	0.0000030	9.5	0.000040	0.000019	0.00032
29-Oct-14	18	500	495	7.8	89	#N/A	8.9	43	3.0	< 0.2	< 0.06	< 0.3	35	0.024	0.00040	0.0036	0.047	< 0.000007	< 0.000007	0.015	< 0.000003	9.3	0.00012	0.000018	0.00024
5-Nov-14	19	500	490	7.9	81	#N/A	#N/A	46	2.0	< 0.2	< 0.06	< 0.3	32	0.024	0.00030	0.0030	0.046	< 0.000007	< 0.000007	0.0060	0.000016	8.5	0.000060	0.000023	0.00054
12-Nov-14	20	500	485	7.6	88	#N/A	6.6	34	3.0	< 0.2	0.070	< 0.3	37	0.047	0.00040	0.0037	0.052	< 0.000007	< 0.000007	0.0058	0.0000030	9.9	0.00019	0.000031	0.00045
19-Nov-14	21	500	485	7.7	89	#N/A	6.7	35	2.0	< 0.2	0.060	< 0.3	36	0.027	0.00040	0.0033	0.058	< 0.000007	< 0.000007	0.0032	0.0000080	9.3	0.000060	0.000023	0.00047
26-Nov-14	22	500	490	8.1	88	#N/A	1.9	39	3.0	< 0.2	0.060	< 0.3	37	0.028	0.00040	0.0036	0.054	< 0.000007	< 0.000007	0.0023	< 0.000003	9.9	0.000050	0.000018	0.00029
3-Dec-14	23	500	475	8.0	75	#N/A	2.9	37	< 2	< 0.2	< 0.06	< 0.3	35	0.027	0.00040	0.0039	0.056	< 0.000007	< 0.000007	0.0049	< 0.000003	9.4	0.000050	0.000016	0.00031
10-Dec-14	24	500	495	7.9	63	#N/A	4.6	34	< 2	< 0.2	< 0.06	< 0.3	27	0.023	< 0.0002	0.0024	0.044	< 0.000007	< 0.000007	0.0029	< 0.000003	7.5	0.000060	0.000010	0.00030
17-Dec-14	25	500	495	7.7	74	#N/A	4.4	35	3.0	< 0.2	< 0.06	< 0.3	31	0.031	0.00020	0.0029	0.053	< 0.000007	< 0.000007	0.0022	< 0.000003	8.4	< 0.00003	0.000013	0.00040
24-Dec-14	26	500	495	7.7	75	#N/A	3.6	35	< 2	< 0.2	< 0.06	< 0.3	32	0.031	0.00030	0.0031	0.058	< 0.000007	< 0.000007	0.0063	< 0.000003	8.8	< 0.00003	0.000012	0.00022
31-Dec-14	27	500	495	7.9	88	#N/A	1.3	37	2.0	< 0.2	< 0.06	< 0.3	38	0.026	0.00080	0.0063	0.063	< 0.000007	< 0.000007	0.0028	< 0.000003	11	< 0.00003	0.0000060	0.00022
7-Jan-15	28	500	485	7.5	71	#N/A	3.1	34	2.0	< 1	< 0.06	< 0.3	33	0.026	0.00030	0.0025	0.048	< 0.000007	< 0.000007	0.0047	< 0.000003	9.1	0.000060	0.000015	0.00036
14-Jan-15	29	500	495	7.9	77	#N/A	2.4	38	3.0	< 1	< 0.06	< 0.3	39	0.022	0.00030	0.0030	0.051	< 0.000007	< 0.000007	0.0040	0.0000050	11	0.000060	0.000010	0.00038
21-Jan-15	30	500	485	7.8	83	#N/A	4.7	43	2.0	< 1	< 0.06	< 0.3	35	0.026	0.00040	0.0030	0.063	< 0.000007	< 0.000007	0.0037	< 0.000003	9.3	0.000080	0.000015	0.00064
28-Jan-15	31	500	495	7.8	75	#N/A	1.7	37	2.0	< 1	< 0.06	< 0.3	33	0.026	0.00030	0.0026	0.054	< 0.000007	< 0.000007	0.0044	0.0000040	9.0	0.00010	0.0000090	0.00021
4-Feb-15	32	500	490	7.8	77	#N/A	2.6	36	2.0	< 1	< 0.06	< 0.3	32	0.022	0.00030	0.0027	0.055	< 0.000007	< 0.000007	0.0051	0.0000030	8.7	0.00020	0.0000070	0.00067
11-Feb-15	33	500	490	8.0	74	#N/A	2.0	37	3.0	< 1	< 0.06	< 0.3	32	0.025	0.00040	0.0026	0.051	< 0.000007	< 0.000007	0.0039	< 0.000003	8.8	0.000050	0.000012	0.00067
18-Feb-15	34	500	485	7.8	73	#N/A	2.3	36	2.0	1.0	0.070	< 0.3	33	0.026	0.00050	0.0027	0.051	< 0.000007	< 0.000007	0.0029	< 0.000003	9.1	0.000040	0.000016	0.00042
25-Feb-15	35	500	490	7.8	76	#N/A	3.1	38	< 2	< 1	< 0.06	< 0.3	32	0.022	0.00040	0.0025	0.057	< 0.000007	< 0.000007	0.0015	0.0000060	9.0	0.000080	0.000017	0.0011
4-Mar-15	36	500	480	7.7	62	#N/A	2.1	31	< 2	< 1	< 0.06	< 0.3	30	0.020	0.00020	0.0018	0.047	< 0.000007	< 0.000007	0.0027	< 0.000003	9.1	0.00011	0.0000070	0.00048
11-Mar-15	37	500	480	8.0	64	#N/A	1.6	34	2.0	< 1	0.080	< 0.3	28	0.021	0.00030	0.0021	0.048	< 0.000007	< 0.000007	0.0053	< 0.000003	7.9	0.000090	0.0000060	0.00080
18-Mar-15	38	500	500	7.8	65	#N/A	2.6	33	2.0	< 1	< 0.06	< 0.3	31	0.021	0.00030	0.0017	0.047	0.000014	< 0.000007	0.0022	< 0.000003	9.5	0.00010	0.000013	0.0011
25-Mar-15	39	500	485	7.8	65	#N/A	2.9	34	< 2	< 1	< 0.06	< 0.3	29	0.026	0.00030	0.0024	0.055	< 0.000007	< 0.000007	0.0052	< 0.000003	8.3	0.00013	0.0000040	0.0020
1-Apr-15	40	500	500	7.7	66	#N/A	3.7	36	2.0	< 1	< 0.06	< 0.3	25	0.023	0.00030	0.0016	0.061	0.000012	< 0.000007	0.0027	< 0.000003	6.8	0.000060	< 0.000004	0.00037
8-Apr-15	41	500	490	7.9	71	#N/A	2.8	38	2.0	< 1	< 0.06	< 0.3	30	0.022	0.00040	0.0022	0.056	< 0.000007	< 0.000007	0.0050	< 0.000003	8.6	0.000060	0.000016	0.00098
15-Apr-15	42	500	485	7.7	61	#N/A	3.8	34	< 2	< 1	< 0.06	< 0.3	26	0.022	0.00030	0.0018	0.050	< 0.000007	< 0.000007	0.0065	< 0.000003	7.6	0.000060	< 0.000004	0.00097
22-Apr-15	43	500	490	7.6	60	#N/A	3.1	34	3.0	< 1	< 0.06	< 0.3	26	0.019	0.00020	0.0015	0.046	< 0.000007	< 0.000007	0.0089	< 0.000003	7.5	0.000040	0.0000060	0.0011
29-Apr-15	44	500	490	7.8	80	#N/A	2.1	39	3.0	< 1	< 0.06	< 0.3	40	0.026	0.00040	0.0029	0.068	< 0.000007	< 0.000007	0.0036	0.0000050	12	0.000090	0.000020	0.00054
6-May-15	45	500	500	8.0	73	#N/A	2.4	39	< 2	< 1	< 0.06	< 0.3	32	0.026	0.00030	0.0064	0.055	< 0.000007	< 0.000007	0.0045	< 0.000003	9.2	< 0.00003	0.000017	0.00033
13-May-15	46	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-May-15	47	490	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-May-15	48	480	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	49	475	470	8.2	161	#N/A	2.8	76	6.0	< 1	0.060	< 0.3	75	0.0097	0.00060	0.0024	0.16	< 0.000007	< 0.000007	0.0041	< 0.000003	22	0.00016	0.000022	0.00034
10-Jun-15	50	500	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-15	51	480	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Jun-15	52	470	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	53	460	465	8.1	166	#N/A	3.6	76	4.0	< 1	< 0.06	< 0.3	66	0.016	0.00050	0.0028	0.14	< 0.000007	< 0.000007	0.014	0.0000030	19	0.00020	0.000037	0.00035
8-Jul-15	54	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-Jul-15	55	490	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jul-15	56	480	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	57	480	470	8.1	161	#N/A	1.9	78	5.0	< 1	< 0.06	< 0.3	70	0.015	0.00050	0.0025	0.14	< 0.000007	< 0.000007	0.0074	0.0000030	20	0.00021	0.000028	0.00022
5-Aug-15	58	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	59	495	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Aug-15	60	490	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	61	480	470	8.0	158	#N/A	2.0	76	5.0	< 1	< 0.06	< 0.3	70	0.0090	0.00060	0.0028	0.15	< 0.000007	< 0.000007	0.0062	0.0000080	20	0.00017	0.000025	0.00046
2-Sep-15	62	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	63	495	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Sep-15	64	490	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	65	490	470	8.1	163	#N/A	2.1	77	5.0				73	0.010	0.00060	0.0028	0.16	< 0.000007	< 0.000007	0.0072	0.0000040	21	0.00020	0.000025	0.00025
30-Sep-15	66	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	67	500	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14-Oct-15	68	480	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	69	460	450	8.1	149	#N/A	1.6	75	5.0				70	0.0099	0.00050	0.0026	0.14	< 0.000007	< 0.000007	0.0066	0.000035	20	0.00024	0.000036	0.0016
28-Oct-15	70	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	71	490	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Nov-15	72	470	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	73	460	460	8.0	138	#N/A	1.1	74	4.0				58	0.019	0.00040	0.0020	0.13	< 0.000007	< 0.000007	0.0033	< 0.000003	17	0.00023	0.000080	0.00062
25-Nov-15	74	500	485	8.0	69	#N/A	0.40	40	2.0				33	0.031	0.00030	0.0025	0.062	< 0.000007	< 0.000007	0.0032	< 0.000003	10	0.00016	0.00018	0.00078
2-Dec-15	75	500	495	8.0	68	#N/A	1.4	35	2.0				30	0.029	0.00030	0.0023	0.062	< 0.000007	< 0.000007	0.0028	0.0000070	8.7	0.000050	0.000014	0.00056
9-Dec-15	76	500	505	8.1	67	#N/A	2.4	34	2.0				28	0.030	0.00040	0.0031	0.062	0.000010	< 0.000007	0.0090	0.000013	8.4	0.00010	0.0000040	0.00035
16-Dec-15	77	500	495	7.9	63	#N/A	1.7	30	2.0				30	0.051	< 0.0002	0.0022	0.063	< 0.000007	< 0.000007	0.0020	0.0000040	8.9	0.00020	0.000016	0.00042
23-Dec-15	78	500	500	7.9	71	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	79	500	485	7.9	62	#N/A	1.3	31	3.0				28	0.026	< 0.0002	0.0015	0.059	< 0.000007	< 0.000007	0.0024	0.0000040	8.5	0.00010	< 0.000004	0.00022
6-Jan-16	80	500	495	7.9	70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	81	500	495	7.8	68	#N/A	1.5	32	3.0				29	0.022	0.00020	0.0018	0.061	< 0.000007	< 0.000007	0.0050	< 0.000003	8.5	0.000080	< 0.000004	0.00024
20-Jan-16	82	500	495	7.9	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	83	500	490	7.9	73	#N/A	2.5	35	2.0				32	0.026	< 0.0002	0.0022	0.073	< 0.000007	< 0.000007	< 0.002	0.0000030	9.2	0.000080	0.000018	0.00020
3-Feb-16	84	500	490	7.9	74	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	85	500	500	7.8	70	#N/A	2.3	34	2.0				30	0.025	0.00020	0.0022	0.076	< 0.000007	< 0.000007	< 0.002	< 0.000003	9.1	0.000090	0.0000080	0.00075
17-Feb-16	86	500	500	7.8	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	87	500	500	7.8	69	#N/A	2.3	32	< 2				31	0.028	0.00020	0.0020	0.070	< 0.000007	< 0.000007	< 0.002	0.0000030	9.0	0.000030	< 0.000004	0.00015

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for HC1 (ST)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
25-Jun-14	0	500	345	7.7	0.0090	0.000010	0.0085	15	0.011	0.020	0.015	0.0053	0.025	9.5	0.0035	2.8	< 0.000002	35	1.1	55	0.000026	0.00013	0.00018	0.012	0.00073	0.0020	< 0.002
2-Jul-14	1	500	500	7.7	< 0.002	< 0.00001	0.0067	12	0.016	< 0.01	0.0096	0.0042	< 0.009	7.7	0.0013	2.4	< 0.000002	21	1.1	35	0.000021	0.0072	0.00020	0.018	0.00048	0.0010	< 0.002
9-Jul-14	2	500	485	7.9	0.0060	< 0.00001	0.0044	6.0	0.0098	< 0.01	0.0062	0.0019	< 0.009	5.8	0.00032	2.0	< 0.000002	8.8	0.82	14	0.000013	0.0033	0.00015	0.0081	0.00048	< 0.001	< 0.002
16-Jul-14	3	500	485	7.8	0.011	< 0.00001	0.0034	4.8	0.0065	< 0.01	0.0075	0.0012	< 0.009	4.5	0.00018	1.5	0.0000060	5.6	0.75	7.5	0.000018	0.00024	0.000090	0.011	0.00037	< 0.001	< 0.002
23-Jul-14	4	500	485	7.8	0.0020	0.000020	0.0026	3.8	0.0078	< 0.01	0.0032	0.00070	< 0.009	3.9	0.00011	1.3	0.0000040	3.4	0.66	5.2	0.0000090	0.0032	0.000080	0.0050	0.00033	< 0.001	< 0.002
30-Jul-14	5	500	480	8.1	0.0050	< 0.00001	0.0019	2.6	0.0066	< 0.01	0.0052	0.00040	0.015	2.7	0.000090	0.84	< 0.000002	1.8	0.51	2.9	0.000011	0.00021	0.00023	0.0071	0.00029	< 0.001	< 0.002
6-Aug-14	6	500	485	7.8	0.0080	0.000030	0.0015	2.5	0.0057	< 0.01	0.0019	< 0.0001	0.011	2.8	0.00012	0.86	< 0.000002	1.5	0.53	2.6	0.0000070	0.00011	0.00026	0.0036	0.00081	0.0020	< 0.002
13-Aug-14	7	500	490	8.2	0.018	0.000020	0.0027	4.1	0.0062	< 0.01	0.0034	0.00030	0.010	4.4	0.00012	1.5	< 0.000002	2.7	0.77	4.3	0.000010	0.0012	0.00082	0.0058	0.00034	< 0.001	< 0.002
20-Aug-14	8	500	485	7.9	0.0060	0.000040	0.0019	3.2	0.0064	< 0.01	0.0024	0.00030	< 0.009	3.4	0.00031	1.1	< 0.000002	1.5	0.66	2.9	0.0000060	0.0020	0.00037	0.0048	0.00037	< 0.001	< 0.002
27-Aug-14	9	500	500	8.1	0.0060	< 0.00001	0.0026	4.1	0.0076	< 0.01	0.0039	0.00030	< 0.009	4.4	0.00011	1.5	< 0.000002	2.1	0.87	3.6	0.000016	0.0014	0.00032	0.0064	0.00039	< 0.001	< 0.002
3-Sep-14	10	500	490	7.8	< 0.007	0.000040	0.0024	3.7	0.0060	< 0.01	0.0031	0.00030	0.0050	4.6	0.00028	1.5	0.000013	1.6	0.94	4.0	0.000018	0.00019	0.000060	0.0053	0.00039	< 0.001	< 0.002
10-Sep-14	11	500	500	8.2	0.010	< 0.00001	0.0019	2.9	0.0060	< 0.01	0.0025	0.00020	< 0.003	3.6	0.000090	1.3	< 0.000002	1.2	0.81	2.3	0.000015	0.0015	0.00032	0.0045	0.00031	< 0.001	< 0.002
17-Sep-14	12	500	475	8.0	< 0.007	< 0.00001	0.0014	2.4	0.0052	< 0.01	0.0017	0.00010	< 0.003	2.9	0.00010	0.82	< 0.000002	0.69	0.66	2.1	< 0.000005	0.000090	0.00017	0.0033	0.00027	< 0.001	< 0.002
24-Sep-14	13	500	485	8.2	< 0.002	0.000010	0.0015	2.5	0.0045	< 0.01	0.0017	0.00020	< 0.009	2.8	< 0.00004	0.82	0.0000050	0.70	0.58	1.6	< 0.000005	0.00010	< 0.00005	0.0034	0.00024	< 0.001	< 0.002
1-Oct-14	14	500	485	7.8	0.040	0.000040	0.0013	2.5	0.011	< 0.01	0.0021	0.00010	< 0.009	2.9	< 0.00004	0.88	< 0.000002	0.58	0.63	2.0	< 0.000005	0.000060	0.00030	0.0033	0.00025	< 0.002	< 0.002
8-Oct-14	15	500	480	8.1	0.010	0.000020	0.0018	2.7	0.0056	< 0.01	0.0034	0.00020	< 0.003	3.4	< 0.00004	1.0	< 0.000002	0.66	0.79	2.4	0.000017	0.00048	0.00041	0.0042	0.00036	< 0.001	< 0.002
15-Oct-14	16	500	485	7.7	< 0.007	< 0.00001	0.0021	3.2	0.0047	< 0.01	0.0022	0.00020	< 0.003	3.8	0.000070	1.1	< 0.000002	0.75	0.89	2.4	0.000010	0.0014	0.00010	0.0046	0.00028	< 0.001	< 0.002
22-Oct-14	17	500	490	8.1	0.010	0.000010	0.0019	3.3	0.0054	< 0.01	0.0022	0.00020	< 0.003	4.0	0.000070	1.1	< 0.000002	0.68	0.89	2.2	0.000022	0.00019	0.000080	0.0047	0.00026	< 0.001	< 0.002
29-Oct-14	18	500	495	7.8	< 0.007	< 0.00001	0.0018	3.0	0.0042	< 0.01	0.0019	0.00010	< 0.003	3.4	0.000060	1.0	< 0.000002	0.53	0.84	1.8	0.000014	0.00096	< 0.00005	0.0041	0.00027	< 0.001	< 0.002
5-Nov-14	19	500	490	7.9	< 0.007	0.00030	0.0015	2.7	0.0039	< 0.01	0.0024	0.00020	< 0.003	3.0	< 0.00004	0.93	< 0.000002	0.46	0.78	1.7	0.000022	0.00026	0.00013	0.0039	0.00023	< 0.001	< 0.002
12-Nov-14	20	500	485	7.6	0.017	0.000040	0.0016	3.0	0.0049	< 0.01	0.0027	0.00020	< 0.003	3.3	0.000070	1.1	< 0.000002	0.53	0.90	1.8	0.000013	0.0010	0.00076	0.0044	0.00034	< 0.001	< 0.002
19-Nov-14	21	500	485	7.7	< 0.007	0.00013	0.0016	3.0	0.0052	< 0.01	0.0017	0.00020	< 0.003	3.3	0.000080	0.93	0.0000020	0.43	0.91	1.6	0.000025	0.00054	0.000050	0.0041	0.00027	0.0020	< 0.002
26-Nov-14	22	500	490	8.1	< 0.007	< 0.00001	0.0018	3.1	0.0042	< 0.01	0.0019	< 0.0001	0.010	3.4	0.00022	1.1	< 0.000002	0.41	0.89	1.5	0.000014	0.00013	0.00011	0.0043	0.00030	< 0.001	< 0.002
3-Dec-14	23	500	475	8.0	< 0.007	< 0.00001	0.0016	2.8	0.0049	0.010	0.0016	0.00010	< 0.003	3.1	0.000070	0.81	< 0.000002	0.33	0.75	1.4	0.000016	0.00097	0.00010	0.0041	0.00032	< 0.001	< 0.002
10-Dec-14	24	500	495	7.9	< 0.007	< 0.00001	0.0011	2.0	0.0039	< 0.01	0.0013	< 0.0001	< 0.003	2.3	0.000060	0.60	< 0.000002	0.21	0.65	1.1	0.000013	0.00058	< 0.00005	0.0028	0.00019	< 0.001	< 0.002
17-Dec-14	25	500	495	7.7	< 0.007	< 0.00001	0.0014	2.6	0.0045	< 0.01	0.0012	< 0.0001	< 0.003	3.1	0.000050	0.86	< 0.000002	0.28	0.79	1.2	0.000011	0.00085	0.00040	0.0034	0.00028	0.0010	< 0.002
24-Dec-14	26	500	495	7.7	< 0.007	< 0.00001	0.0015	2.5	0.0039	< 0.01	0.0014	0.00010	< 0.003	2.8	0.00016	0.78	< 0.000002	0.27	0.78	1.3	0.0000090	0.00074	0.00010	0.0034	0.00029	< 0.001	< 0.002
31-Dec-14	27	500	495	7.9	< 0.007	< 0.00001	0.0017	3.0	0.0043	< 0.01	0.0020	0.00010	< 0.003	3.5	0.00023	1.2	< 0.000002	0.31	0.96	1.8	0.000021	0.00053	0.000060	0.0045	0.00029	< 0.001	< 0.002
7-Jan-15	28	500	485	7.5	< 0.007	0.000020	0.0013	2.5	0.0038	< 0.01	0.0019	0.00010	< 0.003	2.8	0.00012	0.71	< 0.000002	0.21	0.75	0.90	0.000039	0.00036	0.000050	0.0032	0.00023	< 0.001	< 0.002
14-Jan-15	29	500	495	7.9	< 0.007	0.000020	0.0012	2.5	0.0036	< 0.01	0.0021	0.00010	< 0.003	2.9	0.00011	1.0	0.0000020	0.21	0.86	1.0	0.000028	0.00063	< 0.00005	0.0033	0.00022	< 0.001	< 0.002
21-Jan-15	30	500	485	7.8	< 0.007	0.000030	0.0016	2.8	0.0039	< 0.01	0.0023	0.00010	< 0.003	3.2	0.00010	0.88	0.0000020	0.24	0.93	1.0	0.000017	0.00068	0.000080	0.0043	0.00030	< 0.001	< 0.002
28-Jan-15	31	500	495	7.8	< 0.007	< 0.00001	0.0011	2.7	0.0037	< 0.01	0.0065	< 0.0001	< 0.003	3.1	0.00014	0.89	0.0000040	0.20	0.68	1.6	0.0000090	0.00025	0.00011	0.0032	0.00024	< 0.001	< 0.002
4-Feb-15	32	500	490	7.8	< 0.007	0.000030	0.0014	2.6	0.0038	< 0.01	0.0013	0.00010	< 0.003	2.9	0.000060	0.84	< 0.000002	0.18	0.78	1.3	0.0000090	0.00051	< 0.00005	0.0032	0.00025	0.0010	< 0.002
11-Feb-15	33	500	490	8.0	< 0.007	0.000010	0.0012	2.3	0.0033	< 0.01	0.0017	0.00010	< 0.003	2.8	< 0.001	0.77	< 0.000002	0.16	0.77	1.1	0.000013	0.0010	0.000090	0.0029	0.00025	< 0.001	< 0.002
18-Feb-15	34	500	485	7.8	< 0.007	< 0.00001	0.0014	2.6	0.0036	0.010	0.0011	0.00010	< 0.003	3.0	< 0.001	0.81	0.0000030	0.18	0.92	1.1	0.000012	0.00059	0.000070	0.0033	0.00027	< 0.001	< 0.002
25-Feb-15	35	500	490	7.8	< 0.007	0.000020	0.0012	2.4	0.0031	< 0.01	0.0013	0.00010	< 0.003	3.1	< 0.001	0.83	< 0.000002	0.14	0.81	0.60	0.000014	0.00050	0.00013	0.0036	0.00023	< 0.001	< 0.002
4-Mar-15	36	500	480	7.7	< 0.007	0.000020	0.0010	1.7	0.0035	< 0.01	0.00091	< 0.0001	< 0.003	2.2	< 0.001	0.65	< 0.000002	0.11	0.56	1.0	< 0.000005	0.00058	0.000080	0.0026	0.00021	< 0.001	< 0.002
11-Mar-15	37	500	480	8.0	< 0.007	0.000050	0.0011	2.0	0.0036	< 0.01	0.00084	< 0.0001	< 0.003	2.2	< 0.001	0.55	0.0000070	0.080	0.61	0.10	0.0000070	0.00065	< 0.00005	0.0024	0.00019	0.0010	< 0.002
18-Mar-15	38	500	500	7.8	0.013	0.000010	0.00098	1.8	0.0038	< 0.01	0.00085	0.00010	< 0.003	2.5	< 0.001	0.57	< 0.000002	0.10	0.67	1.0	< 0.000005	0.00083	0.00020	0.0023	0.00018	< 0.001	< 0.002
25-Mar-15	39	500	485	7.8	< 0.007	0.000030	0.00084	2.1	0.0036	< 0.01	0.0022	0.00020	< 0.003	2.6	< 0.001	0.65	0.0000020	0.18	0.65	1.0	< 0.000005	0.00083	0.000090	0.0027	0.00031	< 0.001	< 0.002
1-Apr-15	40	500	500	7.7	< 0.007	< 0.00001	0.00080	1.8	0.011	< 0.01	0.00072	0.00010	< 0.003	2.6	< 0.001	0.44	< 0.000002	0.79	0.67	0.50	0.000010	0.00056	< 0.00005	0.0033	0.00017	< 0.001	< 0.002
8-Apr-15	41	500	490	7.9	< 0.007	< 0.00001	0.0011	2.0	0.0031	< 0.01	0.0013	< 0.0001	< 0.003	2.8	< 0.001	0.74	< 0.000002	0.11	0.75	0.60	< 0.000005	0.00075	< 0.00005	0.0027	0.00022	< 0.001	< 0.002
15-Apr-15	42	500	485	7.7	0.010	< 0.00001	0.00098	1.8	0.0030	< 0.01	0.0012	< 0.0001	< 0.003	2.4	< 0.001	0.58	0.0000040	0.13	0.66	0.90	< 0.000005	0.0010	< 0.00005	0.0023	0.00026	< 0.001	< 0.002
22-Apr-15	43	500	490	7.6	< 0.007	0.000020	0.00088	1.7	0.0032	< 0.01	0.00077	< 0.0001	< 0.003	2.3	< 0.001	0.55	0.000011	0.070	0.62	0.60	0.000017	0.00095	0.000090	0.0020	0.00019	< 0.001	< 0.002
29-Apr-15	44	500	490	7.8	< 0.007	0.00010	0.0013	2.5	0.0033	< 0.01	0.0013	0.00010	< 0.003	3.5	< 0.001	0.83	< 0.000002	0.12	0.84	1.1	0.0000080	0.00071	< 0.00005	0.0033	0.00025	< 0.001	< 0.002
6-May-15	45	500	500	8.0	< 0.007	< 0.00001	0.0012	2.2	0.0032	< 0.01	0.0015	0.00010	< 0.003	3.0	< 0.001	0.79	< 0.000002	0.14	0.74	0.90	< 0.000005	0.00057	0.00012	0.0033	0.00025	0.0010	< 0.002
13-May-15	46	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-May-15	47	490	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-May-15	48	480	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	49	475	470	8.2	< 0.007	< 0.00001	0.0026	5.0	0.0045	< 0.01	0.0024	0.00020	< 0.003	5.6	0.00011	1.9	< 0.000002	0.21	1.8	2.5	0.000021	0.0012	0.000070	0.0070	0.00019	< 0.001	< 0.002
10-Jun-15	50	500	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-15	51	480	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Jun-15	52	470	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	53	460	465	8.1	0.011	< 0.00001	0.0024	4.7	0.0048	0.010	0.0020	0.00030	< 0.003	4.8	0.00039	1.6	0.0000040	0.22	1.7	3.3	0.000017	0.0010	0.00025	0.0067	0.00022	0.0010	< 0.002
8-Jul-15	54	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-Jul-15	55	490	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jul-15	56	480	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	57	480	470	8.1	< 0.007	< 0.00001	0.0027	5.1	0.0039	< 0.01	0.0025	0.00030	< 0.003	5.1	0.00013	1.7	< 0.000002	0.23	1.8	2.5	0.0000050	0.00079	0.00019	0.0070	0.00026	< 0.001	< 0.002
5-Aug-15	58	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	59	495	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Aug-15	60	490	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	61	480	470	8.0	< 0.007	0.00011	0.0026	4.7	0.0037	< 0.01	0.0028	0.00020	< 0.003	5.0	0.00013	1.8	< 0.000002	0.21	1.8	2.2	0.000014	0.00095	0.000070	0.0065	0.00028	< 0.001	< 0.002
2-Sep-15	62	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	63	495	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Sep-15	64	490	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	65	490	470	8.1	< 0.007	< 0.00001	0.0025	5.2	0.0028	< 0.01	0.0031	0.00030	< 0.003	5.4	0.00015	1.8	< 0.000002	0.22	1.8	2.5	0.000017	0.0013	0.00013	0.0061	0.00023	< 0.001	< 0.002
30-Sep-15	66	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	67	500	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14-Oct-15	68	480	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	69	460	450	8.1	< 0.007	0.000080	0.0024	4.9	0.0038	< 0.01	0.0018	0.00020	< 0.003	5.2	0.00052	1.6	0.00010	0.40	1.6	2.5	0.000020	0.0013	0.00012	0.0057	0.00018	0.0010	< 0.002
28-Oct-15	70	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	71	490	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Nov-15	72	470	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	73	460	460	8.0	0.0080	0.000020	0.0017	4.0	0.0050	< 0.01	0.0030	< 0.0001	< 0.003	4.5	0.00024	1.2	0.000013	0.20	1.3	1.4	0.000075	0.0012	0.00048	0.0049	0.00021	0.0020	< 0.002
25-Nov-15	74	500	485	8.0	< 0.007	0.00023	0.00100	1.8	0.0027	< 0.01	0.0013	0.00010	0.020	2.8	0.00084	0.65	0.00047	0.14	0.67	0.90	0.000080	0.00038	0.000090	0.0023	0.00030	< 0.001	< 0.002
2-Dec-15	75	500	495	8.0	< 0.007	0.00038	0.00094	2.0	0.0035	< 0.01	0.0013	< 0.0001	< 0.003	2.9	0.00023	0.70	0.0000020	0.11	0.64	0.80	< 0.000005	0.00042	0.00010	0.0025	0.00023	0.0010	< 0.002
9-Dec-15	76	500	505	8.1	< 0.007	< 0.00001	0.00098	1.8	0.0029	< 0.01	0.00094	< 0.0001	< 0.003	2.6	0.00033	0.62	0.0000090	0.090	0.64	0.70	0.000020	0.00041	0.00010	0.0023	0.00026	< 0.001	< 0.002
16-Dec-15	77	500	495	7.9	0.015	0.00012	0.00096	1.8	0.0032	< 0.01	0.00061	0.00010	0.0040	2.8	< 0.00004	0.71	< 0.000002	0.10	0.64	0.50	0.000014	0.00035	0.00041	0.0022	0.00027	< 0.001	< 0.002
23-Dec-15	78	500	500	7.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	79	500	485	7.9	< 0.007	< 0.00001	0.00086	1.7	0.0032	0.010	0.00052	< 0.0001	< 0.003	2.4	0.000050	0.56	0.0000030	0.11	0.59	1.1	< 0.000005	0.00024	0.00016	0.0020	0.00025	< 0.001	< 0.002
6-Jan-16	80	500	495	7.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	81	500	495	7.8	< 0.007	< 0.00001	0.00090	1.8	0.0036	< 0.01	0.0015	< 0.0001	< 0.003	2.7	0.00024	0.63	< 0.000002	0.070	0.63	0.40	< 0.000005	0.00028	< 0.00005	0.0026	0.00017	< 0.001	< 0.002
20-Jan-16	82	500	495	7.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	83	500	490	7.9	< 0.007	< 0.00001	0.0011	2.1	0.0033	< 0.01	0.00063	< 0.0001	< 0.003	3.0	< 0.00004	0.70	< 0.000002	0.080	0.75	0.50	0.000011	0.00042	0.00016	0.0029	0.00020	< 0.001	< 0.002
3-Feb-16	84	500	490	7.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	85	500	500	7.8	< 0.007	< 0.00001	0.00086	1.9	0.0038	< 0.01	0.00058	< 0.0001	< 0.003	2.6	0.000090	0.60	< 0.000002	0.11	0.68	1.1	0.0000090	0.00045	0.00010	0.0019	0.00018	< 0.001	< 0.002
17-Feb-16	86	500	500	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	87	500	500	7.8	< 0.007	< 0.00001	0.00097	2.0	0.0033	< 0.01	0.00096	< 0.0001	< 0.003	2.9	0.00017	0.45	0.000014	0.080	0.71	0.80	< 0.000005	0.00026	0.00010	0.0020	0.00019	< 0.001	< 0.002

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Calculated Loading Rates for HC1 (ST)

Date	Cycle	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu
	No.	Input	Output		umhos/cm	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
25-Jun-14	0	500	345	7.7	484	#N/A	2.2	19	47	0.76	0.13	0.10	47	0.0062	0.00038	0.0038	0.012	0.0000024	0.0000024	0.0067	0.0000010	11	0.000052	0.00016	0.0022
2-Jul-14	1	500	500	7.7	295	#N/A	4.1	26	39	0.25	0.12	0.15	54	0.0090	0.00065	0.0043	0.012	0.0000035	0.0000035	0.0071	0.0000015	12	0.000095	0.00032	0.0013
9-Jul-14	2	500	485	7.9	192	#N/A	1.2	23	19	0.097	0.087	0.15	28	0.011	0.00029	0.0034	0.015	0.0000034	0.0000034	0.0059	0.0000015	6.6	0.000019	0.000050	0.00050
16-Jul-14	3	500	485	7.8	146	#N/A	1.1	22	9.2	0.097	0.063	0.15	23	0.011	0.00053	0.0030	0.015	0.0000034	0.0000034	0.0039	0.0000015	5.4	0.00010	0.00022	0.00039
23-Jul-14	4	500	485	7.8	108	#N/A	1.1	19	5.3	0.097	0.049	0.15	19	0.013	0.00024	0.0023	0.020	0.0000034	0.0000034	0.0032	0.0000015	4.7	0.000015	0.000083	0.00067
30-Jul-14	5	500	480	8.1	79	#N/A	0.76	18	2.9	0.096	0.029	0.14	14	0.016	0.00029	0.0024	0.016	0.0000034	0.0000034	0.0021	0.0000014	3.7	0.000096	0.00014	0.00072
6-Aug-14	6	500	485	7.8	76	#N/A	1.0	15	2.4	0.097	0.029	0.15	14	0.019	0.00015	0.0016	0.018	0.0000034	0.0000034	0.0033	0.0000015	3.7	0.000015	0.000016	0.00018
13-Aug-14	7	500	490	8.2	109	#N/A	1.1	21	4.4	0.098	0.049	0.15	21	0.028	0.00020	0.0026	0.030	0.0000034	0.0000034	0.0033	0.0000015	4.9	0.00013	0.000027	0.00026
20-Aug-14	8	500	485	7.9	85	#N/A	0.85	17	3.9	0.097	0.029	0.15	17	0.021	0.000097	0.0023	0.024	0.0000034	0.0000034	0.0023	0.0000015	4.4	0.000044	0.000028	0.00044
27-Aug-14	9	500	500	8.1	117	#N/A	1.9	24	4.5	0.10	0.055	0.15	22	0.018	0.00020	0.0025	0.027	0.0000035	0.0000035	0.0055	0.0000015	5.5	0.000050	0.000018	0.00019
3-Sep-14	10	500	490	7.8	101	#N/A	2.2	21	4.4	0.098	0.044	0.15	26	0.015	0.00054	0.0029	0.025	0.0000034	0.0000034	0.0037	0.0000015	7.4	0.000015	0.000016	0.00035
10-Sep-14	11	500	500	8.2	98	#N/A	1.5	21	2.5	0.10	0.040	0.15	22	0.019	0.00020	0.0021	0.026	0.0000035	0.0000035	0.0032	0.0000015	6.3	0.000050	0.000013	0.00019
17-Sep-14	12	500	475	8.0	77	#N/A	3.4	17	1.9	0.095	0.029	0.14	13	0.018	0.000095	0.0015	0.021	0.0000033	0.0000033	0.0029	0.0000014	3.6	0.000033	0.0000081	0.00012
24-Sep-14	13	500	485	8.2	75	#N/A	1.5	18	2.4	0.097	0.029	0.15	14	0.014	0.000097	0.0014	0.019	0.0000034	0.0000034	0.0017	0.0000015	3.8	0.000015	0.000053	0.00021
1-Oct-14	14	500	485	7.8	72	#N/A	4.6	18	1.5	0.097	0.029	0.15	15	0.016	0.000097	0.0012	0.019	0.0000034	0.0000034	0.0015	0.000021	3.9	0.000015	0.00	0.0000097
8-Oct-14	15	500	480	8.1	87	#N/A	1.3	17	1.9	0.096	0.029	0.14	21	0.017	0.00014	0.0017	0.025	0.0000034	0.0000034	0.011	0.0000014	6.2	0.000034	0.000012	0.00015
15-Oct-14	16	500	485	7.7	94	#N/A	2.8	18	2.4	0.097	0.029	0.15	23	0.013	0.00019	0.0018	0.023	0.0000034	0.0000034	0.0028	0.0000053	6.8	0.000019	0.0000087	0.00016
22-Oct-14	17	500	490	8.1	92	#N/A	2.0	20	2.5	0.098	0.029	0.15	18	0.012	0.00020	0.0017	0.024	0.0000034	0.0000034	0.0076	0.0000015	4.6	0.000020	0.0000093	0.00016
29-Oct-14	18	500	495	7.8	89	#N/A	4.4	21	1.5	0.099	0.030	0.15	17	0.012	0.00020	0.0018	0.023	0.0000035	0.0000035	0.0073	0.0000015	4.6	0.000059	0.0000089	0.00012
5-Nov-14	19	500	490	7.9	81	#N/A	#N/A	23	0.98	0.098	0.029	0.15	16	0.012	0.00015	0.0015	0.022	0.0000034	0.0000034	0.0029	0.0000078	4.1	0.000029	0.000011	0.00026
12-Nov-14	20	500	485	7.6	88	#N/A	3.2	17	1.5	0.097	0.034	0.15	18	0.023	0.00019	0.0018	0.025	0.0000034	0.0000034	0.0028	0.0000015	4.8	0.000092	0.000015	0.00022
19-Nov-14	21	500	485	7.7	89	#N/A	3.2	17	0.97	0.097	0.029	0.15	17	0.013	0.00019	0.0016	0.028	0.0000034	0.0000034	0.0016	0.0000039	4.5	0.000029	0.000011	0.00023
26-Nov-14	22	500	490	8.1	88	#N/A	0.95	19	1.5	0.098	0.029	0.15	18	0.014	0.00020	0.0018	0.027	0.0000034	0.0000034	0.0011	0.0000015	4.8	0.000025	0.0000088	0.00014
3-Dec-14	23	500	475	8.0	75	#N/A	1.4	17	0.95	0.095	0.029	0.14	16	0.013	0.00019	0.0019	0.027	0.0000033	0.0000033	0.0023	0.0000014	4.4	0.000024	0.0000076	0.00015
10-Dec-14	24	500	495	7.9	63	#N/A	2.3	17	0.99	0.099	0.030	0.15	13	0.011	0.000099	0.0012	0.022	0.0000035	0.0000035	0.0014	0.0000015	3.7	0.000030	0.0000050	0.00015
17-Dec-14	25	500	495	7.7	74	#N/A	2.2	17	1.5	0.099	0.030	0.15	16	0.015	0.000099	0.0014	0.026	0.0000035	0.0000035	0.0011	0.0000015	4.1	0.000015	0.0000064	0.00020
24-Dec-14	26	500	495	7.7	75	#N/A	1.8	17	0.99	0.099	0.030	0.15	16	0.015	0.00015	0.0015	0.029	0.0000035	0.0000035	0.0031	0.0000015	4.4	0.000015	0.0000059	0.00011
31-Dec-14	27	500	495	7.9	88	#N/A	0.65	18	0.99	0.099	0.030	0.15	19	0.013	0.00040	0.0031	0.031	0.0000035	0.0000035	0.0014	0.0000015	5.2	0.000015	0.0000030	0.00011
7-Jan-15	28	500	485	7.5	71	#N/A	1.5	16	0.97	0.49	0.029	0.15	16	0.013	0.00015	0.0012	0.023	0.0000034	0.0000034	0.0023	0.0000015	4.4	0.000029	0.0000073	0.00017
14-Jan-15	29	500	495	7.9	77	#N/A	1.2	19	1.5	0.50	0.030	0.15	19	0.011	0.00015	0.0015	0.025	0.0000035	0.0000035	0.0020	0.0000025	5.5	0.000030	0.0000050	0.00019
21-Jan-15	30	500	485	7.8	83	#N/A	2.3	21	0.97	0.49	0.029	0.15	17	0.013	0.00019	0.0015	0.031	0.0000034	0.0000034	0.0018	0.0000015	4.5	0.000039	0.0000073	0.00031
28-Jan-15	31	500	495	7.8	75	#N/A	0.83	18	0.99	0.50	0.030	0.15	16	0.013	0.00015	0.0013	0.027	0.0000035	0.0000035	0.0022	0.0000020	4.5	0.000050	0.0000045	0.00010
4-Feb-15	32	500	490	7.8	77	#N/A	1.3	18	0.98	0.49	0.029	0.15	16	0.011	0.00015	0.0013	0.027	0.0000034	0.0000034	0.0025	0.0000015	4.2	0.000098	0.0000034	0.00033
11-Feb-15	33	500	490	8.0	74	#N/A	0.96	18	1.5	0.49	0.029	0.15	15	0.012	0.00020	0.0013	0.025	0.0000034	0.0000034	0.0019	0.0000015	4.3	0.000025	0.0000059	0.00033
18-Feb-15	34	500	485	7.8	73	#N/A	1.1	18	0.97	0.49	0.034	0.15	16	0.012	0.00024	0.0013	0.024	0.0000034	0.0000034	0.0014	0.0000015	4.4	0.000019	0.0000078	0.00020
25-Feb-15	35	500	490	7.8	76	#N/A	1.5	19	0.98	0.49	0.029	0.15	16	0.011	0.00020	0.0012	0.028	0.0000034	0.0000034	0.00074	0.0000029	4.4	0.000039	0.0000083	0.00054
4-Mar-15	36	500	480	7.7	62	#N/A	1.0	15	0.96	0.48	0.029	0.14	14	0.0094	0.000096	0.00086	0.022	0.0000034	0.0000034	0.0013	0.0000014	4.4	0.000053	0.0000034	0.00023
11-Mar-15	37	500	480	8.0	64	#N/A	0.74	16	0.96	0.48	0.038	0.14	13	0.010	0.00014	0.0010	0.023	0.0000034	0.0000034	0.0025	0.0000014	3.8	0.000043	0.0000029	0.00038
18-Mar-15	38	500	500	7.8	65	#N/A	1.3	17	1.0	0.50	0.030	0.15	16	0.011	0.00015	0.00085	0.023	0.0000070	0.0000035	0.0011	0.0000015	4.7	0.000050	0.0000065	0.00053
25-Mar-15	39	500	485	7.8	65	#N/A	1.4	17	0.97	0.49	0.029	0.15	14	0.013	0.00015	0.0012	0.027	0.0000034	0.0000034	0.0025	0.0000015	4.0	0.000063	0.0000019	0.00095
1-Apr-15	40	500	500	7.7	66	#N/A	1.9	18	1.0	0.50	0.030	0.15	12	0.011	0.00015	0.00080	0.030	0.0000060	0.0000035	0.0014	0.0000015	3.4	0.000030	0.0000020	0.00019
8-Apr-15	41	500	490	7.9	71	#N/A	1.4	18	0.98	0.49	0.029	0.15	15	0.011	0.00020	0.0011	0.027	0.0000034	0.0000034	0.0025	0.0000015	4.2	0.000029	0.0000078	0.00048
15-Apr-15	42	500	485	7.7	61	#N/A	1.8	16	0.97	0.49	0.029	0.15	13	0.011	0.00015	0.00087	0.024	0.0000034	0.0000034	0.0032	0.0000015	3.7	0.000029	0.0000019	0.00047
22-Apr-15	43	500	490	7.6	60	#N/A	1.5	16	1.5	0.49	0.029	0.15	13	0.0091	0.000098	0.00074	0.023	0.0000034	0.0000034	0.0044	0.0000015	3.7	0.000020	0.0000029	0.00054
29-Apr-15	44	500	490	7.8	80	#N/A	1.0	19	1.5	0.49	0.029	0.15	20	0.013	0.00020	0.0014	0.034	0.0000034	0.0000034	0.0018	0.0000025	5.8	0.000044	0.0000098	0.00026
6-May-15	45	500	500	8.0	73	#N/A	1.2	20	1.0	0.50	0.030	0.15	16	0.013	0.00015	0.0032	0.027	0.0000035	0.0000035	0.0023	0.0000015	4.6	0.000015	0.0000085	0.00017
13-May-15	46	500	490																						
20-May-15	47	490	480																						
27-May-15	48	480	475																						
3-Jun-15	49	475	470	8.2	161	#N/A	1.3	8.9	0.71	0.12	0.0071	0.035	8.9	0.0011	0.000071	0.00028	0.019	0.00000082	0.00000082	0.00048	0.00000035	2.6	0.000019	0.0000026	0.000040
10-Jun-15	50	500	480																						
17-Jun-15	51	480	470																						
24-Jun-15	52	470	460																						
1-Jul-15	53	460	465	8.1	166	#N/A	1.7	8.8	0.47	0.12	0.0070	0.035	7.7	0.0018	0.000058	0.00033	0.016	0.00000081	0.00000081	0.0017	0.00000035	2.2	0.000023	0.0000043	0.000041
8-Jul-15	54	500	490																						
15-Jul-15	55	490	480																						
22-Jul-15	56	480	480																						
29-Jul-15	57	480	470	8.1	161	#N/A	0.91	9.1	0.59	0.12	0.0071	0.035	8.2	0.0017	0.000059	0.00029	0.017	0.00000082	0.00000082	0.00087	0.00000035	2.3	0.000025	0.0000033	0.000026
5-Aug-15	58	500	495																						
12-Aug-15	59	495	490																						
19-Aug-15	60	490	480																						
26-Aug-15	61	480	470	8.0	158	#N/A	0.92	9.0	0.59	0.12	0.0071	0.035	8.2	0.0011	0.000071	0.00033	0.018	0.00000082	0.00000082	0.00073	0.00000094	2.4	0.000020	0.0000029	0.000054
2-Sep-15	62	500	495																						
9-Sep-15	63	495	490																						
16-Sep-15	64	490	490																						
23-Sep-15	65	490	470	8.1	163	#N/A	1.0	9.0	0.59	0.00	0.00	0.00	8.6	0.0012	0.000071	0.00033	0.019	0.00000082	0.00000082	0.00085	0.00000047	2.5	0.000024	0.0000029	0.000029
30-Sep-15	66	500	500																						
7-Oct-15	67	500	480																						
14-Oct-15	68	480	460																						
21-Oct-15	69	460	450	8.1	149	#N/A	0.70	8.5	0.56	0.00	0.00	0.00	7.9	0.0011	0.000056	0.00029	0.016	0.00000079	0.00000079	0.00074	0.0000039	2.2	0.000027	0.0000041	0.00018
28-Oct-15	70	500	490																						
4-Nov-15	71	490	470																						
11-Nov-15	72	470	460																						
18-Nov-15	73	460	460	8.0	138	#N/A	0.52	8.5	0.46	0.00	0.00	0.00	6.7	0.0022	0.000046	0.00023	0.015	0.00000081	0.00000081	0.00038	0.00000035	1.9	0.000026	0.0000092	0.000071
25-Nov-15	74	500	485	8.0	69	#N/A	0.20	19	0.97	0.00	0.00	0.00	16	0.015	0.00015	0.0012	0.030	0.0000034	0.0000034	0.0016	0.0000015	4.9	0.000078	0.000087	0.00038
2-Dec-15	75	500	495	8.0	68	#N/A	0.68	17	0.99	0.00	0.00	0.00	15	0.014	0.00015	0.0011	0.031	0.0000035	0.0000035	0.0014	0.0000035	4.3	0.000025	0.0000069	0.00028
9-Dec-15	76	500	505	8.1	67	#N/A	1.2	17	1.0	0.00	0.00	0.00	14	0.015	0.00020	0.0016	0.031	0.0000051	0.0000035	0.0045	0.0000066	4.2	0.000051	0.0000020	0.00018
16-Dec-15	77	500	495	7.9	63	#N/A	0.85	15	0.99	0.00	0.00	0.00	15	0.025	0.000099	0.0011	0.031	0.0000035	0.0000035	0.00099	0.0000020	4.4	0.000099	0.0000079	0.00021
23-Dec-15	78	500	500	7.9	71	-	0.75	15	1.2	0.00	0.00	0.00	14	0.019	0.000098	0.00091	0.030	0.0000034	0.0000034	0.0011	0.0000020	4.3	0.000074	0.0000049	0.00016
30-Dec-15	79	500	485	7.9	62	#N/A	0.65	15	1.5	0.00	0.00	0.00	14	0.013	0.000097	0.00073	0.029	0.0000034	0.0000034	0.0012	0.0000019	4.1	0.000049	0.0000019	0.00011
6-Jan-16	80	500	495	7.9	70	-	0.69	15	1.5	0.00	0.00	0.00	14	0.012	0.000098	0.00081	0.029	0.0000034	0.0000034	0.0018	0.0000017	4.2	0.000044	0.0000020	0.00011
13-Jan-16	81	500	495	7.8	68	#N/A	0.74	16	1.5	0.00	0.00	0.00	14	0.011	0.000099	0.00089	0.030	0.0000035	0.0000035	0.0025	0.0000015	4.2	0.000040	0.0000020	0.00012
20-Jan-16	82	500	495	7.9	80	-	0.97	17	1.2	0.00	0.00	0.00	15	0.012	0.000099	0.00098	0.033	0.0000034	0.0000034	0.0017	0.0000015	4.4	0.000039	0.0000054	0.00011
27-Jan-16	83	500	490	7.9	73	#N/A	1.2	17	0.98	0.00	0.00	0.00	15	0.012	0.000098	0.0011	0.036	0.0000034	0.0000034	0.00098	0.0000015	4.5	0.000039	0.0000088	0.000098
3-Feb-16	84	500	490	7.9	74	-	1.2	17	0.99	0.00	0.00	0.00	15	0.012	0.000099	0.0011	0.037	0.0000035	0.0000035	0.00099	0.0000015	4.5	0.000042	0.0000064	0.00024
10-Feb-16	85	500	500	7.8	70	#N/A	1.1	17	1.0	0.00	0.00	0.00	15	0.013	0.00010	0.0011	0.038	0.0000035	0.0000035	0.0010	0.0000015	4.5	0.000045	0.0000040	0.00038
17-Feb-16	86	500	500	7.8	73	-	1.1	17	1.0	0.00	0.00	0.00	15	0.013	0.00010	0.0011	0.037	0.0000035	0.0000035	0.0010	0.0000015	4.5	0.000030	0.0000030	0.00023
24-Feb-16	87	500	500	7.8	69	#N/A	1.1	16	1.0	0.00	0.00	0.00	15	0.014	0.00010	0.0010	0.035	0.0000035	0.0000035	0.0010	0.0000015	4.5	0.000015	0.0000020	0.000075

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Calculated Loading Rates for HC1 (ST)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
25-Jun-14	0	500	345	7.7	0.0031	0.0000035	0.0029	5.1	0.0038	0.0069	0.0050	0.0018	0.0086	3.3	0.0012	0.96	0.00000069	12	0.37	19	0.0000090	0.000045	0.000062	0.0042	0.00025	0.00069	0.00069
2-Jul-14	1	500	500	7.7	0.0010	0.0000050	0.0033	5.8	0.0081	0.0050	0.0048	0.0021	0.0045	3.9	0.00064	1.2	0.0000010	10	0.57	18	0.000011	0.0036	0.00010	0.0089	0.00024	0.00050	0.0010
9-Jul-14	2	500	485	7.9	0.0029	0.0000049	0.0022	2.9	0.0048	0.0049	0.0030	0.00092	0.0044	2.8	0.00016	0.98	0.00000097	4.3	0.40	6.7	0.0000063	0.0016	0.000073	0.0039	0.00023	0.00049	0.00097
16-Jul-14	3	500	485	7.8	0.0053	0.0000049	0.0017	2.3	0.0032	0.0049	0.0037	0.00058	0.0044	2.2	0.000087	0.72	0.0000029	2.7	0.36	3.6	0.0000087	0.00012	0.000044	0.0054	0.00018	0.00049	0.00097
23-Jul-14	4	500	485	7.8	0.00097	0.0000097	0.0013	1.8	0.0038	0.0049	0.0015	0.00034	0.0044	1.9	0.000053	0.61	0.0000019	1.7	0.32	2.5	0.0000044	0.0016	0.000039	0.0024	0.00016	0.00049	0.00097
30-Jul-14	5	500	480	8.1	0.0024	0.0000048	0.00089	1.2	0.0032	0.0048	0.0025	0.00019	0.0072	1.3	0.000043	0.40	0.00000096	0.85	0.25	1.4	0.0000053	0.00010	0.00011	0.0034	0.00014	0.00048	0.00096
6-Aug-14	6	500	485	7.8	0.0039	0.000015	0.00075	1.2	0.0028	0.0049	0.00091	0.000049	0.0053	1.4	0.000058	0.42	0.00000097	0.74	0.26	1.3	0.0000034	0.000053	0.00013	0.0018	0.00039	0.00097	0.00097
13-Aug-14	7	500	490	8.2	0.0088	0.0000098	0.0013	2.0	0.0030	0.0049	0.0017	0.00015	0.0049	2.1	0.000059	0.71	0.00000098	1.3	0.38	2.1	0.0000049	0.00060	0.00040	0.0029	0.00017	0.00049	0.00098
20-Aug-14	8	500	485	7.9	0.0029	0.000019	0.00092	1.5	0.0031	0.0049	0.0011	0.00015	0.0044	1.6	0.00015	0.52	0.00000097	0.72	0.32	1.4	0.0000029	0.00097	0.00018	0.0023	0.00018	0.00049	0.00097
27-Aug-14	9	500	500	8.1	0.0030	0.0000050	0.0013	2.1	0.0038	0.0050	0.0019	0.00015	0.0045	2.2	0.000055	0.73	0.0000010	1.1	0.43	1.8	0.0000080	0.00069	0.00016	0.0032	0.00020	0.00050	0.0010
3-Sep-14	10	500	490	7.8	0.0034	0.000020	0.0012	1.8	0.0029	0.0049	0.0015	0.00015	0.0025	2.2	0.00014	0.74	0.0000064	0.78	0.46	2.0	0.0000088	0.000093	0.000029	0.0026	0.00019	0.00049	0.00098
10-Sep-14	11	500	500	8.2	0.0050	0.0000050	0.00093	1.5	0.0030	0.0050	0.0013	0.00010	0.0015	1.8	0.000045	0.65	0.0000010	0.59	0.41	1.2	0.0000075	0.00073	0.00016	0.0023	0.00016	0.00050	0.0010
17-Sep-14	12	500	475	8.0	0.0033	0.0000048	0.00066	1.1	0.0025	0.0048	0.00081	0.000048	0.0014	1.4	0.000048	0.39	0.00000095	0.33	0.31	1.00	0.0000024	0.000043	0.000081	0.0016	0.00013	0.00048	0.00095
24-Sep-14	13	500	485	8.2	0.00097	0.0000049	0.00072	1.2	0.0022	0.0049	0.00081	0.000097	0.0044	1.4	0.000019	0.40	0.0000024	0.34	0.28	0.75	0.0000024	0.000049	0.000024	0.0017	0.00012	0.00049	0.00097
1-Oct-14	14	500	485	7.8	0.019	0.000019	0.00065	1.2	0.0053	0.0049	0.0010	0.000049	0.0044	1.4	0.000019	0.43	0.00000097	0.28	0.30	0.96	0.0000024	0.000029	0.00015	0.0016	0.00012	0.00097	0.00097
8-Oct-14	15	500	480	8.1	0.0048	0.0000096	0.00088	1.3	0.0027	0.0048	0.0016	0.000096	0.0014	1.6	0.000019	0.48	0.00000096	0.32	0.38	1.2	0.0000082	0.00023	0.00020	0.0020	0.00017	0.00048	0.00096
15-Oct-14	16	500	485	7.7	0.0034	0.0000049	0.0010	1.5	0.0023	0.0049	0.0011	0.000097	0.0015	1.9	0.000034	0.53	0.00000097	0.36	0.43	1.2	0.0000049	0.00066	0.000049	0.0022	0.00014	0.00049	0.00097
22-Oct-14	17	500	490	8.1	0.0049	0.0000049	0.00092	1.6	0.0027	0.0049	0.0011	0.000098	0.0015	2.0	0.000034	0.52	0.00000098	0.33	0.43	1.1	0.000011	0.000093	0.000039	0.0023	0.00013	0.00049	0.00098
29-Oct-14	18	500	495	7.8	0.0035	0.0000050	0.00089	1.5	0.0021	0.0050	0.00093	0.000050	0.0015	1.7	0.000030	0.51	0.00000099	0.26	0.41	0.89	0.0000069	0.00048	0.000025	0.0020	0.00013	0.00050	0.00099
5-Nov-14	19	500	490	7.9	0.0034	0.00015	0.00071	1.3	0.0019	0.0049	0.0012	0.000098	0.0015	1.5	0.000020	0.46	0.00000098	0.23	0.38	0.83	0.000011	0.00013	0.000064	0.0019	0.00011	0.00049	0.00098
12-Nov-14	20	500	485	7.6	0.0082	0.000019	0.00076	1.5	0.0024	0.0049	0.0013	0.000097	0.0015	1.6	0.000034	0.51	0.00000097	0.26	0.43	0.87	0.0000063	0.00050	0.00037	0.0021	0.00016	0.00049	0.00097
19-Nov-14	21	500	485	7.7	0.0034	0.000063	0.00077	1.4	0.0025	0.0049	0.00084	0.000097	0.0015	1.6	0.000039	0.45	0.00000097	0.21	0.44	0.78	0.000012	0.00026	0.000024	0.0020	0.00013	0.00097	0.00097
26-Nov-14	22	500	490	8.1	0.0034	0.0000049	0.00089	1.5	0.0021	0.0049	0.00092	0.000049	0.0049	1.7	0.00011	0.56	0.00000098	0.20	0.44	0.74	0.0000069	0.000064	0.000054	0.0021	0.00015	0.00049	0.00098
3-Dec-14	23	500	475	8.0	0.0033	0.0000048	0.00077	1.3	0.0023	0.0048	0.00076	0.000048	0.0014	1.5	0.000033	0.38	0.00000095	0.16	0.36	0.67	0.0000076	0.00046	0.000048	0.0019	0.00015	0.00048	0.00095
10-Dec-14	24	500	495	7.9	0.0035	0.0000050	0.00052	1.00	0.0019	0.0050	0.00063	0.000050	0.0015	1.1	0.000030	0.30	0.00000099	0.10	0.32	0.54	0.0000064	0.00029	0.000025	0.0014	0.000094	0.00050	0.00099
17-Dec-14	25	500	495	7.7	0.0035	0.0000050	0.00071	1.3	0.0022	0.0050	0.00058	0.000050	0.0015	1.5	0.000025	0.43	0.00000099	0.14	0.39	0.59	0.0000054	0.00042	0.00020	0.0017	0.00014	0.00050	0.00099
24-Dec-14	26	500	495	7.7	0.0035	0.0000050	0.00072	1.2	0.0019	0.0050	0.00069	0.000050	0.0015	1.4	0.000079	0.39	0.00000099	0.13	0.39	0.64	0.0000045	0.00037	0.000050	0.0017	0.00014	0.00050	0.00099
31-Dec-14	27	500	495	7.9	0.0035	0.0000050	0.00085	1.5	0.0021	0.0050	0.00098	0.000050	0.0015	1.7	0.00011	0.59	0.00000099	0.15	0.47	0.89	0.000010	0.00026	0.000030	0.0022	0.00014	0.00050	0.00099
7-Jan-15	28	500	485	7.5	0.0034	0.0000097	0.00061	1.2	0.0018	0.0049	0.00090	0.000049	0.0015	1.3	0.000058	0.34	0.00000097	0.10	0.37	0.44	0.000019	0.00017	0.000024	0.0015	0.00011	0.00049	0.00097
14-Jan-15	29	500	495	7.9	0.0035	0.0000099	0.00061	1.3	0.0018	0.0050	0.0011	0.000050	0.0015	1.4	0.000054	0.50	0.00000099	0.10	0.42	0.50	0.000014	0.00031	0.000025	0.0016	0.00011	0.00050	0.00099
21-Jan-15	30	500	485	7.8	0.0034	0.000015	0.00078	1.3	0.0019	0.0049	0.0011	0.000049	0.0015	1.6	0.000049	0.43	0.00000097	0.12	0.45	0.49	0.0000082	0.00033	0.000039	0.0021	0.00015	0.00049	0.00097
28-Jan-15	31	500	495	7.8	0.0035	0.0000050	0.00052	1.3	0.0018	0.0050	0.0032	0.000050	0.0015	1.5	0.000069	0.44	0.0000020	0.099	0.34	0.79	0.0000045	0.00012	0.000054	0.0016	0.00012	0.00050	0.00099
4-Feb-15	32	500	490	7.8	0.0034	0.000015	0.00070	1.3	0.0019	0.0049	0.00066	0.000049	0.0015	1.4	0.000029	0.41	0.00000098	0.088	0.38	0.64	0.0000044	0.00025	0.000025	0.0016	0.00012	0.00049	0.00098
11-Feb-15	33	500	490	8.0	0.0034	0.0000049	0.00057	1.1	0.0016	0.0049	0.00083	0.000049	0.0015	1.4	0.00049	0.38	0.00000098	0.078	0.38	0.54	0.0000064	0.00049	0.000044	0.0014	0.00012	0.00049	0.00098
18-Feb-15	34	500	485	7.8	0.0034	0.0000049	0.00067	1.2	0.0017	0.0049	0.00053	0.000049	0.0015	1.5	0.00049	0.39	0.0000015	0.087	0.45	0.53	0.0000058	0.00029	0.000034	0.0016	0.00013	0.00049	0.00097
25-Feb-15	35	500	490	7.8	0.0034	0.0000098	0.00061	1.2	0.0015	0.0049	0.00061	0.000049	0.0015	1.5	0.00049	0.41	0.00000098	0.069	0.40	0.29	0.0000069	0.00025	0.000064	0.0018	0.00011	0.00049	0.00098
4-Mar-15	36	500	480	7.7	0.0034	0.0000096	0.00048	0.83	0.0017	0.0048	0.00044	0.000048	0.0014	1.0	0.00048	0.31	0.00000096	0.053	0.27	0.48	0.0000024	0.00028	0.000038	0.0013	0.00010	0.00048	0.00096
11-Mar-15	37	500	480	8.0	0.0034	0.000024	0.00050	0.95	0.0017	0.0048	0.00040	0.000048	0.0014	1.1	0.00048	0.26	0.0000034	0.038	0.29	0.048	0.0000034	0.00031	0.000024	0.0012	0.000091	0.00048	0.00096
18-Mar-15	38	500	500	7.8	0.0065	0.0000050	0.00049	0.91	0.0019	0.0050	0.00043	0.000050	0.0015	1.2	0.00050	0.29	0.0000010	0.050	0.33	0.50	0.0000025	0.00042	0.00010	0.0012	0.000090	0.00050	0.0010
25-Mar-15	39	500	485	7.8	0.0034	0.000015	0.00041	1.0	0.0017	0.0049	0.0010	0.000097	0.0015	1.2	0.00049	0.32	0.00000097	0.087	0.31	0.49	0.0000024	0.00040	0.000044	0.0013	0.00015	0.00049	0.00097
1-Apr-15	40	500	500	7.7	0.0035	0.0000050	0.00040	0.92	0.0057	0.0050	0.00036	0.000050	0.0015	1.3	0.00050	0.22	0.0000010	0.40	0.33	0.25	0.0000050	0.00028	0.000025	0.0016	0.000085	0.00050	0.0010
8-Apr-15	41	500	490	7.9	0.0034	0.0000049	0.00053	0.98	0.0015	0.0049	0.00064	0.000049	0.0015	1.4	0.00049	0.36	0.00000098	0.054	0.37	0.29	0.0000025	0.00037	0.000025	0.0013	0.00011	0.00049	0.00098
15-Apr-15	42	500	485	7.7	0.0049	0.0000049	0.00048	0.89	0.0014	0.0049	0.00059	0.000049	0.0015	1.2	0.00049	0.28	0.0000019	0.063	0.32	0.44	0.0000024	0.00050	0.000024	0.0011	0.00013	0.00049	0.00097
22-Apr-15	43	500	490	7.6	0.0034	0.0000098	0.00043	0.83	0.0016	0.0049	0.00038	0.000049	0.0015	1.1	0.00049	0.27	0.0000054	0.034	0.30	0.29	0.0000083	0.00047	0.000044	0.00100	0.000093	0.00049	0.00098
29-Apr-15	44	500	490	7.8	0.0034	0.000049	0.00063	1.2	0.0016	0.0049	0.00065	0.000049	0.0015	1.7	0.00049	0.41	0.00000098	0.059	0.41	0.54	0.0000039	0.00035	0.000025	0.0016	0.00012	0.00049	0.00098
6-May-15	45	500	500	8.0	0.0035	0.0000050	0.00060	1.1	0.0016	0.0050	0.00077	0.000050	0.0015	1.5	0.00050	0.40	0.0000010	0.070	0.37	0.45	0.0000025	0.00029	0.000060	0.0017	0.00013	0.00050	0.0010
13-May-15	46	500	490																								
20-May-15	47	490	480																								
27-May-15	48	480	475																								
3-Jun-15	49	475	470	8.2	0.00082	0.0000012	0.00031	0.59	0.00053	0.0012	0.00028	0.000024	0.00035	0.65	0.000013	0.22	0.00000024	0.025	0.22	0.29	0.0000025	0.00014	0.0000082	0.00082	0.000022	0.00012	0.00024
10-Jun-15	50	500	480																								
17-Jun-15	51	480	470																								
24-Jun-15	52	470	460																								
1-Jul-15	53	460	465	8.1	0.0013	0.0000012	0.00028	0.55	0.00055	0.0012	0.00023	0.000035	0.00035	0.56	0.000045	0.19	0.00000047	0.026	0.19	0.38	0.0000020	0.00012	0.000029	0.00078	0.000026	0.00012	0.00023
8-Jul-15	54	500	490																								
15-Jul-15	55	490	480																								
22-Jul-15	56	480	480																								
29-Jul-15	57	480	470	8.1	0.00082	0.0000012	0.00032	0.60	0.00046	0.0012	0.00029	0.000035	0.00035	0.60	0.000015	0.20	0.00000024	0.027	0.21	0.29	0.00000059	0.000093	0.000022	0.00082	0.000031	0.00012	0.00024
5-Aug-15	58	500	495																								
12-Aug-15	59	495	490																								
19-Aug-15	60	490	480																								
26-Aug-15	61	480	470	8.0	0.00082	0.000013	0.00031	0.56	0.00043	0.0012	0.00032	0.000024	0.00035	0.59	0.000015	0.21	0.00000024	0.025	0.21	0.26	0.0000016	0.00011	0.0000082	0.00076	0.000033	0.00012	0.00024
2-Sep-15	62	500	495																								
9-Sep-15	63	495	490																								
16-Sep-15	64	490	490																								
23-Sep-15	65	490	470	8.1	0.00082	0.0000012	0.00029	0.61	0.00033	0.0012	0.00036	0.000035	0.00035	0.63	0.000018	0.22	0.00000024	0.026	0.21	0.29	0.0000020	0.00016	0.000015	0.00072	0.000027	0.00012	0.00024
30-Sep-15	66	500	500																								
7-Oct-15	67	500	480																								
14-Oct-15	68	480	460																								
21-Oct-15	69	460	450	8.1	0.00079	0.0000090	0.00027	0.55	0.00042	0.0011	0.00020	0.000023	0.00034	0.59	0.000059	0.18	0.000012	0.045	0.18	0.28	0.0000023	0.00015	0.000014	0.00064	0.000020	0.00011	0.00023
28-Oct-15	70	500	490																								
4-Nov-15	71	490	470																								
11-Nov-15	72	470	460																								
18-Nov-15	73	460	460	8.0	0.00092	0.0000023	0.00020	0.45	0.00058	0.0012	0.00035	0.000012	0.00035	0.52	0.000028	0.14	0.0000015	0.023	0.15	0.16	0.0000086	0.00013	0.000055	0.00056	0.000024	0.00023	0.00023
25-Nov-15	74	500	485	8.0	0.0034	0.00011	0.00048	0.89	0.0013	0.0049	0.00063	0.000049	0.0097	1.3	0.00041	0.32	0.00023	0.068	0.32	0.44	0.000039	0.00018	0.000044	0.0011	0.00015	0.00049	0.00097
2-Dec-15	75	500	495	8.0	0.0035	0.00019	0.00047	0.98	0.0017	0.0050	0.00063	0.000050	0.0015	1.5	0.00011	0.35	0.00000099	0.054	0.32	0.40	0.0000025	0.00021	0.000050	0.0012	0.00011	0.00050	0.00099
9-Dec-15	76	500	505	8.1	0.0035	0.0000051	0.00049	0.91	0.0014	0.0051	0.00047	0.000051	0.0015	1.3	0.00017	0.31	0.0000045	0.045	0.32	0.35	0.000010	0.00021	0.000051	0.0012	0.00013	0.00051	0.0010
16-Dec-15	77	500	495	7.9	0.0074	0.000059	0.00047	0.89	0.0016	0.0050	0.00030	0.000050	0.0020	1.4	0.000020	0.35	0.00000099	0.050	0.32	0.25	0.0000069	0.00017	0.00020	0.0011	0.00013	0.00050	0.00099
23-Dec-15	78	500	500	7.9	0.0054	0.000032	0.00045	0.87	0.0016	0.0049	0.00028	0.000049	0.0017	1.3	0.000022	0.31	0.0000012	0.051	0.30	0.39	0.0000047	0.00014	0.00014	0.0010	0.00013	0.00049	0.00098
30-Dec-15	79	500	485	7.9	0.0034	0.0000049	0.00042	0.84	0.0016	0.0049	0.00025	0.000049	0.0015	1.2	0.000024	0.27	0.0000015	0.053	0.28	0.53	0.0000024	0.00012	0.000078	0.00098	0.00012	0.00049	0.00097
6-Jan-16	80	500	495	7.9	0.0034	0.0000049	0.00043	0.87	0.0017	0.0049	0.00050	0.000049	0.0015	1.2	0.000072	0.29	0.0000012	0.044	0.30	0.37	0.0000025	0.00013	0.000051	0.0011	0.00010	0.00049	0.00098
13-Jan-16	81	500	495	7.8	0.0035	0.0000050	0.00044	0.89	0.0018	0.0050	0.00075	0.000050	0.0015	1.3	0.00012	0.31	0.00000099	0.035	0.31	0.20	0.0000025	0.00014	0.000025	0.0013	0.000084	0.00050	0.00099
20-Jan-16	82	500	495	7.9	0.0034	0.0000049	0.00048	0.96	0.0017	0.0049	0.00053	0.000049	0.0015	1.4	0.000069	0.33	0.00000099	0.037	0.34	0.22	0.0000039	0.00017	0.000052	0.0014	0.000091	0.00049	0.00099
27-Jan-16	83	500	490	7.9	0.0034	0.0000049	0.00051	1.0	0.0016	0.0049	0.00031	0.000049	0.0015	1.5	0.000020	0.34	0.00000098	0.039	0.37	0.25	0.0000054	0.00021	0.000078	0.0014	0.000098	0.00049	0.00098
3-Feb-16	84	500	490	7.9	0.0035	0.0000050	0.00047	0.97	0.0018	0.0050	0.00030	0.000050	0.0015	1.4	0.000032	0.32	0.00000099	0.047	0.35	0.40	0.0000049	0.00022	0.000064	0.0012	0.000094	0.00050	0.00099
10-Feb-16	85	500	500	7.8	0.0035	0.0000050	0.00043	0.93	0.0019	0.0050	0.00029	0.000050	0.0015	1.3	0.000045	0.30	0.0000010	0.055	0.34	0.55	0.0000045	0.00023	0.000050	0.00095	0.000090	0.00050	0.0010
17-Feb-16	86	500	500	7.8	0.0035	0.0000050	0.00046	0.95	0.0018	0.0050	0.00039	0.000050	0.0015	1.4	0.000065	0.26	0.0000040	0.048	0.35	0.48	0.0000035	0.00018	0.000050	0.00098	0.000093	0.00050	0.0010
24-Feb-16	87	500	500	7.8	0.0035	0.0000050	0.00048	0.98	0.0017	0.0050	0.00048	0.000050	0.0015	1.5	0.000085	0.23	0.0000070	0.040	0.35	0.40	0.0000025	0.00013	0.000050	0.0010	0.000095	0.00050	0.0010

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for HC2 (SS)

Date	Cycle	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu
	No.	Input	Output		umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
25-Jun-14	0	500	330	8.0	464	#N/A	6.8	88	101	3.3	0.59	< 0.3	126	0.038	0.032	0.064	0.034	0.0000080	< 0.000007	0.019	0.0000090	24	0.00021	0.00044	0.0060
2-Jul-14	1	500	485	8.0	255	#N/A	8.2	74	49	0.80	0.29	< 0.3	83	0.036	0.028	0.063	0.043	< 0.000007	< 0.000007	0.012	< 0.000003	16	0.000040	0.00031	0.0017
9-Jul-14	2	500	490	8.0	220	#N/A	2.4	77	27	< 0.2	0.28	< 0.3	72	0.043	0.031	0.048	0.068	< 0.000007	< 0.000007	0.013	0.0000030	14	< 0.00003	0.00013	0.00092
16-Jul-14	3	500	480	8.0	177	#N/A	2.4	69	12	< 0.2	0.20	< 0.3	64	0.043	0.025	0.036	0.063	< 0.000007	< 0.000007	0.0085	< 0.000003	13	0.00019	0.00046	0.00073
23-Jul-14	4	500	500	8.0	118	#N/A	2.1	50	7.0	< 0.2	0.10	< 0.3	50	0.069	0.015	0.025	0.081	< 0.000007	< 0.000007	0.0059	0.0000030	11	< 0.00003	0.00016	0.0010
30-Jul-14	5	500	485	8.1	160	#N/A	1.9	77	9.0	< 0.2	0.18	< 0.3	66	0.051	0.025	0.034	0.074	< 0.000007	< 0.000007	0.0079	< 0.000003	13	0.00020	0.00020	0.0015
6-Aug-14	6	500	480	8.0	142	#N/A	2.6	64	5.0	< 0.2	0.15	< 0.3	60	0.050	0.021	0.028	0.069	< 0.000007	< 0.000007	0.0070	< 0.000003	12	< 0.00003	0.000088	0.00035
13-Aug-14	7	500	490	8.0	125	#N/A	2.4	58	7.0	< 0.2	0.11	< 0.3	55	0.045	0.018	0.020	0.082	< 0.000007	< 0.000007	0.0060	< 0.000003	12	0.000050	0.000084	0.00035
20-Aug-14	8	500	490	8.0	103	#N/A	1.9	48	6.0	< 0.2	0.070	< 0.3	48	0.057	0.012	0.016	0.074	< 0.000007	< 0.000007	0.0046	< 0.000003	11	< 0.00003	0.000084	0.00038
27-Aug-14	9	500	495	8.0	130	#N/A	4.5	58	5.0	< 0.2	0.10	< 0.3	56	0.045	0.017	0.020	0.080	< 0.000007	< 0.000007	0.010	< 0.000003	12	< 0.00003	0.000068	0.00027
3-Sep-14	10	500	490	7.9	121	#N/A	4.6	54	7.0	< 0.2	0.070	< 0.3	68	0.060	0.018	0.022	0.098	< 0.000007	< 0.000007	0.0052	< 0.000003	18	< 0.00003	0.000066	0.00033
10-Sep-14	11	500	500	8.0	111	#N/A	3.3	50	5.0	< 0.2	0.060	< 0.3	54	0.057	0.014	0.015	0.081	< 0.000007	< 0.000007	0.0062	0.000021	14	< 0.00003	0.000050	0.00029
17-Sep-14	12	500	495	7.9	112	#N/A	8.3	53	6.0	< 0.2	0.060	< 0.3	47	0.058	0.016	0.014	0.076	< 0.000007	< 0.000007	0.0047	< 0.000003	11	0.000040	0.000059	0.00041
24-Sep-14	13	500	480	8.0	95	#N/A	3.7	45	8.0	< 0.2	< 0.06	< 0.3	42	0.048	0.015	0.010	0.068	< 0.000007	< 0.000007	0.0036	0.0000060	9.6	< 0.00003	0.00014	0.00018
1-Oct-14	14	500	470	7.9	96	#N/A	6.7	48	6.0	< 0.2	< 0.06	< 0.3	42	0.052	0.020	0.0097	0.061	< 0.000007	< 0.000007	0.0027	0.0000030	9.8	< 0.00003	0.00	< 0.00002
8-Oct-14	15	500	490	7.9	90	#N/A	3.0	37	4.0	< 0.2	< 0.06	< 0.3	46	0.048	0.012	0.0099	0.059	< 0.000007	< 0.000007	0.016	< 0.000003	13	< 0.00003	0.000040	0.00019
15-Oct-14	16	500	495	7.9	110	#N/A	5.4	43	7.0	< 0.2	< 0.06	< 0.3	57	0.051	0.016	0.012	0.077	< 0.000007	< 0.000007	0.0051	< 0.000003	16	< 0.00003	0.000055	0.00026
22-Oct-14	17	500	505	8.0	102	#N/A	5.0	46	5.0	< 0.2	< 0.06	< 0.3	44	0.049	0.016	0.012	0.071	< 0.000007	< 0.000007	0.011	0.0000050	10	0.00015	0.000058	0.00037
29-Oct-14	18	500	490	7.9	84	#N/A	8.4	39	3.0	< 0.2	< 0.06	< 0.3	37	0.037	0.011	0.0079	0.053	< 0.000007	< 0.000007	0.0075	< 0.000003	9.2	0.000040	0.000040	0.00037
5-Nov-14	19	500	485	7.7	85	#N/A	#N/A	48	3.0	< 0.2	< 0.06	< 0.3	37	0.053	0.011	0.0093	0.062	< 0.000007	< 0.000007	0.0035	0.000019	8.8	< 0.00003	0.000045	0.00052
12-Nov-14	20	500	495	7.6	89	#N/A	6.7	34	2.0	< 0.2	< 0.06	< 0.3	41	0.058	0.012	0.011	0.066	< 0.000007	< 0.000007	0.0048	< 0.000003	10	0.000050	0.000054	0.00043
19-Nov-14	21	500	475	7.6	93	#N/A	6.5	34	2.0	< 0.2	< 0.06	< 0.3	40	0.052	0.013	0.010	0.070	< 0.000007	< 0.000007	0.0027	0.000013	9.8	< 0.00003	0.000052	0.00057
26-Nov-14	22	500	500	7.9	78	#N/A	1.8	35	2.0	< 0.2	< 0.06	< 0.3	35	0.051	0.010	0.0090	0.059	< 0.000007	< 0.000007	0.0021	< 0.000003	8.5	< 0.00003	0.000042	0.00014
3-Dec-14	23	500	495	7.8	71	#N/A	3.0	34	< 2	< 0.2	< 0.06	< 0.3	36	0.047	0.0089	0.0088	0.061	< 0.000007	< 0.000007	0.0032	< 0.000003	9.5	< 0.00003	0.000034	0.00023
10-Dec-14	24	500	495	7.9	71	#N/A	5.1	37	2.0	< 0.2	< 0.06	< 0.3	34	0.051	0.0087	0.0079	0.061	< 0.000007	< 0.000007	0.0023	0.0000030	8.7	< 0.00003	0.000030	0.00035
17-Dec-14	25	500	500	8.0	91	#N/A	3.9	42	3.0	< 0.2	< 0.06	< 0.3	41	0.075	0.012	0.010	0.077	< 0.000007	< 0.000007	0.0023	0.0000030	10	< 0.00003	0.000076	0.00026
24-Dec-14	26	500	495	7.9	87	#N/A	3.3	42	< 2	< 0.2	< 0.06	< 0.3	39	0.057	0.012	0.0092	0.079	< 0.000007	< 0.000007	0.0017	0.0000040	9.9	< 0.00003	0.000048	0.00024
31-Dec-14	27	500	495	7.9	88	#N/A	1.3	30	3.0	< 0.2	< 0.06	< 0.3	41	0.046	0.012	0.0094	0.074	< 0.000007	< 0.000007	0.0016	0.0000030	11	< 0.00003	0.000040	0.00018
7-Jan-15	28	500	500	7.8	68	#N/A	2.7	34	2.0	< 1	< 0.06	< 0.3	33	0.040	0.0073	0.0059	0.056	< 0.000007	< 0.000007	0.0028	< 0.000003	9.0	< 0.00003	0.000038	0.00027
14-Jan-15	29	500	480	7.8	68	#N/A	2.7	34	2.0	< 1	< 0.06	< 0.3	32	0.037	0.0081	0.0057	0.057	< 0.000007	< 0.000007	0.0028	0.0000070	8.5	< 0.00003	0.000035	0.00019
21-Jan-15	30	500	485	8.0	75	#N/A	4.3	42	2.0	< 1	< 0.06	< 0.3	34	0.052	0.0096	0.0076	0.064	< 0.000007	< 0.000007	0.0020	< 0.000003	8.9	< 0.00003	0.000037	0.00031
28-Jan-15	31	500	495	7.9	76	#N/A	1.7	36	2.0	< 1	< 0.06	< 0.3	36	0.050	0.0082	0.0068	0.066	< 0.000007	< 0.000007	0.0032	0.000025	9.0	< 0.00003	0.000035	0.00021
4-Feb-15	32	500	495	7.9	72	#N/A	2.3	34	< 2	< 1	< 0.06	< 0.3	32	0.041	0.0079	0.0063	0.061	< 0.000007	< 0.000007	0.0027	0.0000040	8.0	0.00	0.000028	0.00032
11-Feb-15	33	500	490	7.9	76	#N/A	2.1	36	3.0	< 1	< 0.06	< 0.3	34	0.045	0.0094	0.0066	0.065	< 0.000007	< 0.000007	0.0029	0.0000070	8.6	< 0.00003	0.000039	0.000030
18-Feb-15	34	500	485	7.9	67	#N/A	2.2	35	2.0	< 1	< 0.06	< 0.3	32	0.043	0.0077	0.0058	0.057	< 0.000007	< 0.000007	0.0026	< 0.000003	8.6	< 0.00003	0.000040	0.00036
25-Feb-15	35	500	480	7.9	80	#N/A	3.0	40	< 2	< 1	< 0.06	< 0.3	37	0.033	0.0086	0.0053	0.062	< 0.000007	< 0.000007	0.00090	0.0000050	9.7	0.000030	0.000045	0.00049
4-Mar-15	36	500	490	7.8	68	#N/A	2.0	34	2.0	< 1	< 0.06	< 0.3	33	0.035	0.0070	0.0047	0.054	< 0.000007	< 0.000007	0.0014	< 0.000003	9.4	0.000060	0.000036	0.00019
11-Mar-15	37	500	490	7.9	73	#N/A	1.7	38	< 2	< 1	< 0.06	< 0.3	33	0.029	0.0073	0.0048	0.063	< 0.000007	< 0.000007	0.0024	< 0.000003	9.0	0.000050	0.000037	0.00061
18-Mar-15	38	500	490	7.9	68	#N/A	2.5	37	2.0	< 1	< 0.06	< 0.3	33	0.028	0.0066	0.0038	0.056	< 0.000007	< 0.000007	0.0014	< 0.000003	9.3	< 0.00003	0.000040	0.00031
25-Mar-15	39	500	485	7.8	73	#N/A	3.0	37	< 2	< 1	< 0.06	< 0.3	34	0.029	0.0091	0.0050	0.071	< 0.000007	< 0.000007	0.0040	0.0000040	8.9	0.000080	0.000045	0.00044
1-Apr-15	40	500	490	7.8	64	#N/A	3.7	36	< 2	< 1	< 0.06	< 0.3	24	0.028	0.0064	0.0034	0.062	0.000013	< 0.000007	0.0018	< 0.000003	6.3	< 0.00003	0.000021	0.00088
8-Apr-15	41	500	485	7.8	78	#N/A	2.8	41	< 2	< 1	< 0.06	< 0.3	35	0.032	0.011	0.0051	0.068	< 0.000007	< 0.000007	0.0022	< 0.000003	9.5	< 0.00003	0.000054	0.00074
15-Apr-15	42	500	495	7.8	66	#N/A	3.9	37	< 2	< 1	< 0.06	< 0.3	30	0.029	0.0067	0.0043	0.055	< 0.000007	< 0.000007	0.0042	< 0.000003	8.0	< 0.00003	0.000012	0.00099
22-Apr-15	43	500	485	7.8	53	#N/A	3.4	31	3.0	< 1	< 0.06	< 0.3	25	0.026	0.0043	0.0034	0.047	< 0.000007	< 0.000007	0.0047	< 0.000003	7.0	0.000060	0.000028	0.00082
29-Apr-15	44	500	490	7.9	80	#N/A	2.2	42	< 2	< 1	< 0.06	< 0.3	40	0.047	0.0082	0.0055	0.083	< 0.000007	< 0.000007	0.0030	< 0.000003	11	0.000040	0.000054	0.00048
6-May-15	45	500	495	7.9	73	#N/A	2.8	41	< 2	< 1	< 0.06	< 0.3	34	0.040	0.0074	0.0067	0.067	< 0.000007	< 0.000007	0.0015	< 0.000003	9.1	< 0.00003	0.000048	0.00041
13-May-15	46	500	505	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-May-15	47	505	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-May-15	48	480	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	49	480	490	8.1	181	#N/A	4.0	87	5.0	< 1	< 0.06	< 0.3	88	0.014	0.017	0.0047	0.21	< 0.000007	< 0.000007	0.0042	< 0.000003	23	< 0.00003	0.00015	0.00069
10-Jun-15	50	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-15	51	490	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Jun-15	52	485	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	53	480	480	8.0	192	#N/A	4.5	89	4.0	< 1	< 0.06	< 0.3	83	0.012	0.018	0.0051	0.19	< 0.000007	< 0.000007	0.0067	< 0.000003	22	< 0.00003	0.00018	0.00032
8-Jul-15	54	500	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-Jul-15	55	485	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jul-15	56	480	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	57	480	470	8.1	176	#N/A	2.7	89	4.0	< 1	< 0.06	< 0.3	83	0.016	0.014	0.0045	0.16	0.0000090	< 0.000007	0.0056	0.0000070	22	< 0.00003	0.00016	0.00035
5-Aug-15	58	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	59	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Aug-15	60	495	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	61	480	470	8.0	172	#N/A	1.9	87	4.0	< 1	< 0.06	< 0.3	83	0.016	0.014	0.0037	0.19	< 0.000007	< 0.000007	0.0050	< 0.000003	22	< 0.00003	0.00020	0.00040
2-Sep-15	62	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	63	490	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Sep-15	64	480	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	65	470	460	8.1	167	#N/A	2.4	81	4.0				81	0.013	0.013	0.0043	0.18	< 0.000007	< 0.000007	0.0059	< 0.000003	22	< 0.00003	0.00015	0.00045
30-Sep-15	66	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	67	495	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14-Oct-15	68	485	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	69	475	455	8.1	155	#N/A	1.3	81	4.0				78	0.012	0.012	0.0031	0.17	< 0.000007	< 0.000007	0.0043	0.0000050	20	< 0.00003	0.00016	0.00080
28-Oct-15	70	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	71	495	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Nov-15	72	485	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	73	470	450	8.1	172	#N/A	1.2	97	4.0				79	0.011	0.011	0.0032	0.20	< 0.000007	< 0.000007	0.0024	< 0.000003	21	0.000030	0.00018	0.0011
25-Nov-15	74	500	500	8.1	92	#N/A	0.80	52	2.0				46	0.059	0.0066	0.0041	0.092	< 0.000007	< 0.000007	0.0027	0.0000090	13	0.00011	0.00011	0.00058
2-Dec-15	75	500	490	8.0	85	#N/A	1.6	44	2.0				41	0.056	0.0058	0.0041	0.087	< 0.000007	< 0.000007	0.0024	< 0.000003	11	0.000060	0.000067	0.00044
9-Dec-15	76	500	500	8.1	76	#N/A	2.5	40	2.0				35	0.045	0.0049	0.0039	0.079	0.000031	0.000031	0.0053	0.000017	9.8	0.000060	0.000059	0.00027
16-Dec-15	77	500	495	8.0	76	#N/A	2.0	38	2.0				40	0.048	0.0053	0.0043	0.089	0.000013	< 0.000007	0.0023	0.0000050	11	0.000070	0.000064	0.00037
23-Dec-15	78	500	485	8.2	65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	79	500	495	7.9	70	#N/A	1.3	34	3.0				34	0.035	0.0039	0.0027	0.069	< 0.000007	< 0.000007	0.0020	< 0.000003	9.2	0.000070	0.000036	0.00020
6-Jan-16	80	500	490	7.8	67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	81	500	490	7.8	75	#N/A	1.5	36	2.0				35	0.033	0.0042	0.0029	0.073	< 0.000007	< 0.000007	0.0020	< 0.000003	9.5	< 0.00003	0.000025	0.00034
20-Jan-16	82	500	490	8.0	77	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	83	500	495	7.9	78	#N/A	2.7	38	2.0				37	0.036	0.0044	0.0028	0.087	< 0.000007	< 0.000007	< 0.002	0.0000050	10	< 0.00003	0.000054	0.00031
3-Feb-16	84	500	490	8.0	85	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	85	500	500	7.9	78	#N/A	2.2	39	2.0				36	0.031	0.0040	0.0028	0.086	< 0.000007	< 0.000007	< 0.002	< 0.000003	10.0	< 0.00003	0.000046	0.00014
17-Feb-16	86	500	490	7.8	66	-	-	-	< 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	87	500	500	7.8	74	#N/A	2.1	35	< 2				35	0.037	0.0036	0.0024	0.079	< 0.000007	< 0.000007	< 0.002	< 0.000003	9.5	< 0.00003	0.000039	0.00013

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for HC2 (SS)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
25-Jun-14	0	500	330	8.0	0.0080	0.000020	0.010	16	0.0097	< 0.01	0.0068	0.014	0.020	21	0.0012	2.2	0.0000090	34	1.1	37	0.000044	0.00011	0.00022	0.023	0.0024	0.0040	< 0.002
2-Jul-14	1	500	485	8.0	< 0.002	< 0.00001	0.0057	11	0.010	< 0.01	0.0040	0.0084	< 0.009	12	0.00049	1.7	< 0.000002	12	1.1	17	0.000019	0.00034	0.000060	0.024	0.0014	< 0.001	< 0.002
9-Jul-14	2	500	490	8.0	< 0.002	< 0.00001	0.0049	8.9	0.0091	< 0.01	0.0024	0.0041	< 0.009	9.9	0.00011	1.8	< 0.000002	7.4	1.0	9.6	0.000014	0.00018	0.000090	0.018	0.0013	0.0010	< 0.002
16-Jul-14	3	500	480	8.0	0.0080	< 0.00001	0.0038	7.8	0.0072	< 0.01	0.0022	0.0025	< 0.009	7.7	0.000050	1.5	0.0000040	3.5	1.00	5.3	0.000018	0.000050	0.000090	0.015	0.0010	< 0.001	< 0.002
23-Jul-14	4	500	500	8.0	0.0050	0.000040	0.0022	5.6	0.010	< 0.01	0.00087	0.0011	< 0.009	4.8	0.000080	1.0	0.0000020	1.5	0.74	3.5	0.0000080	0.00024	0.00036	0.0097	0.00071	< 0.001	< 0.002
30-Jul-14	5	500	485	8.1	0.0020	< 0.00001	0.0039	7.9	0.0089	< 0.01	0.0016	0.0019	0.0090	7.3	0.000060	1.5	< 0.000002	1.8	1.1	4.3	0.000016	< 0.00001	0.00021	0.013	0.00099	< 0.001	< 0.002
6-Aug-14	6	500	480	8.0	< 0.002	< 0.00001	0.0030	7.2	0.0078	< 0.01	0.00053	0.0010	< 0.009	6.9	< 0.00004	1.5	< 0.000002	1.0	1.0	3.3	0.000010	0.000030	0.000060	0.012	0.0012	< 0.001	< 0.002
13-Aug-14	7	500	490	8.0	< 0.002	< 0.00001	0.0024	6.3	0.0092	< 0.01	0.00059	0.0010	< 0.009	5.4	0.000040	1.2	< 0.000002	0.68	0.87	2.8	0.0000070	0.00021	0.000060	0.010	0.00057	< 0.001	< 0.002
20-Aug-14	8	500	490	8.0	< 0.002	< 0.00001	0.0017	5.1	0.011	< 0.01	0.00041	0.00070	< 0.009	3.9	0.000050	0.90	< 0.000002	0.42	0.75	2.2	0.0000060	0.00013	0.000090	0.0093	0.00064	0.0010	< 0.002
27-Aug-14	9	500	495	8.0	< 0.002	< 0.00001	0.0022	6.1	0.011	< 0.01	0.00046	0.0010	0.010	5.0	0.000060	1.2	< 0.000002	0.47	0.90	2.6	0.000010	0.00011	< 0.00005	0.011	0.00071	< 0.001	< 0.002
3-Sep-14	10	500	490	7.9	< 0.007	0.000010	0.0019	5.8	0.012	< 0.01	0.00034	0.00090	0.0060	4.8	0.00020	1.3	0.000017	0.39	1.0	3.7	0.000012	0.000020	< 0.00005	0.012	0.00079	< 0.001	< 0.002
10-Sep-14	11	500	500	8.0	< 0.007	0.000010	0.0015	4.5	0.011	< 0.01	0.00027	0.00070	< 0.003	3.6	0.000060	1.0	< 0.000002	0.28	0.85	2.3	0.000012	0.00015	0.00011	0.0096	0.00061	< 0.001	< 0.002
17-Sep-14	12	500	495	7.9	< 0.007	0.000020	0.0015	4.9	0.010	< 0.01	0.00028	0.00080	< 0.003	3.7	0.00014	0.89	< 0.000002	0.27	0.94	3.1	< 0.000005	0.000040	0.00019	0.010	0.00055	< 0.001	< 0.002
24-Sep-14	13	500	480	8.0	< 0.002	0.000020	0.0013	4.3	0.010	< 0.01	0.00032	0.00020	< 0.009	2.9	< 0.00004	0.73	0.0000040	0.27	0.66	2.1	< 0.000005	0.000020	< 0.00005	0.0088	0.00044	< 0.001	< 0.002
1-Oct-14	14	500	470	7.9	0.026	< 0.00001	0.0012	4.4	0.015	< 0.01	0.0010	< 0.0001	< 0.009	3.0	< 0.00004	0.80	< 0.000002	0.19	0.70	2.6	< 0.000005	0.000070	0.00034	0.0088	0.00046	< 0.002	< 0.002
8-Oct-14	15	500	490	7.9	< 0.007	0.000040	0.0011	3.5	0.010	< 0.01	0.00045	0.00050	< 0.003	2.4	< 0.00004	0.60	< 0.000002	0.16	0.65	2.5	0.0000080	0.000080	< 0.00005	0.0078	0.00045	< 0.001	< 0.002
15-Oct-14	16	500	495	7.9	< 0.007	0.000010	0.0015	4.5	0.012	< 0.01	0.00032	0.00070	< 0.003	3.2	0.000050	0.82	< 0.000002	0.22	0.84	2.8	0.0000090	0.00010	< 0.00005	0.0094	0.00046	< 0.001	< 0.002
22-Oct-14	17	500	505	8.0	< 0.007	0.000050	0.0012	4.3	0.012	< 0.01	0.00030	0.00080	< 0.003	3.3	0.000050	0.79	< 0.000002	0.21	0.78	2.5	0.000010	0.000040	0.00026	0.0092	0.00045	< 0.001	< 0.002
29-Oct-14	18	500	490	7.9	< 0.007	0.000010	0.00092	3.3	0.010	< 0.01	0.00024	0.00050	< 0.003	2.0	< 0.00004	0.55	< 0.000002	0.14	0.60	1.7	0.000010	0.000090	0.000090	0.0064	0.00030	< 0.001	< 0.002
5-Nov-14	19	500	485	7.7	< 0.007	0.000040	0.00089	3.5	0.0099	< 0.01	0.00042	0.00040	< 0.003	2.1	< 0.00004	0.61	< 0.000002	0.16	0.63	1.8	0.000023	0.000040	0.00019	0.0069	0.00039	< 0.001	< 0.002
12-Nov-14	20	500	495	7.6	< 0.007	0.000020	0.00096	3.7	0.012	< 0.01	0.00069	0.00060	< 0.003	2.3	0.000040	0.65	< 0.000002	0.19	0.70	1.8	0.0000080	0.00014	0.00020	0.0074	0.00044	< 0.001	< 0.002
19-Nov-14	21	500	475	7.6	< 0.007	0.000030	0.0010	3.7	0.012	< 0.01	0.00082	0.00060	< 0.003	2.3	0.000060	0.64	< 0.000002	0.16	0.72	1.7	0.000032	0.00019	< 0.00005	0.0071	0.00042	0.0020	< 0.002
26-Nov-14	22	500	500	7.9	< 0.007	< 0.00001	0.00092	3.3	0.010	< 0.01	0.00034	0.00040	0.0080	2.0	< 0.00004	0.57	< 0.000002	0.13	0.59	1.4	0.0000080	0.000050	0.00017	0.0066	0.00039	0.0020	< 0.002
3-Dec-14	23	500	495	7.8	< 0.007	0.000020	0.00078	2.9	0.011	< 0.01	0.00025	0.00040	< 0.003	1.6	0.000050	0.47	< 0.000002	0.12	0.50	1.3	0.0000070	0.000050	0.000080	0.0062	0.00042	< 0.001	< 0.002
10-Dec-14	24	500	495	7.9	< 0.007	< 0.00001	0.00077	2.8	0.011	< 0.01	0.00029	0.00030	< 0.003	1.7	< 0.00004	0.46	< 0.000002	0.12	0.56	1.4	0.0000070	0.00010	0.000060	0.0057	0.00034	< 0.001	< 0.002
17-Dec-14	25	500	500	8.0	0.0070	0.000020	0.0012	3.7	0.014	< 0.01	0.00023	0.00060	< 0.003	2.5	< 0.00004	0.74	< 0.000002	0.13	0.74	1.5	0.0000070	0.00017	0.00067	0.0075	0.00046	< 0.001	< 0.002
24-Dec-14	26	500	495	7.9	< 0.007	0.000010	0.0010	3.5	0.013	< 0.01	0.00013	0.00050	< 0.003	2.0	< 0.00004	0.59	< 0.000002	0.14	0.68	1.5	0.0000070	0.000030	< 0.00005	0.0071	0.00043	< 0.001	< 0.002
31-Dec-14	27	500	495	7.9	< 0.007	< 0.00001	0.00097	3.5	0.012	< 0.01	0.00026	0.00050	< 0.003	2.1	< 0.00004	0.68	< 0.000002	0.13	0.69	1.5	0.0000090	0.000050	0.00016	0.0073	0.00038	< 0.001	< 0.002
7-Jan-15	28	500	500	7.8	< 0.007	0.000030	0.00067	2.5	0.011	< 0.01	0.00025	0.00040	< 0.003	1.4	< 0.00004	0.39	< 0.000002	0.090	0.51	0.80	0.000026	0.000040	0.00012	0.0051	0.00032	< 0.001	< 0.002
14-Jan-15	29	500	480	7.8	< 0.007	0.000010	0.00059	2.6	0.011	< 0.01	0.00086	0.00040	< 0.003	1.4	0.000070	0.42	< 0.000002	0.090	0.52	0.80	0.000017	0.000060	0.000070	0.0046	0.00028	< 0.001	< 0.002
21-Jan-15	30	500	485	8.0	< 0.007	0.000040	0.00080	2.9	0.012	< 0.01	0.00031	0.00040	< 0.003	1.7	0.000040	0.48	< 0.000002	0.11	0.57	0.90	0.0000050	0.000040	0.000090	0.0059	0.00043	< 0.001	< 0.002
28-Jan-15	31	500	495	7.9	< 0.007	< 0.00001	0.00063	3.2	0.012	< 0.01	0.0011	0.00040	< 0.003	1.8	0.000090	0.53	< 0.000002	0.11	0.49	1.5	0.000028	0.000080	0.00011	0.0054	0.00032	< 0.001	< 0.002
4-Feb-15	32	500	495	7.9	< 0.007	0.000020	0.00077	2.8	0.010	< 0.01	0.00039	0.00040	< 0.003	1.6	< 0.00004	0.47	< 0.000002	0.10	0.57	1.2	0.0000050	0.00014	0.000080	0.0048	0.00032	< 0.001	< 0.002
11-Feb-15	33	500	490	7.9	< 0.007	0.000030	0.00076	3.0	0.012	< 0.01	0.00053	0.00040	< 0.003	1.7	< 0.001	0.47	< 0.000002	0.10	0.59	1.0	0.000028	0.00042	0.000070	0.0054	0.00035	< 0.001	< 0.002
18-Feb-15	34	500	485	7.9	< 0.007	< 0.00001	0.00078	2.6	0.011	< 0.01	0.00016	0.00040	< 0.003	1.5	< 0.001	0.44	0.0000020	0.090	0.59	1.0	0.0000060	0.000050	0.000060	0.0051	0.00033	< 0.001	< 0.002
25-Feb-15	35	500	480	7.9	< 0.007	0.00048	0.00077	3.0	0.012	< 0.01	0.00018	0.00050	< 0.003	2.0	< 0.001	0.53	< 0.000002	0.10	0.63	0.90	0.000010	0.00017	< 0.00005	0.0057	0.00028	< 0.001	< 0.002
4-Mar-15	36	500	490	7.8	< 0.007	0.000010	0.00071	2.4	0.011	< 0.01	0.000080	0.00050	< 0.003	1.4	< 0.001	0.48	< 0.000002	0.080	0.48	1.2	< 0.000005	0.000060	0.00010	0.0051	0.00029	< 0.001	< 0.002
11-Mar-15	37	500	490	7.9	< 0.007	0.000060	0.00074	2.7	0.012	< 0.01	0.00014	0.00040	< 0.003	1.5	< 0.001	0.40	< 0.000002	0.080	0.55	0.20	< 0.000005	0.00011	< 0.00005	0.0048	0.00030	< 0.001	< 0.002
18-Mar-15	38	500	490	7.9	< 0.007	0.000010	0.00067	2.4	0.012	< 0.01	0.00011	0.00040	< 0.003	1.5	< 0.001	0.38	< 0.000002	0.070	0.54	0.90	< 0.000005	0.000070	0.000060	0.0046	0.00024	< 0.001	< 0.002
25-Mar-15	39	500	485	7.8	< 0.007	< 0.00001	0.00072	3.0	0.013	< 0.01	0.00035	0.00060	< 0.003	1.6	< 0.001	0.45	< 0.000002	0.16	0.58	1.0	< 0.000005	0.00054	0.000090	0.0062	0.00034	< 0.001	< 0.002
1-Apr-15	40	500	490	7.8	< 0.007	0.000040	0.00048	2.1	0.019	< 0.01	0.000080	0.00040	< 0.003	1.2	< 0.001	0.24	< 0.000002	0.72	0.47	0.30	< 0.000005	0.00015	0.000080	0.0053	0.00020	< 0.001	< 0.002
8-Apr-15	41	500	485	7.8	< 0.007	< 0.00001	0.00076	2.8	0.012	< 0.01	0.00026	0.00050	< 0.003	1.8	< 0.001	0.54	< 0.000002	0.080	0.62	0.60	< 0.000005	0.00030	0.00011	0.0052	0.00031	< 0.001	< 0.002
15-Apr-15	42	500	495	7.8	< 0.007	< 0.00001	0.00063	2.5	0.011	< 0.01	0.00026	0.00040	< 0.003	1.4	< 0.001	0.39	0.0000020	0.090	0.53	0.80	< 0.000005	0.00026	< 0.00005	0.0044	0.00026	< 0.001	< 0.002
22-Apr-15	43	500	485	7.8	< 0.007	0.000030	0.00044	1.7	0.011	< 0.01	0.00012	0.00030	< 0.003	0.93	< 0.001	0.29	0.0000040	0.050	0.37	0.40	0.0000090	0.00032	0.000070	0.0029	0.00020	< 0.001	< 0.002
29-Apr-15	44	500	490	7.9	< 0.007	0.00013	0.00083	3.0	0.015	< 0.01	0.00021	0.00040	< 0.003	1.9	< 0.001	0.48	< 0.000002	0.10	0.60	1.3	< 0.000005	0.000080	0.000090	0.0060	0.00032	< 0.001	< 0.002
6-May-15	45	500	495	7.9	< 0.007	0.000020	0.00074	2.7	0.013	< 0.01	0.00010	0.00040	< 0.003	1.6	< 0.001	0.47	0.0000020	0.080	0.53	0.80	< 0.000005	0.00063	0.000050	0.0051	0.00030	0.0030	< 0.002
13-May-15	46	500	505	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-May-15	47	505	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-May-15	48	480	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	49	480	490	8.1	< 0.007	< 0.00001	0.0017	7.1	0.032	< 0.01	0.00034	0.0017	< 0.003	3.6	< 0.00004	1.2	< 0.000002	0.18	1.5	2.6	0.0000050	0.000090	0.000080	0.012	0.00025	< 0.001	< 0.002
10-Jun-15	50	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-15	51	490	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Jun-15	52	485	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	53	480	480	8.0	< 0.007	< 0.00001	0.0016	7.0	0.031	0.010	0.00028	0.0019	< 0.003	3.0	0.000090	1.1	< 0.000002	0.22	1.5	2.2	0.000011	0.00020	< 0.00005	0.013	0.00024	0.0010	< 0.002
8-Jul-15	54	500	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-Jul-15	55	485	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jul-15	56	480	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	57	480	470	8.1	< 0.007	0.000020	0.0016	7.1	0.032	< 0.01	0.00044	0.0017	< 0.003	3.0	< 0.00004	0.99	< 0.000002	0.20	1.5	2.1	< 0.000005	0.000050	0.00013	0.011	0.00025	0.0010	< 0.002
5-Aug-15	58	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	59	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Aug-15	60	495	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	61	480	470	8.0	< 0.007	0.00013	0.0015	7.2	0.038	0.010	0.00077	0.0019	< 0.003	3.1	0.000050	1.0	0.0000020	0.19	1.5	2.6	0.0000080	0.00012	< 0.00005	0.011	0.00027	0.0020	< 0.002
2-Sep-15	62	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	63	490	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Sep-15	64	480	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	65	470	460	8.1	< 0.007	< 0.00001	0.0014	6.6	0.028	< 0.01	0.0011	0.0017	< 0.003	2.9	0.000060	1.0	< 0.000002	0.26	1.3	2.1	0.0000080	0.000030	< 0.00005	0.010	0.00022	< 0.001	< 0.002
30-Sep-15	66	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	67	495	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14-Oct-15	68	485	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	69	475	455	8.1	< 0.007	0.000050	0.0013	6.6	0.030	< 0.01	0.00024	0.0016	< 0.003	2.9	0.00020	0.89	0.000040	0.27	1.2	2.0	0.000011	0.00016	0.000050	0.0096	0.00018	< 0.001	< 0.002
28-Oct-15	70	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	71	495	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Nov-15	72	485	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	73	470	450	8.1	0.040	0.000040	0.0012	6.7	0.030	< 0.01	0.0015	0.0015	< 0.003	2.9	0.00011	0.91	0.0000030	0.19	1.3	1.2	0.000029	0.00013	0.00013	0.011	0.00017	0.0020	< 0.002
25-Nov-15	74	500	500	8.1	0.0070	0.000090	0.00092	3.5	0.017	< 0.01	0.00037	0.00060	0.0070	2.1	0.00050	0.56	0.00028	0.12	0.71	1.0	0.000013	< 0.00001	0.00047	0.0059	0.00030	< 0.001	< 0.002
2-Dec-15	75	500	490	8.0	0.0090	0.000080	0.00082	3.5	0.015	< 0.01	0.00039	0.00060	< 0.003	1.9	0.000040	0.57	< 0.000002	0.11	0.63	0.90	< 0.000005	0.000080	0.00049	0.0056	0.00029	< 0.001	< 0.002
9-Dec-15	76	500	500	8.1	< 0.007	0.000030	0.00073	2.7	0.013	< 0.01	0.00033	0.00050	0.0080	1.6	0.000090	0.43	0.000017	0.090	0.56	0.80	0.000035	0.00014	0.00017	0.0050	0.00028	< 0.001	< 0.002
16-Dec-15	77	500	495	8.0	< 0.007	0.00017	0.00079	3.2	0.016	< 0.01	0.00018	0.00050	0.0040	1.9	< 0.00004	0.50	0.0000040	0.10	0.61	0.80	0.0000070	0.00016	< 0.00005	0.0054	0.00028	< 0.001	< 0.002
23-Dec-15	78	500	485	8.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	79	500	495	7.9	< 0.007	< 0.00001	0.00065	2.6	0.013	0.010	0.00014	0.00040	< 0.003	1.4	< 0.00004	0.35	0.0000030	0.12	0.52	1.1	< 0.000005	< 0.00001	0.00015	0.0041	0.00020	< 0.001	< 0.002
6-Jan-16	80	500	490	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	81	500	490	7.8	< 0.007	< 0.00001	0.00061	2.7	0.013	< 0.01	0.00044	0.00040	< 0.003	1.5	0.00015	0.40	0.0000020	0.060	0.50	0.40	< 0.000005	0.000060	0.00025	0.0041	0.00019	< 0.001	< 0.002
20-Jan-16	82	500	490	8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	83	500	495	7.9	< 0.007	< 0.00001	0.00066	2.8	0.015	< 0.01	0.000070	0.00050	< 0.003	1.6	< 0.00004	0.43	< 0.000002	0.070	0.55	0.40	< 0.000005	0.00011	0.00014	0.0049	0.00019	0.0010	< 0.002
3-Feb-16	84	500	490	8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	85	500	500	7.9	< 0.007	< 0.00001	0.00064	2.6	0.015	< 0.01	0.000090	0.00040	< 0.003	1.4	0.000090	0.37	< 0.000002	0.090	0.54	1.3	< 0.000005	0.000030	< 0.00005	0.0040	0.00017	< 0.001	< 0.002
17-Feb-16	86	500	490	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	87	500	500	7.8	< 0.007	< 0.00001	0.00064	2.8	0.014	< 0.01	0.00011	0.00040	< 0.003	1.5	< 0.00004	0.14	0.0000030	0.040	0.52	0.80	< 0.000005	0.000020	< 0.00005	0.0037	0.00018	< 0.001	< 0.002

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Calculated Loading Rates for HC2 (SS)

Date	**Cycle**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**	**Cu**
	No.	Input	Output		umhos/cm	$mgCaCO_3$/kg/wk	$mgCaCO_3$/kg/wk	$mgCaCO_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
25-Jun-14	0	500	330	8.0	464	#N/A	2.2	29	33	1.1	0.19	0.099	42	0.013	0.011	0.021	0.011	0.0000026	0.0000023	0.0062	0.0000030	7.9	0.000069	0.00014	0.0020
2-Jul-14	1	500	485	8.0	255	#N/A	4.0	36	24	0.39	0.14	0.15	40	0.017	0.013	0.031	0.021	0.0000034	0.0000034	0.0058	0.0000015	7.8	0.000019	0.00015	0.00080
9-Jul-14	2	500	490	8.0	220	#N/A	1.2	37	13	0.098	0.14	0.15	35	0.021	0.015	0.023	0.033	0.0000034	0.0000034	0.0061	0.0000015	7.0	0.000015	0.000064	0.00045
16-Jul-14	3	500	480	8.0	177	#N/A	1.1	33	5.8	0.096	0.096	0.14	31	0.020	0.012	0.017	0.030	0.0000034	0.0000034	0.0041	0.0000014	6.2	0.000091	0.00022	0.00035
23-Jul-14	4	500	500	8.0	118	#N/A	1.1	25	3.5	0.10	0.050	0.15	25	0.035	0.0076	0.013	0.040	0.0000035	0.0000035	0.0030	0.0000015	5.5	0.000015	0.000082	0.00051
30-Jul-14	5	500	485	8.1	160	#N/A	0.90	37	4.4	0.097	0.087	0.15	32	0.025	0.012	0.016	0.036	0.0000034	0.0000034	0.0038	0.0000015	6.4	0.000097	0.000097	0.00071
6-Aug-14	6	500	480	8.0	142	#N/A	1.3	31	2.4	0.096	0.072	0.14	29	0.024	0.010	0.014	0.033	0.0000034	0.0000034	0.0034	0.0000014	5.8	0.000014	0.000042	0.00017
13-Aug-14	7	500	490	8.0	125	#N/A	1.2	28	3.4	0.098	0.054	0.15	27	0.022	0.0088	0.0100	0.040	0.0000034	0.0000034	0.0029	0.0000015	5.7	0.000025	0.000041	0.00017
20-Aug-14	8	500	490	8.0	103	#N/A	0.94	24	2.9	0.098	0.034	0.15	23	0.028	0.0057	0.0078	0.036	0.0000034	0.0000034	0.0023	0.0000015	5.2	0.000015	0.000041	0.00019
27-Aug-14	9	500	495	8.0	130	#N/A	2.2	29	2.5	0.099	0.050	0.15	28	0.022	0.0084	0.0099	0.040	0.0000035	0.0000035	0.0050	0.0000015	6.0	0.000015	0.000034	0.00013
3-Sep-14	10	500	490	7.9	121	#N/A	2.3	26	3.4	0.098	0.034	0.15	33	0.029	0.0088	0.011	0.048	0.0000034	0.0000034	0.0025	0.0000015	8.6	0.000015	0.000032	0.00016
10-Sep-14	11	500	500	8.0	111	#N/A	1.7	25	2.5	0.10	0.030	0.15	27	0.029	0.0072	0.0077	0.041	0.0000035	0.0000035	0.0031	0.000011	7.1	0.000015	0.000025	0.00015
17-Sep-14	12	500	495	7.9	112	#N/A	4.1	26	3.0	0.099	0.030	0.15	23	0.028	0.0077	0.0070	0.038	0.0000035	0.0000035	0.0023	0.0000015	5.3	0.000020	0.000029	0.00020
24-Sep-14	13	500	480	8.0	95	#N/A	1.8	21	3.8	0.096	0.029	0.14	20	0.023	0.0072	0.0049	0.033	0.0000034	0.0000034	0.0017	0.0000029	4.6	0.000014	0.000068	0.000086
1-Oct-14	14	500	470	7.9	96	#N/A	3.1	23	2.8	0.094	0.028	0.14	20	0.024	0.0093	0.0046	0.029	0.0000033	0.0000033	0.0013	0.0000014	4.6	0.000014	0.00	0.0000094
8-Oct-14	15	500	490	7.9	90	#N/A	1.5	18	2.0	0.098	0.029	0.15	23	0.024	0.0059	0.0049	0.029	0.0000034	0.0000034	0.0076	0.0000015	6.3	0.000015	0.000020	0.000093
15-Oct-14	16	500	495	7.9	110	#N/A	2.7	21	3.5	0.099	0.030	0.15	28	0.025	0.0081	0.0060	0.038	0.0000035	0.0000035	0.0025	0.0000015	7.7	0.000015	0.000027	0.00013
22-Oct-14	17	500	505	8.0	102	#N/A	2.5	23	2.5	0.10	0.030	0.15	22	0.025	0.0079	0.0060	0.036	0.0000035	0.0000035	0.0055	0.0000025	5.3	0.000076	0.000029	0.00019
29-Oct-14	18	500	490	7.9	84	#N/A	4.1	19	1.5	0.098	0.029	0.15	18	0.018	0.0054	0.0039	0.026	0.0000034	0.0000034	0.0037	0.0000015	4.5	0.000020	0.000020	0.00018
5-Nov-14	19	500	485	7.7	85	#N/A	#N/A	23	1.5	0.097	0.029	0.15	18	0.025	0.0055	0.0045	0.030	0.0000034	0.0000034	0.0017	0.0000092	4.3	0.000015	0.000022	0.00025
12-Nov-14	20	500	495	7.6	89	#N/A	3.3	17	0.99	0.099	0.030	0.15	20	0.029	0.0061	0.0054	0.033	0.0000035	0.0000035	0.0024	0.0000015	5.0	0.000025	0.000027	0.00021
19-Nov-14	21	500	475	7.6	93	#N/A	3.1	16	0.95	0.095	0.029	0.14	19	0.025	0.0060	0.0048	0.033	0.0000033	0.0000033	0.0013	0.0000062	4.6	0.000014	0.000025	0.00027
26-Nov-14	22	500	500	7.9	78	#N/A	0.91	18	1.0	0.10	0.030	0.15	17	0.025	0.0051	0.0045	0.030	0.0000035	0.0000035	0.0011	0.0000015	4.2	0.000015	0.000021	0.000070
3-Dec-14	23	500	495	7.8	71	#N/A	1.5	17	0.99	0.099	0.030	0.15	18	0.023	0.0044	0.0044	0.030	0.0000035	0.0000035	0.0016	0.0000015	4.7	0.000015	0.000017	0.00011
10-Dec-14	24	500	495	7.9	71	#N/A	2.5	18	0.99	0.099	0.030	0.15	17	0.025	0.0043	0.0039	0.030	0.0000035	0.0000035	0.0011	0.0000015	4.3	0.000015	0.000015	0.00017
17-Dec-14	25	500	500	8.0	91	#N/A	2.0	21	1.5	0.10	0.030	0.15	20	0.037	0.0060	0.0052	0.039	0.0000035	0.0000035	0.0012	0.0000015	5.1	0.000015	0.000038	0.00013
24-Dec-14	26	500	495	7.9	87	#N/A	1.6	21	0.99	0.099	0.030	0.15	19	0.028	0.0057	0.0046	0.039	0.0000035	0.0000035	0.00084	0.0000020	4.9	0.000015	0.000024	0.00012
31-Dec-14	27	500	495	7.9	88	#N/A	0.66	15	1.5	0.099	0.030	0.15	20	0.023	0.0058	0.0047	0.036	0.0000035	0.0000035	0.00079	0.0000015	5.2	0.000015	0.000020	0.000089
7-Jan-15	28	500	500	7.8	68	#N/A	1.3	17	1.0	0.50	0.030	0.15	16	0.020	0.0037	0.0030	0.028	0.0000035	0.0000035	0.0014	0.0000015	4.5	0.000015	0.000019	0.00014
14-Jan-15	29	500	480	7.8	68	#N/A	1.3	16	0.96	0.48	0.029	0.14	15	0.018	0.0039	0.0027	0.027	0.0000034	0.0000034	0.0013	0.0000034	4.1	0.000014	0.000017	0.000091
21-Jan-15	30	500	485	8.0	75	#N/A	2.1	20	0.97	0.49	0.029	0.15	16	0.025	0.0047	0.0037	0.031	0.0000034	0.0000034	0.00097	0.0000015	4.3	0.000015	0.000018	0.00015
28-Jan-15	31	500	495	7.9	76	#N/A	0.82	18	0.99	0.50	0.030	0.15	18	0.025	0.0041	0.0034	0.032	0.0000035	0.0000035	0.0016	0.000012	4.5	0.000015	0.000017	0.00010
4-Feb-15	32	500	495	7.9	72	#N/A	1.1	17	0.99	0.50	0.030	0.15	16	0.020	0.0039	0.0031	0.030	0.0000035	0.0000035	0.0013	0.0000020	4.0	0.00	0.000014	0.00016
11-Feb-15	33	500	490	7.9	76	#N/A	1.0	18	1.5	0.49	0.029	0.15	17	0.022	0.0046	0.0032	0.032	0.0000034	0.0000034	0.0014	0.0000034	4.2	0.000015	0.000019	0.000015
18-Feb-15	34	500	485	7.9	67	#N/A	1.0	17	0.97	0.49	0.029	0.15	16	0.021	0.0037	0.0028	0.028	0.0000034	0.0000034	0.0013	0.0000015	4.2	0.000015	0.000019	0.00017
25-Feb-15	35	500	480	7.9	80	#N/A	1.4	19	0.96	0.48	0.029	0.14	18	0.016	0.0041	0.0025	0.030	0.0000034	0.0000034	0.00043	0.0000024	4.7	0.000014	0.000022	0.00024
4-Mar-15	36	500	490	7.8	68	#N/A	0.98	17	0.98	0.49	0.029	0.15	16	0.017	0.0034	0.0023	0.027	0.0000034	0.0000034	0.00069	0.0000015	4.6	0.000029	0.000018	0.000093
11-Mar-15	37	500	490	7.9	73	#N/A	0.85	18	0.98	0.49	0.029	0.15	16	0.014	0.0036	0.0024	0.031	0.0000034	0.0000034	0.0012	0.0000015	4.4	0.000025	0.000018	0.00030
18-Mar-15	38	500	490	7.9	68	#N/A	1.2	18	0.98	0.49	0.029	0.15	16	0.014	0.0032	0.0019	0.027	0.0000034	0.0000034	0.00069	0.0000015	4.6	0.000015	0.000020	0.00015
25-Mar-15	39	500	485	7.8	73	#N/A	1.5	18	0.97	0.49	0.029	0.15	17	0.014	0.0044	0.0024	0.034	0.0000034	0.0000034	0.0019	0.0000019	4.3	0.000039	0.000022	0.00021
1-Apr-15	40	500	490	7.8	64	#N/A	1.8	18	0.98	0.49	0.029	0.15	12	0.014	0.0031	0.0017	0.030	0.0000064	0.0000034	0.00088	0.0000015	3.1	0.000015	0.000010	0.00043
8-Apr-15	41	500	485	7.8	78	#N/A	1.3	20	0.97	0.49	0.029	0.15	17	0.016	0.0052	0.0025	0.033	0.0000034	0.0000034	0.0011	0.0000015	4.6	0.000015	0.000026	0.00036
15-Apr-15	42	500	495	7.8	66	#N/A	1.9	18	0.99	0.50	0.030	0.15	15	0.014	0.0033	0.0021	0.027	0.0000035	0.0000035	0.0021	0.0000015	4.0	0.000015	0.0000059	0.00049
22-Apr-15	43	500	485	7.8	53	#N/A	1.7	15	1.5	0.49	0.029	0.15	12	0.013	0.0021	0.0016	0.023	0.0000034	0.0000034	0.0023	0.0000015	3.4	0.000029	0.000014	0.00040
29-Apr-15	44	500	490	7.9	80	#N/A	1.1	21	0.98	0.49	0.029	0.15	20	0.023	0.0040	0.0027	0.041	0.0000034	0.0000034	0.0015	0.0000015	5.5	0.000020	0.000026	0.00024
6-May-15	45	500	495	7.9	73	#N/A	1.4	20	0.99	0.50	0.030	0.15	17	0.020	0.0037	0.0033	0.033	0.0000035	0.0000035	0.00074	0.0000015	4.5	0.000015	0.000024	0.00020
13-May-15	46	500	505																						
20-May-15	47	505	480																						
27-May-15	48	480	480																						
3-Jun-15	49	480	490	8.1	181	#N/A	0.49	11	0.61	0.12	0.0074	0.037	11	0.0017	0.0021	0.00058	0.025	0.00000086	0.00000086	0.00051	0.00000037	2.9	0.0000037	0.000018	0.000085
10-Jun-15	50	500	490																						
17-Jun-15	51	490	485																						
24-Jun-15	52	485	480																						
1-Jul-15	53	480	480	8.0	192	#N/A	0.54	11	0.48	0.12	0.0072	0.036	9.9	0.0015	0.0021	0.00061	0.022	0.00000084	0.00000084	0.00080	0.00000036	2.6	0.0000036	0.000021	0.000038
8-Jul-15	54	500	485																						
15-Jul-15	55	485	480																						
22-Jul-15	56	480	480																						
29-Jul-15	57	480	470	8.1	176	#N/A	0.31	10	0.47	0.12	0.0071	0.035	9.8	0.0018	0.0016	0.00053	0.019	0.0000011	0.00000082	0.00066	0.00000082	2.5	0.0000035	0.000019	0.000041
5-Aug-15	58	500	500																						
12-Aug-15	59	500	495																						
19-Aug-15	60	495	480																						
26-Aug-15	61	480	470	8.0	172	#N/A	0.23	10	0.47	0.12	0.0071	0.035	9.8	0.0019	0.0016	0.00043	0.022	0.00000082	0.00000082	0.00059	0.00000035	2.5	0.0000035	0.000023	0.000047
2-Sep-15	62	500	490																						
9-Sep-15	63	490	480																						
16-Sep-15	64	480	470																						
23-Sep-15	65	470	460	8.1	167	#N/A	0.27	9.3	0.46				9.3	0.0014	0.0015	0.00049	0.020	0.00000081	0.00000081	0.00068	0.00000035	2.5	0.0000035	0.000018	0.000052
30-Sep-15	66	500	495																						
7-Oct-15	67	495	485																						
14-Oct-15	68	485	475																						
21-Oct-15	69	475	455	8.1	155	#N/A	0.15	9.2	0.46				8.9	0.0014	0.0014	0.00035	0.019	0.00000080	0.00000080	0.00049	0.00000057	2.3	0.0000034	0.000018	0.000091
28-Oct-15	70	500	495																						
4-Nov-15	71	495	485																						
11-Nov-15	72	485	470																						
18-Nov-15	73	470	450	8.1	172	#N/A	0.14	11	0.45				8.9	0.0012	0.0012	0.00036	0.023	0.00000079	0.00000079	0.00027	0.00000034	2.3	0.0000034	0.000020	0.00012
25-Nov-15	74	500	500	8.1	92	#N/A	0.41	26	1.0				23	0.030	0.0033	0.0021	0.046	0.0000035	0.0000035	0.0014	0.0000045	6.4	0.000055	0.000055	0.00029
2-Dec-15	75	500	490	8.0	85	#N/A	0.78	21	0.98				20	0.028	0.0028	0.0020	0.042	0.0000034	0.0000034	0.0012	0.0000015	5.3	0.000029	0.000033	0.00022
9-Dec-15	76	500	500	8.1	76	#N/A	1.2	20	1.0				18	0.022	0.0025	0.0020	0.039	0.000016	0.000016	0.0027	0.0000085	4.9	0.000030	0.000030	0.00014
16-Dec-15	77	500	495	8.0	76	#N/A	0.97	19	0.99				20	0.024	0.0026	0.0021	0.044	0.0000064	0.0000035	0.0011	0.0000025	5.4	0.000035	0.000032	0.00018
23-Dec-15	78	500	485	8.2	65	#N/A	0.79	18	1.2				18	0.021	0.0023	0.0017	0.039	0.0000050	0.0000035	0.0011	0.0000020	5.0	0.000035	0.000025	0.00014
30-Dec-15	79	500	495	7.9	70	#N/A	0.62	17	1.5				17	0.018	0.0019	0.0013	0.034	0.0000035	0.0000035	0.00099	0.0000015	4.6	0.000035	0.000018	0.000099
6-Jan-16	80	500	490	7.8	67	#N/A	0.68	17	1.2				17	0.017	0.0020	0.0014	0.035	0.0000034	0.0000034	0.00099	0.0000015	4.6	0.000025	0.000015	0.00013
13-Jan-16	81	500	490	7.8	75	#N/A	0.74	17	0.98				17	0.016	0.0021	0.0014	0.036	0.0000034	0.0000034	0.00098	0.0000015	4.7	0.000015	0.000012	0.00017
20-Jan-16	82	500	490	8.0	77	#N/A	1.0	18	0.99				18	0.017	0.0021	0.0014	0.039	0.0000034	0.0000034	0.00099	0.0000020	4.8	0.000015	0.000019	0.00016
27-Jan-16	83	500	495	7.9	78	#N/A	1.3	19	0.99				18	0.018	0.0022	0.0014	0.043	0.0000035	0.0000035	0.00099	0.0000025	5.0	0.000015	0.000027	0.00015
3-Feb-16	84	500	490	8.0	85	#N/A	1.2	19	1.00				18	0.017	0.0021	0.0014	0.043	0.0000035	0.0000035	0.00100	0.0000020	5.0	0.000015	0.000025	0.00011
10-Feb-16	85	500	500	7.9	78	#N/A	1.1	19	1.0				18	0.016	0.0020	0.0014	0.043	0.0000035	0.0000035	0.0010	0.0000015	5.0	0.000015	0.000023	0.000070
17-Feb-16	86	500	490	7.8	66	#N/A	1.1	19	0.98				18	0.017	0.0019	0.0013	0.041	0.0000035	0.0000035	0.0010	0.0000015	4.9	0.000015	0.000021	0.000068
24-Feb-16	87	500	500	7.8	74	#N/A	1.1	18	1.0				18	0.018	0.0018	0.0012	0.040	0.0000035	0.0000035	0.0010	0.0000015	4.8	0.000015	0.000020	0.000065

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Calculated Loading Rates for HC2 (SS)																											
Date	**Cycle**	**Volume** (mL)		**pH**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.	Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
25-Jun-14	0	500	330	8.0	0.0026	0.0000066	0.0034	5.3	0.0032	0.0033	0.0022	0.0046	0.0066	7.0	0.00040	0.72	0.0000030	11	0.35	12	0.000015	0.000036	0.000073	0.0075	0.00078	0.0013	0.00066
2-Jul-14	1	500	485	8.0	0.00097	0.0000049	0.0028	5.1	0.0049	0.0049	0.0019	0.0041	0.0044	5.6	0.00024	0.82	0.00000097	6.0	0.51	8.4	0.0000092	0.00016	0.000029	0.012	0.00070	0.00049	0.00097
9-Jul-14	2	500	490	8.0	0.00098	0.0000049	0.0024	4.4	0.0045	0.0049	0.0012	0.0020	0.0044	4.9	0.000054	0.90	0.00000098	3.6	0.51	4.7	0.0000069	0.000088	0.000044	0.0087	0.00064	0.00049	0.00098
16-Jul-14	3	500	480	8.0	0.0038	0.0000048	0.0018	3.8	0.0035	0.0048	0.0011	0.0012	0.0043	3.7	0.000024	0.70	0.0000019	1.7	0.48	2.5	0.0000086	0.000024	0.000043	0.0074	0.00050	0.00048	0.00096
23-Jul-14	4	500	500	8.0	0.0025	0.000020	0.0011	2.8	0.0052	0.0050	0.00044	0.00055	0.0045	2.4	0.000040	0.51	0.0000010	0.74	0.37	1.7	0.0000040	0.00012	0.00018	0.0049	0.00036	0.00050	0.0010
30-Jul-14	5	500	485	8.1	0.00097	0.0000049	0.0019	3.8	0.0043	0.0049	0.00078	0.00092	0.0044	3.6	0.000029	0.74	0.00000097	0.86	0.52	2.1	0.0000078	0.0000049	0.00010	0.0063	0.00048	0.00049	0.00097
6-Aug-14	6	500	480	8.0	0.00096	0.0000048	0.0014	3.5	0.0037	0.0048	0.00025	0.00048	0.0043	3.3	0.000019	0.70	0.00000096	0.50	0.48	1.6	0.0000048	0.000014	0.000029	0.0055	0.00056	0.00048	0.00096
13-Aug-14	7	500	490	8.0	0.00098	0.0000049	0.0012	3.1	0.0045	0.0049	0.00029	0.00049	0.0044	2.6	0.000020	0.56	0.00000098	0.33	0.42	1.3	0.0000034	0.00010	0.000029	0.0050	0.00028	0.00049	0.00098
20-Aug-14	8	500	490	8.0	0.00098	0.0000049	0.00082	2.5	0.0054	0.0049	0.00020	0.00034	0.0044	1.9	0.000025	0.44	0.00000098	0.21	0.37	1.1	0.0000029	0.000064	0.000044	0.0046	0.00031	0.00049	0.00098
27-Aug-14	9	500	495	8.0	0.00099	0.0000050	0.0011	3.0	0.0055	0.0050	0.00023	0.00050	0.0050	2.5	0.000030	0.58	0.00000099	0.23	0.45	1.3	0.0000050	0.000054	0.000025	0.0054	0.00035	0.00050	0.00099
3-Sep-14	10	500	490	7.9	0.0034	0.0000049	0.00093	2.8	0.0059	0.0049	0.00017	0.00044	0.0029	2.3	0.000098	0.62	0.0000083	0.19	0.51	1.8	0.0000059	0.0000098	0.000025	0.0056	0.00039	0.00049	0.00098
10-Sep-14	11	500	500	8.0	0.0035	0.0000050	0.00073	2.2	0.0056	0.0050	0.00014	0.00035	0.0015	1.8	0.000030	0.50	0.0000010	0.14	0.43	1.2	0.0000060	0.000075	0.000055	0.0048	0.00031	0.00050	0.0010
17-Sep-14	12	500	495	7.9	0.0035	0.0000099	0.00074	2.4	0.0051	0.0050	0.00014	0.00040	0.0015	1.8	0.000069	0.44	0.00000099	0.13	0.47	1.5	0.0000025	0.000020	0.000094	0.0050	0.00027	0.00050	0.00099
24-Sep-14	13	500	480	8.0	0.00096	0.0000096	0.00063	2.0	0.0049	0.0048	0.00015	0.000096	0.0043	1.4	0.000019	0.35	0.0000019	0.13	0.31	0.99	0.0000024	0.0000096	0.000024	0.0042	0.00021	0.00048	0.00096
1-Oct-14	14	500	470	7.9	0.012	0.0000047	0.00054	2.0	0.0069	0.0047	0.00047	0.000047	0.0042	1.4	0.000019	0.38	0.00000094	0.089	0.33	1.2	0.0000024	0.000033	0.00016	0.0041	0.00022	0.00094	0.00094
8-Oct-14	15	500	490	7.9	0.0034	0.000020	0.00053	1.7	0.0050	0.0049	0.00022	0.00025	0.0015	1.2	0.000020	0.29	0.00000098	0.078	0.32	1.2	0.0000039	0.000039	0.000025	0.0038	0.00022	0.00049	0.00098
15-Oct-14	16	500	495	7.9	0.0035	0.0000050	0.00073	2.2	0.0060	0.0050	0.00016	0.00035	0.0015	1.6	0.000025	0.41	0.00000099	0.11	0.42	1.4	0.0000045	0.000050	0.000025	0.0046	0.00023	0.00050	0.00099
22-Oct-14	17	500	505	8.0	0.0035	0.000025	0.00060	2.2	0.0062	0.0051	0.00015	0.00040	0.0015	1.7	0.000025	0.40	0.0000010	0.11	0.39	1.3	0.0000051	0.000020	0.00013	0.0046	0.00023	0.00051	0.0010
29-Oct-14	18	500	490	7.9	0.0034	0.0000049	0.00045	1.6	0.0050	0.0049	0.00012	0.00025	0.0015	1.00	0.000020	0.27	0.00000098	0.069	0.29	0.83	0.0000049	0.000044	0.000044	0.0031	0.00015	0.00049	0.00098
5-Nov-14	19	500	485	7.7	0.0034	0.000019	0.00043	1.7	0.0048	0.0049	0.00020	0.00019	0.0015	1.0	0.000019	0.30	0.00000097	0.078	0.31	0.87	0.000011	0.000019	0.000092	0.0033	0.00019	0.00049	0.00097
12-Nov-14	20	500	495	7.6	0.0035	0.0000099	0.00048	1.8	0.0058	0.0050	0.00034	0.00030	0.0015	1.1	0.000020	0.32	0.00000099	0.094	0.35	0.89	0.0000040	0.000069	0.000099	0.0037	0.00022	0.00050	0.00099
19-Nov-14	21	500	475	7.6	0.0033	0.000014	0.00048	1.8	0.0055	0.0048	0.00039	0.00029	0.0014	1.1	0.000029	0.30	0.00000095	0.076	0.34	0.81	0.000015	0.000090	0.000024	0.0034	0.00020	0.00095	0.00095
26-Nov-14	22	500	500	7.9	0.0035	0.0000050	0.00046	1.6	0.0052	0.0050	0.00017	0.00020	0.0040	0.98	0.000020	0.29	0.0000010	0.065	0.30	0.70	0.0000040	0.000025	0.000085	0.0033	0.00020	0.0010	0.0010
3-Dec-14	23	500	495	7.8	0.0035	0.0000099	0.00039	1.4	0.0054	0.0050	0.00012	0.00020	0.0015	0.81	0.000025	0.23	0.00000099	0.059	0.25	0.64	0.0000035	0.000025	0.000040	0.0031	0.00021	0.00050	0.00099
10-Dec-14	24	500	495	7.9	0.0035	0.0000050	0.00038	1.4	0.0054	0.0050	0.00014	0.00015	0.0015	0.82	0.000020	0.23	0.00000099	0.059	0.28	0.69	0.0000035	0.000050	0.000030	0.0028	0.00017	0.00050	0.00099
17-Dec-14	25	500	500	8.0	0.0035	0.000010	0.00058	1.9	0.0070	0.0050	0.00012	0.00030	0.0015	1.2	0.000020	0.37	0.0000010	0.065	0.37	0.75	0.0000035	0.000085	0.00034	0.0037	0.00023	0.00050	0.0010
24-Dec-14	26	500	495	7.9	0.0035	0.0000050	0.00051	1.7	0.0066	0.0050	0.000064	0.00025	0.0015	0.99	0.000020	0.29	0.00000099	0.069	0.34	0.74	0.0000035	0.000015	0.000025	0.0035	0.00021	0.00050	0.00099
31-Dec-14	27	500	495	7.9	0.0035	0.0000050	0.00048	1.7	0.0061	0.0050	0.00013	0.00025	0.0015	1.0	0.000020	0.34	0.00000099	0.064	0.34	0.74	0.0000045	0.000025	0.000079	0.0036	0.00019	0.00050	0.00099
7-Jan-15	28	500	500	7.8	0.0035	0.000015	0.00033	1.3	0.0055	0.0050	0.00013	0.00020	0.0015	0.70	0.000020	0.20	0.0000010	0.045	0.25	0.40	0.000013	0.000020	0.000060	0.0026	0.00016	0.00050	0.0010
14-Jan-15	29	500	480	7.8	0.0034	0.0000048	0.00029	1.2	0.0052	0.0048	0.00041	0.00019	0.0014	0.67	0.000034	0.20	0.00000096	0.043	0.25	0.38	0.0000082	0.000029	0.000034	0.0022	0.00013	0.00048	0.00096
21-Jan-15	30	500	485	8.0	0.0034	0.000019	0.00039	1.4	0.0056	0.0049	0.00015	0.00019	0.0015	0.81	0.000019	0.23	0.00000097	0.053	0.27	0.44	0.0000024	0.000019	0.000044	0.0029	0.00021	0.00049	0.00097
28-Jan-15	31	500	495	7.9	0.0035	0.0000050	0.00031	1.6	0.0059	0.0050	0.00056	0.00020	0.0015	0.87	0.000045	0.26	0.00000099	0.054	0.24	0.74	0.000014	0.000040	0.000054	0.0027	0.00016	0.00050	0.00099
4-Feb-15	32	500	495	7.9	0.0035	0.0000099	0.00038	1.4	0.0051	0.0050	0.00019	0.00020	0.0015	0.78	0.000020	0.23	0.00000099	0.050	0.28	0.59	0.0000025	0.000069	0.000040	0.0024	0.00016	0.00050	0.00099
11-Feb-15	33	500	490	7.9	0.0034	0.000015	0.00037	1.5	0.0056	0.0049	0.00026	0.00020	0.0015	0.81	0.00049	0.23	0.00000098	0.049	0.29	0.49	0.000014	0.00021	0.000034	0.0026	0.00017	0.00049	0.00098
18-Feb-15	34	500	485	7.9	0.0034	0.0000049	0.00038	1.3	0.0053	0.0049	0.000078	0.00019	0.0015	0.74	0.00049	0.21	0.00000097	0.044	0.29	0.49	0.0000029	0.000024	0.000029	0.0025	0.00016	0.00049	0.00097
25-Feb-15	35	500	480	7.9	0.0034	0.00023	0.00037	1.4	0.0056	0.0048	0.000086	0.00024	0.0014	0.96	0.00048	0.25	0.00000096	0.048	0.30	0.43	0.0000048	0.000082	0.000024	0.0027	0.00013	0.00048	0.00096
4-Mar-15	36	500	490	7.8	0.0034	0.0000049	0.00035	1.2	0.0052	0.0049	0.000039	0.00025	0.0015	0.67	0.00049	0.24	0.00000098	0.039	0.23	0.59	0.0000025	0.000029	0.000049	0.0025	0.00014	0.00049	0.00098
11-Mar-15	37	500	490	7.9	0.0034	0.000029	0.00036	1.3	0.0059	0.0049	0.000069	0.00020	0.0015	0.73	0.00049	0.20	0.00000098	0.039	0.27	0.098	0.0000025	0.000054	0.000025	0.0023	0.00015	0.00049	0.00098
18-Mar-15	38	500	490	7.9	0.0034	0.0000049	0.00033	1.2	0.0060	0.0049	0.000054	0.00020	0.0015	0.72	0.00049	0.19	0.00000098	0.034	0.26	0.44	0.0000025	0.000034	0.000029	0.0022	0.00012	0.00049	0.00098
25-Mar-15	39	500	485	7.8	0.0034	0.0000049	0.00035	1.4	0.0063	0.0049	0.00017	0.00029	0.0015	0.79	0.00049	0.22	0.00000097	0.078	0.28	0.49	0.0000024	0.00026	0.000044	0.0030	0.00016	0.00049	0.00097
1-Apr-15	40	500	490	7.8	0.0034	0.000020	0.00024	1.0	0.0093	0.0049	0.000039	0.00020	0.0015	0.60	0.00049	0.12	0.00000098	0.35	0.23	0.15	0.0000025	0.000074	0.000039	0.0026	0.000098	0.00049	0.00098
8-Apr-15	41	500	485	7.8	0.0034	0.0000049	0.00037	1.3	0.0059	0.0049	0.00013	0.00024	0.0015	0.85	0.00049	0.26	0.00000097	0.039	0.30	0.29	0.0000024	0.00015	0.000053	0.0025	0.00015	0.00049	0.00097
15-Apr-15	42	500	495	7.8	0.0035	0.0000050	0.00031	1.2	0.0053	0.0050	0.00013	0.00020	0.0015	0.70	0.00050	0.19	0.00000099	0.045	0.26	0.40	0.0000025	0.00013	0.000025	0.0022	0.00013	0.00050	0.00099
22-Apr-15	43	500	485	7.8	0.0034	0.000015	0.00021	0.83	0.0053	0.0049	0.000058	0.00015	0.0015	0.45	0.00049	0.14	0.0000019	0.024	0.18	0.19	0.0000044	0.00016	0.000034	0.0014	0.000097	0.00049	0.00097
29-Apr-15	44	500	490	7.9	0.0034	0.000064	0.00040	1.5	0.0073	0.0049	0.00010	0.00020	0.0015	0.91	0.00049	0.24	0.00000098	0.049	0.29	0.64	0.0000025	0.000039	0.000044	0.0030	0.00016	0.00049	0.00098
6-May-15	45	500	495	7.9	0.0035	0.0000099	0.00037	1.3	0.0064	0.0050	0.000050	0.00020	0.0015	0.81	0.00050	0.23	0.00000099	0.040	0.26	0.40	0.0000025	0.00031	0.000025	0.0025	0.00015	0.0015	0.00099
13-May-15	46	500	505																								
20-May-15	47	505	480																								
27-May-15	48	480	480																								
3-Jun-15	49	480	490	8.1	0.00086	0.0000012	0.00021	0.87	0.0039	0.0012	0.000042	0.00021	0.00037	0.44	0.0000049	0.14	0.00000025	0.022	0.19	0.32	0.00000061	0.000011	0.0000098	0.0014	0.000031	0.00012	0.00025
10-Jun-15	50	500	490																								
17-Jun-15	51	490	485																								
24-Jun-15	52	485	480																								
1-Jul-15	53	480	480	8.0	0.00084	0.0000012	0.00019	0.84	0.0038	0.0012	0.000034	0.00023	0.00036	0.36	0.000011	0.14	0.00000024	0.026	0.18	0.26	0.0000013	0.000024	0.0000060	0.0016	0.000029	0.00012	0.00024
8-Jul-15	54	500	485																								
15-Jul-15	55	485	480																								
22-Jul-15	56	480	480																								
29-Jul-15	57	480	470	8.1	0.00082	0.0000024	0.00018	0.84	0.0037	0.0012	0.000052	0.00020	0.00035	0.35	0.0000047	0.12	0.00000024	0.024	0.18	0.25	0.00000059	0.0000059	0.000015	0.0013	0.000029	0.00012	0.00024
5-Aug-15	58	500	500																								
12-Aug-15	59	500	495																								
19-Aug-15	60	495	480																								
26-Aug-15	61	480	470	8.0	0.00082	0.000015	0.00017	0.84	0.0045	0.0012	0.000090	0.00022	0.00035	0.36	0.0000059	0.12	0.00000024	0.022	0.18	0.31	0.00000094	0.000014	0.0000059	0.0013	0.000032	0.00024	0.00024
2-Sep-15	62	500	490																								
9-Sep-15	63	490	480																								
16-Sep-15	64	480	470																								
23-Sep-15	65	470	460	8.1	0.00081	0.0000012	0.00016	0.76	0.0033	0.0012	0.00013	0.00020	0.00035	0.33	0.0000069	0.12	0.00000023	0.030	0.15	0.24	0.00000092	0.0000035	0.0000058	0.0012	0.000025	0.00012	0.00023
30-Sep-15	66	500	495																								
7-Oct-15	67	495	485																								
14-Oct-15	68	485	475																								
21-Oct-15	69	475	455	8.1	0.00080	0.0000057	0.00015	0.75	0.0034	0.0011	0.000027	0.00018	0.00034	0.33	0.000023	0.10	0.0000046	0.031	0.14	0.23	0.0000013	0.000018	0.0000057	0.0011	0.000020	0.00011	0.00023
28-Oct-15	70	500	495																								
4-Nov-15	71	495	485																								
11-Nov-15	72	485	470																								
18-Nov-15	73	470	450	8.1	0.0045	0.0000045	0.00013	0.75	0.0034	0.0011	0.00017	0.00017	0.00034	0.33	0.000012	0.10	0.00000034	0.021	0.15	0.14	0.0000033	0.000015	0.000015	0.0012	0.000019	0.00023	0.00023
25-Nov-15	74	500	500	8.1	0.0035	0.000045	0.00046	1.8	0.0083	0.0050	0.00019	0.00030	0.0035	1.0	0.00025	0.28	0.00014	0.060	0.35	0.50	0.0000065	0.0000050	0.00024	0.0030	0.00015	0.00050	0.0010
2-Dec-15	75	500	490	8.0	0.0044	0.000039	0.00040	1.7	0.0074	0.0049	0.00019	0.00029	0.0015	0.94	0.000020	0.28	0.00000098	0.054	0.31	0.44	0.0000025	0.000039	0.00024	0.0028	0.00014	0.00049	0.00098
9-Dec-15	76	500	500	8.1	0.0035	0.000015	0.00037	1.3	0.0067	0.0050	0.00017	0.00025	0.0040	0.80	0.000045	0.22	0.0000085	0.045	0.28	0.40	0.000018	0.000070	0.000085	0.0025	0.00014	0.00050	0.0010
16-Dec-15	77	500	495	8.0	0.0035	0.000084	0.00039	1.6	0.0081	0.0050	0.000089	0.00025	0.0020	0.92	0.000020	0.25	0.0000020	0.050	0.30	0.40	0.0000035	0.000079	0.000025	0.0027	0.00014	0.00050	0.00099
23-Dec-15	78	500	485	8.2	0.0035	0.000045	0.00036	1.4	0.0073	0.0050	0.000079	0.00022	0.0017	0.81	0.000020	0.21	0.0000017	0.054	0.28	0.47	0.0000030	0.000042	0.000050	0.0023	0.00012	0.00050	0.00099
30-Dec-15	79	500	495	7.9	0.0035	0.0000050	0.00032	1.3	0.0065	0.0050	0.000069	0.00020	0.0015	0.70	0.000020	0.17	0.0000015	0.059	0.26	0.54	0.0000025	0.0000050	0.000074	0.0020	0.000099	0.00050	0.00099
6-Jan-16	80	500	490	7.8	0.0034	0.0000049	0.00031	1.3	0.0065	0.0049	0.00014	0.00020	0.0015	0.73	0.000047	0.18	0.0000012	0.044	0.25	0.37	0.0000025	0.000017	0.000098	0.0020	0.000096	0.00049	0.00099
13-Jan-16	81	500	490	7.8	0.0034	0.0000049	0.00030	1.3	0.0064	0.0049	0.00022	0.00020	0.0015	0.75	0.000074	0.20	0.00000098	0.029	0.25	0.20	0.0000025	0.000029	0.00012	0.0020	0.000093	0.00049	0.00098
20-Jan-16	82	500	490	8.0	0.0034	0.0000049	0.00031	1.4	0.0068	0.0049	0.00013	0.00022	0.0015	0.77	0.000047	0.20	0.00000099	0.032	0.26	0.20	0.0000025	0.000042	0.000096	0.0022	0.000094	0.00049	0.00099
27-Jan-16	83	500	495	7.9	0.0035	0.0000050	0.00032	1.4	0.0072	0.0050	0.000035	0.00025	0.0015	0.79	0.000020	0.21	0.00000099	0.035	0.27	0.20	0.0000025	0.000054	0.000069	0.0024	0.000094	0.00050	0.00099
3-Feb-16	84	500	490	8.0	0.0035	0.0000050	0.00032	1.4	0.0072	0.0050	0.000040	0.00022	0.0015	0.75	0.000032	0.20	0.00000100	0.040	0.27	0.42	0.0000025	0.000035	0.000047	0.0022	0.000090	0.00050	0.00100
10-Feb-16	85	500	500	7.9	0.0035	0.0000050	0.00032	1.3	0.0073	0.0050	0.000045	0.00020	0.0015	0.71	0.000045	0.19	0.0000010	0.045	0.27	0.65	0.0000025	0.000015	0.000025	0.0020	0.000085	0.00050	0.0010
17-Feb-16	86	500	490	7.8	0.0035	0.0000050	0.00032	1.3	0.0072	0.0050	0.000050	0.00020	0.0015	0.72	0.000033	0.13	0.0000013	0.033	0.27	0.53	0.0000025	0.000013	0.000025	0.0019	0.000088	0.00050	0.0010
24-Feb-16	87	500	500	7.8	0.0035	0.0000050	0.00032	1.4	0.0071	0.0050	0.000055	0.00020	0.0015	0.74	0.000020	0.070	0.0000015	0.020	0.26	0.40	0.0000025	0.000010	0.000025	0.0018	0.000090	0.00050	0.0010

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for HC3 (GT)

Date	Cycle	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu
	No.	Input	Output		umhos/cm	mgCaCO3/L	mgCaCO3/L	mgCaCO3/L	mg/L	mg/L	mg/L	mg/L	mgCaCO3/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
25-Jun-14	0	500	400	8.1	121	#N/A	4.8	34	5.0	1.3	0.24	< 0.3	25	0.065	0.0032	0.066	0.042	0.0000080	< 0.000007	0.011	0.0000060	6.5	0.000080	0.00017	0.0021
2-Jul-14	1	500	480	7.9	107	#N/A	5.7	40	13	0.70	0.13	< 0.3	29	0.044	0.0025	0.043	0.045	< 0.000007	< 0.000007	0.0081	< 0.000003	7.5	0.000050	0.00016	0.0012
9-Jul-14	2	500	495	7.9	91	#N/A	1.7	35	8.0	0.30	0.11	< 0.3	26	0.034	0.0024	0.034	0.045	< 0.000007	< 0.000007	0.0075	< 0.000003	6.8	< 0.00003	0.000054	0.00066
16-Jul-14	3	500	485	7.9	80	#N/A	2.0	34	5.0	< 0.2	0.10	< 0.3	26	0.048	0.0025	0.031	0.055	< 0.000007	< 0.000007	0.0069	< 0.000003	6.7	0.00018	0.00029	0.00076
23-Jul-14	4	500	500	7.9	67	#N/A	2.1	32	4.0	< 0.2	0.080	< 0.3	26	0.055	0.0019	0.027	0.069	< 0.000007	< 0.000007	0.0064	< 0.000003	6.9	0.000080	0.00014	0.0012
30-Jul-14	5	500	490	7.8	60	#N/A	2.4	31	4.0	< 0.2	0.060	< 0.3	23	0.052	0.0019	0.022	0.051	< 0.000007	< 0.000007	0.0047	0.0000030	5.8	0.00010	0.00010	0.0013
6-Aug-14	6	500	490	7.8	60	#N/A	2.1	29	3.0	< 0.2	0.070	< 0.3	24	0.030	0.0018	0.020	0.047	< 0.000007	< 0.000007	0.0050	< 0.000003	6.1	< 0.00003	0.000038	0.00029
13-Aug-14	7	500	480	7.8	55	#N/A	2.5	29	5.0	< 0.2	0.070	< 0.3	23	0.061	0.0015	0.018	0.053	< 0.000007	< 0.000007	0.0053	< 0.000003	5.9	0.000070	0.000048	0.00032
20-Aug-14	8	500	500	7.8	52	#N/A	1.8	29	4.0	< 0.2	0.060	< 0.3	24	0.026	0.0012	0.016	0.050	< 0.000007	< 0.000007	0.0055	< 0.000003	6.3	0.000040	0.000063	0.00033
27-Aug-14	9	500	505	7.9	59	#N/A	4.3	31	2.0	< 0.2	< 0.06	< 0.3	25	0.023	0.0013	0.014	0.065	< 0.000007	< 0.000007	0.011	< 0.000003	6.9	< 0.00003	0.000030	0.00029
3-Sep-14	10	500	480	7.8	50	#N/A	4.2	27	5.0	< 0.2	< 0.06	< 0.3	23	0.026	0.0014	0.015	0.050	< 0.000007	< 0.000007	0.0041	0.0000030	6.2	< 0.00003	0.000032	0.00068
10-Sep-14	11	500	515	7.9	54	#N/A	3.2	28	3.0	< 0.2	< 0.06	< 0.3	22	0.046	0.0011	0.013	0.065	< 0.000007	< 0.000007	0.0058	< 0.000003	6.1	< 0.00003	0.000035	0.00041
17-Sep-14	12	500	490	7.9	49	#N/A	6.4	28	4.0	< 0.2	< 0.06	< 0.3	20	0.025	0.0011	0.011	0.043	< 0.000007	< 0.000007	0.0046	0.0000090	5.1	< 0.00003	0.000034	0.00014
24-Sep-14	13	500	480	7.9	48	#N/A	3.7	27	3.0	< 0.2	< 0.06	< 0.3	20	0.034	0.0012	0.012	0.041	< 0.000007	< 0.000007	0.0032	0.0000030	5.3	< 0.00003	0.00010	0.00015
1-Oct-14	14	500	480	7.9	42	#N/A	6.1	28	< 2	< 0.2	< 0.06	< 0.3	19	0.032	0.0012	0.0098	0.038	< 0.000007	< 0.000007	0.0030	0.000051	4.9	< 0.00003	0.00010	< 0.00002
8-Oct-14	15	500	500	7.7	47	#N/A	3.1	23	< 2	< 0.2	< 0.06	< 0.3	20	0.021	0.0010	0.0096	0.047	< 0.000007	< 0.000007	0.013	< 0.000003	5.5	< 0.00003	0.000029	0.00013
15-Oct-14	16	500	490	7.9	52	#N/A	4.6	26	3.0	< 0.2	< 0.06	< 0.3	23	0.051	0.0010	0.013	0.057	< 0.000007	< 0.000007	0.0049	0.000012	6.2	< 0.00003	0.000025	0.00022
22-Oct-14	17	500	510	7.8	52	#N/A	4.1	27	< 2	< 0.2	< 0.06	< 0.3	23	0.024	0.0010	0.0096	0.059	< 0.000007	< 0.000007	0.0059	0.000010	6.3	< 0.00003	0.000027	0.000080
29-Oct-14	18	500	490	7.9	42	#N/A	6.9	27	< 2	< 0.2	< 0.06	< 0.3	19	0.024	0.0010	0.0089	0.044	< 0.000007	< 0.000007	0.0062	< 0.000003	5.1	< 0.00003	0.000020	0.00024
5-Nov-14	19	500	505	7.9	45	#N/A	#N/A	32	< 2	< 0.2	< 0.06	< 0.3	20	0.019	0.00090	0.0081	0.049	< 0.000007	< 0.000007	0.0038	0.000012	5.3	< 0.00003	0.000027	0.00055
12-Nov-14	20	500	505	7.4	48	#N/A	6.8	34	< 2	< 0.2	< 0.06	< 0.3	22	0.024	0.00090	0.0088	0.056	< 0.000007	< 0.000007	0.0045	< 0.000003	6.2	< 0.00003	0.000031	0.00025
19-Nov-14	21	500	490	7.6	57	#N/A	6.6	34	2.0	< 0.2	< 0.06	< 0.3	20	0.034	0.00090	0.0077	0.052	< 0.000007	< 0.000007	0.0031	0.0000040	5.2	< 0.00003	0.000041	0.00031
26-Nov-14	22	500	505	7.7	43	#N/A	2.0	23	2.0	< 0.2	< 0.06	< 0.3	20	0.022	0.00090	0.0081	0.050	< 0.000007	< 0.000007	0.0025	< 0.000003	5.1	< 0.00003	0.000030	0.00012
3-Dec-14	23	500	500	7.8	71	#N/A	3.0	34	< 2	< 0.2	< 0.06	< 0.3	21	0.017	0.00090	0.0081	0.052	< 0.000007	< 0.000007	0.0034	< 0.000003	5.5	< 0.00003	0.000031	0.00015
10-Dec-14	24	500	485	7.8	37	#N/A	4.6	22	2.0	< 0.2	< 0.06	< 0.3	21	0.017	0.00070	0.0066	0.045	< 0.000007	< 0.000007	0.0025	< 0.000003	6.2	< 0.00003	0.000026	0.00021
17-Dec-14	25	500	500	7.8	41	#N/A	3.8	24	< 2	< 0.2	< 0.06	< 0.3	19	0.033	0.00080	0.0079	0.058	< 0.000007	< 0.000007	0.0025	< 0.000003	5.1	< 0.00003	0.000016	0.00016
24-Dec-14	26	500	485	7.8	39	#N/A	3.1	22	< 2	< 0.2	< 0.06	< 0.3	18	0.030	0.00080	0.0063	0.051	< 0.000007	< 0.000007	0.0017	< 0.000003	5.0	< 0.00003	0.000021	0.00017
31-Dec-14	27	500	505	7.6	44	#N/A	1.5	27	< 2	< 0.2	< 0.06	< 0.3	20	0.019	0.00090	0.0067	0.055	< 0.000007	< 0.000007	0.0018	< 0.000003	5.6	< 0.00003	0.000018	0.00015
7-Jan-15	28	500	505	7.7	40	#N/A	2.6	23	< 2	< 1	< 0.06	< 0.3	21	0.016	0.00090	0.0058	0.050	< 0.000007	< 0.000007	0.0021	< 0.000003	5.6	< 0.00003	0.000032	0.00035
14-Jan-15	29	500	495	7.7	36	#N/A	2.2	21	< 2	< 1	< 0.06	< 0.3	17	0.018	0.00080	0.0063	0.042	< 0.000007	< 0.000007	0.0024	< 0.000003	4.7	< 0.00003	0.000020	0.0012
21-Jan-15	30	500	500	8.0	37	#N/A	4.2	26	< 2	< 1	< 0.06	< 0.3	18	0.020	0.00080	0.0052	0.044	< 0.000007	< 0.000007	0.0018	0.0000040	4.8	< 0.00003	0.000024	0.00031
28-Jan-15	31	500	490	7.6	38	#N/A	1.6	21	< 2	< 1	< 0.06	< 0.3	19	0.020	0.0010	0.0059	0.047	< 0.000007	< 0.000007	0.0027	0.0000030	5.0	< 0.00003	0.000019	0.00022
4-Feb-15	32	500	485	7.7	35	#N/A	2.2	20	< 2	< 1	< 0.06	< 0.3	16	0.018	0.00080	0.0053	0.039	< 0.000007	< 0.000007	0.0024	< 0.000003	4.0	< 0.00003	0.000015	0.00074
11-Feb-15	33	500	500	7.6	36	#N/A	1.9	20	< 2	< 1	< 0.06	< 0.3	18	0.020	0.00090	0.0052	0.041	< 0.000007	< 0.000007	0.0025	< 0.000003	4.8	< 0.00003	0.000023	0.00016
18-Feb-15	34	500	485	7.7	35	#N/A	2.3	21	< 2	< 1	< 0.06	< 0.3	17	0.019	0.00090	0.0052	0.042	< 0.000007	< 0.000007	0.0026	< 0.000003	4.7	< 0.00003	0.000024	0.00031
25-Feb-15	35	500	475	7.9	37	#N/A	3.1	23	< 2	< 1	< 0.06	< 0.3	16	0.013	0.00090	0.0047	0.040	< 0.000007	< 0.000007	0.0011	0.0000090	4.2	< 0.00003	0.000023	0.00055
4-Mar-15	36	500	485	7.6	36	#N/A	2.3	22	< 2	< 1	< 0.06	< 0.3	16	0.015	0.00070	0.0046	0.039	< 0.000007	< 0.000007	0.0013	< 0.000003	4.3	0.000050	0.000014	0.00033
11-Mar-15	37	500	510	7.6	35	#N/A	1.9	21	< 2	< 1	< 0.06	< 0.3	16	0.013	0.00080	0.0042	0.041	< 0.000007	< 0.000007	0.0021	0.000036	4.4	0.000060	0.000035	0.0015
18-Mar-15	38	500	490	7.7	37	#N/A	2.5	22	< 2	< 1	< 0.06	< 0.3	17	0.019	0.00080	0.0040	0.039	< 0.000007	< 0.000007	0.0013	0.0000030	4.7	< 0.00003	0.000024	0.00017
25-Mar-15	39	500	485	7.7	37	#N/A	2.7	23	< 2	< 1	< 0.06	< 0.3	19	0.014	0.00090	0.0049	0.043	< 0.000007	< 0.000007	0.0024	< 0.000003	4.8	0.000080	0.000013	0.0013
1-Apr-15	40	500	495	7.8	35	#N/A	3.5	24	< 2	< 1	< 0.06	< 0.3	14	0.016	0.00080	0.0036	0.044	0.000013	< 0.000007	0.0020	0.0000060	3.5	< 0.00003	0.0000060	0.00032
8-Apr-15	41	500	475	7.6	38	#N/A	2.7	23	< 2	< 1	< 0.06	< 0.3	17	0.018	0.0011	0.0044	0.042	< 0.000007	< 0.000007	0.0015	< 0.000003	4.6	< 0.00003	0.000032	0.00042
15-Apr-15	42	500	480	7.8	37	#N/A	4.0	26	< 2	< 1	< 0.06	< 0.3	17	0.016	0.00080	0.0041	0.041	< 0.000007	< 0.000007	0.0041	< 0.000003	4.4	< 0.00003	< 0.000004	0.00099
22-Apr-15	43	500	495	7.7	37	#N/A	3.3	23	3.0	< 1	< 0.06	< 0.3	17	0.016	0.00070	0.0039	0.040	< 0.000007	< 0.000007	0.0035	< 0.000003	4.4	< 0.00003	0.000015	0.00051
29-Apr-15	44	500	500	7.6	34	#N/A	2.1	21	< 2	< 1	< 0.06	< 0.3	16	0.019	0.00080	0.0036	0.041	< 0.000007	< 0.000007	0.0024	< 0.000003	4.4	< 0.00003	0.000021	0.00027
6-May-15	45	500	510	7.7	38	#N/A	2.4	24	< 2	< 1	< 0.06	< 0.3	17	0.019	0.00090	0.0058	0.041	< 0.000007	< 0.000007	0.0017	< 0.000003	4.5	< 0.00003	0.000017	0.00064
13-May-15	46	500	505	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-May-15	47	505	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-May-15	48	490	510	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	49	510	500	7.9	106	#N/A	3.1	54	< 2	< 1	< 0.06	< 0.3	52	0.011	0.0015	0.0049	0.12	< 0.000007	< 0.000007	0.0049	< 0.000003	15	< 0.00003	0.000042	0.0022
10-Jun-15	50	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-15	51	490	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Jun-15	52	500	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	53	480	495	7.9	116	#N/A	3.6	56	< 2	< 1	< 0.06	< 0.3	50	0.015	0.0018	0.0063	0.12	< 0.000007	< 0.000007	0.0047	< 0.000003	14	< 0.00003	0.000041	0.00050
8-Jul-15	54	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-Jul-15	55	490	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jul-15	56	490	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	57	490	485	8.0	108	#N/A	2.3	56																	
5-Aug-15	58	500	510	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	59	510	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Aug-15	60	495	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	61	485	490	8.0	106	#N/A	1.7	54	< 2	< 1	< 0.06	< 0.3	50	0.015	0.0015	0.0049	0.13	< 0.000007	< 0.000007	0.0049	0.000010	14	0.000060	0.000045	0.00067
2-Sep-15	62	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	63	490	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Sep-15	64	485	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	65	460	460	7.9	109	#N/A	2.0	52	< 2				52	0.011	0.0016	0.0050	0.13	< 0.000007	< 0.000007	0.0051	< 0.000003	15	< 0.00003	0.000040	0.00037
30-Sep-15	66	500	505	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	67	505	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14-Oct-15	68	495	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	69	490	470	8.0	99	#N/A	1.4	52	2.0				49	0.012	0.0014	0.0043	0.12	< 0.000007	< 0.000007	0.0041	< 0.000003	14	< 0.00003	0.000036	0.00033
28-Oct-15	70	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	71	490	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Nov-15	72	490	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	73	485	485	8.0	98	#N/A	1.2	55	2.0				44	0.012	0.0014	0.0041	0.094	< 0.000007	< 0.000007	0.0022	< 0.000003	12	0.000050	0.000052	0.00039
25-Nov-15	74	500	500	7.7	37	#N/A	0.70	24	2.0				18	0.021	0.00070	0.0041	0.045	< 0.000007	< 0.000007	0.0021	< 0.000003	4.9	< 0.00003	0.000047	0.00038
2-Dec-15	75	500	500	7.5	36	#N/A	2.4	21	< 2				18	0.017	0.00070	0.0036	0.046	< 0.000007	< 0.000007	0.0019	< 0.000003	4.8	< 0.00003	0.000018	0.00022
9-Dec-15	76	500	505	7.7	36	#N/A	3.0	22	2.0				17	0.021	0.00070	0.0036	0.047	0.000015	0.0000090	0.0039	0.0000070	4.7	< 0.00003	0.000023	0.00032
16-Dec-15	77	500	500	7.7	35	#N/A	2.6	17	2.0				19	0.024	0.00060	0.0042	0.051	< 0.000007	< 0.000007	0.0023	0.000026	5.3	0.000050	0.000017	0.00046
23-Dec-15	78	500	505	8.1	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	79	500	505	7.5	33	#N/A	1.6	17	2.0				17	0.014	0.00050	0.0031	0.044	< 0.000007	< 0.000007	0.0017	< 0.000003	4.6	< 0.00003	0.0000080	0.00023
6-Jan-16	80	500	505	7.4	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	81	500	505	7.4	34	#N/A	1.8	17	2.0				16	0.014	0.00060	0.0030	0.042	< 0.000007	< 0.000007	< 0.002	< 0.000003	4.4	< 0.00003	< 0.000004	0.00036
20-Jan-16	82	500	500	7.6	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	83	500	505	7.6	34	#N/A	3.1	18	2.0				16	0.014	0.00050	0.0031	0.046	< 0.000007	< 0.000007	< 0.002	0.0000030	4.6	< 0.00003	0.000016	0.00024
3-Feb-16	84	500	505	7.7	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	85	500	500	7.5	38	#N/A	2.4	20	2.0				17	0.015	0.00060	0.0032	0.051	< 0.000007	< 0.000007	< 0.002	< 0.000003	4.7	< 0.00003	0.000019	0.00027
17-Feb-16	86	500	505	7.7	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	87	500	500	7.5	32	#N/A	2.4	17	< 2				16	0.014	0.00050	0.0028	0.044	< 0.000007	< 0.000007	< 0.002	< 0.000003	4.3	< 0.00003	0.0000090	0.00012

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for HC3 (GT)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
25-Jun-14	0	500	400	8.1	0.012	0.000030	0.0021	2.2	0.0063	0.030	0.013	0.0010	0.028	5.0	0.00042	1.4	< 0.000002	11	0.041	8.2	0.000084	0.00010	0.00033	0.0096	0.00035	0.0020	< 0.002
2-Jul-14	1	500	480	7.9	0.0060	0.000010	0.0019	2.5	0.010	0.020	0.0070	0.0010	0.012	3.8	0.00023	1.1	< 0.000002	7.9	0.046	5.8	0.000059	0.0038	0.00019	0.029	0.00025	< 0.001	< 0.002
9-Jul-14	2	500	495	7.9	< 0.002	< 0.00001	0.0016	2.2	0.0086	< 0.01	0.0058	0.00060	0.016	3.3	0.000090	1.0	< 0.000002	5.2	0.040	3.6	0.000050	0.00090	< 0.00005	0.032	0.00019	< 0.001	< 0.002
16-Jul-14	3	500	485	7.9	0.016	0.000010	0.0014	2.2	0.0075	< 0.01	0.0056	0.00050	< 0.009	2.9	0.000060	0.98	0.0000020	3.7	0.041	2.4	0.000050	0.00014	0.00026	0.032	0.00021	< 0.001	< 0.002
23-Jul-14	4	500	500	7.9	0.024	0.000050	0.0012	2.1	0.0095	< 0.01	0.0036	0.00030	< 0.009	2.4	< 0.00004	0.96	< 0.000002	2.3	0.042	1.5	0.000043	0.0021	0.00031	0.028	0.00018	< 0.001	< 0.002
30-Jul-14	5	500	490	7.8	0.015	0.000020	0.0011	1.9	0.0092	< 0.01	0.0036	0.00020	< 0.009	2.1	< 0.00004	0.83	< 0.000002	1.8	0.036	1.1	0.000041	0.00011	0.00049	0.028	0.00023	< 0.001	< 0.002
6-Aug-14	6	500	490	7.8	0.0020	< 0.00001	0.0011	2.1	0.0078	< 0.01	0.0034	0.00020	0.0090	2.2	< 0.00004	0.87	< 0.000002	1.5	0.039	1.0	0.000039	0.00017	0.000060	0.031	0.00024	< 0.001	< 0.002
13-Aug-14	7	500	480	7.8	0.010	0.000020	0.00099	1.9	0.0084	< 0.01	0.0030	0.00020	0.015	1.9	< 0.00004	0.85	< 0.000002	1.1	0.036	0.78	0.000037	0.00086	0.00048	0.030	0.000080	< 0.001	< 0.002
20-Aug-14	8	500	500	7.8	< 0.002	0.000010	0.00087	2.0	0.0092	< 0.01	0.0026	0.00010	< 0.009	1.9	< 0.00004	0.79	< 0.000002	0.88	0.040	0.69	0.000030	0.0012	< 0.00005	0.031	0.00015	0.0010	< 0.002
27-Aug-14	9	500	505	7.9	< 0.002	< 0.00001	0.00076	1.8	0.011	< 0.01	0.0025	< 0.0001	< 0.009	1.7	< 0.00004	0.74	< 0.000002	0.60	0.039	0.63	0.000037	0.00095	0.00011	0.030	0.00014	< 0.001	< 0.002
3-Sep-14	10	500	480	7.8	< 0.007	0.000050	0.00077	1.8	0.0093	< 0.01	0.0023	0.00010	0.010	1.8	0.000090	0.82	0.000019	0.57	0.036	1.2	0.000039	0.00010	0.00037	0.030	0.00016	< 0.001	< 0.002
10-Sep-14	11	500	515	7.9	0.011	0.000060	0.00067	1.7	0.0099	< 0.01	0.0018	< 0.0001	< 0.003	1.6	< 0.00004	0.77	< 0.000002	0.44	0.035	0.50	0.000038	0.00077	0.00031	0.026	0.00016	< 0.001	< 0.002
17-Sep-14	12	500	490	7.9	< 0.007	< 0.00001	0.00068	1.7	0.0086	< 0.01	0.0019	< 0.0001	< 0.003	1.5	0.000040	0.68	< 0.000002	0.42	0.032	0.90	0.000025	0.00014	0.000050	0.029	0.00013	< 0.001	< 0.002
24-Sep-14	13	500	480	7.9	0.0020	0.000020	0.00066	1.7	0.0061	< 0.01	0.0019	0.00010	< 0.009	1.4	< 0.00004	0.65	0.0000050	0.35	0.033	0.46	0.000025	0.000080	< 0.00005	0.032	0.00014	< 0.001	< 0.002
1-Oct-14	14	500	480	7.9	0.022	< 0.00001	0.00049	1.6	0.012	< 0.01	0.0016	< 0.0001	< 0.009	1.4	< 0.00004	0.69	< 0.000002	0.27	0.032	0.72	0.000010	0.00015	0.00019	0.027	0.00013	< 0.002	< 0.002
8-Oct-14	15	500	500	7.7	< 0.007	< 0.00001	0.00062	1.6	0.0086	< 0.01	0.0015	< 0.0001	< 0.003	1.4	< 0.00004	0.59	< 0.000002	0.25	0.032	0.90	0.000026	0.00048	< 0.00005	0.026	0.00014	< 0.001	< 0.002
15-Oct-14	16	500	490	7.9	0.0080	0.00031	0.00064	1.7	0.0072	< 0.01	0.0016	< 0.0001	< 0.003	1.4	< 0.00004	0.66	< 0.000002	0.28	0.034	0.70	0.000032	0.00040	0.00024	0.030	0.00017	0.0020	< 0.002
22-Oct-14	17	500	510	7.8	< 0.007	0.000020	0.00054	1.9	0.0092	< 0.01	0.0015	< 0.0001	< 0.003	1.4	< 0.00004	0.69	< 0.000002	0.23	0.035	0.60	0.000037	0.00034	0.000050	0.030	0.00011	< 0.001	< 0.002
29-Oct-14	18	500	490	7.9	< 0.007	0.00014	0.00051	1.5	0.0071	< 0.01	0.0013	< 0.0001	< 0.003	1.1	< 0.00004	0.55	< 0.000002	0.18	0.029	0.30	0.000030	0.00026	0.000080	0.026	0.00010	< 0.001	< 0.002
5-Nov-14	19	500	505	7.9	< 0.007	0.000020	0.00045	1.6	0.0069	< 0.01	0.0015	< 0.0001	< 0.003	1.1	< 0.00004	0.59	< 0.000002	0.20	0.030	0.40	0.000038	0.0010	0.00012	0.028	0.000090	< 0.001	< 0.002
12-Nov-14	20	500	505	7.4	< 0.007	< 0.00001	0.00044	1.6	0.0094	< 0.01	0.0016	< 0.0001	< 0.003	1.1	< 0.00004	0.59	< 0.000002	0.17	0.043	0.40	0.000029	0.00096	0.000080	0.028	0.00011	< 0.001	< 0.002
19-Nov-14	21	500	490	7.6	0.010	0.000030	0.00047	1.6	0.0091	< 0.01	0.0012	< 0.0001	< 0.003	1.1	< 0.00004	0.56	< 0.000002	0.17	0.031	0.30	0.000029	0.00055	0.00031	0.026	0.00011	0.0010	< 0.002
26-Nov-14	22	500	505	7.7	< 0.007	< 0.00001	0.00050	1.7	0.0089	< 0.01	0.0012	< 0.0001	0.010	1.1	< 0.00004	0.60	< 0.000002	0.15	0.031	0.40	0.000028	0.00029	0.00010	0.027	0.00010	< 0.001	< 0.002
3-Dec-14	23	500	500	7.8	< 0.007	< 0.00001	0.00048	1.7	0.0084	< 0.01	0.0011	< 0.0001	< 0.003	1.1	< 0.00004	0.51	< 0.000002	0.16	0.029	0.40	0.000026	0.00016	0.000060	0.028	0.00011	0.0010	< 0.002
10-Dec-14	24	500	485	7.8	< 0.007	< 0.00001	0.00037	1.4	0.0081	< 0.01	0.0010	< 0.0001	< 0.003	0.89	< 0.00004	0.57	< 0.000002	0.12	0.026	0.60	0.000023	0.00029	0.000050	0.024	0.000070	0.0010	< 0.002
17-Dec-14	25	500	500	7.8	< 0.007	< 0.00001	0.00043	1.5	0.0089	< 0.01	0.0011	< 0.0001	< 0.003	1.00	< 0.00004	0.50	< 0.000002	0.12	0.030	0.30	0.000026	0.00048	0.000090	0.023	0.00014	< 0.001	< 0.002
24-Dec-14	26	500	485	7.8	< 0.007	< 0.00001	0.00037	1.4	0.0077	< 0.01	0.00087	< 0.0001	< 0.003	0.90	< 0.00004	0.47	< 0.000002	0.11	0.028	0.30	0.000023	0.00021	0.000080	0.024	0.00013	< 0.001	< 0.002
31-Dec-14	27	500	505	7.6	< 0.007	< 0.00001	0.00041	1.6	0.0077	< 0.01	0.00092	< 0.0001	< 0.003	1.0	< 0.00004	0.59	< 0.000002	0.11	0.032	0.40	0.000022	0.00019	0.000060	0.029	0.000090	< 0.001	< 0.002
7-Jan-15	28	500	505	7.7	< 0.007	0.000010	0.00038	1.6	0.0079	< 0.01	0.00090	< 0.0001	< 0.003	0.97	< 0.00004	0.49	< 0.000002	0.10	0.031	0.20	0.000024	0.00021	< 0.00005	0.024	0.00010	< 0.001	< 0.002
14-Jan-15	29	500	495	7.7	< 0.007	0.00013	0.00031	1.4	0.0069	< 0.01	0.00094	< 0.0001	< 0.003	0.87	< 0.00004	0.46	0.0000040	0.090	0.026	0.10	0.000019	0.00018	< 0.00005	0.022	0.00010	0.0010	< 0.002
21-Jan-15	30	500	500	8.0	< 0.007	0.000060	0.00033	1.3	0.0066	< 0.01	0.00088	< 0.0001	< 0.003	0.85	< 0.00004	0.45	< 0.000002	0.090	0.026	< 0.1	0.000019	0.00012	0.000080	0.022	0.00010	< 0.001	< 0.002
28-Jan-15	31	500	490	7.6	< 0.007	< 0.00001	0.00030	1.6	0.0069	< 0.01	0.0017	< 0.0001	< 0.003	0.99	0.000080	0.55	0.0000020	0.10	0.024	0.80	0.000027	0.00019	0.000070	0.025	0.000090	< 0.001	< 0.002
4-Feb-15	32	500	485	7.7	< 0.007	0.000020	0.00035	1.4	0.0060	< 0.01	0.00088	< 0.0001	< 0.003	0.83	< 0.00004	0.43	< 0.000002	0.090	0.028	0.50	0.000019	0.00020	0.000070	0.021	0.000090	0.0010	< 0.002
11-Feb-15	33	500	500	7.6	< 0.007	< 0.00001	0.00031	1.4	0.0065	< 0.01	0.00099	< 0.0001	< 0.003	0.86	< 0.001	0.44	< 0.000002	0.080	0.026	0.20	0.000022	0.00026	0.000050	0.022	0.00014	< 0.001	< 0.002
18-Feb-15	34	500	485	7.7	< 0.007	< 0.00001	0.00037	1.4	0.0069	< 0.01	0.00075	< 0.0001	< 0.003	0.86	< 0.001	0.46	< 0.000002	0.080	0.028	0.20	0.000024	0.00023	0.000060	0.024	0.000090	< 0.001	< 0.002
25-Feb-15	35	500	475	7.9	< 0.007	0.00012	0.00029	1.4	0.0057	< 0.01	0.00080	< 0.0001	< 0.003	0.84	< 0.001	0.43	< 0.000002	0.080	0.026	0.10	0.000032	0.00021	< 0.00005	0.023	0.000070	0.0030	< 0.002
4-Mar-15	36	500	485	7.6	< 0.007	< 0.00001	0.00032	1.3	0.0054	< 0.01	0.00079	< 0.0001	< 0.003	0.79	< 0.001	0.49	< 0.000002	0.070	0.025	0.70	0.000019	0.00020	< 0.00005	0.023	0.000080	< 0.001	< 0.002
11-Mar-15	37	500	510	7.6	0.011	0.00013	0.00037	1.3	0.0060	< 0.01	0.00072	< 0.0001	< 0.003	0.72	< 0.001	0.37	< 0.000002	0.050	0.024	< 0.1	0.000012	0.00036	< 0.00005	0.020	0.00010	0.016	< 0.002
18-Mar-15	38	500	490	7.7	< 0.007	< 0.00001	0.00030	1.3	0.0067	< 0.01	0.00071	< 0.0001	< 0.003	0.80	< 0.001	0.43	< 0.000002	0.060	0.026	0.60	0.000015	0.00018	0.000070	0.021	0.000080	< 0.001	< 0.002
25-Mar-15	39	500	485	7.7	< 0.007	< 0.00001	0.00025	1.6	0.0063	< 0.01	0.00089	< 0.0001	< 0.003	0.86	< 0.001	0.46	< 0.000002	0.15	0.029	0.60	0.000010	0.00042	0.00020	0.024	0.00018	0.0010	< 0.002
1-Apr-15	40	500	495	7.8	< 0.007	0.000020	0.00022	1.2	0.014	< 0.01	0.00060	< 0.0001	< 0.003	0.77	< 0.001	0.28	< 0.000002	0.72	0.025	0.10	0.000015	0.00023	< 0.00005	0.028	0.000060	< 0.001	< 0.002
8-Apr-15	41	500	475	7.6	< 0.007	< 0.00001	0.00027	1.3	0.0066	< 0.01	0.00071	< 0.0001	< 0.003	0.75	< 0.001	0.49	< 0.000002	0.070	0.026	< 0.1	0.000011	0.00031	< 0.00005	0.022	0.00010	< 0.001	< 0.002
15-Apr-15	42	500	480	7.8	< 0.007	< 0.00001	0.00026	1.4	0.0059	< 0.01	0.00069	< 0.0001	< 0.003	0.78	< 0.001	0.40	0.0000020	0.070	0.026	0.30	0.0000060	0.00064	0.00013	0.022	0.000090	< 0.001	< 0.002
22-Apr-15	43	500	495	7.7	< 0.007	0.000040	0.00027	1.4	0.0057	< 0.01	0.00056	< 0.0001	< 0.003	0.76	< 0.001	0.43	0.0000040	0.050	0.025	0.40	0.000025	0.00054	< 0.00005	0.021	0.00010	< 0.001	< 0.002
29-Apr-15	44	500	500	7.6	< 0.007	0.000020	0.00027	1.3	0.0068	< 0.01	0.00061	< 0.0001	< 0.003	0.77	< 0.001	0.38	< 0.000002	0.040	0.024	0.60	0.000017	0.00027	0.000080	0.019	0.000070	< 0.001	< 0.002
6-May-15	45	500	510	7.7	< 0.007	0.000020	0.00026	1.3	0.0066	< 0.01	0.00060	< 0.0001	< 0.003	0.78	< 0.001	0.44	< 0.000002	0.060	0.025	0.30	0.000016	0.00028	0.00010	0.021	0.00012	0.0020	< 0.002
13-May-15	46	500	505	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-May-15	47	505	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-May-15	48	490	510	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	49	510	500	7.9	< 0.007	0.000030	0.00056	3.9	0.016	< 0.01	0.0014	< 0.0001	< 0.003	1.8	< 0.00004	1.1	< 0.000002	0.14	0.073	0.80	0.000033	0.0015	< 0.00005	0.059	0.00014	0.0020	< 0.002
10-Jun-15	50	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-15	51	490	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Jun-15	52	500	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	53	480	495	7.9	< 0.007	< 0.00001	0.00059	3.9	0.016	< 0.01	0.0015	< 0.0001	< 0.003	1.7	0.000050	1.2	< 0.000002	0.16	0.076	0.80	0.000041	0.00076	< 0.00005	0.062	0.00010	0.0010	< 0.002
8-Jul-15	54	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-Jul-15	55	490	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jul-15	56	490	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	57	490	485	8.0																							
5-Aug-15	58	500	510	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	59	510	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Aug-15	60	495	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	61	485	490	8.0	< 0.007	0.00013	0.00056	3.8	0.014	< 0.01	0.0017	< 0.0001	< 0.003	1.7	< 0.00004	1.1	< 0.000002	0.11	0.074	1.0	0.000042	0.00051	< 0.00005	0.059	0.00012	0.0020	< 0.002
2-Sep-15	62	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	63	490	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Sep-15	64	485	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	65	460	460	7.9	< 0.007	< 0.00001	0.00051	3.7	0.013	< 0.01	0.0017	< 0.0001	< 0.003	1.7	< 0.00004	1.2	< 0.000002	0.14	0.069	0.80	0.000032	0.0010	< 0.00005	0.051	0.000080	< 0.001	< 0.002
30-Sep-15	66	500	505	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	67	505	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14-Oct-15	68	495	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	69	490	470	8.0	< 0.007	0.000020	0.00052	3.8	0.011	< 0.01	0.0010	< 0.0001	< 0.003	1.8	0.00010	1.1	0.000028	0.21	0.066	0.80	0.000034	0.00075	0.000070	0.050	0.000090	< 0.001	< 0.002
28-Oct-15	70	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	71	490	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Nov-15	72	490	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	73	485	485	8.0	0.018	< 0.00001	0.00045	3.5	0.012	< 0.01	0.0020	< 0.0001	< 0.003	1.6	0.00014	0.95	0.0000030	0.15	0.060	0.60	0.000033	0.00072	0.000070	0.042	0.000090	0.0010	< 0.002
25-Nov-15	74	500	500	7.7	< 0.007	0.000020	0.00025	1.3	0.0071	< 0.01	0.00079	< 0.0001	< 0.003	0.91	0.00032	0.41	0.0081	0.070	0.025	0.40	0.000023	0.00024	0.00010	0.017	0.000080	< 0.001	< 0.002
2-Dec-15	75	500	500	7.5	< 0.007	0.000030	0.00025	1.4	0.0061	< 0.01	0.00042	< 0.0001	< 0.003	0.85	0.000040	0.44	< 0.000002	0.050	0.024	0.50	< 0.000005	0.00023	< 0.00005	0.018	0.000070	< 0.001	< 0.002
9-Dec-15	76	500	505	7.7	< 0.007	< 0.00001	0.00024	1.3	0.0067	< 0.01	0.00059	< 0.0001	0.0030	0.80	0.000060	0.38	0.0000070	0.050	0.024	0.30	0.000037	0.00026	0.000060	0.018	0.000090	< 0.001	< 0.002
16-Dec-15	77	500	500	7.7	< 0.007	0.00017	0.00027	1.4	0.0073	< 0.01	0.00052	< 0.0001	< 0.003	0.90	< 0.00004	0.45	< 0.000002	0.050	0.026	0.20	0.000024	0.00026	< 0.00005	0.019	0.00011	0.0060	< 0.002
23-Dec-15	78	500	505	8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	79	500	505	7.5	< 0.007	< 0.00001	0.00022	1.3	0.0055	< 0.01	0.00036	< 0.0001	< 0.003	0.74	< 0.00004	0.34	< 0.000002	0.10	0.022	0.70	0.0000060	0.00011	< 0.00005	0.016	0.000070	< 0.001	< 0.002
6-Jan-16	80	500	505	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	81	500	505	7.4	< 0.007	< 0.00001	0.00020	1.2	0.0059	< 0.01	0.00054	< 0.0001	< 0.003	0.75	0.00013	0.36	0.0000020	0.040	0.021	< 0.1	< 0.000005	0.00020	< 0.00005	0.015	0.000040	< 0.001	< 0.002
20-Jan-16	82	500	500	7.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	83	500	505	7.6	< 0.007	< 0.00001	0.00019	1.2	0.0062	< 0.01	0.00040	< 0.0001	< 0.003	0.72	< 0.00004	0.38	< 0.000002	0.040	0.024	< 0.1	0.000019	0.00018	< 0.00005	0.017	0.000070	< 0.001	< 0.002
3-Feb-16	84	500	505	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	85	500	500	7.5	< 0.007	< 0.00001	0.00020	1.4	0.0070	< 0.01	0.00043	< 0.0001	< 0.003	0.76	0.000060	0.37	0.000051	0.070	0.025	0.80	0.000022	0.00021	0.000090	0.016	0.000070	< 0.001	< 0.002
17-Feb-16	86	500	505	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	87	500	500	7.5	< 0.007	< 0.00001	0.00019	1.2	0.0059	0.010	0.00037	< 0.0001	< 0.003	0.66	< 0.00004	0.13	0.0000020	0.020	0.021	0.50	0.000012	0.00014	< 0.00005	0.013	0.000050	< 0.001	< 0.002

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Calculated Loading Rates for HC3 (GT)

Date	**Cycle**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**	**Cu**
	No.	Input	Output		umhos/cm	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
25-Jun-14	0	500	400	8.1	121	#N/A	1.9	14	2.0	0.52	0.096	0.12	10	0.026	0.0013	0.026	0.017	0.0000032	0.0000028	0.0044	0.0000024	2.6	0.000032	0.000067	0.00084
2-Jul-14	1	500	480	7.9	107	#N/A	2.7	19	6.2	0.34	0.062	0.14	14	0.021	0.0012	0.021	0.022	0.0000034	0.0000034	0.0039	0.0000014	3.6	0.000024	0.000076	0.00055
9-Jul-14	2	500	495	7.9	91	#N/A	0.82	17	4.0	0.15	0.054	0.15	13	0.017	0.0012	0.017	0.022	0.0000035	0.0000035	0.0037	0.0000015	3.4	0.000015	0.000027	0.00033
16-Jul-14	3	500	485	7.9	80	#N/A	0.96	16	2.4	0.097	0.049	0.15	13	0.023	0.0012	0.015	0.027	0.0000034	0.0000034	0.0033	0.0000015	3.3	0.000087	0.00014	0.00037
23-Jul-14	4	500	500	7.9	67	#N/A	1.0	16	2.0	0.10	0.040	0.15	13	0.027	0.00095	0.014	0.034	0.0000035	0.0000035	0.0032	0.0000015	3.5	0.000040	0.000071	0.00059
30-Jul-14	5	500	490	7.8	60	#N/A	1.2	15	2.0	0.098	0.029	0.15	11	0.025	0.00093	0.011	0.025	0.0000034	0.0000034	0.0023	0.0000015	2.8	0.000049	0.000049	0.00064
6-Aug-14	6	500	490	7.8	60	#N/A	1.0	14	1.5	0.098	0.034	0.15	12	0.015	0.00088	0.0099	0.023	0.0000034	0.0000034	0.0025	0.0000015	3.0	0.000015	0.000019	0.00014
13-Aug-14	7	500	480	7.8	55	#N/A	1.2	14	2.4	0.096	0.034	0.14	11	0.029	0.00072	0.0085	0.025	0.0000034	0.0000034	0.0025	0.0000014	2.8	0.000034	0.000023	0.00015
20-Aug-14	8	500	500	7.8	52	#N/A	0.91	14	2.0	0.10	0.030	0.15	12	0.013	0.00060	0.0081	0.025	0.0000035	0.0000035	0.0028	0.0000015	3.1	0.000020	0.000032	0.00017
27-Aug-14	9	500	505	7.9	59	#N/A	2.2	16	1.0	0.10	0.030	0.15	13	0.012	0.00066	0.0072	0.033	0.0000035	0.0000035	0.0054	0.0000015	3.5	0.000015	0.000015	0.00015
3-Sep-14	10	500	480	7.8	50	#N/A	2.0	13	2.4	0.096	0.029	0.14	11	0.013	0.00067	0.0070	0.024	0.0000034	0.0000034	0.0020	0.0000014	3.0	0.000014	0.000015	0.00033
10-Sep-14	11	500	515	7.9	54	#N/A	1.6	14	1.5	0.10	0.031	0.15	11	0.023	0.00057	0.0068	0.033	0.0000036	0.0000036	0.0030	0.0000015	3.1	0.000015	0.000018	0.00021
17-Sep-14	12	500	490	7.9	49	#N/A	3.2	13	2.0	0.098	0.029	0.15	9.6	0.012	0.00054	0.0055	0.021	0.0000034	0.0000034	0.0023	0.0000044	2.5	0.000015	0.000017	0.000069
24-Sep-14	13	500	480	7.9	48	#N/A	1.8	13	1.4	0.096	0.029	0.14	9.6	0.016	0.00058	0.0059	0.020	0.0000034	0.0000034	0.0015	0.0000014	2.5	0.000014	0.000048	0.000072
1-Oct-14	14	500	480	7.9	42	#N/A	2.9	13	0.96	0.096	0.029	0.14	9.1	0.015	0.00058	0.0047	0.018	0.0000034	0.0000034	0.0014	0.000024	2.4	0.000014	0.000048	0.0000096
8-Oct-14	15	500	500	7.7	47	#N/A	1.6	12	1.0	0.10	0.030	0.15	10	0.011	0.00050	0.0048	0.024	0.0000035	0.0000035	0.0066	0.0000015	2.7	0.000015	0.000015	0.000065
15-Oct-14	16	500	490	7.9	52	#N/A	2.3	13	1.5	0.098	0.029	0.15	11	0.025	0.00049	0.0065	0.028	0.0000034	0.0000034	0.0024	0.0000059	3.0	0.000015	0.000012	0.00011
22-Oct-14	17	500	510	7.8	52	#N/A	2.1	14	1.0	0.10	0.031	0.15	12	0.012	0.00051	0.0049	0.030	0.0000036	0.0000036	0.0030	0.0000051	3.2	0.000015	0.000014	0.000041
29-Oct-14	18	500	490	7.9	42	#N/A	3.4	13	0.98	0.098	0.029	0.15	9.2	0.012	0.00049	0.0044	0.022	0.0000034	0.0000034	0.0030	0.0000015	2.5	0.000015	0.0000098	0.00012
5-Nov-14	19	500	505	7.9	45	#N/A	#N/A	16	1.0	0.10	0.030	0.15	9.9	0.0097	0.00045	0.0041	0.025	0.0000035	0.0000035	0.0019	0.0000061	2.7	0.000015	0.000014	0.00028
12-Nov-14	20	500	505	7.4	48	#N/A	3.4	17	1.0	0.10	0.030	0.15	11	0.012	0.00045	0.0044	0.028	0.0000035	0.0000035	0.0023	0.0000015	3.1	0.000015	0.000016	0.00013
19-Nov-14	21	500	490	7.6	57	#N/A	3.2	16	0.98	0.098	0.029	0.15	9.6	0.016	0.00044	0.0038	0.026	0.0000034	0.0000034	0.0015	0.0000020	2.5	0.000015	0.000020	0.00015
26-Nov-14	22	500	505	7.7	43	#N/A	0.99	12	1.0	0.10	0.030	0.15	9.8	0.011	0.00045	0.0041	0.025	0.0000035	0.0000035	0.0013	0.0000015	2.6	0.000015	0.000015	0.000061
3-Dec-14	23	500	500	7.8	71	#N/A	1.5	17	1.0	0.10	0.030	0.15	10	0.0083	0.00045	0.0041	0.026	0.0000035	0.0000035	0.0017	0.0000015	2.7	0.000015	0.000016	0.000075
10-Dec-14	24	500	485	7.8	37	#N/A	2.2	11	0.97	0.097	0.029	0.15	10	0.0084	0.00034	0.0032	0.022	0.0000034	0.0000034	0.0012	0.0000015	3.0	0.000015	0.000013	0.00010
17-Dec-14	25	500	500	7.8	41	#N/A	1.9	12	1.0	0.10	0.030	0.15	9.5	0.017	0.00040	0.0040	0.029	0.0000035	0.0000035	0.0013	0.0000015	2.6	0.000015	0.0000080	0.000080
24-Dec-14	26	500	485	7.8	39	#N/A	1.5	11	0.97	0.097	0.029	0.15	8.9	0.015	0.00039	0.0031	0.025	0.0000034	0.0000034	0.00082	0.0000015	2.4	0.000015	0.000010	0.000082
31-Dec-14	27	500	505	7.6	44	#N/A	0.77	14	1.0	0.10	0.030	0.15	10	0.0095	0.00045	0.0034	0.028	0.0000035	0.0000035	0.00091	0.0000015	2.8	0.000015	0.0000091	0.000076
7-Jan-15	28	500	505	7.7	40	#N/A	1.3	12	1.0	0.51	0.030	0.15	10	0.0079	0.00045	0.0029	0.025	0.0000035	0.0000035	0.0011	0.0000015	2.8	0.000015	0.000016	0.00018
14-Jan-15	29	500	495	7.7	36	#N/A	1.1	11	0.99	0.50	0.030	0.15	8.6	0.0090	0.00040	0.0031	0.021	0.0000035	0.0000035	0.0012	0.0000015	2.3	0.000015	0.0000099	0.00057
21-Jan-15	30	500	500	8.0	37	#N/A	2.1	13	1.0	0.50	0.030	0.15	8.8	0.0099	0.00040	0.0026	0.022	0.0000035	0.0000035	0.00090	0.0000020	2.4	0.000015	0.000012	0.00016
28-Jan-15	31	500	490	7.6	38	#N/A	0.77	10	0.98	0.49	0.029	0.15	9.3	0.0099	0.00049	0.0029	0.023	0.0000034	0.0000034	0.0013	0.0000015	2.4	0.000015	0.0000093	0.00011
4-Feb-15	32	500	485	7.7	35	#N/A	1.1	9.8	0.97	0.49	0.029	0.15	7.6	0.0085	0.00039	0.0026	0.019	0.0000034	0.0000034	0.0012	0.0000015	1.9	0.000015	0.0000073	0.00036
11-Feb-15	33	500	500	7.6	36	#N/A	0.94	10	1.0	0.50	0.030	0.15	8.9	0.0098	0.00045	0.0026	0.020	0.0000035	0.0000035	0.0013	0.0000015	2.4	0.000015	0.000012	0.000080
18-Feb-15	34	500	485	7.7	35	#N/A	1.1	10	0.97	0.49	0.029	0.15	8.4	0.0092	0.00044	0.0025	0.020	0.0000034	0.0000034	0.0013	0.0000015	2.3	0.000015	0.000012	0.00015
25-Feb-15	35	500	475	7.9	37	#N/A	1.5	11	0.95	0.48	0.029	0.14	7.6	0.0063	0.00043	0.0022	0.019	0.0000033	0.0000033	0.00052	0.0000043	2.0	0.000014	0.000011	0.00026
4-Mar-15	36	500	485	7.6	36	#N/A	1.1	11	0.97	0.49	0.029	0.15	7.8	0.0075	0.00034	0.0022	0.019	0.0000034	0.0000034	0.00063	0.0000015	2.1	0.000024	0.0000068	0.00016
11-Mar-15	37	500	510	7.6	35	#N/A	0.96	11	1.0	0.51	0.031	0.15	8.2	0.0068	0.00041	0.0021	0.021	0.0000036	0.0000036	0.0011	0.000018	2.2	0.000031	0.000018	0.00079
18-Mar-15	38	500	490	7.7	37	#N/A	1.2	11	0.98	0.49	0.029	0.15	8.4	0.0095	0.00039	0.0020	0.019	0.0000034	0.0000034	0.00064	0.0000015	2.3	0.000015	0.000012	0.000083
25-Mar-15	39	500	485	7.7	37	#N/A	1.3	11	0.97	0.49	0.029	0.15	9.0	0.0068	0.00044	0.0024	0.021	0.0000034	0.0000034	0.0012	0.0000015	2.3	0.000039	0.0000063	0.00065
1-Apr-15	40	500	495	7.8	35	#N/A	1.7	12	0.99	0.50	0.030	0.15	6.8	0.0081	0.00040	0.0018	0.022	0.0000064	0.0000035	0.00099	0.0000030	1.7	0.000015	0.0000030	0.00016
8-Apr-15	41	500	475	7.6	38	#N/A	1.3	11	0.95	0.48	0.029	0.14	7.9	0.0087	0.00052	0.0021	0.020	0.0000033	0.0000033	0.00071	0.0000014	2.2	0.000014	0.000015	0.00020
15-Apr-15	42	500	480	7.8	37	#N/A	1.9	12	0.96	0.48	0.029	0.14	8.1	0.0078	0.00038	0.0020	0.019	0.0000034	0.0000034	0.0020	0.0000014	2.1	0.000014	0.0000019	0.00048
22-Apr-15	43	500	495	7.7	37	#N/A	1.6	12	1.5	0.50	0.030	0.15	8.3	0.0080	0.00035	0.0019	0.020	0.0000035	0.0000035	0.0017	0.0000015	2.2	0.000015	0.0000074	0.00025
29-Apr-15	44	500	500	7.6	34	#N/A	1.0	10	1.0	0.50	0.030	0.15	8.2	0.0097	0.00040	0.0018	0.021	0.0000035	0.0000035	0.0012	0.0000015	2.2	0.000015	0.000011	0.00014
6-May-15	45	500	510	7.7	38	#N/A	1.2	12	1.0	0.51	0.031	0.15	8.4	0.0096	0.00046	0.0030	0.021	0.0000036	0.0000036	0.00087	0.0000015	2.3	0.000015	0.0000087	0.00033
13-May-15	46	500	505																						
20-May-15	47	505	490																						
27-May-15	48	490	510																						
3-Jun-15	49	510	500	7.9	106	#N/A	1.6	6.8	0.25	0.13	0.0075	0.038	6.5	0.0014	0.00019	0.00061	0.015	0.00000088	0.00000088	0.00061	0.00000038	1.8	0.0000038	0.0000053	0.00028
10-Jun-15	50	500	490																						
17-Jun-15	51	490	500																						
24-Jun-15	52	500	480																						
1-Jul-15	53	480	495	7.9	116	#N/A	1.8	7.0	0.25	0.12	0.0074	0.037	6.2	0.0019	0.00022	0.00078	0.015	0.00000087	0.00000087	0.00058	0.00000037	1.7	0.0000037	0.0000051	0.000062
8-Jul-15	54	500	490																						
15-Jul-15	55	490	490																						
22-Jul-15	56	490	490																						
29-Jul-15	57	490	485	8.0	108	#N/A	1.1	6.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5-Aug-15	58	500	510																						
12-Aug-15	59	510	495																						
19-Aug-15	60	495	485																						
26-Aug-15	61	485	490	8.0	106	#N/A	0.83	6.7	0.25	0.12	0.0074	0.037	6.1	0.0018	0.00018	0.00060	0.016	0.00000086	0.00000086	0.00060	0.0000012	1.7	0.0000074	0.0000055	0.000082
2-Sep-15	62	500	490																						
9-Sep-15	63	490	485																						
16-Sep-15	64	485	460																						
23-Sep-15	65	460	460	7.9	109	#N/A	0.92	6.0	0.23				5.9	0.0012	0.00018	0.00058	0.015	0.00000081	0.00000081	0.00059	0.00000035	1.7	0.0000035	0.0000046	0.000043
30-Sep-15	66	500	505																						
7-Oct-15	67	505	495																						
14-Oct-15	68	495	490																						
21-Oct-15	69	490	470	8.0	99	#N/A	0.63	6.1	0.24				5.8	0.0014	0.00016	0.00051	0.014	0.00000082	0.00000082	0.00048	0.00000035	1.6	0.0000035	0.0000042	0.000039
28-Oct-15	70	500	490																						
4-Nov-15	71	490	490																						
11-Nov-15	72	490	485																						
18-Nov-15	73	485	485	8.0	98	#N/A	0.60	6.7	0.24				5.3	0.0015	0.00017	0.00050	0.011	0.00000085	0.00000085	0.00027	0.00000036	1.4	0.0000061	0.0000063	0.000047
25-Nov-15	74	500	500	7.7	37	#N/A	0.34	12	1.0				8.8	0.011	0.00035	0.0021	0.023	0.0000035	0.0000035	0.0011	0.0000015	2.4	0.000015	0.000024	0.00019
2-Dec-15	75	500	500	7.5	36	#N/A	1.2	10	1.0				8.9	0.0085	0.00035	0.0018	0.023	0.0000035	0.0000035	0.00095	0.0000015	2.4	0.000015	0.0000090	0.00011
9-Dec-15	76	500	505	7.7	36	#N/A	1.5	11	1.0				8.6	0.011	0.00035	0.0018	0.024	0.0000076	0.0000045	0.0020	0.0000035	2.4	0.000015	0.000012	0.00016
16-Dec-15	77	500	500	7.7	35	#N/A	1.3	8.6	1.0				9.5	0.012	0.00030	0.0021	0.025	0.0000035	0.0000035	0.0012	0.000013	2.6	0.000025	0.0000085	0.00023
23-Dec-15	78	500	505	8.1	34	#N/A	1.1	8.5	1.0				8.9	0.0096	0.00028	0.0018	0.024	0.0000035	0.0000035	0.0010	0.0000073	2.5	0.000020	0.0000063	0.00017
30-Dec-15	79	500	505	7.5	33	#N/A	0.83	8.5	1.0				8.4	0.0072	0.00025	0.0016	0.022	0.0000035	0.0000035	0.00086	0.0000015	2.3	0.000015	0.0000040	0.00012
6-Jan-16	80	500	505	7.4	36	#N/A	0.86	8.6	1.0				8.2	0.0071	0.00028	0.0015	0.022	0.0000035	0.0000035	0.00093	0.0000015	2.3	0.000015	0.0000030	0.00015
13-Jan-16	81	500	505	7.4	34	#N/A	0.89	8.7	1.0				8.0	0.0071	0.00030	0.0015	0.021	0.0000035	0.0000035	0.0010	0.0000015	2.2	0.000015	0.0000020	0.00018
20-Jan-16	82	500	500	7.6	37	#N/A	1.2	9.0	1.0				8.2	0.0071	0.00028	0.0015	0.022	0.0000035	0.0000035	0.0010	0.0000015	2.3	0.000015	0.0000051	0.00015
27-Jan-16	83	500	505	7.6	34	#N/A	1.6	9.2	1.0				8.3	0.0072	0.00025	0.0016	0.023	0.0000035	0.0000035	0.0010	0.0000015	2.3	0.000015	0.0000081	0.00012
3-Feb-16	84	500	505	7.7	38	#N/A	1.4	9.6	1.0				8.5	0.0074	0.00028	0.0016	0.024	0.0000035	0.0000035	0.0010	0.0000015	2.3	0.000015	0.0000088	0.00013
10-Feb-16	85	500	500	7.5	38	#N/A	1.2	10	1.0				8.7	0.0076	0.00030	0.0016	0.025	0.0000035	0.0000035	0.0010	0.0000015	2.3	0.000015	0.0000095	0.00014
17-Feb-16	86	500	505	7.7	39	#N/A	1.2	9.3	1.0				8.2	0.0073	0.00028	0.0015	0.024	0.0000035	0.0000035	0.0010	0.0000015	2.3	0.000015	0.0000070	0.000098
24-Feb-16	87	500	500	7.5	32	#N/A	1.2	8.5	1.0				7.8	0.0070	0.00025	0.0014	0.022	0.0000035	0.0000035	0.0010	0.0000015	2.2	0.000015	0.0000045	0.000060

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Calculated Loading Rates for HC3 (GT)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
25-Jun-14	0	500	400	8.1	0.0048	0.000012	0.00083	0.87	0.0025	0.012	0.0053	0.00040	0.011	2.0	0.00017	0.57	0.00000080	4.4	0.016	3.3	0.000034	0.000040	0.00013	0.0038	0.00014	0.00080	0.00080
2-Jul-14	1	500	480	7.9	0.0029	0.0000048	0.00089	1.2	0.0049	0.0096	0.0034	0.00048	0.0058	1.8	0.00011	0.52	0.00000096	3.8	0.022	2.8	0.000028	0.0018	0.000091	0.014	0.00012	0.00048	0.00096
9-Jul-14	2	500	495	7.9	0.00099	0.0000050	0.00079	1.1	0.0043	0.0050	0.0029	0.00030	0.0079	1.6	0.000045	0.51	0.00000099	2.6	0.020	1.8	0.000025	0.00045	0.000025	0.016	0.000094	0.00050	0.00099
16-Jul-14	3	500	485	7.9	0.0078	0.0000049	0.00068	1.1	0.0036	0.0049	0.0027	0.00024	0.0044	1.4	0.000029	0.48	0.00000097	1.8	0.020	1.1	0.000024	0.000068	0.00013	0.015	0.00010	0.00049	0.00097
23-Jul-14	4	500	500	7.9	0.012	0.000025	0.00062	1.0	0.0048	0.0050	0.0018	0.00015	0.0045	1.2	0.000020	0.48	0.0000010	1.2	0.021	0.76	0.000022	0.0010	0.00016	0.014	0.000090	0.00050	0.0010
30-Jul-14	5	500	490	7.8	0.0074	0.0000098	0.00056	0.95	0.0045	0.0049	0.0018	0.000098	0.0044	1.0	0.000020	0.41	0.00000098	0.86	0.018	0.56	0.000020	0.000054	0.00024	0.014	0.00011	0.00049	0.00098
6-Aug-14	6	500	490	7.8	0.00098	0.0000049	0.00051	1.0	0.0038	0.0049	0.0016	0.000098	0.0044	1.1	0.000020	0.43	0.00000098	0.72	0.019	0.49	0.000019	0.000083	0.000029	0.015	0.00012	0.00049	0.00098
13-Aug-14	7	500	480	7.8	0.0048	0.0000096	0.00048	0.93	0.0040	0.0048	0.0015	0.000096	0.0072	0.92	0.000019	0.41	0.00000096	0.52	0.017	0.37	0.000018	0.00041	0.00023	0.014	0.000038	0.00048	0.00096
20-Aug-14	8	500	500	7.8	0.0010	0.0000050	0.00044	1.0	0.0046	0.0050	0.0013	0.000050	0.0045	0.96	0.000020	0.40	0.0000010	0.44	0.020	0.35	0.000015	0.00062	0.000025	0.016	0.000075	0.00050	0.0010
27-Aug-14	9	500	505	7.9	0.0010	0.0000051	0.00038	0.93	0.0057	0.0051	0.0013	0.000051	0.0045	0.83	0.000020	0.37	0.0000010	0.30	0.020	0.32	0.000019	0.00048	0.000056	0.015	0.000071	0.00051	0.0010
3-Sep-14	10	500	480	7.8	0.0034	0.000024	0.00037	0.87	0.0045	0.0048	0.0011	0.000048	0.0048	0.85	0.000043	0.39	0.0000091	0.27	0.017	0.58	0.000019	0.000048	0.00018	0.014	0.000077	0.00048	0.00096
10-Sep-14	11	500	515	7.9	0.0057	0.000031	0.00035	0.88	0.0051	0.0052	0.00093	0.000052	0.0015	0.80	0.000021	0.40	0.0000010	0.23	0.018	0.26	0.000020	0.00040	0.00016	0.013	0.000082	0.00052	0.0010
17-Sep-14	12	500	490	7.9	0.0034	0.0000049	0.00033	0.81	0.0042	0.0049	0.00092	0.000049	0.0015	0.73	0.000020	0.33	0.00000098	0.21	0.016	0.44	0.000012	0.000069	0.000025	0.014	0.000064	0.00049	0.00098
24-Sep-14	13	500	480	7.9	0.00096	0.0000096	0.00032	0.81	0.0029	0.0048	0.00091	0.000048	0.0043	0.69	0.000019	0.31	0.0000024	0.17	0.016	0.22	0.000012	0.000038	0.000024	0.015	0.000067	0.00048	0.00096
1-Oct-14	14	500	480	7.9	0.011	0.0000048	0.00024	0.78	0.0057	0.0048	0.00077	0.000048	0.0043	0.65	0.000019	0.33	0.00000096	0.13	0.015	0.35	0.0000048	0.000072	0.000091	0.013	0.000062	0.00096	0.00096
8-Oct-14	15	500	500	7.7	0.0035	0.0000050	0.00031	0.81	0.0043	0.0050	0.00075	0.000050	0.0015	0.68	0.000020	0.30	0.0000010	0.13	0.016	0.45	0.000013	0.00024	0.000025	0.013	0.000070	0.00050	0.0010
15-Oct-14	16	500	490	7.9	0.0039	0.00015	0.00031	0.83	0.0035	0.0049	0.00077	0.000049	0.0015	0.66	0.000020	0.32	0.00000098	0.14	0.017	0.34	0.000016	0.00020	0.00012	0.015	0.000083	0.00098	0.00098
22-Oct-14	17	500	510	7.8	0.0036	0.000010	0.00028	0.95	0.0047	0.0051	0.00077	0.000051	0.0015	0.69	0.000020	0.35	0.0000010	0.12	0.018	0.31	0.000019	0.00017	0.000026	0.016	0.000056	0.00051	0.0010
29-Oct-14	18	500	490	7.9	0.0034	0.000069	0.00025	0.73	0.0035	0.0049	0.00063	0.000049	0.0015	0.55	0.000020	0.27	0.00000098	0.088	0.014	0.15	0.000015	0.00013	0.000039	0.013	0.000049	0.00049	0.00098
5-Nov-14	19	500	505	7.9	0.0035	0.000010	0.00023	0.80	0.0035	0.0051	0.00074	0.000051	0.0015	0.56	0.000020	0.30	0.0000010	0.10	0.015	0.20	0.000019	0.00052	0.000061	0.014	0.000045	0.00051	0.0010
12-Nov-14	20	500	505	7.4	0.0035	0.0000051	0.00022	0.83	0.0048	0.0051	0.00080	0.000051	0.0015	0.57	0.000020	0.30	0.0000010	0.086	0.022	0.20	0.000015	0.00048	0.000040	0.014	0.000056	0.00051	0.0010
19-Nov-14	21	500	490	7.6	0.0049	0.000015	0.00023	0.80	0.0044	0.0049	0.00059	0.000049	0.0015	0.54	0.000020	0.27	0.00000098	0.083	0.015	0.15	0.000014	0.00027	0.00015	0.013	0.000054	0.00049	0.00098
26-Nov-14	22	500	505	7.7	0.0035	0.0000051	0.00025	0.83	0.0045	0.0051	0.00058	0.000051	0.0051	0.55	0.000020	0.30	0.0000010	0.076	0.016	0.20	0.000014	0.00015	0.000051	0.013	0.000051	0.00051	0.0010
3-Dec-14	23	500	500	7.8	0.0035	0.0000050	0.00024	0.86	0.0042	0.0050	0.00057	0.000050	0.0015	0.53	0.000020	0.26	0.0000010	0.080	0.015	0.20	0.000013	0.000080	0.000030	0.014	0.000055	0.00050	0.0010
10-Dec-14	24	500	485	7.8	0.0034	0.0000049	0.00018	0.67	0.0039	0.0049	0.00049	0.000049	0.0015	0.43	0.000019	0.28	0.00000097	0.058	0.013	0.29	0.000011	0.00014	0.000024	0.011	0.000034	0.00049	0.00097
17-Dec-14	25	500	500	7.8	0.0035	0.0000050	0.00022	0.75	0.0044	0.0050	0.00053	0.000050	0.0015	0.50	0.000020	0.25	0.0000010	0.060	0.015	0.15	0.000013	0.00024	0.000045	0.012	0.000070	0.00050	0.0010
24-Dec-14	26	500	485	7.8	0.0034	0.0000049	0.00018	0.70	0.0037	0.0049	0.00042	0.000049	0.0015	0.44	0.000019	0.23	0.00000097	0.053	0.013	0.15	0.000011	0.00010	0.000039	0.011	0.000063	0.00049	0.00097
31-Dec-14	27	500	505	7.6	0.0035	0.0000051	0.00021	0.80	0.0039	0.0051	0.00046	0.000051	0.0015	0.52	0.000020	0.30	0.0000010	0.056	0.016	0.20	0.000011	0.000096	0.000030	0.014	0.000045	0.00051	0.0010
7-Jan-15	28	500	505	7.7	0.0035	0.0000051	0.00019	0.81	0.0040	0.0051	0.00045	0.000051	0.0015	0.49	0.000020	0.25	0.0000010	0.051	0.016	0.10	0.000012	0.00011	0.000025	0.012	0.000051	0.00051	0.0010
14-Jan-15	29	500	495	7.7	0.0035	0.000064	0.00015	0.69	0.0034	0.0050	0.00047	0.000050	0.0015	0.43	0.000020	0.23	0.0000020	0.045	0.013	0.050	0.0000094	0.000089	0.000025	0.011	0.000050	0.00050	0.00099
21-Jan-15	30	500	500	8.0	0.0035	0.000030	0.00016	0.67	0.0033	0.0050	0.00044	0.000050	0.0015	0.43	0.000020	0.23	0.0000010	0.045	0.013	0.050	0.0000095	0.000060	0.000040	0.011	0.000050	0.00050	0.0010
28-Jan-15	31	500	490	7.6	0.0034	0.0000049	0.00015	0.78	0.0034	0.0049	0.00084	0.000049	0.0015	0.48	0.000039	0.27	0.00000098	0.049	0.012	0.39	0.000013	0.000093	0.000034	0.012	0.000044	0.00049	0.00098
4-Feb-15	32	500	485	7.7	0.0034	0.0000097	0.00017	0.66	0.0029	0.0049	0.00043	0.000049	0.0015	0.40	0.000019	0.21	0.00000097	0.044	0.013	0.24	0.0000092	0.000097	0.000034	0.010	0.000044	0.00049	0.00097
11-Feb-15	33	500	500	7.6	0.0035	0.0000050	0.00016	0.69	0.0032	0.0050	0.00050	0.000050	0.0015	0.43	0.00050	0.22	0.0000010	0.040	0.013	0.10	0.000011	0.00013	0.000025	0.011	0.000070	0.00050	0.0010
18-Feb-15	34	500	485	7.7	0.0034	0.0000049	0.00018	0.67	0.0033	0.0049	0.00036	0.000049	0.0015	0.42	0.00049	0.22	0.00000097	0.039	0.014	0.097	0.000012	0.00011	0.000029	0.012	0.000044	0.00049	0.00097
25-Feb-15	35	500	475	7.9	0.0033	0.000057	0.00014	0.64	0.0027	0.0048	0.00038	0.000048	0.0014	0.40	0.00048	0.20	0.00000095	0.038	0.012	0.048	0.000015	0.000100	0.000024	0.011	0.000033	0.0014	0.00095
4-Mar-15	36	500	485	7.6	0.0034	0.0000049	0.00015	0.61	0.0026	0.0049	0.00038	0.000049	0.0015	0.38	0.00049	0.24	0.00000097	0.034	0.012	0.34	0.0000092	0.000097	0.000024	0.011	0.000039	0.00049	0.00097
11-Mar-15	37	500	510	7.6	0.0056	0.000066	0.00019	0.64	0.0031	0.0051	0.00037	0.000051	0.0015	0.37	0.00051	0.19	0.0000010	0.026	0.012	0.051	0.0000061	0.00018	0.000026	0.010	0.000051	0.0082	0.0010
18-Mar-15	38	500	490	7.7	0.0034	0.0000049	0.00015	0.66	0.0033	0.0049	0.00035	0.000049	0.0015	0.39	0.00049	0.21	0.00000098	0.029	0.013	0.29	0.0000074	0.000088	0.000034	0.010	0.000039	0.00049	0.00098
25-Mar-15	39	500	485	7.7	0.0034	0.0000049	0.00012	0.77	0.0030	0.0049	0.00043	0.000049	0.0015	0.42	0.00049	0.22	0.00000097	0.073	0.014	0.29	0.0000049	0.00020	0.000097	0.012	0.000087	0.00049	0.00097
1-Apr-15	40	500	495	7.8	0.0035	0.0000099	0.00011	0.61	0.0067	0.0050	0.00030	0.000050	0.0015	0.38	0.00050	0.14	0.00000099	0.36	0.012	0.050	0.0000074	0.00011	0.000025	0.014	0.000030	0.00050	0.00099
8-Apr-15	41	500	475	7.6	0.0033	0.0000048	0.00013	0.60	0.0031	0.0048	0.00034	0.000048	0.0014	0.36	0.00048	0.23	0.00000095	0.033	0.012	0.048	0.0000052	0.00015	0.000024	0.010	0.000048	0.00048	0.00095
15-Apr-15	42	500	480	7.8	0.0034	0.0000048	0.00013	0.69	0.0028	0.0048	0.00033	0.000048	0.0014	0.37	0.00048	0.19	0.00000096	0.034	0.013	0.14	0.0000029	0.00031	0.000062	0.011	0.000043	0.00048	0.00096
22-Apr-15	43	500	495	7.7	0.0035	0.000020	0.00013	0.68	0.0028	0.0050	0.00028	0.000050	0.0015	0.37	0.00050	0.21	0.0000020	0.025	0.013	0.20	0.000012	0.00027	0.000025	0.010	0.000050	0.00050	0.00099
29-Apr-15	44	500	500	7.6	0.0035	0.000010	0.00014	0.67	0.0034	0.0050	0.00031	0.000050	0.0015	0.39	0.00050	0.19	0.0000010	0.020	0.012	0.30	0.0000085	0.00014	0.000040	0.0093	0.000035	0.00050	0.0010
6-May-15	45	500	510	7.7	0.0036	0.000010	0.00013	0.67	0.0034	0.0051	0.00031	0.000051	0.0015	0.40	0.00051	0.22	0.0000010	0.031	0.013	0.15	0.0000082	0.00014	0.000051	0.010	0.000061	0.0010	0.0010
13-May-15	46	500	505																								
20-May-15	47	505	490																								
27-May-15	48	490	510																								
3-Jun-15	49	510	500	7.9	0.00088	0.0000038	0.000070	0.48	0.0020	0.0013	0.00017	0.000013	0.00038	0.23	0.0000050	0.14	0.00000025	0.018	0.0091	0.10	0.0000041	0.00019	0.0000063	0.0074	0.000018	0.00025	0.00025
10-Jun-15	50	500	490																								
17-Jun-15	51	490	500																								
24-Jun-15	52	500	480																								
1-Jul-15	53	480	495	7.9	0.00087	0.0000012	0.000073	0.48	0.0019	0.0012	0.00019	0.000012	0.00037	0.21	0.0000062	0.14	0.00000025	0.020	0.0094	0.099	0.0000051	0.000094	0.0000062	0.0076	0.000012	0.00012	0.00025
8-Jul-15	54	500	490																								
15-Jul-15	55	490	490																								
22-Jul-15	56	490	490																								
29-Jul-15	57	490	485	8.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5-Aug-15	58	500	510																								
12-Aug-15	59	510	495																								
19-Aug-15	60	495	485																								
26-Aug-15	61	485	490	8.0	0.00086	0.000016	0.000068	0.46	0.0017	0.0012	0.00021	0.000012	0.00037	0.21	0.0000049	0.14	0.00000025	0.013	0.0091	0.12	0.0000051	0.000062	0.0000061	0.0073	0.000015	0.00025	0.00025
2-Sep-15	62	500	490																								
9-Sep-15	63	490	485																								
16-Sep-15	64	485	460																								
23-Sep-15	65	460	460	7.9	0.00081	0.0000012	0.000059	0.43	0.0015	0.0012	0.00020	0.000012	0.00035	0.20	0.0000046	0.13	0.00000023	0.016	0.0079	0.092	0.0000037	0.00012	0.0000058	0.0059	0.0000092	0.00012	0.00023
30-Sep-15	66	500	505																								
7-Oct-15	67	505	495																								
14-Oct-15	68	495	490																								
21-Oct-15	69	490	470	8.0	0.00082	0.0000024	0.000061	0.45	0.0013	0.0012	0.00012	0.000012	0.00035	0.21	0.000012	0.13	0.0000033	0.025	0.0078	0.094	0.0000040	0.000088	0.0000082	0.0059	0.000011	0.00012	0.00024
28-Oct-15	70	500	490																								
4-Nov-15	71	490	490																								
11-Nov-15	72	490	485																								
18-Nov-15	73	485	485	8.0	0.0022	0.0000012	0.000055	0.42	0.0015	0.0012	0.00024	0.000012	0.00036	0.20	0.000017	0.12	0.00000036	0.018	0.0073	0.073	0.0000040	0.000087	0.0000085	0.0051	0.000011	0.00012	0.00024
25-Nov-15	74	500	500	7.7	0.0035	0.000010	0.00013	0.67	0.0036	0.0050	0.00040	0.000050	0.0015	0.46	0.00016	0.21	0.0040	0.035	0.013	0.20	0.000012	0.00012	0.000050	0.0085	0.000040	0.00050	0.0010
2-Dec-15	75	500	500	7.5	0.0035	0.000015	0.00013	0.68	0.0031	0.0050	0.00021	0.000050	0.0015	0.43	0.000020	0.22	0.0000010	0.025	0.012	0.25	0.0000025	0.00012	0.000025	0.0090	0.000035	0.00050	0.0010
9-Dec-15	76	500	505	7.7	0.0035	0.0000051	0.00012	0.65	0.0034	0.0051	0.00030	0.000051	0.0015	0.41	0.000030	0.19	0.0000035	0.025	0.012	0.15	0.000019	0.00013	0.000030	0.0091	0.000045	0.00051	0.0010
16-Dec-15	77	500	500	7.7	0.0035	0.000085	0.00014	0.71	0.0036	0.0050	0.00026	0.000050	0.0015	0.45	0.000020	0.23	0.0000010	0.025	0.013	0.10	0.000012	0.00013	0.000025	0.0097	0.000055	0.0030	0.0010
23-Dec-15	78	500	505	8.1	0.0035	0.000045	0.00012	0.67	0.0032	0.0050	0.00022	0.000050	0.0015	0.41	0.000020	0.20	0.0000010	0.038	0.012	0.23	0.0000075	0.000093	0.000025	0.0089	0.000045	0.0018	0.0010
30-Dec-15	79	500	505	7.5	0.0035	0.0000051	0.00011	0.63	0.0028	0.0051	0.00018	0.000051	0.0015	0.37	0.000020	0.17	0.0000010	0.051	0.011	0.35	0.0000030	0.000056	0.000025	0.0080	0.000035	0.00051	0.0010
6-Jan-16	80	500	505	7.4	0.0035	0.0000051	0.00011	0.62	0.0029	0.0051	0.00023	0.000051	0.0015	0.38	0.000043	0.18	0.0000010	0.035	0.011	0.20	0.0000028	0.000078	0.000025	0.0078	0.000028	0.00051	0.0010
13-Jan-16	81	500	505	7.4	0.0035	0.0000051	0.00010	0.61	0.0030	0.0051	0.00027	0.000051	0.0015	0.38	0.000066	0.18	0.0000010	0.020	0.011	0.051	0.0000025	0.00010	0.000025	0.0076	0.000020	0.00051	0.0010
20-Jan-16	82	500	500	7.6	0.0035	0.0000051	0.000099	0.61	0.0030	0.0051	0.00024	0.000051	0.0015	0.37	0.000043	0.19	0.0000010	0.020	0.011	0.051	0.0000061	0.000096	0.000025	0.0080	0.000028	0.00051	0.0010
27-Jan-16	83	500	505	7.6	0.0035	0.0000051	0.000096	0.62	0.0031	0.0051	0.00020	0.000051	0.0015	0.36	0.000020	0.19	0.0000010	0.020	0.012	0.051	0.0000096	0.000091	0.000025	0.0083	0.000035	0.00051	0.0010
3-Feb-16	84	500	505	7.7	0.0035	0.0000050	0.000099	0.65	0.0033	0.0050	0.00021	0.000050	0.0015	0.37	0.000025	0.19	0.000013	0.028	0.012	0.23	0.000010	0.000098	0.000035	0.0081	0.000035	0.00050	0.0010
10-Feb-16	85	500	500	7.5	0.0035	0.0000050	0.00010	0.69	0.0035	0.0050	0.00022	0.000050	0.0015	0.38	0.000030	0.19	0.000026	0.035	0.012	0.40	0.000011	0.00011	0.000045	0.0079	0.000035	0.00050	0.0010
17-Feb-16	86	500	505	7.7	0.0035	0.0000050	0.000098	0.64	0.0032	0.0050	0.00020	0.000050	0.0015	0.35	0.000025	0.13	0.000013	0.023	0.012	0.33	0.0000085	0.000088	0.000035	0.0072	0.000030	0.00050	0.0010
24-Feb-16	87	500	500	7.5	0.0035	0.0000050	0.000095	0.58	0.0030	0.0050	0.00019	0.000050	0.0015	0.33	0.000020	0.065	0.0000010	0.010	0.011	0.25	0.0000060	0.000070	0.000025	0.0066	0.000025	0.00050	0.0010

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for HC4 (GS)

Date	Cycle	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu
	No.	Input	Output		umhos/cm	mgCaCO$_3$/L	mgCaCO$_3$/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
25-Jun-14	0	500	335	7.8	547	#N/A	7.1	53	163	1.7	0.19	< 0.3	194	0.029	0.0045	0.028	0.020	< 0.000007	< 0.000007	0.011	< 0.000003	39	0.000080	0.00025	0.0031
2-Jul-14	1	500	505	7.8	446	#N/A	7.8	59	144	0.60	0.16	< 0.3	168	0.024	0.0066	0.032	0.015	< 0.000007	< 0.000007	0.0093	< 0.000003	34	< 0.00003	0.00022	0.0015
9-Jul-14	2	500	475	7.9	258	#N/A	2.1	60	58	< 0.2	0.16	< 0.3	93	0.031	0.0074	0.023	0.019	< 0.000007	< 0.000007	0.0096	< 0.000003	19	< 0.00003	0.000098	0.00079
16-Jul-14	3	500	500	8.0	176	#N/A	2.6	60	17	< 0.2	0.12	< 0.3	67	0.037	0.0068	0.019	0.018	< 0.000007	< 0.000007	0.0067	< 0.000003	14	0.00020	0.00027	0.00065
23-Jul-14	4	500	495	8.0	124	#N/A	2.3	50	9.0	< 0.2	0.10	< 0.3	53	0.044	0.0054	0.018	0.018	< 0.000007	< 0.000007	0.0059	< 0.000003	11	0.000090	0.00014	0.00045
30-Jul-14	5	500	480	8.0	121	#N/A	1.7	59	8.0	< 0.2	0.090	< 0.3	51	0.050	0.0055	0.017	0.018	< 0.000007	< 0.000007	0.0053	< 0.000003	11	0.00010	0.00010	0.0013
6-Aug-14	6	500	485	7.9	104	#N/A	2.0	47	5.0	< 0.2	0.080	< 0.3	46	0.048	0.0048	0.013	0.017	< 0.000007	< 0.000007	0.0044	< 0.000003	9.9	< 0.00003	0.000041	0.00048
13-Aug-14	7	500	485	7.9	85	#N/A	2.3	41	6.0	< 0.2	< 0.06	< 0.3	38	0.058	0.0035	0.011	0.017	< 0.000007	< 0.000007	0.0039	< 0.000003	8.5	0.000050	0.000043	0.00047
20-Aug-14	8	500	480	7.9	78	#N/A	1.9	38	5.0	< 0.2	< 0.06	< 0.3	36	0.055	0.0029	0.011	0.015	< 0.000007	< 0.000007	0.0036	< 0.000003	8.2	0.000070	0.000053	0.00042
27-Aug-14	9	500	500	7.9	103	#N/A	5.3	46	4.0	< 0.2	0.060	< 0.3	44	0.049	0.0041	0.011	0.020	< 0.000007	< 0.000007	0.0075	< 0.000003	10	< 0.00003	0.000025	0.00023
3-Sep-14	10	500	475	7.8	99	#N/A	4.8	45	5.0	< 0.2	< 0.06	< 0.3	44	0.051	0.0040	0.013	0.021	< 0.000007	< 0.000007	0.0033	< 0.000003	11	< 0.00003	0.000027	0.00077
10-Sep-14	11	500	505	7.9	93	#N/A	3.7	42	4.0	< 0.2	< 0.06	< 0.3	38	0.057	0.0038	0.011	0.019	< 0.000007	< 0.000007	0.0040	< 0.000003	9.2	< 0.00003	0.000021	0.00040
17-Sep-14	12	500	490	7.9	93	#N/A	7.3	45	5.0	< 0.2	< 0.06	< 0.3	38	0.057	0.0039	0.010	0.020	< 0.000007	< 0.000007	0.0037	0.0000040	9.0	< 0.00003	0.000021	0.00016
24-Sep-14	13	500	485	7.9	78	#N/A	3.4	38	6.0	< 0.2	< 0.06	< 0.3	34	0.054	0.0040	0.0082	0.016	< 0.000007	< 0.000007	0.0025	< 0.000003	8.0	< 0.00003	0.00011	0.00017
1-Oct-14	14	500	480	7.8	63	#N/A	6.2	35	3.0	< 0.2	< 0.06	< 0.3	29	0.047	0.0038	0.0063	0.014	< 0.000007	< 0.000007	0.0019	< 0.000003	7.0	< 0.00003	0.00	< 0.00002
8-Oct-14	15	500	490	7.7	65	#N/A	3.0	27	< 2	< 0.2	< 0.06	< 0.3	28	0.041	0.0028	0.0065	0.013	< 0.000007	< 0.000007	0.0098	< 0.000003	6.9	< 0.00003	0.000015	0.00014
15-Oct-14	16	500	480	7.8	68	#N/A	4.9	29	3.0	< 0.2	< 0.06	< 0.3	29	0.045	0.0032	0.0068	0.014	< 0.000007	< 0.000007	0.0042	< 0.000003	7.3	< 0.00003	0.000017	0.00012
22-Oct-14	17	500	500	7.8	87	#N/A	5.0	39	4.0	< 0.2	< 0.06	< 0.3	38	0.047	0.0047	0.0083	0.022	< 0.000007	< 0.000007	0.0050	< 0.000003	9.2	< 0.00003	0.000025	0.00011
29-Oct-14	18	500	490	7.7	63	#N/A	7.5	31	2.0	< 0.2	< 0.06	< 0.3	28	0.046	0.0030	0.0055	0.013	< 0.000007	< 0.000007	0.0047	< 0.000003	6.9	< 0.00003	0.000016	0.00055
5-Nov-14	19	500	475	7.8	57	#N/A	#N/A	36	< 2	< 0.2	< 0.06	< 0.3	25	0.036	0.0027	0.0050	0.013	< 0.000007	< 0.000007	0.0026	0.000016	6.3	< 0.00003	0.000019	0.00052
12-Nov-14	20	500	505	7.8	89	#N/A	6.5	34	2.0	< 0.2	< 0.06	< 0.3	41	0.048	0.0049	0.0089	0.020	< 0.000007	< 0.000007	0.0033	< 0.000003	10	< 0.00003	0.000022	0.00028
19-Nov-14	21	500	480	7.9	94	#N/A	6.5	34	< 2	< 0.2	< 0.06	< 0.3	29	0.052	0.0029	0.0064	0.014	< 0.000007	< 0.000007	0.0021	< 0.000003	7.4	< 0.00003	0.000020	0.00033
26-Nov-14	22	500	490	7.8	62	#N/A	2.0	29	< 2	< 0.2	< 0.06	< 0.3	28	0.045	0.0031	0.0061	0.017	< 0.000007	< 0.000007	0.0023	0.0000030	7.1	< 0.00003	0.000018	0.00029
3-Dec-14	23	500	485	7.7	59	#N/A	2.9	29	< 2	< 0.2	< 0.06	< 0.3	29	0.049	0.0029	0.0064	0.015	< 0.000007	< 0.000007	0.0027	< 0.000003	7.5	< 0.00003	0.000014	0.00016
10-Dec-14	24	500	500	7.8	56	#N/A	4.9	29	< 2	< 0.2	< 0.06	< 0.3	26	0.043	0.0029	0.0054	0.013	< 0.000007	< 0.000007	0.0021	0.0000030	6.7	< 0.00003	0.000012	0.00024
17-Dec-14	25	500	485	7.8	64	#N/A	3.8	31	< 2	< 0.2	< 0.06	< 0.3	30	0.061	0.0032	0.0078	0.016	< 0.000007	< 0.000007	0.0019	< 0.000003	7.7	< 0.00003	0.000011	0.00029
24-Dec-14	26	500	480	7.8	74	#N/A	3.3	36	< 2	< 0.2	< 0.06	< 0.3	34	0.060	0.0041	0.0078	0.020	< 0.000007	< 0.000007	0.0016	< 0.000003	8.8	< 0.00003	0.000015	0.00020
31-Dec-14	27	500	500	7.8	71	#N/A	1.4	48	< 2	< 0.2	< 0.06	< 0.3	35	0.047	0.0040	0.0067	0.020	< 0.000007	< 0.000007	0.0015	< 0.000003	9.0	< 0.00003	0.000010	0.00047
7-Jan-15	28	500	495	7.7	69	#N/A	2.7	34	2.0	< 1	< 0.06	< 0.3	31	0.039	0.0038	0.0058	0.018	< 0.000007	< 0.000007	0.0023	< 0.000003	7.9	< 0.00003	0.000021	0.00016
14-Jan-15	29	500	490	7.7	72	#N/A	2.8	37	< 2	< 1	< 0.06	< 0.3	34	0.039	0.0046	0.0069	0.019	< 0.000007	< 0.000007	0.0024	0.0000030	8.6	< 0.00003	0.000015	0.00046
21-Jan-15	30	500	485	7.9	62	#N/A	5.5	36	< 2	< 1	< 0.06	< 0.3	30	0.047	0.0033	0.0054	0.016	< 0.000007	< 0.000007	0.0016	< 0.000003	7.9	< 0.00003	0.000013	0.00037
28-Jan-15	31	500	485	7.7	61	#N/A	1.5	31	< 2	< 1	< 0.06	< 0.3	28	0.045	0.0033	0.0052	0.017	< 0.000007	< 0.000007	0.0025	< 0.000003	7.0	0.00010	0.000010	0.00017
4-Feb-15	32	500	485	7.8	59	#N/A	2.2	30	< 2	< 1	< 0.06	< 0.3	27	0.036	0.0031	0.0045	0.018	< 0.000007	< 0.000007	0.0021	< 0.000003	6.7	< 0.00003	0.0000090	0.00038
11-Feb-15	33	500	475	7.7	55	#N/A	2.2	29	2.0	< 1	< 0.06	< 0.3	25	0.041	0.0028	0.0043	0.014	< 0.000007	< 0.000007	0.0021	< 0.000003	6.6	< 0.00003	0.000014	0.00025
18-Feb-15	34	500	500	7.7	61	#N/A	2.2	31	< 2	< 1	< 0.06	< 0.3	30	0.036	0.0033	0.0048	0.017	< 0.000007	< 0.000007	0.0024	< 0.000003	7.8	< 0.00003	0.000014	0.00051
25-Feb-15	35	500	480	7.8	72	#N/A	3.5	37	< 2	< 1	< 0.06	< 0.3	31	0.036	0.0036	0.0048	0.021	< 0.000007	< 0.000007	0.00080	0.0000040	7.9	0.000060	0.000016	0.00059
4-Mar-15	36	500	490	7.7	58	#N/A	2.3	30	< 2	< 1	< 0.06	< 0.3	26	0.041	0.0024	0.0042	0.015	< 0.000007	< 0.000007	0.00080	< 0.000003	6.8	0.000060	0.000012	0.00014
11-Mar-15	37	500	485	7.7	54	#N/A	1.8	29	2.0	< 1	< 0.06	< 0.3	24	0.031	0.0026	0.0036	0.014	0.0000070	< 0.000007	0.0016	0.000020	6.5	0.000060	0.000026	0.00088
18-Mar-15	38	500	490	7.7	50	#N/A	2.4	27	< 2	< 1	< 0.06	< 0.3	23	0.032	0.0021	0.0030	0.015	< 0.000007	< 0.000007	0.0011	< 0.000003	6.1	< 0.00003	0.000017	0.00037
25-Mar-15	39	500	490	7.7	45	#N/A	2.7	26	< 2	< 1	< 0.06	< 0.3	22	0.030	0.0022	0.0032	0.013	< 0.000007	< 0.000007	0.00090	< 0.000003	5.7	0.000090	0.0000060	0.00076
1-Apr-15	40	500	485	7.9	44	#N/A	4.0	27	< 2	< 1	< 0.06	< 0.3	18	0.028	0.0021	0.0022	0.015	0.000012	< 0.000007	0.0016	0.0000040	4.4	< 0.00003	< 0.000004	0.00026
8-Apr-15	41	500	485	7.6	45	#N/A	2.6	26	< 2	< 1	< 0.06	< 0.3	20	0.026	0.0026	0.0028	0.013	< 0.000007	< 0.000007	0.00080	< 0.000003	5.4	< 0.00003	0.000019	0.00022
15-Apr-15	42	500	475	7.7	57	#N/A	3.7	32	< 2	< 1	< 0.06	< 0.3	26	0.035	0.0026	0.0040	0.016	< 0.000007	< 0.000007	0.0034	< 0.000003	6.9	< 0.00003	< 0.000004	0.0027
22-Apr-15	43	500	505	7.8	65	#N/A	3.2	35	3.0	< 1	< 0.06	< 0.3	29	0.045	0.0029	0.0053	0.019	< 0.000007	< 0.000007	0.0029	< 0.000003	7.7	0.000050	0.000010	0.00095
29-Apr-15	44	500	495	7.8	68	#N/A	2.1	36	< 2	< 1	< 0.06	< 0.3	32	0.049	0.0031	0.0053	0.021	< 0.000007	< 0.000007	0.0021	< 0.000003	8.3	< 0.00003	0.000022	0.00066
6-May-15	45	500	495	7.7	62	#N/A	2.6	34	< 2	< 1	< 0.06	< 0.3	28	0.043	0.0030	0.0063	0.017	< 0.000007	< 0.000007	0.0019	< 0.000003	7.3	< 0.00003	0.000018	0.00040
13-May-15	46	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-May-15	47	495	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-May-15	48	480	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	49	475	475	8.0	172	#N/A	3.8	85	4.0	< 1	0.060	< 0.3	84	0.014	0.0082	0.0068	0.063	< 0.000007	< 0.000007	0.0036	< 0.000003	22	< 0.00003	0.000033	0.00017
10-Jun-15	50	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-15	51	490	482	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Jun-15	52	480	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	53	450	445	8.0	186	#N/A	5.0	89	3.0	< 1	< 0.06	< 0.3	83	0.013	0.0070	0.0062	0.069	< 0.000007	< 0.000007	0.0035	< 0.000003	21	< 0.00003	0.000047	0.00037
8-Jul-15	54	500	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-Jul-15	55	485	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jul-15	56	470	455	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	57	455	445	8.0	175	#N/A	2.8	90	3.0	< 1	< 0.06	< 0.3	86	0.011	0.0064	0.0049	0.066	< 0.000007	< 0.000007	0.0034	0.000010	22	0.000040	0.000038	0.000080
5-Aug-15	58	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	59	490	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Aug-15	60	475	465	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	61	465	445	8.1	177	#N/A	1.8	92	3.0	< 1	< 0.06	< 0.3	94	0.014	0.0063	0.0047	0.073	< 0.000007	< 0.000007	0.0037	0.0000090	26	0.00011	0.000041	0.00061
2-Sep-15	62	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	63	500	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Sep-15	64	480	465	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	65	465	465	8.1	171	#N/A	2.2	86	3.0				86	0.012	0.0064	0.0055	0.073	< 0.000007	< 0.000007	0.0040	< 0.000003	22	< 0.00003	0.000038	0.00024
30-Sep-15	66	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	67	495	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14-Oct-15	68	475	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	69	470	455	8.1	156	#N/A	1.3	82	3.0				80	0.014	0.0049	0.0037	0.066	< 0.000007	< 0.000007	0.0036	< 0.000003	21	< 0.00003	0.000041	0.00035
28-Oct-15	70	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	71	490	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Nov-15	72	480	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	73	470	455	8.1	145	#N/A	1.2	84	2.0	-	-	-	68	0.012	0.0040	0.0039	0.049	< 0.000007	< 0.000007	0.0016	< 0.000003	18	0.000070	0.000072	0.00038
25-Nov-15	74	500	490	7.9	72	#N/A	0.90	43	2.0	-	-	-	34	0.041	0.0021	0.0039	0.030	< 0.000007	< 0.000007	0.0014	< 0.000003	9.1	< 0.00003	0.000023	0.00021
2-Dec-15	75	500	490	8.0	85	#N/A	1.7	44	2.0	-	-	-	43	0.037	0.0028	0.0041	0.036	< 0.000007	< 0.000007	0.00090	0.0000030	11	< 0.00003	0.000016	0.00034
9-Dec-15	76	500	495	7.9	70	#N/A	2.8	37	2.0	-	-	-	33	0.037	0.0020	0.0039	0.030	0.0000090	< 0.000007	0.0030	0.000012	8.6	< 0.00003	0.000015	0.00034
16-Dec-15	77	500	495	8.1	77	#N/A	1.5	38	2.0	-	-	-	38	0.051	0.0023	0.0046	0.034	0.0000070	< 0.000007	0.0021	< 0.000003	10.0	0.000050	0.000020	0.00035
23-Dec-15	78	500	485	8.1	62	-	-	-	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	79	500	490	7.8	55	#N/A	1.3	29	2.0	-	-	-	28	0.034	0.0012	0.0025	0.024	< 0.000007	< 0.000007	0.0014	< 0.000003	7.4	0.000050	0.0000060	0.00022
6-Jan-16	80	500	490	7.6	53	-	-	-	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	81	500	495	7.6	55	#N/A	1.7	29	2.0	-	-	-	26	0.033	0.0013	0.0024	0.022	< 0.000007	< 0.000007	< 0.002	< 0.000003	7.0	< 0.00003	< 0.000004	0.00048
20-Jan-16	82	500	495	7.8	71	-	-	-	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	83	500	495	7.8	62	#N/A	2.8	33	2.0	-	-	-	30	0.036	0.0014	0.0027	0.029	< 0.000007	< 0.000007	< 0.002	0.000010	8.2	< 0.00003	0.000024	0.00052
3-Feb-16	84	500	495	7.8	70	-	-	-	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	85	500	480	7.7	67	#N/A	2.6	34	2.0	-	-	-	32	0.028	0.0015	0.0028	0.030	< 0.000007	< 0.000007	< 0.002	< 0.000003	8.8	< 0.00003	0.000016	0.000090
17-Feb-16	86	500	505	7.7	64	-	-	-	< 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	87	500	480	7.8	70	#N/A	2.3	35	< 2	-	-	-	34	0.034	0.0016	0.0028	0.030	< 0.000007	< 0.000007	< 0.002	< 0.000003	9.0	< 0.00003	0.000010	0.000080

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for HC4 (GS)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
25-Jun-14	0	500	335	7.8	0.0050	< 0.00001	0.0064	23	0.022	< 0.01	0.0061	0.0012	0.015	11	0.00082	1.9	< 0.000002	24	0.30	65	0.000036	0.00017	0.00011	0.032	0.00044	0.0020	< 0.002
2-Jul-14	1	500	505	7.8	< 0.002	< 0.00001	0.0051	21	0.028	< 0.01	0.0046	0.0023	< 0.009	8.2	0.00054	2.1	< 0.000002	16	0.26	52	0.000022	0.0012	0.000060	0.060	0.00033	0.0020	< 0.002
9-Jul-14	2	500	475	7.9	< 0.002	< 0.00001	0.0038	11	0.015	< 0.01	0.0047	0.0010	0.020	6.3	0.00015	2.2	< 0.000002	7.9	0.14	20	0.000017	0.0029	0.000080	0.034	0.00043	< 0.001	< 0.002
16-Jul-14	3	500	500	8.0	0.0070	< 0.00001	0.0028	7.8	0.011	< 0.01	0.0037	0.00080	< 0.009	4.6	0.000050	1.7	0.0000020	4.1	0.11	7.8	0.000015	0.00015	0.000070	0.019	0.00040	< 0.001	< 0.002
23-Jul-14	4	500	495	8.0	0.013	< 0.00001	0.0022	6.1	0.010	< 0.01	0.0024	0.00040	< 0.009	3.8	< 0.00004	1.5	< 0.000002	2.4	0.085	4.6	0.000010	0.0016	0.000080	0.012	0.00037	< 0.001	< 0.002
30-Jul-14	5	500	480	8.0	< 0.002	< 0.00001	0.0023	5.8	0.0083	< 0.01	0.0024	0.00050	< 0.009	3.6	0.000070	1.5	0.0000020	1.8	0.083	3.3	0.000018	0.000040	0.00015	0.011	0.00043	< 0.001	< 0.002
6-Aug-14	6	500	485	7.9	0.0020	0.000050	0.0018	5.2	0.0072	< 0.01	0.0015	< 0.0001	< 0.009	3.3	0.000050	1.4	< 0.000002	1.3	0.075	2.4	0.0000080	0.000030	0.000060	0.0094	0.00039	< 0.001	< 0.002
13-Aug-14	7	500	485	7.9	0.0020	< 0.00001	0.0013	4.1	0.0083	< 0.01	0.0011	0.00020	< 0.009	2.5	< 0.00004	1.0	< 0.000002	0.76	0.060	1.6	0.0000050	0.000010	0.00018	0.0074	0.00019	< 0.001	< 0.002
20-Aug-14	8	500	480	7.9	< 0.002	< 0.00001	0.0012	3.8	0.0078	< 0.01	0.0011	0.00020	0.0090	2.4	0.000060	0.98	< 0.000002	0.65	0.058	1.6	< 0.000005	0.0013	0.00017	0.0078	0.00036	< 0.001	< 0.002
27-Aug-14	9	500	500	7.9	< 0.002	0.000010	0.0013	4.7	0.0086	< 0.01	0.0012	0.00020	0.012	2.7	0.000050	1.2	< 0.000002	0.72	0.071	1.9	0.000012	0.000090	0.000080	0.0096	0.00034	< 0.001	< 0.002
3-Sep-14	10	500	475	7.8	< 0.007	0.000060	0.0013	4.3	0.0096	< 0.01	0.0010	0.00010	0.0060	2.7	0.000090	1.4	0.000018	0.58	0.071	2.4	0.000013	0.00020	< 0.00005	0.0092	0.00036	< 0.001	< 0.002
10-Sep-14	11	500	505	7.9	< 0.007	0.000010	0.0011	3.7	0.0087	< 0.01	0.00084	0.00010	< 0.003	2.4	0.000050	1.2	< 0.000002	0.45	0.063	1.5	0.000010	0.000060	0.000090	0.0087	0.00034	< 0.001	< 0.002
17-Sep-14	12	500	490	7.9	< 0.007	< 0.00001	0.0012	3.9	0.0071	< 0.01	0.00084	0.00010	< 0.003	2.6	0.000050	1.1	< 0.000002	0.45	0.063	2.1	< 0.000005	0.000020	0.00015	0.0097	0.00036	0.0010	< 0.002
24-Sep-14	13	500	485	7.9	< 0.002	0.000010	0.00099	3.5	0.0065	< 0.01	0.00076	0.00020	< 0.009	2.1	< 0.00004	0.94	0.0000050	0.35	0.055	1.4	< 0.000005	0.000020	< 0.00005	0.0087	0.00029	0.0010	< 0.002
1-Oct-14	14	500	480	7.8	0.0090	< 0.00001	0.00066	2.8	0.012	< 0.01	0.00080	< 0.0001	< 0.009	1.7	< 0.00004	0.78	< 0.000002	0.23	0.047	1.5	< 0.000005	0.000030	0.000060	0.0071	0.00026	< 0.002	< 0.002
8-Oct-14	15	500	490	7.7	< 0.007	< 0.00001	0.00072	2.5	0.0075	< 0.01	0.00056	< 0.0001	< 0.003	1.7	< 0.00004	0.70	< 0.000002	0.23	0.043	1.8	0.0000080	0.0011	< 0.00005	0.0072	0.00026	< 0.001	< 0.002
15-Oct-14	16	500	480	7.8	< 0.007	< 0.00001	0.00087	2.7	0.0081	< 0.01	0.00064	< 0.0001	< 0.003	1.8	< 0.00004	0.74	< 0.000002	0.24	0.045	1.8	0.0000090	0.00075	0.00016	0.0076	0.00024	< 0.001	< 0.002
22-Oct-14	17	500	500	7.8	< 0.007	0.000060	0.0010	3.7	0.011	< 0.01	0.00091	0.00010	< 0.003	2.2	< 0.00004	1.0	< 0.000002	0.29	0.058	2.1	0.000011	0.000040	< 0.00005	0.011	0.00028	< 0.001	< 0.002
29-Oct-14	18	500	490	7.7	< 0.007	< 0.00001	0.00062	2.5	0.0087	< 0.01	0.00055	< 0.0001	< 0.003	1.4	< 0.00004	0.60	< 0.000002	0.18	0.040	1.2	0.0000080	0.00089	0.000060	0.0065	0.00018	< 0.001	< 0.002
5-Nov-14	19	500	475	7.8	< 0.007	0.000010	0.00056	2.3	0.0085	< 0.01	0.00063	< 0.0001	< 0.003	1.3	< 0.00004	0.60	< 0.000002	0.18	0.038	1.2	0.000011	0.00094	0.000070	0.0063	0.00018	< 0.001	< 0.002
12-Nov-14	20	500	505	7.8	< 0.007	< 0.00001	0.00088	3.8	0.0093	< 0.01	0.0013	0.00010	< 0.003	2.1	0.000050	0.99	< 0.000002	0.33	0.063	1.9	0.000011	0.00011	< 0.00005	0.011	0.00030	< 0.001	< 0.002
19-Nov-14	21	500	480	7.9	< 0.007	0.000020	0.00062	2.6	0.0083	< 0.01	0.00062	< 0.0001	< 0.003	1.4	< 0.00004	0.65	< 0.000002	0.17	0.045	1.0	0.0000090	0.00030	< 0.00005	0.0066	0.00025	0.0010	< 0.002
26-Nov-14	22	500	490	7.8	< 0.007	< 0.00001	0.00064	2.6	0.0100	< 0.01	0.00069	< 0.0001	0.0090	1.4	< 0.00004	0.67	< 0.000002	0.17	0.044	1.1	0.000016	0.00079	0.00013	0.0074	0.00025	< 0.001	< 0.002
3-Dec-14	23	500	485	7.7	< 0.007	0.000040	0.00057	2.4	0.011	0.010	0.00072	< 0.0001	< 0.003	1.3	< 0.00004	0.57	< 0.000002	0.18	0.038	1.1	0.0000060	0.00026	< 0.00005	0.0073	0.00030	< 0.001	< 0.002
10-Dec-14	24	500	500	7.8	< 0.007	< 0.00001	0.00056	2.3	0.0094	< 0.01	0.00079	< 0.0001	< 0.003	1.3	< 0.00004	0.57	< 0.000002	0.14	0.040	1.1	0.000010	0.00038	0.000070	0.0065	0.00021	< 0.001	< 0.002
17-Dec-14	25	500	485	7.8	< 0.007	< 0.00001	0.00067	2.6	0.011	< 0.01	0.00074	< 0.0001	< 0.003	1.4	< 0.00004	0.73	< 0.000002	0.16	0.045	0.90	0.0000090	0.00074	< 0.00005	0.0081	0.00029	< 0.001	< 0.002
24-Dec-14	26	500	480	7.8	< 0.007	< 0.00001	0.00079	2.9	0.011	< 0.01	0.00090	< 0.0001	< 0.003	1.7	0.000080	0.80	< 0.000002	0.18	0.052	1.1	0.000012	0.00041	0.00018	0.0088	0.00033	< 0.001	< 0.002
31-Dec-14	27	500	500	7.8	< 0.007	0.00011	0.00072	3.0	0.011	< 0.01	0.00095	< 0.0001	< 0.003	1.6	< 0.00004	0.92	< 0.000002	0.17	0.053	1.2	0.000010	0.00035	< 0.00005	0.0090	0.00025	< 0.001	< 0.002
7-Jan-15	28	500	495	7.7	< 0.007	0.000020	0.00069	2.8	0.011	< 0.01	0.00094	< 0.0001	< 0.003	1.5	< 0.00004	0.71	< 0.000002	0.15	0.049	0.80	0.000010	0.00054	0.000080	0.0081	0.00024	< 0.001	< 0.002
14-Jan-15	29	500	490	7.7	< 0.007	0.000020	0.00067	3.1	0.0087	< 0.01	0.0011	< 0.0001	< 0.003	1.7	< 0.00004	0.89	< 0.000002	0.18	0.051	0.80	0.0000090	0.00017	0.000070	0.0079	0.00026	< 0.001	< 0.002
21-Jan-15	30	500	485	7.9	< 0.007	0.000030	0.00057	2.5	0.0094	< 0.01	0.0011	< 0.0001	< 0.003	1.3	< 0.00004	0.66	< 0.000002	0.12	0.043	0.50	< 0.000005	0.00026	0.00018	0.0071	0.00025	< 0.001	< 0.002
28-Jan-15	31	500	485	7.7	< 0.007	< 0.00001	0.00051	2.6	0.0081	< 0.01	0.0010	< 0.0001	< 0.003	1.4	0.000080	0.70	< 0.000002	0.16	0.036	1.1	0.0000060	0.00012	0.000060	0.0072	0.00026	< 0.001	< 0.002
4-Feb-15	32	500	485	7.8	< 0.007	0.000020	0.00060	2.5	0.0086	< 0.01	0.00086	< 0.0001	< 0.003	1.3	< 0.00004	0.66	< 0.000002	0.14	0.045	1.0	< 0.000005	0.00024	0.00014	0.0062	0.00022	< 0.001	< 0.002
11-Feb-15	33	500	475	7.7	< 0.007	< 0.00001	0.00049	2.1	0.0090	< 0.01	0.00079	< 0.0001	< 0.003	1.2	< 0.001	0.58	< 0.000002	0.11	0.037	0.50	0.0000060	0.00045	0.00034	0.0054	0.00026	< 0.001	< 0.002
18-Feb-15	34	500	500	7.7	< 0.007	< 0.00001	0.00064	2.5	0.0081	< 0.01	0.00076	< 0.0001	< 0.003	1.4	< 0.001	0.70	< 0.000002	0.12	0.048	0.70	0.0000080	0.00013	0.000060	0.0072	0.00025	< 0.001	< 0.002
25-Feb-15	35	500	480	7.8	< 0.007	0.000020	0.00064	2.9	0.0076	< 0.01	0.00083	< 0.0001	< 0.003	1.7	< 0.001	0.71	< 0.000002	0.14	0.051	0.70	0.0000080	0.00011	< 0.00005	0.0084	0.00024	< 0.001	< 0.002
4-Mar-15	36	500	490	7.7	< 0.007	< 0.00001	0.00052	2.2	0.0077	< 0.01	0.00063	< 0.0001	< 0.003	1.2	< 0.001	0.68	< 0.000002	0.11	0.039	0.90	< 0.000005	0.000030	0.000090	0.0065	0.00023	< 0.001	< 0.002
11-Mar-15	37	500	485	7.7	0.010	0.00010	0.00050	2.0	0.0083	< 0.01	0.00060	< 0.0001	< 0.003	1.0	< 0.001	0.49	< 0.000002	0.070	0.037	< 0.1	< 0.000005	0.00057	0.000090	0.0057	0.00020	0.012	< 0.002
18-Mar-15	38	500	490	7.7	< 0.007	< 0.00001	0.00047	1.9	0.0094	< 0.01	0.00056	< 0.0001	< 0.003	1.1	< 0.001	0.50	< 0.000002	0.080	0.035	0.90	< 0.000005	0.00041	0.00021	0.0051	0.00016	< 0.001	< 0.002
25-Mar-15	39	500	490	7.7	< 0.007	< 0.00001	0.00033	2.0	0.0088	< 0.01	0.00058	0.00010	< 0.003	1.0	< 0.001	0.49	< 0.000002	0.13	0.034	0.70	< 0.000005	0.00048	0.000080	0.0052	0.00025	0.0010	< 0.002
1-Apr-15	40	500	485	7.9	< 0.007	< 0.00001	0.00032	1.6	0.016	< 0.01	0.00042	< 0.0001	< 0.003	0.90	< 0.001	0.30	< 0.000002	0.68	0.030	< 0.1	< 0.000005	0.00047	< 0.00005	0.0062	0.00014	< 0.001	< 0.002
8-Apr-15	41	500	485	7.6	< 0.007	< 0.00001	0.00037	1.6	0.0085	< 0.01	0.00049	< 0.0001	< 0.003	0.93	< 0.001	0.53	< 0.000002	0.070	0.031	0.10	< 0.000005	0.00039	0.000050	0.0046	0.00018	< 0.001	< 0.002
15-Apr-15	42	500	475	7.7	< 0.007	< 0.00001	0.00050	2.2	0.0090	< 0.01	0.00062	< 0.0001	< 0.003	1.2	< 0.001	0.58	< 0.000002	0.10	0.039	0.70	< 0.000005	0.00098	0.00012	0.0065	0.00025	0.0010	< 0.002
22-Apr-15	43	500	505	7.8	< 0.007	0.000060	0.00055	2.4	0.0090	< 0.01	0.00067	< 0.0001	< 0.003	1.4	< 0.001	0.71	0.0000040	0.11	0.044	0.60	0.000013	0.00036	0.000050	0.0076	0.00027	< 0.001	< 0.002
29-Apr-15	44	500	495	7.8	< 0.007	0.000020	0.00054	2.7	0.010	< 0.01	0.00077	< 0.0001	< 0.003	1.6	< 0.001	0.69	< 0.000002	0.090	0.047	0.80	< 0.000005	0.00038	0.000080	0.0078	0.00027	< 0.001	< 0.002
6-May-15	45	500	495	7.7	< 0.007	0.000010	0.00054	2.3	0.0095	< 0.01	0.00064	< 0.0001	< 0.003	1.3	< 0.001	0.70	0.0000020	0.090	0.041	0.70	< 0.000005	0.00055	0.00010	0.0069	0.00024	< 0.001	< 0.002
13-May-15	46	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-May-15	47	495	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-May-15	48	480	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	49	475	475	8.0	< 0.007	< 0.00001	0.0014	7.2	0.012	< 0.01	0.0022	0.00020	< 0.003	3.6	< 0.00004	2.1	< 0.000002	0.25	0.13	1.8	0.000010	0.00038	0.000090	0.022	0.00031	< 0.001	< 0.002
10-Jun-15	50	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-15	51	490	482	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Jun-15	52	480	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	53	450	445	8.0	< 0.007	< 0.00001	0.0012	7.2	0.017	0.010	0.0020	0.00020	< 0.003	2.9	0.000080	1.9	0.0000020	0.26	0.13	1.6	0.000013	0.00090	< 0.00005	0.024	0.00027	0.0010	< 0.002
8-Jul-15	54	500	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-Jul-15	55	485	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jul-15	56	470	455	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	57	455	445	8.0	< 0.007	< 0.00001	0.0013	7.6	0.018	< 0.01	0.0013	0.00020	< 0.003	2.9	0.000060	1.8	0.000013	0.25	0.14	1.6	< 0.000005	0.00042	< 0.00005	0.012	0.00018	< 0.001	< 0.002
5-Aug-15	58	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	59	490	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Aug-15	60	475	465	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	61	465	445	8.1	< 0.007	0.00011	0.0012	7.4	0.017	< 0.01	0.0021	0.00020	< 0.003	3.0	0.000070	2.2	< 0.000002	0.22	0.14	1.6	0.000015	0.00097	< 0.00005	0.024	0.00029	0.0020	< 0.002
2-Sep-15	62	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	63	500	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Sep-15	64	480	465	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	65	465	465	8.1	< 0.007	< 0.00001	0.0012	7.5	0.013	< 0.01	0.0016	0.00020	< 0.003	3.1	0.000080	1.9	0.000015	0.24	0.14	1.7	0.0000080	0.00081	0.000070	0.020	0.00023	< 0.001	< 0.002
30-Sep-15	66	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	67	495	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14-Oct-15	68	475	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	69	470	455	8.1	< 0.007	0.000020	0.0010	6.8	0.014	< 0.01	0.0012	0.00020	< 0.003	2.7	0.000090	1.6	0.000024	0.25	0.11	1.3	0.000014	0.0012	< 0.00005	0.019	0.00019	< 0.001	< 0.002
28-Oct-15	70	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	71	490	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Nov-15	72	480	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	73	470	455	8.1	0.022	< 0.00001	0.00083	5.8	0.016	< 0.01	0.0022	< 0.0001	< 0.003	2.4	0.00018	1.3	< 0.000002	0.21	0.099	0.90	0.000016	0.0011	< 0.00005	0.016	0.00020	< 0.001	< 0.002
25-Nov-15	74	500	490	7.9	< 0.007	0.000020	0.00054	2.7	0.0083	< 0.01	0.00081	< 0.0001	< 0.003	1.5	0.00029	0.71	0.00014	0.12	0.049	0.50	0.0000050	0.00047	< 0.00005	0.0095	0.00027	< 0.001	< 0.002
2-Dec-15	75	500	490	8.0	< 0.007	0.000030	0.00059	3.9	0.0090	< 0.01	0.00088	0.00010	< 0.003	1.9	0.000040	0.96	0.0000020	0.12	0.062	0.80	< 0.000005	0.00041	0.000080	0.011	0.00025	< 0.001	< 0.002
9-Dec-15	76	500	495	7.9	< 0.007	< 0.00001	0.00055	2.7	0.0063	< 0.01	0.00062	< 0.0001	< 0.003	1.5	0.000050	0.69	0.0000040	0.080	0.049	0.30	0.000020	0.00040	0.00014	0.0089	0.00024	< 0.001	< 0.002
16-Dec-15	77	500	495	8.1	< 0.007	0.00013	0.00064	3.3	0.0075	< 0.01	0.00058	< 0.0001	0.012	1.8	< 0.00004	0.88	< 0.000002	0.10	0.058	0.20	0.0000070	0.00064	0.00014	0.011	0.00029	< 0.001	< 0.002
23-Dec-15	78	500	485	8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	79	500	490	7.8	< 0.007	< 0.00001	0.00047	2.2	0.0062	< 0.01	0.00035	< 0.0001	< 0.003	1.2	< 0.00004	0.52	< 0.000002	0.10	0.040	0.80	< 0.000005	0.00022	0.00012	0.0069	0.00019	< 0.001	< 0.002
6-Jan-16	80	500	490	7.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	81	500	495	7.6	< 0.007	0.000020	0.00036	2.1	0.0064	< 0.01	0.00049	< 0.0001	< 0.003	1.2	0.00013	0.55	< 0.000002	0.060	0.036	< 0.1	< 0.000005	0.00028	0.00012	0.0060	0.00015	< 0.001	< 0.002
20-Jan-16	82	500	495	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	83	500	495	7.8	< 0.007	< 0.00001	0.00044	2.4	0.0074	< 0.01	0.00036	< 0.0001	< 0.003	1.2	< 0.00004	0.63	< 0.000002	0.070	0.044	< 0.1	0.0000050	0.00049	0.00011	0.0080	0.00018	< 0.001	< 0.002
3-Feb-16	84	500	495	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	85	500	480	7.7	< 0.007	< 0.00001	0.00042	2.5	0.0085	< 0.01	0.00037	< 0.0001	< 0.003	1.2	0.000070	0.59	< 0.000002	0.10	0.045	0.60	0.0000070	0.00034	0.00014	0.0069	0.00016	< 0.001	< 0.002
17-Feb-16	86	500	505	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	87	500	480	7.8	< 0.007	< 0.00001	0.00048	2.7	0.0068	< 0.01	0.00042	< 0.0001	< 0.003	1.4	< 0.00004	0.47	< 0.000002	0.050	0.047	0.50	0.0000050	0.00030	0.00014	0.0079	0.00017	< 0.001	< 0.002

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Calculated Loading Rates for HC4 (GS)

Date	**Cycle**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**	**Cu**
	No.	Input	Output		umhos/cm	mgCaCO$_3$/kg/wk	mgCaCO$_3$/kg/wk	mgCaCO$_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mgCaCO$_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
25-Jun-14	0	500	335	7.8	547	#N/A	2.4	18	55	0.57	0.064	0.10	65	0.0098	0.0015	0.0094	0.0066	0.0000023	0.0000023	0.0036	0.0000010	13	0.000027	0.000083	0.0010
2-Jul-14	1	500	505	7.8	446	#N/A	4.0	30	73	0.30	0.081	0.15	85	0.012	0.0033	0.016	0.0077	0.0000035	0.0000035	0.0047	0.0000015	17	0.000015	0.00011	0.00074
9-Jul-14	2	500	475	7.9	258	#N/A	1.0	28	28	0.095	0.076	0.14	44	0.015	0.0035	0.011	0.0088	0.0000033	0.0000033	0.0046	0.0000014	9.0	0.000014	0.000047	0.00038
16-Jul-14	3	500	500	8.0	176	#N/A	1.3	30	8.5	0.10	0.060	0.15	33	0.018	0.0034	0.0094	0.0089	0.0000035	0.0000035	0.0034	0.0000015	7.0	0.00010	0.00014	0.00033
23-Jul-14	4	500	495	8.0	124	#N/A	1.1	25	4.5	0.099	0.050	0.15	26	0.022	0.0027	0.0087	0.0089	0.0000035	0.0000035	0.0029	0.0000015	5.6	0.000045	0.000068	0.00022
30-Jul-14	5	500	480	8.0	121	#N/A	0.81	28	3.8	0.096	0.043	0.14	24	0.024	0.0026	0.0081	0.0087	0.0000034	0.0000034	0.0025	0.0000014	5.2	0.000048	0.000048	0.00062
6-Aug-14	6	500	485	7.9	104	#N/A	0.97	23	2.4	0.097	0.039	0.15	22	0.023	0.0023	0.0065	0.0084	0.0000034	0.0000034	0.0021	0.0000015	4.8	0.000015	0.000020	0.00023
13-Aug-14	7	500	485	7.9	85	#N/A	1.1	20	2.9	0.097	0.029	0.15	18	0.028	0.0017	0.0053	0.0081	0.0000034	0.0000034	0.0019	0.0000015	4.1	0.000024	0.000021	0.00023
20-Aug-14	8	500	480	7.9	78	#N/A	0.90	18	2.4	0.096	0.029	0.14	17	0.026	0.0014	0.0054	0.0072	0.0000034	0.0000034	0.0017	0.0000014	3.9	0.000034	0.000025	0.00020
27-Aug-14	9	500	500	7.9	103	#N/A	2.6	23	2.0	0.10	0.030	0.15	22	0.024	0.0021	0.0054	0.010	0.0000035	0.0000035	0.0038	0.0000015	5.0	0.000015	0.000013	0.00012
3-Sep-14	10	500	475	7.8	99	#N/A	2.3	21	2.4	0.095	0.029	0.14	21	0.024	0.0019	0.0060	0.010	0.0000033	0.0000033	0.0016	0.0000014	5.0	0.000014	0.000013	0.00037
10-Sep-14	11	500	505	7.9	93	#N/A	1.8	21	2.0	0.10	0.030	0.15	19	0.029	0.0019	0.0054	0.0096	0.0000035	0.0000035	0.0020	0.0000015	4.6	0.000015	0.000011	0.00020
17-Sep-14	12	500	490	7.9	93	#N/A	3.6	22	2.5	0.098	0.029	0.15	19	0.028	0.0019	0.0050	0.0096	0.0000034	0.0000034	0.0018	0.0000020	4.4	0.000015	0.000010	0.000078
24-Sep-14	13	500	485	7.9	78	#N/A	1.7	18	2.9	0.097	0.029	0.15	17	0.026	0.0019	0.0040	0.0078	0.0000034	0.0000034	0.0012	0.0000015	3.9	0.000015	0.000053	0.000082
1-Oct-14	14	500	480	7.8	63	#N/A	3.0	17	1.4	0.096	0.029	0.14	14	0.023	0.0018	0.0030	0.0065	0.0000034	0.0000034	0.00091	0.0000014	3.3	0.000014	0.00	0.0000096
8-Oct-14	15	500	490	7.7	65	#N/A	1.5	13	0.98	0.098	0.029	0.15	14	0.020	0.0014	0.0032	0.0064	0.0000034	0.0000034	0.0048	0.0000015	3.4	0.000015	0.0000074	0.000069
15-Oct-14	16	500	480	7.8	68	#N/A	2.3	14	1.4	0.096	0.029	0.14	14	0.022	0.0015	0.0033	0.0067	0.0000034	0.0000034	0.0020	0.0000014	3.5	0.000014	0.0000082	0.000058
22-Oct-14	17	500	500	7.8	87	#N/A	2.5	19	2.0	0.10	0.030	0.15	19	0.023	0.0024	0.0042	0.011	0.0000035	0.0000035	0.0025	0.0000015	4.6	0.000015	0.000013	0.000055
29-Oct-14	18	500	490	7.7	63	#N/A	3.7	15	0.98	0.098	0.029	0.15	14	0.022	0.0015	0.0027	0.0064	0.0000034	0.0000034	0.0023	0.0000015	3.4	0.000015	0.0000078	0.00027
5-Nov-14	19	500	475	7.8	57	#N/A	#N/A	17	0.95	0.095	0.029	0.14	12	0.017	0.0013	0.0024	0.0063	0.0000033	0.0000033	0.0012	0.0000076	3.0	0.000014	0.0000090	0.00025
12-Nov-14	20	500	505	7.8	89	#N/A	3.3	17	1.0	0.10	0.030	0.15	21	0.024	0.0025	0.0045	0.0099	0.0000035	0.0000035	0.0017	0.0000015	5.1	0.000015	0.000011	0.00014
19-Nov-14	21	500	480	7.9	94	#N/A	3.1	16	0.96	0.096	0.029	0.14	14	0.025	0.0014	0.0031	0.0069	0.0000034	0.0000034	0.0010	0.0000014	3.6	0.000014	0.0000096	0.00016
26-Nov-14	22	500	490	7.8	62	#N/A	0.96	14	0.98	0.098	0.029	0.15	14	0.022	0.0015	0.0030	0.0085	0.0000034	0.0000034	0.0011	0.0000015	3.5	0.000015	0.0000088	0.00014
3-Dec-14	23	500	485	7.7	59	#N/A	1.4	14	0.97	0.097	0.029	0.15	14	0.024	0.0014	0.0031	0.0072	0.0000034	0.0000034	0.0013	0.0000015	3.6	0.000015	0.0000068	0.000078
10-Dec-14	24	500	500	7.8	56	#N/A	2.4	14	1.0	0.10	0.030	0.15	13	0.022	0.0015	0.0027	0.0067	0.0000035	0.0000035	0.0011	0.0000015	3.3	0.000015	0.0000060	0.00012
17-Dec-14	25	500	485	7.8	64	#N/A	1.8	15	0.97	0.097	0.029	0.15	14	0.030	0.0016	0.0038	0.0078	0.0000034	0.0000034	0.00092	0.0000015	3.7	0.000015	0.0000053	0.00014
24-Dec-14	26	500	480	7.8	74	#N/A	1.6	17	0.96	0.096	0.029	0.14	16	0.029	0.0020	0.0037	0.0096	0.0000034	0.0000034	0.00077	0.0000014	4.2	0.000014	0.0000072	0.000096
31-Dec-14	27	500	500	7.8	71	#N/A	0.72	24	1.0	0.10	0.030	0.15	17	0.024	0.0020	0.0034	0.0099	0.0000035	0.0000035	0.00075	0.0000015	4.5	0.000015	0.0000050	0.00024
7-Jan-15	28	500	495	7.7	69	#N/A	1.3	17	0.99	0.50	0.030	0.15	16	0.019	0.0019	0.0029	0.0089	0.0000035	0.0000035	0.0011	0.0000015	3.9	0.000015	0.000010	0.000079
14-Jan-15	29	500	490	7.7	72	#N/A	1.4	18	0.98	0.49	0.029	0.15	17	0.019	0.0023	0.0034	0.0095	0.0000034	0.0000034	0.0012	0.0000015	4.2	0.000015	0.0000074	0.00023
21-Jan-15	30	500	485	7.9	62	#N/A	2.7	17	0.97	0.49	0.029	0.15	15	0.023	0.0016	0.0026	0.0078	0.0000034	0.0000034	0.00078	0.0000015	3.8	0.000015	0.0000063	0.00018
28-Jan-15	31	500	485	7.7	61	#N/A	0.71	15	0.97	0.49	0.029	0.15	14	0.022	0.0016	0.0025	0.0083	0.0000034	0.0000034	0.0012	0.0000015	3.4	0.000049	0.0000049	0.000082
4-Feb-15	32	500	485	7.8	59	#N/A	1.1	15	0.97	0.49	0.029	0.15	13	0.017	0.0015	0.0022	0.0088	0.0000034	0.0000034	0.0010	0.0000015	3.3	0.000015	0.0000044	0.00018
11-Feb-15	33	500	475	7.7	55	#N/A	1.0	14	0.95	0.48	0.029	0.14	12	0.020	0.0013	0.0020	0.0067	0.0000033	0.0000033	0.00100	0.0000014	3.1	0.000014	0.0000067	0.00012
18-Feb-15	34	500	500	7.7	61	#N/A	1.1	16	1.0	0.50	0.030	0.15	15	0.018	0.0017	0.0024	0.0086	0.0000035	0.0000035	0.0012	0.0000015	3.9	0.000015	0.0000070	0.00026
25-Feb-15	35	500	480	7.8	72	#N/A	1.7	18	0.96	0.48	0.029	0.14	15	0.017	0.0017	0.0023	0.0098	0.0000034	0.0000034	0.00038	0.0000019	3.8	0.000029	0.0000077	0.00028
4-Mar-15	36	500	490	7.7	58	#N/A	1.1	15	0.98	0.49	0.029	0.15	13	0.020	0.0012	0.0021	0.0072	0.0000034	0.0000034	0.00039	0.0000015	3.3	0.000029	0.0000059	0.000069
11-Mar-15	37	500	485	7.7	54	#N/A	0.88	14	0.97	0.49	0.029	0.15	12	0.015	0.0013	0.0017	0.0070	0.0000034	0.0000034	0.00078	0.0000097	3.1	0.000029	0.000013	0.00043
18-Mar-15	38	500	490	7.7	50	#N/A	1.2	13	0.98	0.49	0.029	0.15	11	0.015	0.0010	0.0015	0.0071	0.0000034	0.0000034	0.00054	0.0000015	3.0	0.000015	0.0000083	0.00018
25-Mar-15	39	500	490	7.7	45	#N/A	1.3	13	0.98	0.49	0.029	0.15	11	0.015	0.0011	0.0016	0.0065	0.0000034	0.0000034	0.00044	0.0000015	2.8	0.000044	0.0000029	0.00037
1-Apr-15	40	500	485	7.9	44	#N/A	1.9	13	0.97	0.49	0.029	0.15	8.5	0.014	0.0010	0.0011	0.0071	0.0000058	0.0000034	0.00078	0.0000019	2.2	0.000015	0.0000019	0.00013
8-Apr-15	41	500	485	7.6	45	#N/A	1.3	12	0.97	0.49	0.029	0.15	9.7	0.013	0.0013	0.0014	0.0065	0.0000034	0.0000034	0.00039	0.0000015	2.6	0.000015	0.0000092	0.00011
15-Apr-15	42	500	475	7.7	57	#N/A	1.8	15	0.95	0.48	0.029	0.14	12	0.017	0.0012	0.0019	0.0076	0.0000033	0.0000033	0.0016	0.0000014	3.3	0.000014	0.0000019	0.0013
22-Apr-15	43	500	505	7.8	65	#N/A	1.6	18	1.5	0.51	0.030	0.15	15	0.023	0.0015	0.0027	0.0095	0.0000035	0.0000035	0.0015	0.0000015	3.9	0.000025	0.0000051	0.00048
29-Apr-15	44	500	495	7.8	68	#N/A	1.0	18	0.99	0.50	0.030	0.15	16	0.024	0.0015	0.0026	0.010	0.0000035	0.0000035	0.0010	0.0000015	4.1	0.000015	0.000011	0.00033
6-May-15	45	500	495	7.7	62	#N/A	1.3	17	0.99	0.50	0.030	0.15	14	0.021	0.0015	0.0031	0.0083	0.0000035	0.0000035	0.00094	0.0000015	3.6	0.000015	0.0000089	0.00020
13-May-15	46	500	495																						
20-May-15	47	495	480																						
27-May-15	48	480	475																						
3-Jun-15	49	475	475	8.0	172	#N/A	1.8	10	0.48	0.12	0.0071	0.036	10.0	0.0017	0.00097	0.00081	0.0075	0.00000083	0.00000083	0.00043	0.00000036	2.6	0.0000036	0.0000039	0.000020
10-Jun-15	50	500	490																						
17-Jun-15	51	490	482																						
24-Jun-15	52	480	450																						
1-Jul-15	53	450	445	8.0	186	#N/A	2.2	9.9	0.33	0.11	0.0067	0.033	9.3	0.0015	0.00078	0.00069	0.0076	0.00000078	0.00000078	0.00039	0.00000033	2.4	0.0000033	0.0000052	0.000041
8-Jul-15	54	500	485																						
15-Jul-15	55	485	470																						
22-Jul-15	56	470	455																						
29-Jul-15	57	455	445	8.0	175	#N/A	1.2	10	0.33	0.11	0.0067	0.033	9.5	0.0012	0.00071	0.00055	0.0073	0.00000078	0.00000078	0.00038	0.0000011	2.4	0.0000045	0.0000042	0.0000089
5-Aug-15	58	500	490																						
12-Aug-15	59	490	475																						
19-Aug-15	60	475	465																						
26-Aug-15	61	465	445	8.1	177	#N/A	0.79	10	0.33	0.11	0.0067	0.033	10	0.0015	0.00070	0.00052	0.0081	0.00000078	0.00000078	0.00041	0.0000010	2.8	0.000012	0.0000046	0.000068
2-Sep-15	62	500	500																						
9-Sep-15	63	500	480																						
16-Sep-15	64	480	465																						
23-Sep-15	65	465	465	8.1	171	#N/A	1.0	9.9	0.35				10	0.0014	0.00074	0.00064	0.0085	0.00000081	0.00000081	0.00047	0.00000035	2.6	0.0000035	0.0000044	0.000028
30-Sep-15	66	500	495																						
7-Oct-15	67	495	475																						
14-Oct-15	68	475	470																						
21-Oct-15	69	470	455	8.1	156	#N/A	0.59	9.3	0.34				9.1	0.0016	0.00056	0.00042	0.0075	0.00000080	0.00000080	0.00041	0.00000034	2.4	0.0000034	0.0000047	0.000040
28-Oct-15	70	500	490																						
4-Nov-15	71	490	480																						
11-Nov-15	72	480	470																						
18-Nov-15	73	470	455	8.1	145	#N/A	0.54	9.5	0.23				7.7	0.0014	0.00046	0.00044	0.0055	0.00000080	0.00000080	0.00018	0.00000034	2.0	0.0000080	0.0000082	0.000043
25-Nov-15	74	500	490	7.9	72	#N/A	0.42	21	0.98				16	0.020	0.0010	0.0019	0.015	0.0000034	0.0000034	0.00069	0.0000015	4.4	0.000015	0.000011	0.00010
2-Dec-15	75	500	490	8.0	85	#N/A	0.82	21	0.98				21	0.018	0.0014	0.0020	0.018	0.0000034	0.0000034	0.00044	0.0000015	5.2	0.000015	0.0000078	0.00017
9-Dec-15	76	500	495	7.9	70	#N/A	1.4	18	0.99				16	0.018	0.00099	0.0019	0.015	0.0000045	0.0000035	0.0015	0.0000059	4.3	0.000015	0.0000074	0.00017
16-Dec-15	77	500	495	8.1	77	#N/A	0.73	19	0.99				19	0.025	0.0011	0.0023	0.017	0.0000035	0.0000035	0.0010	0.0000015	4.9	0.000025	0.0000099	0.00017
23-Dec-15	78	500	485	8.1	62	#N/A	0.69	16	0.97				16	0.021	0.00086	0.0018	0.014	0.0000034	0.0000034	0.00086	0.0000015	4.3	0.000025	0.0000064	0.00014
30-Dec-15	79	500	490	7.8	55	#N/A	0.66	14	0.98				14	0.017	0.00059	0.0012	0.012	0.0000034	0.0000034	0.00069	0.0000015	3.6	0.000025	0.0000029	0.00011
6-Jan-16	80	500	490	7.6	53	#N/A	0.75	14	0.98				13	0.016	0.00062	0.0012	0.011	0.0000034	0.0000034	0.00084	0.0000015	3.5	0.000020	0.0000025	0.00017
13-Jan-16	81	500	495	7.6	55	#N/A	0.84	14	0.99				13	0.016	0.00064	0.0012	0.011	0.0000035	0.0000035	0.00099	0.0000015	3.5	0.000015	0.0000020	0.00024
20-Jan-16	82	500	495	7.8	71	#N/A	1.1	15	0.99				14	0.017	0.00067	0.0013	0.013	0.0000035	0.0000035	0.00099	0.0000032	3.7	0.000015	0.0000069	0.00025
27-Jan-16	83	500	495	7.8	62	#N/A	1.4	16	0.99				15	0.018	0.00069	0.0013	0.014	0.0000035	0.0000035	0.00099	0.0000050	4.0	0.000015	0.000012	0.00026
3-Feb-16	84	500	495	7.8	70	#N/A	1.3	16	0.99				15	0.016	0.00071	0.0013	0.014	0.0000034	0.0000034	0.00098	0.0000032	4.1	0.000015	0.0000098	0.00015
10-Feb-16	85	500	480	7.7	67	#N/A	1.2	16	0.96				15	0.014	0.00072	0.0013	0.014	0.0000034	0.0000034	0.00096	0.0000014	4.2	0.000014	0.0000077	0.000043
17-Feb-16	86	500	505	7.7	64	#N/A	1.2	17	1.0				16	0.015	0.00074	0.0013	0.014	0.0000034	0.0000034	0.00096	0.0000014	4.3	0.000014	0.0000062	0.000041
24-Feb-16	87	500	480	7.8	70	#N/A	1.1	17	0.96				16	0.016	0.00077	0.0013	0.014	0.0000034	0.0000034	0.00096	0.0000014	4.3	0.000014	0.0000048	0.000038

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Calculated Loading Rates for HC4 (GS)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
25-Jun-14	0	500	335	7.8	0.0017	0.0000034	0.0021	7.8	0.0072	0.0034	0.0020	0.00040	0.0050	3.7	0.00027	0.64	0.00000067	8.0	0.10	22	0.000012	0.000057	0.000037	0.011	0.00015	0.00067	0.00067
2-Jul-14	1	500	505	7.8	0.0010	0.0000051	0.0026	10	0.014	0.0051	0.0023	0.0012	0.0045	4.1	0.00027	1.0	0.0000010	7.8	0.13	26	0.000011	0.00059	0.000030	0.031	0.00017	0.0010	0.0010
9-Jul-14	2	500	475	7.9	0.00095	0.0000048	0.0018	5.3	0.0070	0.0048	0.0022	0.00048	0.0095	3.0	0.000071	1.0	0.00000095	3.7	0.067	9.6	0.0000081	0.0014	0.000038	0.016	0.00020	0.00048	0.00095
16-Jul-14	3	500	500	8.0	0.0035	0.0000050	0.0014	3.9	0.0054	0.0050	0.0019	0.00040	0.0045	2.3	0.000025	0.87	0.0000010	2.1	0.053	3.9	0.0000075	0.000075	0.000035	0.0096	0.00020	0.00050	0.0010
23-Jul-14	4	500	495	8.0	0.0064	0.0000050	0.0011	3.0	0.0051	0.0050	0.0012	0.00020	0.0045	1.9	0.000020	0.75	0.00000099	1.2	0.042	2.3	0.0000050	0.00081	0.000040	0.0057	0.00018	0.00050	0.00099
30-Jul-14	5	500	480	8.0	0.00096	0.0000048	0.0011	2.8	0.0040	0.0048	0.0012	0.00024	0.0043	1.7	0.000034	0.70	0.00000096	0.84	0.040	1.6	0.0000086	0.000019	0.000072	0.0051	0.00021	0.00048	0.00096
6-Aug-14	6	500	485	7.9	0.00097	0.000024	0.00086	2.5	0.0035	0.0049	0.00074	0.000049	0.0044	1.6	0.000024	0.67	0.00000097	0.61	0.036	1.2	0.0000039	0.000015	0.000029	0.0045	0.00019	0.00049	0.00097
13-Aug-14	7	500	485	7.9	0.00097	0.0000049	0.00065	2.0	0.0040	0.0049	0.00054	0.000097	0.0044	1.2	0.000019	0.50	0.00000097	0.37	0.029	0.78	0.0000024	0.0000049	0.000087	0.0036	0.000092	0.00049	0.00097
20-Aug-14	8	500	480	7.9	0.00096	0.0000048	0.00058	1.8	0.0037	0.0048	0.00050	0.000096	0.0043	1.2	0.000029	0.47	0.00000096	0.31	0.028	0.75	0.0000024	0.00064	0.000082	0.0037	0.00017	0.00048	0.00096
27-Aug-14	9	500	500	7.9	0.0010	0.0000050	0.00067	2.3	0.0043	0.0050	0.00058	0.00010	0.0060	1.4	0.000025	0.62	0.0000010	0.36	0.035	0.95	0.0000060	0.000045	0.000040	0.0048	0.00017	0.00050	0.0010
3-Sep-14	10	500	475	7.8	0.0033	0.000029	0.00062	2.1	0.0045	0.0048	0.00049	0.000048	0.0029	1.3	0.000043	0.67	0.0000086	0.28	0.034	1.1	0.0000062	0.000095	0.000024	0.0044	0.00017	0.00048	0.00095
10-Sep-14	11	500	505	7.9	0.0035	0.0000051	0.00057	1.9	0.0044	0.0051	0.00042	0.000051	0.0015	1.2	0.000025	0.61	0.0000010	0.23	0.032	0.76	0.0000051	0.000030	0.000045	0.0044	0.00017	0.00051	0.0010
17-Sep-14	12	500	490	7.9	0.0034	0.0000049	0.00057	1.9	0.0035	0.0049	0.00041	0.000049	0.0015	1.3	0.000025	0.54	0.00000098	0.22	0.031	1.0	0.0000025	0.0000098	0.000074	0.0048	0.00018	0.00049	0.00098
24-Sep-14	13	500	485	7.9	0.00097	0.0000049	0.00048	1.7	0.0032	0.0049	0.00037	0.000097	0.0044	1.0	0.000019	0.46	0.0000024	0.17	0.027	0.68	0.0000024	0.0000097	0.000024	0.0042	0.00014	0.00049	0.00097
1-Oct-14	14	500	480	7.8	0.0043	0.0000048	0.00032	1.3	0.0056	0.0048	0.00038	0.000048	0.0043	0.83	0.000019	0.37	0.00000096	0.11	0.023	0.73	0.0000024	0.000014	0.000029	0.0034	0.00012	0.00096	0.00096
8-Oct-14	15	500	490	7.7	0.0034	0.0000049	0.00035	1.2	0.0037	0.0049	0.00027	0.000049	0.0015	0.81	0.000020	0.34	0.00000098	0.11	0.021	0.88	0.0000039	0.00052	0.000025	0.0035	0.00013	0.00049	0.00098
15-Oct-14	16	500	480	7.8	0.0034	0.0000048	0.00042	1.3	0.0039	0.0048	0.00031	0.000048	0.0014	0.84	0.000019	0.36	0.00000096	0.12	0.022	0.86	0.0000043	0.00036	0.000077	0.0036	0.00012	0.00048	0.00096
22-Oct-14	17	500	500	7.8	0.0035	0.000030	0.00050	1.9	0.0053	0.0050	0.00046	0.000050	0.0015	1.1	0.000020	0.52	0.0000010	0.15	0.029	1.1	0.0000055	0.000020	0.000025	0.0054	0.00014	0.00050	0.0010
29-Oct-14	18	500	490	7.7	0.0034	0.0000049	0.00030	1.2	0.0043	0.0049	0.00027	0.000049	0.0015	0.69	0.000020	0.29	0.00000098	0.088	0.020	0.59	0.0000039	0.00044	0.000029	0.0032	0.000088	0.00049	0.00098
5-Nov-14	19	500	475	7.8	0.0033	0.0000048	0.00027	1.1	0.0040	0.0048	0.00030	0.000048	0.0014	0.59	0.000019	0.29	0.00000095	0.086	0.018	0.57	0.0000052	0.00045	0.000033	0.0030	0.000086	0.00048	0.00095
12-Nov-14	20	500	505	7.8	0.0035	0.0000051	0.00044	1.9	0.0047	0.0051	0.00067	0.000051	0.0015	1.0	0.000025	0.50	0.0000010	0.17	0.032	0.96	0.0000056	0.000056	0.000025	0.0054	0.00015	0.00051	0.0010
19-Nov-14	21	500	480	7.9	0.0034	0.0000096	0.00030	1.2	0.0040	0.0048	0.00030	0.000048	0.0014	0.68	0.000019	0.31	0.00000096	0.082	0.022	0.48	0.0000043	0.00014	0.000024	0.0032	0.00012	0.00048	0.00096
26-Nov-14	22	500	490	7.8	0.0034	0.0000049	0.00031	1.3	0.0049	0.0049	0.00034	0.000049	0.0044	0.69	0.000020	0.33	0.00000098	0.083	0.022	0.54	0.0000078	0.00039	0.000064	0.0036	0.00012	0.00049	0.00098
3-Dec-14	23	500	485	7.7	0.0034	0.000019	0.00028	1.2	0.0053	0.0049	0.00035	0.000049	0.0015	0.61	0.000019	0.28	0.00000097	0.087	0.018	0.53	0.0000029	0.00013	0.000024	0.0036	0.00015	0.00049	0.00097
10-Dec-14	24	500	500	7.8	0.0035	0.0000050	0.00028	1.1	0.0047	0.0050	0.00040	0.000050	0.0015	0.66	0.000020	0.29	0.0000010	0.070	0.020	0.55	0.0000050	0.00019	0.000035	0.0033	0.00011	0.00050	0.0010
17-Dec-14	25	500	485	7.8	0.0034	0.0000049	0.00032	1.2	0.0052	0.0049	0.00036	0.000049	0.0015	0.68	0.000019	0.35	0.00000097	0.078	0.022	0.44	0.0000044	0.00036	0.000024	0.0039	0.00014	0.00049	0.00097
24-Dec-14	26	500	480	7.8	0.0034	0.0000048	0.00038	1.4	0.0054	0.0048	0.00043	0.000048	0.0014	0.80	0.000038	0.38	0.00000096	0.086	0.025	0.53	0.0000058	0.00020	0.000086	0.0042	0.00016	0.00048	0.00096
31-Dec-14	27	500	500	7.8	0.0035	0.000055	0.00036	1.5	0.0053	0.0050	0.00048	0.000050	0.0015	0.81	0.000020	0.46	0.0000010	0.085	0.027	0.60	0.0000050	0.00018	0.000025	0.0045	0.00013	0.00050	0.0010
7-Jan-15	28	500	495	7.7	0.0035	0.0000099	0.00034	1.4	0.0052	0.0050	0.00047	0.000050	0.0015	0.76	0.000020	0.35	0.00000099	0.074	0.024	0.40	0.0000050	0.00027	0.000040	0.0040	0.00012	0.00050	0.00099
14-Jan-15	29	500	490	7.7	0.0034	0.0000098	0.00033	1.5	0.0043	0.0049	0.00053	0.000049	0.0015	0.85	0.000020	0.44	0.00000098	0.088	0.025	0.39	0.0000044	0.000083	0.000034	0.0039	0.00013	0.00049	0.00098
21-Jan-15	30	500	485	7.9	0.0034	0.000015	0.00028	1.2	0.0046	0.0049	0.00052	0.000049	0.0015	0.65	0.000019	0.32	0.00000097	0.058	0.021	0.24	0.0000024	0.00013	0.000087	0.0035	0.00012	0.00049	0.00097
28-Jan-15	31	500	485	7.7	0.0034	0.0000049	0.00025	1.3	0.0039	0.0049	0.00049	0.000049	0.0015	0.67	0.000039	0.34	0.00000097	0.078	0.017	0.53	0.0000029	0.000058	0.000029	0.0035	0.00013	0.00049	0.00097
4-Feb-15	32	500	485	7.8	0.0034	0.0000097	0.00029	1.2	0.0042	0.0049	0.00042	0.000049	0.0015	0.64	0.000019	0.32	0.00000097	0.068	0.022	0.49	0.0000024	0.00012	0.000068	0.0030	0.00011	0.00049	0.00097
11-Feb-15	33	500	475	7.7	0.0033	0.0000048	0.00023	1.0	0.0043	0.0048	0.00038	0.000048	0.0014	0.57	0.00048	0.28	0.00000095	0.052	0.018	0.24	0.0000029	0.00021	0.00016	0.0026	0.00012	0.00048	0.00095
18-Feb-15	34	500	500	7.7	0.0035	0.0000050	0.00032	1.3	0.0040	0.0050	0.00038	0.000050	0.0015	0.69	0.00050	0.35	0.0000010	0.060	0.024	0.35	0.0000040	0.000065	0.000030	0.0036	0.00013	0.00050	0.0010
25-Feb-15	35	500	480	7.8	0.0034	0.0000096	0.00030	1.4	0.0036	0.0048	0.00040	0.000048	0.0014	0.82	0.00048	0.34	0.00000096	0.067	0.025	0.34	0.0000038	0.000053	0.000024	0.0040	0.00012	0.00048	0.00096
4-Mar-15	36	500	490	7.7	0.0034	0.0000049	0.00026	1.1	0.0038	0.0049	0.00031	0.000049	0.0015	0.61	0.00049	0.33	0.00000098	0.054	0.019	0.44	0.0000025	0.000015	0.000044	0.0032	0.00011	0.00049	0.00098
11-Mar-15	37	500	485	7.7	0.0049	0.000049	0.00024	0.96	0.0040	0.0049	0.00029	0.000049	0.0015	0.50	0.00049	0.24	0.00000097	0.034	0.018	0.049	0.0000024	0.00028	0.000044	0.0028	0.000097	0.0058	0.00097
18-Mar-15	38	500	490	7.7	0.0034	0.0000049	0.00023	0.94	0.0046	0.0049	0.00027	0.000049	0.0015	0.53	0.00049	0.25	0.00000098	0.039	0.017	0.44	0.0000025	0.00020	0.00010	0.0025	0.000078	0.00049	0.00098
25-Mar-15	39	500	490	7.7	0.0034	0.0000049	0.00016	0.98	0.0043	0.0049	0.00028	0.000049	0.0015	0.51	0.00049	0.24	0.00000098	0.064	0.017	0.34	0.0000025	0.00024	0.000039	0.0025	0.00012	0.00049	0.00098
1-Apr-15	40	500	485	7.9	0.0034	0.0000049	0.00015	0.76	0.0080	0.0049	0.00020	0.000049	0.0015	0.44	0.00049	0.15	0.00000097	0.33	0.014	0.049	0.0000024	0.00023	0.000024	0.0030	0.000068	0.00049	0.00097
8-Apr-15	41	500	485	7.6	0.0034	0.0000049	0.00018	0.79	0.0041	0.0049	0.00024	0.000049	0.0015	0.45	0.00049	0.26	0.00000097	0.034	0.015	0.049	0.0000024	0.00019	0.000024	0.0022	0.000087	0.00049	0.00097
15-Apr-15	42	500	475	7.7	0.0033	0.0000048	0.00024	1.0	0.0043	0.0048	0.00029	0.000048	0.0014	0.58	0.00048	0.28	0.00000095	0.048	0.019	0.33	0.0000024	0.00047	0.000057	0.0031	0.00012	0.00048	0.00095
22-Apr-15	43	500	505	7.8	0.0035	0.000030	0.00028	1.2	0.0045	0.0051	0.00034	0.000051	0.0015	0.69	0.00051	0.36	0.0000020	0.056	0.022	0.30	0.0000066	0.00018	0.000025	0.0038	0.00014	0.00051	0.0010
29-Apr-15	44	500	495	7.8	0.0035	0.0000099	0.00027	1.3	0.0050	0.0050	0.00038	0.000050	0.0015	0.77	0.00050	0.34	0.00000099	0.045	0.023	0.40	0.0000025	0.00019	0.000040	0.0038	0.00013	0.00050	0.00099
6-May-15	45	500	495	7.7	0.0035	0.0000050	0.00027	1.1	0.0047	0.0050	0.00032	0.000050	0.0015	0.66	0.00050	0.35	0.00000099	0.045	0.020	0.35	0.0000025	0.00027	0.000050	0.0034	0.00012	0.00050	0.00099
13-May-15	46	500	495																								
20-May-15	47	495	480																								
27-May-15	48	480	475																								
3-Jun-15	49	475	475	8.0	0.00083	0.0000012	0.00016	0.86	0.0014	0.0012	0.00026	0.000024	0.00036	0.42	0.0000048	0.25	0.00000024	0.030	0.015	0.21	0.0000012	0.000045	0.000011	0.0026	0.000037	0.00012	0.00024
10-Jun-15	50	500	490																								
17-Jun-15	51	490	482																								
24-Jun-15	52	480	450																								
1-Jul-15	53	450	445	8.0	0.00078	0.0000011	0.00014	0.81	0.0019	0.0011	0.00022	0.000022	0.00033	0.32	0.0000089	0.21	0.00000022	0.029	0.015	0.18	0.0000014	0.00010	0.0000056	0.0026	0.000030	0.00011	0.00022
8-Jul-15	54	500	485																								
15-Jul-15	55	485	470																								
22-Jul-15	56	470	455																								
29-Jul-15	57	455	445	8.0	0.00078	0.0000011	0.00014	0.85	0.0020	0.0011	0.00015	0.000022	0.00033	0.32	0.0000067	0.20	0.0000014	0.028	0.016	0.18	0.00000056	0.000047	0.0000056	0.0013	0.000020	0.00011	0.00022
5-Aug-15	58	500	490																								
12-Aug-15	59	490	475																								
19-Aug-15	60	475	465																								
26-Aug-15	61	465	445	8.1	0.00078	0.000012	0.00013	0.82	0.0019	0.0011	0.00024	0.000022	0.00033	0.33	0.0000078	0.25	0.00000022	0.024	0.015	0.18	0.0000017	0.00011	0.0000056	0.0027	0.000032	0.00022	0.00022
2-Sep-15	62	500	500																								
9-Sep-15	63	500	480																								
16-Sep-15	64	480	465																								
23-Sep-15	65	465	465	8.1	0.00081	0.0000012	0.00014	0.88	0.0015	0.0012	0.00018	0.000023	0.00035	0.36	0.0000093	0.22	0.0000017	0.028	0.016	0.20	0.00000093	0.000094	0.0000081	0.0023	0.000027	0.00012	0.00023
30-Sep-15	66	500	495																								
7-Oct-15	67	495	475																								
14-Oct-15	68	475	470																								
21-Oct-15	69	470	455	8.1	0.00080	0.0000023	0.00012	0.77	0.0016	0.0011	0.00014	0.000023	0.00034	0.31	0.000010	0.19	0.0000027	0.028	0.013	0.15	0.0000016	0.00014	0.0000057	0.0022	0.000022	0.00011	0.00023
28-Oct-15	70	500	490																								
4-Nov-15	71	490	480																								
11-Nov-15	72	480	470																								
18-Nov-15	73	470	455	8.1	0.0025	0.0000011	0.000094	0.66	0.0018	0.0011	0.00025	0.000011	0.00034	0.27	0.000020	0.15	0.00000023	0.024	0.011	0.10	0.0000018	0.00013	0.0000057	0.0018	0.000023	0.00011	0.00023
25-Nov-15	74	500	490	7.9	0.0034	0.0000098	0.00027	1.3	0.0041	0.0049	0.00040	0.000049	0.0015	0.73	0.00014	0.35	0.000068	0.059	0.024	0.25	0.0000025	0.00023	0.000025	0.0047	0.00013	0.00049	0.00098
2-Dec-15	75	500	490	8.0	0.0034	0.000015	0.00029	1.9	0.0044	0.0049	0.00043	0.000049	0.0015	0.95	0.000020	0.47	0.00000098	0.059	0.030	0.39	0.0000025	0.00020	0.000039	0.0055	0.00012	0.00049	0.00098
9-Dec-15	76	500	495	7.9	0.0035	0.0000050	0.00027	1.3	0.0031	0.0050	0.00031	0.000050	0.0015	0.73	0.000025	0.34	0.0000020	0.040	0.024	0.15	0.0000099	0.00020	0.000069	0.0044	0.00012	0.00050	0.00099
16-Dec-15	77	500	495	8.1	0.0035	0.000064	0.00032	1.6	0.0037	0.0050	0.00029	0.000050	0.0059	0.88	0.000020	0.44	0.00000099	0.050	0.028	0.099	0.0000035	0.00032	0.000069	0.0052	0.00014	0.00050	0.00099
23-Dec-15	78	500	485	8.1	0.0034	0.000035	0.00027	1.4	0.0034	0.0049	0.00023	0.000049	0.0037	0.72	0.000020	0.35	0.00000099	0.049	0.024	0.25	0.0000030	0.00021	0.000064	0.0043	0.00012	0.00049	0.00099
30-Dec-15	79	500	490	7.8	0.0034	0.0000049	0.00023	1.1	0.0030	0.0049	0.00017	0.000049	0.0015	0.57	0.000020	0.25	0.00000098	0.049	0.019	0.39	0.0000025	0.00011	0.000059	0.0034	0.000093	0.00049	0.00098
6-Jan-16	80	500	490	7.6	0.0034	0.0000074	0.00020	1.1	0.0031	0.0049	0.00021	0.000049	0.0015	0.58	0.000042	0.26	0.00000099	0.039	0.019	0.22	0.0000025	0.00012	0.000059	0.0032	0.000084	0.00049	0.00099
13-Jan-16	81	500	495	7.6	0.0035	0.0000099	0.00018	1.0	0.0031	0.0050	0.00024	0.000050	0.0015	0.58	0.000064	0.27	0.00000099	0.030	0.018	0.050	0.0000025	0.00014	0.000059	0.0030	0.000074	0.00050	0.00099
20-Jan-16	82	500	495	7.8	0.0035	0.0000074	0.00020	1.1	0.0034	0.0050	0.00021	0.000050	0.0015	0.60	0.000042	0.29	0.00000099	0.032	0.020	0.050	0.0000025	0.00019	0.000057	0.0035	0.000082	0.00050	0.00099
27-Jan-16	83	500	495	7.8	0.0035	0.0000050	0.00022	1.2	0.0036	0.0050	0.00018	0.000050	0.0015	0.61	0.000020	0.31	0.00000099	0.035	0.022	0.050	0.0000025	0.00024	0.000054	0.0040	0.000089	0.00050	0.00099
3-Feb-16	84	500	495	7.8	0.0034	0.0000049	0.00021	1.2	0.0039	0.0049	0.00018	0.000049	0.0015	0.60	0.000027	0.30	0.00000098	0.041	0.022	0.17	0.0000029	0.00020	0.000061	0.0036	0.000083	0.00049	0.00098
10-Feb-16	85	500	480	7.7	0.0034	0.0000048	0.00020	1.2	0.0041	0.0048	0.00018	0.000048	0.0014	0.59	0.000034	0.28	0.00000096	0.048	0.022	0.29	0.0000034	0.00016	0.000067	0.0033	0.000077	0.00048	0.00096
17-Feb-16	86	500	505	7.7	0.0034	0.0000048	0.00022	1.2	0.0037	0.0048	0.00019	0.000048	0.0014	0.62	0.000026	0.25	0.00000096	0.036	0.022	0.26	0.0000029	0.00015	0.000067	0.0035	0.000079	0.00048	0.00096
24-Feb-16	87	500	480	7.8	0.0034	0.0000048	0.00023	1.3	0.0033	0.0048	0.00020	0.000048	0.0014	0.66	0.000019	0.23	0.00000096	0.024	0.022	0.24	0.0000024	0.00014	0.000067	0.0038	0.000082	0.00048	0.00096

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for HC5 (OKY Master)

Date	**Cycle**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**	**Cu**
	No.	Input	Output		umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
6-May-15	0	500	290	7.5	232	#N/A	4.4	26	57	5.0	0.23	< 0.3	28	0.14	0.010	0.093	0.0064	0.000028	< 0.000007	0.075	0.000019	7.9	< 0.00003	0.0026	0.0029
13-May-15	1	500	485	7.6	70	#N/A	5.0	17	10	1.0	0.54	< 0.3	3.2	0.50	0.015	0.24	0.0050	0.000037	0.000013	0.053	< 0.000003	0.87	0.000050	0.00049	0.0017
20-May-15	2	500	495	7.4	35	#N/A	3.5	9.7	3.0	1.0	0.82	< 0.3	1.0	0.20	0.011	0.29	0.0018	0.000018	< 0.000007	0.022	< 0.000003	0.28	< 0.00003	0.00014	0.0010
27-May-15	3	500	435	7.3	31	#N/A	2.5	9.2	4.0	1.0	0.72	< 0.3	1.1	0.24	0.010	0.27	0.0018	0.000012	< 0.000007	0.019	< 0.000003	0.29	< 0.00003	0.00012	0.00037
3-Jun-15	4	500	520	7.4	25	#N/A	2.8	7.7	2.0	< 1	0.70	< 0.3	0.87	0.37	0.0078	0.29	0.0029	0.000019	< 0.000007	0.011	0.0000040	0.24	< 0.00003	0.00010	0.00048
10-Jun-15	5	500	495	7.3	23	#N/A	3.0	8.2	3.0	< 1	0.55	< 0.3	0.74	0.052	0.0059	0.27	0.00060	< 0.000007	< 0.000007	0.013	< 0.000003	0.21	< 0.00003	0.000096	0.00089
17-Jun-15	6	500	490	7.4	19	#N/A	3.0	7.3	3.0	< 1	0.41	< 0.3	0.78	0.28	0.0056	0.30	0.0025	0.000019	< 0.000007	0.014	0.0000060	0.22	< 0.00003	0.00011	0.00047
24-Jun-15	7	500	490	7.2	19	#N/A	3.2	5.8	< 2	< 1	0.40	< 0.3	0.76	0.20	0.0053	0.27	0.0015	0.000015	< 0.000007	0.0083	< 0.000003	0.20	< 0.00003	0.00011	0.00029
1-Jul-15	8	500	480	7.6	16	#N/A	3.1	6.5	< 2	< 1	0.33	< 0.3	0.72	0.21	0.0044	0.25	0.0017	0.000015	< 0.000007	0.0049	< 0.000003	0.19	0.000040	0.00010	0.00074
8-Jul-15	9	500	495	7.5	15	#N/A	2.6	5.8	3.0	< 1	0.33	< 0.3	0.70	0.046	0.0039	0.22	0.00049	< 0.000007	< 0.000007	0.0065	< 0.000003	0.20	< 0.00003	0.000091	0.00032
15-Jul-15	10	500	490	7.2	12	#N/A	3.4	5.1	2.0	< 1	0.25	< 0.3	0.61	0.088	0.0032	0.22	0.00072	< 0.000007	< 0.000007	0.0093	< 0.000003	0.16	0.000030	0.000096	0.00052
22-Jul-15	11	500	495	7.0	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	12	500	495	7.3	12	#N/A	2.3	5.1	< 2	< 1	0.18	< 0.3	0.59	0.031	0.0026	0.17	0.00032	0.0000070	< 0.000007	0.0038	< 0.000003	0.16	< 0.00003	0.000073	0.00075
5-Aug-15	13	500	490	6.9	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	14	500	495	6.8	10	#N/A	1.7	3.9	< 2	< 1	0.15	< 0.3	0.76	0.088	0.0022	0.14	0.00067	< 0.000007	0.0000070	0.0090	< 0.000003	0.20	0.000030	0.000090	0.00028
19-Aug-15	15	500	475	7.0	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	16	500	515	7.4	11	#N/A	2.6	4.6	2.0	< 1	0.12	< 0.3	0.88	0.068	0.0020	0.11	0.00050	< 0.000007	< 0.000007	0.0032	0.0000060	0.24	< 0.00003	0.00011	0.00012
2-Sep-15	17	500	490	7.0	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	18	500	500	7.0	10	#N/A	1.9	3.4	< 2	< 1	0.11	< 0.3	0.87	0.034	0.0016	0.100	0.00033	< 0.000007	< 0.000007	0.0040	< 0.000003	0.24	0.000040	0.000092	0.00044
16-Sep-15	19	500	495	6.9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	20	500	500	7.1	8.0	#N/A	1.5	3.8	< 2		0.060		0.85	0.020	0.0012	0.065	0.00024	< 0.000007	< 0.000007	0.0022	0.000018	0.23	< 0.00003	0.000079	0.000070
30-Sep-15	21	500	490	6.9	5.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	22	500	495	7.4	10	#N/A	2.0	5.2	< 2		0.070		1.5	0.041	0.0014	0.052	0.00040	< 0.000007	< 0.000007	0.0027	< 0.000003	0.42	0.000040	0.00011	0.00042
14-Oct-15	23	500	500	7.1	8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	24	500	505	7.3	7.0	#N/A	0.80	4.0	2.0		0.070		1.1	0.029	0.0011	0.054	0.00090	< 0.000007	< 0.000007	0.0023	< 0.000003	0.29	< 0.00003	0.00011	0.00040
28-Oct-15	25	500	490	7.3	8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	26	500	475	7.3	8.0	#N/A	1.2	4.4	2.0		< 0.06		1.1	0.046	0.0011	0.049	0.00044	< 0.000007	< 0.000007	0.0042	0.0000050	0.30	< 0.00003	0.00011	0.00043
11-Nov-15	27	500	500	7.3	6.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	28	500	500	7.2	8.0	#N/A	1.4	4.7	2.0		< 0.06		1.1	0.019	0.0010	0.045	0.00021	< 0.000007	< 0.000007	0.00050	< 0.000003	0.31	0.000040	0.00012	0.00048
25-Nov-15	29	500	490	7.1	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Dec-15	30	500	490	6.8	8.0	#N/A	3.0	4.0	2.0		0.070		1.2	0.11	0.0011	0.059	0.00090	< 0.000007	< 0.000007	0.0010	< 0.000003	0.34	< 0.00003	0.00012	0.00015
9-Dec-15	31	500	490	7.3	5.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	32	500	495	7.3	7.0	#N/A	3.2	3.5	2.0		< 0.06		1.4	0.056	0.00090	0.058	0.00075	0.000017	0.000012	0.0020	0.000030	0.39	0.00024	0.00014	0.00052
23-Dec-15	33	500	490	7.9	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	34	500	505	6.7	4.0	#N/A	2.3	3.6	2.0		< 0.06		1.1	0.040	0.00080	0.045	0.00043	< 0.000007	< 0.000007	0.0016	< 0.000003	0.31	0.000060	0.000094	0.0015
6-Jan-16	35	500	485	6.6	6.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	36	500	490	6.4	5.0	#N/A	2.4	2.7	2.0		< 0.06		1.2	0.024	0.00060	0.025	0.00036	< 0.000007	< 0.000007	< 0.002	< 0.000003	0.33	< 0.00003	0.000096	0.00044
20-Jan-16	37	500	485	7.3	8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	38	500	505	7.2	6.0	#N/A	3.3	3.5	2.0		< 0.06		1.1	0.014	0.00060	0.029	0.00064	< 0.000007	< 0.000007	< 0.002	0.000023	0.30	< 0.00003	0.00013	0.00058
3-Feb-16	39	500	480	7.2	3.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	40	500	505	6.6	5.0	#N/A	2.5	3.0	2.0		< 0.06		0.98	0.0063	0.00050	0.026	0.00017	< 0.000007	< 0.000007	< 0.002	< 0.000003	0.27	0.000040	0.000097	0.00080
17-Feb-16	41	500	490	7.5	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	42	500	490	6.9	4.0	#N/A	2.4	3.3	< 2		< 0.06		1.2	0.0071	0.00060	0.029	0.00031	< 0.000007	< 0.000007	< 0.002	0.0000050	0.32	< 0.00003	0.00010	0.000060
2-Mar-16	43	500	495	6.7	6.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Mar-16	44	500	495	6.9	6.0	#N/A	3.3	4.5	< 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Calculated Loading Rates for HC5 (OKY Master)

Date	**Cycle**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**	**Cu**
	No.	Input	Output		umhos/cm	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
6-May-15	0	500	290	7.5	232	#N/A	1.3	7.5	17	1.5	0.067	0.087	8.0	0.039	0.0030	0.027	0.0019	0.0000081	0.0000020	0.022	0.0000055	2.3	0.0000087	0.00074	0.00083
13-May-15	1	500	485	7.6	70	#N/A	2.4	8.2	4.9	0.49	0.26	0.15	1.6	0.24	0.0071	0.12	0.0024	0.000018	0.0000063	0.025	0.0000015	0.42	0.000024	0.00024	0.00082
20-May-15	2	500	495	7.4	35	#N/A	1.8	4.8	1.5	0.50	0.41	0.15	0.50	0.098	0.0052	0.14	0.00091	0.0000089	0.0000035	0.011	0.0000015	0.14	0.000015	0.000070	0.00051
27-May-15	3	500	435	7.3	31	#N/A	1.1	4.0	1.7	0.44	0.31	0.13	0.48	0.10	0.0044	0.12	0.00078	0.0000052	0.0000030	0.0081	0.0000013	0.13	0.000013	0.000053	0.00016
3-Jun-15	4	500	520	7.4	25	#N/A	1.4	4.0	1.0	0.52	0.36	0.16	0.45	0.19	0.0041	0.15	0.0015	0.0000099	0.0000036	0.0059	0.0000021	0.12	0.000016	0.000053	0.00025
10-Jun-15	5	500	495	7.3	23	#N/A	1.5	4.0	1.5	0.50	0.27	0.15	0.37	0.026	0.0029	0.13	0.00030	0.0000035	0.0000035	0.0063	0.0000015	0.10	0.000015	0.000048	0.00044
17-Jun-15	6	500	490	7.4	19	#N/A	1.5	3.6	1.5	0.49	0.20	0.15	0.38	0.14	0.0027	0.15	0.0012	0.0000093	0.0000034	0.0069	0.0000029	0.11	0.000015	0.000055	0.00023
24-Jun-15	7	500	490	7.2	19	#N/A	1.6	2.8	0.98	0.49	0.20	0.15	0.37	0.098	0.0026	0.13	0.00073	0.0000074	0.0000034	0.0041	0.0000015	0.098	0.000015	0.000052	0.00014
1-Jul-15	8	500	480	7.6	16	#N/A	1.5	3.1	0.96	0.48	0.16	0.14	0.35	0.10	0.0021	0.12	0.00080	0.0000072	0.0000034	0.0024	0.0000014	0.091	0.000019	0.000049	0.00036
8-Jul-15	9	500	495	7.5	15	#N/A	1.3	2.9	1.5	0.50	0.16	0.15	0.35	0.023	0.0019	0.11	0.00024	0.0000035	0.0000035	0.0032	0.0000015	0.099	0.000015	0.000045	0.00016
15-Jul-15	10	500	490	7.2	12	#N/A	1.7	2.5	0.98	0.49	0.12	0.15	0.30	0.043	0.0016	0.11	0.00035	0.0000034	0.0000034	0.0046	0.0000015	0.078	0.000015	0.000047	0.00025
22-Jul-15	11	500	495	7.0	12	#N/A	1.4	2.5	0.99	0.49	0.11	0.15	0.30	0.029	0.0014	0.095	0.00026	0.0000034	0.0000034	0.0032	0.0000015	0.079	0.000015	0.000042	0.00031
29-Jul-15	12	500	495	7.3	12	#N/A	1.1	2.5	0.99	0.50	0.089	0.15	0.29	0.015	0.0013	0.082	0.00016	0.0000035	0.0000035	0.0019	0.0000015	0.079	0.000015	0.000036	0.00037
5-Aug-15	13	500	490	6.9	11	#N/A	0.99	2.2	0.99	0.50	0.082	0.15	0.33	0.029	0.0012	0.076	0.00025	0.0000035	0.0000035	0.0032	0.0000015	0.089	0.000015	0.000040	0.00025
12-Aug-15	14	500	495	6.8	10	#N/A	0.85	1.9	0.99	0.50	0.074	0.15	0.38	0.043	0.0011	0.070	0.00033	0.0000035	0.0000035	0.0045	0.0000015	0.099	0.000015	0.000045	0.00014
19-Aug-15	15	500	475	7.0	10	#N/A	1.1	2.1	1.0	0.51	0.068	0.15	0.41	0.039	0.0011	0.064	0.00029	0.0000035	0.0000035	0.0031	0.0000023	0.11	0.000015	0.000050	0.00010
26-Aug-15	16	500	515	7.4	11	#N/A	1.3	2.4	1.0	0.52	0.062	0.15	0.45	0.035	0.0010	0.059	0.00026	0.0000036	0.0000036	0.0016	0.0000031	0.12	0.000015	0.000055	0.000062
2-Sep-15	17	500	490	7.0	10	#N/A	1.1	2.0	1.0	0.51	0.058	0.15	0.44	0.026	0.00092	0.054	0.00021	0.0000036	0.0000036	0.0018	0.0000023	0.12	0.000018	0.000050	0.00014
9-Sep-15	18	500	500	7.0	10	#N/A	0.95	1.7	1.0	0.50	0.055	0.15	0.44	0.017	0.00080	0.050	0.00017	0.0000035	0.0000035	0.0020	0.0000015	0.12	0.000020	0.000046	0.00022
16-Sep-15	19	500	495	6.9	9.7	#N/A	0.84	1.8	1.0	0.25	0.043	0.075	0.43	0.014	0.00070	0.041	0.00014	0.0000035	0.0000035	0.0016	0.0000053	0.12	0.000018	0.000043	0.00013
23-Sep-15	20	500	500	7.1	8.0	#N/A	0.74	1.9	1.0	0.00	0.030	0.00	0.43	0.010	0.00060	0.033	0.00012	0.0000035	0.0000035	0.0011	0.0000090	0.12	0.000015	0.000040	0.000035
30-Sep-15	21	500	490	6.9	4.9	#N/A	0.86	2.2	1.00	0.00	0.032	0.00	0.58	0.015	0.00065	0.029	0.00016	0.0000035	0.0000035	0.0012	0.0000052	0.16	0.000017	0.000047	0.00012
7-Oct-15	22	500	495	7.4	10	#N/A	0.98	2.6	0.99	0.00	0.035	0.00	0.74	0.020	0.00069	0.026	0.00020	0.0000035	0.0000035	0.0013	0.0000015	0.21	0.000020	0.000055	0.00021
14-Oct-15	23	500	500	7.1	7.8	#N/A	0.68	2.3	1.0	0.00	0.035	0.00	0.65	0.017	0.00062	0.026	0.00033	0.0000035	0.0000035	0.0012	0.0000015	0.18	0.000017	0.000057	0.00020
21-Oct-15	24	500	505	7.3	7.1	#N/A	0.38	2.0	1.0	0.00	0.035	0.00	0.56	0.015	0.00056	0.027	0.00045	0.0000035	0.0000035	0.0012	0.0000015	0.15	0.000015	0.000058	0.00020
28-Oct-15	25	500	490	7.3	8.4	#N/A	0.47	2.1	0.98	0.00	0.032	0.00	0.54	0.018	0.00054	0.025	0.00033	0.0000034	0.0000034	0.0016	0.0000019	0.14	0.000015	0.000056	0.00020
4-Nov-15	26	500	475	7.3	8.0	#N/A	0.55	2.1	0.95	0.00	0.029	0.00	0.52	0.022	0.00052	0.023	0.00021	0.0000033	0.0000033	0.0020	0.0000024	0.14	0.000014	0.000054	0.00020
11-Nov-15	27	500	500	7.3	5.8	#N/A	0.62	2.2	0.98	0.00	0.029	0.00	0.53	0.016	0.00051	0.023	0.00016	0.0000034	0.0000034	0.0011	0.0000019	0.15	0.000017	0.000057	0.00022
18-Nov-15	28	500	500	7.2	7.8	#N/A	0.69	2.3	1.0	0.00	0.030	0.00	0.55	0.0095	0.00050	0.022	0.00011	0.0000035	0.0000035	0.00025	0.0000015	0.16	0.000020	0.000061	0.00024
25-Nov-15	29	500	490	7.1	8.7	#N/A	1.1	2.1	0.99	0.00	0.032	0.00	0.57	0.033	0.00052	0.026	0.00027	0.0000035	0.0000035	0.00037	0.0000015	0.16	0.000017	0.000060	0.00016
2-Dec-15	30	500	490	6.8	7.5	#N/A	1.5	2.0	0.98	0.00	0.034	0.00	0.59	0.056	0.00054	0.029	0.00044	0.0000034	0.0000034	0.00049	0.0000015	0.17	0.000015	0.000059	0.000074
9-Dec-15	31	500	490	7.3	5.3	#N/A	1.5	1.9	0.99	0.00	0.032	0.00	0.64	0.042	0.00049	0.029	0.00041	0.0000059	0.0000047	0.00074	0.0000082	0.18	0.000067	0.000064	0.00017
16-Dec-15	32	500	495	7.3	6.6	#N/A	1.6	1.7	0.99	0.00	0.030	0.00	0.69	0.028	0.00045	0.029	0.00037	0.0000084	0.0000059	0.00099	0.000015	0.19	0.00012	0.000068	0.00026
23-Dec-15	33	500	490	7.9	4.5	#N/A	1.4	1.8	1.0	0.00	0.030	0.00	0.62	0.024	0.00042	0.026	0.00029	0.0000060	0.0000047	0.00090	0.0000082	0.17	0.000075	0.000058	0.00051
30-Dec-15	34	500	505	6.7	4.5	#N/A	1.1	1.8	1.0	0.00	0.030	0.00	0.56	0.020	0.00040	0.023	0.00022	0.0000035	0.0000035	0.00081	0.0000015	0.16	0.000030	0.000047	0.00076
6-Jan-16	35	500	485	6.6	6.5	#N/A	1.2	1.6	1.00	0.00	0.030	0.00	0.57	0.016	0.00035	0.017	0.00020	0.0000035	0.0000035	0.00089	0.0000015	0.16	0.000023	0.000047	0.00049
13-Jan-16	36	500	490	6.4	5.2	#N/A	1.2	1.3	0.98	0.00	0.029	0.00	0.58	0.012	0.00029	0.012	0.00018	0.0000034	0.0000034	0.00098	0.0000015	0.16	0.000015	0.000047	0.00022
20-Jan-16	37	500	485	7.3	8.0	#N/A	1.4	1.5	1.00	0.00	0.030	0.00	0.57	0.0095	0.00030	0.013	0.00025	0.0000035	0.0000035	0.00100	0.0000065	0.16	0.000015	0.000057	0.00025
27-Jan-16	38	500	505	7.2	5.8	#N/A	1.7	1.7	1.0	0.00	0.030	0.00	0.56	0.0072	0.00030	0.015	0.00032	0.0000035	0.0000035	0.0010	0.000012	0.15	0.000015	0.000067	0.00029
3-Feb-16	39	500	480	7.2	2.7	#N/A	1.5	1.6	1.0	0.00	0.030	0.00	0.53	0.0052	0.00028	0.014	0.00020	0.0000035	0.0000035	0.0010	0.0000066	0.14	0.000018	0.000058	0.00035
10-Feb-16	40	500	505	6.6	4.6	#N/A	1.3	1.5	1.0	0.00	0.030	0.00	0.49	0.0032	0.00025	0.013	0.000086	0.0000035	0.0000035	0.0010	0.0000015	0.14	0.000020	0.000049	0.00040
17-Feb-16	41	500	490	7.5	4.5	#N/A	1.2	1.6	1.00	0.00	0.030	0.00	0.54	0.0033	0.00027	0.014	0.00012	0.0000035	0.0000035	0.00100	0.0000020	0.15	0.000017	0.000049	0.00022
24-Feb-16	42	500	490	6.9	3.6	#N/A	1.2	1.6	0.98	0.00	0.029	0.00	0.59	0.0035	0.00029	0.014	0.00015	0.0000034	0.0000034	0.00098	0.0000025	0.16	0.000015	0.000050	0.000029

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for HC5 (OKY Master)

Date	**Cycle**	**Volume** (mL)		**pH**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.	Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
6-May-15	0	500	290	7.5	0.042	0.00041	0.0086	1.9	0.27	0.040	0.0012	0.00060	0.022	9.5	< 0.001	11	0.000046	28	0.034	20	0.000085	0.000080	0.0018	0.00074	0.00021	0.019	< 0.002
13-May-15	1	500	485	7.6	0.26	0.0023	0.0032	0.26	0.082	0.020	0.0044	0.00020	0.036	4.2	< 0.001	11	0.000011	11	0.0048	2.7	0.000037	0.000070	0.0068	0.0010	0.00039	0.0040	< 0.002
20-May-15	2	500	495	7.4	0.098	0.0012	0.0016	0.082	0.031	0.010	0.0066	< 0.0001	0.044	2.3	0.000050	9.4	0.0000030	5.1	0.0015	1.6	0.000016	0.00011	0.0024	0.00086	0.00028	0.0010	< 0.002
27-May-15	3	500	435	7.3	0.11	0.00062	0.0014	0.083	0.030	< 0.01	0.0058	< 0.0001	0.038	2.1	< 0.001	11	0.0000040	4.8	0.0015	0.90	0.000010	0.00013	0.0037	0.00038	0.00032	0.0020	< 0.002
3-Jun-15	4	500	520	7.4	0.17	0.0012	0.0012	0.067	0.026	< 0.01	0.0060	< 0.0001	0.046	2.0	< 0.00004	8.7	0.000011	3.7	0.0015	1.1	0.000012	< 0.00001	0.0060	0.00053	0.00038	0.0010	< 0.002
10-Jun-15	5	500	495	7.3	0.026	0.00044	0.0010	0.052	0.024	< 0.01	0.0050	< 0.0001	0.038	1.9	0.000060	7.2	< 0.000002	3.1	0.00087	0.90	0.0000070	0.000080	0.00071	0.00030	0.00022	0.0020	< 0.002
17-Jun-15	6	500	490	7.4	0.15	0.0011	0.0010	0.057	0.026	< 0.01	0.0048	< 0.0001	0.048	1.8	0.000050	7.4	0.0000030	2.5	0.0011	1.0	0.000017	0.000040	0.0048	0.00073	0.00031	0.0020	< 0.002
24-Jun-15	7	500	490	7.2	0.095	0.00066	0.00098	0.062	0.027	< 0.01	0.0033	< 0.0001	0.037	1.9	< 0.00004	6.9	0.0000030	2.4	0.0012	0.80	0.000011	0.000060	0.0031	0.00033	0.00027	0.0010	< 0.002
1-Jul-15	8	500	480	7.6	0.11	0.00072	0.00091	0.057	0.025	0.020	0.0030	< 0.0001	0.032	1.7	< 0.00004	6.7	0.0000050	1.9	0.0012	0.60	0.000011	0.00013	0.0026	0.00045	0.00028	0.0020	< 0.002
8-Jul-15	9	500	495	7.5	0.025	0.00029	0.00080	0.051	0.024	< 0.01	0.0024	< 0.0001	0.026	1.6	0.000060	7.0	0.0000040	1.6	0.00098	1.2	0.000013	0.000040	0.00054	0.00019	0.00016	< 0.001	< 0.002
15-Jul-15	10	500	490	7.2	0.035	0.00023	0.00089	0.051	0.023	< 0.01	0.0029	< 0.0001	0.023	1.4	< 0.00004	5.7	< 0.000002	1.5	0.00091	0.20	0.0000090	0.00014	0.00075	0.00086	0.00021	0.0010	< 0.002
22-Jul-15	11	500	495	7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	12	500	495	7.3	0.011	0.000080	0.00078	0.047	0.023	< 0.01	0.0017	< 0.0001	0.024	1.5	< 0.00004	4.9	0.000015	1.0	0.00087	0.50	< 0.000005	0.000050	0.00017	0.0022	0.00017	0.0010	< 0.002
5-Aug-15	13	500	490	6.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	14	500	495	6.8	0.033	0.00021	0.00070	0.060	0.028	< 0.01	0.0023	< 0.0001	0.022	1.7	< 0.00004	4.9	< 0.000002	0.87	0.0011	0.50	0.000017	0.000040	0.0015	0.0012	0.00018	0.0010	< 0.002
19-Aug-15	15	500	475	7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	16	500	515	7.4	0.023	0.00023	0.00075	0.068	0.034	< 0.01	0.0013	< 0.0001	0.016	1.7	< 0.00004	4.4	< 0.000002	0.61	0.0012	0.70	0.0000090	< 0.00001	0.00036	0.00038	0.00014	< 0.001	< 0.002
2-Sep-15	17	500	490	7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	18	500	500	7.0	0.011	0.000080	0.00068	0.067	0.032	< 0.01	0.0029	< 0.0001	0.013	1.6	< 0.00004	3.5	0.0000020	0.60	0.0010	3.3	0.000013	0.00016	0.00035	0.0012	0.00016	< 0.001	< 0.002
16-Sep-15	19	500	495	6.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	20	500	500	7.1	0.0080	0.000040	0.00056	0.064	0.032	< 0.01	0.00070	< 0.0001	0.0050	1.4	< 0.00004	2.8	0.000013	0.38	0.0010	0.50	0.0000070	< 0.00001	0.00025	0.00055	0.000090	< 0.001	< 0.002
30-Sep-15	21	500	490	6.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	22	500	495	7.4	0.013	0.00010	0.00061	0.10	0.047	< 0.01	0.0024	< 0.0001	0.0090	1.5	< 0.00004	3.4	< 0.000002	0.46	0.0016	0.40	0.0000060	0.000080	0.00033	0.0029	0.00010	< 0.001	< 0.002
14-Oct-15	23	500	500	7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	24	500	505	7.3	0.012	0.000090	0.00055	0.080	0.040	< 0.01	0.0036	< 0.0001	0.0090	1.4	0.000040	3.1	0.000019	0.35	0.0015	0.40	0.000010	0.000060	0.00046	0.00045	0.00010	< 0.001	< 0.002
28-Oct-15	25	500	490	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	26	500	475	7.3	0.018	0.00011	0.00048	0.083	0.042	< 0.01	0.013	< 0.0001	0.0040	1.4	< 0.00004	2.9	< 0.000002	0.31	0.0014	0.30	0.0000050	0.000050	0.00061	0.00018	0.00014	0.0010	< 0.002
11-Nov-15	27	500	500	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	28	500	500	7.2	0.033	0.000030	0.00044	0.084	0.042	< 0.01	0.0013	< 0.0001	< 0.003	1.2	0.00013	2.8	< 0.000002	0.30	0.0016	0.20	0.0000080	0.000080	0.00049	0.00032	0.000080	0.0020	< 0.002
25-Nov-15	29	500	490	7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Dec-15	30	500	490	6.8	0.047	0.00019	0.00047	0.097	0.049	< 0.01	0.00065	< 0.0001	0.0050	1.5	< 0.00004	3.2	< 0.000002	0.30	0.0016	0.70	< 0.000005	< 0.00001	0.00079	0.00033	0.00013	< 0.001	< 0.002
9-Dec-15	31	500	490	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	32	500	495	7.3	0.023	0.00024	0.00053	0.12	0.046	< 0.01	0.00054	0.00010	0.010	1.3	0.00012	2.8	0.000019	0.26	0.0022	0.50	0.000016	0.00012	0.00034	0.00046	0.00012	0.0090	< 0.002
23-Dec-15	33	500	490	7.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	34	500	505	6.7	0.020	0.00016	0.00052	0.087	0.047	< 0.01	0.00037	< 0.0001	0.0040	1.3	< 0.00004	2.3	< 0.000002	0.25	0.0016	0.80	< 0.000005	0.00039	0.00032	0.00060	0.000090	0.0020	< 0.002
6-Jan-16	35	500	485	6.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	36	500	490	6.4	0.0090	0.00011	0.00037	0.088	0.049	< 0.01	0.00036	< 0.0001	< 0.003	0.95	0.00011	2.0	0.0000020	0.15	0.0015	< 0.1	< 0.000005	0.000040	0.00058	0.00029	0.000040	< 0.001	< 0.002
20-Jan-16	37	500	485	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	38	500	505	7.2	< 0.007	0.000050	0.00038	0.077	0.044	< 0.01	0.00024	0.00010	< 0.003	0.89	< 0.00004	2.1	< 0.000002	0.24	0.0015	< 0.1	< 0.000005	0.000070	0.00013	0.00021	0.00010	0.010	< 0.002
3-Feb-16	39	500	480	7.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	40	500	505	6.6	< 0.007	0.000040	0.00032	0.074	0.045	< 0.01	0.00022	< 0.0001	< 0.003	0.78	0.000050	1.5	< 0.000002	0.17	0.0013	0.60	0.0000050	0.000040	0.000070	0.00032	0.000030	0.0010	< 0.002
17-Feb-16	41	500	490	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	42	500	490	6.9	< 0.007	0.000020	0.00034	0.087	0.051	0.030	0.00027	0.00020	< 0.003	0.92	< 0.00004	1.8	< 0.000002	0.13	0.0015	0.50	< 0.000005	< 0.00001	< 0.00005	0.00027	0.000040	0.0020	< 0.002
2-Mar-16	43	500	495	6.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Mar-16	44	500	495	6.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Calculated Loading Rates for HC5 (OKY Master)

Date	**Cycle**	**Volume** (mL)		**pH**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.	Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
6-May-15	0	500	290	7.5	0.012	0.00012	0.0025	0.55	0.077	0.012	0.00036	0.00017	0.0064	2.7	0.00029	3.1	0.000013	8.1	0.0097	5.8	0.000025	0.000023	0.00052	0.00021	0.000061	0.0055	0.00058
13-May-15	1	500	485	7.6	0.12	0.0011	0.0015	0.12	0.040	0.0097	0.0021	0.000097	0.017	2.0	0.00049	5.4	0.0000053	5.2	0.0023	1.3	0.000018	0.000034	0.0033	0.00049	0.00019	0.0019	0.00097
20-May-15	2	500	495	7.4	0.049	0.00058	0.00080	0.041	0.015	0.0050	0.0033	0.000050	0.022	1.1	0.000025	4.6	0.0000015	2.5	0.00076	0.79	0.0000079	0.000054	0.0012	0.00042	0.00014	0.00050	0.00099
27-May-15	3	500	435	7.3	0.046	0.00027	0.00061	0.036	0.013	0.0044	0.0025	0.000044	0.017	0.91	0.00044	4.6	0.0000017	2.1	0.00065	0.39	0.0000044	0.000057	0.0016	0.00017	0.00014	0.00087	0.00087
3-Jun-15	4	500	520	7.4	0.088	0.00060	0.00063	0.035	0.014	0.0052	0.0031	0.000052	0.024	1.1	0.000021	4.5	0.0000057	1.9	0.00077	0.57	0.0000062	0.0000052	0.0031	0.00027	0.00020	0.00052	0.0010
10-Jun-15	5	500	495	7.3	0.013	0.00022	0.00051	0.026	0.012	0.0050	0.0025	0.000050	0.019	0.94	0.000030	3.6	0.00000099	1.5	0.00043	0.45	0.0000035	0.000040	0.00035	0.00015	0.00011	0.00099	0.00099
17-Jun-15	6	500	490	7.4	0.073	0.00054	0.00049	0.028	0.013	0.0049	0.0024	0.000049	0.024	0.90	0.000025	3.6	0.0000015	1.2	0.00055	0.49	0.0000083	0.000020	0.0024	0.00036	0.00015	0.00098	0.00098
24-Jun-15	7	500	490	7.2	0.047	0.00032	0.00048	0.030	0.013	0.0049	0.0016	0.000049	0.018	0.91	0.000020	3.4	0.0000015	1.2	0.00057	0.39	0.0000054	0.000029	0.0015	0.00016	0.00013	0.00049	0.00098
1-Jul-15	8	500	480	7.6	0.052	0.00035	0.00044	0.027	0.012	0.0096	0.0014	0.000048	0.015	0.80	0.000019	3.2	0.0000024	0.91	0.00056	0.29	0.0000053	0.000062	0.0013	0.00022	0.00013	0.00096	0.00096
8-Jul-15	9	500	495	7.5	0.012	0.00014	0.00040	0.025	0.012	0.0050	0.0012	0.000050	0.013	0.81	0.000030	3.4	0.0000020	0.80	0.00049	0.59	0.0000064	0.000020	0.00027	0.000095	0.000079	0.00050	0.00099
15-Jul-15	10	500	490	7.2	0.017	0.00011	0.00044	0.025	0.011	0.0049	0.0014	0.000049	0.011	0.70	0.000020	2.8	0.00000098	0.74	0.00045	0.098	0.0000044	0.000069	0.00037	0.00042	0.00010	0.00049	0.00098
22-Jul-15	11	500	495	7.0	0.011	0.000076	0.00041	0.024	0.011	0.0049	0.0011	0.000049	0.012	0.71	0.000020	2.6	0.0000042	0.63	0.00044	0.17	0.0000034	0.000047	0.00023	0.00076	0.000094	0.00049	0.00099
29-Jul-15	12	500	495	7.3	0.0054	0.000040	0.00039	0.023	0.011	0.0050	0.00083	0.000050	0.012	0.73	0.000020	2.4	0.0000074	0.51	0.00043	0.25	0.0000025	0.000025	0.000084	0.0011	0.000084	0.00050	0.00099
5-Aug-15	13	500	490	6.9	0.011	0.000072	0.00037	0.026	0.012	0.0050	0.00098	0.000050	0.011	0.79	0.000020	2.4	0.0000042	0.47	0.00048	0.25	0.0000054	0.000022	0.00041	0.00085	0.000087	0.00050	0.00099
12-Aug-15	14	500	495	6.8	0.016	0.00010	0.00035	0.030	0.014	0.0050	0.0011	0.000050	0.011	0.85	0.000020	2.4	0.00000099	0.43	0.00052	0.25	0.0000084	0.000020	0.00074	0.00060	0.000089	0.00050	0.00099
19-Aug-15	15	500	475	7.0	0.014	0.00011	0.00037	0.032	0.016	0.0051	0.00090	0.000051	0.0096	0.85	0.000020	2.4	0.0000010	0.37	0.00056	0.30	0.0000065	0.000012	0.00046	0.00040	0.000081	0.00051	0.0010
26-Aug-15	16	500	515	7.4	0.012	0.00012	0.00039	0.035	0.018	0.0052	0.00066	0.000052	0.0082	0.85	0.000021	2.3	0.0000010	0.31	0.00060	0.36	0.0000046	0.0000052	0.00019	0.00020	0.000072	0.00052	0.0010
2-Sep-15	17	500	490	7.0	0.0087	0.000079	0.00036	0.034	0.017	0.0051	0.0010	0.000051	0.0074	0.82	0.000020	2.0	0.0000010	0.31	0.00056	1.0	0.0000056	0.000043	0.00018	0.00040	0.000076	0.00051	0.0010
9-Sep-15	18	500	500	7.0	0.0055	0.000040	0.00034	0.034	0.016	0.0050	0.0014	0.000050	0.0065	0.79	0.000020	1.8	0.0000010	0.30	0.00052	1.7	0.0000065	0.000080	0.00018	0.00060	0.000080	0.00050	0.0010
16-Sep-15	19	500	495	6.9	0.0048	0.000030	0.00031	0.033	0.016	0.0050	0.00089	0.000050	0.0045	0.74	0.000020	1.6	0.0000038	0.25	0.00052	0.95	0.0000050	0.000043	0.00015	0.00044	0.000063	0.00050	0.0010
23-Sep-15	20	500	500	7.1	0.0040	0.000020	0.00028	0.032	0.016	0.0050	0.00035	0.000050	0.0025	0.70	0.000020	1.4	0.0000065	0.19	0.00051	0.25	0.0000035	0.0000050	0.00013	0.00027	0.000045	0.00050	0.0010
30-Sep-15	21	500	490	6.9	0.0052	0.000035	0.00029	0.041	0.019	0.0050	0.00077	0.000050	0.0035	0.73	0.000020	1.6	0.0000037	0.21	0.00066	0.22	0.0000032	0.000022	0.00014	0.00086	0.000047	0.00050	0.00100
7-Oct-15	22	500	495	7.4	0.0064	0.000050	0.00030	0.050	0.023	0.0050	0.0012	0.000050	0.0045	0.76	0.000020	1.7	0.00000099	0.23	0.00081	0.20	0.0000030	0.000040	0.00016	0.0014	0.000050	0.00050	0.00099
14-Oct-15	23	500	500	7.1	0.0062	0.000047	0.00029	0.045	0.022	0.0050	0.0015	0.000050	0.0044	0.73	0.000020	1.6	0.0000053	0.20	0.00079	0.20	0.0000040	0.000035	0.00020	0.00083	0.000050	0.00050	0.0010
21-Oct-15	24	500	505	7.3	0.0061	0.000045	0.00028	0.040	0.020	0.0051	0.0018	0.000051	0.0044	0.71	0.000020	1.6	0.0000096	0.18	0.00078	0.20	0.0000051	0.000030	0.00023	0.00023	0.000051	0.00051	0.0010
28-Oct-15	25	500	490	7.3	0.0073	0.000049	0.00025	0.040	0.020	0.0049	0.0039	0.000049	0.0031	0.68	0.000020	1.5	0.0000053	0.16	0.00072	0.17	0.0000037	0.000027	0.00026	0.00016	0.000059	0.00049	0.00098
4-Nov-15	26	500	475	7.3	0.0086	0.000052	0.00023	0.039	0.020	0.0048	0.0061	0.000048	0.0019	0.65	0.000019	1.4	0.00000095	0.15	0.00066	0.14	0.0000024	0.000024	0.00029	0.000084	0.000067	0.00048	0.00095
11-Nov-15	27	500	500	7.3	0.013	0.000034	0.00022	0.041	0.020	0.0049	0.0034	0.000049	0.0017	0.63	0.000042	1.4	0.00000098	0.15	0.00073	0.12	0.0000032	0.000032	0.00027	0.00012	0.000053	0.00074	0.00098
18-Nov-15	28	500	500	7.2	0.017	0.000015	0.00022	0.042	0.021	0.0050	0.00066	0.000050	0.0015	0.61	0.000065	1.4	0.0000010	0.15	0.00081	0.10	0.0000040	0.000040	0.00025	0.00016	0.000040	0.0010	0.0010
25-Nov-15	29	500	490	7.1	0.020	0.000054	0.00023	0.045	0.023	0.0050	0.00049	0.000050	0.0020	0.66	0.000042	1.5	0.00000099	0.15	0.00079	0.22	0.0000032	0.000022	0.00032	0.00016	0.000052	0.00075	0.00099
2-Dec-15	30	500	490	6.8	0.023	0.000093	0.00023	0.048	0.024	0.0049	0.00032	0.000049	0.0025	0.71	0.000020	1.5	0.00000098	0.15	0.00077	0.34	0.0000025	0.0000049	0.00039	0.00016	0.000064	0.00049	0.00098
9-Dec-15	31	500	490	7.3	0.017	0.00011	0.00025	0.052	0.023	0.0049	0.00029	0.000049	0.0037	0.69	0.000040	1.5	0.0000052	0.14	0.00094	0.30	0.0000052	0.000032	0.00028	0.00020	0.000062	0.0025	0.00099
16-Dec-15	32	500	495	7.3	0.011	0.00012	0.00026	0.057	0.023	0.0050	0.00027	0.000050	0.0050	0.66	0.000059	1.4	0.0000094	0.13	0.0011	0.25	0.0000079	0.000059	0.00017	0.00023	0.000059	0.0045	0.00099
23-Dec-15	33	500	490	7.9	0.011	0.000100	0.00026	0.051	0.023	0.0050	0.00023	0.000050	0.0035	0.65	0.000040	1.3	0.0000052	0.13	0.00095	0.33	0.0000052	0.00013	0.00016	0.00026	0.000052	0.0027	0.0010
30-Dec-15	34	500	505	6.7	0.010	0.000081	0.00026	0.044	0.024	0.0051	0.00019	0.000051	0.0020	0.63	0.000020	1.2	0.0000010	0.13	0.00078	0.40	0.0000025	0.00020	0.00016	0.00030	0.000045	0.0010	0.0010
6-Jan-16	35	500	485	6.6	0.0073	0.000067	0.00022	0.044	0.024	0.0050	0.00018	0.000050	0.0017	0.55	0.000037	1.1	0.00000100	0.100	0.00075	0.23	0.0000025	0.00011	0.00022	0.00022	0.000033	0.00075	0.00100
13-Jan-16	36	500	490	6.4	0.0044	0.000054	0.00018	0.043	0.024	0.0049	0.00018	0.000049	0.0015	0.47	0.000054	0.97	0.00000098	0.074	0.00072	0.049	0.0000025	0.000020	0.00028	0.00014	0.000020	0.00049	0.00098
20-Jan-16	37	500	485	7.3	0.0040	0.000040	0.00019	0.041	0.023	0.0050	0.00015	0.000050	0.0015	0.46	0.000037	1.0	0.00000100	0.097	0.00073	0.050	0.0000025	0.000027	0.00017	0.00012	0.000035	0.0028	0.00100
27-Jan-16	38	500	505	7.2	0.0035	0.000025	0.00019	0.039	0.022	0.0051	0.00012	0.000051	0.0015	0.45	0.000020	1.0	0.0000010	0.12	0.00073	0.051	0.0000025	0.000035	0.000066	0.00010	0.000051	0.0051	0.0010
3-Feb-16	39	500	480	7.2	0.0035	0.000023	0.00018	0.038	0.022	0.0051	0.00012	0.000051	0.0015	0.42	0.000023	0.90	0.0000010	0.10	0.00068	0.18	0.0000025	0.000028	0.000051	0.00013	0.000033	0.0028	0.0010
10-Feb-16	40	500	505	6.6	0.0035	0.000020	0.00016	0.037	0.023	0.0051	0.00011	0.000051	0.0015	0.39	0.000025	0.76	0.0000010	0.086	0.00063	0.30	0.0000025	0.000020	0.000035	0.00016	0.000015	0.00051	0.0010
17-Feb-16	41	500	490	7.5	0.0035	0.000015	0.00016	0.040	0.024	0.0099	0.00012	0.000074	0.0015	0.42	0.000022	0.82	0.00000100	0.075	0.00067	0.27	0.0000025	0.000013	0.000030	0.00015	0.000017	0.00074	0.00100
24-Feb-16	42	500	490	6.9	0.0034	0.0000098	0.00016	0.043	0.025	0.015	0.00013	0.000098	0.0015	0.45	0.000020	0.89	0.00000098	0.064	0.00072	0.25	0.0000025	0.0000049	0.000025	0.00013	0.000020	0.00098	0.00098

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for HC6 (OKY Master (Fresh))

Date	**Cycle**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**	**Cu**
	No.	Input	Output		umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
6-May-15	0	500	320	7.9	385	#N/A	3.6	96	77	7.0	1.8	< 0.3	85	0.021	0.0056	0.061	0.015	0.0000080	< 0.000007	0.041	0.0000070	26	< 0.00003	0.0014	0.0020
13-May-15	1	500	495	7.6	146	#N/A	6.6	48	13	2.0	1.1	< 0.3	34	0.023	0.0049	0.064	0.0075	< 0.000007	< 0.000007	0.030	0.0000030	10	0.000050	0.00034	0.00080
20-May-15	2	500	490	7.5	95	#N/A	3.7	34	3.0	2.0	0.65	< 0.3	27	0.025	0.0034	0.082	0.0062	< 0.000007	< 0.000007	0.015	< 0.000003	8.4	< 0.00003	0.00014	0.00050
27-May-15	3	500	490	7.6	73	#N/A	2.6	29	3.0	1.0	0.37	< 0.3	23	0.12	0.0030	0.096	0.0062	< 0.000007	< 0.000007	0.012	< 0.000003	7.0	< 0.00003	0.00011	0.00025
3-Jun-15	4	500	490	7.4	65	#N/A	3.3	27	3.0	< 1	0.26	< 0.3	21	0.047	0.0024	0.091	0.0049	< 0.000007	< 0.000007	0.0085	< 0.000003	6.4	0.000030	0.000089	0.00021
10-Jun-15	5	500	495	7.4	59	#N/A	3.6	26	3.0	< 1	0.22	< 0.3	21	0.044	0.0020	0.087	0.0046	< 0.000007	< 0.000007	0.0080	< 0.000003	6.5	< 0.00003	0.000077	0.00017
17-Jun-15	6	500	490	7.3	52	#N/A	3.7	25	3.0	< 1	0.17	< 0.3	18	0.052	0.0020	0.092	0.0044	< 0.000007	< 0.000007	0.0090	< 0.000003	5.7	< 0.00003	0.000075	0.00016
24-Jun-15	7	500	485	7.5	52	#N/A	3.2	22	< 2	< 1	0.16	< 0.3	17	0.041	0.0018	0.083	0.0040	< 0.000007	< 0.000007	0.0060	< 0.000003	5.4	< 0.00003	0.000076	0.00015
1-Jul-15	8	500	485	7.3	43	#N/A	3.8	17	2.0	< 1	0.12	< 0.3	14	0.058	0.0015	0.079	0.0034	< 0.000007	< 0.000007	0.0024	0.0000030	4.2	< 0.00003	0.000065	0.00044
8-Jul-15	9	500	485	7.4	41	#N/A	2.5	17	2.0	< 1	< 0.06	< 0.3	15	0.055	0.0014	0.060	0.0034	< 0.000007	< 0.000007	0.0049	< 0.000003	4.6	< 0.00003	0.000065	0.00066
15-Jul-15	10	500	490	7.3	34	#N/A	3.6	16	< 2	< 1	0.10	< 0.3	12	0.072	0.0012	0.059	0.0030	< 0.000007	< 0.000007	0.0059	< 0.000003	3.8	< 0.00003	0.000059	0.00020
22-Jul-15	11	500	485	7.4	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	12	500	490	7.3	32	#N/A	2.0	14	< 2	< 1	0.090	< 0.3	12	0.068	0.0011	0.043	0.0026	< 0.000007	< 0.000007	0.0029	< 0.000003	3.6	< 0.00003	0.000049	0.00014
5-Aug-15	13	500	480	7.3	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	14	500	495	7.3	28	#N/A	1.7	12	< 2	< 1	0.080	< 0.3	11	0.067	0.00090	0.042	0.0026	< 0.000007	< 0.000007	0.0047	< 0.000003	3.3	< 0.00003	0.000051	0.00033
19-Aug-15	15	500	505	7.3	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	16	500	500	7.5	28	#N/A	1.5	13	< 2	< 1	0.070	< 0.3	10	0.052	0.00090	0.028	0.0025	< 0.000007	< 0.000007	0.0022	0.0000060	3.3	< 0.00003	0.000054	0.00013
2-Sep-15	17	500	490	7.3	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	18	500	485	7.3	28	#N/A	2.0	12	< 2	< 1	0.070	< 0.3	11	0.045	0.00080	0.023	0.0025	< 0.000007	< 0.000007	0.0020	< 0.000003	3.4	< 0.00003	0.000049	0.00025
16-Sep-15	19	500	495	7.3	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	20	500	490	7.3	26	#N/A	1.4	11	< 2		0.070		9.7	0.043	0.0010	0.025	0.0022	< 0.000007	< 0.000007	0.0019	< 0.000003	3.1	0.000050	0.000045	0.000090
30-Sep-15	21	500	495	7.2	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	22	500	495	7.4	23	#N/A	2.1	12	< 2		0.060		8.8	0.032	0.00070	0.014	0.0019	< 0.000007	< 0.000007	0.0015	< 0.000003	2.8	< 0.00003	0.000043	0.00036
14-Oct-15	23	500	505	7.4	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	24	500	505	7.3	20	#N/A	1.2	9.5	2.0		0.060		8.3	0.059	0.00070	0.016	0.0025	0.0000070	< 0.000007	0.0016	0.0000050	2.6	< 0.00003	0.000068	0.00042
28-Oct-15	25	500	510	7.4	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	26	500	485	7.4	26	#N/A	1.6	12	2.0		0.060		10	0.026	0.00080	0.016	0.0023	< 0.000007	< 0.000007	0.0023	< 0.000003	3.3	< 0.00003	0.000046	0.00033
11-Nov-15	27	500	485	7.3	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	28	500	505	7.3	19	#N/A	1.5	10	2.0		< 0.06		7.3	0.024	0.00070	0.013	0.0014	< 0.000007	< 0.000007	< 0.0002	< 0.000003	2.3	< 0.00003	0.000050	0.00061
25-Nov-15	29	500	485	7.3	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Dec-15	30	500	485	7.2	23	#N/A	3.0	12	2.0		0.060		9.6	0.12	0.00090	0.017	0.0035	0.0000070	< 0.000007	0.00080	0.0000030	3.0	< 0.00003	0.000071	0.00025
9-Dec-15	31	500	485	7.2	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	32	500	495	7.1	17	#N/A	2.6	9.0	2.0		< 0.06		8.1	0.017	0.00060	0.014	0.0031	0.000010	< 0.000007	0.0016	0.000014	2.5	0.000070	0.000076	0.00023
23-Dec-15	33	500	490	7.5	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	34	500	490	7.1	18	#N/A	1.9	9.9	3.0		< 0.06		8.4	0.023	0.00050	0.012	0.0021	< 0.000007	< 0.000007	0.0010	0.0000040	2.6	< 0.00003	0.000061	0.00026
6-Jan-16	35	500	490	7.1	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	36	500	495	7.0	19	#N/A	2.2	9.9	2.0		< 0.06		7.8	0.011	0.00050	0.0067	0.0021	< 0.000007	< 0.000007	< 0.002	< 0.000003	2.5	< 0.00003	0.000043	0.00033
20-Jan-16	37	500	490	7.1	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	38	500	485	7.1	21	#N/A	3.1	10	2.0		< 0.06		8.6	0.019	0.00050	0.0096	0.0027	< 0.000007	< 0.000007	< 0.002	0.0000030	2.7	< 0.00003	0.000077	0.00045
3-Feb-16	39	500	485	7.0	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	40	500	490	6.9	16	#N/A	2.5	9.3	2.0		< 0.06		6.6	0.032	0.00050	0.0079	0.0021	< 0.000007	< 0.000007	< 0.002	< 0.000003	2.1	< 0.00003	0.000067	0.00015
17-Feb-16	41	500	495	7.2	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	42	500	490	7.0	16	#N/A	2.7	8.3	2.0		< 0.06		6.7	0.016	0.00060	0.011	0.0019	< 0.000007	< 0.000007	< 0.002	0.000011	2.1	< 0.00003	0.000066	0.000040
2-Mar-16	43	500	485	7.0	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Mar-16	44	500	490	7.1	16	#N/A	3.1	8.8	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Calculated Loading Rates for HC6 (OKY Master (Fresh))

Date	**Cycle**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**	**Cu**
	No.	Input	Output		umhos/cm	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
6-May-15	0	500	320	7.9	385	#N/A	1.2	31	25	2.2	0.59	0.096	27	0.0068	0.0018	0.020	0.0049	0.0000026	0.0000022	0.013	0.0000022	8.3	0.0000096	0.00044	0.00063
13-May-15	1	500	495	7.6	146	#N/A	3.3	24	6.4	0.99	0.56	0.15	17	0.012	0.0024	0.032	0.0037	0.0000035	0.0000035	0.015	0.0000015	5.1	0.000025	0.00017	0.00040
20-May-15	2	500	490	7.5	95	#N/A	1.8	17	1.5	0.98	0.32	0.15	13	0.012	0.0017	0.040	0.0030	0.0000034	0.0000034	0.0071	0.0000015	4.1	0.000015	0.000071	0.00025
27-May-15	3	500	490	7.6	73	#N/A	1.3	14	1.5	0.49	0.18	0.15	11	0.056	0.0015	0.047	0.0030	0.0000034	0.0000034	0.0059	0.0000015	3.4	0.000015	0.000052	0.00012
3-Jun-15	4	500	490	7.4	65	#N/A	1.6	13	1.5	0.49	0.13	0.15	10	0.023	0.0012	0.045	0.0024	0.0000034	0.0000034	0.0042	0.0000015	3.1	0.000015	0.000044	0.00010
10-Jun-15	5	500	495	7.4	59	#N/A	1.8	13	1.5	0.50	0.11	0.15	10	0.022	0.00099	0.043	0.0023	0.0000035	0.0000035	0.0040	0.0000015	3.2	0.000015	0.000038	0.000084
17-Jun-15	6	500	490	7.3	52	#N/A	1.8	12	1.5	0.49	0.083	0.15	8.9	0.025	0.00098	0.045	0.0022	0.0000034	0.0000034	0.0044	0.0000015	2.8	0.000015	0.000037	0.000078
24-Jun-15	7	500	485	7.5	52	#N/A	1.5	11	0.97	0.49	0.078	0.15	8.4	0.020	0.00087	0.040	0.0019	0.0000034	0.0000034	0.0029	0.0000015	2.6	0.000015	0.000037	0.000073
1-Jul-15	8	500	485	7.3	43	#N/A	1.8	8.2	0.97	0.49	0.058	0.15	6.7	0.028	0.00073	0.038	0.0016	0.0000034	0.0000034	0.0012	0.0000015	2.1	0.000015	0.000032	0.00021
8-Jul-15	9	500	485	7.4	41	#N/A	1.2	8.2	0.97	0.49	0.029	0.15	7.2	0.027	0.00068	0.029	0.0017	0.0000034	0.0000034	0.0024	0.0000015	2.2	0.000015	0.000032	0.00032
15-Jul-15	10	500	490	7.3	34	#N/A	1.8	7.8	0.98	0.49	0.049	0.15	6.0	0.035	0.00059	0.029	0.0015	0.0000034	0.0000034	0.0029	0.0000015	1.9	0.000015	0.000029	0.000098
22-Jul-15	11	500	485	7.4	36	#N/A	1.4	7.3	0.98	0.49	0.047	0.15	5.9	0.034	0.00056	0.025	0.0014	0.0000034	0.0000034	0.0022	0.0000015	1.8	0.000015	0.000026	0.000083
29-Jul-15	12	500	490	7.3	32	#N/A	0.98	6.9	0.98	0.49	0.044	0.15	5.7	0.033	0.00054	0.021	0.0013	0.0000034	0.0000034	0.0014	0.0000015	1.8	0.000015	0.000024	0.000069
5-Aug-15	13	500	480	7.3	31	#N/A	0.91	6.4	0.99	0.49	0.042	0.15	5.4	0.033	0.00049	0.021	0.0013	0.0000034	0.0000034	0.0019	0.0000015	1.7	0.000015	0.000025	0.00012
12-Aug-15	14	500	495	7.3	28	#N/A	0.83	6.0	0.99	0.50	0.040	0.15	5.2	0.033	0.00045	0.021	0.0013	0.0000035	0.0000035	0.0023	0.0000015	1.6	0.000015	0.000025	0.00016
19-Aug-15	15	500	505	7.3	29	#N/A	0.80	6.2	1.00	0.50	0.037	0.15	5.2	0.030	0.00045	0.017	0.0012	0.0000035	0.0000035	0.0017	0.0000022	1.6	0.000015	0.000026	0.00011
26-Aug-15	16	500	500	7.5	28	#N/A	0.76	6.4	1.0	0.50	0.035	0.15	5.2	0.026	0.00045	0.014	0.0012	0.0000035	0.0000035	0.0011	0.0000030	1.7	0.000015	0.000027	0.000065
2-Sep-15	17	500	490	7.3	32	#N/A	0.86	6.2	0.99	0.49	0.034	0.15	5.2	0.024	0.00042	0.013	0.0012	0.0000034	0.0000034	0.0010	0.0000022	1.7	0.000015	0.000025	0.000093
9-Sep-15	18	500	485	7.3	28	#N/A	0.95	6.0	0.97	0.49	0.034	0.15	5.2	0.022	0.00039	0.011	0.0012	0.0000034	0.0000034	0.00097	0.0000015	1.6	0.000015	0.000024	0.00012
16-Sep-15	19	500	495	7.3	27	#N/A	0.82	5.7	0.98	0.24	0.034	0.073	5.0	0.022	0.00044	0.012	0.0012	0.0000034	0.0000034	0.00095	0.0000015	1.6	0.000020	0.000023	0.000083
23-Sep-15	20	500	490	7.3	26	#N/A	0.68	5.3	0.98	0.00	0.034	0.00	4.8	0.021	0.00049	0.012	0.0011	0.0000034	0.0000034	0.00093	0.0000015	1.5	0.000025	0.000022	0.000044
30-Sep-15	21	500	495	7.2	24	#N/A	0.87	5.6	0.99	0.00	0.032	0.00	4.6	0.019	0.00042	0.0097	0.0010	0.0000034	0.0000034	0.00084	0.0000015	1.4	0.000020	0.000022	0.00011
7-Oct-15	22	500	495	7.4	23	#N/A	1.1	5.9	0.99	0.00	0.030	0.00	4.4	0.016	0.00035	0.0071	0.00093	0.0000035	0.0000035	0.00074	0.0000015	1.4	0.000015	0.000021	0.00018
14-Oct-15	23	500	505	7.4	24	#N/A	0.83	5.4	1.0	0.00	0.030	0.00	4.3	0.023	0.00035	0.0075	0.0011	0.0000035	0.0000035	0.00078	0.0000020	1.3	0.000015	0.000028	0.00020
21-Oct-15	24	500	505	7.3	20	#N/A	0.60	4.8	1.0	0.00	0.030	0.00	4.2	0.030	0.00035	0.0079	0.0012	0.0000035	0.0000035	0.00081	0.0000025	1.3	0.000015	0.000034	0.00021
28-Oct-15	25	500	510	7.4	22	#N/A	0.69	5.4	0.99	0.00	0.030	0.00	4.6	0.021	0.00037	0.0077	0.0012	0.0000035	0.0000035	0.00096	0.0000020	1.5	0.000015	0.000028	0.00019
4-Nov-15	26	500	485	7.4	26	#N/A	0.79	5.9	0.97	0.00	0.029	0.00	5.0	0.013	0.00039	0.0076	0.0011	0.0000034	0.0000034	0.0011	0.0000015	1.6	0.000015	0.000022	0.00016
11-Nov-15	27	500	485	7.3	23	#N/A	0.77	5.6	0.99	0.00	0.030	0.00	4.4	0.012	0.00037	0.0070	0.00092	0.0000035	0.0000035	0.00061	0.0000015	1.4	0.000015	0.000024	0.00023
18-Nov-15	28	500	505	7.3	19	#N/A	0.76	5.2	1.0	0.00	0.030	0.00	3.7	0.012	0.00035	0.0064	0.00072	0.0000035	0.0000035	0.00010	0.0000015	1.2	0.000015	0.000025	0.00031
25-Nov-15	29	500	485	7.3	27	#N/A	1.1	5.5	0.99	0.00	0.030	0.00	4.2	0.036	0.00040	0.0074	0.0012	0.0000035	0.0000035	0.00024	0.0000015	1.3	0.000015	0.000030	0.00021
2-Dec-15	30	500	485	7.2	23	#N/A	1.4	5.8	0.97	0.00	0.029	0.00	4.7	0.060	0.00044	0.0084	0.0017	0.0000034	0.0000034	0.00039	0.0000015	1.5	0.000015	0.000034	0.00012
9-Dec-15	31	500	485	7.2	20	#N/A	1.4	5.1	0.98	0.00	0.029	0.00	4.3	0.034	0.00037	0.0076	0.0016	0.0000042	0.0000034	0.00059	0.0000042	1.4	0.000025	0.000036	0.00012
16-Dec-15	32	500	495	7.1	17	#N/A	1.3	4.5	0.99	0.00	0.030	0.00	4.0	0.0086	0.00030	0.0067	0.0015	0.0000050	0.0000035	0.00079	0.0000069	1.3	0.000035	0.000038	0.00011
23-Dec-15	33	500	490	7.5	19	#N/A	1.1	4.6	1.2	0.00	0.030	0.00	4.1	0.0099	0.00027	0.0064	0.0013	0.0000042	0.0000034	0.00064	0.0000044	1.3	0.000025	0.000034	0.00012
30-Dec-15	34	500	490	7.1	18	#N/A	0.92	4.8	1.5	0.00	0.029	0.00	4.1	0.011	0.00025	0.0061	0.0010	0.0000034	0.0000034	0.00049	0.0000020	1.3	0.000015	0.000030	0.00013
6-Jan-16	35	500	490	7.1	21	#N/A	1.00	4.9	1.2	0.00	0.030	0.00	4.0	0.0083	0.00025	0.0047	0.0010	0.0000034	0.0000034	0.00074	0.0000017	1.3	0.000015	0.000026	0.00015
13-Jan-16	36	500	495	7.0	19	#N/A	1.1	4.9	0.99	0.00	0.030	0.00	3.9	0.0054	0.00025	0.0033	0.0010	0.0000035	0.0000035	0.00099	0.0000015	1.2	0.000015	0.000021	0.00016
20-Jan-16	37	500	490	7.1	17	#N/A	1.3	4.9	0.98	0.00	0.029	0.00	4.0	0.0074	0.00025	0.0040	0.0012	0.0000034	0.0000034	0.00098	0.0000015	1.3	0.000015	0.000029	0.00019
27-Jan-16	38	500	485	7.1	21	#N/A	1.5	5.0	0.97	0.00	0.029	0.00	4.2	0.0094	0.00024	0.0047	0.0013	0.0000034	0.0000034	0.00097	0.0000015	1.3	0.000015	0.000037	0.00022
3-Feb-16	39	500	485	7.0	17	#N/A	1.4	4.8	0.98	0.00	0.029	0.00	3.7	0.012	0.00024	0.0043	0.0012	0.0000034	0.0000034	0.00098	0.0000015	1.2	0.000015	0.000035	0.00015
10-Feb-16	40	500	490	6.9	16	#N/A	1.2	4.6	0.98	0.00	0.029	0.00	3.2	0.016	0.00025	0.0039	0.0010	0.0000034	0.0000034	0.00098	0.0000015	1.0	0.000015	0.000033	0.000074
17-Feb-16	41	500	495	7.2	16	#N/A	1.3	4.3	0.98	0.00	0.029	0.00	3.3	0.012	0.00027	0.0045	0.00097	0.0000034	0.0000034	0.00098	0.0000034	1.0	0.000015	0.000033	0.000047
24-Feb-16	42	500	490	7.0	16	#N/A	1.3	4.1	0.98	0.00	0.029	0.00	3.3	0.0080	0.00029	0.0051	0.00092	0.0000034	0.0000034	0.00098	0.0000054	1.0	0.000015	0.000032	0.000020

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for HC6 (OKY Master (Fresh))

Date	**Cycle**	**Volume** (mL)		**pH**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.	Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
6-May-15	0	500	320	7.9	< 0.007	0.000030	0.026	4.9	0.24	0.020	0.014	0.00050	0.028	16	< 0.001	5.3	0.000033	35	0.065	26	0.000070	0.000080	0.000090	0.026	0.00059	0.0040	< 0.002
13-May-15	1	500	495	7.6	0.011	0.000030	0.011	2.1	0.11	0.010	0.011	0.00030	0.022	8.9	< 0.001	4.6	0.000017	11	0.027	4.9	0.000033	0.000090	0.00034	0.0080	0.00066	0.0010	< 0.002
20-May-15	2	500	490	7.5	0.0070	0.000020	0.0063	1.4	0.074	< 0.01	0.0060	< 0.0001	0.025	6.3	< 0.00004	5.1	0.0000090	3.9	0.020	2.9	0.000022	0.000090	0.00044	0.0020	0.00087	< 0.001	< 0.002
27-May-15	3	500	490	7.6	0.043	0.00011	0.0042	1.3	0.067	0.010	0.0035	< 0.0001	0.030	4.7	< 0.001	5.1	0.0000050	2.4	0.017	1.6	0.000016	0.000080	0.0017	0.0019	0.0010	< 0.001	< 0.002
3-Jun-15	4	500	490	7.4	0.021	0.000070	0.0034	1.2	0.062	< 0.01	0.0024	< 0.0001	0.032	4.6	< 0.00004	4.3	0.0000030	1.7	0.016	1.8	0.000012	< 0.00001	0.00072	0.0022	0.0011	< 0.001	< 0.002
10-Jun-15	5	500	495	7.4	0.021	0.000070	0.0028	1.1	0.061	< 0.01	0.0019	< 0.0001	0.028	4.2	< 0.00004	4.0	< 0.000002	1.3	0.015	1.5	0.000013	0.000020	0.00072	0.0022	0.0011	< 0.001	< 0.002
17-Jun-15	6	500	490	7.3	0.020	0.000070	0.0024	0.95	0.056	< 0.01	0.0016	< 0.0001	0.028	3.4	0.000040	3.9	0.0000020	0.97	0.014	1.6	0.000018	0.000050	0.00078	0.0022	0.0011	< 0.001	< 0.002
24-Jun-15	7	500	485	7.5	0.018	0.000080	0.0022	0.94	0.059	< 0.01	0.0012	< 0.0001	0.026	3.0	< 0.00004	3.7	< 0.000002	0.89	0.013	1.1	0.000014	0.000050	0.00032	0.0020	0.0010	< 0.001	< 0.002
1-Jul-15	8	500	485	7.3	0.018	0.000050	0.0019	0.79	0.053	0.020	0.00093	< 0.0001	0.025	2.4	< 0.00004	3.3	0.0000020	0.73	0.012	1.0	0.000010	0.00015	0.00048	0.0017	0.0010	< 0.001	< 0.002
8-Jul-15	9	500	485	7.4	0.020	0.000090	0.0018	0.82	0.054	< 0.01	0.00085	< 0.0001	0.017	2.4	< 0.00004	3.7	< 0.000002	0.63	0.011	1.6	0.000012	0.00023	0.00046	0.0016	0.00098	< 0.001	< 0.002
15-Jul-15	10	500	490	7.3	0.022	0.000080	0.0016	0.69	0.051	< 0.01	0.00089	< 0.0001	0.013	1.9	< 0.00004	3.2	< 0.000002	0.62	0.0096	0.70	0.000013	0.000070	0.00085	0.0016	0.0010	< 0.001	< 0.002
22-Jul-15	11	500	485	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	12	500	490	7.3	0.019	0.000080	0.0014	0.61	0.048	< 0.01	0.00061	< 0.0001	0.0090	1.7	< 0.00004	2.7	0.0000050	0.46	0.0091	0.70	< 0.000005	0.000020	0.00067	0.0013	0.00078	< 0.001	< 0.002
5-Aug-15	13	500	480	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	14	500	495	7.3	0.015	0.000090	0.0011	0.56	0.044	< 0.01	0.00071	< 0.0001	0.012	1.6	< 0.00004	2.9	< 0.000002	0.42	0.0081	0.50	0.000013	0.000080	0.00057	0.0010	0.00077	< 0.001	< 0.002
19-Aug-15	15	500	505	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	16	500	500	7.5	0.011	0.00013	0.0011	0.52	0.053	< 0.01	0.00058	< 0.0001	0.012	1.3	< 0.00004	2.8	0.0000020	0.34	0.0079	0.70	0.000010	< 0.00001	0.00030	0.00092	0.00057	< 0.001	< 0.002
2-Sep-15	17	500	490	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	18	500	485	7.3	0.0080	0.000040	0.00098	0.56	0.058	< 0.01	0.00097	< 0.0001	0.0080	1.3	< 0.00004	2.4	0.0000030	0.40	0.0077	3.2	0.000011	0.00013	0.00026	0.00095	0.00047	< 0.001	< 0.002
16-Sep-15	19	500	495	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	20	500	490	7.3	0.010	< 0.00001	0.00089	0.49	0.057	< 0.01	0.00044	< 0.0001	0.0030	1.1	< 0.00004	2.8	0.000010	0.38	0.0072	0.70	0.0000060	< 0.00001	0.00035	0.00082	0.00044	< 0.001	< 0.002
30-Sep-15	21	500	495	7.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	22	500	495	7.4	0.0080	0.000050	0.00066	0.45	0.058	< 0.01	0.0011	< 0.0001	0.0030	0.84	< 0.00004	1.9	< 0.000002	0.31	0.0066	0.30	< 0.000005	0.00012	0.00030	0.0012	0.00031	< 0.001	< 0.002
14-Oct-15	23	500	505	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	24	500	505	7.3	0.029	0.00017	0.00072	0.44	0.063	< 0.01	0.0025	< 0.0001	0.0060	0.95	< 0.00004	2.3	0.000018	0.31	0.0061	0.50	0.000011	0.000070	0.00064	0.00081	0.00036	0.0020	< 0.002
28-Oct-15	25	500	510	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	26	500	485	7.4	0.0080	0.000040	0.00076	0.54	0.074	0.010	0.0035	< 0.0001	0.0080	1.1	< 0.00004	2.4	< 0.000002	0.33	0.0079	0.60	0.0000090	0.000080	0.00021	0.00084	0.00038	< 0.001	< 0.002
11-Nov-15	27	500	485	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	28	500	505	7.3	0.019	0.000020	0.00052	0.38	0.058	< 0.01	0.00090	< 0.0001	< 0.003	0.81	0.00010	2.1	< 0.000002	0.28	0.0056	0.30	0.0000070	0.000090	0.00022	0.00060	0.00028	0.0010	< 0.002
25-Nov-15	29	500	485	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Dec-15	30	500	485	7.2	0.042	0.00018	0.00064	0.53	0.080	< 0.01	0.00051	< 0.0001	< 0.003	1.1	< 0.00004	3.0	< 0.000002	0.34	0.0073	0.90	< 0.000005	0.000030	0.0013	0.00079	0.00038	0.0020	< 0.002
9-Dec-15	31	500	485	7.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	32	500	495	7.1	< 0.007	0.00017	0.00057	0.43	0.076	< 0.01	0.00031	< 0.0001	< 0.003	0.87	< 0.00004	2.4	0.0000040	0.29	0.0067	0.60	0.000012	0.00013	0.0010	0.00089	0.00027	< 0.001	< 0.002
23-Dec-15	33	500	490	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	34	500	490	7.1	0.0070	0.000030	0.00058	0.44	0.078	0.010	0.00021	< 0.0001	< 0.003	0.83	< 0.00004	2.2	0.0000020	0.30	0.0067	0.70	< 0.000005	< 0.00001	0.00011	0.00072	0.00026	< 0.001	< 0.002
6-Jan-16	35	500	490	7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	36	500	495	7.0	< 0.007	0.000020	0.00048	0.42	0.082	< 0.01	0.00025	< 0.0001	< 0.003	0.74	0.00011	1.8	0.0000020	0.22	0.0057	0.20	< 0.000005	0.000040	< 0.00005	0.00061	0.00014	< 0.001	< 0.002
20-Jan-16	37	500	490	7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	38	500	485	7.1	< 0.007	0.000020	0.00051	0.45	0.088	< 0.01	0.00021	< 0.0001	< 0.003	0.80	< 0.00004	2.5	< 0.000002	0.25	0.0069	0.40	0.0000050	0.000040	0.000090	0.00081	0.00020	< 0.001	< 0.002
3-Feb-16	39	500	485	7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	40	500	490	6.9	0.014	0.00012	0.00038	0.36	0.079	< 0.01	0.00019	< 0.0001	< 0.003	0.64	0.000050	1.7	< 0.000002	0.25	0.0052	0.90	0.0000060	0.000020	0.00045	0.00060	0.00015	0.0010	< 0.002
17-Feb-16	41	500	495	7.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	42	500	490	7.0	< 0.007	0.000020	0.00044	0.35	0.075	0.030	0.00020	0.00020	< 0.003	0.72	< 0.00004	2.1	< 0.000002	0.19	0.0052	0.60	0.0000050	0.000040	0.00010	0.00063	0.00019	0.0010	< 0.002
2-Mar-16	43	500	485	7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Mar-16	44	500	490	7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Calculated Loading Rates for HC6 (OKY Master (Fresh))

Date	**Cycle**	**Volume** (mL)		**pH**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.	Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
6-May-15	0	500	320	7.9	0.0022	0.0000096	0.0082	1.6	0.077	0.0064	0.0045	0.00016	0.0090	5.0	0.00032	1.7	0.000011	11	0.021	8.3	0.000022	0.000026	0.000029	0.0082	0.00019	0.0013	0.00064
13-May-15	1	500	495	7.6	0.0054	0.000015	0.0054	1.0	0.053	0.0050	0.0056	0.00015	0.011	4.4	0.00050	2.3	0.0000084	5.2	0.014	2.4	0.000016	0.000045	0.00017	0.0039	0.00033	0.00050	0.00099
20-May-15	2	500	490	7.5	0.0034	0.0000098	0.0031	0.71	0.036	0.0049	0.0029	0.000049	0.012	3.1	0.000020	2.5	0.0000044	1.9	0.0096	1.4	0.000011	0.000044	0.00022	0.00099	0.00043	0.00049	0.00098
27-May-15	3	500	490	7.6	0.021	0.000054	0.0021	0.61	0.033	0.0049	0.0017	0.000049	0.015	2.3	0.00049	2.5	0.0000025	1.2	0.0082	0.78	0.0000078	0.000039	0.00082	0.00091	0.00050	0.00049	0.00098
3-Jun-15	4	500	490	7.4	0.010	0.000034	0.0017	0.56	0.030	0.0049	0.0012	0.000049	0.016	2.3	0.000020	2.1	0.0000015	0.81	0.0077	0.88	0.0000059	0.0000049	0.00035	0.0011	0.00054	0.00049	0.00098
10-Jun-15	5	500	495	7.4	0.010	0.000035	0.0014	0.54	0.030	0.0050	0.00094	0.000050	0.014	2.1	0.000020	2.0	0.00000099	0.62	0.0072	0.74	0.0000064	0.0000099	0.00036	0.0011	0.00053	0.00050	0.00099
17-Jun-15	6	500	490	7.3	0.0098	0.000034	0.0012	0.47	0.027	0.0049	0.00079	0.000049	0.014	1.7	0.000020	1.9	0.00000098	0.48	0.0067	0.78	0.0000088	0.000025	0.00038	0.0011	0.00053	0.00049	0.00098
24-Jun-15	7	500	485	7.5	0.0087	0.000039	0.0011	0.46	0.029	0.0049	0.00060	0.000049	0.013	1.4	0.000019	1.8	0.00000097	0.43	0.0065	0.53	0.0000068	0.000024	0.00016	0.00098	0.00050	0.00049	0.00097
1-Jul-15	8	500	485	7.3	0.0087	0.000024	0.00094	0.39	0.026	0.0097	0.00045	0.000049	0.012	1.2	0.000019	1.6	0.00000097	0.35	0.0056	0.49	0.0000049	0.000073	0.00023	0.00083	0.00050	0.00049	0.00097
8-Jul-15	9	500	485	7.4	0.0097	0.000044	0.00085	0.40	0.026	0.0049	0.00041	0.000049	0.0082	1.1	0.000019	1.8	0.00000097	0.31	0.0055	0.78	0.0000058	0.00011	0.00022	0.00077	0.00048	0.00049	0.00097
15-Jul-15	10	500	490	7.3	0.011	0.000039	0.00077	0.34	0.025	0.0049	0.00044	0.000049	0.0064	0.91	0.000020	1.5	0.00000098	0.30	0.0047	0.34	0.0000064	0.000034	0.00042	0.00076	0.00050	0.00049	0.00098
22-Jul-15	11	500	485	7.4	0.010	0.000039	0.00074	0.32	0.024	0.0049	0.00037	0.000049	0.0054	0.86	0.000020	1.4	0.0000017	0.26	0.0046	0.34	0.0000044	0.000022	0.00037	0.00070	0.00044	0.00049	0.00098
29-Jul-15	12	500	490	7.3	0.0093	0.000039	0.00070	0.30	0.024	0.0049	0.00030	0.000049	0.0044	0.81	0.000020	1.3	0.0000025	0.23	0.0044	0.34	0.0000025	0.0000098	0.00033	0.00064	0.00038	0.00049	0.00098
5-Aug-15	13	500	480	7.3	0.0084	0.000042	0.00063	0.29	0.023	0.0049	0.00033	0.000049	0.0052	0.80	0.000020	1.4	0.0000017	0.22	0.0042	0.30	0.0000044	0.000025	0.00031	0.00058	0.00038	0.00049	0.00099
12-Aug-15	14	500	495	7.3	0.0074	0.000045	0.00055	0.28	0.022	0.0050	0.00035	0.000050	0.0059	0.79	0.000020	1.4	0.00000099	0.21	0.0040	0.25	0.0000064	0.000040	0.00028	0.00051	0.00038	0.00050	0.00099
19-Aug-15	15	500	505	7.3	0.0065	0.000055	0.00054	0.27	0.024	0.0050	0.00032	0.000050	0.0060	0.72	0.000020	1.4	0.00000100	0.19	0.0040	0.30	0.0000057	0.000022	0.00022	0.00048	0.00033	0.00050	0.00100
26-Aug-15	16	500	500	7.5	0.0055	0.000065	0.00053	0.26	0.027	0.0050	0.00029	0.000050	0.0060	0.65	0.000020	1.4	0.0000010	0.17	0.0040	0.35	0.0000050	0.0000050	0.00015	0.00046	0.00029	0.00050	0.0010
2-Sep-15	17	500	490	7.3	0.0047	0.000042	0.00050	0.27	0.027	0.0049	0.00038	0.000049	0.0049	0.64	0.000020	1.3	0.0000012	0.18	0.0038	0.95	0.0000052	0.000034	0.00014	0.00046	0.00026	0.00049	0.00099
9-Sep-15	18	500	485	7.3	0.0039	0.000019	0.00048	0.27	0.028	0.0049	0.00047	0.000049	0.0039	0.63	0.000019	1.2	0.0000015	0.19	0.0037	1.6	0.0000053	0.000063	0.00013	0.00046	0.00023	0.00049	0.00097
16-Sep-15	19	500	495	7.3	0.0044	0.000012	0.00046	0.26	0.028	0.0049	0.00034	0.000049	0.0027	0.59	0.000020	1.3	0.0000032	0.19	0.0036	0.95	0.0000041	0.000034	0.00015	0.00043	0.00022	0.00049	0.00098
23-Sep-15	20	500	490	7.3	0.0049	0.0000049	0.00043	0.24	0.028	0.0049	0.00022	0.000049	0.0015	0.55	0.000020	1.4	0.0000049	0.19	0.0035	0.34	0.0000029	0.0000049	0.00017	0.00040	0.00022	0.00049	0.00098
30-Sep-15	21	500	495	7.2	0.0044	0.000015	0.00038	0.23	0.028	0.0049	0.00039	0.000049	0.0015	0.48	0.000020	1.1	0.0000029	0.17	0.0034	0.25	0.0000027	0.000032	0.00016	0.00050	0.00018	0.00049	0.00099
7-Oct-15	22	500	495	7.4	0.0040	0.000025	0.00033	0.22	0.029	0.0050	0.00056	0.000050	0.0015	0.42	0.000020	0.94	0.00000099	0.15	0.0033	0.15	0.0000025	0.000059	0.00015	0.00061	0.00015	0.00050	0.00099
14-Oct-15	23	500	505	7.4	0.0093	0.000055	0.00034	0.22	0.030	0.0050	0.00092	0.000050	0.0022	0.45	0.000020	1.0	0.0000050	0.16	0.0032	0.20	0.0000040	0.000047	0.00024	0.00051	0.00017	0.00075	0.0010
21-Oct-15	24	500	505	7.3	0.015	0.000086	0.00036	0.22	0.032	0.0051	0.0013	0.000051	0.0029	0.48	0.000020	1.1	0.0000091	0.16	0.0031	0.25	0.0000056	0.000035	0.00032	0.00041	0.00018	0.0010	0.0010
28-Oct-15	25	500	510	7.4	0.0093	0.000053	0.00036	0.24	0.034	0.0050	0.0015	0.000050	0.0034	0.50	0.000020	1.2	0.0000050	0.16	0.0035	0.27	0.0000050	0.000037	0.00021	0.00041	0.00018	0.00075	0.00099
4-Nov-15	26	500	485	7.4	0.0039	0.000019	0.00037	0.26	0.036	0.0049	0.0017	0.000049	0.0039	0.52	0.000019	1.2	0.00000097	0.16	0.0038	0.29	0.0000044	0.000039	0.00010	0.00041	0.00018	0.00049	0.00097
11-Nov-15	27	500	485	7.3	0.0067	0.000015	0.00032	0.23	0.033	0.0050	0.0011	0.000050	0.0027	0.46	0.000035	1.1	0.00000099	0.15	0.0033	0.22	0.0000040	0.000042	0.00011	0.00035	0.00016	0.00050	0.00099
18-Nov-15	28	500	505	7.3	0.0096	0.000010	0.00026	0.19	0.029	0.0051	0.00045	0.000051	0.0015	0.41	0.000051	1.1	0.0000010	0.14	0.0028	0.15	0.0000035	0.000045	0.00011	0.00030	0.00014	0.00051	0.0010
25-Nov-15	29	500	485	7.3	0.015	0.000049	0.00029	0.22	0.034	0.0050	0.00035	0.000050	0.0015	0.46	0.000035	1.3	0.00000099	0.15	0.0032	0.29	0.0000030	0.000030	0.00037	0.00034	0.00016	0.00074	0.00099
2-Dec-15	30	500	485	7.2	0.020	0.000087	0.00031	0.26	0.039	0.0049	0.00025	0.000049	0.0015	0.52	0.000019	1.5	0.00000097	0.16	0.0036	0.44	0.0000024	0.000015	0.00064	0.00038	0.00018	0.00097	0.00097
9-Dec-15	31	500	485	7.2	0.012	0.000086	0.00030	0.23	0.038	0.0049	0.00020	0.000049	0.0015	0.48	0.000020	1.3	0.0000015	0.15	0.0034	0.37	0.0000042	0.000039	0.00057	0.00041	0.00016	0.00073	0.00098
16-Dec-15	32	500	495	7.1	0.0035	0.000084	0.00028	0.21	0.038	0.0050	0.00015	0.000050	0.0015	0.43	0.000020	1.2	0.0000020	0.14	0.0033	0.30	0.0000059	0.000064	0.00050	0.00044	0.00013	0.00050	0.00099
23-Dec-15	33	500	490	7.5	0.0034	0.000049	0.00028	0.21	0.038	0.0049	0.00013	0.000049	0.0015	0.42	0.000020	1.1	0.0000015	0.15	0.0033	0.32	0.0000042	0.000035	0.00028	0.00040	0.00013	0.00049	0.00099
30-Dec-15	34	500	490	7.1	0.0034	0.000015	0.00028	0.21	0.038	0.0049	0.00010	0.000049	0.0015	0.41	0.000020	1.1	0.00000098	0.15	0.0033	0.34	0.0000025	0.0000049	0.000054	0.00035	0.00013	0.00049	0.00098
6-Jan-16	35	500	490	7.1	0.0034	0.000012	0.00026	0.21	0.039	0.0049	0.00011	0.000049	0.0015	0.39	0.000037	1.0	0.00000099	0.13	0.0031	0.22	0.0000025	0.000012	0.000039	0.00033	0.000098	0.00049	0.00099
13-Jan-16	36	500	495	7.0	0.0035	0.0000099	0.00024	0.21	0.040	0.0050	0.00012	0.000050	0.0015	0.37	0.000054	0.91	0.00000099	0.11	0.0028	0.099	0.0000025	0.000020	0.000025	0.00030	0.000069	0.00050	0.00099
20-Jan-16	37	500	490	7.1	0.0034	0.0000098	0.00024	0.21	0.042	0.0049	0.00011	0.000049	0.0015	0.38	0.000037	1.1	0.00000098	0.12	0.0031	0.15	0.0000025	0.000020	0.000034	0.00035	0.000083	0.00049	0.00098
27-Jan-16	38	500	485	7.1	0.0034	0.0000097	0.00024	0.22	0.043	0.0049	0.00010	0.000049	0.0015	0.39	0.000019	1.2	0.00000097	0.12	0.0033	0.19	0.0000024	0.000019	0.000044	0.00039	0.000097	0.00049	0.00097
3-Feb-16	39	500	485	7.0	0.0051	0.000034	0.00021	0.20	0.041	0.0049	0.000097	0.000049	0.0015	0.35	0.000022	1.0	0.00000098	0.12	0.0030	0.32	0.0000027	0.000015	0.00013	0.00034	0.000085	0.00049	0.00098
10-Feb-16	40	500	490	6.9	0.0069	0.000059	0.00018	0.18	0.039	0.0049	0.000093	0.000049	0.0015	0.31	0.000025	0.84	0.00000098	0.12	0.0026	0.44	0.0000029	0.0000098	0.00022	0.00029	0.000074	0.00049	0.00098
17-Feb-16	41	500	495	7.2	0.0051	0.000034	0.00020	0.17	0.038	0.0098	0.000096	0.000074	0.0015	0.33	0.000022	0.94	0.00000098	0.11	0.0026	0.37	0.0000027	0.000015	0.00013	0.00030	0.000083	0.00049	0.00098
24-Feb-16	42	500	490	7.0	0.0034	0.0000098	0.00022	0.17	0.037	0.015	0.000098	0.000098	0.0015	0.35	0.000020	1.0	0.00000098	0.093	0.0025	0.29	0.0000025	0.000020	0.000049	0.00031	0.000093	0.00049	0.00098

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for HC7 (KAM036824)

Date	**Cycle**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**	**Cu**
	No.	Input	Output		umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
12-Aug-15	0	500	415	7.4	598	#N/A	3.7	32	244	3.0	0.11	< 0.3	247	0.0092	0.016	0.038	0.013	< 0.000007	0.000010	0.0062	0.0000080	59	0.000060	0.0048	0.0044
19-Aug-15	1	500	495	7.4	219	#N/A	1.9	17	83	1.0	< 0.06	< 0.3	79	0.014	0.0092	0.033	0.011	< 0.000007	< 0.000007	0.0040	< 0.000003	18	< 0.00003	0.0014	0.00064
26-Aug-15	2	500	505	7.5	138	#N/A	1.6	17	42	1.0	< 0.06	< 0.3	51	0.016	0.0090	0.036	0.011	< 0.000007	< 0.000007	0.0022	0.0000070	12	< 0.00003	0.00089	0.00049
2-Sep-15	3	500	475	7.5	109	#N/A	1.7	16	32	< 1	0.060	< 0.3	40	0.037	0.0084	0.036	0.011	< 0.000007	< 0.000007	0.0019	0.0000040	9.6	0.000050	0.00059	0.00061
9-Sep-15	4	500	490	7.9	93	#N/A	1.5	23	21	< 1	0.060	< 0.3	32	0.017	0.0085	0.041	0.0073	< 0.000007	< 0.000007	0.0018	< 0.000003	7.5	< 0.00003	0.00058	0.00056
16-Sep-15	5	500	480	7.5	81	#N/A	1.5	18	17	< 1	0.060	< 0.3	30	0.019	0.0085	0.036	0.0067	< 0.000007	< 0.000007	0.0017	< 0.000003	7.4	0.000060	0.00045	0.00041
23-Sep-15	6	500	495	7.5	76	#N/A	1.6	20	13	< 1	< 0.06	< 0.3	30	0.017	0.0086	0.033	0.0068	< 0.000007	< 0.000007	0.0014	< 0.000003	7.1	< 0.00003	0.00049	0.00045
30-Sep-15	7	500	485	7.5	65	#N/A	1.9	21	12	< 1	0.060	< 0.3	26	0.017	0.0079	0.034	0.0052	< 0.000007	< 0.000007	0.0026	0.0000050	6.1	< 0.00003	0.00040	0.00033
7-Oct-15	8	500	480	7.6	56	#N/A	1.9	17	7.0	< 1	< 0.06	< 0.3	22	0.016	0.0071	0.023	0.0052	< 0.000007	< 0.000007	0.00090	< 0.000003	5.1	< 0.00003	0.00037	0.00019
14-Oct-15	9	500	475	7.7	64	#N/A	1.7	23	8.0	< 1	0.060	< 0.3	25	0.021	0.0078	0.029	0.0069	< 0.000007	< 0.000007	0.0038	< 0.000003	5.8	< 0.00003	0.00027	0.00038
21-Oct-15	10	500	495	7.6	63	#N/A	1.2	23	8.0	< 1	0.060	< 0.3	28	0.019	0.0084	0.022	0.0071	< 0.000007	< 0.000007	0.0014	< 0.000003	6.6	< 0.00003	0.00042	0.00050
28-Oct-15	11	500	505	7.7	59	#N/A	2.3	26	7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	12	500	480	7.6	51	#N/A	1.1	18	5.0	< 1	< 0.06	< 0.3	22	0.020	0.0066	0.021	0.0053	< 0.000007	< 0.000007	0.00090	< 0.000003	5.1	< 0.00003	0.00030	0.00037
11-Nov-15	13	500	465	7.6	52	#N/A	1.5	20	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	14	500	495	7.7	58	#N/A	1.0	28	5.0	< 1	< 0.06	< 0.3	24	0.017	0.0073	0.022	0.0064	< 0.000007	< 0.000007	< 0.0002	< 0.000003	5.8	0.000030	0.00034	0.00041
25-Nov-15	15	500	465	7.6	46	#N/A	1.0	22	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Dec-15	16	500	485	7.5	51	#N/A	2.4	23	4.0	< 1	< 0.06	< 0.3	24	0.020	0.0069	0.021	0.0076	< 0.000007	< 0.000007	0.00030	0.0000070	5.7	< 0.00003	0.00034	0.00044
9-Dec-15	17	500	470	7.7	45	#N/A	2.9	21	3.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	18	500	500	7.6	50	#N/A	2.4	22	4.0	< 1	< 0.06	< 0.3	25	0.017	0.0073	0.021	0.0088	0.0000080	< 0.000007	0.0012	0.0000040	6.0	0.000040	0.00034	0.00032
23-Dec-15	19	500	485	8.0	43	#N/A	3.5	21	3.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	20	500	490	7.5	43	#N/A	1.6	18	4.0	< 1	< 0.06	< 0.3	21	0.015	0.0054	0.017	0.0074	< 0.000007	< 0.000007	0.00070	0.0000030	5.1	0.000040	0.00026	0.00019
6-Jan-16	21	500	465	7.4	43	#N/A	1.7	17	3.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	22	500	490	7.5	48	#N/A	1.6	22	4.0	< 1	< 0.06	< 0.3	23	0.014	0.0062	0.015	0.0077	< 0.000007	< 0.000007	< 0.002	< 0.000003	5.4	< 0.00003	0.00028	0.00016
20-Jan-16	23	500	475	7.5	42	#N/A	2.6	17	3.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	24	500	490	7.6	49	#N/A	2.8	23	3.0	< 1	< 0.06	< 0.3	23	0.013	0.0062	0.015	0.0085	< 0.000007	< 0.000007	< 0.002	< 0.000003	5.5	< 0.00003	0.00027	0.00030
3-Feb-16	25	500	480	7.5	41	#N/A	2.9	18	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	26	500	495	7.5	52	#N/A	2.4	24	3.0	< 1	< 0.06	< 0.3	24	0.010	0.0061	0.016	0.0091	< 0.000007	< 0.000007	< 0.002	< 0.000003	5.7	< 0.00003	0.00033	0.00011
17-Feb-16	27	500	490	7.6	45	#N/A	4.6	22	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	28	500	490	7.6	49	#N/A	2.2	22	2.0	< 1	< 0.06	< 0.3	24	0.014	0.0059	0.015	0.0090	< 0.000007	< 0.000007	< 0.002	< 0.000003	5.6	< 0.00003	0.00028	0.000080
2-Mar-16	29	500	485	7.5	46	#N/A	2.1	22	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Mar-16	30	500	495	7.5	48	#N/A	2.5	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Calculated Loading Rates for HC7 (KAM036824)

Date	**Cycle**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**	**Cu**
	No.	Input	Output		umhos/cm	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
12-Aug-15	0	500	415	7.4	598	#N/A	1.6	13	101	1.2	0.046	0.12	103	0.0038	0.0067	0.016	0.0054	0.0000029	0.0000042	0.0026	0.0000033	24	0.000025	0.0020	0.0018
19-Aug-15	1	500	495	7.4	219	#N/A	0.96	8.3	41	0.50	0.030	0.15	39	0.0068	0.0046	0.016	0.0054	0.0000035	0.0000035	0.0020	0.0000015	8.9	0.000015	0.00070	0.00032
26-Aug-15	2	500	505	7.5	138	#N/A	0.81	8.5	21	0.51	0.030	0.15	26	0.0083	0.0045	0.018	0.0057	0.0000035	0.0000035	0.0011	0.0000035	6.3	0.000015	0.00045	0.00025
2-Sep-15	3	500	475	7.5	109	#N/A	0.80	7.8	15	0.48	0.029	0.14	19	0.017	0.0040	0.017	0.0050	0.0000033	0.0000033	0.00090	0.0000019	4.5	0.000024	0.00028	0.00029
9-Sep-15	4	500	490	7.9	93	#N/A	0.72	11	10	0.49	0.029	0.15	16	0.0081	0.0042	0.020	0.0036	0.0000034	0.0000034	0.00088	0.0000015	3.7	0.000015	0.00029	0.00027
16-Sep-15	5	500	480	7.5	81	#N/A	0.74	8.4	8.2	0.48	0.029	0.14	15	0.0091	0.0041	0.017	0.0032	0.0000034	0.0000034	0.00082	0.0000014	3.6	0.000029	0.00021	0.00020
23-Sep-15	6	500	495	7.5	76	#N/A	0.79	10.0	6.4	0.50	0.030	0.15	15	0.0086	0.0043	0.016	0.0034	0.0000035	0.0000035	0.00069	0.0000015	3.5	0.000015	0.00024	0.00022
30-Sep-15	7	500	485	7.5	65	#N/A	0.93	10	5.8	0.49	0.029	0.15	13	0.0081	0.0038	0.016	0.0025	0.0000034	0.0000034	0.0013	0.0000024	3.0	0.000015	0.00019	0.00016
7-Oct-15	8	500	480	7.6	56	#N/A	0.92	8.3	3.4	0.48	0.029	0.14	10	0.0075	0.0034	0.011	0.0025	0.0000034	0.0000034	0.00043	0.0000014	2.4	0.000014	0.00018	0.000091
14-Oct-15	9	500	475	7.7	64	#N/A	0.81	11	3.8	0.48	0.029	0.14	12	0.0099	0.0037	0.014	0.0033	0.0000033	0.0000033	0.0018	0.0000014	2.7	0.000014	0.00013	0.00018
21-Oct-15	10	500	495	7.6	63	#N/A	0.57	11	4.0	0.50	0.030	0.15	14	0.0094	0.0042	0.011	0.0035	0.0000035	0.0000035	0.00069	0.0000015	3.3	0.000015	0.00021	0.00025
28-Oct-15	11	500	505	7.7	59	#N/A	1.2	13	3.5	0.49	0.029	0.15	12	0.0096	0.0037	0.011	0.0030	0.0000034	0.0000034	0.00056	0.0000015	2.9	0.000015	0.00017	0.00021
4-Nov-15	12	500	480	7.6	51	#N/A	0.54	8.5	2.4	0.48	0.029	0.14	10	0.0097	0.0032	0.010	0.0025	0.0000034	0.0000034	0.00043	0.0000014	2.4	0.000014	0.00014	0.00018
11-Nov-15	13	500	465	7.6	52	#N/A	0.70	9.4	1.9	0.49	0.029	0.15	11	0.0091	0.0034	0.010	0.0029	0.0000034	0.0000034	0.00027	0.0000015	2.6	0.000015	0.00015	0.00019
18-Nov-15	14	500	495	7.7	58	#N/A	0.48	14	2.5	0.50	0.030	0.15	12	0.0086	0.0036	0.011	0.0032	0.0000035	0.0000035	0.000099	0.0000015	2.9	0.000015	0.00017	0.00020
25-Nov-15	15	500	465	7.6	46	#N/A	0.48	10	1.9	0.49	0.029	0.15	12	0.0092	0.0035	0.010	0.0034	0.0000034	0.0000034	0.00012	0.0000024	2.8	0.000015	0.00017	0.00021
2-Dec-15	16	500	485	7.5	51	#N/A	1.2	11	1.9	0.49	0.029	0.15	12	0.0097	0.0033	0.010	0.0037	0.0000034	0.0000034	0.00015	0.0000034	2.7	0.000015	0.00016	0.00021
9-Dec-15	17	500	470	7.7	45	#N/A	1.4	9.8	1.4	0.49	0.030	0.15	12	0.0090	0.0035	0.010	0.0040	0.0000037	0.0000034	0.00037	0.0000027	2.9	0.000017	0.00017	0.00019
16-Dec-15	18	500	500	7.6	50	#N/A	1.2	11	2.0	0.50	0.030	0.15	13	0.0084	0.0037	0.010	0.0044	0.0000040	0.0000035	0.00060	0.0000020	3.0	0.000020	0.00017	0.00016
23-Dec-15	19	500	485	8.0	43	#N/A	1.7	10	1.5	0.50	0.030	0.15	11	0.0078	0.0031	0.0093	0.0040	0.0000037	0.0000035	0.00047	0.0000017	2.7	0.000020	0.00015	0.00013
30-Dec-15	20	500	490	7.5	43	#N/A	0.77	8.7	2.0	0.49	0.029	0.15	10	0.0072	0.0026	0.0081	0.0036	0.0000034	0.0000034	0.00034	0.0000015	2.5	0.000020	0.00013	0.000093
6-Jan-16	21	500	465	7.4	43	#N/A	0.77	8.0	1.4	0.49	0.029	0.15	11	0.0070	0.0028	0.0078	0.0037	0.0000034	0.0000034	0.00066	0.0000015	2.6	0.000017	0.00013	0.000086
13-Jan-16	22	500	490	7.5	48	#N/A	0.79	11	2.0	0.49	0.029	0.15	11	0.0068	0.0030	0.0075	0.0038	0.0000034	0.0000034	0.00098	0.0000015	2.6	0.000015	0.00014	0.000078
20-Jan-16	23	500	475	7.5	42	#N/A	1.2	8.2	1.4	0.49	0.029	0.15	11	0.0066	0.0030	0.0075	0.0040	0.0000034	0.0000034	0.00098	0.0000015	2.7	0.000015	0.00014	0.00011
27-Jan-16	24	500	490	7.6	49	#N/A	1.4	11	1.5	0.49	0.029	0.15	11	0.0064	0.0030	0.0075	0.0042	0.0000034	0.0000034	0.00098	0.0000015	2.7	0.000015	0.00013	0.00015
3-Feb-16	25	500	480	7.5	41	#N/A	1.4	8.6	0.96	0.49	0.030	0.15	12	0.0058	0.0030	0.0077	0.0043	0.0000034	0.0000034	0.00099	0.0000015	2.8	0.000015	0.00015	0.00010
10-Feb-16	26	500	495	7.5	52	#N/A	1.2	12	1.5	0.50	0.030	0.15	12	0.0051	0.0030	0.0078	0.0045	0.0000035	0.0000035	0.00099	0.0000015	2.8	0.000015	0.00016	0.000054
17-Feb-16	27	500	490	7.6	45	#N/A	2.2	11	0.98	0.49	0.030	0.15	12	0.0060	0.0030	0.0075	0.0045	0.0000034	0.0000034	0.00099	0.0000015	2.8	0.000015	0.00015	0.000047
24-Feb-16	28	500	490	7.6	49	#N/A	1.1	11	0.98	0.49	0.029	0.15	12	0.0069	0.0029	0.0072	0.0044	0.0000034	0.0000034	0.00098	0.0000015	2.7	0.000015	0.00014	0.000039

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for HC7 (KAM036824)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
12-Aug-15	0	500	415	7.4	0.0070	0.00011	0.0050	24	0.10	< 0.01	0.0020	0.036	0.0080	6.1	0.00020	0.67	0.000016	18	0.30	86	0.000035	0.0022	< 0.00005	0.024	0.00027	0.0040	< 0.002
19-Aug-15	1	500	495	7.4	0.034	0.000020	0.0020	8.4	0.031	< 0.01	0.00066	0.012	< 0.003	2.7	< 0.00004	0.42	< 0.000002	5.6	0.095	26	0.0000080	< 0.00001	0.00023	0.0097	0.00030	< 0.001	< 0.002
26-Aug-15	2	500	505	7.5	< 0.007	0.00012	0.0016	4.8	0.022	< 0.01	0.00055	0.0075	0.0040	2.1	0.000080	0.40	0.0000030	3.2	0.058	15	0.0000080	0.000020	< 0.00005	0.0097	0.00035	< 0.001	< 0.002
2-Sep-15	3	500	475	7.5	0.012	0.00012	0.0013	3.8	0.014	< 0.01	0.00031	0.0049	< 0.003	1.8	< 0.00004	0.36	0.0000040	2.2	0.044	12	0.0000070	< 0.00001	0.00018	0.0077	0.00038	< 0.001	< 0.002
9-Sep-15	4	500	490	7.9	< 0.007	0.000030	0.0011	3.2	0.014	< 0.01	0.0022	0.0039	< 0.003	1.7	0.000070	0.35	0.0000050	1.7	0.035	11	0.000011	0.000080	0.000070	0.0090	0.00033	< 0.001	< 0.002
16-Sep-15	5	500	480	7.5	< 0.007	0.000080	0.0013	2.9	0.011	< 0.01	0.00023	0.0028	< 0.003	1.6	< 0.00004	0.34	0.0000050	1.4	0.030	7.0	0.0000070	0.000060	< 0.00005	0.0066	0.00033	< 0.001	< 0.002
23-Sep-15	6	500	495	7.5	< 0.007	< 0.00001	0.0010	2.9	0.013	< 0.01	0.00033	0.0032	< 0.003	1.5	< 0.00004	0.39	0.000020	1.1	0.030	5.2	< 0.000005	< 0.00001	0.000080	0.0062	0.00031	< 0.001	< 0.002
30-Sep-15	7	500	485	7.5	0.0070	0.000040	0.00093	2.6	0.011	< 0.01	0.00027	0.0032	< 0.003	1.4	< 0.00004	0.27	< 0.000002	0.91	0.027	4.4	< 0.000005	0.000070	0.00010	0.0055	0.00034	0.0040	< 0.002
7-Oct-15	8	500	480	7.6	< 0.007	0.000020	0.00081	2.2	0.0095	< 0.01	0.00047	0.0023	< 0.003	1.1	< 0.00004	0.26	< 0.000002	0.60	0.022	3.5	< 0.000005	0.000040	< 0.00005	0.0048	0.00025	< 0.001	< 0.002
14-Oct-15	9	500	475	7.7	< 0.007	0.000010	0.00099	2.5	0.0097	< 0.01	0.00046	0.0018	< 0.003	1.4	< 0.00004	0.35	0.0000020	0.66	0.026	4.2	0.0000060	0.000090	< 0.00005	0.0055	0.00040	< 0.001	< 0.002
21-Oct-15	10	500	495	7.6	< 0.007	0.000040	0.00094	2.8	0.012	< 0.01	0.0019	0.0023	< 0.003	1.4	0.000040	0.37	0.000013	0.60	0.029	3.4	0.0000070	0.00013	0.00037	0.0064	0.00027	< 0.001	< 0.002
28-Oct-15	11	500	505	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	12	500	480	7.6	< 0.007	0.000020	0.00072	2.2	0.0089	< 0.01	0.0014	0.0017	0.0080	1.2	< 0.00004	0.27	< 0.000002	0.39	0.023	2.4	< 0.000005	< 0.00001	< 0.00005	0.0052	0.00025	< 0.001	< 0.002
11-Nov-15	13	500	465	7.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	14	500	495	7.7	0.019	0.000030	0.00072	2.4	0.012	< 0.01	0.00068	0.0016	< 0.003	1.1	0.00013	0.32	< 0.000002	0.35	0.026	2.2	< 0.000005	0.000050	< 0.00005	0.0042	0.00026	< 0.001	< 0.002
25-Nov-15	15	500	465	7.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Dec-15	16	500	485	7.5	< 0.007	0.000080	0.00066	2.4	0.010	< 0.01	0.00028	0.0018	< 0.003	1.1	< 0.00004	0.31	< 0.000002	0.27	0.024	2.2	< 0.000005	0.000060	0.00022	0.0053	0.00031	< 0.001	< 0.002
9-Dec-15	17	500	470	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	18	500	500	7.6	< 0.007	0.00012	0.00070	2.5	0.012	< 0.01	0.00013	0.0017	< 0.003	1.1	< 0.00004	0.34	0.0000030	0.23	0.026	1.8	< 0.000005	0.000070	0.00010	0.0052	0.00025	< 0.001	< 0.002
23-Dec-15	19	500	485	8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	20	500	490	7.5	< 0.007	0.000030	0.00062	2.1	0.010	0.010	0.00036	0.0014	< 0.003	0.92	< 0.00004	0.24	< 0.000002	0.20	0.021	1.9	< 0.000005	< 0.00001	0.00010	0.0040	0.00022	< 0.001	< 0.002
6-Jan-16	21	500	465	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	22	500	490	7.5	< 0.007	0.000030	0.00056	2.2	0.011	< 0.01	0.00018	0.0013	< 0.003	0.95	0.00017	0.28	0.0000030	0.15	0.021	1.1	< 0.000005	0.000030	< 0.00005	0.0043	0.00021	< 0.001	< 0.002
20-Jan-16	23	500	475	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	24	500	490	7.6	< 0.007	< 0.00001	0.00054	2.2	0.012	< 0.01	0.000060	0.0013	< 0.003	0.89	< 0.00004	0.27	< 0.000002	0.16	0.023	1.2	< 0.000005	0.000030	< 0.00005	0.0049	0.00026	< 0.001	< 0.002
3-Feb-16	25	500	480	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	26	500	495	7.5	< 0.007	0.000040	0.00053	2.4	0.013	< 0.01	0.000080	0.0015	< 0.003	0.86	0.000050	0.26	< 0.000002	0.15	0.024	1.6	< 0.000005	< 0.00001	< 0.00005	0.0041	0.00017	< 0.001	< 0.002
17-Feb-16	27	500	490	7.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	28	500	490	7.6	< 0.007	0.000030	0.00055	2.4	0.013	0.020	0.000090	0.0013	< 0.003	0.83	< 0.00004	0.040	< 0.000002	0.070	0.022	1.3	< 0.000005	0.000090	0.000070	0.0039	0.00020	< 0.001	< 0.002
2-Mar-16	29	500	485	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Mar-16	30	500	495	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Calculated Loading Rates for HC7 (KAM036824)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
12-Aug-15	0	500	415	7.4	0.0029	0.000046	0.0021	10	0.042	0.0042	0.00084	0.015	0.0033	2.5	0.000083	0.28	0.0000066	7.4	0.12	35	0.000015	0.00092	0.000021	0.0098	0.00011	0.0017	0.00083
19-Aug-15	1	500	495	7.4	0.017	0.0000099	0.00098	4.1	0.016	0.0050	0.00033	0.0060	0.0015	1.4	0.000020	0.21	0.00000099	2.8	0.047	13	0.0000040	0.0000050	0.00011	0.0048	0.00015	0.00050	0.00099
26-Aug-15	2	500	505	7.5	0.0035	0.000061	0.00082	2.4	0.011	0.0051	0.00028	0.0038	0.0020	1.1	0.000040	0.20	0.0000015	1.6	0.029	7.4	0.0000040	0.000010	0.000025	0.0049	0.00018	0.00051	0.0010
2-Sep-15	3	500	475	7.5	0.0057	0.000057	0.00062	1.8	0.0068	0.0048	0.00015	0.0023	0.0014	0.87	0.000019	0.17	0.0000019	1.0	0.021	5.9	0.0000033	0.0000048	0.000086	0.0036	0.00018	0.00048	0.00095
9-Sep-15	4	500	490	7.9	0.0034	0.000015	0.00056	1.6	0.0070	0.0049	0.0011	0.0019	0.0015	0.82	0.000034	0.17	0.0000025	0.82	0.017	5.2	0.0000054	0.000039	0.000034	0.0044	0.00016	0.00049	0.00098
16-Sep-15	5	500	480	7.5	0.0034	0.000038	0.00064	1.4	0.0054	0.0048	0.00011	0.0013	0.0014	0.76	0.000019	0.16	0.0000024	0.65	0.014	3.4	0.0000034	0.000029	0.000024	0.0032	0.00016	0.00048	0.00096
23-Sep-15	6	500	495	7.5	0.0035	0.0000050	0.00050	1.4	0.0065	0.0050	0.00016	0.0016	0.0015	0.74	0.000020	0.19	0.0000099	0.55	0.015	2.6	0.0000025	0.0000050	0.000040	0.0031	0.00015	0.00050	0.00099
30-Sep-15	7	500	485	7.5	0.0034	0.000019	0.00045	1.2	0.0051	0.0049	0.00013	0.0016	0.0015	0.69	0.000019	0.13	0.00000097	0.44	0.013	2.1	0.0000024	0.000034	0.000049	0.0026	0.00016	0.0019	0.00097
7-Oct-15	8	500	480	7.6	0.0034	0.0000096	0.00039	1.1	0.0046	0.0048	0.00023	0.0011	0.0014	0.55	0.000019	0.12	0.00000096	0.29	0.011	1.7	0.0000024	0.000019	0.000024	0.0023	0.00012	0.00048	0.00096
14-Oct-15	9	500	475	7.7	0.0033	0.0000048	0.00047	1.2	0.0046	0.0048	0.00022	0.00086	0.0014	0.65	0.000019	0.17	0.00000095	0.31	0.012	2.0	0.0000029	0.000043	0.000024	0.0026	0.00019	0.00048	0.00095
21-Oct-15	10	500	495	7.6	0.0035	0.000020	0.00046	1.4	0.0061	0.0050	0.00096	0.0011	0.0015	0.68	0.000020	0.18	0.0000064	0.30	0.014	1.7	0.0000035	0.000064	0.00018	0.0032	0.00013	0.00050	0.00099
28-Oct-15	11	500	505	7.7	0.0034	0.000015	0.00040	1.2	0.0052	0.0049	0.00081	0.00098	0.0027	0.62	0.000020	0.16	0.0000037	0.24	0.013	1.4	0.0000029	0.000035	0.00010	0.0028	0.00013	0.00049	0.00098
4-Nov-15	12	500	480	7.6	0.0034	0.0000096	0.00034	1.0	0.0042	0.0048	0.00065	0.00082	0.0038	0.55	0.000019	0.13	0.00000096	0.19	0.011	1.2	0.0000024	0.0000048	0.000024	0.0025	0.00012	0.00048	0.00096
11-Nov-15	13	500	465	7.6	0.0064	0.000012	0.00035	1.1	0.0050	0.0049	0.00049	0.00080	0.0027	0.55	0.000042	0.14	0.00000098	0.18	0.012	1.1	0.0000024	0.000015	0.000024	0.0023	0.00012	0.00049	0.00098
18-Nov-15	14	500	495	7.7	0.0094	0.000015	0.00036	1.2	0.0057	0.0050	0.00034	0.00079	0.0015	0.55	0.000064	0.16	0.00000099	0.17	0.013	1.1	0.0000025	0.000025	0.000025	0.0021	0.00013	0.00050	0.00099
25-Nov-15	15	500	465	7.6	0.0064	0.000027	0.00034	1.2	0.0054	0.0049	0.00024	0.00083	0.0015	0.55	0.000042	0.15	0.00000098	0.15	0.012	1.1	0.0000025	0.000027	0.000066	0.0023	0.00014	0.00049	0.00098
2-Dec-15	16	500	485	7.5	0.0034	0.000039	0.00032	1.2	0.0050	0.0049	0.00014	0.00087	0.0015	0.55	0.000019	0.15	0.00000097	0.13	0.011	1.1	0.0000024	0.000029	0.00011	0.0026	0.00015	0.00049	0.00097
9-Dec-15	17	500	470	7.7	0.0034	0.000049	0.00034	1.2	0.0056	0.0049	0.00010	0.00086	0.0015	0.55	0.000020	0.16	0.0000012	0.12	0.012	0.98	0.0000025	0.000032	0.000078	0.0026	0.00014	0.00049	0.00099
16-Dec-15	18	500	500	7.6	0.0035	0.000060	0.00035	1.2	0.0061	0.0050	0.000065	0.00085	0.0015	0.56	0.000020	0.17	0.0000015	0.12	0.013	0.90	0.0000025	0.000035	0.000050	0.0026	0.00013	0.00050	0.0010
23-Dec-15	19	500	485	8.0	0.0035	0.000037	0.00033	1.1	0.0055	0.0050	0.00012	0.00077	0.0015	0.50	0.000020	0.14	0.0000012	0.11	0.012	0.92	0.0000025	0.000020	0.000050	0.0023	0.00012	0.00050	0.00099
30-Dec-15	20	500	490	7.5	0.0034	0.000015	0.00030	1.0	0.0050	0.0049	0.00018	0.00069	0.0015	0.45	0.000020	0.12	0.00000098	0.098	0.010	0.93	0.0000025	0.0000049	0.000049	0.0020	0.00011	0.00049	0.00098
6-Jan-16	21	500	465	7.4	0.0034	0.000015	0.00029	1.1	0.0052	0.0049	0.00013	0.00066	0.0015	0.46	0.000051	0.13	0.0000012	0.086	0.010	0.74	0.0000025	0.0000098	0.000037	0.0020	0.00011	0.00049	0.00098
13-Jan-16	22	500	490	7.5	0.0034	0.000015	0.00027	1.1	0.0054	0.0049	0.000088	0.00064	0.0015	0.47	0.000083	0.14	0.0000015	0.074	0.010	0.54	0.0000025	0.000015	0.000025	0.0021	0.00010	0.00049	0.00098
20-Jan-16	23	500	475	7.5	0.0034	0.0000098	0.00027	1.1	0.0055	0.0049	0.000059	0.00064	0.0015	0.45	0.000051	0.13	0.0000012	0.076	0.011	0.56	0.0000025	0.000015	0.000025	0.0023	0.00012	0.00049	0.00098
27-Jan-16	24	500	490	7.6	0.0034	0.0000049	0.00026	1.1	0.0057	0.0049	0.000029	0.00064	0.0015	0.44	0.000020	0.13	0.00000098	0.078	0.011	0.59	0.0000025	0.000015	0.000025	0.0024	0.00013	0.00049	0.00098
3-Feb-16	25	500	480	7.5	0.0034	0.000012	0.00026	1.1	0.0061	0.0049	0.000035	0.00069	0.0015	0.43	0.000022	0.13	0.00000099	0.076	0.011	0.69	0.0000025	0.0000098	0.000025	0.0022	0.00011	0.00049	0.00099
10-Feb-16	26	500	495	7.5	0.0035	0.000020	0.00026	1.2	0.0066	0.0050	0.000040	0.00074	0.0015	0.42	0.000025	0.13	0.00000099	0.074	0.012	0.79	0.0000025	0.0000050	0.000025	0.0020	0.000084	0.00050	0.00099
17-Feb-16	27	500	490	7.6	0.0034	0.000017	0.00026	1.2	0.0064	0.0074	0.000042	0.00069	0.0015	0.42	0.000022	0.074	0.00000099	0.054	0.011	0.71	0.0000025	0.000025	0.000030	0.0020	0.000091	0.00049	0.00099
24-Feb-16	28	500	490	7.6	0.0034	0.000015	0.00027	1.2	0.0062	0.0098	0.000044	0.00064	0.0015	0.41	0.000020	0.020	0.00000098	0.034	0.011	0.64	0.0000025	0.000044	0.000034	0.0019	0.000098	0.00049	0.00098

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for HC8 (KAM092488)

Date	Cycle	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu
	No.	Input	Output		umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
12-Aug-15	0	500	410	7.6	128	#N/A	2.5	22	29	*< 1*	0.080	*< 0.3*	24	0.075	0.0037	0.13	0.0077	0.000014	0.000010	0.016	0.000025	5.7	0.00011	0.00031	0.016
19-Aug-15	1	500	505	7.5	68	#N/A	1.9	15	13	*< 1*	*< 0.06*	*< 0.3*	16	0.024	0.0030	0.063	0.0084	*< 0.000007*	*< 0.000007*	0.0084	0.0000040	3.8	*< 0.00003*	0.00017	0.0032
26-Aug-15	2	500	495	7.5	38	#N/A	1.3	12	3.0	*< 1*	*< 0.06*	*< 0.3*	9.3	0.021	0.0025	0.050	0.0049	*< 0.000007*	*< 0.000007*	0.0053	0.0000090	2.3	*< 0.00003*	0.000070	0.0020
2-Sep-15	3	500	500	7.5	32	#N/A	1.6	12	*< 2*	*< 1*	*< 0.06*	*< 0.3*	8.5	0.018	0.0025	0.043	0.0045	*< 0.000007*	*< 0.000007*	0.0047	0.0000060	2.1	*< 0.00003*	0.000053	0.0014
9-Sep-15	4	500	495	7.5	25	#N/A	1.6	11	*< 2*	*< 1*	*< 0.06*	*< 0.3*	8.2	0.019	0.0021	0.038	0.0045	*< 0.000007*	*< 0.000007*	0.0039	*< 0.000003*	1.9	*< 0.00003*	0.000048	0.0011
16-Sep-15	5	500	495	7.4	24	#N/A	1.5	11	*< 2*	*< 1*	*< 0.06*	*< 0.3*	8.3	0.017	0.0021	0.038	0.0049	*< 0.000007*	*< 0.000007*	0.0037	0.0000060	2.0	*< 0.00003*	0.000030	0.00082
23-Sep-15	6	500	495	7.4	24	#N/A	1.4	12	*< 2*	*< 1*	*< 0.06*	*< 0.3*	8.9	0.014	0.0021	0.035	0.0056	*< 0.000007*	*< 0.000007*	0.0030	*< 0.000003*	2.1	*< 0.00003*	0.000034	0.00081
30-Sep-15	7	500	490	7.4	21	#N/A	1.5	12	*< 2*	*< 1*	*< 0.06*	*< 0.3*	8.7	0.012	0.0018	0.032	0.0054	*< 0.000007*	*< 0.000007*	0.0032	0.0000050	2.0	*< 0.00003*	0.000037	0.00086
7-Oct-15	8	500	500	7.5	19	#N/A	1.5	10	2.0	*< 1*	*< 0.06*	*< 0.3*	8.0	0.011	0.0016	0.022	0.0052	*< 0.000007*	*< 0.000007*	0.0018	*< 0.000003*	1.9	*< 0.00003*	0.000024	0.00059
14-Oct-15	9	500	490	7.6	19	#N/A	1.5	11	2.0	*< 1*	*< 0.06*	*< 0.3*	8.1	0.012	0.0016	0.027	0.0052	*< 0.000007*	*< 0.000007*	0.0031	*< 0.000003*	1.9	*< 0.00003*	0.000027	0.00052
21-Oct-15	10	500	495	7.5	21	#N/A	1.2	11	2.0	*< 1*	*< 0.06*	*< 0.3*	9.4	0.014	0.0016	0.022	0.0065	*< 0.000007*	*< 0.000007*	0.0022	0.0000050	2.2	*< 0.00003*	0.000025	0.00065
28-Oct-15	11	500	510	7.7	21	#N/A	2.4	13	3.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	12	500	495	7.4	20	#N/A	1.1	11	*< 2*	*< 1*	*< 0.06*	*< 0.3*	8.4	0.012	0.0013	0.018	0.0061	*< 0.000007*	*< 0.000007*	0.00080	*< 0.000003*	2.0	0.000040	0.000017	0.00045
11-Nov-15	13	500	480	7.4	19	#N/A	1.6	10	*< 2*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	14	500	505	7.5	22	#N/A	0.80	13	2.0	*< 1*	*< 0.06*	*< 0.3*	9.6	0.013	0.0014	0.020	0.0069	*< 0.000007*	*< 0.000007*	*< 0.0002*	*< 0.000003*	2.3	*< 0.00003*	0.000024	0.00055
25-Nov-15	15	500	475	7.3	17	#N/A	1.0	9.7	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Dec-15	16	500	490	7.1	18	#N/A	2.8	11	2.0	*< 1*	*< 0.06*	*< 0.3*	8.7	0.017	0.0013	0.018	0.0056	*< 0.000007*	*< 0.000007*	0.00060	0.0000050	2.1	*< 0.00003*	0.000016	0.00059
9-Dec-15	17	500	495	7.6	19	#N/A	3.1	11	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	18	500	490	7.6	18	#N/A	2.7	9.9	2.0	*< 1*	*< 0.06*	*< 0.3*	9.3	0.015	0.0013	0.018	0.0061	0.0000080	*< 0.000007*	0.0015	0.0000060	2.3	0.00012	0.000027	0.00065
23-Dec-15	19	500	495	8.1	15	#N/A	3.9	11	*< 2*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	20	500	495	7.2	16	#N/A	1.3	9.5	2.0	*< 1*	*< 0.06*	*< 0.3*	8.7	0.0091	0.0011	0.013	0.0062	*< 0.000007*	*< 0.000007*	0.0010	*< 0.000003*	2.1	*< 0.00003*	0.000017	0.00021
6-Jan-16	21	500	485	7.1	17	#N/A	1.7	9.2	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	22	500	490	7.2	19	#N/A	1.8	10	2.0	*< 1*	*< 0.06*	*< 0.3*	8.9	0.011	0.0013	0.014	0.0061	*< 0.000007*	*< 0.000007*	*< 0.002*	*< 0.000003*	2.2	*< 0.00003*	0.0000040	0.00027
20-Jan-16	23	500	485	7.4	17	#N/A	2.5	9.6	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	24	500	490	7.5	20	#N/A	2.8	11	2.0	*< 1*	*< 0.06*	*< 0.3*	8.8	0.012	0.0013	0.016	0.0060	*< 0.000007*	*< 0.000007*	*< 0.002*	0.0000050	2.1	*< 0.00003*	0.000016	0.00034
3-Feb-16	25	500	500	7.4	18	#N/A	3.5	10	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	26	500	495	7.3	20	#N/A	2.0	11	2.0	*< 1*	*< 0.06*	*< 0.3*	9.3	0.0080	0.0014	0.017	0.0057	*< 0.000007*	*< 0.000007*	*< 0.002*	*< 0.000003*	2.3	*< 0.00003*	0.000023	0.00024
17-Feb-16	27	500	490	7.6	15	#N/A	4.0	11	*< 2*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	28	500	500	7.4	17	#N/A	2.6	11	2.0	*< 1*	*< 0.06*	*< 0.3*	9.1	0.013	0.0013	0.016	0.0061	*< 0.000007*	*< 0.000007*	*< 0.002*	*< 0.000003*	2.3	*< 0.00003*	0.0000080	0.0020
2-Mar-16	29	500	500	7.2	19	#N/A	2.2	11	*< 2*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Mar-16	30	500	500	7.4	19	#N/A	2.5	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Calculated Loading Rates for HC8 (KAM092488)

Date	Cycle	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu
	No.	Input	Output		umhos/cm	$mgCaCO_3$/kg/wk	$mgCaCO_3$/kg/wk	$mgCaCO_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
12-Aug-15	0	500	410	7.6	128	#N/A	1.0	9.2	12	0.41	0.033	0.12	9.7	0.031	0.0015	0.055	0.0031	0.0000057	0.0000041	0.0066	0.000010	2.3	0.000045	0.00013	0.0064
19-Aug-15	1	500	505	7.5	68	#N/A	0.94	7.7	6.6	0.51	0.030	0.15	8.1	0.012	0.0015	0.032	0.0042	0.0000035	0.0000035	0.0042	0.0000020	1.9	0.000015	0.000085	0.0016
26-Aug-15	2	500	495	7.5	38	#N/A	0.66	6.2	1.5	0.50	0.030	0.15	4.6	0.010	0.0012	0.025	0.0024	0.0000035	0.0000035	0.0026	0.0000045	1.1	0.000015	0.000035	0.0010
2-Sep-15	3	500	500	7.5	32	#N/A	0.82	6.1	1.0	0.50	0.030	0.15	4.3	0.0090	0.0013	0.022	0.0023	0.0000035	0.0000035	0.0024	0.0000030	1.0	0.000015	0.000027	0.00069
9-Sep-15	4	500	495	7.5	25	#N/A	0.78	5.4	0.99	0.50	0.030	0.15	4.1	0.0094	0.0010	0.019	0.0022	0.0000035	0.0000035	0.0019	0.0000015	0.96	0.000015	0.000024	0.00052
16-Sep-15	5	500	495	7.4	24	#N/A	0.72	5.6	0.99	0.50	0.030	0.15	4.1	0.0086	0.0010	0.019	0.0024	0.0000035	0.0000035	0.0018	0.0000030	0.99	0.000015	0.000015	0.00041
23-Sep-15	6	500	495	7.4	24	#N/A	0.67	5.7	0.99	0.50	0.030	0.15	4.4	0.0067	0.0010	0.017	0.0028	0.0000035	0.0000035	0.0015	0.0000015	1.0	0.000015	0.000017	0.00040
30-Sep-15	7	500	490	7.4	21	#N/A	0.74	5.8	0.98	0.49	0.029	0.15	4.2	0.0060	0.00088	0.016	0.0026	0.0000034	0.0000034	0.0016	0.0000025	0.98	0.000015	0.000018	0.00042
7-Oct-15	8	500	500	7.5	19	#N/A	0.77	5.2	1.0	0.50	0.030	0.15	4.0	0.0057	0.00080	0.011	0.0026	0.0000035	0.0000035	0.00090	0.0000015	0.96	0.000015	0.000012	0.00030
14-Oct-15	9	500	490	7.6	19	#N/A	0.75	5.4	0.98	0.49	0.029	0.15	4.0	0.0058	0.00078	0.013	0.0026	0.0000034	0.0000034	0.0015	0.0000015	0.93	0.000015	0.000013	0.00025
21-Oct-15	10	500	495	7.5	21	#N/A	0.59	5.6	0.99	0.50	0.030	0.15	4.7	0.0068	0.00079	0.011	0.0032	0.0000035	0.0000035	0.0011	0.0000025	1.1	0.000015	0.000012	0.00032
28-Oct-15	11	500	510	7.7	21	#N/A	1.2	6.8	1.5	0.50	0.030	0.15	4.4	0.0064	0.00072	0.0097	0.0031	0.0000035	0.0000035	0.00074	0.0000020	1.0	0.000017	0.000010	0.00027
4-Nov-15	12	500	495	7.4	20	#N/A	0.52	5.2	0.99	0.50	0.030	0.15	4.2	0.0060	0.00064	0.0087	0.0030	0.0000035	0.0000035	0.00040	0.0000015	0.99	0.000020	0.0000084	0.00022
11-Nov-15	13	500	480	7.4	19	#N/A	0.77	4.9	0.96	0.50	0.030	0.15	4.5	0.0063	0.00068	0.0093	0.0033	0.0000035	0.0000035	0.00025	0.0000015	1.1	0.000017	0.000010	0.00025
18-Nov-15	14	500	505	7.5	22	#N/A	0.40	6.6	1.0	0.51	0.030	0.15	4.8	0.0066	0.00071	0.0098	0.0035	0.0000035	0.0000035	0.00010	0.0000015	1.2	0.000015	0.000012	0.00028
25-Nov-15	15	500	475	7.3	17	#N/A	0.48	4.6	0.95	0.50	0.030	0.15	4.6	0.0074	0.00067	0.0093	0.0031	0.0000035	0.0000035	0.00020	0.0000020	1.1	0.000015	0.0000100	0.00028
2-Dec-15	16	500	490	7.1	18	#N/A	1.4	5.2	0.98	0.49	0.029	0.15	4.3	0.0081	0.00064	0.0088	0.0027	0.0000034	0.0000034	0.00029	0.0000025	1.0	0.000015	0.0000078	0.00029
9-Dec-15	17	500	495	7.6	19	#N/A	1.5	5.6	0.99	0.49	0.029	0.15	4.4	0.0076	0.00064	0.0089	0.0029	0.0000037	0.0000034	0.00051	0.0000027	1.1	0.000037	0.000011	0.00030
16-Dec-15	18	500	490	7.6	18	#N/A	1.3	4.8	0.98	0.49	0.029	0.15	4.6	0.0072	0.00064	0.0090	0.0030	0.0000039	0.0000034	0.00074	0.0000029	1.1	0.000059	0.000013	0.00032
23-Dec-15	19	500	495	8.1	15	#N/A	1.9	5.3	0.99	0.49	0.030	0.15	4.4	0.0059	0.00059	0.0078	0.0030	0.0000037	0.0000034	0.00062	0.0000022	1.1	0.000037	0.000011	0.00021
30-Dec-15	20	500	495	7.2	16	#N/A	0.65	4.7	0.99	0.50	0.030	0.15	4.3	0.0045	0.00054	0.0066	0.0030	0.0000035	0.0000035	0.00050	0.0000015	1.0	0.000015	0.0000084	0.00010
6-Jan-16	21	500	485	7.1	17	#N/A	0.84	4.5	0.97	0.49	0.030	0.15	4.3	0.0049	0.00059	0.0067	0.0030	0.0000034	0.0000034	0.00074	0.0000015	1.1	0.000015	0.0000052	0.00012
13-Jan-16	22	500	490	7.2	19	#N/A	0.87	5.0	0.98	0.49	0.029	0.15	4.4	0.0054	0.00064	0.0069	0.0030	0.0000034	0.0000034	0.00098	0.0000015	1.1	0.000015	0.0000020	0.00013
20-Jan-16	23	500	485	7.4	17	#N/A	1.2	4.6	0.97	0.49	0.029	0.15	4.3	0.0057	0.00064	0.0073	0.0030	0.0000034	0.0000034	0.00098	0.0000020	1.1	0.000015	0.0000049	0.00015
27-Jan-16	24	500	490	7.5	20	#N/A	1.4	5.3	0.98	0.49	0.029	0.15	4.3	0.0059	0.00064	0.0076	0.0029	0.0000034	0.0000034	0.00098	0.0000025	1.0	0.000015	0.0000078	0.00017
3-Feb-16	25	500	500	7.4	18	#N/A	1.7	5.1	1.0	0.49	0.030	0.15	4.5	0.0049	0.00067	0.0080	0.0029	0.0000034	0.0000034	0.00099	0.0000020	1.1	0.000015	0.0000096	0.00014
10-Feb-16	26	500	495	7.3	20	#N/A	0.98	5.4	0.99	0.50	0.030	0.15	4.6	0.0040	0.00069	0.0084	0.0028	0.0000035	0.0000035	0.00099	0.0000015	1.1	0.000015	0.000011	0.00012
17-Feb-16	27	500	490	7.6	15	#N/A	1.9	5.3	0.98	0.50	0.030	0.15	4.6	0.0051	0.00067	0.0081	0.0029	0.0000035	0.0000035	0.00100	0.0000015	1.1	0.000015	0.0000077	0.00057
24-Feb-16	28	500	500	7.4	17	#N/A	1.3	5.3	1.0	0.50	0.030	0.15	4.6	0.0063	0.00065	0.0079	0.0031	0.0000035	0.0000035	0.0010	0.0000015	1.1	0.000015	0.0000040	0.0010

Notes:
Values in grey italics are below the analytical detection limit

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for HC8 (KAM092488)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
12-Aug-15	0	500	410	7.6	0.021	0.00061	0.0049	2.3	0.012	< 0.01	0.0033	0.0018	0.025	3.7	0.00067	0.92	0.0000040	14	0.096	10	0.000017	0.0021	0.00063	0.024	0.00038	0.0070	< 0.002
19-Aug-15	1	500	505	7.5	0.013	0.000070	0.0019	1.6	0.013	< 0.01	0.0015	0.0011	< 0.003	2.4	0.00024	0.60	< 0.000002	5.2	0.062	4.1	0.0000070	< 0.00001	0.00015	0.017	0.00014	< 0.001	< 0.002
26-Aug-15	2	500	495	7.5	< 0.007	0.00014	0.0013	0.88	0.0082	< 0.01	0.0011	0.00060	< 0.003	1.6	0.00014	0.45	0.0000050	2.5	0.036	1.9	0.0000060	0.000020	< 0.00005	0.021	0.00012	< 0.001	< 0.002
2-Sep-15	3	500	500	7.5	< 0.007	0.000090	0.0012	0.84	0.0063	< 0.01	0.00074	0.00040	< 0.003	1.5	0.000080	0.43	0.0000020	1.7	0.033	1.5	0.0000050	< 0.00001	< 0.00005	0.022	0.00011	< 0.001	< 0.002
9-Sep-15	4	500	495	7.5	< 0.007	0.000020	0.00096	0.82	0.0056	< 0.01	0.0016	0.00030	< 0.003	1.3	0.000080	0.40	0.0000040	1.1	0.031	4.0	0.0000080	0.00010	< 0.00005	0.020	0.00011	< 0.001	< 0.002
16-Sep-15	5	500	495	7.4	< 0.007	0.000020	0.0012	0.80	0.0048	< 0.01	0.00037	< 0.0001	< 0.003	1.3	0.000060	0.45	0.0000020	0.81	0.030	1.3	< 0.000005	0.000050	< 0.00005	0.020	0.000090	< 0.001	< 0.002
23-Sep-15	6	500	495	7.4	< 0.007	< 0.00001	0.00088	0.89	0.0051	0.010	0.00037	0.00020	< 0.003	1.2	< 0.00004	0.43	0.0000070	0.56	0.033	0.50	< 0.000005	< 0.00001	0.000060	0.019	0.000090	< 0.001	< 0.002
30-Sep-15	7	500	490	7.4	< 0.007	0.000010	0.00077	0.89	0.0047	< 0.01	0.00032	0.00030	< 0.003	1.1	< 0.00004	0.32	< 0.000002	0.43	0.030	0.90	< 0.000005	0.000080	0.000060	0.018	0.000080	< 0.001	< 0.002
7-Oct-15	8	500	500	7.5	< 0.007	0.000010	0.00067	0.79	0.0046	< 0.01	0.00042	0.00020	< 0.003	0.92	< 0.00004	0.31	< 0.000002	0.25	0.029	0.50	< 0.000005	0.000050	0.000070	0.017	0.000080	< 0.001	< 0.002
14-Oct-15	9	500	490	7.6	< 0.007	0.000060	0.00071	0.81	0.0042	< 0.01	0.00043	0.00020	< 0.003	0.90	< 0.00004	0.36	< 0.000002	0.21	0.029	0.40	< 0.000005	0.000050	< 0.00005	0.018	0.000070	0.0010	< 0.002
21-Oct-15	10	500	495	7.5	< 0.007	0.000050	0.00072	0.94	0.0046	< 0.01	0.0014	0.00020	< 0.003	0.93	< 0.00004	0.39	0.000010	0.19	0.033	0.40	< 0.000005	0.00013	0.000050	0.020	0.000070	< 0.001	< 0.002
28-Oct-15	11	500	510	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	12	500	495	7.4	< 0.007	0.000010	0.00054	0.84	0.0045	0.020	0.00088	0.00020	0.0030	0.79	< 0.00004	0.30	< 0.000002	0.11	0.030	0.30	< 0.000005	0.000020	< 0.00005	0.019	0.000070	< 0.001	< 0.002
11-Nov-15	13	500	480	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	14	500	505	7.5	0.0090	0.000010	0.00053	0.94	0.0053	< 0.01	0.00055	< 0.0001	< 0.003	0.74	0.00012	0.34	< 0.000002	0.090	0.034	0.10	< 0.000005	0.000030	0.000050	0.021	0.000050	< 0.001	< 0.002
25-Nov-15	15	500	475	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Dec-15	16	500	490	7.1	< 0.007	0.000060	0.00044	0.87	0.0049	< 0.01	0.00026	0.00020	< 0.003	0.64	< 0.00004	0.31	< 0.000002	0.050	0.029	0.70	< 0.000005	0.000040	< 0.00005	0.021	0.000070	< 0.001	< 0.002
9-Dec-15	17	500	495	7.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	18	500	490	7.6	< 0.007	0.00023	0.00050	0.89	0.0054	< 0.01	0.00015	0.00020	< 0.003	0.61	< 0.00004	0.31	< 0.000002	0.060	0.032	0.20	< 0.000005	0.000080	< 0.00005	0.022	0.000080	0.0010	< 0.002
23-Dec-15	19	500	495	8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	20	500	495	7.2	< 0.007	0.000050	0.00043	0.84	0.0054	0.010	0.00032	< 0.0001	< 0.003	0.50	< 0.00004	0.26	0.0000020	0.060	0.029	0.80	< 0.000005	< 0.00001	< 0.00005	0.019	0.000050	< 0.001	< 0.002
6-Jan-16	21	500	485	7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	22	500	490	7.2	< 0.007	0.000040	0.00035	0.84	0.0055	< 0.01	0.00016	< 0.0001	< 0.003	0.48	0.00013	0.27	< 0.000002	0.030	0.028	< 0.1	< 0.000005	0.000030	< 0.00005	0.019	0.000040	< 0.001	< 0.002
20-Jan-16	23	500	485	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	24	500	490	7.5	< 0.007	< 0.00001	0.00034	0.85	0.0060	< 0.01	0.000060	< 0.0001	< 0.003	0.43	< 0.00004	0.27	< 0.000002	0.050	0.029	0.10	< 0.000005	0.000040	< 0.00005	0.021	0.000060	< 0.001	< 0.002
3-Feb-16	25	500	500	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	26	500	495	7.3	< 0.007	0.000010	0.00033	0.88	0.0066	< 0.01	0.00010	< 0.0001	< 0.003	0.40	0.000050	0.26	< 0.000002	0.050	0.030	0.70	< 0.000005	< 0.00001	< 0.00005	0.019	0.000030	< 0.001	< 0.002
17-Feb-16	27	500	490	7.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	28	500	500	7.4	< 0.007	0.000020	0.00032	0.84	0.0059	0.030	0.00011	< 0.0001	< 0.003	0.36	< 0.00004	0.040	< 0.000002	< 0.01	0.027	0.50	< 0.000005	0.000070	< 0.00005	0.020	0.000020	< 0.001	< 0.002
2-Mar-16	29	500	500	7.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Mar-16	30	500	500	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Calculated Loading Rates for HC8 (KAM092488)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
12-Aug-15	0	500	410	7.6	0.0086	0.00025	0.0020	0.95	0.0048	0.0041	0.0014	0.00074	0.010	1.5	0.00027	0.38	0.0000016	5.5	0.039	4.2	0.0000070	0.00087	0.00026	0.0096	0.00016	0.0029	0.00082
19-Aug-15	1	500	505	7.5	0.0066	0.000035	0.00095	0.80	0.0066	0.0051	0.00075	0.00056	0.0015	1.2	0.00012	0.30	0.0000010	2.6	0.031	2.1	0.0000035	0.0000051	0.000076	0.0085	0.000071	0.00051	0.0010
26-Aug-15	2	500	495	7.5	0.0035	0.000069	0.00065	0.43	0.0040	0.0050	0.00052	0.00030	0.0015	0.81	0.000069	0.22	0.0000025	1.3	0.018	0.94	0.0000030	0.0000099	0.000025	0.010	0.000059	0.00050	0.00099
2-Sep-15	3	500	500	7.5	0.0035	0.000045	0.00058	0.42	0.0031	0.0050	0.00037	0.00020	0.0015	0.73	0.000040	0.22	0.0000010	0.83	0.016	0.75	0.0000025	0.0000050	0.000025	0.011	0.000055	0.00050	0.0010
9-Sep-15	4	500	495	7.5	0.0035	0.0000099	0.00048	0.41	0.0028	0.0050	0.00081	0.00015	0.0015	0.66	0.000040	0.20	0.0000020	0.54	0.015	2.0	0.0000040	0.000050	0.000025	0.010	0.000054	0.00050	0.00099
16-Sep-15	5	500	495	7.4	0.0035	0.0000099	0.00057	0.40	0.0024	0.0050	0.00018	0.000050	0.0015	0.65	0.000030	0.22	0.00000099	0.40	0.015	0.64	0.0000025	0.000025	0.000025	0.0097	0.000045	0.00050	0.00099
23-Sep-15	6	500	495	7.4	0.0035	0.0000050	0.00044	0.44	0.0025	0.0050	0.00018	0.000099	0.0015	0.58	0.000020	0.21	0.0000035	0.28	0.016	0.25	0.0000025	0.0000050	0.000030	0.0092	0.000045	0.00050	0.00099
30-Sep-15	7	500	490	7.4	0.0034	0.0000049	0.00038	0.44	0.0023	0.0049	0.00016	0.00015	0.0015	0.56	0.000020	0.16	0.00000098	0.21	0.015	0.44	0.0000025	0.000039	0.000029	0.0090	0.000039	0.00049	0.00098
7-Oct-15	8	500	500	7.5	0.0035	0.0000050	0.00034	0.40	0.0023	0.0050	0.00021	0.00010	0.0015	0.46	0.000020	0.16	0.0000010	0.13	0.015	0.25	0.0000025	0.000025	0.000035	0.0087	0.000040	0.00050	0.0010
14-Oct-15	9	500	490	7.6	0.0034	0.000029	0.00035	0.40	0.0021	0.0049	0.00021	0.000098	0.0015	0.44	0.000020	0.18	0.00000098	0.10	0.014	0.20	0.0000025	0.000025	0.000025	0.0090	0.000034	0.00049	0.00098
21-Oct-15	10	500	495	7.5	0.0035	0.000025	0.00035	0.46	0.0023	0.0050	0.00071	0.000099	0.0015	0.46	0.000020	0.19	0.0000050	0.094	0.016	0.20	0.0000025	0.000064	0.000025	0.0100	0.000035	0.00050	0.00099
28-Oct-15	11	500	510	7.7	0.0035	0.000015	0.00031	0.44	0.0022	0.0074	0.00057	0.000099	0.0015	0.42	0.000020	0.17	0.0000030	0.074	0.016	0.17	0.0000025	0.000037	0.000025	0.0097	0.000035	0.00050	0.00099
4-Nov-15	12	500	495	7.4	0.0035	0.0000050	0.00027	0.41	0.0022	0.0099	0.00044	0.000099	0.0015	0.39	0.000020	0.15	0.00000099	0.054	0.015	0.15	0.0000025	0.0000099	0.000025	0.0095	0.000035	0.00050	0.00099
11-Nov-15	13	500	480	7.4	0.0040	0.0000050	0.00027	0.44	0.0024	0.0075	0.00036	0.000075	0.0015	0.38	0.000040	0.16	0.0000010	0.050	0.016	0.100	0.0000025	0.000013	0.000025	0.0100	0.000030	0.00050	0.0010
18-Nov-15	14	500	505	7.5	0.0045	0.0000051	0.00027	0.47	0.0027	0.0051	0.00028	0.000051	0.0015	0.37	0.000061	0.17	0.0000010	0.045	0.017	0.051	0.0000025	0.000015	0.000025	0.011	0.000025	0.00051	0.0010
25-Nov-15	15	500	475	7.3	0.0040	0.000017	0.00024	0.45	0.0025	0.0050	0.00020	0.000074	0.0015	0.34	0.000040	0.16	0.00000100	0.035	0.016	0.20	0.0000025	0.000017	0.000025	0.010	0.000030	0.00050	0.00100
2-Dec-15	16	500	490	7.1	0.0034	0.000029	0.00021	0.43	0.0024	0.0049	0.00013	0.000098	0.0015	0.31	0.000020	0.15	0.00000098	0.025	0.014	0.34	0.0000025	0.000020	0.000025	0.010	0.000034	0.00049	0.00098
9-Dec-15	17	500	495	7.6	0.0034	0.000071	0.00023	0.43	0.0025	0.0049	0.00010	0.000098	0.0015	0.31	0.000020	0.15	0.00000098	0.027	0.015	0.22	0.0000025	0.000029	0.000025	0.010	0.000037	0.00049	0.00098
16-Dec-15	18	500	490	7.6	0.0034	0.00011	0.00025	0.44	0.0026	0.0049	0.000074	0.000098	0.0015	0.30	0.000020	0.15	0.00000098	0.029	0.016	0.098	0.0000025	0.000039	0.000025	0.011	0.000039	0.00049	0.00098
23-Dec-15	19	500	495	8.1	0.0034	0.000069	0.00023	0.43	0.0026	0.0049	0.00012	0.000074	0.0015	0.27	0.000020	0.14	0.00000099	0.030	0.015	0.25	0.0000025	0.000022	0.000025	0.0100	0.000032	0.00049	0.00099
30-Dec-15	20	500	495	7.2	0.0035	0.000025	0.00021	0.41	0.0026	0.0050	0.00016	0.000050	0.0015	0.25	0.000020	0.13	0.00000099	0.030	0.014	0.40	0.0000025	0.0000050	0.000025	0.0094	0.000025	0.00050	0.00099
6-Jan-16	21	500	485	7.1	0.0034	0.000022	0.00019	0.41	0.0027	0.0049	0.00012	0.000049	0.0015	0.24	0.000042	0.13	0.00000099	0.022	0.014	0.22	0.0000025	0.0000098	0.000025	0.0093	0.000022	0.00049	0.00099
13-Jan-16	22	500	490	7.2	0.0034	0.000020	0.00017	0.41	0.0027	0.0049	0.000078	0.000049	0.0015	0.24	0.000064	0.13	0.00000098	0.015	0.014	0.049	0.0000025	0.000015	0.000025	0.0093	0.000020	0.00049	0.00098
20-Jan-16	23	500	485	7.4	0.0034	0.000012	0.00017	0.41	0.0028	0.0049	0.000054	0.000049	0.0015	0.22	0.000042	0.13	0.00000098	0.020	0.014	0.049	0.0000025	0.000017	0.000025	0.0099	0.000025	0.00049	0.00098
27-Jan-16	24	500	490	7.5	0.0034	0.0000049	0.00017	0.42	0.0029	0.0049	0.000029	0.000049	0.0015	0.21	0.000020	0.13	0.00000098	0.025	0.014	0.049	0.0000025	0.000020	0.000025	0.010	0.000029	0.00049	0.00098
3-Feb-16	25	500	500	7.4	0.0034	0.0000049	0.00016	0.43	0.0031	0.0049	0.000039	0.000049	0.0015	0.20	0.000022	0.13	0.00000099	0.025	0.015	0.20	0.0000025	0.000012	0.000025	0.0099	0.000022	0.00049	0.00099
10-Feb-16	26	500	495	7.3	0.0035	0.0000050	0.00016	0.43	0.0033	0.0050	0.000050	0.000050	0.0015	0.20	0.000025	0.13	0.00000099	0.025	0.015	0.35	0.0000025	0.0000050	0.000025	0.0094	0.000015	0.00050	0.00099
17-Feb-16	27	500	490	7.6	0.0035	0.0000075	0.00016	0.43	0.0031	0.0100	0.000052	0.000050	0.0015	0.19	0.000022	0.074	0.00000100	0.015	0.014	0.30	0.0000025	0.000020	0.000025	0.0097	0.000012	0.00050	0.00100
24-Feb-16	28	500	500	7.4	0.0035	0.000010	0.00016	0.42	0.0029	0.015	0.000055	0.000050	0.0015	0.18	0.000020	0.020	0.0000010	0.0050	0.014	0.25	0.0000025	0.000035	0.000025	0.0099	0.000010	0.00050	0.0010

Notes:
Values in grey italics are below the analytical detection limit

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for Waste Rock Field Kinetic Tests

Sample ID		**FB-GO**				**FB-GT**				**FB-GS**				**FB-SO**				**FB-ST**				**FB-SS**				**FB-GGT**		**FB-GGS**	
Date Sampled		**17-Jun-14**	**25-Sep-14**	**4-Jun-15**	**22-Oct-15**	**17-Jun-14**	**6-Oct-14**	**4-Jun-15**	**22-Oct-15**	**17-Jun-14**	**6-Oct-14**	**4-Jun-15**	**22-Oct-15**	**17-Jun-14**	**25-Sep-14**	**4-Jun-15**	**22-Oct-15**	**17-Jun-14**	**25-Sep-14**	**4-Jun-15**	**22-Oct-15**	**17-Jun-14**	**25-Sep-14**	**4-Jun-15**	**22-Oct-15**	**17-Jun-15**	**22-Oct-15**	**17-Jun-15**	**22-Oct-15**
Weeks		**0**	**14**	**50**	**70**	**0**	**16**	**50**	**70**	**0**	**16**	**50**	**70**	**0**	**14**	**50**	**70**	**0**	**14**	**50**	**70**	**0**	**14**	**50**	**70**	**0**	**18**	**0**	**18**
Volume	L	4	0.55	8.2	5	4	1.5	3.8	4	4	1.5	8	4	4	2	7.8	4	4	2	6.2	3	4	2	7.8	3	1.5	5	4	6
Conductivity	uS/cm	1000	633	323	304	1100	1250	781	1230	1920	3310	1970	2110	2360	382	516	412	1130	1260	924	1200	1370	2810	1320	1710	991	1450	1530	1090
Hardness (as CaCO3)	mg/L	222		34.5	45.3	299	428	227	527	1160	2070	1090	1200	927	96	87.3	122	518	598	399	571	629		614	892	230	-	643	448
pH		7.8	8.19	8.34	8.18	7.68	8.06	8.04	7.89	7.61	7.66	7.94	7.97	7.86	7.68	8.19	8.13	7.77	7.75	8.02	7.88	7.65	7.81	8.07	8.08	7.94	6.43	8.27	7.69
TDS	mg/L	978		234	211	734	963	552	909	2060	3540	1730	1750	2380	294	330	265	874	1040	677	909	1300		1030	1350	758	1110	1210	785
Anions and Nutrients																													
T-Alkalinity (as CaCO3)	mg/L	339	148	114	75.6	243	91	69	62.7	251	97.4	61.8	75.7	499	41	88.9	84.5	118	45.6	70.1	50.7	294	146	78.6	91.4	123	1.2	227	41.4
T-Ammonia-N	mg/L	0.0261		0.01	*< 0.005*	0.0086	0.0254	0.0097	*< 0.005*	0.167	0.0117	0.0366	*< 0.005*	0.166	*< 0.005*	*< 0.005*	*< 0.005*	0.0444	*< 0.005*	*< 0.005*	*< 0.005*	0.293		0.0211	-	1.58	0.725	0.417	0.185
Nitrate-N	mg/L	3.62	0.0839	0.0081	0.218	0.431	*< 0.05*	*< 0.005*	0.041	2.43	1.53	0.722	1.08	3.15	*< 0.005*	*< 0.005*	*< 0.005*	0.97	*< 0.05*	*< 0.005*	0.26	0.947	*< 0.1*	*< 0.025*	0.025 *	1.23	0.015	0.403	0.066
Nitrite-N	mg/L	0.141		*< 0.001*	0.0011	0.023		0.0012	0.0020 *	0.045		*< 0.01*	0.0050 *	0.219		*< 0.001*	*< 0.001*	0.014		*< 0.001*	0.0020 *	0.013		*< 0.005*	0.0050 *	0.165	0.0020 *	0.0296	0.0698
Br	mg/L	*< 0.5*		*< 0.05*	*< 0.05*	*< 0.5*		*< 0.1*	*< 0.25*	*< 1*		*< 0.5*	*< 0.5*	*< 1*		*< 0.05*	*< 0.05*	*< 0.5*		*< 0.1*	*< 0.25*	*< 0.5*		*< 0.25*	*< 0.25*	*< 0.1*	*< 0.25*	*< 0.25*	*< 0.25*
Cl	mg/L	44.2	13.5	2.34	2.37	19.6	12.8	5.29	5.4	17	17	*< 5*	2.8	68	5.94	3.82	2.89	15	5.5	1.68	4.4	23.6	24	3.8	6.9	26.4	6	24.4	5
F	mg/L	0.7		0.581	0.868	0.51		0.373	0.345	*< 0.4*		0.43	0.19	0.69		0.471	0.52	0.5		0.409	0.217	0.83		0.36	0.25	*< 0.2*	0.095	*< 0.8*	0.861
S(6)	mg/L	109	150	51.8	63.9	301	572	310	570	1060	2280	1120	1180	732	133	158	109	516	633	416	575	451	1660	679	882	317	708	597	497
Cyanides																													
WAD Cyanide	mg/L	-	-	-	-	-	0.005	-	-	-	0.005	-	-	-	0.005	-	-	-	0.0148	-	-	-	-	-	-	-	-	-	-
T-Cyanide	mg/L	-	-	-	-	-	0.005	-	-	-	0.005	-	-	-	0.005	-	-	-	0.016	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																													
DOC	mg/L	147	-	-	6.61	54	9.5	-	7.13	109	8.23	-	2.7	350	27.2	-	5.41	45.6	15.9	-	-	161	-	-	-	-	4.68	-	3.27
Total Metals																													
Al	mg/L	-	-	-	-	-	0.155	-	-	-	0.0252	-	-	-	0.198	-	-	-	0.128	-	-	-	-	-	-	-	-	-	-
Sb	mg/L	-	-	-	-	-	0.0103	-	-	-	0.0123	-	-	-	0.00336	-	-	-	0.00152	-	-	-	-	-	-	-	-	-	-
As	mg/L	-	-	-	-	-	0.0487	-	-	-	0.0147	-	-	-	0.0229	-	-	-	0.00301	-	-	-	-	-	-	-	-	-	-
Ba	mg/L	-	-	-	-	-	0.037	-	-	-	*< 0.02*	-	-	-	0.058	-	-	-	0.033	-	-	-	-	-	-	-	-	-	-
Be	mg/L	-	-	-	-	-	*< 0.001*	-	-	-	*< 0.001*	-	-	-	*< 0.001*	-	-	-	*< 0.001*	-	-	-	-	-	-	-	-	-	-
B	mg/L	-	-	-	-	-	*< 0.1*	-	-	-	*< 0.1*	-	-	-	*< 0.1*	-	-	-	*< 0.1*	-	-	-	-	-	-	-	-	-	-
Cd	mg/L	-	-	-	-	-	0.000015	-	-	-	*< 2E-05*	-	-	-	0.000041	-	-	-	0.000021	-	-	-	-	-	-	-	-	-	-
Ca	mg/L	-	-	-	-	-	96.3	-	-	-	376	-	-	-	22.9	-	-	-	124	-	-	-	-	-	-	-	-	-	-
Cr	mg/L	-	-	-	-	-	*< 0.001*	-	-	-	*< 0.001*	-	-	-	0.0019	-	-	-	0.0012	-	-	-	-	-	-	-	-	-	-
Co	mg/L	-	-	-	-	-	0.00071	-	-	-	0.00144	-	-	-	0.00116	-	-	-	0.00046	-	-	-	-	-	-	-	-	-	-
Cu	mg/L	-	-	-	-	-	0.0027	-	-	-	0.0023	-	-	-	0.004	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-
Fe	mg/L	-	-	-	-	-	0.236	-	-	-	0.032	-	-	-	1.07	-	-	-	0.206	-	-	-	-	-	-	-	-	-	-
Pb	mg/L	-	-	-	-	-	*< 0.0005*	-	-	-	*< 0.0005*	-	-	-	0.00307	-	-	-	0.00114	-	-	-	-	-	-	-	-	-	-
Li	mg/L	-	-	-	-	-	0.0058	-	-	-	0.0125	-	-	-	*< 0.005*	-	-	-	0.012	-	-	-	-	-	-	-	-	-	-
Mg	mg/L	-	-	-	-	-	43.9	-	-	-	265	-	-	-	9.02	-	-	-	67.7	-	-	-	-	-	-	-	-	-	-
Mn	mg/L	-	-	-	-	-	0.0259	-	-	-	0.0449	-	-	-	0.118	-	-	-	0.0406	-	-	-	-	-	-	-	-	-	-
Hg	mg/L	0.000261	-	-	-	0.000211	0.000016	-	-	*< 0.00005*	*< 1E-05*	-	-	0.000365	0.000189	-	-	*< 0.00005*	*< 0.00001*	-	-	*< 0.00005*	-	-	-	-	-	-	-
Mo	mg/L	-	-	-	-	-	0.0512	-	-	-	0.0169	-	-	-	0.0014	-	-	-	0.0156	-	-	-	-	-	-	-	-	-	-
Ni	mg/L	-	-	-	-	-	0.0014	-	-	-	0.008	-	-	-	0.0019	-	-	-	0.0029	-	-	-	-	-	-	-	-	-	-
K	mg/L	-	-	-	-	-	22.1	-	-	-	28	-	-	-	4.4	-	-	-	15.5	-	-	-	-	-	-	-	-	-	-
Se	mg/L	-	-	-	-	-	0.00216	-	-	-	0.00625	-	-	-	0.00109	-	-	-	0.00695	-	-	-	-	-	-	-	-	-	-
Ag	mg/L	-	-	-	-	-	*< 2E-05*	-	-	-	*< 2E-05*	-	-	-	*< 0.00002*	-	-	-	*< 0.00002*	-	-	-	-	-	-	-	-	-	-
Na	mg/L	-	-	-	-	-	120	-	-	-	165	-	-	-	39.9	-	-	-	63	-	-	-	-	-	-	-	-	-	-
Tl	mg/L	-	-	-	-	-	0.00029	-	-	-	*< 0.0002*	-	-	-	*< 0.0002*	-	-	-	*< 0.0002*	-	-	-	-	-	-	-	-	-	-
Sn	mg/L	-	-	-	-	-	*< 0.0005*	-	-	-	*< 0.0005*	-	-	-	*< 0.0005*	-	-	-	*< 0.0005*	-	-	-	-	-	-	-	-	-	-
Ti	mg/L	-	-	-	-	-	0.019	-	-	-	0.03	-	-	-	*< 0.01*	-	-	-	0.025	-	-	-	-	-	-	-	-	-	-
U	mg/L	-	-	-	-	-	0.601	-	-	-	0.773	-	-	-	0.00394	-	-	-	0.0647	-	-	-	-	-	-	-	-	-	-
V	mg/L	-	-	-	-	-	*< 0.001*	-	-	-	*< 0.002*	-	-	-	0.0015	-	-	-	*< 0.001*	-	-	-	-	-	-	-	-	-	-
Zn	mg/L	-	-	-	-	-	0.0116	-	-	-	*< 0.005*	-	-	-	0.557	-	-	-	0.216	-	-	-	-	-	-	-	-	-	-

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for Waste Rock Field Kinetic Tests

Sample ID		FB-GO				FB-GT				FB-GS				FB-SO				FB-ST				FB-SS				FB-GGT		FB-GGS	
Dissolved Metals																													
Al	mg/L	0.008	0.006	0.017	0.0479	0.009	0.005	0.003	0.0049	0.009	0.005	0.002	0.0091	0.006	0.024	0.003	0.003	0.011	0.014	0.003	0.0023	0.013	< 0.005	0.002	0.0037	0.012	0.0284	0.006	0.0037
Sb	mg/L	0.008	0.004	0.004	0.0041	0.018	0.01	0.01	0.00727	0.017	0.012	0.012	0.0102	0.009	0.001	0.003	0.00296	0.002	0.001	0.002	0.0013	0.059	0.043	0.041	0.0248	0.016	0.00887	0.009	0.0073
As	mg/L	0.047	0.032	0.041	0.0663	0.088	0.045	0.043	0.0354	0.066	0.015	0.013	0.0117	0.031	0.004	0.01	0.00915	0.013	0.003	0.003	0.00215	0.088	0.019	0.014	0.00924	0.639	0.154	0.126	0.0806
Ba	mg/L	0.107	0.044	0.015	0.0289	0.077	0.03	0.02	0.0262	0.049	< 0.02	0.011	0.0294	0.089	0.03	0.013	0.0541	0.052	0.029	0.023	0.0336	0.055	0.025	0.015	0.0229	0.049	0.0266	0.083	0.03
Be	mg/L	< 0.0001	< 0.001	< 0.00002	< 0.00002	< 0.0001	< 0.001	< 0.00002	< 0.00002	< 0.0001	< 0.001	< 0.00002	< 0.00002	< 0.0001	< 0.001	< 0.00002	< 0.00002	< 0.0001	< 0.001	< 0.00002	< 0.00002	< 0.0001	< 0.001	< 0.00002	< 0.00002	0	0.00014	< 0.00002	< 0.00002
Bi	mg/L	< 0.0005	-	< 0.00005	< 0.00005	< 0.0005	-	< 0.00005	< 0.00005	< 0.0005	-	< 0.00005	< 0.00005	< 0.0005	-	< 0.00005	< 0.00005	< 0.0005	-	< 0.00005	< 0.00005	< 0.0005	-	< 0.00005	< 0.00005	< 0.00005	0.00025 *	< 0.00005	< 0.00005
B	mg/L	0.077	< 0.1	0.023	0.02	0.068	< 0.1	0.026	0.021	0.036	< 0.1	0.022	0.038	0.044	< 0.1	0.012	< 0.01	0.035	< 0.1	0.029	0.021	0.033	< 0.1	0.018	0.015	0.225	0.171	0.105	0.064
Cd	mg/L	< 0.00002	< 0.00001	< 5E-06	< 5E-06	< 0.00002	0.000014	< 5E-06	0.0000185	0.000012	< 2E-05	< 5E-06	0.0000073	0.000013	0.000023	< 5E-06	0.0000061	< 0.00001	0.000021	< 5E-06	0.0000134	0.000011	< 0.00002	< 5E-06	< 5E-06	0.000111	0.000201	0.000091	0.0000728
Ca	mg/L	55.7	26.3	7.92	11.6	67.6	97.4	46.3	122	218	384	194	239	215	23.3	15.4	28.4	112	127	79	124	118	271	104	168	66.5	139	187	140
Cr	mg/L	0.001	0.002	0	0.00332	0	< 0.001	< 0.0001	0.00022	< 0.0001	< 0.001	0	< 0.0001	0.002	< 0.001	0.001	0.00229	< 0.0001	< 0.001	0	0.00052	0	< 0.001	< 0.0001	< 0.0001	< 0.0001	0.00050 *	< 0.0001	< 0.0001
Co	mg/L	0.001	< 0.0003	0	0.00016	0.001	0.001	0	0.00029	0.002	0.001	0	0.00035	0.001	0.001	< 0.0001	0.00012	0.001	0	0	0.00018	0.002	0.004	0.001	0.00114	0.021	0.0739	0.029	0.00535
Cu	mg/L	0.007	0.003	0.001	0.00216	0.01	0.002	0.001	0.00178	0.007	0.002	0.001	0.00126	0.006	0.003	0.001	0.00063	0.006	0.002	0.001	0.00087	0.011	0.003	0.001	0.00096	0.001	0.0011	0.003	0.00048
Fe	mg/L	< 0.01	< 0.03	< 0.01	0.044	< 0.01	< 0.03	< 0.01	< 0.01	< 0.01	< 0.03	< 0.01	< 0.01	< 0.01	0.07	< 0.01	< 0.01	< 0.01	0.03	< 0.01	< 0.01	< 0.01	< 0.03	< 0.01	< 0.01	< 0.01	0.013	< 0.01	< 0.01
Pb	mg/L	< 0.00005	< 0.0005	< 0.00005	0.000155	< 0.00005	< 0.0005	< 0.00005	0.000085	< 0.00005	< 0.0005	< 0.00005	< 0.00005	< 0.00005	0.00084	< 0.00005	0.000126	< 0.00005	0.00067	< 0.00005	0.000053	< 0.00005	< 0.0005	< 0.00005	< 0.00005	< 0.00005	< 0.00025	0.000053	< 0.00005
Li	mg/L	0.017	< 0.005	0.002	< 0.001	0.024	0.006	0.005	0.0034	0.023	0.012	0.008	0.0072	0.04	< 0.005	0.005	0.003	0.026	0.012	0.014	0.0115	0.025	0.015	0.011	0.009	0.028	0.0315	0.072	0.0184
Mg	mg/L	20.2	9.45	3.58	3.98	31.5	44.8	26.9	54	150	270	147	146	95	9.16	11.8	12.3	57.9	67.9	49	63.4	81.4	195	85.7	115	15.5	32.1	42.4	23.8
Mn	mg/L	0.027	0.007	0	0.00583	0.065	0.016	0.001	0.00753	0.141	0.044	0.006	0.0131	0.036	0.096	0.001	0.0114	0.049	0.036	0.002	0.0195	0.053	0.149	0.014	0.0527	3.73	24.8	3.73	3.09
Hg	mg/L	0.000232	0.000021	0.000008	0.000011	0.000195	< 1E-05	< 5E-06	0.000007	0.00002	< 1E-05	< 5E-06	< 5E-06	0.000309	0.000059	0.000009	0.0000052	0.000019	< 0.00001	< 5E-06	< 5E-06	< 0.00001	< 0.00001	< 5E-06	< 5E-06	0.000046	< 5E-06	< 5E-06	< 5E-06
Mo	mg/L	0.036	0.056	0.058	0.155	0.044	0.049	0.046	0.049	0.017	0.016	0.013	0.023	0.004	0.001	0.005	0.0059	0.023	0.015	0.022	0.0162	0.012	0.017	0.008	0.00719	0.001	0.00045	0.02	0.0195
Ni	mg/L	0.004	0.001	< 0.0005	< 0.0005	0.007	0.001	0.001	0.00071	0.011	0.008	0.004	0.00284	0.005	< 0.001	< 0.0005	< 0.0005	0.012	0.002	0.001	0.00131	0.063	0.058	0.021	0.0153	0.005	0.02	0.003	0.00068
P	mg/L	< 0.05	-	< 0.05	< 0.05	< 0.05	-	< 0.05	< 0.05	< 0.05	-	< 0.05	< 0.05	< 0.05	-	< 0.05	< 0.05	< 0.05	-	< 0.05	< 0.05	< 0.05	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
K	mg/L	20.1	8	5.1	5.64	30.8	22.3	16.6	21.6	29.2	28.6	19	22.3	30.3	4.5	6.7	6.53	21.1	15.9	16.1	18.5	40.8	40.9	26.6	32.9	28.3	40.6	44.6	25.6
Se	mg/L	0.005	0.002	0	0.00033	0.004	0.002	0.001	0.000441	0.005	0.006	0.001	0.000603	0.008	0.001	0.001	0.000314	0.013	0.007	0.002	0.00236	0.005	0.006	0.001	0.000487	0.001	0.00049	0.001	0.000186
Si	mg/L	7.1	-	4.1	4.48	5.5	-	3.67	3.36	4.83	-	2.93	3.01	6.17	-	3.12	2.93	4.61	-	3.85	2.74	3.72	-	2.09	1.52	16.4	19.9	7.89	6.78
Ag	mg/L	< 0.00001	< 0.00002	< 0.00001	< 0.00001	< 0.00001	< 2E-05	< 0.00001	< 0.00001	< 0.00001	< 2E-05	< 0.00001	< 0.00001	< 0.00001	< 0.00002	< 0.00001	< 0.00001	< 0.00001	< 0.00002	< 0.00001	< 0.00001	0	< 0.00002	< 0.00001	< 0.00001	< 0.00001	< 0.00005	< 0.00001	< 0.00001
Na	mg/L	142	98.2	56.2	43.6	118	120	74.1	71.3	104	168	83.7	70	241	41	71.3	38.5	68.2	64.7	52.1	49.8	95.5	148	64.3	60.7	105	94.5	89.4	59.3
Sr	mg/L	0.291	-	0.046	0.0609	0.374	-	0.258	0.578	1.67	-	1.49	1.72	1.27	-	0.127	0.183	3.04	-	3.67	7.37	4.01	-	5.92	9.87	0.259	0.498	0.586	0.318
Tl	mg/L	0	< 0.0002	0	0.000018	0	0	0	0.000157	0	< 0.0002	0	0.000054	0	< 0.0002	0	0.000066	0	< 0.0002	0	0.000014	0	< 0.0002	0	0.00005	0	0.000362	0	0.000063
Sn	mg/L	< 0.0001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0001	< 0.0001	0	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0001	< 0.0001	0	< 0.0005	< 0.0001	< 0.0001
Ti	mg/L	< 0.01	< 0.01	< 0.0003	0.00104	< 0.01	0.017	< 0.0003	< 0.0003	< 0.01	0.028	< 0.0003	< 0.0003	< 0.01	< 0.01	< 0.0003	< 0.0003	< 0.01	0.019	< 0.0003	< 0.0003	< 0.01	0.026	< 0.0003	< 0.0003	< 0.0003	< 0.0015	< 0.0003	< 0.0003
U	mg/L	0.133	0.164	0.075	0.0674	0.439	0.591	0.39	0.572	0.402	0.752	0.433	0.491	0.032	0.004	0.005	0.00624	0.047	0.064	0.044	0.0454	0.132	0.573	0.223	0.245	0.006	0.000797	0.526	0.123
V	mg/L	< 0.001	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.002	< 0.0005	< 0.0005	< 0.001	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.001	< 0.0005	< 0.0005	0.001	< 0.002	< 0.0005	< 0.0005	< 0.0005	< 0.0025	< 0.0005	< 0.0005
Zn	mg/L	0.004	0.019	< 0.001	0.0091	0.005	0.01	0.005	0.105	0.001	< 0.005	0.002	0.0762	0.003	0.56	0.024	0.152	< 0.001	0.214	0.03	0.107	0.002	0.012	0.001	0.0878	0.141	0.247	0.007	0.0075
Radioisotopes																													
Ra-226	Bq/L	-	-	0.026	0.026	-	-	0.026	0.026	-	-	0.06	0.057	-	-	<0.0100	0.011	-	-	0.025	0.023	-	-	0.016	0.028	-	0.028	0.39	0.099

Notes:
Values in grey italics are below the analytical detection limit

Appendix D.1-4: Shake Flask Extraction Results for Waste Rock Kinetic Test Samples

Sample ID	Kinetic Test IDs	Volume Nanopure Water	Sample Weight	pH	Redox	Conductivity	Acidity (to pH 4.5)	Total Acidity (to pH 8.3)	Alkalinity	Sulphate
				meter	meter	meter	titration	titration	titration	Turbidity
		mL	g		mV	uS/cm	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L
GO	FB-GO, Col 5	750	250	7.88	384.27	101.19	#N/A	2.35	47.85	3
GS	FB-GS, HC3	750	250	7.84	375	198.51	#N/A	2.61	44.06	36
GT	FB-GT, Col6, HC3	750	250	7.76	381.34	89.22	#N/A	2.59	35.63	5
SO	FB-SO, Col3	750	250	7.96	371.58	142.46	#N/A	2.33	52.46	12
SS	FB-SS, HC2	750	250	7.98	368.65	156.94	#N/A	2.29	54.15	14
ST	FB-ST, HC1, Col 3	750	250	7.98	372.07	196.53	#N/A	2.3	47.91	36
KAM036824	HC7	750	250	7.65	364.74	204.91	#N/A	3.05	39.83	60
OKY Master	Col 13, HC5, FB-GGT	750	250	7.49	292.96	41.26	#N/A	2.63	9.69	6
OKY Master Sulphide	Col 14, HC6, FB-GGS	750	250	7.55	294.92	98.09	#N/A	3.02	34.85	11
KAM092488	HC8- No SFE performed due to limited sample size									

Appendix D.1-4: Shake Flask Extraction Results for Waste Rock Kinetic Test Samples

Sample ID	Ion Balance	Major Anions	Major Cations	Difference	Balance (%)	Dissolved Metals	Hardness CaCO3	Aluminum Al	Antimony Sb	Arsenic As	Barium Ba	Beryllium Be	Bismuth Bi
		Calc	Calc	Calc	Calc			ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
		meq/L	meq/L	meq/L	%		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
GO		1.0195	1.022534239	-0.003034239	-0.001485891		24.2	0.119	0.0039	0.0615	0.027	< 0.000007	< 0.000007
GS		1.6312	1.87800014	-0.24680014	-0.070329457		72.2	0.072	0.0076	0.0379	0.0324	< 0.000007	< 0.000007
GT		0.816766667	0.871236699	-0.054470032	-0.032268912		28.4	0.155	0.0038	0.0757	0.0999	< 0.000007	< 0.000007
SO		1.2992	1.4093294	-0.1101294	-0.040660219		48	0.0541	0.0086	0.0257	0.0906	< 0.000007	< 0.000007
SS		1.374666667	1.534757719	-0.160091052	-0.055024991		51.8	0.115	0.0297	0.0674	0.113	< 0.000007	< 0.000007
ST		1.7082	1.829127954	-0.120927954	-0.034186243		61	0.053	0.0016	0.0157	0.0759	< 0.000007	< 0.000007
KAM036824		2.0466	1.913945841	0.132654159	0.033493908		77.5	0.105	0.0221	0.0655	0.0232	0.000008	< 0.000007
OKY Master		0.321219355	0.403744358	-0.082525003	-0.113833288		0.89	0.183	0.0071	0.167	0.00162	0.000012	< 0.000007
OKY Master Sulphide		0.927424731	0.933909099	-0.006484368	-0.003483721		25.1	0.108	0.003	0.0423	0.0077	0.000008	< 0.000007
KAM092488													

Appendix D.1-4: Shake Flask Extraction Results for Waste Rock Kinetic Test Samples

Sample ID	Boron B	Cadmium Cd	Calcium Ca	Chromium Cr	Cobalt Co	Copper Cu	Iron Fe	Lead Pb	Lithium Li	Magnesium Mg	Manganese Mn	Mercury Hg	Molybdenum Mo	Nickel Ni
	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L
GO	0.0173	0.000009	6.96	0.00025	0.000099	0.0017	0.033	0.00005	0.00156	1.65	0.0022	0.02	0.0146	0.0009
GS	0.0081	0.000006	16.3	< 0.00003	0.000072	0.00109	< 0.002	< 0.00001	0.00292	7.67	0.0092	< 0.01	0.00359	0.0006
GT	0.0095	0.000007	7.5	< 0.00003	0.000091	0.00114	0.012	0.00003	0.00164	2.36	0.0036	0.01	0.00709	0.0007
SO	0.0095	0.000004	13.9	0.00027	0.000079	0.00094	0.006	0.00001	0.00283	3.23	0.0019	0.02	0.00494	0.0006
SS	0.0086	0.000004	11.5	0.00009	0.000077	0.00126	0.004	0.00002	0.00324	5.6	0.0049	< 0.01	0.00149	0.0024
ST	0.0132	0.000004	15.2	0.00017	0.000115	0.00203	0.01	0.00001	0.00363	5.6	0.0041	< 0.01	0.0076	0.0022
KAM036824	0.0093	< 0.000003	18.4	0.00017	0.000587	0.00085	0.024	0.0001	0.00337	7.64	0.0233	< 0.01	0.00063	0.0067
OKY Master	0.0246	0.000005	0.24	0.00005	0.00009	0.00162	0.103	0.00075	0.00281	0.069	0.0215	0.01	0.00282	< 0.0001
OKY Master Sulphide	0.021	< 0.000003	7.82	0.00004	0.000122	0.00074	0.033	0.0001	0.00744	1.35	0.0814	< 0.01	0.00513	< 0.0001
KAM092488														

Appendix D.1-4: Shake Flask Extraction Results for Waste Rock Kinetic Test Samples

Sample ID	Phosphorus P	Potassium K	Selenium Se	Silicon Si	Silver Ag	Sodium Na	Strontium Sr	Sulphur (S)	Thallium Tl	Tin Sn	Titanium Ti	Uranium U	Vanadium V	Zinc Zn	Zirconium Zr
	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
	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
GO	0.044	3.51	0.00012	3.97	< 0.000002	9.83	0.0345	1.26	0.000026	0.00009	0.00091	0.0106	0.00079	< 0.001	< 0.002
GS	< 0.009	5.73	0.00007	2.59	< 0.000002	6.35	0.119	16.5	0.00002	0.00003	0.00012	0.0101	0.00083	0.001	< 0.002
GT	0.018	3.65	0.00014	2.4	< 0.000002	4.42	0.0504	3.01	0.000087	0.0001	0.0003	0.0108	0.00053	< 0.001	< 0.002
SO	< 0.009	3.67	0.00026	2.82	< 0.000002	8.05	0.0803	5.63	0.000071	0.00007	0.00021	0.00125	0.00028	< 0.001	< 0.002
SS	< 0.009	8.23	0.00021	2.2	< 0.000002	5.97	0.68	6.98	0.000022	0.00007	0.00039	0.0072	0.00304	< 0.001	< 0.002
ST	< 0.009	6.54	0.00075	3.45	< 0.000002	9.55	0.936	15.1	0.00002	0.00005	0.00064	0.00453	0.00098	0.001	< 0.002
KAM036824	< 0.003	4.68	0.0001	1.19	0.000033	5.26	0.0945	19.3	0.000038	0.00004	0.00039	0.00766	0.00102	< 0.001	< 0.002
OKY Master	0.025	3.98	< 0.001	7.14	0.000003	5.79	0.00119	2.5	0.000033	0.00004	0.00327	0.000469	0.00037	0.001	< 0.002
OKY Master Sulphide	0.013	6.16	< 0.001	5.26	0.000002	5.97	0.0185	3.9	0.000044	< 0.00001	0.0011	0.00191	0.00103	< 0.001	< 0.002
KAM092488															

APPENDIX D.2: KINETIC TEST RESULTS FOR ORE

Appendix D.2-1: Overview of Operating Procedures for the Coffee Gold Mine Ore Kinetic Tests

Kinetic Test ID	Test Sample ID	Sample Description	Type of Test	Lithology	Weathering Facies	Column Dimensions		Dry Wt. of Sample (kg)	Temp (°C)	Operation Procedure	Sampling Frequency	Total Volume of Initial Flushings (mL)	Flushing Rate/ Weekly Input* (mL)	Start Date	Test Status	Cycles/ Weeks
						Inner Diameter (cm)	Length (cm)									
Col 7	72139B	Kona Oxide Ore	Unsaturated Column	Granite	Oxide	21.0	20.5	4.39	4°	Trickle Leach	Biweekly	750	variable	22-Apr-15	active	45
Col 8	72140B	Kona Transition Ore	Unsaturated Column	Granite	Transition	21.0	20.5	4.35	4°	Trickle Leach	Biweekly	700	variable	22-Apr-15	active	45
Col 9	50% 72135B, 50% 72136B	Latte Oxide Ore	Unsaturated Column	Schist	Oxide	21.0	20.5	5	4°	Trickle Leach	Biweekly	700	variable	22-Apr-15	active	45
Col 10	50% 72137B, 50% 72138B	Latte Transition Ore	Unsaturated Column	Schist	Transition	21.0	20.5	5	4°	Trickle Leach	Biweekly	700	variable	22-Apr-15	active	45
Col 11	50% 72144B, 50% 72145B	Supremo Oxide Ore	Unsaturated Column	Gneiss	Oxide	21.0	20.5	5	4°	Trickle Leach	Biweekly	700	variable	22-Apr-15	active	45
Col 12	72146B	Supremo Transition Ore	Unsaturated Column	Gneiss	Transition	21.0	20.5	4.33	4°	Trickle Leach	Biweekly	750	variable	22-Apr-15	active	45

Notes:
Columns and humidity cells are composed of Plexiglas with an acrylic perforated disk & nylon mesh
No sample preparation was conducted prior to leachate sampling for any tests
* generally 400-500 mL, see individual leachate results in Appendix D.2-3 for specific input volumes

Appendix D.2-2 Static Test Results for Ore Kinetic Test Samples

Acid-Base Accounting Results

Kinetic Tests	Description	Test Sample ID	Lithology	Weathering Facies	Rinse pH	Paste pH	TIC	CaNP	Total C	Total S	S(SO4)	S(S-2)	Insoluble S	AP	Sobek NP	Siderite NP	Sobek NNP	Siderite NNP	Fizz Test
					s.u.	s.u.	%	kg $CaCO_3$/t	%	%	%	%	%	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	
				Method Code	*Sobek*	*Sobek*	*CSB02V*	*Calc.*	*CSA06V*	*CSA06V*	*CSA07V*	*CSA08D*	*Calc.*	*Calc.*	*Sobek*	*Siderite Corr.*	*Calc.*	*Calc.*	*Sobek*
				Limit of Detection	*0.20*	*0.20*	*0.01*	*#N/A*	*0.005*	*0.005*	*0.01*	*0.01*	*#N/A*	*#N/A*	*0.5*	*0.5*	*#N/A*	*#N/A*	*#N/A*
Col 7	Kona Oxide	72139B	Granite	Oxide	5.7	5.9	0.020	1.7	0.024	0.027	*<0.01*	0.010	0.017	0.31	0.73	7.1	0.41	6.8	none
Col 8	Kona 80% CN	72140B	Granite	Transition	4.4	4.9	0.020	1.7	0.039	0.15	0.020	0.11	0.021	3.4	0.48	7.0	-3.0	3.6	none
Col 9	Latte Oxide Ore	50% 72135B, 50% 72136B	Schist	Oxide	7.4	7.5	1.5	125	1.6	0.14	0.035	0.090	0.017	2.8	79	105	76	102	moderate
Col 10	Latte Transition Ore	50% 72137B, 50% 72138B	Schist	Transition	7.4	7.4	1.8	148	1.8	0.54	0.050	0.44	0.052	14	100	129	86	115	moderate
Col 11	Supremo Oxide Ore	50% 72144B, 50% 72145B	Gneiss	Oxide	7.4	7.3	0.060	5.0	0.082	0.024	*<0.01*	*<0.01*	0.024	0.31	8.5	15	8.5	15	none
Col 12	Supremo 80%	72146B	Gneiss	Transition	7.3	7.5	0.40	33	0.44	0.13	0.020	0.090	0.018	2.8	38	44	35	42	slight

Notes:

Values in grey italics are below the analytical detection limit

CaNP = carbonate NP calculated from total inorganic carbon (TIC)

NNP = net neutralization potential, derived by subtracting acid potential (AP) from NP

Appendix D.2-2 Static Test Results for Ore Kinetic Test Samples

Solid Phase Elements by Aqua Regia Digestion

Kinetic Tests	Description	Test Sample ID	Lithology	Weathering Facies	Ag	Al	As	B	Ba	Be	Bi	Ca	Flushing Rate/ Weekly Input* (mL)	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La	Li	Lu	Mg	Mn
					ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	%	ppm
				Method Code	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*
				Limit of Detection	*0.01*	*0.01*	*1*	*10*	*5*	*0.1*	*0.02*	*0.01*	*0.01*	*0.05*	*0.1*	*1*	*0.05*	*0.5*	*0.01*	*0.1*	*0.1*	*0.05*	*0.01*	*0.02*	*0.01*	*0.1*	*1*	*0.01*	*0.01*	*2*
Col 7	Kona Oxide	72139B	Granite	Oxide	0.080	0.41	3080	*<10*	64	0.50	0.080	0.050	0.060	26	1.2	77	1.5	0.80	1.3	1.4	*<0.1*	0.32	0.83	*<0.02*	0.13	15	*<1*	0.13	0.020	114
Col 8	Kona 80% CN	72140B	Granite	Transition	0.090	0.34	5770	*<10*	44	0.40	0.10	0.050	0.040	24	1.9	76	1.4	3.8	1.5	1.2	*<0.1*	0.27	4.0	*<0.02*	0.12	14	*<1*	0.11	0.010	217
Col 9	Latte Oxide Ore	50% 72135B, 50% 72136B	Schist	Oxide	0.25	0.44	1265	*<10*	548	1.1	0.52	3.9	0.10	52	11	86	2.1	20	2.7	1.5	*<0.1*	0.13	0.48	0.020	0.21	28	1.0	0.20	0.73	545
Col 10	Latte Transition Ore	50% 72137B, 50% 72138B	Schist	Transition	0.29	0.65	1215	*<10*	313	0.85	0.48	4.0	0.090	52	11	83	2.5	21	2.6	2.2	*<0.1*	0.11	0.47	0.020	0.27	29	2.5	0.20	1.2	502
Col 11	Supremo Oxide Ore	50% 72144B, 50% 72145B	Gneiss	Oxide	0.11	0.43	940	*<10*	198	0.95	0.21	0.32	0.060	54	5.6	84	1.9	4.1	1.6	1.3	*<0.1*	0.17	0.96	*<0.02*	0.20	32	1.0	0.17	0.10	300
Col 12	Supremo 80%	72146B	Gneiss	Transition	0.16	0.56	1700	*<10*	191	0.90	0.30	1.1	0.040	57	6.6	107	2.4	3.5	1.8	1.9	*<0.1*	0.17	1.2	*<0.02*	0.26	34	2.0	0.17	0.42	396

Notes:

Values in grey italics are below the analytical detection limit

Appendix D.2-2 Static Test Results for Ore Kinetic Test Samples

Solid Phase Elements by Aqua Regia Digestion

Kinetic Tests	**Description**	**Test Sample ID**	**Lithology**	**Weathering Facies**	**Mo**	**Na**	**Nb**	**Ni**	**P**	**Pb**	**Rb**	**S**	**Sb**	**Sc**	**Se**	**Sn**	**Sr**	**Ta**	**Tb**	**Te**	**Th**	**Ti**	**Tl**	**U**	**V**	**W**	**Y**	**Yb**	**Zn**	**Zr**
					ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
				Method Code	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*
				Limit of Detection	*0.05*	*0.01*	*0.05*	*0.5*	*0.005*	*0.2*	*0.2*	*0.01*	*0.05*	*0.1*	*1*	*0.3*	*0.5*	*0.05*	*0.02*	*0.05*	*0.1*	*0.01*	*0.02*	*0.05*	*1*	*0.1*	*0.05*	*0.1*	*1*	*0.5*
Col 7	Kona Oxide	72139B	Granite	Oxide	1.9	*<0.01*	0.41	1.9	0.013	15	11	0.020	37	2.5	*<1*	*<0.3*	18	*<0.05*	0.24	*<0.05*	18	*<0.01*	0.56	9.6	10	0.20	7.2	0.80	18	12
Col 8	Kona 80% CN	72140B	Granite	Transition	2.3	*<0.01*	0.34	2.3	0.014	16	8.8	0.14	128	2.3	*<1*	0.30	21	*<0.05*	0.22	*<0.05*	17	*<0.01*	1.2	9.7	8.0	0.10	6.3	0.70	19	11
Col 9	Latte Oxide Ore	50% 72135B, 50% 72136B	Schist	Oxide	1.5	0.010	*<0.05*	52	0.043	17	12	0.14	21	4.8	*<1*	0.40	135	*<0.05*	0.50	0.060	12	*<0.01*	0.33	2.8	18	0.70	14	1.3	55	4.4
Col 10	Latte Transition Ore	50% 72137B, 50% 72138B	Schist	Transition	2.8	0.015	0.070	44	0.043	17	16	0.54	36	5.2	*<1*	0.45	165	*<0.05*	0.51	0.070	12	0.010	0.57	2.6	23	0.25	14	1.4	48	3.4
Col 11	Supremo Oxide Ore	50% 72144B, 50% 72145B	Gneiss	Oxide	2.0	0.010	*<0.05*	17	0.026	13	12	0.010	40	2.9	*<1*	0.55	24	*<0.05*	0.38	*<0.05*	25	*<0.01*	0.68	13	15	0.45	11	1.1	26	5.7
Col 12	Supremo 80%	72146B	Gneiss	Transition	3.1	0.010	0.070	12	0.030	14	17	0.12	20	2.8	*<1*	0.30	49	*<0.05*	0.40	0.060	25	*<0.01*	1.2	11	14	0.20	11	1.1	27	6.1

Notes:

Values in grey italics are below the analytical detection limit

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 7 (Kona Granite Oxide Ore)

Date	Cycle	Week	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Flushing Rate/ Weekly Input* (mL)	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
	No.		Input	Output		umhos/cm	mgCaCO$_3$/L	mgCaCO$_3$/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	750	300	7.6	622	#N/A	5.9	43	242	23	0.090	< 0.3	159	0.0084	0.028	0.30	0.00032	< 7E-06	< 7E-06	0.028	0.000011	45	0.000040	0.0080
6-May-15	2	3	400	350	7.6	281	#N/A	3.0	20	96	6.0	0.18	< 0.3	49	0.10	0.029	0.28	0.00088	< 7E-06	< 7E-06	0.019	< 3E-06	14	< 3E-05	0.0013
20-May-15	3	5	400	390	7.7	167	#N/A	2.9	16	45	3.0	0.23	< 0.3	22	0.052	0.028	0.41	0.00024	< 7E-06	< 7E-06	0.018	< 3E-06	6.0	< 3E-05	0.00040
3-Jun-15	4	7	400	270	7.7	128	#N/A	3.3	21	32	2.0	0.25	< 0.3	16	0.24	0.030	0.47	0.00086	0.0000070	< 7E-06	0.021	< 3E-06	4.4	0.000040	0.00024
17-Jun-15	5	9	500	470	7.5	85	#N/A	3.2	18	18	1.2	0.25	< 0.3	9.0	0.11	0.032	0.70	0.00043	< 7E-06	< 7E-06	0.018	0.0000050	2.5	0.000030	0.00016
1-Jul-15	6	11	500	475	7.8	69	#N/A	3.0	18	11	< 1	0.26	< 0.3	7.0	0.16	0.031	0.71	0.00050	< 7E-06	< 7E-06	0.015	< 3E-06	2.0	< 3E-05	0.00011
15-Jul-15	7	13	500	460	7.5	61	#N/A	3.2	21	8.0	< 1	0.25	< 0.3	7.5	0.20	0.027	0.59	0.00063	< 7E-06	< 7E-06	0.017	< 3E-06	2.0	0.000030	0.00014
29-Jul-15	8	15	400	375	7.6	60	#N/A	2.0	17	9.0	1.0	0.44	< 0.3	6.8	0.34	0.027	0.55	0.0011	0.000015	0.000012	0.020	< 3E-06	1.9	0.00011	0.00020
12-Aug-15	9	17	400	405	7.4	56	#N/A	1.9	16	8.0	< 1	0.24	< 0.3	7.4	0.12	0.025	0.53	0.00037	< 7E-06	< 7E-06	0.016	< 3E-06	2.1	0.000040	0.000096
26-Aug-15	10	19	500	470	7.4	53	#N/A	2.0	14	7.0	1.0	0.25	0.30	6.9	0.26	0.025	0.54	0.0010	0.000012	0.0000070	0.015	0.0000030	1.9	0.000055	0.000093
9-Sep-15	11	21	500	485	7.4	46	#N/A	2.1	13	6.0	< 1	0.25	< 0.3	6.3	0.41	0.025	0.56	0.0017	0.000016	< 7E-06	0.014	< 3E-06	1.8	0.000070	0.000089
23-Sep-15	12	23	500	475	7.4	49	#N/A	1.5	14	5.0	1.0	0.24	0.30	6.7	0.26	0.024	0.51	0.0010	0.000012	0.0000070	0.012	0.0000030	1.9	0.000065	0.000074
7-Oct-15	13	25	500	385	7.6	46	#N/A	1.8	16	5.0	< 1	0.23	-	7.1	0.10	0.024	0.46	0.00033	< 7E-06	< 7E-06	0.011	< 3E-06	2.0	0.000060	0.000059
21-Oct-15	14	27	400	400	7.5	42	#N/A	1.4	12	5.0	< 1	0.23	-	6.9	0.017	0.022	0.44	0.00018	< 7E-06	< 7E-06	0.014	< 3E-06	1.9	0.000070	0.000075
4-Nov-15	15	29	400	385	7.4	42	#N/A	1.8	11	5.0	< 1	0.22	-	7.1	0.024	0.017	0.43	0.00018	< 7E-06	< 7E-06	0.0067	< 3E-06	2.0	0.000040	0.0000050
18-Nov-15	16	31	400	385	7.7	42	#N/A	0.90	13	5.0	< 1	0.22	-	7.3	0.16	0.018	0.44	0.00065	< 7E-06	< 7E-06	0.0084	< 3E-06	2.0	0.000040	0.000080
2-Dec-15	17	33	400	380	7.1	45	#N/A	2.9	11	4.0	< 1	0.20	-	9.2	0.055	0.018	0.42	0.00095	< 7E-06	< 7E-06	0.011	0.0000030	2.6	0.000050	0.00041
16-Dec-15	18	35	400	370	8.1	43	#N/A	3.1	13	4.0	< 1	0.19	-	9.0	0.36	0.019	0.42	0.0012	0.000017	< 7E-06	0.012	< 3E-06	2.5	0.000060	0.000082
30-Dec-15	19	37	400	375	7.1	41	#N/A	2.1	9.1	4.0	< 1	0.20	-	8.8	0.12	0.016	0.37	0.00046	< 7E-06	< 7E-06	0.0086	0.0000050	2.4	0.000070	0.000082
13-Jan-16	20	39	400	360	7.0	46	#N/A	2.2	9.0	4.0	< 1	0.18	-	9.5	0.067	0.016	0.31	0.00031	0.000031	< 7E-06	0.015	0.000010	2.6	0.000050	0.00010
27-Jan-16	21	41	400	370	6.9	44	#N/A	3.6	9.6	3.0	< 1	0.19	-	9.6	0.068	0.016	0.35	0.00063	< 7E-06	< 7E-06	0.0090	0.0000040	2.6	< 3E-05	0.000081
10-Feb-16	22	43	400	400	7.0	43	#N/A	2.7	9.8	3.0	< 1	0.16	-	9.4	0.10	0.016	0.37	0.00061	< 7E-06	< 7E-06	0.0070	0.0000050	2.6	< 3E-05	0.000069
24-Feb-16	23	45	400	355	7.1	44	#N/A	3.0	9.0	3.0															
9-Mar-16	24	47	400	375	7.1	40	#N/A	3.0	9.4	3.0															

Calculated Loading Rates for Col 7

Date	Cycle	Week	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
-	No.	-	Input	Output	-	umhos/cm	mgCaCO$_3$/kg/wk	mgCaCO$_3$/kg/wk	mgCaCO$_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mgCaCO$_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	750	300	7.6	622	#N/A	0.40	2.9	17	1.6	0.0062	0.021	11	0.00057	0.0019	0.021	0.000022	0.00000048	0.00000048	0.0019	0.00000075	3.1	0.0000027	0.00055
6-May-15	2	3	400	350	7.6	281	#N/A	0.12	0.81	3.8	0.24	0.0072	0.012	1.9	0.0041	0.0012	0.011	0.000035	0.00000028	0.00000028	0.00077	0.00000012	0.55	0.0000012	0.000050
20-May-15	3	5	400	390	7.7	167	#N/A	0.13	0.70	2.0	0.13	0.010	0.013	0.96	0.0023	0.0013	0.018	0.000011	0.00000031	0.00000031	0.00080	0.00000013	0.27	0.0000013	0.000018
3-Jun-15	4	7	400	270	7.7	128	#N/A	0.10	0.66	0.98	0.062	0.0077	0.0092	0.49	0.0075	0.00093	0.014	0.000026	0.00000022	0.00000022	0.00065	0.000000092	0.14	0.0000012	0.0000073
17-Jun-15	5	9	500	470	7.5	85	#N/A	0.17	0.95	0.96	0.064	0.013	0.016	0.48	0.0056	0.0017	0.037	0.000023	0.00000037	0.00000037	0.00098	0.00000027	0.14	0.0000016	0.0000086
1-Jul-15	6	11	500	475	7.8	69	#N/A	0.16	0.95	0.60	0.054	0.014	0.016	0.38	0.0084	0.0017	0.038	0.000027	0.00000038	0.00000038	0.00080	0.00000016	0.11	0.0000016	0.0000062
15-Jul-15	7	13	500	460	7.5	61	#N/A	0.17	1.1	0.42	0.052	0.013	0.016	0.39	0.011	0.0014	0.031	0.000033	0.00000037	0.00000037	0.00091	0.00000016	0.11	0.0000016	0.0000075
29-Jul-15	8	15	400	375	7.6	60	#N/A	0.085	0.73	0.38	0.043	0.019	0.013	0.29	0.015	0.0011	0.024	0.000046	0.00000064	0.00000051	0.00086	0.00000013	0.081	0.0000047	0.0000085
12-Aug-15	9	17	400	405	7.4	56	#N/A	0.089	0.74	0.37	0.046	0.011	0.014	0.34	0.0053	0.0011	0.024	0.000017	0.00000032	0.00000032	0.00076	0.00000014	0.095	0.0000018	0.0000044
26-Aug-15	10	19	500	470	7.4	53	0.00	0.11	0.77	0.37	0.054	0.013	0.016	0.37	0.014	0.0013	0.029	0.000056	0.00000062	0.00000037	0.00082	0.00000016	0.10	0.0000029	0.0000050
9-Sep-15	11	21	500	485	7.4	46	#N/A	0.11	0.70	0.33	0.055	0.014	0.017	0.35	0.023	0.0014	0.031	0.000095	0.00000088	0.00000039	0.00078	0.00000017	0.097	0.0000039	0.0000049
23-Sep-15	12	23	500	475	7.4	49	#N/A	0.083	0.74	0.27	0.054	0.013	0.016	0.36	0.014	0.0013	0.028	0.000055	0.00000062	0.00000038	0.00067	0.00000016	0.10	0.0000035	0.0000040
7-Oct-15	13	25	500	385	7.6	46	#N/A	0.079	0.68	0.22	0.044	0.010		0.31	0.0046	0.0010	0.020	0.000014	0.00000031	0.00000031	0.00047	0.00000013	0.086	0.0000026	0.0000026
21-Oct-15	14	27	400	400	7.5	42	#N/A	0.063	0.56	0.23	0.046	0.010		0.31	0.00076	0.00099	0.020	0.0000082	0.00000032	0.00000032	0.00062	0.00000014	0.087	0.0000032	0.0000034
4-Nov-15	15	29	400	385	7.4	42	#N/A	0.081	0.49	0.22	0.044	0.0096		0.31	0.0010	0.00076	0.019	0.0000079	0.00000031	0.00000031	0.00029	0.00000013	0.086	0.0000018	0.00000022
18-Nov-15	16	31	400	385	7.7	42	#N/A	0.040	0.56	0.22	0.044	0.0096		0.32	0.0070	0.00079	0.019	0.000029	0.00000031	0.00000031	0.00037	0.00000013	0.087	0.0000018	0.0000035
2-Dec-15	17	33	400	380	7.1	45	#N/A	0.12	0.49	0.17	0.043	0.0087		0.40	0.0024	0.00079	0.018	0.000041	0.00000030	0.00000030	0.00047	0.00000013	0.11	0.0000022	0.000018
16-Dec-15	18	35	400	370	8.1	43	#N/A	0.13	0.55	0.17	0.042	0.0080		0.38	0.015	0.00078	0.018	0.000048	0.00000072	0.00000029	0.00052	0.00000013	0.10	0.0000025	0.0000035
30-Dec-15	19	37	400	375	7.1	41	#N/A	0.090	0.39	0.17	0.043	0.0085		0.38	0.0051	0.00066	0.016	0.000020	0.00000030	0.00000030	0.00037	0.00000021	0.10	0.0000030	0.0000035
13-Jan-16	20	39	400	360	7.0	46	#N/A	0.090	0.37	0.16	0.041	0.0074		0.39	0.0027	0.00064	0.013	0.000013	0.0000013	0.00000029	0.00062	0.00000041	0.11	0.0000021	0.0000042
27-Jan-16	21	41	400	370	6.9	44	#N/A	0.15	0.40	0.13	0.042	0.0080		0.40	0.0028	0.00067	0.015	0.000027	0.00000029	0.00000029	0.00038	0.00000017	0.11	0.0000013	0.0000034
10-Feb-16	22	43	400	400	7.0	43	#N/A	0.12	0.44	0.14	0.046	0.0073		0.43	0.0047	0.00071	0.017	0.000028	0.00000032	0.00000032	0.00032	0.00000023	0.12	0.0000014	0.0000031
24-Feb-16	23	45	400	355	7.1	44	#N/A	0.12	0.36	0.12															
9-Mar-16	24	47	400	375	7.1	40	#N/A	0.13	0.40	0.13															

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 7 (Kona Granite Oxide Ore)

Date	Cycle	Week	Volume (mL)		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.		Input	Output	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	750	300	0.0069	< 0.007	0.00018	0.0035	11	0.75	0.28	0.00044	0.0039	0.015	7.4	0.0019	5.7	0.000088	67	0.36	85	0.00025	0.00014	0.000080	0.0015	0.00014	0.0080	< 0.002
6-May-15	2	3	400	350	0.0039	0.0090	0.000020	0.0011	3.4	0.15	0.030	0.0020	0.0013	0.0050	3.8	< 0.001	2.7	0.000014	32	0.091	35	0.000094	< 1E-05	0.00020	0.00096	0.00015	0.0030	< 0.002
20-May-15	3	5	400	390	0.0028	< 0.007	0.000020	0.00066	1.6	0.058	0.020	0.0071	0.00080	0.010	2.5	0.00029	2.4	0.000017	19	0.040	15	0.000066	0.000060	0.00016	0.00050	0.00012	< 0.001	< 0.002
3-Jun-15	4	7	400	270	0.0031	0.028	0.00013	0.00061	1.2	0.035	0.020	0.0032	0.00050	0.010	2.2	0.00018	2.6	0.000013	16	0.029	11	0.000056	0.00034	0.00063	0.0012	0.00033	0.0020	< 0.002
17-Jun-15	5	9	500	470	0.0012	0.013	0.000030	0.00044	0.65	0.021	0.010	0.0075	0.00030	0.025	1.6	0.00022	2.2	0.000011	12	0.017	6.9	0.000054	0.000030	0.00025	0.00041	0.00018	< 0.001	< 0.002
1-Jul-15	6	11	500	475	0.00091	0.016	0.000020	0.00041	0.52	0.015	0.030	0.0034	0.00020	0.027	1.4	0.00010	2.2	0.0000040	9.8	0.013	4.0	0.000048	0.000060	0.00098	0.0013	0.00018	< 0.001	< 0.002
15-Jul-15	7	13	500	460	0.0014	0.025	0.00012	0.00039	0.59	0.019	0.020	0.0021	0.00020	0.019	1.4	0.000070	2.3	0.000010	9.8	0.014	3.1	0.000053	0.000060	0.00065	0.00049	0.00020	< 0.001	< 0.002
29-Jul-15	8	15	400	375	0.0011	0.046	0.00015	0.00045	0.50	0.015	0.010	0.0024	0.00020	0.024	1.4	0.00011	2.5	0.0000040	8.5	0.013	3.3	0.000048	0.000070	0.00086	0.00043	0.00029	< 0.001	< 0.002
12-Aug-15	9	17	400	405	0.0012	0.013	0.000040	0.00040	0.56	0.015	0.010	0.0025	0.00020	0.020	1.5	0.00010	2.3	0.0000050	8.3	0.014	2.9	0.000055	0.00010	0.00032	0.00042	0.00020	< 0.001	< 0.002
26-Aug-15	10	19	500	470	0.0014	0.033	0.00011	0.00038	0.52	0.014	0.015	0.0023	0.00020	0.021	1.5	0.000085	2.4	0.0000070	7.3	0.012	4.0	0.000051	0.00011	0.00069	0.00040	0.00024	0.0015	0.0020
9-Sep-15	11	21	500	485	0.0015	0.053	0.00017	0.00037	0.47	0.012	0.020	0.0021	0.00020	0.022	1.4	0.000070	2.5	0.0000090	6.4	0.011	5.1	0.000046	0.00012	0.0011	0.00037	0.00028	0.0020	< 0.002
23-Sep-15	12	23	500	475	0.0012	0.033	0.00013	0.00034	0.50	0.013	0.015	0.0017	0.00015	0.018	1.4	0.000055	2.3	0.0000060	6.2	0.012	3.7	0.000036	0.00010	0.00064	0.00056	0.00022	0.0015	0.0020
7-Oct-15	13	25	500	385	0.00076	0.012	0.000080	0.00031	0.54	0.014	0.010	0.0014	0.00010	0.013	1.3	< 4E-05	2.1	0.0000030	6.1	0.013	2.3	0.000026	0.000080	0.00022	0.00075	0.00015	< 0.001	< 0.002
21-Oct-15	14	27	400	400	0.0023	< 0.007	0.000060	0.00032	0.52	0.015	< 0.01	0.0040	0.00010	0.011	1.2	0.000060	2.1	0.0000040	5.0	0.012	1.8	0.000046	0.00058	< 5E-05	0.00029	0.00014	< 0.001	< 0.002
4-Nov-15	15	29	400	385	0.0018	0.0090	0.000050	0.00022	0.52	0.012	0.010	0.0012	0.00010	0.0090	1.3	< 4E-05	1.8	< 2E-06	4.9	0.012	1.7	0.000049	0.00021	< 5E-05	0.00024	0.00019	0.0010	< 0.002
18-Nov-15	16	31	400	385	0.00059	0.028	0.000070	0.00032	0.56	0.013	0.030	0.0031	< 0.0001	0.010	1.3	0.00013	2.1	0.0000040	4.9	0.015	1.6	0.000040	0.000020	0.00091	0.0027	0.00018	< 0.001	< 0.002
2-Dec-15	17	33	400	380	0.0014	0.010	0.000020	0.00029	0.67	0.021	< 0.01	0.0023	0.00080	0.013	1.4	0.00014	2.1	0.0000030	5.4	0.016	2.4	0.000023	0.000050	0.000070	0.00023	0.00016	0.0090	< 0.002
16-Dec-15	18	35	400	370	0.0011	0.051	0.00011	0.00037	0.68	0.021	0.020	0.0015	0.00020	0.015	1.5	0.000080	2.7	0.0000020	5.0	0.016	1.3	0.000028	0.000070	0.0011	0.00027	0.00027	0.0030	< 0.002
30-Dec-15	19	37	400	375	0.0010	0.020	0.000070	0.00034	0.69	0.019	0.020	0.0012	0.00020	0.0060	1.3	< 4E-05	2.0	0.0000050	4.5	0.016	2.0	0.000027	< 1E-05	0.00033	0.0012	0.00016	0.0020	< 0.002
13-Jan-16	20	39	400	360	0.00070	0.011	0.000030	0.00033	0.73	0.022	0.010	0.0020	0.00010	0.0040	1.4	0.00019	2.2	0.0000020	4.4	0.015	1.3	< 5E-06	0.000060	0.00024	0.00019	0.00011	0.0010	< 0.002
27-Jan-16	21	41	400	370	0.00063	0.012	< 1E-05	0.00033	0.74	0.023	0.010	0.00092	0.00010	0.011	1.4	< 4E-05	2.2	0.0000020	4.0	0.017	1.4	0.000035	0.000050	0.000070	0.00041	0.00011	0.0010	< 0.002
10-Feb-16	22	43	400	400	0.00076	0.014	0.00011	0.00033	0.72	0.019	0.020	0.00080	0.00020	0.0060	1.3	0.000060	2.2	< 2E-06	3.6	0.016	1.9	0.000037	0.00029	0.00018	0.00075	0.00013	0.0010	< 0.002
24-Feb-16	23	45	400	355																								
9-Mar-16	24	47	400	375																								

Calculated Loading Rates for Col 7

Date	Cycle	Week	Volume (mL)		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
-	No.	-	Input	Output	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	750	300	0.00047	0.00048	0.000012	0.00024	0.77	0.051	0.019	0.000030	0.00027	0.0010	0.51	0.00013	0.39	0.0000060	4.6	0.025	5.8	0.000017	0.0000096	0.0000055	0.00011	0.0000096	0.00055	0.00014
6-May-15	2	3	400	350	0.00015	0.00036	0.00000080	0.000043	0.13	0.0059	0.0012	0.000078	0.000052	0.00020	0.15	0.000040	0.11	0.00000056	1.3	0.0036	1.4	0.0000037	0.00000040	0.0000080	0.000038	0.0000060	0.00012	0.000080
20-May-15	3	5	400	390	0.00012	0.00031	0.00000089	0.000029	0.069	0.0026	0.00089	0.00032	0.000036	0.00044	0.11	0.000013	0.11	0.00000076	0.85	0.0018	0.67	0.0000029	0.0000027	0.0000071	0.000022	0.0000053	0.000044	0.000089
3-Jun-15	4	7	400	270	0.000096	0.00086	0.0000040	0.000019	0.036	0.0011	0.00062	0.000097	0.000015	0.00031	0.068	0.0000055	0.079	0.00000040	0.50	0.00090	0.34	0.0000017	0.000010	0.000019	0.000038	0.000010	0.000062	0.000062
17-Jun-15	5	9	500	470	0.000065	0.00070	0.0000016	0.000023	0.035	0.0011	0.00054	0.00040	0.000016	0.0013	0.086	0.000012	0.12	0.00000059	0.64	0.00090	0.37	0.0000029	0.0000016	0.000013	0.000022	0.0000096	0.000054	0.00011
1-Jul-15	6	11	500	475	0.000049	0.00087	0.0000011	0.000022	0.028	0.00083	0.0016	0.00018	0.000011	0.0015	0.074	0.0000054	0.12	0.00000022	0.53	0.00072	0.22	0.0000026	0.0000032	0.000053	0.000070	0.0000097	0.000054	0.00011
15-Jul-15	7	13	500	460	0.000073	0.0013	0.0000063	0.000020	0.031	0.0010	0.0010	0.00011	0.000010	0.00100	0.074	0.0000037	0.12	0.00000052	0.51	0.00075	0.16	0.0000028	0.0000031	0.000034	0.000026	0.000010	0.000052	0.00010
29-Jul-15	8	15	400	375	0.000046	0.0020	0.0000064	0.000019	0.021	0.00063	0.00043	0.00010	0.0000085	0.0010	0.058	0.0000047	0.10	0.00000017	0.36	0.00054	0.14	0.0000021	0.0000030	0.000037	0.000019	0.000012	0.000043	0.000085
12-Aug-15	9	17	400	405	0.000056	0.00060	0.0000018	0.000019	0.026	0.00069	0.00046	0.00012	0.0000092	0.00092	0.069	0.0000046	0.10	0.00000023	0.38	0.00062	0.13	0.0000025	0.0000046	0.000015	0.000020	0.0000092	0.000046	0.000092
26-Aug-15	10	19	500	470	0.000074	0.0018	0.0000056	0.000021	0.028	0.00073	0.00080	0.00012	0.000011	0.0011	0.079	0.0000046	0.13	0.00000037	0.39	0.00067	0.21	0.0000027	0.0000059	0.000037	0.000021	0.000013	0.000080	0.00011
9-Sep-15	11	21	500	485	0.000085	0.0029	0.0000094	0.000020	0.026	0.00067	0.0011	0.00011	0.000011	0.0012	0.080	0.0000039	0.14	0.00000050	0.35	0.00063	0.28	0.0000025	0.0000066	0.000059	0.000020	0.000015	0.00011	0.00011
23-Sep-15	12	23	500	475	0.000062	0.0018	0.0000068	0.000018	0.027	0.00071	0.00081	0.000093	0.0000081	0.00095	0.074	0.0000030	0.12	0.00000032	0.34	0.00066	0.20	0.0000019	0.0000054	0.000035	0.000030	0.000012	0.000081	0.00011
7-Oct-15	13	25	500	385	0.000033	0.00053	0.0000035	0.000013	0.024	0.00062	0.00044	0.000061	0.0000044	0.00057	0.057	0.0000018	0.091	0.00000013	0.27	0.00057	0.10	0.0000011	0.0000035	0.0000096	0.000033	0.0000066	0.000044	0.000088
21-Oct-15	14	27	400	400	0.00010	0.00032	0.0000027	0.000014	0.024	0.00067	0.00046	0.00018	0.0000046	0.00050	0.056	0.0000027	0.094	0.00000018	0.23	0.00055	0.082	0.0000021	0.000026	0.0000023	0.000013	0.0000064	0.000046	0.000091
4-Nov-15	15	29	400	385	0.000078	0.00039	0.0000022	0.0000097	0.023	0.00053	0.00044	0.000054	0.0000044	0.00039	0.055	0.0000018	0.081	0.000000088	0.22	0.00052	0.075	0.0000021	0.0000092	0.0000022	0.000011	0.0000083	0.000044	0.000088
18-Nov-15	16	31	400	385	0.000026	0.0012	0.0000031	0.000014	0.025	0.00057	0.0013	0.00014	0.0000044	0.00044	0.058	0.0000057	0.093	0.00000018	0.21	0.00064	0.070	0.0000018	0.00000088	0.000040	0.00012	0.0000079	0.000044	0.000088
2-Dec-15	17	33	400	380	0.000062	0.00043	0.00000087	0.000013	0.029	0.00090	0.00043	0.00010	0.000035	0.00056	0.061	0.0000061	0.093	0.00000013	0.23	0.00068	0.10	0.00000100	0.0000022	0.0000030	0.000010	0.0000069	0.00039	0.000087
16-Dec-15	18	35	400	370	0.000046	0.0021	0.0000046	0.000016	0.029	0.00086	0.00084	0.000064	0.0000084	0.00063	0.062	0.0000034	0.11	0.000000084	0.21	0.00068	0.055	0.0000012	0.0000029	0.000046	0.000011	0.000011	0.00013	0.000084
30-Dec-15	19	37	400	375	0.000044	0.00085	0.0000030	0.000014	0.029	0.00083	0.00085	0.000049	0.0000085	0.00026	0.057	0.0000017	0.086	0.00000021	0.19	0.00067	0.085	0.0000012	0.00000043	0.000014	0.000050	0.0000068	0.000085	0.000085
13-Jan-16	20	39	400	360	0.000029	0.00045	0.0000012	0.000014	0.030	0.00089	0.00041	0.000083	0.0000041	0.00016	0.055	0.0000078	0.089	0.000000082	0.18	0.00063	0.053	0.00000021	0.0000025	0.0000098	0.0000079	0.0000045	0.000041	0.000082
27-Jan-16	21	41	400	370	0.000027	0.00051	0.00000042	0.000014	0.031	0.00097	0.00042	0.000039	0.0000042	0.00046	0.057	0.0000017	0.092	0.000000084	0.17	0.00073	0.059	0.0000015	0.0000021	0.0000029	0.000017	0.0000046	0.000042	0.000084
10-Feb-16	22	43	400	400	0.000035	0.00064	0.0000050	0.000015	0.033	0.00086	0.00091	0.000036	0.0000091	0.00027	0.058	0.0000027	0.10	0.000000091	0.16	0.00074	0.087	0.0000017	0.000013	0.0000082	0.000034	0.0000059	0.000046	0.000091
24-Feb-16	23	45	400	355																								
9-Mar-16	24	47	400	375																								

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 8 (Kona Granite Transition Ore)

Date	**Cycle**	**Week**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
-	No.	-	Input	Output	-	umhos/cm	mgCaCO$_3$/L	mgCaCO$_3$/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	700	375	4.7	1588	#N/A	50	< 0.1	1056	17	0.59	< 0.3	739	6.6	0.0090	5.4	0.0040	0.0035	< 7E-06	0.055	0.00051	216	0.00051	0.83
6-May-15	2	3	400	370	4.8	1162	#N/A	38	< 0.1	641	11	0.48	< 0.3	454	2.9	0.0067	53	0.0016	0.0021	< 7E-06	0.047	0.00028	129	0.00013	0.55
20-May-15	3	5	400	380	5.1	666	#N/A	27	0.30	307	13	0.23	< 0.3	226	0.97	0.0051	65	0.00069	0.0011	< 7E-06	0.036	0.00015	65	0.000090	0.28
3-Jun-15	4	7	400	290	5.2	499	#N/A	21	0.80	230	12	0.18	< 0.3	163	0.61	0.0054	65	0.00066	0.00088	< 7E-06	0.039	0.00011	47	0.000060	0.20
17-Jun-15	5	9	500	450	5.1	360	#N/A	19	0.40	164	< 1	0.13	< 0.3	123	0.45	0.0057	63	0.00035	0.00077	< 7E-06	0.026	0.00010	35	0.000060	0.15
1-Jul-15	6	11	500	470	5.5	281	#N/A	14	0.90	121	< 1	0.10	< 0.3	85	0.30	0.0066	45	0.00031	0.00065	< 7E-06	0.019	0.000076	24	0.000040	0.11
15-Jul-15	7	13	500	465	5.2	247	#N/A	16	0.30	95	< 1	0.090	< 0.3	74	0.28	0.0073	28	0.00030	0.00055	< 7E-06	0.020	0.000065	20	0.000050	0.10
29-Jul-15	8	15	400	385	5.2	238	#N/A	8.8	0.60	99	< 1	0.11	< 0.3	77	0.27	0.0075	19	0.00077	0.00059	< 7E-06	0.020	0.000059	22	0.000080	0.100
12-Aug-15	9	17	400	405	4.8	227	#N/A	10	< 0.1	89	1.0	0.10	< 0.3	74	0.26	0.0072	15	0.00021	0.00056	< 7E-06	0.017	0.000069	21	0.000060	0.093
26-Aug-15	10	19	500	455	5.2	223	-	9.6	0.10	79	1.0	0.090	0.30	68	0.24	0.0075	13	0.00063	0.00053	0.0000070	0.015	0.000066	20	0.000055	0.088
9-Sep-15	11	21	500	495	4.9	186	#N/A	9.1	< 0.1	74	< 1	0.080	< 0.3	63	0.22	0.0078	12	0.0011	0.00049	< 7E-06	0.013	0.000063	18	0.000050	0.082
23-Sep-15	12	23	500	480	5.1	176	#N/A	8.5	0.070	68	1.0	0.080	-	60	0.20	0.0076	12	0.00065	0.00047	0.0000070	0.012	0.000062	17	0.000070	0.074
7-Oct-15	13	25	400	390	5.1	180	#N/A	8.2	0.50	65	< 1	0.080	-	57	0.19	0.0074	12	0.00025	0.00045	< 7E-06	0.0096	0.000060	16	0.000090	0.065
21-Oct-15	14	27	400	400	5.0	177	#N/A	8.6	< 0.1	59	< 1	0.080	-	56	0.21	0.0075	12	0.00023	0.00048	< 7E-06	0.011	0.000054	16	0.000090	0.074
4-Nov-15	15	29	400	405	4.7	181	#N/A	9.3	< 0.1	63	< 1	0.090	-	60	0.21	0.0065	11	0.00021	0.00043	< 7E-06	0.0076	0.000076	17	0.000040	0.073
18-Nov-15	16	31	400	385	5.2	178	#N/A	7.8	< 0.1	56	< 1	0.080	-	53	0.18	0.0066	11	0.0011	0.00043	< 7E-06	0.0069	0.000094	15	0.000060	0.065
2-Dec-15	17	33	401	385	4.5	168	#N/A	14	0.10	58	< 1	0.080	-	57	0.19	0.0071	11	0.00035	0.00044	< 7E-06	0.0089	0.000078	16	0.000080	0.071
16-Dec-15	18	35	401	380	4.6	165	#N/A	14	< 0.1	64	< 1	0.080	-	58	0.20	0.0070	11	0.00027	0.00049	< 7E-06	0.0096	0.00012	16	0.000040	0.073
30-Dec-15	19	37	402	395	4.5	161	#N/A	12	< 0.1	59	< 1	0.080	-	54	0.19	0.0064	9.7	0.00031	0.00049	< 7E-06	0.0075	0.000067	16	0.00010	0.066
13-Jan-16	20	39	402	375	4.4	160	0.90	12	0.10	60	< 1	0.080	-	52	0.17	0.0067	11	0.00083	0.00044	< 7E-06	0.010	0.000072	15	0.000040	0.061
27-Jan-16	21	41	403	405	4.5	155	#N/A	14	< 0.1	52	< 1	0.080	-	49	0.17	0.0068	10	0.00092	0.00045	< 7E-06	0.0070	0.000063	14	0.000060	0.061
10-Feb-16	22	43	404	400	4.5	149	0.90	14	0.10	52	< 1	0.080	-	47	0.16	0.0069	9.7	0.00028	0.00045	< 7E-06	0.0050	0.000056	13	0.000040	0.059
24-Feb-16	23	45	405	375	4.5	158	#N/A	13	< 0.1	54	< 1	0.11	-	53	0.18	0.0066	10	0.00094	0.00050	< 7E-06	0.0050	0.000067	15	0.000050	0.061
9-Mar-16	24	47	405	385	4.5	151	#N/A	13	< 0.1	57															

Calculated Loading Rates for Col 8

Date	**Cycle**	**Week**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
-	No.	-	Input	Output	-	umhos/cm	mgCaCO$_3$/kg/wk	mgCaCO$_3$/kg/wk	mgCaCO$_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mgCaCO$_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	700	375	4.7	1588	#N/A	4.3	0.0086	91	1.5	0.051	0.026	64	0.57	0.00078	0.47	0.00034	0.00030	0.00000060	0.0047	0.000044	19	0.000044	0.071
6-May-15	2	3	400	370	4.8	1162	#N/A	1.6	0.0043	27	0.47	0.020	0.013	19	0.12	0.00028	2.3	0.000066	0.000091	0.00000030	0.0020	0.000012	5.5	0.0000055	0.024
20-May-15	3	5	400	380	5.1	666	#N/A	1.2	0.014	13	0.57	0.010	0.013	9.9	0.042	0.00022	2.8	0.000030	0.000050	0.00000031	0.0016	0.0000067	2.8	0.0000039	0.012
3-Jun-15	4	7	400	290	5.2	499	#N/A	0.71	0.028	7.7	0.40	0.0060	0.010	5.4	0.020	0.00018	2.2	0.000022	0.000029	0.00000023	0.0013	0.0000035	1.6	0.0000020	0.0067
17-Jun-15	5	9	500	450	5.1	360	#N/A	0.97	0.018	8.5	0.052	0.0067	0.016	6.4	0.023	0.00029	3.2	0.000018	0.000040	0.00000036	0.0013	0.0000053	1.8	0.0000031	0.0078
1-Jul-15	6	11	500	470	5.5	281	#N/A	0.75	0.046	6.5	0.054	0.0054	0.016	4.6	0.016	0.00036	2.4	0.000017	0.000035	0.00000038	0.0010	0.0000041	1.3	0.0000022	0.0058
15-Jul-15	7	13	500	465	5.2	247	#N/A	0.83	0.016	5.1	0.053	0.0048	0.016	3.9	0.015	0.00039	1.5	0.000016	0.000029	0.00000037	0.0011	0.0000035	1.1	0.0000027	0.0054
29-Jul-15	8	15	400	385	5.2	238	#N/A	0.39	0.026	4.4	0.044	0.0049	0.013	3.4	0.012	0.00033	0.83	0.000034	0.000026	0.00000031	0.00089	0.0000026	0.97	0.0000035	0.0044
12-Aug-15	9	17	400	405	4.8	227	#N/A	0.47	0.0047	4.1	0.047	0.0047	0.014	3.4	0.012	0.00034	0.68	0.0000098	0.000026	0.00000033	0.00077	0.0000032	0.98	0.0000028	0.0043
26-Aug-15	10	19	500	455	5.2	223	#N/A	0.50	0.0052	4.1	0.052	0.0047	0.016	3.6	0.012	0.00039	0.70	0.000033	0.000028	0.00000037	0.00078	0.0000035	1.0	0.0000029	0.0046
9-Sep-15	11	21	500	495	4.9	186	#N/A	0.52	0.0057	4.2	0.057	0.0046	0.017	3.6	0.012	0.00044	0.69	0.000060	0.000028	0.00000040	0.00076	0.0000036	1.0	0.0000028	0.0047
23-Sep-15	12	23	500	480	5.1	176	#N/A	0.47	0.0039	3.8	0.055	0.0044		3.3	0.011	0.00042	0.67	0.000036	0.000026	0.00000039	0.00063	0.0000034	0.95	0.0000039	0.0041
7-Oct-15	13	25	400	390	5.1	180	#N/A	0.37	0.020	2.9	0.045	0.0036		2.6	0.0084	0.00033	0.55	0.000011	0.000020	0.00000031	0.00043	0.0000027	0.74	0.0000040	0.0029
21-Oct-15	14	27	400	400	5.0	177	#N/A	0.40	0.0046	2.7	0.046	0.0037		2.6	0.0096	0.00034	0.53	0.000011	0.000022	0.00000032	0.00052	0.0000025	0.74	0.0000041	0.0034
4-Nov-15	15	29	400	405	4.7	181	#N/A	0.43	0.0047	2.9	0.047	0.0042		2.8	0.0096	0.00030	0.50	0.0000098	0.000020	0.00000033	0.00035	0.0000035	0.81	0.0000019	0.0034
18-Nov-15	16	31	400	385	5.2	178	#N/A	0.34	0.0044	2.5	0.044	0.0035		2.4	0.0079	0.00029	0.50	0.000047	0.000019	0.00000031	0.00031	0.0000042	0.66	0.0000027	0.0029
2-Dec-15	17	33	401	385	4.5	168	#N/A	0.60	0.0044	2.6	0.044	0.0035		2.5	0.0083	0.00031	0.48	0.000015	0.000019	0.00000031	0.00039	0.0000035	0.70	0.0000035	0.0032
16-Dec-15	18	35	401	380	4.6	165	#N/A	0.63	0.0044	2.8	0.044	0.0035		2.5	0.0088	0.00031	0.47	0.000012	0.000021	0.00000031	0.00042	0.0000050	0.71	0.0000017	0.0032
30-Dec-15	19	37	402	395	4.5	161	#N/A	0.56	0.0045	2.7	0.045	0.0036		2.5	0.0084	0.00029	0.44	0.000014	0.000022	0.00000032	0.00034	0.0000030	0.70	0.0000045	0.0030
13-Jan-16	20	39	402	375	4.4	160	0.86	0.53	0.0043	2.6	0.043	0.0034		2.2	0.0072	0.00029	0.48	0.000036	0.000019	0.00000030	0.00043	0.0000031	0.63	0.0000017	0.0026
27-Jan-16	21	41	403	405	4.5	155	#N/A	0.63	0.0047	2.4	0.047	0.0037		2.3	0.0078	0.00032	0.48	0.000043	0.000021	0.00000033	0.00033	0.0000029	0.65	0.0000028	0.0028
10-Feb-16	22	43	404	400	4.5	149	0.89	0.64	0.0046	2.4	0.046	0.0037		2.2	0.0073	0.00032	0.45	0.000013	0.000021	0.00000032	0.00023	0.0000026	0.62	0.0000018	0.0027
24-Feb-16	23	45	405	375	4.5	158	#N/A	0.54	0.0043	2.3	0.043	0.0047		2.3	0.0078	0.00028	0.44	0.000041	0.000021	0.00000030	0.00022	0.0000029	0.66	0.0000022	0.0026
9-Mar-16	24	47	405	385	4.5	151	#N/A	0.58	0.0044	2.5															

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 8 (Kona Granite Transition Ore)

Date	Cycle	Week	Volume (mL)		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
-	No.	-	Input	Output	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	700	375	0.17	11	0.00030	0.076	49	25	0.43	0.000040	0.19	0.0070	26	0.0092	8.5	0.000035	62	1.1	337	0.0030	0.000080	0.00010	0.033	0.00014	0.78	< 0.002
6-May-15	2	3	400	370	0.060	7.6	0.00012	0.046	32	17	0.11	0.00031	0.13	< 0.003	18	0.0050	14	0.000011	29	0.73	234	0.0016	0.000070	0.00012	0.018	0.000070	0.50	< 0.002
20-May-15	3	5	400	380	0.028	3.2	0.000040	0.026	15	8.5	0.080	0.0012	0.064	< 0.003	12	0.0027	13	0.000010	13	0.37	110	0.0011	0.000090	0.00023	0.0084	0.000050	0.26	< 0.002
3-Jun-15	4	7	400	290	0.021	2.1	0.000030	0.019	11	6.1	0.080	0.00036	0.046	< 0.003	10	0.0020	12	0.0000040	8.4	0.27	86	0.00092	0.000010	0.00013	0.0054	0.000090	0.19	< 0.002
17-Jun-15	5	9	500	450	0.019	1.4	0.000040	0.012	8.6	4.9	0.050	0.0011	0.037	< 0.003	8.3	0.0018	10	0.0000060	5.4	0.19	62	0.00073	0.00014	0.00016	0.0040	0.000080	0.18	< 0.002
1-Jul-15	6	11	500	470	0.015	0.85	< 1E-05	0.0091	6.0	3.6	0.040	0.000050	0.027	0.0050	6.4	0.0013	8.8	0.0000020	3.2	0.14	37	0.00057	0.000040	0.00013	0.0022	0.00010	0.13	< 0.002
15-Jul-15	7	13	500	465	0.016	0.61	0.000030	0.0074	5.6	3.3	0.020	0.00016	0.024	0.0040	5.6	0.00094	8.7	0.0000050	2.4	0.11	31	0.00056	0.000050	0.00017	0.0018	0.00010	0.12	< 0.002
29-Jul-15	8	15	400	385	0.016	0.43	0.00015	0.0074	5.3	3.5	< 0.01	0.00023	0.023	0.0080	5.7	0.00086	8.7	0.0000020	1.8	0.12	32	0.00053	< 1E-05	< 5E-05	0.0017	0.00010	0.11	< 0.002
12-Aug-15	9	17	400	405	0.016	0.35	0.000030	0.0061	5.2	3.3	0.020	0.00039	0.023	0.014	5.8	0.00080	9.2	< 2E-06	1.5	0.11	28	0.00044	0.000060	0.000050	0.0015	0.00010	0.12	< 0.002
26-Aug-15	10	19	500	455	0.015	0.28	0.000025	0.0053	4.8	3.1	0.015	0.00042	0.021	0.016	5.6	0.00071	8.1	0.0000030	1.2	0.10	28	0.00042	0.000050	0.000050	0.0013	0.00013	0.11	0.0020
9-Sep-15	11	21	500	495	0.015	0.21	0.000020	0.0045	4.4	2.9	0.010	0.00045	0.020	0.018	5.3	0.00062	7.0	0.0000040	0.99	0.090	29	0.00039	0.000040	< 5E-05	0.0012	0.00015	0.098	< 0.002
23-Sep-15	12	23	500	480	0.014	0.18	0.000020	0.0041	4.2	2.7	0.010	0.00027	0.018	0.019	4.9	0.00060	6.8	0.0000050	0.83	0.085	25	0.00035	0.000030	0.000050	0.0011	0.00012	0.094	0.0020
7-Oct-15	13	25	400	390	0.012	0.14	0.000020	0.0036	4.0	2.5	< 0.01	0.000090	0.016	0.020	4.4	0.00057	6.5	0.0000060	0.66	0.079	22	0.00030	0.000020	< 5E-05	0.0011	0.000080	0.090	< 0.002
21-Oct-15	14	27	400	400	0.015	0.15	0.000030	0.0035	3.7	2.5	< 0.01	0.0013	0.019	0.014	4.3	0.00050	6.6	0.0000020	0.61	0.083	22	0.00041	0.000050	0.000080	0.0013	0.00012	0.099	< 0.002
4-Nov-15	15	29	400	405	0.015	0.15	0.000050	0.0028	4.1	2.6	0.010	0.00016	0.020	0.018	4.5	0.00050	6.4	0.0000030	0.55	0.080	22	0.00038	0.000080	< 5E-05	0.0012	0.00015	0.097	< 0.002
18-Nov-15	16	31	400	385	0.015	0.13	0.00032	0.0030	3.8	2.6	< 0.01	0.00098	0.016	0.018	4.2	0.00060	5.9	< 2E-06	0.48	0.078	22	0.00027	0.000020	< 5E-05	0.0013	0.00013	0.10	< 0.002
2-Dec-15	17	33	401	385	0.020	0.13	0.0011	0.0028	4.3	2.6	< 0.01	0.00095	0.019	0.020	4.4	0.00059	5.7	< 2E-06	0.49	0.083	22	0.00033	0.000050	0.000060	0.0012	0.00011	0.11	< 0.002
16-Dec-15	18	35	401	380	0.024	0.12	0.0028	0.0029	4.1	2.8	< 0.01	0.00044	0.019	0.022	4.4	0.00047	6.3	< 2E-06	0.42	0.084	22	0.00033	0.000060	< 5E-05	0.0012	0.00010	0.11	< 0.002
30-Dec-15	19	37	402	395	0.015	0.11	0.00056	0.0027	3.8	2.5	0.020	0.00034	0.017	0.019	3.9	0.00042	5.4	0.0000070	0.43	0.076	18	0.00033	< 1E-05	< 5E-05	0.0013	0.00012	0.096	< 0.002
13-Jan-16	20	39	402	375	0.013	0.10	0.00015	0.0024	3.7	2.5	< 0.01	0.00057	0.016	0.022	4.0	0.00056	5.8	0.0000020	0.37	0.070	19	0.00026	0.000060	< 5E-05	0.0011	0.000090	0.093	< 0.002
27-Jan-16	21	41	403	405	0.014	0.11	0.00013	0.0022	3.5	2.4	< 0.01	0.000080	0.015	0.022	3.9	0.00032	5.2	< 2E-06	0.32	0.075	20	0.00034	0.000020	< 5E-05	0.0012	0.000090	0.092	< 0.002
10-Feb-16	22	43	404	400	0.015	0.096	0.000090	0.0020	3.3	2.4	< 0.01	0.000070	0.015	0.023	3.7	0.00037	4.8	< 2E-06	0.31	0.070	19	0.00030	0.000070	< 5E-05	0.0012	0.000090	0.10	< 0.002
24-Feb-16	23	45	405	375	0.015	0.10	0.000040	0.0020	3.7	2.5	0.020	0.000070	0.016	0.025	3.8	0.00035	5.2	< 2E-06	0.25	0.072	18	0.00030	0.000080	< 5E-05	0.0011	0.000070	0.11	< 0.002
9-Mar-16	24	47	405	385																								

Calculated Loading Rates for Col 8

Date	Cycle	Week	Volume (mL)		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
-	No.	-	Input	Output	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	700	375	0.014	0.92	0.000026	0.0066	4.2	2.1	0.037	0.0000034	0.016	0.00060	2.2	0.00079	0.73	0.0000030	5.4	0.091	29	0.00026	0.0000069	0.0000086	0.0029	0.000012	0.068	0.00017
6-May-15	2	3	400	370	0.0025	0.32	0.0000051	0.0020	1.4	0.72	0.0047	0.000013	0.0057	0.00013	0.76	0.00021	0.58	0.00000047	1.2	0.031	10.0	0.000069	0.0000030	0.0000051	0.00077	0.0000030	0.021	0.000085
20-May-15	3	5	400	380	0.0012	0.14	0.0000017	0.0011	0.67	0.37	0.0035	0.000051	0.0028	0.00013	0.52	0.00012	0.55	0.00000044	0.56	0.016	4.8	0.000048	0.0000039	0.000010	0.00037	0.0000022	0.011	0.000087
3-Jun-15	4	7	400	290	0.00070	0.068	0.0000010	0.00064	0.37	0.20	0.0027	0.000012	0.0015	0.00010	0.34	0.000067	0.40	0.00000013	0.28	0.0090	2.9	0.000031	0.00000033	0.0000043	0.00018	0.0000030	0.0063	0.000067
17-Jun-15	5	9	500	450	0.00098	0.074	0.0000021	0.00064	0.45	0.25	0.0026	0.000058	0.0019	0.00016	0.43	0.000092	0.52	0.00000031	0.28	0.010	3.2	0.000038	0.0000072	0.0000083	0.00021	0.0000041	0.0091	0.00010
1-Jul-15	6	11	500	470	0.00079	0.046	0.00000054	0.00049	0.32	0.20	0.0022	0.0000027	0.0015	0.00027	0.34	0.000069	0.48	0.00000011	0.17	0.0075	2.0	0.000031	0.0000022	0.0000070	0.00012	0.0000054	0.0072	0.00011
15-Jul-15	7	13	500	465	0.00084	0.032	0.0000016	0.00040	0.30	0.18	0.0011	0.0000086	0.0013	0.00021	0.30	0.000050	0.46	0.00000027	0.13	0.0060	1.7	0.000030	0.0000027	0.0000091	0.000094	0.0000053	0.0062	0.00011
29-Jul-15	8	15	400	385	0.00070	0.019	0.0000066	0.00033	0.23	0.15	0.00044	0.000010	0.0010	0.00035	0.25	0.000038	0.38	0.000000089	0.080	0.0053	1.4	0.000023	0.00000044	0.0000022	0.000073	0.0000044	0.0050	0.000089
12-Aug-15	9	17	400	405	0.00073	0.016	0.0000014	0.00029	0.24	0.15	0.00093	0.000018	0.0011	0.00065	0.27	0.000037	0.43	0.000000093	0.068	0.0052	1.3	0.000021	0.0000028	0.0000023	0.000069	0.0000047	0.0054	0.000093
26-Aug-15	10	19	500	455	0.00079	0.015	0.0000013	0.00028	0.25	0.16	0.00078	0.000022	0.0011	0.00084	0.29	0.000037	0.42	0.00000016	0.064	0.0053	1.5	0.000022	0.0000026	0.0000026	0.000070	0.0000065	0.0056	0.00010
9-Sep-15	11	21	500	495	0.00084	0.012	0.0000011	0.00026	0.25	0.17	0.00057	0.000026	0.0011	0.0010	0.30	0.000035	0.40	0.00000023	0.056	0.0051	1.6	0.000022	0.0000023	0.0000028	0.000067	0.0000085	0.0056	0.00011
23-Sep-15	12	23	500	480	0.00075	0.0097	0.0000011	0.00022	0.23	0.15	0.00055	0.000015	0.00100	0.0010	0.27	0.000033	0.37	0.00000028	0.046	0.0047	1.4	0.000019	0.0000017	0.0000028	0.000062	0.0000063	0.0052	0.00011
7-Oct-15	13	25	400	390	0.00056	0.0063	0.00000090	0.00016	0.18	0.11	0.00045	0.0000040	0.00074	0.00090	0.20	0.000026	0.29	0.00000027	0.030	0.0036	0.98	0.000014	0.00000090	0.0000022	0.000048	0.0000036	0.0040	0.000090
21-Oct-15	14	27	400	400	0.00070	0.0070	0.0000014	0.00016	0.17	0.11	0.00046	0.000057	0.00089	0.00064	0.20	0.000023	0.30	0.000000092	0.028	0.0038	1.00	0.000019	0.0000023	0.0000037	0.000058	0.0000055	0.0046	0.000092
4-Nov-15	15	29	400	405	0.00069	0.0070	0.0000023	0.00013	0.19	0.12	0.00047	0.0000074	0.00092	0.00084	0.21	0.000023	0.30	0.00000014	0.026	0.0037	1.0	0.000018	0.0000037	0.0000023	0.000054	0.0000070	0.0045	0.000093
18-Nov-15	16	31	400	385	0.00065	0.0055	0.000014	0.00013	0.17	0.12	0.00044	0.000043	0.00069	0.00080	0.19	0.000027	0.26	0.000000089	0.021	0.0034	0.96	0.000012	0.00000089	0.0000022	0.000057	0.0000058	0.0044	0.000089
2-Dec-15	17	33	401	385	0.00087	0.0058	0.000049	0.00012	0.19	0.12	0.00044	0.000042	0.00084	0.00089	0.20	0.000026	0.25	0.000000089	0.022	0.0037	0.96	0.000015	0.0000022	0.0000027	0.000052	0.0000049	0.0049	0.000089
16-Dec-15	18	35	401	380	0.0010	0.0051	0.00012	0.00013	0.18	0.12	0.00044	0.000019	0.00085	0.00096	0.19	0.000021	0.28	0.000000087	0.018	0.0037	0.95	0.000014	0.0000026	0.0000022	0.000051	0.0000044	0.0048	0.000087
30-Dec-15	19	37	402	395	0.00069	0.0050	0.000025	0.00012	0.17	0.12	0.00091	0.000015	0.00076	0.00086	0.18	0.000019	0.24	0.00000032	0.020	0.0034	0.81	0.000015	0.00000045	0.0000023	0.000059	0.0000054	0.0044	0.000091
13-Jan-16	20	39	402	375	0.00056	0.0045	0.0000065	0.00010	0.16	0.11	0.00043	0.000025	0.00068	0.00095	0.17	0.000024	0.25	0.000000086	0.016	0.0030	0.81	0.000011	0.0000026	0.0000022	0.000045	0.0000039	0.0040	0.000086
27-Jan-16	21	41	403	405	0.00064	0.0050	0.0000061	0.00010	0.16	0.11	0.00047	0.0000037	0.00071	0.0010	0.18	0.000015	0.24	0.000000093	0.015	0.0035	0.92	0.000016	0.00000093	0.0000023	0.000056	0.0000042	0.0043	0.000093
10-Feb-16	22	43	404	400	0.00070	0.0044	0.0000041	0.000091	0.15	0.11	0.00046	0.0000032	0.00071	0.0011	0.17	0.000017	0.22	0.000000092	0.014	0.0032	0.85	0.000014	0.0000032	0.0000023	0.000054	0.0000041	0.0047	0.000092
24-Feb-16	23	45	405	375	0.00064	0.0044	0.0000017	0.000088	0.16	0.11	0.00086	0.0000030	0.00069	0.0011	0.16	0.000015	0.23	0.000000086	0.011	0.0031	0.79	0.000013	0.0000034	0.0000022	0.000049	0.0000030	0.0045	0.000086
9-Mar-16	24	47	405	385																								

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 9 (Latte Schist Oxide Ore)

Date	Cycle	Week	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
-	No.	-	Input	Output	-	umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	700	360	7.6	3083	#N/A	12	139	2100	33	0.34	< 0.3	1890	0.0037	0.0070	0.11	0.024	< 7E-06	< 7E-06	0.022	0.000018	442	0.00029	0.0027
6-May-15	2	3	400	355	7.7	1878	#N/A	7.0	80	1352	10	0.37	< 0.3	1200	0.0028	0.0044	0.095	0.011	< 7E-06	< 7E-06	0.017	0.000010	293	< 3E-05	0.0015
20-May-15	3	5	400	375	7.8	1274	#N/A	7.1	73	720	2.0	0.37	< 0.3	712	0.0014	0.0031	0.081	0.0079	< 7E-06	< 7E-06	0.013	0.0000040	183	0.00011	0.00081
3-Jun-15	4	7	400	255	7.8	1162	#N/A	6.7	82	560	1.0	0.43	< 0.3	542	0.0053	0.0032	0.087	0.0086	< 7E-06	< 7E-06	0.017	0.0000030	137	0.000060	0.00055
17-Jun-15	5	9	500	445	7.9	776	#N/A	7.0	85	353	< 1	0.42	< 0.3	374	0.0048	0.0032	0.096	0.0081	< 7E-06	< 7E-06	0.014	0.0000030	96	0.000060	0.00034
1-Jul-15	6	11	500	390	7.9	687	#N/A	7.0	90	235	< 1	0.47	< 0.3	276	0.0038	0.0030	0.097	0.0097	< 7E-06	< 7E-06	0.011	< 3E-06	68	0.000080	0.00023
15-Jul-15	7	13	500	455	7.9	521	#N/A	5.8	93	182	< 1	0.50	< 0.3	230	0.0047	0.0031	0.093	0.011	< 7E-06	< 7E-06	0.015	< 3E-06	54	0.000090	0.00021
29-Jul-15	8	15	400	375	7.9	490	#N/A	3.9	93	155	< 1	0.51	< 0.3	219	0.0036	0.0033	0.085	0.011	< 7E-06	< 7E-06	0.014	0.0000080	54	0.000080	0.00015
12-Aug-15	9	17	400	395	7.9	440	#N/A	4.4	94	122	< 1	0.50	< 0.3	197	0.0025	0.0032	0.079	0.012	< 7E-06	< 7E-06	0.010	< 3E-06	48	0.000070	0.00011
26-Aug-15	10	19	500	460	7.6	408	#N/A	4.2	94	100	1.0	0.51	0.30	189	0.0039	0.0033	0.086	0.014	0.0000070	0.0000070	0.010	0.0000040	45	0.000075	0.00010
9-Sep-15	11	21	500	450	7.9	374	#N/A	4.0	94	89	-	0.52	-	180	0.0050	0.0034	0.10	0.016	< 7E-06	< 7E-06	0.011	0.0000050	43	0.000080	0.00010
23-Sep-15	12	23	500	465	8.0	346	#N/A	3.4	98	79	-	0.51	-	171	0.0046	0.0036	0.11	0.016	0.0000070	0.0000070	0.0098	0.0000045	41	0.000095	0.000080
7-Oct-15	13	25	400	370	7.9	349	#N/A	3.2	107	70	-	0.49	-	161	0.0038	0.0037	0.12	0.016	< 7E-06	< 7E-06	0.0091	0.0000040	40	0.00011	0.000066
21-Oct-15	14	27	400	385	8.1	321	#N/A	2.1	102	56	-	0.47	-	150	0.0051	0.0037	0.11	0.018	< 7E-06	< 7E-06	0.010	< 3E-06	38	0.00010	0.000058
4-Nov-15	15	29	400	385	8.0	316	#N/A	2.3	107	54	-	0.48	-	155	0.0097	0.0031	0.12	0.019	< 7E-06	< 7E-06	0.0068	0.000011	39	0.000070	0.000042
18-Nov-15	16	31	400	370	8.1	316	#N/A	1.4	117	49	-	0.48	-	149	0.0036	0.0032	0.12	0.015	< 7E-06	< 7E-06	0.0066	< 3E-06	37	0.00011	0.000055
2-Dec-15	17	33	400	375	8.2	306	#N/A	1.8	105	46	-	0.48	-	158	0.0036	0.0033	0.11	0.021	< 7E-06	< 7E-06	0.0077	0.0000070	39	0.000080	0.000091
16-Dec-15	18	35	400	360	8.2	296	#N/A	2.1	97	44	-	0.46	-	155	0.0030	0.0035	0.14	0.022	< 7E-06	< 7E-06	0.0092	0.0000080	38	0.000060	0.000076
30-Dec-15	19	37	400	385	8.2	288	#N/A	1.4	95	45	-	0.47	-	146	0.0052	0.0030	0.12	0.022	< 7E-06	< 7E-06	0.0078	0.000011	36	0.00014	0.000054
13-Jan-16	20	39	400	355	8.2	285	#N/A	1.5	98	46	-	0.45	-	143	0.0022	0.0032	0.11	0.021	< 7E-06	< 7E-06	0.0090	< 3E-06	35	0.00015	0.000082
27-Jan-16	21	41	400	370	8.1	276	#N/A	2.8	98	44	-	0.47	-	136	0.0030	0.0033	0.088	0.024	< 7E-06	< 7E-06	0.0070	0.000010	33	0.000070	0.000058
10-Feb-16	22	43	400	385	8.1	276	#N/A	2.4	101	38	-	0.42	-	139	0.0031	0.0033	0.083	0.025	0.000011	< 7E-06	0.0060	< 3E-06	34	0.000070	0.000045
24-Feb-16	23	45	400	360	8.1	285	#N/A	2.2	101	38	-	0.41	-	148	0.0012	0.0032	0.094	0.026	< 7E-06	< 7E-06	0.0050	0.0000040	36	0.00012	0.000058
9-Mar-16	24	47	400	365	8.1	270	#N/A	2.0	97	33															

Calculated Loading Rates for Col 9

Date	Cycle	Week	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
-	No.	-	Input	Output	-	umhos/cm	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	700	360	7.6	3083	#N/A	0.88	10	151	2.4	0.024	0.022	136	0.00027	0.00050	0.0079	0.0017	0.00000050	0.00000050	0.0015	0.0000013	32	0.000021	0.00020
6-May-15	2	3	400	355	7.7	1878	#N/A	0.25	2.8	48	3.6	0.013	0.011	43	0.000099	0.00016	0.0034	0.00038	0.00000025	0.00000025	0.00061	0.00000036	10	0.0000011	0.000053
20-May-15	3	5	400	375	7.8	1274	#N/A	0.27	2.7	27	0.75	0.014	0.011	27	0.000053	0.00012	0.0030	0.00029	0.00000026	0.00000026	0.00049	0.00000015	6.9	0.0000041	0.000030
3-Jun-15	4	7	400	255	7.8	1162	#N/A	0.17	2.1	14	0.26	0.011	0.0077	14	0.00014	0.000082	0.0022	0.00022	0.00000018	0.00000018	0.00043	0.000000077	3.5	0.0000015	0.000014
17-Jun-15	5	9	500	445	7.9	776	#N/A	0.31	3.8	16	0.45	0.019	0.013	17	0.00021	0.00014	0.0043	0.00036	0.00000031	0.00000031	0.00061	0.00000013	4.3	0.0000027	0.000015
1-Jul-15	6	11	500	390	7.9	687	#N/A	0.27	3.5	9.2	0.39	0.018	0.012	11	0.00015	0.00012	0.0038	0.00038	0.00000027	0.00000027	0.00041	0.00000012	2.7	0.0000031	0.0000090
15-Jul-15	7	13	500	455	7.9	521	#N/A	0.26	4.2	8.3	0.46	0.023	0.014	10	0.00021	0.00014	0.0042	0.00049	0.00000032	0.00000032	0.00069	0.00000014	2.5	0.0000041	0.0000096
29-Jul-15	8	15	400	375	7.9	490	#N/A	0.15	3.5	5.8	0.38	0.019	0.011	8.2	0.00014	0.00012	0.0032	0.00041	0.00000026	0.00000026	0.00051	0.00000030	2.0	0.0000030	0.0000057
12-Aug-15	9	17	400	395	7.9	440	#N/A	0.18	3.7	4.8	0.40	0.020	0.012	7.8	0.000099	0.00013	0.0031	0.00047	0.00000028	0.00000028	0.00040	0.00000012	1.9	0.0000028	0.0000045
26-Aug-15	10	19	500	460	7.6	408	0.00	0.19	4.3	4.6	0.46	0.023	0.014	8.7	0.00018	0.00015	0.0040	0.00063	0.00000032	0.00000032	0.00048	0.00000018	2.1	0.0000035	0.0000048
9-Sep-15	11	21	500	450	7.9	374	#N/A	0.18	4.2	4.6	0.00	0.027	0.00	9.3	0.00027	0.00018	0.0048	0.00080	0.00000036	0.00000036	0.00054	0.00000026	2.2	0.0000041	0.0000049
23-Sep-15	12	23	500	465	8.0	346	#N/A	0.16	4.6	4.2	0.00	0.027		9.1	0.00024	0.00019	0.0056	0.00084	0.00000037	0.00000037	0.00052	0.00000024	2.2	0.0000051	0.0000043
7-Oct-15	13	25	400	370	7.9	349	#N/A	0.12	4.0	3.0	0.00	0.021		6.8	0.00016	0.00016	0.0050	0.00068	0.00000030	0.00000030	0.00039	0.00000017	1.7	0.0000047	0.0000028
21-Oct-15	14	27	400	385	8.1	321	#N/A	0.081	3.9	2.5	0.00	0.021		6.6	0.00023	0.00016	0.0050	0.00078	0.00000031	0.00000031	0.00044	0.00000013	1.7	0.0000044	0.0000026
4-Nov-15	15	29	400	385	8.0	316	#N/A	0.089	4.1	2.4	0.00	0.021		6.9	0.00043	0.00014	0.0054	0.00084	0.00000031	0.00000031	0.00030	0.00000049	1.7	0.0000031	0.0000019
18-Nov-15	16	31	400	370	8.1	316	#N/A	0.053	4.3	2.1	0.00	0.020		6.3	0.00015	0.00014	0.0049	0.00065	0.00000030	0.00000030	0.00028	0.00000013	1.6	0.0000047	0.0000023
2-Dec-15	17	33	400	375	8.2	306	#N/A	0.068	3.9	2.0	0.00	0.021		6.8	0.00016	0.00014	0.0048	0.00090	0.00000030	0.00000030	0.00033	0.00000030	1.7	0.0000034	0.0000039
16-Dec-15	18	35	400	360	8.2	296	#N/A	0.075	3.5	1.8	0.00	0.019		6.4	0.00012	0.00014	0.0056	0.00093	0.00000029	0.00000029	0.00038	0.00000033	1.6	0.0000025	0.0000031
30-Dec-15	19	37	400	385	8.2	288	#N/A	0.054	3.7	2.0	0.00	0.021		6.5	0.00023	0.00013	0.0054	0.00099	0.00000031	0.00000031	0.00035	0.00000049	1.6	0.0000062	0.0000024
13-Jan-16	20	39	400	355	8.2	285	#N/A	0.054	3.5	1.9	0.00	0.018		5.8	0.000090	0.00013	0.0045	0.00087	0.00000029	0.00000029	0.00037	0.00000012	1.4	0.0000061	0.0000033
27-Jan-16	21	41	400	370	8.1	276	#N/A	0.11	3.6	1.9	0.00	0.020		5.8	0.00013	0.00014	0.0037	0.0010	0.00000030	0.00000030	0.00030	0.00000043	1.4	0.0000030	0.0000025
10-Feb-16	22	43	400	385	8.1	276	#N/A	0.092	3.9	1.7	0.00	0.019		6.2	0.00014	0.00015	0.0037	0.0011	0.00000049	0.00000031	0.00027	0.00000013	1.5	0.0000031	0.0000020
24-Feb-16	23	45	400	360	8.1	285	#N/A	0.078	3.6	1.6	0.00	0.017		6.1	0.000050	0.00013	0.0039	0.0011	0.00000029	0.00000029	0.00021	0.00000017	1.5	0.0000050	0.0000024
9-Mar-16	24	47	400	365	8.1	270	#N/A	0.073	3.5	1.4															

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 9 (Latte Schist Oxide Ore)

Date	Cycle	Week	Volume (mL)		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
-	No.	-	Input	Output	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	700	360	0.0087	< 0.007	< 1E-05	0.020	192	0.13	0.26	0.0030	0.029	0.017	17	0.019	4.8	0.000046	131	3.0	672	0.00033	0.00012	0.00013	0.069	0.00013	0.0030	< 0.002
6-May-15	2	3	400	355	0.0034	< 0.007	< 1E-05	0.012	114	0.094	0.050	0.0026	0.017	< 0.003	11	0.015	4.2	0.000014	67	1.8	467	0.00017	< 1E-05	0.000050	0.031	0.00010	0.0020	< 0.002
20-May-15	3	5	400	375	0.0020	0.010	< 1E-05	0.0088	62	0.049	0.010	0.0031	0.0084	< 0.003	7.8	0.0077	4.3	0.000015	34	1.1	237	0.00014	0.00018	0.000060	0.018	0.000040	0.0020	< 0.002
3-Jun-15	4	7	400	255	0.0012	< 0.007	< 1E-05	0.0078	48	0.029	< 0.01	0.0028	0.0061	< 0.003	7.2	0.0056	4.2	0.000011	26	0.85	189	0.00012	0.000050	< 5E-05	0.014	0.000080	0.0010	< 0.002
17-Jun-15	5	9	500	445	0.0011	< 0.007	< 1E-05	0.0059	33	0.016	< 0.01	0.0030	0.0039	< 0.003	5.7	0.0037	4.0	0.000010	16	0.56	121	0.00012	0.000090	0.00010	0.0099	0.00010	0.0010	< 0.002
1-Jul-15	6	11	500	390	0.0013	< 0.007	< 1E-05	0.0054	26	0.0093	0.020	0.0027	0.0027	< 0.003	4.9	0.0027	4.0	0.0000080	12	0.45	76	0.00010	0.000080	< 5E-05	0.0078	0.000060	0.0020	< 0.002
15-Jul-15	7	13	500	455	0.00074	< 0.007	0.000010	0.0049	23	0.010	< 0.01	0.0026	0.0021	< 0.003	4.4	0.0017	3.8	0.0000080	8.8	0.38	60	0.00011	0.000080	0.000090	0.0063	0.000090	0.0010	< 0.002
29-Jul-15	8	15	400	375	0.00074	< 0.007	0.000010	0.0047	21	0.0073	< 0.01	0.0028	0.0017	< 0.003	4.3	0.0013	3.5	< 2E-06	6.7	0.37	52	0.000090	0.000080	< 5E-05	0.0053	0.000070	0.0010	< 0.002
12-Aug-15	9	17	400	395	0.00049	< 0.007	< 1E-05	0.0041	19	0.0048	< 0.01	0.0026	0.0015	< 0.003	4.4	0.0010	3.7	0.000018	5.2	0.34	40	0.000064	0.000040	< 5E-05	0.0040	0.000060	0.0010	< 0.002
26-Aug-15	10	19	500	460	0.00065	0.0070	0.000015	0.0039	18	0.0048	0.010	0.0026	0.0015	0.0040	4.5	0.00093	3.6	0.000013	4.4	0.32	40	0.000066	0.000085	0.000050	0.0033	0.000070	0.0010	0.0020
9-Sep-15	11	21	500	450	0.00080	< 0.007	0.000020	0.0036	18	0.00	< 0.01	0.0027	0.0014	0.0050	4.5	0.00082	3.4	0.0000070	3.7	0.31	40	0.000068	0.00013	< 5E-05	0.0026	0.000080	0.0010	< 0.002
23-Sep-15	12	23	500	465	0.00073	0.0070	0.000015	0.0035	16	0.0039	0.010	0.0024	0.0013	0.0040	4.1	0.00075	3.4	0.0000065	3.0	0.28	32	0.000066	0.000080	0.000050	0.0023	0.000070	0.0010	0.0020
7-Oct-15	13	25	400	370	0.00064	< 0.007	< 1E-05	0.0033	15	0.0029	< 0.01	0.0021	0.0011	< 0.003	3.7	0.00067	3.4	0.0000060	2.3	0.26	25	0.000064	0.000030	< 5E-05	0.0021	0.000060	< 0.001	< 0.002
21-Oct-15	14	27	400	385	0.00067	< 0.007	< 1E-05	0.0030	13	0.0024	< 0.01	0.0029	0.0012	< 0.003	3.5	0.00059	3.5	0.0000030	1.9	0.24	22	0.000096	0.000060	< 5E-05	0.0021	0.000060	< 0.001	< 0.002
4-Nov-15	15	29	400	385	0.0031	< 0.007	0.00021	0.0025	14	0.0020	< 0.01	0.0027	0.0012	0.0050	3.5	0.00054	3.3	0.0000030	1.8	0.24	21	0.000095	0.00072	< 5E-05	0.0018	0.00017	0.0030	< 0.002
18-Nov-15	16	31	400	370	0.00066	0.013	0.00015	0.0028	14	0.0017	< 0.01	0.0027	0.00080	< 0.003	3.5	0.00066	3.3	< 2E-06	1.5	0.24	20	0.000066	0.000040	< 5E-05	0.0015	0.000080	0.0010	< 0.002
2-Dec-15	17	33	400	375	0.00069	< 0.007	0.000020	0.0027	15	0.0050	< 0.01	0.0029	0.0012	< 0.003	3.7	0.00066	3.3	< 2E-06	1.5	0.25	19	0.000059	0.000060	0.000070	0.0016	0.000060	0.0010	< 0.002
16-Dec-15	18	35	400	360	0.00077	< 0.007	0.000060	0.0028	15	0.0054	< 0.01	0.0025	0.0011	< 0.003	3.7	0.00056	3.5	< 2E-06	1.3	0.25	18	0.000082	0.00013	0.000070	0.0016	0.000040	< 0.001	< 0.002
30-Dec-15	19	37	400	385	0.00060	0.0070	0.00013	0.0028	14	0.0046	0.010	0.0025	0.0010	< 0.003	3.4	0.00050	3.0	0.0000040	1.2	0.24	15	0.000076	0.000020	0.000060	0.0015	0.000080	0.0010	< 0.002
13-Jan-16	20	39	400	355	0.00089	< 0.007	0.000050	0.0026	14	0.0055	< 0.01	0.0025	0.00090	< 0.003	3.5	0.00064	3.4	0.0000030	1.0	0.22	15	0.000038	0.000060	< 5E-05	0.0012	0.000050	< 0.001	< 0.002
27-Jan-16	21	41	400	370	0.00069	< 0.007	0.000010	0.0026	13	0.0027	< 0.01	0.0024	0.00080	< 0.003	3.5	0.00043	3.3	< 2E-06	0.93	0.24	15	0.000064	0.000060	< 5E-05	0.0013	0.000050	0.0020	< 0.002
10-Feb-16	22	43	400	385	0.00053	< 0.007	0.000060	0.0025	13	0.0018	< 0.01	0.0023	0.00090	< 0.003	3.4	0.00049	3.2	< 2E-06	0.88	0.23	14	0.000057	0.000040	< 5E-05	0.0011	0.000050	< 0.001	< 0.002
24-Feb-16	23	45	400	360	0.00035	< 0.007	< 1E-05	0.0026	14	0.0033	0.020	0.0023	0.00090	< 0.003	3.5	0.00045	3.2	< 2E-06	0.73	0.23	13	0.000060	0.000010	< 5E-05	0.0011	0.000040	0.0010	< 0.002
9-Mar-16	24	47	400	365																								

Calculated Loading Rates for Col 9

Date	Cycle	Week	Volume (mL)		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
-	No.	-	Input	Output	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	700	360	0.00063	0.00050	0.00000072	0.0014	14	0.0093	0.019	0.00021	0.0021	0.0012	1.2	0.0014	0.34	0.0000033	9.4	0.21	48	0.000024	0.0000086	0.0000094	0.0049	0.0000094	0.00022	0.00014
6-May-15	2	3	400	355	0.00012	0.00025	0.00000036	0.00043	4.0	0.0033	0.0018	0.000092	0.00062	0.00011	0.39	0.00053	0.15	0.00000050	2.4	0.062	17	0.0000061	0.00000036	0.0000018	0.0011	0.0000036	0.000071	0.000071
20-May-15	3	5	400	375	0.000075	0.00038	0.00000038	0.00033	2.3	0.0018	0.00038	0.00012	0.00032	0.00011	0.29	0.00029	0.16	0.00000056	1.3	0.040	8.9	0.0000053	0.0000068	0.0000023	0.00068	0.0000015	0.000075	0.000075
3-Jun-15	4	7	400	255	0.000031	0.00018	0.00000026	0.00020	1.2	0.00073	0.00026	0.000071	0.00016	0.000077	0.18	0.00014	0.11	0.00000028	0.65	0.022	4.8	0.0000031	0.0000013	0.0000013	0.00036	0.0000020	0.000026	0.000051
17-Jun-15	5	9	500	445	0.000047	0.00031	0.00000045	0.00026	1.5	0.00071	0.00045	0.00013	0.00017	0.00013	0.25	0.00017	0.18	0.00000045	0.73	0.025	5.4	0.0000052	0.0000040	0.0000045	0.00044	0.0000045	0.000045	0.000089
1-Jul-15	6	11	500	390	0.000052	0.00027	0.00000039	0.00021	1.0	0.00036	0.00078	0.00010	0.00011	0.00012	0.19	0.00011	0.16	0.00000031	0.46	0.018	3.0	0.0000040	0.0000031	0.0000020	0.00030	0.0000023	0.000078	0.000078
15-Jul-15	7	13	500	455	0.000034	0.00032	0.00000046	0.00022	1.0	0.00046	0.00046	0.00012	0.000096	0.00014	0.20	0.000078	0.17	0.00000036	0.40	0.017	2.7	0.0000049	0.0000036	0.0000041	0.00029	0.0000041	0.000046	0.000091
29-Jul-15	8	15	400	375	0.000028	0.00026	0.00000038	0.00018	0.77	0.00027	0.00038	0.00010	0.000064	0.00011	0.16	0.000047	0.13	0.000000075	0.25	0.014	2.0	0.0000034	0.0000030	0.0000019	0.00020	0.0000026	0.000038	0.000075
12-Aug-15	9	17	400	395	0.000019	0.00028	0.00000040	0.00016	0.73	0.00019	0.00040	0.00010	0.000059	0.00012	0.17	0.000041	0.14	0.00000071	0.20	0.013	1.6	0.0000025	0.0000016	0.0000020	0.00016	0.0000024	0.000040	0.000079
26-Aug-15	10	19	500	460	0.000030	0.00032	0.00000069	0.00018	0.84	0.00022	0.00046	0.00012	0.000067	0.00018	0.21	0.000043	0.16	0.00000058	0.20	0.015	1.8	0.0000030	0.0000039	0.0000023	0.00015	0.0000032	0.000046	0.000092
9-Sep-15	11	21	500	450	0.000042	0.00036	0.0000010	0.00019	0.93	0.00025	0.00052	0.00014	0.000072	0.00026	0.23	0.000042	0.18	0.00000036	0.19	0.016	2.1	0.0000035	0.0000067	0.0000026	0.00013	0.0000041	0.000052	0.00010
23-Sep-15	12	23	500	465	0.000039	0.00037	0.00000080	0.00019	0.88	0.00021	0.00053	0.00013	0.000067	0.00021	0.22	0.000040	0.18	0.00000035	0.16	0.015	1.7	0.0000035	0.0000043	0.0000027	0.00013	0.0000037	0.000053	0.00011
7-Oct-15	13	25	400	370	0.000027	0.00030	0.00000043	0.00014	0.64	0.00013	0.00043	0.000087	0.000047	0.00013	0.16	0.000028	0.14	0.00000026	0.097	0.011	1.1	0.0000027	0.0000013	0.0000021	0.000089	0.0000026	0.000043	0.000085
21-Oct-15	14	27	400	385	0.000030	0.00031	0.00000044	0.00013	0.59	0.00011	0.00044	0.00013	0.000053	0.00013	0.16	0.000026	0.15	0.00000013	0.085	0.011	0.98	0.0000042	0.0000027	0.0000022	0.000093	0.0000027	0.000044	0.000089
4-Nov-15	15	29	400	385	0.00014	0.00031	0.0000093	0.00011	0.62	0.000090	0.00044	0.00012	0.000053	0.00022	0.16	0.000024	0.15	0.00000013	0.079	0.010	0.92	0.0000042	0.000032	0.0000022	0.000081	0.0000075	0.00013	0.000089
18-Nov-15	16	31	400	370	0.000028	0.00055	0.0000064	0.00012	0.59	0.000072	0.00043	0.00011	0.000034	0.00013	0.15	0.000028	0.14	0.000000085	0.065	0.0100	0.84	0.0000028	0.0000017	0.0000021	0.000065	0.0000034	0.000043	0.000085
2-Dec-15	17	33	400	375	0.000030	0.00030	0.00000086	0.00012	0.64	0.00022	0.00043	0.00012	0.000052	0.00013	0.16	0.000028	0.14	0.000000086	0.066	0.011	0.81	0.0000025	0.0000026	0.0000030	0.000070	0.0000026	0.000043	0.000086
16-Dec-15	18	35	400	360	0.000032	0.00029	0.0000025	0.00012	0.60	0.00022	0.00041	0.00010	0.000046	0.00012	0.15	0.000023	0.14	0.000000083	0.055	0.010	0.74	0.0000034	0.0000054	0.0000029	0.000067	0.0000017	0.000041	0.000083
30-Dec-15	19	37	400	385	0.000027	0.00031	0.0000058	0.00012	0.61	0.00020	0.00044	0.00011	0.000044	0.00013	0.15	0.000022	0.13	0.00000018	0.054	0.011	0.66	0.0000034	0.00000089	0.0000027	0.000065	0.0000035	0.000044	0.000089
13-Jan-16	20	39	400	355	0.000036	0.00029	0.0000020	0.00011	0.55	0.00022	0.00041	0.00010	0.000037	0.00012	0.14	0.000026	0.14	0.00000012	0.042	0.0090	0.59	0.0000016	0.0000024	0.0000020	0.000050	0.0000020	0.000041	0.000082
27-Jan-16	21	41	400	370	0.000029	0.00030	0.00000043	0.00011	0.54	0.00011	0.00043	0.00010	0.000034	0.00013	0.15	0.000018	0.14	0.000000085	0.040	0.010	0.62	0.0000027	0.0000026	0.0000021	0.000056	0.0000021	0.000085	0.000085
10-Feb-16	22	43	400	385	0.000023	0.00031	0.0000027	0.00011	0.58	0.000077	0.00044	0.00010	0.000040	0.00013	0.15	0.000022	0.14	0.000000089	0.039	0.010	0.61	0.0000025	0.0000018	0.0000022	0.000050	0.0000022	0.000044	0.000089
24-Feb-16	23	45	400	360	0.000014	0.00029	0.00000041	0.00011	0.58	0.00013	0.00083	0.000097	0.000037	0.00012	0.15	0.000019	0.13	0.000000083	0.030	0.0096	0.54	0.0000025	0.00000041	0.0000021	0.000047	0.0000017	0.000041	0.000083
9-Mar-16	24	47	400	365																								

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 10 (Latte Schist Transition Ore)

Date	**Cycle**	**Week**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
-	No.	-	Input	Output	-	umhos/cm	mgCaCO$_3$/L	mgCaCO$_3$/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	700	435	7.7	3558	#N/A	13	142	2538	31	0.31	< 0.3	2390	0.0027	0.027	0.18	0.013	< 7E-06	< 7E-06	0.014	0.000018	507	0.000050	0.0069
6-May-15	2	3	400	355	7.6	2779	#N/A	7.8	70	1837	14	0.33	< 0.3	1740	0.0026	0.018	0.14	0.0054	< 7E-06	< 7E-06	0.010	0.0000080	425	< 3E-05	0.0041
20-May-15	3	5	400	360	7.7	2305	#N/A	9.0	60	1421	1.0	0.34	< 0.3	1340	0.0052	0.014	0.12	0.0046	< 7E-06	< 7E-06	0.0070	0.0000040	351	0.000050	0.0030
3-Jun-15	4	7	400	270	7.7	2125	#N/A	8.2	63	1280	< 1	0.36	< 0.3	1277	0.0049	0.015	0.12	0.0048	< 7E-06	< 7E-06	0.011	0.0000040	348	0.000040	0.0026
17-Jun-15	5	9	500	455	7.8	1396	#N/A	8.1	65	848	< 1	0.37	< 0.3	826	0.0044	0.014	0.12	0.0041	< 7E-06	< 7E-06	0.0084	0.0000040	229	0.000080	0.0017
1-Jul-15	6	11	500	470	7.8	873	#N/A	7.1	66	639	< 1	0.38	< 0.3	611	0.0040	0.014	0.12	0.0043	< 7E-06	< 7E-06	0.0053	< 3E-06	168	< 3E-05	0.0013
15-Jul-15	7	13	500	450	7.8	825	#N/A	5.6	69	521	< 1	0.41	< 0.3	530	0.0060	0.014	0.11	0.0046	< 7E-06	0.0000070	0.0097	< 3E-06	140	< 3E-05	0.0013
29-Jul-15	8	15	400	365	7.8	988	#N/A	4.6	69	485	< 1	0.41	< 0.3	516	0.0051	0.014	0.10	0.0051	< 7E-06	< 7E-06	0.0089	< 3E-06	141	0.00013	0.0010
12-Aug-15	9	17	400	375	7.8	788	#N/A	4.8	71	396	< 1	0.39	< 0.3	448	0.0047	0.014	0.11	0.0051	< 7E-06	< 7E-06	0.0063	0.0000050	123	0.00014	0.00082
26-Aug-15	10	19	500	445	7.7	788	#N/A	4.5	70	343	1.0	0.41	0.30	396	0.0048	0.015	0.11	0.0056	0.0000070	0.0000070	0.0061	0.0000040	109	0.000085	0.00070
9-Sep-15	11	21	500	450	7.9	602	#N/A	4.2	70	283	< 1	0.42	< 0.3	344	0.0049	0.017	0.11	0.0062	< 7E-06	< 7E-06	0.0058	< 3E-06	96	< 3E-05	0.00058
23-Sep-15	12	23	500	465	7.9	586	#N/A	3.6	74	251	-	0.41	-	322	0.0043	0.017	0.11	0.0063	0.0000070	0.0000070	0.0054	0.0000030	89	0.000055	0.00052
7-Oct-15	13	25	400	360	7.9	630	#N/A	3.9	81	241	-	0.39	-	299	0.0036	0.018	0.11	0.0065	< 7E-06	< 7E-06	0.0050	< 3E-06	83	0.000080	0.00045
21-Oct-15	14	27	400	360	8.0	583	#N/A	2.1	79	178	-	0.39	-	267	0.0060	0.018	0.12	0.0076	< 7E-06	< 7E-06	0.0064	0.0000030	76	0.000050	0.00041
4-Nov-15	15	29	400	375	8.0	585	#N/A	2.9	84	225	-	0.38	-	284	0.0051	0.016	0.12	0.0085	< 7E-06	< 7E-06	0.0043	< 3E-06	80	< 3E-05	0.00036
18-Nov-15	16	31	400	360	8.1	534	#N/A	1.7	90	168	-	0.39	-	244	0.0037	0.015	0.12	0.0056	< 7E-06	< 7E-06	0.0029	< 3E-06	69	0.000040	0.00032
2-Dec-15	17	33	400	375	8.1	492	#N/A	2.4	81	136	-	0.39	-	250	0.0048	0.017	0.12	0.0086	< 7E-06	< 7E-06	0.0050	0.0000070	69	0.000040	0.00049
16-Dec-15	18	35	400	355	8.1	438	#N/A	2.3	75	144	-	0.37	-	246	0.0037	0.017	0.14	0.0099	< 7E-06	< 7E-06	0.0056	0.0000050	69	< 3E-05	0.00043
30-Dec-15	19	37	400	345	8.1	443	#N/A	1.8	77	120	-	0.37	-	222	0.0043	0.016	0.13	0.0094	< 7E-06	< 7E-06	0.0047	< 3E-06	62	0.000070	0.00039
13-Jan-16	20	39	400	365	8.1	403	#N/A	1.7	77	112	-	0.36	-	196	0.0032	0.016	0.12	0.0095	< 7E-06	< 7E-06	0.0060	< 3E-06	54	< 3E-05	0.00031
27-Jan-16	21	41	400	365	8.0	386	#N/A	3.4	77	108	-	0.42	-	188	0.0040	0.017	0.13	0.011	< 7E-06	< 7E-06	0.0040	0.0000030	53	< 3E-05	0.00032
10-Feb-16	22	43	401	375	8.1	380	#N/A	2.5	81	103	-	0.36	-	183	0.0049	0.017	0.14	0.011	< 7E-06	< 7E-06	0.0030	< 3E-06	51	< 3E-05	0.00028
24-Feb-16	23	45	402	350	8.1	397	#N/A	2.5	82	103	-	0.37	-	201	0.0020	0.017	0.14	0.011	< 7E-06	< 7E-06	0.0020	0.0000040	56	< 3E-05	0.00031
9-Mar-16	24	47	403	370	8.1	379	#N/A	2.3	78	79															

Calculated Loading Rates for Col 10

Date	**Cycle**	**Week**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
-	No.	-	Input	Output	-	umhos/cm	mgCaCO$_3$/kg/wk	mgCaCO$_3$/kg/wk	mgCaCO$_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mgCaCO$_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	700	435	7.7	3558	#N/A	1.1	12	221	2.7	0.027	0.026	208	0.00023	0.0024	0.015	0.0011	0.00000061	0.00000061	0.0012	0.0000016	44	0.0000044	0.00060
6-May-15	2	3	400	355	7.6	2779	#N/A	0.28	2.5	65	0.50	0.012	0.011	62	0.000092	0.00063	0.0049	0.00019	0.00000025	0.00000025	0.00036	0.00000028	15	0.0000011	0.00015
20-May-15	3	5	400	360	7.7	2305	#N/A	0.33	2.1	51	0.036	0.012	0.011	48	0.00019	0.00050	0.0043	0.00016	0.00000025	0.00000025	0.00025	0.00000014	13	0.0000018	0.00011
3-Jun-15	4	7	400	270	7.7	2125	#N/A	0.22	1.7	35	0.027	0.0097	0.0081	34	0.00013	0.00040	0.0032	0.00013	0.00000019	0.00000019	0.00030	0.00000011	9.4	0.0000011	0.000070
17-Jun-15	5	9	500	455	7.8	1396	#N/A	0.37	3.0	39	0.046	0.017	0.014	38	0.00020	0.00065	0.0056	0.00018	0.00000032	0.00000032	0.00038	0.00000018	10	0.0000036	0.000077
1-Jul-15	6	11	500	470	7.8	873	#N/A	0.33	3.1	30	0.047	0.018	0.014	29	0.00019	0.00067	0.0055	0.00020	0.00000033	0.00000033	0.00025	0.00000014	7.9	0.0000014	0.000062
15-Jul-15	7	13	500	450	7.8	825	#N/A	0.25	3.1	23	0.045	0.018	0.014	24	0.00027	0.00063	0.0051	0.00021	0.00000032	0.00000032	0.00044	0.00000014	6.3	0.0000014	0.000057
29-Jul-15	8	15	400	365	7.8	988	#N/A	0.17	2.5	18	0.037	0.015	0.011	19	0.00019	0.00051	0.0037	0.00019	0.00000026	0.00000026	0.00032	0.00000011	5.1	0.0000047	0.000038
12-Aug-15	9	17	400	375	7.8	788	#N/A	0.18	2.7	15	0.038	0.015	0.011	17	0.00018	0.00053	0.0039	0.00019	0.00000026	0.00000026	0.00024	0.00000019	4.6	0.0000053	0.000031
26-Aug-15	10	19	500	445	7.7	788	0.00	0.20	3.1	15	0.045	0.018	0.013	18	0.00021	0.00068	0.0048	0.00025	0.00000031	0.00000031	0.00027	0.00000018	4.9	0.0000038	0.000031
9-Sep-15	11	21	500	450	7.9	602	#N/A	0.19	3.1	15	0.045	0.022	0.016	18	0.00025	0.00086	0.0056	0.00032	0.00000036	0.00000036	0.00030	0.00000016	5.0	0.0000016	0.000030
23-Sep-15	12	23	500	465	7.9	586	#N/A	0.17	3.4	13	0.00	0.022		17	0.00023	0.00092	0.0060	0.00034	0.00000037	0.00000037	0.00029	0.00000016	4.8	0.0000029	0.000028
7-Oct-15	13	25	400	360	7.9	630	#N/A	0.14	2.9	10.0	0.00	0.016		12	0.00015	0.00074	0.0047	0.00027	0.00000029	0.00000029	0.00021	0.00000012	3.4	0.0000033	0.000019
21-Oct-15	14	27	400	360	8.0	583	#N/A	0.077	2.8	7.4	0.00	0.016		11	0.00025	0.00072	0.0050	0.00031	0.00000029	0.00000029	0.00026	0.00000012	3.1	0.0000021	0.000017
4-Nov-15	15	29	400	375	8.0	585	#N/A	0.11	3.2	9.7	0.00	0.016		12	0.00022	0.00067	0.0053	0.00037	0.00000030	0.00000030	0.00019	0.00000013	3.4	0.0000013	0.000015
18-Nov-15	16	31	400	360	8.1	534	#N/A	0.060	3.3	7.0	0.00	0.016		10	0.00015	0.00064	0.0050	0.00023	0.00000029	0.00000029	0.00012	0.00000012	2.8	0.0000017	0.000013
2-Dec-15	17	33	400	375	8.1	492	#N/A	0.088	3.0	5.9	0.00	0.017		11	0.00021	0.00073	0.0050	0.00037	0.00000030	0.00000030	0.00022	0.00000030	3.0	0.0000017	0.000021
16-Dec-15	18	35	400	355	8.1	438	#N/A	0.082	2.6	5.9	0.00	0.015		10	0.00015	0.00071	0.0056	0.00041	0.00000029	0.00000029	0.00023	0.00000020	2.8	0.0000012	0.000017
30-Dec-15	19	37	400	345	8.1	443	#N/A	0.062	2.6	4.8	0.00	0.015		8.8	0.00017	0.00063	0.0051	0.00037	0.00000028	0.00000028	0.00019	0.00000012	2.5	0.0000028	0.000015
13-Jan-16	20	39	400	365	8.1	403	#N/A	0.062	2.8	4.7	0.00	0.015		8.2	0.00013	0.00068	0.0048	0.00040	0.00000029	0.00000029	0.00025	0.00000013	2.3	0.0000013	0.000013
27-Jan-16	21	41	400	365	8.0	386	#N/A	0.12	2.8	4.5	0.00	0.018		7.9	0.00017	0.00070	0.0053	0.00044	0.00000029	0.00000029	0.00017	0.00000013	2.2	0.0000013	0.000013
10-Feb-16	22	43	401	375	8.1	380	#N/A	0.095	3.0	4.4	0.00	0.016		7.9	0.00021	0.00073	0.0060	0.00046	0.00000030	0.00000030	0.00013	0.00000013	2.2	0.0000013	0.000012
24-Feb-16	23	45	402	350	8.1	397	#N/A	0.088	2.9	4.1	0.00	0.015		8.1	0.000080	0.00069	0.0055	0.00046	0.00000028	0.00000028	0.000080	0.00000016	2.2	0.0000012	0.000012
9-Mar-16	24	47	403	370	8.1	379	#N/A	0.084	2.9	3.4	0.00														

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 10 (Latte Schist Transition Ore)

Date	Cycle	Week	Volume (mL)		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
-	No.	-	Input	Output	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	700	435	0.0085	< 0.007	< 1E-05	0.020	272	0.41	0.26	0.0049	0.048	0.014	21	0.028	3.9	0.00020	68	3.8	807	0.00065	0.000080	0.000060	0.065	0.00015	0.0020	< 0.002
6-May-15	2	3	400	355	0.0037	< 0.007	0.000020	0.011	164	0.33	0.040	0.0047	0.033	< 0.003	14	0.018	3.1	0.000012	31	2.6	720	0.00042	< 1E-05	< 5E-05	0.042	0.00013	0.0030	< 0.002
20-May-15	3	5	400	360	0.0018	< 0.007	0.000010	0.0088	112	0.27	< 0.01	0.0046	0.022	< 0.003	11	0.0089	3.3	0.0000060	17	2.0	447	0.00039	0.00013	0.00012	0.031	0.00014	0.0010	< 0.002
3-Jun-15	4	7	400	270	0.010	< 0.007	0.00016	0.0085	99	0.23	< 0.01	0.0051	0.019	< 0.003	11	0.0064	3.3	0.0000060	13	1.9	434	0.00036	0.0020	< 5E-05	0.029	0.00013	0.0090	< 0.002
17-Jun-15	5	9	500	455	0.0012	< 0.007	< 1E-05	0.0062	62	0.13	< 0.01	0.0039	0.013	< 0.003	8.1	0.0042	3.0	0.0000060	7.5	1.2	285	0.00029	0.000050	0.000060	0.018	0.00011	0.0010	< 0.002
1-Jul-15	6	11	500	470	0.00093	< 0.007	< 1E-05	0.0054	47	0.10	< 0.01	0.0036	0.0098	< 0.003	6.8	0.0032	2.9	0.0000030	5.0	0.91	195	0.00025	0.000050	< 5E-05	0.015	0.00011	0.0010	< 0.002
15-Jul-15	7	13	500	450	0.0011	< 0.007	0.000020	0.0051	44	0.099	< 0.01	0.0034	0.0087	< 0.003	5.9	0.0024	3.1	0.0000030	4.2	0.77	171	0.00024	0.000070	< 5E-05	0.014	0.00014	0.0010	< 0.002
29-Jul-15	8	15	400	365	0.0014	< 0.007	0.000030	0.0049	40	0.082	< 0.01	0.0038	0.0068	< 0.003	6.2	0.0019	2.6	< 2E-06	3.3	0.78	167	0.00021	0.00015	< 5E-05	0.014	0.00013	< 0.001	< 0.002
12-Aug-15	9	17	400	375	0.00043	< 0.007	< 1E-05	0.0042	34	0.067	< 0.01	0.0036	0.0060	< 0.003	6.0	0.0015	2.9	0.0000080	2.7	0.68	130	0.00018	0.000040	0.000080	0.011	0.00012	< 0.001	< 0.002
26-Aug-15	10	19	500	445	0.00056	0.0070	0.000010	0.0038	30	0.057	0.010	0.0033	0.0051	0.0030	5.6	0.0014	2.7	0.0000055	2.2	0.59	118	0.00017	0.000085	0.000065	0.0096	0.00015	0.0010	0.0020
9-Sep-15	11	21	500	450	0.00068	< 0.007	< 1E-05	0.0035	26	0.047	< 0.01	0.0031	0.0042	< 0.003	5.2	0.0012	2.5	0.0000030	1.8	0.50	105	0.00016	0.00013	< 5E-05	0.0082	0.00018	< 0.001	< 0.002
23-Sep-15	12	23	500	465	0.00060	0.0070	0.000010	0.0033	24	0.044	0.010	0.0028	0.0040	0.0030	4.9	0.0012	2.4	0.0000025	1.6	0.48	94	0.00014	0.000070	0.000050	0.0080	0.00014	0.0010	0.0020
7-Oct-15	13	25	400	360	0.00051	< 0.007	< 1E-05	0.0031	22	0.041	< 0.01	0.0025	0.0037	< 0.003	4.5	0.0012	2.4	0.0000020	1.4	0.46	83	0.00012	0.000010	< 5E-05	0.0077	0.00010	0.0010	< 0.002
21-Oct-15	14	27	400	360	0.00060	< 0.007	0.000010	0.0030	19	0.037	< 0.01	0.0034	0.0036	< 0.003	4.2	0.0011	2.5	< 2E-06	1.3	0.40	74	0.00016	0.000040	< 5E-05	0.0079	0.00011	0.0080	< 0.002
4-Nov-15	15	29	400	375	0.0013	< 0.007	0.000070	0.0025	21	0.036	< 0.01	0.0030	0.0039	< 0.003	4.4	0.0010	2.4	< 2E-06	1.2	0.40	74	0.00017	0.000070	< 5E-05	0.0081	0.00012	0.0010	< 0.002
18-Nov-15	16	31	400	360	0.00035	< 0.007	< 1E-05	0.0027	18	0.030	< 0.01	0.0032	0.0028	< 0.003	4.0	0.0012	2.3	< 2E-06	0.98	0.36	63	0.00012	0.000030	< 5E-05	0.0050	0.00011	< 0.001	< 0.002
2-Dec-15	17	33	400	375	0.00089	< 0.007	0.000040	0.0026	19	0.038	< 0.01	0.0033	0.0033	< 0.003	4.3	0.0011	2.4	< 2E-06	1.0	0.35	58	0.00012	0.000040	< 5E-05	0.0061	0.00012	0.0020	< 0.002
16-Dec-15	18	35	400	355	0.00048	< 0.007	< 1E-05	0.0027	18	0.042	< 0.01	0.0032	0.0032	< 0.003	4.2	0.0010	2.5	< 2E-06	0.89	0.36	57	0.00013	0.000040	< 5E-05	0.0062	0.00012	< 0.001	< 0.002
30-Dec-15	19	37	400	345	0.00071	< 0.007	0.000040	0.0027	16	0.035	0.010	0.0031	0.0029	< 0.003	3.9	0.00090	2.2	0.0000030	0.85	0.32	44	0.00012	0.000020	0.000050	0.0053	0.00017	0.0010	< 0.002
13-Jan-16	20	39	400	365	0.00064	< 0.007	0.000070	0.0024	15	0.031	< 0.01	0.0028	0.0025	< 0.003	3.8	0.0010	2.3	0.0000020	0.69	0.28	41	0.000085	0.000040	< 5E-05	0.0043	0.00011	< 0.001	< 0.002
27-Jan-16	21	41	400	365	0.00035	< 0.007	0.00020	0.0023	14	0.028	< 0.01	0.0027	0.0022	< 0.003	3.8	0.00078	2.2	< 2E-06	0.63	0.29	41	0.00012	0.000040	< 5E-05	0.0045	0.00011	< 0.001	< 0.002
10-Feb-16	22	43	401	375	0.00044	< 0.007	0.000080	0.0023	14	0.025	< 0.01	0.0027	0.0023	< 0.003	3.6	0.00088	2.2	< 2E-06	0.61	0.28	37	0.00012	0.000030	< 5E-05	0.0039	0.00013	< 0.001	< 0.002
24-Feb-16	23	45	402	350	0.00037	< 0.007	0.000030	0.0025	15	0.027	0.020	0.0029	0.0024	< 0.003	4.0	0.00091	2.2	< 2E-06	0.52	0.29	37	0.00011	0.000010	< 5E-05	0.0043	0.00011	< 0.001	< 0.002
9-Mar-16	24	47	403	370																								

Calculated Loading Rates for Col 10

Date	Cycle	Week	Volume (mL)		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
-	No.	-	Input	Output	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	700	435	0.00074	0.00061	0.00000087	0.0017	24	0.036	0.023	0.00043	0.0042	0.0012	1.8	0.0024	0.34	0.000017	6.0	0.33	70	0.000057	0.0000070	0.0000052	0.0056	0.000013	0.00017	0.00017
6-May-15	2	3	400	355	0.00013	0.00025	0.00000071	0.00039	5.8	0.012	0.0014	0.00017	0.0012	0.00011	0.48	0.00064	0.11	0.00000043	1.1	0.091	26	0.000015	0.00000036	0.0000018	0.0015	0.0000046	0.00011	0.000071
20-May-15	3	5	400	360	0.000063	0.00025	0.00000036	0.00032	4.0	0.0096	0.00036	0.00016	0.00077	0.00011	0.40	0.00032	0.12	0.00000022	0.63	0.071	16	0.000014	0.0000047	0.0000043	0.0011	0.0000050	0.000036	0.000072
3-Jun-15	4	7	400	270	0.00028	0.00019	0.0000043	0.00023	2.7	0.0062	0.00027	0.00014	0.00050	0.000081	0.29	0.00017	0.090	0.00000016	0.35	0.050	12	0.0000097	0.000054	0.0000014	0.00077	0.0000035	0.00024	0.000054
17-Jun-15	5	9	500	455	0.000053	0.00032	0.00000046	0.00028	2.8	0.0060	0.00046	0.00018	0.00057	0.00014	0.37	0.00019	0.14	0.00000027	0.34	0.052	13	0.000013	0.0000023	0.0000027	0.00084	0.0000050	0.000046	0.000091
1-Jul-15	6	11	500	470	0.000044	0.00033	0.00000047	0.00025	2.2	0.0048	0.00047	0.00017	0.00046	0.00014	0.32	0.00015	0.14	0.00000014	0.23	0.043	9.2	0.000012	0.0000024	0.0000024	0.00072	0.0000052	0.000047	0.000094
15-Jul-15	7	13	500	450	0.000047	0.00032	0.00000090	0.00023	2.0	0.0045	0.00045	0.00015	0.00039	0.00014	0.27	0.00011	0.14	0.00000014	0.19	0.035	7.7	0.000011	0.0000032	0.0000023	0.00063	0.0000063	0.000045	0.000090
29-Jul-15	8	15	400	365	0.000050	0.00026	0.0000011	0.00018	1.5	0.0030	0.00037	0.00014	0.00025	0.00011	0.23	0.000069	0.096	0.000000073	0.12	0.028	6.1	0.0000078	0.0000055	0.0000018	0.00050	0.0000047	0.000037	0.000073
12-Aug-15	9	17	400	375	0.000016	0.00026	0.00000038	0.00016	1.3	0.0025	0.00038	0.00013	0.00023	0.00011	0.22	0.000057	0.11	0.00000030	0.10	0.026	4.9	0.0000069	0.0000015	0.0000030	0.00041	0.0000045	0.000038	0.000075
26-Aug-15	10	19	500	445	0.000025	0.00031	0.00000045	0.00017	1.3	0.0025	0.00045	0.00015	0.00023	0.00013	0.25	0.000061	0.12	0.00000024	0.100	0.026	5.2	0.0000077	0.0000038	0.0000029	0.00043	0.0000067	0.000045	0.000089
9-Sep-15	11	21	500	450	0.000035	0.00036	0.00000052	0.00018	1.3	0.0024	0.00052	0.00016	0.00022	0.00016	0.27	0.000063	0.13	0.00000016	0.094	0.026	5.4	0.0000083	0.0000067	0.0000026	0.00042	0.0000093	0.000052	0.00010
23-Sep-15	12	23	500	465	0.000032	0.00037	0.00000053	0.00018	1.3	0.0023	0.00053	0.00015	0.00021	0.00016	0.26	0.000065	0.13	0.00000013	0.086	0.026	5.0	0.0000075	0.0000037	0.0000027	0.00043	0.0000075	0.000053	0.00011
7-Oct-15	13	25	400	360	0.000021	0.00029	0.00000041	0.00013	0.92	0.0017	0.00041	0.00010	0.00015	0.00012	0.19	0.000050	0.100	0.000000083	0.057	0.019	3.5	0.0000050	0.00000041	0.0000021	0.00032	0.0000041	0.000041	0.000083
21-Oct-15	14	27	400	360	0.000025	0.00029	0.00000041	0.00012	0.79	0.0015	0.00041	0.00014	0.00015	0.00012	0.17	0.000044	0.11	0.000000083	0.053	0.016	3.0	0.0000067	0.0000017	0.0000021	0.00032	0.0000046	0.00033	0.000083
4-Nov-15	15	29	400	375	0.000054	0.00030	0.0000030	0.00011	0.89	0.0016	0.00043	0.00013	0.00017	0.00013	0.19	0.000044	0.10	0.000000086	0.050	0.017	3.2	0.0000072	0.0000030	0.0000022	0.00035	0.0000052	0.000043	0.000086
18-Nov-15	16	31	400	360	0.000014	0.00029	0.00000041	0.00011	0.73	0.0012	0.00041	0.00013	0.00012	0.00012	0.17	0.000048	0.095	0.000000083	0.041	0.015	2.6	0.0000048	0.0000012	0.0000021	0.00021	0.0000046	0.000041	0.000083
2-Dec-15	17	33	400	375	0.000038	0.00030	0.0000017	0.00011	0.81	0.0016	0.00043	0.00014	0.00014	0.00013	0.19	0.000046	0.10	0.000000086	0.044	0.015	2.5	0.0000053	0.0000017	0.0000022	0.00026	0.0000052	0.000086	0.000086
16-Dec-15	18	35	400	355	0.000020	0.00029	0.00000041	0.00011	0.73	0.0017	0.00041	0.00013	0.00013	0.00012	0.17	0.000041	0.10	0.000000082	0.036	0.015	2.3	0.0000054	0.0000016	0.0000020	0.00025	0.0000049	0.000041	0.000082
30-Dec-15	19	37	400	345	0.000028	0.00028	0.0000016	0.00011	0.64	0.0014	0.00040	0.00012	0.00012	0.00012	0.15	0.000036	0.089	0.00000012	0.034	0.013	1.7	0.0000049	0.00000079	0.0000020	0.00021	0.0000067	0.000040	0.000079
13-Jan-16	20	39	400	365	0.000027	0.00029	0.0000029	0.00010	0.62	0.0013	0.00042	0.00012	0.00010	0.00013	0.16	0.000043	0.095	0.000000084	0.029	0.012	1.7	0.0000036	0.0000017	0.0000021	0.00018	0.0000046	0.000042	0.000084
27-Jan-16	21	41	400	365	0.000015	0.00029	0.0000084	0.000096	0.58	0.0012	0.00042	0.00011	0.000092	0.00013	0.16	0.000033	0.094	0.000000084	0.026	0.012	1.7	0.0000050	0.0000017	0.0000021	0.00019	0.0000046	0.000042	0.000084
10-Feb-16	22	43	401	375	0.000019	0.00030	0.0000034	0.000100	0.58	0.0011	0.00043	0.00012	0.000099	0.00013	0.16	0.000038	0.093	0.000000086	0.026	0.012	1.6	0.0000050	0.0000013	0.0000022	0.00017	0.0000056	0.000043	0.000086
24-Feb-16	23	45	402	350	0.000015	0.00028	0.0000012	0.00010	0.60	0.0011	0.00080	0.00012	0.000097	0.00012	0.16	0.000037	0.088	0.000000080	0.021	0.012	1.5	0.0000044	0.00000040	0.0000020	0.00017	0.0000044	0.000040	0.000080
9-Mar-16	24	47	403	370																								

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 11 (Supremo Gneiss Oxide Ore)

Date	Cycle	Week	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
-	No.	-	Input	Output	-	umhos/cm	mgCaCO$_3$/L	mgCaCO$_3$/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	700	360	8.0	538	#N/A	6.0	165	54	14	0.20	< 0.3	178	0.0060	0.010	0.082	0.15	< 7E-06	< 7E-06	0.019	0.0000030	49	0.00027	0.0022
6-May-15	2	3	400	335	8.0	301	#N/A	4.4	98	51	4.0	0.33	< 0.3	88	0.0029	0.0092	0.13	0.048	< 7E-06	< 7E-06	0.013	0.0000030	23	0.000060	0.00097
20-May-15	3	5	400	380	8.1	269	#N/A	4.2	86	37	1.0	0.35	< 0.3	80	0.0040	0.0067	0.13	0.041	< 7E-06	< 7E-06	0.0097	0.0000070	22	0.00023	0.00050
3-Jun-15	4	7	400	275	8.0	242	#N/A	4.4	94	28	< 1	0.35	< 0.3	80	0.0054	0.0068	0.14	0.045	< 7E-06	< 7E-06	0.014	0.0000070	22	0.00016	0.00030
17-Jun-15	5	9	500	465	8.1	212	#N/A	4.5	87	21	< 1	0.32	< 0.3	70	0.0043	0.0066	0.15	0.037	< 7E-06	< 7E-06	0.012	0.000015	19	0.00015	0.00022
1-Jul-15	6	11	500	475	8.0	206	#N/A	4.8	84	16	< 1	0.34	< 0.3	69	0.0040	0.0064	0.15	0.040	< 7E-06	< 7E-06	0.0088	0.0000030	19	0.00016	0.00014
15-Jul-15	7	13	500	475	8.0	184	#N/A	4.2	86	14	< 1	0.34	< 0.3	72	0.0041	0.0059	0.14	0.044	< 7E-06	< 7E-06	0.013	0.0000060	19	0.00016	0.00014
29-Jul-15	8	15	400	380	8.0	188	#N/A	3.5	86	12	< 1	0.33	< 0.3	75	0.0043	0.0054	0.13	0.043	< 7E-06	< 7E-06	0.012	< 3E-06	21	0.00015	0.000093
12-Aug-15	9	17	400	390	8.0	186	#N/A	3.1	86	10	< 1	0.31	< 0.3	77	0.0025	0.0053	0.13	0.045	< 7E-06	< 7E-06	0.0092	0.0000090	21	0.00016	0.000073
26-Aug-15	10	19	500	465	7.5	184	#N/A	3.0	83	10	1.0	0.32	0.30	76	0.0034	0.0055	0.13	0.046	0.0000070	0.0000070	0.0090	0.0000060	21	0.00015	0.000069
9-Sep-15	11	21	500	475	8.0	175	#N/A	3.0	80	8.0	< 1	0.32	< 0.3	75	0.0043	0.0057	0.13	0.046	< 7E-06	< 7E-06	0.0087	< 3E-06	21	0.00014	0.000064
23-Sep-15	12	23	500	470	8.0	176	#N/A	2.4	82	8.0	-	0.30	-	79	0.0041	0.0058	0.13	0.046	0.0000070	0.0000070	0.0079	0.0000040	22	0.00013	0.000056
7-Oct-15	13	25	400	380	8.0	186	#N/A	3.1	89	7.0	-	0.28	-	82	0.0038	0.0058	0.12	0.046	< 7E-06	< 7E-06	0.0071	0.0000050	23	0.00012	0.000047
21-Oct-15	14	27	400	390	8.1	173	#N/A	1.4	84	7.0	-	0.27	-	76	0.0036	0.0058	0.13	0.053	< 7E-06	< 7E-06	0.0083	0.0000040	21	0.00017	0.000049
4-Nov-15	15	29	400	390	8.1	177	#N/A	2.3	88	7.0	-	0.28	-	83	0.0039	0.0049	0.12	0.055	< 7E-06	< 7E-06	0.0055	0.0000070	23	0.00029	< 4E-06
18-Nov-15	16	31	400	380	8.2	176	#N/A	1.0	95	7.0	-	0.27	-	79	0.0030	0.0047	0.13	0.042	< 7E-06	< 7E-06	0.0046	< 3E-06	21	0.00012	0.000067
2-Dec-15	17	33	400	380	8.1	178	#N/A	2.0	83	6.0	-	0.26	-	87	0.0032	0.0051	0.11	0.057	< 7E-06	< 7E-06	0.0061	< 3E-06	23	0.00017	0.000050
16-Dec-15	18	35	400	360	8.1	174	#N/A	2.0	77	7.0	-	0.26	-	87	0.0032	0.0054	0.13	0.059	< 7E-06	< 7E-06	0.0075	< 3E-06	24	0.00014	0.000053
30-Dec-15	19	37	400	385	8.1	170	#N/A	1.7	74	5.0	-	0.25	-	88	0.0030	0.0047	0.13	0.056	< 7E-06	< 7E-06	0.0062	0.0000030	24	0.00022	0.000048
13-Jan-16	20	39	400	370	8.1	172	#N/A	1.7	78	7.0	-	0.23	-	83	0.0022	0.0050	0.11	0.052	< 7E-06	< 7E-06	0.0070	< 3E-06	23	0.00013	0.000021
27-Jan-16	21	41	400	385	8.0	171	#N/A	2.8	77	6.0	-	0.28	-	84	0.013	0.0051	0.12	0.059	< 7E-06	< 7E-06	0.0060	0.0000040	23	0.00018	0.000042
10-Feb-16	22	43	400	350	8.1	173	#N/A	2.4	77	7.0	-	0.23	-	80	0.0029	0.0051	0.12	0.057	< 7E-06	< 7E-06	0.0040	< 3E-06	22	0.00014	0.000055
24-Feb-16	23	45	400	380	8.1	178	#N/A	2.1	77	4.0	-	0.25	-	90	0.0015	0.0049	0.12	0.060	< 7E-06	< 7E-06	0.0030	< 3E-06	25	0.00019	0.000038
9-Mar-16	24	47	400	380	8.1	172	#N/A	2.0	74	4.0															

Calculated Loading Rates for Col 11

Date	Cycle	Week	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
-	No.	-	Input	Output	-	umhos/cm	mgCaCO$_3$/kg/wk	mgCaCO$_3$/kg/wk	mgCaCO$_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mgCaCO$_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	700	360	8.0	538	#N/A	0.43	12	3.9	1.0	0.014	0.022	13	0.00043	0.00073	0.0059	0.011	0.00000050	0.00000050	0.0014	0.00000022	3.5	0.000019	0.00015
6-May-15	2	3	400	335	8.0	301	#N/A	0.15	3.3	1.7	0.13	0.011	0.010	2.9	0.000097	0.00031	0.0042	0.0016	0.00000023	0.00000023	0.00044	0.00000010	0.78	0.0000020	0.000033
20-May-15	3	5	400	380	8.1	269	#N/A	0.16	3.3	1.4	0.038	0.013	0.011	3.0	0.00015	0.00025	0.0048	0.0016	0.00000027	0.00000027	0.00037	0.00000027	0.82	0.0000087	0.000019
3-Jun-15	4	7	400	275	8.0	242	#N/A	0.12	2.6	0.77	0.028	0.0096	0.0083	2.2	0.00015	0.00019	0.0037	0.0012	0.00000019	0.00000019	0.00039	0.00000019	0.59	0.0000044	0.0000082
17-Jun-15	5	9	500	465	8.1	212	#N/A	0.21	4.0	0.98	0.047	0.015	0.014	3.2	0.00020	0.00031	0.0068	0.0017	0.00000033	0.00000033	0.00053	0.00000070	0.89	0.0000070	0.000010
1-Jul-15	6	11	500	475	8.0	206	#N/A	0.23	4.0	0.76	0.048	0.016	0.014	3.3	0.00019	0.00030	0.0072	0.0019	0.00000033	0.00000033	0.00042	0.00000014	0.88	0.0000076	0.0000067
15-Jul-15	7	13	500	475	8.0	184	#N/A	0.20	4.1	0.67	0.048	0.016	0.014	3.4	0.00019	0.00028	0.0067	0.0021	0.00000033	0.00000033	0.00059	0.00000029	0.88	0.0000076	0.0000064
29-Jul-15	8	15	400	380	8.0	188	#N/A	0.13	3.3	0.46	0.038	0.013	0.011	2.9	0.00016	0.00021	0.0048	0.0016	0.00000027	0.00000027	0.00045	0.00000011	0.78	0.0000057	0.0000035
12-Aug-15	9	17	400	390	8.0	186	#N/A	0.12	3.4	0.39	0.039	0.012	0.012	3.0	0.000098	0.00021	0.0049	0.0018	0.00000027	0.00000027	0.00036	0.00000035	0.82	0.0000062	0.0000028
26-Aug-15	10	19	500	465	7.5	184	0.00	0.14	3.9	0.47	0.047	0.015	0.014	3.5	0.00016	0.00026	0.0060	0.0021	0.00000033	0.00000033	0.00042	0.00000028	0.96	0.0000070	0.0000032
9-Sep-15	11	21	500	475	8.0	175	#N/A	0.14	3.8	0.44	0.048	0.017	0.016	4.1	0.00023	0.00031	0.0072	0.0025	0.00000038	0.00000038	0.00048	0.00000016	1.1	0.0000076	0.0000035
23-Sep-15	12	23	500	470	8.0	176	#N/A	0.11	3.8	0.43	0.00	0.016		4.3	0.00022	0.00031	0.0068	0.0025	0.00000038	0.00000038	0.00043	0.00000022	1.2	0.0000070	0.0000030
7-Oct-15	13	25	400	380	8.0	186	#N/A	0.12	3.4	0.31	0.00	0.012		3.6	0.00017	0.00025	0.0052	0.0020	0.00000031	0.00000031	0.00031	0.00000022	1.00	0.0000052	0.0000021
21-Oct-15	14	27	400	390	8.1	173	#N/A	0.055	3.3	0.31	0.00	0.012		3.4	0.00016	0.00026	0.0057	0.0024	0.00000031	0.00000031	0.00037	0.00000018	0.95	0.0000076	0.0000022
4-Nov-15	15	29	400	390	8.1	177	#N/A	0.090	3.4	0.31	0.00	0.013		3.7	0.00017	0.00022	0.0055	0.0025	0.00000031	0.00000031	0.00025	0.00000031	1.0	0.000013	0.00000018
18-Nov-15	16	31	400	380	8.2	176	#N/A	0.040	3.6	0.31	0.00	0.012		3.4	0.00013	0.00021	0.0056	0.0018	0.00000031	0.00000031	0.00020	0.00000013	0.93	0.0000052	0.0000029
2-Dec-15	17	33	400	380	8.1	178	#N/A	0.076	3.2	0.26	0.00	0.011		3.8	0.00014	0.00022	0.0050	0.0025	0.00000031	0.00000031	0.00027	0.00000013	1.0	0.0000074	0.0000022
16-Dec-15	18	35	400	360	8.1	174	#N/A	0.071	2.8	0.29	0.00	0.011		3.6	0.00013	0.00022	0.0053	0.0024	0.00000029	0.00000029	0.00031	0.00000012	0.98	0.0000058	0.0000022
30-Dec-15	19	37	400	385	8.1	170	#N/A	0.065	2.9	0.22	0.00	0.011		3.9	0.00013	0.00021	0.0057	0.0025	0.00000031	0.00000031	0.00027	0.00000013	1.1	0.0000097	0.0000021
13-Jan-16	20	39	400	370	8.1	172	#N/A	0.062	2.9	0.30	0.00	0.0098		3.5	0.000094	0.00021	0.0046	0.0022	0.00000030	0.00000030	0.00030	0.00000013	0.97	0.0000055	0.00000089
27-Jan-16	21	41	400	385	8.0	171	#N/A	0.11	3.0	0.27	0.00	0.012		3.7	0.00058	0.00023	0.0052	0.0026	0.00000031	0.00000031	0.00027	0.00000018	1.0	0.0000080	0.0000019
10-Feb-16	22	43	400	350	8.1	173	#N/A	0.085	2.7	0.28	0.00	0.0093		3.2	0.00012	0.00021	0.0049	0.0023	0.00000028	0.00000028	0.00016	0.00000012	0.87	0.0000056	0.0000022
24-Feb-16	23	45	400	380	8.1	178	#N/A	0.080	2.9	0.17	0.00	0.011		3.9	0.000066	0.00021	0.0052	0.0026	0.00000031	0.00000031	0.00013	0.00000013	1.1	0.0000083	0.0000017
9-Mar-16	24	47	400	380	8.1	172	#N/A	0.077	2.8	0.17	0.00														

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 11 (Supremo Gneiss Oxide Ore)

Date	Cycle	Week	Volume (mL)		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
-	No.	-	Input	Output	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	700	360	0.0030	< 0.007	< 1E-05	0.018	14	0.041	9.2	0.0074	0.0015	0.019	7.7	0.00079	6.1	0.0000080	39	0.25	19	0.00031	0.00030	< 5E-05	0.11	0.00012	0.0020	< 0.002
6-May-15	2	3	400	335	0.0013	< 0.007	< 1E-05	0.0082	7.1	0.013	0.82	0.018	0.00080	0.023	4.9	< 0.001	4.8	0.0000050	26	0.11	18	0.00013	< 1E-05	0.000070	0.084	0.00010	< 0.001	< 0.002
20-May-15	3	5	400	380	0.00079	< 0.007	< 1E-05	0.0062	6.3	0.0014	0.10	0.018	0.00060	0.030	4.5	0.00038	5.2	0.0000050	19	0.098	12	0.00014	0.00016	0.00013	0.070	0.00012	< 0.001	< 0.002
3-Jun-15	4	7	400	275	0.00076	< 0.007	< 1E-05	0.0059	6.2	0.00032	0.040	0.018	0.00040	0.028	4.2	0.00020	4.9	0.0000060	16	0.10	9.4	0.00013	0.000040	0.000080	0.063	0.00012	0.0010	< 0.002
17-Jun-15	5	9	500	465	0.0016	< 0.007	0.00090	0.0046	5.4	0.0015	0.020	0.017	0.00040	0.080	4.2	0.00019	4.5	0.0000080	13	0.090	8.1	0.00014	0.00013	0.00011	0.046	0.000090	0.0040	< 0.002
1-Jul-15	6	11	500	475	0.0013	< 0.007	< 1E-05	0.0044	5.6	0.00051	0.030	0.016	0.00030	0.033	3.7	0.00012	4.5	0.0000060	10	0.093	5.3	0.00014	0.00021	0.000060	0.041	0.00012	< 0.001	< 0.002
15-Jul-15	7	13	500	475	0.00050	< 0.007	< 1E-05	0.0042	6.1	0.0026	0.020	0.014	0.00030	0.028	3.4	0.00011	4.6	0.0000050	8.9	0.095	4.7	0.00014	0.000030	0.00012	0.039	0.00013	0.0010	< 0.002
29-Jul-15	8	15	400	380	0.00049	< 0.007	< 1E-05	0.0043	5.9	0.00011	0.010	0.014	0.00020	0.035	3.6	0.000090	4.3	0.0000030	6.6	0.097	4.2	0.00013	0.000010	< 5E-05	0.040	0.00012	< 0.001	< 0.002
12-Aug-15	9	17	400	390	0.00043	< 0.007	0.000030	0.0036	6.0	0.00012	< 0.01	0.013	0.00020	0.032	3.7	0.000080	4.6	0.000010	5.6	0.098	3.7	0.00013	0.000030	< 5E-05	0.035	0.000090	< 0.001	< 0.002
26-Aug-15	10	19	500	465	0.00045	0.0070	0.000020	0.0034	5.9	0.00017	0.010	0.012	0.00020	0.033	3.7	0.000070	4.3	0.0000070	4.7	0.095	5.1	0.00013	0.000065	0.000050	0.033	0.00011	0.0010	0.0020
9-Sep-15	11	21	500	475	0.00046	< 0.007	< 1E-05	0.0031	5.8	0.00022	0.010	0.011	0.00020	0.033	3.6	0.000060	4.0	0.0000040	3.9	0.091	6.5	0.00012	0.00010	0.000050	0.030	0.00013	< 0.001	< 0.002
23-Sep-15	12	23	500	470	0.00040	0.0070	0.000010	0.0029	6.0	0.00027	0.010	0.010	0.00015	0.029	3.5	0.000065	4.0	0.0000040	3.3	0.095	4.7	0.00012	0.000075	0.000050	0.031	0.00011	0.0010	0.0020
7-Oct-15	13	25	400	380	0.00033	< 0.007	< 1E-05	0.0028	6.1	0.00031	< 0.01	0.0088	0.00010	0.024	3.3	0.000070	3.9	0.0000040	2.7	0.100	2.8	0.00011	0.000050	< 5E-05	0.031	0.000090	< 0.001	< 0.002
21-Oct-15	14	27	400	390	0.00062	< 0.007	< 1E-05	0.0027	5.6	0.00019	< 0.01	0.011	0.00020	0.020	3.3	0.000090	4.0	0.0000020	2.2	0.099	3.1	0.00013	0.000070	0.00012	0.030	0.00010	< 0.001	< 0.002
4-Nov-15	15	29	400	390	0.00054	< 0.007	< 1E-05	0.0022	6.0	0.00030	< 0.01	0.0100	0.00020	0.034	3.4	< 4E-05	3.9	< 2E-06	2.1	0.095	3.1	0.00013	0.000040	< 5E-05	0.029	0.000090	< 0.001	< 0.002
18-Nov-15	16	31	400	380	0.00027	< 0.007	< 1E-05	0.0024	6.3	0.00074	< 0.01	0.0099	< 0.0001	0.031	3.3	0.00013	3.9	< 2E-06	1.8	0.10	2.9	0.000097	0.000040	< 5E-05	0.025	0.000070	< 0.001	< 0.002
2-Dec-15	17	33	400	380	0.00058	< 0.007	< 1E-05	0.0023	7.0	0.0011	< 0.01	0.0096	0.00020	0.034	3.6	0.000080	3.7	< 2E-06	1.8	0.11	3.1	0.00010	0.000050	< 5E-05	0.032	0.000080	< 0.001	< 0.002
16-Dec-15	18	35	400	360	0.00048	< 0.007	< 1E-05	0.0025	6.7	0.0017	< 0.01	0.0097	0.00010	0.036	3.6	0.000080	4.0	0.0000020	1.6	0.11	2.9	0.00012	0.00011	< 5E-05	0.032	0.000070	< 0.001	< 0.002
30-Dec-15	19	37	400	385	0.00034	< 0.007	0.000030	0.0024	6.7	0.0014	0.020	0.0092	0.00010	0.028	3.4	< 4E-05	3.7	0.0000020	1.4	0.11	2.8	0.00011	< 1E-05	0.000070	0.030	0.000090	< 0.001	< 0.002
13-Jan-16	20	39	400	370	0.00047	< 0.007	0.000040	0.0022	6.2	0.0013	< 0.01	0.0083	0.00010	0.032	3.4	0.00020	3.8	0.0000020	1.2	0.098	2.3	0.000071	0.000050	< 5E-05	0.027	0.000070	< 0.001	< 0.002
27-Jan-16	21	41	400	385	0.00031	< 0.007	< 1E-05	0.0021	6.2	0.00078	< 0.01	0.0089	0.00010	0.035	3.3	< 4E-05	3.9	< 2E-06	1.1	0.11	2.5	0.00011	0.000050	< 5E-05	0.030	0.000070	< 0.001	< 0.002
10-Feb-16	22	43	400	350	0.00054	< 0.007	0.000070	0.0020	6.3	0.0020	< 0.01	0.0088	0.00010	0.044	3.4	0.000080	3.4	< 2E-06	1.1	0.11	2.8	0.00010	0.000060	< 5E-05	0.028	0.000090	< 0.001	< 0.002
24-Feb-16	23	45	400	380	0.00017	< 0.007	0.000030	0.0021	6.6	0.00093	< 0.01	0.0087	0.00010	0.036	3.4	< 4E-05	3.8	< 2E-06	0.83	0.11	2.6	0.00011	0.000040	< 5E-05	0.029	0.000040	0.0010	< 0.002
9-Mar-16	24	47	400	380																								

Calculated Loading Rates for Col 11

Date	Cycle	Week	Volume (mL)		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
-	No.	-	Input	Output	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	700	360	0.00021	0.00050	0.00000072	0.0013	0.99	0.0030	0.66	0.00053	0.00011	0.0014	0.56	0.000057	0.44	0.00000058	2.8	0.018	1.4	0.000022	0.000022	0.0000036	0.0076	0.0000086	0.00014	0.00014
6-May-15	2	3	400	335	0.000043	0.00023	0.00000034	0.00028	0.24	0.00044	0.027	0.00060	0.000027	0.00077	0.16	0.000034	0.16	0.00000017	0.87	0.0037	0.61	0.0000044	0.00000034	0.0000023	0.0028	0.0000034	0.000034	0.000067
20-May-15	3	5	400	380	0.000030	0.00027	0.00000038	0.00024	0.24	0.000052	0.0038	0.00067	0.000023	0.0011	0.17	0.000014	0.20	0.00000019	0.73	0.0037	0.44	0.0000051	0.0000061	0.0000049	0.0027	0.0000046	0.000038	0.000076
3-Jun-15	4	7	400	275	0.000021	0.00019	0.00000028	0.00016	0.17	0.0000088	0.0011	0.00048	0.000011	0.00077	0.12	0.0000055	0.14	0.00000017	0.44	0.0028	0.26	0.0000036	0.0000011	0.0000022	0.0017	0.0000033	0.000028	0.000055
17-Jun-15	5	9	500	465	0.000076	0.00033	0.000042	0.00021	0.25	0.000070	0.00093	0.00078	0.000019	0.0037	0.20	0.0000088	0.21	0.00000037	0.59	0.0042	0.38	0.0000064	0.0000060	0.0000051	0.0022	0.0000042	0.00019	0.000093
1-Jul-15	6	11	500	475	0.000059	0.00033	0.00000048	0.00021	0.27	0.000024	0.0014	0.00074	0.000014	0.0016	0.18	0.0000057	0.21	0.00000029	0.48	0.0044	0.25	0.0000066	0.0000100	0.0000029	0.0020	0.0000057	0.000048	0.000095
15-Jul-15	7	13	500	475	0.000024	0.00033	0.00000048	0.00020	0.29	0.00012	0.00095	0.00067	0.000014	0.0013	0.16	0.0000052	0.22	0.00000024	0.42	0.0045	0.22	0.0000066	0.0000014	0.0000057	0.0019	0.0000062	0.000048	0.000095
29-Jul-15	8	15	400	380	0.000019	0.00027	0.00000038	0.00016	0.22	0.0000042	0.00038	0.00052	0.0000076	0.0013	0.14	0.0000034	0.16	0.00000011	0.25	0.0037	0.16	0.0000049	0.00000038	0.0000019	0.0015	0.0000046	0.000038	0.000076
12-Aug-15	9	17	400	390	0.000017	0.00027	0.0000012	0.00014	0.23	0.0000047	0.00039	0.00051	0.0000078	0.0012	0.14	0.0000031	0.18	0.00000039	0.22	0.0038	0.14	0.0000050	0.0000012	0.0000020	0.0014	0.0000035	0.000039	0.000078
26-Aug-15	10	19	500	465	0.000021	0.00033	0.00000093	0.00016	0.27	0.0000079	0.00047	0.00057	0.0000093	0.0015	0.17	0.0000033	0.20	0.00000033	0.22	0.0044	0.24	0.0000059	0.0000030	0.0000023	0.0015	0.0000051	0.000047	0.000093
9-Sep-15	11	21	500	475	0.000025	0.00038	0.00000055	0.00017	0.32	0.000012	0.00055	0.00062	0.000011	0.0018	0.20	0.0000033	0.22	0.00000022	0.21	0.0050	0.35	0.0000067	0.0000055	0.0000027	0.0016	0.0000071	0.000055	0.00011
23-Sep-15	12	23	500	470	0.000021	0.00038	0.00000054	0.00016	0.32	0.000014	0.00054	0.00055	0.0000081	0.0015	0.19	0.0000035	0.21	0.00000022	0.18	0.0052	0.25	0.0000063	0.0000041	0.0000027	0.0017	0.0000059	0.000054	0.00011
7-Oct-15	13	25	400	380	0.000014	0.00031	0.00000044	0.00012	0.27	0.000014	0.00044	0.00039	0.0000044	0.0010	0.15	0.0000031	0.17	0.00000017	0.12	0.0044	0.12	0.0000049	0.0000022	0.0000022	0.0014	0.0000039	0.000044	0.000087
21-Oct-15	14	27	400	390	0.000028	0.00031	0.00000045	0.00012	0.25	0.0000085	0.00045	0.00049	0.0000090	0.00090	0.15	0.0000040	0.18	0.000000090	0.10	0.0044	0.14	0.0000059	0.0000031	0.0000054	0.0013	0.0000045	0.000045	0.000090
4-Nov-15	15	29	400	390	0.000024	0.00031	0.00000045	0.00010	0.27	0.000013	0.00045	0.00045	0.0000090	0.0015	0.15	0.0000018	0.17	0.000000090	0.094	0.0043	0.14	0.0000057	0.0000018	0.0000022	0.0013	0.0000040	0.000045	0.000090
18-Nov-15	16	31	400	380	0.000012	0.00031	0.00000044	0.00010	0.27	0.000032	0.00044	0.00043	0.0000044	0.0014	0.15	0.0000057	0.17	0.000000087	0.080	0.0044	0.13	0.0000042	0.0000017	0.0000022	0.0011	0.0000031	0.000044	0.000087
2-Dec-15	17	33	400	380	0.000025	0.00031	0.00000044	0.00010	0.31	0.000050	0.00044	0.00042	0.0000087	0.0015	0.16	0.0000035	0.16	0.000000087	0.079	0.0046	0.14	0.0000044	0.0000022	0.0000022	0.0014	0.0000035	0.000044	0.000087
16-Dec-15	18	35	400	360	0.000020	0.00029	0.00000041	0.00010	0.28	0.000072	0.00041	0.00040	0.0000041	0.0015	0.15	0.0000033	0.17	0.000000083	0.065	0.0044	0.12	0.0000051	0.0000046	0.0000021	0.0013	0.0000029	0.000041	0.000083
30-Dec-15	19	37	400	385	0.000015	0.00031	0.0000013	0.00011	0.30	0.000060	0.00089	0.00041	0.0000044	0.0012	0.15	0.0000018	0.16	0.000000089	0.062	0.0046	0.12	0.0000050	0.00000044	0.0000031	0.0013	0.0000040	0.000044	0.000089
13-Jan-16	20	39	400	370	0.000020	0.00030	0.0000017	0.000094	0.26	0.000056	0.00043	0.00035	0.0000043	0.0014	0.14	0.0000085	0.16	0.000000085	0.051	0.0042	0.098	0.0000030	0.0000021	0.0000021	0.0012	0.0000030	0.000043	0.000085
27-Jan-16	21	41	400	385	0.000014	0.00031	0.00000044	0.000092	0.28	0.000035	0.00044	0.00039	0.0000044	0.0015	0.15	0.0000018	0.17	0.000000089	0.048	0.0046	0.11	0.0000050	0.0000022	0.0000022	0.0013	0.0000031	0.000044	0.000089
10-Feb-16	22	43	400	350	0.000022	0.00028	0.0000028	0.000081	0.26	0.000080	0.00040	0.00036	0.0000040	0.0018	0.14	0.0000032	0.14	0.000000080	0.045	0.0042	0.11	0.0000041	0.0000024	0.0000020	0.0011	0.0000036	0.000040	0.000080
24-Feb-16	23	45	400	380	0.0000074	0.00031	0.0000013	0.000092	0.29	0.000041	0.00044	0.00038	0.0000044	0.0016	0.15	0.0000017	0.16	0.000000087	0.036	0.0047	0.11	0.0000047	0.0000017	0.0000022	0.0012	0.0000017	0.000044	0.000087
9-Mar-16	24	47	400	380																								

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 12 (Supremo Gneiss Transition Ore)

Date	Cycle	Week	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
-	No.	-	Input	Output	-	umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	750	305	7.8	2557	#N/A	11	145	1561	62	0.26	< 0.3	1450	0.0033	0.013	0.15	0.011	< 7E-06	< 7E-06	0.022	0.0000080	385	0.000040	0.011
6-May-15	2	3	400	365	7.6	1465	#N/A	7.5	75	816	22	0.36	< 0.3	751	0.0021	0.0087	0.14	0.0042	< 7E-06	< 7E-06	0.014	< 3E-06	199	< 3E-05	0.0026
20-May-15	3	5	400	375	7.8	915	#N/A	6.0	69	393	2.0	0.40	< 0.3	405	0.0022	0.0074	0.15	0.0036	< 7E-06	< 7E-06	0.011	0.0000080	109	0.000040	0.0013
3-Jun-15	4	7	400	260	7.8	704	#N/A	5.9	77	274	< 1	0.46	< 0.3	323	0.0051	0.0082	0.17	0.0049	< 7E-06	< 7E-06	0.015	0.0000030	88	0.000040	0.00088
17-Jun-15	5	9	500	485	7.8	555	#N/A	7.0	81	206	< 1	0.45	< 0.3	245	0.0051	0.0086	0.20	0.0036	< 7E-06	< 7E-06	0.012	0.0000080	67	0.000050	0.00062
1-Jul-15	6	11	500	485	7.9	395	#N/A	5.7	81	136	< 1	0.51	< 0.3	184	0.0047	0.0090	0.22	0.0039	< 7E-06	< 7E-06	0.010	0.000013	48	< 3E-05	0.00041
15-Jul-15	7	13	500	490	7.9	339	#N/A	5.4	87	103	< 1	0.54	< 0.3	162	0.0047	0.0091	0.22	0.0041	< 7E-06	< 7E-06	0.014	0.000010	42	0.000030	0.00039
29-Jul-15	8	15	400	390	7.9	347	#N/A	3.5	88	88	< 1	0.57	< 0.3	152	0.0038	0.0093	0.21	0.0042	< 7E-06	< 7E-06	0.013	0.0000070	40	0.000050	0.00025
12-Aug-15	9	17	400	400	7.9	334	#N/A	4.1	90	77	< 1	0.51	< 0.3	152	0.0041	0.0093	0.22	0.0043	< 7E-06	< 7E-06	0.011	< 3E-06	40	< 3E-05	0.00018
26-Aug-15	10	19	500	465	7.6	320	#N/A	3.7	89	72	1.0	0.53	0.30	147	0.0060	0.011	0.23	0.0047	0.0000070	0.0000070	0.011	0.0000040	39	0.000045	0.00016
9-Sep-15	11	21	500	470	7.9	307	#N/A	3.3	89	67	< 1	0.55	< 0.3	141	0.0079	0.013	0.23	0.0050	< 7E-06	< 7E-06	0.011	0.0000050	38	0.000060	0.00014
23-Sep-15	12	23	500	480	8.0	285	#N/A	3.3	89	57	1.0	0.52	0.30	135	0.0058	0.015	0.23	0.0047	0.0000070	0.0000070	0.0096	0.0000050	36	0.000055	0.00010
7-Oct-15	13	25	400	390	8.0	298	#N/A	3.5	96	54	-	0.49	-	128	0.0037	0.017	0.23	0.0043	< 7E-06	< 7E-06	0.0081	0.0000050	34	0.000050	0.000059
21-Oct-15	14	27	400	390	8.1	288	#N/A	1.6	92	44	-	0.49	-	128	0.0058	0.020	0.25	0.0049	< 7E-06	< 7E-06	0.0087	< 3E-06	35	< 3E-05	0.000075
4-Nov-15	15	29	400	400	8.1	287	#N/A	3.0	97	50	-	0.47	-	138	0.0085	0.022	0.25	0.0050	< 7E-06	< 7E-06	0.0063	< 3E-06	38	0.00011	0.000027
18-Nov-15	16	31	400	380	8.1	288	#N/A	1.1	103	50	-	0.47	-	131	0.0031	0.026	0.26	0.0036	< 7E-06	< 7E-06	0.0053	0.0000060	35	0.000030	0.000044
2-Dec-15	17	33	400	390	8.1	282	#N/A	2.0	91	46	-	0.46	-	143	0.0041	0.031	0.28	0.0054	< 7E-06	< 7E-06	0.0070	0.0000030	38	0.000030	0.00017
16-Dec-15	18	35	400	360	8.1	278	#N/A	2.0	85	50	-	0.44	-	138	0.0035	0.035	0.29	0.0054	< 7E-06	< 7E-06	0.0081	0.0000070	37	0.000090	0.00014
30-Dec-15	19	37	400	390	8.1	269	#N/A	1.8	83	38	-	0.46	-	137	0.0039	0.035	0.29	0.0052	< 7E-06	< 7E-06	0.0072	< 3E-06	37	0.000050	0.00011
13-Jan-16	20	39	400	365	8.1	268	#N/A	1.6	86	47	-	0.41	-	131	0.0034	0.039	0.26	0.0047	< 7E-06	< 7E-06	0.0080	< 3E-06	35	< 3E-05	0.000095
27-Jan-16	21	41	400	385	8.0	266	#N/A	3.1	85	46	-	0.44	-	126	0.0067	0.042	0.28	0.0054	< 7E-06	< 7E-06	0.0060	0.0000040	34	< 3E-05	0.000096
10-Feb-16	22	43	400	360	8.1	258	#N/A	2.6	88	42	-	0.40	-	127	0.0038	0.044	0.31	0.0054	< 7E-06	< 7E-06	0.0050	0.0000030	34	< 3E-05	0.000080
24-Feb-16	23	45	400	395	8.1	266	#N/A	2.3	86	42	-	0.36	-	136	0.0017	0.045	0.30	0.0053	< 7E-06	< 7E-06	0.0040	0.0000040	36	< 3E-05	0.00012
9-Mar-16	24	47	400	385	8.1	258	#N/A	2.3	85	34															

Calculated Loading Rates for Col 12

Date	Cycle	Week	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
-	No.	-	Input	Output	-	umhos/cm	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	750	305	7.8	2557	#N/A	0.78	10	110	4.4	0.018	0.021	102	0.00023	0.00090	0.011	0.00075	0.00000049	0.00000049	0.0015	0.00000056	27	0.0000028	0.00076
6-May-15	2	3	400	365	7.6	1465	#N/A	0.32	3.1	34	0.93	0.015	0.013	32	0.000089	0.00037	0.0060	0.00018	0.00000030	0.00000030	0.00059	0.00000013	8.4	0.0000013	0.00011
20-May-15	3	5	400	375	7.8	915	#N/A	0.26	3.0	17	0.087	0.017	0.013	18	0.000095	0.00032	0.0063	0.00016	0.00000030	0.00000030	0.00047	0.00000035	4.7	0.0000017	0.000056
3-Jun-15	4	7	400	260	7.8	704	#N/A	0.18	2.3	8.2	0.030	0.014	0.0090	9.7	0.00015	0.00025	0.0051	0.00015	0.00000021	0.00000021	0.00045	0.000000090	2.6	0.0000012	0.000026
17-Jun-15	5	9	500	485	7.8	555	#N/A	0.39	4.5	12	0.056	0.025	0.017	14	0.00029	0.00048	0.011	0.00020	0.00000039	0.00000039	0.00068	0.00000045	3.8	0.0000028	0.000035
1-Jul-15	6	11	500	485	7.9	395	#N/A	0.32	4.5	7.6	0.056	0.029	0.017	10	0.00026	0.00050	0.012	0.00022	0.00000039	0.00000039	0.00058	0.00000073	2.7	0.0000017	0.000023
15-Jul-15	7	13	500	490	7.9	339	#N/A	0.31	4.9	5.8	0.057	0.031	0.017	9.2	0.00027	0.00051	0.013	0.00023	0.00000040	0.00000040	0.00076	0.00000057	2.4	0.0000017	0.000022
29-Jul-15	8	15	400	390	7.9	347	#N/A	0.16	3.9	4.0	0.045	0.026	0.014	6.8	0.00017	0.00042	0.0092	0.00019	0.00000032	0.00000032	0.00057	0.00000032	1.8	0.0000023	0.000011
12-Aug-15	9	17	400	400	7.9	334	#N/A	0.19	4.1	3.6	0.046	0.024	0.014	7.0	0.00019	0.00043	0.010	0.00020	0.00000032	0.00000032	0.00048	0.00000014	1.9	0.0000014	0.0000084
26-Aug-15	10	19	500	465	7.6	320	0.00	0.20	4.8	3.9	0.054	0.028	0.016	7.9	0.00032	0.00059	0.012	0.00025	0.00000038	0.00000038	0.00058	0.00000021	2.1	0.0000024	0.0000087
9-Sep-15	11	21	500	470	7.9	307	#N/A	0.18	4.8	3.6	0.054	0.030	0.016	7.6	0.00043	0.00068	0.012	0.00027	0.00000038	0.00000038	0.00059	0.00000027	2.0	0.0000032	0.0000078
23-Sep-15	12	23	500	480	8.0	285	#N/A	0.18	4.9	3.1	0.055	0.029		7.4	0.00032	0.00082	0.013	0.00026	0.00000039	0.00000039	0.00053	0.00000028	2.0	0.0000030	0.0000056
7-Oct-15	13	25	400	390	8.0	298	#N/A	0.16	4.3	2.4	0.00	0.022		5.7	0.00017	0.00078	0.010	0.00019	0.00000031	0.00000031	0.00036	0.00000022	1.5	0.0000022	0.0000026
21-Oct-15	14	27	400	390	8.1	288	#N/A	0.070	4.1	2.0	0.00	0.022		5.7	0.00026	0.00089	0.011	0.00022	0.00000031	0.00000031	0.00039	0.00000013	1.6	0.0000013	0.0000034
4-Nov-15	15	29	400	400	8.1	287	#N/A	0.14	4.5	2.3	0.00	0.022		6.3	0.00039	0.0010	0.011	0.00023	0.00000032	0.00000032	0.00029	0.00000014	1.7	0.0000051	0.0000012
18-Nov-15	16	31	400	380	8.1	288	#N/A	0.050	4.5	2.2	0.00	0.021		5.7	0.00014	0.0011	0.011	0.00016	0.00000031	0.00000031	0.00023	0.00000026	1.5	0.0000013	0.0000019
2-Dec-15	17	33	400	390	8.1	282	#N/A	0.091	4.1	2.1	0.00	0.021		6.4	0.00018	0.0014	0.013	0.00024	0.00000031	0.00000031	0.00031	0.00000013	1.7	0.0000013	0.0000075
16-Dec-15	18	35	400	360	8.1	278	#N/A	0.083	3.5	2.1	0.00	0.018		5.7	0.00014	0.0015	0.012	0.00022	0.00000029	0.00000029	0.00034	0.00000029	1.5	0.0000037	0.0000058
30-Dec-15	19	37	400	390	8.1	269	#N/A	0.082	3.7	1.7	0.00	0.021		6.1	0.00017	0.0016	0.013	0.00023	0.00000031	0.00000031	0.00032	0.00000013	1.6	0.0000022	0.0000047
13-Jan-16	20	39	400	365	8.1	268	#N/A	0.069	3.6	2.0	0.00	0.017		5.5	0.00014	0.0016	0.011	0.00020	0.00000029	0.00000029	0.00034	0.00000013	1.5	0.0000013	0.0000040
27-Jan-16	21	41	400	385	8.0	266	#N/A	0.14	3.8	2.0	0.00	0.019		5.6	0.00030	0.0018	0.012	0.00024	0.00000031	0.00000031	0.00027	0.00000018	1.5	0.0000013	0.0000042
10-Feb-16	22	43	400	360	8.1	258	#N/A	0.11	3.7	1.7	0.00	0.017		5.3	0.00016	0.0018	0.013	0.00022	0.00000029	0.00000029	0.00021	0.00000012	1.4	0.0000012	0.0000033
24-Feb-16	23	45	400	395	8.1	266	#N/A	0.11	3.9	1.9	0.00	0.016		6.2	0.000077	0.0020	0.014	0.00024	0.00000032	0.00000032	0.00018	0.00000018	1.6	0.0000014	0.0000053
9-Mar-16	24	47	400	385	8.1	258	#N/A	0.10	3.8	1.5	0.00														

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 12 (Supremo Gneiss Transition Ore)

Date	**Cycle**	**Week**	**Volume** (mL)		**Cu**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
-	No.	-	Input	Output	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	750	305	0.0046	*< 0.007*	*< 1E-05*	0.025	119	0.54	2.2	0.011	0.014	0.030	20	0.011	5.5	0.000089	61	1.8	475	0.00058	0.000080	0.00010	0.64	0.00011	0.0020	*< 0.002*
6-May-15	2	3	400	365	0.0016	*< 0.007*	*< 1E-05*	0.013	62	0.29	0.13	0.016	0.0038	*< 0.003*	13	0.0060	4.0	0.0000040	28	0.89	284	0.00029	*< 1E-05*	0.000070	0.24	0.000070	0.0020	*< 0.002*
20-May-15	3	5	400	375	0.00069	*< 0.007*	0.000050	0.0084	32	0.16	0.010	0.019	0.0018	*< 0.003*	9.7	0.0025	4.1	0.0000040	14	0.49	127	0.00024	0.00013	0.00011	0.15	0.000060	*< 0.001*	*< 0.002*
3-Jun-15	4	7	400	260	0.00072	*< 0.007*	*< 1E-05*	0.0070	25	0.11	*< 0.01*	0.021	0.0014	*< 0.003*	8.5	0.0016	4.1	0.0000050	11	0.41	97	0.00020	0.000040	0.000050	0.12	0.00010	0.0010	*< 0.002*
17-Jun-15	5	9	500	485	0.00072	*< 0.007*	*< 1E-05*	0.0055	19	0.083	*< 0.01*	0.019	0.0011	0.0060	7.1	0.0012	4.0	0.0000040	7.1	0.29	71	0.00019	0.000070	0.000070	0.081	0.000080	0.0010	*< 0.002*
1-Jul-15	6	11	500	485	0.00039	*< 0.007*	*< 1E-05*	0.0048	15	0.057	0.010	0.022	0.00090	*< 0.003*	6.2	0.00077	4.1	0.0000030	4.9	0.23	42	0.00016	0.000060	*< 5E-05*	0.056	0.000090	*< 0.001*	*< 0.002*
15-Jul-15	7	13	500	490	0.00038	*< 0.007*	*< 1E-05*	0.0044	14	0.059	*< 0.01*	0.020	0.00080	0.0040	5.5	0.00054	4.2	0.0000030	3.7	0.21	33	0.00016	0.000030	0.000090	0.047	0.00010	*< 0.001*	*< 0.002*
29-Jul-15	8	15	400	390	0.00032	*< 0.007*	*< 1E-05*	0.0045	13	0.039	*< 0.01*	0.020	0.00060	0.0050	5.5	0.00044	3.7	*< 2E-06*	2.6	0.20	29	0.00014	*< 1E-05*	*< 5E-05*	0.043	0.000070	*< 0.001*	*< 0.002*
12-Aug-15	9	17	400	400	0.00043	*< 0.007*	*< 1E-05*	0.0038	12	0.024	*< 0.01*	0.019	0.00050	0.0040	5.7	0.00040	4.1	0.0000050	2.2	0.19	25	0.00015	0.000060	0.000050	0.038	0.00010	*< 0.001*	*< 0.002*
26-Aug-15	10	19	500	465	0.00042	0.0070	0.000010	0.0036	12	0.023	0.010	0.018	0.00050	0.0040	5.6	0.00036	4.0	0.0000035	1.9	0.18	25	0.00015	0.000055	0.000050	0.033	0.000090	0.0010	0.0020
9-Sep-15	11	21	500	470	0.00040	*< 0.007*	*< 1E-05*	0.0035	11	0.023	*< 0.01*	0.017	0.00050	0.0040	5.4	0.00031	3.8	0.0000020	1.5	0.17	25	0.00014	0.000050	*< 5E-05*	0.029	0.000080	*< 0.001*	*< 0.002*
23-Sep-15	12	23	500	480	0.00044	0.0070	0.000015	0.0032	11	0.015	0.010	0.015	0.00055	0.0035	5.1	0.00028	3.7	0.0000020	1.3	0.16	22	0.00013	0.000080	0.000050	0.026	0.000065	0.0010	0.0020
7-Oct-15	13	25	400	390	0.00047	*< 0.007*	0.000020	0.0029	10	0.0081	*< 0.01*	0.013	0.00060	0.0030	4.8	0.00024	3.5	0.0000020	1.1	0.15	19	0.00011	0.00011	*< 5E-05*	0.024	0.000050	0.0010	*< 0.002*
21-Oct-15	14	27	400	390	0.00049	*< 0.007*	*< 1E-05*	0.0027	9.9	0.015	*< 0.01*	0.016	0.00050	*< 0.003*	4.7	0.00026	3.8	*< 2E-06*	0.98	0.16	19	0.00015	0.000060	0.000060	0.026	0.000080	*< 0.001*	*< 0.002*
4-Nov-15	15	29	400	400	0.00060	*< 0.007*	0.000010	0.0023	11	0.0094	*< 0.01*	0.016	0.00040	0.0050	5.0	0.00024	3.8	*< 2E-06*	0.88	0.15	19	0.00015	0.00028	0.00011	0.026	0.00010	0.0010	*< 0.002*
18-Nov-15	16	31	400	380	0.00017	*< 0.007*	*< 1E-05*	0.0026	11	0.0040	*< 0.01*	0.014	0.00010	*< 0.003*	4.8	0.00032	3.8	*< 2E-06*	0.76	0.15	18	0.00010	0.000020	*< 5E-05*	0.019	0.000080	*< 0.001*	*< 0.002*
2-Dec-15	17	33	400	390	0.00045	*< 0.007*	*< 1E-05*	0.0025	12	0.026	*< 0.01*	0.016	0.00040	0.011	5.3	0.00038	3.9	*< 2E-06*	0.80	0.17	19	0.00013	0.000050	*< 5E-05*	0.026	0.000090	*< 0.001*	*< 0.002*
16-Dec-15	18	35	400	360	0.00053	*< 0.007*	*< 1E-05*	0.0026	11	0.025	*< 0.01*	0.014	0.00040	0.012	5.0	0.00028	4.1	*< 2E-06*	0.69	0.17	18	0.00012	0.00014	*< 5E-05*	0.026	0.000060	*< 0.001*	*< 0.002*
30-Dec-15	19	37	400	390	0.00051	*< 0.007*	*< 1E-05*	0.0026	11	0.021	0.010	0.014	0.00030	0.0030	4.8	0.00024	3.8	*< 2E-06*	0.66	0.16	16	0.00013	*< 1E-05*	0.00010	0.024	0.000080	0.0010	*< 0.002*
13-Jan-16	20	39	400	365	0.00042	*< 0.007*	0.000020	0.0024	11	0.020	*< 0.01*	0.012	0.00030	0.0030	5.0	0.00045	4.0	0.0000020	0.57	0.15	16	0.000084	0.000080	*< 5E-05*	0.021	0.000050	0.0020	*< 0.002*
27-Jan-16	21	41	400	385	0.00044	*< 0.007*	*< 1E-05*	0.0021	10	0.017	*< 0.01*	0.012	0.00030	0.0080	4.7	0.00019	4.0	*< 2E-06*	0.50	0.15	16	0.00014	0.000050	*< 5E-05*	0.022	0.000070	*< 0.001*	*< 0.002*
10-Feb-16	22	43	400	360	0.00024	*< 0.007*	0.000070	0.0021	10	0.013	*< 0.01*	0.012	0.00030	0.0060	4.6	0.00026	3.8	*< 2E-06*	0.50	0.16	15	0.00013	0.000040	0.000080	0.020	0.000070	*< 0.001*	*< 0.002*
24-Feb-16	23	45	400	395	0.00022	*< 0.007*	0.000010	0.0023	11	0.020	0.010	0.012	0.00030	0.013	4.8	0.00025	3.9	*< 2E-06*	0.40	0.16	14	0.00012	0.000020	*< 5E-05*	0.022	0.000070	*< 0.001*	*< 0.002*
9-Mar-16	24	47	400	385																								

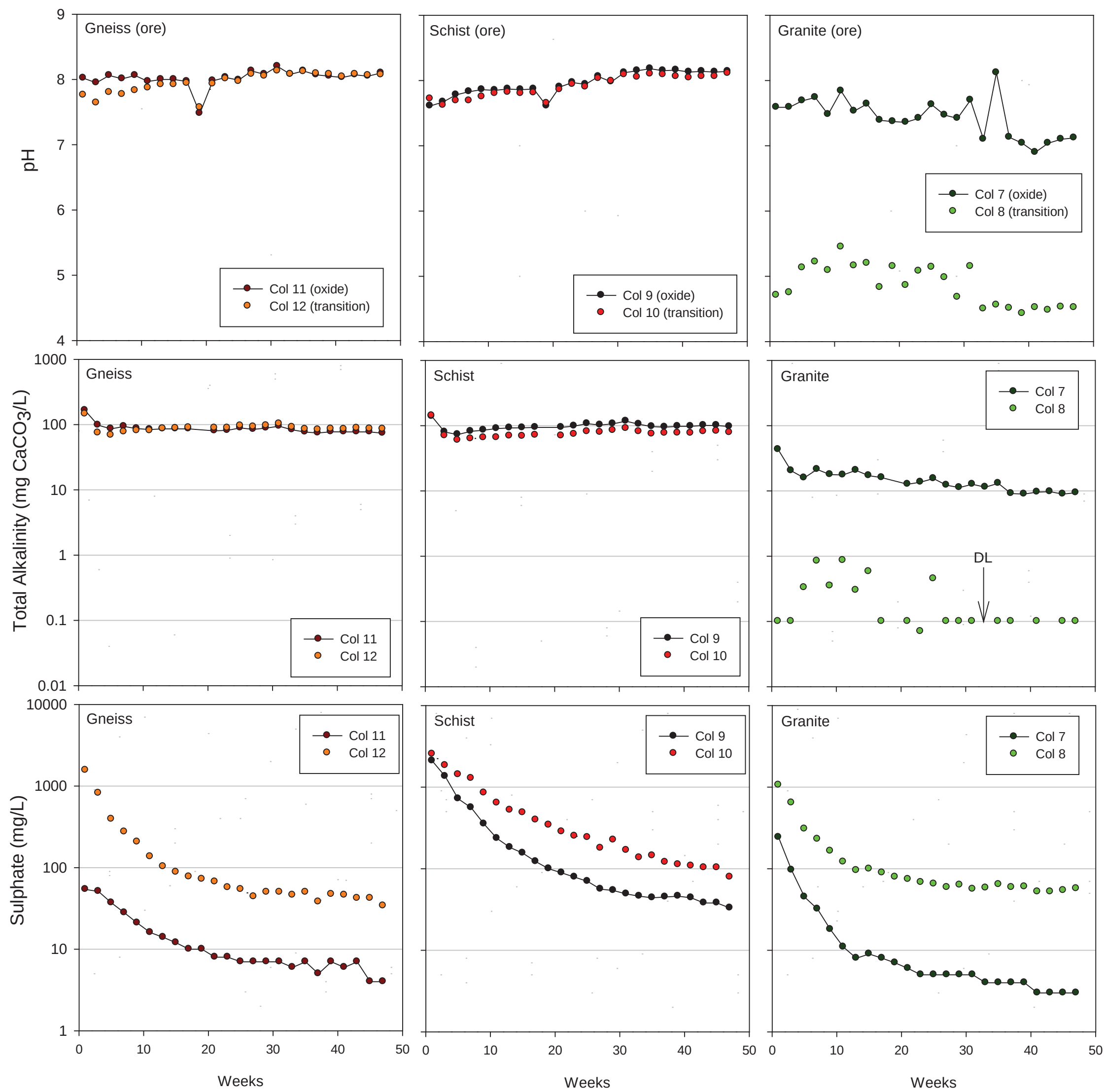
Calculated Loading Rates for Col 12

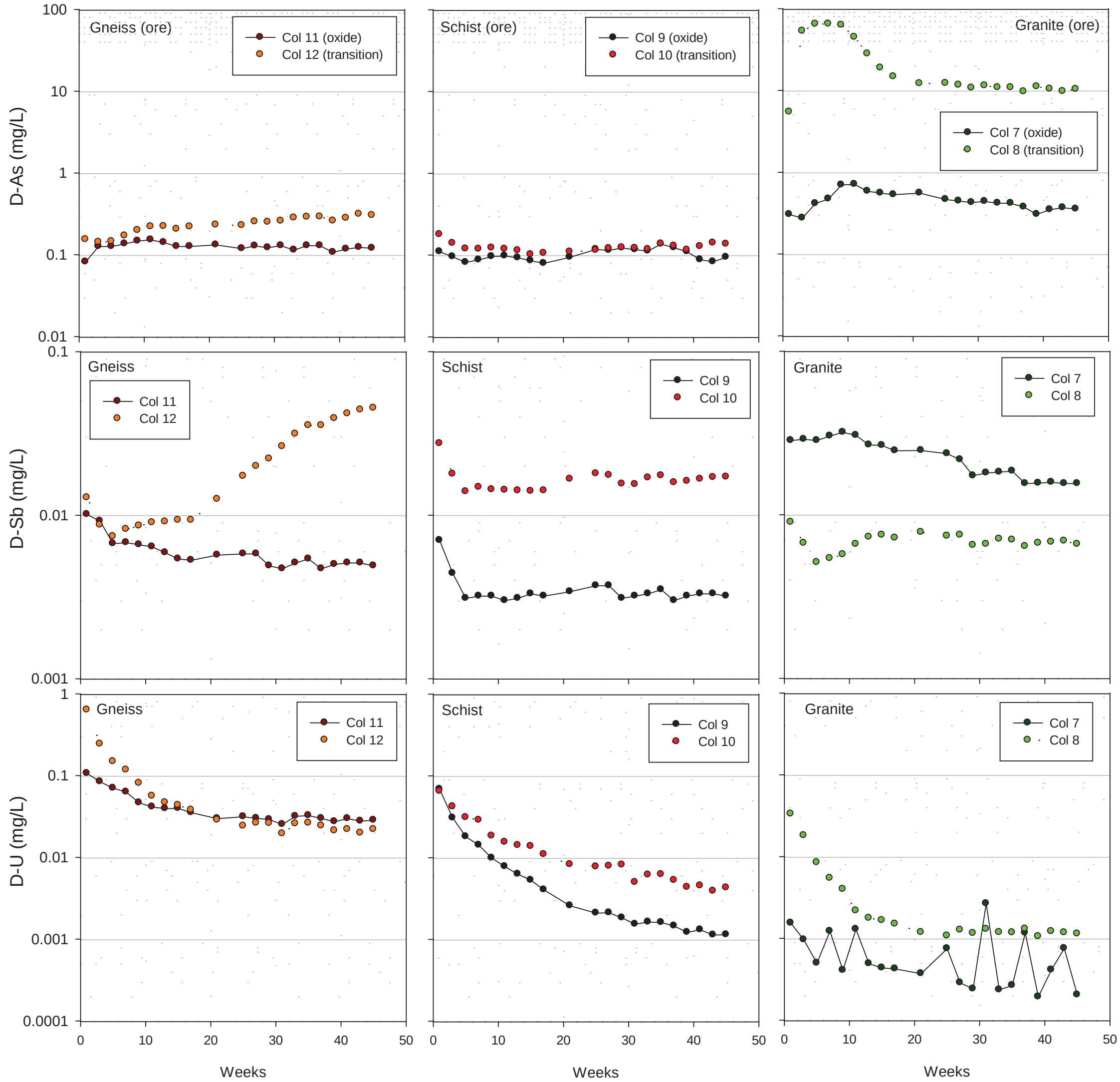
Date	**Cycle**	**Week**	**Volume** (mL)		**Cu**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
-	No.	-	Input	Output	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	750	305	0.00033	0.00049	0.00000070	0.0018	8.4	0.038	0.16	0.00075	0.0010	0.0021	1.4	0.00078	0.39	0.0000063	4.3	0.13	33	0.000041	0.0000056	0.0000070	0.045	0.0000077	0.00014	0.00014
6-May-15	2	3	400	365	0.000067	0.00030	0.00000042	0.00053	2.6	0.012	0.0055	0.00068	0.00016	0.00013	0.56	0.00025	0.17	0.00000017	1.2	0.038	12	0.000012	0.00000042	0.0000030	0.010	0.0000030	0.000084	0.000084
20-May-15	3	5	400	375	0.000030	0.00030	0.0000022	0.00036	1.4	0.0068	0.00043	0.00081	0.000078	0.00013	0.42	0.00011	0.18	0.00000017	0.62	0.021	5.5	0.000010	0.0000056	0.0000048	0.0064	0.0000026	0.000043	0.000087
3-Jun-15	4	7	400	260	0.000022	0.00021	0.00000030	0.00021	0.76	0.0033	0.00030	0.00062	0.000042	0.000090	0.26	0.000049	0.12	0.00000015	0.32	0.012	2.9	0.0000061	0.0000012	0.0000015	0.0035	0.0000030	0.000030	0.000060
17-Jun-15	5	9	500	485	0.000040	0.00039	0.00000056	0.00031	1.1	0.0047	0.00056	0.0011	0.000062	0.00034	0.40	0.000067	0.23	0.00000022	0.40	0.016	4.0	0.000011	0.0000039	0.0000039	0.0045	0.0000045	0.000056	0.00011
1-Jul-15	6	11	500	485	0.000022	0.00039	0.00000056	0.00027	0.86	0.0032	0.00056	0.0012	0.000050	0.00017	0.35	0.000043	0.23	0.00000017	0.28	0.013	2.3	0.0000090	0.0000034	0.0000028	0.0031	0.0000050	0.000056	0.00011
15-Jul-15	7	13	500	490	0.000022	0.00040	0.00000057	0.00025	0.79	0.0034	0.00057	0.0011	0.000045	0.00023	0.31	0.000031	0.24	0.00000017	0.21	0.012	1.9	0.0000090	0.0000017	0.0000051	0.0026	0.0000057	0.000057	0.00011
29-Jul-15	8	15	400	390	0.000014	0.00032	0.00000045	0.00020	0.56	0.0017	0.00045	0.00088	0.000027	0.00023	0.25	0.000020	0.16	0.000000090	0.12	0.0091	1.3	0.0000063	0.00000045	0.0000023	0.0020	0.0000032	0.000045	0.000090
12-Aug-15	9	17	400	400	0.000020	0.00032	0.00000046	0.00017	0.57	0.0011	0.00046	0.00086	0.000023	0.00018	0.26	0.000018	0.19	0.00000023	0.10	0.0085	1.2	0.0000068	0.0000028	0.0000023	0.0017	0.0000046	0.000046	0.000092
26-Aug-15	10	19	500	465	0.000022	0.00038	0.00000054	0.00019	0.64	0.0012	0.00054	0.00096	0.000027	0.00021	0.30	0.000019	0.21	0.00000019	0.100	0.0096	1.4	0.0000078	0.0000030	0.0000027	0.0018	0.0000048	0.000054	0.00011
9-Sep-15	11	21	500	470	0.000022	0.00038	0.00000054	0.00019	0.61	0.0012	0.00054	0.00092	0.000027	0.00022	0.29	0.000017	0.21	0.00000011	0.083	0.0092	1.4	0.0000078	0.0000027	0.0000027	0.0015	0.0000043	0.000054	0.00011
23-Sep-15	12	23	500	480	0.000024	0.00039	0.00000083	0.00017	0.60	0.00085	0.00055	0.00083	0.000030	0.00019	0.28	0.000015	0.20	0.00000011	0.072	0.0090	1.2	0.0000070	0.0000044	0.0000028	0.0015	0.0000036	0.000055	0.00011
7-Oct-15	13	25	400	390	0.000021	0.00031	0.00000090	0.00013	0.47	0.00036	0.00045	0.00059	0.000027	0.00013	0.22	0.000011	0.16	0.000000090	0.048	0.0069	0.83	0.0000048	0.0000049	0.0000022	0.0011	0.0000022	0.000045	0.000090
21-Oct-15	14	27	400	390	0.000022	0.00031	0.00000045	0.00012	0.44	0.00069	0.00045	0.00073	0.000022	0.00013	0.21	0.000012	0.17	0.000000090	0.044	0.0071	0.84	0.0000068	0.0000027	0.0000027	0.0012	0.0000036	0.000045	0.000090
4-Nov-15	15	29	400	400	0.000028	0.00032	0.00000046	0.00011	0.50	0.00043	0.00046	0.00072	0.000018	0.00023	0.23	0.000011	0.17	0.000000092	0.040	0.0070	0.88	0.0000070	0.000013	0.0000051	0.0012	0.0000046	0.000046	0.000092
18-Nov-15	16	31	400	380	0.0000074	0.00031	0.00000044	0.00011	0.47	0.00018	0.00044	0.00061	0.0000044	0.00013	0.21	0.000014	0.17	0.000000087	0.033	0.0066	0.78	0.0000045	0.00000087	0.0000022	0.00085	0.0000035	0.000044	0.000087
2-Dec-15	17	33	400	390	0.000020	0.00031	0.00000045	0.00011	0.53	0.0012	0.00045	0.00071	0.000018	0.00049	0.24	0.000017	0.18	0.000000090	0.036	0.0074	0.85	0.0000059	0.0000022	0.0000022	0.0012	0.0000040	0.000045	0.000090
16-Dec-15	18	35	400	360	0.000022	0.00029	0.00000041	0.00011	0.45	0.0010	0.00041	0.00059	0.000017	0.00050	0.21	0.000012	0.17	0.000000083	0.029	0.0069	0.73	0.0000048	0.0000058	0.0000021	0.0011	0.0000025	0.000041	0.000083
30-Dec-15	19	37	400	390	0.000023	0.00031	0.00000045	0.00012	0.50	0.00095	0.00045	0.00064	0.000013	0.00013	0.21	0.000011	0.17	0.000000090	0.030	0.0074	0.70	0.0000058	0.00000045	0.0000045	0.0011	0.0000036	0.000045	0.000090
13-Jan-16	20	39	400	365	0.000018	0.00029	0.00000084	0.000099	0.45	0.00085	0.00042	0.00052	0.000013	0.00013	0.21	0.000019	0.17	0.000000084	0.024	0.0062	0.65	0.0000035	0.0000034	0.0000021	0.00089	0.0000021	0.000084	0.000084
27-Jan-16	21	41	400	385	0.000019	0.00031	0.00000044	0.000095	0.45	0.00077	0.00044	0.00054	0.000013	0.00035	0.21	0.0000084	0.18	0.000000089	0.022	0.0068	0.69	0.0000062	0.0000022	0.0000022	0.00097	0.0000031	0.000044	0.000089
10-Feb-16	22	43	400	360	0.0000099	0.00029	0.0000029	0.000087	0.42	0.00054	0.00041	0.00051	0.000012	0.00025	0.19	0.000011	0.16	0.000000083	0.021	0.0065	0.63	0.0000055	0.0000017	0.0000033	0.00082	0.0000029	0.000041	0.000083
24-Feb-16	23	45	400	395	0.0000100	0.00032	0.00000045	0.00010	0.49	0.00090	0.00045	0.00056	0.000014	0.00059	0.22	0.000011	0.18	0.000000091	0.018	0.0070	0.65	0.0000056	0.00000091	0.0000023	0.00099	0.0000032	0.000045	0.000091
9-Mar-16	24	47	400	385																								

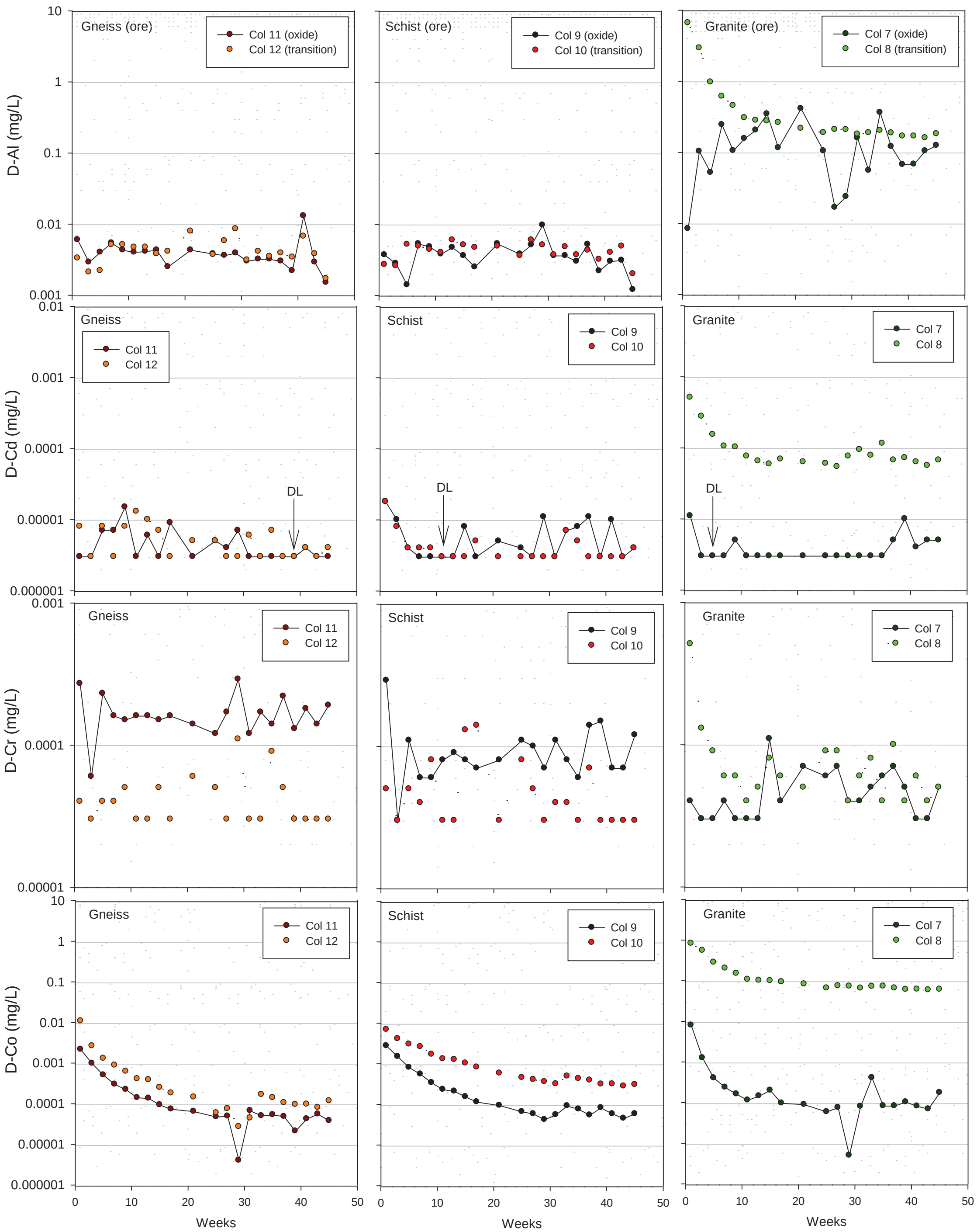
Notes:
Values in grey italics are below the analytical detection limit

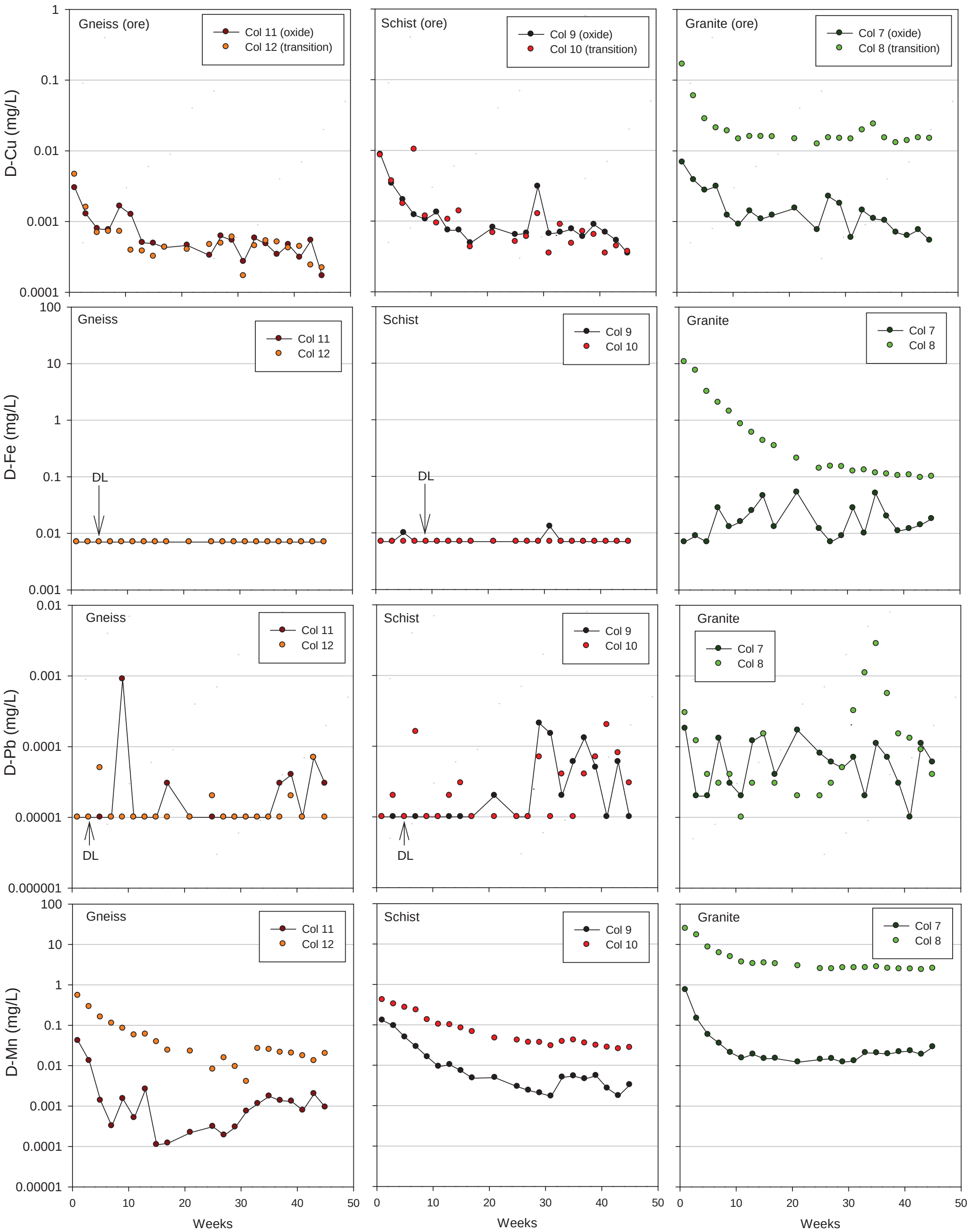
Appendix D.2-4:
Time Series Profiles for Ore Kinetic Tests Leachate Concentrations and Loading Rates

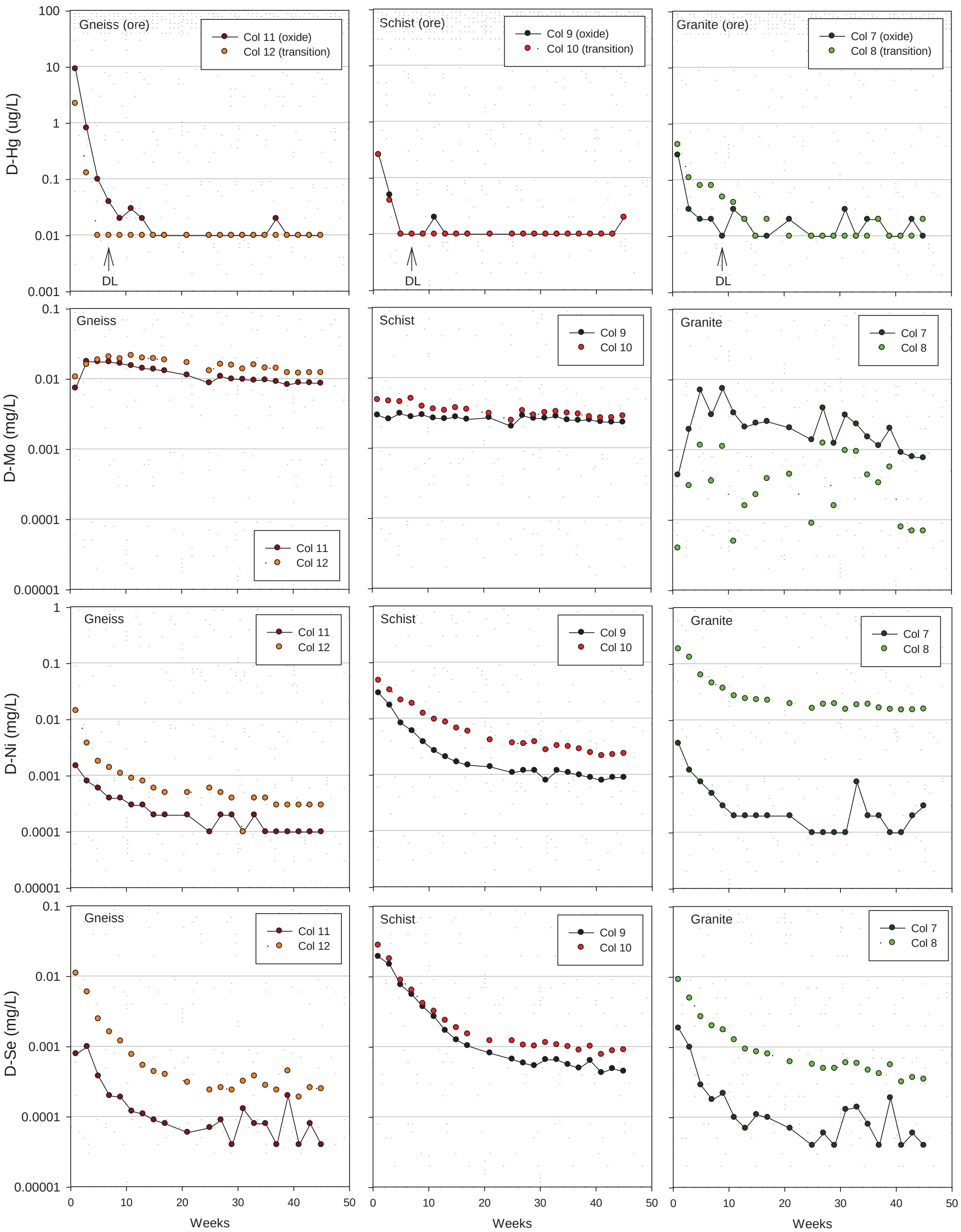
Leachate Concentrations for Ore Unsaturated Columns

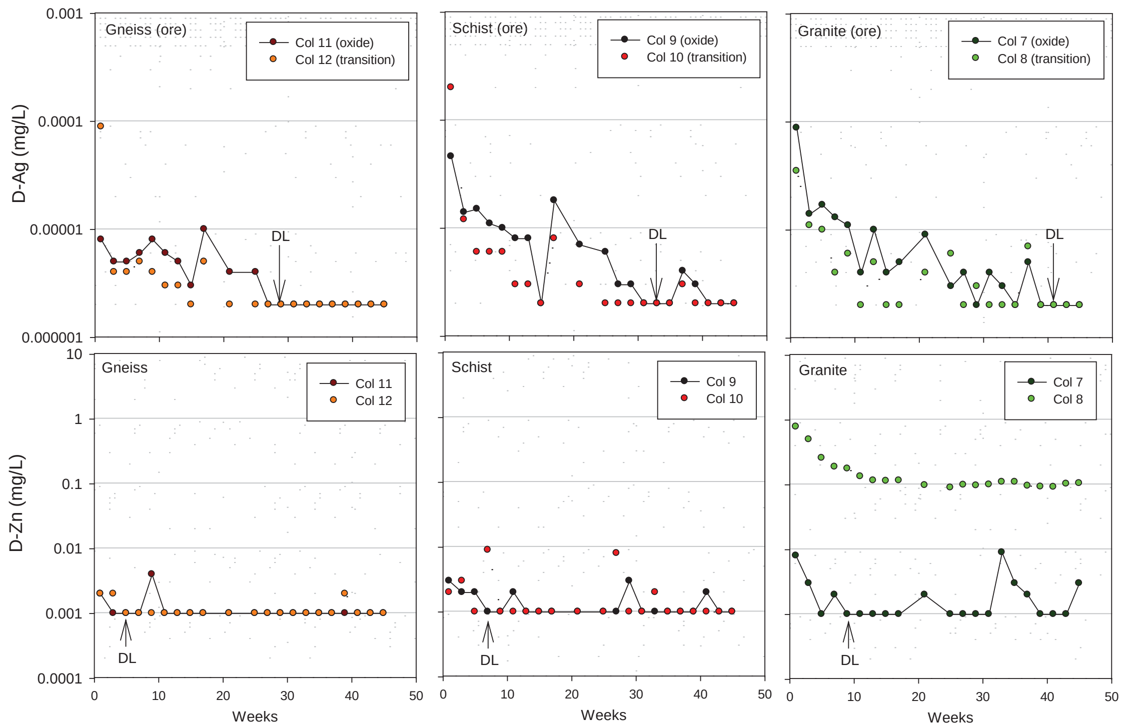



Gneiss (ore)
Col 11 (oxide)
Col 12 (transition)
Schist (ore)
Col 9 (oxide)
Col 10 (transition)
Granite (ore)
Col 7 (oxide)
Col 8 (transition)
D-As (mg/L)
D-Sb (mg/L)
D-U (mg/L)
Gneiss
Schist
Granite
Weeks

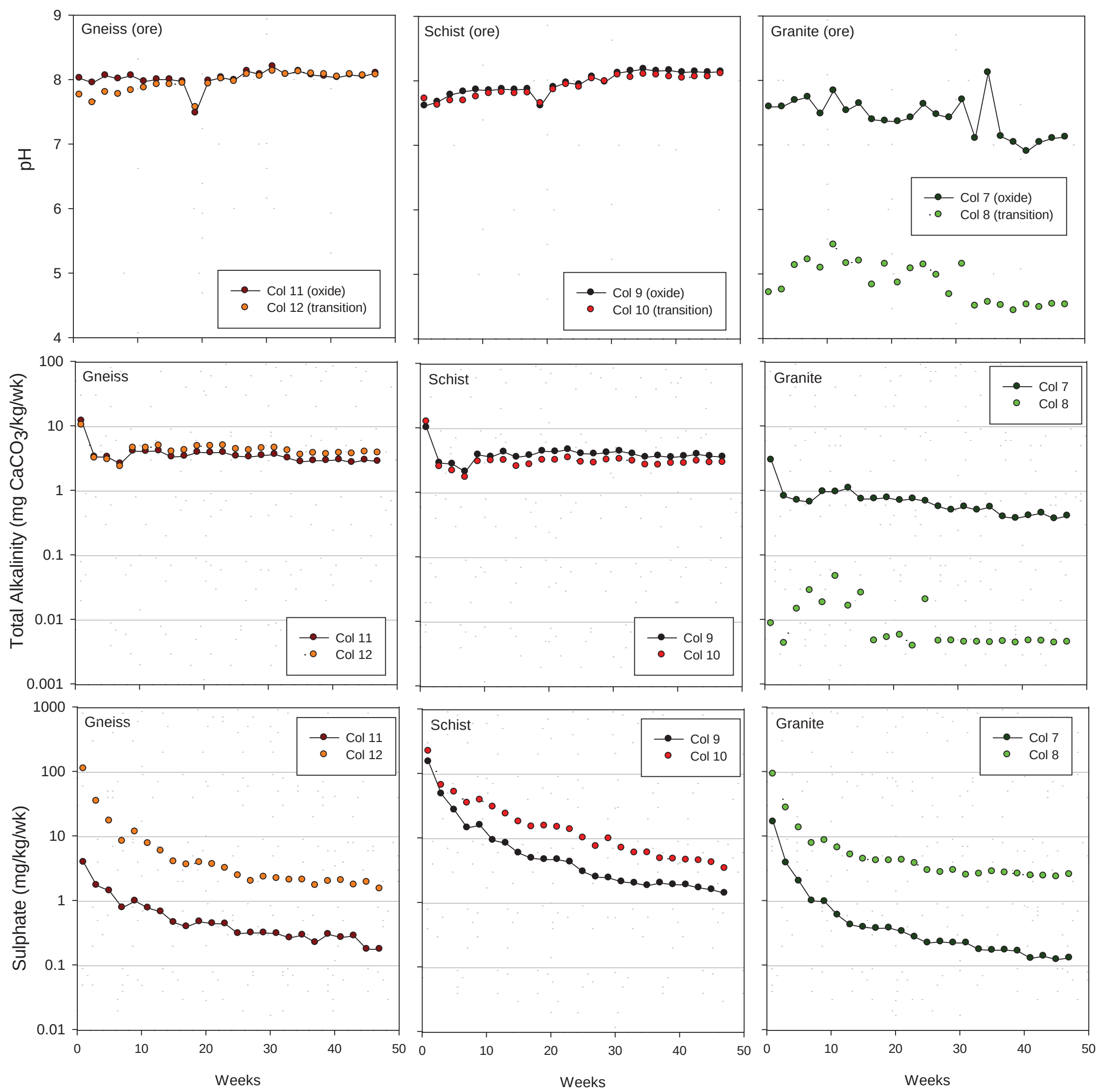

Gneiss (ore)
Col 11 (oxide)
Col 12 (transition)
Schist (ore)
Col 9 (oxide)
Col 10 (transition)
Granite (ore)
Col 7 (oxide)
Col 8 (transition)
D-Al (mg/L)
D-Cd (mg/L)
D-Cr (mg/L)
D-Co (mg/L)
Gneiss
Schist
Granite
Col 11
Col 12
Col 9
Col 10
Col 7
Col 8
DL
Weeks

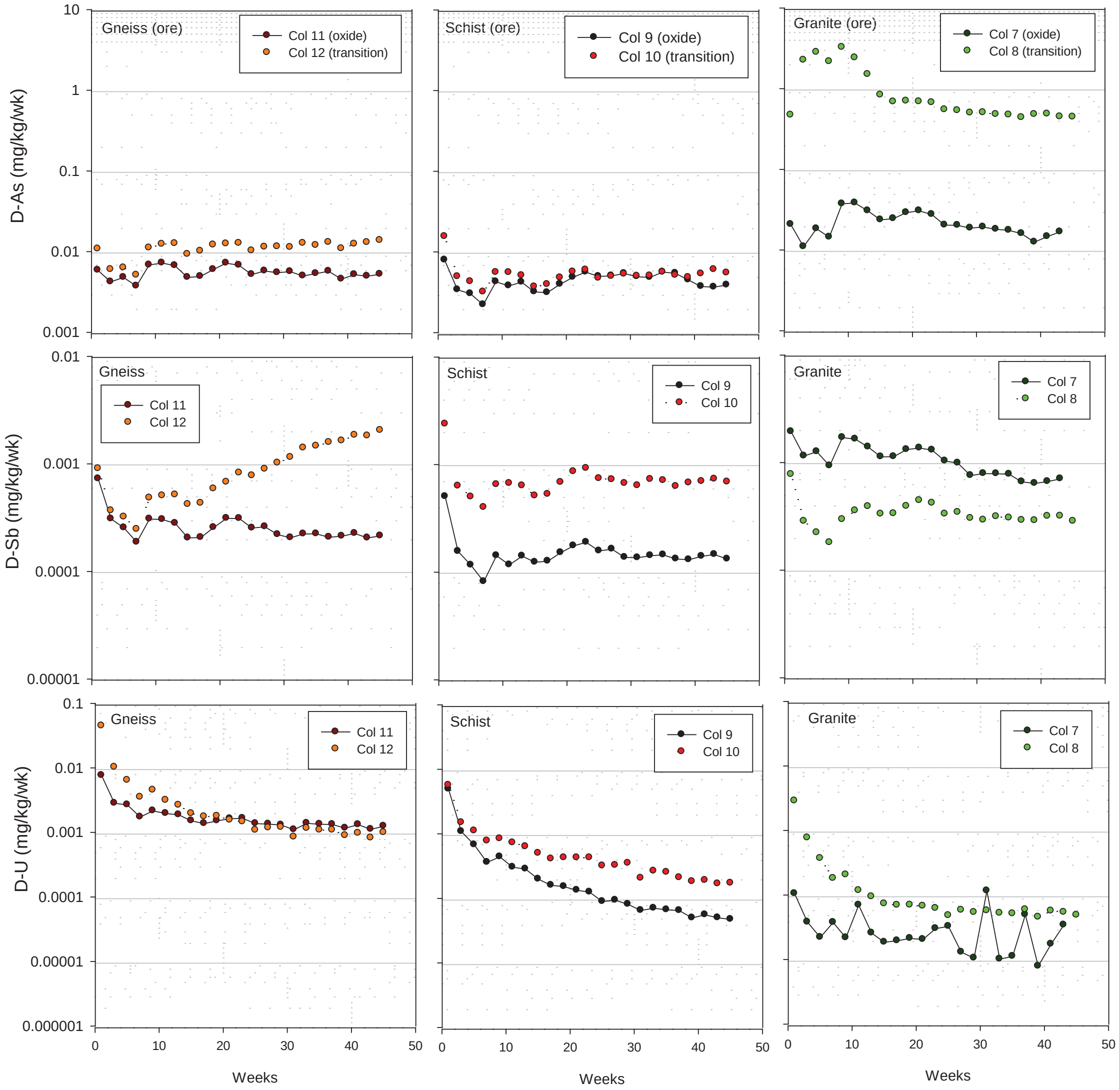

Gneiss (ore)
Col 11 (oxide)
Col 12 (transition)
Schist (ore)
Col 9 (oxide)
Col 10 (transition)
Granite (ore)
Col 7 (oxide)
Col 8 (transition)
D-Cu (mg/L)
D-Fe (mg/L)
D-Pb (mg/L)
D-Mn (mg/L)
Gneiss
Schist
Granite
Col 11
Col 12
Col 9
Col 10
Col 7
Col 8
DL
Weeks

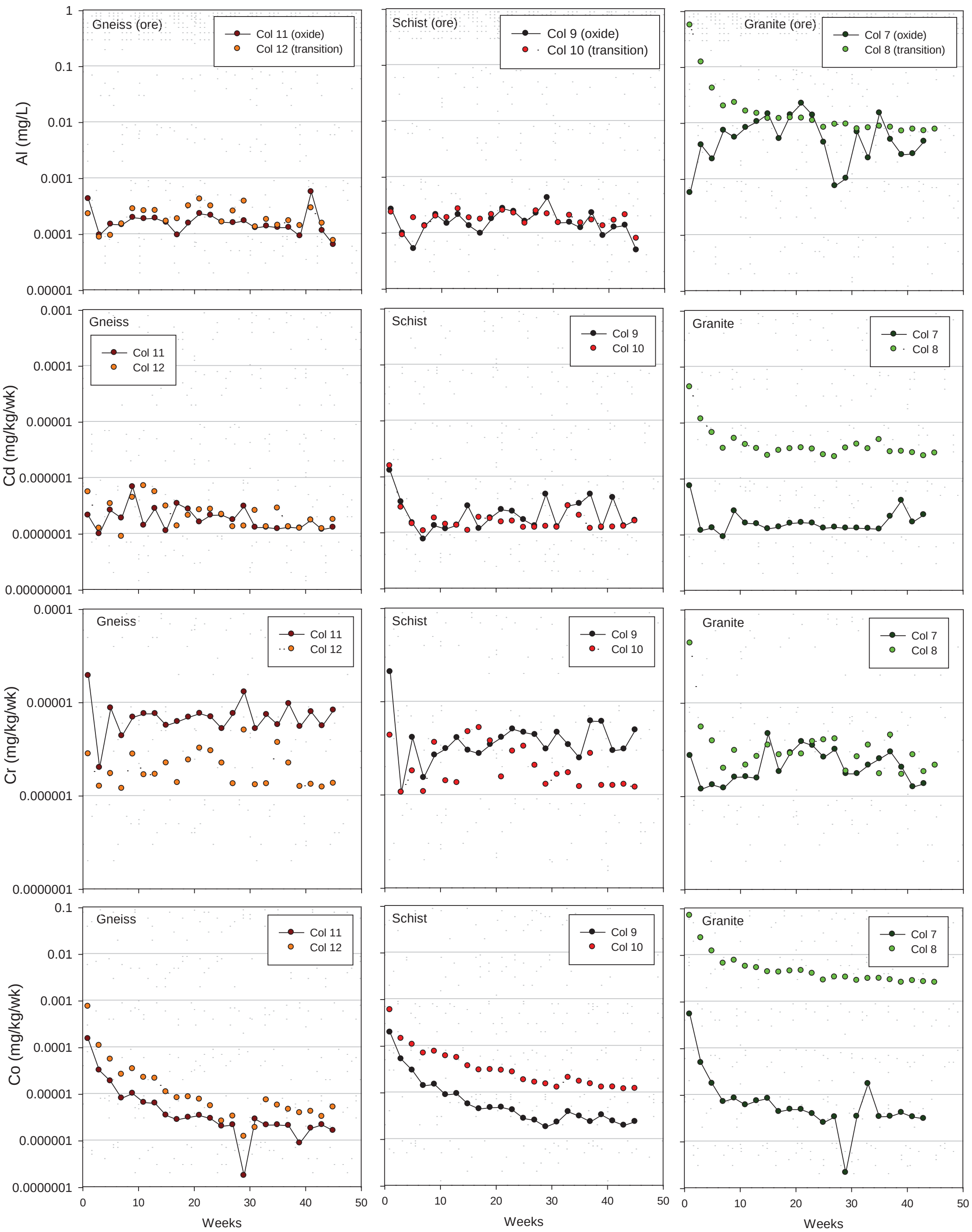

Gneiss (ore)
Col 11 (oxide)
Col 12 (transition)
Schist (ore)
Col 9 (oxide)
Col 10 (transition)
Granite (ore)
Col 7 (oxide)
Col 8 (transition)
DL
D-Hg (ug/L)
D-Mo (mg/L)
D-Ni (mg/L)
D-Se (mg/L)
Gneiss
Schist
Granite
Col 11
Col 12
Col 9
Col 10
Col 7
Col 8
Weeks

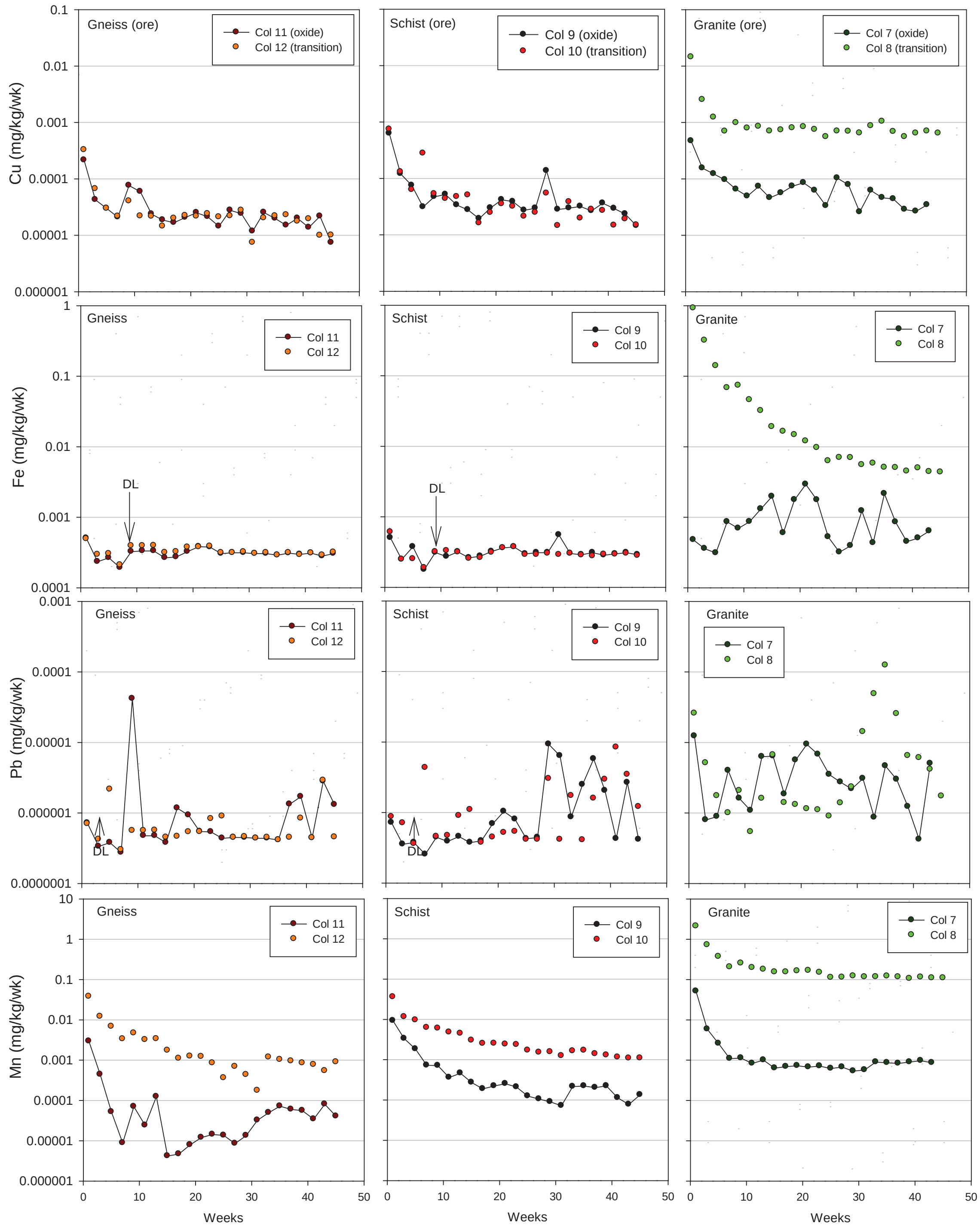

Gneiss (ore)
Col 11 (oxide)
Col 12 (transition)
Schist (ore)
Col 9 (oxide)
Col 10 (transition)
Granite (ore)
Col 7 (oxide)
Col 8 (transition)
D-Ag (mg/L)
0.001
0.0001
0.00001
0.000001
DL
Gneiss
Col 11
Col 12
Schist
Col 9
Col 10
Granite
Col 7
Col 8
D-Zn (mg/L)
10
1
0.1
0.01
0.001
0.0001
0
10
20
30
40
50
Weeks

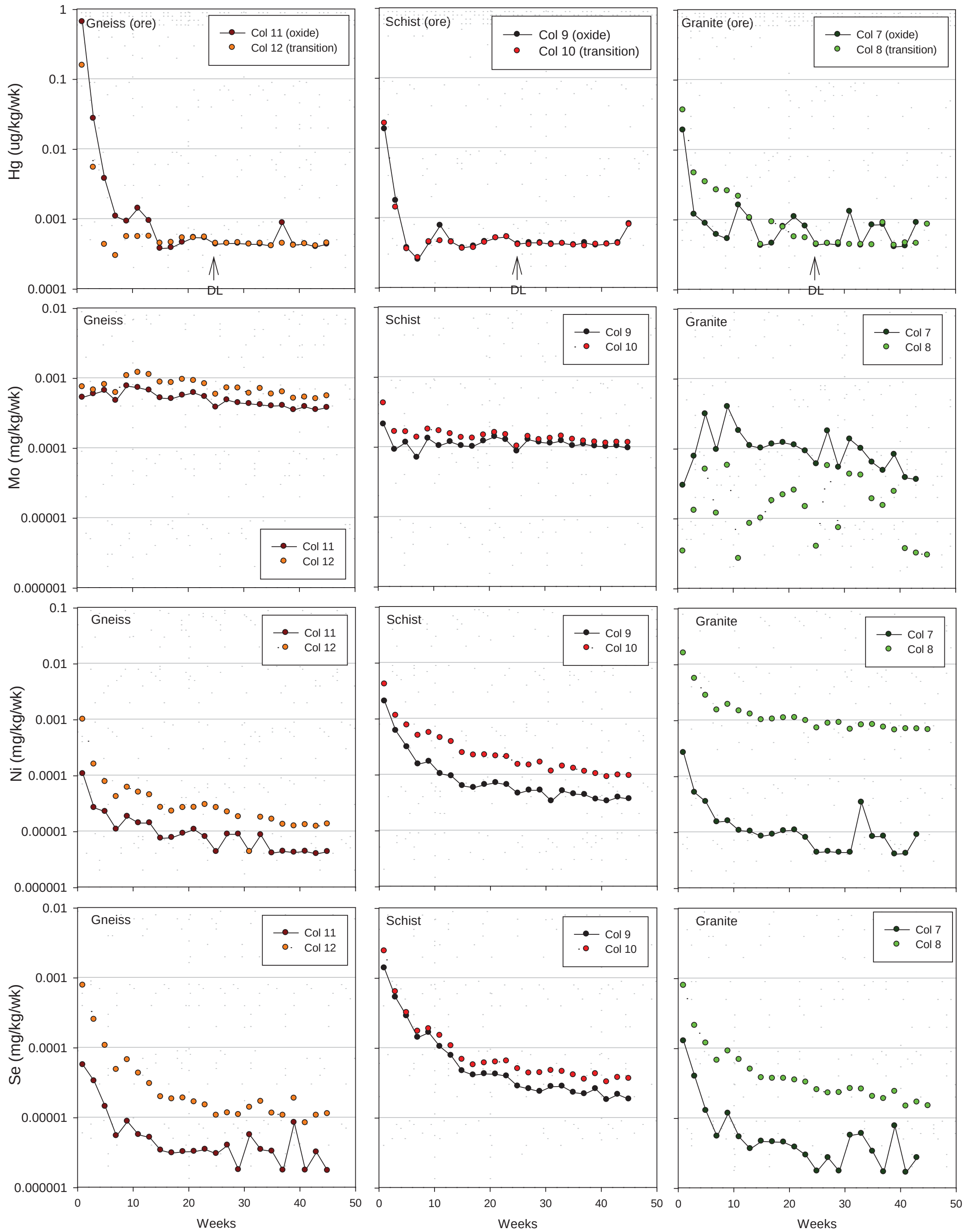
Loading Rates for Ore Unsaturated Columns

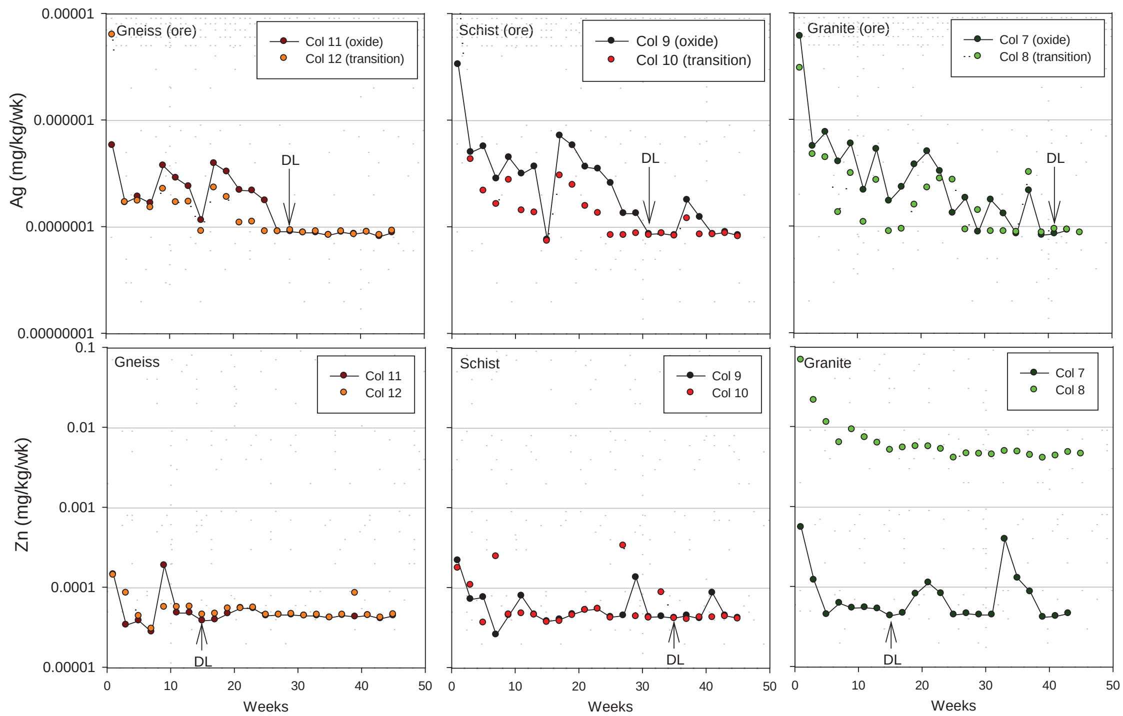



Gneiss (ore)
Col 11 (oxide)
Col 12 (transition)
Schist (ore)
Col 9 (oxide)
Col 10 (transition)
Granite (ore)
Col 7 (oxide)
Col 8 (transition)
D-As (mg/kg/wk)
Gneiss
Col 11
Col 12
Schist
Col 9
Col 10
Granite
Col 7
Col 8
D-Sb (mg/kg/wk)
D-U (mg/kg/wk)
Weeks


Gneiss (ore)
Col 11 (oxide)
Col 12 (transition)
Schist (ore)
Col 9 (oxide)
Col 10 (transition)
Granite (ore)
Col 7 (oxide)
Col 8 (transition)
Al (mg/L)
1
0.1
0.01
0.001
0.0001
0.00001
Gneiss
Col 11
Col 12
Schist
Col 9
Col 10
Granite
Col 7
Col 8
Cd (mg/kg/wk)
0.001
0.0001
0.00001
0.000001
0.0000001
0.00000001
Cr (mg/kg/wk)
0.0001
0.00001
0.000001
0.0000001
Co (mg/kg/wk)
0.1
0.01
0.001
0.0001
0.00001
0.000001
0.0000001
0
10
20
30
40
50
Weeks


Gneiss (ore)
Col 11 (oxide)
Col 12 (transition)
Schist (ore)
Col 9 (oxide)
Col 10 (transition)
Granite (ore)
Col 7 (oxide)
Col 8 (transition)
Cu (mg/kg/wk)
Fe (mg/kg/wk)
Pb (mg/kg/wk)
Mn (mg/kg/wk)
Gneiss
Schist
Granite
Col 11
Col 12
Col 9
Col 10
Col 7
Col 8
DL
Weeks


Hg (ug/kg/wk)
Mo (mg/kg/wk)
Ni (mg/kg/wk)
Se (mg/kg/wk)
Gneiss (ore)
Col 11 (oxide)
Col 12 (transition)
Schist (ore)
Col 9 (oxide)
Col 10 (transition)
Granite (ore)
Col 7 (oxide)
Col 8 (transition)
DL
Gneiss
Schist
Granite
Col 11
Col 12
Col 9
Col 10
Col 7
Col 8
Weeks


Gneiss (ore)
Col 11 (oxide)
Col 12 (transition)
Schist (ore)
Col 9 (oxide)
Col 10 (transition)
Granite (ore)
Col 7 (oxide)
Col 8 (transition)
Ag (mg/kg/wk)
0.00001
0.000001
0.0000001
0.00000001
DL
Gneiss
Col 11
Col 12
Schist
Col 9
Col 10
Granite
Col 7
Col 8
Zn (mg/kg/wk)
0.1
0.01
0.001
0.0001
0.00001
0
10
20
30
40
50
Weeks

APPENDIX D3: KINETIC TEST RESULTS FOR LEACH TAILINGS

Appendix D.3-1: Overview of Operating Procedures for the Coffee Gold Mine Leach Tailings Kinetic Tests

Test ID	Test Sample Description	Duplicate Tests	Type of Test	Lithology	Weathering Facies	Metallurgical Column ID	Column Dimensions			Dry Wt. of Sample (kg)	Temp (°C)	Operation Procedure	Sampling Frequency	Total Volume of Initial Flushings (mL)	Flushing Rate/ Weekly Input* (mL)	Start Date	Test Status	Cycles/ Weeks	Recirculation Cycles
							Inner Diameter (cm)	Length (cm)	Height (cm)										
Col 1	"A" Bag		Unsaturated Column	82% Gneiss, 23% Schist	90% Oxide, 10% Transition	70340	10.5			10	4°	Trickle Leach	Biweekly	1210	variable	10-Apr-14	active	98	57-89
Col 2	"B" Bag	Col 1	Unsaturated Column	82% Gneiss, 23% Schist	90% Oxide, 10% Transition	70340	10.5			20	4°	Trickle Leach	Biweekly	2355	variable	10-Apr-14	active	98	57-89
Col 15	Latte Composite		Unsaturated Column	Schist	40% Oxide, 60% Transition	20%72162, 20% 72168, 30% 72150, 30% 72156	10.5			5	4°	Trickle Leach	Biweekly	700	variable	3-Jun-15	active	39	-
Col 16	Supremo Composite		Unsaturated Column	Gneiss	80% Oxide, 20% Transition	40% 73028, 40% 73034, 20% 73040	10.5			5	4°	Trickle Leach	Biweekly	700	variable	3-Jun-15	active	39	-
Col 17	Supremo/Kona Composite		Unsaturated Column	90% Gneiss, 10% Granite	80% Oxide, 20% Transition	35% 73028, 35% 73034, 18% 73040, 7% 72174, 3% 72180	10.5			5	4°	Trickle Leach	Biweekly	700	variable	3-Jun-15	active	39	-
FB-LT1		Col 1 & Col 2	Field Bin	82% Gneiss, 23% Schist	90% Oxide, 10% Transition	70340	45.0		80	76.3				7		17-Jun-14	active	70	-
FB-LT2			Field Bin	Schist	Oxide	50% 73007 50% 73016	45.0		80	200	site conditions	natural precipitation	3x's / field season	15	natural precipitation	10-Aug-15	active	10	-
FB-LT3			Field Bin	Gneiss	Oxide	50% 72108 50% 72111	45.0		80	200				19		10-Aug-15	active	10	-

Notes:
Columns and humidity cells are composed of Plexiglas with an acrylic perforated disk & nylon mesh
No sample preparation was conducted prior to leachate sampling for any tests
* generally 400-500 mL for columns, see individual leachate results in Appendix D.3-3 for specific input volumes

APPENDIX D.3-2: X-RAY DIFFRACTION ANALYSES FOR LEACH TAILINGS KINETIC TEST SUB-SAMPLE

SGS

Quantitative X-Ray Diffraction by Rietveld Refinement

Report Prepared for:	*SGS Canada Inc*
Project Number/ LIMS No.	*14094-101A/MI4512-APR14*
Batch No.	*1416 Kaminak Coffee Project*
Reporting Date:	*April 29, 2014*

Instrument:	BRUKER AXS D8 Advance Diffractometer
Test Conditions:	Co radiation, 40 kV, 35 mA Regular Scanning: Step: 0.02°, Step time: 1s, 2θ range: 3-80°
***Interpretations*:**	PDF2/PDF4 powder diffraction databases issued by the International Center for Diffraction Data (ICDD). DiffracPlus Eva and Topas software.
***Detection Limit*:**	0.5-2%. Strongly dependent on crystallinity.

Contents:

1) Method Summary
2) Summary of Mineral Asemblages
3) Semi-Quantitative XRD Results
4) XRD Pattern(s)

Signature REDACTED

Signature REDACTED

Bernie C. Yeung, B.Sc.
Mineralogist

Huyun Zhou, Ph.D., P.Geo.
Senior Mineralogist

Report Prepared by: Kim Gibbs

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Member of the SGS Group (SGS SA)

SGS

Method Summary

Mineral Identification and Interpretation:

Mineral identification and interpretation involves matching the diffraction pattern of an unknown material to patterns of single-phase reference materials. The reference patterns are compiled by the Joint Committee on Powder Diffraction Standards - International Center for Diffraction Data (JCPDS-ICDD) database and released on software as Powder Diffraction Files (PDF).

Interpretations do not reflect the presence of non-crystalline and/or amorphous compounds, except when internal standards have been added by request. Mineral proportions may be strongly influenced by crystallinity, crystal structure and preferred orientations. Mineral or compound identification and quantitative analysis results should be accompanied by supporting chemical assay data or other additional tests.

Quantitative Rietveld Analysis:

Quantitative Rietveld Analysis is performed by using Topas 4.2 (Bruker AXS), a graphics based profile analysis program built around a non-linear least squares fitting system, to determine the amount of different phases present in a multicomponent sample. Whole pattern analyses are predicated by the fact that the X-ray diffraction pattern is a total sum of both instrumental and specimen factors. Unlike other peak intensity-based methods, the Rietveld method uses a least squares approach to refine a theoretical line profile until it matches the obtained experimental patterns.

Rietveld refinement is completed with a set of minerals specifically identified for the sample. Zero values indicate that the mineral was included in the refinement calculations, but the calculated concentration was less than 0.05wt%. Minerals not identified by the analyst are not included in refinement calculations for specific samples and are indicated with a dash.

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Member of the SGS Group (SGS SA)

SGS Canada Inc
14094-101A/MI4512-APR14
29-Apr-14

Summary of Rietveld Quantitative Analysis X-ray Diffraction Results

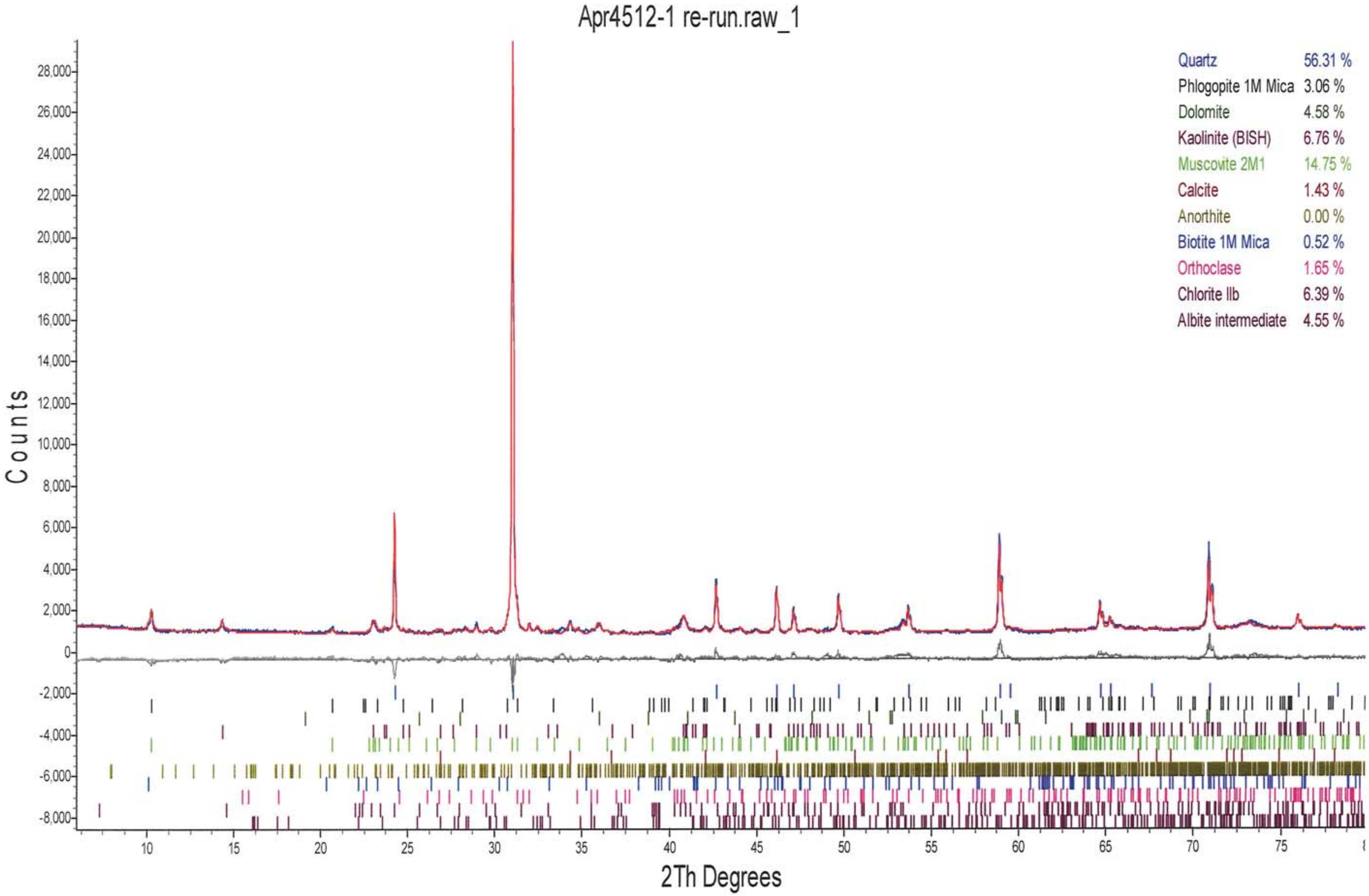
Quantitative X-ray Diffraction Results

Mineral/Compound	70340 A APR4512-01 (wt %)	70340 B APR4512-02 (wt %)
Quartz	56.3	55.7
Phlogopite	3.1	2.8
Dolomite	4.6	2.8
Kaolinite	6.8	9.0
Muscovite	14.8	17.9
Calcite	1.4	1.4
Anorthite	0.0	-
Biotite	0.5	0.7
Orthoclase	1.6	1.3
Chlorite	6.4	5.8
Albite	4.6	2.6
TOTAL	100	100

Zero values indicate that the mineral was included in the refinement, but the calculated concentration is below a measurable value.
Dashes indicate that the mineral was not identifed by the analyst and not included in the refinement calculation for the sample.

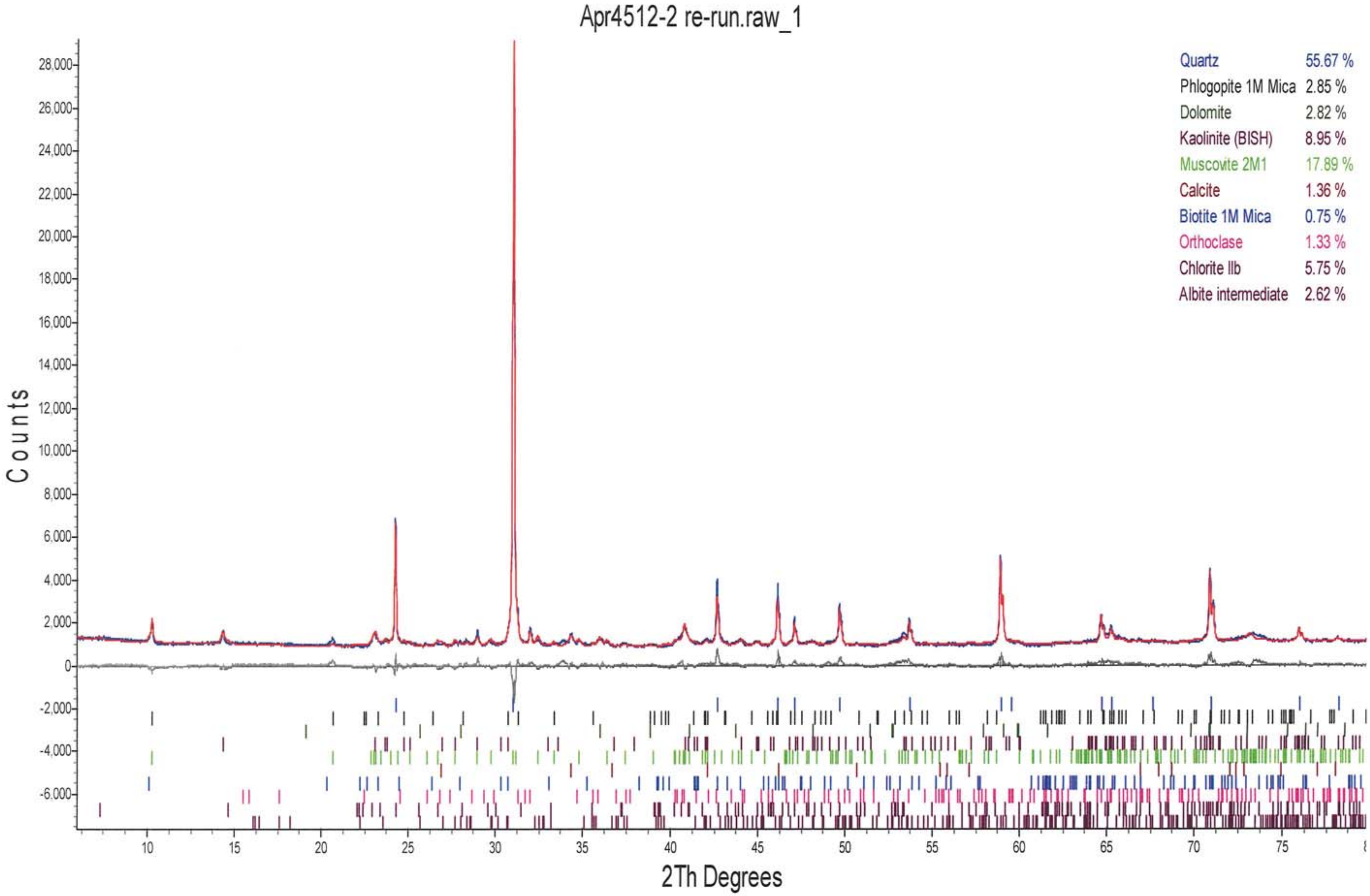
Mineral/Compound	Formula
Quartz	SiO_2
Phlogopite	$KMg_3(AlSi_3O_{10})(OH)$
Dolomite	$CaMg(CO_3)_2$
Kaolinite	$Al_2Si_2O_5(OH)_4$
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$
Calcite	$CaCO_3$
Anorthite	$CaAl_2Si_2O_8$
Biotite	$K(Mg,Fe)_3(AlSi_3O_{10})(OH)_2$
Orthoclase	$KAlSi_3O_8$
Chlorite	$(Fe,(Mg,Mn)_5,Al)(Si_3Al)O_{10}(OH)_8$
Albite	$NaAlSi_3O_8$

SGS Canada Inc
14094-101A/MI4512-APR14
29-Apr-14



The Qualitative XRD method (METH # 8-8-1) used by SGS Minerals Services, P.O. Box 4300, 185 Concession Street, Lakefield, Ontario, Canada K0L 2H0.
Tel: (705) 652-2000 Fax: (705) 652-6365 Mini-method available upon request.

SGS Canada Inc
14094-101A/MI4512-APR14
29-Apr-14



The Qualitative XRD method (METH # 8-8-1) used by SGS Minerals Services, P.O. Box 4300, 185 Concession Street, Lakefield, Ontario, Canada K0L 2H0.
Tel: (705) 652-2000 Fax: (705) 652-6365 Mini-method available upon request.

Appendix D.3-2: Static Test Results for Leach Tailings Kinetic Test Sub-Samples

Acid-Base Accounting Results

Kinetic Tests	Lithology	Weathering Facies	Rinse pH	Paste pH	TIC	CaNP	Total C	Total S	S(SO4)	S(S-2)	Insoluble S	AP	Sobek NP	Siderite NP	Sobek NNP	Siderite NNP	Fizz Test
			s.u.	s.u.	%	kg $CaCO_3$/t	%	%	%	%	%	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	
		Method Code	*Sobek*	*Sobek*	*CSB02V*	*Calc.*	*CSA06V*	*CSA06V*	*CSA07V*	*CSA08D*	*Calc.*	*Calc.*	*Sobek*	*Siderite Corr.*	*Calc.*	*Calc.*	*Sobek*
		Limit of Detection	*0.20*	*0.20*	*0.01*	*#N/A*	*0.005*	*0.005*	*0.01*	*0.01*	*#N/A*	*#N/A*	*0.5*	*0.5*	*#N/A*	*#N/A*	*#N/A*
Col 1, Col 2 & FB-LT1	82% Gneiss, 23% Schist	90% Oxide, 10% Transition		8.4	0.56	47	0.60	0.080	0.020	0.040	0.020	1.3	48	47	*ND*	*ND*	Slight
Col 15	Schist	40% Oxide, 60% Transition	9.4	8.8	0.71	59	0.76	0.24	0.020	0.19	0.029	6.0	55	71	49	65	Slight
Col 16	Gneiss	80% Oxide, 20% Transition	9.6	9.2	0.27	23	0.28	0.041	0.012	0.018	0.019	0.56	24	30	24	30	Slight
Col 17	90% Gneiss, 10% Granite	80% Oxide, 20% Transition	9.4	9.0	0.24	20	0.25	0.044	0.012	0.022	0.019	0.68	21	28	21	27	Slight
FB-LT3	Schist	Oxide	9.6	9.1	0.97	81	1.0	0.042	0.020	0.020	0.012	0.63	80	94	80	94	Moderate
FB-LT2	Gneiss	Oxide	9.6	9.3	0.020	1.7	0.041	0.015	*<0.01*	*<0.01*	0.015	0.31	4.2	11	4.2	11	None

Notes:
Values in grey italics are below the analytical detection limit
CaNP = carbonate NP calculated from total inorganic carbon (TIC)
NNP = net neutralization potential, derived by subtracting acid potential (AP) from NP

Solid Phase Elements by Aqua Regia Digestion

Kinetic Tests	Lithology	Weathering Facies	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La	Li	Lu	Mg	Mn
			ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	%	ppm
		Method Code	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*
		Limit of Detection	*0.010*	*0.010*	*1.0*	*10*	*5.0*	*0.10*	*0.020*	*0.010*	*0.010*	*0.050*	*0.10*	*1.0*	*0.050*	*0.50*	*0.010*	*0.10*	*0.10*	*0.050*	*0.010*	*0.020*	*0.010*	*0.10*	*1.0*	*0.010*	*0.010*	*2.0*
Col 1, Col 2 & FB-LT1	82% Gneiss, 23% Schist	90% Oxide, 10% Transition	0.13	0.33	1690	20	201	1.1	0.29	1.6	0.090	46	8.2	123	1.8	15	2.3	1.0	*<0.1*	0.21	0.57	0.020	0.20	26	1.0	0.17	0.34	402
Col 15	Schist	40% Oxide, 60% Transition	0.065	0.53	3543	*<10*	175	0.61	0.24	1.8	0.065	39	5.5	97	1.7	7.9	1.9	1.8	*<0.1*	0.23	1.2	*<0.02*	0.21	20	2.2	0.14	0.43	284
Col 16	Gneiss	80% Oxide, 20% Transition	0.11	0.52	1156	*<10*	214	1.1	0.31	0.90	0.076	61	6.5	108	1.9	6.2	1.9	1.7	*<0.1*	0.16	0.89	*<0.02*	0.27	34	2.0	0.17	0.22	412
Col 17	90% Gneiss, 10% Granite	80% Oxide, 20% Transition	0.099	0.50	1488	*<10*	196	0.98	0.29	0.81	0.072	57	5.9	105	1.8	5.6	1.8	1.6	*<0.1*	0.17	0.91	*<0.02*	0.25	32	1.9	0.16	0.20	376
FB-LT3	Schist	Oxide	0.075	0.65	1350	*<10*	874	0.75	0.66	3.0	0.12	68	14	95	1.9	29	3.3	2.3	*<0.1*	0.13	0.39	0.025	0.29	35	3.0	0.22	0.49	638
FB-LT2	Gneiss	Oxide	0.090	0.63	824	*<10*	242	0.85	0.36	0.17	0.095	48	9.8	115	1.3	9.8	2.4	2.0	*<0.1*	0.18	0.35	0.030	0.23	26	2.5	0.15	0.19	537

Notes:
Values in grey italics are below the analytical detection limit

Solid Phase Elements by Aqua Regia Digestion

Kinetic Tests	Lithology	Weathering Facies	Mo	Na	Nb	Ni	P	Pb	Rb	S	Sb	Sc	Se	Sn	Sr	Ta	Tb	Te	Th	Ti	Tl	U	V	W	Y	Yb	Zn	Zr
			ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		Method Code	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*
		Limit of Detection	*0.050*	*0.010*	*0.050*	*0.50*	*0.0050*	*0.20*	*0.20*	*0.010*	*0.050*	*0.10*	*1.0*	*0.30*	*0.50*	*0.050*	*0.020*	*0.050*	*0.10*	*0.010*	*0.020*	*0.050*	*1.0*	*0.10*	*0.050*	*0.10*	*1.0*	*0.50*
Col 1, Col 2 & FB-LT1	82% Gneiss, 23% Schist	90% Oxide, 10% Transition	4.5	0.030	*<0.05*	14	0.031	15	11	0.080	37	3.8	*<1*	0.30	61	*<0.05*	0.43	0.060	17	*<0.01*	0.59	10	16	0.70	11	1.2	33	7.0
Col 15	Schist	40% Oxide, 60% Transition	4.6	0.038	0.22	23	0.026	16	12	0.24	55	3.6	*<1*	0.41	69	*<0.05*	0.32	*<0.05*	18	*<0.01*	0.74	5.8	16	0.28	8.8	0.91	29	8.0
Col 16	Gneiss	80% Oxide, 20% Transition	5.3	0.036	0.076	16	0.028	13	15	0.038	39	3.2	*<1*	0.92	38	*<0.05*	0.39	*<0.05*	26	*<0.01*	1.0	14	18	0.56	11	1.2	31	5.5
Col 17	90% Gneiss, 10% Granite	80% Oxide, 20% Transition	5.2	0.036	0.098	15	0.026	13	14	0.041	40	3.2	*<1*	0.85	36	*<0.05*	0.36	*<0.05*	25	*<0.01*	0.99	14	17	0.51	11	1.1	28	6.0
FB-LT3	Schist	Oxide	3.7	0.045	0.070	36	0.064	14	14	0.040	95	5.2	*<1*	0.30	76	*<0.05*	0.58	0.075	13	0.010	0.61	1.9	27	0.65	16	1.5	60	4.9
FB-LT2	Gneiss	Oxide	4.8	0.040	0.075	41	0.034	13	13	0.010	41	6.2	*<1*	0.45	19	*<0.05*	0.35	0.14	20	0.010	0.92	13	31	0.40	9.9	1.1	32	7.1

Notes:
Values in grey italics are below the analytical detection limit

Appendix D.3-3: Leachate Concentrations and Calculated Loading Rates for Leach Tailings Kinetic Tests

Leachate Concentrations for Col 1 (LT1, Sample 'A')

Date	Cycle	Weeks	Volume (mL)		pH	Alkalinity	Sulphate	Total CN	WAD CN	SCN	CNO	Ammonia-N	Nitrate-N	Nitrite-N	Chloride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr
	No.		Input	Output		$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
23-Apr-14	1	1	1210	385	8.4	496	412	9.8	0.50	< 10	< 3	3.7	4.0	10.0	87	0.70	134	0.062	0.061	0.11	0.058	0.0000070	< 7E-06	0.080	0.00016	40	0.089
7-May-14	2	3	400	455	8.5	394	251	4.4	0.22	< 5	< 3	1.3	1.8	4.2	31	< 0.3	46	0.012	0.080	2.0	0.022	0.000014	< 7E-06	0.050	0.00033	13	0.040
21-May-14	3	5	450	385	8.6	406	219	2.0	0.070	< 2	< 1	0.70	0.56	1.2	10	< 0.3	33	0.014	0.056	2.0	0.017	0.000079	0.00044	0.041	< 3E-06	9.2	0.021
4-Jun-14	4	7	400	325	8.6	396	181	1.4	0.040	< 2	< 1	0.60	0.21	0.41	3.1	< 0.3	29	0.0084	0.052	2.3	0.012	< 7E-06	< 7E-06	0.020	< 3E-06	8.2	0.012
18-Jun-14	5	9	400	335	8.6	399	95	0.84	0.030	< 2	< 1	0.50	0.17	0.14	1.6	< 0.3	25	0.0095	0.047	2.7	0.012	< 7E-06	< 7E-06	0.020	< 3E-06	7.0	0.0091
2-Jul-14	6	11	400	340	8.5	411	101	0.65	0.040	< 2	< 1	0.50	< 0.06	0.090	0.90	< 0.3	25	0.018	0.052	2.5	0.013	< 7E-06	< 7E-06	0.018	0.000021	6.9	0.0065
16-Jul-14	7	13	400	340	8.5	374	69	0.44	0.020	< 2	< 1	0.80	< 0.06	0.060	0.60	< 0.3	22	0.011	0.051	2.6	0.012	0.000014	0.000013	0.020	< 3E-06	6.3	0.0057
30-Jul-14	8	15	400	330	8.5	361	58	0.38	0.020	< 2	< 1	0.50	< 0.06	0.050	0.40	< 0.3	18	0.037	0.052	2.9	0.011	< 7E-06	< 7E-06	0.020	< 3E-06	5.1	0.0049
13-Aug-14	9	17	400	325	8.4	345	51	0.38	0.020	< 2	< 1	0.50	< 0.06	0.040	< 0.3	0.40	21	0.011	0.050	2.4	0.013	< 7E-06	< 7E-06	0.024	< 3E-06	5.8	0.0038
27-Aug-14	10	19	400	325	8.4	329	47	0.21	0.010	-	-	0.40	< 0.06	0.040	< 1	< 0.3	20	0.023	0.045	2.3	0.012	< 7E-06	< 7E-06	0.033	0.0000070	5.7	0.0032
10-Sep-14	11	21	400	315	8.4	317	35	0.23	0.010	-	-	0.30	< 0.06	< 0.03	< 0.2	< 0.3	19	0.021	0.042	2.3	0.012	< 7E-06	< 7E-06	0.027	0.000014	5.2	0.0029
24-Sep-14	12	23	400	340	8.4	319	42	0.19	< 0.01	-	-	0.40	< 0.06	0.030	< 1	< 0.3	33	0.0082	0.047	2.2	0.013	< 7E-06	< 7E-06	0.021	< 3E-06	5.1	0.0026
8-Oct-14	13	25	400	305	8.4	284	39	0.17	0.020	-	-	0.70	< 0.06	< 0.03	< 1	< 0.3	21	0.012	0.038	2.2	0.013	< 7E-06	< 7E-06	0.018	0.0000030	5.7	0.0025
22-Oct-14	14	27	400	325	8.3	273	33	0.18	0.010	-	-	0.40	< 0.06	< 0.03	< 1	< 0.3	20	0.019	0.039	2.2	0.015	< 7E-06	< 7E-06	0.030	0.000013	5.5	0.0022
5-Nov-14	15	29	400	325	-	275	32	0.12	< 0.01	-	-	0.30	< 0.06	< 0.03	< 1	< 0.3	20	0.015	0.038	2.1	0.014	< 7E-06	< 7E-06	0.024	0.0000050	5.4	0.0020
19-Nov-14	16	31	400	315	8.3	260	30	0.11	0.020	-	-	0.60	< 0.06	0.040	< 1	< 0.3	22	0.0095	0.036	1.9	0.016	< 7E-06	< 7E-06	0.020	0.000013	5.8	0.0019
3-Dec-14	17	33	400	285	8.4	256	29	0.10	< 0.01	-	-	0.40	< 0.06	0.030	< 1	< 0.3	22	0.014	0.034	1.8	0.016	< 7E-06	< 7E-06	0.019	0.0000080	6.1	0.0017
17-Dec-14	18	35	400	365	8.4	233	23	0.10	< 0.01	-	-	1.8	< 0.06	0.080	< 1	< 0.3	21	0.017	0.036	1.7	0.015	< 7E-06	< 7E-06	0.019	0.0000080	5.4	0.0014
31-Dec-14	19	37	400	335	8.5	273	19	0.080	0.010	-	-	0.50	< 0.06	0.060	< 1	< 0.3	20	0.021	0.034	1.6	0.017	< 7E-06	< 7E-06	0.018	0.0000030	5.4	0.0013
14-Jan-15	20	39	400	325	8.3	220	20	0.080	< 0.01	-	-	0.40	< 0.06	0.050	< 1	< 0.3	23	0.022	0.034	1.6	0.017	< 7E-06	< 7E-06	0.019	0.000017	6.3	0.0066
28-Jan-15	21	41	400	340	8.3	232	21	0.060	< 0.01	-	-	0.40	< 0.06	0.11	< 1	< 0.3	27	0.015	0.030	1.4	0.017	< 7E-06	0.000044	0.016	0.0000040	7.4	0.0014
11-Feb-15	22	43	400	325	8.2	206	21	0.050	< 0.01	-	-	0.40	< 0.06	0.070	< 1	< 0.3	26	0.012	0.032	1.3	0.018	< 7E-06	< 7E-06	0.020	0.0000060	7.0	0.0012
25-Feb-15	23	45	400	320	8.2	202	18	0.050	< 0.01	-	-	0.40	< 0.06	0.080	< 1	< 0.3	32	0.0038	0.026	0.97	0.022	< 7E-06	< 7E-06	0.018	0.0000060	8.7	0.0011
11-Mar-15	24	47	400	315	8.2	194	20	0.040	0.010	-	-	0.50	< 0.06	0.060	< 1	< 0.3	36	0.0049	0.025	0.87	0.023	< 7E-06	< 7E-06	0.017	0.0000050	9.8	0.0011
25-Mar-15	25	49	400	325	8.1	178	13	0.010	< 0.01	-	-	0.40	< 0.06	0.070	< 1	< 0.3	41	0.0059	0.025	0.90	0.027	< 7E-06	< 7E-06	0.016	< 3E-06	11	0.0013
8-Apr-15	26	51	400	350	8.1	172	14	0.050	0.010	-	-	0.60	< 0.06	0.10	< 1	< 0.3	45	0.0073	0.028	0.75	0.030	< 7E-06	< 7E-06	0.014	< 3E-06	12	0.00090
22-Apr-15	27	53	400	320	8.0	158	16	0.030	< 0.01	-	-	0.80	< 0.06	0.15	< 1	< 0.3	50	0.0097	0.025	0.70	0.031	< 7E-06	< 7E-06	0.022	0.000014	13	0.00091
6-May-15	28	55	400	325	8.1	160	13	0.020	< 0.01	-	-	0.40	< 0.06	0.25	< 1	< 0.3	55	0.0065	0.021	0.59	0.033	< 7E-06	< 7E-06	0.018	< 3E-06	15	0.00077
20-May-15	29	57	500	445	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	30	59	445	380	8.1	144	9.0	0.67	0.020	-	-	0.60	< 0.06	< 0.01	< 1	< 0.3	66	0.0089	0.016	0.48	0.041	< 7E-06	< 7E-06	0.020	0.0000040	18	0.00084
17-Jun-15	31	61	500	445	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	32	63	445	385	8.0	140	11	0.020	< 0.01	-	-	0.70	0.060	2.0	< 1	< 0.3	79	0.0051	0.016	0.46	0.049	< 7E-06	< 7E-06	0.015	0.0000030	21	0.00069
15-Jul-15	33	65	500	425	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	34	67	425	355	8.0	131	11	0.020	0.040	-	-	0.80	0.10	5.7	< 1	< 0.3	97	0.0063	0.014	0.36	0.052	< 7E-06	0.000011	0.017	< 3E-06	26	0.00075
12-Aug-15	35	69	500	455	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	36	71	455	375	8.0	121	9.0	0.020	0.020	-	-	0.90	0.17	13	< 1	< 0.3	109	0.0050	0.013	0.33	0.061	< 7E-06	< 7E-06	0.016	0.000028	29	0.00065
9-Sep-15	37	73	500	445	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	38	75	445	390	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	39	77	390	320	7.9	121	8.0	0.020	< 0.01	-	-	0.50	0.28	21			139	0.0075	0.014	0.28	0.070	< 7E-06	< 7E-06	0.016	0.0000030	36	0.00060
21-Oct-15	40	79	500	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	41	81	450	425	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	42	83	425	360	8.2	132	7.0	0.010	< 0.01	-	-	0.20	0.28	17			137	0.0044	0.011	0.29	0.060	< 7E-06	< 7E-06	0.011	< 3E-06	36	0.00060
2-Dec-15	43	85	500	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	44	87	450	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	45	89	400	360	8.3	111	9.0	0.020	< 0.01	-	-	0.10	0.30	13	-	-	129	0.0035	0.011	0.24	0.060	< 7E-06	< 7E-06	0.013	< 3E-06	34	0.00053
6-Jan-16	46	90	400	340	8.2	112	9.0	0.020	< 0.01	-	-	0.20	0.24	12	-	-	134	0.0049	0.012	0.27	0.062	< 7E-06	< 7E-06	0.013	0.0000030	35	0.00057
20-Jan-16	47	92	400	355	8.2	108	9.0	0.020	< 0.01	-	-	< 0.1	0.20	8.4	-	-	123	0.0042	0.013	0.32	0.057	< 7E-06	< 7E-06	0.022	0.0000060	33	0.00060
3-Feb-16	48	94	400	350	8.1	109	9.0	0.010	< 0.01	-	-	< 0.1	0.13	5.1	-	-	107	0.0035	0.012	0.33	0.054	< 7E-06	< 7E-06	0.012	< 3E-06	28	0.00060
17-Feb-16	49	96	400	330	8.1	116	8.0	0.020	0.040	-	-	< 0.1	0.10	3.2	-	-	115	0.0036	0.012	0.34	0.054	< 7E-06	< 7E-06	0.013	< 3E-06	31	0.00067
2-Mar-16	50	98	400	350	8.2	112	9.0	0.010	< 0.01	-	-	< 0.1	0.060	1.9	-	-	104	0.0016	0.013	0.38	0.051	< 7E-06	< 7E-06	0.011	0.0000050	27	0.00067

Appendix D.3-3: Leachate Concentrations and Calculated Loading Rates for Leach Tailings Kinetic Tests

Leachate Concentrations for Col 1 (LT1, Sample 'A')

Date	Cycle	Weeks	Volume (mL)		Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.		Input	Output	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
23-Apr-14	1	1	1210	385	0.32	0.025	2.9	0.00013	0.015	8.1	0.012	7.8	0.22	0.25	0.52	27	0.00060	5.6	0.0062	550	0.17	201	0.00053	0.00078	0.0012	1.1	0.00048	0.0090	< 0.002
7-May-14	2	3	400	455	0.19	0.0079	1.6	0.00013	0.0075	3.4	0.0066	0.65	0.37	0.056	0.43	15	0.0047	5.8	< 2E-06	329	0.062	128	0.00031	0.000050	0.0013	0.99	< 1E-05	0.0030	< 0.002
21-May-14	3	5	450	385	0.092	0.0043	0.82	0.00049	0.0069	2.5	0.0044	0.11	0.14	0.0026	0.42	10	0.0023	4.9	0.000063	294	0.045	78	0.00022	0.000060	0.0015	0.69	0.00010	0.0020	< 0.002
4-Jun-14	4	7	400	325	0.041	0.010	0.47	0.00027	0.0053	2.1	0.0031	0.050	0.14	0.0010	0.44	9.3	0.0013	5.3	0.000014	253	0.038	57	0.00018	0.00018	0.00064	0.56	0.000060	0.0050	< 0.002
18-Jun-14	5	9	400	335	0.029	0.017	0.31	0.000020	0.0052	1.9	0.0021	0.050	0.088	0.00080	0.45	8.4	0.0011	5.3	< 2E-06	221	0.034	43	0.00016	0.000090	0.00045	0.56	0.000080	< 0.001	< 0.002
2-Jul-14	6	11	400	340	0.022	0.0042	0.22	0.000070	0.0050	1.8	0.0016	0.030	0.070	0.00090	0.46	8.3	0.00080	5.6	< 2E-06	206	0.033	37	0.00015	0.00013	0.00043	0.49	0.000060	0.0020	< 0.002
16-Jul-14	7	13	400	340	0.018	0.0017	0.17	0.000030	0.0050	1.6	0.0012	0.020	0.063	0.00060	0.45	7.7	0.00061	5.1	0.000015	190	0.030	29	0.00016	0.00011	0.00032	0.40	0.00020	< 0.001	< 0.002
30-Jul-14	8	15	400	330	0.013	0.0037	0.14	0.000030	0.0047	1.3	0.0012	< 0.01	0.068	0.00050	0.47	6.5	0.00060	4.8	0.0000020	160	0.024	23	0.00013	0.000020	0.00087	0.33	0.00031	< 0.001	< 0.002
13-Aug-14	9	17	400	325	0.011	0.0014	0.075	0.000020	0.0050	1.5	0.00080	< 0.01	0.046	0.00040	0.46	6.6	0.00052	5.1	< 2E-06	169	0.028	20	0.00012	0.000050	0.00029	0.32	0.00012	< 0.001	< 0.002
27-Aug-14	10	19	400	325	0.010	0.0012	0.080	0.000020	0.0048	1.5	0.00090	< 0.01	0.045	0.00040	0.43	6.9	0.00043	5.3	0.0000020	157	0.027	18	0.00014	0.00035	0.00010	0.29	0.00023	< 0.001	< 0.002
10-Sep-14	11	21	400	315	0.0084	0.00098	0.081	0.000020	0.0044	1.4	0.00050	< 0.01	0.040	0.00030	0.44	5.7	0.00049	6.4	< 2E-06	151	0.026	16	0.00012	0.00027	0.000090	0.25	0.00021	< 0.001	< 0.002
24-Sep-14	12	23	400	340	0.0072	0.0012	0.036	0.00013	0.0048	1.4	0.00060	0.010	0.044	0.00040	0.39	6.6	0.00021	5.1	0.000010	128	0.025	13	0.00015	0.00026	0.00026	0.23	0.00019	< 0.001	< 0.002
8-Oct-14	13	25	400	305	0.0071	0.00097	0.061	< 1E-05	0.0056	1.6	0.00028	< 0.01	0.033	0.00030	0.39	5.8	0.00034	5.2	< 2E-06	151	0.029	12	0.00012	0.000040	0.00012	0.23	0.00019	< 0.001	< 0.002
22-Oct-14	14	27	400	325	0.0063	0.00074	0.054	0.000020	0.0057	1.6	0.00064	< 0.01	0.029	0.00020	0.46	5.9	0.00043	5.1	< 2E-06	140	0.026	13	0.00013	0.000030	0.00012	0.20	0.00022	0.0010	< 0.002
5-Nov-14	15	29	400	325	0.0054	0.0010	0.048	0.000070	0.0049	1.6	0.00033	0.010	0.028	0.00020	0.38	5.3	0.00035	5.2	0.0000030	132	0.028	10	0.00011	0.000060	0.00018	0.19	0.00020	< 0.001	< 0.002
19-Nov-14	16	31	400	315	0.0050	0.0014	0.037	0.000030	0.0056	1.8	0.00084	< 0.01	0.024	0.00020	0.37	5.6	0.00027	5.7	0.0000020	132	0.032	9.5	0.00015	0.000060	0.00017	0.18	0.00017	< 0.001	< 0.002
3-Dec-14	17	33	400	285	0.0044	0.020	0.034	0.000020	0.0049	1.6	0.00054	< 0.01	0.021	0.00030	0.34	5.4	0.00027	5.2	< 2E-06	115	0.032	8.8	0.00013	0.000040	0.00015	0.16	0.00018	0.0030	< 0.002
17-Dec-14	18	35	400	365	0.0040	0.0013	0.030	< 1E-05	0.0050	1.8	0.00071	< 0.01	0.019	0.00020	0.34	6.2	0.00030	5.2	< 2E-06	112	0.030	8.3	0.00012	0.000030	0.00016	0.15	0.00019	< 0.001	< 0.002
31-Dec-14	19	37	400	335	0.0036	0.0012	0.031	0.00012	0.0051	1.7	0.00054	< 0.01	0.018	0.00030	0.33	5.4	0.00028	5.5	< 2E-06	103	0.030	7.7	0.00012	0.00014	0.00016	0.15	0.00020	< 0.001	< 0.002
14-Jan-15	20	39	400	325	0.0033	0.00065	0.028	0.00056	0.0051	1.9	0.00062	< 0.01	0.018	0.00020	0.31	5.8	0.00025	5.7	0.0000020	98	0.032	6.9	0.00012	0.000090	0.00019	0.13	0.00018	< 0.001	< 0.002
28-Jan-15	21	41	400	340	0.0028	0.00061	0.025	< 1E-05	0.0049	2.2	0.00055	< 0.01	0.018	0.00020	0.27	6.4	0.00035	5.4	0.0000030	106	0.029	7.2	0.00012	0.00032	0.00018	0.13	0.00021	< 0.001	< 0.002
11-Feb-15	22	43	400	325	0.0027	0.00044	0.046	< 1E-05	0.0059	2.1	0.00060	0.010	0.015	0.00020	0.26	6.2	< 0.001	5.4	< 2E-06	88	0.039	7.0	0.00012	0.00019	0.00012	0.11	0.00018	< 0.001	< 0.002
25-Feb-15	23	45	400	320	0.0027	0.00082	0.016	< 1E-05	0.0063	2.4	0.00028	< 0.01	0.012	0.00010	0.20	6.9	< 0.001	5.5	< 2E-06	80	0.045	6.0	0.00014	0.00015	< 5E-05	0.10	0.00011	< 0.001	< 0.002
11-Mar-15	24	47	400	315	0.0025	0.00084	0.017	< 1E-05	0.0064	2.7	0.00032	< 0.01	0.012	0.00020	0.16	6.6	< 0.001	4.7	0.0000040	69	0.051	6.1	0.00013	0.000080	0.000050	0.094	0.00013	< 0.001	< 0.002
25-Mar-15	25	49	400	325	0.0027	0.0024	0.017	0.000050	0.0064	3.5	0.00042	< 0.01	0.013	0.00020	0.17	7.8	< 0.001	6.0	0.0000030	76	0.061	6.1	0.00016	0.0012	0.00012	0.085	0.00014	0.0010	< 0.002
8-Apr-15	26	51	400	350	0.0020	0.00092	0.012	< 1E-05	0.0066	3.3	0.00061	< 0.01	0.0095	0.00010	0.15	7.8	< 0.001	6.1	0.0000020	56	0.064	5.1	0.00014	0.00014	0.000090	0.076	0.00010	< 0.001	< 0.002
22-Apr-15	27	53	400	320	0.0019	0.00059	0.012	0.00036	0.0065	4.1	0.00073	< 0.01	0.011	0.00010	0.14	8.9	0.00017	5.4	0.000046	54	0.073	5.3	0.00017	0.000080	0.000070	0.071	0.00012	< 0.001	< 0.002
6-May-15	28	55	400	325	0.0018	0.00095	0.013	0.000030	0.0067	4.2	0.00091	0.020	0.0091	0.00010	0.11	8.8	< 0.001	5.8	0.000058	46	0.074	4.9	0.00016	0.000020	0.000080	0.067	0.00014	< 0.001	< 0.002
20-May-15	29	57	500	445	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	30	59	445	380	0.0016	0.0038	0.018	0.000070	0.0068	5.3	0.00065	< 0.01	0.012	0.00010	0.092	9.5	0.00017	5.5	0.000012	33	0.093	4.3	0.00016	0.00016	0.000080	0.064	0.00012	0.0010	< 0.002
17-Jun-15	31	61	500	445	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	32	63	445	385	0.0016	0.00050	0.011	< 1E-05	0.0069	6.4	0.00083	0.020	0.0066	0.00010	0.089	9.6	0.00016	5.7	0.000020	26	0.12	3.7	0.00019	0.000070	0.000070	0.063	0.00010	< 0.001	< 0.002
15-Jul-15	33	65	500	425	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	34	67	425	355	0.0015	0.00070	0.011	0.000010	0.0072	7.5	0.0018	< 0.01	0.0067	0.00010	0.073	9.9	0.00011	5.7	0.0000090	21	0.14	3.6	0.00020	0.000050	< 5E-05	0.063	0.00013	< 0.001	< 0.002
12-Aug-15	35	69	500	455	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	36	71	455	375	0.0014	0.0018	0.0080	0.000060	0.0072	8.8	0.00091	< 0.01	0.0069	0.00010	0.054	11	0.00032	5.8	0.00026	19	0.17	3.5	0.00021	0.00011	< 5E-05	0.051	0.00011	< 0.001	< 0.002
9-Sep-15	37	73	500	445	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	38	75	445	390	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	39	77	390	320	0.0013	0.00061	0.0080	0.000020	0.0074	12	0.00098	< 0.01	0.0041	0.00020	0.057	12	0.00012	5.3	0.0000070	17	0.20	3.7	0.00021	0.00016	0.00011	0.053	0.00013	< 0.001	< 0.002
21-Oct-15	40	79	500	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	41	81	450	425	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	42	83	425	360	0.0014	0.00079	0.014	< 1E-05	0.0061	12	0.0028	< 0.01	0.0048	< 0.0001	0.057	11	0.00021	5.5	0.0000070	14	0.18	3.5	0.00015	0.000070	0.000070	0.046	0.000080	< 0.001	< 0.002
2-Dec-15	43	85	500	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	44	87	450	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	45	89	400	360	0.0012	0.00046	0.017	0.000020	0.0056	11	0.00042	< 0.01	0.0057	0.00010	0.056	9.3	0.00015	5.3	0.0000090	13	0.15	3.3	0.00012	0.000040	0.00031	0.049	0.000070	< 0.001	< 0.002
6-Jan-16	46	90	400	340	0.0013	0.0010	0.010	< 1E-05	0.0059	11	0.0013	< 0.01	0.0057	0.00010	0.063	10	0.0012	5.6	0.000012	13	0.17	3.2	0.00011	0.00027	< 5E-05	0.047	0.000090	< 0.001	< 0.002
20-Jan-16	47	92	400	355	0.0015	0.00037	0.010	0.000060	0.0057	9.7	0.0011	< 0.01	0.0061	0.00020	0.061	9.0	0.00015	5.9	0.000012	11	0.17	3.6	0.00029	0.000050	0.000050	0.053	0.000070	0.0020	< 0.002
3-Feb-16	48	94	400	350	0.0014	0.0010	0.012	0.000020	0.0053	8.8	0.00060	< 0.01	0.0057	0.00010	0.069	8.7	0.00029	5.4	0.000022	10	0.15	3.7	0.00013	0.000090	< 5E-05	0.051	0.000060	< 0.001	< 0.002
17-Feb-16	49	96	400	330	0.0015	0.00076	0.0080	0.000030	0.0053	9.3	0.00091	< 0.01	0.0060	0.00020	0.068	9.0	0.000090	5.6	< 2E-06	11	0.15	3.4	0.00012	0.00012	< 5E-05	0.051	0.000080	< 0.001	< 0.002
2-Mar-16	50	98	400	350	0.0015	0.00039	0.0080	0.000030	0.0054	9.1	0.0016	< 0.01	0.0062	0.00010	0.070	8.6	0.000080	5.5	0.0000040	9.6	0.14	3.9	0.00012	0.000020	< 5E-05	0.052	0.000040	< 0.001	< 0.002

Appendix D.3-3: Leachate Concentrations and Calculated Loading Rates for Leach Tailings Kinetic Tests

Calculated Loading Rates for Col 1

Date	Cycle	Weeks	Volume (mL)		pH	Alkalinity	Sulphate	Total CN	WAD CN	SCN	CNO	Ammonia-N	Nitrate-N	Nitrite-N	Chloride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr
	No.		Input	Output		$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
23-Apr-14	1	1	1210	385	8.4	19	16	0.38	0.019	0.39	0.12	0.14	0.15	0.38	3.3	0.027	5.2	0.0024	0.0024	0.0042	0.0022	0.00000027	0.00000027	0.0031	0.0000060	1.5	0.0034
7-May-14	2	3	400	455	8.5	9.0	5.7	0.100	0.0050	0.11	0.068	0.030	0.040	0.096	0.71	0.0068	1.0	0.00027	0.0018	0.045	0.00051	0.00000032	0.00000016	0.0011	0.0000076	0.29	0.00091
21-May-14	3	5	450	385	8.6	7.8	4.2	0.039	0.0013	0.039	0.019	0.013	0.011	0.023	0.19	0.0058	0.64	0.00028	0.0011	0.038	0.00033	0.0000015	0.0000085	0.00078	0.000000058	0.18	0.00040
4-Jun-14	4	7	400	325	8.6	6.4	2.9	0.022	0.00065	0.033	0.016	0.0098	0.0034	0.0067	0.050	0.0049	0.47	0.00014	0.00084	0.037	0.00020	0.00000011	0.00000011	0.00032	0.000000049	0.13	0.00020
18-Jun-14	5	9	400	335	8.6	6.7	1.6	0.014	0.00050	0.034	0.017	0.0084	0.0028	0.0023	0.027	0.0050	0.42	0.00016	0.00079	0.045	0.00020	0.00000012	0.00000012	0.00033	0.000000050	0.12	0.00015
2-Jul-14	6	11	400	340	8.5	7.0	1.7	0.011	0.00068	0.034	0.017	0.0085	0.0010	0.0015	0.015	0.0051	0.42	0.00031	0.00089	0.043	0.00021	0.00000012	0.00000012	0.00031	0.00000036	0.12	0.00011
16-Jul-14	7	13	400	340	8.5	6.4	1.2	0.0075	0.00034	0.034	0.017	0.014	0.0010	0.0010	0.010	0.0051	0.38	0.00018	0.00087	0.044	0.00020	0.00000024	0.00000022	0.00035	0.000000051	0.11	0.000097
30-Jul-14	8	15	400	330	8.5	5.9	0.96	0.0063	0.00033	0.033	0.017	0.0083	0.00099	0.00083	0.0066	0.0050	0.30	0.00060	0.00086	0.047	0.00018	0.00000012	0.00000012	0.00034	0.000000050	0.084	0.000081
13-Aug-14	9	17	400	325	8.4	5.6	0.83	0.0062	0.00033	0.033	0.016	0.0081	0.00098	0.00065	0.0049	0.0065	0.34	0.00017	0.00081	0.039	0.00021	0.00000011	0.00000011	0.00039	0.000000049	0.095	0.000062
27-Aug-14	10	19	400	325	8.4	5.3	0.76	0.0034	0.00016			0.0065	0.00098	0.00065	0.016	0.0049	0.33	0.00038	0.00073	0.037	0.00019	0.00000011	0.00000011	0.00054	0.00000011	0.093	0.000052
10-Sep-14	11	21	400	315	8.4	5.0	0.55	0.0036	0.00016			0.0047	0.00095	0.00047	0.0032	0.0047	0.29	0.00033	0.00066	0.037	0.00018	0.00000011	0.00000011	0.00042	0.00000022	0.082	0.000046
24-Sep-14	12	23	400	340	8.4	5.4	0.71	0.0032	0.00017			0.0068	0.0010	0.00051	0.017	0.0051	0.55	0.00014	0.00079	0.037	0.00022	0.00000012	0.00000012	0.00036	0.000000051	0.087	0.000044
8-Oct-14	13	25	400	305	8.4	4.3	0.59	0.0026	0.00031			0.011	0.00092	0.00046	0.015	0.0046	0.32	0.00018	0.00058	0.034	0.00020	0.00000011	0.00000011	0.00027	0.000000046	0.086	0.000038
22-Oct-14	14	27	400	325	8.3	4.4	0.54	0.0029	0.00016			0.0065	0.00098	0.00049	0.016	0.0049	0.33	0.00030	0.00063	0.035	0.00024	0.00000011	0.00000011	0.00049	0.00000021	0.090	0.000035
5-Nov-14	15	29	400	325		4.5	0.52	0.0020	0.00016			0.0049	0.00098	0.00049	0.016	0.0049	0.32	0.00024	0.00061	0.033	0.00022	0.00000011	0.00000011	0.00038	0.000000081	0.088	0.000033
19-Nov-14	16	31	400	315	8.3	4.1	0.47	0.0017	0.00032			0.0095	0.00095	0.00063	0.016	0.0047	0.34	0.00015	0.00057	0.030	0.00025	0.00000011	0.00000011	0.00032	0.00000020	0.092	0.000029
3-Dec-14	17	33	400	285	8.4	3.7	0.41	0.0014	0.00014			0.0057	0.00086	0.00043	0.014	0.0043	0.31	0.00020	0.00048	0.026	0.00022	0.000000100	0.000000100	0.00026	0.00000011	0.087	0.000024
17-Dec-14	18	35	400	365	8.4	4.3	0.42	0.0018	0.00018			0.033	0.0011	0.0015	0.018	0.0055	0.38	0.00031	0.00065	0.031	0.00026	0.00000013	0.00000013	0.00035	0.00000015	0.098	0.000026
31-Dec-14	19	37	400	335	8.5	4.6	0.32	0.0013	0.00017			0.0084	0.0010	0.0010	0.017	0.0050	0.34	0.00035	0.00056	0.027	0.00028	0.00000012	0.00000012	0.00030	0.000000050	0.090	0.000022
14-Jan-15	20	39	400	325	8.3	3.6	0.33	0.0013	0.00016			0.0065	0.00098	0.00081	0.016	0.0049	0.38	0.00036	0.00055	0.025	0.00027	0.00000011	0.00000011	0.00031	0.00000028	0.10	0.00011
28-Jan-15	21	41	400	340	8.3	3.9	0.36	0.0010	0.00017			0.0068	0.0010	0.0019	0.017	0.0051	0.46	0.00026	0.00050	0.023	0.00030	0.00000012	0.00000075	0.00027	0.000000068	0.13	0.000023
11-Feb-15	22	43	400	325	8.2	3.4	0.34	0.00081	0.00016			0.0065	0.00098	0.0011	0.016	0.0049	0.43	0.00020	0.00051	0.021	0.00029	0.00000011	0.00000011	0.00033	0.000000098	0.11	0.000019
25-Feb-15	23	45	400	320	8.2	3.2	0.29	0.00080	0.00016			0.0064	0.00096	0.0013	0.016	0.0048	0.51	0.000061	0.00042	0.016	0.00035	0.00000011	0.00000011	0.00029	0.000000096	0.14	0.000018
11-Mar-15	24	47	400	315	8.2	3.1	0.32	0.00063	0.00016			0.0079	0.00095	0.00095	0.016	0.0047	0.56	0.000077	0.00039	0.014	0.00036	0.00000011	0.00000011	0.00027	0.000000079	0.15	0.000017
25-Mar-15	25	49	400	325	8.1	2.9	0.21	0.00016	0.00016			0.0065	0.00098	0.0011	0.016	0.0049	0.67	0.000096	0.00041	0.015	0.00044	0.00000011	0.00000011	0.00025	0.000000049	0.18	0.000021
8-Apr-15	26	51	400	350	8.1	3.0	0.25	0.00088	0.00018			0.011	0.0011	0.0018	0.018	0.0053	0.78	0.00013	0.00049	0.013	0.00052	0.00000012	0.00000012	0.00025	0.000000053	0.22	0.000016
22-Apr-15	27	53	400	320	8.0	2.5	0.26	0.00048	0.00016			0.013	0.00096	0.0024	0.016	0.0048	0.80	0.00016	0.00039	0.011	0.00050	0.00000011	0.00000011	0.00035	0.00000022	0.21	0.000015
6-May-15	28	55	400	325	8.1	2.6	0.21	0.00033	0.00016			0.0065	0.00098	0.0041	0.016	0.0049	0.89	0.00011	0.00034	0.0095	0.00053	0.00000011	0.00000011	0.00030	0.000000049	0.24	0.000013
20-May-15	29	57	500	445																							
3-Jun-15	30	59	445	380	8.1	1.4	0.086	0.0064	0.00019			0.0057	0.00057	0.000095	0.0095	0.0029	0.63	0.000085	0.00015	0.0045	0.00039	0.000000067	0.000000067	0.00019	0.000000038	0.17	0.0000080
17-Jun-15	31	61	500	445																							
1-Jul-15	32	63	445	385	8.0	1.4	0.11	0.00019	0.000096			0.0067	0.00058	0.019	0.0096	0.0029	0.76	0.000049	0.00015	0.0044	0.00048	0.000000067	0.000000067	0.00014	0.000000029	0.20	0.0000066
15-Jul-15	33	65	500	425																							
29-Jul-15	34	67	425	355	8.0	1.2	0.098	0.00018	0.00036			0.0071	0.00089	0.050	0.0089	0.0027	0.86	0.000056	0.00012	0.0032	0.00046	0.000000062	0.000000098	0.00015	0.000000027	0.23	0.0000067
12-Aug-15	35	69	500	455																							
26-Aug-15	36	71	455	375	8.0	1.1	0.084	0.00019	0.00019			0.0084	0.0016	0.12	0.0094	0.0028	1.0	0.000047	0.00012	0.0031	0.00057	0.000000066	0.000000066	0.00015	0.00000026	0.27	0.0000061
9-Sep-15	37	73	500	445																							
23-Sep-15	38	75	445	390																							
7-Oct-15	39	77	390	320	7.9	0.65	0.043	0.00011	0.000053			0.0027	0.0015	0.11	0.00	0.00	0.74	0.000040	0.000072	0.0015	0.00038	0.000000037	0.000000037	0.000084	0.000000016	0.19	0.0000032
21-Oct-15	40	79	500	450																							
4-Nov-15	41	81	450	425																							
18-Nov-15	42	83	425	360	8.2	0.79	0.042	0.000060	0.000060			0.0012	0.0017	0.10	0.00	0.00	0.82	0.000026	0.000067	0.0017	0.00036	0.000000042	0.000000042	0.000064	0.000000018	0.22	0.0000036
2-Dec-15	43	85	500	450																							
16-Dec-15	44	87	450	400																							
30-Dec-15	45	89	400	360	8.3	0.67	0.054	0.00012	0.000060			0.00060	0.0018	0.077			0.77	0.000021	0.000065	0.0014	0.00036	0.000000042	0.000000042	0.000078	0.000000018	0.20	0.0000032
6-Jan-16	46	90	400	340	8.2	3.8	0.31	0.00068	0.00034			0.0068	0.0082	0.40			4.6	0.00017	0.00039	0.0091	0.0021	0.00000024	0.00000024	0.00044	0.00000010	1.2	0.000019
20-Jan-16	47	92	400	355	8.2	1.9	0.16	0.00036	0.00018			0.0018	0.0036	0.15			2.2	0.000075	0.00024	0.0056	0.0010	0.00000012	0.00000012	0.00039	0.00000011	0.59	0.000011
3-Feb-16	48	94	400	350	8.1	1.9	0.16	0.00018	0.00018			0.0018	0.0023	0.090			1.9	0.000061	0.00021	0.0058	0.00095	0.00000012	0.00000012	0.00021	0.000000053	0.50	0.000011
17-Feb-16	49	96	400	330	8.1	1.9	0.13	0.00033	0.00066			0.0017	0.0017	0.052			1.9	0.000059	0.00020	0.0056	0.00089	0.00000012	0.00000012	0.00021	0.000000050	0.50	0.000011
2-Mar-16	50	98	400	350	8.2	2.0	0.16	0.00018	0.00018			0.0018	0.0011	0.033			1.8	0.000028	0.00023	0.0067	0.00089	0.00000012	0.00000012	0.00019	0.000000088	0.47	0.000012

Appendix D.3-3: Leachate Concentrations and Calculated Loading Rates for Leach Tailings Kinetic Tests

Calculated Loading Rates for Col 1

Date	Cycle	Weeks	Volume (mL)		Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.		Input	Output	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
23-Apr-14	1	1	1210	385	0.012	0.00095	0.11	0.0000050	0.00057	0.31	0.00045	0.30	0.0084	0.0096	0.020	1.0	0.000023	0.22	0.00024	21	0.0066	7.7	0.000020	0.000030	0.000046	0.043	0.000018	0.00035	0.000077
7-May-14	2	3	400	455	0.0044	0.00018	0.037	0.0000030	0.00017	0.076	0.00015	0.015	0.0085	0.0013	0.0098	0.33	0.00011	0.13	0.000000046	7.5	0.0014	2.9	0.0000069	0.0000011	0.000030	0.022	0.00000023	0.000068	0.000046
21-May-14	3	5	450	385	0.0018	0.000082	0.016	0.0000094	0.00013	0.048	0.000085	0.0021	0.0027	0.000050	0.0081	0.20	0.000045	0.095	0.0000012	5.7	0.00086	1.5	0.0000043	0.0000012	0.000029	0.013	0.0000019	0.000039	0.000039
4-Jun-14	4	7	400	325	0.00066	0.00016	0.0077	0.0000044	0.000086	0.035	0.000050	0.00081	0.0023	0.000016	0.0072	0.15	0.000020	0.085	0.00000023	4.1	0.00062	0.93	0.0000030	0.0000029	0.000010	0.0091	0.00000098	0.000081	0.000033
18-Jun-14	5	9	400	335	0.00048	0.00028	0.0052	0.00000034	0.000087	0.031	0.000035	0.00084	0.0015	0.000013	0.0076	0.14	0.000018	0.089	0.000000034	3.7	0.00056	0.73	0.0000026	0.0000015	0.0000075	0.0094	0.0000013	0.000017	0.000034
2-Jul-14	6	11	400	340	0.00037	0.000071	0.0037	0.0000012	0.000085	0.031	0.000027	0.00051	0.0012	0.000015	0.0078	0.14	0.000014	0.095	0.000000034	3.5	0.00056	0.63	0.0000025	0.0000022	0.0000073	0.0083	0.0000010	0.000034	0.000034
16-Jul-14	7	13	400	340	0.00031	0.000029	0.0029	0.00000051	0.000084	0.028	0.000020	0.00034	0.0011	0.000010	0.0077	0.13	0.000010	0.086	0.00000026	3.2	0.00050	0.49	0.0000027	0.0000019	0.0000054	0.0067	0.0000034	0.000017	0.000034
30-Jul-14	8	15	400	330	0.00022	0.000060	0.0023	0.00000050	0.000077	0.022	0.000020	0.00017	0.0011	0.0000083	0.0077	0.11	0.0000099	0.079	0.000000033	2.6	0.00040	0.38	0.0000021	0.00000033	0.000014	0.0054	0.0000051	0.000017	0.000033
13-Aug-14	9	17	400	325	0.00017	0.000022	0.0012	0.00000033	0.000081	0.024	0.000013	0.00016	0.00075	0.0000065	0.0075	0.11	0.0000085	0.084	0.000000033	2.7	0.00045	0.33	0.0000020	0.00000081	0.0000047	0.0051	0.0000020	0.000016	0.000033
27-Aug-14	10	19	400	325	0.00016	0.000019	0.0013	0.00000033	0.000077	0.024	0.000015	0.00016	0.00073	0.0000065	0.0069	0.11	0.0000070	0.086	0.000000033	2.6	0.00044	0.29	0.0000022	0.0000057	0.0000016	0.0048	0.0000037	0.000016	0.000033
10-Sep-14	11	21	400	315	0.00013	0.000015	0.0013	0.00000032	0.000069	0.022	0.0000079	0.00016	0.00063	0.0000047	0.0070	0.090	0.0000077	0.10	0.000000032	2.4	0.00041	0.25	0.0000019	0.0000043	0.0000014	0.0039	0.0000033	0.000016	0.000032
24-Sep-14	12	23	400	340	0.00012	0.000020	0.00061	0.0000022	0.000082	0.024	0.000010	0.00017	0.00074	0.0000068	0.0066	0.11	0.0000036	0.086	0.00000017	2.2	0.00042	0.22	0.0000026	0.0000044	0.0000044	0.0039	0.0000032	0.000017	0.000034
8-Oct-14	13	25	400	305	0.00011	0.000015	0.00093	0.00000015	0.000085	0.024	0.0000043	0.00015	0.00051	0.0000046	0.0060	0.088	0.0000052	0.079	0.000000031	2.3	0.00044	0.19	0.0000019	0.00000061	0.0000018	0.0035	0.0000029	0.000015	0.000031
22-Oct-14	14	27	400	325	0.00010	0.000012	0.00088	0.00000033	0.000093	0.026	0.000010	0.00016	0.00046	0.0000033	0.0075	0.095	0.0000070	0.083	0.000000033	2.3	0.00042	0.21	0.0000020	0.00000049	0.0000020	0.0033	0.0000036	0.000016	0.000033
5-Nov-14	15	29	400	325	0.000087	0.000017	0.00078	0.0000011	0.000079	0.026	0.0000054	0.00016	0.00046	0.0000033	0.0062	0.085	0.0000057	0.084	0.000000049	2.1	0.00045	0.16	0.0000019	0.00000098	0.0000029	0.0031	0.0000033	0.000016	0.000033
19-Nov-14	16	31	400	315	0.000079	0.000022	0.00058	0.00000047	0.000088	0.028	0.000013	0.00016	0.00038	0.0000032	0.0059	0.089	0.0000043	0.090	0.000000032	2.1	0.00050	0.15	0.0000023	0.00000095	0.0000027	0.0029	0.0000027	0.000016	0.000032
3-Dec-14	17	33	400	285	0.000062	0.00028	0.00048	0.00000029	0.000070	0.023	0.0000077	0.00014	0.00030	0.0000043	0.0048	0.076	0.0000038	0.074	0.000000029	1.6	0.00045	0.13	0.0000018	0.00000057	0.0000021	0.0022	0.0000026	0.000043	0.000029
17-Dec-14	18	35	400	365	0.000073	0.000023	0.00055	0.00000018	0.000091	0.032	0.000013	0.00018	0.00035	0.0000037	0.0062	0.11	0.0000055	0.095	0.000000037	2.0	0.00055	0.15	0.0000022	0.00000055	0.0000029	0.0027	0.0000035	0.000018	0.000037
31-Dec-14	19	37	400	335	0.000060	0.000021	0.00052	0.0000020	0.000085	0.028	0.0000090	0.00017	0.00031	0.0000050	0.0055	0.091	0.0000047	0.093	0.000000034	1.7	0.00050	0.13	0.0000020	0.0000023	0.0000027	0.0026	0.0000034	0.000017	0.000034
14-Jan-15	20	39	400	325	0.000054	0.000011	0.00046	0.0000091	0.000083	0.030	0.000010	0.00016	0.00029	0.0000033	0.0050	0.094	0.0000041	0.093	0.000000033	1.6	0.00052	0.11	0.0000020	0.0000015	0.0000031	0.0020	0.0000029	0.000016	0.000033
28-Jan-15	21	41	400	340	0.000047	0.000010	0.00043	0.00000017	0.000083	0.037	0.0000094	0.00017	0.00031	0.0000034	0.0046	0.11	0.0000060	0.091	0.000000051	1.8	0.00049	0.12	0.0000020	0.0000054	0.0000031	0.0022	0.0000036	0.000017	0.000034
11-Feb-15	22	43	400	325	0.000045	0.0000072	0.00075	0.00000016	0.000096	0.034	0.0000098	0.00016	0.00024	0.0000033	0.0043	0.100	0.000016	0.088	0.000000033	1.4	0.00063	0.11	0.0000019	0.0000031	0.0000020	0.0017	0.0000029	0.000016	0.000033
25-Feb-15	23	45	400	320	0.000043	0.000013	0.00026	0.00000016	0.00010	0.038	0.0000045	0.00016	0.00020	0.0000016	0.0032	0.11	0.000016	0.088	0.000000032	1.3	0.00072	0.096	0.0000022	0.0000024	0.00000080	0.0016	0.0000018	0.000016	0.000032
11-Mar-15	24	47	400	315	0.000040	0.000013	0.00027	0.00000016	0.00010	0.043	0.0000050	0.00016	0.00019	0.0000032	0.0026	0.10	0.000016	0.075	0.000000063	1.1	0.00080	0.096	0.0000020	0.0000013	0.00000079	0.0015	0.0000020	0.000016	0.000032
25-Mar-15	25	49	400	325	0.000044	0.000040	0.00028	0.00000081	0.00010	0.056	0.0000068	0.00016	0.00022	0.0000033	0.0027	0.13	0.000016	0.098	0.000000049	1.2	0.00099	0.099	0.0000026	0.000019	0.0000020	0.0014	0.0000023	0.000016	0.000033
8-Apr-15	26	51	400	350	0.000035	0.000016	0.00021	0.00000018	0.00012	0.057	0.000011	0.00018	0.00017	0.0000018	0.0026	0.14	0.000018	0.11	0.000000035	0.98	0.0011	0.089	0.0000025	0.0000025	0.0000016	0.0013	0.0000018	0.000018	0.000035
22-Apr-15	27	53	400	320	0.000031	0.0000094	0.00019	0.0000058	0.00010	0.066	0.000012	0.00016	0.00018	0.0000016	0.0023	0.14	0.0000027	0.086	0.00000074	0.86	0.0012	0.085	0.0000027	0.0000013	0.0000011	0.0011	0.0000019	0.000016	0.000032
6-May-15	28	55	400	325	0.000028	0.000015	0.00021	0.00000049	0.00011	0.069	0.000015	0.00033	0.00015	0.0000016	0.0017	0.14	0.000016	0.094	0.00000094	0.75	0.0012	0.080	0.0000026	0.00000033	0.0000013	0.0011	0.0000023	0.000016	0.000033
20-May-15	29	57	500	445																									
3-Jun-15	30	59	445	380	0.000015	0.000036	0.00017	0.00000067	0.000065	0.050	0.0000062	0.000095	0.00012	0.00000095	0.00087	0.090	0.0000016	0.052	0.00000011	0.31	0.00089	0.041	0.0000015	0.0000015	0.00000076	0.00061	0.0000011	0.0000095	0.000019
17-Jun-15	31	61	500	445																									
1-Jul-15	32	63	445	385	0.000015	0.0000048	0.00011	0.000000096	0.000066	0.062	0.0000080	0.00019	0.000064	0.00000096	0.00086	0.092	0.0000015	0.055	0.00000019	0.25	0.0011	0.036	0.0000018	0.00000067	0.00000067	0.00060	0.00000096	0.0000096	0.000019
15-Jul-15	33	65	500	425																									
29-Jul-15	34	67	425	355	0.000013	0.0000062	0.000098	0.000000089	0.000064	0.067	0.000016	0.000089	0.000059	0.00000089	0.00065	0.088	0.00000098	0.050	0.000000080	0.19	0.0013	0.032	0.0000018	0.00000044	0.00000044	0.00056	0.0000012	0.0000089	0.000018
12-Aug-15	35	69	500	455																									
26-Aug-15	36	71	455	375	0.000013	0.000017	0.000075	0.00000056	0.000067	0.082	0.0000085	0.000094	0.000065	0.00000094	0.00051	0.099	0.0000030	0.054	0.0000025	0.17	0.0016	0.033	0.0000020	0.0000010	0.00000047	0.00048	0.0000010	0.0000094	0.000019
9-Sep-15	37	73	500	445																									
23-Sep-15	38	75	445	390																									
7-Oct-15	39	77	390	320	0.0000070	0.0000033	0.000043	0.00000011	0.000040	0.064	0.0000052	0.000053	0.000022	0.0000011	0.00030	0.061	0.00000064	0.028	0.000000037	0.092	0.0011	0.020	0.0000011	0.00000085	0.00000059	0.00028	0.00000069	0.0000053	0.000011
21-Oct-15	40	79	500	450																									
4-Nov-15	41	81	450	425																									
18-Nov-15	42	83	425	360	0.0000086	0.0000047	0.000084	0.000000060	0.000037	0.069	0.000017	0.000060	0.000029	0.00000060	0.00034	0.063	0.0000013	0.033	0.000000042	0.085	0.0011	0.021	0.00000092	0.00000042	0.00000042	0.00027	0.00000048	0.0000060	0.000012
2-Dec-15	43	85	500	450																									
16-Dec-15	44	87	450	400																									
30-Dec-15	45	89	400	360	0.0000073	0.0000028	0.00010	0.00000012	0.000033	0.065	0.0000025	0.000060	0.000034	0.00000060	0.00034	0.056	0.00000090	0.032	0.000000054	0.077	0.00088	0.020	0.00000071	0.00000024	0.0000019	0.00029	0.00000042	0.0000060	0.000012
6-Jan-16	46	90	400	340	0.000043	0.000034	0.00034	0.00000034	0.00020	0.38	0.000043	0.00034	0.00019	0.0000034	0.0021	0.34	0.000041	0.19	0.00000041	0.44	0.0056	0.11	0.0000036	0.0000092	0.0000017	0.0016	0.0000031	0.000034	0.000068
20-Jan-16	47	92	400	355	0.000026	0.0000066	0.00018	0.0000011	0.00010	0.17	0.000019	0.00018	0.00011	0.0000036	0.0011	0.16	0.0000027	0.10	0.00000021	0.20	0.0030	0.064	0.0000051	0.00000089	0.00000089	0.00093	0.0000012	0.000036	0.000036
3-Feb-16	48	94	400	350	0.000024	0.000018	0.00021	0.00000035	0.000093	0.15	0.000011	0.00018	0.000099	0.0000018	0.0012	0.15	0.0000051	0.094	0.00000039	0.18	0.0027	0.065	0.0000023	0.0000016	0.00000088	0.00090	0.0000011	0.000018	0.000035
17-Feb-16	49	96	400	330	0.000025	0.000013	0.00013	0.00000050	0.000088	0.15	0.000015	0.00017	0.000099	0.0000033	0.0011	0.15	0.0000015	0.092	0.000000033	0.18	0.0024	0.056	0.0000020	0.0000020	0.00000083	0.00084	0.0000013	0.000017	0.000033
2-Mar-16	50	98	400	350	0.000025	0.0000068	0.00014	0.00000053	0.000094	0.16	0.000029	0.00018	0.00011	0.0000018	0.0012	0.15	0.0000014	0.096	0.000000070	0.17	0.0025	0.068	0.0000021	0.00000035	0.00000088	0.00091	0.00000070	0.000018	0.000035

Appendix D.3-3: Leachate Concentrations and Calculated Loading Rates for Leach Tailings Kinetic Tests

Leachate Concentrations for Col 2 (LT1, Sample 'B')

Date	Cycle	Weeks	Volume (mL)		pH	Alkalinity	Sulphate	Total CN	WAD CN	SCN	CNO	Ammonia-N	Nitrate-N	Nitrite-N	Chloride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr
	No.		Input	Output		mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
23-Apr-14	1	1	2355	590	8.5	475	598	14	0.50	< 10	< 5	5.2	1.8	12	130	0.80	206	0.027	0.056	0.087	0.080	< 7E-06	< 7E-06	0.082	< 4E-06	63	0.13
7-May-14	2	3	450	340	8.5	424	374	6.7	0.24	< 5	< 3	1.9	2.4	5.9	46	< 0.3	61	0.013	0.079	1.8	0.028	0.000022	< 7E-06	0.054	0.00037	17	0.065
21-May-14	3	5	550	380	8.7	415	291	3.6	0.080	< 2	< 1	1.0	1.0	2.3	18	< 0.3	45	0.28	0.059	1.8	0.019	0.000046	0.00027	0.033	< 3E-06	13	0.031
4-Jun-14	4	7	450	350	8.6	422	274	1.8	0.050	< 2	< 1	1.0	0.50	1.1	7.7	< 0.3	41	0.0097	0.052	2.1	0.016	< 7E-06	< 7E-06	0.021	< 3E-06	12	0.020
18-Jun-14	5	9	450	325	8.6	447	204	1.5	0.030	< 2	< 1	0.70	0.56	0.28	4.6	< 0.3	36	0.017	0.053	2.4	0.016	< 7E-06	< 7E-06	0.025	< 3E-06	10	0.017
2-Jul-14	6	11	450	350	8.6	485	179	1.3	0.040	< 2	< 1	0.80	0.16	0.28	2.5	< 0.3	34	0.012	0.054	2.5	0.014	< 7E-06	< 7E-06	0.019	0.000029	9.4	0.011
16-Jul-14	7	13	450	295	8.6	464	132	0.95	0.020	< 2	< 1	1.0	0.11	0.18	1.6	< 0.3	32	0.0084	0.054	2.6	0.014	0.0000070	0.0000070	0.021	< 3E-06	9.0	0.010
30-Jul-14	8	15	450	340	8.6	504	119	0.84	0.030	< 2	< 1	0.80	0.070	0.12	1.1	< 0.3	28	0.022	0.054	2.7	0.013	< 7E-06	< 7E-06	0.023	< 3E-06	7.9	0.0088
13-Aug-14	9	17	450	350	8.6	448	107	0.98	0.030	< 2	< 1	0.70	< 0.06	0.090	0.80	< 0.3	27	0.012	0.053	2.5	0.013	< 7E-06	< 7E-06	0.023	< 3E-06	7.5	0.0066
27-Aug-14	10	19	450	350	8.6	439	89	0.50	0.020	-	-	0.60	< 0.06	0.070	0.70	< 0.3	27	0.016	0.048	2.5	0.012	< 7E-06	< 7E-06	0.031	0.000015	7.5	0.0056
10-Sep-14	11	21	450	340	8.6	437	70	0.51	0.030	-	-	0.50	< 0.06	0.060	0.50	< 0.3	25	0.012	0.045	2.7	0.012	< 7E-06	< 7E-06	0.026	0.000022	6.9	0.0049
24-Sep-14	12	23	450	305	8.6	442	65	0.49	0.020	-	-	0.50	< 0.06	0.070	< 1	< 0.3	24	0.0073	0.051	2.5	0.012	< 7E-06	< 7E-06	0.021	< 3E-06	6.6	0.0043
8-Oct-14	13	25	450	350	8.6	381	64	0.55	0.020	-	-	0.80	< 0.06	0.050	< 1	< 0.3	24	0.013	0.045	2.7	0.013	< 7E-06	< 7E-06	0.020	0.000017	6.7	0.0041
22-Oct-14	14	27	450	345	8.6	409	57	0.40	0.020	-	-	0.60	< 0.06	0.050	< 1	< 0.3	25	0.011	0.047	2.8	0.013	< 7E-06	< 7E-06	0.029	0.000033	6.8	0.0041
5-Nov-14	15	29	450	335	-	405	53	0.34	0.010	-	-	0.40	< 0.06	0.040	< 1	< 0.3	22	0.012	0.044	2.6	0.012	< 7E-06	< 7E-06	0.022	0.000015	5.9	0.0035
19-Nov-14	16	31	450	340	8.5	397	46	0.33	0.020	-	-	0.50	< 0.06	0.060	< 1	< 0.3	23	0.0072	0.043	2.6	0.014	< 7E-06	< 7E-06	0.024	0.000019	6.2	0.0034
3-Dec-14	17	33	450	350	8.6	377	42	0.28	< 0.01	-	-	0.40	< 0.06	0.050	< 1	< 0.3	23	0.0099	0.044	2.7	0.014	< 7E-06	< 7E-06	0.021	0.000014	6.4	0.0032
17-Dec-14	18	35	450	335	8.6	368	41	0.31	< 0.01	-	-	0.60	< 0.06	0.10	< 1	< 0.3	21	0.0077	0.046	2.6	0.013	< 7E-06	< 7E-06	0.022	0.000014	5.5	0.0030
31-Dec-14	19	37	650	355	8.5	431	36	0.21	0.020	-	-	0.50	< 0.06	0.070	< 1	< 0.3	21	0.014	0.046	2.6	0.014	< 7E-06	< 7E-06	0.021	0.000014	5.5	0.0029
14-Jan-15	20	39	450	335	8.5	319	31	0.14	0.020	-	-	0.50	< 0.06	0.050	< 1	< 0.3	19	0.012	0.047	2.5	0.014	< 7E-06	< 7E-06	0.021	0.000016	5.2	0.0027
28-Jan-15	21	41	450	335	8.5	333	34	0.16	< 0.01	-	-	0.40	< 0.06	0.060	1.0	< 0.3	22	0.013	0.038	2.3	0.015	< 7E-06	0.000021	0.018	0.000011	5.9	0.0026
11-Feb-15	22	43	450	335	8.5	325	33	0.14	< 0.01	-	-	0.40	< 0.06	0.080	1.0	< 0.3	21	0.0093	0.044	2.2	0.016	< 7E-06	< 7E-06	0.023	0.000010	5.6	0.0023
25-Feb-15	23	45	450	345	8.5	340	30	0.12	0.010	-	-	0.40	< 0.06	0.14	< 1	< 0.3	23	0.0080	0.039	1.9	0.017	< 7E-06	< 7E-06	0.023	0.000014	6.3	0.0023
11-Mar-15	24	47	450	330	8.5	337	31	0.12	0.010	-	-	0.40	< 0.06	0.16	< 1	< 0.3	23	0.0086	0.041	2.0	0.016	< 7E-06	< 7E-06	0.020	0.000013	6.2	0.0023
25-Mar-15	25	49	450	355	8.4	309	23	0.11	0.010	-	-	0.40	0.060	0.23	< 1	< 0.3	23	0.011	0.041	2.1	0.017	< 7E-06	< 7E-06	0.020	0.000011	6.1	0.0025
8-Apr-15	26	51	450	370	8.4	310	24	0.11	< 0.01	-	-	0.30	0.21	0.27	< 1	< 0.3	22	0.0075	0.047	2.1	0.018	< 7E-06	0.000010	0.020	< 3E-06	6.1	0.0021
22-Apr-15	27	53	450	330	8.4	303	27	0.10	0.020	-	-	0.50	0.58	0.19	< 1	< 0.3	23	0.0067	0.042	1.9	0.015	< 7E-06	< 7E-06	0.021	0.000038	6.1	0.0021
6-May-15	28	55	450	325	8.4	289	20	0.080	< 0.01	-	-	0.20	1.1	0.060	< 1	< 0.3	22	0.0093	0.039	1.7	0.018	< 7E-06	< 7E-06	0.021	0.0000030	5.8	0.0018
20-May-15	29	57	500	410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	30	59	410	300	8.4	248	17	0.070	0.070	-	-	0.40	2.8	< 0.01	< 1	< 0.3	29	0.0086	0.029	1.4	0.023	< 7E-06	< 7E-06	0.025	0.0000070	8.1	0.0016
17-Jun-15	31	61	500	410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	32	63	410	310	8.3	226	16	0.070	0.010	-	-	0.40	7.9	< 0.03	< 1	< 0.3	27	0.010	0.028	1.4	0.024	< 7E-06	< 7E-06	0.021	0.0000060	7.2	0.0015
15-Jul-15	33	65	500	385	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	34	67	385	300	8.3	202	14	0.040	0.040	-	-	0.50	17	0.040	< 1	< 0.3	34	0.0057	0.023	1.00	0.027	< 7E-06	< 7E-06	0.021	0.000011	9.5	0.0013
12-Aug-15	35	69	500	385	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	36	71	385	285	8.3	176	12	0.040	0.010	-	-	0.60	24	0.050	< 1	< 0.3	45	0.0060	0.020	0.74	0.039	< 7E-06	< 7E-06	0.022	0.000015	12	0.0012
9-Sep-15	37	73	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	38	75	495	410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	39	77	410	310	8.1	154	11	0.030	< 0.01	-	-	0.20	26	0.030	-	-	66	0.0048	0.019	0.48	0.047	< 7E-06	< 7E-06	0.019	0.0000030	18	0.00097
21-Oct-15	40	79	500	410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	41	81	410	335	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	42	83	335	255	8.0	160	10	0.020	0.010	-	-	< 0.1	26	< 0.03	-	-	88	0.0041	0.014	0.44	0.047	< 7E-06	< 7E-06	0.016	< 3E-06	23	0.0011
2-Dec-15	43	85	500	415	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	44	87	415	345	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	45	89	345	285	8.3	135	10	0.030	< 0.01	-	-	< 0.1	22	< 0.03	-	-	98	0.0048	0.014	0.33	0.058	< 7E-06	< 7E-06	0.019	0.0000040	26	0.00096
6-Jan-16	46	90	400	310	8.3	134	12	0.020	< 0.01	-	-	< 0.1	21	< 0.03	-	-	105	0.0053	0.014	0.36	0.064	< 7E-06	< 7E-06	0.018	0.000037	28	0.0011
20-Jan-16	47	92	400	305	8.3	132	9.0	0.020	0.020	-	-	< 0.1	20	< 0.03	-	-	105	0.0040	0.016	0.41	0.066	< 7E-06	< 7E-06	0.019	< 3E-06	28	0.0012
3-Feb-16	48	94	400	285	8.3	133	12	0.020	< 0.01	-	-	< 0.1	18	< 0.03	-	-	97	0.0053	0.014	0.43	0.063	< 7E-06	< 7E-06	0.016	< 3E-06	26	0.0011
17-Feb-16	49	96	400	300	8.2	139	12	0.030	0.040	-	-	< 0.1	14	< 0.03	-	-	99	0.0037	0.014	0.43	0.061	< 7E-06	< 7E-06	0.017	0.000022	27	0.0013
2-Mar-16	50	98	400	320	8.3	142	14	0.030	< 0.01	-	-	0.10	11	< 0.03	-	-	93	0.0020	0.015	0.51	0.057	< 7E-06	< 7E-06	0.016	0.0000030	24	0.0013

Appendix D.3-3: Leachate Concentrations and Calculated Loading Rates for Leach Tailings Kinetic Tests

Leachate Concentrations for Col 2 (LT1, Sample 'B')

Date	Cycle	Weeks	Volume (mL)		Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.		Input	Output	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
23-Apr-14	1	1	2355	590	0.50	0.024	5.3	0.00083	0.019	12	0.011	7.9	0.20	0.40	0.40	35	0.00070	5.6	0.0082	721	0.26	279	0.00072	0.00023	0.00088	1.4	< 1E-05	0.0080	< 0.002
7-May-14	2	3	450	340	0.27	0.011	2.5	0.00032	0.0090	4.5	0.011	1.2	0.28	0.12	0.42	18	0.0059	6.1	< 2E-06	424	0.083	179	0.00037	0.000060	0.0016	1.2	< 1E-05	0.0040	< 0.002
21-May-14	3	5	550	380	0.15	0.0064	1.4	0.00050	0.0068	3.2	0.0067	0.30	0.19	0.021	0.38	12	0.0031	5.0	0.000066	347	0.059	112	0.00025	0.00027	0.00094	0.82	0.00014	0.0020	< 0.002
4-Jun-14	4	7	450	350	0.079	0.0095	0.89	0.000030	0.0063	2.8	0.0049	0.13	0.15	0.0020	0.42	11	0.0022	5.4	0.0000050	314	0.052	90	0.00022	0.00011	0.00062	0.68	< 1E-05	0.0030	< 0.002
18-Jun-14	5	9	450	325	0.075	0.039	0.66	0.000070	0.0065	2.6	0.0038	0.090	0.18	0.0013	0.42	11	0.0019	5.4	< 2E-06	285	0.047	75	0.00022	< 1E-05	0.00043	0.84	< 1E-05	0.0030	< 0.002
2-Jul-14	6	11	450	350	0.045	0.0036	0.46	0.000030	0.0059	2.5	0.0031	0.070	0.11	0.0011	0.45	10	0.0015	5.5	< 2E-06	264	0.044	63	0.00019	0.00016	0.00055	0.62	< 1E-05	0.0010	< 0.002
16-Jul-14	7	13	450	295	0.040	0.0031	0.39	0.000020	0.0059	2.3	0.0039	0.060	0.12	0.0011	0.47	9.8	0.0013	5.1	0.0000030	254	0.041	51	0.00019	0.00012	0.00048	0.56	0.00015	< 0.001	< 0.002
30-Jul-14	8	15	450	340	0.030	0.0040	0.30	0.000020	0.0064	2.1	0.0025	0.030	0.11	0.00090	0.48	9.0	0.0013	5.1	< 2E-06	238	0.037	42	0.00018	< 1E-05	0.0010	0.50	0.00037	< 0.001	< 0.002
13-Aug-14	9	17	450	350	0.024	0.0023	0.20	0.000020	0.0059	2.0	0.0026	< 0.01	0.089	0.00070	0.48	8.2	0.0015	5.2	< 2E-06	243	0.035	36	0.00016	0.000040	0.00048	0.48	0.000080	< 0.001	< 0.002
27-Aug-14	10	19	450	350	0.022	0.0024	0.20	0.000050	0.0054	2.0	0.0018	< 0.01	0.086	0.00050	0.48	8.7	0.00085	5.5	0.0000020	223	0.035	32	0.00016	0.00038	0.000070	0.45	0.00027	< 0.001	< 0.002
10-Sep-14	11	21	450	340	0.018	0.0014	0.19	< 1E-05	0.0051	1.8	0.00089	0.020	0.077	0.00050	0.49	6.6	0.0011	6.2	< 2E-06	216	0.034	29	0.00015	0.00015	0.000090	0.39	0.00023	< 0.001	< 0.002
24-Sep-14	12	23	450	305	0.015	0.0018	0.092	0.000060	0.0055	1.8	0.0010	0.020	0.071	0.00060	0.46	8.2	0.00089	5.1	0.0000040	219	0.031	23	0.00016	0.000080	0.00045	0.37	0.00021	0.0030	< 0.002
8-Oct-14	13	25	450	350	0.015	0.0019	0.14	0.000040	0.0061	1.8	0.00066	0.030	0.066	0.00040	0.48	6.4	0.00080	5.2	< 2E-06	210	0.033	21	0.00014	0.000080	0.00020	0.35	0.00022	< 0.001	< 0.002
22-Oct-14	14	27	450	345	0.014	0.0011	0.14	0.000020	0.0059	2.0	0.00072	< 0.01	0.062	0.00040	0.57	6.8	0.00077	5.3	< 2E-06	217	0.033	23	0.00014	0.000030	0.00014	0.35	0.00027	< 0.001	< 0.002
5-Nov-14	15	29	450	335	0.012	0.0014	0.12	0.000050	0.0053	1.8	0.00044	0.040	0.058	0.00040	0.47	5.8	0.00074	5.4	< 2E-06	199	0.031	18	0.00014	0.000050	0.00016	0.33	0.00020	< 0.001	< 0.002
19-Nov-14	16	31	450	340	0.011	0.0013	0.097	< 1E-05	0.0060	1.9	0.00073	< 0.01	0.054	0.00030	0.47	6.0	0.00062	5.8	< 2E-06	206	0.034	16	0.00016	0.000040	0.00011	0.32	0.00019	< 0.001	< 0.002
3-Dec-14	17	33	450	350	0.0099	0.0017	0.093	< 1E-05	0.0049	1.7	0.00046	< 0.01	0.050	0.00030	0.47	5.7	0.00070	5.2	< 2E-06	181	0.033	16	0.00014	0.000040	0.00014	0.30	0.00021	0.0010	< 0.002
17-Dec-14	18	35	450	335	0.0094	0.0013	0.079	< 1E-05	0.0056	1.8	0.00056	0.010	0.045	0.00030	0.45	6.4	0.00060	5.2	< 2E-06	182	0.031	14	0.00013	0.000040	0.00014	0.28	0.00019	< 0.001	< 0.002
31-Dec-14	19	37	650	355	0.0087	0.0011	0.084	0.000030	0.0055	1.8	0.00058	< 0.01	0.046	0.00030	0.49	5.9	0.00065	5.7	0.0000020	176	0.031	14	0.00013	0.000090	0.00013	0.28	0.00023	< 0.001	< 0.002
14-Jan-15	20	39	450	335	0.0073	0.0011	0.070	0.000020	0.0048	1.5	0.00073	< 0.01	0.042	0.00030	0.47	5.4	0.00064	5.6	0.0000030	152	0.026	11	0.00013	0.000040	0.00015	0.23	0.00022	< 0.001	< 0.002
28-Jan-15	21	41	450	335	0.0057	0.0013	0.066	< 1E-05	0.0044	1.8	0.00063	< 0.01	0.040	0.00020	0.42	5.8	0.0012	4.8	0.0000020	172	0.024	11	0.00012	0.00022	0.00015	0.22	0.00025	< 0.001	< 0.002
11-Feb-15	22	43	450	335	0.0059	0.0010	0.053	0.000020	0.0053	1.6	0.00053	0.020	0.032	0.00020	0.42	5.5	< 0.001	5.2	0.0000020	149	0.031	10	0.00013	0.00087	0.000090	0.20	0.00022	< 0.001	< 0.002
25-Feb-15	23	45	450	345	0.0062	0.00088	0.053	0.000030	0.0057	1.8	0.00048	< 0.01	0.030	0.00020	0.37	6.2	< 0.001	5.4	< 2E-06	148	0.033	9.4	0.00014	0.00012	0.00011	0.21	0.00016	< 0.001	< 0.002
11-Mar-15	24	47	450	330	0.0059	0.00099	0.048	0.000020	0.0058	1.7	0.00054	< 0.01	0.031	0.00020	0.34	5.6	< 0.001	4.7	0.00010	140	0.032	8.8	0.00012	0.000060	< 5E-05	0.20	0.00016	< 0.001	< 0.002
25-Mar-15	25	49	450	355	0.0063	0.0010	0.056	< 1E-05	0.0056	1.9	0.00062	< 0.01	0.034	0.00020	0.38	6.0	< 0.001	5.8	< 2E-06	159	0.034	9.2	0.00014	0.00052	0.00018	0.18	0.00024	< 0.001	< 0.002
8-Apr-15	26	51	450	370	0.0049	0.0012	0.039	< 1E-05	0.0056	1.7	0.00044	0.010	0.027	0.00020	0.38	5.8	< 0.001	6.1	< 2E-06	132	0.033	8.0	0.00013	0.00018	0.000060	0.17	0.00016	< 0.001	< 0.002
22-Apr-15	27	53	450	330	0.0047	0.0012	0.035	0.00022	0.0050	1.8	0.00050	0.020	0.027	0.00020	0.34	6.2	0.00032	5.3	0.000044	138	0.034	7.8	0.00011	0.00011	0.00014	0.14	0.00022	< 0.001	< 0.002
6-May-15	28	55	450	325	0.0040	0.0015	0.032	0.000020	0.0055	1.7	0.00070	0.010	0.024	0.00020	0.31	6.0	< 0.001	5.5	0.000052	123	0.032	7.3	0.00013	< 1E-05	0.00011	0.15	0.00019	< 0.001	< 0.002
20-May-15	29	57	500	410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	30	59	410	300	0.0034	0.0013	0.024	0.000050	0.0059	2.2	0.00074	< 0.01	0.020	0.00010	0.28	6.4	0.00040	5.6	0.000014	102	0.040	6.3	0.00013	0.000050	0.00011	0.12	0.00018	< 0.001	< 0.002
17-Jun-15	31	61	500	410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	32	63	410	310	0.0031	0.0017	0.022	< 1E-05	0.0064	2.1	0.0012	0.020	0.016	0.00020	0.24	6.0	0.00030	5.6	0.000026	105	0.041	5.1	0.00015	0.00032	0.000090	0.11	0.00017	< 0.001	< 0.002
15-Jul-15	33	65	500	385	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	34	67	385	300	0.0026	0.00072	0.016	0.000020	0.0076	2.6	0.00047	< 0.01	0.014	0.00010	0.19	6.7	0.00021	5.3	0.000011	101	0.051	4.7	0.00016	0.00012	< 5E-05	0.093	0.00016	< 0.001	< 0.002
12-Aug-15	35	69	500	385	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	36	71	385	285	0.0022	0.0013	0.011	0.000040	0.0082	3.4	0.0010	0.010	0.028	0.00010	0.14	7.6	0.00025	5.8	0.00012	96	0.066	4.1	0.00019	0.00012	< 5E-05	0.070	0.00013	< 0.001	< 0.002
9-Sep-15	37	73	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	38	75	495	410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	39	77	410	310	0.0018	0.00085	0.0080	0.000020	0.0085	5.2	0.00061	< 0.01	0.0064	0.00020	0.10	8.3	0.00017	5.5	0.0000050	77	0.095	3.9	0.00018	0.00016	0.00010	0.057	0.000090	< 0.001	< 0.002
21-Oct-15	40	79	500	410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	41	81	410	335	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	42	83	335	255	0.0020	0.0016	0.020	0.000090	0.0090	7.3	0.0017	< 0.01	0.0072	< 0.0001	0.089	9.3	0.00027	5.7	0.0000030	67	0.12	4.1	0.00015	0.00015	< 5E-05	0.047	0.00010	0.0010	< 0.002
2-Dec-15	43	85	500	415	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	44	87	415	345	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	45	89	345	285	0.0017	0.00062	0.013	0.000020	0.0083	8.1	0.0017	< 0.01	0.0067	0.00010	0.092	9.3	0.00019	5.6	0.0000070	56	0.11	4.3	0.00014	0.000030	< 5E-05	0.060	0.000070	< 0.001	< 0.002
6-Jan-16	46	90	400	310	0.0019	0.0014	0.011	0.000090	0.0086	8.7	0.0024	< 0.01	0.0066	0.00010	0.091	10	0.00070	6.0	0.000012	57	0.13	4.5	0.00014	0.00033	< 5E-05	0.058	0.000090	< 0.001	< 0.002
20-Jan-16	47	92	400	305	0.0021	0.00064	0.011	0.000040	0.0088	8.3	0.0022	< 0.01	0.0077	0.00020	0.088	9.5	0.00030	6.3	0.000016	51	0.15	4.5	0.00022	0.000050	< 5E-05	0.069	0.00016	0.0010	< 0.002
3-Feb-16	48	94	400	285	0.0022	0.0017	0.012	0.000050	0.0085	7.9	0.0017	< 0.01	0.0075	0.00020	0.088	9.7	0.00034	5.5	0.000019	49	0.14	4.8	0.00017	0.00011	< 5E-05	0.066	0.00010	< 0.001	< 0.002
17-Feb-16	49	96	400	300	0.0023	0.00091	0.010	0.00011	0.0080	7.9	0.0020	< 0.01	0.0079	0.00020	0.099	9.1	0.00016	5.8	< 2E-06	46	0.13	4.6	0.00016	0.000090	< 5E-05	0.069	0.000090	0.0020	< 0.002
2-Mar-16	50	98	400	320	0.0025	0.00042	0.011	0.000090	0.0082	7.9	0.0059	< 0.01	0.0086	0.00020	0.10	9.2	0.00022	6.0	0.0000030	47	0.13	5.5	0.00016	0.000030	< 5E-05	0.072	0.000050	0.0010	< 0.002

Appendix D.3-3: Leachate Concentrations and Calculated Loading Rates for Leach Tailings Kinetic Tests

Calculated Loading Rates for Col 2

Date	Cycle	Weeks	Volume (mL)		pH	Alkalinity	Sulphate	Total CN	WAD CN	SCN	CNO	Ammonia-N	Nitrate-N	Nitrite-N	Chloride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr
	No.		Input	Output		$mgCaCO_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
23-Apr-14	1	1	2355	590	8.5	14	18	0.40	0.015	0.30	0.15	0.15	0.054	0.35	3.8	0.024	6.1	0.00080	0.0016	0.0026	0.0024	0.00000021	0.00000021	0.0024	0.00000012	1.8	0.0038
7-May-14	2	3	450	340	8.5	3.6	3.2	0.057	0.0020	0.043	0.026	0.016	0.021	0.050	0.39	0.0026	0.52	0.00011	0.00067	0.015	0.00024	0.00000019	0.000000060	0.00046	0.0000032	0.15	0.00055
21-May-14	3	5	550	380	8.7	3.9	2.8	0.034	0.00076	0.019	0.0095	0.0095	0.0095	0.022	0.17	0.0029	0.42	0.0026	0.00056	0.017	0.00018	0.00000044	0.0000026	0.00031	0.000000029	0.12	0.00030
4-Jun-14	4	7	450	350	8.6	3.7	2.4	0.016	0.00044	0.018	0.0088	0.0088	0.0044	0.0096	0.067	0.0026	0.35	0.000085	0.00046	0.018	0.00014	0.000000061	0.000000061	0.00018	0.000000026	0.10	0.00017
18-Jun-14	5	9	450	325	8.6	3.6	1.7	0.012	0.00024	0.016	0.0081	0.0057	0.0046	0.0023	0.037	0.0024	0.29	0.00014	0.00043	0.020	0.00013	0.000000057	0.000000057	0.00020	0.000000024	0.082	0.00014
2-Jul-14	6	11	450	350	8.6	4.2	1.6	0.012	0.00035	0.018	0.0088	0.0070	0.0014	0.0025	0.022	0.0026	0.29	0.00010	0.00047	0.022	0.00012	0.000000061	0.000000061	0.00017	0.00000025	0.082	0.000096
16-Jul-14	7	13	450	295	8.6	3.4	0.97	0.0070	0.00015	0.015	0.0074	0.0074	0.00081	0.0013	0.012	0.0022	0.24	0.000062	0.00040	0.019	0.00010	0.000000052	0.000000052	0.00015	0.000000022	0.066	0.000075
30-Jul-14	8	15	450	340	8.6	4.3	1.0	0.0071	0.00026	0.017	0.0085	0.0068	0.00060	0.0010	0.0094	0.0026	0.24	0.00019	0.00046	0.023	0.00011	0.000000060	0.000000060	0.00019	0.000000026	0.067	0.000075
13-Aug-14	9	17	450	350	8.6	3.9	0.94	0.0086	0.00026	0.018	0.0088	0.0061	0.00053	0.00079	0.0070	0.0026	0.23	0.00011	0.00047	0.022	0.00012	0.000000061	0.000000061	0.00020	0.000000026	0.066	0.000058
27-Aug-14	10	19	450	350	8.6	3.8	0.78	0.0044	0.00018			0.0053	0.00053	0.00061	0.0061	0.0026	0.24	0.00014	0.00042	0.022	0.00010	0.000000061	0.000000061	0.00027	0.00000013	0.066	0.000049
10-Sep-14	11	21	450	340	8.6	3.7	0.60	0.0043	0.00026			0.0043	0.00051	0.00051	0.0043	0.0026	0.21	0.000099	0.00039	0.023	0.00010	0.000000060	0.000000060	0.00022	0.00000019	0.059	0.000042
24-Sep-14	12	23	450	305	8.6	3.4	0.50	0.0037	0.00015			0.0038	0.00046	0.00053	0.0076	0.0023	0.18	0.000056	0.00039	0.019	0.000093	0.000000053	0.000000053	0.00016	0.000000023	0.051	0.000033
8-Oct-14	13	25	450	350	8.6	3.3	0.56	0.0048	0.00018			0.0070	0.00053	0.00044	0.0088	0.0026	0.21	0.00012	0.00040	0.023	0.00011	0.000000061	0.000000061	0.00017	0.00000015	0.059	0.000036
22-Oct-14	14	27	450	345	8.6	3.5	0.49	0.0035	0.00017			0.0052	0.00052	0.00043	0.0086	0.0026	0.22	0.000098	0.00041	0.024	0.00011	0.000000060	0.000000060	0.00025	0.00000028	0.059	0.000035
5-Nov-14	15	29	450	335		3.4	0.44	0.0028	0.000084			0.0034	0.00050	0.00034	0.0084	0.0025	0.19	0.000100	0.00037	0.022	0.00010	0.000000059	0.000000059	0.00018	0.00000013	0.050	0.000029
19-Nov-14	16	31	450	340	8.5	3.4	0.39	0.0028	0.00017			0.0043	0.00051	0.00051	0.0085	0.0026	0.20	0.000061	0.00036	0.022	0.00012	0.000000060	0.000000060	0.00020	0.00000016	0.052	0.000029
3-Dec-14	17	33	450	350	8.6	3.3	0.37	0.0025	0.000088			0.0035	0.00053	0.00044	0.0088	0.0026	0.20	0.000087	0.00038	0.024	0.00013	0.000000061	0.000000061	0.00018	0.00000012	0.056	0.000028
17-Dec-14	18	35	450	335	8.6	3.1	0.34	0.0026	0.000084			0.0050	0.00050	0.00084	0.0084	0.0025	0.18	0.000064	0.00038	0.021	0.00011	0.000000059	0.000000059	0.00019	0.00000012	0.046	0.000025
31-Dec-14	19	37	650	355	8.5	3.8	0.32	0.0019	0.00018			0.0044	0.00053	0.00062	0.0089	0.0027	0.19	0.00012	0.00041	0.023	0.00013	0.000000062	0.000000062	0.00019	0.00000012	0.049	0.000026
14-Jan-15	20	39	450	335	8.5	2.7	0.26	0.0012	0.00017			0.0042	0.00050	0.00042	0.0084	0.0025	0.16	0.000096	0.00040	0.021	0.00011	0.000000059	0.000000059	0.00018	0.00000013	0.044	0.000022
28-Jan-15	21	41	450	335	8.5	2.8	0.28	0.0013	0.000084			0.0034	0.00050	0.00050	0.0084	0.0025	0.18	0.00011	0.00032	0.019	0.00013	0.000000059	0.00000018	0.00015	0.000000092	0.049	0.000022
11-Feb-15	22	43	450	335	8.5	2.7	0.28	0.0012	0.000084			0.0034	0.00050	0.00067	0.0084	0.0025	0.17	0.000078	0.00037	0.019	0.00013	0.000000059	0.000000059	0.00019	0.000000084	0.047	0.000019
25-Feb-15	23	45	450	345	8.5	2.9	0.26	0.0010	0.000086			0.0035	0.00052	0.0012	0.0086	0.0026	0.20	0.000069	0.00034	0.017	0.00014	0.000000060	0.000000060	0.00020	0.00000012	0.054	0.000020
11-Mar-15	24	47	450	330	8.5	2.8	0.26	0.00099	0.000083			0.0033	0.00050	0.0013	0.0083	0.0025	0.19	0.000071	0.00034	0.016	0.00013	0.000000058	0.000000058	0.00017	0.00000011	0.051	0.000019
25-Mar-15	25	49	450	355	8.4	2.7	0.20	0.00098	0.000089			0.0036	0.00053	0.0020	0.0089	0.0027	0.20	0.000099	0.00036	0.018	0.00015	0.000000062	0.000000062	0.00018	0.000000098	0.054	0.000023
8-Apr-15	26	51	450	370	8.4	2.9	0.22	0.0010	0.000093			0.0028	0.0019	0.0025	0.0093	0.0028	0.20	0.000069	0.00044	0.020	0.00016	0.000000065	0.000000093	0.00018	0.000000028	0.056	0.000019
22-Apr-15	27	53	450	330	8.4	2.5	0.22	0.00083	0.00017			0.0041	0.0048	0.0016	0.0083	0.0025	0.19	0.000055	0.00034	0.016	0.00012	0.000000058	0.000000058	0.00017	0.00000031	0.051	0.000018
6-May-15	28	55	450	325	8.4	2.3	0.16	0.00065	0.000081			0.0016	0.0092	0.00049	0.0081	0.0024	0.18	0.000076	0.00031	0.014	0.00015	0.000000057	0.000000057	0.00017	0.000000024	0.047	0.000014
20-May-15	29	57	500	410																							
3-Jun-15	30	59	410	300	8.4	1.9	0.13	0.00053	0.00053			0.0015	0.011	0.000038	0.0038	0.0011	0.11	0.000032	0.00011	0.0054	0.000084	0.000000026	0.000000026	0.000092	0.000000026	0.031	0.0000059
17-Jun-15	31	61	500	410																							
1-Jul-15	32	63	410	310	8.3	1.8	0.12	0.00054	0.000078			0.0016	0.031	0.00012	0.0039	0.0012	0.10	0.000040	0.00011	0.0052	0.000091	0.000000027	0.000000027	0.000079	0.000000023	0.028	0.0000057
15-Jul-15	33	65	500	385																							
29-Jul-15	34	67	385	300	8.3	1.5	0.11	0.00030	0.00030			0.0019	0.064	0.00015	0.0038	0.0011	0.13	0.000021	0.000087	0.0037	0.00010	0.000000026	0.000000026	0.000080	0.000000041	0.036	0.0000048
12-Aug-15	35	69	500	385																							
26-Aug-15	36	71	385	285	8.3	1.3	0.086	0.00029	0.000071			0.0021	0.087	0.00018	0.0036	0.0011	0.16	0.000021	0.000073	0.0026	0.00014	0.000000025	0.000000025	0.000077	0.000000053	0.044	0.0000043
9-Sep-15	37	73	500	495																							
23-Sep-15	38	75	495	410																							
7-Oct-15	39	77	410	310	8.1	1.2	0.085	0.00023	0.000078			0.00078	0.10	0.00012	0.00	0.00	0.25	0.000019	0.000072	0.0019	0.00018	0.000000027	0.000000027	0.000073	0.000000012	0.069	0.0000038
21-Oct-15	40	79	500	410																							
4-Nov-15	41	81	410	335																							
18-Nov-15	42	83	335	255	8.0	1.0	0.064	0.00013	0.000064			0.00032	0.082	0.000096	0.00	0.00	0.28	0.000013	0.000046	0.0014	0.00015	0.000000022	0.000000022	0.000051	0.0000000096	0.074	0.0000034
2-Dec-15	43	85	500	415																							
16-Dec-15	44	87	415	345																							
30-Dec-15	45	89	345	285	8.3	0.96	0.071	0.00021	0.000071			0.00036	0.079	0.00011	0.00	0.00	0.35	0.000017	0.000048	0.0012	0.00021	0.000000025	0.000000025	0.000066	0.000000014	0.092	0.0000034
6-Jan-16	46	90	400	310	8.3	1.0	0.093	0.00016	0.000078			0.00039	0.081	0.00012	0.00	0.00	0.41	0.000021	0.000053	0.0014	0.00025	0.000000027	0.000000027	0.000070	0.00000014	0.11	0.0000041
20-Jan-16	47	92	400	305	8.3	1.0	0.069	0.00015	0.00015			0.00038	0.075	0.00011	0.00	0.00	0.40	0.000015	0.000059	0.0016	0.00025	0.000000027	0.000000027	0.000072	0.000000011	0.11	0.0000044
3-Feb-16	48	94	400	285	8.3	0.95	0.086	0.00014	0.000071			0.00036	0.062	0.00011	0.00	0.00	0.35	0.000019	0.000051	0.0015	0.00023	0.000000025	0.000000025	0.000057	0.000000011	0.093	0.0000040
17-Feb-16	49	96	400	300	8.2	1.0	0.090	0.00023	0.00030			0.00038	0.053	0.00011	0.00	0.00	0.37	0.000014	0.000054	0.0016	0.00023	0.000000026	0.000000026	0.000064	0.000000083	0.10	0.0000047
2-Mar-16	50	98	400	320	8.3	1.1	0.11	0.00024	0.000080			0.00040	0.043	0.00012	0.00	0.00	0.37	0.0000080	0.000061	0.0020	0.00023	0.000000028	0.000000028	0.000064	0.000000012	0.097	0.0000054

Appendix D.3-3: Leachate Concentrations and Calculated Loading Rates for Leach Tailings Kinetic Tests

Calculated Loading Rates for Col 2

Date	Cycle	Weeks	Volume (mL)		Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.		Input	Output	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
23-Apr-14	1	1	2355	590	0.015	0.00070	0.16	0.000024	0.00056	0.35	0.00032	0.23	0.0060	0.012	0.012	1.0	0.000021	0.17	0.00024	21	0.0077	8.2	0.000021	0.0000068	0.000026	0.040	0.00000030	0.00024	0.000059
7-May-14	2	3	450	340	0.0023	0.000090	0.022	0.0000027	0.000076	0.038	0.000094	0.011	0.0024	0.0010	0.0036	0.15	0.000050	0.052	0.000000017	3.6	0.00070	1.5	0.0000031	0.00000051	0.000013	0.010	0.000000085	0.000034	0.000017
21-May-14	3	5	550	380	0.0015	0.000061	0.013	0.0000048	0.000064	0.030	0.000064	0.0029	0.0018	0.00020	0.0036	0.11	0.000029	0.048	0.00000063	3.3	0.00056	1.1	0.0000024	0.0000026	0.0000089	0.0078	0.0000013	0.000019	0.000019
4-Jun-14	4	7	450	350	0.00069	0.000083	0.0078	0.00000026	0.000055	0.025	0.000043	0.0011	0.0013	0.000018	0.0037	0.100	0.000020	0.048	0.000000044	2.7	0.00046	0.79	0.0000020	0.00000096	0.0000054	0.0060	0.000000088	0.000026	0.000018
18-Jun-14	5	9	450	325	0.00061	0.00032	0.0054	0.00000057	0.000053	0.021	0.000031	0.00073	0.0014	0.000011	0.0034	0.087	0.000015	0.044	0.000000016	2.3	0.00038	0.61	0.0000018	0.000000081	0.0000035	0.0068	0.000000081	0.000024	0.000016
2-Jul-14	6	11	450	350	0.00039	0.000031	0.0041	0.00000026	0.000052	0.021	0.000027	0.00061	0.00099	0.0000096	0.0039	0.090	0.000013	0.048	0.000000018	2.3	0.00038	0.55	0.0000017	0.0000014	0.0000048	0.0055	0.000000088	0.0000088	0.000018
16-Jul-14	7	13	450	295	0.00030	0.000023	0.0029	0.00000015	0.000044	0.017	0.000029	0.00044	0.00086	0.0000081	0.0035	0.072	0.0000096	0.038	0.000000022	1.9	0.00030	0.38	0.0000014	0.00000089	0.0000035	0.0042	0.0000011	0.0000074	0.000015
30-Jul-14	8	15	450	340	0.00025	0.000034	0.0026	0.00000017	0.000055	0.018	0.000021	0.00026	0.00089	0.0000077	0.0041	0.076	0.000011	0.044	0.000000017	2.0	0.00032	0.36	0.0000015	0.000000085	0.0000085	0.0042	0.0000031	0.0000085	0.000017
13-Aug-14	9	17	450	350	0.00021	0.000020	0.0017	0.00000018	0.000052	0.017	0.000023	0.000088	0.00078	0.0000061	0.0042	0.071	0.000013	0.045	0.000000018	2.1	0.00031	0.32	0.0000014	0.00000035	0.0000042	0.0042	0.00000070	0.0000088	0.000018
27-Aug-14	10	19	450	350	0.00019	0.000021	0.0018	0.00000044	0.000047	0.017	0.000016	0.000088	0.00075	0.0000044	0.0042	0.076	0.0000074	0.048	0.000000018	2.0	0.00031	0.28	0.0000014	0.0000033	0.00000061	0.0040	0.0000024	0.0000088	0.000018
10-Sep-14	11	21	450	340	0.00016	0.000012	0.0016	0.000000085	0.000043	0.016	0.0000076	0.00017	0.00065	0.0000043	0.0042	0.056	0.0000089	0.053	0.000000017	1.8	0.00029	0.24	0.0000013	0.0000013	0.00000077	0.0033	0.0000020	0.0000085	0.000017
24-Sep-14	12	23	450	305	0.00012	0.000013	0.00070	0.00000046	0.000042	0.014	0.0000076	0.00015	0.00054	0.0000046	0.0035	0.062	0.0000068	0.039	0.000000031	1.7	0.00024	0.18	0.0000012	0.00000061	0.0000034	0.0028	0.0000016	0.000023	0.000015
8-Oct-14	13	25	450	350	0.00013	0.000017	0.0012	0.00000035	0.000054	0.016	0.0000058	0.00026	0.00058	0.0000035	0.0042	0.056	0.0000070	0.046	0.000000018	1.8	0.00029	0.19	0.0000012	0.00000070	0.0000018	0.0031	0.0000019	0.0000088	0.000018
22-Oct-14	14	27	450	345	0.00012	0.0000097	0.0012	0.00000017	0.000051	0.017	0.0000062	0.000086	0.00053	0.0000035	0.0049	0.059	0.0000066	0.046	0.000000017	1.9	0.00028	0.20	0.0000012	0.00000026	0.0000012	0.0030	0.0000023	0.0000086	0.000017
5-Nov-14	15	29	450	335	0.000097	0.000011	0.0010	0.00000042	0.000044	0.015	0.0000037	0.00034	0.00049	0.0000034	0.0039	0.049	0.0000062	0.045	0.000000017	1.7	0.00026	0.15	0.0000011	0.00000042	0.0000013	0.0027	0.0000017	0.0000084	0.000017
19-Nov-14	16	31	450	340	0.000094	0.000011	0.00082	0.000000085	0.000051	0.016	0.0000062	0.000085	0.00046	0.0000026	0.0040	0.051	0.0000053	0.049	0.000000017	1.8	0.00029	0.14	0.0000014	0.00000034	0.00000094	0.0027	0.0000016	0.0000085	0.000017
3-Dec-14	17	33	450	350	0.000087	0.000015	0.00081	0.000000088	0.000043	0.015	0.0000040	0.000088	0.00043	0.0000026	0.0041	0.050	0.0000061	0.045	0.000000018	1.6	0.00029	0.14	0.0000012	0.00000035	0.0000012	0.0026	0.0000018	0.0000088	0.000018
17-Dec-14	18	35	450	335	0.000079	0.000011	0.00066	0.000000084	0.000047	0.015	0.0000047	0.000084	0.00038	0.0000025	0.0038	0.053	0.0000050	0.044	0.000000017	1.5	0.00026	0.12	0.0000011	0.00000034	0.0000012	0.0023	0.0000016	0.0000084	0.000017
31-Dec-14	19	37	650	355	0.000077	0.0000099	0.00075	0.00000027	0.000048	0.016	0.0000051	0.000089	0.00041	0.0000027	0.0043	0.052	0.0000058	0.051	0.000000018	1.6	0.00028	0.12	0.0000011	0.00000080	0.0000012	0.0025	0.0000020	0.0000089	0.000018
14-Jan-15	20	39	450	335	0.000061	0.0000093	0.00059	0.00000017	0.000040	0.013	0.0000061	0.000084	0.00035	0.0000025	0.0039	0.045	0.0000054	0.047	0.000000025	1.3	0.00022	0.095	0.0000011	0.00000034	0.0000013	0.0019	0.0000018	0.0000084	0.000017
28-Jan-15	21	41	450	335	0.000047	0.000010	0.00055	0.000000084	0.000037	0.015	0.0000053	0.000084	0.00034	0.0000017	0.0035	0.048	0.000010	0.041	0.000000017	1.4	0.00020	0.091	0.00000096	0.0000018	0.0000013	0.0018	0.0000021	0.0000084	0.000017
11-Feb-15	22	43	450	335	0.000049	0.0000084	0.00044	0.00000017	0.000044	0.013	0.0000044	0.00017	0.00027	0.0000017	0.0035	0.046	0.0000084	0.043	0.000000017	1.2	0.00026	0.086	0.0000011	0.0000073	0.00000075	0.0017	0.0000018	0.0000084	0.000017
25-Feb-15	23	45	450	345	0.000053	0.0000076	0.00046	0.00000026	0.000049	0.015	0.0000041	0.000086	0.00026	0.0000017	0.0032	0.053	0.0000086	0.046	0.000000017	1.3	0.00028	0.081	0.0000012	0.0000010	0.00000095	0.0018	0.0000014	0.0000086	0.000017
11-Mar-15	24	47	450	330	0.000048	0.0000082	0.00040	0.00000017	0.000048	0.014	0.0000045	0.000083	0.00026	0.0000017	0.0028	0.046	0.0000083	0.039	0.00000083	1.2	0.00027	0.073	0.00000100	0.00000050	0.00000041	0.0016	0.0000013	0.0000083	0.000017
25-Mar-15	25	49	450	355	0.000056	0.0000092	0.00050	0.000000089	0.000050	0.017	0.0000055	0.000089	0.00030	0.0000018	0.0033	0.053	0.0000089	0.051	0.000000018	1.4	0.00030	0.082	0.0000012	0.0000046	0.0000016	0.0016	0.0000021	0.0000089	0.000018
8-Apr-15	26	51	450	370	0.000046	0.000011	0.00036	0.000000093	0.000052	0.015	0.0000041	0.000093	0.00025	0.0000019	0.0035	0.054	0.0000093	0.056	0.000000019	1.2	0.00030	0.074	0.0000012	0.0000017	0.00000056	0.0016	0.0000015	0.0000093	0.000019
22-Apr-15	27	53	450	330	0.000039	0.000010	0.00029	0.0000018	0.000041	0.015	0.0000041	0.00017	0.00022	0.0000017	0.0028	0.051	0.0000026	0.044	0.00000036	1.1	0.00028	0.064	0.00000092	0.00000091	0.0000012	0.0011	0.0000018	0.0000083	0.000017
6-May-15	28	55	450	325	0.000033	0.000012	0.00026	0.00000016	0.000045	0.014	0.0000057	0.000081	0.00020	0.0000016	0.0025	0.049	0.0000081	0.044	0.00000042	1.00	0.00026	0.059	0.0000010	0.000000081	0.00000089	0.0012	0.0000015	0.0000081	0.000016
20-May-15	29	57	500	410																									
3-Jun-15	30	59	410	300	0.000013	0.0000050	0.000090	0.00000019	0.000022	0.0081	0.0000028	0.000038	0.000074	0.00000038	0.0010	0.024	0.0000015	0.021	0.000000053	0.38	0.00015	0.024	0.00000049	0.00000019	0.00000041	0.00047	0.00000068	0.0000038	0.0000075
17-Jun-15	31	61	500	410																									
1-Jul-15	32	63	410	310	0.000012	0.0000067	0.000085	0.000000039	0.000025	0.0081	0.0000048	0.000078	0.000063	0.00000078	0.00095	0.023	0.0000012	0.022	0.00000010	0.41	0.00016	0.020	0.00000058	0.0000012	0.00000035	0.00042	0.00000066	0.0000039	0.0000078
15-Jul-15	33	65	500	385																									
29-Jul-15	34	67	385	300	0.0000097	0.0000027	0.000060	0.000000075	0.000028	0.0097	0.0000018	0.000038	0.000052	0.00000038	0.00071	0.025	0.00000079	0.020	0.000000041	0.38	0.00019	0.018	0.00000059	0.00000045	0.00000019	0.00035	0.00000060	0.0000038	0.0000075
12-Aug-15	35	69	500	385																									
26-Aug-15	36	71	385	285	0.0000078	0.0000045	0.000039	0.00000014	0.000029	0.012	0.0000036	0.000036	0.000098	0.00000036	0.00050	0.027	0.00000089	0.021	0.00000042	0.34	0.00024	0.015	0.00000068	0.00000043	0.00000018	0.00025	0.00000046	0.0000036	0.0000071
9-Sep-15	37	73	500	495																									
23-Sep-15	38	75	495	410																									
7-Oct-15	39	77	410	310	0.0000069	0.0000033	0.000031	0.000000078	0.000033	0.020	0.0000024	0.000039	0.000025	0.00000078	0.00039	0.032	0.00000066	0.021	0.000000019	0.30	0.00037	0.015	0.00000070	0.00000062	0.00000039	0.00022	0.00000035	0.0000039	0.0000078
21-Oct-15	40	79	500	410																									
4-Nov-15	41	81	410	335																									
18-Nov-15	42	83	335	255	0.0000063	0.0000051	0.000064	0.00000029	0.000029	0.023	0.0000055	0.000032	0.000023	0.00000032	0.00028	0.030	0.00000086	0.018	0.0000000096	0.21	0.00039	0.013	0.00000047	0.00000048	0.00000016	0.00015	0.00000032	0.0000032	0.0000064
2-Dec-15	43	85	500	415																									
16-Dec-15	44	87	415	345																									
30-Dec-15	45	89	345	285	0.0000061	0.0000022	0.000046	0.000000071	0.000029	0.029	0.0000061	0.000036	0.000024	0.00000036	0.00033	0.033	0.00000068	0.020	0.000000025	0.20	0.00040	0.015	0.00000051	0.00000011	0.00000018	0.00021	0.00000025	0.0000036	0.0000071
6-Jan-16	46	90	400	310	0.0000074	0.0000053	0.000043	0.00000035	0.000033	0.034	0.0000094	0.000039	0.000026	0.00000039	0.00035	0.039	0.0000027	0.023	0.000000047	0.22	0.00050	0.017	0.00000054	0.0000013	0.00000019	0.00023	0.00000035	0.0000039	0.0000078
20-Jan-16	47	92	400	305	0.0000082	0.0000024	0.000042	0.00000015	0.000033	0.031	0.0000085	0.000038	0.000029	0.00000076	0.00034	0.036	0.0000011	0.024	0.000000061	0.19	0.00057	0.017	0.00000082	0.00000019	0.00000019	0.00026	0.00000061	0.0000038	0.0000076
3-Feb-16	48	94	400	285	0.0000077	0.0000060	0.000043	0.00000018	0.000030	0.028	0.0000061	0.000036	0.000027	0.00000071	0.00031	0.034	0.0000012	0.020	0.000000068	0.17	0.00051	0.017	0.00000059	0.00000039	0.00000018	0.00023	0.00000036	0.0000036	0.0000071
17-Feb-16	49	96	400	300	0.0000085	0.0000034	0.000038	0.00000041	0.000030	0.030	0.0000074	0.000038	0.000030	0.00000075	0.00037	0.034	0.00000060	0.022	0.0000000075	0.17	0.00047	0.017	0.00000060	0.00000034	0.00000019	0.00026	0.00000034	0.0000075	0.0000075
2-Mar-16	50	98	400	320	0.0000099	0.0000017	0.000044	0.00000036	0.000033	0.031	0.000023	0.000040	0.000034	0.00000080	0.00040	0.037	0.00000088	0.024	0.000000012	0.19	0.00052	0.022	0.00000064	0.00000012	0.00000020	0.00029	0.00000020	0.0000040	0.0000080

Appendix D.3-3: Leachate Concentrations and Calculated Loading Rates for Leach Tailings Kinetic Tests

Leachate Concentrations for Col 15 (Latte Composite)

Date	Cycle	Weeks	Volume (mL)		pH	Alkalinity	Sulphate	Total CN	WAD CN	SCN	CNO	Ammonia-N	Nitrate-N	Nitrite-N	Chloride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr
	No.		Input	Output		mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
3-Jun-15	1	1	700	350	8.0	141	2258	14	2.6	25	1.7	2.4	3.0	< 0.06	44	< 0.3	684	0.015	0.065	1.3	0.026	< 7E-06	0.000030	0.12	0.000036	213	0.0079
17-Jun-15	2	3	600	565	8.2	156	825	2.9	0.86	5.6	< 1	0.70	0.33	0.53	15	< 0.3	224	0.0065	0.060	1.5	0.0093	< 7E-06	0.00016	0.015	0.0000050	68	0.0013
1-Jul-15	3	5	550	535	8.2	160	433	1.1	0.15	< 2	< 1	0.40	0.070	0.10	5.0	< 0.3	116	0.0068	0.062	1.4	0.0083	< 7E-06	< 7E-06	0.023	0.0000090	32	0.00049
15-Jul-15	4	7	550	525	8.2	142	262	1.1	0.050	< 2	< 1	0.20	< 0.06	0.030	1.0	< 0.3	100	0.0074	0.055	1.2	0.0089	< 7E-06	< 7E-06	0.064	0.00012	27	0.00028
29-Jul-15	5	9	500	490	8.1	141	229	0.60	0.060	< 2	< 1	0.20	< 0.06	< 0.03	1.0	< 0.3	110	0.0091	0.048	0.86	0.010	< 7E-06	< 7E-06	0.021	< 3E-06	30	0.00019
12-Aug-15	6	11	500	490	8.2	124	172	0.48	0.030	< 2	< 1	0.30	< 0.06	< 0.03	1.0	< 0.3	111	0.0054	0.041	0.79	0.011	< 7E-06	< 7E-06	0.017	0.0000060	29	0.00020
26-Aug-15	7	13	600	560	7.9	155	161	0.40	0.030	2.0	1.0	0.30	0.060	0.030	1.0	0.30	122	0.0054	0.040	0.70	0.013	0.0000070	0.0000070	0.017	0.0000055	32	0.00022
9-Sep-15	8	15	600	580	8.1	118	129	0.31	0.030	< 2	< 1	0.30	< 0.06	< 0.03	< 1	< 0.3	132	0.0053	0.038	0.61	0.014	< 7E-06	< 7E-06	0.017	0.0000050	34	0.00024
23-Sep-15	9	17	600	575	8.1	118	105	0.25	0.025	2.0	1.0	0.25	0.060	0.030	1.0	0.30	136	0.0059	0.035	0.53	0.014	0.0000070	0.0000070	0.017	0.0000045	35	0.00017
7-Oct-15	10	19	500	470	8.1	127	107	0.18	0.020	-	-	0.20	< 0.06	< 0.03	< 1	-	139	0.0065	0.033	0.46	0.014	< 7E-06	< 7E-06	0.016	0.0000040	35	0.000090
21-Oct-15	11	21	500	485	8.1	118	93	0.20	0.020	-	-	0.20	< 0.06	< 0.03	< 1	-	143	0.0074	0.033	0.49	0.016	< 7E-06	< 7E-06	0.018	< 3E-06	37	0.00014
4-Nov-15	12	23	500	475	8.2	123	86	0.26	0.020	-	-	0.20	< 0.06	< 0.03	< 1	-	157	0.0068	0.028	0.45	0.018	< 7E-06	< 7E-06	0.014	< 3E-06	40	0.00011
18-Nov-15	13	25	500	485	8.3	130	82	0.18	0.010	-	-	0.10	< 0.06	< 0.03	< 1	-	147	0.0033	0.027	0.45	0.014	0.0000080	< 7E-06	0.018	0.000021	36	0.000080
2-Dec-15	14	27	500	475	8.2	116	76	0.16	0.020	-	-	0.20	< 0.06	< 0.03	< 1	-	161	0.0040	0.029	0.46	0.019	< 7E-06	< 7E-06	0.010	< 3E-06	41	0.00014
16-Dec-15	15	29	500	475	8.2	112	71	0.15	0.020	-	-	0.20	< 0.06	< 0.03	< 1	-	150	0.012	0.028	0.43	0.021	0.000013	0.000015	0.012	0.00017	37	0.00018
30-Dec-15	16	31	500	490	8.2	105	56	0.14	< 0.01	-	-	0.10	< 0.06	< 0.03	< 1	-	155	0.0058	0.027	0.43	0.020	< 7E-06	< 7E-06	0.020	< 3E-06	38	0.00018
13-Jan-16	17	33	500	450	8.2	107	54	0.13	0.020	-	-	0.20	< 0.06	< 0.03	< 1	-	144	0.0042	0.025	0.34	0.019	< 7E-06	< 7E-06	0.012	< 3E-06	35	0.00011
27-Jan-16	18	35	500	460	8.2	106	54	0.13	0.020	-	-	0.20	< 0.06	< 0.03	< 1	-	140	0.0039	0.025	0.38	0.020	< 7E-06	< 7E-06	0.011	< 3E-06	35	0.00012
10-Feb-16	19	37	500	475	8.2	108	49	0.14	< 0.01	-	-	0.20	< 0.06	< 0.03	< 1	-	138	0.0035	0.025	0.41	0.022	< 7E-06	< 7E-06	0.0080	< 3E-06	35	0.00012
24-Feb-16	20	39	500	470	8.2	109	46	0.10	0.010	-	-	0.20	< 0.06	< 0.03	< 1	-	150	0.0021	0.024	0.39	0.023	< 7E-06	< 7E-06	0.010	< 3E-06	37	0.00016
9-Mar-16	21	41	501	455	8.2	104	39																				

Calculated Loading Rates for Col 15

Date	Cycle	Weeks	Volume (mL)		pH	Alkalinity	Sulphate	Total CN	WAD CN	SCN	CNO	Ammonia-N	Nitrate-N	Nitrite-N	Chloride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr
	No.		Input	Output		mgCaCO$_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mgCaCO$_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
3-Jun-15	1	1	700	350	8.0	9.8	158	0.95	0.18	1.8	0.12	0.17	0.21	0.0042	3.1	0.021	48	0.0010	0.0045	0.089	0.0018	0.00000049	0.0000021	0.0084	0.0000025	15	0.00055
17-Jun-15	2	3	600	565	8.2	8.8	47	0.17	0.049	0.32	0.057	0.040	0.019	0.030	0.85	0.017	13	0.00037	0.0034	0.085	0.00052	0.00000040	0.0000089	0.00084	0.00000028	3.8	0.000072
1-Jul-15	3	5	550	535	8.2	8.6	23	0.059	0.0080	0.11	0.054	0.021	0.0037	0.0054	0.27	0.016	6.2	0.00036	0.0033	0.076	0.00044	0.00000037	0.00000037	0.0012	0.00000048	1.7	0.000026
15-Jul-15	4	7	550	525	8.2	7.5	14	0.055	0.0026	0.11	0.053	0.011	0.0032	0.0016	0.053	0.016	5.3	0.00039	0.0029	0.060	0.00047	0.00000037	0.00000037	0.0033	0.0000060	1.4	0.000015
29-Jul-15	5	9	500	490	8.1	6.9	11	0.029	0.0029	0.098	0.049	0.0098	0.0029	0.0015	0.049	0.015	5.4	0.00045	0.0023	0.042	0.00049	0.00000034	0.00000034	0.0010	0.00000015	1.5	0.0000093
12-Aug-15	6	11	500	490	8.2	6.1	8.4	0.024	0.0015	0.098	0.049	0.015	0.0029	0.0015	0.049	0.015	5.4	0.00026	0.0020	0.038	0.00052	0.00000034	0.00000034	0.00081	0.00000029	1.4	0.0000098
26-Aug-15	7	13	600	560	7.9	8.7	9.0	0.022	0.0017	0.11	0.056	0.017	0.0034	0.0017	0.056	0.017	6.8	0.00030	0.0022	0.039	0.00070	0.00000039	0.00000039	0.00095	0.00000031	1.8	0.000012
9-Sep-15	8	15	600	580	8.1	6.8	7.5	0.018	0.0017	0.12	0.058	0.017	0.0035	0.0017	0.058	0.017	7.7	0.00031	0.0022	0.035	0.00083	0.00000041	0.00000041	0.0010	0.00000029	2.0	0.000014
23-Sep-15	9	17	600	575	8.1	6.8	6.0	0.014	0.0014	0.12	0.058	0.014	0.0035	0.0017	0.058	0.017	7.8	0.00034	0.0020	0.031	0.00081	0.00000040	0.00000040	0.00095	0.00000026	2.0	0.0000095
7-Oct-15	10	19	500	470	8.1	6.0	5.0	0.0085	0.00094			0.0094	0.0028	0.0014	0.047	0.00	6.5	0.00031	0.0015	0.021	0.00066	0.00000033	0.00000033	0.00074	0.00000019	1.6	0.0000042
21-Oct-15	11	21	500	485	8.1	5.7	4.5	0.0097	0.00097			0.0097	0.0029	0.0015	0.049	0.00	6.9	0.00036	0.0016	0.024	0.00079	0.00000034	0.00000034	0.00087	0.00000015	1.8	0.0000068
4-Nov-15	12	23	500	475	8.2	5.9	4.1	0.012	0.00095			0.0095	0.0029	0.0014	0.048	0.00	7.5	0.00032	0.0013	0.021	0.00085	0.00000033	0.00000033	0.00066	0.00000014	1.9	0.0000052
18-Nov-15	13	25	500	485	8.3	6.3	4.0	0.0087	0.00049			0.0049	0.0029	0.0015	0.049	0.00	7.1	0.00016	0.0013	0.022	0.00069	0.00000039	0.00000034	0.00085	0.0000010	1.7	0.0000039
2-Dec-15	14	27	500	475	8.2	5.5	3.6	0.0076	0.00095			0.0095	0.0029	0.0014	0.048	0.00	7.6	0.00019	0.0014	0.022	0.00091	0.00000033	0.00000033	0.00049	0.00000014	1.9	0.0000067
16-Dec-15	15	29	500	475	8.2	5.3	3.4	0.0071	0.00095			0.0095	0.0029	0.0014	0.048	0.00	7.1	0.00055	0.0013	0.020	0.00097	0.00000062	0.00000071	0.00055	0.0000083	1.7	0.0000086
30-Dec-15	16	31	500	490	8.2	5.1	2.7	0.0069	0.00049			0.0049	0.0029	0.0015	0.049	0.00	7.6	0.00028	0.0013	0.021	0.00098	0.00000034	0.00000034	0.00096	0.00000015	1.9	0.0000088
13-Jan-16	17	33	500	450	8.2	4.8	2.4	0.0059	0.00090			0.0090	0.0027	0.0014	0.045	0.00	6.5	0.00019	0.0011	0.015	0.00086	0.00000032	0.00000032	0.00054	0.00000014	1.6	0.0000050
27-Jan-16	18	35	500	460	8.2	4.9	2.5	0.0060	0.00092			0.0092	0.0028	0.0014	0.046	0.00	6.4	0.00018	0.0012	0.017	0.00093	0.00000032	0.00000032	0.00051	0.00000014	1.6	0.0000055
10-Feb-16	19	37	500	475	8.2	5.1	2.3	0.0067	0.00048			0.0095	0.0029	0.0014	0.048	0.00	6.6	0.00017	0.0012	0.019	0.0010	0.00000033	0.00000033	0.00038	0.00000014	1.6	0.0000057
24-Feb-16	20	39	500	470	8.2	5.1	2.2	0.0047	0.00047			0.0094	0.0028	0.0014	0.047	0.00	7.1	0.000099	0.0011	0.018	0.0011	0.00000033	0.00000033	0.00047	0.00000014	1.7	0.0000075
9-Mar-16	21	41	501	455	8.2	4.7	1.8																				

Leachate Concentrations for Col 16 (Supremo Composite)

Date	Cycle	Weeks	Volume (mL)		pH	Alkalinity	Sulphate	Total CN	WAD CN	SCN	CNO	Ammonia-N	Nitrate-N	Nitrite-N	Chloride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr
	No.		Input	Output		mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
3-Jun-15	1	1	700	320	8.9	418	150	3.3	0.25	6.9	< 1	1.0	2.2	0.76	19	< 0.3	28	0.043	0.064	3.7	0.016	< 7E-06	0.000010	0.079	0.000044	8.8	0.0085
17-Jun-15	2	3	600	550	8.8	413	60	1.6	0.070	< 2	< 1	0.30	0.28	0.34	7.0	< 0.3	18	0.085	0.061	4.7	0.0090	< 7E-06	0.000080	0.019	0.000028	5.6	0.0029
1-Jul-15	3	5	550	510	8.7	377	28	0.98	0.040	< 2	< 1	0.20	0.10	0.060	3.0	< 0.3	16	0.022	0.057	4.5	0.0099	< 7E-06	< 7E-06	0.023	0.000015	4.8	0.0014
15-Jul-15	4	7	550	535	8.6	311	18	1.1	0.060	< 2	< 1	< 0.1	0.060	< 0.03	1.0	< 0.3	12	0.047	0.054	4.3	0.0092	< 7E-06	< 7E-06	0.040	0.000012	3.5	0.00095
29-Jul-15	5	9	500	465	8.6	318	16	0.48	0.040	< 2	< 1	0.20	< 0.06	< 0.03	1.0	< 0.3	16	0.030	0.043	3.0	0.012	< 7E-06	< 7E-06	0.020	< 3E-06	4.7	0.00068
12-Aug-15	6	11	500	490	8.6	298	12	0.46	0.13	< 2	< 1	0.10	< 0.06	< 0.03	< 1	< 0.3	14	0.10	0.039	2.7	0.014	< 7E-06	< 7E-06	0.018	0.0000090	4.3	0.00062
26-Aug-15	7	13	600	565	8.2	308	9.0	0.38	0.080	2.0	1.0	0.10	0.060	0.030	1.0	0.30	14	0.071	0.037	2.5	0.014	0.0000070	0.0000070	0.017	0.0000060	4.3	0.00055
9-Sep-15	8	15	600	560	8.5	224	8.0	0.29	0.030	< 2	< 1	< 0.1	< 0.06	< 0.03	< 1	< 0.3	14	0.038	0.036	2.2	0.014	< 7E-06	< 7E-06	0.016	< 3E-06	4.3	0.00048
23-Sep-15	9	17	600	560	8.5	218	7.0	0.21	0.030	2.0	1.0	0.10	0.060	0.030	1.0	0.30	15	0.030	0.032	1.8	0.014	0.0000070	0.0000070	0.014	0.0000030	4.6	0.00042
7-Oct-15	10	19	500	475	8.4	224	5.0	0.12	0.030	-	-	< 0.1	< 0.06	< 0.03	< 1	-	16	0.021	0.028	1.4	0.015	< 7E-06	< 7E-06	0.012	0.0000030	4.9	0.00036
21-Oct-15	11	21	500	465	8.5	206	5.0	0.15	0.020	-	-	0.10	< 0.06	< 0.03	< 1	-	18	0.018	0.027	1.4	0.018	< 7E-06	< 7E-06	0.014	< 3E-06	5.1	0.00046
4-Nov-15	12	23	500	485	8.5	197	6.0	0.16	0.020	-	-	< 0.1	< 0.06	< 0.03	< 1	-	21	0.024	0.022	1.2	0.021	< 7E-06	< 7E-06	0.011	< 3E-06	6.2	0.00047
18-Nov-15	13	25	500	460	8.6	204	5.0	0.13	< 0.01	-	-	< 0.1	< 0.06	< 0.03	< 1	-	21	0.015	0.021	1.1	0.019	0.000015	0.000010	0.012	< 3E-06	6.2	0.00040
2-Dec-15	14	27	500	470	8.5	170	4.0	0.10	0.010	-	-	0.20	< 0.06	< 0.03	< 1	-	27	0.022	0.021	0.99	0.027	< 7E-06	< 7E-06	0.0095	< 3E-06	7.8	0.00040
16-Dec-15	15	29	500	460	8.5	157	4.0	0.090	< 0.01	-	-	0.10	< 0.06	< 0.03	< 1	-	28	0.013	0.019	0.82	0.030	0.000021	0.000023	0.010	0.000035	8.1	0.00049
30-Dec-15	16	31	500	460	8.4	131	4.0	0.060	< 0.01	-	-	< 0.1	< 0.06	< 0.03	< 1	-	34	0.027	0.019	0.81	0.035	< 7E-06	< 7E-06	0.011	< 3E-06	10	0.00046
13-Jan-16	17	33	500	445	8.3	131	4.0	0.060	< 0.01	-	-	0.20	< 0.06	< 0.03	< 1	-	33	0.012	0.016	0.57	0.032	< 7E-06	< 7E-06	0.010	< 3E-06	9.2	0.00038
27-Jan-16	18	35	500	475	8.3	122	4.0	0.060	< 0.01	-	-	0.20	< 0.06	< 0.03	< 1	-	37	0.0082	0.015	0.57	0.039	< 7E-06	< 7E-06	0.0090	< 3E-06	11	0.00036
10-Feb-16	19	37	500	460	8.3	118	4.0	0.050	< 0.01	-	-	0.20	< 0.06	< 0.03	< 1	-	43	0.0059	0.015	0.52	0.046	< 7E-06	< 7E-06	0.0070	< 3E-06	12	0.00037
24-Feb-16	20	39	500	455	8.3	116	3.0	0.040	0.020	-	-	0.20	< 0.06	< 0.03	< 1	-	52	0.0032	0.014	0.46	0.051	< 7E-06	< 7E-06	0.0070	< 3E-06	15	0.00035
9-Mar-16	21	41	501	450	8.3	108	3.0																				

Appendix D.3-3: Leachate Concentrations and Calculated Loading Rates for Leach Tailings Kinetic Tests

Leachate Concentrations for Col 15 (Latte Composite)

Date	Cycle	Weeks	Volume (mL)		Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.		Input	Output	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
3-Jun-15	1	1	700	350	0.37	0.079	4.1	0.00024	0.013	37	0.011	0.23	0.044	1.6	0.023	28	0.0080	4.3	0.017	780	1.0	748	0.00040	< 1E-05	0.00019	0.12	0.00033	0.0010	< 0.002
17-Jun-15	2	3	600	565	0.097	0.0074	0.90	< 1E-05	0.0065	13	0.013	0.030	0.020	0.37	0.059	15	0.0038	5.3	0.00066	316	0.36	282	0.00020	0.00040	0.000080	0.036	0.00023	< 0.001	< 0.002
1-Jul-15	3	5	550	535	0.035	0.0024	0.34	< 1E-05	0.0056	8.6	0.013	0.020	0.014	0.068	0.026	10	0.0017	5.3	0.000056	187	0.19	128	0.00015	0.000050	0.000070	0.027	0.00025	< 0.001	< 0.002
15-Jul-15	4	7	550	525	0.020	0.0028	0.25	0.00054	0.0050	8.3	0.011	< 0.01	0.011	0.0089	0.047	9.7	0.00083	5.4	0.000041	139	0.15	98	0.00015	0.00055	0.00013	0.019	0.00024	0.0030	< 0.002
29-Jul-15	5	9	500	490	0.013	0.00098	0.20	< 0.00001	0.0056	8.8	0.0096	< 0.01	0.0089	0.0024	0.0090	9.6	0.00055	4.8	0.000018	105	0.18	78	0.00013	0.000050	< 0.00005	0.018	0.00021	< 0.001	< 0.002
12-Aug-15	6	11	500	490	0.0084	0.00087	0.14	0.000010	0.0045	9.2	0.0087	< 0.01	0.0063	0.0018	0.016	10	0.00060	4.9	0.000012	81	0.17	59	0.00013	0.000050	< 0.00005	0.014	0.00021	< 0.001	< 0.002
26-Aug-15	7	13	600	560	0.0070	0.00094	0.12	0.000010	0.0043	10	0.0090	0.010	0.014	0.0016	0.013	10	0.00078	4.8	0.000050	63	0.19	54	0.00015	0.00012	0.000050	0.013	0.00020	0.0010	0.0020
9-Sep-15	8	15	600	580	0.0057	0.0010	0.092	< 1E-05	0.0041	11	0.0094	< 0.01	0.023	0.0013	0.0090	11	0.00095	4.7	0.000088	45	0.20	49	0.00017	0.00018	< 5E-05	0.011	0.00018	< 0.001	< 0.002
23-Sep-15	9	17	600	575	0.0046	0.00083	0.080	0.000010	0.0040	12	0.0087	0.010	0.014	0.0012	0.0060	10	0.00068	4.5	0.000047	36	0.21	42	0.00015	0.00013	0.000050	0.011	0.00018	0.0010	0.0020
7-Oct-15	10	19	500	470	0.0036	0.00065	0.067	< 1E-05	0.0040	13	0.0080	< 0.01	0.0049	0.0011	< 0.003	9.6	0.00040	4.3	0.0000060	26	0.21	34	0.00012	0.000070	< 5E-05	0.011	0.00017	< 0.001	< 0.002
21-Oct-15	11	21	500	485	0.0040	0.00088	0.082	< 1E-05	0.0039	13	0.0083	< 0.01	0.0056	0.0012	< 0.003	9.3	0.00041	4.7	0.0000070	21	0.22	33	0.00017	0.00016	0.000080	0.011	0.00021	< 0.001	< 0.002
4-Nov-15	12	23	500	475	0.0037	0.0011	0.080	0.000040	0.0035	14	0.0068	< 0.01	0.0045	0.0011	0.0050	10	0.00041	4.5	0.0000040	19	0.22	31	0.00016	0.00020	< 5E-05	0.010	0.00019	< 0.001	< 0.002
18-Nov-15	13	25	500	485	0.0030	0.00055	0.066	0.000070	0.0037	14	0.0064	< 0.01	0.0026	0.00070	0.0030	10	0.0011	4.6	0.000012	16	0.21	32	0.00016	0.00010	< 5E-05	0.0073	0.00017	< 0.001	< 0.002
2-Dec-15	14	27	500	475	0.0028	0.00036	0.064	0.000070	0.0036	15	0.0060	< 0.01	0.0025	0.0010	< 0.003	10	0.00038	4.7	0.0000020	15	0.23	26	0.00013	0.000090	< 5E-05	0.0079	0.00018	< 0.002	< 0.002
16-Dec-15	15	29	500	475	0.0025	0.00080	0.058	0.0026	0.0037	14	0.0064	< 0.01	0.0026	0.0011	0.086	10	0.00041	5.8	0.000021	12	0.23	26	0.00013	0.00016	0.00026	0.0076	0.00021	0.020	< 0.002
30-Dec-15	16	31	500	490	0.0025	0.00078	0.053	0.00017	0.0037	14	0.0055	0.010	0.0033	0.00090	< 0.003	10	0.00036	4.4	0.0000090	11	0.23	23	0.00014	0.000040	0.000070	0.0074	0.00021	< 0.001	< 0.002
13-Jan-16	17	33	500	450	0.0022	0.00075	0.056	0.00014	0.0033	14	0.0049	< 0.01	0.0026	0.00080	< 0.003	9.8	0.0026	4.4	0.0000020	8.6	0.20	20	0.000084	0.000060	< 5E-05	0.0060	0.00014	< 0.001	< 0.002
27-Jan-16	18	35	500	460	0.0021	0.00047	0.045	0.000010	0.0032	13	0.0043	< 0.01	0.0024	0.00070	< 0.003	9.1	0.00029	4.5	< 2E-06	7.1	0.22	20	0.00014	0.000090	< 5E-05	0.0061	0.00015	< 0.001	< 0.002
10-Feb-16	19	37	500	475	0.0019	0.00051	0.035	0.00015	0.0032	13	0.0040	< 0.01	0.0023	0.00080	< 0.003	8.9	0.00038	4.4	< 2E-06	6.2	0.21	17	0.00013	0.000070	< 5E-05	0.0052	0.00016	< 0.001	< 0.002
24-Feb-16	20	39	500	470	0.0021	0.00023	0.047	0.000050	0.0033	14	0.0041	0.040	0.0024	0.00070	0.0040	9.5	0.00034	4.4	< 2E-06	5.4	0.22	17	0.00012	0.000020	< 5E-05	0.0055	0.00014	< 0.001	< 0.002
9-Mar-16	21	41	501	455																									

Calculated Loading Rates for Col 15

Date	Cycle	Weeks	Volume (mL)		Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.		Input	Output	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
3-Jun-15	1	1	700	350	0.026	0.0056	0.29	0.000017	0.00088	2.6	0.00076	0.016	0.0030	0.11	0.0016	2.0	0.00056	0.30	0.0012	55	0.073	52	0.000028	0.00000070	0.000013	0.0084	0.000023	0.000070	0.00014
17-Jun-15	2	3	600	565	0.0055	0.00042	0.051	0.00000057	0.00037	0.75	0.00076	0.0017	0.0011	0.021	0.0033	0.82	0.00022	0.30	0.000037	18	0.020	16	0.000011	0.000023	0.0000045	0.0020	0.000013	0.000057	0.00011
1-Jul-15	3	5	550	535	0.0019	0.00013	0.018	0.00000054	0.00030	0.46	0.00067	0.0011	0.00077	0.0036	0.0014	0.56	0.000090	0.28	0.0000030	10	0.010	6.8	0.0000079	0.0000027	0.0000037	0.0014	0.000013	0.000054	0.00011
15-Jul-15	4	7	550	525	0.0010	0.00014	0.013	0.000028	0.00026	0.44	0.00058	0.00053	0.00056	0.00047	0.0025	0.51	0.000044	0.28	0.0000022	7.3	0.0081	5.1	0.0000080	0.000029	0.0000068	0.0010	0.000013	0.00016	0.00011
29-Jul-15	5	9	500	490	0.00062	0.000048	0.0098	0.00000049	0.00028	0.43	0.00047	0.00049	0.00043	0.00012	0.00044	0.47	0.000027	0.23	0.00000088	5.1	0.0090	3.8	0.0000063	0.0000025	0.0000025	0.00089	0.000010	0.000049	0.000098
12-Aug-15	6	11	500	490	0.00041	0.000043	0.0069	0.00000049	0.00022	0.45	0.00043	0.00049	0.00031	0.000088	0.00078	0.49	0.000029	0.24	0.00000059	3.9	0.0083	2.9	0.0000063	0.0000025	0.0000025	0.00067	0.000010	0.000049	0.000098
26-Aug-15	7	13	600	560	0.00039	0.000052	0.0065	0.00000056	0.00024	0.57	0.00051	0.00056	0.00081	0.000087	0.00070	0.58	0.000043	0.27	0.0000028	3.5	0.010	3.0	0.0000085	0.0000064	0.0000028	0.00070	0.000011	0.000056	0.00011
9-Sep-15	8	15	600	580	0.00033	0.000058	0.0053	0.00000058	0.00024	0.66	0.00054	0.00058	0.0013	0.000075	0.00052	0.62	0.000055	0.27	0.0000051	2.6	0.012	2.8	0.000010	0.000010	0.0000029	0.00066	0.000010	0.000058	0.00012
23-Sep-15	9	17	600	575	0.00027	0.000047	0.0046	0.00000058	0.00023	0.68	0.00050	0.00058	0.00079	0.000069	0.00035	0.58	0.000039	0.26	0.0000027	2.1	0.012	2.4	0.0000085	0.0000072	0.0000029	0.00063	0.000010	0.000058	0.00012
7-Oct-15	10	19	500	470	0.00017	0.000031	0.0031	0.00000047	0.00019	0.59	0.00038	0.00047	0.00023	0.000052	0.00014	0.45	0.000019	0.20	0.00000028	1.2	0.0098	1.6	0.0000057	0.0000033	0.0000024	0.00050	0.0000080	0.000047	0.000094
21-Oct-15	11	21	500	485	0.00020	0.000043	0.0040	0.00000049	0.00019	0.61	0.00040	0.00049	0.00027	0.000058	0.00015	0.45	0.000020	0.23	0.00000034	1.0	0.010	1.6	0.0000081	0.0000078	0.0000039	0.00055	0.000010	0.000049	0.000097
4-Nov-15	12	23	500	475	0.00018	0.000051	0.0038	0.0000019	0.00017	0.66	0.00032	0.00048	0.00021	0.000052	0.00024	0.48	0.000019	0.21	0.00000019	0.90	0.010	1.5	0.0000077	0.0000095	0.0000024	0.00048	0.0000090	0.000048	0.000095
18-Nov-15	13	25	500	485	0.00015	0.000027	0.0032	0.0000034	0.00018	0.68	0.00031	0.00049	0.00013	0.000034	0.00015	0.49	0.000051	0.22	0.00000058	0.79	0.010	1.5	0.0000077	0.0000049	0.0000024	0.00035	0.0000082	0.000049	0.000097
2-Dec-15	14	27	500	475	0.00013	0.000017	0.0030	0.0000033	0.00017	0.69	0.00029	0.00048	0.00012	0.000048	0.00014	0.49	0.000018	0.22	0.000000095	0.70	0.011	1.3	0.0000061	0.0000043	0.0000024	0.00038	0.0000086	0.000095	0.000095
16-Dec-15	15	29	500	475	0.00012	0.000038	0.0028	0.00012	0.00017	0.67	0.00031	0.00048	0.00012	0.000052	0.0041	0.49	0.000019	0.28	0.00000100	0.57	0.011	1.2	0.0000062	0.0000076	0.000012	0.00036	0.0000100	0.00095	0.000095
30-Dec-15	16	31	500	490	0.00012	0.000038	0.0026	0.0000083	0.00018	0.71	0.00027	0.00049	0.00016	0.000044	0.00015	0.49	0.000018	0.22	0.00000044	0.52	0.011	1.1	0.0000070	0.0000020	0.0000034	0.00036	0.000010	0.000049	0.000098
13-Jan-16	17	33	500	450	0.000099	0.000034	0.0025	0.0000063	0.00015	0.62	0.00022	0.00045	0.00012	0.000036	0.00014	0.44	0.00011	0.20	0.000000090	0.39	0.0089	0.88	0.0000038	0.0000027	0.0000023	0.00027	0.0000063	0.000045	0.000090
27-Jan-16	18	35	500	460	0.000096	0.000022	0.0021	0.00000046	0.00014	0.59	0.00020	0.00046	0.00011	0.000032	0.00014	0.42	0.000013	0.21	0.000000092	0.33	0.0099	0.91	0.0000064	0.0000041	0.0000023	0.00028	0.0000069	0.000046	0.000092
10-Feb-16	19	37	500	475	0.000091	0.000024	0.0017	0.0000071	0.00015	0.60	0.00019	0.00048	0.00011	0.000038	0.00014	0.42	0.000018	0.21	0.000000095	0.29	0.010	0.82	0.0000062	0.0000033	0.0000024	0.00025	0.0000076	0.000048	0.000095
24-Feb-16	20	39	500	470	0.000096	0.000011	0.0022	0.0000024	0.00015	0.66	0.00019	0.0019	0.00011	0.000033	0.00019	0.45	0.000016	0.21	0.000000094	0.25	0.010	0.80	0.0000058	0.00000094	0.0000024	0.00026	0.0000066	0.000047	0.000094
9-Mar-16	21	41	501	455																									

Leachate Concentrations for Col 16 (Supremo Composite)

Date	Cycle	Weeks	Volume (mL)		Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.		Input	Output	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
3-Jun-15	1	1	700	320	0.23	0.0042	1.3	0.00029	0.0043	1.5	0.00053	0.65	0.18	0.10	1.1	7.3	0.0020	4.1	0.0013	270	0.029	56	0.00014	< 1E-05	0.00033	2.2	0.0076	0.0020	< 0.002
17-Jun-15	2	3	600	550	0.069	0.0015	0.55	0.000010	0.0026	0.96	0.0028	0.16	0.084	0.014	1.5	6.0	0.00083	4.9	0.000036	204	0.018	21	0.00014	0.00034	0.00056	1.6	0.00066	< 0.001	< 0.002
1-Jul-15	3	5	550	510	0.029	0.0013	0.33	< 1E-05	0.0027	0.95	0.00041	0.050	0.051	0.0016	1.3	5.5	0.00053	5.0	0.000012	178	0.018	9.6	0.00013	0.00011	0.00029	1.2	0.00056	< 0.001	< 0.002
15-Jul-15	4	7	550	535	0.016	0.0012	0.29	0.000020	0.0025	0.79	0.00070	0.040	0.032	0.00060	1.1	4.6	0.00041	4.6	0.000044	150	0.015	6.9	0.00013	0.000040	0.00038	0.94	0.00062	< 0.001	< 0.002
29-Jul-15	5	9	500	465	0.0095	0.00091	0.18	0.000010	0.0028	0.91	0.00038	0.020	0.022	0.00020	0.93	4.9	0.00028	4.6	0.000013	136	0.018	5.3	0.00011	0.000050	0.00017	0.69	0.00042	< 0.001	< 0.002
12-Aug-15	6	11	500	490	0.0073	0.00065	0.16	0.000030	0.0025	0.88	0.00070	0.030	0.018	0.00020	0.86	5.3	0.00034	5.1	0.000015	127	0.018	4.1	0.00019	0.000070	0.00056	0.51	0.00057	< 0.001	< 0.002
26-Aug-15	7	13	600	565	0.0059	0.00082	0.12	0.000025	0.0023	0.86	0.00066	0.020	0.016	0.00015	0.77	5.0	0.00030	4.8	0.000024	112	0.017	4.9	0.00016	0.00011	0.00040	0.43	0.00046	0.0010	0.0020
9-Sep-15	8	15	600	560	0.0045	0.00099	0.087	0.000020	0.0022	0.84	0.00062	< 0.01	0.015	< 0.0001	0.68	4.7	0.00026	4.4	0.000033	97	0.017	5.7	0.00012	0.00015	0.00023	0.35	0.00035	< 0.001	< 0.002
23-Sep-15	9	17	600	560	0.0036	0.00070	0.068	0.000015	0.0023	0.92	0.00040	0.010	0.011	0.00010	0.57	4.8	0.00020	4.3	0.000020	91	0.018	4.0	0.00012	0.00011	0.00023	0.29	0.00031	0.0010	0.0020
7-Oct-15	10	19	500	475	0.0027	0.00041	0.048	< 1E-05	0.0024	0.99	0.00017	< 0.01	0.0068	< 0.0001	0.47	4.8	0.00014	4.2	0.0000070	85	0.020	2.2	0.00011	0.000060	0.00022	0.23	0.00026	< 0.001	< 0.002
21-Oct-15	11	21	500	465	0.0030	0.00054	0.057	< 1E-05	0.0024	1.1	0.00030	< 0.01	0.0073	< 0.0001	0.43	4.9	0.000090	4.6	0.0000050	76	0.021	2.2	0.00012	0.00023	0.000070	0.20	0.00030	< 0.001	< 0.002
4-Nov-15	12	23	500	485	0.0025	0.00052	0.051	< 1E-05	0.0023	1.3	0.00079	< 0.01	0.0063	< 0.0001	0.37	5.4	0.00010	4.4	0.0000030	78	0.023	2.5	0.00014	0.00011	0.000090	0.17	0.00026	< 0.001	< 0.002
18-Nov-15	13	25	500	460	0.0021	0.00067	0.044	0.000060	0.0026	1.4	0.0010	< 0.01	0.0053	< 0.0001	0.39	5.4	0.00062	4.6	0.000010	71	0.025	2.5	0.00016	0.00017	0.000070	0.15	0.00024	< 0.001	< 0.002
2-Dec-15	14	27	500	470	0.0022	0.00042	0.045	< 1E-05	0.0027	1.8	0.0026	< 0.01	0.0049	< 0.0001	0.32	6.3	0.00010	4.6	0.0000040	75	0.032	2.2	0.00012	0.000010	0.00014	0.15	0.00023	< 0.002	< 0.002
16-Dec-15	15	29	500	460	0.0019	0.00064	0.033	0.00027	0.0028	1.9	0.0020	< 0.01	0.0045	< 0.0001	0.27	6.6	0.00018	6.1	0.000021	63	0.033	1.4	0.00015	0.00026	0.00017	0.13	0.00024	0.0010	< 0.002
30-Dec-15	16	31	500	460	0.0016	0.00071	0.033	0.00013	0.0034	2.2	0.0017	0.010	0.0041	< 0.0001	0.26	6.8	0.00014	5.0	0.000061	59	0.040	1.5	0.00021	0.000080	0.00013	0.13	0.00023	< 0.001	< 0.002
13-Jan-16	17	33	500	445	0.0014	0.00086	0.028	0.000040	0.0029	2.3	0.0019	< 0.01	0.0037	< 0.0001	0.20	7.2	0.0014	4.4	< 2E-06	50	0.038	1.6	0.00013	0.000080	< 5E-05	0.096	0.00014	< 0.001	< 0.002
27-Jan-16	18	35	500	475	0.0012	0.00037	0.018	< 1E-05	0.0029	2.5	0.0016	< 0.01	0.0032	< 0.0001	0.19	7.1	< 4E-05	4.8	0.0000020	41	0.046	1.6	0.00017	0.000060	< 5E-05	0.094	0.00014	< 0.001	< 0.002
10-Feb-16	19	37	500	460	0.0011	0.00044	0.013	0.000090	0.0032	3.0	0.0014	< 0.01	0.0029	< 0.0001	0.16	7.4	0.000090	4.6	< 2E-06	36	0.053	1.8	0.00018	0.000070	< 5E-05	0.080	0.00013	< 0.001	< 0.002
24-Feb-16	20	39	500	455	0.0011	0.00021	0.016	0.000020	0.0034	3.7	0.0028	< 0.01	0.0029	< 0.0001	0.16	8.5	0.000050	4.8	< 2E-06	30	0.063	1.7	0.00018	0.000010	< 5E-05	0.082	0.00010	< 0.001	< 0.002
9-Mar-16	21	41	501	450																									

Appendix D.3-3: Leachate Concentrations and Calculated Loading Rates for Leach Tailings Kinetic Tests

Calculated Loading Rates for Col 2

Date	Cycle	Weeks	Volume (mL)		pH	Alkalinity	Sulphate	Total CN	WAD CN	SCN	CNO	Ammonia-N	Nitrate-N	Nitrite-N	Chloride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr
	No.		Input	Output		$mgCaCO_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
3-Jun-15	1	1	700	320	8.9	27	9.6	0.21	0.016	0.44	0.064	0.064	0.14	0.049	1.2	0.019	1.8	0.0027	0.0041	0.24	0.0010	0.00000045	0.00000064	0.0050	0.0000028	0.56	0.00055
17-Jun-15	2	3	600	550	8.8	23	3.3	0.089	0.0039	0.11	0.055	0.017	0.015	0.019	0.39	0.017	0.99	0.0047	0.0034	0.26	0.00050	0.00000039	0.0000044	0.0010	0.0000015	0.31	0.00016
1-Jul-15	3	5	550	510	8.7	19	1.4	0.050	0.0020	0.10	0.051	0.010	0.0051	0.0031	0.15	0.015	0.81	0.0011	0.0029	0.23	0.00050	0.00000036	0.00000036	0.0012	0.00000077	0.24	0.000069
15-Jul-15	4	7	550	535	8.6	17	0.96	0.061	0.0032	0.11	0.054	0.0054	0.0032	0.0016	0.054	0.016	0.64	0.0025	0.0029	0.23	0.00049	0.00000037	0.00000037	0.0021	0.00000064	0.19	0.000051
29-Jul-15	5	9	500	465	8.6	15	0.74	0.022	0.0019	0.093	0.047	0.0093	0.0028	0.0014	0.047	0.014	0.72	0.0014	0.0020	0.14	0.00055	0.00000033	0.00000033	0.00092	0.00000014	0.22	0.000032
12-Aug-15	6	11	500	490	8.6	15	0.59	0.023	0.0064	0.098	0.049	0.0049	0.0029	0.0015	0.049	0.015	0.70	0.0050	0.0019	0.13	0.00071	0.00000034	0.00000034	0.00088	0.00000044	0.21	0.000030
26-Aug-15	7	13	600	565	8.2	17	0.51	0.021	0.0045	0.11	0.057	0.0057	0.0034	0.0017	0.057	0.017	0.81	0.0040	0.0021	0.14	0.00079	0.00000040	0.00000040	0.00096	0.00000034	0.24	0.000031
9-Sep-15	8	15	600	560	8.5	13	0.45	0.016	0.0017	0.11	0.056	0.0056	0.0034	0.0017	0.056	0.017	0.80	0.0022	0.0020	0.12	0.00076	0.00000039	0.00000039	0.00090	0.00000017	0.24	0.000027
23-Sep-15	9	17	600	560	8.5	12	0.39	0.011	0.0017	0.11	0.056	0.0056	0.0034	0.0017	0.056	0.017	0.86	0.0017	0.0018	0.10	0.00078	0.00000039	0.00000039	0.00080	0.00000017	0.26	0.000024
7-Oct-15	10	19	500	475	8.4	11	0.24	0.0057	0.0014			0.0048	0.0029	0.0014	0.048	0.00	0.78	0.00099	0.0013	0.065	0.00069	0.00000033	0.00000033	0.00059	0.00000014	0.23	0.000017
21-Oct-15	11	21	500	465	8.5	9.6	0.23	0.0070	0.00093			0.0047	0.0028	0.0014	0.047	0.00	0.81	0.00081	0.0013	0.064	0.00084	0.00000033	0.00000033	0.00065	0.00000014	0.24	0.000021
4-Nov-15	12	23	500	485	8.5	9.6	0.29	0.0078	0.00097			0.0049	0.0029	0.0015	0.049	0.00	1.0	0.0011	0.0011	0.057	0.0010	0.00000034	0.00000034	0.00051	0.00000015	0.30	0.000023
18-Nov-15	13	25	500	460	8.6	9.4	0.23	0.0060	0.00046			0.0046	0.0028	0.0014	0.046	0.00	0.97	0.00067	0.00097	0.051	0.00085	0.00000069	0.00000046	0.00056	0.00000014	0.28	0.000018
2-Dec-15	14	27	500	470	8.5	8.0	0.19	0.0047	0.00047			0.0094	0.0028	0.0014	0.047	0.00	1.3	0.0010	0.00098	0.047	0.0013	0.00000033	0.00000033	0.00045	0.00000014	0.36	0.000019
16-Dec-15	15	29	500	460	8.5	7.2	0.18	0.0041	0.00046			0.0046	0.0028	0.0014	0.046	0.00	1.3	0.00058	0.00088	0.038	0.0014	0.00000097	0.0000011	0.00046	0.0000016	0.37	0.000023
30-Dec-15	16	31	500	460	8.4	6.0	0.18	0.0028	0.00046			0.0046	0.0028	0.0014	0.046	0.00	1.6	0.0012	0.00086	0.037	0.0016	0.00000032	0.00000032	0.00051	0.00000014	0.46	0.000021
13-Jan-16	17	33	500	445	8.3	5.8	0.18	0.0027	0.00045			0.0089	0.0027	0.0013	0.045	0.00	1.4	0.00053	0.00071	0.025	0.0014	0.00000031	0.00000031	0.00045	0.00000013	0.41	0.000017
27-Jan-16	18	35	500	475	8.3	5.8	0.19	0.0029	0.00048			0.0095	0.0029	0.0014	0.048	0.00	1.7	0.00039	0.00072	0.027	0.0018	0.00000033	0.00000033	0.00043	0.00000014	0.50	0.000017
10-Feb-16	19	37	500	460	8.3	5.4	0.18	0.0023	0.00046			0.0092	0.0028	0.0014	0.046	0.00	2.0	0.00027	0.00067	0.024	0.0021	0.00000032	0.00000032	0.00032	0.00000014	0.57	0.000017
24-Feb-16	20	39	500	455	8.3	5.3	0.14	0.0018	0.00091			0.0091	0.0027	0.0014	0.046	0.00	2.4	0.00015	0.00062	0.021	0.0023	0.00000032	0.00000032	0.00032	0.00000014	0.67	0.000016
9-Mar-16	21	41	501	450	8.3	4.9	0.14																				

Leachate Concentrations for Col 17 (Supremo/Kone Composite)

Date	Cycle	Weeks	Volume (mL)		pH	Alkalinity	Sulphate	Total CN	WAD CN	SCN	CNO	Ammonia-N	Nitrate-N	Nitrite-N	Chloride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr
	No.		Input	Output		$mgCaCO_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
3-Jun-15	1	1	700	315	8.9	404	135	4.6	0.26	6.8	< 1	0.90	1.4	0.66	17	< 0.3	24	0.054	0.11	8.9	0.0084	< 7E-06	< 7E-06	0.054	0.000033	7.5	0.0064
17-Jun-15	2	3	600	560	8.8	395	60	1.9	0.090	< 2	< 1	0.30	0.28	0.41	8.0	< 0.3	20	0.099	0.089	7.9	0.0065	< 7E-06	0.0000070	0.017	0.000022	6.6	0.0020
1-Jul-15	3	5	550	520	8.7	364	32	1.2	0.040	< 2	< 1	0.20	0.090	0.11	3.0	< 0.3	16	0.076	0.082	6.9	0.0061	< 7E-06	< 7E-06	0.020	0.000014	5.2	0.0010
15-Jul-15	4	7	550	515	8.7	302	23	1.2	0.060	< 2	< 1	0.10	< 0.06	0.030	1.0	< 0.3	12	0.20	0.072	5.9	0.0056	0.0000070	< 7E-06	0.030	0.0000050	3.6	0.00066
29-Jul-15	5	9	500	475	8.6	297	15	0.52	0.060	< 2	< 1	0.20	< 0.06	< 0.03	1.0	< 0.3	14	0.13	0.062	4.9	0.0071	0.000012	< 7E-06	0.018	< 3E-06	4.5	0.00045
12-Aug-15	6	11	500	485	8.6	268	19	0.48	0.040	< 2	< 1	0.20	< 0.06	0.030	1.0	< 0.3	14	0.18	0.051	4.0	0.0094	< 7E-06	< 7E-06	0.016	0.0000040	4.1	0.00051
26-Aug-15	7	13	600	555	8.1	273	13	0.38	0.035	2.0	1.0	0.15	0.060	0.030	1.0	0.30	14	0.12	0.048	3.6	0.0089	0.0000070	0.0000070	0.014	0.0000035	4.2	0.00040
9-Sep-15	8	15	600	570	8.6	214	10	0.28	0.030	< 2	< 1	< 0.1	< 0.06	< 0.03	< 1	< 0.3	14	0.062	0.045	3.2	0.0084	< 7E-06	< 7E-06	0.013	< 3E-06	4.2	0.00029
23-Sep-15	9	17	600	560	8.5	201	9.0	0.22	0.025	-	-	0.10	0.060	0.030	1.0	-	15	0.052	0.041	2.7	0.0092	0.0000070	0.0000070	0.012	0.0000030	4.6	0.00027
7-Oct-15	10	19	500	460	8.4	202	7.0	0.16	0.020	-	-	< 0.1	< 0.06	< 0.03	< 1	-	17	0.043	0.037	2.1	0.0100	< 7E-06	< 7E-06	0.011	< 3E-06	5.1	0.00025
21-Oct-15	11	21	500	475	8.5	187	8.0	0.17	0.020	-	-	0.10	< 0.06	< 0.03	< 1	-	17	0.018	0.035	2.1	0.012	< 7E-06	< 7E-06	0.012	< 3E-06	5.1	0.00031
4-Nov-15	12	23	500	485	8.5	180	7.0	0.15	0.020	-	-	0.10	< 0.06	< 0.03	< 1	-	20	0.026	0.029	1.8	0.013	< 7E-06	< 7E-06	0.0086	0.0000080	6.1	0.00033
18-Nov-15	13	25	500	465	8.5	187	6.0	0.10	< 0.01	-	-	< 0.1	< 0.06	< 0.03	< 1	-	21	0.033	0.027	1.6	0.014	< 7E-06	< 7E-06	0.0073	0.0000040	6.3	0.00023
2-Dec-15	14	27	500	460	8.4	155	6.0	0.12	0.010	-	-	0.20	< 0.06	< 0.03	< 1	-	28	0.068	0.026	1.4	0.020	< 7E-06	< 7E-06	0.0081	< 3E-06	8.3	0.00023
16-Dec-15	15	29	500	465	8.4	145	6.0	0.10	0.010	-	-	0.10	< 0.06	< 0.03	< 1	-	31	0.017	0.024	1.2	0.023	0.000020	0.000025	0.0085	0.000040	9.3	0.00031
30-Dec-15	16	31	500	475	8.4	123	5.0	0.070	< 0.01	-	-	< 0.1	< 0.06	< 0.03	< 1	-	37	0.033	0.026	1.3	0.027	< 7E-06	< 7E-06	0.011	0.0000070	11	0.00033
13-Jan-16	17	33	500	445	8.3	126	5.0	0.090	< 0.01	-	-	0.20	< 0.06	< 0.03	< 1	-	34	0.012	0.021	0.88	0.022	< 7E-06	< 7E-06	0.0080	< 3E-06	10.0	0.00027
27-Jan-16	18	35	500	455	8.3	120	6.0	0.080	< 0.01	-	-	< 0.1	< 0.06	< 0.03	< 1	-	39	0.023	0.020	0.86	0.027	< 7E-06	< 7E-06	0.0080	< 3E-06	11	0.00024
10-Feb-16	19	37	500	465	8.2	114	5.0	0.060	< 0.01	-	-	0.10	< 0.06	< 0.03	< 1	-	43	0.0079	0.020	0.85	0.029	< 7E-06	< 7E-06	0.0060	< 3E-06	13	0.00023
24-Feb-16	20	39	500	465	8.3	112	4.0	0.050	< 0.01	-	-	0.20	< 0.06	< 0.03	< 1	-	51	0.0052	0.018	0.77	0.033	< 7E-06	< 7E-06	0.0050	< 3E-06	15	0.00027
9-Mar-16	21	41	501	455	8.3	106	4.0																				

Calculated Loading Rates for Col 2

Date	Cycle	Weeks	Volume (mL)		pH	Alkalinity	Sulphate	Total CN	WAD CN	SCN	CNO	Ammonia-N	Nitrate-N	Nitrite-N	Chloride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr
	No.		Input	Output		$mgCaCO_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
3-Jun-15	1	1	700	315	8.9	25	8.5	0.29	0.016	0.43	0.063	0.057	0.088	0.042	1.1	0.019	1.5	0.0034	0.0066	0.56	0.00053	0.00000044	0.00000044	0.0034	0.0000021	0.47	0.00040
17-Jun-15	2	3	600	560	8.8	22	3.4	0.11	0.0050	0.11	0.056	0.017	0.016	0.023	0.45	0.017	1.1	0.0055	0.0050	0.44	0.00036	0.00000039	0.00000039	0.00094	0.0000012	0.37	0.00011
1-Jul-15	3	5	550	520	8.7	19	1.7	0.064	0.0021	0.10	0.052	0.010	0.0047	0.0057	0.16	0.016	0.85	0.0040	0.0043	0.36	0.00032	0.00000036	0.00000036	0.0011	0.00000073	0.27	0.000054
15-Jul-15	4	7	550	515	8.7	16	1.2	0.064	0.0031	0.10	0.052	0.0052	0.0031	0.0015	0.052	0.015	0.61	0.010	0.0037	0.30	0.00029	0.00000036	0.00000036	0.0015	0.00000026	0.19	0.000034
29-Jul-15	5	9	500	475	8.6	14	0.71	0.025	0.0029	0.095	0.048	0.0095	0.0029	0.0014	0.048	0.014	0.68	0.0061	0.0029	0.23	0.00034	0.00000057	0.00000033	0.00086	0.00000014	0.21	0.000021
12-Aug-15	6	11	500	485	8.6	13	0.92	0.023	0.0019	0.097	0.049	0.0097	0.0029	0.0015	0.049	0.015	0.65	0.0086	0.0025	0.20	0.00046	0.00000034	0.00000034	0.00077	0.00000019	0.20	0.000025
26-Aug-15	7	13	600	555	8.1	15	0.72	0.021	0.0019	0.11	0.056	0.0083	0.0033	0.0017	0.056	0.017	0.75	0.0066	0.0027	0.20	0.00050	0.00000039	0.00000039	0.00080	0.00000019	0.23	0.000022
9-Sep-15	8	15	600	570	8.6	12	0.57	0.016	0.0017	0.11	0.057	0.0057	0.0034	0.0017	0.057	0.017	0.78	0.0035	0.0026	0.18	0.00048	0.00000040	0.00000040	0.00075	0.00000017	0.24	0.000017
23-Sep-15	9	17	600	560	8.5	11	0.50	0.012	0.0014			0.0056	0.0034	0.0017	0.056		0.84	0.0029	0.0023	0.15	0.00052	0.00000039	0.00000039	0.00066	0.00000017	0.26	0.000015
7-Oct-15	10	19	500	460	8.4	9.3	0.32	0.0074	0.00092			0.0046	0.0028	0.0014	0.046		0.76	0.0020	0.0017	0.098	0.00046	0.00000032	0.00000032	0.00048	0.00000014	0.23	0.000012
21-Oct-15	11	21	500	475	8.5	8.9	0.38	0.0081	0.00095			0.0048	0.0029	0.0014	0.048		0.80	0.00086	0.0016	0.100	0.00055	0.00000033	0.00000033	0.00055	0.00000014	0.24	0.000015
4-Nov-15	12	23	500	485	8.5	8.7	0.34	0.0073	0.00097			0.0049	0.0029	0.0015	0.049		0.97	0.0013	0.0014	0.087	0.00064	0.00000034	0.00000034	0.00042	0.00000039	0.30	0.000016
18-Nov-15	13	25	500	465	8.5	8.7	0.28	0.0047	0.00047			0.0047	0.0028	0.0014	0.047		0.98	0.0015	0.0012	0.074	0.00065	0.00000033	0.00000033	0.00034	0.00000019	0.29	0.000011
2-Dec-15	14	27	500	460	8.4	7.1	0.28	0.0055	0.00046			0.0092	0.0028	0.0014	0.046		1.3	0.0031	0.0012	0.065	0.00093	0.00000032	0.00000032	0.00037	0.00000014	0.38	0.000011
16-Dec-15	15	29	500	465	8.4	6.7	0.28	0.0047	0.00047			0.0047	0.0028	0.0014	0.047		1.4	0.00079	0.0011	0.057	0.0011	0.00000093	0.0000012	0.00040	0.0000019	0.43	0.000014
30-Dec-15	16	31	500	475	8.4	5.8	0.24	0.0033	0.00048			0.0048	0.0029	0.0014	0.048		1.7	0.0016	0.0012	0.060	0.0013	0.00000033	0.00000033	0.00051	0.00000033	0.51	0.000016
13-Jan-16	17	33	500	445	8.3	5.6	0.22	0.0040	0.00045			0.0089	0.0027	0.0013	0.045		1.5	0.00055	0.00094	0.039	0.00099	0.00000031	0.00000031	0.00036	0.00000013	0.44	0.000012
27-Jan-16	18	35	500	455	8.3	5.5	0.27	0.0036	0.00046			0.0046	0.0027	0.0014	0.046		1.8	0.0011	0.00092	0.039	0.0012	0.00000032	0.00000032	0.00036	0.00000014	0.52	0.000011
10-Feb-16	19	37	500	465	8.2	5.3	0.23	0.0028	0.00047			0.0047	0.0028	0.0014	0.047		2.0	0.00037	0.00092	0.039	0.0014	0.00000033	0.00000033	0.00028	0.00000014	0.60	0.000011
24-Feb-16	20	39	500	465	8.3	5.2	0.19	0.0023	0.00047			0.0093	0.0028	0.0014	0.047		2.4	0.00024	0.00086	0.036	0.0015	0.00000033	0.00000033	0.00023	0.00000014	0.69	0.000013
9-Mar-16	21	41	501	455	8.3	4.8	0.18																				

Appendix D.3-3: Leachate Concentrations and Calculated Loading Rates for Leach Tailings Kinetic Tests

Calculated Loading Rates for Col 2

Date	Cycle	Weeks	Volume (mL)		Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.		Input	Output	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
3-Jun-15	1	1	700	320	0.015	0.00027	0.084	0.000019	0.00028	0.097	0.000034	0.042	0.011	0.0065	0.070	0.46	0.00013	0.26	0.000080	17	0.0018	3.6	0.0000090	0.00000064	0.000021	0.14	0.000049	0.00013	0.00013
17-Jun-15	2	3	600	550	0.0038	0.000085	0.030	0.00000055	0.00014	0.053	0.00016	0.0088	0.0046	0.00077	0.081	0.33	0.000046	0.27	0.0000020	11	0.0010	1.1	0.0000075	0.000019	0.000031	0.087	0.000036	0.000055	0.00011
1-Jul-15	3	5	550	510	0.0015	0.000066	0.017	0.00000051	0.00014	0.048	0.000021	0.0026	0.0026	0.000082	0.064	0.28	0.000027	0.25	0.00000061	9.1	0.00093	0.49	0.0000065	0.0000056	0.000015	0.059	0.000029	0.000051	0.00010
15-Jul-15	4	7	550	535	0.00088	0.000066	0.016	0.0000011	0.00013	0.042	0.000037	0.0021	0.0017	0.000032	0.058	0.25	0.000022	0.25	0.0000024	8.0	0.00081	0.37	0.0000072	0.0000021	0.000020	0.050	0.000033	0.000054	0.00011
29-Jul-15	5	9	500	465	0.00044	0.000042	0.0083	0.00000047	0.00013	0.042	0.000018	0.00093	0.0010	0.0000093	0.043	0.23	0.000013	0.21	0.00000060	6.3	0.00085	0.25	0.0000053	0.0000023	0.0000079	0.032	0.000020	0.000047	0.000093
12-Aug-15	6	11	500	490	0.00036	0.000032	0.0078	0.0000015	0.00012	0.043	0.000034	0.0015	0.00087	0.0000098	0.042	0.26	0.000017	0.25	0.00000074	6.2	0.00089	0.20	0.0000092	0.0000034	0.000027	0.025	0.000028	0.000049	0.000098
26-Aug-15	7	13	600	565	0.00033	0.000046	0.0070	0.0000014	0.00013	0.049	0.000037	0.0011	0.00092	0.0000085	0.043	0.28	0.000017	0.27	0.0000014	6.3	0.00098	0.28	0.0000088	0.0000062	0.000022	0.024	0.000026	0.000057	0.00011
9-Sep-15	8	15	600	560	0.00025	0.000055	0.0049	0.0000011	0.00012	0.047	0.000035	0.00056	0.00082	0.0000056	0.038	0.27	0.000015	0.25	0.0000018	5.4	0.00094	0.32	0.0000069	0.0000084	0.000013	0.019	0.000020	0.000056	0.00011
23-Sep-15	9	17	600	560	0.00020	0.000039	0.0038	0.00000084	0.00013	0.051	0.000022	0.00056	0.00060	0.0000056	0.032	0.27	0.000011	0.24	0.0000011	5.1	0.0010	0.22	0.0000066	0.0000059	0.000013	0.016	0.000017	0.000056	0.00011
7-Oct-15	10	19	500	475	0.00013	0.000019	0.0023	0.00000048	0.00011	0.047	0.0000081	0.00048	0.00032	0.0000048	0.022	0.23	0.0000067	0.20	0.00000033	4.0	0.00093	0.10	0.0000053	0.0000029	0.000010	0.011	0.000012	0.000048	0.000095
21-Oct-15	11	21	500	465	0.00014	0.000025	0.0027	0.00000047	0.00011	0.053	0.000014	0.00047	0.00034	0.0000047	0.020	0.23	0.0000042	0.21	0.00000023	3.5	0.00096	0.10	0.0000057	0.000011	0.0000033	0.0095	0.000014	0.000047	0.000093
4-Nov-15	12	23	500	485	0.00012	0.000025	0.0025	0.00000049	0.00011	0.063	0.000038	0.00049	0.00030	0.0000049	0.018	0.26	0.0000049	0.21	0.00000015	3.8	0.0011	0.12	0.0000066	0.0000053	0.0000044	0.0082	0.000013	0.000049	0.000097
18-Nov-15	13	25	500	460	0.000098	0.000031	0.0020	0.0000028	0.00012	0.063	0.000046	0.00046	0.00024	0.0000046	0.018	0.25	0.000029	0.21	0.00000046	3.3	0.0011	0.12	0.0000075	0.0000078	0.0000032	0.0071	0.000011	0.000046	0.000092
2-Dec-15	14	27	500	470	0.00010	0.000020	0.0021	0.00000047	0.00013	0.085	0.00012	0.00047	0.00023	0.0000047	0.015	0.30	0.0000047	0.22	0.00000019	3.5	0.0015	0.10	0.0000058	0.00000047	0.0000066	0.0068	0.000011	0.000094	0.000094
16-Dec-15	15	29	500	460	0.000087	0.000029	0.0015	0.000012	0.00013	0.087	0.000090	0.00046	0.00020	0.0000046	0.013	0.30	0.0000083	0.28	0.00000097	2.9	0.0015	0.064	0.0000068	0.000012	0.0000078	0.0059	0.000011	0.000046	0.000092
30-Dec-15	16	31	500	460	0.000073	0.000033	0.0015	0.0000060	0.00016	0.10	0.000080	0.00046	0.00019	0.0000046	0.012	0.31	0.0000064	0.23	0.0000028	2.7	0.0018	0.069	0.0000095	0.0000037	0.0000060	0.0058	0.000011	0.000046	0.000092
13-Jan-16	17	33	500	445	0.000061	0.000038	0.0012	0.0000018	0.00013	0.10	0.000083	0.00045	0.00017	0.0000045	0.0089	0.32	0.000062	0.20	0.000000089	2.2	0.0017	0.071	0.0000056	0.0000036	0.0000022	0.0043	0.0000062	0.000045	0.000089
27-Jan-16	18	35	500	475	0.000057	0.000018	0.00086	0.00000048	0.00014	0.12	0.000074	0.00048	0.00015	0.0000048	0.0091	0.34	0.0000019	0.23	0.000000095	2.0	0.0022	0.076	0.0000083	0.0000029	0.0000024	0.0045	0.0000067	0.000048	0.000095
10-Feb-16	19	37	500	460	0.000052	0.000020	0.00060	0.0000041	0.00015	0.14	0.000065	0.00046	0.00013	0.0000046	0.0075	0.34	0.0000041	0.21	0.000000092	1.7	0.0024	0.083	0.0000082	0.0000032	0.0000023	0.0037	0.0000060	0.000046	0.000092
24-Feb-16	20	39	500	455	0.000052	0.0000096	0.00073	0.00000091	0.00016	0.17	0.00013	0.00046	0.00013	0.0000046	0.0071	0.38	0.0000023	0.22	0.000000091	1.4	0.0028	0.077	0.0000080	0.00000046	0.0000023	0.0037	0.0000046	0.000046	0.000091
9-Mar-16	21	41	501	450																									

Leachate Concentrations for Col 17 (Supremo/Kone Composite)

Date	Cycle	Weeks	Volume (mL)		Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.		Input	Output	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
3-Jun-15	1	1	700	315	0.20	0.0055	1.8	0.00026	0.0032	1.2	0.00031	0.54	0.14	0.075	1.4	7.0	0.0010	3.9	0.00076	262	0.023	52	0.00014	*< 1E-05*	0.00031	2.5	0.0011	0.0020	*< 0.002*
17-Jun-15	2	3	600	560	0.072	0.0020	0.69	0.00032	0.0021	0.94	0.0014	0.14	0.076	0.016	1.7	6.1	0.00091	4.5	0.000052	200	0.019	22	0.00016	0.00014	0.00069	1.8	0.00081	*< 0.001*	*< 0.002*
1-Jul-15	3	5	550	520	0.033	0.0012	0.41	*< 1E-05*	0.0021	0.82	0.00083	0.050	0.047	0.0028	1.4	5.3	0.00057	4.7	0.0000080	173	0.017	10	0.00014	0.000080	0.00032	1.3	0.00069	*< 0.001*	*< 0.002*
15-Jul-15	4	7	550	515	0.018	0.0014	0.36	0.000040	0.0019	0.68	0.0011	0.040	0.028	0.00070	1.2	4.7	0.00055	4.7	0.000029	144	0.014	7.9	0.00013	0.000070	0.00083	1.0	0.00081	*< 0.001*	*< 0.002*
29-Jul-15	5	9	500	475	0.011	0.0015	0.22	0.000040	0.0021	0.79	0.00058	0.020	0.021	0.00030	1.0	4.8	0.00032	4.3	0.0000060	130	0.016	6.2	0.00011	0.00023	0.00039	0.77	0.00054	*< 0.001*	*< 0.002*
12-Aug-15	6	11	500	485	0.011	0.00085	0.19	0.000040	0.0019	0.78	0.00080	0.040	0.018	0.00020	0.84	5.4	0.00030	4.7	0.000016	121	0.017	5.9	0.00023	0.000070	0.00069	0.55	0.00069	*< 0.001*	*< 0.002*
26-Aug-15	7	13	600	555	0.0078	0.00091	0.15	0.000030	0.0017	0.77	0.00081	0.025	0.015	0.00015	0.76	5.0	0.00027	4.3	0.000017	106	0.016	6.4	0.00018	0.00013	0.00050	0.47	0.00058	0.0010	0.0020
9-Sep-15	8	15	600	570	0.0049	0.00097	0.10	0.000020	0.0015	0.77	0.00081	*< 0.01*	0.012	*< 0.0001*	0.69	4.6	0.00024	3.9	0.000017	92	0.015	6.8	0.00013	0.00018	0.00031	0.38	0.00047	*< 0.001*	*< 0.002*
23-Sep-15	9	17	600	560	0.0039	0.00074	0.079	0.000015	0.0016	0.85	0.00051	0.010	0.0091	0.00010	0.59	4.7	0.00018	3.9	0.000012	86	0.017	5.0	0.00012	0.00013	0.00027	0.32	0.00038	0.0010	0.0020
7-Oct-15	10	19	500	460	0.0030	0.00051	0.056	0.000010	0.0017	0.92	0.00021	*< 0.01*	0.0064	*< 0.0001*	0.49	4.8	0.00011	3.9	0.0000060	80	0.019	3.2	0.00011	0.000080	0.00023	0.25	0.00028	*< 0.001*	*< 0.002*
21-Oct-15	11	21	500	475	0.0033	0.00066	0.062	*< 1E-05*	0.0017	1.0	0.00012	*< 0.01*	0.0069	*< 0.0001*	0.43	4.7	0.00013	3.9	0.0000020	69	0.019	2.9	0.00015	0.00014	0.000060	0.23	0.00036	*< 0.001*	*< 0.002*
4-Nov-15	12	23	500	485	0.0028	0.00063	0.056	*< 1E-05*	0.0016	1.2	0.00036	*< 0.01*	0.0061	*< 0.0001*	0.39	5.2	0.00013	3.8	0.0000020	71	0.021	3.1	0.00014	0.000090	0.00011	0.19	0.00029	*< 0.001*	*< 0.002*
18-Nov-15	13	25	500	465	0.0023	0.00098	0.049	0.00020	0.0018	1.3	0.0017	*< 0.01*	0.0044	*< 0.0001*	0.37	5.3	0.00035	4.0	0.000015	65	0.024	2.8	0.00015	0.00011	0.00010	0.18	0.00022	*< 0.001*	*< 0.002*
2-Dec-15	14	27	500	460	0.0022	0.00048	0.054	*< 1E-05*	0.0020	1.7	0.0015	0.010	0.0049	0.00010	0.31	6.2	0.00010	4.1	*< 2E-06*	65	0.031	2.8	0.00015	0.000080	0.00017	0.16	0.00024	*< 0.002*	*< 0.002*
16-Dec-15	15	29	500	465	0.0022	0.00055	0.047	0.00025	0.0020	1.9	0.0011	*< 0.01*	0.0048	*< 0.0001*	0.26	6.6	0.00018	5.5	0.000024	57	0.036	2.3	0.00017	0.00027	0.000060	0.14	0.00022	*< 0.001*	*< 0.002*
30-Dec-15	16	31	500	475	0.0020	0.00063	0.039	0.00014	0.0026	2.3	0.0020	0.010	0.0046	*< 0.0001*	0.25	7.4	0.00010	4.3	0.000017	58	0.043	2.1	0.00023	0.000090	*< 5E-05*	0.15	0.00024	*< 0.001*	*< 0.002*
13-Jan-16	17	33	500	445	0.0016	0.00054	0.029	0.000050	0.0021	2.2	0.00070	*< 0.01*	0.0035	*< 0.0001*	0.20	7.2	0.0010	4.1	*< 2E-06*	48	0.038	2.0	0.00013	0.000050	*< 5E-05*	0.11	0.00014	*< 0.001*	*< 0.002*
27-Jan-16	18	35	500	455	0.0015	0.00042	0.024	0.000020	0.0021	2.5	0.00070	*< 0.01*	0.0032	*< 0.0001*	0.19	7.0	*< 4E-05*	4.2	*< 2E-06*	40	0.048	2.2	0.00018	0.000070	*< 5E-05*	0.11	0.00015	*< 0.001*	*< 0.002*
10-Feb-16	19	37	500	465	0.0013	0.00037	0.016	0.00010	0.0022	2.7	0.00079	*< 0.01*	0.0029	*< 0.0001*	0.18	7.2	0.000090	4.0	*< 2E-06*	35	0.052	2.3	0.00019	0.000060	*< 5E-05*	0.094	0.00014	*< 0.001*	*< 0.002*
24-Feb-16	20	39	500	465	0.0013	0.00032	0.021	0.000030	0.0024	3.4	0.00095	0.020	0.0029	*< 0.0001*	0.17	7.9	0.000050	4.2	*< 2E-06*	31	0.058	2.3	0.00019	0.000050	*< 5E-05*	0.100	0.00010	*< 0.001*	*< 0.002*
9-Mar-16	21	41	501	455																									

Calculated Loading Rates for Col 2

Date	Cycle	Weeks	Volume (mL)		Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.		Input	Output	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
3-Jun-15	1	1	700	315	0.013	0.00034	0.12	0.000016	0.00020	0.076	0.000020	0.034	0.0089	0.0047	0.091	0.44	0.000063	0.25	0.000048	17	0.0015	3.2	0.0000087	0.00000063	0.000020	0.15	0.000066	0.00013	0.00013
17-Jun-15	2	3	600	560	0.0040	0.00011	0.039	0.000018	0.00011	0.053	0.000077	0.0078	0.0042	0.00087	0.092	0.34	0.000051	0.25	0.0000029	11	0.0011	1.2	0.0000091	0.0000078	0.000039	0.10	0.000045	0.000056	0.00011
1-Jul-15	3	5	550	520	0.0017	0.000063	0.021	0.00000052	0.00011	0.043	0.000043	0.0026	0.0024	0.00015	0.071	0.28	0.000030	0.25	0.00000042	9.0	0.00090	0.54	0.0000074	0.0000042	0.000017	0.068	0.000036	0.000052	0.00010
15-Jul-15	4	7	550	515	0.00093	0.000074	0.018	0.0000021	0.000097	0.035	0.000055	0.0021	0.0014	0.000036	0.059	0.24	0.000028	0.24	0.0000015	7.4	0.00070	0.41	0.0000065	0.0000036	0.000043	0.052	0.000042	0.000052	0.00010
29-Jul-15	5	9	500	475	0.00051	0.000071	0.010	0.0000019	0.00010	0.038	0.000028	0.00095	0.00098	0.000014	0.048	0.23	0.000015	0.21	0.00000029	6.2	0.00077	0.29	0.0000054	0.000011	0.000019	0.036	0.000026	0.000048	0.000095
12-Aug-15	6	11	500	485	0.00052	0.000041	0.0092	0.0000019	0.000091	0.038	0.000039	0.0019	0.00086	0.0000097	0.041	0.26	0.000015	0.23	0.00000078	5.9	0.00082	0.29	0.000011	0.0000034	0.000033	0.027	0.000033	0.000049	0.000097
26-Aug-15	7	13	600	555	0.00043	0.000051	0.0081	0.0000017	0.000094	0.043	0.000045	0.0014	0.00082	0.0000083	0.042	0.28	0.000015	0.24	0.00000092	5.9	0.00089	0.35	0.0000100	0.0000069	0.000028	0.026	0.000032	0.000056	0.00011
9-Sep-15	8	15	600	570	0.00028	0.000055	0.0058	0.0000011	0.000086	0.044	0.000046	0.00057	0.00067	0.0000057	0.039	0.26	0.000014	0.22	0.00000097	5.2	0.00087	0.39	0.0000073	0.000010	0.000018	0.022	0.000027	0.000057	0.00011
23-Sep-15	9	17	600	560	0.00022	0.000041	0.0044	0.00000084	0.000089	0.047	0.000029	0.00056	0.00051	0.0000056	0.033	0.26	0.0000098	0.22	0.00000064	4.8	0.00095	0.28	0.0000066	0.0000073	0.000015	0.018	0.000021	0.000056	0.00011
7-Oct-15	10	19	500	460	0.00014	0.000023	0.0026	0.00000046	0.000078	0.043	0.0000097	0.00046	0.00029	0.0000046	0.022	0.22	0.0000051	0.18	0.00000028	3.7	0.00086	0.15	0.0000050	0.0000037	0.000011	0.011	0.000013	0.000046	0.000092
21-Oct-15	11	21	500	475	0.00016	0.000031	0.0029	0.00000048	0.000079	0.048	0.0000057	0.00048	0.00033	0.0000048	0.020	0.22	0.0000062	0.19	0.000000095	3.3	0.00092	0.14	0.0000071	0.0000067	0.0000029	0.011	0.000017	0.000048	0.000095
4-Nov-15	12	23	500	485	0.00013	0.000031	0.0027	0.00000049	0.000076	0.057	0.000017	0.00049	0.00029	0.0000049	0.019	0.25	0.0000063	0.18	0.000000097	3.5	0.0010	0.15	0.0000070	0.0000044	0.0000053	0.0093	0.000014	0.000049	0.000097
18-Nov-15	13	25	500	465	0.00011	0.000046	0.0023	0.0000093	0.000084	0.060	0.000078	0.00047	0.00020	0.0000047	0.017	0.25	0.000016	0.18	0.00000070	3.0	0.0011	0.13	0.0000071	0.0000051	0.0000047	0.0083	0.000010	0.000047	0.000093
2-Dec-15	14	27	500	460	0.00010	0.000022	0.0025	0.00000046	0.000090	0.078	0.000067	0.00046	0.00022	0.0000046	0.014	0.28	0.0000046	0.19	0.000000092	3.0	0.0014	0.13	0.0000070	0.0000037	0.0000078	0.0075	0.000011	0.000092	0.000092
16-Dec-15	15	29	500	465	0.00010	0.000026	0.0022	0.000012	0.000093	0.086	0.000050	0.00047	0.00022	0.0000047	0.012	0.31	0.0000084	0.25	0.0000011	2.6	0.0017	0.11	0.0000079	0.000013	0.0000028	0.0066	0.000010	0.000047	0.000093
30-Dec-15	16	31	500	475	0.000094	0.000030	0.0019	0.0000067	0.00012	0.11	0.000097	0.00048	0.00022	0.0000048	0.012	0.35	0.0000048	0.20	0.00000081	2.8	0.0020	0.100	0.000011	0.0000043	0.0000024	0.0071	0.000011	0.000048	0.000095
13-Jan-16	17	33	500	445	0.000069	0.000024	0.0013	0.0000022	0.000093	0.099	0.000031	0.00045	0.00016	0.0000045	0.0088	0.32	0.000046	0.18	0.000000089	2.1	0.0017	0.089	0.0000056	0.0000022	0.0000022	0.0049	0.0000062	0.000045	0.000089
27-Jan-16	18	35	500	455	0.000066	0.000019	0.0011	0.00000091	0.000096	0.11	0.000032	0.00046	0.00015	0.0000046	0.0088	0.32	0.0000018	0.19	0.000000091	1.8	0.0022	0.10	0.0000080	0.0000032	0.0000023	0.0050	0.0000068	0.000046	0.000091
10-Feb-16	19	37	500	465	0.000059	0.000017	0.00074	0.0000047	0.000100	0.13	0.000037	0.00047	0.00014	0.0000047	0.0081	0.33	0.0000042	0.18	0.000000093	1.6	0.0024	0.11	0.0000087	0.0000028	0.0000023	0.0043	0.0000065	0.000047	0.000093
24-Feb-16	20	39	500	465	0.000062	0.000015	0.00098	0.0000014	0.00011	0.16	0.000044	0.00093	0.00014	0.0000047	0.0077	0.37	0.0000023	0.20	0.000000093	1.4	0.0027	0.11	0.0000088	0.0000023	0.0000023	0.0046	0.0000047	0.000047	0.000093
9-Mar-16	21	41	501	455																									

Notes:
Values in grey italics are below the analytical detection limit

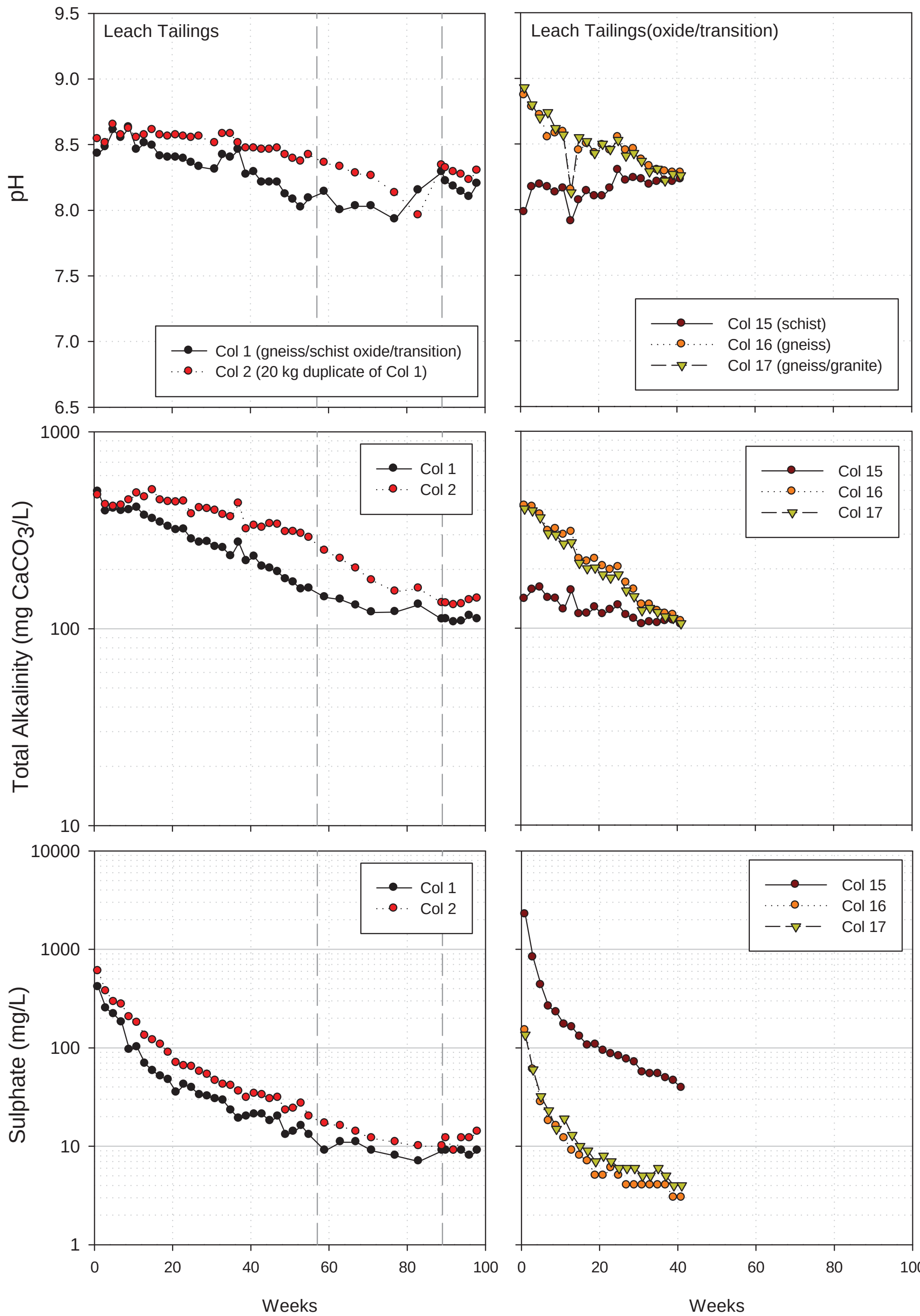
Leachate Concentrations for Leach Tailings Field Kinetic Tests

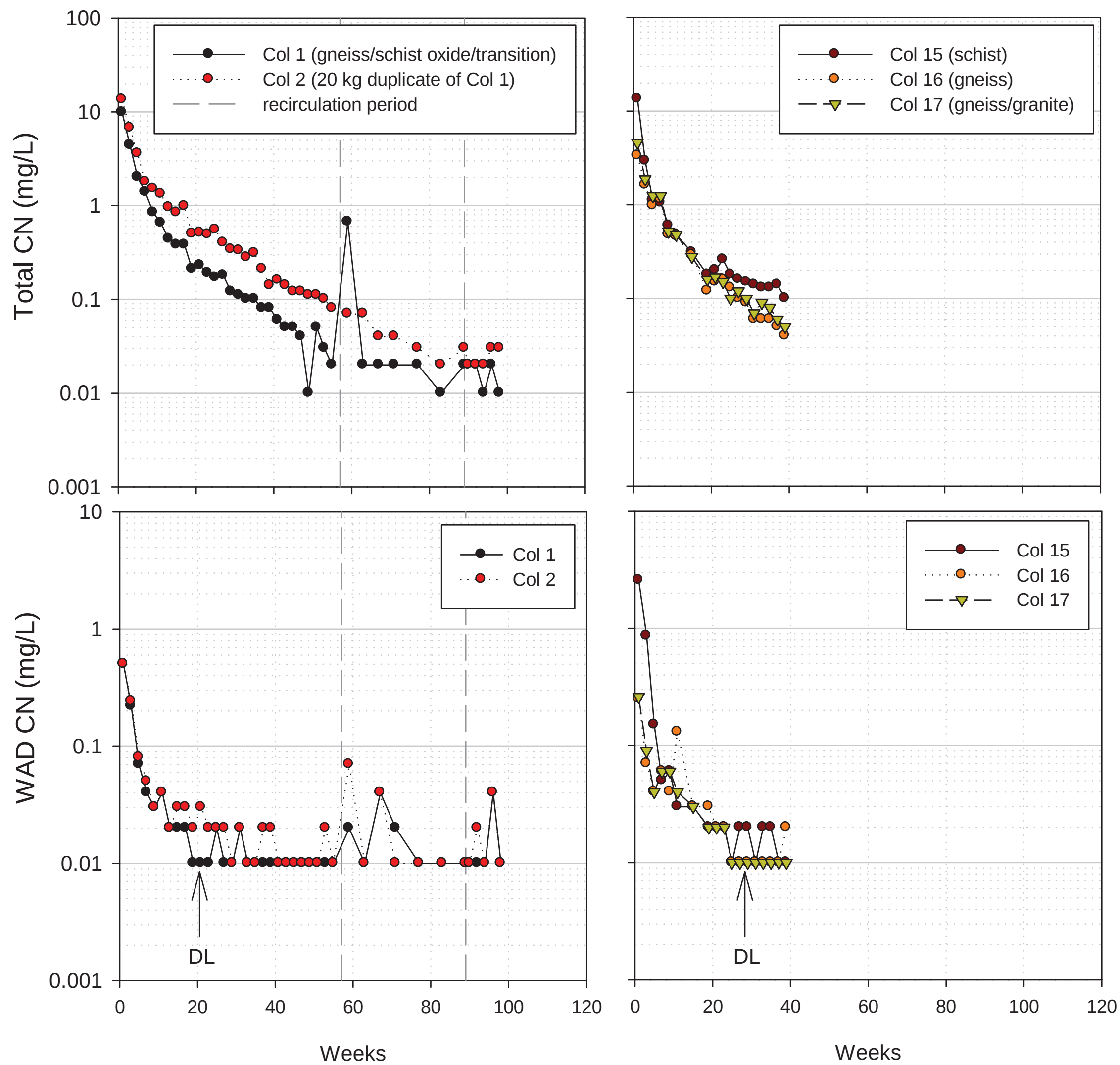
Sample ID		FB-LT1					FB-LT2		FB-LT3	
Date Sampled		17-Jun-14	25-Sep-14	4-Jun-15	10-Aug-15	22-Oct-15	10-Aug-15	22-Oct-15	10-Aug-15	22-Oct-15
Weeks		0.00	14	50	60	70	0.00	10	0.00	10
Volume	L	5.0	7.0	5.8	2.0	5.0	0.50	8.0	0.50	8.0
Conductivity	uS/cm	716	991	709	529	692	595	490	780	734
Hardness (as CaCO3)	mg/L	39	38	17	26	29	51	22	21	23
pH		8.5	8.5	8.6	8.4	8.5	8.7	9.2	8.9	8.6
TDS	mg/L	529	669	471	356	429	953	985	680	1120
Anions and Nutrients										
T-Alkalinity (as CaCO3)	mg/L	227	15	193	-	197	-	254	-	235
T-Ammonia-N	mg/L	0.71	0.29	0.036	-	< 0.005	-	5.0	-	1.9
Nitrate-N	mg/L	0.94	4.2	3.9	3.6	5.2	0.14	0.16	< 0.005	0.85
Nitrite-N	mg/L	2.0	-	0.95	0.34	0.0046	0.18	0.080	< 0.001	25
Br	mg/L	< 0.25	-	< 0.1	< 0.05	< 0.25	< 0.05	< 0.05	< 0.25	< 0.25
Cl	mg/L	20	18	8.4	2.1	3.7	8.3	6.2	15	16
F	mg/L	0.43		0.31	0.36	0.35	0.35	0.27	0.54	0.60
S(6)	mg/L	119	243	135	88	118	9.9	6.2	18	24
Cyanides										
WAD Cyanide	mg/L	0.18	0.019	0.34	0.010	0.017	0.047	0.052	-	0.17
T-Cyanide	mg/L	1.6	0.34	0.83	0.27	0.38	1.5	2.6	-	2.2
Organic / Inorganic Carbon										
DOC	mg/L	9.0	11	-	-	6.0	-	26	-	48
Radioisotopes										
Ra-226	Bq/L	-	-	0.012	0.020	0.012	-	0.42	-	0.030
Dissolved Metals										
Al	mg/L	0.49	0.0080	0.0080	0.0080	0.012	10	0.85	0.30	1.7
Sb	mg/L	0.046	0.035	0.027	0.030	0.024	0.11	0.021	0.070	0.057
As	mg/L	1.2	1.8	1.6	1.3	1.4	1.2	1.1	2.3	3.2
Ba	mg/L	0.048	0.023	0.011	0.029	0.025	0.19	0.039	0.044	0.080
Be	mg/L	< 0.0001	< 0.001	< 0.00002	< 0.00002	< 0.00002	0.0010	0.000039	< 0.00002	0.00010
Bi	mg/L	< 0.0005	-	< 0.00005	< 0.00005	< 0.00005	0.00	< 0.00005	< 0.00005	< 0.00005
B	mg/L	0.028	< 0.1	0.016	0.017	0.016	0.022	< 0.01	0.018	0.019
Cd	mg/L	0.000020	< 0.00001	< 5E-06	< 5E-06	< 5E-06	< 0.00005	0.0000089	< 5E-06	0.0000057
Ca	mg/L	12	11	4.1	7.4	8.1	17	8.1	8.1	8.3
Cr	mg/L	0.020	0.010	0.0020	0.0030	0.0044	0.031	0.015	0.0020	0.0050
Co	mg/L	0.077	0.10	0.043	0.021	0.024	0.57	0.46	0.12	0.20
Cu	mg/L	0.0060	0.0020	0.0020	0.0020	0.0014	0.016	0.010	0.063	0.042
Fe	mg/L	1.0	0.81	0.24	0.12	0.19	15	2.2	0.32	2.9
Pb	mg/L	0.00053	< 0.0005	< 0.00005	0.00010	0.000070	0.0073	0.00049	0.000073	0.00088
Li	mg/L	0.0050	< 0.005	0.0040	0.0040	0.0041	0.0030	< 0.001	< 0.001	< 0.001
Mg	mg/L	2.4	2.4	1.6	1.7	2.1	1.9	0.28	0.24	0.55
Mn	mg/L	0.033	0.0090	0.010	0.013	0.0042	0.30	0.022	0.0080	0.085
Hg	mg/L	0.00042	0.000052	0.000039	0.000019	0.000018	-	0.00064	-	0.00038
Mo	mg/L	0.054	0.089	0.043	0.058	0.061	0.22	0.17	0.034	0.048
Ni	mg/L	0.042	< 0.001	0.0010	< 0.0005	< 0.0005	0.061	0.016	0.26	0.085
P	mg/L	0.24	-	0.23	0.21	0.21	0.69	0.53	0.14	0.39
K	mg/L	8.5	7.2	4.8	5.3	5.8	5.0	1.6	1.3	2.2
Se	mg/L	0.0020	0.0020	0.0010	0.0010	0.00082	0.0020	0.0017	0.0030	0.0024
Si	mg/L	5.2	-	3.2	3.8	3.9	24	4.8	6.3	8.9
Ag	mg/L	0.00	< 0.00002	0.00	< 0.00001	< 0.00001	0.00	0.000033	0.00	0.00030
Na	mg/L	138	216	154	108	144	114	110	195	150
Sr	mg/L	0.052	-	0.024	0.039	0.041	0.043	0.016	0.017	0.023
Tl	mg/L	0.00	0.00	0.00	0.00	0.00010	0.0010	0.00021	0.00	0.00038
Sn	mg/L	< 0.0001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	0.0010	< 0.0001	0.00	0.00035
Ti	mg/L	< 0.01	< 0.01	< 0.0003	< 0.0003	< 0.0003	0.17	0.013	0.0010	0.017
U	mg/L	0.21	0.36	0.23	0.16	0.21	0.46	0.67	0.036	0.027
V	mg/L	< 0.001	< 0.001	< 0.0005	< 0.0005	< 0.0005	0.023	0.0029	0.0020	0.0041
Zn	mg/L	0.0020	0.019	0.0070	0.047	0.021	0.019	0.0019	< 0.001	0.0066
Total Metals										
Al	mg/L	-	0.13	-	-	-	-	-	-	-
Sb	mg/L	-	0.037	-	-	-	-	-	-	-
As	mg/L	-	1.8	-	-	-	-	-	-	-
Ba	mg/L	-	0.025	-	-	-	-	-	-	-
Be	mg/L	-	< 0.001	-	-	-	-	-	-	-
B	mg/L	-	< 0.1	-	-	-	-	-	-	-
Cd	mg/L	-	< 0.00001	-	-	-	-	-	-	-
Ca	mg/L	-	11	-	-	-	-	-	-	-
Cr	mg/L	-	0.0098	-	-	-	-	-	-	-
Co	mg/L	-	0.11	-	-	-	-	-	-	-
Cu	mg/L	-	0.0025	-	-	-	-	-	-	-
Fe	mg/L	-	0.99	-	-	-	-	-	-	-
Pb	mg/L	-	< 0.0005	-	-	-	-	-	-	-
Li	mg/L	-	< 0.005	-	-	-	-	-	-	-
Mg	mg/L	-	2.4	-	-	-	-	-	-	-
Mn	mg/L	-	0.014	-	-	-	-	-	-	-
Hg	mg/L	0.0096	0.000062	-	-	-	-	-	-	-
Mo	mg/L	-	0.092	-	-	-	-	-	-	-
Ni	mg/L	-	0.0011	-	-	-	-	-	-	-
K	mg/L	-	7.2	-	-	-	-	-	-	-
Se	mg/L	-	0.0020	-	-	-	-	-	-	-
Ag	mg/L	-	< 0.00002	-	-	-	-	-	-	-
Na	mg/L	-	216	-	-	-	-	-	-	-
Tl	mg/L	-	0.00021	-	-	-	-	-	-	-
Sn	mg/L	-	< 0.0005	-	-	-	-	-	-	-
Ti	mg/L	-	< 0.01	-	-	-	-	-	-	-
U	mg/L	-	0.36	-	-	-	-	-	-	-
V	mg/L	-	< 0.001	-	-	-	-	-	-	-
Zn	mg/L	-	0.028	-	-	-	-	-	-	-

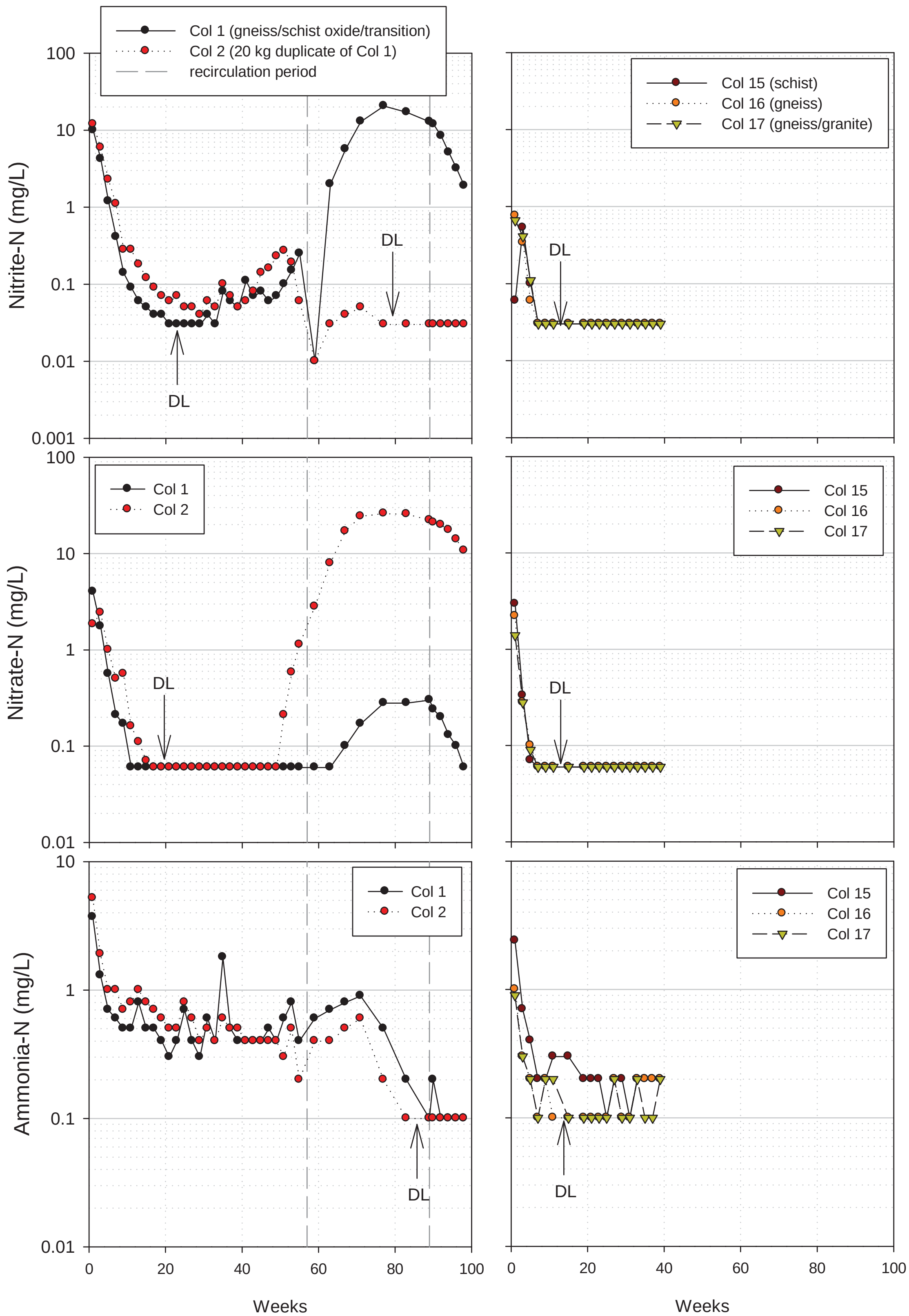
Notes:
Values in grey italics are below the analytical detection limit

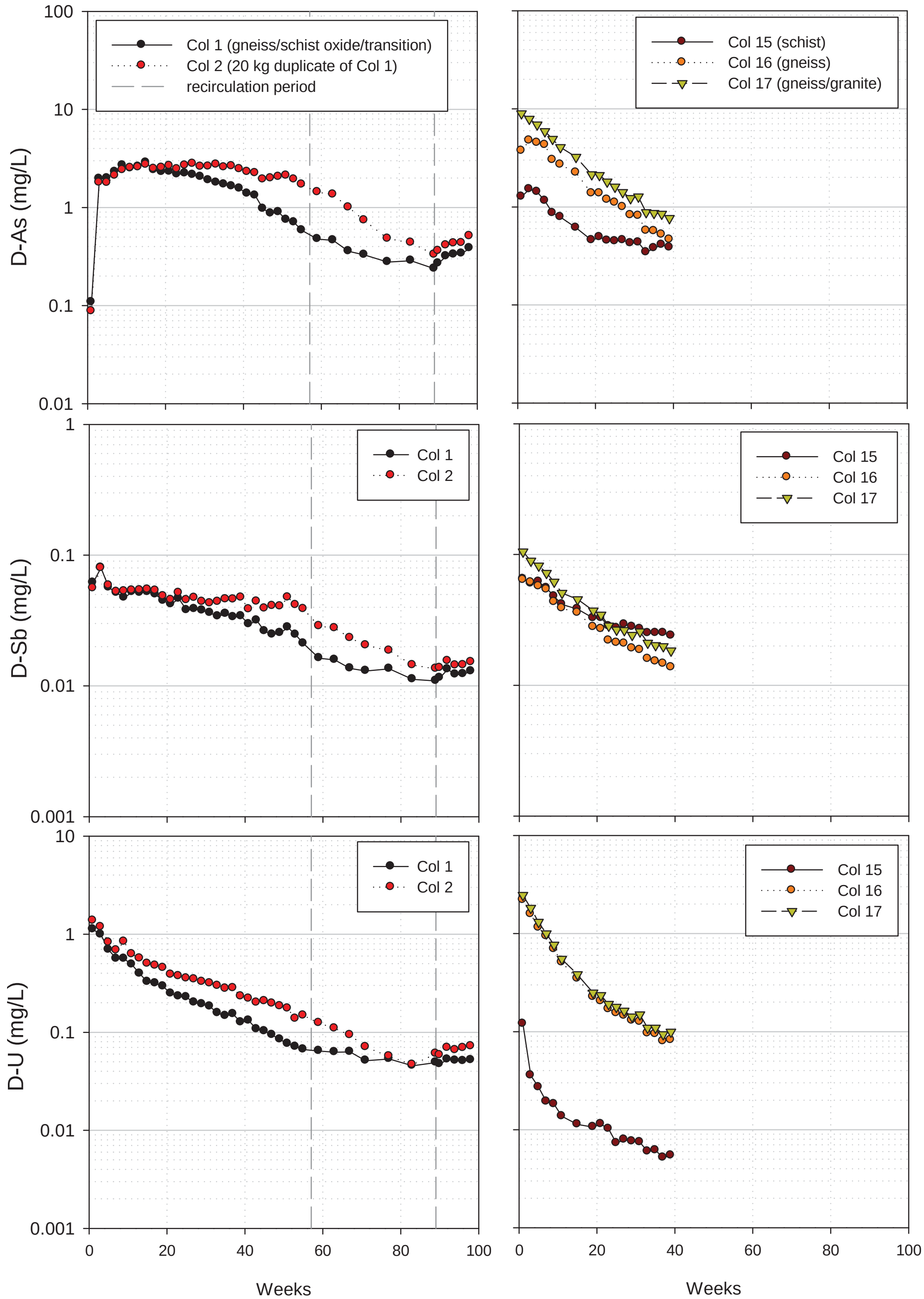
Appendix D.3-4: Time Series Profiles for Leach Tailings Kinetic Tests

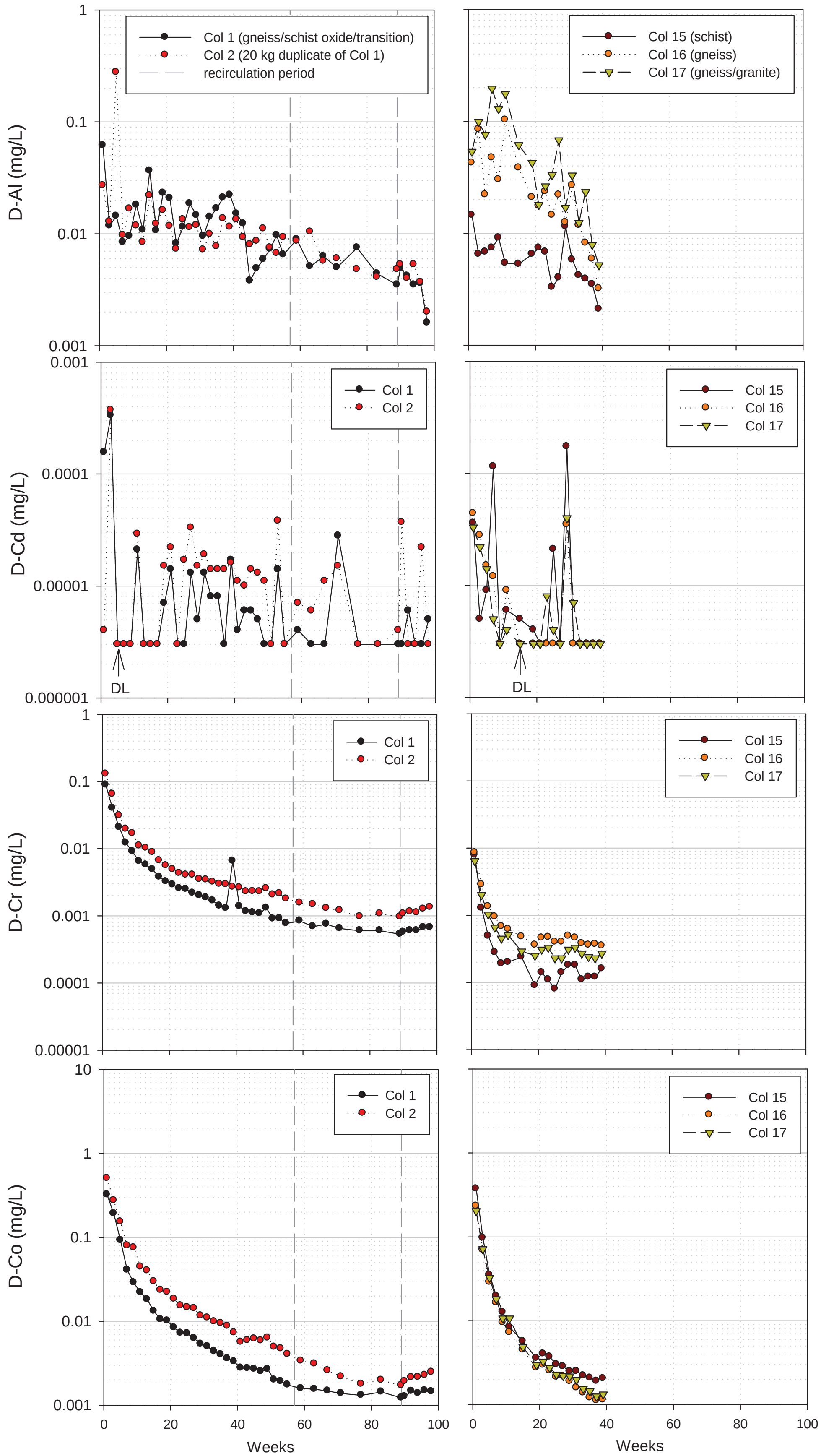
Leachate Concentrations for Leach Tailings Unsaturated Columns

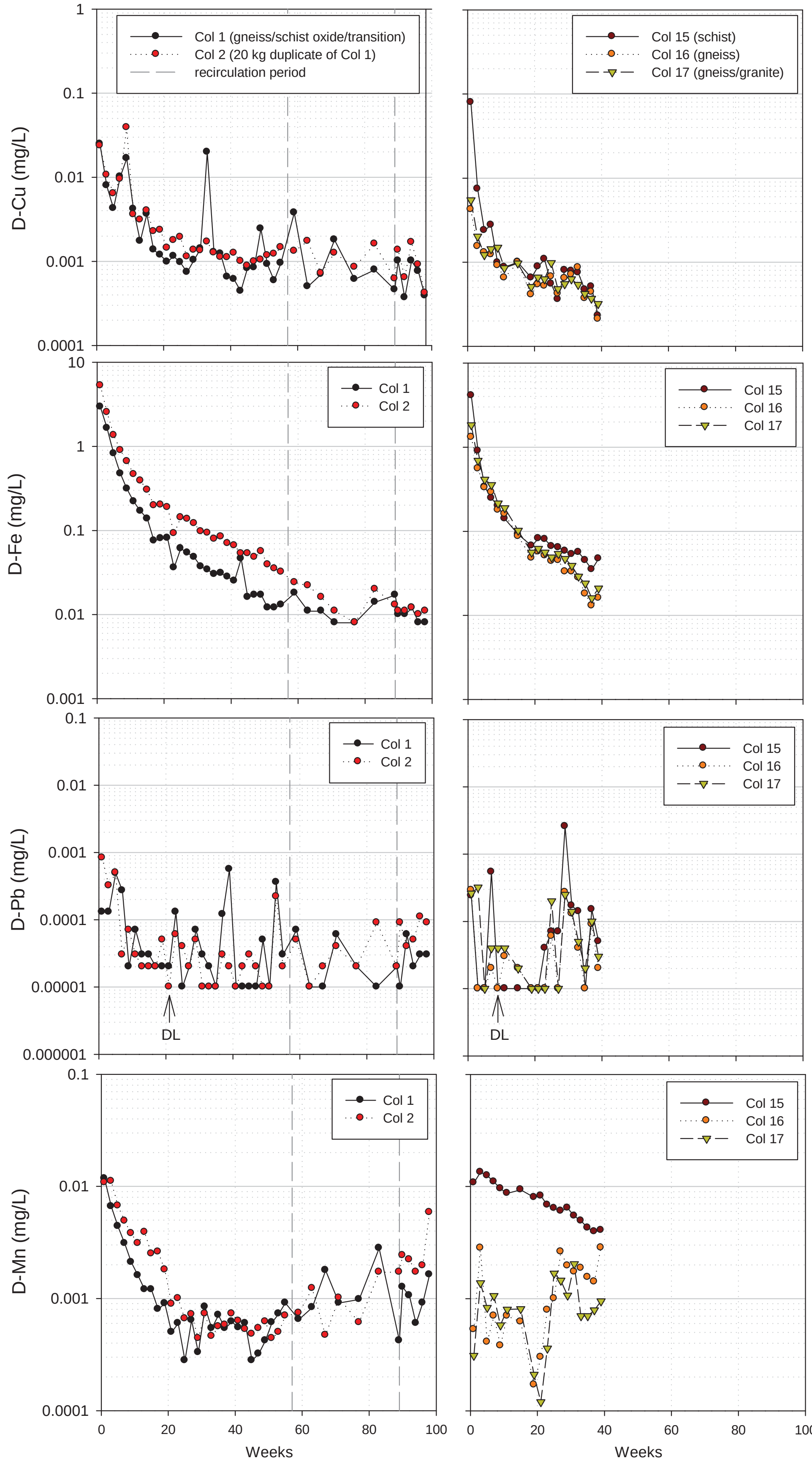


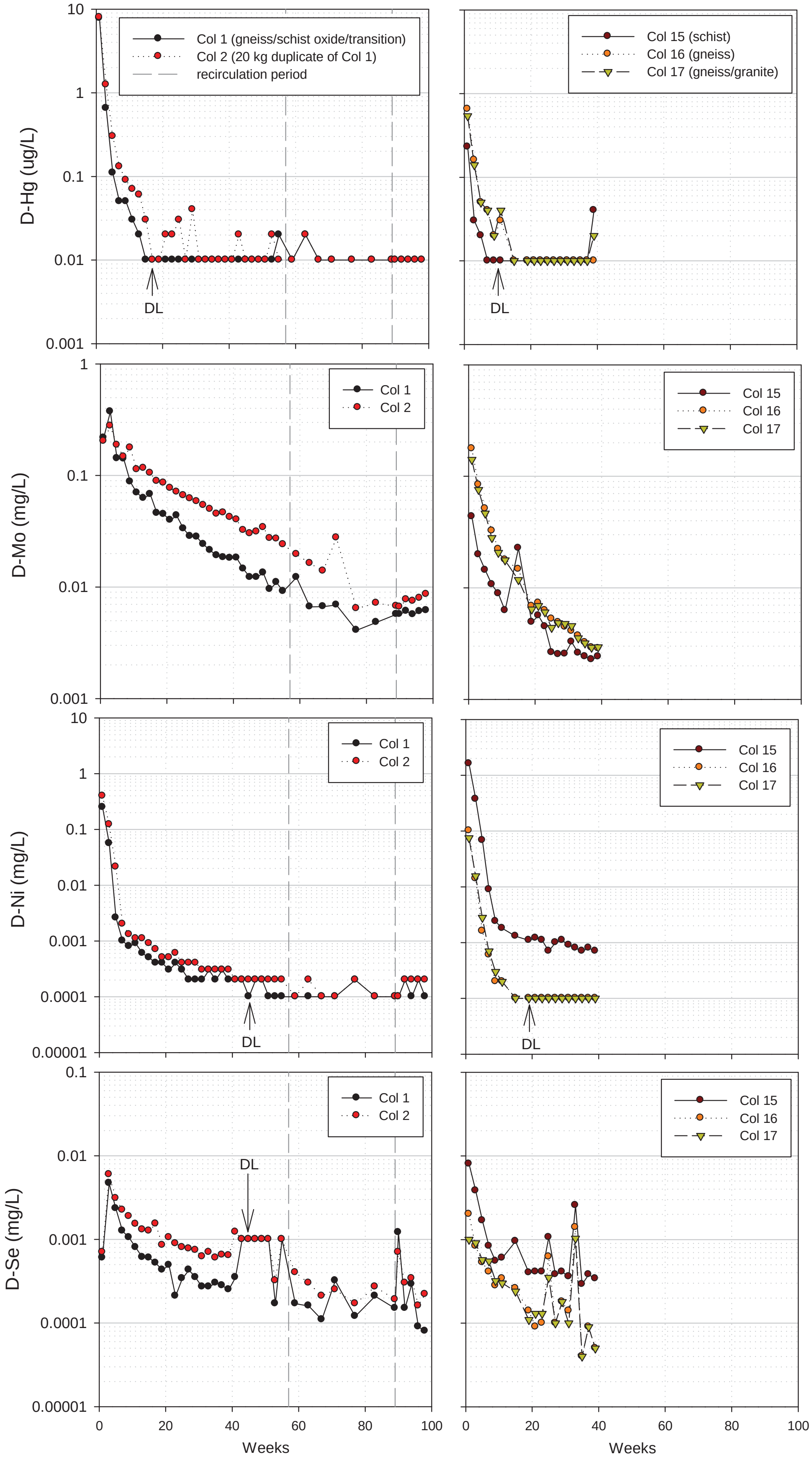

Total CN (mg/L)
WAD CN (mg/L)
100
10
1
0.1
0.01
0.001
Col 1 (gneiss/schist oxide/transition)
Col 2 (20 kg duplicate of Col 1)
recirculation period
Col 15 (schist)
Col 16 (gneiss)
Col 17 (gneiss/granite)
Col 1
Col 2
Col 15
Col 16
Col 17
DL
0
20
40
60
80
100
120
Weeks

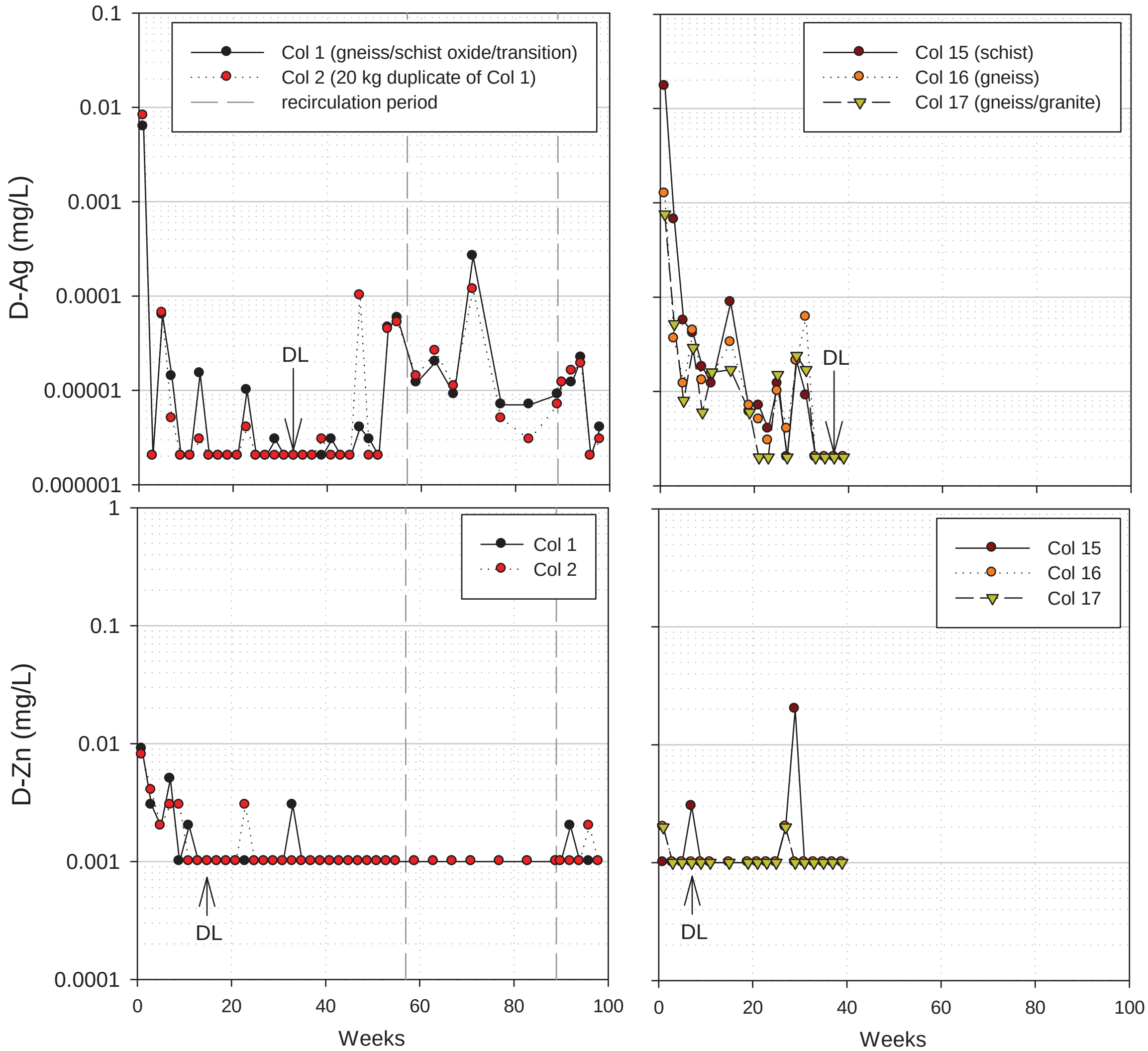

Col 1 (gneiss/schist oxide/transition)
Col 2 (20 kg duplicate of Col 1)
recirculation period
Col 15 (schist)
Col 16 (gneiss)
Col 17 (gneiss/granite)
Nitrite-N (mg/L)
Nitrate-N (mg/L)
Ammonia-N (mg/L)
DL
Col 1
Col 2
Col 15
Col 16
Col 17
Weeks


D-As (mg/L)
D-Sb (mg/L)
D-U (mg/L)
Col 1 (gneiss/schist oxide/transition)
Col 2 (20 kg duplicate of Col 1)
recirculation period
Col 15 (schist)
Col 16 (gneiss)
Col 17 (gneiss/granite)
Col 1
Col 2
Col 15
Col 16
Col 17
Weeks
Weeks


Col 1 (gneiss/schist oxide/transition)
Col 2 (20 kg duplicate of Col 1)
recirculation period
Col 15 (schist)
Col 16 (gneiss)
Col 17 (gneiss/granite)
D-Al (mg/L)
D-Cd (mg/L)
D-Cr (mg/L)
D-Co (mg/L)
Col 1
Col 2
Col 15
Col 16
Col 17
DL
Weeks


Col 1 (gneiss/schist oxide/transition)
Col 2 (20 kg duplicate of Col 1)
recirculation period
Col 15 (schist)
Col 16 (gneiss)
Col 17 (gneiss/granite)
D-Cu (mg/L)
D-Fe (mg/L)
D-Pb (mg/L)
D-Mn (mg/L)
Col 1
Col 2
Col 15
Col 16
Col 17
DL
Weeks


Col 1 (gneiss/schist oxide/transition)
Col 2 (20 kg duplicate of Col 1)
recirculation period
Col 15 (schist)
Col 16 (gneiss)
Col 17 (gneiss/granite)
D-Hg (ug/L)
D-Mo (mg/L)
D-Ni (mg/L)
D-Se (mg/L)
DL
Col 1
Col 2
Col 15
Col 16
Col 17
Weeks


D-Ag (mg/L)
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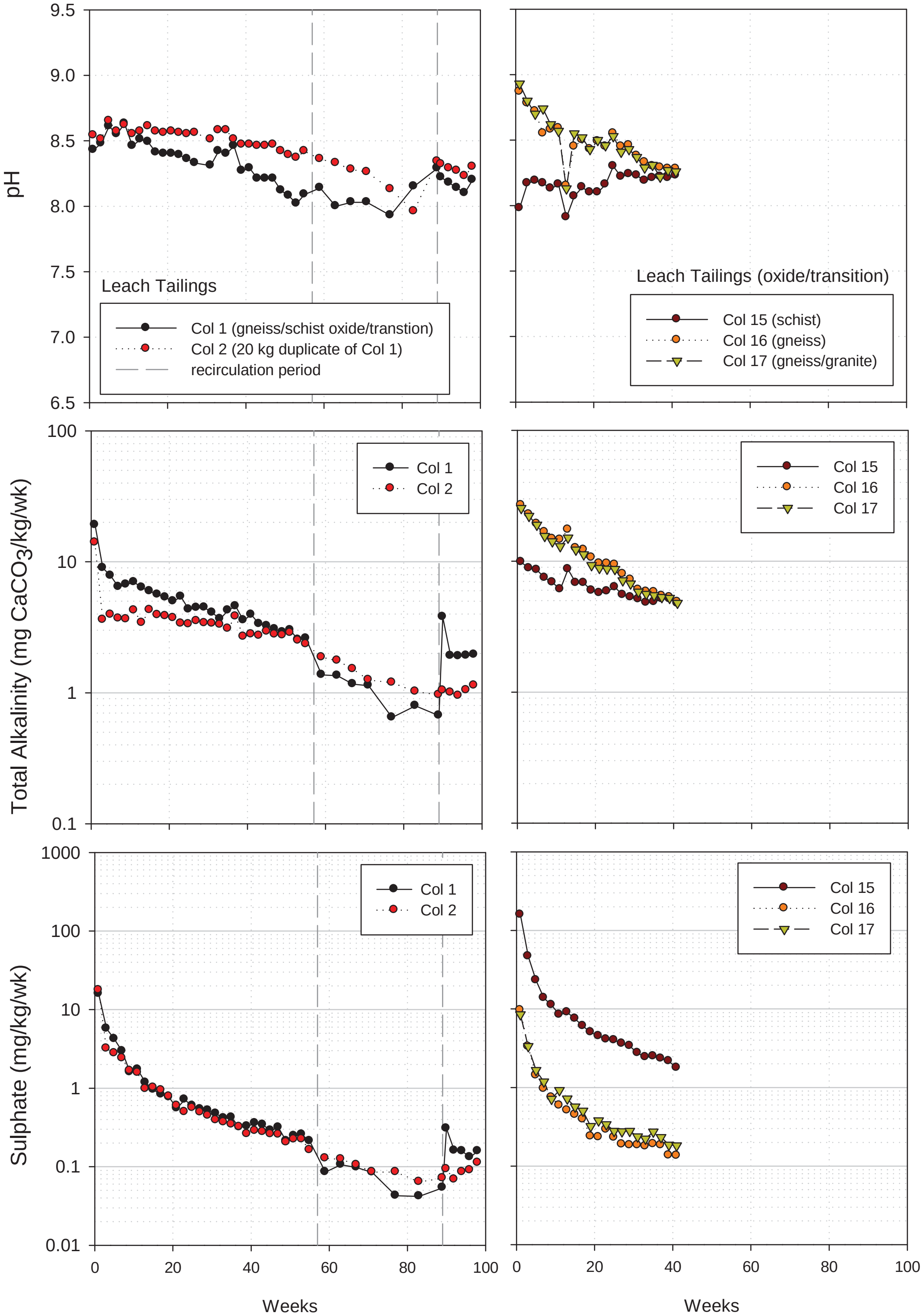
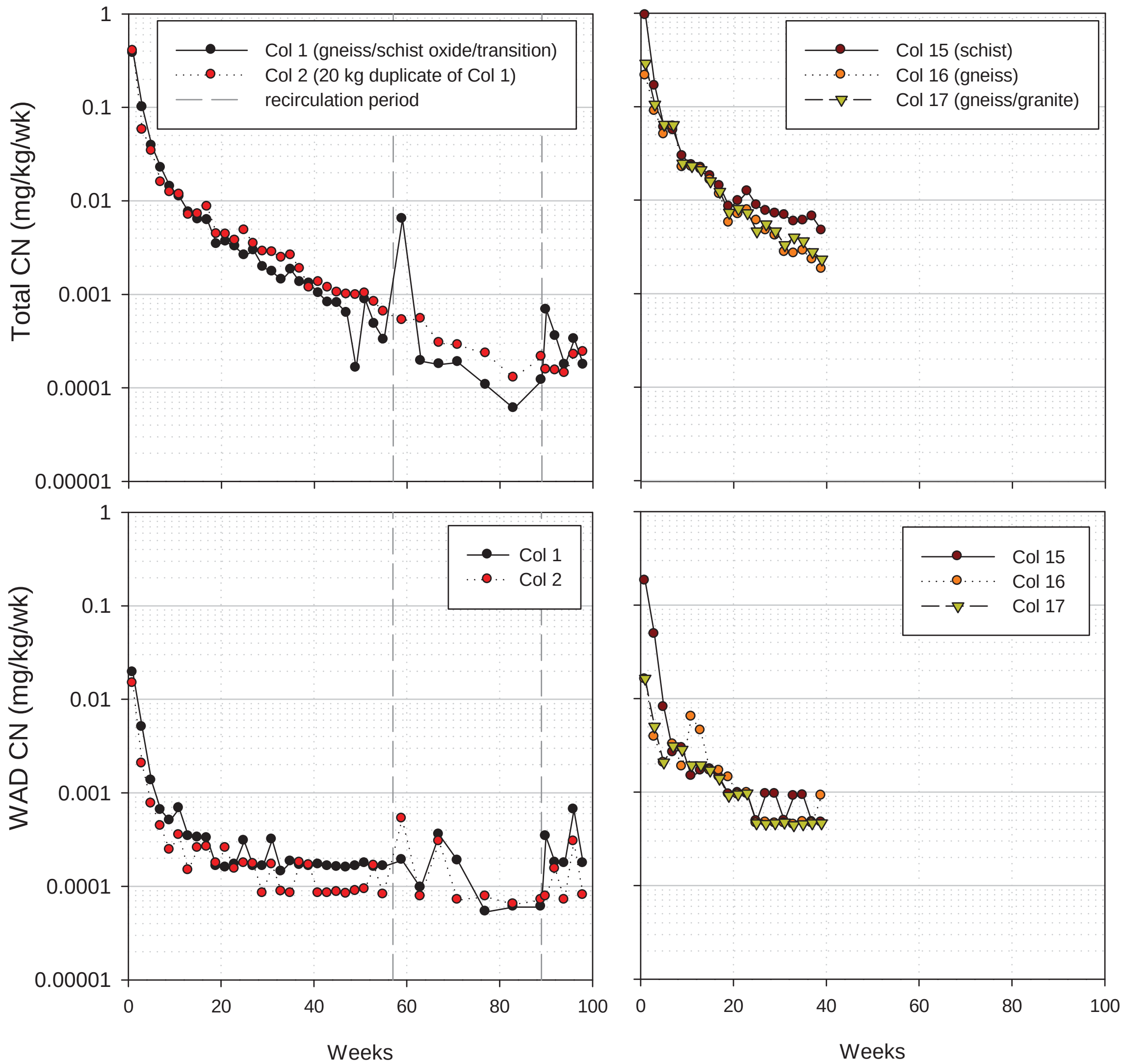
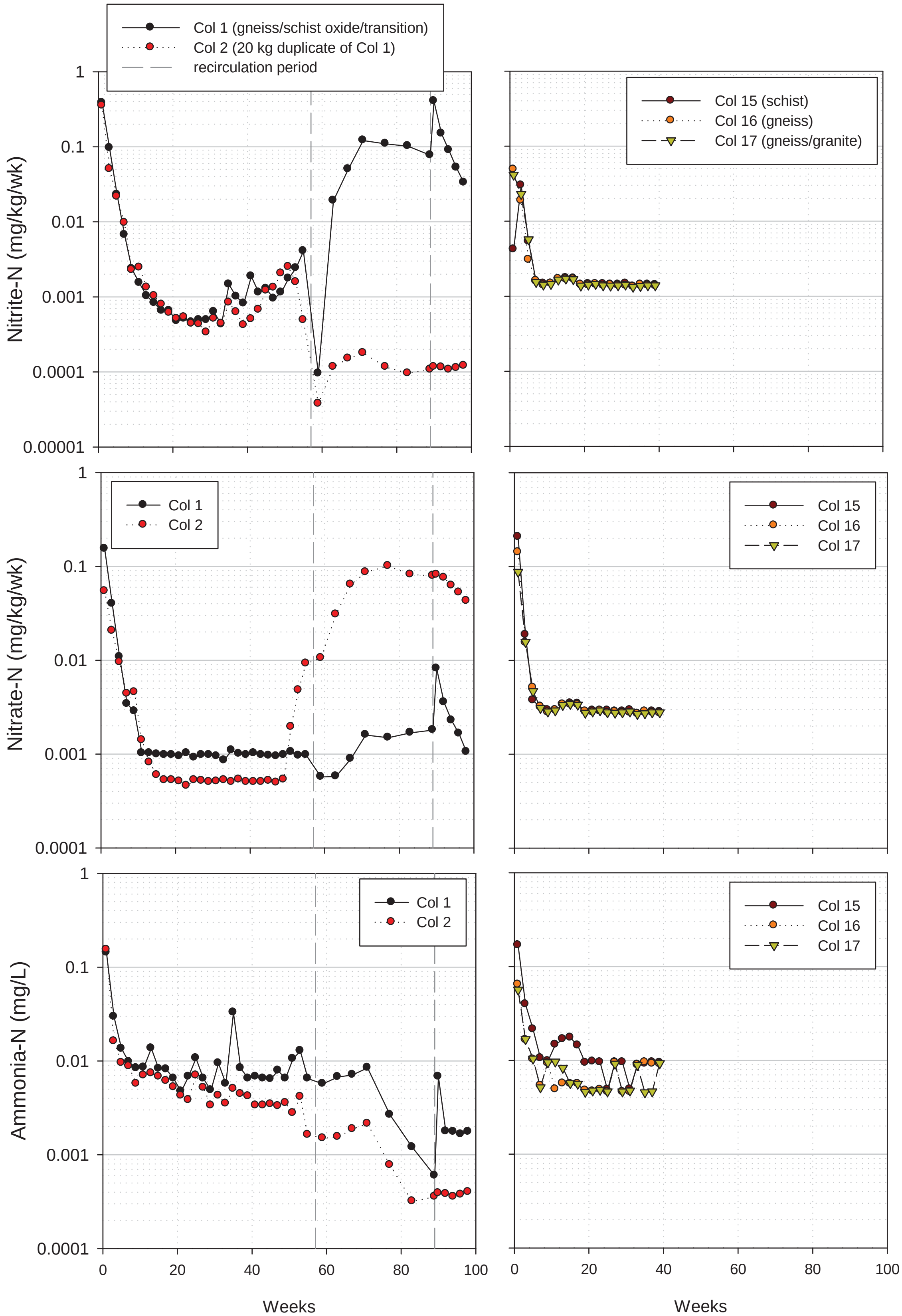
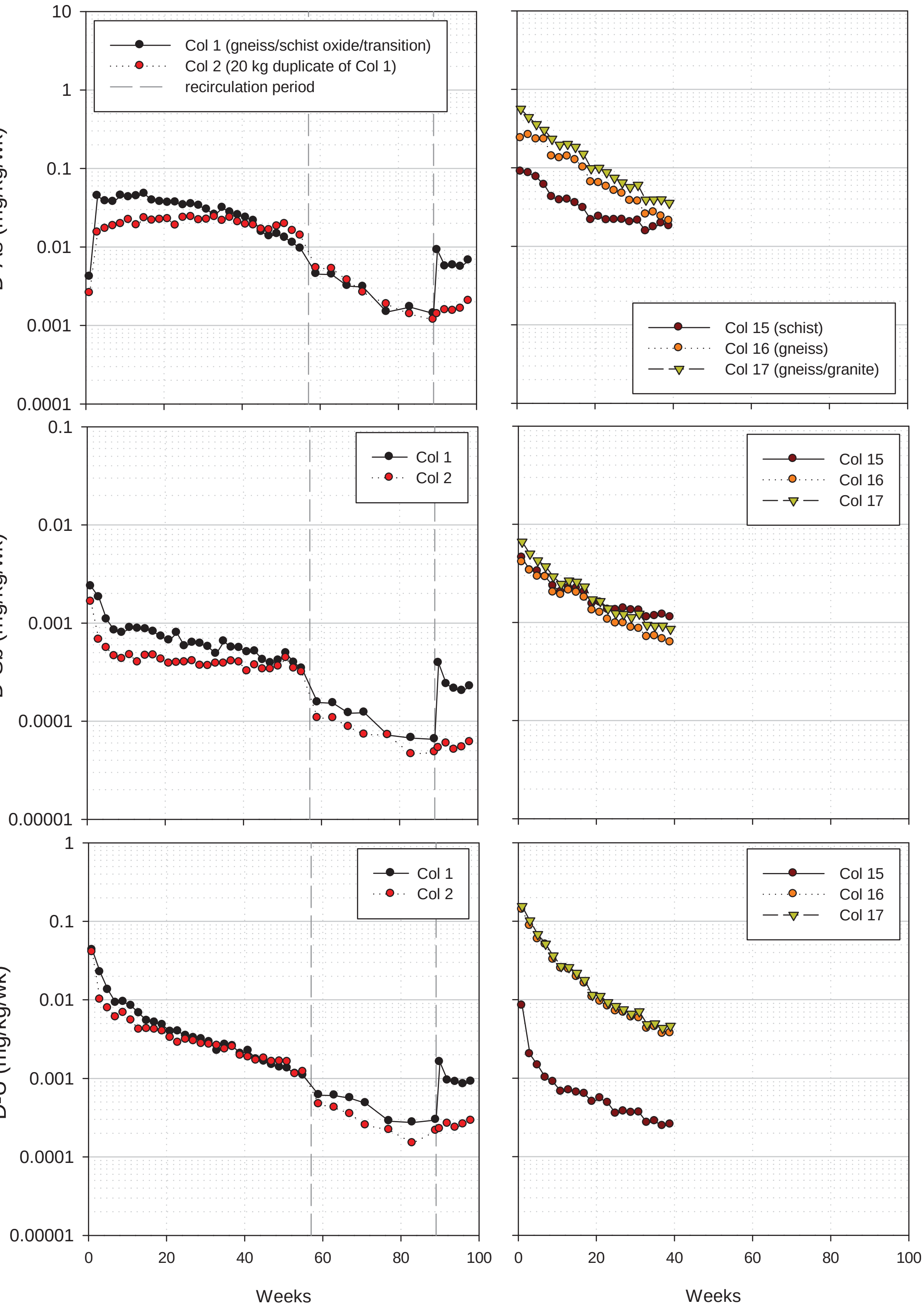
0.01
0.001
0.0001
0.00001
0.000001
Col 1 (gneiss/schist oxide/transition)
Col 2 (20 kg duplicate of Col 1)
recirculation period
DL
Col 15 (schist)
Col 16 (gneiss)
Col 17 (gneiss/granite)
DL
D-Zn (mg/L)
1
0.1
0.01
0.001
0.0001
Col 1
Col 2
DL
Col 15
Col 16
Col 17
DL
0
20
40
60
80
100
Weeks
Weeks

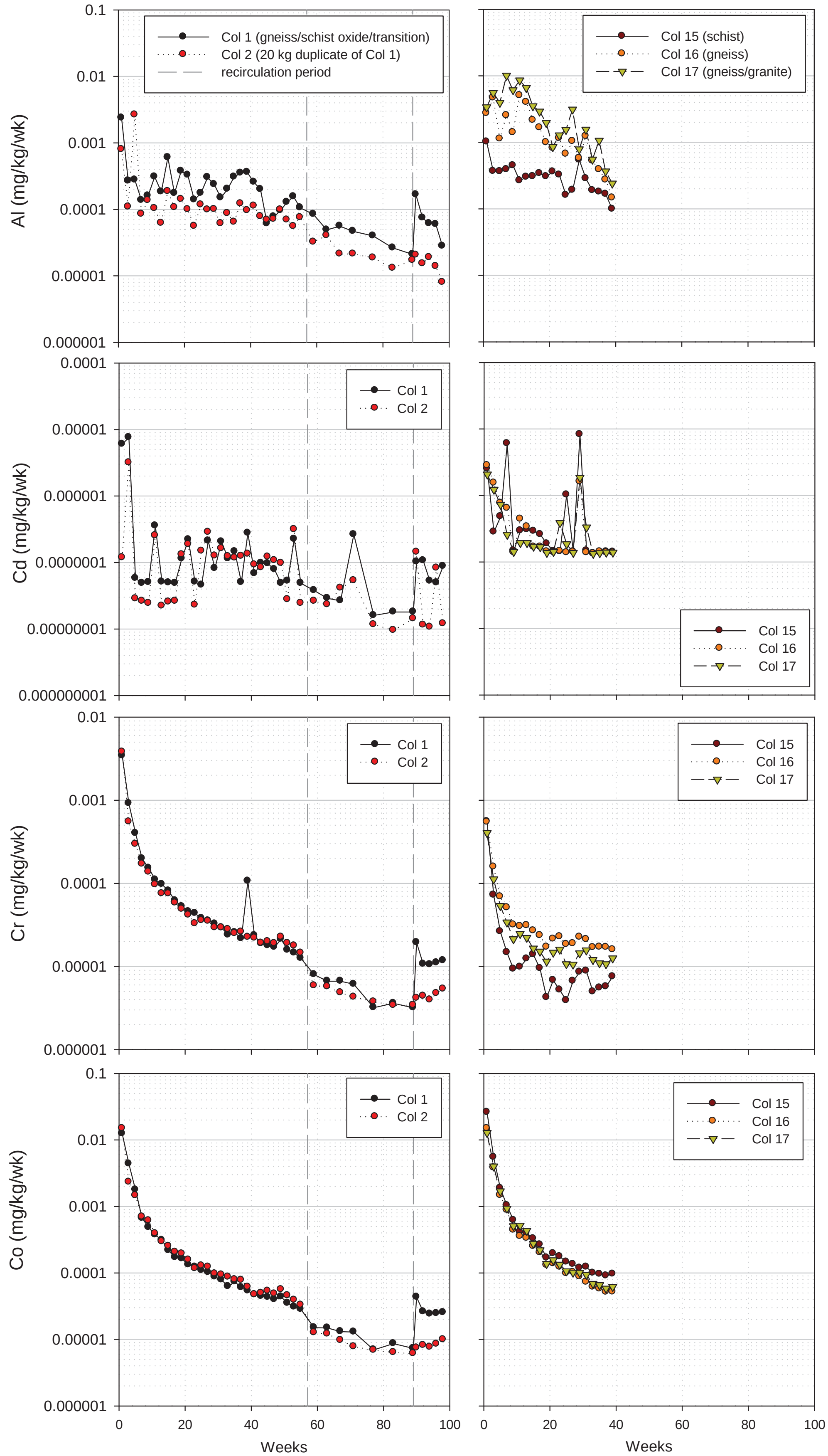
Loading Rates for Leach Tailings Unsaturated Columns

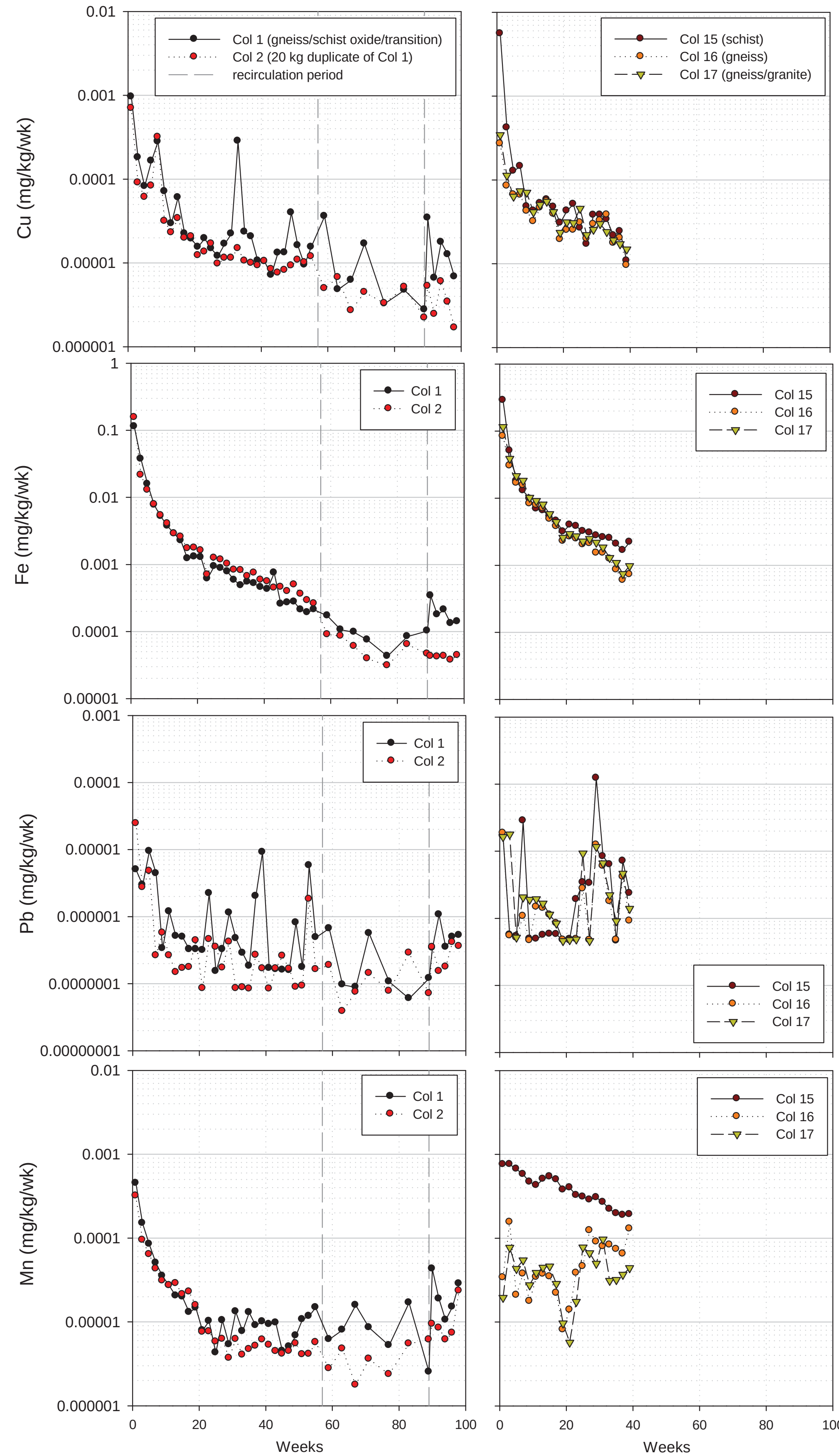


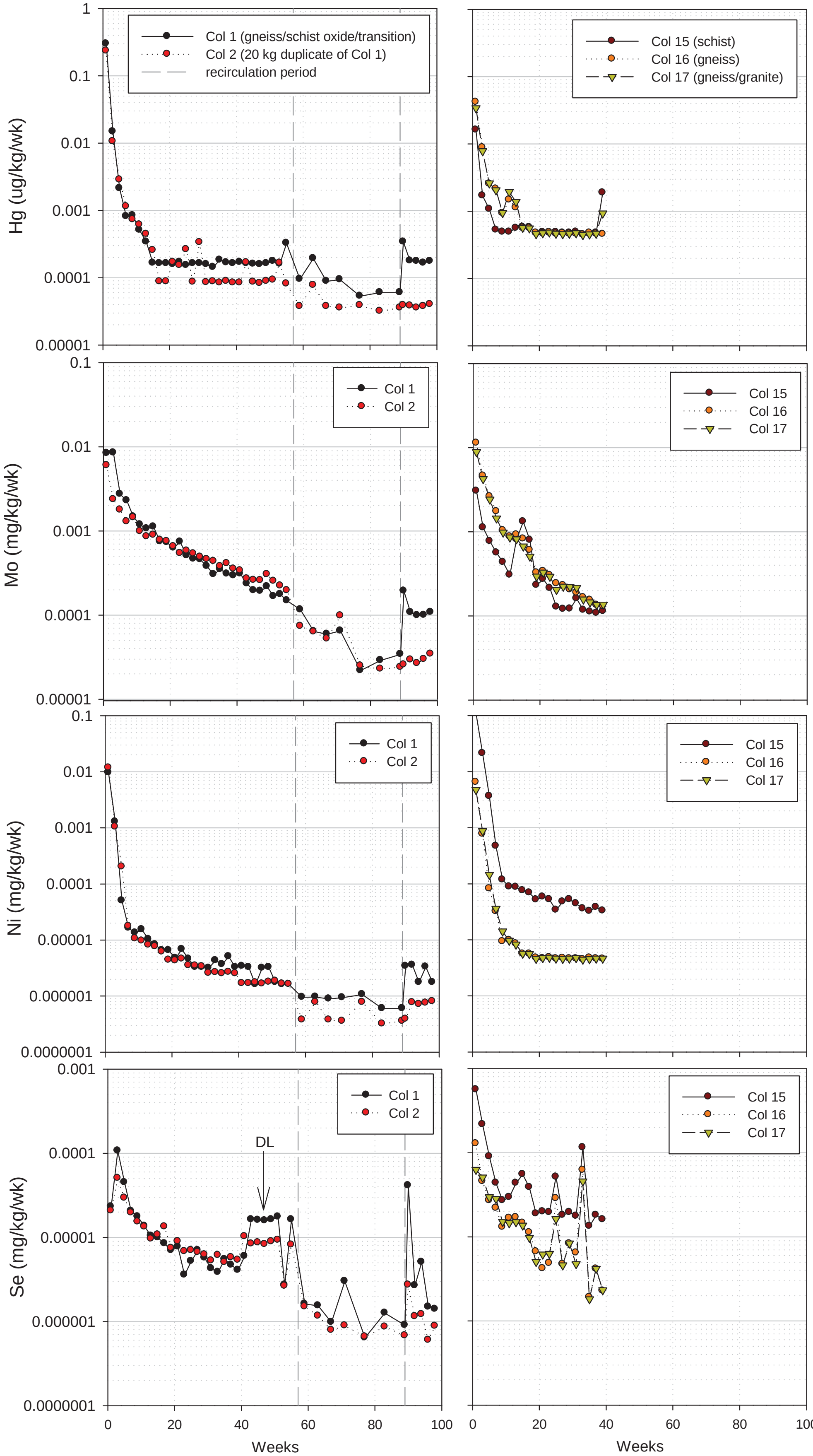

Total CN (mg/kg/wk)
WAD CN (mg/kg/wk)
1
0.1
0.01
0.001
0.0001
0.00001
Col 1 (gneiss/schist oxide/transition)
Col 2 (20 kg duplicate of Col 1)
recirculation period
Col 15 (schist)
Col 16 (gneiss)
Col 17 (gneiss/granite)
Col 1
Col 2
Col 15
Col 16
Col 17
0
20
40
60
80
100
Weeks
Weeks

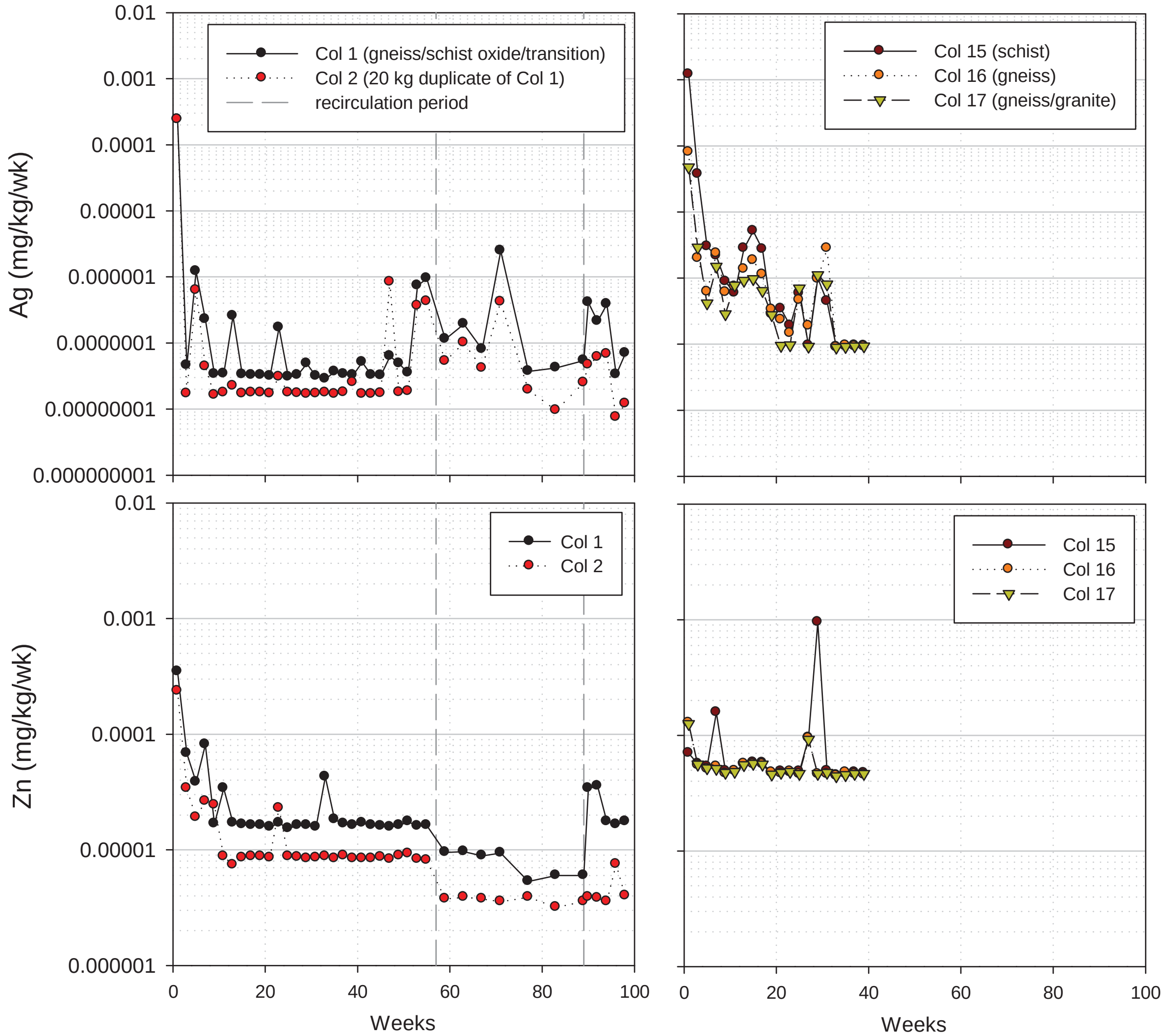

Col 1 (gneiss/schist oxide/transition)
Col 2 (20 kg duplicate of Col 1)
recirculation period
Nitrite-N (mg/kg/wk)
Col 15 (schist)
Col 16 (gneiss)
Col 17 (gneiss/granite)
Nitrate-N (mg/kg/wk)
Col 1
Col 2
Col 15
Col 16
Col 17
Ammonia-N (mg/L)
Weeks
1
0.1
0.01
0.001
0.0001
0.00001
0
20
40
60
80
100


D-As (mg/kg/wk)
10
1
0.1
0.01
0.001
0.0001
Col 1 (gneiss/schist oxide/transition)
Col 2 (20 kg duplicate of Col 1)
recirculation period
Col 15 (schist)
Col 16 (gneiss)
Col 17 (gneiss/granite)
D-Sb (mg/kg/wk)
0.1
0.01
0.001
0.0001
0.00001
Col 1
Col 2
Col 15
Col 16
Col 17
D-U (mg/kg/wk)
1
0.1
0.01
0.001
0.0001
0.00001
Col 1
Col 2
Col 15
Col 16
Col 17
0
20
40
60
80
100
Weeks
Weeks


Al (mg/kg/wk)
Cd (mg/kg/wk)
Cr (mg/kg/wk)
Co (mg/kg/wk)
Col 1 (gneiss/schist oxide/transition)
Col 2 (20 kg duplicate of Col 1)
recirculation period
Col 15 (schist)
Col 16 (gneiss)
Col 17 (gneiss/granite)
Col 1
Col 2
Col 15
Col 16
Col 17
Weeks
0.1
0.01
0.001
0.0001
0.00001
0.000001
0.0000001
0.00000001
0.000000001
0
20
40
60
80
100


Cu (mg/kg/wk)
Col 1 (gneiss/schist oxide/transition)
Col 2 (20 kg duplicate of Col 1)
recirculation period
Col 15 (schist)
Col 16 (gneiss)
Col 17 (gneiss/granite)
Fe (mg/kg/wk)
Pb (mg/kg/wk)
Mn (mg/kg/wk)
Col 1
Col 2
Col 15
Col 16
Col 17
Weeks


Col 1 (gneiss/schist oxide/transition)
Col 2 (20 kg duplicate of Col 1)
recirculation period
Col 15 (schist)
Col 16 (gneiss)
Col 17 (gneiss/granite)
Hg (ug/kg/wk)
Mo (mg/kg/wk)
Ni (mg/kg/wk)
Se (mg/kg/wk)
Col 1
Col 2
Col 15
Col 16
Col 17
DL
Weeks


Ag (mg/kg/wk)
0.01
0.001
0.0001
0.00001
0.000001
0.0000001
0.00000001
0.000000001
Col 1 (gneiss/schist oxide/transition)
Col 2 (20 kg duplicate of Col 1)
recirculation period
Col 15 (schist)
Col 16 (gneiss)
Col 17 (gneiss/granite)
Zn (mg/kg/wk)
0.01
0.001
0.0001
0.00001
0.000001
Col 1
Col 2
Col 15
Col 16
Col 17
0
20
40
60
80
100
Weeks
Weeks

Appendix E: Additional Data to Support Source Term Predictions

Appendix E.1: Nitrogen Loadings

Appendix E.2: PHREEQC Geochemical Modelling Input

Appendix E.3: Geochemical Source Terms

Appendix E.4: Bench-Scale Testwork for HLF Water Treatment System (INOTEC Report)

GOLDCORP

Appendix E.1: Nitrogen Loadings

Appendix E.1: Nitrogen Loadings

1. Overview

Explosive residue and associated combustion products on blasted rock surfaces are the primary sources of ammonia (NH_3 and NH_4^+), nitrate (NO_3^-), and nitrite (NO_2^-) associated with runoff from active mining and blasting operations (Pommen, 1983). The export of nitrogen (N) from blasting is therefore linked to the quantity and types of explosives used, in addition to the detonation efficiency.

Ammonium nitrate fuel oil (ANFO) is the primary component of explosives used in mining and blasting related operations. Ideally the explosive reaction converts nitrogen species, in this case ammonia and nitrate, to nitrogen gas. In practice, the detonation efficiency, and thus conversion of nitrogen species to nitrogen gas, are dictated by the handling procedures of the explosives and the blasting conditions (Forsyth *et al.*, 1995; Revey, 1996). Wet blasting conditions may result in the leaching of N from explosives prior to detonation. Wet conditions may also result in inefficient or incomplete detonation and/or misfires, which in turn yields excess N residue available for leaching (Mueller *et al*, 2015). Nitrogen compounds in explosive mixtures are readily water soluble, with solubility rates varying from minutes for ANFO to weeks for water resistant ANFO emulsion mixtures as described by Revy (1996). Emulsion products continue to be developed to mitigate the effects of wet-blasting conditions on N leaching and overall blasting efficiency. The application of emulsion products continues to be more common as their costs decrease and their benefits to overall operational efficiency are realized.

The primary pathway of nitrogen associated with blasting residue is via seepage from excavated waste rock, which is deposited in waste rock storage facilities. The release of nitrogen compounds is directly related to the volume of blasted rock and the rate of water infiltration into the waste rock facilities. Water percolation rates through waste rock piles is variable and leads to a time lag between rock deposition and observed release of nitrogen at significant concentrations (Bailey, 2013; Mueller *et al*, 2015). Preferential flow paths develop within a rock pile leading to partial and gradual wetting from the outer to the inner portions of the pile. The nitrogen available for leaching is limited to the wetted areas of the pile and over time newly wetted areas will release stored nitrogen, therefore nitrogen release from a large rock pile can persist for years or decades after rock placement. Microbial activity along the flow paths can mediate nitrification reactions which act to oxidize ammonia and nitrite to nitrate. For open pit mining operations, which are typically oxidizing environments, the export of nitrogen to the receiving environment has been observed to be predominantly in the form of nitrate, and to a lesser extent, nitrite and ammonia (Ferguson and Leask, 1988).

The export of aqueous nitrogen species can also occur via mine pit water, particularly during dewatering of active pit development (Cameron, 2007). Infiltration of water into loaded blast patterns can lead to nitrogen release prior to blasting from explosives loaded into boreholes or from explosives spilled on the pit floor. Subsequent to blasting, infiltration water in contact with blasted rock on the pit floor can mobilize residual nitrogen species. There is limited storage of nitrogen within the pit as the majority of explosives residuals are excavated with the blasted rock. As a result, the export of nitrogen from mine pit contact water is typically associated with operations.

The processes that result in the distribution of water soluble N species are not immediately quantifiable, nor are they predictable, as each blast is unique with respect to detonation efficiency, residue amount and type, as well as microbial activity. Consequently, empirical methods have been developed to predict N loadings from mining activity and are based on explosive type, explosive quantity, and pit dewatering conditions (*e.g.*, wet versus dry) as presented in Mueller *et al*. (2015). Model assumptions and methodologies for the derivation of nitrogen species source terms are presented in the sections below. Source terms are derived for application in the water quality model for the Project and are used to predict Project effects on surface and groundwater quality.

2. Assumptions

Nitrogen source terms were derived for contact water associated with pit wall runoff and waste rock seepage. Source terms were calculated based on projected explosive use and waste rock deposition plans. Source term loadings are estimated as a percentage of the total explosives used for blasting over a specified time period and incorporate the following assumptions:

- Mining, explosive use, waste rock production and placement will proceed as per the mine plan;
- Explosive types to be used are ANFO (34% N) and Emulsion (27.5% N; Orica Fortis® or Fortan® products);
- Best explosive use and blasting practices will be implemented to maximize explosive consumption and minimize explosive residue as a result of blasting;
- Over the operational mine life, 15% of blast holes were assumed to be wet, were used as a proxy for less efficient detonation, and are assumed to apply to approximately 15% of the total explosives used;

- Nitrogen is exported to the aqueous downstream receiving environment in species that are proportional to average distributions observed by Ferguson and Leask (1988) when T-N is greater than 3 mg/L, with nitrate, ammonia and nitrite respectively representing 95%, 4% and 1% of the total nitrogen release, respectively;
- The observations of nitrogen loadings from pit walls and waste rock at the Aitik Mine, Thompson Creek Mine, and Minto Mine are reasonably representative examples of open pit mining and blasting conditions that will be encountered at the Project; and,
- For the purpose of source term derivation, the baseline levels for nitrate, ammonia and nitrite are assumed to be zero.

3. Methodology

A desktop review of the Aitik, Thompson Creek, and Minto mines was conducted to document N loading associated with well-managed open pit mining operations. Mine development, waste rock production rates, and/or climatic settings for these projects are relatively similar to the proposed Coffee Creek Mine and are considered reasonable analogs for comparison to the Coffee Gold Mine. Associated N loading rates observed from these analog sites are therefore used to constrain nitrogen source terms for the Project.

Boliden's Aitik Mine is an open pit hard-rock mine in northern Sweden. Production began in the 1960s and is currently operating with an annual ore production rate of approximately 39 Mtonnes (2014). Climatic conditions at Aitik are similar to the Coffee Gold Mine. Sources of N loading at Aitik include pit walls and waste rock dumps.

The Thompson Creek Mine (TCM) is an open pit molybdenum mine located in Idaho, United States of America. The Thompson Creek Mine is owned and operated by the Thompson Creek Metals Company Inc. and operated from 1983 to 2014. Production at Thompson Creek reached up to 9 Mtonnes per year. While not at a northern latitude, the Thompson Creek mine is located at in the Rocky Mountains at a high elevation (2,200 masl) and experiences extreme, continental conditions not dissimilar from Coffee. Further, the open pit blasting conditions at TCM are relatively dry and are considered a reasonable proxy for the relatively dry conditions expected at Coffee, where open pits development is predominantly above the water table. With decades of water quality data with nitrogen species measurements associated with the waste rock seepage and pit wall contact water seepage, TCM is an ideal site for comparison to Coffee.

Capstone Mining Corporation's Minto Mine is an open pit copper mine located north of Whitehorse in central Yukon, Canada. Yearly production reached nearly 17 Mt in 2015, with approximately 7 years of operations remaining. The Minto site, like Aitik, is within a region of similar conditions to the Project. and has been collecting operational water quality data that includes pit wall and waste rock seepage sampling. The benefits of Minto as an analogue for N species source term loadings are two-fold: site climate conditions are expected to be reasonably similar to the Project; and Minto is a relatively modern, operating, open-pit mine with a supporting, up to date monitoring plan and water quality database.

3.1 Source Term Development

Methods used to develop N source terms for waste rock seepage, pit wall runoff, and draindown quality from the heap leach facility are described below.

3.1.1 Waste Rock Seepage

Annual waste rock deposition schedules are not available for the Project. Therefore, an annual accumulation and release of residual nitrogen from waste rock facilities cannot be calculated as per the Ferguson and Leask (1988) approach. Rather, the range of N concentrations that may be produced from mine waste facilities is taken from observations at analogue sites, which include Aitik, Thompson Creek, and the Minto Mine. Observations from analogue sites function as proxies for expected N concentrations from active, well managed mine sites and are applied as capping terms for the N source terms.

Water quality datasets were developed for each analogue and included NH_3, NO_3^-, and NO_2^- concentrations. Median and 90th percentile or maximum N species concentrations were calculated for each of the analogue waste rock dumps (Table 1). A Base Case estimate and an Upper estimate for NH_3, NO_3^- and NO_2^- concentrations were developed. Median and 90th percentile or maximum values were considered from each facility for the Base Case and Upper estimate, respectively. The highest value was selected for each term. In this case, the median and 90th percentile values from the Minto Mine were consistently highest from the analogue sites and were selected as the Base Case and Upper Estimate N source terms for waste rock seepage (Table 1). The final N source terms are based on the Base Case and Upper Estimate concentrations presented in (Table 1) for all waste rock storage facilities at the Project.

Table 1:
Median, 90th Percentile, and maximum nitrate, nitrite, and ammonia concentrations for seepages associated with waste rock dumps from each of Aitik Mine, Thompson Creek Mine, and Minto Mine

Location	Rock Mass	NO_3-N (mg/L)			NO_2-N (mg/L)			NH_3-N (mg/L)		
	(MT)	Median	P90 or Max*	n	Median	P90 or Max*	n	Median	P90 or Max*	n
Aitik (WRD T6)	225	30	43	3	-	-	-	0.003	0.006	3
Thompson Creek (Buck C)	310	7	15	45	<0.010	0.11	42	<0.050	<0.050	23
Thompson Creek (PH Toe)	45	8.5	10	32	0.01	0.01	31	0.05	0.05	31
Minto (Southwest Dump)	21	30	45	42	0.1	0.3	42	0.06	0.2	42
Source Term		Base Case Estimate	Upper Estimate		Base Case Estimate	Upper Estimate		Base Case Estimate	Upper Estimate	
		30	45		0.1	0.3		0.06	0.2	

Note: *P90 values calculated for samples with N>10; max values calculated for samples with N<10.

3.1.2 Pit Wall Seepage

Pit water quality from analogue sites was used as a proxy for N pit wall seepage source terms and include pit lakes at Aitik and Thompson Creek mine sites. Similar to the waste rock seepage capping terms, median and 90th percentile or maximum N species concentrations were calculated for each analogue pit lake (Table 2). Maximum concentrations were selected for populations <10, and 90th percentile concentrations were calculated for populations >10. Base Case and Upper Estimate source terms for NH3, NO3-, and NO2- were derived (Table 2). The higher median value was selected for the Base Case estimate. Similarly, the higher 90th percentile or maximum value was selected for the Upper Estimate.

Table 2:
Median, 90th Percentile, and maximum nitrate, nitrite, and ammonia concentrations for seepages associated with pit wall from each of Aitik Mine, Thompson Creek Mine, and Minto Mine.

Location	NO_3-N (mg/L)			NO_2-N (mg/L)			NH_3-N (mg/L)		
	Median	P90 or Max*	n	Median	P90 or Max*	n	Median	P90 or Max*	n
Aitik	5.6	8.4	28	0.007	0.03	28	0.3	1.6	28
Thompson Creek	5.6	29	26	0.01	0.52	6	0.19	5.7	6
Source Term	Base Case Estimate	Upper Estimate		Base Case Estimate	Upper Estimate		Base Case Estimate	Upper Estimate	
	5.6	29		0.01	0.52		0.3	5.7	

Note: *P90 values calculated for samples with N>10; max values calculated for samples with N<10.

3.1.3 Heap Leach Facility

Following operations, heap leach facility (HLF) drainage will be treated with an electro bioreactor (EBR) system before being discharged. This facility will treat a variety of chemical species, including NO_3^-. The efficacy of the EBR system at treating HLF drainage was demonstrated with bench scale testing, as described in Appendix E.4. During the EBR bench scale test work, nutrients such as ammonia and phosphate were added to stimulate microbial growth. The duration of the experiment was not sufficient to optimize nutrient addition rates, resulting in excess nutrient addition which in turn induced artificially high effluent concentrations of N parameters. The bio-treatment process is designed to denitrify the influent and as a result, effluent nitrogen concentrations are expected to be low. As a conservative assumption, NH_3 concentrations in EBR effluent were assumed to be equal to NO_3^-. Source term concentrations of NO_3^- and NO_2^- were set to observed concentrations in EBR bench test effluent (median and 75th percentile) for Base Case and Upper estimate source terms, respectively (Table 3).

Elevated concentrations of nitrogen species are expected to be present in HLF drainage in post closure. Unlike other sources of nitrogen loading at the minesite, the primary source of nitrogen species in the HLF is from degradation of CN. Hence, nitrogen concentrations cannot be calculated based on an estimate of explosive use as is it is for waste rock storage facilities. Nitrogen loadings in the HLF will depend in large part on the rate of CN degradation during mine life and the effectiveness of rinsing closed sections of the heap during progressive reclamation. For the purposes of source term prediction, nitrogen concentrations produced at the closed heap leach facility at an analogue mine site, Brewery

Creek are applied. The median and 90th percentile concentrations observed 1 to 10 years after closure are used as the Base Case and Upper source term concentrations for nitrogen species (Table 3).

In the Base Case scenario, it is assumed that in-situ degradation of nitrogen species will be partially successful, and that nitrogen species will be degraded within the HLF (Table 3). The In-situ treatment of nitrogen species within the HLF is described in the Conceptual Reclamation and Closure of Mine Facilities (Appendix 31-R)

Table 3:
Nitrogen source term estimates for the Heap Leach Facility during Closure (treated EBR effluent) and Post Closure.

Parameter	Units	Closure		Post Closure		
		Base Case Estimate	Upper Estimate	Base Case Estimate (no in-situ treatment)	Base Case Estimate (in situ treatment)	Upper Estimate
NH_3-N	mg/L	0.13	0.25	0.050	0.050	9.0
NO_3-N	mg/L	0.13	0.25	317	50	375
NO_2-N	mg/L	0.025	0.050	5.3	0.20	6.7

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APPENDIX E.2: PHREEQC GEOCHEMICAL MODELLING INPUT

Appendix E.2: PHREEQC Geochemical Modelling Input

Alkalinity at Calcite Equilibrium as a Function of CO_2 (g), High TDS and High Temperature

SELECTED_OUTPUT 1		
-file selected_output_1.sel		
-pH true		
-alkalinity true		
-molalities CO_3^{-2}		
-saturation_indices CO_2(g)		
Solution		
Temp	10	
pH	7	
redox pe		
units mg/L		
density 1		
S(6)	2000.0	
Ca	338.0	
Mg	167.6	
Na	868.0	
-water 1 # kg		
save solution 1		
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-3.5	
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-3.45	
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-3.4	
end		
Use Solution 1		

SELECTED_OUTPUT 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-3.35	
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-3.3	
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-3.25	
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-3.2	
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-3.15	
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-3.1	
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-3.05	
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-3	
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-2.95	
end		
Use Solution 1		

SELECTED_OUTPUT 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-2.9	
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-2.85	
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-2.8	
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-2.75	
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-2.7	
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-2.65	
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-2.6	
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-2.55	
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-2.5	
end		
Use Solution 1		

SELECTED_OUTPUT 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-2.4	
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-2.3	
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-2.2	
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-2.1	
end		
Use Solution 1		
equilibrium_phases		
calcite	0	10
CO_2(g)	-2	
end		

Alkalinity at Calcite Equilibrium as a Function of CO_2 (g), Low TDS and Low Temperature

SELECTED_OUTPUT 1			
-file selected_output_1.sel			
-pH true			
-alkalinity true			
-charge_balance true			
-molalities CO_3^{-2}			
-saturation_indices calcite CO_2(g)			
Solution			
Temp	0.1		
pH	7		
redox pe			
units mg/L			
density 1			
S(6)	500.0		
Ca	84.5		
Mg	41.9		
Na	217.0		
-water 1 # kg			
save solution 1			
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-3.5		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-3.45		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-3.4		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-3.35		
end			

SELECTED_OUTPUT 1			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-3.3		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-3.25		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-3.2		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-3.15		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-3.1		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-3.05		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-3		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-2.95		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-2.9		

SELECTED_OUTPUT 1			
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-2.85		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-2.8		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-2.75		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-2.7		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-2.65		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-2.6		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-2.55		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-2.5		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	

SELECTED_OUTPUT 1			
CO_2(g)	-2.4		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-2.3		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-2.2		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-2.1		
end			
Use Solution 1			
equilibrium_phases			
calcite	0	10	
CO_2(g)	-2		
end			

Barium Concentration at Barite Saturation Indices (SI) 0.55

SELECTED_OUTPUT		
-totals Ba		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	40	
Ca	12.5	
Mg	2.5	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	50	
Ca	15.625	
Mg	3.125	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	60	
Ca	18.75	
Mg	3.75	

SELECTED_OUTPUT		
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	70	
Ca	21.875	
Mg	4.375	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	80	
Ca	25	
Mg	5	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	90	

SELECTED_OUTPUT		
Ca	28.125	
Mg	5.625	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	100	
Ca	31.25	
Mg	6.25	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	110	
Ca	34.375	
Mg	6.875	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	

SELECTED_OUTPUT		
S(6)	120	
Ca	37.5	
Mg	7.5	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	130	
Ca	40.625	
Mg	8.125	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	135	
Ca	42.1875	
Mg	8.4375	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		

SELECTED_OUTPUT		
density 1		
Alkalinity	100	
S(6)	140	
Ca	43.75	
Mg	8.75	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	145	
Ca	45.3125	
Mg	9.0625	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	155	
Ca	48.4375	
Mg	9.6875	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	

SELECTED_OUTPUT		
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	165	
Ca	51.5625	
Mg	10.3125	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	175	
Ca	54.6875	
Mg	10.9375	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	185	
Ca	57.8125	
Mg	11.5625	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	

SELECTED_OUTPUT		
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	195	
Ca	60.9375	
Mg	12.1875	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	205	
Ca	64.0625	
Mg	12.8125	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	215	
Ca	67.1875	
Mg	13.4375	
Ba	0.1	barite 0.55
-water 1 # kg		
end		

SELECTED_OUTPUT		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	225	
Ca	70.3125	
Mg	14.0625	
Ba	0.1	barite 0.55
#Cl	1	charge
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	235	
Ca	73.4375	
Mg	14.6875	
Ba	0.1	barite 0.55
#Cl	1	charge
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	245	
Ca	76.5625	
Mg	15.3125	
Ba	0.1	barite 0.55
#Cl	1	charge
-water 1 # kg		

SELECTED_OUTPUT		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	255	
Ca	79.6875	
Mg	15.9375	
Ba	0.1	barite 0.55
#Cl	1	charge
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	265	
Ca	82.8125	
Mg	16.5625	
Ba	0.1	barite 0.55
#Cl	1	charge
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	275	
Ca	85.9375	
Mg	17.1875	
Ba	0.1	barite 0.55

SELECTED_OUTPUT		
#Cl	1	charge
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	285	
Ca	89.0625	
Mg	17.8125	
Ba	0.1	barite 0.55
#Cl	1	charge
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	290	
Ca	90.625	
Mg	18.125	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	295	
Ca	92.1875	

SELECTED_OUTPUT		
Mg	18.4375	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	300	
Ca	93.75	
Mg	18.75	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	310	
Ca	96.875	
Mg	19.375	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	

SELECTED_OUTPUT		
S(6)	320	
Ca	100	
Mg	20	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	330	
Ca	103.125	
Mg	20.625	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	340	
Ca	106.25	
Mg	21.25	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		

SELECTED_OUTPUT		
density 1		
Alkalinity	100	
S(6)	350	
Ca	109.375	
Mg	21.875	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	360	
Ca	112.5	
Mg	22.5	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	410	
Ca	128.125	
Mg	25.625	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	

SELECTED_OUTPUT		
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	460	
Ca	143.75	
Mg	28.75	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	510	
Ca	159.375	
Mg	31.875	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	560	
Ca	175	
Mg	35	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	

SELECTED_OUTPUT		
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	610	
Ca	190.625	
Mg	38.125	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	660	
Ca	206.25	
Mg	41.25	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	710	
Ca	221.875	
Mg	44.375	
Ba	0.1	barite 0.55
-water 1 # kg		
end		

SELECTED_OUTPUT		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	760	
Ca	237.5	
Mg	47.5	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	810	
Ca	253.125	
Mg	50.625	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	860	
Ca	268.75	
Mg	53.75	
Ba	0.1	barite 0.55
-water 1 # kg		

SELECTED_OUTPUT		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	910	
Ca	284.375	
Mg	56.875	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	960	
Ca	300	
Mg	60	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	1010	
Ca	315.625	
Mg	63.125	
Ba	0.1	barite 0.55

SELECTED_OUTPUT		
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	1060	
Ca	331.25	
Mg	66.25	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	1110	
Ca	346.875	
Mg	69.375	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	1160	
Ca	362.5	
Mg	72.5	

SELECTED_OUTPUT		
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	1210	
Ca	378.125	
Mg	75.625	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	1260	
Ca	393.75	
Mg	78.75	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	1310	

SELECTED_OUTPUT		
Ca	409.375	
Mg	81.875	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	1360	
Ca	425	
Mg	85	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	1410	
Ca	440.625	
Mg	88.125	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	

SELECTED_OUTPUT		
S(6)	1460	
Ca	456.25	
Mg	91.25	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	1510	
Ca	471.875	
Mg	94.375	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	1560	
Ca	487.5	
Mg	97.5	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		

SELECTED_OUTPUT		
density 1		
Alkalinity	100	
S(6)	1610	
Ca	503.125	
Mg	100.625	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	1660	
Ca	518.75	
Mg	103.75	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	1710	
Ca	534.375	
Mg	106.875	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	

SELECTED_OUTPUT		
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	1760	
Ca	550	
Mg	110	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	1810	
Ca	565.625	
Mg	113.125	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	1860	
Ca	581.25	
Mg	116.25	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	

SELECTED_OUTPUT		
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	1910	
Ca	596.875	
Mg	119.375	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	1960	
Ca	612.5	
Mg	122.5	
Ba	0.1	barite 0.55
-water 1 # kg		
end		
Solution	1	Upper
temp	25	
pH	8.3	
redox pe		
units mg/L		
density 1		
Alkalinity	100	
S(6)	2010	
Ca	628.125	
Mg	125.625	
Ba	0.1	barite 0.55
-water 1 # kg		
end		

Mount Nansen Field Bin and Waste Rock Seep Saturation Indices

SELECTED_OUTPUT 1		
-file selected_output_1.sel		
-saturation_indices Gypsum Calcite		
SOLUTION 1	#	NW Seep-01
temp 25		
pH	7.3	
pe 4		
redox pe		
units mg/L		
density 1		
S(6)	515	
Alkalinity	46	
Ca	185	
Mg	41.6	
Cl	0.63	
K	3.1	
Na	2.6	
Sr	0.423	
Si	2.6	
N(5)	0.32	
N(3)	0.01	
N(-3)	0.01	
-water 1 # kg		
end		
SOLUTION 1	#	NW Seep-01
temp 25		
pH	7.91	
pe 4		
redox pe		
units mg/L		
density 1		
S(6)	863	
Alkalinity	54	
Ca	313	
Mg	86.1	
Cl	3.7	
K	3.6	

Na	4.3	
Sr	0.854	
Si	3.36	
N(5)	0.55	
N(3)	0.01	
N(-3)	0.1	
-water 1 # kg		
end		
SOLUTION 1	#	NW Seep-01
temp 25		
pH	8.13	
pe 4		
redox pe		
units mg/L		
density 1		
S(6)	1150	
Alkalinity	51	
Ca	367	
Mg	88.2	
Cl	0.17	
K	3.8	
Na	4.8	
Sr	0.911	
Si	2.95	
N(5)	0.01	
N(3)	0.01	
N(-3)	0.01	
-water 1 # kg		
end		
SOLUTION 1	#	NW Seep-01
temp 25		
pH	7.82	
pe 4		
redox pe		
units mg/L		
density 1		
S(6)	1120	
Alkalinity	64	
Ca	353	

Mg	82.9	
Cl	0.07	
K	3.8	
Na	4.6	
Sr	0.874	
Si	3.42	
N(5)	0.06	
N(3)	0.01	
N(-3)	0.01	
-water 1 # kg		
end		
SOLUTION 1	#	NW Seep-01
temp 25		
pH	7.89	
pe 4		
redox pe		
units mg/L		
density 1		
S(6)	1290	
Alkalinity	59	
Ca	407	
Mg	93.6	
Cl	0.17	
K	0	
Na	4.4	
Sr	1.13	
Si	3.35	
N(5)	0.01	
N(3)	0.04	
N(-3)	0.1	
-water 1 # kg		
end		
SOLUTION 1	#	NW Seep-01
temp 25		
pH	7.88	
pe 4		
redox pe		
units mg/L		
density 1		

S(6)	1300	
Alkalinity	63	
Ca	463	
Mg	121	
Cl	0.36	
K	5.2	
Na	5.7	
Sr	1.21	
Si	3.73	
N(5)	0.01	
N(3)	0.01	
N(-3)	0.01	
-water 1 # kg		
end		
SOLUTION 1	#	NW Seep-01
temp 25		
pH	7.72	
pe 4		
redox pe		
units mg/L		
density 1		
S(6)	1070	
Alkalinity	58	
Ca	373	
Mg	92.7	
Cl	0.11	
K	3.8	
Na	4.6	
Sr	0.814	
Si	2.75	
N(5)	0.14	
N(3)	0.05	
N(-3)	0.01	
-water 1 # kg		
end		
SOLUTION 1	#	NW Seep-01
temp 25		
pH	7.75	
pe 4		

redox pe		
units mg/L		
density 1		
S(6)	1040	
Alkalinity	62	
Ca	343	
Mg	86.8	
Cl	0.11	
K	3.3	
Na	4.2	
Sr	0.826	
Si	2.89	
N(5)	0.31	
N(3)	0.04	
N(-3)	0.08	
-water 1 # kg		
end		
SOLUTION 1	#	NW Seep-01
temp 25		
pH	7.57	
pe 4		
redox pe		
units mg/L		
density 1		
S(6)	887	
Alkalinity	44	
Ca	201	
Mg	49.8	
Cl	0.48	
K	3	
Na	2.2	
Sr	0.673	
Si	2.52	
N(5)	0.48	
N(3)	0.08	
N(-3)	0.01	
-water 1 # kg		
end		
SOLUTION 1	#	NW Seep-01

temp 25		
pH	7.63	
pe 4		
redox pe		
units mg/L		
density 1		
S(6)	883	
Alkalinity	47	
Ca	359	
Mg	75.2	
Cl	0.35	
K	3.6	
Na	3.7	
Sr	0.939	
Si	3.55	
N(5)	0.4	
N(3)	0.01	
N(-3)	0.01	
-water 1 # kg		
end		
SOLUTION 1	#	NW Seep-01
temp 25		
pH	7.54	
pe 4		
redox pe		
units mg/L		
density 1		
S(6)	820	
Alkalinity	47	
Ca	294	
Mg	70	
Cl	0.32	
K	2	
Na	2	
Sr	0.647	
Si	3.5	
N(5)	0.49	
N(3)	0.01	
N(-3)	0.01	
-water 1 # kg		

end		
SOLUTION 1	#	LW Seep-01
temp 25		
pH	6.96	
pe 4		
redox pe		
units mg/L		
density 1		
S(6)	1120	
Alkalinity	58	
Ca	346	
Mg	125	
Cl	0.53	
K	2	
Na	8.8	
Sr	0.92	
Si	4.44	
N(5)	8.19	
N(3)	0.03	
N(-3)	0.01	
-water 1 # kg		
end		
SOLUTION 1	#	LW Seep-01
temp 25		
pH	6.7	
pe 4		
redox pe		
units mg/L		
density 1		
S(6)	1690	
Alkalinity	41	
Ca	371	
Mg	90.5	
Cl	0.83	
K	1.5	
Na	10.1	
Sr	0.972	
Si	4.43	
N(5)	9.96	

N(3)	0.01	
N(-3)	0.01	
-water 1 # kg		
end		
SOLUTION 1	#	LW Seep-01
temp 25		
pH	6.66	
pe 4		
redox pe		
units mg/L		
density 1		
S(6)	1740	
Alkalinity	38	
Ca	370	
Mg	203	
Cl	1.1	
K	0	
Na	9.9	
Sr	0.963	
Si	5.09	
N(5)	9.13	
N(3)	0.02	
N(-3)	0.01	
-water 1 # kg		
end		
SOLUTION 1	#	LW Seep-01
temp 25		
pH	6.62	
pe 4		
redox pe		
units mg/L		
density 1		
S(6)	1450	
Alkalinity	41	
Ca	377	
Mg	194	
Cl	1.25	
K	1.9	
Na	12.9	

Sr	1.11	
Si	6.31	
N(5)	9.86	
N(3)	0.04	
N(-3)	0.01	
-water 1 # kg		
end		
SOLUTION 1	#	LW Seep-01
temp 25		
pH	6.66	
pe 4		
redox pe		
units mg/L		
density 1		
S(6)	1450	
Alkalinity	36	
Ca	385	
Mg	182	
Cl	1.38	
K	1.6	
Na	11.5	
Sr	0.892	
Si	5.92	
N(5)	9.55	
N(3)	0.06	
N(-3)	0.2	
-water 1 # kg		
end		
SOLUTION 1	#	LW Seep-01
temp 25		
pH	6.62	
pe 4		
redox pe		
units mg/L		
density 1		
S(6)	1610	
Alkalinity	31	
Ca	395	
Mg	201	

Cl	1.03	
K	1.1	
Na	7.3	
Sr	0.951	
Si	4.1	
N(5)	8.16	
N(3)	0.06	
N(-3)	0.36	
-water 1 # kg		
end		
SOLUTION 1	#	LW Seep-01
temp 25		
pH	6.49	
pe 4		
redox pe		
units mg/L		
density 1		
S(6)	1680	
Alkalinity	28	
Ca	420	
Mg	219	
Cl	0.91	
K	1.9	
Na	8.8	
Sr	0.958	
Si	4.22	
N(5)	8.09	
N(3)	0.08	
N(-3)	0.01	
-water 1 # kg		
end		
SOLUTION 1	#	LW Seep-01
temp 25		
pH	6.86	
pe 4		
redox pe		
units mg/L		
density 1		
S(6)	1330	

Alkalinity	54	
Ca	368	
Mg	173	
Cl	1.04	
K	1	
Na	11	
Sr	0.884	
Si	5.4	
N(5)	6.35	
N(3)	0.01	
N(-3)	0.01	
-water 1 # kg		
end		
SOLUTION 1 # Field Bin		
temp 25		
pe 4		
redox pe		
units mg/L		
density 1		
pH	6.29	
S(6)	1890	
N(-3)	0.005	
N(5)	0.5	
N(3)	0.1	
Mg	191	
Ca	337	
Mn	1.79	
Na	2	
Sr	0.799	
Cl		
F	0.152	
-water 1 # kg		
end		
SOLUTION 1 # Field Bin		
temp 25		
pe 4		
redox pe		
units mg/L		

density 1		
pH	7.43	
S(6)	1710	
N(-3)	0.044	
N(5)	0.75	
N(3)	0.32	
Mg	139	
Ca	355	
Mn	0.242	
Na	2	
Sr	0.546	
Cl		
F	0.167	
Alkalinity	39.6	
-water 1 # kg		
end		
SOLUTION 1 # Field Bin		
temp 25		
pe 4		
redox pe		
units mg/L		
density 1		
pH	6.47	
S(6)	1360	
N(-3)	0.0079	
N(5)	6.24	
N(3)	0.05	
Mg	110	
Ca	416	
Mn	0.0669	
Na	0.8	
Sr	0.615	
Cl		
F	0.165	
Alkalinity	34	
-water 1 # kg		
end		
SOLUTION # Field Bin		

temp 25		
pe 4		
redox pe		
units mg/L		
density 1		
pH	7.35	
S(6)	1280	
N(-3)	0.01	
N(5)	0.15	
N(3)	0.01	
Mg	159	
Ca	496	
Mn	0.167	
Na	1	
Sr	0.705	
Cl	0.45	
F		
Alkalinity	16	
-water 1 # kg		
end		
SOLUTION 1 # Field Bin		
temp 25		
pe 4		
redox pe		
units mg/L		
density 1		
pH	5.21	
S(6)	1410	
N(-3)	0.01	
N(5)	0.1	
N(3)	0.1	
Mg	250	
Ca	446	
Mn	0.0538	
Na	2	
Sr	0.936	
Cl	2.3	
F		
Alkalinity	24	
-water 1 # kg		

end		
SOLUTION 1 # Field Bin		
temp 25		
pe 4		
redox pe		
units mg/L		
density 1		
pH	7.3	
S(6)	1870	
N(-3)	0.01	
N(5)	0.01	
N(3)	0.01	
Mg	212	
Ca	542	
Mn	0.119	
Na	1.8	
Sr	0.74	
Cl	0.58	
F		
Alkalinity	47	
-water 1 # kg		
end		
SOLUTION # Field Bin		
temp 25		
pe 4		
redox pe		
units mg/L		
density 1		
pH	6.5	
S(6)	1690	
N(-3)	0.01	
N(5)	0.11	
N(3)	0.01	
Mg	265	
Ca	446	
Mn	0.075	
Na	6	
Sr	0.76	
Cl	0.52	
F		
Alkalinity	47	
-water 1 # kg		
end		

APPENDIX E3: GEOCHEMICAL SOURCE TERMS

Appendix E.3: Geochemical Source Terms

Geochemical Source Terms for Waste Rock Facilities

		SO4	P	WADCN	Al	Ag	As	Ca	Cd	Co	Cr	Cu	Fe
Upper Case		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Alpha Dump	mg/L	2091.2	0.050	0	0.014958694	5.6615E-05	0.028160118	390.9132182	3.5251E-05	0.001651238	0.004278068	0.005805372	0.03355218
Kona Backfill	mg/L	401.3	0.078	0	0.020954087	2.64439E-05	0.595158603	92.58863484	0.000105599	0.027041502	0.000621828	0.000874274	0.019852145
in Pit Latte	mg/L	1103.9	0.050	0	0.014544095	2.90632E-05	0.031079887	207.1123022	1.84624E-05	0.000819286	0.002271572	0.00305103	0.031984318
in Pit Supremo	mg/L	1212.5	0.050	0	0.014544095	3.19224E-05	0.031079887	227.4878768	2.02787E-05	0.000899886	0.002495048	0.003351188	0.031984318
in Pit Double Double	mg/L	1081.2	0.050	0	0.014544095	2.84653E-05	0.031079887	202.8517515	1.80826E-05	0.000802432	0.002224843	0.002988266	0.031984318
Alpha Under Drain	mg/m/yr	439478.1	40.064	0	9.545812723	0.011897884	28.59983113	82152.08323	0.007408155	0.347014638	0.899054172	1.220023767	17.11447871
Base Case													
Alpha Dump	mg/L	1429.8	0.025	0	0.007931028	3.87082E-05	0.006309529	267.2712253	2.41015E-05	0.001128967	0.002924957	0.00396919	0.021483066
Kona Backfill	mg/L	274.3	0.027	0	0.014326516	1.808E-05	0.011367883	63.30376342	7.21989E-05	0.018488542	0.00042515	0.00059775	0.013573107
in Pit Latte	mg/L	754.8	0.025	0	0.007925593	1.98708E-05	0.007023385	141.604725	1.26229E-05	0.000560154	0.001553096	0.002086019	0.02141737
in Pit Supremo	mg/L	829.0	0.025	0	0.007925593	2.18257E-05	0.007023385	155.5357065	1.38648E-05	0.000615261	0.001705889	0.00229124	0.02141737
in Pit Double Double	mg/L	739.2	0.025	0	0.007925593	1.9462E-05	0.007023385	138.6917445	1.23633E-05	0.000548631	0.001521147	0.002043107	0.02141737
Alpha Under Drain	mg/m/yr	439478.1	40.064	0	9.545812723	0.011897884	28.59983113	82152.08323	0.007408155	0.347014638	0.899054172	1.220023767	17.11447871

Appendix E.3: Geochemical Source Terms

Geochemical Source Terms for Waste Rock Facilities

		Hg	Mg	Mn	Mo	Ni	Pb	Sb	Se	Tl	U	Zn	Ra-226
Upper Case		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	Bq/L
Alpha Dump	mg/L	2.44545E-05	236.3178529	0.026333133	0.19936325	0.009311543	0.001110593	0.033511708	0.003007408	0.000592658	0.768802979	0.131336918	0.019458122
Kona Backfill	mg/L	4.22151E-06	17.71184274	10.24834406	0.006387923	0.007276152	0.000310914	0.006337664	0.000179391	0.000211464	0.2538	0.092088334	0.091868435
in Pit Latte	mg/L	1.19937E-05	124.2728387	0.009462993	0.115349487	0.003390183	0.00054362	0.016634375	0.001331929	0.00030723	0.8601	0.06088923	0.029531715
in Pit Supremo	mg/L	1.31736E-05	136.4987203	0.010393956	0.126697495	0.003723707	0.000597101	0.018270854	0.001462964	0.000337455	0.8601	0.066879473	0.028246982
in Pit Double Double	mg/L	1.17469E-05	121.716396	0.009268328	0.112976608	0.003320442	0.000532437	0.016292186	0.00130453	0.00030091	0.8601	0.059636665	0.029824113
Alpha Under Drain	mg/m/yr	0.005139219	49663.20662	5.534020424	41.89703895	1.956860602	0.233395855	7.04262873	0.632019597	0.12454954	244.9084392	27.60101451	18.2469385
Base Case													
Alpha Dump	mg/L	6.15571E-06	161.5728483	0.018004223	0.136306622	0.006366394	0.000759323	0.022912286	0.002056194	0.000405206	0.3322803	0.089796347	0.011430937
Kona Backfill	mg/L	2.88629E-06	12.10976168	7.006893979	0.004367486	0.004974777	0.000212575	0.004333123	0.000122651	0.00014458	0.1316	0.062961703	0.06293025
in Pit Latte	mg/L	6.19083E-06	84.96656627	0.006469942	0.078865583	0.002317901	0.000371678	0.011373086	0.000910653	0.000210056	0.376	0.041630567	0.017430422
in Pit Supremo	mg/L	6.19083E-06	93.32552223	0.00710645	0.086624328	0.002545935	0.000408244	0.012491963	0.001000243	0.000230721	0.376	0.045726156	0.016672138
in Pit Double Double	mg/L	6.19083E-06	83.21870116	0.006336847	0.077243222	0.002270219	0.000364032	0.011139128	0.00089192	0.000205735	0.376	0.040774176	0.017603003
Alpha Under Drain	mg/m/yr	0.005139219	49663.20662	5.534020424	41.89703895	1.956860602	0.233395855	7.04262873	0.632019597	0.12454954	244.9084392	27.60101451	18.2469385

Appendix E.3: Geochemical Source Terms

Geochemical Source Terms for Pit Walls

		Sulphate	P	WADCN	Al	Ag	As	Ca	Cd	Co	Cr	Cu	Fe	Hg
		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
BASE CASE														
	No Lake, end of mine life	39.5	0.022		0.007579785	2.67503E-05	0.0218188	119.8747943	4.27048E-05	0.000233268	0.000470768	0.001032277	0.01354255	9.71543E-06
SU4 NORTH DRAINAGE	Lake at Spillway	39.2	0.021		0.007553	2.83741E-05	0.016925249	124.3338875	4.51458E-05	0.000240817	0.000487968	0.001027645	0.01349781	8.96182E-06
	No Lake, end of mine life	33.8	0.025		0.007254123	2.28453E-05	0.030761285	106.1695308	3.67724E-05	0.000207336	0.000460916	0.001046771	0.01304087	1.05856E-05
SU4 South Drainage	Lake at Spillway	34.8	0.023		0.007276872	2.39643E-05	0.028033791	109.7152072	3.84626E-05	0.000214108	0.000469496	0.001046055	0.0130645	1.01505E-05
	No Lake, end of mine life	32.5	0.024		0.007206479	2.02657E-05	0.027662804	97.38669749	3.33154E-05	0.000188369	0.000407477	0.001017084	0.01239871	1.06777E-05
SU3-SU5	Lake at Spillway	32.6	0.020		0.007121952	2.04886E-05	0.021461531	97.23526494	3.38659E-05	0.000186802	0.000394704	0.000997096	0.01193362	9.86321E-06
	No Lake, end of mine life	34.8	0.017		0.0069612	1.83991E-05	0.019931562	90.45877204	3.09495E-05	0.000174593	0.000349478	0.000967061	0.01128195	9.73437E-06
SU1-SU2	Lake at Spillway	34.8	0.017		0.006970164	1.99328E-05	0.018311175	95.1082941	3.31196E-05	0.000183336	0.000372962	0.000970429	0.01149204	9.41358E-06
	No Lake, end of mine life	124.0	0.013		0.009498723	2.72829E-05	0.046935134	171.5623593	4.25431E-05	0.000772375	0.000578783	0.001218503	0.01501509	1.09331E-05
LA	Lake at Spillway	73.9	0.014		0.009069345	3.06462E-05	0.018338371	165.4825758	4.78974E-05	0.000712404	0.000671474	0.001162373	0.01396896	7.7216E-06
UPPER CASE														
	No Lake, end of mine life	41.1	0.034		0.006679299	2.71523E-05	0.03908585	133.5414043	4.63571E-05	0.000299127	0.000499808	0.001128243	0.01376482	1.00419E-05
SU4 NORTH DRAINAGE	Lake at Spillway	40.7	0.033		0.006389203	2.87929E-05	0.030176418	138.7227773	4.8736E-05	0.000309754	0.000515611	0.00111851	0.01371032	9.27255E-06
	No Lake, end of mine life	35.2	0.035		0.006702487	2.3219E-05	0.047779356	117.8325752	4.03828E-05	0.00026302	0.000502879	0.001158838	0.01333661	1.10217E-05
SU4 South Drainage	Lake at Spillway	36.2	0.034		0.006605632	2.43486E-05	0.042994886	121.9352495	4.20644E-05	0.000272779	0.000510951	0.001153503	0.01335095	1.05713E-05
	No Lake, end of mine life	33.9	0.033		0.006819829	2.06263E-05	0.046550415	107.755702	3.71711E-05	0.000237446	0.000442466	0.001135147	0.01268598	1.11012E-05
SU3-SU5	Lake at Spillway	34.0	0.030		0.006616528	2.08586E-05	0.036464621	107.6838099	3.77996E-05	0.000236515	0.000427189	0.001111001	0.01220973	1.02672E-05
	No Lake, end of mine life	36.7	0.026		0.006724836	1.87595E-05	0.036257204	100.020386	3.4991E-05	0.000221687	0.000381894	0.001080895	0.01154371	1.01149E-05
SU1-SU2	Lake at Spillway	36.5	0.027		0.006537048	2.03051E-05	0.033123576	105.3740252	3.70351E-05	0.000233333	0.000405004	0.001081005	0.01174557	9.78242E-06
	No Lake, end of mine life	183.6	0.023		0.007489689	2.79199E-05	0.092292251	188.5271773	6.46309E-05	0.00095657	0.000866042	0.001442626	0.01529846	1.23118E-05
LA	Lake at Spillway	104.4	0.026		0.006146484	3.13333E-05	0.03752014	178.8204119	7.31469E-05	0.000890581	0.001004133	0.001335457	0.01419015	9.2014E-06

Appendix E.3: Geochemical Source Terms

Geochemical Source Terms for Pit Walls

		Mg	Mn	Mo	Ni	Pb	Sb	Se	Tl	U	Zn	Ra-226
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	Bq/L
BASE CASE												
	No Lake, end of mine life	41.21473248	0.108042224	0.024756661	0.001508038	0.000137072	0.012374961	0.000759226	0.000175483	0.061476085	0.013370523	0.019898998
SU4 NORTH DRAINAGE	Lake at Spillway	42.81880431	0.114915327	0.024455768	0.001581627	0.000145292	0.011385813	0.000792029	0.00017027	0.060874474	0.014182761	0.019139064
	No Lake, end of mine life	36.31296642	0.089958078	0.024141059	0.001306363	0.000118975	0.010833936	0.000658812	0.000167911	0.06457882	0.011418889	0.023664288
SU4 South Drainage	Lake at Spillway	37.56812092	0.095157079	0.024105996	0.001363745	0.000124607	0.010906124	0.000686957	0.000165739	0.064045589	0.011978742	0.022717963
	No Lake, end of mine life	33.87882088	0.0787191	0.02497052	0.001197192	0.000105277	0.010854165	0.000597287	0.000170343	0.063985095	0.010127734	0.023116159
SU3-SU5	Lake at Spillway	34.18352572	0.080143691	0.025054885	0.001218556	0.000106323	0.010501085	0.000602658	0.00016413	0.062824583	0.010239402	0.021453189
	No Lake, end of mine life	32.22143643	0.072580151	0.025206824	0.001154918	9.57599E-05	0.011949623	0.000571932	0.000160723	0.059619437	0.009194365	0.018991411
SU1-SU2	Lake at Spillway	33.69244127	0.078885791	0.024781908	0.001220407	0.000103519	0.011221928	0.000603943	0.000158906	0.059098994	0.009961312	0.018897304
	No Lake, end of mine life	52.9721605	0.171852255	0.010536621	0.007181217	0.000152065	0.034478896	0.00161127	0.000159953	0.00783896	0.013618984	0.00054742
LA	Lake at Spillway	52.89728217	0.182029823	0.011114635	0.00686225	0.000166411	0.031625875	0.001353312	0.000125651	0.008093155	0.01530365	0.000562541
UPPER CASE												
	No Lake, end of mine life	44.87257517	0.122094167	0.028987995	0.001581606	0.000277882	0.015679025	0.000777102	0.00022251	0.158274806	0.013550946	0.062767209
SU4 NORTH DRAINAGE	Lake at Spillway	46.65357393	0.129805945	0.028700814	0.001645598	0.000294148	0.014510892	0.000787375	0.000218385	0.161188362	0.014370689	0.062752664
	No Lake, end of mine life	39.50069382	0.101741261	0.027935404	0.001388938	0.000241428	0.013515833	0.000738935	0.000209805	0.147281855	0.01158685	0.066473643
SU4 South Drainage	Lake at Spillway	40.88422951	0.107584717	0.027968401	0.001441931	0.000252376	0.013686779	0.000752708	0.000208706	0.149188648	0.01215177	0.065630589
	No Lake, end of mine life	36.77893446	0.089067327	0.02884185	0.001277826	0.000215253	0.013380132	0.000751223	0.000208374	0.153417538	0.010284571	0.065138244
SU3-SU5	Lake at Spillway	37.10504353	0.090635792	0.028999469	0.001289324	0.000217262	0.012978291	0.000775772	0.000201188	0.158008795	0.01039832	0.063155702
	No Lake, end of mine life	34.9102509	0.082121873	0.029254767	0.00123142	0.00019628	0.014802821	0.000785842	0.000195011	0.155052279	0.009343595	0.057483364
SU1-SU2	Lake at Spillway	36.54997811	0.089216516	0.028810114	0.001293637	0.000211743	0.013948139	0.00077961	0.000194916	0.154663365	0.010116482	0.058013927
	No Lake, end of mine life	62.59136004	0.198158138	0.013001839	0.008876746	0.00045016	0.025012242	0.001294683	0.000227635	0.035632282	0.013925996	0.004151265
LA	Lake at Spillway	62.45485766	0.209739341	0.013885277	0.008487134	0.000491538	0.020302083	0.000952132	0.000187434	0.038045137	0.01557562	0.002792895

Appendix E.3: Geochemical Source Terms

Geochemical Source Terms for Treated Heap Leach Facility Drainage

	Ammonia	NO3	NO2	Sulphate	P	WADCN	Al	Ag	As	Ca	Cd	Co	Cr
	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
Base Case	0.125	0.125	0.025	67	0.188	0.0069	0.0198	0.000059	0.0134	37.4	0.00001	0.0941	0.00056
Upper Case	0.25	0.25	0.05	73	0.197	0.0104	0.0257	0.000074	0.0155	38.9	0.00001	0.0974	0.0007

	Cu	Fe	Hg	Mg	Mn	Mo	Ni	Pb	Sb	Se	Tl	U	Zn	Ra-226
	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	Bq/L
Base Case	0.0023	0.288	0.000037	12.9	0.159	0.00017	0.0011	0.0001	0.00021	0.00176	0.00002	0.000914	0.0295	0.023
Upper Case	0.0026	0.305	0.0000405	13.6	0.198	0.00051	0.0012	0.00016	0.00023	0.00228	0.00002	0.00119	0.0456	0.032

Appendix E.3: Geochemical Source Terms

Geochemical Source Terms for Heap Leach Facility Drainage at Closure

Solution	T-CN	Ammonia	NO3	NO2	Sulphate	P	WADCN	Al	Ag	As	Ca	Cd	Co	Cr
	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
Base Case	mg/L	0.05	316.5	5.3	562.2	0.227	0.09685	0.0084	0.000162522	0.292817364	171.1679146	8.50018E-05	0.05995	0.00651
Upper Case	mg/L	9.02	375.4	6.68	1914.5	0.244	0.2	0.1288	0.00074925	0.691268883	460.6481141	0.000268486	0.101	0.0195
Base Case (Passive Discharge)														
	Cu	**Fe**	**Hg**	**Mg**	**Mn**	**Mo**	**Ni**	**Pb**	**Sb**	**Se**	**Tl**	**U**	**Zn**	**Ra-226**
	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	Bq/L
Base Case	0.002335	0.522	0.00004565	52.23898228	0.03293246	0.254461526	0.005859489	0.000369563	0.03275	0.006591223	0.002255966	0.291774839	0.015872223	0.020897299
Upper Case	0.0064	1.01	0.000423	140.301542	0.100733031	0.900113335	0.019799156	0.001623678	0.0802	0.019829836	0.005938213	0.68162509	0.044042277	0.029774847
Base Case (Passive Discharge)														

Appendix E.3: Geochemical Source Terms
Geochemical Source Terms for Plantsite Area

Solution	Ammonia	NO3	NO2	Sulphate	P	WADCN	Al	Ag	As	Ca	Cd	Co	Cr	
	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	
Base Case	0.005	0.0025	0.001	0.25	0.025	0	0.0169	0.000025	0.0023	0.94	0.000025	0.00059	0.00294	
Upper Case	0.01	0.0089	0.0017	0.855	0.025	0	0.0479	0.0000605	0.00335	1.415	0.00005	0.000915	0.003485	
	Cu	Fe	Hg	Mg	Mn	Mo	Ni	Pb	Sb	Se	Tl	U	Zn	Ra-226
	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	Bq/L
Base Case	0.0052	0.03	0.000025	0.351	0.0535	0.00108	0.00221	0.0007	0.00025	0.00025	0.00005	0.00159	0.005	0.011951644
Upper Case	0.00735	0.044	0.00005	0.514	0.0812	0.001535	0.003085	0.00107	0.00027	0.0005	0.0001	0.002435	0.01	0.018187508

Appendix E.3: Geochemical Source Terms
Geochemical Source Terms for Nitrogen Species

	Ammonia	NO3	NO2
	mg/L	mg/L	mg/L
BASE CASE			
Alpha	0.06	30.00	0.10
Kona in-pit Dump	0.06	30.00	0.10
In-pit Latte WRSF	0.06	30.00	0.10
In-pit Supremo WRSF	0.06	30.00	0.10
In-pit Double Double WRSF	0.06	30.00	0.10
PIT WALLS Active	1.8	17	0.030
PIT WALLS Inactive	0.00	0.00	0.00
UPPER CASE			
Alpha	0.20	45.00	0.30
Kona- In Pit Dump	0.20	45.00	0.30
North Dump	0.20	45.00	0.30
In-pit Latte WRSF	0.20	45.00	0.30
In-pit Supremo WRSF	0.20	45.00	0.30
In-pit Double Double WRSF	0.20	45.00	0.30
PIT WALLS Active	5.5	34	3.6
PIT WALLS Inactive	0.00	0.00	0.00

APPENDIX E4: BENCH-SCALE TESTWORK FOR HLF WATER TREATMENT SYSTEM (INOTEC REPORT)

LORAX ENVIRONMENTAL

COFFEE GOLD PROJECT

Bench-Scale EBR Testing: Nitrate, Arsenic, and Uranium Removal from the Coffee Gold Mine Leach Waters

Final Report

April, 2016

Lorax Environmental Services

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Table of Contents

1. Executive Summary

The Coffee Gold project is located in the west-central Yukon Territory, approximately 130 km south of Dawson City. Lorax Environmental Services (Lorax) has contracted with Inotec LLC (Inotec) to perform treatability studies. This report summarizes results of preliminary bench-scale laboratory evaluations of contaminant removal efficiency using Electro-Biochemical Reactor (EBR) technology.

A microbial population was screened and selected that is expected to exhibit stable nitrate, uranium, and arsenic removal characteristics within the Coffee Gold leach waters and indigenous microbial population. Optimized EBR system achieved 99.9%, 98.8%, and 99.1% removals for nitrate-N, arsenic, and uranium, respectively. Additionally, sixteen other metals as well as total and WAD cyanide were removed by the EBR treatment.

The preliminary bench-scale testing successfully validated the EBR technology as a treatment option for the Coffee Gold leach waters.

2. Introduction

2.1. Coffee Gold Project Description

The Coffee Gold project is located in the west-central Yukon Territory, approximately 130 km south of Dawson City. Exploration drilling has led to the discovery of gold mineralization in 19 areas.

Lorax Environmental Services (Lorax) has contracted with Inotec LLC (Inotec) to perform treatability studies. This report summarizes results of preliminary bench-scale laboratory evaluations of contaminant removal efficiency using Electro-Biochemical Reactor technology.

2.2. Electro-Biochemical Reactor (EBR)

Microbes mediate the removal of metal and inorganic contaminants through electron transfer (redox processes). For example, nitrate reduction can be described by the following redox reaction:

$$NO_3^- + 5e^- + 6H^+ \rightarrow \frac{1}{2}N_2 + 3H_2O \quad (1)$$

The biotransformation shown in reaction 1 occurs under anaerobic, reductive conditions, and thus requires low dissolved oxygen (DO) levels and a negative ORP environment. Five electrons are needed to reduce one molecule of nitrate to nitrogen gas. Other co-contaminants, such as arsenate, uranium, etc., would add to the electron demand. One molecule of glucose, often used as a cost-effective nutrient in the form of molasses, can provide up to 24 electrons under optimal conditions and complete glucose metabolism (usually measured in hours). In environmental applications, this efficiency or the amount of electrons actually realized is usually considerably less; only a few of these electrons are available within 4 to 6 hours time.

In conventional biological treatment systems, electrons are supplied from excess nutrients added to the system. Excess nutrients/chemicals are typically required to compensate for inefficient and variable electron availability needed to adjust the reactor chemistry, microbial growth, contaminant removal, and to compensate for system sensitivity. However, these excess nutrients lead to additional capital and operational expenses, due to higher nutrient consumption and excessive biomass production.

The Electro-Biochemical Reactor (EBR) technology overcomes these shortcomings by directly supplying needed electrons to the reactor and microbes, using a low applied potential across the reactor cell (1-3 V). For a comparison with a conventional nutrient electron donor, the current of 1 mA provides 6.2×10^{15} electrons per second. These electrons replace and supplement the electrons normally supplied to the reactor/microbial system by excess nutrients, at a considerable monetary savings and reactor, microbial, and environmental benefits. The directly supplied electrons are readily available to the microbes in a consistent controllable manner without metabolic energy expenditure. The excess electron provision in the EBR systems allows for a better control of the ORP conditions, without the need to add chemicals, such as bisulfide to adjust the ORP. Moreover, those "free electrons", from the microbes' metabolic standpoint, make the EBR bioreactors more robust and less sensitive to wide fluctuations in water chemistries than the past generations of biotreatments.

2.3. Test Goals

The Coffee Gold treatability tests consisted of the following tasks:

- Task 1 – Spent Ore Column Leaching Tests. Task 1 was used to generate leach waters for Tasks 2 through 4.
- Task 2 – Microbial Screening and Treatability Assessment. The goal of Task 2 was to develop microbial consortia for Tasks 3 and 4.
- Task 3 – EBR Validation Testing. The goal of Task 3 was to provide preliminary evaluation of the EBR technology for treatment of the Coffee Gold leach waters.
- Task 4 – In Situ Testing. The goal of Task 4 was to evaluate microbial in situ treatment of the Coffee Gold spent ore materials.

This report focuses on results obtained during Tasks 2 and 3 of testing. The main goal of the EBR bench-study was to provide a preliminary assessment and validation of the Electro-Biochemical Reactor Technology for arsenic, uranium, and nitrate removal from the Coffee Gold leach waters. Nitrate-N removal is important because it is a co-contaminant and a preferred electron acceptor that needs to be reduced or removed before other metals can be effectively targeted. Treatability assessment, microbial assessment and bench-scale testing was performed on Coffee Gold waters, generated in the lab via Coffee Gold spent ore leaching.

3. Experimental Design and Procedures

3.1. Microbial Screening

Microbial isolation and screening tests were conducted on solutions received and initial column materials at 5ºC and 20 ºC. Microbes isolated from the Coffee Gold waters and spent ore materials were tested for their ability to remove arsenic, uranium, and nitrate from solution. These isolates were tested in direct comparative screening tests alongside Inotec's repository microbes in order to select a site-specific inoculum for removal of contaminants of interest.

These tests provided the microbes for the EBR treatability assessment. A microbial population screened to be effective at removing arsenic, uranium, and nitrate were grown into an inoculum for the EBR testing.

3.2. EBR Bench-Scale Testing

The process flow diagram for the bench-scale EBR testing is shown in Figure 1. The bench-scale setup consisted of a two-stage, up-flow, fixed bed EBR system. The tests were conducted under continuous flow conditions, i.e., the water was treated 24 hours per day. The system was operated using a total hydraulic retention time of 44 hours.

The EBR column tests were conducted continuously for two months for process assessment and validation testing. The goal of validation testing was to generate sufficient compliance data (i.e., nitrate, arsenic, and uranium concentrations in the EBR treatment effluent below desired levels). The EBR system initially treated leach waters pumped twice through the Coffee Gold spent ore columns. However, since uranium concentrations have decreased after the second pass through the spent ore columns, it was decided for the EBR to treat first pass leach solutions instead.

Prior to the EBR treatment, cyanide destruction in the leachate solutions was performed using hydrogen peroxide treatment; nitrate-N was readjusted to at least 150 mg/L, and pH of the water was dropped to about 6.5.

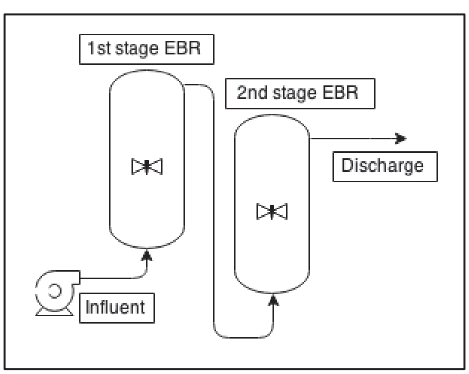

Figure 1. Process flow diagram of a bench-scale EBR system.

3.3. Sampling and Analysis

Daily Inotec in-house measurements included flowrate, pH, ORP, DO, temperature, nutrient addition, conductivity, and nitrate-N. Influent and EBR effluent samples were collected in 5-day intervals and sent out to ALS Vancouver for a complete suite analysis (Table 1).

Table 1. Analytes and analytical methods used in the EBR bench-scale tests.

Analyte	Method	Method Number
Hardness	EDTA Titration	APHA 2340B
pH	Automated pH meter	APHA 4500-H pH Value
TDS	Gravimetric	APHA 2540 C
Alkalinity	Titration	APHA 2320 Alkalinity
Bromide	Ion Chromatography (IC)	EPA 300.1
Chloride	Ion Chromatography (IC)	EPA 300.1
Fluoride	Ion Chromatography (IC)	EPA 300.1
Total Nitrogen	Colorimetric	APHA Method 4500-P (J) / NEMI 5735
Ammonia-Nitrogen	Fluorescence	J. ENVIRON. MONIT., 2005
Nitrite-Nitrogen	Ion Chromatography (IC)	EPA 300.1
Nitrate-Nitrogen	Ion Chromatography (IC)	EPA 300.1
Total Phosphorus	Colorimetric	APHA 4500-P Phosphorus
Orthophosphate	Colorimetric	APHA 4500-P Phosphorus
Sulfate	Ion Chromatography (IC)	EPA 300.1
Total Cyanide	Continuous Flow Analyzer (CFA)	ISO 14403:2002
WAD Cyanide	Continuous Flow Analyzer (CFA)	APHA 4500-CN CYANIDE
Total Metals	Collision/Reaction Cell – Inductively Coupled Plasma (CRC-ICP)	EPA 200.2/6020A
Total Mercury	Cold Vapor Atomic Absorption Spectrophotometry (CVAAS)	EPA 1631E

4. Results

4.1. Chemistry and Treatability Assessment

The leachate solution chemistry treated by the EBR system is shown in Table 2. Nitrate as well as arsenic (1.1 mg/L) and uranium (144 µg/L) concentrations were well within the EBR treatability range. Compounds that often compete with nitrate, arsenic, and uranium for electrons during biotreatments, e.g., nitrite, and other metal oxyanions, such as selenate or chromate, were not present at concentrations that would impact EBR performance.

Inorganic parameters that often have an inhibitory effect on microbial metabolism, such as chlorides, were present at low levels. Total and WAD cyanides were elevated and needed to be destroyed prior to EBR treatment. Due to the nature of the spent ore, the generated leach solutions had pH of about 8.7 and needed to be adjusted to 6.5 for optimal denitrification and As/U removal.

Water chemistry assessment strongly suggests that the EBR technology will be effective at removing the contaminants of concern. Additionally, the EBR technology should also reduce the concentration of some other metals, such as aluminum, antimony, cadmium, chromium, copper, mercury, molybdenum, nickel, and tin.

4.2. Microbial Screening and Assessment Results

Nitrate-, arsenic-, and uranium-reducing microorganisms were isolated from the Coffee Gold waters and spent ore materials received and screened with Inotec's repository strains to examine their bioremediation potential in the site waters at 5^oC and 20^oC. The microbial screening is used to 1) determine whether a given contaminant is easy or difficult to remove in a given water chemistry using the EBR technology; 2) identify a best performing microbial population in the given water chemistry (contaminant transformation, temperature dependence, performance robustness); 3) selection of an adjusted/enhanced microbial consortium that is the most compatible with the unadjusted native population; and 4) condition the selected microbial consortia for optimal EBR performance.

With an evaluation of the obtained wastewater chemistry, good positive denitrification and microbial arsenic/uranium reduction screening results were obtained. Selected microbes were further screened and characterized to develop the inocula for EBR tests. From the various consortia tested in the Coffee Gold waters, the best inoculum for the bench-scale tests was selected based on:

- Nitrate/As/U reduction potential at low and high temperatures.
- Robustness in the Coffee Gold waters at low and high temperatures.
- Compatibility with indigenous microbes present in the Coffee Gold waters.
- The ability to maintain an integrated biofilm with desired contaminant removal characteristics.

Table 2. Water chemistry of Coffee Gold leach solutions.

Parameter	Concentration
Metals	
Aluminum	1.5 mg/L
Antimony	30.8 µg/L
Arsenic	1.1 mg/L
Barium	70.5 µg/L
Cadmium	3.7 µg/L
Calcium	37.5 mg/L
Chromium	10.3 µg/L
Cobalt	239 µg/L
Copper	0.5 mg/L
Iron	0.5 mg/L
Lead	1.1 µg/L
Magnesium	5.9 mg/L
Manganese	32 µg/L
Mercury	3.7 µg/L
Molybdenum	75 µg/L
Nickel	118 µg/L
Potassium	83 mg/L
Selenium	2.1 µg/L
Silver	5.2 µg/L
Sodium	234 mg/L
Strontium	186 µg/L
Thallium	0.88 µg/L
Tin	7.7 µg/L
Titanium	9.3 µg/L
Uranium	144 µg/L
Vanadium	1.2 µg/L
Zinc	187 µg/L
Inorganics	
pH	8.7
Hardness, Total (as $CaCO_3$)	118 mg/L
Alkalinity, Total (as $CaCO_3$)	188 mg/L
Ammonia as N	13 mg/L
Chloride	6.8 mg/L
Fluoride	0.35 mg/L
Cyanide, Total	24 mg/L
Cyanide, WAD	25 mg/L
Nitrate as N	105 mg/L
Nitrite as N	0.3 mg/L
Total N	130 mg/L
Sulfate	160 mg/L
Dissolved Orthophosphate	0.13 mg/L

4.3. Removal of Contaminants of Interest

The bench-scale testing validated the EBR technology for removal of nitrate, arsenic, and uranium from Coffee Gold leach waters. Figures 2 and 3 show removal of nitrate-N and nitrite-N by the bench-scale EBR system. Nitrate-N concentrations were adjusted to a minimum of 150 mg/L in the influent waters and averaged 188 mg/L during the 2-month test period. The EBR system consistently removed both nitrate-N and nitrite-N to below detection limits (0.19 mg/L and 0.04 mg/L, respectively).

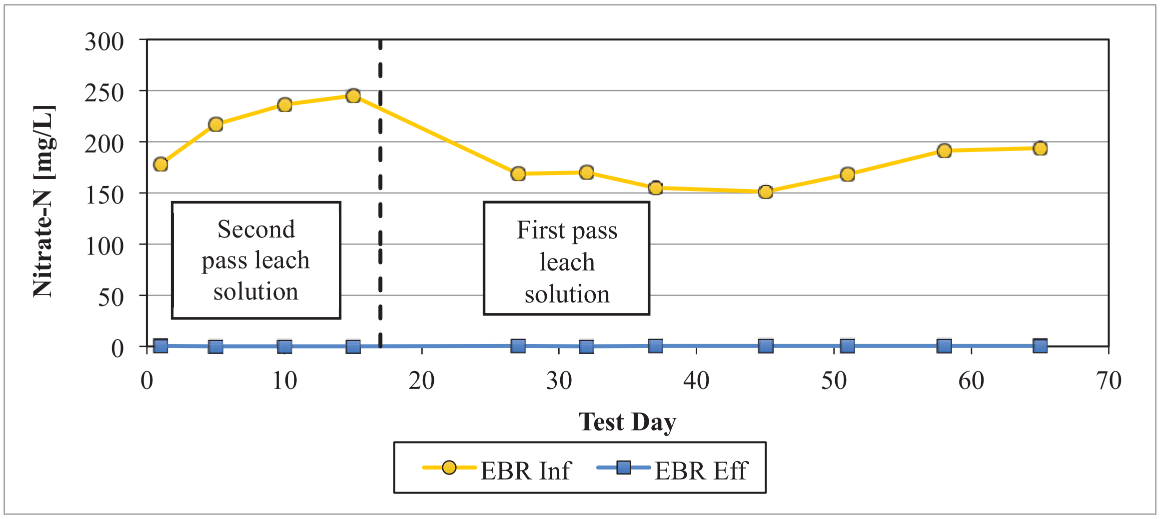

Figure 2. EBR nitrate-N removal from Coffee Gold leach waters. The dashed vertical line corresponds to the day when the EBR system influent was changed from leach waters pumped through the spent ore columns twice to the leach waters that were pumped through the spent ore columns once.

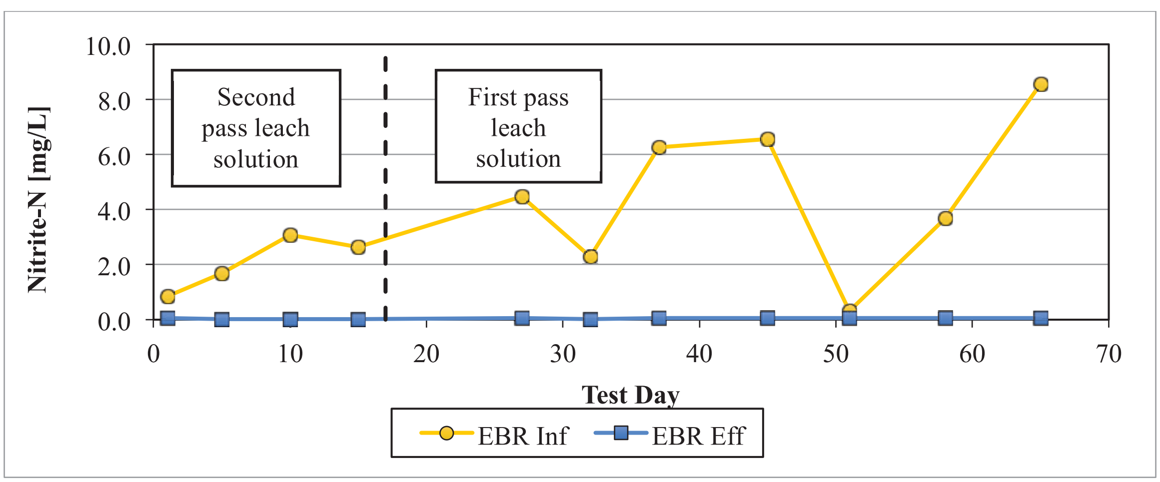

Figure 3. EBR nitrite-N removal from Coffee Gold leach waters. The dashed vertical line corresponds to the day when the EBR system influent was changed from leach waters pumped through the spent ore columns twice to the leach waters that were pumped through the spent ore columns once.

Arsenic removal by the EBR Coffee Gold system for the initial two weeks averaged 60% (Figure 4). Process and bioreactor operation were adjusted to improve the EBR performance. After system modifications were implemented, the EBR As removal increased to an average of 98.8%. Total arsenic was removed from the average of 1,113 µg/L in the leach waters to average of 12.9 µg/L in the EBR system effluent.

Uranium removal averaged 99.1%, with the EBR system effluent concentrations averaging 0.8 µg/L (Figure 5). Influent uranium levels varied between 34 µg/L and 154 µg/L, with the average concentrations of 92.5 µg/L. Table 3 summarizes EBR performance.

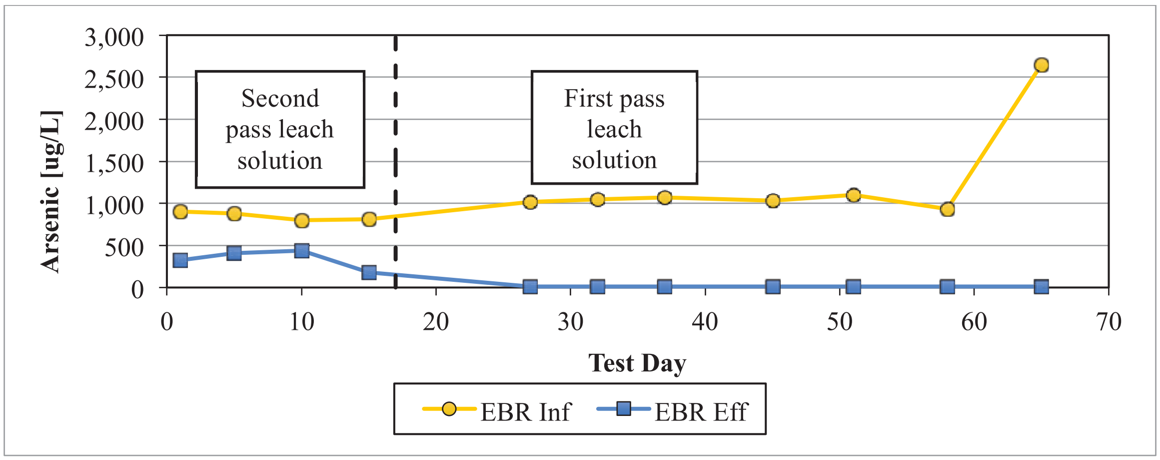

Figure 4. EBR arsenic removal from Coffee Gold leach waters. The dashed vertical line corresponds to the day when the EBR system influent was changed from leach waters pumped through the spent ore columns twice to the leach waters that were pumped through the spent ore columns once.

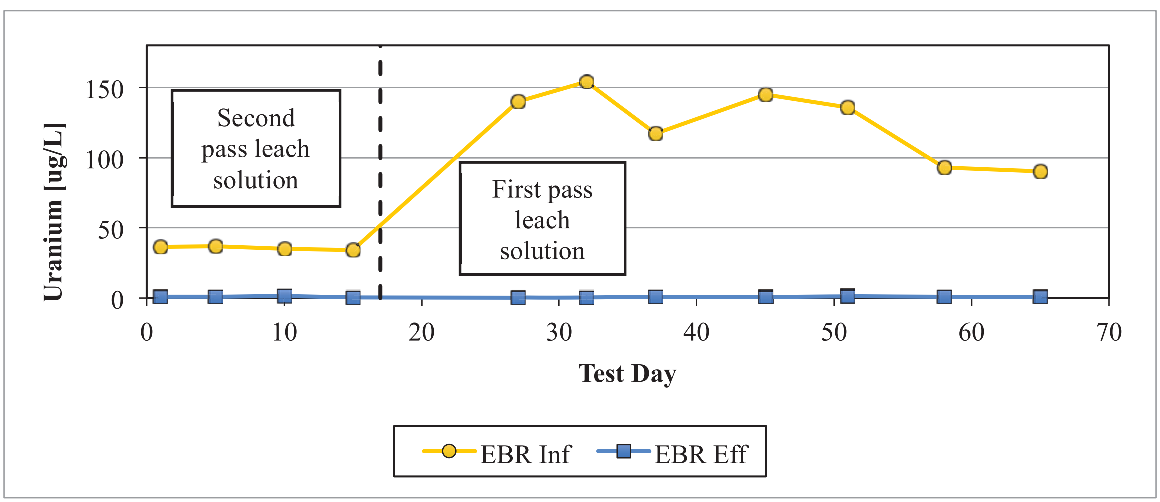

Figure 5. EBR uranium removal from Coffee Gold leach waters. The dashed vertical line corresponds to the day when the EBR system influent was changed from leach waters pumped through the spent ore columns twice to the leach waters that were pumped through the spent ore columns once.

Table 3. Average EBR treatment performance.

Parameter	Average EBR Influent	Average EBR Effluent	% Removal
Nitrate-N [mg/L]	188	< 0.19	> 99.9%
Nitrite-N [mg/L]	3.7	< 0.04	> 98.9%
As [µg/L]	1,113	12.9*	98.8%
U [µg/L]	92.5	0.8	99.1%
Al [µg/L]	737	< 35.8	> 95.1%
Sb [µg/L]	33.2	< 0.35	> 98.9%
Cd [µg/L]	1.3	< 0.02	> 98.5%
Cr [µg/L]	10.7	< 0.66	> 93.8%
Co [µg/L]	269	122	54.6%
Cu [µg/L]	267	< 2.4	> 99.1%
Fe [µg/L]	2.2	0.23	89.5%
Pb [µg/L]	1.9	< 0.17	> 91.0%
Hg [µg/L]	1.6	0.03	98.1%
Mo [µg/L]	59.5	< 6.9	> 88.4%
Ni [µg/L]	75.1	< 2.3	> 96.9%
Se [µg/L]	2.9	1.2	58.6%
Ag [µg/L]	3.9	< 0.06	> 98.5%
Tl [µg/L]	0.8	< 0.03	> 96.2%
Sn [µg/L]	32.5	0.8	97.5%
Zn [µg/L]	76.1	38.1	49.9%
WAD Cyanide [mg/L]	0.03	< 0.007	> 76.7%
Total Cyanide [mg/L]	0.48	0.16	66.7%
Ammonia-N [mg/L]	15.3	208	NA
Orthophosphate [mg/L]	0.2	47.1	NA

*after process adjustment

NA – not applicable

4.4. Removal of Other Contaminants

Beside arsenic and uranium, the EBR system removed other metals to various degrees as well (Table 3). Over 90% average removal efficiencies were achieved for Al, Sb, Cd, Cr, Cu, Pb, Hg, Ni, Sn, Ag, and Tl. Total and WAD cyanide were still present in the leach waters after peroxide cyanide destruction, albeit at much lower concentrations (0.48 mg/L and 0.03 mg/L, respectively). The EBR system degraded WAD cyanide to below the detection limit of 0.007 mg/L and total cyanide to average levels of 0.16 mg/L (Table 3). Complete analytical data tables are given in Appendix A.

As expected in this preliminary treatability evaluation, nutrient levels (e.g., ammonia-N and orthophosphate) were elevated in the EBR system effluent. The scope of work for this project was focused on the initial validation of the EBR process for removal of contaminants of interest and not on process optimization. In field applications, minimum nutrient additions to the EBR system are established and balanced, often resulting in minimal (if any) increases in the system effluent. However, if ultra-low levels of ammonia or BOD are required in the system effluent, a conventional aerobic bioreactor polishing step can be used. Aerobic bioreactors are a well-established technology for nutrient removal from municipal wastewaters, where they have been successfully implemented for over a century.

5. Conclusions

The preliminary bench-scale testing successfully validated EBR technology for removal of nitrate, arsenic, and uranium from Coffee Gold leach waters. Nitrate-N was removed from an average of 188 mg/L to below detection limit of 0.19 mg/L. After process adjustments, average removals of 98.8% and 99.1% were achieved for arsenic and uranium, respectively. Furthermore, sixteen other metals as well as total and WAD cyanides were removed by the EBR system.

In order to develop process requirements and design parameters for a Coffee Gold site-specific EBR system, additional bench-scale and/or pilot-scale testing is required. Testing duration of a minimum of 14-16 weeks is required for process assessment and to develop validation data, nutrient and hydraulic retention time requirements, as well as evaluation of post-treatment needs, if any.

Thank you for your consideration of INOTEC's EBR technology for evaluation.

Sincerely,

INOTEC, INC.

Signature REDACTED

Signature REDACTED

Jack Adams, Ph.D.
President, INOTEC

Ola Opara, Ph.D.
Vice President, INOTEC

Appendix A.
Analytical Data Tables

	Hardness [mg/L as CaCO3]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	95.5	145	135	282	111
5		148	141	176	122
10		135	151	147	114
15	77.4	136	152	177	109
27	110			107	154
32	108			114	149
37	106			130	147
45	110			115	148
51	109			101	128
58	121			116	150
65	145			146	144

	pH				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	8.64	8.31	8.3	6.55	7.98
5		8.36	8.32	7.38	8.08
10		8.34	8.33	6.78	8.06
15	8.78	8.30	8.38	7.27	8.01
27	8.29			7.16	7.91
32	8.34			6.62	7.93
37	8.32			6.46	7.88
45	8.29			6.24	7.73
51	8.31			6.65	7.83
58	8.31			6.49	7.87
65	8.16			6.25	7.97

	TDS [mg/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	1390	1450	1330	1680	3190
5		1480	1560	1830	2400
10		1560	1650	1840	2170
15	1620	1560	1670	2000	1910
27	1110			1280	1980
32	1160			1630	2040
37	1160			1560	2090
45	1160			1540	2600
51	1170			1690	2130
58	1290			1730	2230
65	1320			1780	2280

	Alkalinity [mg/L as CaCO3]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	140	182	168	43.8	1890
5		190	174	64.8	1530
10		187	190	32.1	1410
15	131	165	200	47.5	1260
27	157			106	852
32	158			65.4	775
37	164			41.8	772
45	167			44.9	739
51	179			70.9	680
58	176			65.9	689
65	166			57.1	682

	Ammonia-N [mg/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	17.1	9.5	10.1	9.91	314
5		9.3	10.7	9.38	192
10		10.4	12.4	10.5	149
15	19.4	12.2	14.3	12.0	144
27	18.2			21.8	178
32	18.5			21.5	206
37	19.6			21.1	218
45	19.0			20.6	210
51	19.9			20.7	215
58	12.4			13.0	234
65	8.97			7.94	231

	Chloride [mg/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	<10	6.7	6.9	215	733
5		<10	6.7	127	488
10		<10	<10	142	424
15	<10	6.3	<10	158	433
27	6.3			177	1020
32	7.0			114	1010
37	6.5			184	1060
45	6.5			160	1060
51	6.8			89	1060
58	7.0			92	1180
65	6.8			100	1160

	Nitrate-N [mg/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	206	159	161	178	<0.25
5		194	180	217	<0.1
10		205	195	236	<0.1
15	178	184	197	245	<0.1
27	94.6			169	<0.25
32	103			170	<0.1
37	101			155	<0.25
45	100			151	<0.25
51	98.1			168	<0.25
58	125			191	<0.25
65	127			194	<0.25

	Nitrite-N [mg/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	0.328	1.82	0.94	0.84	<0.05
5		2.26	3.49	1.68	<0.02
10		0.899	6.64	3.07	<0.02
15	0.319	0.571	16.4	2.64	<0.02
27	0.281			4.46	<0.05
32	0.300			2.28	<0.02
37	0.325			6.25	<0.05
45	0.303			6.56	<0.05
51	0.298			0.30	<0.05
58	4.1			3.68	<0.05
65	8.73			8.55	<0.05

	Total N [mg/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	216	178	165	186	346
5		190	181	223	205
10		199	209	239	166
15	192	203	216	248	149
27	122			259	195
32	124			190	210
37	118			177	224
45	120			171	223
51	120			185	216
58	147			213	247
65	141			212	243

	Orthophosphate-P [mg/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	0.074	0.08	0.07	0.368	78.3
5		0.071	0.087	0.198	51.7
10		0.076	0.0862	0.138	50
15	0.032	0.062	0.112	0.193	41.6
27	0.141			0.266	41
32	0.131			0.184	44
37	0.124			0.197	42.1
45	0.128			0.188	44.3
51	0.117			0.169	39.6
58	0.128			0.184	43.9
65	0.150			0.193	42.1

	Sulfate [mg/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	160	163	167	223	<15
5		171	158	166	<6
10		158	144	144	<6
15	152	151	154	178	<6
27	143			168	<15
32	156			155	50.2
37	147			158	39
45	150			159	67
51	149			150	57
58	166			166	73
65	165			163	69

	Sulfide-S [mg/L]		
Test Day	**Leach Columns Influent**	**EBR Influent**	**EBR Effluent**
27	<0.0015	<0.0015	0.611
32	<0.0015	<0.0015	3.48
37	<0.0015	<0.0015	1.96
45	0.0026	<0.0015	3.99
51	<0.0015	<0.006	3.36
58	<0.0015	<0.0015	2.42
65	<0.0015	<0.0015	4.42

	Cyanide WAD [mg/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	11.3	0.0201	0.054	0.0188	<0.005
5		0.0193	0.0232	0.0143	<0.005
10		0.0155	0.0136	0.0087	<0.005
15	9.7	0.0245	0.0208	0.0161	0.0084
27	6.71			0.0479	0.013
32	6.62			0.0908	0.0098
37	5.76			0.0083	0.0104
45	4.09			0.0623	0.0067
51	2.21			0.0085	0.0069
58	0.73			<0.005	0.0051
65	0.364			0.0302	0.0077

	Cyanide Total [mg/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	11.7	0.529	0.505	0.558	0.374
5		0.448	0.37	0.452	0.355
10		0.518	0.342	0.355	0.24
15	10.4	0.493	0.334	0.353	0.0997
27	7.04			0.696	0.0975
32	7.4			0.693	0.11
37	6.18			0.0979	0.0964
45	4.73			0.521	0.0959
51	2.92			0.779	0.104
58	1.37			0.376	0.0811
65	0.749			0.363	0.0816

	Aluminum [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	32.2	19.6	8.8	51.1	74.3
5		<6	6.6	61.8	62.9
10		<6	<6	9.9	59.8
15	81.9	<6	7.4	15.7	46
27	114			214	<15
32	131			128	<30
37	97.5			84.7	17.2
45	93.1			50.9	19.5
51	382			163	23.2
58	260			356	25.7
65	6430			6970	19.8

	Antimony [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	28.7	31.3	32.2	35	0.38
5		32.8	33.8	32.7	<0.2
10		36.9	33.5	32.7	<0.2
15	29.1	30.9	31.2	30.7	<0.5
27	30.5			28.9	<0.5
32	30.3			31	<1
37	25.5			29.7	0.23
45	29			28.4	<0.2
51	31.1			28.9	0.22
58	32.1			32.1	<0.2
65	65.3			54.9	0.21

	Arsenic [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	1040	864	866	903	321
5		916	869	877	405
10		875	786	800	440
15	951	891	767	813	179
27	1060			1020	10.1
32	1080			1050	13.2
37	1090			1070	11.7
45	1100			1030	12.2
51	1170			1100	13.4
58	942			934	14.3
65	2620			2650	15.5

	Barium [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	51.8	52.1	40.2	60.7	188
5		47.0	40.9	51.2	498
10		41.7	42.0	42.6	350
15	34.1	41.2	49.6	47.6	207
27	61.7			60.5	550
32	61			64	351
37	63.1			68.6	423
45	63.5			63.4	426
51	69.7			67.1	384
58	52.8			52.2	332
65	254			268	350

	Beryllium [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	<0.04	<0.04	<0.04	<0.04	<0.04
5		<0.04	<0.04	<0.04	<0.04
10		<0.04	<0.04	<0.04	<0.04
15	<0.02	<0.04	<0.04	<0.04	<0.01
27	<0.02			<0.04	<0.1
32	<0.02			<0.02	<0.02
37	<0.02			<0.02	<0.04
45	<0.02			<0.02	<0.04
51	0.021			<0.02	<0.04
58	0.02			0.041	<0.04
65	1.26			1.13	<0.04

	Bismuth [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	<0.1	<0.1	<0.1	<0.1	<0.1
5		<0.1	<0.1	<0.1	<0.1
10		<0.1	<0.1	<0.1	<0.1
15	<0.05	<0.1	<0.1	<0.1	<0.25
27	<0.05			<0.1	<0.25
32	<0.05			<0.05	<0.05
37	<0.05			<0.05	<0.1
45	<0.05			<0.05	<0.1
51	<0.05			<0.05	<0.1
58	<0.05			<0.05	<0.1
65	0.425			0.376	<0.1

	Boron [mg/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	0.028	0.023	0.025	0.050	0.231
5		0.024	0.026	0.030	0.279
10		0.022	0.020	0.022	0.272
15	0.022	0.023	0.024	0.028	0.237
27	0.022			0.022	0.144
32	0.023			0.025	0.170
37	0.019			0.027	0.149
45	0.021			0.024	0.135
51	0.024			0.023	0.131
58	0.022			0.021	0.107
65	0.027			0.025	0.096

	Cadmium [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	2.06	0.044	0.046	0.157	<0.01
5		0.021	0.03	0.103	<0.01
10		0.015	0.012	0.041	0.014
15	1.64	0.016	0.011	0.072	<0.025
27	1.2			1.29	<0.025
32	0.939			0.964	<0.05
37	0.521			0.888	<0.01
45	0.300			0.589	<0.01
51	0.370			0.544	<0.01
58	0.333			0.505	<0.01
65	9.06			9.38	<0.01

	Calcium [mg/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	29.1	41.4	37.4	98.1	29.6
5		41.4	38.5	53.7	30.1
10		37.4	40.0	41.6	28.9
15	21.6	37.5	39.3	53.5	26.0
27	34.6			33.5	37.7
32	33.9			36.3	35.7
37	33.4			42.8	36.6
45	34.3			37.0	37.8
51	33.9			31.5	32.7
58	35.3			34.0	38.9
65	40.8			41.6	37.4

	Chromium [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	10.3	7.25	6.54	5.4	0.93
5		7.14	6.6	6.87	0.76
10		6.69	6.57	6.19	0.60
15	10.3	6.99	6.07	6.24	0.71
27	9.39			9.11	<0.5
32	10.5			8.59	<1
37	10.2			8.38	0.46
45	10.6			7.95	0.51
51	11.7			11.0	<0.7
58	6.89			8.82	0.57
65	39.8			39.2	0.56

	Cobalt [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	261	285	289	350	194
5		285	285	284	173
10		268	272	258	147
15	255	277	273	266	153
27	248			244	95.8
32	266			239	112
37	259			254	89.1
45	266			248	92.5
51	279			260	96.8
58	265			270	97.4
65	281			282	94.1

	Copper [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	607	9.2	10	58.4	2.3
5		4.8	4.3	40.7	<1.0
10		3.4	3.7	5.8	1.5
15	579	3.1	6.4	6.7	<2.5
27	561			497	<2.5
32	631			446	<5.0
37	606			403	2.6
45	631			387	2.0
51	671			523	2.3
58	162			179	2.3
65	444			389	2.5

	Iron [mg/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	0.258	0.259	0.191	0.338	0.158
5		0.241	0.198	0.389	0.202
10		0.244	0.194	0.202	0.177
15	0.288	0.257	0.203	0.203	0.194
27	0.33			0.404	0.242
32	0.357			0.278	0.173
37	0.337			0.214	0.242
45	0.355			0.192	0.282
51	0.544			0.445	0.288
58	0.475			0.788	0.305
65	21.7			21	0.291

	Lead [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	<0.1	<0.1	<0.1	<0.1	<0.1
5		<0.1	<0.1	<0.25	<0.1
10		<0.1	<0.1	<0.1	<0.1
15	0.052	<0.1	<0.1	<0.1	<0.25
27	0.075			0.22	<0.25
32	0.113			0.117	<0.5
37	0.07			0.079	<0.1
45	0.065			0.058	<0.1
51	0.245			0.23	<0.1
58	0.270			0.595	0.16
65	20.9			19.1	0.14

	Lithium [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	3.8	7.3	7.5	7.3	26.1
5		7.4	8.1	7.0	20.6
10		5.9	9.2	7.6	34.7
15	4.9	8.1	9.4	7.7	93.1
27	4.5			4.2	55.1
32	4.5			4.4	45.0
37	4.0			4.6	27.2
45	4.7			4.6	28.0
51	5.0			5.0	26.3
58	6.5			6.1	22.9
65	7.0			6.4	19.7

	Magnesium [mg/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	5.52	10.2	9.98	9.04	8.99
5		10.8	10.9	10.1	11.4
10		10.2	12.3	10.5	10.1
15	5.68	10.3	13.1	10.6	10.8
27	5.82			5.59	14.6
32	5.77			5.6	14.5
37	5.61			5.49	13.6
45	5.90			5.54	13.1
51	5.87			5.47	11.3
58	7.93			7.59	12.9
65	10.4			10.3	12.4

	Manganese [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	4.88	32.1	12.9	176	36.1
5		20	12.9	70.7	31
10		16.9	12.6	28.3	38.9
15	4.74	19.7	12.7	68	106
27	14.2			20.3	108
32	16.2			24.6	133
37	15.8			44.2	148
45	17.0			26.6	146
51	21.8			21.8	159
58	22.7			32.7	177
65	628			668	198

	Mercury [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	0.591	0.0746	0.0378	0.201	0.033
5		0.0312	0.0241	0.117	<0.025
10		0.0248	0.0185	0.0309	0.0263
15	0.505	0.0142	0.0295	0.0268	0.0087
27	0.588			0.708	0.0462
32	0.564			0.607	0.0409
37	0.489			0.637	0.0405
45	0.651			0.602	0.0325
51	0.657			0.497	0.0352
58	1.12			1.27	0.039
65	12.8			13.4	0.037

	Molybdenum [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	78	40.4	46	52.6	18.3
5		40.4	42	42.5	23.5
10		43.8	38.5	38.5	23.1
15	77.2	34.2	34.6	36.6	8.68
27	81.6			75	<0.25
32	80.5			80.4	<0.5
37	68.2			79.6	0.51
45	78.8			77.0	0.20
51	81.6			75.1	0.13
58	64.1			60.6	0.14
65	44.5			37.0	0.17

	Nickel [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	131	3.6	4.8	62.6	4.0
5		2.6	2.1	23.3	2.7
10		2.2	1.7	3.0	2.6
15	122	2.2	1.7	4.1	2.9
27	120			115	<2.5
32	127			113	<5.0
37	125			120	1.2
45	127			111	1.1
51	132			117	1.2
58	62.6			53.1	1.1
65	121			104	1.0

	Phosphorus [mg/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	0.051	<0.05	<0.05	0.363	72
5		<0.05	<0.05	0.204	49.1
10		<0.05	<0.05	0.095	49.2
15	<0.05	<0.05	<0.05	0.140	43.3
27	0.097			0.219	42.7
32	0.095			0.22	45.1
37	0.09			0.216	43.1
45	0.095			0.198	43.5
51	0.151			0.241	35.3
58	0.061			0.187	41.2
65	0.349			0.470	43.0

	Potassium [mg/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	314	54.8	68.2	228	455
5		61.3	76	204	351
10		63.8	87.5	191	308
15	267	68.8	91.9	189	232
27	79.3			473	272
32	81.6			269	275
37	76.4			240	320
45	81.9			231	340
51	77.6			250	312
58	72.7			235	343
65	75.8			242	336

	Selenium [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	2.95	2.15	2.12	3.79	0.5
5		2.18	2.17	3.11	0.28
10		2.25	2.24	2.47	0.34
15	2.51	2.20	2.05	3.67	<0.25
27	2.39			2.83	0.88
32	2.65			2.89	2.46
37	2.36			3.28	1.21
45	2.48			2.82	1.76
51	2.54			2.41	1.56
58	2.32			2.15	2.28
65	2.54			2.47	2.25

	Silicon [mg/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	4.76	5.06	5.47	5.68	25.5
5		5.43	5.71	5.51	23
10		5.27	5.62	5.24	26.5
15	5.12	5.59	6.18	5.22	41.5
27	5.42			5.4	25.5
32	5.34			5.18	22.7
37	5.11			5.06	17.3
45	5.31			5.00	18.4
51	5.83			5.07	17.6
58	5.82			5.73	18.5
65	18.7			19.5	18.3

	Silver [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	7.07	0.027	0.111	1.04	0.086
5		<0.020	0.037	0.811	0.031
10		<0.020	0.030	0.094	0.026
15	7.76	<0.020	0.023	0.100	<0.05
27	7.75			7.21	<0.05
32	8.35			6.22	<0.1
37	6.63			6.22	0.054
45	7.81			4.74	0.048
51	8.93			7.81	0.066
58	2.16			4.03	0.059
65	5.63			4.83	0.074

	Sodium [mg/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	264	350	335	260	587
5		377	376	343	467
10		354	371	338	423
15	261	365	384	367	433
27	251			239	367
32	266			240	453
37	271			273	435
45	264			250	438
51	269			254	439
58	272			260	451
65	274			276	485

	Strontium [mg/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	0.177	0.275	0.253	0.388	0.23
5		0.287	0.269	0.299	0.218
10		0.309	0.293	0.282	0.211
15	0.168	0.262	0.299	0.306	0.162
27	0.197			0.185	0.165
32	0.196			0.207	0.207
37	0.162			0.212	0.204
45	0.190			0.196	0.209
51	0.202			0.188	0.213
58	0.231			0.220	0.245
65	0.248			0.219	0.249

	Sulfur [mg/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	46.7	51.4	50.7	69.4	5.5
5		54.5	52.4	54.6	0.81
10		53.5	53.3	52.6	0.61
15	49.9	53.3	52.0	54.9	1.54
27	50.8			49.1	8.06
32	48.1			48.8	18.2
37	50.1			52.6	15.5
45	52.3			52.2	24.4
51	51.6			48.3	20.6
58	51.0			48.9	23.2
65	53.8			53.1	23.5

	Thallium [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	0.787	0.685	0.678	0.409	<0.02
5		0.707	0.711	0.698	<0.02
10		0.804	0.761	0.694	<0.02
15	0.786	0.707	0.790	0.657	<0.05
27	0.869			0.86	<0.05
32	0.833			0.851	<0.10
37	0.711			0.824	<0.02
45	0.829			0.773	<0.02
51	0.902			0.791	<0.02
58	0.729			0.655	<0.02
65	1.96			1.46	<0.02

	Tin [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	2.45	0.29	18	22.9	1.02
5		0.23	14.7	31.9	0.8
10		<0.20	12.0	18.0	0.87
15	3.01	0.22	23.4	8.66	0.53
27	3.91			50.7	0.93
32	3.53			40.7	1.1
37	2.28			28.5	0.97
45	2.67			27.0	0.75
51	3.96			46.5	0.62
58	5.50			54.1	0.45
65	9.69			29.0	0.46

	Titanium [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	<0.6	<0.6	<0.6	<1.2	<0.6
5		<0.6	<0.6	<1.5	<0.6
10		<0.6	<0.6	<0.6	<0.6
15	<0.99	<0.6	<0.6	<0.6	<1.5
27	<1.2			<2.4	<1.5
32	<1.5			0.83	<3
37	<1.2			<0.9	<0.6
45	0.75			<0.9	<0.6
51	<3.0			1.61	<0.6
58	<6.0			4.3	<0.6
65	77.3			81.6	<0.6

	Uranium [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	137	41.4	29.4	36.4	1.02
5		45.9	29.4	37.1	0.983
10		66.4	34.9	34.9	1.40
15	132	60.3	36.5	34.0	0.601
27	158			140	0.23
32	150			154	0.41
37	124			117	0.935
45	147			145	0.741
51	154			136	1.19
58	97.3			92.9	0.914
65	103			90.3	0.741

	Vanadium [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	1.4	<1.0	<1.0	0.5	<1.0
5		<1.0	<1.0	<1.0	<1.0
10		<1.0	<1.0	<1.0	<1.0
15	0.8	<1.0	<1.0	<1.0	2.5
27	0.5			<1.0	2.5
32	0.6			0.55	5.0
37	0.5			0.53	<1.0
45	0.5			0.5	<1.0
51	0.8			0.66	<1.0
58	0.6			1.01	<1.0
65	23.0			23.1	<1.0

	Zinc [ug/L]				
Test Day	**Leach Columns Influent**	**Leach Column A Effluent**	**Leach Column B Effluent**	**EBR Influent**	**EBR Effluent**
1	185	<6	<6	14.0	43.2
5		<6	<6	9.1	48.9
10		<6	<6	<6	30.5
15	171	<6	<6	<6	69.0
27	161			153.0	28.0
32	159			130.0	45.0
37	142			111.0	21.9
45	92.1			107.0	36.0
51	53.7			78.7	29.5
58	15.1			26.9	22.0
65	184			196.0	45.6

Appendix D: Kinetic Test Results

Appendix D.1: Kinetic Test Results for Waste Rock

Appendix D.2: Kinetic Test Results for Ore

Appendix D.3: Kinetic Test Results for Leach Tailings

GOLDCORP

Appendix D.1: Kinetic Test Results for Waste Rock

Appendix D.1-1: Overview of Operating Procedures for the Coffee Gold Mine Waste Rock Kinetic Tests

Test ID	Test Sample Description	Duplicate Tests	Type of Test	Lithology	Weathering Facies	Column Dimensions			Dry Wt. of Sample (kg)	Temp (°C)	Operation Procedure	Sampling Frequency	Total Volume of Initial Flushings (mL)	Flushing Rate/ Weekly Input* (mL)	Start Date	Test Status	Cycles/ Weeks	Recirculation Cycles
						Inner Diameter (cm)	Length (cm)	Height (cm)										
Col 3	SO	-	Unsaturated Column	Schist	Oxide	21.0	20.5		10	4°	Trickle Leach	Biweekly	1500	variable	16-Jul-14	active	86	45-77
Col 4	ST	-	Unsaturated Column	Schist	Transition	21.0	20.5		10	4°	Trickle Leach	Biweekly	1300	variable	16-Jul-14	active	86	45-77
Col 5	GO	-	Unsaturated Column	Gneiss	Oxide	21.0	20.5		10	4°	Trickle Leach	Biweekly	1500	variable	16-Jul-14	active	86	45-77
Col 6	GT	-	Unsaturated Column	Gneiss	Transition	21.0	20.5		10	4°	Trickle Leach	Biweekly	1200	variable	30-Jul-14	active	84	43-75
Col 13	OKY Master	-	Unsaturated Column	Granite	Transition	21.0	20.5		10	4°	Trickle Leach	Biweekly	2000	variable	20-May-15	active	41	-
Col 14	OKY Master (Fresh)	-	Unsaturated Column	Granite	Fresh	21.0	20.5		10	4°	Trickle Leach	Biweekly	2000	variable	20-May-15	active	41	-
HC 1	ST	Col 4	Humidity Cell	Schist	Transition		10.2	25.5	1	4°	Flood Leach	Weekly	500	500	25-Jun-14	terminated	87	46-73
HC 2	SS	-	Humidity Cell	Schist	Fresh		10.2	25.5	1	4°	Flood Leach	Weekly	500	500	25-Jun-14	terminated	87	46-73
HC 3	GT	Col 6	Humidity Cell	Gneiss	Transition		10.2	25.5	1	4°	Flood Leach	Weekly	500	500	25-Jun-14	terminated	87	46-73
HC 4	GS	-	Humidity Cell	Gneiss	Fresh		10.2	25.5	1	4°	Flood Leach	Weekly	500	500	25-Jun-14	terminated	87	46-73
HC 5	OKY Master	Col 13	Humidity Cell	Granite	Transition		10.2	25.5	1	4°	Flood Leach	Weekly	500	500	6-May-15	active	42	-
HC 6	OKY Master (Fresh)	Col 14	Humidity Cell	Granite	Fresh		10.2	25.5	1	4°	Flood Leach	Weekly	500	500	6-May-15	active	42	-
HC 7	KAM036824	-	Humidity Cell	Schist	Fresh		10.2	25.5	1	4°	Flood Leach	Weekly	500	500	12-Aug-15	active	28	-
HC 8	KAM092488	-	Humidity Cell	Gneiss	Fresh		10.2	25.5	1	4°	Flood Leach	Weekly	500	500	12-Aug-15	active	28	-
FB-GO	Gneiss Oxide composite	Col 5	Field Bin	Gneiss	Oxide	45.0		80	183.1	site conditions	natural precipitation	3x's / field season	28	natural precipitation	17-Jun-14	active	70	-
FB-GT	Gneiss Transition composite	Col 6 & HC3	Field Bin	Gneiss	Transition	45.0		80	229.4				28		17-Jun-14	active	70	-
FB-GS	Gneiss Fresh composite	HC4	Field Bin	Gneiss	Fresh	45.0		80	190.1				28		17-Jun-14	active	70	-
FB-SO	Schist Oxide composite	Col 3	Field Bin	Schist	Oxide	45.0		80	171.3				28		17-Jun-14	active	70	-
FB-ST	Schist Transition composite	Col 4 & HC1	Field Bin	Schist	Transition	45.0		80	164.8				27.6		17-Jun-14	active	70	-
FB-SS	Schist Fresh composite	HC2	Field Bin	Schist	Fresh	45.0		80	201.5				28		17-Jun-14	active	70	-
FB-GGT	Granite Transition composite	Col 13 & HC5	Field Bin	Granite	Transition	45.0		80	165.5				26		17-Jun-15	active	18	-
FB-GGS	Granite Fresh composite	Col 14 & HC6	Field Bin	Granite	Fresh	45.0		80	134.4				22		17-Jun-15	active	18	-

Notes:
Columns and humidity cells are composed of Plexiglas with an acrylic perforated disk & nylon mesh
No sample preparation was conducted prior to leachate sampling for any tests
* generally 400-500 mL for columns, see individual leachate results in Appendix D.1-3 for specific input volumes

Appendix D.1-1: Overview of Operating Procedures for the Coffee Gold Mine Waste Rock Kinetic Tests

Construction of Field Bins

Field Bin ID	Bag #	Hole ID	Length (m)	Lithology	% Fresh	Weight (Kg)
FB-GO	20	CFD0152	48-52, 92-95, 96-100	65% MG, 35% FG	0	32
	25	CFD0149	170-175, 211-213	76% MG, 24% MxM	0	23
	34	CFD0175	126-130, 193-196	100% FG	0	24
	35	CFD0175	205-211,230-233	100% FG	0	28
	46	CFD0004	20.86-26.86	100% FG	0	21
	47	CFD0004	43-49	100% FG	0	19
	48	CFD0004	76-83	100% FG	0	23
	49	CFD0003	163-167	100% FG	0	13
	62	CFD0209	66-72, 15-19	100% MxM	2.3	20
	63	CFD0209	52.5-58	100% MxM	0	14
	64	CFD0176	12-18, 149-152	100% MxF	0	23
	79	CFD0267	109-122	100% MxF	0	20
	83	CFD0176	164-170	100% MxF	0	17
	84	CFD0176	170-175	100% MxF	0	22
FB-GT	16	CFD0142	134-139	100% MG	30	17
	17	CFD0142	139-144	100% MG	30	17
	26	CFD0175	47-54	100% FG	70	21
	27	CFD0175	54-61	100% FG	70	23
	28	CFD0175	61-68	100% FG	47	23
	29	CFD0175	68-75	100% FG	30	23
	30	CFD0175	75-82	100% FG	30	25
	31	CFD0175	82-89	100% FG	53	26
	32	CFD0175	89-93	100% FG	70	16
	33	CFD0175	44-46	100% FG	70	7
	65	CFD0270	252-258	100% MxF	70	25
	66	CFD0270	258-264	100% MxF	43	24
	67	CFD0270	264-271	100% MxF	36	19
	68	CFD0270	237-240, 241-243	40% FG, 60% MxF	30	16
	91	CFD0272	89-92, 93-95, 96-97, 98-99	100% FG	30	20
	92	CFD0272	76-80, 224-225, 239-245	46% FG, 54% MxF	30	24
	93	CFD0272	228-238	100% MxF	30	27
FB-GS	56	CFD0020	263-270	100% FG	100	23
	57	CFD0020	270-277	100% FG	100	22
	58	CFD0020	277-283	100% FG	100	18
	59	CFD0071	187-195	100% FG	100	27
	60	CFD0071	202-210	100% FG	100	33
	61	CFD0071	210-217	100% FG	100	27
	69	CFD0249	234.5-239	100% MxM	99.3	27
	70	CFD0249	262-269	100% MxM	98.4	18
	71	CFD0249	271-280.5	46% MxM, 54% MxF	99.4	20
	72	CFD0249	286-290	100% MxM	100	18
	73	CFD0249	271-280.5	46% MxM, 54% MxF	99.4	21
	74	CFD0249	292-298	100% MxF	100	35
	75	CFD0249	298-304	17% FG, 83% MxF	100	27
	76	CFD0273	245-254	100% MxM	70	28
	77	CFD0273	240-243	100% MxM	70	8
	78	CFD0170	391-399	100% MxM	100	30
FB-SO	1	CFD0131	57-63	100% MsS	0	19
	2	CFD0131	63-69	31% MsS, 69% RQM	0	21
	3	CFD0131	69-74	100% RQM	0	17
	4	CFD0131	77-81	100% RQM	0	13
	5	CFD0131	87-93	50% MsS, 50% RQM	0	20
	6	CFD0131	93-99	100% MsS	0	20
	7	CFD0131	99-105	41% MsS, 59% RQM	0	21
	36	CFD0084	43-49	100% RQM	0	19
	37	CFD0084	49-55	100% RQM	0	19
	38	CFD0084	55-61	100% RQM	0	22
	39	CFD0008	2.13-9	100% BtS	0	13
	40	CFD0008	42248	100% BtS	0	19
	41	CFD0008	15-21	100% BtS	0	21
	42	CFD0007	2.13-10	100% BtS	0	27
	43	CFD0007	42644	100% BtS	0	21
	44	CFD0007	16-21	100% BtS	0	18
	45	CFD0007	31-36	100% BtS	0	16

Appendix D.1-1: Overview of Operating Procedures for the Coffee Gold Mine Waste Rock Kinetic Tests
Construction of Field Bins

Field Bin ID	Bag #	Hole ID	Length (m)	Lithology	% Fresh	Weight (Kg)
FB-ST	18	CFD0146	57-62	100% BtS	70	17
	19	CFD0146	65-72	100% BtS	70	21
	21	CFD0145	70-80	100% BtS_Carb	30	37
	22	CFD0145	43009	100% BtS_Carb	70	25
	23	CFD0145	17-25	80% BtS_Carb, 20% YO	44	28
	24	CFD0145	25-32	15% BtS_Carb, 85% YO	4.3	23
	80	CFD0172	123-129	100% BtS	50	23
	81	CFD0172	129-135	100% BtS	50	21
	82	CFD0172	160-166	100% BtS	50	20
	85	CFD0142	16-22	100% BtS	70	25
	86	CFD0142	22-28	100% BtS	70	20
	87	CFD0142	28-34	100% BtS	70	18
	88	CFD0142	34-39	100% BtS	70	19
	89	CFD0265	246-256	100% BtS	54	30
	90	CFD0265	212-215, 220-228	100% BtS	70	30
FB-SS	8	CFD0096	167-173, 203-205	74% RQM, 26% BtS	100	16
	9	CFD0096	220-233	100% RQM	100	25
	10	CFD0096	233-239	100% RQM	100	13
	11	CFD0127	276-283	100% BtS	100	21
	12	CFD0127	283-290	100% BtS	100	23
	13	CFD0127	290-297	100% BtS	100	22
	14	CFD0127	297-304	100% BtS	100	18
	15	CFD0127	304-309	100% BtS	100	15
	50	CFD0040	230-237.4	100% BtS	100	24
	51	CFD0040	237.4-244	100% BtS	100	22
	52	CFD0040	244-250	100% BtS	100	24
	53	CFD0040	256-262	100% BtS	100	21
	54	CFD0040	262-268	100% BtS	100	21
	55	CFD0040	268-273	100% BtS	100	16
FB-GGT	1	CFD0380_36-50 (Bag 1 + 2)	*NA*	granite	10	13.59
	2	CFD0380_36-50 (Bag 3 +4)	*NA*	granite	10	16.761
	3	CFD0383_115-125 (Bag 1)	*NA*	granite	76	12.231
	4	CFD0383_115-125 (Bag 2)	*NA*	granite	76	14.496
	5	CFD0381_4-13 (Bag 1)	*NA*	granite	37	9.06
	6	CFD0381_4-13 (Bag 2)	*NA*	granite	37	12.684
	7	CFD0403_204-217 (Bag 1)	*NA*	granite	80	9.966
	8	CFD0403_204-217 (Bag 2)	*NA*	granite	80	13.137
	9	CFD0403_204-217 (Bag 3)	*NA*	granite	80	10.419
	10	CFD0396_50-60 (Bag 1)	*NA*	granite	40	13.59
	11	CFD0396_50-60 (Bag 2)	*NA*	granite	40	9.513
	12	CFD0394_31-41 (Bag 1)	*NA*	granite	38	13.137
	13	CFD0394_31-41 (Bag 2)	*NA*	granite	38	13.137
	14	CFD0394_55-66 (Bag 1)	*NA*	granite	50	12.231
	15	CFD0394_55-66 (Bag 2)	*NA*	granite	50	14.043
		CFD0389_34_38	*NA*	granite	100	6.3
		CFD0396_81_87	*NA*	granite	100	14.9
FB-GGS	1	CFD0380_22-30 (Bag 1 +2)	*NA*	granite	100	17.214
	2	CFD0383_182-194 (Bag 1)	*NA*	granite	99	10.872
	3	CFD0383_182-194 (Bag 2)	*NA*	granite	99	10.872
	4	CFD0383_182-194 (Bag 3)	*NA*	granite	99	12.231
	5	CFD0381_69-79 (Bag 1)	*NA*	granite	95	15.855
	6	CFD0381_69-79 (Bag 2)	*NA*	granite	95	11.325
	7	CFD0385_28-38 (Bag 1)	*NA*	granite	95	12.684
	8	CFD0385_28-38 (Bag 2)	*NA*	granite	95	14.043
	9	CFD0385_38-48 (Bag 1)	*NA*	granite	95	13.137
	13	CFD0394_99-104 (Bag 1)	*NA*	granite	95	11.325
	14	CFD0396_91-101 (Bag 1)	*NA*	granite	100	9.513
	15	CFD0396_91-101 (Bag 2)	*NA*	granite	100	11.778
	16	CFD0396_72-81 (Bag 1)	*NA*	granite	100	6.795
	17	CFD0396_72-81 (Bag 2)	*NA*	granite	100	10.872

SGS

Quantitative X-Ray Diffraction by Rietveld Refinement

Report Prepared for:	*SGS Canada Inc*
Project Number/ LIMS No.	*14094-101A/MI4521-JUN14*
ARD Number	*1416 Kaminak Coffee Proj*
Reporting Date:	*June 30, 2014*

Instrument:	BRUKER AXS D8 Advance Diffractometer
Test Conditions:	Co radiation, 40 kV, 35 mA Regular Scanning: Step: 0.02°, Step time: 1s, 2θ range: 3-80°
Interpretations :	PDF2/PDF4 powder diffraction databases issued by the International Center for Diffraction Data (ICDD). DiffracPlus Eva and Topas software.
Detection Limit :	0.5-2%. Strongly dependent on crystallinity.

Contents:

Signature REDACTED

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Bernie C. Yeung, B.Sc.
Mineralogist

Huyun Zhou, Ph.D., P.Geo.
Senior Mineralogist

Method Summary

Mineral Identification and Interpretation:

Mineral identification and interpretation involves matching the diffraction pattern of an unknown material to patterns of single-phase reference materials. The reference patterns are compiled by the Joint Committee on Powder Diffraction Standards - International Center for Diffraction Data (JCPDS-ICDD) database and released on software as Powder Diffraction Files (PDF).

Interpretations do not reflect the presence of non-crystalline and/or amorphous compounds, except when internal standards have been added by request. Mineral proportions may be strongly influenced by crystallinity, crystal structure and preferred orientations. Mineral or compound identification and quantitative analysis results should be accompanied by supporting chemical assay data or other additional tests.

Quantitative Rietveld Analysis:

Quantitative Rietveld Analysis is performed by using Topas 4.2 (Bruker AXS), a graphics based profile analysis program built around a non-linear least squares fitting system, to determine the amount of different phases present in a multicomponent sample. Whole pattern analyses are predicated by the fact that the X-ray diffraction pattern is a total sum of both instrumental and specimen factors. Unlike other peak intensity-based methods, the Rietveld method uses a least squares approach to refine a theoretical line profile until it matches the obtained experimental patterns.

Rietveld refinement is completed with a set of minerals specifically identified for the sample. Zero values indicate that the mineral was included in the refinement calculations, but the calculated concentration was less than 0.05wt%. Minerals not identified by the analyst are not included in refinement calculations for specific samples and are indicated with a dash.

Summary of Rietveld Quantitative Analysis X-ray Diffraction Results

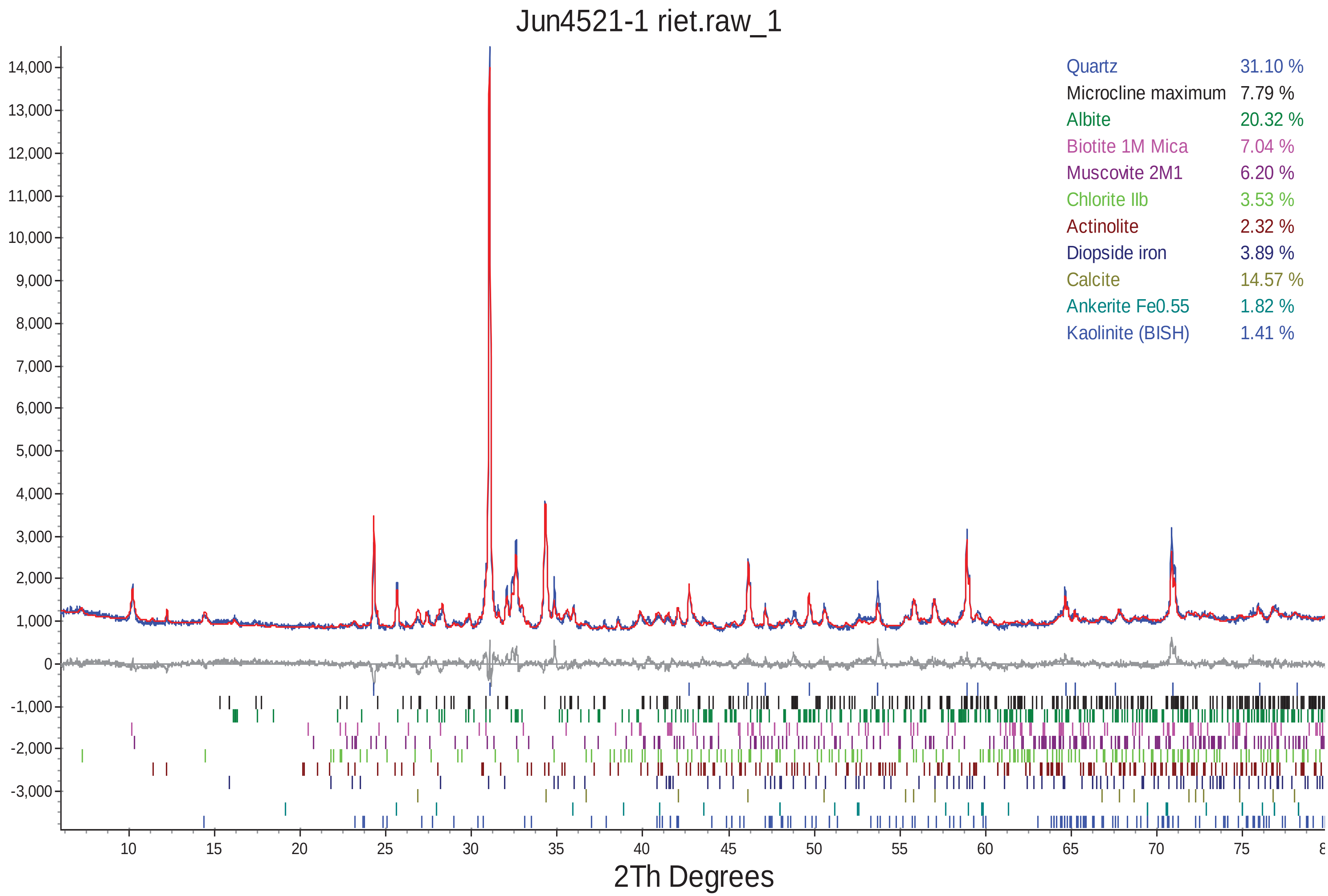
Quantitative X-ray Diffraction Results

Mineral/Compound	ST JUN4521-01 (wt %)	GO JUN4521-02 (wt %)	SO JUN4521-03 (wt %)	GS JUN4521-04 (wt %)	GT JUN4521-05 (wt %)	SS JUN4521-06 (wt %)
Quartz	31.1	46.8	55.2	39.4	45.7	32.9
Microcline	7.8	19.0	0.7	12.2	16.3	11.1
Albite	20.3	7.5	1.2	17.2	9.7	8.7
Biotite	7.0	1.0	1.3	3.0	1.2	4.4
Muscovite	6.2	7.9	13.9	9.6	5.3	10.6
Chlorite	3.5	4.1	5.3	2.8	3.6	5.0
Actinolite	2.3	0.3	0.4	0.4	0.0	0.3
Diopside	3.9	1.7	0.6	2.1	1.3	1.8
Calcite	14.6	1.7	3.9	2.3	1.0	10.6
Ankerite	1.8	1.3	4.3	4.5	4.4	9.0
Kaolinite	1.4	8.7	13.1	6.7	11.6	5.6
TOTAL	100	100	100	100	100	100

Zero values indicate that the mineral was included in the refinement, but the calculated concentration is below a measurable value.
Dashes indicate that the mineral was not identifed by the analyst and not included in the refinement calculation for the sample.

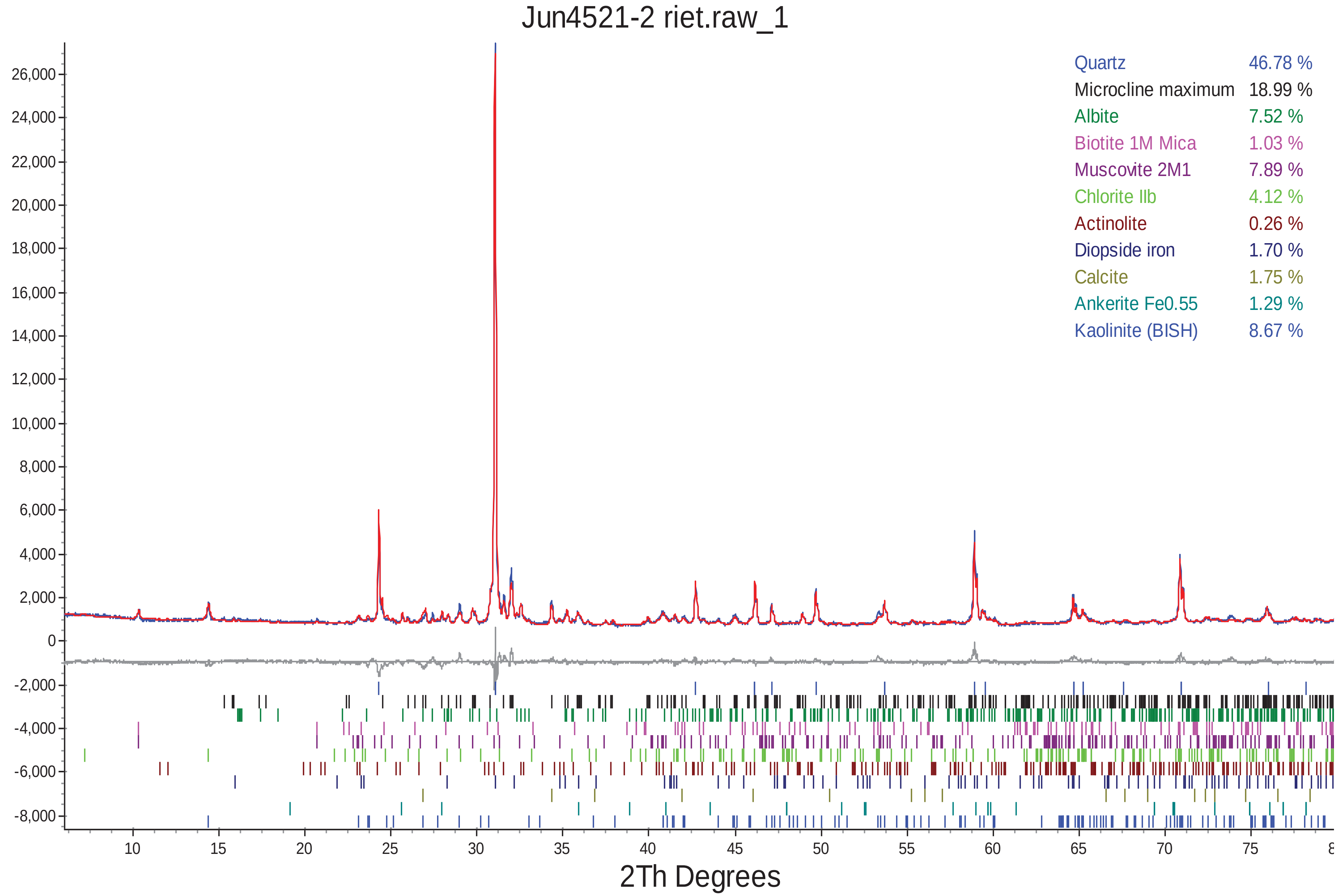
Mineral/Compound	Formula
Quartz	SiO_2
Microcline	$KAlSi_3O_8$
Albite	$NaAlSi_3O_8$
Biotite	$K(Mg,Fe)_3(AlSi_3O_{10})(OH)_2$
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$
Chlorite	$(Fe,(Mg,Mn)_5,Al)(Si_3Al)O_{10}(OH)_8$
Actinolite	$Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$
Diopside	$CaMgSi_2O_6$
Calcite	$CaCO_3$
Ankerite	$CaFe(CO_3)_2$
Kaolinite	$Al_2Si_2O_5(OH)_4$

SGS Canada Inc
14094-101A/MI4521-JUN14
06/30/2014



The Qualitative XRD method (METH # 8-8-1) used by SGS Minerals Services, P.O. Box 4300, 185 Concession Street, Lakefield, Ontario, Canada K0L 2H0.
Tel: (705) 652-2000 Fax: (705) 652-6365 Mini-method available upon request.

SGS Canada Inc
14094-101A/MI4521-JUN14
06/30/2014



The Qualitative XRD method (METH # 8-8-1) used by SGS Minerals Services, P.O. Box 4300, 185 Concession Street, Lakefield, Ontario, Canada K0L 2H0.
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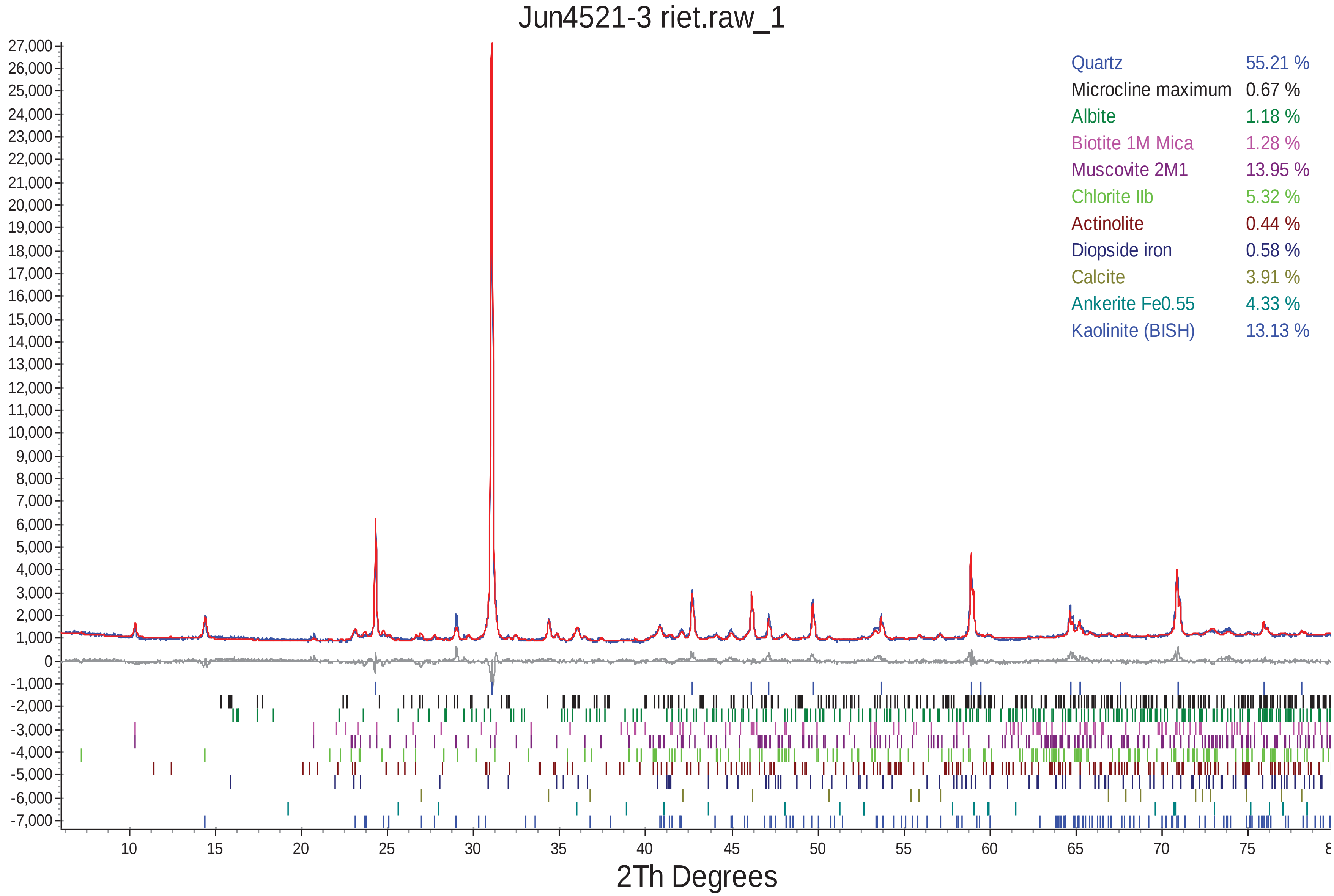
SGS Canada Inc
14094-101A/MI4521-JUN14
06/30/2014



The Qualitative XRD method (METH # 8-8-1) used by SGS Minerals Services, P.O. Box 4300, 185 Concession Street, Lakefield, Ontario, Canada K0L 2H0.
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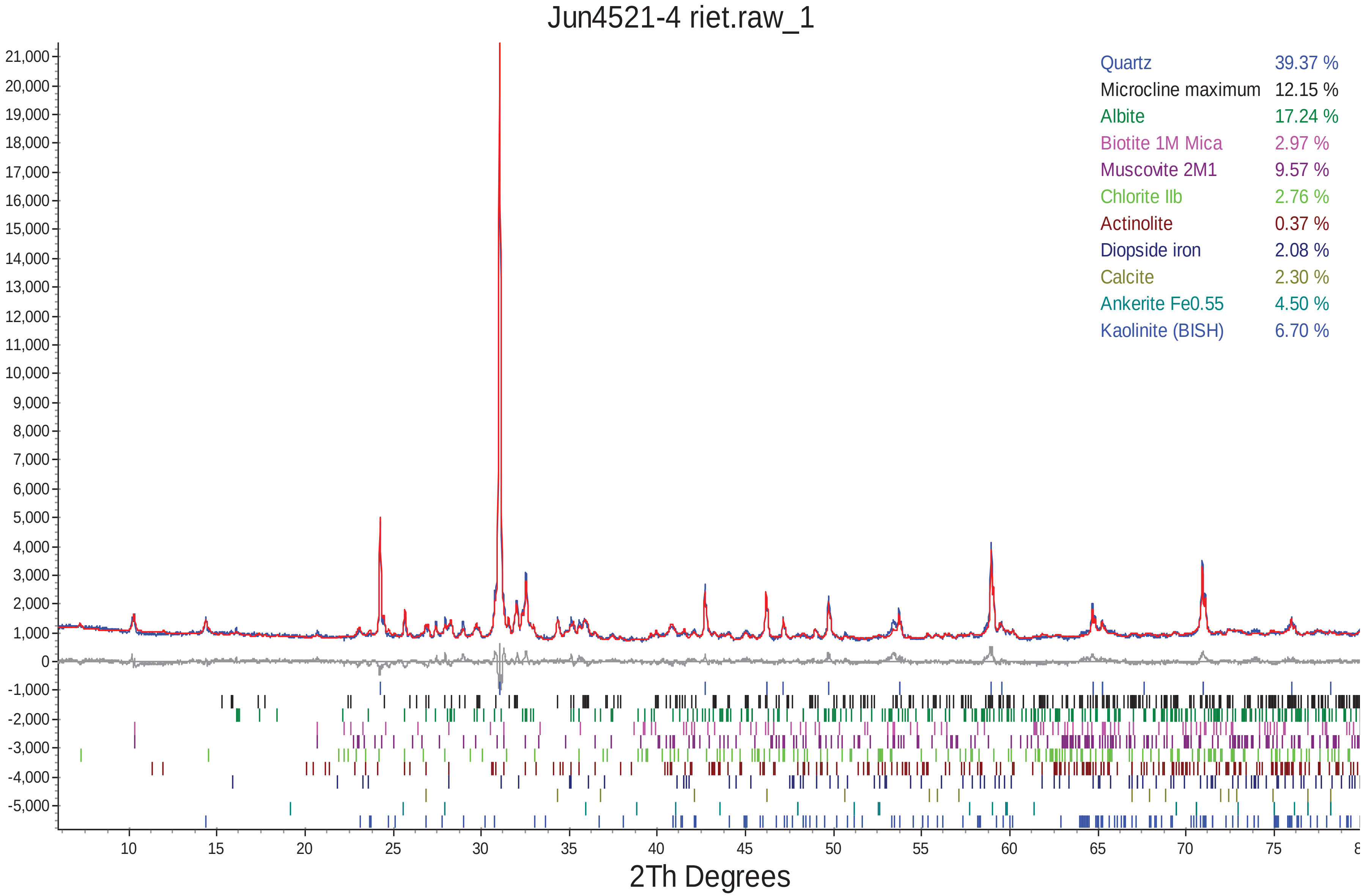
SGS Canada Inc
14094-101A/MI4521-JUN14
06/30/2014



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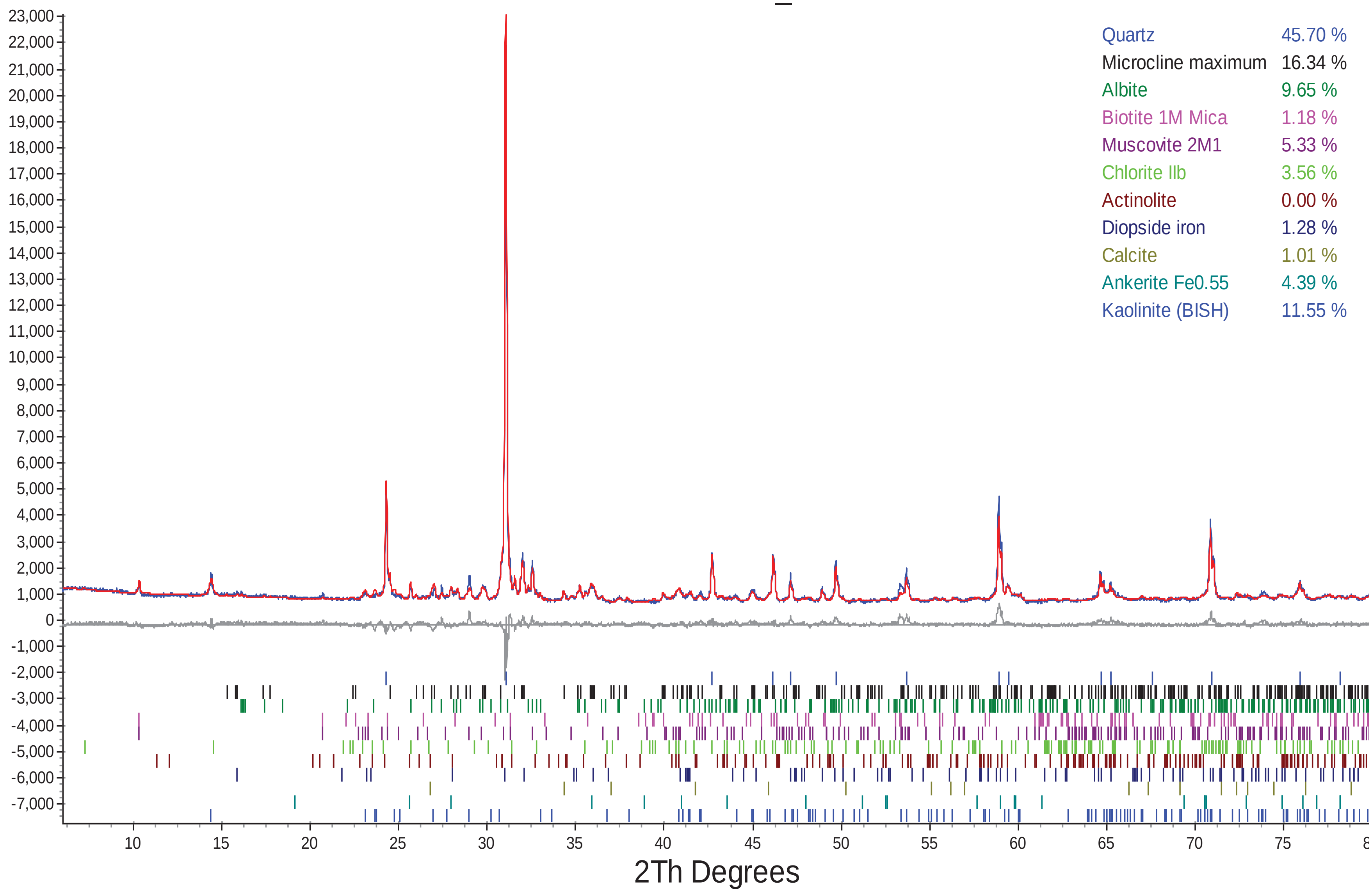
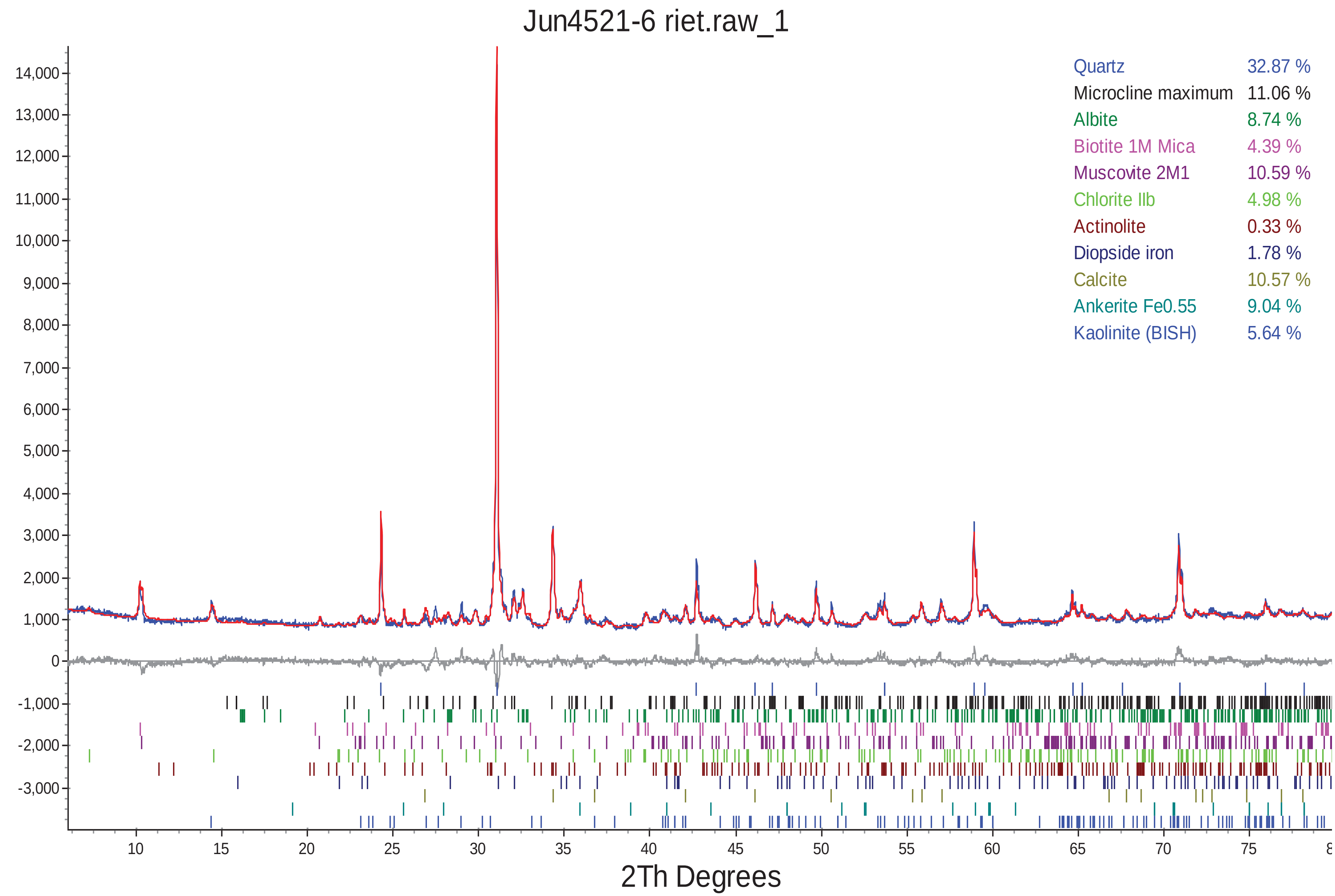
14094-101A/MI4521-JUN14
06/30/2014

Jun4521-5 riet.raw_1



The Qualitative XRD method (METH # 8-8-1) used by SGS Minerals Services, P.O. Box 4300, 185 Concession Street, Lakefield, Ontario, Canada K0L 2H0.
Tel: (705) 652-2000 Fax: (705) 652-6365 Mini-method available upon request.

SGS Canada Inc
14094-101A/MI4521-JUN14
06/30/2014



SGS

Quantitative X-Ray Diffraction by Rietveld Refinement

Report Prepared for:	*SGS Canada Inc*
Project Number/ LIMS No.	*14094-101B/MI4511-AUG15*
Batch No.	*1416 Kaminak*
Sample Receipt:	*August 14, 2015*
Sample Analysis:	*August 17, 2015*
Reporting Date:	*September 10, 2015*

Instrument:	BRUKER AXS D8 Advance Diffractometer
Test Conditions:	Co radiation, 40 kV, 35 mA Regular Scanning: Step: 0.02°, Step time: 1s, 2θ range: 3-80°
Interpretations:	PDF2/PDF4 powder diffraction databases issued by the International Center for Diffraction Data (ICDD). DiffracPlus Eva and Topas software.
Detection Limit:	0.5-2%. Strongly dependent on crystallinity.

Contents:

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Kim Gibbs, H.B.Sc., P.Geo.
Senior Mineralogist

Huyun Zhou, Ph.D., P.Geo.
Senior Mineralogist

ACCREDITATION: SGS Minerals Services Lakefield is accredited to the requirements of ISO/IEC 17025 for specific tests as listed on our scope of accreditation, including geochemical, mineralogical and trade mineral tests. To view a list of the accredited methods, please visit the following website and search SGS Canada - Minerals Services - Lakefield: http://palcan.scc.ca/SpecsSearch/GLSearchForm.do.

Method Summary

The Rietveld Method of Mineral Identification by XRD (ME-LR-MIN-MET-MN-D05) method used by SGS Minerals Services is accredited to the requirements of ISO/IEC 17025.

Mineral Identification and Interpretation:

Mineral identification and interpretation involves matching the diffraction pattern of an unknown material to patterns of single-phase reference materials. The reference patterns are compiled by the Joint Committee on Powder Diffraction Standards - International Center for Diffraction Data (JCPDS-ICDD) database and released on software as Powder Diffraction Files (PDF).

Interpretations do not reflect the presence of non-crystalline and/or amorphous compounds, except when internal standards have been added by request. Mineral proportions may be strongly influenced by crystallinity, crystal structure and preferred orientations. Mineral or compound identification and quantitative analysis results should be accompanied by supporting chemical assay data or other additional tests.

Quantitative Rietveld Analysis:

Quantitative Rietveld Analysis is performed by using Topas 4.2 (Bruker AXS), a graphics based profile analysis program built around a non-linear least squares fitting system, to determine the amount of different phases present in a multicomponent sample. Whole pattern analyses are predicated by the fact that the X-ray diffraction pattern is a total sum of both instrumental and specimen factors. Unlike other peak intensity-based methods, the Rietveld method uses a least squares approach to refine a theoretical line profile until it matches the obtained experimental patterns.

Rietveld refinement is completed with a set of minerals specifically identified for the sample. Zero values indicate that the mineral was included in the refinement calculations, but the calculated concentration was less than 0.05wt%. Minerals not identified by the analyst are not included in refinement calculations for specific samples and are indicated with a dash.

Summary of Rietveld Quantitative Analysis X-ray Diffraction Results

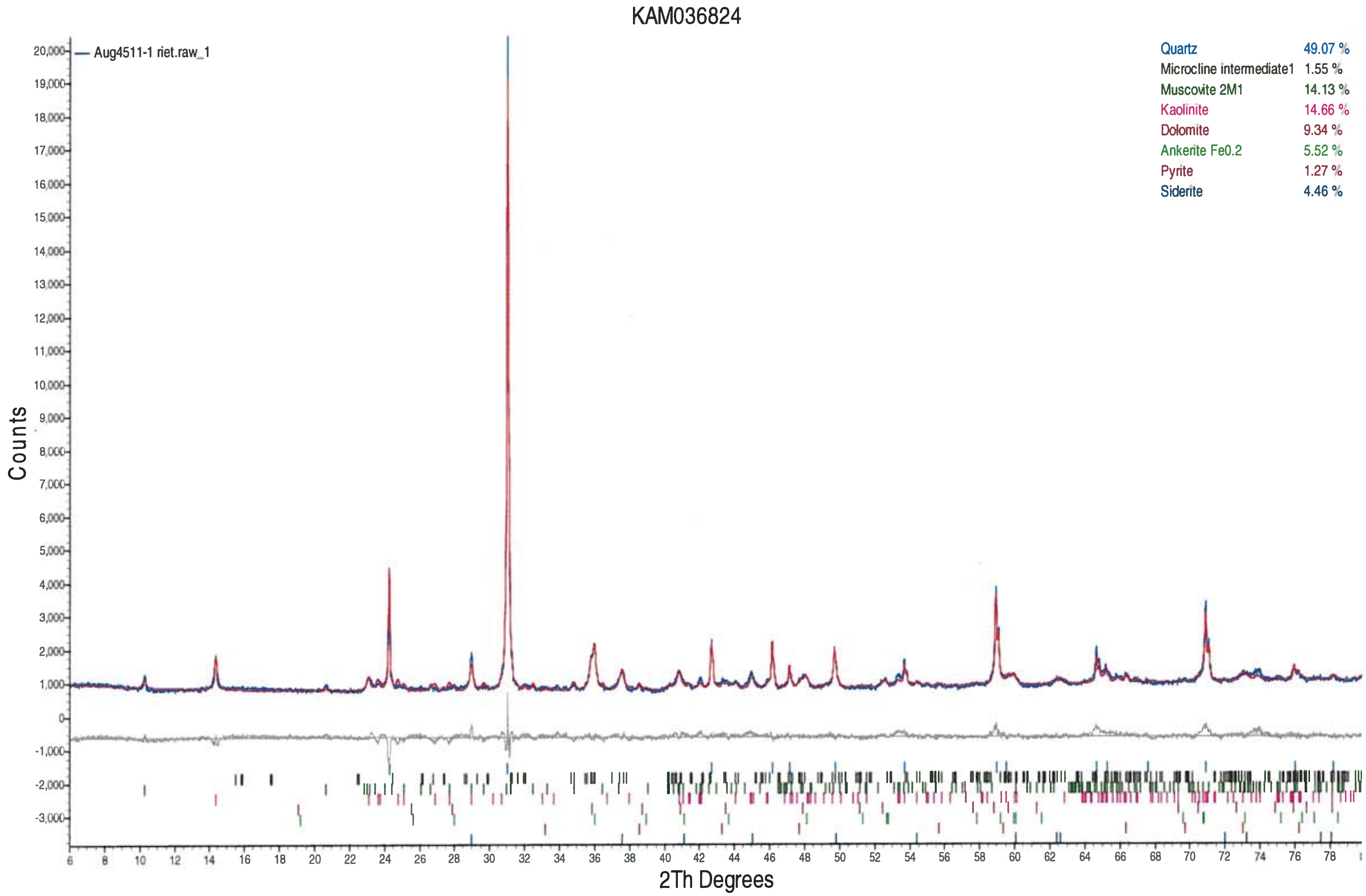
Quantitative X-ray Diffraction Results

Mineral/Compound	KAM036824 AUG4511-01 (wt %)	KAM092488 AUG4511-02 (wt %)
Quartz	49.1	48.9
Microcline	1.6	22.5
Muscovite	14.1	14.5
Kaolinite	14.7	9.6
Dolomite	9.3	4.1
Ankerite	5.5	0.0
Pyrite	1.3	0.5
Siderite	4.5	-
TOTAL	100	100

Zero values indicate that the mineral was included in the refinement, but the calculated concentration is below a measurable value.
Dashes indicate that the mineral was not identifed by the analyst and not included in the refinement calculation for the sample.

Mineral/Compound	Formula
Quartz	SiO_2
Microcline	$KAlSi_3O_8$
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$
Kaolinite	$Al_2Si_2O_5(OH)_4$
Dolomite	$CaMg(CO_3)_2$
Ankerite	$CaFe(CO_3)_2$
Pyrite	FeS_2
Siderite	$FeCO_3$

SGS Canada Inc
14094-101B/MI4511-AUG15
10-Sep-15



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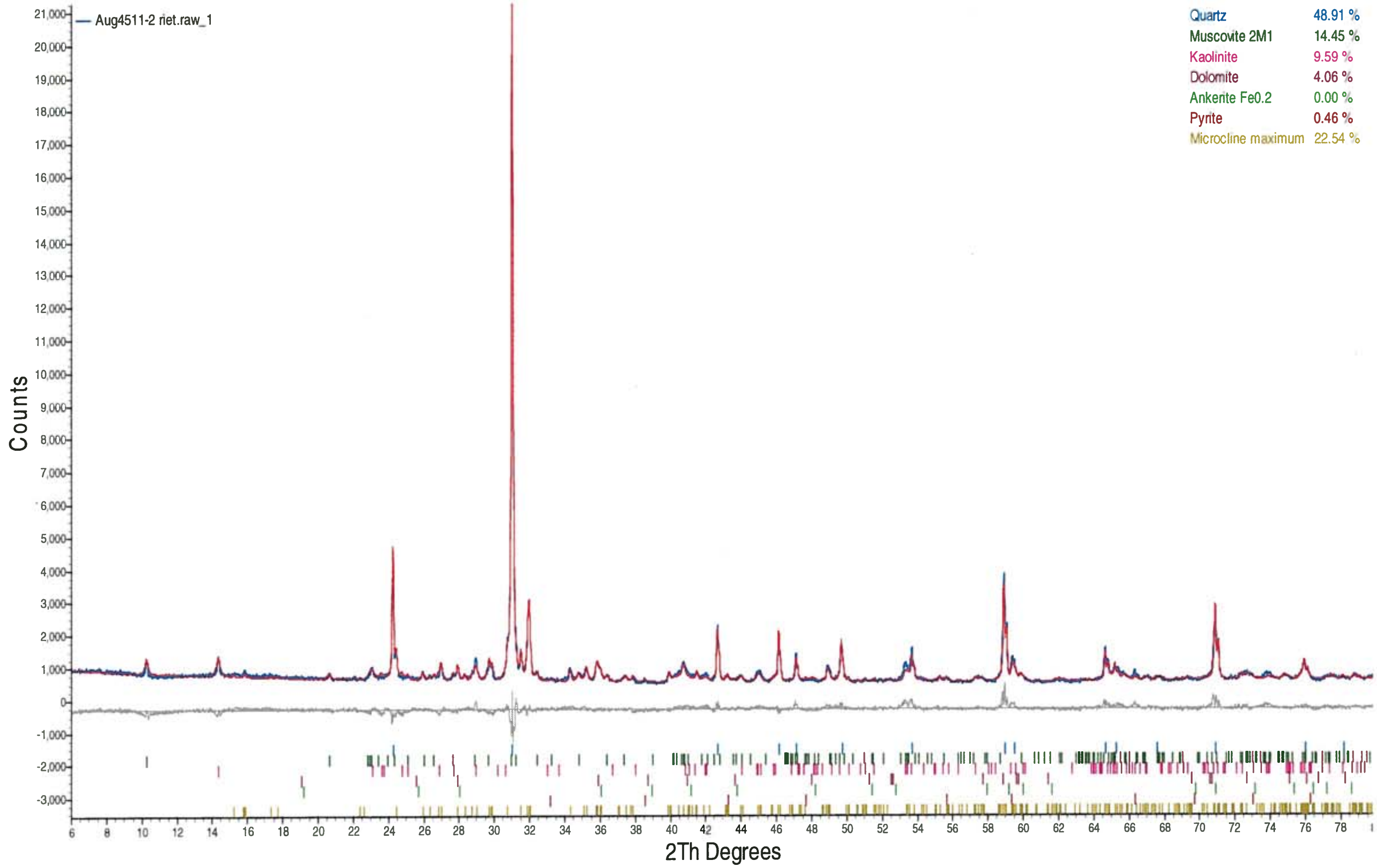
Aug4511-2 riet.raw_1
Quartz 48.91 %
Muscovite 2M1 14.45 %
Kaolinite 9.59 %
Dolomite 4.06 %
Ankerite Fe0.2 0.00 %
Pyrite 0.46 %
Microcline maximum 22.54 %
Counts
2Th Degrees

SGS

Quantitative X-Ray Diffraction by Rietveld Refinement

Report Prepared for:	*SGS Canada Inc*
Project Number/ LIMS No.	*14094-101B/MI4522-APR15*
Batch No.	*1416 Kaminak Coffee*
Sample Receipt:	*April 24, 2015*
Sample Analysis:	*April 29, 2015*
Reporting Date:	*May 1, 2015*

Instrument:	BRUKER AXS D8 Advance Diffractometer
Test Conditions:	Co radiation, 40 kV, 35 mA Regular Scanning: Step: 0.02°, Step time: 1s, 2θ range: 3-80°
***Interpretations*:**	PDF2/PDF4 powder diffraction databases issued by the International Center for Diffraction Data (ICDD). DiffracPlus Eva and Topas software.
***Detection Limit*:**	0.5-2%. Strongly dependent on crystallinity.

Contents:

1) Method Summary
2) Summary of Mineral Asemblages
3) Quantitative XRD Results
4) XRD Pattern(s)

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Kim Gibbs, H.B.Sc., P.Geo.
Senior Mineralogist

Huyun Zhou, Ph.D., P.Geo.
Senior Mineralogist

ACCREDITATION: SGS Minerals Services Lakefield is accredited to the requirements of ISO/IEC 17025 for specific tests as listed on our scope of accreditation, including geochemical, mineralogical and trade mineral tests. To view a list of the accredited methods, please visit the following website and search SGS Canada - Minerals Services - Lakefield: http://palcan.scc.ca/SpecsSearch/GLSearchForm.do.

SGS Minerals
a division of SGS Canada Inc.
P.O. Box 4300, 185 Concession Street, Lakefield, Ontario, Canada K0L 2H0
Tel: (705) 652-2000 Fax: (705) 652-6365 www.sgs.com www.sgs.com/met
Member of the SGS Group (SGS SA)

Method Summary

The Rietveld Method of Mineral Identification by XRD (ME-LR-MIN-MET-MN-D05) method used by SGS Minerals Services is accredited to the requirements of ISO/IEC 17025.

Mineral Identification and Interpretation:

Mineral identification and interpretation involves matching the diffraction pattern of an unknown material to patterns of single-phase reference materials. The reference patterns are compiled by the Joint Committee on Powder Diffraction Standards - International Center for Diffraction Data (JCPDS-ICDD) database and released on software as Powder Diffraction Files (PDF).

Interpretations do not reflect the presence of non-crystalline and/or amorphous compounds, except when internal standards have been added by request. Mineral proportions may be strongly influenced by crystallinity, crystal structure and preferred orientations. Mineral or compound identification and quantitative analysis results should be accompanied by supporting chemical assay data or other additional tests.

Quantitative Rietveld Analysis:

Quantitative Rietveld Analysis is performed by using Topas 4.2 (Bruker AXS), a graphics based profile analysis program built around a non-linear least squares fitting system, to determine the amount of different phases present in a multicomponent sample. Whole pattern analyses are predicated by the fact that the X-ray diffraction pattern is a total sum of both instrumental and specimen factors. Unlike other peak intensity-based methods, the Rietveld method uses a least squares approach to refine a theoretical line profile until it matches the obtained experimental patterns.

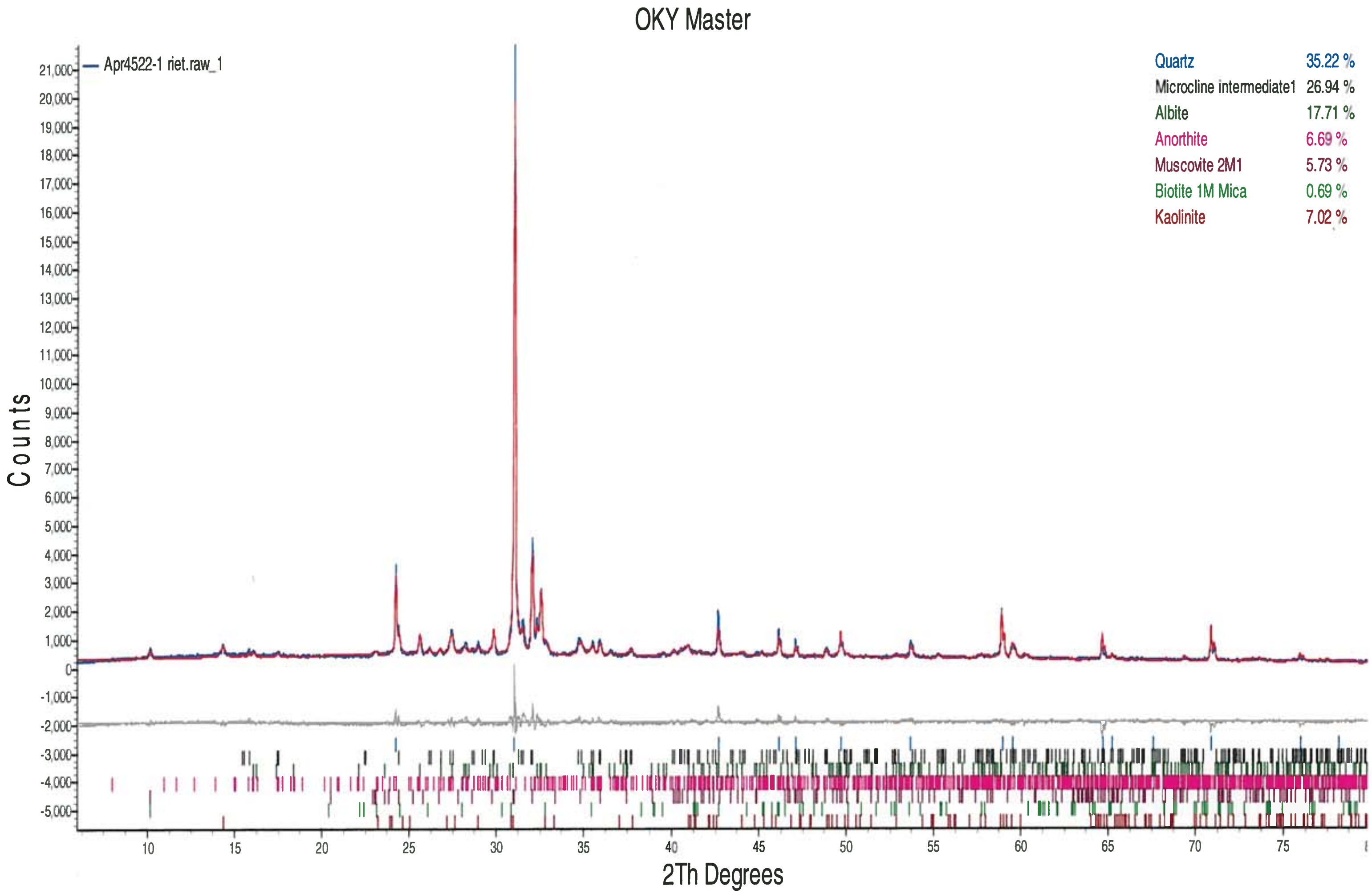
Rietveld refinement is completed with a set of minerals specifically identified for the sample. Zero values indicate that the mineral was included in the refinement calculations, but the calculated concentration was less than 0.05wt%. Minerals not identified by the analyst are not included in refinement calculations for specific samples and are indicated with a dash.

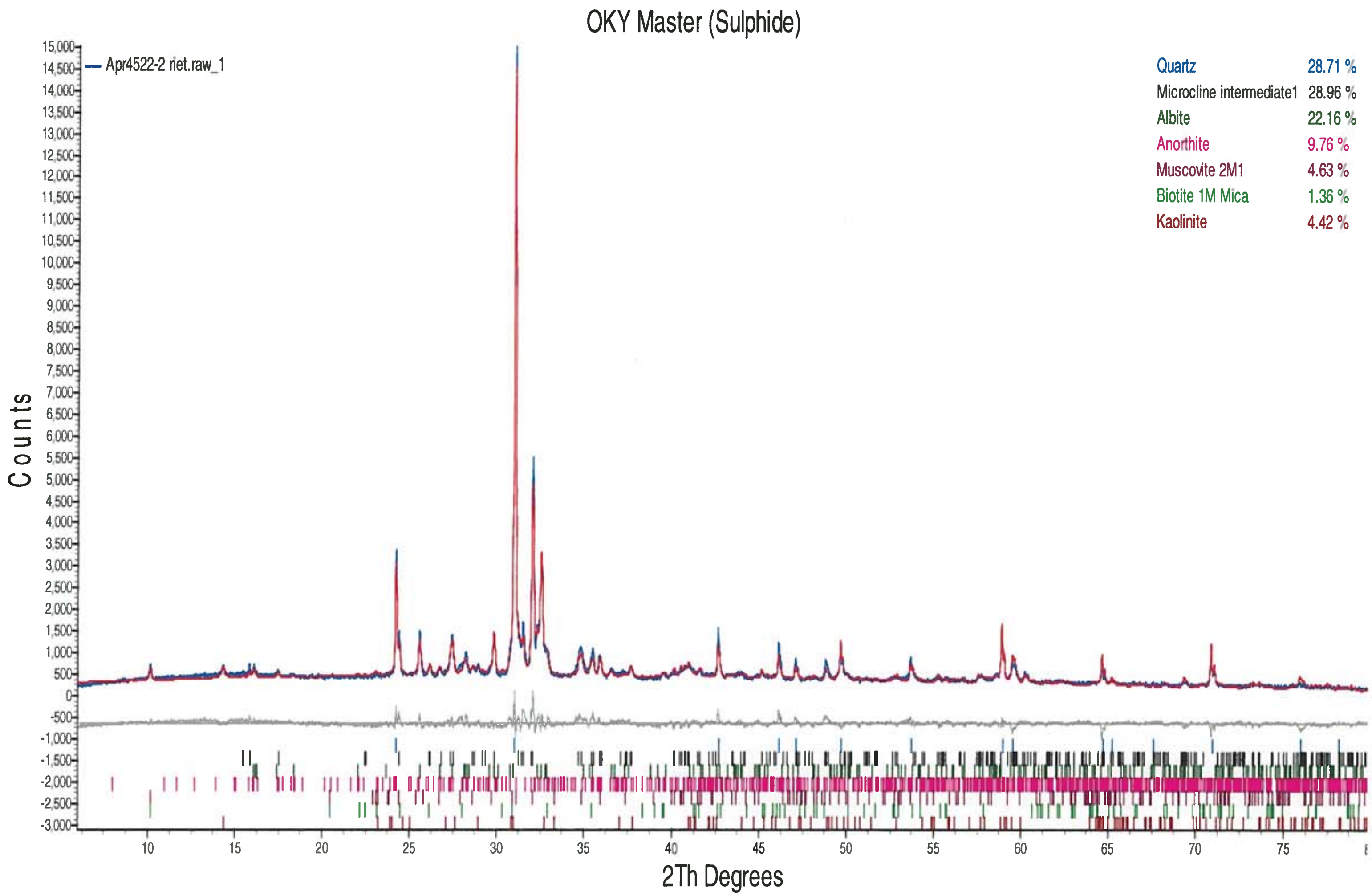
Summary of Rietveld Quantitative Analysis X-ray Diffraction Results

Quantitative X-ray Diffraction Results

Mineral/Compound	OKY Master APR4522-01 (wt %)	OKY Master (Sulphide) APR4522-02 (wt %)
Quartz	35.2	28.7
Microcline	26.9	29.0
Albite	17.7	22.2
Anorthite	6.7	9.8
Muscovite	5.7	4.6
Biotite	0.7	1.4
Kaolinite	7.0	4.4
TOTAL	100	100

Mineral/Compound	Formula
Quartz	SiO_2
Microcline	$KAlSi_3O_8$
Albite	$NaAlSi_3O_8$
Anorthite	$CaAl_2Si_2O_8$
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$
Biotite	$K(Mg,Fe)_3(AlSi_3O_{10})(OH)_2$
Kaolinite	$Al_2Si_2O_5(OH)_4$


OKY Master
Apr4522-1 riet.raw_1
Quartz 35.22 %
Microcline intermediate1 26.94 %
Albite 17.71 %
Anorthite 6.69 %
Muscovite 2M1 5.73 %
Biotite 1M Mica 0.69 %
Kaolinite 7.02 %
Counts
2Th Degrees


OKY Master (Sulphide)
Apr4522-2 riet.raw_1
Counts
2Th Degrees
Quartz 28.71 %
Microcline intermediate1 28.96 %
Albite 22.16 %
Anorthite 9.76 %
Muscovite 2M1 4.63 %
Biotite 1M Mica 1.36 %
Kaolinite 4.42 %

Appendix D.1-2 Static Test Results for Waste Rock Kinetic Test Samples

Acid-Base Accounting Results

Kinetic Tests	Description	Lithology	Weathering Facies	Rinse pH	Paste pH	TIC	CaNP	Total C	Total S	S(SO4)	S(S-2)	Insoluble S	AP	Sobek NP	Siderite NP	Sobek NNP	Siderite NNP	Fizz Test
				s.u.	s.u.	%	kg $CaCO_3$/t	%	%	%	%	%	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	
			Method Code	*Sobek*	*Sobek*	*CSB02V*	*Calc.*	*CSA06V*	*CSA06V*	*CSA07V*	*CSA08D*	*Calc.*	*Calc.*	*Sobek*	*Siderite Corr.*	*Calc.*	*Calc.*	*Sobek*
			Limit of Detection	*0.20*	*0.20*	*0.01*	*#N/A*	*0.005*	*0.005*	*0.01*	*0.01*	*#N/A*	*#N/A*	*0.5*	*0.5*	*#N/A*	*#N/A*	*#N/A*
Col 5, FB-GO	GO	Gneiss	Oxide	8.46	8.43	0.23	19.2	0.258	0.016	*<0.01*	0.01	0.006	0.3	22.7	26.5	22.4	26.2	Slight
Col 6, HC3, FB-GT	GT	Gneiss	Transition	8.00	8.59	0.48	40.0	0.488	0.083	*<0.01*	0.07	0.013	2.2	32.9	40.8	30.7	38.6	Slight
HC4, FB-GS	GS	Gneiss	Fresh	8.22	8.28	0.66	55.0	0.672	0.21	*<0.01*	0.18	0.03	5.6	51.7	56.9	46.1	51.3	Slight
HC8	KAM092488	Gneiss	Fresh		8.58	0.24	20.0	0.24	0.386	*<0.01*	0.38	<0.01	11.9	20.2		8.3		Slight
Col 3, FB-SO	SO	Schist	Oxide	8.35	8.25	0.93	77.5	0.958	0.031	*<0.01*	0.01	0.021	0.3	74.9	75.9	74.6	75.6	Slight
Col 4, HC1, FB-ST	ST	Schist	Transition	8.41	8.28	1.58	131.7	1.62	0.101	0.01	0.05	0.041	1.6	172.9	192.6	171.3	191.0	Moderate
HC2, FB-SS	SS	Schist	Fresh	8.49	8.40	2.09	174.2	2.13	0.421	*<0.01*	0.35	0.071	10.9	180.5	200.1	169.6	189.2	Moderate
HC7	KAM036824	Schist	Fresh		8.18	1.81	150.8	1.83	1.1	0.02	1.06	0.02	33.1	127.2		94.1		Moderate
Col 13, HC5, FB-GGT	OKY Master	Granite	Transition	7.12	7.49	0.01	0.8	0.02	0.035	*<0.01*	<0.01	0.035	<0.3	2.8	7.6	2.8	7.6	None
Col 14, HC6, FB-GGS	OKY Master (Fresh)	Granite	Fresh	8.59	8.48	0.11	9.2	0.122	0.045	*<0.01*	0.03	0.015	0.9	5.7	9.9	4.8	9.0	None

Notes:
Values in grey italics are below the analytical detection limit
CaNP = carbonate NP calculated from total inorganic carbon (TIC)
NNP = net neutralization potential, derived by subtracting AP from NP

Appendix D.1-2 Static Test Results for Waste Rock Kinetic Test Samples

Solid Phase Elements by Aqua Regia Digestion

Kinetic Tests	Description	Lithology	Weathering Facies	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La	Li	Lu	Mg	Mn	Mo
				ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm
			Method Code	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*
			Limit of Detection	*0.01*	*0.01*	*1*	*10*	*5*	*0.1*	*0.02*	*0.01*	*0.01*	*0.05*	*0.1*	*1*	*0.05*	*0.5*	*0.01*	*0.1*	*0.1*	*0.05*	*0.01*	*0.02*	*0.01*	*0.1*	*1*	*0.01*	*0.01*	*2*	*0.05*
Col 5, FB-GO	GO	Gneiss	Oxide	0.17	0.58	218	30	106	0.8	0.35	0.68	0.07	62.7	6.2	142	1.57	9.8	1.5	2.3	*<0.1*	0.32	0.15	*<0.02*	0.21	33.3	2	0.23	0.21	339	4.98
Col 6, HC3, FB-GT	GT	Gneiss	Transition	0.03	0.47	182	30	162	0.7	0.2	0.96	0.05	58.8	4.1	122	1.21	5.9	1.18	1.9	*<0.1*	0.28	0.24	*<0.02*	0.19	32.1	2	0.19	0.35	280	4.89
HC4, FB-GS	GS	Gneiss	Fresh	0.03	0.92	86	20	120	0.7	0.47	1.57	0.03	65.4	8	112	2.07	6.7	1.81	3.6	*<0.1*	0.22	0.07	*<0.02*	0.41	33.4	5	0.22	0.6	373	4.49
HC8	KAM092488	Gneiss	Fresh	0.06	0.34	248	50	63	0.5	0.06	0.47	0.07	36.3	1	100	0.36	2	0.6	0.9	*<0.1*	0.23	0.11	*<0.02*	0.18	22.5	2	0.11	0.19	102	5.42
Col 3, FB-SO	SO	Schist	Oxide	0.17	0.49	369	20	336	0.8	0.48	2.33	0.14	55.6	12.6	125	1.21	24.1	2.89	1.9	*<0.1*	0.14	0.44	0.03	0.16	27.3	2	0.24	0.48	530	3.84
Col 4, HC1, FB-ST	ST	Schist	Transition	0.05	1.52	67	30	542	0.7	0.25	4.86	0.07	38.7	15.1	190	3.7	16.1	2.57	5.8	*<0.1*	0.17	0.03	0.02	0.83	22.7	13	0.19	1.21	589	5.49
HC2, FB-SS	SS	Schist	Fresh	0.11	1.37	30	20	327	0.9	0.45	5.03	0.1	57.5	14.2	145	3.62	18	2.87	5.9	*<0.1*	0.08	0.12	0.04	0.68	28	10	0.23	1.44	660	3.25
HC7	KAM036824	Schist	Fresh	0.05	0.57	989	50	182	1.1	0.21	2.65	0.13	47.1	17	111	1.87	26.9	3.68	2.7	*<0.1*	*<0.05*	0.51	0.04	0.21	24.2	2	0.24	1.11	733	3.64
Col 13, HC5, FB-GGT	OKY Master	Granite	Transition	0.04	0.4	298	*<10*	54	0.4	0.21	0.05	0.05	46.7	1.6	132	3.25	7.6	0.87	1.9	*<0.1*	0.38	0.14	*<0.02*	0.16	25.1	6	0.2	0.06	384	6.68
Col 14, HC6, FB-GGS	OKY Master (Sulphide)	Granite	Fresh	0.03	0.38	59	*<10*	63	0.4	0.15	0.1	0.05	48	1.6	125	3	5.6	1.1	2.2	*<0.1*	0.43	0.08	*<0.02*	0.2	25.7	8	0.23	0.12	678	6.21

Notes:
Values in grey italics are below the analytical detection limit

Appendix D.1-2 Static Test Results for Waste Rock Kinetic Test Samples

Solid Phase Elements by Aqua Regia Digestion

Kinetic Tests	Description	Lithology	Weathering Facies	Na	Nb	Ni	P	Pb	Rb	S	Sb	Sc	Se	Sn	Sr	Ta	Tb	Te	Th	Ti	Tl	U	V	W	Y	Yb	Zn	Zr
				%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
			Method Code	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*
			Limit of Detection	*0.01*	*0.05*	*0.5*	*0.005*	*0.2*	*0.2*	*0.01*	*0.05*	*0.1*	*1*	*0.3*	*0.5*	*0.05*	*0.02*	*0.05*	*0.1*	*0.01*	*0.02*	*0.05*	*1*	*0.1*	*0.05*	*0.1*	*1*	*0.5*
Col 5, FB-GO	GO	Gneiss	Oxide	0.02	0.1	9.7	0.03	10.8	18	0.01	12.1	3	*<1*	0.6	25	*<0.05*	0.49	0.1	35.2	*<0.01*	0.32	5.53	17	1.3	13	1.5	21	11.2
Col 6, HC3, FB-GT	GT	Gneiss	Transition	0.02	0.11	5.7	0.022	7.4	15.7	0.07	6.89	2	*<1*	0.6	38.1	*<0.05*	0.41	*<0.05*	30.6	*<0.01*	0.26	6.32	9	0.2	11	1.3	16	8.9
HC4, FB-GS	GS	Gneiss	Fresh	0.02	0.27	12.8	0.034	6	29.9	0.2	2.58	3.7	*<1*	0.7	55.3	*<0.05*	0.55	0.13	21.5	0.03	0.27	6.05	18	0.2	14.3	1.5	19	6.7
HC8	KAM092488	Gneiss	Fresh	0.01	0.09	5.7	0.006	6	12.5	0.35	2.18	0.4	2	*<0.3*	24.9	*<0.05*	0.19	0.09	36.1	*<0.01*	0.08	12.4	1	0.2	3.94	0.6	4	6.5
Col 3, FB-SO	SO	Schist	Oxide	0.01	*<0.05*	27.4	0.048	17	8.4	0.01	32.6	7	*<1*	0.4	56.9	*<0.05*	0.63	0.06	11.8	*<0.01*	0.44	2.55	32	0.4	15	1.6	41	4.5
Col 4, HC1, FB-ST	ST	Schist	Transition	0.04	0.73	49.6	0.048	9.3	52.2	0.09	1.86	5.7	*<1*	1.1	778	*<0.05*	0.41	0.07	15.1	0.11	0.48	2.71	42	1.4	11.9	1.3	43	4.8
HC2, FB-SS	SS	Schist	Fresh	0.03	0.29	53.9	0.063	15	43.1	0.43	2.59	6.8	*<1*	1.1	243	*<0.05*	0.61	*<0.05*	12.3	0.06	0.37	3.24	43	0.6	16.2	1.6	58	3
HC7	KAM036824	Schist	Fresh	0.02	0.07	43.1	0.048	42.5	13.3	1.09	6.4	8.6	3	0.4	70.9	*<0.05*	0.6	*<0.05*	11.7	*<0.01*	0.3	3.77	34	0.2	15.3	1.6	91	1.5
Col 13, HC5, FB-GGT	OKY Master	Granite	Transition	0.03	1.56	6.4	0.017	16.3	16.5	0.02	1.52	1.7	*<1*	0.7	7.6	*<0.05*	0.39	*<0.05*	30.3	0.02	0.24	7.64	6	0.1	11	1.3	29	8.3
Col 14, HC6, FB-GGS	OKY Master (Sulphide)	Granite	Fresh	0.04	2.38	5.8	0.019	8	22	0.04	0.51	2.1	*<1*	0.9	4	*<0.05*	0.41	*<0.05*	33.7	0.04	0.33	6.24	7	0.1	12.1	1.5	32	8.7

Notes:
Values in grey italics are below the analytical detection limit

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 3 (SO)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	mgCaCO$_3$/L	mgCaCO$_3$/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
16-Jul-14	1	1	1500	440	7.9	2529	#N/A	8.6	284	600	49	0.26	1.0	748	0.11	0.0088	0.028	0.050	0.000014	< 0.000007	0.032	0.000025	188	0.0032	0.0076
30-Jul-14	2	3	400	295	8.3	938	#N/A	2.5	203	240	7.5	0.36	< 0.3	209	0.0090	0.0065	0.018	0.019	< 0.000007	< 0.000007	0.023	< 0.000003	50	0.00088	0.00091
13-Aug-14	3	5	400	300	8.2	720	#N/A	3.4	208	129	2.6	0.32	< 0.3	164	0.0022	0.0060	0.014	0.024	< 0.000007	< 0.000007	0.024	< 0.000003	39	0.00074	0.00038
27-Aug-14	4	7	400	315	8.2	551	#N/A	8.0	187	91	< 2	0.40	< 0.3	133	0.0065	0.0052	0.015	0.022	< 0.000007	< 0.000007	0.028	< 0.000003	32	0.00063	0.00021
10-Sep-14	5	9	400	310	8.2	497	#N/A	3.8	181	65	0.50	0.43	< 0.3	118	0.0048	0.0049	0.016	0.024	< 0.000007	< 0.000007	0.023	< 0.000003	29	0.00065	0.00015
24-Sep-14	6	11	400	215	8.2	476	#N/A	4.7	198	57	0.30	0.36	< 0.3	133	0.0023	0.0049	0.011	0.032	< 0.000007	< 0.000007	0.021	< 0.000003	32	0.00074	0.00020
8-Oct-14	7	13	300	200	8.2	426	#N/A	4.2	159	48	< 1	0.42	< 0.3	129	0.0066	0.0043	0.015	0.031	< 0.000007	< 0.000007	0.019	< 0.000003	32	0.00072	0.00011
22-Oct-14	8	15	400	260	8.2	385	#N/A	6.1	158	42	< 1	0.44	< 0.3	126	0.0077	0.0043	0.013	0.034	< 0.000007	< 0.000007	0.021	0.000014	30	0.00076	0.000086
5-Nov-14	9	17	400	270	-	378	#N/A	#N/A	175	36	< 1	0.39	< 0.3	141	0.0050	0.0039	0.011	0.040	< 0.000007	< 0.000007	0.022	< 0.000003	33	0.00079	0.00011
19-Nov-14	10	19	400	260	8.1	351	#N/A	6.8	156	29	< 0.2	0.39	< 0.3	148	0.0049	0.0036	0.012	0.048	< 0.000007	< 0.000007	0.021	0.0000030	34	0.00073	0.000088
3-Dec-14	11	21	400	335	8.2	342	#N/A	2.7	161	27	< 1	0.35	< 0.3	161	0.0048	0.0036	0.011	0.051	< 0.000007	< 0.000007	0.020	0.0000040	39	0.00070	0.000074
17-Dec-14	12	23	400	280	8.2	362	#N/A	3.0	164	21	< 0.2	0.38	< 0.3	161	0.0052	0.0037	0.012	0.058	< 0.000007	< 0.000007	0.022	< 0.000003	37	0.00057	0.000067
31-Dec-14	13	25	400	280	8.4	353	#N/A	#N/A	215	20	< 1	0.37	< 0.3	154	0.0082	0.0035	0.012	0.057	< 0.000007	< 0.000007	0.020	< 0.000003	37	0.00091	0.00011
14-Jan-15	14	27	400	265	8.2	311	#N/A	3.4	145	21	< 1	0.44	< 0.3	145	0.0061	0.0040	0.014	0.051	< 0.000007	< 0.000007	0.020	0.0000050	34	0.00091	0.000073
28-Jan-15	15	29	400	275	8.2	334	#N/A	3.3	154	18	< 1	0.38	< 0.3	156	0.0087	0.0035	0.011	0.060	< 0.000007	0.0000090	0.017	0.000030	36	0.00086	0.000052
11-Feb-15	16	31	400	255	8.2	357	#N/A	3.2	164	21	< 1	0.41	< 0.3	163	0.0061	0.0040	0.011	0.062	< 0.000007	< 0.000007	0.022	0.0000080	39	0.00078	0.000066
25-Feb-15	17	33	400	235	8.2	343	#N/A	4.2	172	15	< 1	0.34	< 0.3	165	0.0024	0.0034	0.0071	0.066	< 0.000007	< 0.000007	0.020	< 0.000003	41	0.00076	0.000049
11-Mar-15	18	35	400	295	8.2	349	#N/A	2.9	180	17	< 1	0.39	< 0.3	169	0.0053	0.0035	0.0074	0.067	< 0.000007	< 0.000007	0.019	< 0.000003	42	0.00087	0.000074
25-Mar-15	19	37	400	260	8.1	366	#N/A	5.1	181	13	< 1	0.37	< 0.3	180	0.0051	0.0040	0.0082	0.077	< 0.000007	< 0.000007	0.018	< 0.000003	42	0.00090	0.000047
8-Apr-15	20	39	400	315	8.1	354	#N/A	5.0	187	13	< 1	0.37	< 0.3	172	0.0038	0.0045	0.012	0.077	< 0.000007	< 0.000007	0.019	< 0.000003	43	0.00063	0.000049
22-Apr-15	21	41	400	275	8.1	324	#N/A	5.4	166	14	< 1	0.42	< 0.3	161	0.0051	0.0039	0.0088	0.068	< 0.000007	< 0.000007	0.021	0.000028	39	0.00080	0.000032
6-May-15	22	43	400	265	8.1	318	#N/A	3.9	171	11	< 1	0.37	< 0.3	161	0.0054	0.0039	0.0083	0.075	< 0.000007	< 0.000007	0.019	< 0.000003	39	0.00060	0.000030
20-May-15	23	45	500	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	24	47	420	295	8.1	283	#N/A	4.7	135	11	< 1	0.46	< 0.3	135	0.0082	0.0034	0.0086	0.065	< 0.000007	< 0.000007	0.017	< 0.000003	33	0.00074	0.000026
17-Jun-15	25	49	500	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	26	51	420	280	8.1	304	#N/A	5.6	140	10	< 1	0.46	< 0.3	136	0.0044	0.0041	0.014	0.077	< 0.000007	< 0.000007	0.019	0.0000040	32	0.00082	0.000042
15-Jul-15	27	53	500	360	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	28	55	360	280	8.2	269	#N/A	2.1	132	12	< 1	0.50	< 0.3	125	0.0065	0.0036	0.0098	0.070	< 0.000007	< 0.000007	0.018	< 0.000003	30	0.00084	0.000035
12-Aug-15	29	57	500	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	30	59	400	270	8.2	259	#N/A	2.0	131	10	< 1	0.46	< 0.3	125	0.0079	0.0038	0.011	0.079	< 0.000007	< 0.000007	0.017	0.0000060	30	0.00096	0.000038
9-Sep-15	31	61	500	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	32	63	400	340	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	33	65	340	230	8.2	273	#N/A	3.3	138	8.0		0.48		123	0.0083	0.0041	0.012	0.077	< 0.000007	< 0.000007	0.015	0.0000030	29	0.00082	0.000026
21-Oct-15	34	67	500	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	35	69	450	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	36	71	420	305	8.4	264	#N/A	#N/A	149	7.0		0.52		125	0.0040	0.0037	0.0088	0.079	< 0.000007	< 0.000007	0.011	< 0.000003	30	0.00091	0.000023
2-Dec-15	37	73	500	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	38	75	460	405	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	39	77	405	380	8.3	263	#N/A	#N/A	119	7.0	-	0.48	-	123	0.0061	0.0035	0.0097	0.083	< 0.000007	< 0.000007	0.014	< 0.000003	29	0.00083	0.000051
6-Jan-16	40	78	400	330	8.3	255	#N/A	0.90	120	8.0	-	0.54	-	134	0.0057	0.0038	0.011	0.085	< 0.000007	< 0.000007	0.015	< 0.000003	32	0.00095	0.000031
20-Jan-16	41	80	400	260	8.3	255	#N/A	1.7	120	8.0	-	0.53	-	132	0.0054	0.0043	0.012	0.093	< 0.000007	< 0.000007	0.014	0.0000040	32	0.00099	0.00012
3-Feb-16	42	82	400	375	8.2	245	#N/A	2.0	119	7.0	-	0.37	-	122	0.0041	0.0040	0.0094	0.091	< 0.000007	< 0.000007	0.012	< 0.000003	30	0.00092	0.000023
17-Feb-16	43	84	400	285	8.2	262	#N/A	4.0	122	7.0	-	0.59	-	134	0.0018	0.0040	0.0097	0.096	< 0.000007	< 0.000007	0.012	< 0.000003	33	0.0011	0.000021
2-Mar-16	44	86	400	350	8.2	251	#N/A	1.3	117	7.0	-	0.56	-	126	0.0022	0.0043	0.012	0.094	< 0.000007	< 0.000007	0.011	< 0.000003	29	0.0010	0.000040

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 3 (SO)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cu**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.		Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
16-Jul-14	1	1	1500	440	7.9	0.043	0.015	0.000090	0.020	68	0.052	0.34	0.0039	0.016	0.050	21	0.0081	5.0	0.000021	229	0.93	215	0.00019	0.00085	0.00054	0.025	0.0074	0.016	*< 0.002*
30-Jul-14	2	3	400	295	8.3	0.0079	2.7	0.000010	0.011	21	0.029	0.060	0.0046	0.0042	*< 0.009*	9.5	0.0034	4.8	*< 0.000002*	103	0.29	92	0.000096	0.000050	0.00039	0.013	0.00098	0.0030	*< 0.002*
13-Aug-14	3	5	400	300	8.2	0.0025	*< 0.002*	*< 0.00001*	0.011	16	0.011	0.020	0.0050	0.0021	*< 0.009*	7.9	0.0020	5.0	*< 0.000002*	46	0.23	49	0.000083	0.000020	0.00020	0.012	0.000020	0.0010	*< 0.002*
27-Aug-14	4	7	400	315	8.2	0.0014	*< 0.002*	0.000020	0.0089	13	0.0040	*< 0.01*	0.0049	0.0012	0.013	7.3	0.0013	4.9	*< 0.000002*	50	0.19	33	0.000082	0.00024	0.000070	0.0092	0.00019	*< 0.001*	*< 0.002*
10-Sep-14	5	9	400	310	8.2	0.0012	*< 0.007*	*< 0.00001*	0.0082	11	0.0021	*< 0.01*	0.0050	0.0010	*< 0.003*	6.5	0.0011	5.8	*< 0.000002*	56	0.20	27	0.000073	0.00017	*< 0.00005*	0.0074	0.00015	*< 0.001*	*< 0.002*
24-Sep-14	6	11	400	215	8.2	0.0015	*< 0.002*	0.000040	0.0091	13	0.0023	0.010	0.0034	0.0014	0.013	7.2	0.00045	5.0	0.000039	45	0.19	18	0.000080	0.000050	0.00033	0.0063	0.00011	0.0020	*< 0.002*
8-Oct-14	7	13	300	200	8.2	0.00098	*< 0.007*	0.00012	0.0090	12	0.0011	*< 0.01*	0.0046	0.00070	*< 0.003*	6.5	0.00080	5.1	*< 0.000002*	40	0.21	16	0.000077	0.000060	0.000090	0.0066	0.00014	*< 0.001*	*< 0.002*
22-Oct-14	8	15	400	260	8.2	0.0010	*< 0.007*	0.000030	0.0078	13	0.0017	*< 0.01*	0.0043	0.00070	*< 0.003*	7.4	0.00064	5.4	*< 0.000002*	30	0.19	15	0.000077	0.000060	0.00012	0.0058	0.00018	0.0010	*< 0.002*
5-Nov-14	9	17	400	270	-	0.00085	0.026	0.000060	0.0080	14	0.0016	*< 0.01*	0.0041	0.00060	*< 0.003*	6.3	0.00057	5.0	*< 0.000002*	24	0.24	12	0.000083	0.000030	0.00010	0.0058	0.000090	*< 0.001*	*< 0.002*
19-Nov-14	10	19	400	260	8.1	0.00096	*< 0.007*	*< 0.00001*	0.0082	15	0.00025	*< 0.01*	0.0037	0.00050	0.0060	6.6	0.00050	5.3	*< 0.000002*	17	0.26	9.4	0.00010	0.000070	0.00011	0.0058	0.00011	*< 0.001*	*< 0.002*
3-Dec-14	11	21	400	335	8.2	0.0011	*< 0.007*	0.000010	0.0074	15	0.0013	*< 0.01*	0.0032	0.00060	*< 0.003*	6.5	0.00043	5.0	*< 0.000002*	12	0.28	8.8	0.000089	0.000020	0.000070	0.0056	0.00010	*< 0.001*	*< 0.002*
17-Dec-14	12	23	400	280	8.2	0.00083	*< 0.007*	*< 0.00001*	0.0078	16	0.00018	*< 0.01*	0.0037	0.00050	*< 0.003*	7.3	0.00039	5.2	*< 0.000002*	9.2	0.29	7.7	0.000085	*< 0.00001*	0.000060	0.0058	0.00016	*< 0.001*	*< 0.002*
31-Dec-14	13	25	400	280	8.4	0.00082	*< 0.007*	0.00047	0.0071	15	0.0014	*< 0.01*	0.0042	0.00050	*< 0.003*	6.7	0.00035	5.1	0.0000020	6.3	0.28	7.2	0.000093	0.000070	0.000090	0.0056	0.00012	0.0020	*< 0.002*
14-Jan-15	14	27	400	265	8.2	0.0015	*< 0.007*	0.000050	0.0064	14	0.0012	*< 0.01*	0.0047	0.00050	*< 0.003*	6.7	0.00033	5.2	0.0000020	5.3	0.25	6.9	0.000078	0.000070	0.000090	0.0053	0.00014	0.0020	*< 0.002*
28-Jan-15	15	29	400	275	8.2	0.00071	*< 0.007*	0.000080	0.0057	16	0.00075	*< 0.01*	0.0041	0.00050	*< 0.003*	6.9	0.00043	4.7	*< 0.000002*	4.7	0.22	6.7	0.000083	0.00010	0.00012	0.0051	0.00022	0.0020	*< 0.002*
11-Feb-15	16	31	400	255	8.2	0.00067	*< 0.007*	0.000090	0.0067	16	0.00065	*< 0.01*	0.0036	0.00050	*< 0.003*	6.6	*< 0.001*	5.0	*< 0.000002*	3.6	0.27	6.4	0.000084	0.00039	*< 0.00005*	0.0053	0.00012	*< 0.001*	*< 0.002*
25-Feb-15	17	33	400	235	8.2	0.0013	*< 0.007*	0.000020	0.0068	16	0.00062	*< 0.01*	0.0026	0.00040	*< 0.003*	7.1	*< 0.001*	5.0	*< 0.000002*	3.0	0.27	5.4	0.000087	0.00013	*< 0.00005*	0.0052	0.000090	*< 0.001*	*< 0.002*
11-Mar-15	18	35	400	295	8.2	0.0016	*< 0.007*	0.000030	0.0068	16	0.00080	*< 0.01*	0.0028	0.00060	*< 0.003*	6.6	*< 0.001*	4.6	*< 0.000002*	2.6	0.29	5.3	0.000080	0.000020	*< 0.00005*	0.0051	0.00012	0.0020	*< 0.002*
25-Mar-15	19	37	400	260	8.1	0.0021	*< 0.007*	0.000010	0.0067	18	0.00060	*< 0.01*	0.0031	0.00060	*< 0.003*	7.7	*< 0.001*	5.7	0.0000020	2.7	0.31	5.5	0.000092	0.00068	0.000050	0.0058	0.00014	0.0010	*< 0.002*
8-Apr-15	20	39	400	315	8.1	0.0012	*< 0.007*	*< 0.00001*	0.0065	16	0.00039	*< 0.01*	0.0034	0.00040	*< 0.003*	7.2	*< 0.001*	5.8	*< 0.000002*	1.9	0.31	4.4	0.000080	0.00013	*< 0.00005*	0.0054	0.00011	*< 0.001*	*< 0.002*
22-Apr-15	21	41	400	275	8.1	0.0011	*< 0.007*	0.00027	0.0059	16	0.00075	*< 0.01*	0.0034	0.00040	*< 0.003*	7.1	0.00029	5.3	0.0000040	1.8	0.28	4.7	0.000086	0.00010	*< 0.00005*	0.0052	0.00013	0.0010	*< 0.002*
6-May-15	22	43	400	265	8.1	0.0015	*< 0.007*	*< 0.00001*	0.0060	15	0.00055	*< 0.01*	0.0031	0.00040	*< 0.003*	7.1	*< 0.001*	5.3	0.0000030	1.5	0.27	4.4	0.000071	0.000040	0.00012	0.0048	0.00018	0.0010	*< 0.002*
20-May-15	23	45	500	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	24	47	420	295	8.1	0.0020	*< 0.007*	0.000090	0.0048	13	0.00025	*< 0.01*	0.0034	0.00030	*< 0.003*	6.5	0.00015	4.9	0.0000020	1.1	0.24	4.5	0.000065	*< 0.00001*	*< 0.00005*	0.0044	0.00015	*< 0.001*	*< 0.002*
17-Jun-15	25	49	500	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	26	51	420	280	8.1	0.0044	*< 0.007*	0.000050	0.0052	14	0.0014	0.010	0.0041	0.00030	*< 0.003*	6.4	0.00029	5.2	*< 0.000002*	0.98	0.24	4.1	0.000074	0.00076	0.000080	0.0052	0.00012	0.0030	*< 0.002*
15-Jul-15	27	53	500	360	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	28	55	360	280	8.2	0.00046	*< 0.007*	0.000060	0.0048	12	0.00022	*< 0.01*	0.0043	0.00020	*< 0.003*	5.9	0.00012	4.4	*< 0.000002*	0.83	0.22	3.8	0.000063	0.000050	*< 0.00005*	0.0047	0.00013	0.0010	*< 0.002*
12-Aug-15	29	57	500	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	30	59	400	270	8.2	0.0010	*< 0.007*	0.00010	0.0043	12	0.0012	*< 0.01*	0.012	0.00020	*< 0.003*	5.9	0.00018	4.7	0.000087	0.87	0.23	3.9	0.000081	0.000090	*< 0.00005*	0.0046	0.00016	0.0020	*< 0.002*
9-Sep-15	31	61	500	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	32	63	400	340	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	33	65	340	230	8.2	0.0062	*< 0.007*	0.00066	0.0038	12	0.00053	0.020	0.0037	0.00030	*< 0.003*	5.8	0.00017	4.2	*< 0.000002*	0.66	0.20	3.5	0.000060	0.00030	*< 0.00005*	0.0047	0.00016	0.0010	*< 0.002*
21-Oct-15	34	67	500	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	35	69	450	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	36	71	420	305	8.4	0.00055	*< 0.007*	0.000060	0.0037	12	0.00024	*< 0.01*	0.0032	*< 0.0001*	*< 0.003*	6.0	0.00025	4.3	*< 0.000002*	0.59	0.20	3.1	0.000061	0.000030	0.000050	0.0035	0.000080	*< 0.001*	*< 0.002*
2-Dec-15	37	73	500	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	38	75	460	405	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	39	77	405	380	8.3	0.00098	*< 0.007*	0.00042	0.0033	12	0.00017	*< 0.01*	0.0040	0.00020	*< 0.003*	5.9	0.00013	4.2	*< 0.000002*	0.60	0.17	2.9	0.000043	0.00013	0.000060	0.0041	0.00013	*< 0.001*	*< 0.002*
6-Jan-16	40	78	400	330	8.3	0.0012	*< 0.007*	0.00048	0.0036	13	0.00057	*< 0.01*	0.0038	0.00020	*< 0.003*	6.6	0.00071	4.6	0.0000020	0.61	0.19	3.1	0.000023	0.00030	*< 0.00005*	0.0045	0.00010	*< 0.001*	*< 0.002*
20-Jan-16	41	80	400	260	8.3	0.00069	*< 0.007*	0.00019	0.0037	12	0.0062	*< 0.01*	0.0044	0.00030	*< 0.003*	6.2	0.00033	4.8	*< 0.000002*	0.57	0.22	3.1	0.00011	0.00010	*< 0.00005*	0.0050	0.00011	0.0020	*< 0.002*
3-Feb-16	42	82	400	375	8.2	0.00085	*< 0.007*	0.000080	0.0036	11	0.000040	*< 0.01*	0.0039	0.00020	*< 0.003*	6.0	0.00036	4.4	0.000011	0.56	0.22	3.0	0.000070	0.000040	*< 0.00005*	0.0043	0.00010	*< 0.001*	*< 0.002*
17-Feb-16	43	84	400	285	8.2	0.00045	*< 0.007*	0.000050	0.0036	13	0.00023	*< 0.01*	0.0040	0.00020	0.0050	6.3	0.000080	4.5	*< 0.000002*	0.61	0.21	3.0	0.000069	*< 0.00001*	*< 0.00005*	0.0044	0.000070	*< 0.001*	*< 0.002*
2-Mar-16	44	86	400	350	8.2	0.00024	*< 0.007*	0.000070	0.0036	13	0.00025	*< 0.01*	0.0041	0.00020	*< 0.003*	6.1	0.000080	4.5	*< 0.000002*	0.59	0.21	3.3	0.000076	0.000010	*< 0.00005*	0.0047	0.000070	*< 0.001*	*< 0.002*

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Calculated Loading Rates for Col 3 (SO)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
16-Jul-14	1	1	1500	440	7.9	2529	#N/A	0.38	12	26	2.2	0.011	0.044	33	0.0050	0.00039	0.0012	0.0022	0.00000062	0.00000031	0.0014	0.0000011	8.3	0.00014	0.00034
30-Jul-14	2	3	400	295	8.3	938	#N/A	0.036	3.0	3.5	0.11	0.0053	0.0044	3.1	0.00013	0.000096	0.00027	0.00028	0.00000010	0.00000010	0.00033	0.000000044	0.73	0.000013	0.000013
13-Aug-14	3	5	400	300	8.2	720	#N/A	0.051	3.1	1.9	0.039	0.0048	0.0045	2.5	0.000033	0.000090	0.00022	0.00036	0.00000011	0.00000011	0.00036	0.000000045	0.59	0.000011	0.0000057
27-Aug-14	4	7	400	315	8.2	551	#N/A	0.13	2.9	1.4	0.032	0.0063	0.0047	2.1	0.00010	0.000082	0.00023	0.00034	0.00000011	0.00000011	0.00045	0.000000047	0.50	0.0000099	0.0000032
10-Sep-14	5	9	400	310	8.2	497	#N/A	0.058	2.8	1.0	0.0078	0.0067	0.0047	1.8	0.000074	0.000076	0.00024	0.00038	0.00000011	0.00000011	0.00036	0.000000047	0.45	0.000010	0.0000023
24-Sep-14	6	11	400	215	8.2	476	#N/A	0.050	2.1	0.61	0.0032	0.0039	0.0032	1.4	0.000025	0.000053	0.00012	0.00034	0.000000075	0.000000075	0.00022	0.000000032	0.34	0.0000080	0.0000021
8-Oct-14	7	13	300	200	8.2	426	#N/A	0.042	1.6	0.48	0.010	0.0042	0.0030	1.3	0.000066	0.000043	0.00015	0.00031	0.000000070	0.000000070	0.00019	0.000000030	0.32	0.0000072	0.0000011
22-Oct-14	8	15	400	260	8.2	385	#N/A	0.080	2.1	0.55	0.013	0.0057	0.0039	1.6	0.00010	0.000056	0.00017	0.00044	0.000000091	0.000000091	0.00027	0.00000018	0.38	0.0000099	0.0000011
5-Nov-14	9	17	400	270		378	#N/A	#N/A	2.4	0.49	0.014	0.0053	0.0041	1.9	0.000068	0.000053	0.00015	0.00054	0.000000095	0.000000095	0.00029	0.000000041	0.44	0.000011	0.0000014
19-Nov-14	10	19	400	260	8.1	351	#N/A	0.088	2.0	0.38	0.0026	0.0051	0.0039	1.9	0.000064	0.000047	0.00015	0.00062	0.000000091	0.000000091	0.00028	0.000000039	0.44	0.0000095	0.0000011
3-Dec-14	11	21	400	335	8.2	342	#N/A	0.046	2.7	0.45	0.017	0.0059	0.0050	2.7	0.000080	0.000060	0.00018	0.00086	0.00000012	0.00000012	0.00033	0.000000067	0.65	0.000012	0.0000012
17-Dec-14	12	23	400	280	8.2	362	#N/A	0.042	2.3	0.29	0.0028	0.0053	0.0042	2.3	0.000073	0.000052	0.00016	0.00082	0.000000098	0.000000098	0.00030	0.000000042	0.52	0.0000080	0.00000094
31-Dec-14	13	25	400	280	8.4	353	#N/A	#N/A	3.0	0.28	0.014	0.0052	0.0042	2.2	0.00011	0.000049	0.00017	0.00080	0.000000098	0.000000098	0.00029	0.000000042	0.51	0.000013	0.0000015
14-Jan-15	14	27	400	265	8.2	311	#N/A	0.045	1.9	0.28	0.013	0.0058	0.0040	1.9	0.000081	0.000053	0.00018	0.00068	0.000000093	0.000000093	0.00026	0.000000066	0.45	0.000012	0.00000097
28-Jan-15	15	29	400	275	8.2	334	#N/A	0.045	2.1	0.25	0.014	0.0052	0.0041	2.1	0.00012	0.000048	0.00015	0.00082	0.000000096	0.00000012	0.00024	0.00000041	0.50	0.000012	0.00000072
11-Feb-15	16	31	400	255	8.2	357	#N/A	0.041	2.1	0.27	0.013	0.0052	0.0038	2.1	0.000078	0.000051	0.00014	0.00079	0.000000089	0.000000089	0.00027	0.00000010	0.50	0.0000099	0.00000084
25-Feb-15	17	33	400	235	8.2	343	#N/A	0.049	2.0	0.18	0.012	0.0040	0.0035	1.9	0.000028	0.000040	0.000083	0.00077	0.000000082	0.000000082	0.00023	0.000000035	0.48	0.0000089	0.00000058
11-Mar-15	18	35	400	295	8.2	349	#N/A	0.042	2.6	0.25	0.015	0.0058	0.0044	2.5	0.000078	0.000052	0.00011	0.00099	0.00000010	0.00000010	0.00027	0.000000044	0.62	0.000013	0.0000011
25-Mar-15	19	37	400	260	8.1	366	#N/A	0.066	2.4	0.17	0.013	0.0048	0.0039	2.3	0.000066	0.000052	0.00011	0.0010	0.000000091	0.000000091	0.00024	0.000000039	0.54	0.000012	0.00000061
8-Apr-15	20	39	400	315	8.1	354	#N/A	0.078	2.9	0.20	0.016	0.0058	0.0047	2.7	0.000060	0.000071	0.00018	0.0012	0.00000011	0.00000011	0.00030	0.000000047	0.68	0.0000099	0.00000077
22-Apr-15	21	41	400	275	8.1	324	#N/A	0.074	2.3	0.19	0.014	0.0058	0.0041	2.2	0.000070	0.000054	0.00012	0.00094	0.000000096	0.000000096	0.00029	0.00000039	0.54	0.000011	0.00000044
6-May-15	22	43	400	265	8.1	318	#N/A	0.052	2.3	0.15	0.013	0.0049	0.0040	2.1	0.000072	0.000052	0.00011	0.00099	0.000000093	0.000000093	0.00025	0.000000040	0.52	0.0000080	0.00000040
20-May-15	23	45	500	420																					
3-Jun-15	24	47	420	295	8.1	283	#N/A	0.035	0.99	0.081	0.0074	0.0034	0.0022	1.00	0.000060	0.000025	0.000063	0.00048	0.000000052	0.000000052	0.00012	0.000000022	0.24	0.0000055	0.00000019
17-Jun-15	25	49	500	420																					
1-Jul-15	26	51	420	280	8.1	304	#N/A	0.039	0.98	0.070	0.0070	0.0032	0.0021	0.95	0.000031	0.000029	0.000095	0.00054	0.000000049	0.000000049	0.00013	0.000000028	0.23	0.0000057	0.00000029
15-Jul-15	27	53	500	360																					
29-Jul-15	28	55	360	280	8.2	269	#N/A	0.015	0.92	0.084	0.0070	0.0035	0.0021	0.88	0.000046	0.000025	0.000069	0.00049	0.000000049	0.000000049	0.00012	0.000000021	0.21	0.0000059	0.00000025
12-Aug-15	29	57	500	400																					
26-Aug-15	30	59	400	270	8.2	259	#N/A	0.013	0.89	0.068	0.0068	0.0031	0.0020	0.84	0.000053	0.000026	0.000075	0.00053	0.000000047	0.000000047	0.00011	0.000000041	0.21	0.0000065	0.00000026
9-Sep-15	31	61	500	400																					
23-Sep-15	32	63	400	340																					
7-Oct-15	33	65	340	230	8.2	273	#N/A	0.013	0.53	0.031		0.0018		0.47	0.000032	0.000016	0.000045	0.00029	0.000000027	0.000000027	0.000058	0.000000012	0.11	0.0000031	0.000000100
21-Oct-15	34	67	500	450																					
4-Nov-15	35	69	450	420																					
18-Nov-15	36	71	420	305	8.4	264	#N/A		0.76	0.036		0.0026		0.64	0.000020	0.000019	0.000045	0.00040	0.000000036	0.000000036	0.000055	0.000000015	0.15	0.0000046	0.00000012
2-Dec-15	37	73	500	460																					
16-Dec-15	38	75	460	405																					
30-Dec-15	39	77	405	380	8.3	263	#N/A		0.76	0.044		0.0030		0.78	0.000039	0.000022	0.000061	0.00052	0.000000044	0.000000044	0.000087	0.000000019	0.19	0.0000053	0.00000032
6-Jan-16	40	78	400	330	8.3	255	#N/A	0.015	2.0	0.13		0.0089		2.2	0.000094	0.000063	0.00018	0.0014	0.00000012	0.00000012	0.00025	0.000000050	0.52	0.000016	0.00000051
20-Jan-16	41	80	400	260	8.3	255	#N/A	0.022	1.6	0.10		0.0069		1.7	0.000070	0.000056	0.00015	0.0012	0.000000091	0.000000091	0.00018	0.000000052	0.42	0.000013	0.0000016
3-Feb-16	42	82	400	375	8.2	245	#N/A	0.037	2.2	0.13		0.0069		2.3	0.000077	0.000075	0.00018	0.0017	0.00000013	0.00000013	0.00023	0.000000056	0.56	0.000017	0.00000043
17-Feb-16	43	84	400	285	8.2	262	#N/A	0.057	1.7	0.100		0.0084		1.9	0.000026	0.000057	0.00014	0.0014	0.000000100	0.000000100	0.00017	0.000000043	0.46	0.000015	0.00000030
2-Mar-16	44	86	400	350	8.2	251	#N/A	0.023	2.0	0.12		0.0098		2.2	0.000039	0.000075	0.00020	0.0016	0.00000012	0.00000012	0.00019	0.000000053	0.51	0.000018	0.00000070

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Calculated Loading Rates for Col 3 (SO)

Date	Cycle	Weeks	Volume (mL)		pH	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.		Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
16-Jul-14	1	1	1500	440	7.9	0.0019	0.00066	0.0000040	0.00089	3.0	0.0023	0.015	0.00017	0.00070	0.0022	0.93	0.00036	0.22	0.00000092	10	0.041	9.5	0.0000082	0.000037	0.000024	0.0011	0.00032	0.00070	0.000088
30-Jul-14	2	3	400	295	8.3	0.00012	0.039	0.00000015	0.00017	0.30	0.00043	0.00089	0.000068	0.000062	0.00013	0.14	0.000051	0.071	0.000000030	1.5	0.0042	1.4	0.0000014	0.00000074	0.0000058	0.00020	0.000014	0.000044	0.000030
13-Aug-14	3	5	400	300	8.2	0.000037	0.000030	0.00000015	0.00017	0.24	0.00017	0.00030	0.000075	0.000032	0.00014	0.12	0.000029	0.075	0.000000030	0.69	0.0034	0.74	0.0000012	0.00000030	0.0000030	0.00017	0.00000030	0.000015	0.000030
27-Aug-14	4	7	400	315	8.2	0.000023	0.000032	0.00000032	0.00014	0.20	0.000063	0.00016	0.000077	0.000019	0.00020	0.12	0.000020	0.077	0.000000032	0.79	0.0029	0.52	0.0000013	0.0000038	0.0000011	0.00014	0.0000030	0.000016	0.000032
10-Sep-14	5	9	400	310	8.2	0.000019	0.00011	0.00000016	0.00013	0.17	0.000032	0.00016	0.000078	0.000016	0.000047	0.100	0.000017	0.089	0.000000031	0.87	0.0030	0.41	0.0000011	0.0000026	0.00000078	0.00011	0.0000023	0.000016	0.000031
24-Sep-14	6	11	400	215	8.2	0.000016	0.000022	0.00000043	0.000098	0.14	0.000025	0.00011	0.000037	0.000015	0.00014	0.078	0.0000048	0.053	0.00000042	0.48	0.0021	0.19	0.00000086	0.00000054	0.0000035	0.000068	0.0000012	0.000022	0.000022
8-Oct-14	7	13	300	200	8.2	0.0000098	0.000070	0.0000012	0.000090	0.12	0.000011	0.00010	0.000046	0.0000070	0.000030	0.065	0.0000080	0.051	0.000000020	0.40	0.0021	0.16	0.00000077	0.00000060	0.00000090	0.000066	0.0000014	0.000010	0.000020
22-Oct-14	8	15	400	260	8.2	0.000013	0.000091	0.00000039	0.00010	0.16	0.000022	0.00013	0.000056	0.0000091	0.000039	0.096	0.0000083	0.070	0.000000026	0.39	0.0025	0.20	0.0000010	0.00000078	0.0000016	0.000075	0.0000023	0.000013	0.000026
5-Nov-14	9	17	400	270		0.000011	0.00035	0.00000081	0.00011	0.19	0.000021	0.00014	0.000055	0.0000081	0.000041	0.085	0.0000077	0.068	0.000000027	0.32	0.0033	0.16	0.0000011	0.00000041	0.0000014	0.000078	0.0000012	0.000014	0.000027
19-Nov-14	10	19	400	260	8.1	0.000012	0.000091	0.00000013	0.00011	0.20	0.0000033	0.00013	0.000048	0.0000065	0.000078	0.085	0.0000065	0.069	0.000000026	0.22	0.0034	0.12	0.0000014	0.00000091	0.0000014	0.000075	0.0000014	0.000013	0.000026
3-Dec-14	11	21	400	335	8.2	0.000018	0.00012	0.00000017	0.00012	0.26	0.000022	0.00017	0.000054	0.000010	0.000050	0.11	0.0000072	0.083	0.000000034	0.20	0.0047	0.15	0.0000015	0.00000034	0.0000012	0.000094	0.0000017	0.000017	0.000034
17-Dec-14	12	23	400	280	8.2	0.000012	0.000098	0.00000014	0.00011	0.23	0.0000025	0.00014	0.000051	0.0000070	0.000042	0.10	0.0000055	0.073	0.000000028	0.13	0.0040	0.11	0.0000012	0.00000014	0.00000084	0.000081	0.0000022	0.000014	0.000028
31-Dec-14	13	25	400	280	8.4	0.000011	0.000098	0.0000066	0.000099	0.21	0.000019	0.00014	0.000058	0.0000070	0.000042	0.094	0.0000049	0.072	0.000000028	0.089	0.0039	0.10	0.0000013	0.00000098	0.0000013	0.000078	0.0000017	0.000028	0.000028
14-Jan-15	14	27	400	265	8.2	0.000020	0.000093	0.00000066	0.000085	0.19	0.000015	0.00013	0.000062	0.0000066	0.000040	0.089	0.0000044	0.069	0.000000027	0.070	0.0033	0.091	0.0000010	0.00000093	0.0000012	0.000070	0.0000019	0.000027	0.000027
28-Jan-15	15	29	400	275	8.2	0.0000098	0.000096	0.0000011	0.000079	0.22	0.000010	0.00014	0.000057	0.0000069	0.000041	0.094	0.0000059	0.065	0.000000028	0.064	0.0030	0.092	0.0000011	0.0000014	0.0000017	0.000071	0.0000030	0.000028	0.000028
11-Feb-15	16	31	400	255	8.2	0.0000085	0.000089	0.0000011	0.000085	0.20	0.0000083	0.00013	0.000046	0.0000064	0.000038	0.084	0.000013	0.064	0.000000026	0.046	0.0035	0.082	0.0000011	0.0000050	0.00000064	0.000068	0.0000015	0.000013	0.000026
25-Feb-15	17	33	400	235	8.2	0.000015	0.000082	0.00000024	0.000079	0.18	0.0000073	0.00012	0.000030	0.0000047	0.000035	0.083	0.000012	0.059	0.000000024	0.036	0.0032	0.063	0.0000010	0.0000015	0.00000059	0.000061	0.0000011	0.000012	0.000024
11-Mar-15	18	35	400	295	8.2	0.000023	0.00010	0.00000044	0.00010	0.23	0.000012	0.00015	0.000042	0.0000089	0.000044	0.098	0.000015	0.067	0.000000030	0.038	0.0042	0.078	0.0000012	0.00000030	0.00000074	0.000075	0.0000018	0.000030	0.000030
25-Mar-15	19	37	400	260	8.1	0.000027	0.000091	0.00000013	0.000087	0.24	0.0000078	0.00013	0.000041	0.0000078	0.000039	0.10	0.000013	0.075	0.000000026	0.035	0.0040	0.072	0.0000012	0.0000088	0.00000065	0.000075	0.0000018	0.000013	0.000026
8-Apr-15	20	39	400	315	8.1	0.000018	0.00011	0.00000016	0.00010	0.25	0.0000061	0.00016	0.000054	0.0000063	0.000047	0.11	0.000016	0.092	0.000000032	0.030	0.0049	0.069	0.0000013	0.0000020	0.00000079	0.000086	0.0000017	0.000016	0.000032
22-Apr-15	21	41	400	275	8.1	0.000015	0.000096	0.0000037	0.000081	0.21	0.000010	0.00014	0.000047	0.0000055	0.000041	0.097	0.0000040	0.073	0.000000055	0.024	0.0038	0.065	0.0000012	0.0000014	0.00000069	0.000071	0.0000018	0.000014	0.000028
6-May-15	22	43	400	265	8.1	0.000020	0.000093	0.00000013	0.000080	0.20	0.0000073	0.00013	0.000041	0.0000053	0.000040	0.095	0.000013	0.071	0.000000040	0.020	0.0035	0.058	0.00000094	0.00000053	0.0000016	0.000063	0.0000024	0.000013	0.000027
20-May-15	23	45	500	420																									
3-Jun-15	24	47	420	295	8.1	0.000015	0.000052	0.00000066	0.000035	0.094	0.0000018	0.000074	0.000025	0.0000022	0.000022	0.048	0.0000011	0.036	0.000000015	0.0080	0.0017	0.033	0.00000048	0.000000074	0.00000037	0.000032	0.0000011	0.0000074	0.000015
17-Jun-15	25	49	500	420																									
1-Jul-15	26	51	420	280	8.1	0.000031	0.000049	0.00000035	0.000036	0.095	0.0000097	0.000070	0.000029	0.0000021	0.000021	0.045	0.0000020	0.036	0.000000014	0.0069	0.0017	0.029	0.00000052	0.0000053	0.00000056	0.000036	0.00000084	0.000021	0.000014
15-Jul-15	27	53	500	360																									
29-Jul-15	28	55	360	280	8.2	0.0000032	0.000049	0.00000042	0.000034	0.084	0.0000015	0.000070	0.000030	0.0000014	0.000021	0.041	0.00000084	0.031	0.000000014	0.0058	0.0015	0.027	0.00000044	0.00000035	0.00000035	0.000033	0.00000091	0.0000070	0.000014
12-Aug-15	29	57	500	400																									
26-Aug-15	30	59	400	270	8.2	0.0000068	0.000047	0.00000068	0.000029	0.080	0.0000080	0.000068	0.000081	0.0000014	0.000020	0.040	0.0000012	0.031	0.00000059	0.0059	0.0015	0.026	0.00000055	0.00000061	0.00000034	0.000031	0.0000011	0.000014	0.000014
9-Sep-15	31	61	500	400																									
23-Sep-15	32	63	400	340																									
7-Oct-15	33	65	340	230	8.2	0.000024	0.000027	0.0000025	0.000015	0.046	0.0000020	0.000077	0.000014	0.0000012	0.000012	0.022	0.00000065	0.016	0.0000000077	0.0025	0.00076	0.013	0.00000023	0.0000012	0.00000019	0.000018	0.00000061	0.0000038	0.0000077
21-Oct-15	34	67	500	450																									
4-Nov-15	35	69	450	420																									
18-Nov-15	36	71	420	305	8.4	0.0000028	0.000036	0.00000031	0.000019	0.062	0.0000012	0.000051	0.000016	0.00000051	0.000015	0.031	0.0000013	0.022	0.000000010	0.0030	0.0010	0.016	0.00000031	0.00000015	0.00000025	0.000018	0.00000041	0.0000051	0.000010
2-Dec-15	37	73	500	460																									
16-Dec-15	38	75	460	405																									
30-Dec-15	39	77	405	380	8.3	0.0000062	0.000044	0.0000027	0.000021	0.076	0.0000011	0.000063	0.000025	0.0000013	0.000019	0.037	0.00000082	0.027	0.000000013	0.0038	0.0011	0.018	0.00000027	0.00000082	0.00000038	0.000026	0.00000082	0.0000063	0.000013
6-Jan-16	40	78	400	330	8.3	0.000020	0.00012	0.0000079	0.000060	0.22	0.0000094	0.00017	0.000063	0.0000033	0.000050	0.11	0.000012	0.075	0.000000033	0.010	0.0032	0.051	0.00000038	0.0000050	0.00000083	0.000074	0.0000017	0.000017	0.000033
20-Jan-16	41	80	400	260	8.3	0.0000090	0.000091	0.0000025	0.000048	0.16	0.000080	0.00013	0.000057	0.0000039	0.000039	0.080	0.0000043	0.063	0.000000026	0.0074	0.0029	0.040	0.0000014	0.0000013	0.00000065	0.000064	0.0000014	0.000026	0.000026
3-Feb-16	42	82	400	375	8.2	0.000016	0.00013	0.0000015	0.000068	0.21	0.00000075	0.00019	0.000073	0.0000038	0.000056	0.11	0.0000068	0.083	0.00000021	0.011	0.0041	0.056	0.0000013	0.00000075	0.00000094	0.000080	0.0000019	0.000019	0.000038
17-Feb-16	43	84	400	285	8.2	0.0000064	0.000100	0.00000071	0.000051	0.18	0.0000033	0.00014	0.000058	0.0000029	0.000071	0.089	0.0000011	0.065	0.000000029	0.0087	0.0030	0.043	0.00000098	0.0000014	0.00000071	0.000063	0.00000100	0.000014	0.000029
2-Mar-16	44	86	400	350	8.2	0.0000042	0.00012	0.0000012	0.000064	0.22	0.0000044	0.00018	0.000071	0.0000035	0.000053	0.11	0.0000014	0.079	0.000000035	0.010	0.0036	0.058	0.0000013	0.00000018	0.00000088	0.000083	0.0000012	0.000018	0.000035

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 4 (ST)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
16-Jul-14	1	1	1300	315	7.8	3419	#N/A	9.6	138	1704	24	0.27	0.40	1720	0.062	0.0032	0.021	0.071	< 0.000007	< 0.000007	0.038	0.000018	360	0.0017	0.0084
30-Jul-14	2	3	400	335	8.0	1594	#N/A	4.4	116	711	3.0	0.34	< 0.3	615	0.0057	0.0026	0.014	0.021	< 0.000007	< 0.000007	0.033	0.0000030	135	0.00029	0.0017
13-Aug-14	3	5	400	340	8.0	1176	#N/A	5.2	113	434	1.2	0.38	< 0.3	403	0.0022	0.0025	0.010	0.022	< 0.000007	< 0.000007	0.036	0.0000070	86	0.00022	0.00089
27-Aug-14	4	7	400	340	8.1	882	#N/A	7.3	125	333	0.60	0.41	< 0.3	304	0.0037	0.0023	0.0089	0.019	< 0.000007	< 0.000007	0.040	0.0000060	65	0.00015	0.00053
10-Sep-14	5	9	400	355	8.1	756	#N/A	6.7	126	237	0.20	0.49	< 0.3	285	0.0081	0.0020	0.0093	0.022	< 0.000007	< 0.000007	0.036	0.000018	71	0.00021	0.00037
24-Sep-14	6	11	400	255	8.2	671	#N/A	5.8	163	183	0.20	0.44	< 0.3	205	0.0017	0.0022	0.0092	0.026	< 0.000007	< 0.000007	0.036	0.0000060	43	0.00026	0.00045
8-Oct-14	7	13	300	225	8.1	673	#N/A	5.4	163	170	< 1	0.42	< 0.3	275	0.0059	0.0020	0.0098	0.027	< 0.000007	< 0.000007	0.036	< 0.000003	71	0.00021	0.00030
22-Oct-14	8	15	400	315	8.2	653	#N/A	7.7	188	142	< 1	0.43	< 0.3	217	0.0042	0.0021	0.0082	0.030	< 0.000007	< 0.000007	0.041	0.000052	45	0.00017	0.00027
5-Nov-14	9	17	400	320	-	561	#N/A	#N/A	170	119	< 1	0.48	< 0.3	166	0.0045	0.0021	0.0084	0.028	< 0.000007	< 0.000007	0.037	0.0000060	35	0.00024	0.00021
19-Nov-14	10	19	400	290	8.0	521	#N/A	7.1	154	118	< 0.2	0.57	< 0.3	153	0.0047	0.0022	0.0087	0.028	< 0.000007	< 0.000007	0.036	0.000047	31	0.00028	0.00018
3-Dec-14	11	21	400	350	8.2	481	#N/A	2.5	151	109	< 0.2	0.53	< 0.3	146	0.0056	0.0022	0.0073	0.029	< 0.000007	< 0.000007	0.032	0.000012	32	0.00032	0.00015
17-Dec-14	12	23	400	310	8.2	502	#N/A	3.0	141	99	< 0.2	0.66	< 0.3	143	0.0073	0.0023	0.0083	0.030	< 0.000007	< 0.000007	0.035	0.000012	29	0.00026	0.00013
31-Dec-14	13	25	400	300	8.3	475	#N/A	1.0	183	78	< 1	0.57	< 0.3	135	0.0076	0.0021	0.0069	0.030	< 0.000007	< 0.000007	0.030	0.000013	29	0.00023	0.00013
14-Jan-15	14	27	400	300	8.2	457	#N/A	2.9	155	81	< 1	0.56	< 0.3	146	0.0056	0.0022	0.0065	0.033	< 0.000007	< 0.000007	0.032	0.000017	32	0.00040	0.00011
28-Jan-15	15	29	400	295	8.1	461	#N/A	3.4	149	85	< 1	0.55	< 0.3	142	0.0069	0.0021	0.0069	0.030	< 0.000007	< 0.000007	0.026	0.0000070	29	0.00049	0.000089
11-Feb-15	16	31	400	270	8.2	454	#N/A	3.6	136	87	< 1	0.61	< 0.3	139	0.0070	0.0025	0.0078	0.030	< 0.000007	< 0.000007	0.032	0.000012	29	0.00045	0.000096
25-Feb-15	17	33	400	270	8.1	420	#N/A	4.2	147	65	< 1	0.50	< 0.3	144	0.0025	0.0019	0.0051	0.034	< 0.000007	< 0.000007	0.028	0.0000070	32	0.00047	0.000083
11-Mar-15	18	35	400	305	8.2	412	#N/A	3.1	149	69	< 1	0.57	< 0.3	150	0.0047	0.0019	0.0055	0.032	< 0.000007	< 0.000007	0.025	0.0000040	34	0.00050	0.000080
25-Mar-15	19	37	400	280	8.1	437	#N/A	4.8	158	67	< 1	0.53	< 0.3	177	0.0044	0.0022	0.0066	0.039	< 0.000007	< 0.000007	0.025	0.0000040	37	0.00062	0.000092
8-Apr-15	20	39	400	370	8.1	417	#N/A	5.7	164	60	< 1	0.51	< 0.3	167	0.0041	0.0025	0.0063	0.039	< 0.000007	< 0.000007	0.026	< 0.000003	38	0.00040	0.000087
22-Apr-15	21	41	400	260	8.1	380	#N/A	5.0	140	65	< 1	0.60	< 0.3	156	0.0054	0.0022	0.0061	0.033	< 0.000007	< 0.000007	0.027	0.000022	33	0.00051	0.000065
6-May-15	22	43	400	325	8.1	375	#N/A	4.3	140	57	< 1	0.61	< 0.3	157	0.0064	0.0022	0.0063	0.035	< 0.000007	< 0.000007	0.024	0.0000030	33	0.00044	0.000070
20-May-15	23	45	500	445	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	24	47	445	340	8.1	348	#N/A	4.4	124	47	< 1	0.58	< 0.3	146	0.0087	0.0017	0.0054	0.037	< 0.000007	< 0.000007	0.023	0.0000090	32	0.00054	0.000056
17-Jun-15	25	49	500	440	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	26	51	440	315	8.1	378	#N/A	5.7	124	55	< 1	0.55	< 0.3	145	0.0064	0.0018	0.0072	0.038	< 0.000007	< 0.000007	0.021	0.0000090	31	0.00063	0.000064
15-Jul-15	27	53	500	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	28	55	420	325	8.1	346	#N/A	3.6	121	56	< 1	0.56	< 0.3	146	0.0054	0.0017	0.0057	0.035	< 0.000007	< 0.000007	0.020	0.0000050	31	0.00061	0.000039
12-Aug-15	29	57	500	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	30	59	450	335	8.2	350	#N/A	2.2	120	60	< 1	0.53	< 0.3	147	0.0080	0.0017	0.0060	0.038	< 0.000007	< 0.000007	0.018	0.000010	32	0.00062	0.000055
9-Sep-15	31	61	500	445	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	32	63	445	395	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	33	65	395	305	8.1	378	#N/A	3.3	130	63		0.50		149	0.0073	0.0017	0.0058	0.035	< 0.000007	< 0.000007	0.015	0.0000040	32	0.00057	0.000037
21-Oct-15	34	67	500	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	35	69	450	440	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	36	71	440	350	8.3	368	#N/A	#N/A	139	64		0.48		158	0.0051	0.0014	0.0054	0.036	< 0.000007	< 0.000007	0.010	0.0000040	33	0.00061	0.000032
2-Dec-15	37	73	500	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	38	75	460	430	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	39	77	430	425	8.3	365	#N/A	#N/A	112	53	-	0.47	-	151	0.0051	0.0014	0.0049	0.036	< 0.000007	< 0.000007	0.013	< 0.000003	33	0.00059	0.000019
6-Jan-16	40	78	400	330	8.3	366	#N/A	1.1	114	60	-	0.42	-	168	0.0054	0.0016	0.0055	0.042	< 0.000007	< 0.000007	0.014	0.000056	36	0.00064	0.000025
20-Jan-16	41	80	400	310	8.2	366	#N/A	2.0	109	65	-	0.44	-	169	0.0045	0.0016	0.0064	0.042	< 0.000007	< 0.000007	0.012	0.000010	36	0.00073	0.000053
3-Feb-16	42	82	400	340	8.2	336	#N/A	2.1	111	52	-	0.44	-	146	0.0042	0.0016	0.0059	0.038	< 0.000007	< 0.000007	0.011	0.0000030	32	0.00066	0.000035
17-Feb-16	43	84	400	330	8.2	335	#N/A	3.8	119	42	-	0.50	-	155	0.0019	0.0016	0.0057	0.040	< 0.000007	< 0.000007	0.010	< 0.000003	34	0.00079	0.000034
2-Mar-16	44	86	400	360	8.3	318	#N/A	1.3	116	41	-	0.49	-	142	0.0027	0.0017	0.0072	0.038	< 0.000007	< 0.000007	0.010	0.0000080	30	0.00084	0.000066

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 4 (ST)

Date	Cycle	Weeks	Volume (mL)		pH	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.		Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
16-Jul-14	1	1	1300	315	7.8	0.056	0.017	0.00010	0.037	200	0.14	0.040	0.018	0.054	0.040	37	0.039	5.5	0.000035	187	7.1	632	0.000053	0.00036	0.00060	0.18	0.0045	0.016	< 0.002
30-Jul-14	2	3	400	335	8.0	0.0093	1.0	0.000020	0.020	68	0.084	< 0.01	0.019	0.023	0.012	22	0.011	5.2	< 0.000002	95	3.9	263	0.000038	< 0.00001	0.00051	0.074	0.00051	0.0030	< 0.002
13-Aug-14	3	5	400	340	8.0	0.0054	< 0.002	0.000010	0.019	46	0.046	< 0.01	0.023	0.013	< 0.009	18	0.0052	5.2	< 0.000002	46	3.6	164	0.000024	< 0.00001	0.00023	0.063	0.00013	0.0020	< 0.002
27-Aug-14	4	7	400	340	8.1	0.0032	< 0.002	0.000010	0.015	34	0.028	< 0.01	0.029	0.0067	< 0.009	17	0.0023	5.3	< 0.000002	50	3.3	115	0.000025	0.00021	0.000070	0.054	0.00027	< 0.001	< 0.002
10-Sep-14	5	9	400	355	8.1	0.0030	< 0.007	0.000020	0.014	26	0.017	< 0.01	0.034	0.0037	< 0.003	14	0.0014	6.0	< 0.000002	57	3.9	93	0.000018	0.00016	0.000080	0.048	0.00031	< 0.001	< 0.002
24-Sep-14	6	11	400	255	8.2	0.0029	< 0.002	0.000070	0.014	24	0.018	< 0.01	0.030	0.0039	< 0.009	14	0.00086	5.1	0.000016	47	3.1	60	0.000019	0.000040	0.00041	0.047	0.00029	0.0020	< 0.002
8-Oct-14	7	13	300	225	8.1	0.0025	< 0.007	0.000020	0.017	24	0.016	< 0.01	0.027	0.0032	< 0.003	14	0.00098	5.5	< 0.000002	52	4.3	59	0.000021	0.000040	0.00011	0.051	0.00029	< 0.001	< 0.002
22-Oct-14	8	15	400	315	8.2	0.0021	< 0.007	0.00059	0.015	25	0.018	< 0.01	0.027	0.0029	< 0.003	15	0.00084	6.1	< 0.000002	51	4.2	55	0.000020	0.000020	0.00014	0.055	0.00030	0.0010	< 0.002
5-Nov-14	9	17	400	320	-	0.0019	< 0.007	0.000050	0.013	20	0.011	< 0.01	0.030	0.0023	< 0.003	12	0.00070	5.3	< 0.000002	44	3.5	42	0.000020	0.0098	0.00012	0.047	0.00028	< 0.001	< 0.002
19-Nov-14	10	19	400	290	8.0	0.0018	< 0.007	0.00020	0.014	19	0.0064	< 0.01	0.038	0.0022	0.0050	11	0.00059	5.5	< 0.000002	44	3.5	40	0.000042	0.0018	0.000090	0.048	0.00033	< 0.001	< 0.002
3-Dec-14	11	21	400	350	8.2	0.0025	< 0.007	0.000040	0.011	16	0.0062	< 0.01	0.034	0.0020	< 0.003	11	0.00056	5.0	< 0.000002	39	3.4	36	0.000018	0.00098	0.000060	0.043	0.00034	0.0010	< 0.002
17-Dec-14	12	23	400	310	8.2	0.0019	< 0.007	< 0.00001	0.013	17	0.0019	< 0.01	0.038	0.0018	< 0.003	13	0.00055	5.1	< 0.000002	40	3.6	37	0.000013	0.00058	0.00014	0.046	0.00046	< 0.001	< 0.002
31-Dec-14	13	25	400	300	8.3	0.0014	< 0.007	0.000050	0.011	15	0.0037	< 0.01	0.032	0.0016	< 0.003	11	0.00055	5.2	0.0000020	33	3.4	29	0.000020	0.00048	0.00015	0.039	0.00040	< 0.001	< 0.002
14-Jan-15	14	27	400	300	8.2	0.0014	< 0.007	0.000020	0.011	17	0.0042	< 0.01	0.030	0.0017	< 0.003	11	0.00064	5.4	0.0000030	32	3.6	27	0.000014	0.00040	0.000080	0.040	0.00035	< 0.001	< 0.002
28-Jan-15	15	29	400	295	8.1	0.0013	< 0.007	0.000020	0.0097	17	0.0030	< 0.01	0.031	0.0013	< 0.003	12	0.00060	4.8	0.0000020	32	2.9	27	0.000014	0.00040	0.000080	0.045	0.00037	0.0010	< 0.002
11-Feb-15	16	31	400	270	8.2	0.0020	< 0.007	0.00018	0.011	16	0.0022	< 0.01	0.031	0.0015	< 0.003	12	< 0.001	4.9	0.0000020	27	3.7	30	0.000021	0.00055	0.000070	0.041	0.00039	0.0020	< 0.002
25-Feb-15	17	33	400	270	8.1	0.0016	< 0.007	0.000010	0.011	15	0.0021	< 0.01	0.024	0.0014	< 0.003	12	< 0.001	4.9	< 0.000002	21	3.7	22	0.000012	0.00038	< 0.00005	0.042	0.00031	< 0.001	< 0.002
11-Mar-15	18	35	400	305	8.2	0.0016	< 0.007	0.000040	0.012	16	0.0022	< 0.01	0.024	0.0014	< 0.003	11	< 0.001	4.5	0.0000040	16	3.8	23	< 0.000005	0.0058	0.00010	0.039	0.00032	0.0010	< 0.002
25-Mar-15	19	37	400	280	8.1	0.0016	< 0.007	< 0.00001	0.011	20	0.0029	< 0.01	0.027	0.0019	< 0.003	13	< 0.001	5.9	0.0000020	16	4.5	23	< 0.000005	0.00069	0.000090	0.041	0.00040	< 0.001	< 0.002
8-Apr-15	20	39	400	370	8.1	0.0013	< 0.007	< 0.00001	0.012	18	0.0025	< 0.01	0.020	0.0015	< 0.003	13	< 0.001	5.8	< 0.000002	9.3	4.7	20	< 0.000005	0.00039	< 0.00005	0.041	0.00031	< 0.001	< 0.002
22-Apr-15	21	41	400	260	8.1	0.0016	< 0.007	0.00020	0.011	18	0.0013	< 0.01	0.026	0.0013	< 0.003	13	0.00046	5.3	0.0000070	8.1	4.4	21	0.0000090	0.0047	0.00010	0.041	0.00042	0.0020	< 0.002
6-May-15	22	43	400	325	8.1	0.0017	< 0.007	0.000030	0.011	18	0.0013	< 0.01	0.026	0.0013	< 0.003	14	< 0.001	5.4	0.0000080	6.3	4.3	23	< 0.000005	0.00052	0.000090	0.038	0.00035	0.0010	< 0.002
20-May-15	23	45	500	445	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	24	47	445	340	8.1	0.00097	0.013	0.00012	0.0099	16	0.00086	< 0.01	0.023	0.0011	< 0.003	12	0.00035	5.1	0.0000080	3.4	4.2	18	< 0.000005	0.00067	0.000060	0.035	0.00038	0.0070	< 0.002
17-Jun-15	25	49	500	440	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	26	51	440	315	8.1	0.0017	< 0.007	< 0.00001	0.0100	17	0.0011	0.010	0.022	0.0011	< 0.003	12	0.00045	5.2	0.0000050	2.5	4.3	18	0.000011	0.00034	0.00017	0.036	0.00041	0.0030	< 0.002
15-Jul-15	27	53	500	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	28	55	420	325	8.1	0.00078	< 0.007	0.000060	0.011	16	0.00050	< 0.01	0.018	0.0010	< 0.003	11	0.00030	4.7	0.0000030	1.9	4.4	19	< 0.000005	0.00014	< 0.00005	0.036	0.00035	0.0010	< 0.002
12-Aug-15	29	57	500	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	30	59	450	335	8.2	0.0015	< 0.007	0.000080	0.0098	16	0.00094	0.010	0.022	0.00090	< 0.003	12	0.00036	5.0	0.000065	1.7	4.4	19	0.000012	0.00017	< 0.00005	0.036	0.00040	0.0010	< 0.002
9-Sep-15	31	61	500	445	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	32	63	445	395	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	33	65	395	305	8.1	0.0013	< 0.007	0.000060	0.0092	17	0.00034	0.030	0.013	0.0010	< 0.003	11	0.00038	4.4	< 0.000002	1.4	4.3	20	0.0000070	0.00085	< 0.00005	0.036	0.00030	0.0010	< 0.002
21-Oct-15	34	67	500	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	35	69	450	440	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	36	71	440	350	8.3	0.0011	< 0.007	0.000030	0.0090	18	0.00040	< 0.01	0.014	0.00080	< 0.003	13	0.00053	4.7	< 0.000002	1.4	4.6	23	0.000020	0.00012	< 0.00005	0.035	0.00030	< 0.001	< 0.002
2-Dec-15	37	73	500	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	38	75	460	430	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	39	77	430	425	8.3	0.0010	< 0.007	0.00033	0.0086	17	0.00021	< 0.01	0.013	0.00080	< 0.003	12	0.00033	4.5	< 0.000002	1.3	3.6	20	< 0.000005	0.00012	< 0.00005	0.036	0.00029	< 0.001	< 0.002
6-Jan-16	40	78	400	330	8.3	0.0020	< 0.007	0.00028	0.0097	19	0.00048	< 0.01	0.012	0.00090	< 0.003	13	0.0018	4.9	< 0.000002	1.5	4.4	23	< 0.000005	0.00037	< 0.00005	0.035	0.00030	< 0.001	< 0.002
20-Jan-16	41	80	400	310	8.2	0.0011	< 0.007	0.00012	0.010	19	0.0018	< 0.01	0.014	0.0010	< 0.003	13	0.00056	5.1	< 0.000002	1.5	5.1	23	0.000027	0.00013	< 0.00005	0.039	0.00034	0.0020	< 0.002
3-Feb-16	42	82	400	340	8.2	0.0012	< 0.007	0.000090	0.0097	16	0.00010	< 0.01	0.015	0.00090	< 0.003	12	0.00052	4.6	0.000015	1.4	4.6	19	0.0000080	0.00012	< 0.00005	0.034	0.00032	< 0.001	< 0.002
17-Feb-16	43	84	400	330	8.2	0.00079	< 0.007	0.000010	0.0091	17	0.00032	< 0.01	0.016	0.00090	< 0.003	13	0.00020	4.8	< 0.000002	1.5	4.3	16	0.000010	0.000050	< 0.00005	0.033	0.00029	< 0.001	< 0.002
2-Mar-16	44	86	400	360	8.3	0.00068	< 0.007	0.000040	0.0094	17	0.0015	< 0.01	0.016	0.00090	< 0.003	12	0.00018	4.8	< 0.000002	1.5	4.3	14	0.000013	0.000090	< 0.00005	0.031	0.00033	0.0020	< 0.002

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Calculated Loading Rates for Col 4 (ST)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
16-Jul-14	1	1	1300	315	7.8	3419	#N/A	0.30	4.4	54	0.76	0.0085	0.013	54	0.0019	0.00010	0.00067	0.0022	0.00000022	0.00000022	0.0012	0.00000057	11	0.000053	0.00027
30-Jul-14	2	3	400	335	8.0	1594	#N/A	0.073	1.9	12	0.050	0.0057	0.0050	10	0.000095	0.000044	0.00024	0.00035	0.00000012	0.00000012	0.00054	0.000000050	2.3	0.0000049	0.000028
13-Aug-14	3	5	400	340	8.0	1176	#N/A	0.088	1.9	7.4	0.020	0.0065	0.0051	6.9	0.000037	0.000043	0.00018	0.00038	0.00000012	0.00000012	0.00062	0.00000012	1.5	0.0000037	0.000015
27-Aug-14	4	7	400	340	8.1	882	#N/A	0.12	2.1	5.7	0.010	0.0070	0.0051	5.2	0.000063	0.000039	0.00015	0.00032	0.00000012	0.00000012	0.00068	0.00000010	1.1	0.0000026	0.0000090
10-Sep-14	5	9	400	355	8.1	756	#N/A	0.12	2.2	4.2	0.0036	0.0087	0.0053	5.1	0.00014	0.000036	0.00017	0.00039	0.00000012	0.00000012	0.00064	0.00000032	1.3	0.0000037	0.0000066
24-Sep-14	6	11	400	255	8.2	671	#N/A	0.074	2.1	2.3	0.0026	0.0056	0.0038	2.6	0.000022	0.000028	0.00012	0.00033	0.000000089	0.000000089	0.00046	0.000000077	0.55	0.0000033	0.0000057
8-Oct-14	7	13	300	225	8.1	673	#N/A	0.061	1.8	1.9	0.011	0.0047	0.0034	3.1	0.000066	0.000023	0.00011	0.00031	0.000000079	0.000000079	0.00041	0.000000034	0.80	0.0000024	0.0000033
22-Oct-14	8	15	400	315	8.2	653	#N/A	0.12	3.0	2.2	0.016	0.0068	0.0047	3.4	0.000066	0.000033	0.00013	0.00048	0.00000011	0.00000011	0.00064	0.00000082	0.71	0.0000027	0.0000042
5-Nov-14	9	17	400	320		561	#N/A	#N/A	2.7	1.9	0.016	0.0077	0.0048	2.7	0.000072	0.000034	0.00013	0.00044	0.00000011	0.00000011	0.00060	0.000000096	0.55	0.0000038	0.0000034
19-Nov-14	10	19	400	290	8.0	521	#N/A	0.10	2.2	1.7	0.0029	0.0083	0.0044	2.2	0.000068	0.000032	0.00013	0.00040	0.00000010	0.00000010	0.00052	0.00000068	0.45	0.0000041	0.0000026
3-Dec-14	11	21	400	350	8.2	481	#N/A	0.044	2.6	1.9	0.0035	0.0093	0.0053	2.6	0.000098	0.000039	0.00013	0.00050	0.00000012	0.00000012	0.00055	0.00000021	0.55	0.0000056	0.0000026
17-Dec-14	12	23	400	310	8.2	502	#N/A	0.047	2.2	1.5	0.0031	0.010	0.0047	2.2	0.00011	0.000036	0.00013	0.00047	0.00000011	0.00000011	0.00053	0.00000019	0.45	0.0000040	0.0000020
31-Dec-14	13	25	400	300	8.3	475	#N/A	0.015	2.7	1.2	0.015	0.0086	0.0045	2.0	0.00011	0.000032	0.00010	0.00045	0.00000011	0.00000011	0.00045	0.00000020	0.44	0.0000035	0.0000020
14-Jan-15	14	27	400	300	8.2	457	#N/A	0.044	2.3	1.2	0.015	0.0084	0.0045	2.2	0.000084	0.000033	0.000098	0.00049	0.00000011	0.00000011	0.00049	0.00000026	0.47	0.0000060	0.0000017
28-Jan-15	15	29	400	295	8.1	461	#N/A	0.051	2.2	1.3	0.015	0.0081	0.0044	2.1	0.00010	0.000031	0.00010	0.00045	0.00000010	0.00000010	0.00039	0.00000010	0.42	0.0000072	0.0000013
11-Feb-15	16	31	400	270	8.2	454	#N/A	0.049	1.8	1.2	0.014	0.0082	0.0041	1.9	0.000095	0.000034	0.00011	0.00041	0.000000095	0.000000095	0.00043	0.00000016	0.39	0.0000061	0.0000013
25-Feb-15	17	33	400	270	8.1	420	#N/A	0.056	2.0	0.88	0.014	0.0068	0.0041	1.9	0.000034	0.000026	0.000069	0.00046	0.000000095	0.000000095	0.00038	0.000000095	0.43	0.0000063	0.0000011
11-Mar-15	18	35	400	305	8.2	412	#N/A	0.047	2.3	1.1	0.015	0.0087	0.0046	2.3	0.000072	0.000029	0.000084	0.00049	0.00000011	0.00000011	0.00038	0.000000061	0.52	0.0000076	0.0000012
25-Mar-15	19	37	400	280	8.1	437	#N/A	0.067	2.2	0.94	0.014	0.0074	0.0042	2.5	0.000062	0.000031	0.000092	0.00055	0.000000098	0.000000098	0.00034	0.000000056	0.52	0.0000087	0.0000013
8-Apr-15	20	39	400	370	8.1	417	#N/A	0.10	3.0	1.1	0.019	0.0094	0.0056	3.1	0.000076	0.000046	0.00012	0.00071	0.00000013	0.00000013	0.00047	0.000000056	0.70	0.0000074	0.0000016
22-Apr-15	21	41	400	260	8.1	380	#N/A	0.065	1.8	0.85	0.013	0.0078	0.0039	2.0	0.000070	0.000029	0.000079	0.00043	0.000000091	0.000000091	0.00036	0.00000029	0.43	0.0000066	0.00000085
6-May-15	22	43	400	325	8.1	375	#N/A	0.070	2.3	0.93	0.016	0.0099	0.0049	2.6	0.00010	0.000036	0.00010	0.00057	0.00000011	0.00000011	0.00039	0.000000049	0.54	0.0000072	0.0000011
20-May-15	23	45	500	445																					
3-Jun-15	24	47	445	340	8.1	348	#N/A	0.037	1.1	0.40	0.0085	0.0049	0.0026	1.2	0.000074	0.000014	0.000046	0.00032	0.000000060	0.000000060	0.00019	0.000000077	0.28	0.0000046	0.00000048
17-Jun-15	25	49	500	440																					
1-Jul-15	26	51	440	315	8.1	378	#N/A	0.045	0.98	0.43	0.0079	0.0043	0.0024	1.1	0.000050	0.000014	0.000057	0.00030	0.000000055	0.000000055	0.00016	0.000000071	0.24	0.0000050	0.00000050
15-Jul-15	27	53	500	420																					
29-Jul-15	28	55	420	325	8.1	346	#N/A	0.029	0.98	0.46	0.0081	0.0046	0.0024	1.2	0.000044	0.000014	0.000046	0.00029	0.000000057	0.000000057	0.00016	0.000000041	0.26	0.0000050	0.00000032
12-Aug-15	29	57	500	450																					
26-Aug-15	30	59	450	335	8.2	350	#N/A	0.019	1.0	0.50	0.0084	0.0044	0.0025	1.2	0.000067	0.000014	0.000050	0.00032	0.000000059	0.000000059	0.00015	0.000000084	0.27	0.0000052	0.00000046
9-Sep-15	31	61	500	445																					
23-Sep-15	32	63	445	395																					
7-Oct-15	33	65	395	305	8.1	378	#N/A	0.017	0.66	0.32		0.0025		0.76	0.000037	0.0000086	0.000029	0.00018	0.000000036	0.000000036	0.000077	0.000000020	0.16	0.0000029	0.00000019
21-Oct-15	34	67	500	450																					
4-Nov-15	35	69	450	440																					
18-Nov-15	36	71	440	350	8.3	368	#N/A	#N/A	0.81	0.37		0.0028		0.92	0.000030	0.0000082	0.000032	0.00021	0.000000041	0.000000041	0.000060	0.000000023	0.19	0.0000036	0.00000019
2-Dec-15	37	73	500	460																					
16-Dec-15	38	75	460	430																					
30-Dec-15	39	77	430	425	8.3	365	#N/A	#N/A	0.79	0.38		0.0033		1.1	0.000036	0.0000099	0.000035	0.00026	0.000000050	0.000000050	0.000089	0.000000021	0.23	0.0000042	0.00000013
6-Jan-16	40	78	400	330	8.3	366	#N/A	0.018	1.9	0.99		0.0069		2.8	0.000089	0.000026	0.000091	0.00069	0.00000012	0.00000012	0.00023	0.00000092	0.59	0.000011	0.00000041
20-Jan-16	41	80	400	310	8.2	366	#N/A	0.030	1.7	1.0		0.0068		2.6	0.000070	0.000025	0.000099	0.00065	0.00000011	0.00000011	0.00019	0.00000016	0.56	0.000011	0.00000082
3-Feb-16	42	82	400	340	8.2	336	#N/A	0.036	1.9	0.88		0.0075		2.5	0.000071	0.000027	0.00010	0.00065	0.00000012	0.00000012	0.00019	0.000000051	0.54	0.000011	0.00000060
17-Feb-16	43	84	400	330	8.2	335	#N/A	0.063	2.0	0.69		0.0083		2.6	0.000031	0.000026	0.000094	0.00065	0.00000012	0.00000012	0.00017	0.000000050	0.56	0.000013	0.00000056
2-Mar-16	44	86	400	360	8.3	318	#N/A	0.024	2.1	0.74		0.0088		2.6	0.000049	0.000031	0.00013	0.00069	0.00000013	0.00000013	0.00018	0.00000014	0.53	0.000015	0.0000012

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Calculated Loading Rates for Col 4 (ST)

Date	Cycle	Weeks	Volume (mL)		pH	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.		Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
16-Jul-14	1	1	1300	315	7.8	0.0017	0.00054	0.0000032	0.0012	6.3	0.0043	0.0013	0.00056	0.0017	0.0013	1.2	0.0012	0.17	0.0000011	5.9	0.22	20	0.0000017	0.000011	0.000019	0.0057	0.00014	0.00050	0.000063
30-Jul-14	2	3	400	335	8.0	0.00016	0.017	0.00000034	0.00034	1.1	0.0014	0.00017	0.00032	0.00039	0.00020	0.37	0.00018	0.088	0.000000034	1.6	0.065	4.4	0.00000064	0.00000017	0.0000085	0.0012	0.0000085	0.000050	0.000034
13-Aug-14	3	5	400	340	8.0	0.000092	0.000034	0.00000017	0.00032	0.78	0.00078	0.00017	0.00038	0.00022	0.00015	0.31	0.000088	0.088	0.000000034	0.78	0.062	2.8	0.00000041	0.00000017	0.0000039	0.0011	0.0000022	0.000034	0.000034
27-Aug-14	4	7	400	340	8.1	0.000055	0.000034	0.00000017	0.00026	0.58	0.00048	0.00017	0.00049	0.00011	0.00015	0.29	0.000038	0.089	0.000000034	0.86	0.055	2.0	0.00000043	0.0000036	0.0000012	0.00092	0.0000046	0.000017	0.000034
10-Sep-14	5	9	400	355	8.1	0.000053	0.00012	0.00000036	0.00024	0.46	0.00031	0.00018	0.00060	0.000066	0.000053	0.24	0.000025	0.11	0.000000036	1.0	0.069	1.7	0.00000032	0.0000028	0.0000014	0.00084	0.0000055	0.000018	0.000036
24-Sep-14	6	11	400	255	8.2	0.000037	0.000026	0.00000089	0.00018	0.30	0.00023	0.00013	0.00038	0.000050	0.00011	0.18	0.000011	0.065	0.00000020	0.60	0.040	0.77	0.00000024	0.00000051	0.0000052	0.00060	0.0000037	0.000026	0.000026
8-Oct-14	7	13	300	225	8.1	0.000028	0.000079	0.00000023	0.00019	0.27	0.00018	0.00011	0.00030	0.000036	0.000034	0.15	0.000011	0.062	0.000000023	0.58	0.048	0.67	0.00000024	0.00000045	0.0000012	0.00057	0.0000033	0.000011	0.000023
22-Oct-14	8	15	400	315	8.2	0.000032	0.00011	0.0000093	0.00023	0.40	0.00028	0.00016	0.00043	0.000046	0.000047	0.23	0.000013	0.096	0.000000032	0.81	0.067	0.86	0.00000032	0.00000032	0.0000022	0.00086	0.0000047	0.000016	0.000032
5-Nov-14	9	17	400	320		0.000031	0.00011	0.00000080	0.00021	0.31	0.00018	0.00016	0.00049	0.000037	0.000048	0.18	0.000011	0.085	0.000000032	0.70	0.056	0.66	0.00000032	0.00016	0.0000019	0.00075	0.0000045	0.000016	0.000032
19-Nov-14	10	19	400	290	8.0	0.000027	0.00010	0.0000029	0.00020	0.27	0.000093	0.00015	0.00055	0.000032	0.000073	0.17	0.0000086	0.079	0.000000029	0.64	0.051	0.58	0.00000061	0.000025	0.0000013	0.00070	0.0000048	0.000015	0.000029
3-Dec-14	11	21	400	350	8.2	0.000043	0.00012	0.00000070	0.00020	0.29	0.00011	0.00018	0.00059	0.000035	0.000053	0.19	0.0000098	0.087	0.000000035	0.68	0.060	0.62	0.00000032	0.000017	0.0000011	0.00075	0.0000060	0.000018	0.000035
17-Dec-14	12	23	400	310	8.2	0.000029	0.00011	0.00000016	0.00020	0.26	0.000030	0.00016	0.00059	0.000028	0.000047	0.19	0.0000085	0.080	0.000000031	0.63	0.056	0.58	0.00000020	0.0000090	0.0000022	0.00071	0.0000071	0.000016	0.000031
31-Dec-14	13	25	400	300	8.3	0.000021	0.00011	0.00000075	0.00016	0.23	0.000056	0.00015	0.00048	0.000024	0.000045	0.16	0.0000083	0.078	0.000000030	0.50	0.051	0.43	0.00000030	0.0000072	0.0000023	0.00059	0.0000060	0.000015	0.000030
14-Jan-15	14	27	400	300	8.2	0.000021	0.00011	0.00000030	0.00017	0.25	0.000063	0.00015	0.00045	0.000026	0.000045	0.17	0.0000096	0.081	0.000000045	0.49	0.054	0.40	0.00000021	0.0000060	0.0000012	0.00061	0.0000053	0.000015	0.000030
28-Jan-15	15	29	400	295	8.1	0.000020	0.00010	0.00000030	0.00014	0.25	0.000044	0.00015	0.00046	0.000019	0.000044	0.17	0.0000089	0.070	0.000000030	0.48	0.042	0.40	0.00000021	0.0000059	0.0000012	0.00066	0.0000055	0.000015	0.000030
11-Feb-15	16	31	400	270	8.2	0.000027	0.000095	0.0000024	0.00015	0.22	0.000029	0.00014	0.00041	0.000020	0.000041	0.16	0.000014	0.066	0.000000027	0.36	0.050	0.40	0.00000028	0.0000074	0.00000095	0.00055	0.0000053	0.000027	0.000027
25-Feb-15	17	33	400	270	8.1	0.000022	0.000095	0.00000014	0.00015	0.21	0.000028	0.00014	0.00032	0.000019	0.000041	0.16	0.000014	0.066	0.000000027	0.28	0.049	0.29	0.00000016	0.0000051	0.00000068	0.00056	0.0000042	0.000014	0.000027
11-Mar-15	18	35	400	305	8.2	0.000025	0.00011	0.00000061	0.00018	0.24	0.000033	0.00015	0.00036	0.000021	0.000046	0.17	0.000015	0.068	0.000000061	0.24	0.058	0.35	0.000000076	0.000089	0.0000015	0.00060	0.0000049	0.000015	0.000031
25-Mar-15	19	37	400	280	8.1	0.000023	0.000098	0.00000014	0.00016	0.29	0.000041	0.00014	0.00038	0.000027	0.000042	0.18	0.000014	0.083	0.000000028	0.22	0.062	0.32	0.000000070	0.0000097	0.0000013	0.00057	0.0000056	0.000014	0.000028
8-Apr-15	20	39	400	370	8.1	0.000025	0.00013	0.00000019	0.00022	0.33	0.000046	0.00019	0.00037	0.000028	0.000056	0.23	0.000019	0.11	0.000000037	0.17	0.088	0.37	0.000000093	0.0000072	0.00000093	0.00075	0.0000057	0.000019	0.000037
22-Apr-15	21	41	400	260	8.1	0.000021	0.000091	0.0000026	0.00015	0.23	0.000016	0.00013	0.00034	0.000017	0.000039	0.17	0.0000060	0.068	0.000000091	0.11	0.057	0.27	0.00000012	0.000061	0.0000013	0.00053	0.0000055	0.000026	0.000026
6-May-15	22	43	400	325	8.1	0.000027	0.00011	0.00000049	0.00018	0.29	0.000021	0.00016	0.00043	0.000021	0.000049	0.22	0.000016	0.088	0.00000013	0.10	0.069	0.37	0.000000081	0.0000085	0.0000015	0.00061	0.0000057	0.000016	0.000033
20-May-15	23	45	500	445																									
3-Jun-15	24	47	445	340	8.1	0.0000082	0.00011	0.0000010	0.000084	0.13	0.0000073	0.000085	0.00019	0.0000094	0.000026	0.11	0.0000030	0.043	0.000000068	0.029	0.036	0.15	0.000000043	0.0000057	0.00000051	0.00030	0.0000032	0.000060	0.000017
17-Jun-15	25	49	500	440																									
1-Jul-15	26	51	440	315	8.1	0.000013	0.000055	0.000000079	0.000078	0.13	0.0000084	0.000079	0.00017	0.0000087	0.000024	0.091	0.0000035	0.041	0.000000039	0.020	0.034	0.14	0.000000087	0.0000027	0.0000013	0.00029	0.0000032	0.000024	0.000016
15-Jul-15	27	53	500	420																									
29-Jul-15	28	55	420	325	8.1	0.0000063	0.000057	0.00000049	0.000088	0.13	0.0000041	0.000081	0.00015	0.0000081	0.000024	0.093	0.0000024	0.038	0.000000024	0.016	0.036	0.16	0.000000041	0.0000011	0.00000041	0.00029	0.0000028	0.0000081	0.000016
12-Aug-15	29	57	500	450																									
26-Aug-15	30	59	450	335	8.2	0.000013	0.000059	0.00000067	0.000082	0.14	0.0000079	0.000084	0.00018	0.0000075	0.000025	0.100	0.0000030	0.042	0.00000054	0.014	0.037	0.16	0.00000010	0.0000014	0.00000042	0.00030	0.0000034	0.0000084	0.000017
9-Sep-15	31	61	500	445																									
23-Sep-15	32	63	445	395																									
7-Oct-15	33	65	395	305	8.1	0.0000065	0.000036	0.00000031	0.000047	0.084	0.0000017	0.00015	0.000067	0.0000051	0.000015	0.057	0.0000019	0.023	0.000000010	0.0069	0.022	0.10	0.000000036	0.0000043	0.00000025	0.00018	0.0000015	0.0000051	0.000010
21-Oct-15	34	67	500	450																									
4-Nov-15	35	69	450	440																									
18-Nov-15	36	71	440	350	8.3	0.0000066	0.000041	0.00000018	0.000053	0.11	0.0000023	0.000058	0.000083	0.0000047	0.000018	0.077	0.0000031	0.027	0.000000012	0.0081	0.027	0.13	0.00000012	0.00000070	0.00000029	0.00020	0.0000018	0.0000058	0.000012
2-Dec-15	37	73	500	460																									
16-Dec-15	38	75	460	430																									
30-Dec-15	39	77	430	425	8.3	0.0000071	0.000050	0.0000023	0.000061	0.12	0.0000015	0.000071	0.000092	0.0000057	0.000021	0.084	0.0000023	0.032	0.000000014	0.0094	0.026	0.14	0.000000035	0.00000085	0.00000035	0.00025	0.0000021	0.0000071	0.000014
6-Jan-16	40	78	400	330	8.3	0.000033	0.00012	0.0000046	0.00016	0.31	0.0000079	0.00017	0.00020	0.000015	0.000050	0.22	0.000030	0.081	0.000000033	0.025	0.073	0.38	0.000000083	0.0000061	0.00000083	0.00057	0.0000050	0.000017	0.000033
20-Jan-16	41	80	400	310	8.2	0.000017	0.00011	0.0000019	0.00016	0.29	0.000028	0.00016	0.00022	0.000016	0.000047	0.21	0.0000087	0.079	0.000000031	0.023	0.079	0.35	0.00000042	0.0000020	0.00000078	0.00060	0.0000053	0.000031	0.000031
3-Feb-16	42	82	400	340	8.2	0.000020	0.00012	0.0000015	0.00017	0.28	0.0000017	0.00017	0.00025	0.000015	0.000051	0.21	0.0000088	0.078	0.00000026	0.023	0.079	0.32	0.00000014	0.0000020	0.00000085	0.00058	0.0000054	0.000017	0.000034
17-Feb-16	43	84	400	330	8.2	0.000013	0.00012	0.00000017	0.00015	0.28	0.0000053	0.00017	0.00026	0.000015	0.000050	0.21	0.0000033	0.079	0.000000033	0.024	0.071	0.26	0.00000017	0.00000083	0.00000083	0.00055	0.0000048	0.000017	0.000033
2-Mar-16	44	86	400	360	8.3	0.000012	0.00013	0.00000072	0.00017	0.30	0.000027	0.00018	0.00029	0.000016	0.000054	0.22	0.0000032	0.087	0.000000036	0.026	0.078	0.26	0.00000023	0.0000016	0.00000090	0.00056	0.0000059	0.000036	0.000036

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 5 (GO)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
16-Jul-14	1	1	1500	280	8.2	1228	#N/A	2.7	218	145	58	0.31	0.90	219	0.045	0.0049	0.045	0.073	0.000012	*< 0.000007*	0.059	*< 0.000003*	55	0.0028	0.0040
30-Jul-14	2	3	400	290	8.3	667	#N/A	#N/A	264	68	6.6	0.37	*< 0.3*	89	0.0061	0.0047	0.038	0.016	*< 0.000007*	*< 0.000007*	0.052	*< 0.000003*	22	0.0012	0.00060
13-Aug-14	3	5	400	305	8.3	525	#N/A	#N/A	226	32	1.6	0.42	*< 0.3*	69	0.0046	0.0040	0.032	0.031	*< 0.000007*	*< 0.000007*	0.055	*< 0.000003*	17	0.00058	0.00042
27-Aug-14	4	7	400	305	8.3	465	#N/A	#N/A	219	27	0.70	0.44	*< 0.3*	66	0.0078	0.0036	0.031	0.029	*< 0.000007*	*< 0.000007*	0.061	0.000012	16	0.00060	0.00028
10-Sep-14	5	9	400	265	8.3	445	#N/A	#N/A	213	17	0.40	0.46	*< 0.3*	61	0.0079	0.0034	0.033	0.032	*< 0.000007*	*< 0.000007*	0.052	0.000020	15	0.00057	0.00022
24-Sep-14	6	11	400	240	8.3	455	#N/A	4.1	232	17	0.30	0.39	*< 0.3*	72	0.0024	0.0035	0.025	0.040	*< 0.000007*	*< 0.000007*	0.052	*< 0.000003*	18	0.00064	0.00027
8-Oct-14	7	13	300	225	8.3	477	#N/A	4.1	212	12	*< 1*	0.35	*< 0.3*	84	0.0060	0.0031	0.021	0.048	*< 0.000007*	*< 0.000007*	0.054	0.0000040	21	0.00047	0.00017
22-Oct-14	8	15	400	290	8.3	492	#N/A	5.2	245	13	*< 1*	0.33	*< 0.3*	92	0.0067	0.0030	0.020	0.055	*< 0.000007*	*< 0.000007*	0.061	0.000023	23	0.00046	0.00015
5-Nov-14	9	17	400	275		463	#N/A	#N/A	245	10	*< 1*	0.35	*< 0.3*	89	0.0044	0.0030	0.019	0.056	*< 0.000007*	*< 0.000007*	0.060	0.0000050	22	0.00044	0.00014
19-Nov-14	10	19	400	275	8.3	437	#N/A	#N/A	202	11	*< 0.2*	0.35	*< 0.3*	93	0.0040	0.0029	0.018	0.060	*< 0.000007*	*< 0.000007*	0.057	0.000026	23	0.00041	0.00012
3-Dec-14	11	21	400	345	8.3	401	#N/A	#N/A	210	9.0	*< 0.2*	0.32	*< 0.3*	96	0.0038	0.0029	0.016	0.062	*< 0.000007*	*< 0.000007*	0.049	0.0000090	25	0.00039	0.00011
17-Dec-14	12	23	400	285	8.3	394	#N/A	2.7	193	8.0	*< 0.2*	0.34	*< 0.3*	96	0.0044	0.0028	0.016	0.065	*< 0.000007*	*< 0.000007*	0.046	0.0000030	24	0.00028	0.000099
31-Dec-14	13	25	400	295	8.4	398	#N/A	#N/A	240	5.0	*< 1*	0.31	*< 0.3*	103	0.0062	0.0026	0.015	0.066	*< 0.000007*	*< 0.000007*	0.045	0.000011	26	0.00057	0.000093
14-Jan-15	14	27	400	285	8.2	368	#N/A	2.7	188	8.0	*< 1*	0.31	*< 0.3*	108	0.0082	0.0029	0.014	0.075	*< 0.000007*	*< 0.000007*	0.046	0.000015	27	0.00038	0.000082
28-Jan-15	15	29	400	280	8.2	375	#N/A	3.5	186	8.0	*< 1*	0.29	*< 0.3*	113	0.0060	0.0026	0.013	0.076	*< 0.000007*	*< 0.000007*	0.035	0.0000080	27	0.00035	0.000069
11-Feb-15	16	31	400	275	8.2	374	#N/A	3.5	181	8.0	*< 1*	0.29	*< 0.3*	119	0.0064	0.0029	0.013	0.078	*< 0.000007*	*< 0.000007*	0.047	0.000011	30	0.00032	0.000082
25-Feb-15	17	33	400	255	8.2	348	#N/A	3.7	180	6.0	*< 1*	0.27	*< 0.3*	125	0.0022	0.0027	0.011	0.086	*< 0.000007*	*< 0.000007*	0.041	0.000018	32	0.00030	0.000072
11-Mar-15	18	35	400	265	8.2	352	#N/A	2.6	183	7.0	*< 1*	0.31	*< 0.3*	133	0.0049	0.0026	0.012	0.086	*< 0.000007*	*< 0.000007*	0.038	0.0000050	34	0.00036	0.000069
25-Mar-15	19	37	400	280	8.1	356	#N/A	4.1	183	7.0	*< 1*	0.28	*< 0.3*	152	0.0039	0.0028	0.012	0.096	*< 0.000007*	*< 0.000007*	0.036	0.0000040	38	0.00045	0.000072
8-Apr-15	20	39	400	350	8.1	336	#N/A	5.6	179	5.0	*< 1*	0.29	*< 0.3*	143	0.0062	0.0032	0.011	0.095	*< 0.000007*	*< 0.000007*	0.039	*< 0.000003*	37	0.00038	0.000067
22-Apr-15	21	41	400	270	8.1	288	#N/A	5.9	151	9.0	*< 1*	0.36	*< 0.3*	127	0.0043	0.0031	0.015	0.075	*< 0.000007*	*< 0.000007*	0.038	0.000027	32	0.00044	0.000057
6-May-15	22	43	400	290	8.1	278	#N/A	4.1	148	7.0	*< 1*	0.32	*< 0.3*	123	0.0051	0.0028	0.012	0.077	*< 0.000007*	*< 0.000007*	0.033	0.0000030	31	0.00059	0.000056
20-May-15	23	45	500	455	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	24	47	445	340	8.1	259	#N/A	4.7	123	7.0	*< 1*	0.40	*< 0.3*	118	0.0068	0.0026	0.015	0.071	*< 0.000007*	*< 0.000007*	0.034	0.0000080	31	0.00043	0.000047
17-Jun-15	25	49	500	440	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	26	51	440	335	8.1	267	#N/A	5.2	122	9.0	*< 1*	0.39	*< 0.3*	107	0.0051	0.0027	0.016	0.071	*< 0.000007*	*< 0.000007*	0.030	0.000010	27	0.00046	0.000054
15-Jul-15	27	53	500	380	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	28	55	380	280	8.1	243	#N/A	3.2	118	10	*< 1*	0.41	*< 0.3*	109	0.0069	0.0024	0.014	0.066	*< 0.000007*	0.0000070	0.028	0.000013	28	0.00061	0.000051
12-Aug-15	29	57	500	425	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	30	59	425	305	8.2	240	#N/A	2.0	117	9.0	*< 1*	0.39	*< 0.3*	110	0.0066	0.0025	0.016	0.070	*< 0.000007*	*< 0.000007*	0.027	0.000015	28	0.00059	0.000050
9-Sep-15	31	61	500	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	32	63	420	345	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	33	65	345	305	8.1	260	#N/A	3.0	129	8.0		0.36		109	0.0073	0.0025	0.014	0.066	*< 0.000007*	*< 0.000007*	0.022	0.000022	28	0.00058	0.000037
21-Oct-15	34	67	500	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	35	69	480	435	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	36	71	435	335	8.3	255	#N/A	1.2	142	8.0		0.36		115	0.0038	0.0024	0.016	0.061	*< 0.000007*	*< 0.000007*	0.018	*< 0.000003*	28	0.00062	0.000046
2-Dec-15	37	73	500	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	38	75	475	425	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	39	77	425	410	8.3	256	#N/A	#N/A	114	8.0	-	0.33	-	113	0.0058	0.0022	0.012	0.070	*< 0.000007*	*< 0.000007*	0.021	*< 0.000003*	28	0.00062	0.000028
6-Jan-16	40	78	400	340	8.3	244	#N/A	1.0	110	8.0	-	0.33	-	117	0.0044	0.0023	0.014	0.074	*< 0.000007*	*< 0.000007*	0.022	0.0000030	30	0.00063	0.000018
20-Jan-16	41	80	400	280	8.2	239	#N/A	1.9	111	7.0	-	0.35	-	118	0.0049	0.0026	0.016	0.079	*< 0.000007*	*< 0.000007*	0.020	0.0000070	30	0.00068	0.000068
3-Feb-16	42	82	400	325	8.2	228	#N/A	2.3	107	6.0	-	0.36	-	104	0.0058	0.0025	0.016	0.076	*< 0.000007*	*< 0.000007*	0.018	*< 0.000003*	27	0.00058	0.000032
17-Feb-16	43	84	400	300	8.2	234	#N/A	3.5	109	6.0	-	0.37	-	111	0.0040	0.0024	0.017	0.077	*< 0.000007*	*< 0.000007*	0.018	0.0000060	29	0.00070	0.000037
2-Mar-16	44	86	400	330	8.2	231	#N/A	1.4	109	6.0	-	0.37	-	110	0.0021	0.0026	0.019	0.077	*< 0.000007*	*< 0.000007*	0.017	0.000010	28	0.00063	0.000041

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 5 (GO)

Date	Cycle	Weeks	Volume (mL)		pH	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.		Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
16-Jul-14	1	1	1500	280	8.2	0.029	0.024	0.000040	0.0080	20	0.056	0.19	0.037	0.0095	0.062	12	0.0068	5.8	< 0.000002	153	0.27	54	0.000048	0.00033	0.00057	0.17	0.0025	0.0070	< 0.002
30-Jul-14	2	3	400	290	8.3	0.0069	1.9	< 0.00001	0.0053	8.5	0.018	0.040	0.054	0.0046	0.018	7.8	0.0026	5.9	< 0.000002	100	0.12	29	0.000014	< 0.00001	0.00051	0.15	0.00027	< 0.001	< 0.002
13-Aug-14	3	5	400	305	8.3	0.0092	0.0020	0.000020	0.0048	6.4	0.0042	< 0.01	0.050	0.0026	0.021	6.6	0.00073	5.7	< 0.000002	46	0.092	13	0.000029	0.000050	0.00019	0.14	0.00012	< 0.001	< 0.002
27-Aug-14	4	7	400	305	8.3	0.0029	< 0.002	< 0.00001	0.0042	6.1	0.0020	< 0.01	0.054	0.0015	0.011	6.8	0.00034	5.9	< 0.000002	53	0.089	9.0	0.000026	0.00021	< 0.00005	0.13	0.00024	< 0.001	< 0.002
10-Sep-14	5	9	400	265	8.3	0.0024	< 0.007	0.000020	0.0037	5.4	0.00066	< 0.01	0.054	0.0010	0.012	6.1	0.00031	6.8	< 0.000002	74	0.086	8.1	0.000028	0.00011	0.000060	0.12	0.00025	< 0.001	< 0.002
24-Sep-14	6	11	400	240	8.3	0.0024	< 0.002	0.000020	0.0044	6.6	0.0013	0.010	0.043	0.0012	< 0.009	7.1	< 0.00004	5.9	0.0000090	52	0.099	5.9	0.000029	0.000080	0.00011	0.11	0.00019	0.0020	< 0.002
8-Oct-14	7	13	300	225	8.3	0.0018	< 0.007	< 0.00001	0.0056	7.6	0.00070	< 0.01	0.035	0.0011	< 0.003	7.0	0.00016	6.3	< 0.000002	73	0.12	5.2	0.000032	0.000020	0.00012	0.12	0.00018	< 0.001	< 0.002
22-Oct-14	8	15	400	290	8.3	0.0019	< 0.007	0.000020	0.0049	8.5	0.00089	< 0.01	0.032	0.00080	< 0.003	7.9	0.00024	7.1	< 0.000002	73	0.13	5.6	0.000036	0.000020	0.00018	0.13	0.00020	< 0.001	< 0.002
5-Nov-14	9	17	400	275		0.0017	< 0.007	0.000040	0.0049	8.4	0.0012	< 0.01	0.028	0.00070	< 0.003	6.7	0.00019	6.4	< 0.000002	68	0.14	4.1	0.000035	0.00013	0.00012	0.12	0.00017	< 0.001	< 0.002
19-Nov-14	10	19	400	275	8.3	0.0018	< 0.007	0.00022	0.0055	8.9	0.00020	< 0.01	0.027	0.00060	0.014	6.9	0.00013	6.9	< 0.000002	65	0.16	4.0	0.000042	0.000040	0.00021	0.12	0.00017	< 0.001	< 0.002
3-Dec-14	11	21	400	345	8.3	0.0015	< 0.007	0.000020	0.0046	8.5	0.00059	< 0.01	0.025	0.00060	0.0030	6.8	0.00014	6.1	< 0.000002	53	0.16	3.9	0.000035	0.000030	0.000090	0.11	0.00016	< 0.001	< 0.002
17-Dec-14	12	23	400	285	8.3	0.0014	< 0.007	< 0.00001	0.0046	9.0	0.00021	< 0.01	0.024	0.00060	0.0030	7.6	0.00020	6.0	< 0.000002	48	0.15	3.7	0.000031	0.000010	0.00010	0.11	0.00018	< 0.001	< 0.002
31-Dec-14	13	25	400	295	8.4	0.0011	< 0.007	0.00031	0.0045	9.1	0.00099	< 0.01	0.023	0.00050	0.0060	7.1	0.00014	6.7	< 0.000002	42	0.17	3.4	0.000034	0.000050	0.000070	0.098	0.00019	< 0.001	< 0.002
14-Jan-15	14	27	400	285	8.2	0.0019	< 0.007	0.000020	0.0045	9.9	0.00051	< 0.01	0.024	0.00050	0.0030	7.4	0.00016	6.6	0.0000020	36	0.17	3.0	0.000035	0.000060	0.00014	0.10	0.00016	0.0010	< 0.002
28-Jan-15	15	29	400	280	8.2	0.00090	< 0.007	0.000060	0.0039	11	0.0010	< 0.01	0.021	0.00040	0.0040	7.6	0.00025	5.7	< 0.000002	33	0.15	3.3	0.000031	0.000040	0.00012	0.10	0.00018	0.0020	< 0.002
11-Feb-15	16	31	400	275	8.2	0.0016	< 0.007	0.00015	0.0045	11	0.00065	< 0.01	0.019	0.00050	0.0040	7.5	< 0.001	6.2	< 0.000002	25	0.20	3.0	0.000035	0.00015	0.00015	0.099	0.00021	< 0.001	< 0.002
25-Feb-15	17	33	400	255	8.2	0.0012	< 0.007	0.00015	0.0046	11	0.0012	< 0.01	0.017	0.00040	0.0050	8.4	< 0.001	6.0	< 0.000002	20	0.20	2.6	0.000041	0.00010	0.000090	0.11	0.00014	0.0030	< 0.002
11-Mar-15	18	35	400	265	8.2	0.0011	< 0.007	< 0.00001	0.0046	12	0.00051	< 0.01	0.018	0.00050	< 0.003	8.0	< 0.001	5.3	< 0.000002	16	0.21	2.8	0.000025	0.000050	0.000080	0.100	0.00017	< 0.001	< 0.002
25-Mar-15	19	37	400	280	8.1	0.0025	< 0.007	0.000040	0.0045	14	0.00089	< 0.01	0.020	0.00050	< 0.003	9.0	< 0.001	7.3	< 0.000002	14	0.23	3.0	0.000038	0.00044	0.00012	0.096	0.00019	< 0.001	< 0.002
8-Apr-15	20	39	400	350	8.1	0.0011	< 0.007	< 0.00001	0.0046	12	0.00094	< 0.01	0.017	0.00040	< 0.003	8.3	< 0.001	7.2	< 0.000002	8.8	0.22	2.5	0.000026	0.00011	0.000060	0.095	0.00016	0.0010	< 0.002
22-Apr-15	21	41	400	270	8.1	0.0080	< 0.007	0.00036	0.0039	11	0.00027	< 0.01	0.024	0.00040	< 0.003	8.5	0.000090	6.3	0.0000050	7.5	0.18	3.2	0.000030	0.0067	< 0.00005	0.099	0.00017	0.0060	< 0.002
6-May-15	22	43	400	290	8.1	0.0012	< 0.007	< 0.00001	0.0038	11	0.00061	< 0.01	0.021	0.00040	< 0.003	8.2	< 0.001	6.1	0.0000040	5.5	0.18	2.9	0.000026	0.00019	0.00012	0.081	0.00021	0.0010	< 0.002
20-May-15	23	45	500	455	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	24	47	445	340	8.1	0.0022	< 0.007	0.000050	0.0032	10	0.00043	< 0.01	0.026	0.00030	< 0.003	7.9	0.000060	6.2	0.0000070	3.7	0.17	3.3	0.000015	0.0037	0.00011	0.085	0.00016	< 0.001	< 0.002
17-Jun-15	25	49	500	440	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	26	51	440	335	8.1	0.00085	< 0.007	< 0.00001	0.0030	9.5	0.00094	0.010	0.026	0.00030	0.0040	6.9	0.000070	6.0	0.0000020	2.7	0.17	3.1	0.000028	0.0016	0.00010	0.084	0.00016	< 0.001	< 0.002
15-Jul-15	27	53	500	380	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	28	55	380	280	8.1	0.00092	< 0.007	0.000050	0.0030	9.6	0.00025	0.020	0.027	0.00030	< 0.003	6.9	< 0.00004	5.6	0.0000040	2.3	0.18	3.4	0.000020	0.0011	0.000080	0.089	0.00020	< 0.001	< 0.002
12-Aug-15	29	57	500	425	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	30	59	425	305	8.2	0.0011	< 0.007	0.00016	0.0027	9.6	0.00062	0.010	0.029	0.00020	< 0.003	7.0	0.000070	6.0	0.000040	2.3	0.17	3.6	0.000027	0.0012	< 0.00005	0.083	0.00016	< 0.001	< 0.002
9-Sep-15	31	61	500	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	32	63	420	345	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	33	65	345	305	8.1	0.0011	< 0.007	0.000020	0.0024	9.8	0.00027	0.020	0.021	0.00020	< 0.003	6.7	0.000050	5.1	< 0.000002	1.9	0.16	3.1	0.000022	0.00069	0.000060	0.084	0.00020	< 0.001	< 0.002
21-Oct-15	34	67	500	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	35	69	480	435	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	36	71	435	335	8.3	0.00072	< 0.007	0.00012	0.0023	11	0.00020	< 0.01	0.023	< 0.0001	< 0.003	7.5	0.00017	5.6	< 0.000002	1.9	0.16	3.2	0.000022	0.00047	< 0.00005	0.074	0.00014	< 0.001	< 0.002
2-Dec-15	37	73	500	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	38	75	475	425	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	39	77	425	410	8.3	0.0011	< 0.007	0.00035	0.0023	10	0.00019	< 0.01	0.022	0.00020	< 0.003	7.3	0.000070	5.4	< 0.000002	1.7	0.14	3.0	< 0.000005	0.00045	< 0.00005	0.082	0.00016	< 0.001	< 0.002
6-Jan-16	40	78	400	340	8.3	0.0012	< 0.007	0.000020	0.0023	10	0.00017	< 0.01	0.019	0.00020	0.0060	8.0	0.00025	5.8	0.0000020	1.9	0.15	2.9	< 0.000005	0.00051	< 0.00005	0.076	0.00014	< 0.001	< 0.002
20-Jan-16	41	80	400	280	8.2	0.00091	< 0.007	0.000040	0.0025	10	0.0021	< 0.01	0.023	0.00030	0.0050	7.6	0.000080	6.1	0.0000020	1.8	0.17	3.1	0.000042	0.00040	< 0.00005	0.090	0.00017	< 0.001	< 0.002
3-Feb-16	42	82	400	325	8.2	0.0011	< 0.007	0.000030	0.0024	9.2	< 0.00001	< 0.01	0.022	0.00020	< 0.003	7.4	0.00015	5.5	0.000013	1.7	0.16	2.7	0.000026	0.00031	< 0.00005	0.081	0.00016	< 0.001	< 0.002
17-Feb-16	43	84	400	300	8.2	0.00090	< 0.007	< 0.00001	0.0022	9.7	0.00014	< 0.01	0.024	0.00020	0.0060	7.5	< 0.00004	5.5	< 0.000002	1.8	0.15	2.4	0.000028	0.00030	< 0.00005	0.082	0.00016	< 0.001	< 0.002
2-Mar-16	44	86	400	330	8.2	0.00052	< 0.007	0.000030	0.0023	10	0.00050	< 0.01	0.024	0.00020	< 0.003	7.6	< 0.00004	5.7	< 0.000002	1.8	0.16	2.9	0.000026	0.00026	< 0.00005	0.082	0.00015	< 0.001	< 0.002

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Calculated Loading Rates for Col 5 (GO)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
16-Jul-14	1	1	1500	280	8.2	1228	#N/A	0.074	6.1	4.1	1.6	0.0087	0.025	6.1	0.0013	0.00014	0.0013	0.0020	0.00000034	0.00000020	0.0016	0.000000084	1.5	0.000078	0.00011
30-Jul-14	2	3	400	290	8.3	667	#N/A	#N/A	3.8	0.99	0.096	0.0054	0.0044	1.3	0.000088	0.000068	0.00055	0.00023	0.00000010	0.00000010	0.00076	0.000000044	0.32	0.000017	0.0000087
13-Aug-14	3	5	400	305	8.3	525	#N/A	#N/A	3.4	0.49	0.024	0.0064	0.0046	1.0	0.000070	0.000061	0.00049	0.00048	0.00000011	0.00000011	0.00084	0.000000046	0.26	0.0000088	0.0000064
27-Aug-14	4	7	400	305	8.3	465	#N/A	#N/A	3.3	0.41	0.011	0.0067	0.0046	1.0	0.00012	0.000055	0.00047	0.00044	0.00000011	0.00000011	0.00094	0.00000018	0.25	0.0000092	0.0000043
10-Sep-14	5	9	400	265	8.3	445	#N/A	#N/A	2.8	0.23	0.0053	0.0061	0.0040	0.80	0.00010	0.000045	0.00044	0.00043	0.000000093	0.000000093	0.00068	0.00000027	0.20	0.0000076	0.0000030
24-Sep-14	6	11	400	240	8.3	455	#N/A	0.049	2.8	0.20	0.0036	0.0047	0.0036	0.86	0.000029	0.000042	0.00030	0.00048	0.000000084	0.000000084	0.00063	0.000000036	0.22	0.0000077	0.0000032
8-Oct-14	7	13	300	225	8.3	477	#N/A	0.046	2.4	0.14	0.011	0.0039	0.0034	0.95	0.000068	0.000035	0.00024	0.00054	0.000000079	0.000000079	0.00060	0.000000045	0.24	0.0000053	0.0000019
22-Oct-14	8	15	400	290	8.3	492	#N/A	0.075	3.6	0.19	0.015	0.0048	0.0044	1.3	0.000097	0.000044	0.00029	0.00079	0.00000010	0.00000010	0.00088	0.00000033	0.33	0.0000066	0.0000021
5-Nov-14	9	17	400	275		463	#N/A	#N/A	3.4	0.14	0.014	0.0048	0.0041	1.2	0.000061	0.000041	0.00026	0.00077	0.000000096	0.000000096	0.00082	0.000000069	0.30	0.0000061	0.0000019
19-Nov-14	10	19	400	275	8.3	437	#N/A	#N/A	2.8	0.15	0.0028	0.0048	0.0041	1.3	0.000055	0.000040	0.00024	0.00083	0.000000096	0.000000096	0.00079	0.00000036	0.31	0.0000056	0.0000016
3-Dec-14	11	21	400	345	8.3	401	#N/A	#N/A	3.6	0.16	0.0035	0.0055	0.0052	1.7	0.000066	0.000050	0.00028	0.0011	0.00000012	0.00000012	0.00084	0.00000016	0.42	0.0000067	0.0000018
17-Dec-14	12	23	400	285	8.3	394	#N/A	0.038	2.8	0.11	0.0029	0.0048	0.0043	1.4	0.000063	0.000040	0.00023	0.00093	0.000000100	0.000000100	0.00065	0.000000043	0.34	0.0000040	0.0000014
31-Dec-14	13	25	400	295	8.4	398	#N/A	#N/A	3.5	0.074	0.015	0.0046	0.0044	1.5	0.000091	0.000038	0.00022	0.00097	0.00000010	0.00000010	0.00066	0.00000016	0.38	0.0000084	0.0000014
14-Jan-15	14	27	400	285	8.2	368	#N/A	0.038	2.7	0.11	0.014	0.0044	0.0043	1.5	0.00012	0.000041	0.00020	0.0011	0.000000100	0.000000100	0.00066	0.00000021	0.38	0.0000054	0.0000012
28-Jan-15	15	29	400	280	8.2	375	#N/A	0.049	2.6	0.11	0.014	0.0041	0.0042	1.6	0.000084	0.000036	0.00018	0.0011	0.000000098	0.000000098	0.00049	0.00000011	0.38	0.0000049	0.00000097
11-Feb-15	16	31	400	275	8.2	374	#N/A	0.048	2.5	0.11	0.014	0.0040	0.0041	1.6	0.000088	0.000040	0.00018	0.0011	0.000000096	0.000000096	0.00064	0.00000015	0.41	0.0000044	0.0000011
25-Feb-15	17	33	400	255	8.2	348	#N/A	0.047	2.3	0.077	0.013	0.0034	0.0038	1.6	0.000028	0.000034	0.00014	0.0011	0.000000089	0.000000089	0.00052	0.00000023	0.40	0.0000038	0.00000092
11-Mar-15	18	35	400	265	8.2	352	#N/A	0.034	2.4	0.093	0.013	0.0041	0.0040	1.8	0.000065	0.000034	0.00015	0.0011	0.000000093	0.000000093	0.00050	0.000000066	0.44	0.0000048	0.00000091
25-Mar-15	19	37	400	280	8.1	356	#N/A	0.057	2.6	0.098	0.014	0.0039	0.0042	2.1	0.000055	0.000039	0.00017	0.0013	0.000000098	0.000000098	0.00050	0.000000056	0.53	0.0000063	0.0000010
8-Apr-15	20	39	400	350	8.1	336	#N/A	0.098	3.1	0.088	0.018	0.0051	0.0053	2.5	0.00011	0.000056	0.00020	0.0017	0.00000012	0.00000012	0.00069	0.000000053	0.65	0.0000067	0.0000012
22-Apr-15	21	41	400	270	8.1	288	#N/A	0.079	2.0	0.12	0.014	0.0049	0.0041	1.7	0.000058	0.000042	0.00021	0.0010	0.000000095	0.000000095	0.00052	0.00000036	0.43	0.0000059	0.00000077
6-May-15	22	43	400	290	8.1	278	#N/A	0.060	2.1	0.10	0.015	0.0046	0.0044	1.8	0.000074	0.000041	0.00017	0.0011	0.00000010	0.00000010	0.00047	0.000000044	0.45	0.0000086	0.00000081
20-May-15	23	45	500	455																					
3-Jun-15	24	47	445	340	8.1	259	#N/A	0.040	1.0	0.060	0.0085	0.0034	0.0026	1.0	0.000058	0.000022	0.00013	0.00061	0.000000060	0.000000060	0.00029	0.000000068	0.26	0.0000037	0.00000040
17-Jun-15	25	49	500	440																					
1-Jul-15	26	51	440	335	8.1	267	#N/A	0.043	1.0	0.075	0.0084	0.0033	0.0025	0.90	0.000043	0.000023	0.00014	0.00060	0.000000059	0.000000059	0.00025	0.000000084	0.23	0.0000039	0.00000045
15-Jul-15	27	53	500	380																					
29-Jul-15	28	55	380	280	8.1	243	#N/A	0.022	0.83	0.070	0.0070	0.0029	0.0021	0.76	0.000048	0.000017	0.000099	0.00046	0.000000049	0.000000049	0.00019	0.000000091	0.19	0.0000043	0.00000036
12-Aug-15	29	57	500	425																					
26-Aug-15	30	59	425	305	8.2	240	#N/A	0.015	0.89	0.069	0.0076	0.0030	0.0023	0.84	0.000050	0.000019	0.00012	0.00054	0.000000053	0.000000053	0.00020	0.00000011	0.22	0.0000045	0.00000038
9-Sep-15	31	61	500	420																					
23-Sep-15	32	63	420	345																					
7-Oct-15	33	65	345	305	8.1	260	#N/A	0.015	0.66	0.041		0.0018		0.55	0.000037	0.000013	0.000073	0.00034	0.000000036	0.000000036	0.00011	0.00000011	0.14	0.0000029	0.00000019
21-Oct-15	34	67	500	480																					
4-Nov-15	35	69	480	435																					
18-Nov-15	36	71	435	335	8.3	255	#N/A	0.0064	0.79	0.045		0.0020		0.64	0.000021	0.000013	0.000087	0.00034	0.000000039	0.000000039	0.00010	0.000000017	0.16	0.0000035	0.00000026
2-Dec-15	37	73	500	475																					
16-Dec-15	38	75	475	425																					
30-Dec-15	39	77	425	410	8.3	256	#N/A	#N/A	0.78	0.055		0.0023		0.77	0.000040	0.000015	0.000084	0.00048	0.000000048	0.000000048	0.00014	0.000000021	0.19	0.0000042	0.00000019
6-Jan-16	40	78	400	340	8.3	244	#N/A	0.017	1.9	0.14		0.0056		2.0	0.000075	0.000039	0.00024	0.0013	0.00000012	0.00000012	0.00037	0.000000051	0.50	0.000011	0.00000031
20-Jan-16	41	80	400	280	8.2	239	#N/A	0.026	1.6	0.098		0.0049		1.7	0.000069	0.000036	0.00022	0.0011	0.000000098	0.000000098	0.00028	0.000000098	0.42	0.0000095	0.00000095
3-Feb-16	42	82	400	325	8.2	228	#N/A	0.037	1.7	0.098		0.0059		1.7	0.000094	0.000041	0.00026	0.0012	0.00000011	0.00000011	0.00029	0.000000049	0.43	0.0000094	0.00000052
17-Feb-16	43	84	400	300	8.2	234	#N/A	0.052	1.6	0.090		0.0056		1.7	0.000060	0.000036	0.00025	0.0012	0.00000011	0.00000011	0.00027	0.000000090	0.43	0.000011	0.00000056
2-Mar-16	44	86	400	330	8.2	231	#N/A	0.023	1.8	0.099		0.0061		1.8	0.000035	0.000043	0.00031	0.0013	0.00000012	0.00000012	0.00028	0.00000017	0.45	0.000010	0.00000068

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Calculated Loading Rates for Col 5 (GO)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cu**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.		Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
16-Jul-14	1	1	1500	280	8.2	0.00081	0.00067	0.0000011	0.00023	0.55	0.0016	0.0053	0.0010	0.00027	0.0017	0.33	0.00019	0.16	0.000000056	4.3	0.0077	1.5	0.0000013	0.0000092	0.000016	0.0047	0.000069	0.00020	0.000056
30-Jul-14	2	3	400	290	8.3	0.00010	0.027	0.00000015	0.000077	0.12	0.00027	0.00058	0.00078	0.000067	0.00026	0.11	0.000038	0.086	0.000000029	1.5	0.0017	0.42	0.00000020	0.00000015	0.0000074	0.0022	0.0000039	0.000015	0.000029
13-Aug-14	3	5	400	305	8.3	0.00014	0.000031	0.00000031	0.000073	0.097	0.000064	0.00015	0.00075	0.000040	0.00032	0.10	0.000011	0.086	0.000000031	0.70	0.0014	0.19	0.00000044	0.00000076	0.0000029	0.0021	0.0000018	0.000015	0.000031
27-Aug-14	4	7	400	305	8.3	0.000043	0.000031	0.00000015	0.000064	0.093	0.000031	0.00015	0.00082	0.000023	0.00017	0.10	0.0000052	0.090	0.000000031	0.81	0.0014	0.14	0.00000040	0.0000032	0.00000076	0.0019	0.0000037	0.000015	0.000031
10-Sep-14	5	9	400	265	8.3	0.000032	0.000093	0.00000027	0.000049	0.072	0.0000087	0.00013	0.00072	0.000013	0.00016	0.081	0.0000041	0.090	0.000000027	0.98	0.0011	0.11	0.00000037	0.0000015	0.00000080	0.0016	0.0000033	0.000013	0.000027
24-Sep-14	6	11	400	240	8.3	0.000029	0.000024	0.00000024	0.000053	0.079	0.000016	0.00012	0.00051	0.000014	0.00011	0.085	0.00000048	0.070	0.00000011	0.63	0.0012	0.070	0.00000035	0.00000096	0.0000013	0.0013	0.0000023	0.000024	0.000024
8-Oct-14	7	13	300	225	8.3	0.000021	0.000079	0.00000011	0.000063	0.085	0.0000079	0.00011	0.00039	0.000012	0.000034	0.079	0.0000018	0.071	0.000000023	0.82	0.0014	0.059	0.00000036	0.00000023	0.0000014	0.0014	0.0000020	0.000011	0.000023
22-Oct-14	8	15	400	290	8.3	0.000028	0.00010	0.00000029	0.000072	0.12	0.000013	0.00015	0.00046	0.000012	0.000044	0.11	0.0000035	0.10	0.000000029	1.1	0.0018	0.081	0.00000052	0.00000029	0.0000026	0.0019	0.0000029	0.000015	0.000029
5-Nov-14	9	17	400	275		0.000023	0.000096	0.00000055	0.000068	0.12	0.000017	0.00014	0.00039	0.0000096	0.000041	0.092	0.0000026	0.088	0.000000028	0.93	0.0020	0.056	0.00000048	0.0000018	0.0000017	0.0017	0.0000023	0.000014	0.000028
19-Nov-14	10	19	400	275	8.3	0.000024	0.000096	0.0000030	0.000075	0.12	0.0000028	0.00014	0.00037	0.0000083	0.00019	0.095	0.0000018	0.094	0.000000028	0.89	0.0021	0.055	0.00000058	0.00000055	0.0000029	0.0017	0.0000023	0.000014	0.000028
3-Dec-14	11	21	400	345	8.3	0.000026	0.00012	0.00000035	0.000079	0.15	0.000010	0.00017	0.00042	0.000010	0.000052	0.12	0.0000024	0.11	0.000000035	0.92	0.0027	0.067	0.00000060	0.00000052	0.0000016	0.0020	0.0000028	0.000017	0.000035
17-Dec-14	12	23	400	285	8.3	0.000020	0.000100	0.00000014	0.000066	0.13	0.0000030	0.00014	0.00034	0.0000086	0.000043	0.11	0.0000029	0.086	0.000000029	0.68	0.0021	0.053	0.00000044	0.00000014	0.0000014	0.0015	0.0000026	0.000014	0.000029
31-Dec-14	13	25	400	295	8.4	0.000016	0.00010	0.0000046	0.000066	0.13	0.000015	0.00015	0.00033	0.0000074	0.000089	0.11	0.0000021	0.099	0.000000030	0.61	0.0024	0.050	0.00000050	0.00000074	0.0000010	0.0015	0.0000028	0.000015	0.000030
14-Jan-15	14	27	400	285	8.2	0.000028	0.000100	0.00000029	0.000065	0.14	0.0000073	0.00014	0.00034	0.0000071	0.000043	0.10	0.0000023	0.094	0.000000029	0.52	0.0025	0.043	0.00000050	0.00000086	0.0000020	0.0014	0.0000023	0.000014	0.000029
28-Jan-15	15	29	400	280	8.2	0.000013	0.000098	0.00000084	0.000055	0.15	0.000014	0.00014	0.00030	0.0000056	0.000056	0.11	0.0000035	0.080	0.000000028	0.46	0.0021	0.046	0.00000043	0.00000056	0.0000017	0.0014	0.0000025	0.000028	0.000028
11-Feb-15	16	31	400	275	8.2	0.000021	0.000096	0.0000021	0.000062	0.15	0.0000089	0.00014	0.00026	0.0000069	0.000055	0.10	0.000014	0.085	0.000000028	0.35	0.0027	0.041	0.00000048	0.0000021	0.0000021	0.0014	0.0000029	0.000014	0.000028
25-Feb-15	17	33	400	255	8.2	0.000015	0.000089	0.0000019	0.000058	0.14	0.000015	0.00013	0.00022	0.0000051	0.000064	0.11	0.000013	0.077	0.000000026	0.26	0.0026	0.033	0.00000052	0.0000013	0.0000011	0.0014	0.0000018	0.000038	0.000026
11-Mar-15	18	35	400	265	8.2	0.000015	0.000093	0.00000013	0.000061	0.16	0.0000068	0.00013	0.00024	0.0000066	0.000040	0.11	0.000013	0.070	0.000000027	0.21	0.0028	0.037	0.00000033	0.00000066	0.0000011	0.0013	0.0000023	0.000013	0.000027
25-Mar-15	19	37	400	280	8.1	0.000036	0.000098	0.00000056	0.000063	0.19	0.000012	0.00014	0.00028	0.0000070	0.000042	0.13	0.000014	0.10	0.000000028	0.20	0.0032	0.042	0.00000053	0.0000062	0.0000017	0.0013	0.0000027	0.000014	0.000028
8-Apr-15	20	39	400	350	8.1	0.000020	0.00012	0.00000018	0.000080	0.21	0.000016	0.00018	0.00029	0.0000070	0.000053	0.15	0.000018	0.13	0.000000035	0.15	0.0038	0.044	0.00000046	0.0000019	0.0000011	0.0017	0.0000028	0.000018	0.000035
22-Apr-15	21	41	400	270	8.1	0.00011	0.000095	0.0000049	0.000052	0.15	0.0000036	0.00014	0.00032	0.0000054	0.000041	0.11	0.0000012	0.084	0.000000068	0.10	0.0025	0.043	0.00000041	0.000090	0.00000068	0.0013	0.0000023	0.000081	0.000027
6-May-15	22	43	400	290	8.1	0.000017	0.00010	0.00000015	0.000055	0.16	0.0000088	0.00015	0.00030	0.0000058	0.000044	0.12	0.000015	0.088	0.000000058	0.079	0.0026	0.042	0.00000038	0.0000028	0.0000017	0.0012	0.0000030	0.000015	0.000029
20-May-15	23	45	500	455																									
3-Jun-15	24	47	445	340	8.1	0.000019	0.000060	0.00000043	0.000027	0.086	0.0000037	0.000085	0.00022	0.0000026	0.000026	0.067	0.00000051	0.053	0.000000060	0.032	0.0015	0.028	0.00000013	0.000031	0.00000094	0.00072	0.0000014	0.0000085	0.000017
17-Jun-15	25	49	500	440																									
1-Jul-15	26	51	440	335	8.1	0.0000071	0.000059	0.000000084	0.000025	0.079	0.0000079	0.000084	0.00022	0.0000025	0.000034	0.057	0.00000059	0.050	0.000000017	0.022	0.0014	0.026	0.00000023	0.000013	0.00000084	0.00070	0.0000013	0.0000084	0.000017
15-Jul-15	27	53	500	380																									
29-Jul-15	28	55	380	280	8.1	0.0000064	0.000049	0.00000035	0.000021	0.067	0.0000018	0.00014	0.00019	0.0000021	0.000021	0.048	0.00000028	0.039	0.000000028	0.016	0.0012	0.024	0.00000014	0.0000078	0.00000056	0.00063	0.0000014	0.0000070	0.000014
12-Aug-15	29	57	500	425																									
26-Aug-15	30	59	425	305	8.2	0.0000086	0.000053	0.0000012	0.000021	0.073	0.0000047	0.000076	0.00022	0.0000015	0.000023	0.053	0.00000053	0.046	0.00000031	0.017	0.0013	0.027	0.00000021	0.0000093	0.00000038	0.00063	0.0000012	0.0000076	0.000015
9-Sep-15	31	61	500	420																									
23-Sep-15	32	63	420	345																									
7-Oct-15	33	65	345	305	8.1	0.0000056	0.000036	0.00000010	0.000012	0.050	0.0000014	0.00010	0.00011	0.0000010	0.000015	0.034	0.00000025	0.026	0.000000010	0.0096	0.00080	0.016	0.00000011	0.0000035	0.00000031	0.00043	0.0000010	0.0000051	0.000010
21-Oct-15	34	67	500	480																									
4-Nov-15	35	69	480	435																									
18-Nov-15	36	71	435	335	8.3	0.0000040	0.000039	0.00000067	0.000013	0.060	0.0000011	0.000056	0.00013	0.00000056	0.000017	0.042	0.00000095	0.031	0.000000011	0.011	0.00091	0.018	0.00000012	0.0000026	0.00000028	0.00042	0.00000078	0.0000056	0.000011
2-Dec-15	37	73	500	475																									
16-Dec-15	38	75	475	425																									
30-Dec-15	39	77	425	410	8.3	0.0000077	0.000048	0.0000024	0.000015	0.069	0.0000013	0.000068	0.00015	0.0000014	0.000021	0.050	0.00000048	0.037	0.000000014	0.012	0.00092	0.021	0.000000034	0.0000031	0.00000034	0.00056	0.0000011	0.0000068	0.000014
6-Jan-16	40	78	400	340	8.3	0.000020	0.00012	0.00000034	0.000040	0.18	0.0000029	0.00017	0.00033	0.0000034	0.00010	0.14	0.0000043	0.099	0.000000034	0.031	0.0026	0.049	0.000000085	0.0000087	0.00000085	0.0013	0.0000024	0.000017	0.000034
20-Jan-16	41	80	400	280	8.2	0.000013	0.000098	0.00000056	0.000035	0.15	0.000029	0.00014	0.00032	0.0000042	0.000070	0.11	0.0000011	0.085	0.000000028	0.025	0.0024	0.043	0.00000059	0.0000056	0.00000070	0.0013	0.0000024	0.000014	0.000028
3-Feb-16	42	82	400	325	8.2	0.000019	0.00011	0.00000049	0.000039	0.15	0.00000016	0.00016	0.00035	0.0000033	0.000049	0.12	0.0000024	0.090	0.00000021	0.027	0.0026	0.044	0.00000042	0.0000050	0.00000081	0.0013	0.0000026	0.000016	0.000033
17-Feb-16	43	84	400	300	8.2	0.000014	0.00011	0.00000015	0.000033	0.15	0.0000021	0.00015	0.00036	0.0000030	0.000090	0.11	0.00000060	0.082	0.000000030	0.027	0.0023	0.036	0.00000042	0.0000045	0.00000075	0.0012	0.0000024	0.000015	0.000030
2-Mar-16	44	86	400	330	8.2	0.0000086	0.00012	0.00000050	0.000038	0.17	0.0000083	0.00017	0.00039	0.0000033	0.000050	0.13	0.00000066	0.094	0.000000033	0.029	0.0026	0.048	0.00000043	0.0000043	0.00000083	0.0013	0.0000025	0.000017	0.000033

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 6 (GT)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
30-Jul-14	1	1	1200	370	8.1	1431	#N/A	4.8	197	443	23	0.35	0.30	366	0.010	0.011	0.078	0.029	< 0.000007	0.000012	0.040	< 0.000003	83	0.00095	0.0015
13-Aug-14	2	3	400	300	8.2	776	#N/A	4.2	172	180	4.3	0.41	< 0.3	165	0.0039	0.012	0.084	0.022	< 0.000007	< 0.000007	0.036	< 0.000003	36	0.00033	0.00069
27-Aug-14	3	5	400	310	8.2	576	#N/A	4.9	174	120	< 2	0.45	< 0.3	135	0.0066	0.011	0.083	0.024	< 0.000007	< 0.000007	0.044	0.000010	30	0.000050	0.00035
10-Sep-14	4	7	400	310	8.3	492	#N/A	3.8	174	73	0.50	0.51	< 0.3	119	0.0067	0.0098	0.088	0.030	< 0.000007	< 0.000007	0.035	0.000022	27	0.00010	0.00024
24-Sep-14	5	9	400	240	8.2	449	#N/A	4.4	181	65	0.20	0.50	< 0.3	127	0.0039	0.010	0.074	0.038	< 0.000007	< 0.000007	0.033	< 0.000003	28	0.00012	0.00027
8-Oct-14	6	11	300	220	8.2	424	#N/A	6.5	158	43	< 1	0.46	< 0.3	140	0.0076	0.0093	0.069	0.041	< 0.000007	< 0.000007	0.035	0.000018	32	0.000080	0.00014
22-Oct-14	7	13	400	295	8.3	491	#N/A	5.6	245	45	< 1	0.48	< 0.3	138	0.0068	0.0091	0.069	0.044	< 0.000007	< 0.000007	0.036	0.000048	30	0.000033	0.00014
5-Nov-14	8	15	400	275		366	#N/A	#N/A	165	40	< 1	0.50	< 0.3	139	0.0067	0.0091	0.064	0.046	< 0.000007	< 0.000007	0.034	0.000017	29	0.000080	0.00012
19-Nov-14	9	17	400	270	8.3	368	#N/A	#N/A	204	33	< 0.2	0.50	< 0.3	153	0.0065	0.0088	0.062	0.054	< 0.000007	< 0.000007	0.035	0.00010	32	0.000050	0.000072
3-Dec-14	10	19	400	335	8.3	335	#N/A	2.9	155	30	< 0.2	0.45	< 0.3	151	0.0065	0.0086	0.058	0.056	< 0.000007	< 0.000007	0.028	0.000015	34	0.000060	0.000081
17-Dec-14	11	21	400	290	8.2	346	#N/A	2.9	150	27	< 1	0.54	< 0.3	156	0.0065	0.0091	0.061	0.053	< 0.000007	< 0.000007	0.029	0.0000080	35	< 0.00003	0.000065
31-Dec-14	12	23	400	290	8.2	333	#N/A	3.7	151	24	< 1	0.50	< 0.3	150	0.0090	0.0089	0.058	0.056	< 0.000007	< 0.000007	0.027	0.000015	33	< 0.00003	0.000083
14-Jan-15	13	25	400	275	8.2	351	#N/A	3.2	154	24	< 1	0.52	< 0.3	153	0.0069	0.0099	0.059	0.060	< 0.000007	< 0.000007	0.029	0.000018	33	0.000070	0.000070
28-Jan-15	14	27	400	285	8.2	347	#N/A	3.1	150	24	< 1	0.52	< 0.3	151	0.010	0.0090	0.055	0.059	< 0.000007	< 0.000007	0.022	0.000010	31	0.000090	0.000053
11-Feb-15	15	29	400	300	8.2	334	#N/A	4.2	157	26	< 1	0.52	< 0.3	151	0.0097	0.010	0.061	0.058	< 0.000007	< 0.000007	0.027	0.000015	33	0.000090	0.000058
25-Feb-15	16	31	400	275	8.2	335	#N/A	2.6	160	24	< 1	0.46	< 0.3	156	0.0040	0.0093	0.051	0.063	< 0.000007	< 0.000007	0.025	0.000019	35	0.00024	0.000058
11-Mar-15	17	33	400	300	8.3	355	#N/A	#N/A	184	20	< 1	0.53	< 0.3	148	0.0075	0.0096	0.051	0.058	< 0.000007	< 0.000007	0.021	0.000010	34	0.000090	0.000052
25-Mar-15	18	35	400	275	8.2	331	#N/A	3.8	151	21	< 1	0.50	< 0.3	154	0.0069	0.011	0.061	0.065	< 0.000007	< 0.000007	0.021	0.0000090	32	0.00014	0.000056
8-Apr-15	19	37	400	335	8.1	322	#N/A	4.3	153	25	< 1	0.50	< 0.3	146	0.0062	0.013	0.056	0.060	< 0.000007	< 0.000007	0.024	0.0000040	34	0.000070	0.000050
22-Apr-15	20	39	400	270	8.1	338	#N/A	5.2	165	25	< 1	0.47	< 0.3	164	0.0062	0.011	0.048	0.066	< 0.000007	< 0.000007	0.025	0.0000070	38	0.000080	0.000046
6-May-15	21	41	400	240	8.2	343	#N/A	4.4	170	23	< 1	0.39	< 0.3	163	0.0085	0.010	0.042	0.066	< 0.000007	< 0.000007	0.022	< 0.000003	37	< 0.00003	0.000039
20-May-15	22	43	500	435	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	23	45	435	315	8.1	307	#N/A	4.9	138	21	< 1	0.45	< 0.3	142	0.011	0.010	0.046	0.057	< 0.000007	< 0.000007	0.022	< 0.000003	33	0.000060	0.000037
17-Jun-15	24	47	500	435	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	25	49	435	315	8.1	319	#N/A	4.6	135	22	< 1	0.42	< 0.3	136	0.0081	0.011	0.053	0.059	< 0.000007	< 0.000007	0.017	0.0000060	31	0.000080	0.000052
15-Jul-15	26	51	500	375	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	27	53	375	270	8.1	298	#N/A	3.0	133	27	< 1	0.42	< 0.3	135	0.0087	0.010	0.045	0.054	< 0.000007	< 0.000007	0.018	0.0000070	31	0.000080	0.000035
12-Aug-15	28	55	500	430	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	29	57	430	270	8.2	299	#N/A	1.9	133	26	< 1	0.41	< 0.3	135	0.010	0.010	0.048	0.056	< 0.000007	< 0.000007	0.016	0.0000060	31	0.00010	0.000045
9-Sep-15	30	59	500	425	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	31	61	425	335	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	32	63	335	245	8.2	321	#N/A	3.2	148	23		0.39		137	0.0085	0.011	0.045	0.049	< 0.000007	< 0.000007	0.013	0.0000090	31	0.00013	0.000029
21-Oct-15	33	65	500	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	34	67	485	375	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	35	69	375	280	8.4	310	#N/A	#N/A	159	21		0.35		140	0.0086	0.0099	0.051	0.044	< 0.000007	< 0.000007	0.0098	0.0000090	32	0.00010	0.00045
2-Dec-15	36	71	500	455	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	37	73	455	410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	38	75	410	350	8.4	316	#N/A	#N/A	130	22	-	0.32	-	143	0.0075	0.0094	0.039	0.051	< 0.000007	< 0.000007	0.012	< 0.000003	33	0.00010	0.000019
6-Jan-16	39	76	400	355	8.3	315	#N/A	#N/A	131	28	-	0.29	-	156	0.0065	0.0097	0.043	0.058	< 0.000007	< 0.000007	0.013	0.000026	36	0.000070	< 0.000004
20-Jan-16	40	78	400	255	8.3	321	#N/A	1.6	132	32	-	0.33	-	157	0.0059	0.012	0.052	0.059	< 0.000007	< 0.000007	0.012	0.0000060	36	0.000080	0.000042
3-Feb-16	41	80	400	310	8.3	292	#N/A	1.9	128	20	-	0.32	-	142	0.0067	0.011	0.052	0.053	< 0.000007	< 0.000007	0.011	0.0000060	32	0.000070	0.000033
17-Feb-16	42	82	400	285	8.3	318	#N/A	3.2	142	18	-	0.34	-	160	0.0064	0.012	0.055	0.072	< 0.000007	< 0.000007	0.012	0.0000030	37	0.00012	0.000028
2-Mar-16	43	84	400	335	8.3	296	#N/A	1.1	131	14	-	0.35	-	146	0.0044	0.011	0.060	0.061	< 0.000007	< 0.000007	0.010	0.000013	32	0.00012	0.000027

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 6 (GT)

Date	Cycle	Weeks	Volume (mL)		pH	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.		Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
30-Jul-14	1	1	1200	370	8.1	0.016	0.31	0.000070	0.011	39	0.070	0.41	0.054	0.0086	0.051	24	0.0065	4.6	0.000084	146	0.42	169	0.00021	0.00051	0.00059	0.44	0.00038	0.0030	*< 0.002*
13-Aug-14	2	3	400	300	8.2	0.0059	*< 0.002*	0.000070	0.0073	18	0.026	*< 0.01*	0.065	0.0072	0.024	14	0.0022	4.5	*< 0.000002*	43	0.21	67	0.00015	0.000030	0.00019	0.41	0.000050	0.0010	*< 0.002*
27-Aug-14	3	5	400	310	8.2	0.0027	*< 0.002*	0.000040	0.0060	15	0.010	*< 0.01*	0.068	0.0039	0.026	13	0.0012	4.6	*< 0.000002*	51	0.18	40	0.00014	0.00019	0.000050	0.33	0.00014	0.0010	*< 0.002*
10-Sep-14	4	7	400	310	8.3	0.0020	*< 0.007*	0.000030	0.0053	13	0.0070	*< 0.01*	0.064	0.0014	0.020	11	0.00076	5.5	*< 0.000002*	53	0.19	29	0.00016	0.000060	0.000050	0.28	0.00017	*< 0.001*	*< 0.002*
24-Sep-14	5	9	400	240	8.2	0.0020	*< 0.002*	0.000030	0.0060	14	0.0052	*< 0.01*	0.057	0.0017	0.013	12	0.00034	4.5	0.0000070	42	0.18	19	0.00016	0.00012	0.00033	0.25	0.00015	0.0030	*< 0.002*
8-Oct-14	6	11	300	220	8.2	0.0015	*< 0.007*	0.000080	0.0066	15	0.0028	*< 0.01*	0.050	0.00090	0.015	11	0.00034	4.6	*< 0.000002*	32	0.22	17	0.00016	0.000040	0.00010	0.25	0.00015	*< 0.001*	*< 0.002*
22-Oct-14	7	13	400	295	8.3	0.0012	*< 0.007*	0.00019	0.0051	15	0.0046	*< 0.01*	0.050	0.00080	0.015	12	0.00029	5.1	*< 0.000002*	26	0.20	16	0.00016	*< 0.00001*	0.00011	0.25	0.00014	*< 0.001*	*< 0.002*
5-Nov-14	8	15	400	275		0.0013	*< 0.007*	0.000060	0.0051	16	0.0036	*< 0.01*	0.048	0.00070	0.011	10	0.00024	4.7	*< 0.000002*	17	0.24	13	0.00015	0.000060	0.00013	0.25	0.00013	*< 0.001*	*< 0.002*
19-Nov-14	9	17	400	270	8.3	0.0011	*< 0.007*	0.00013	0.0057	18	0.00018	*< 0.01*	0.042	0.00060	0.014	11	0.00020	4.9	*< 0.000002*	13	0.25	12	0.00023	0.000030	0.000090	0.26	0.00014	0.0020	*< 0.002*
3-Dec-14	10	19	400	335	8.3	0.0015	*< 0.007*	*< 0.00001*	0.0046	16	0.0018	*< 0.01*	0.038	0.00070	0.0090	10	0.00019	4.5	*< 0.000002*	8.9	0.26	10	0.00016	0.000020	0.000090	0.23	0.00014	0.0010	*< 0.002*
17-Dec-14	11	21	400	290	8.2	0.0011	*< 0.007*	*< 0.00001*	0.0048	17	0.00010	*< 0.01*	0.040	0.00060	0.0040	12	0.00018	4.5	*< 0.000002*	7.6	0.26	10	0.00015	*< 0.00001*	0.000080	0.24	0.00016	*< 0.001*	*< 0.002*
31-Dec-14	12	23	400	290	8.2	0.0010	*< 0.007*	*< 0.00001*	0.0044	17	0.0014	*< 0.01*	0.038	0.00060	0.013	11	0.00016	4.8	*< 0.000002*	5.9	0.26	8.9	0.00015	0.000080	0.00011	0.24	0.00015	*< 0.001*	*< 0.002*
14-Jan-15	13	25	400	275	8.2	0.00083	*< 0.007*	0.000030	0.0045	17	0.0013	*< 0.01*	0.040	0.00060	0.0030	11	0.00016	4.8	0.0000020	4.9	0.26	8.3	0.00015	0.000050	0.000090	0.25	0.00015	0.0010	*< 0.002*
28-Jan-15	14	27	400	285	8.2	0.00063	*< 0.007*	0.00012	0.0037	18	0.0011	*< 0.01*	0.036	0.00040	*< 0.003*	11	0.00018	4.3	*< 0.000002*	4.5	0.20	8.1	0.00014	0.000060	0.00012	0.25	0.00022	0.0020	*< 0.002*
11-Feb-15	15	29	400	300	8.2	0.0012	*< 0.007*	*< 0.00001*	0.0043	17	0.00069	0.010	0.034	0.00050	0.0060	11	*< 0.001*	4.4	*< 0.000002*	3.8	0.26	8.7	0.00014	0.00018	0.00010	0.25	0.00018	*< 0.001*	*< 0.002*
25-Feb-15	16	31	400	275	8.2	0.0011	*< 0.007*	0.000030	0.0044	17	0.00075	*< 0.01*	0.031	0.00050	*< 0.003*	11	*< 0.001*	4.7	*< 0.000002*	3.4	0.26	7.9	0.00017	0.00013	0.000060	0.27	0.00011	0.0010	*< 0.002*
11-Mar-15	17	33	400	300	8.3	0.0023	*< 0.007*	*< 0.00001*	0.0041	16	0.00048	*< 0.01*	0.031	0.00050	0.0080	10	*< 0.001*	3.9	*< 0.000002*	2.7	0.25	7.8	0.00015	0.000020	0.000060	0.25	0.00017	0.0020	*< 0.002*
25-Mar-15	18	35	400	275	8.2	0.0011	*< 0.007*	0.000010	0.0040	18	0.00044	*< 0.01*	0.036	0.00050	0.0070	11	*< 0.001*	4.8	*< 0.000002*	3.1	0.26	8.3	0.00016	0.00018	0.00011	0.25	0.00021	*< 0.001*	*< 0.002*
8-Apr-15	19	37	400	335	8.1	0.00062	*< 0.007*	*< 0.00001*	0.0040	15	0.00025	*< 0.01*	0.028	0.00040	0.011	11	*< 0.001*	5.0	*< 0.000002*	2.2	0.25	7.7	0.00015	0.000060	0.000070	0.25	0.00014	*< 0.001*	*< 0.002*
22-Apr-15	20	39	400	270	8.1	0.0019	*< 0.007*	0.00021	0.0042	17	0.00046	*< 0.01*	0.025	0.00050	0.0090	11	0.00017	4.9	0.0000030	2.2	0.28	7.6	0.00017	0.00041	0.000070	0.25	0.00016	*< 0.001*	*< 0.002*
6-May-15	21	41	400	240	8.2	0.0012	*< 0.007*	*< 0.00001*	0.0043	17	0.00073	*< 0.01*	0.022	0.00050	0.0050	11	*< 0.001*	4.8	0.0000030	2.0	0.27	8.0	0.00015	*< 0.00001*	0.000060	0.24	0.00021	0.0010	*< 0.002*
20-May-15	22	43	500	435	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	23	45	435	315	8.1	0.0013	*< 0.007*	0.00013	0.0037	15	0.00030	*< 0.01*	0.023	0.00040	0.010	10	0.00014	4.6	0.0000020	1.5	0.24	7.7	0.00012	0.000030	0.000070	0.24	0.00017	*< 0.001*	*< 0.002*
17-Jun-15	24	47	500	435	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	25	49	435	315	8.1	0.00060	*< 0.007*	*< 0.00001*	0.0034	15	0.00079	0.010	0.021	0.00030	0.012	9.1	0.00014	4.6	*< 0.000002*	1.3	0.23	7.5	0.00015	0.000080	0.000070	0.25	0.00016	0.0010	*< 0.002*
15-Jul-15	26	51	500	375	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	27	53	375	270	8.1	0.00091	*< 0.007*	0.000070	0.0035	14	0.00017	0.010	0.020	0.00030	0.0040	9.1	0.00010	4.1	*< 0.000002*	1.2	0.24	8.7	0.00014	0.000050	*< 0.00005*	0.27	0.00017	0.0010	*< 0.002*
12-Aug-15	28	55	500	430	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	29	57	430	270	8.2	0.00058	*< 0.007*	0.000060	0.0032	14	0.00056	*< 0.01*	0.023	0.00030	0.0060	8.7	0.00013	4.3	0.000026	1.2	0.24	8.5	0.00013	0.000020	*< 0.00005*	0.25	0.00018	*< 0.001*	*< 0.002*
9-Sep-15	30	59	500	425	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	31	61	425	335	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	32	63	335	245	8.2	0.00058	*< 0.007*	*< 0.00001*	0.0028	15	0.00016	*< 0.01*	0.015	0.00030	0.0050	8.4	0.00010	3.9	*< 0.000002*	1.1	0.22	7.7	0.000096	0.00013	*< 0.00005*	0.23	0.00017	0.0020	*< 0.002*
21-Oct-15	33	65	500	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	34	67	485	375	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	35	69	375	280	8.4	0.0014	0.017	0.00028	0.0026	15	0.0078	*< 0.01*	0.018	0.00080	0.0070	8.8	0.00027	4.1	0.000012	1.1	0.23	8.7	0.00012	0.000060	*< 0.00005*	0.21	0.00016	0.0010	*< 0.002*
2-Dec-15	36	71	500	455	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	37	73	455	410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	38	75	410	350	8.4	0.00070	*< 0.007*	0.00028	0.0025	15	0.00010	*< 0.01*	0.016	0.00020	0.0090	8.2	0.00011	4.0	*< 0.000002*	1.0	0.19	7.4	0.000095	0.00011	*< 0.00005*	0.24	0.00014	*< 0.001*	*< 0.002*
6-Jan-16	39	76	400	355	8.3	0.0010	*< 0.007*	0.00011	0.0027	16	0.000080	*< 0.01*	0.014	0.00020	0.0070	9.1	0.00032	4.5	0.0000020	1.1	0.22	9.3	0.000085	0.00032	*< 0.00005*	0.25	0.00011	*< 0.001*	*< 0.002*
20-Jan-16	40	78	400	255	8.3	0.00054	*< 0.007*	0.000050	0.0028	16	0.0011	*< 0.01*	0.018	0.00030	0.0060	8.9	0.00014	4.7	*< 0.000002*	1.1	0.26	9.6	0.00013	0.000030	*< 0.00005*	0.31	0.00014	*< 0.001*	*< 0.002*
3-Feb-16	41	80	400	310	8.3	0.00065	*< 0.007*	0.000030	0.0027	15	*< 0.00001*	*< 0.01*	0.015	0.00030	0.0080	8.8	0.00021	4.4	0.000014	1.0	0.24	7.9	0.00014	0.000040	*< 0.00005*	0.24	0.00014	*< 0.001*	*< 0.002*
17-Feb-16	42	82	400	285	8.3	0.00074	*< 0.007*	*< 0.00001*	0.0030	17	0.00014	*< 0.01*	0.017	0.00030	0.010	9.3	0.000070	4.5	*< 0.000002*	1.2	0.25	6.9	0.00016	0.000080	*< 0.00005*	0.28	0.00014	*< 0.001*	*< 0.002*
2-Mar-16	43	84	400	335	8.3	0.00036	*< 0.007*	0.00017	0.0026	16	0.00013	*< 0.01*	0.017	0.00020	0.0040	8.8	0.000070	4.5	*< 0.000002*	1.1	0.23	6.4	0.00014	0.000020	*< 0.00005*	0.22	0.00012	*< 0.001*	*< 0.002*

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Calculated Loading Rates for Col 6 (GT)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
30-Jul-14	1	1	1200	370	8.1	1431	#N/A	0.18	7.3	16	0.85	0.013	0.011	14	0.00037	0.00041	0.0029	0.0011	0.00000026	0.00000044	0.0015	0.00000011	3.1	0.000035	0.000054
13-Aug-14	2	3	400	300	8.2	776	#N/A	0.062	2.6	2.7	0.065	0.0062	0.0045	2.5	0.000059	0.00017	0.0013	0.00033	0.00000011	0.00000011	0.00054	0.000000045	0.54	0.0000050	0.000010
27-Aug-14	3	5	400	310	8.2	576	#N/A	0.076	2.7	1.9	0.031	0.0070	0.0047	2.1	0.00010	0.00016	0.0013	0.00037	0.00000011	0.00000011	0.00068	0.00000016	0.46	0.00000078	0.0000054
10-Sep-14	4	7	400	310	8.3	492	#N/A	0.058	2.7	1.1	0.0078	0.0079	0.0047	1.8	0.00010	0.00015	0.0014	0.00047	0.00000011	0.00000011	0.00053	0.00000034	0.41	0.0000016	0.0000037
24-Sep-14	5	9	400	240	8.2	449	#N/A	0.052	2.2	0.78	0.0024	0.0060	0.0036	1.5	0.000047	0.00012	0.00089	0.00045	0.000000084	0.000000084	0.00040	0.000000036	0.33	0.0000014	0.0000032
8-Oct-14	6	11	300	220	8.2	424	#N/A	0.072	1.7	0.47	0.011	0.0051	0.0033	1.5	0.000084	0.00010	0.00076	0.00045	0.000000077	0.000000077	0.00039	0.00000020	0.35	0.00000088	0.0000015
22-Oct-14	7	13	400	295	8.3	491	#N/A	0.082	3.6	0.66	0.015	0.0071	0.0044	2.0	0.00010	0.00013	0.0010	0.00064	0.00000010	0.00000010	0.00053	0.00000071	0.44	0.00000049	0.0000020
5-Nov-14	8	15	400	275		366	#N/A	#N/A	2.3	0.55	0.014	0.0069	0.0041	1.9	0.000092	0.00013	0.00087	0.00064	0.000000096	0.000000096	0.00046	0.00000023	0.40	0.0000011	0.0000017
19-Nov-14	9	17	400	270	8.3	368	#N/A	#N/A	2.7	0.45	0.0027	0.0068	0.0041	2.1	0.000088	0.00012	0.00083	0.00072	0.000000095	0.000000095	0.00047	0.0000014	0.43	0.00000068	0.00000097
3-Dec-14	10	19	400	335	8.3	335	#N/A	0.049	2.6	0.50	0.0034	0.0075	0.0050	2.5	0.00011	0.00014	0.00097	0.00093	0.00000012	0.00000012	0.00046	0.00000025	0.56	0.0000010	0.0000014
17-Dec-14	11	21	400	290	8.2	346	#N/A	0.042	2.2	0.39	0.015	0.0078	0.0044	2.3	0.000094	0.00013	0.00088	0.00077	0.00000010	0.00000010	0.00042	0.00000012	0.50	0.00000044	0.00000094
31-Dec-14	12	23	400	290	8.2	333	#N/A	0.054	2.2	0.35	0.015	0.0073	0.0044	2.2	0.00013	0.00013	0.00084	0.00082	0.00000010	0.00000010	0.00039	0.00000022	0.48	0.00000044	0.0000012
14-Jan-15	13	25	400	275	8.2	351	#N/A	0.044	2.1	0.33	0.014	0.0072	0.0041	2.1	0.000095	0.00014	0.00082	0.00082	0.000000096	0.000000096	0.00039	0.00000025	0.46	0.00000096	0.00000096
28-Jan-15	14	27	400	285	8.2	347	#N/A	0.045	2.1	0.34	0.014	0.0074	0.0043	2.2	0.00014	0.00013	0.00078	0.00084	0.000000100	0.000000100	0.00031	0.00000014	0.44	0.0000013	0.00000076
11-Feb-15	15	29	400	300	8.2	334	#N/A	0.063	2.4	0.39	0.015	0.0078	0.0045	2.3	0.00015	0.00016	0.00091	0.00087	0.00000011	0.00000011	0.00040	0.00000023	0.49	0.0000014	0.00000087
25-Feb-15	16	31	400	275	8.2	335	#N/A	0.035	2.2	0.33	0.014	0.0063	0.0041	2.1	0.000055	0.00013	0.00070	0.00086	0.000000096	0.000000096	0.00034	0.00000026	0.49	0.0000033	0.00000080
11-Mar-15	17	33	400	300	8.3	355	#N/A	#N/A	2.8	0.30	0.015	0.0080	0.0045	2.2	0.00011	0.00014	0.00077	0.00087	0.00000011	0.00000011	0.00032	0.00000015	0.50	0.0000014	0.00000078
25-Mar-15	18	35	400	275	8.2	331	#N/A	0.052	2.1	0.29	0.014	0.0069	0.0041	2.1	0.000095	0.00015	0.00084	0.00089	0.000000096	0.000000096	0.00029	0.00000012	0.44	0.0000019	0.00000077
8-Apr-15	19	37	400	335	8.1	322	#N/A	0.072	2.6	0.42	0.017	0.0084	0.0050	2.4	0.00010	0.00022	0.00093	0.00100	0.00000012	0.00000012	0.00041	0.000000067	0.56	0.0000012	0.00000084
22-Apr-15	20	39	400	270	8.1	338	#N/A	0.070	2.2	0.34	0.014	0.0063	0.0041	2.2	0.000084	0.00015	0.00065	0.00090	0.000000095	0.000000095	0.00034	0.000000095	0.51	0.0000011	0.00000062
6-May-15	21	41	400	240	8.2	343	#N/A	0.053	2.0	0.28	0.012	0.0047	0.0036	2.0	0.00010	0.00012	0.00050	0.00079	0.000000084	0.000000084	0.00026	0.000000036	0.44	0.00000036	0.00000047
20-May-15	22	43	500	435																					
3-Jun-15	23	45	435	315	8.1	307	#N/A	0.039	1.1	0.17	0.0079	0.0035	0.0024	1.1	0.000083	0.000080	0.00036	0.00045	0.000000055	0.000000055	0.00017	0.000000024	0.26	0.00000047	0.00000029
17-Jun-15	24	47	500	435																					
1-Jul-15	25	49	435	315	8.1	319	#N/A	0.036	1.1	0.17	0.0079	0.0033	0.0024	1.1	0.000064	0.000087	0.00042	0.00046	0.000000055	0.000000055	0.00013	0.000000047	0.24	0.00000063	0.00000041
15-Jul-15	26	51	500	375																					
29-Jul-15	27	53	375	270	8.1	298	#N/A	0.020	0.90	0.18	0.0068	0.0028	0.0020	0.91	0.000059	0.000070	0.00030	0.00037	0.000000047	0.000000047	0.00012	0.000000047	0.21	0.00000054	0.00000024
12-Aug-15	28	55	500	430																					
26-Aug-15	29	57	430	270	8.2	299	#N/A	0.013	0.90	0.18	0.0068	0.0028	0.0020	0.91	0.000070	0.000070	0.00032	0.00038	0.000000047	0.000000047	0.00011	0.000000041	0.21	0.00000068	0.00000030
9-Sep-15	30	59	500	425																					
23-Sep-15	31	61	425	335																					
7-Oct-15	32	63	335	245	8.2	321	#N/A	0.013	0.60	0.094	0.00	0.0016	0.00	0.56	0.000035	0.000045	0.00018	0.00020	0.000000029	0.000000029	0.000054	0.000000037	0.13	0.00000053	0.00000012
21-Oct-15	33	65	500	485																					
4-Nov-15	34	67	485	375																					
18-Nov-15	35	69	375	280	8.4	310	#N/A	#N/A	0.74	0.098	0.00	0.0016	0.00	0.65	0.000040	0.000046	0.00024	0.00021	0.000000033	0.000000033	0.000046	0.000000042	0.15	0.00000047	0.0000021
2-Dec-15	36	71	500	455																					
16-Dec-15	37	73	455	410																					
30-Dec-15	38	75	410	350	8.4	316	#N/A	#N/A	0.76	0.13	0.00	0.0019	0.00	0.83	0.000044	0.000055	0.00023	0.00030	0.000000041	0.000000041	0.000072	0.000000018	0.19	0.00000058	0.00000011
6-Jan-16	39	76	400	355	8.3	315	#N/A	#N/A	0.77	0.17	0.00	0.0017	0.00	0.92	0.000038	0.000057	0.00026	0.00034	0.000000041	0.000000041	0.000077	0.00000015	0.21	0.00000041	0.000000024
20-Jan-16	40	78	400	255	8.3	321	#N/A	0.0067	0.56	0.14	0.00	0.0014	0.00	0.67	0.000025	0.000049	0.00022	0.00025	0.000000030	0.000000030	0.000051	0.000000026	0.15	0.00000034	0.00000018
3-Feb-16	41	80	400	310	8.3	292	#N/A	0.030	2.0	0.31	0.00	0.0050	0.00	2.2	0.00010	0.00017	0.00081	0.00082	0.00000011	0.00000011	0.00017	0.000000093	0.50	0.0000011	0.00000051
17-Feb-16	42	82	400	285	8.3	318	#N/A	0.046	2.0	0.26	0.00	0.0048	0.00	2.3	0.000091	0.00017	0.00078	0.0010	0.000000100	0.000000100	0.00017	0.000000043	0.52	0.0000017	0.00000040
2-Mar-16	43	84	400	335	8.3	296	#N/A	0.018	2.2	0.23	0.00	0.0059	0.00	2.4	0.000074	0.00019	0.0010	0.0010	0.00000012	0.00000012	0.00017	0.00000022	0.54	0.0000020	0.00000045

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Calculated Loading Rates for Col 6 (GT)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cu**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.		Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
30-Jul-14	1	1	1200	370	8.1	0.00060	0.011	0.0000026	0.00041	1.4	0.0026	0.015	0.0020	0.00032	0.0019	0.88	0.00024	0.17	0.0000031	5.4	0.016	6.3	0.0000077	0.000019	0.000022	0.016	0.000014	0.00011	0.000074
13-Aug-14	2	3	400	300	8.2	0.000088	0.000030	0.0000011	0.00011	0.28	0.00039	0.00015	0.00097	0.00011	0.00036	0.21	0.000033	0.068	0.000000030	0.65	0.0032	1.0	0.0000023	0.00000045	0.0000029	0.0062	0.00000075	0.000015	0.000030
27-Aug-14	3	5	400	310	8.2	0.000042	0.000031	0.00000062	0.000093	0.23	0.00016	0.00016	0.0011	0.000060	0.00040	0.20	0.000019	0.071	0.000000031	0.78	0.0028	0.63	0.0000021	0.0000029	0.00000078	0.0051	0.0000022	0.000016	0.000031
10-Sep-14	4	7	400	310	8.3	0.000031	0.00011	0.00000047	0.000082	0.20	0.00011	0.00016	0.00100	0.000022	0.00031	0.17	0.000012	0.085	0.000000031	0.82	0.0029	0.44	0.0000024	0.00000093	0.00000078	0.0043	0.0000026	0.000016	0.000031
24-Sep-14	5	9	400	240	8.2	0.000024	0.000024	0.00000036	0.000072	0.17	0.000062	0.00012	0.00068	0.000020	0.00016	0.14	0.0000041	0.054	0.000000084	0.51	0.0021	0.23	0.0000020	0.0000014	0.0000040	0.0030	0.0000018	0.000036	0.000024
8-Oct-14	6	11	300	220	8.2	0.000016	0.000077	0.00000088	0.000073	0.16	0.000030	0.00011	0.00055	0.0000099	0.00017	0.12	0.0000037	0.051	0.000000022	0.36	0.0025	0.18	0.0000018	0.00000044	0.0000011	0.0028	0.0000017	0.000011	0.000022
22-Oct-14	7	13	400	295	8.3	0.000018	0.00010	0.0000028	0.000075	0.23	0.000068	0.00015	0.00074	0.000012	0.00022	0.17	0.0000043	0.075	0.000000030	0.39	0.0030	0.23	0.0000023	0.00000015	0.0000016	0.0037	0.0000021	0.000015	0.000030
5-Nov-14	8	15	400	275		0.000018	0.000096	0.00000083	0.000070	0.22	0.000049	0.00014	0.00066	0.0000096	0.00015	0.14	0.0000033	0.064	0.000000028	0.24	0.0032	0.17	0.0000021	0.00000083	0.0000018	0.0034	0.0000018	0.000014	0.000028
19-Nov-14	9	17	400	270	8.3	0.000015	0.000095	0.0000018	0.000077	0.24	0.0000024	0.00014	0.00057	0.0000081	0.00019	0.15	0.0000027	0.066	0.000000027	0.17	0.0034	0.16	0.0000032	0.00000041	0.0000012	0.0035	0.0000019	0.000027	0.000027
3-Dec-14	10	19	400	335	8.3	0.000026	0.00012	0.00000017	0.000077	0.27	0.000029	0.00017	0.00063	0.000012	0.00015	0.17	0.0000032	0.075	0.000000034	0.15	0.0043	0.17	0.0000026	0.00000034	0.0000015	0.0038	0.0000023	0.000017	0.000034
17-Dec-14	11	21	400	290	8.2	0.000016	0.00010	0.00000015	0.000069	0.25	0.0000015	0.00015	0.00057	0.0000087	0.000058	0.17	0.0000026	0.065	0.000000029	0.11	0.0038	0.15	0.0000022	0.00000015	0.0000012	0.0035	0.0000023	0.000015	0.000029
31-Dec-14	12	23	400	290	8.2	0.000015	0.00010	0.00000015	0.000063	0.24	0.000020	0.00015	0.00055	0.0000087	0.00019	0.15	0.0000023	0.069	0.000000029	0.085	0.0037	0.13	0.0000022	0.0000012	0.0000016	0.0035	0.0000022	0.000015	0.000029
14-Jan-15	13	25	400	275	8.2	0.000011	0.000096	0.00000041	0.000062	0.24	0.000018	0.00014	0.00055	0.0000083	0.000041	0.15	0.0000022	0.065	0.000000028	0.067	0.0036	0.11	0.0000021	0.00000069	0.0000012	0.0034	0.0000021	0.000014	0.000028
28-Jan-15	14	27	400	285	8.2	0.0000090	0.000100	0.0000017	0.000053	0.25	0.000016	0.00014	0.00051	0.0000057	0.000043	0.15	0.0000026	0.061	0.000000029	0.064	0.0029	0.12	0.0000020	0.00000086	0.0000017	0.0036	0.0000031	0.000029	0.000029
11-Feb-15	15	29	400	300	8.2	0.000018	0.00011	0.00000015	0.000064	0.26	0.000010	0.00015	0.00051	0.0000075	0.000090	0.16	0.000015	0.066	0.000000030	0.057	0.0038	0.13	0.0000021	0.0000027	0.0000015	0.0037	0.0000027	0.000015	0.000030
25-Feb-15	16	31	400	275	8.2	0.000015	0.000096	0.00000041	0.000060	0.23	0.000010	0.00014	0.00043	0.0000069	0.000041	0.16	0.000014	0.065	0.000000028	0.046	0.0036	0.11	0.0000023	0.0000018	0.00000083	0.0037	0.0000015	0.000014	0.000028
11-Mar-15	17	33	400	300	8.3	0.000034	0.00011	0.00000015	0.000062	0.23	0.0000072	0.00015	0.00047	0.0000075	0.00012	0.15	0.000015	0.058	0.000000030	0.040	0.0037	0.12	0.0000023	0.00000030	0.00000090	0.0038	0.0000026	0.000030	0.000030
25-Mar-15	18	35	400	275	8.2	0.000015	0.000096	0.00000014	0.000054	0.24	0.0000061	0.00014	0.00049	0.0000069	0.000096	0.15	0.000014	0.066	0.000000028	0.042	0.0035	0.11	0.0000022	0.0000025	0.0000015	0.0035	0.0000029	0.000014	0.000028
8-Apr-15	19	37	400	335	8.1	0.000010	0.00012	0.00000017	0.000067	0.25	0.0000042	0.00017	0.00047	0.0000067	0.00018	0.18	0.000017	0.084	0.000000034	0.037	0.0042	0.13	0.0000025	0.0000010	0.0000012	0.0043	0.0000023	0.000017	0.000034
22-Apr-15	20	39	400	270	8.1	0.000025	0.000095	0.0000028	0.000057	0.23	0.0000062	0.00014	0.00034	0.0000068	0.00012	0.15	0.0000023	0.066	0.000000041	0.030	0.0037	0.10	0.0000023	0.0000055	0.00000095	0.0034	0.0000022	0.000014	0.000027
6-May-15	21	41	400	240	8.2	0.000014	0.000084	0.00000012	0.000051	0.21	0.0000088	0.00012	0.00027	0.0000060	0.000060	0.13	0.000012	0.058	0.000000036	0.024	0.0032	0.096	0.0000018	0.00000012	0.00000072	0.0029	0.0000025	0.000012	0.000024
20-May-15	22	43	500	435																									
3-Jun-15	23	45	435	315	8.1	0.000010	0.000055	0.0000010	0.000029	0.12	0.0000024	0.000079	0.00018	0.0000032	0.000079	0.079	0.0000011	0.036	0.000000016	0.012	0.0019	0.061	0.00000098	0.00000024	0.00000055	0.0019	0.0000013	0.0000079	0.000016
17-Jun-15	24	47	500	435																									
1-Jul-15	25	49	435	315	8.1	0.0000047	0.000055	0.000000079	0.000027	0.11	0.0000062	0.000079	0.00017	0.0000024	0.000095	0.072	0.0000011	0.036	0.000000016	0.010	0.0018	0.059	0.0000012	0.00000063	0.00000055	0.0019	0.0000013	0.0000079	0.000016
15-Jul-15	26	51	500	375																									
29-Jul-15	27	53	375	270	8.1	0.0000061	0.000047	0.00000047	0.000024	0.097	0.0000011	0.000068	0.00014	0.0000020	0.000027	0.061	0.00000068	0.028	0.000000014	0.0078	0.0016	0.059	0.00000092	0.00000034	0.00000034	0.0018	0.0000011	0.0000068	0.000014
12-Aug-15	28	55	500	430																									
26-Aug-15	29	57	430	270	8.2	0.0000039	0.000047	0.00000041	0.000021	0.096	0.0000038	0.000068	0.00015	0.0000020	0.000041	0.059	0.00000088	0.029	0.00000018	0.0080	0.0016	0.057	0.00000088	0.00000014	0.00000034	0.0017	0.0000012	0.0000068	0.000014
9-Sep-15	30	59	500	425																									
23-Sep-15	31	61	425	335																									
7-Oct-15	32	63	335	245	8.2	0.0000024	0.000029	0.000000041	0.000011	0.060	0.00000065	0.000041	0.000060	0.0000012	0.000020	0.034	0.00000041	0.016	0.0000000082	0.0043	0.00088	0.031	0.00000039	0.00000053	0.00000020	0.00095	0.00000069	0.0000082	0.0000082
21-Oct-15	33	65	500	485																									
4-Nov-15	34	67	485	375																									
18-Nov-15	35	69	375	280	8.4	0.0000066	0.000079	0.0000013	0.000012	0.069	0.000037	0.000047	0.000082	0.0000037	0.000033	0.041	0.0000013	0.019	0.000000056	0.0051	0.0011	0.041	0.00000056	0.00000028	0.00000023	0.00096	0.00000075	0.0000047	0.0000093
2-Dec-15	36	71	500	455																									
16-Dec-15	37	73	455	410																									
30-Dec-15	38	75	410	350	8.4	0.0000041	0.000041	0.0000016	0.000014	0.087	0.00000058	0.000058	0.000094	0.0000012	0.000053	0.048	0.00000064	0.024	0.000000012	0.0060	0.0011	0.043	0.00000055	0.00000064	0.00000029	0.0014	0.00000082	0.0000058	0.000012
6-Jan-16	39	76	400	355	8.3	0.0000059	0.000041	0.00000065	0.000016	0.096	0.00000047	0.000059	0.000083	0.0000012	0.000041	0.054	0.0000019	0.027	0.000000012	0.0062	0.0013	0.055	0.00000050	0.0000019	0.00000030	0.0015	0.00000065	0.0000059	0.000012
20-Jan-16	40	78	400	255	8.3	0.0000023	0.000030	0.00000021	0.000012	0.070	0.0000045	0.000043	0.000075	0.0000013	0.000026	0.038	0.00000060	0.020	0.0000000085	0.0046	0.0011	0.041	0.00000057	0.00000013	0.00000021	0.0013	0.00000060	0.0000043	0.0000085
3-Feb-16	41	80	400	310	8.3	0.000010	0.00011	0.00000047	0.000042	0.23	0.00000016	0.00016	0.00023	0.0000047	0.00012	0.14	0.0000033	0.068	0.00000022	0.016	0.0036	0.12	0.0000021	0.00000062	0.00000078	0.0038	0.0000022	0.000016	0.000031
17-Feb-16	42	82	400	285	8.3	0.000011	0.000100	0.00000014	0.000043	0.24	0.0000020	0.00014	0.00025	0.0000043	0.00014	0.13	0.00000100	0.064	0.000000029	0.017	0.0035	0.098	0.0000023	0.0000011	0.00000071	0.0039	0.0000020	0.000014	0.000029
2-Mar-16	43	84	400	335	8.3	0.0000060	0.00012	0.0000028	0.000044	0.26	0.0000022	0.00017	0.00028	0.0000034	0.000067	0.15	0.0000012	0.075	0.000000034	0.019	0.0039	0.11	0.0000023	0.00000034	0.00000084	0.0038	0.0000020	0.000017	0.000034

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 13 (OKY Master)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
20-May-15	1	1	2000	415	7.0	1431	#N/A	9.4	80	333	36	#N/A	< 0.3	272	0.012	0.0046	0.057	0.031	0.000037	< 0.000007	0.12	0.000062	77	0.000060	0.020
3-Jun-15	2	3	400	360	7.7	301	#N/A	6.8	83	67	6.0	0.18	< 0.3	29	0.0050	0.0069	0.20	0.0034	0.0000090	< 0.000007	0.16	< 0.000003	8.2	0.000060	0.0025
17-Jun-15	3	5	300	260	7.7	282	#N/A	5.2	85	45	< 1	0.18	< 0.3	30	0.0042	0.0071	0.23	0.0034	0.000010	< 0.000007	0.14	0.0000040	8.5	0.000040	0.0026
1-Jul-15	4	7	300	280	7.8	300	#N/A	6.6	78	52	8.0	0.20	< 0.3	31	0.0050	0.0066	0.14	0.0033	0.0000090	< 0.000007	0.16	0.000012	8.5	0.000080	0.0028
15-Jul-15	5	9	300	265	7.8	293	#N/A	5.8	70	66	4.0	0.20	< 0.3	32	0.0043	0.0064	0.10	0.0038	< 0.000007	< 0.000007	0.16	0.0000040	8.8	0.000060	0.0034
29-Jul-15	6	11	300	250	7.7	307	#N/A	3.5	57	87	2.0	0.20	< 0.3	35	0.0049	0.0060	0.081	0.0036	0.0000070	< 0.000007	0.13	0.000010	10	0.00011	0.0032
12-Aug-15	7	13	300	295	7.7	301	#N/A	3.8	51	90	< 1	0.19	< 0.3	36	0.0044	0.0060	0.086	0.0037	< 0.000007	0.0000090	0.13	0.000011	10	0.00024	0.0033
26-Aug-15	8	15	300	250	7.6	262	#N/A	3.8	40	81	< 1	0.22	< 0.3	29	0.0043	0.0066	0.096	0.0028	< 0.000007	< 0.000007	0.13	0.000012	8.2	< 0.00003	0.0023
9-Sep-15	9	17	300	235	7.5	230	#N/A	3.9	31	69	< 1	0.25	< 0.3	24	0.0038	0.0071	0.11	0.0023	< 0.000007	< 0.000007	0.12	0.0000030	6.8	0.000050	0.0018
23-Sep-15	10	19	300	250	7.5	197	#N/A	3.0	23	63	< 1	0.25	-	19	0.0039	0.0076	0.12	0.0018	< 0.000007	< 0.000007	0.12	< 0.000003	5.5	0.00017	0.0013
7-Oct-15	11	21	300	230	7.5	181	#N/A	3.1	22	55	< 1	0.27	-	15	0.0047	0.0077	0.10	0.0014	< 0.000007	< 0.000007	0.089	0.0000040	4.3	0.000030	0.0011
21-Oct-15	12	23	350	275	7.8	164	#N/A	1.5	24	41	< 1	0.28	-	14	0.0075	0.0069	0.11	0.0016	< 0.000007	< 0.000007	0.070	0.0000050	3.9	0.00020	0.00095
4-Nov-15	13	25	300	230	7.4	152	#N/A	2.3	17	39	< 1	0.26	-	15	0.0073	0.0076	0.12	0.0015	< 0.000007	< 0.000007	0.091	0.0000070	4.2	0.000070	0.0013
18-Nov-15	14	27	300	245	7.6	146	#N/A	1.4	22	42	< 1	0.26	-	13	0.0025	0.0070	0.11	0.0011	< 0.000007	< 0.000007	0.068	< 0.000003	3.6	< 0.00003	0.0012
2-Dec-15	15	29	300	240	7.3	137	#N/A	3.6	17	39	< 1	0.29	-	13	0.0052	0.0077	0.13	0.0015	< 0.000007	< 0.000007	0.063	0.000010	3.6	0.00028	0.00098
16-Dec-15	16	31	300	235	7.6	129	#N/A	4.1	18	39	< 1	0.24	-	13	0.0039	0.0073	0.11	0.0014	< 0.000007	< 0.000007	0.066	0.0000070	3.6	0.000060	0.0012
30-Dec-15	17	33	300	385	7.5	126	#N/A	2.8	16	31	< 1	0.28	-	13	0.0039	0.0073	0.12	0.0014	< 0.000007	< 0.000007	0.070	0.0000040	3.5	0.000040	0.0011
13-Jan-16	18	35	300	290	7.4	118	#N/A	2.8	17	31	< 1	0.26	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	19	37	300	300	7.5	120	#N/A	3.7	21	32	< 1	0.29	-	12	0.020	0.0069	0.10	0.0016	< 0.000007	< 0.000007	0.057	0.0000080	3.3	< 0.00003	0.00095
10-Feb-16	20	39	300	275	7.5	119	#N/A	3.4	23	30	< 1	0.26	-	13	0.0033	0.0073	0.11	0.0013	< 0.000007	< 0.000007	0.047	0.0000050	3.6	< 0.00003	0.0011
24-Feb-16	21	41	300	300	7.5	119	#N/A	3.4	22	28	< 1	0.26	-	12	0.0022	0.0073	0.11	0.0013	< 0.000007	< 0.000007	0.050	0.0000060	3.3	< 0.00003	0.0011
9-Mar-16	22	43	300	335	7.5	119	#N/A	3.0	22	23															

Calculated Loading Rates for Col 13 (OKY Master)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
20-May-15	1	1	2000	415	7.0	1431	#N/A	0.39	3.3	14	1.5	#N/A	0.012	11	0.00048	0.00019	0.0023	0.0013	0.0000015	0.00000029	0.0049	0.0000026	3.2	0.0000025	0.00081
3-Jun-15	2	3	400	360	7.7	301	#N/A	0.12	1.5	1.2	0.11	0.0032	0.0054	0.52	0.000090	0.00012	0.0036	0.000062	0.00000016	0.00000013	0.0028	0.000000054	0.15	0.0000011	0.000045
17-Jun-15	3	5	300	260	7.7	282	#N/A	0.067	1.1	0.59	0.013	0.0023	0.0039	0.39	0.000055	0.000092	0.0029	0.000044	0.00000013	0.000000091	0.0018	0.000000052	0.11	0.00000052	0.000034
1-Jul-15	4	7	300	280	7.8	300	#N/A	0.093	1.1	0.73	0.11	0.0028	0.0042	0.43	0.000070	0.000092	0.0020	0.000046	0.00000013	0.000000098	0.0022	0.00000017	0.12	0.0000011	0.000040
15-Jul-15	5	9	300	265	7.8	293	#N/A	0.077	0.92	0.87	0.053	0.0027	0.0040	0.43	0.000057	0.000085	0.0014	0.000050	0.000000093	0.000000093	0.0021	0.000000053	0.12	0.00000080	0.000045
29-Jul-15	6	11	300	250	7.7	307	#N/A	0.044	0.71	1.1	0.025	0.0025	0.0038	0.44	0.000061	0.000075	0.0010	0.000045	0.000000088	0.000000088	0.0017	0.00000013	0.13	0.0000014	0.000040
12-Aug-15	7	13	300	295	7.7	301	#N/A	0.056	0.75	1.3	0.015	0.0028	0.0044	0.53	0.000065	0.000089	0.0013	0.000054	0.00000010	0.00000013	0.0018	0.00000016	0.15	0.0000035	0.000049
26-Aug-15	8	15	300	250	7.6	262	#N/A	0.048	0.50	1.0	0.013	0.0028	0.0038	0.36	0.000054	0.000083	0.0012	0.000035	0.000000088	0.000000088	0.0016	0.00000015	0.10	0.00000038	0.000029
9-Sep-15	9	17	300	235	7.5	230	#N/A	0.045	0.36	0.81	0.012	0.0029	0.0035	0.28	0.000045	0.000083	0.0013	0.000027	0.000000082	0.000000082	0.0015	0.000000035	0.080	0.00000059	0.000022
23-Sep-15	10	19	300	250	7.5	197	#N/A	0.037	0.29	0.79	0.013	0.0031	0.00	0.24	0.000049	0.000095	0.0015	0.000023	0.000000088	0.000000088	0.0015	0.000000038	0.068	0.0000021	0.000017
7-Oct-15	11	21	300	230	7.5	181	#N/A	0.035	0.25	0.63	0.012	0.0031	0.00	0.17	0.000054	0.000089	0.0012	0.000016	0.000000081	0.000000081	0.0010	0.000000046	0.049	0.00000035	0.000012
21-Oct-15	12	23	350	275	7.8	164	#N/A	0.020	0.32	0.56	0.014	0.0039	0.00	0.19	0.00010	0.000095	0.0015	0.000022	0.000000096	0.000000096	0.00096	0.000000069	0.054	0.0000028	0.000013
4-Nov-15	13	25	300	230	7.4	152	#N/A	0.027	0.20	0.45	0.012	0.0030	0.00	0.17	0.000084	0.000087	0.0013	0.000018	0.000000081	0.000000081	0.0010	0.000000081	0.049	0.00000081	0.000015
18-Nov-15	14	27	300	245	7.6	146	#N/A	0.018	0.27	0.51	0.012	0.0032	0.00	0.16	0.000031	0.000086	0.0014	0.000014	0.000000086	0.000000086	0.00083	0.000000037	0.044	0.00000037	0.000015
2-Dec-15	15	29	300	240	7.3	137	#N/A	0.043	0.21	0.47	0.012	0.0035	0.00	0.16	0.000062	0.000092	0.0015	0.000017	0.000000084	0.000000084	0.00075	0.00000012	0.043	0.0000034	0.000012
16-Dec-15	16	31	300	235	7.6	129	#N/A	0.048	0.21	0.46	0.012	0.0028	0.00	0.15	0.000046	0.000086	0.0013	0.000017	0.000000082	0.000000082	0.00077	0.000000082	0.042	0.00000071	0.000014
30-Dec-15	17	33	300	385	7.5	126	#N/A	0.054	0.31	0.60	0.019	0.0054	0.00	0.24	0.000075	0.00014	0.0022	0.000028	0.00000013	0.00000013	0.0014	0.000000077	0.068	0.00000077	0.000021
13-Jan-16	18	35	300	290	7.4	118	#N/A	0.041	0.24	0.45	0.015	0.0038	0.00												
27-Jan-16	19	37	300	300	7.5	120	#N/A	0.056	0.31	0.48	0.015	0.0044	0.00	0.18	0.00030	0.00010	0.0016	0.000024	0.00000011	0.00000011	0.00086	0.00000012	0.050	0.00000045	0.000014
10-Feb-16	20	39	300	275	7.5	119	#N/A	0.047	0.31	0.41	0.014	0.0036	0.00	0.17	0.000045	0.00010	0.0016	0.000018	0.000000096	0.000000096	0.00065	0.000000069	0.050	0.00000041	0.000015
24-Feb-16	21	41	300	300	7.5	119	#N/A	0.051	0.33	0.42	0.015	0.0039	0.00	0.18	0.000033	0.00011	0.0017	0.000019	0.00000011	0.00000011	0.00075	0.000000090	0.050	0.00000045	0.000016
9-Mar-16	22	43	300	335	7.5	119	#N/A	0.050	0.36	0.39															

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 13 (OKY Master)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cu**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.		Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
20-May-15	1	1	2000	415	7.0	0.0011	0.056	0.00014	0.023	19	2.3	0.050	0.0011	0.0042	0.023	31	0.0020	14	0.000056	120	0.36	125	0.00024	0.000070	0.00020	0.0030	0.00010	0.049	*< 0.002*
3-Jun-15	2	3	400	360	7.7	0.0013	*< 0.007*	0.000070	0.0096	2.1	0.54	0.030	0.0015	0.00080	0.0080	12	*< 0.001*	14	0.000032	42	0.036	22	0.000070	0.00011	0.00017	0.0029	0.00013	0.0070	*< 0.002*
17-Jun-15	3	5	300	260	7.7	0.00059	*< 0.007*	*< 0.00001*	0.0085	2.1	0.66	*< 0.01*	0.0023	0.00070	0.0060	12	0.00021	15	0.000010	40	0.038	26	0.000078	0.000090	0.00021	0.0037	0.00011	0.0060	*< 0.002*
1-Jul-15	4	7	300	280	7.8	0.00077	*< 0.007*	*< 0.00001*	0.0093	2.3	0.79	0.020	0.0022	0.00080	*< 0.003*	11	0.00020	15	0.000017	39	0.041	26	0.000074	0.00015	0.00022	0.0037	0.00013	0.0060	*< 0.002*
15-Jul-15	5	9	300	265	7.8	0.0034	*< 0.007*	0.000060	0.0099	2.5	1.0	*< 0.01*	0.0022	0.00090	*< 0.003*	11	0.00019	15	0.000017	41	0.045	29	0.000082	0.00044	0.00025	0.0038	0.00012	0.0070	*< 0.002*
29-Jul-15	6	11	300	250	7.7	0.00059	*< 0.007*	0.000020	0.011	2.5	1.1	0.010	0.0023	0.00080	*< 0.003*	12	0.00014	14	0.000010	37	0.046	30	0.000069	0.000060	*< 0.00005*	0.0035	0.00011	0.0050	*< 0.002*
12-Aug-15	7	13	300	295	7.7	0.00055	*< 0.007*	0.000010	0.0095	2.6	1.1	*< 0.01*	0.0025	0.00090	0.0030	12	0.00013	15	0.000012	36	0.047	27	0.000087	0.000090	*< 0.00005*	0.0026	0.00010	0.0050	*< 0.002*
26-Aug-15	8	15	300	250	7.6	0.00090	*< 0.007*	0.00010	0.0091	1.9	0.90	0.010	0.0022	0.00060	0.0040	10	0.00013	15	0.0000090	31	0.037	24	0.000065	0.00013	*< 0.00005*	0.0021	0.00012	0.0040	*< 0.002*
9-Sep-15	9	17	300	235	7.5	0.00093	*< 0.007*	0.000040	0.0071	1.7	0.75	*< 0.01*	0.0038	0.00060	*< 0.003*	10	0.00010	14	0.0000080	28	0.029	27	0.000066	0.00015	*< 0.00005*	0.0015	0.00014	0.0030	*< 0.002*
23-Sep-15	10	19	300	250	7.5	0.00092	*< 0.007*	0.000020	0.0065	1.3	0.60	*< 0.01*	0.0021	0.00040	*< 0.003*	8.6	0.000090	15	0.000086	24	0.024	21	0.000042	0.00010	0.00015	0.0011	0.00010	0.0030	*< 0.002*
7-Oct-15	11	21	300	230	7.5	0.00061	*< 0.007*	0.000020	0.0057	1.1	0.51	*< 0.01*	0.0037	0.00040	*< 0.003*	7.5	0.000050	13	0.000010	20	0.019	18	0.000059	0.00016	*< 0.00005*	0.0012	0.000090	0.0020	*< 0.002*
21-Oct-15	12	23	350	275	7.8	0.0014	*< 0.007*	0.000030	0.0047	0.97	0.45	*< 0.01*	0.0034	0.00040	0.0050	7.3	*< 0.00004*	14	0.0000060	17	0.016	15	0.000066	0.00016	0.000070	0.00087	0.00018	0.0020	*< 0.002*
4-Nov-15	13	25	300	230	7.4	0.00065	*< 0.007*	*< 0.00001*	0.0057	1.1	0.53	*< 0.01*	0.0040	0.00040	*< 0.003*	6.9	0.000070	14	0.0000020	18	0.019	17	0.000067	0.00016	0.00013	0.0012	0.00030	0.0030	*< 0.002*
18-Nov-15	14	27	300	245	7.6	0.00096	*< 0.007*	0.000070	0.0052	0.95	0.46	*< 0.01*	0.0039	0.00040	*< 0.003*	7.2	0.00011	14	*< 0.000002*	17	0.017	15	0.000052	0.000090	*< 0.00005*	0.0011	0.00010	0.0030	*< 0.002*
2-Dec-15	15	29	300	240	7.3	0.0013	*< 0.007*	0.000060	0.0050	0.98	0.45	*< 0.01*	0.0046	0.00030	0.0030	7.6	0.000090	14	0.0000020	18	0.016	15	0.000037	0.00018	*< 0.00005*	0.0010	0.00014	0.0040	*< 0.002*
16-Dec-15	16	31	300	235	7.6	0.00043	*< 0.007*	0.00017	0.0054	0.95	0.49	*< 0.01*	0.0043	0.00040	*< 0.003*	7.2	0.000060	15	*< 0.000002*	16	0.017	13	0.000075	0.000080	*< 0.00005*	0.0016	0.00012	0.0030	*< 0.002*
30-Dec-15	17	33	300	385	7.5	0.00061	*< 0.007*	0.00015	0.0058	0.94	0.49	0.010	0.0039	0.00040	0.0040	7.0	*< 0.00004*	14	0.0000030	16	0.016	12	0.000051	0.000040	0.000090	0.0012	0.00012	0.0030	*< 0.002*
13-Jan-16	18	35	300	290	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	19	37	300	300	7.5	0.00056	*< 0.007*	0.000030	0.0047	0.84	0.46	*< 0.01*	0.0021	0.00030	0.0060	6.7	*< 0.00004*	15	0.0000020	14	0.015	11	0.000046	0.00014	*< 0.00005*	0.00084	0.00012	0.0030	*< 0.002*
10-Feb-16	20	39	300	275	7.5	0.0026	*< 0.007*	0.00013	0.0050	0.85	0.48	*< 0.01*	0.0023	0.00030	0.0030	6.6	0.00017	16	*< 0.000002*	13	0.016	10	0.000043	0.00011	*< 0.00005*	0.00080	0.00012	0.0040	*< 0.002*
24-Feb-16	21	41	300	300	7.5	0.00054	*< 0.007*	0.000040	0.0051	0.86	0.49	0.020	0.0022	0.00040	0.0070	6.8	0.000040	16	0.0000020	12	0.015	9.6	0.000041	0.000050	0.000060	0.00089	0.000080	0.0050	*< 0.002*
9-Mar-16	22	43	300	335	7.5																								

Calculated Loading Rates for Col 13 (OKY Master)

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cu**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.		Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
20-May-15	1	1	2000	415	7.0	0.000046	0.0023	0.0000058	0.00097	0.80	0.096	0.0021	0.000045	0.00017	0.00095	1.3	0.000083	0.60	0.0000023	5.0	0.015	5.2	0.000010	0.0000029	0.0000083	0.00012	0.0000042	0.0020	0.000083
3-Jun-15	2	3	400	360	7.7	0.000023	0.00013	0.0000013	0.00017	0.037	0.0097	0.00054	0.000028	0.000014	0.00014	0.21	0.000018	0.25	0.00000058	0.76	0.00065	0.39	0.0000013	0.0000020	0.0000031	0.000052	0.0000023	0.00013	0.000036
17-Jun-15	3	5	300	260	7.7	0.0000077	0.000091	0.00000013	0.00011	0.027	0.0086	0.00013	0.000030	0.0000091	0.000078	0.15	0.0000027	0.19	0.00000013	0.52	0.00049	0.34	0.0000010	0.0000012	0.0000027	0.000048	0.0000014	0.000078	0.000026
1-Jul-15	4	7	300	280	7.8	0.000011	0.000098	0.00000014	0.00013	0.032	0.011	0.00028	0.000031	0.000011	0.000042	0.16	0.0000028	0.21	0.00000024	0.55	0.00058	0.36	0.0000010	0.0000021	0.0000031	0.000052	0.0000018	0.000084	0.000028
15-Jul-15	5	9	300	265	7.8	0.000045	0.000093	0.00000080	0.00013	0.034	0.014	0.00013	0.000029	0.000012	0.000040	0.14	0.0000025	0.20	0.00000023	0.54	0.00059	0.38	0.0000011	0.0000058	0.0000033	0.000050	0.0000016	0.000093	0.000027
29-Jul-15	6	11	300	250	7.7	0.0000074	0.000088	0.00000025	0.00013	0.031	0.014	0.00013	0.000029	0.000010	0.000038	0.15	0.0000018	0.18	0.00000013	0.46	0.00057	0.38	0.00000086	0.00000075	0.00000063	0.000044	0.0000014	0.000063	0.000025
12-Aug-15	7	13	300	295	7.7	0.0000081	0.00010	0.00000015	0.00014	0.038	0.017	0.00015	0.000037	0.000013	0.000044	0.18	0.0000019	0.22	0.00000018	0.53	0.00069	0.40	0.0000013	0.0000013	0.00000074	0.000038	0.0000015	0.000074	0.000030
26-Aug-15	8	15	300	250	7.6	0.000011	0.000088	0.0000013	0.00011	0.024	0.011	0.00013	0.000028	0.0000075	0.000050	0.13	0.0000016	0.18	0.00000011	0.39	0.00046	0.29	0.00000081	0.0000016	0.00000063	0.000027	0.0000015	0.000050	0.000025
9-Sep-15	9	17	300	235	7.5	0.000011	0.000082	0.00000047	0.000083	0.020	0.0089	0.00012	0.000044	0.0000071	0.000035	0.12	0.0000012	0.16	0.000000094	0.32	0.00034	0.32	0.00000078	0.0000018	0.00000059	0.000018	0.0000016	0.000035	0.000024
23-Sep-15	10	19	300	250	7.5	0.000012	0.000088	0.00000025	0.000081	0.016	0.0075	0.00013	0.000026	0.0000050	0.000038	0.11	0.0000011	0.19	0.0000011	0.30	0.00030	0.27	0.00000053	0.0000013	0.0000019	0.000014	0.0000013	0.000038	0.000025
7-Oct-15	11	21	300	230	7.5	0.0000070	0.000081	0.00000023	0.000066	0.012	0.0058	0.00012	0.000043	0.0000046	0.000035	0.087	0.00000058	0.15	0.00000012	0.23	0.00022	0.21	0.00000068	0.0000018	0.00000058	0.000014	0.0000010	0.000023	0.000023
21-Oct-15	12	23	350	275	7.8	0.000019	0.000096	0.00000041	0.000064	0.013	0.0061	0.00014	0.000047	0.0000055	0.000069	0.100	0.00000055	0.19	0.000000083	0.24	0.00022	0.21	0.00000091	0.0000022	0.00000096	0.000012	0.0000025	0.000028	0.000028
4-Nov-15	13	25	300	230	7.4	0.0000075	0.000081	0.00000012	0.000065	0.013	0.0061	0.00012	0.000046	0.0000046	0.000035	0.079	0.00000081	0.16	0.000000023	0.21	0.00022	0.19	0.00000077	0.0000018	0.0000015	0.000014	0.0000035	0.000035	0.000023
18-Nov-15	14	27	300	245	7.6	0.000012	0.000086	0.00000086	0.000063	0.012	0.0056	0.00012	0.000047	0.0000049	0.000037	0.088	0.0000013	0.17	0.000000025	0.20	0.00020	0.18	0.00000064	0.0000011	0.00000061	0.000013	0.0000012	0.000037	0.000025
2-Dec-15	15	29	300	240	7.3	0.000015	0.000084	0.00000072	0.000060	0.012	0.0054	0.00012	0.000055	0.0000036	0.000036	0.091	0.0000011	0.17	0.000000024	0.21	0.00020	0.18	0.00000044	0.0000022	0.00000060	0.000012	0.0000017	0.000048	0.000024
16-Dec-15	16	31	300	235	7.6	0.0000051	0.000082	0.0000020	0.000063	0.011	0.0057	0.00012	0.000051	0.0000047	0.000035	0.084	0.00000071	0.18	0.000000024	0.18	0.00020	0.15	0.00000088	0.00000094	0.00000059	0.000018	0.0000014	0.000035	0.000024
30-Dec-15	17	33	300	385	7.5	0.000012	0.00013	0.0000029	0.00011	0.018	0.0094	0.00019	0.000075	0.0000077	0.000077	0.13	0.00000077	0.27	0.000000058	0.30	0.00031	0.22	0.00000098	0.00000077	0.0000017	0.000023	0.0000023	0.000058	0.000039
13-Jan-16	18	35	300	290	7.4																								
27-Jan-16	19	37	300	300	7.5	0.0000084	0.00011	0.00000045	0.000071	0.013	0.0070	0.00015	0.000031	0.0000045	0.000090	0.10	0.00000060	0.23	0.000000030	0.20	0.00023	0.16	0.00000069	0.0000021	0.00000075	0.000013	0.0000018	0.000045	0.000030
10-Feb-16	20	39	300	275	7.5	0.000036	0.000096	0.0000018	0.000069	0.012	0.0066	0.00014	0.000032	0.0000041	0.000041	0.091	0.0000023	0.22	0.000000028	0.18	0.00021	0.14	0.00000059	0.0000015	0.00000069	0.000011	0.0000017	0.000055	0.000028
24-Feb-16	21	41	300	300	7.5	0.0000081	0.00011	0.00000060	0.000077	0.013	0.0073	0.00030	0.000033	0.0000060	0.00011	0.10	0.00000060	0.24	0.000000030	0.18	0.00023	0.14	0.00000062	0.00000075	0.00000090	0.000013	0.0000012	0.000075	0.000030
9-Mar-16	22	43	300	335	7.5																								

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 14 (OKY Master (Fresh))

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	$mgCaCO_3$/L	$mgCaCO_3$/L	$mgCaCO_3$/L	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
20-May-15	1	1	2000	575	8.0	782	#N/A	7.5	210	431	48	#N/A	*< 0.3*	569	0.0057	0.0062	0.050	0.043	*< 0.000007*	*< 0.000007*	0.048	0.000034	174	0.000050	0.0068
3-Jun-15	2	3	400	395	8.1	556	#N/A	6.0	200	78	9.0	0.80	*< 0.3*	119	0.0070	0.0085	0.057	0.022	*< 0.000007*	*< 0.000007*	0.075	0.000014	35	0.000060	0.0014
17-Jun-15	3	5	300	270	8.1	582	#N/A	5.4	193	79	*< 1*	0.70	*< 0.3*	140	0.0044	0.0085	0.048	0.027	*< 0.000007*	*< 0.000007*	0.074	0.000019	43	0.000050	0.0016
1-Jul-15	4	7	300	230	8.1	666	#N/A	6.1	187	126	7.0	0.70	*< 0.3*	159	0.0068	0.0076	0.041	0.032	*< 0.000007*	*< 0.000007*	0.084	0.000013	48	0.000040	0.0022
15-Jul-15	5	9	300	300	8.1	701	#N/A	6.0	192	175	*< 1*	0.65	*< 0.3*	188	0.0065	0.0071	0.034	0.041	*< 0.000007*	*< 0.000007*	0.092	0.000018	54	0.000090	0.0030
29-Jul-15	6	11	300	240	8.1	700	#N/A	5.1	181	173	*< 1*	0.66	*< 0.3*	202	0.0057	0.0065	0.025	0.037	0.0000070	*< 0.000007*	0.073	*< 0.000003*	61	0.00012	0.0027
12-Aug-15	7	13	300	335	8.1	665	#N/A	5.2	179	159	*< 1*	0.65	*< 0.3*	201	0.0055	0.0066	0.025	0.035	*< 0.000007*	*< 0.000007*	0.076	0.000025	59	0.000090	0.0029
26-Aug-15	8	15	300	280	8.1	572	#N/A	3.5	152	133	*< 1*	0.87	*< 0.3*	166	0.0077	0.0068	0.032	0.027	*< 0.000007*	*< 0.000007*	0.074	0.000019	50	*< 0.00003*	0.0015
9-Sep-15	9	17	300	285	8.1	354	#N/A	2.0	118	57	-	1.2	-	115	0.13	0.0072	0.031	0.019	*< 0.000007*	*< 0.000007*	0.059	0.000016	35	0.00015	0.00098
23-Sep-15	10	19	300	290	8.2	353	#N/A	1.4	134	53	-	1.2	-	113	0.0042	0.0062	0.033	0.014	*< 0.000007*	*< 0.000007*	0.045	0.0000090	34	0.000050	0.00081
7-Oct-15	11	21	300	280	8.2	342	#N/A	2.0	115	48	-	1.3	-	126	0.0076	0.0066	0.032	0.019	*< 0.000007*	*< 0.000007*	0.045	0.000012	38	0.00020	0.0010
21-Oct-15	12	23	300	290	8.3	333	#N/A	3.5	109	48	-	1.3	-	125	0.0059	0.0066	0.032	0.020	*< 0.000007*	*< 0.000007*	0.049	0.0000080	38	0.000050	0.00092
4-Nov-15	13	25	300	285	8.2	340	#N/A	1.4	109	40	-	1.3	-	131	0.0038	0.0066	0.032	0.021	*< 0.000007*	*< 0.000007*	0.050	0.000012	39	0.000040	0.0010
18-Nov-15	14	27	300	295	8.2	315	#N/A	1.2	107	45	-	1.3	-	121	0.0050	0.0061	0.026	0.018	0.0000080	*< 0.000007*	0.041	0.0000070	37	*< 0.00003*	0.00083
2-Dec-15	15	29	300	260	8.1	308	#N/A	3.0	105	46	-	1.4	-	114	0.0074	0.0061	0.030	0.020	*< 0.000007*	*< 0.000007*	0.043	0.000016	34	*< 0.00003*	0.00079
16-Dec-15	16	31	300	290	8.3	333	#N/A	3.5	109	48	-	1.3	-	125	0.0059	0.0066	0.032	0.020	*< 0.000007*	*< 0.000007*	0.049	0.0000080	38	0.000050	0.00092
30-Dec-15	17	33	300	285	8.2	340	#N/A	1.4	109	40	-	1.3	-	131	0.0038	0.0066	0.032	0.021	*< 0.000007*	*< 0.000007*	0.050	0.000012	39	0.000040	0.0010
13-Jan-16	18	35	300	295	8.2	315	#N/A	1.2	107	45	-	1.3	-	121	0.0050	0.0061	0.026	0.018	0.0000080	*< 0.000007*	0.041	0.0000070	37	*< 0.00003*	0.00083
27-Jan-16	19	37	300	260	8.1	308	#N/A	3.0	105	46	-	1.4	-	114	0.0074	0.0061	0.030	0.020	*< 0.000007*	*< 0.000007*	0.043	0.000016	34	*< 0.00003*	0.00079
10-Feb-16	20	39	300	280	8.2	300	#N/A	2.4	103	42	-	1.5	-	112	0.0057	0.0067	0.034	0.020	*< 0.000007*	*< 0.000007*	0.033	0.0000080	34	*< 0.00003*	0.00083
24-Feb-16	21	41	300	290	8.1	301	#N/A	2.2	100	42	-	1.5	-	119	0.0042	0.0065	0.034	0.020	*< 0.000007*	*< 0.000007*	0.036	0.000010	36	0.000050	0.00075
9-Mar-16	22	43	301	265	8.1	291	#N/A	2.3	97	40															

Calculated Loading Rates for Col 14 (OKY Master (Fresh))

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
	No.		Input	Output		umhos/cm	$mgCaCO_3$/kg/wk	$mgCaCO_3$/kg/wk	$mgCaCO_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
20-May-15	1	1	2000	575	8.0	782	#N/A	0.43	12	25	2.8	#N/A	0.017	33	0.00033	0.00036	0.0029	0.0025	0.00000040	0.00000040	0.0028	0.0000020	10	0.0000029	0.00039
3-Jun-15	2	3	400	395	8.1	556	#N/A	0.12	3.9	1.5	0.18	0.016	0.0059	2.4	0.00014	0.00017	0.0011	0.00044	0.00000014	0.00000014	0.0015	0.00000028	0.70	0.0000012	0.000028
17-Jun-15	3	5	300	270	8.1	582	#N/A	0.073	2.6	1.1	0.014	0.0095	0.0041	1.9	0.000059	0.00011	0.00065	0.00037	0.000000095	0.000000095	0.00099	0.00000026	0.58	0.00000068	0.000022
1-Jul-15	4	7	300	230	8.1	666	#N/A	0.070	2.1	1.4	0.081	0.0081	0.0035	1.8	0.000078	0.000087	0.00047	0.00037	0.000000081	0.000000081	0.00096	0.00000015	0.55	0.00000046	0.000025
15-Jul-15	5	9	300	300	8.1	701	#N/A	0.090	2.9	2.6	0.015	0.0098	0.0045	2.8	0.000098	0.00011	0.00051	0.00061	0.00000011	0.00000011	0.0014	0.00000027	0.81	0.0000014	0.000045
29-Jul-15	6	11	300	240	8.1	700	#N/A	0.061	2.2	2.1	0.012	0.0079	0.0036	2.4	0.000068	0.000078	0.00030	0.00044	0.000000084	0.000000084	0.00087	0.000000036	0.73	0.0000014	0.000033
12-Aug-15	7	13	300	335	8.1	665	#N/A	0.087	3.0	2.7	0.017	0.011	0.0050	3.4	0.000092	0.00011	0.00042	0.00059	0.00000012	0.00000012	0.0013	0.00000042	0.99	0.0000015	0.000048
26-Aug-15	8	15	300	280	8.1	572	#N/A	0.049	2.1	1.9	0.014	0.012	0.0042	2.3	0.00011	0.000095	0.00044	0.00038	0.000000098	0.000000098	0.0010	0.00000027	0.70	0.00000042	0.000021
9-Sep-15	9	17	300	285	8.1	354	#N/A	0.028	1.7	0.81		0.017	0.00	1.6	0.0019	0.00010	0.00044	0.00027	0.000000100	0.000000100	0.00084	0.00000023	0.50	0.0000021	0.000014
23-Sep-15	10	19	300	290	8.2	353	#N/A	0.020	1.9	0.77		0.018	0.00	1.6	0.000061	0.000090	0.00047	0.00020	0.00000010	0.00000010	0.00065	0.00000013	0.49	0.00000073	0.000012
7-Oct-15	11	21	300	280	8.2	342	#N/A	0.028	1.6	0.67		0.018	0.00	1.8	0.00011	0.000092	0.00045	0.00026	0.000000098	0.000000098	0.00063	0.00000017	0.53	0.0000028	0.000014
21-Oct-15	12	23	300	290	8.3	333	#N/A	0.050	1.6	0.70		0.019	0.00	1.8	0.000086	0.000096	0.00046	0.00029	0.00000010	0.00000010	0.00070	0.00000012	0.55	0.00000073	0.000013
4-Nov-15	13	25	300	285	8.2	340	#N/A	0.019	1.6	0.57		0.018	0.00	1.9	0.000054	0.000094	0.00045	0.00030	0.000000100	0.000000100	0.00071	0.00000017	0.56	0.00000057	0.000014
18-Nov-15	14	27	300	295	8.2	315	#N/A	0.018	1.6	0.66		0.019	0.00	1.8	0.000074	0.000090	0.00038	0.00027	0.00000012	0.00000010	0.00060	0.00000010	0.54	0.00000044	0.000012
2-Dec-15	15	29	300	260	8.1	308	#N/A	0.039	1.4	0.60		0.018	0.00	1.5	0.000096	0.000079	0.00039	0.00026	0.000000091	0.000000091	0.00056	0.00000021	0.45	0.00000039	0.000010
16-Dec-15	16	31	300	290	8.3	333	#N/A	0.050	1.6	0.70		0.019	0.00	1.8	0.000086	0.000096	0.00046	0.00029	0.00000010	0.00000010	0.00070	0.00000012	0.55	0.00000073	0.000013
30-Dec-15	17	33	300	285	8.2	340	#N/A	0.019	1.6	0.57		0.018	0.00	1.9	0.000054	0.000094	0.00045	0.00030	0.000000100	0.000000100	0.00071	0.00000017	0.56	0.00000057	0.000014
13-Jan-16	18	35	300	295	8.2	315	#N/A	0.018	1.6	0.66		0.019	0.00	1.8	0.000074	0.000090	0.00038	0.00027	0.00000012	0.00000010	0.00060	0.00000010	0.54	0.00000044	0.000012
27-Jan-16	19	37	300	260	8.1	308	#N/A	0.039	1.4	0.60		0.018	0.00	1.5	0.000096	0.000079	0.00039	0.00026	0.000000091	0.000000091	0.00056	0.00000021	0.45	0.00000039	0.000010
10-Feb-16	20	39	300	280	8.2	300	#N/A	0.033	1.4	0.59		0.021	0.00	1.6	0.000080	0.000094	0.00047	0.00027	0.000000098	0.000000098	0.00046	0.00000011	0.47	0.00000042	0.000012
24-Feb-16	21	41	300	290	8.1	301	#N/A	0.031	1.4	0.61		0.021	0.00	1.7	0.000061	0.000094	0.00049	0.00028	0.00000010	0.00000010	0.00052	0.00000015	0.52	0.00000073	0.000011
9-Mar-16	22	43	301	265	8.1	291	#N/A	0.030	1.3	0.53															

Note:

Values in grey italics are below the analytical detection limit

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for Col 14 (OKY Master (Fresh))

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cu**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.		Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
20-May-15	1	1	2000	575	8.0	0.0021	*< 0.007*	0.000040	0.058	33	1.5	0.010	0.024	0.0024	0.025	31	*< 0.001*	6.9	0.000068	107	0.46	165	0.00014	*< 0.00001*	0.00015	0.40	0.00043	0.0020	*< 0.002*
3-Jun-15	2	3	400	395	8.1	0.0012	*< 0.007*	0.000060	0.037	7.4	0.47	*< 0.01*	0.038	0.00080	0.0070	17	*< 0.001*	6.7	0.000046	58	0.097	32	0.000075	0.000030	0.00012	0.084	0.00050	0.0010	*< 0.002*
17-Jun-15	3	5	300	270	8.1	0.0013	*< 0.007*	0.000010	0.033	8.1	0.64	*< 0.01*	0.036	0.00080	0.0090	18	0.00014	7.5	0.000010	53	0.11	44	0.000098	0.00011	0.00017	0.13	0.00042	0.0020	*< 0.002*
1-Jul-15	4	7	300	230	8.1	0.00081	*< 0.007*	0.000010	0.035	9.7	0.86	0.030	0.033	0.00090	0.0050	18	0.00011	7.6	0.000016	53	0.14	47	0.000094	0.00010	0.00012	0.21	0.00040	0.0010	*< 0.002*
15-Jul-15	5	9	300	300	8.1	0.0015	*< 0.007*	0.000060	0.037	13	1.3	*< 0.01*	0.028	0.0011	*< 0.003*	18	0.000080	8.0	0.0000050	57	0.17	56	0.00012	0.00022	0.00018	0.34	0.00042	0.0020	*< 0.002*
29-Jul-15	6	11	300	240	8.1	0.00092	*< 0.007*	0.000030	0.038	12	1.3	*< 0.01*	0.026	0.00090	*< 0.003*	19	0.000070	7.4	0.000034	50	0.18	59	0.00011	0.000060	0.000060	0.33	0.00039	0.0020	*< 0.002*
12-Aug-15	7	13	300	335	8.1	0.00045	*< 0.007*	0.000020	0.030	13	1.4	*< 0.01*	0.025	0.00090	0.0030	21	0.000070	8.0	0.000013	50	0.17	54	0.00011	0.000040	0.000090	0.26	0.00037	0.0020	*< 0.002*
26-Aug-15	8	15	300	280	8.1	0.0011	*< 0.007*	0.00015	0.027	9.7	1.0	*< 0.01*	0.027	0.00050	0.0040	17	0.000070	7.3	0.0000060	40	0.14	41	0.000096	0.00019	*< 0.00005*	0.21	0.00040	0.0020	*< 0.002*
9-Sep-15	9	17	300	285	8.1	0.0012	*< 0.007*	0.000010	0.016	6.7	0.72	*< 0.01*	0.026	0.00030	0.0030	12	0.000060	6.5	0.0000030	18	0.090	24	0.000082	0.00018	*< 0.00005*	0.083	0.00044	0.0040	*< 0.002*
23-Sep-15	10	19	300	290	8.2	0.00043	*< 0.007*	0.000030	0.014	7.1	0.73	*< 0.01*	0.020	*< 0.0001*	*< 0.003*	14	0.00017	6.6	*< 0.000002*	16	0.091	19	0.000059	0.000050	*< 0.00005*	0.055	0.00035	*< 0.001*	*< 0.002*
7-Oct-15	11	21	300	280	8.2	0.00057	*< 0.007*	0.00017	0.014	7.7	0.80	*< 0.01*	0.020	0.00030	*< 0.003*	14	0.000050	6.5	0.0000020	16	0.095	19	0.000060	0.000080	*< 0.00005*	0.070	0.00042	0.0020	*< 0.002*
21-Oct-15	12	23	300	290	8.3	0.00052	*< 0.007*	0.00038	0.014	7.4	0.82	*< 0.01*	0.018	0.00030	0.0060	14	0.000070	7.0	*< 0.000002*	14	0.096	17	0.000081	0.00011	0.000080	0.068	0.00035	0.0010	*< 0.002*
4-Nov-15	13	25	300	285	8.2	0.00067	*< 0.007*	0.00013	0.015	8.0	0.93	0.010	0.010	0.00040	0.0030	14	*< 0.00004*	6.8	*< 0.000002*	14	0.10	16	0.000065	*< 0.00001*	*< 0.00005*	0.047	0.00033	0.0020	*< 0.002*
18-Nov-15	14	27	300	295	8.2	0.00046	*< 0.007*	0.00025	0.014	7.3	0.83	*< 0.01*	0.012	0.00020	0.0030	14	0.00020	6.9	0.000012	12	0.086	15	0.000042	0.00018	*< 0.00005*	0.057	0.00032	0.0010	*< 0.002*
2-Dec-15	15	29	300	260	8.1	0.00047	*< 0.007*	0.000040	0.012	6.8	0.78	*< 0.01*	0.012	0.00020	0.0040	13	*< 0.00004*	6.7	0.0000020	10	0.092	15	0.000075	0.00011	0.000090	0.062	0.00035	0.0010	*< 0.002*
16-Dec-15	16	31	300	290	8.3	0.00052	*< 0.007*	0.00038	0.014	7.4	0.82	*< 0.01*	0.018	0.00030	0.0060	14	0.000070	7.0	*< 0.000002*	14	0.096	17	0.000081	0.00011	0.000080	0.068	0.00035	0.0010	*< 0.002*
30-Dec-15	17	33	300	285	8.2	0.00067	*< 0.007*	0.00013	0.015	8.0	0.93	0.010	0.010	0.00040	0.0030	14	*< 0.00004*	6.8	*< 0.000002*	14	0.10	16	0.000065	*< 0.00001*	*< 0.00005*	0.047	0.00033	0.0020	*< 0.002*
13-Jan-16	18	35	300	295	8.2	0.00046	*< 0.007*	0.00025	0.014	7.3	0.83	*< 0.01*	0.012	0.00020	0.0030	14	0.00020	6.9	0.000012	12	0.086	15	0.000042	0.00018	*< 0.00005*	0.057	0.00032	0.0010	*< 0.002*
27-Jan-16	19	37	300	260	8.1	0.00047	*< 0.007*	0.000040	0.012	6.8	0.78	*< 0.01*	0.012	0.00020	0.0040	13	*< 0.00004*	6.7	0.0000020	10	0.092	15	0.000075	0.00011	0.000090	0.062	0.00035	0.0010	*< 0.002*
10-Feb-16	20	39	300	280	8.2	0.0018	*< 0.007*	0.00014	0.012	6.8	0.80	*< 0.01*	0.012	0.00020	0.0060	13	0.000060	6.6	*< 0.000002*	9.6	0.090	15	0.000070	0.000080	*< 0.00005*	0.055	0.00037	0.0020	*< 0.002*
24-Feb-16	21	41	300	290	8.1	0.00019	*< 0.007*	0.000050	0.012	7.2	0.81	0.020	0.011	0.00020	0.0080	13	*< 0.00004*	7.1	*< 0.000002*	8.3	0.089	13	0.000073	0.000020	*< 0.00005*	0.056	0.00034	0.0010	*< 0.002*
9-Mar-16	22	43	301	265	8.1																								

Calculated Loading Rates for Col 14 (OKY Master (Fresh))

Date	**Cycle**	**Weeks**	**Volume** (mL)		**pH**	**Cu**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.		Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
20-May-15	1	1	2000	575	8.0	0.00012	0.00040	0.0000023	0.0033	1.9	0.089	0.00058	0.0014	0.00014	0.0014	1.8	0.000058	0.40	0.0000039	6.2	0.027	9.5	0.0000082	0.00000058	0.0000086	0.023	0.000025	0.00012	0.00012
3-Jun-15	2	3	400	395	8.1	0.000024	0.00014	0.0000012	0.00073	0.15	0.0093	0.00020	0.00075	0.000016	0.00014	0.34	0.000020	0.13	0.00000091	1.1	0.0019	0.63	0.0000015	0.00000059	0.0000024	0.0017	0.0000099	0.000020	0.000040
17-Jun-15	3	5	300	270	8.1	0.000018	0.000095	0.00000014	0.00045	0.11	0.0087	0.00014	0.00048	0.000011	0.00012	0.24	0.0000019	0.10	0.00000014	0.71	0.0015	0.59	0.0000013	0.0000015	0.0000023	0.0017	0.0000057	0.000027	0.000027
1-Jul-15	4	7	300	230	8.1	0.0000093	0.000081	0.00000012	0.00040	0.11	0.0099	0.00035	0.00038	0.000010	0.000058	0.21	0.0000013	0.087	0.00000018	0.61	0.0016	0.54	0.0000011	0.0000012	0.0000014	0.0024	0.0000046	0.000012	0.000023
15-Jul-15	5	9	300	300	8.1	0.000023	0.00011	0.00000090	0.00055	0.19	0.020	0.00015	0.00042	0.000017	0.000045	0.27	0.0000012	0.12	0.000000075	0.86	0.0025	0.83	0.0000018	0.0000033	0.0000027	0.0051	0.0000063	0.000030	0.000030
29-Jul-15	6	11	300	240	8.1	0.000011	0.000084	0.00000036	0.00045	0.15	0.016	0.00012	0.00031	0.000011	0.000036	0.23	0.00000084	0.089	0.00000041	0.60	0.0021	0.71	0.0000013	0.00000072	0.00000072	0.0040	0.0000047	0.000024	0.000024
12-Aug-15	7	13	300	335	8.1	0.0000075	0.00012	0.00000034	0.00051	0.22	0.024	0.00017	0.00042	0.000015	0.000050	0.36	0.0000012	0.13	0.00000022	0.83	0.0029	0.90	0.0000019	0.00000067	0.0000015	0.0043	0.0000062	0.000034	0.000034
26-Aug-15	8	15	300	280	8.1	0.000016	0.000098	0.0000021	0.00037	0.14	0.014	0.00014	0.00038	0.0000070	0.000056	0.24	0.00000098	0.10	0.000000084	0.55	0.0019	0.58	0.0000013	0.0000027	0.00000070	0.0029	0.0000056	0.000028	0.000028
9-Sep-15	9	17	300	285	8.1	0.000018	0.000100	0.00000014	0.00022	0.096	0.010	0.00014	0.00037	0.0000043	0.000043	0.18	0.00000086	0.092	0.000000043	0.26	0.0013	0.34	0.0000012	0.0000026	0.00000071	0.0012	0.0000063	0.000057	0.000029
23-Sep-15	10	19	300	290	8.2	0.0000062	0.00010	0.00000044	0.00020	0.10	0.011	0.00015	0.00029	0.0000015	0.000044	0.20	0.0000025	0.096	0.000000029	0.23	0.0013	0.28	0.00000086	0.00000073	0.00000073	0.00080	0.0000051	0.000015	0.000029
7-Oct-15	11	21	300	280	8.2	0.0000080	0.000098	0.0000024	0.00019	0.11	0.011	0.00014	0.00028	0.0000042	0.000042	0.20	0.00000070	0.091	0.000000028	0.23	0.0013	0.26	0.00000084	0.0000011	0.00000070	0.00098	0.0000059	0.000028	0.000028
21-Oct-15	12	23	300	290	8.3	0.0000075	0.00010	0.0000055	0.00021	0.11	0.012	0.00015	0.00025	0.0000044	0.000087	0.20	0.0000010	0.10	0.000000029	0.20	0.0014	0.24	0.0000012	0.0000016	0.0000012	0.00099	0.0000051	0.000015	0.000029
4-Nov-15	13	25	300	285	8.2	0.0000095	0.000100	0.0000019	0.00022	0.11	0.013	0.00014	0.00015	0.0000057	0.000043	0.20	0.00000057	0.097	0.000000029	0.20	0.0015	0.23	0.00000093	0.00000014	0.00000071	0.00067	0.0000047	0.000029	0.000029
18-Nov-15	14	27	300	295	8.2	0.0000068	0.00010	0.0000037	0.00020	0.11	0.012	0.00015	0.00018	0.0000030	0.000044	0.20	0.0000030	0.10	0.00000018	0.17	0.0013	0.22	0.00000062	0.0000027	0.00000074	0.00085	0.0000047	0.000015	0.000030
2-Dec-15	15	29	300	260	8.1	0.0000061	0.000091	0.00000052	0.00016	0.088	0.010	0.00013	0.00016	0.0000026	0.000052	0.17	0.00000052	0.087	0.000000026	0.13	0.0012	0.20	0.00000098	0.0000014	0.0000012	0.00081	0.0000046	0.000013	0.000026
16-Dec-15	16	31	300	290	8.3	0.0000075	0.00010	0.0000055	0.00021	0.11	0.012	0.00015	0.00025	0.0000044	0.000087	0.20	0.0000010	0.10	0.000000029	0.20	0.0014	0.24	0.0000012	0.0000016	0.0000012	0.00099	0.0000051	0.000015	0.000029
30-Dec-15	17	33	300	285	8.2	0.0000095	0.000100	0.0000019	0.00022	0.11	0.013	0.00014	0.00015	0.0000057	0.000043	0.20	0.00000057	0.097	0.000000029	0.20	0.0015	0.23	0.00000093	0.00000014	0.00000071	0.00067	0.0000047	0.000029	0.000029
13-Jan-16	18	35	300	295	8.2	0.0000068	0.00010	0.0000037	0.00020	0.11	0.012	0.00015	0.00018	0.0000030	0.000044	0.20	0.0000030	0.10	0.00000018	0.17	0.0013	0.22	0.00000062	0.0000027	0.00000074	0.00085	0.0000047	0.000015	0.000030
27-Jan-16	19	37	300	260	8.1	0.0000061	0.000091	0.00000052	0.00016	0.088	0.010	0.00013	0.00016	0.0000026	0.000052	0.17	0.00000052	0.087	0.000000026	0.13	0.0012	0.20	0.00000098	0.0000014	0.0000012	0.00081	0.0000046	0.000013	0.000026
10-Feb-16	20	39	300	280	8.2	0.000026	0.000098	0.0000020	0.00017	0.096	0.011	0.00014	0.00016	0.0000028	0.000084	0.18	0.00000084	0.092	0.000000028	0.13	0.0013	0.21	0.00000098	0.0000011	0.00000070	0.00077	0.0000052	0.000028	0.000028
24-Feb-16	21	41	300	290	8.1	0.0000028	0.00010	0.00000073	0.00017	0.10	0.012	0.00029	0.00016	0.0000029	0.00012	0.19	0.00000058	0.10	0.000000029	0.12	0.0013	0.19	0.0000011	0.00000029	0.00000073	0.00081	0.0000049	0.000015	0.000029
9-Mar-16	22	43	301	265	8.1																								

Note:

Values in grey italics are below the analytical detection limit

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for HC1 (ST)

Date	Cycle	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu
	No.	Input	Output		umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
25-Jun-14	0	500	345	7.7	484	#N/A	6.4	54	136	2.2	0.38	< 0.3	137	0.018	0.0011	0.011	0.036	< 0.000007	< 0.000007	0.020	< 0.000003	31	0.00015	0.00048	0.0064
2-Jul-14	1	500	500	7.7	295	#N/A	8.1	53	77	0.50	0.23	< 0.3	107	0.018	0.0013	0.0086	0.025	< 0.000007	< 0.000007	0.014	< 0.000003	24	0.00019	0.00064	0.0026
9-Jul-14	2	500	485	7.9	192	#N/A	2.5	48	39	< 0.2	0.18	< 0.3	59	0.023	0.00060	0.0071	0.032	< 0.000007	< 0.000007	0.012	< 0.000003	14	0.000040	0.00010	0.0010
16-Jul-14	3	500	485	7.8	146	#N/A	2.4	46	19	< 0.2	0.13	< 0.3	47	0.023	0.0011	0.0062	0.032	< 0.000007	< 0.000007	0.0080	0.0000030	11	0.00021	0.00046	0.00081
23-Jul-14	4	500	485	7.8	108	#N/A	2.3	39	11	< 0.2	0.10	< 0.3	40	0.027	0.00050	0.0048	0.042	< 0.000007	< 0.000007	0.0066	< 0.000003	9.8	< 0.00003	0.00017	0.0014
30-Jul-14	5	500	480	8.1	79	#N/A	1.6	37	6.0	< 0.2	< 0.06	< 0.3	30	0.034	0.00060	0.0051	0.034	< 0.000007	< 0.000007	0.0043	< 0.000003	7.8	0.00020	0.00030	0.0015
6-Aug-14	6	500	485	7.8	76	#N/A	2.1	30	5.0	< 0.2	< 0.06	< 0.3	29	0.038	0.00030	0.0034	0.036	< 0.000007	< 0.000007	0.0068	< 0.000003	7.6	0.000030	0.000032	0.00037
13-Aug-14	7	500	490	8.2	109	#N/A	2.2	43	9.0	< 0.2	0.10	< 0.3	42	0.057	0.00040	0.0053	0.061	< 0.000007	< 0.000007	0.0067	< 0.000003	10	0.00026	0.000056	0.00053
20-Aug-14	8	500	485	7.9	85	#N/A	1.8	36	8.0	< 0.2	0.060	< 0.3	36	0.044	< 0.0002	0.0048	0.049	< 0.000007	< 0.000007	0.0048	< 0.000003	9.2	0.000090	0.000057	0.00091
27-Aug-14	9	500	500	8.1	117	#N/A	3.9	49	9.0	< 0.2	0.11	< 0.3	44	0.036	0.00040	0.0049	0.053	< 0.000007	< 0.000007	0.011	< 0.000003	11	0.00010	0.000035	0.00038
3-Sep-14	10	500	490	7.8	101	#N/A	4.4	42	9.0	< 0.2	0.090	< 0.3	53	0.030	0.0011	0.0060	0.052	< 0.000007	< 0.000007	0.0076	0.0000030	15	< 0.00003	0.000032	0.00072
10-Sep-14	11	500	500	8.2	98	#N/A	3.0	41	5.0	< 0.2	0.080	< 0.3	44	0.039	0.00040	0.0041	0.051	< 0.000007	< 0.000007	0.0064	< 0.000003	13	0.00010	0.000025	0.00037
17-Sep-14	12	500	475	8.0	77	#N/A	7.3	37	4.0	< 0.2	< 0.06	< 0.3	28	0.037	0.00020	0.0031	0.044	< 0.000007	< 0.000007	0.0062	< 0.000003	7.5	0.000070	0.000017	0.00025
24-Sep-14	13	500	485	8.2	75	#N/A	3.1	36	5.0	< 0.2	< 0.06	< 0.3	30	0.029	< 0.0002	0.0028	0.040	< 0.000007	< 0.000007	0.0035	< 0.000003	7.8	< 0.00003	0.00011	0.00044
1-Oct-14	14	500	485	7.8	72	#N/A	9.4	37	3.0	< 0.2	< 0.06	< 0.3	30	0.034	< 0.0002	0.0025	0.040	< 0.000007	< 0.000007	0.0030	0.000044	8.0	< 0.00003	0.00	< 0.00002
8-Oct-14	15	500	480	8.1	87	#N/A	2.7	35	4.0	< 0.2	0.060	< 0.3	44	0.036	0.00030	0.0036	0.052	< 0.000007	< 0.000007	0.024	< 0.000003	13	0.000070	0.000025	0.00031
15-Oct-14	16	500	485	7.7	94	#N/A	5.8	38	5.0	< 0.2	0.060	< 0.3	48	0.028	0.00040	0.0037	0.047	< 0.000007	< 0.000007	0.0057	0.000011	14	0.000040	0.000018	0.00034
22-Oct-14	17	500	490	8.1	92	#N/A	4.1	41	5.0	< 0.2	0.060	< 0.3	37	0.024	0.00040	0.0035	0.050	< 0.000007	< 0.000007	0.016	0.0000030	9.5	0.000040	0.000019	0.00032
29-Oct-14	18	500	495	7.8	89	#N/A	8.9	43	3.0	< 0.2	< 0.06	< 0.3	35	0.024	0.00040	0.0036	0.047	< 0.000007	< 0.000007	0.015	< 0.000003	9.3	0.00012	0.000018	0.00024
5-Nov-14	19	500	490	7.9	81	#N/A	#N/A	46	2.0	< 0.2	< 0.06	< 0.3	32	0.024	0.00030	0.0030	0.046	< 0.000007	< 0.000007	0.0060	0.000016	8.5	0.000060	0.000023	0.00054
12-Nov-14	20	500	485	7.6	88	#N/A	6.6	34	3.0	< 0.2	0.070	< 0.3	37	0.047	0.00040	0.0037	0.052	< 0.000007	< 0.000007	0.0058	0.0000030	9.9	0.00019	0.000031	0.00045
19-Nov-14	21	500	485	7.7	89	#N/A	6.7	35	2.0	< 0.2	0.060	< 0.3	36	0.027	0.00040	0.0033	0.058	< 0.000007	< 0.000007	0.0032	0.0000080	9.3	0.000060	0.000023	0.00047
26-Nov-14	22	500	490	8.1	88	#N/A	1.9	39	3.0	< 0.2	0.060	< 0.3	37	0.028	0.00040	0.0036	0.054	< 0.000007	< 0.000007	0.0023	< 0.000003	9.9	0.000050	0.000018	0.00029
3-Dec-14	23	500	475	8.0	75	#N/A	2.9	37	< 2	< 0.2	< 0.06	< 0.3	35	0.027	0.00040	0.0039	0.056	< 0.000007	< 0.000007	0.0049	< 0.000003	9.4	0.000050	0.000016	0.00031
10-Dec-14	24	500	495	7.9	63	#N/A	4.6	34	< 2	< 0.2	< 0.06	< 0.3	27	0.023	< 0.0002	0.0024	0.044	< 0.000007	< 0.000007	0.0029	< 0.000003	7.5	0.000060	0.000010	0.00030
17-Dec-14	25	500	495	7.7	74	#N/A	4.4	35	3.0	< 0.2	< 0.06	< 0.3	31	0.031	0.00020	0.0029	0.053	< 0.000007	< 0.000007	0.0022	< 0.000003	8.4	< 0.00003	0.000013	0.00040
24-Dec-14	26	500	495	7.7	75	#N/A	3.6	35	< 2	< 0.2	< 0.06	< 0.3	32	0.031	0.00030	0.0031	0.058	< 0.000007	< 0.000007	0.0063	< 0.000003	8.8	< 0.00003	0.000012	0.00022
31-Dec-14	27	500	495	7.9	88	#N/A	1.3	37	2.0	< 0.2	< 0.06	< 0.3	38	0.026	0.00080	0.0063	0.063	< 0.000007	< 0.000007	0.0028	< 0.000003	11	< 0.00003	0.0000060	0.00022
7-Jan-15	28	500	485	7.5	71	#N/A	3.1	34	2.0	< 1	< 0.06	< 0.3	33	0.026	0.00030	0.0025	0.048	< 0.000007	< 0.000007	0.0047	< 0.000003	9.1	0.000060	0.000015	0.00036
14-Jan-15	29	500	495	7.9	77	#N/A	2.4	38	3.0	< 1	< 0.06	< 0.3	39	0.022	0.00030	0.0030	0.051	< 0.000007	< 0.000007	0.0040	0.0000050	11	0.000060	0.000010	0.00038
21-Jan-15	30	500	485	7.8	83	#N/A	4.7	43	2.0	< 1	< 0.06	< 0.3	35	0.026	0.00040	0.0030	0.063	< 0.000007	< 0.000007	0.0037	< 0.000003	9.3	0.000080	0.000015	0.00064
28-Jan-15	31	500	495	7.8	75	#N/A	1.7	37	2.0	< 1	< 0.06	< 0.3	33	0.026	0.00030	0.0026	0.054	< 0.000007	< 0.000007	0.0044	0.0000040	9.0	0.00010	0.0000090	0.00021
4-Feb-15	32	500	490	7.8	77	#N/A	2.6	36	2.0	< 1	< 0.06	< 0.3	32	0.022	0.00030	0.0027	0.055	< 0.000007	< 0.000007	0.0051	0.0000030	8.7	0.00020	0.0000070	0.00067
11-Feb-15	33	500	490	8.0	74	#N/A	2.0	37	3.0	< 1	< 0.06	< 0.3	32	0.025	0.00040	0.0026	0.051	< 0.000007	< 0.000007	0.0039	< 0.000003	8.8	0.000050	0.000012	0.00067
18-Feb-15	34	500	485	7.8	73	#N/A	2.3	36	2.0	1.0	0.070	< 0.3	33	0.026	0.00050	0.0027	0.051	< 0.000007	< 0.000007	0.0029	< 0.000003	9.1	0.000040	0.000016	0.00042
25-Feb-15	35	500	490	7.8	76	#N/A	3.1	38	< 2	< 1	< 0.06	< 0.3	32	0.022	0.00040	0.0025	0.057	< 0.000007	< 0.000007	0.0015	0.0000060	9.0	0.000080	0.000017	0.0011
4-Mar-15	36	500	480	7.7	62	#N/A	2.1	31	< 2	< 1	< 0.06	< 0.3	30	0.020	0.00020	0.0018	0.047	< 0.000007	< 0.000007	0.0027	< 0.000003	9.1	0.00011	0.0000070	0.00048
11-Mar-15	37	500	480	8.0	64	#N/A	1.6	34	2.0	< 1	0.080	< 0.3	28	0.021	0.00030	0.0021	0.048	< 0.000007	< 0.000007	0.0053	< 0.000003	7.9	0.000090	0.0000060	0.00080
18-Mar-15	38	500	500	7.8	65	#N/A	2.6	33	2.0	< 1	< 0.06	< 0.3	31	0.021	0.00030	0.0017	0.047	0.000014	< 0.000007	0.0022	< 0.000003	9.5	0.00010	0.000013	0.0011
25-Mar-15	39	500	485	7.8	65	#N/A	2.9	34	< 2	< 1	< 0.06	< 0.3	29	0.026	0.00030	0.0024	0.055	< 0.000007	< 0.000007	0.0052	< 0.000003	8.3	0.00013	0.0000040	0.0020
1-Apr-15	40	500	500	7.7	66	#N/A	3.7	36	2.0	< 1	< 0.06	< 0.3	25	0.023	0.00030	0.0016	0.061	0.000012	< 0.000007	0.0027	< 0.000003	6.8	0.000060	< 0.000004	0.00037
8-Apr-15	41	500	490	7.9	71	#N/A	2.8	38	2.0	< 1	< 0.06	< 0.3	30	0.022	0.00040	0.0022	0.056	< 0.000007	< 0.000007	0.0050	< 0.000003	8.6	0.000060	0.000016	0.00098
15-Apr-15	42	500	485	7.7	61	#N/A	3.8	34	< 2	< 1	< 0.06	< 0.3	26	0.022	0.00030	0.0018	0.050	< 0.000007	< 0.000007	0.0065	< 0.000003	7.6	0.000060	< 0.000004	0.00097
22-Apr-15	43	500	490	7.6	60	#N/A	3.1	34	3.0	< 1	< 0.06	< 0.3	26	0.019	0.00020	0.0015	0.046	< 0.000007	< 0.000007	0.0089	< 0.000003	7.5	0.000040	0.0000060	0.0011
29-Apr-15	44	500	490	7.8	80	#N/A	2.1	39	3.0	< 1	< 0.06	< 0.3	40	0.026	0.00040	0.0029	0.068	< 0.000007	< 0.000007	0.0036	0.0000050	12	0.000090	0.000020	0.00054
6-May-15	45	500	500	8.0	73	#N/A	2.4	39	< 2	< 1	< 0.06	< 0.3	32	0.026	0.00030	0.0064	0.055	< 0.000007	< 0.000007	0.0045	< 0.000003	9.2	< 0.00003	0.000017	0.00033
13-May-15	46	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-May-15	47	490	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-May-15	48	480	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	49	475	470	8.2	161	#N/A	2.8	76	6.0	< 1	0.060	< 0.3	75	0.0097	0.00060	0.0024	0.16	< 0.000007	< 0.000007	0.0041	< 0.000003	22	0.00016	0.000022	0.00034
10-Jun-15	50	500	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-15	51	480	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Jun-15	52	470	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	53	460	465	8.1	166	#N/A	3.6	76	4.0	< 1	< 0.06	< 0.3	66	0.016	0.00050	0.0028	0.14	< 0.000007	< 0.000007	0.014	0.0000030	19	0.00020	0.000037	0.00035
8-Jul-15	54	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-Jul-15	55	490	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jul-15	56	480	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	57	480	470	8.1	161	#N/A	1.9	78	5.0	< 1	< 0.06	< 0.3	70	0.015	0.00050	0.0025	0.14	< 0.000007	< 0.000007	0.0074	0.0000030	20	0.00021	0.000028	0.00022
5-Aug-15	58	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	59	495	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Aug-15	60	490	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	61	480	470	8.0	158	#N/A	2.0	76	5.0	< 1	< 0.06	< 0.3	70	0.0090	0.00060	0.0028	0.15	< 0.000007	< 0.000007	0.0062	0.0000080	20	0.00017	0.000025	0.00046
2-Sep-15	62	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	63	495	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Sep-15	64	490	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	65	490	470	8.1	163	#N/A	2.1	77	5.0				73	0.010	0.00060	0.0028	0.16	< 0.000007	< 0.000007	0.0072	0.0000040	21	0.00020	0.000025	0.00025
30-Sep-15	66	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	67	500	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14-Oct-15	68	480	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	69	460	450	8.1	149	#N/A	1.6	75	5.0				70	0.0099	0.00050	0.0026	0.14	< 0.000007	< 0.000007	0.0066	0.000035	20	0.00024	0.000036	0.0016
28-Oct-15	70	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	71	490	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Nov-15	72	470	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	73	460	460	8.0	138	#N/A	1.1	74	4.0				58	0.019	0.00040	0.0020	0.13	< 0.000007	< 0.000007	0.0033	< 0.000003	17	0.00023	0.000080	0.00062
25-Nov-15	74	500	485	8.0	69	#N/A	0.40	40	2.0				33	0.031	0.00030	0.0025	0.062	< 0.000007	< 0.000007	0.0032	< 0.000003	10	0.00016	0.00018	0.00078
2-Dec-15	75	500	495	8.0	68	#N/A	1.4	35	2.0				30	0.029	0.00030	0.0023	0.062	< 0.000007	< 0.000007	0.0028	0.0000070	8.7	0.000050	0.000014	0.00056
9-Dec-15	76	500	505	8.1	67	#N/A	2.4	34	2.0				28	0.030	0.00040	0.0031	0.062	0.000010	< 0.000007	0.0090	0.000013	8.4	0.00010	0.0000040	0.00035
16-Dec-15	77	500	495	7.9	63	#N/A	1.7	30	2.0				30	0.051	< 0.0002	0.0022	0.063	< 0.000007	< 0.000007	0.0020	0.0000040	8.9	0.00020	0.000016	0.00042
23-Dec-15	78	500	500	7.9	71	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	79	500	485	7.9	62	#N/A	1.3	31	3.0				28	0.026	< 0.0002	0.0015	0.059	< 0.000007	< 0.000007	0.0024	0.0000040	8.5	0.00010	< 0.000004	0.00022
6-Jan-16	80	500	495	7.9	70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	81	500	495	7.8	68	#N/A	1.5	32	3.0				29	0.022	0.00020	0.0018	0.061	< 0.000007	< 0.000007	0.0050	< 0.000003	8.5	0.000080	< 0.000004	0.00024
20-Jan-16	82	500	495	7.9	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	83	500	490	7.9	73	#N/A	2.5	35	2.0				32	0.026	< 0.0002	0.0022	0.073	< 0.000007	< 0.000007	< 0.002	0.0000030	9.2	0.000080	0.000018	0.00020
3-Feb-16	84	500	490	7.9	74	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	85	500	500	7.8	70	#N/A	2.3	34	2.0				30	0.025	0.00020	0.0022	0.076	< 0.000007	< 0.000007	< 0.002	< 0.000003	9.1	0.000090	0.0000080	0.00075
17-Feb-16	86	500	500	7.8	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	87	500	500	7.8	69	#N/A	2.3	32	< 2				31	0.028	0.00020	0.0020	0.070	< 0.000007	< 0.000007	< 0.002	0.0000030	9.0	0.000030	< 0.000004	0.00015

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for HC1 (ST)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
25-Jun-14	0	500	345	7.7	0.0090	0.000010	0.0085	15	0.011	0.020	0.015	0.0053	0.025	9.5	0.0035	2.8	< 0.000002	35	1.1	55	0.000026	0.00013	0.00018	0.012	0.00073	0.0020	< 0.002
2-Jul-14	1	500	500	7.7	< 0.002	< 0.00001	0.0067	12	0.016	< 0.01	0.0096	0.0042	< 0.009	7.7	0.0013	2.4	< 0.000002	21	1.1	35	0.000021	0.0072	0.00020	0.018	0.00048	0.0010	< 0.002
9-Jul-14	2	500	485	7.9	0.0060	< 0.00001	0.0044	6.0	0.0098	< 0.01	0.0062	0.0019	< 0.009	5.8	0.00032	2.0	< 0.000002	8.8	0.82	14	0.000013	0.0033	0.00015	0.0081	0.00048	< 0.001	< 0.002
16-Jul-14	3	500	485	7.8	0.011	< 0.00001	0.0034	4.8	0.0065	< 0.01	0.0075	0.0012	< 0.009	4.5	0.00018	1.5	0.0000060	5.6	0.75	7.5	0.000018	0.00024	0.000090	0.011	0.00037	< 0.001	< 0.002
23-Jul-14	4	500	485	7.8	0.0020	0.000020	0.0026	3.8	0.0078	< 0.01	0.0032	0.00070	< 0.009	3.9	0.00011	1.3	0.0000040	3.4	0.66	5.2	0.0000090	0.0032	0.000080	0.0050	0.00033	< 0.001	< 0.002
30-Jul-14	5	500	480	8.1	0.0050	< 0.00001	0.0019	2.6	0.0066	< 0.01	0.0052	0.00040	0.015	2.7	0.000090	0.84	< 0.000002	1.8	0.51	2.9	0.000011	0.00021	0.00023	0.0071	0.00029	< 0.001	< 0.002
6-Aug-14	6	500	485	7.8	0.0080	0.000030	0.0015	2.5	0.0057	< 0.01	0.0019	< 0.0001	0.011	2.8	0.00012	0.86	< 0.000002	1.5	0.53	2.6	0.0000070	0.00011	0.00026	0.0036	0.00081	0.0020	< 0.002
13-Aug-14	7	500	490	8.2	0.018	0.000020	0.0027	4.1	0.0062	< 0.01	0.0034	0.00030	0.010	4.4	0.00012	1.5	< 0.000002	2.7	0.77	4.3	0.000010	0.0012	0.00082	0.0058	0.00034	< 0.001	< 0.002
20-Aug-14	8	500	485	7.9	0.0060	0.000040	0.0019	3.2	0.0064	< 0.01	0.0024	0.00030	< 0.009	3.4	0.00031	1.1	< 0.000002	1.5	0.66	2.9	0.0000060	0.0020	0.00037	0.0048	0.00037	< 0.001	< 0.002
27-Aug-14	9	500	500	8.1	0.0060	< 0.00001	0.0026	4.1	0.0076	< 0.01	0.0039	0.00030	< 0.009	4.4	0.00011	1.5	< 0.000002	2.1	0.87	3.6	0.000016	0.0014	0.00032	0.0064	0.00039	< 0.001	< 0.002
3-Sep-14	10	500	490	7.8	< 0.007	0.000040	0.0024	3.7	0.0060	< 0.01	0.0031	0.00030	0.0050	4.6	0.00028	1.5	0.000013	1.6	0.94	4.0	0.000018	0.00019	0.000060	0.0053	0.00039	< 0.001	< 0.002
10-Sep-14	11	500	500	8.2	0.010	< 0.00001	0.0019	2.9	0.0060	< 0.01	0.0025	0.00020	< 0.003	3.6	0.000090	1.3	< 0.000002	1.2	0.81	2.3	0.000015	0.0015	0.00032	0.0045	0.00031	< 0.001	< 0.002
17-Sep-14	12	500	475	8.0	< 0.007	< 0.00001	0.0014	2.4	0.0052	< 0.01	0.0017	0.00010	< 0.003	2.9	0.00010	0.82	< 0.000002	0.69	0.66	2.1	< 0.000005	0.000090	0.00017	0.0033	0.00027	< 0.001	< 0.002
24-Sep-14	13	500	485	8.2	< 0.002	0.000010	0.0015	2.5	0.0045	< 0.01	0.0017	0.00020	< 0.009	2.8	< 0.00004	0.82	0.0000050	0.70	0.58	1.6	< 0.000005	0.00010	< 0.00005	0.0034	0.00024	< 0.001	< 0.002
1-Oct-14	14	500	485	7.8	0.040	0.000040	0.0013	2.5	0.011	< 0.01	0.0021	0.00010	< 0.009	2.9	< 0.00004	0.88	< 0.000002	0.58	0.63	2.0	< 0.000005	0.000060	0.00030	0.0033	0.00025	< 0.002	< 0.002
8-Oct-14	15	500	480	8.1	0.010	0.000020	0.0018	2.7	0.0056	< 0.01	0.0034	0.00020	< 0.003	3.4	< 0.00004	1.0	< 0.000002	0.66	0.79	2.4	0.000017	0.00048	0.00041	0.0042	0.00036	< 0.001	< 0.002
15-Oct-14	16	500	485	7.7	< 0.007	< 0.00001	0.0021	3.2	0.0047	< 0.01	0.0022	0.00020	< 0.003	3.8	0.000070	1.1	< 0.000002	0.75	0.89	2.4	0.000010	0.0014	0.00010	0.0046	0.00028	< 0.001	< 0.002
22-Oct-14	17	500	490	8.1	0.010	0.000010	0.0019	3.3	0.0054	< 0.01	0.0022	0.00020	< 0.003	4.0	0.000070	1.1	< 0.000002	0.68	0.89	2.2	0.000022	0.00019	0.000080	0.0047	0.00026	< 0.001	< 0.002
29-Oct-14	18	500	495	7.8	< 0.007	< 0.00001	0.0018	3.0	0.0042	< 0.01	0.0019	0.00010	< 0.003	3.4	0.000060	1.0	< 0.000002	0.53	0.84	1.8	0.000014	0.00096	< 0.00005	0.0041	0.00027	< 0.001	< 0.002
5-Nov-14	19	500	490	7.9	< 0.007	0.00030	0.0015	2.7	0.0039	< 0.01	0.0024	0.00020	< 0.003	3.0	< 0.00004	0.93	< 0.000002	0.46	0.78	1.7	0.000022	0.00026	0.00013	0.0039	0.00023	< 0.001	< 0.002
12-Nov-14	20	500	485	7.6	0.017	0.000040	0.0016	3.0	0.0049	< 0.01	0.0027	0.00020	< 0.003	3.3	0.000070	1.1	< 0.000002	0.53	0.90	1.8	0.000013	0.0010	0.00076	0.0044	0.00034	< 0.001	< 0.002
19-Nov-14	21	500	485	7.7	< 0.007	0.00013	0.0016	3.0	0.0052	< 0.01	0.0017	0.00020	< 0.003	3.3	0.000080	0.93	0.0000020	0.43	0.91	1.6	0.000025	0.00054	0.000050	0.0041	0.00027	0.0020	< 0.002
26-Nov-14	22	500	490	8.1	< 0.007	< 0.00001	0.0018	3.1	0.0042	< 0.01	0.0019	< 0.0001	0.010	3.4	0.00022	1.1	< 0.000002	0.41	0.89	1.5	0.000014	0.00013	0.00011	0.0043	0.00030	< 0.001	< 0.002
3-Dec-14	23	500	475	8.0	< 0.007	< 0.00001	0.0016	2.8	0.0049	0.010	0.0016	0.00010	< 0.003	3.1	0.000070	0.81	< 0.000002	0.33	0.75	1.4	0.000016	0.00097	0.00010	0.0041	0.00032	< 0.001	< 0.002
10-Dec-14	24	500	495	7.9	< 0.007	< 0.00001	0.0011	2.0	0.0039	< 0.01	0.0013	< 0.0001	< 0.003	2.3	0.000060	0.60	< 0.000002	0.21	0.65	1.1	0.000013	0.00058	< 0.00005	0.0028	0.00019	< 0.001	< 0.002
17-Dec-14	25	500	495	7.7	< 0.007	< 0.00001	0.0014	2.6	0.0045	< 0.01	0.0012	< 0.0001	< 0.003	3.1	0.000050	0.86	< 0.000002	0.28	0.79	1.2	0.000011	0.00085	0.00040	0.0034	0.00028	0.0010	< 0.002
24-Dec-14	26	500	495	7.7	< 0.007	< 0.00001	0.0015	2.5	0.0039	< 0.01	0.0014	0.00010	< 0.003	2.8	0.00016	0.78	< 0.000002	0.27	0.78	1.3	0.0000090	0.00074	0.00010	0.0034	0.00029	< 0.001	< 0.002
31-Dec-14	27	500	495	7.9	< 0.007	< 0.00001	0.0017	3.0	0.0043	< 0.01	0.0020	0.00010	< 0.003	3.5	0.00023	1.2	< 0.000002	0.31	0.96	1.8	0.000021	0.00053	0.000060	0.0045	0.00029	< 0.001	< 0.002
7-Jan-15	28	500	485	7.5	< 0.007	0.000020	0.0013	2.5	0.0038	< 0.01	0.0019	0.00010	< 0.003	2.8	0.00012	0.71	< 0.000002	0.21	0.75	0.90	0.000039	0.00036	0.000050	0.0032	0.00023	< 0.001	< 0.002
14-Jan-15	29	500	495	7.9	< 0.007	0.000020	0.0012	2.5	0.0036	< 0.01	0.0021	0.00010	< 0.003	2.9	0.00011	1.0	0.0000020	0.21	0.86	1.0	0.000028	0.00063	< 0.00005	0.0033	0.00022	< 0.001	< 0.002
21-Jan-15	30	500	485	7.8	< 0.007	0.000030	0.0016	2.8	0.0039	< 0.01	0.0023	0.00010	< 0.003	3.2	0.00010	0.88	0.0000020	0.24	0.93	1.0	0.000017	0.00068	0.000080	0.0043	0.00030	< 0.001	< 0.002
28-Jan-15	31	500	495	7.8	< 0.007	< 0.00001	0.0011	2.7	0.0037	< 0.01	0.0065	< 0.0001	< 0.003	3.1	0.00014	0.89	0.0000040	0.20	0.68	1.6	0.0000090	0.00025	0.00011	0.0032	0.00024	< 0.001	< 0.002
4-Feb-15	32	500	490	7.8	< 0.007	0.000030	0.0014	2.6	0.0038	< 0.01	0.0013	0.00010	< 0.003	2.9	0.000060	0.84	< 0.000002	0.18	0.78	1.3	0.0000090	0.00051	< 0.00005	0.0032	0.00025	0.0010	< 0.002
11-Feb-15	33	500	490	8.0	< 0.007	0.000010	0.0012	2.3	0.0033	< 0.01	0.0017	0.00010	< 0.003	2.8	< 0.001	0.77	< 0.000002	0.16	0.77	1.1	0.000013	0.0010	0.000090	0.0029	0.00025	< 0.001	< 0.002
18-Feb-15	34	500	485	7.8	< 0.007	< 0.00001	0.0014	2.6	0.0036	0.010	0.0011	0.00010	< 0.003	3.0	< 0.001	0.81	0.0000030	0.18	0.92	1.1	0.000012	0.00059	0.000070	0.0033	0.00027	< 0.001	< 0.002
25-Feb-15	35	500	490	7.8	< 0.007	0.000020	0.0012	2.4	0.0031	< 0.01	0.0013	0.00010	< 0.003	3.1	< 0.001	0.83	< 0.000002	0.14	0.81	0.60	0.000014	0.00050	0.00013	0.0036	0.00023	< 0.001	< 0.002
4-Mar-15	36	500	480	7.7	< 0.007	0.000020	0.0010	1.7	0.0035	< 0.01	0.00091	< 0.0001	< 0.003	2.2	< 0.001	0.65	< 0.000002	0.11	0.56	1.0	< 0.000005	0.00058	0.000080	0.0026	0.00021	< 0.001	< 0.002
11-Mar-15	37	500	480	8.0	< 0.007	0.000050	0.0011	2.0	0.0036	< 0.01	0.00084	< 0.0001	< 0.003	2.2	< 0.001	0.55	0.0000070	0.080	0.61	0.10	0.0000070	0.00065	< 0.00005	0.0024	0.00019	0.0010	< 0.002
18-Mar-15	38	500	500	7.8	0.013	0.000010	0.00098	1.8	0.0038	< 0.01	0.00085	0.00010	< 0.003	2.5	< 0.001	0.57	< 0.000002	0.10	0.67	1.0	< 0.000005	0.00083	0.00020	0.0023	0.00018	< 0.001	< 0.002
25-Mar-15	39	500	485	7.8	< 0.007	0.000030	0.00084	2.1	0.0036	< 0.01	0.0022	0.00020	< 0.003	2.6	< 0.001	0.65	0.0000020	0.18	0.65	1.0	< 0.000005	0.00083	0.000090	0.0027	0.00031	< 0.001	< 0.002
1-Apr-15	40	500	500	7.7	< 0.007	< 0.00001	0.00080	1.8	0.011	< 0.01	0.00072	0.00010	< 0.003	2.6	< 0.001	0.44	< 0.000002	0.79	0.67	0.50	0.000010	0.00056	< 0.00005	0.0033	0.00017	< 0.001	< 0.002
8-Apr-15	41	500	490	7.9	< 0.007	< 0.00001	0.0011	2.0	0.0031	< 0.01	0.0013	< 0.0001	< 0.003	2.8	< 0.001	0.74	< 0.000002	0.11	0.75	0.60	< 0.000005	0.00075	< 0.00005	0.0027	0.00022	< 0.001	< 0.002
15-Apr-15	42	500	485	7.7	0.010	< 0.00001	0.00098	1.8	0.0030	< 0.01	0.0012	< 0.0001	< 0.003	2.4	< 0.001	0.58	0.0000040	0.13	0.66	0.90	< 0.000005	0.0010	< 0.00005	0.0023	0.00026	< 0.001	< 0.002
22-Apr-15	43	500	490	7.6	< 0.007	0.000020	0.00088	1.7	0.0032	< 0.01	0.00077	< 0.0001	< 0.003	2.3	< 0.001	0.55	0.000011	0.070	0.62	0.60	0.000017	0.00095	0.000090	0.0020	0.00019	< 0.001	< 0.002
29-Apr-15	44	500	490	7.8	< 0.007	0.00010	0.0013	2.5	0.0033	< 0.01	0.0013	0.00010	< 0.003	3.5	< 0.001	0.83	< 0.000002	0.12	0.84	1.1	0.0000080	0.00071	< 0.00005	0.0033	0.00025	< 0.001	< 0.002
6-May-15	45	500	500	8.0	< 0.007	< 0.00001	0.0012	2.2	0.0032	< 0.01	0.0015	0.00010	< 0.003	3.0	< 0.001	0.79	< 0.000002	0.14	0.74	0.90	< 0.000005	0.00057	0.00012	0.0033	0.00025	0.0010	< 0.002
13-May-15	46	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-May-15	47	490	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-May-15	48	480	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	49	475	470	8.2	< 0.007	< 0.00001	0.0026	5.0	0.0045	< 0.01	0.0024	0.00020	< 0.003	5.6	0.00011	1.9	< 0.000002	0.21	1.8	2.5	0.000021	0.0012	0.000070	0.0070	0.00019	< 0.001	< 0.002
10-Jun-15	50	500	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-15	51	480	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Jun-15	52	470	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	53	460	465	8.1	0.011	< 0.00001	0.0024	4.7	0.0048	0.010	0.0020	0.00030	< 0.003	4.8	0.00039	1.6	0.0000040	0.22	1.7	3.3	0.000017	0.0010	0.00025	0.0067	0.00022	0.0010	< 0.002
8-Jul-15	54	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-Jul-15	55	490	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jul-15	56	480	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	57	480	470	8.1	< 0.007	< 0.00001	0.0027	5.1	0.0039	< 0.01	0.0025	0.00030	< 0.003	5.1	0.00013	1.7	< 0.000002	0.23	1.8	2.5	0.0000050	0.00079	0.00019	0.0070	0.00026	< 0.001	< 0.002
5-Aug-15	58	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	59	495	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Aug-15	60	490	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	61	480	470	8.0	< 0.007	0.00011	0.0026	4.7	0.0037	< 0.01	0.0028	0.00020	< 0.003	5.0	0.00013	1.8	< 0.000002	0.21	1.8	2.2	0.000014	0.00095	0.000070	0.0065	0.00028	< 0.001	< 0.002
2-Sep-15	62	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	63	495	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Sep-15	64	490	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	65	490	470	8.1	< 0.007	< 0.00001	0.0025	5.2	0.0028	< 0.01	0.0031	0.00030	< 0.003	5.4	0.00015	1.8	< 0.000002	0.22	1.8	2.5	0.000017	0.0013	0.00013	0.0061	0.00023	< 0.001	< 0.002
30-Sep-15	66	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	67	500	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14-Oct-15	68	480	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	69	460	450	8.1	< 0.007	0.000080	0.0024	4.9	0.0038	< 0.01	0.0018	0.00020	< 0.003	5.2	0.00052	1.6	0.00010	0.40	1.6	2.5	0.000020	0.0013	0.00012	0.0057	0.00018	0.0010	< 0.002
28-Oct-15	70	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	71	490	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Nov-15	72	470	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	73	460	460	8.0	0.0080	0.000020	0.0017	4.0	0.0050	< 0.01	0.0030	< 0.0001	< 0.003	4.5	0.00024	1.2	0.000013	0.20	1.3	1.4	0.000075	0.0012	0.00048	0.0049	0.00021	0.0020	< 0.002
25-Nov-15	74	500	485	8.0	< 0.007	0.00023	0.00100	1.8	0.0027	< 0.01	0.0013	0.00010	0.020	2.8	0.00084	0.65	0.00047	0.14	0.67	0.90	0.000080	0.00038	0.000090	0.0023	0.00030	< 0.001	< 0.002
2-Dec-15	75	500	495	8.0	< 0.007	0.00038	0.00094	2.0	0.0035	< 0.01	0.0013	< 0.0001	< 0.003	2.9	0.00023	0.70	0.0000020	0.11	0.64	0.80	< 0.000005	0.00042	0.00010	0.0025	0.00023	0.0010	< 0.002
9-Dec-15	76	500	505	8.1	< 0.007	< 0.00001	0.00098	1.8	0.0029	< 0.01	0.00094	< 0.0001	< 0.003	2.6	0.00033	0.62	0.0000090	0.090	0.64	0.70	0.000020	0.00041	0.00010	0.0023	0.00026	< 0.001	< 0.002
16-Dec-15	77	500	495	7.9	0.015	0.00012	0.00096	1.8	0.0032	< 0.01	0.00061	0.00010	0.0040	2.8	< 0.00004	0.71	< 0.000002	0.10	0.64	0.50	0.000014	0.00035	0.00041	0.0022	0.00027	< 0.001	< 0.002
23-Dec-15	78	500	500	7.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	79	500	485	7.9	< 0.007	< 0.00001	0.00086	1.7	0.0032	0.010	0.00052	< 0.0001	< 0.003	2.4	0.000050	0.56	0.0000030	0.11	0.59	1.1	< 0.000005	0.00024	0.00016	0.0020	0.00025	< 0.001	< 0.002
6-Jan-16	80	500	495	7.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	81	500	495	7.8	< 0.007	< 0.00001	0.00090	1.8	0.0036	< 0.01	0.0015	< 0.0001	< 0.003	2.7	0.00024	0.63	< 0.000002	0.070	0.63	0.40	< 0.000005	0.00028	< 0.00005	0.0026	0.00017	< 0.001	< 0.002
20-Jan-16	82	500	495	7.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	83	500	490	7.9	< 0.007	< 0.00001	0.0011	2.1	0.0033	< 0.01	0.00063	< 0.0001	< 0.003	3.0	< 0.00004	0.70	< 0.000002	0.080	0.75	0.50	0.000011	0.00042	0.00016	0.0029	0.00020	< 0.001	< 0.002
3-Feb-16	84	500	490	7.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	85	500	500	7.8	< 0.007	< 0.00001	0.00086	1.9	0.0038	< 0.01	0.00058	< 0.0001	< 0.003	2.6	0.000090	0.60	< 0.000002	0.11	0.68	1.1	0.0000090	0.00045	0.00010	0.0019	0.00018	< 0.001	< 0.002
17-Feb-16	86	500	500	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	87	500	500	7.8	< 0.007	< 0.00001	0.00097	2.0	0.0033	< 0.01	0.00096	< 0.0001	< 0.003	2.9	0.00017	0.45	0.000014	0.080	0.71	0.80	< 0.000005	0.00026	0.00010	0.0020	0.00019	< 0.001	< 0.002

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Calculated Loading Rates for HC1 (ST)

Date	Cycle	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu
	No.	Input	Output		umhos/cm	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
25-Jun-14	0	500	345	7.7	484	#N/A	2.2	19	47	0.76	0.13	0.10	47	0.0062	0.00038	0.0038	0.012	0.0000024	0.0000024	0.0067	0.0000010	11	0.000052	0.00016	0.0022
2-Jul-14	1	500	500	7.7	295	#N/A	4.1	26	39	0.25	0.12	0.15	54	0.0090	0.00065	0.0043	0.012	0.0000035	0.0000035	0.0071	0.0000015	12	0.000095	0.00032	0.0013
9-Jul-14	2	500	485	7.9	192	#N/A	1.2	23	19	0.097	0.087	0.15	28	0.011	0.00029	0.0034	0.015	0.0000034	0.0000034	0.0059	0.0000015	6.6	0.000019	0.000050	0.00050
16-Jul-14	3	500	485	7.8	146	#N/A	1.1	22	9.2	0.097	0.063	0.15	23	0.011	0.00053	0.0030	0.015	0.0000034	0.0000034	0.0039	0.0000015	5.4	0.00010	0.00022	0.00039
23-Jul-14	4	500	485	7.8	108	#N/A	1.1	19	5.3	0.097	0.049	0.15	19	0.013	0.00024	0.0023	0.020	0.0000034	0.0000034	0.0032	0.0000015	4.7	0.000015	0.000083	0.00067
30-Jul-14	5	500	480	8.1	79	#N/A	0.76	18	2.9	0.096	0.029	0.14	14	0.016	0.00029	0.0024	0.016	0.0000034	0.0000034	0.0021	0.0000014	3.7	0.000096	0.00014	0.00072
6-Aug-14	6	500	485	7.8	76	#N/A	1.0	15	2.4	0.097	0.029	0.15	14	0.019	0.00015	0.0016	0.018	0.0000034	0.0000034	0.0033	0.0000015	3.7	0.000015	0.000016	0.00018
13-Aug-14	7	500	490	8.2	109	#N/A	1.1	21	4.4	0.098	0.049	0.15	21	0.028	0.00020	0.0026	0.030	0.0000034	0.0000034	0.0033	0.0000015	4.9	0.00013	0.000027	0.00026
20-Aug-14	8	500	485	7.9	85	#N/A	0.85	17	3.9	0.097	0.029	0.15	17	0.021	0.000097	0.0023	0.024	0.0000034	0.0000034	0.0023	0.0000015	4.4	0.000044	0.000028	0.00044
27-Aug-14	9	500	500	8.1	117	#N/A	1.9	24	4.5	0.10	0.055	0.15	22	0.018	0.00020	0.0025	0.027	0.0000035	0.0000035	0.0055	0.0000015	5.5	0.000050	0.000018	0.00019
3-Sep-14	10	500	490	7.8	101	#N/A	2.2	21	4.4	0.098	0.044	0.15	26	0.015	0.00054	0.0029	0.025	0.0000034	0.0000034	0.0037	0.0000015	7.4	0.000015	0.000016	0.00035
10-Sep-14	11	500	500	8.2	98	#N/A	1.5	21	2.5	0.10	0.040	0.15	22	0.019	0.00020	0.0021	0.026	0.0000035	0.0000035	0.0032	0.0000015	6.3	0.000050	0.000013	0.00019
17-Sep-14	12	500	475	8.0	77	#N/A	3.4	17	1.9	0.095	0.029	0.14	13	0.018	0.000095	0.0015	0.021	0.0000033	0.0000033	0.0029	0.0000014	3.6	0.000033	0.0000081	0.00012
24-Sep-14	13	500	485	8.2	75	#N/A	1.5	18	2.4	0.097	0.029	0.15	14	0.014	0.000097	0.0014	0.019	0.0000034	0.0000034	0.0017	0.0000015	3.8	0.000015	0.000053	0.00021
1-Oct-14	14	500	485	7.8	72	#N/A	4.6	18	1.5	0.097	0.029	0.15	15	0.016	0.000097	0.0012	0.019	0.0000034	0.0000034	0.0015	0.000021	3.9	0.000015	0.00	0.0000097
8-Oct-14	15	500	480	8.1	87	#N/A	1.3	17	1.9	0.096	0.029	0.14	21	0.017	0.00014	0.0017	0.025	0.0000034	0.0000034	0.011	0.0000014	6.2	0.000034	0.000012	0.00015
15-Oct-14	16	500	485	7.7	94	#N/A	2.8	18	2.4	0.097	0.029	0.15	23	0.013	0.00019	0.0018	0.023	0.0000034	0.0000034	0.0028	0.0000053	6.8	0.000019	0.0000087	0.00016
22-Oct-14	17	500	490	8.1	92	#N/A	2.0	20	2.5	0.098	0.029	0.15	18	0.012	0.00020	0.0017	0.024	0.0000034	0.0000034	0.0076	0.0000015	4.6	0.000020	0.0000093	0.00016
29-Oct-14	18	500	495	7.8	89	#N/A	4.4	21	1.5	0.099	0.030	0.15	17	0.012	0.00020	0.0018	0.023	0.0000035	0.0000035	0.0073	0.0000015	4.6	0.000059	0.0000089	0.00012
5-Nov-14	19	500	490	7.9	81	#N/A	#N/A	23	0.98	0.098	0.029	0.15	16	0.012	0.00015	0.0015	0.022	0.0000034	0.0000034	0.0029	0.0000078	4.1	0.000029	0.000011	0.00026
12-Nov-14	20	500	485	7.6	88	#N/A	3.2	17	1.5	0.097	0.034	0.15	18	0.023	0.00019	0.0018	0.025	0.0000034	0.0000034	0.0028	0.0000015	4.8	0.000092	0.000015	0.00022
19-Nov-14	21	500	485	7.7	89	#N/A	3.2	17	0.97	0.097	0.029	0.15	17	0.013	0.00019	0.0016	0.028	0.0000034	0.0000034	0.0016	0.0000039	4.5	0.000029	0.000011	0.00023
26-Nov-14	22	500	490	8.1	88	#N/A	0.95	19	1.5	0.098	0.029	0.15	18	0.014	0.00020	0.0018	0.027	0.0000034	0.0000034	0.0011	0.0000015	4.8	0.000025	0.0000088	0.00014
3-Dec-14	23	500	475	8.0	75	#N/A	1.4	17	0.95	0.095	0.029	0.14	16	0.013	0.00019	0.0019	0.027	0.0000033	0.0000033	0.0023	0.0000014	4.4	0.000024	0.0000076	0.00015
10-Dec-14	24	500	495	7.9	63	#N/A	2.3	17	0.99	0.099	0.030	0.15	13	0.011	0.000099	0.0012	0.022	0.0000035	0.0000035	0.0014	0.0000015	3.7	0.000030	0.0000050	0.00015
17-Dec-14	25	500	495	7.7	74	#N/A	2.2	17	1.5	0.099	0.030	0.15	16	0.015	0.000099	0.0014	0.026	0.0000035	0.0000035	0.0011	0.0000015	4.1	0.000015	0.0000064	0.00020
24-Dec-14	26	500	495	7.7	75	#N/A	1.8	17	0.99	0.099	0.030	0.15	16	0.015	0.00015	0.0015	0.029	0.0000035	0.0000035	0.0031	0.0000015	4.4	0.000015	0.0000059	0.00011
31-Dec-14	27	500	495	7.9	88	#N/A	0.65	18	0.99	0.099	0.030	0.15	19	0.013	0.00040	0.0031	0.031	0.0000035	0.0000035	0.0014	0.0000015	5.2	0.000015	0.0000030	0.00011
7-Jan-15	28	500	485	7.5	71	#N/A	1.5	16	0.97	0.49	0.029	0.15	16	0.013	0.00015	0.0012	0.023	0.0000034	0.0000034	0.0023	0.0000015	4.4	0.000029	0.0000073	0.00017
14-Jan-15	29	500	495	7.9	77	#N/A	1.2	19	1.5	0.50	0.030	0.15	19	0.011	0.00015	0.0015	0.025	0.0000035	0.0000035	0.0020	0.0000025	5.5	0.000030	0.0000050	0.00019
21-Jan-15	30	500	485	7.8	83	#N/A	2.3	21	0.97	0.49	0.029	0.15	17	0.013	0.00019	0.0015	0.031	0.0000034	0.0000034	0.0018	0.0000015	4.5	0.000039	0.0000073	0.00031
28-Jan-15	31	500	495	7.8	75	#N/A	0.83	18	0.99	0.50	0.030	0.15	16	0.013	0.00015	0.0013	0.027	0.0000035	0.0000035	0.0022	0.0000020	4.5	0.000050	0.0000045	0.00010
4-Feb-15	32	500	490	7.8	77	#N/A	1.3	18	0.98	0.49	0.029	0.15	16	0.011	0.00015	0.0013	0.027	0.0000034	0.0000034	0.0025	0.0000015	4.2	0.000098	0.0000034	0.00033
11-Feb-15	33	500	490	8.0	74	#N/A	0.96	18	1.5	0.49	0.029	0.15	15	0.012	0.00020	0.0013	0.025	0.0000034	0.0000034	0.0019	0.0000015	4.3	0.000025	0.0000059	0.00033
18-Feb-15	34	500	485	7.8	73	#N/A	1.1	18	0.97	0.49	0.034	0.15	16	0.012	0.00024	0.0013	0.024	0.0000034	0.0000034	0.0014	0.0000015	4.4	0.000019	0.0000078	0.00020
25-Feb-15	35	500	490	7.8	76	#N/A	1.5	19	0.98	0.49	0.029	0.15	16	0.011	0.00020	0.0012	0.028	0.0000034	0.0000034	0.00074	0.0000029	4.4	0.000039	0.0000083	0.00054
4-Mar-15	36	500	480	7.7	62	#N/A	1.0	15	0.96	0.48	0.029	0.14	14	0.0094	0.000096	0.00086	0.022	0.0000034	0.0000034	0.0013	0.0000014	4.4	0.000053	0.0000034	0.00023
11-Mar-15	37	500	480	8.0	64	#N/A	0.74	16	0.96	0.48	0.038	0.14	13	0.010	0.00014	0.0010	0.023	0.0000034	0.0000034	0.0025	0.0000014	3.8	0.000043	0.0000029	0.00038
18-Mar-15	38	500	500	7.8	65	#N/A	1.3	17	1.0	0.50	0.030	0.15	16	0.011	0.00015	0.00085	0.023	0.0000070	0.0000035	0.0011	0.0000015	4.7	0.000050	0.0000065	0.00053
25-Mar-15	39	500	485	7.8	65	#N/A	1.4	17	0.97	0.49	0.029	0.15	14	0.013	0.00015	0.0012	0.027	0.0000034	0.0000034	0.0025	0.0000015	4.0	0.000063	0.0000019	0.00095
1-Apr-15	40	500	500	7.7	66	#N/A	1.9	18	1.0	0.50	0.030	0.15	12	0.011	0.00015	0.00080	0.030	0.0000060	0.0000035	0.0014	0.0000015	3.4	0.000030	0.0000020	0.00019
8-Apr-15	41	500	490	7.9	71	#N/A	1.4	18	0.98	0.49	0.029	0.15	15	0.011	0.00020	0.0011	0.027	0.0000034	0.0000034	0.0025	0.0000015	4.2	0.000029	0.0000078	0.00048
15-Apr-15	42	500	485	7.7	61	#N/A	1.8	16	0.97	0.49	0.029	0.15	13	0.011	0.00015	0.00087	0.024	0.0000034	0.0000034	0.0032	0.0000015	3.7	0.000029	0.0000019	0.00047
22-Apr-15	43	500	490	7.6	60	#N/A	1.5	16	1.5	0.49	0.029	0.15	13	0.0091	0.000098	0.00074	0.023	0.0000034	0.0000034	0.0044	0.0000015	3.7	0.000020	0.0000029	0.00054
29-Apr-15	44	500	490	7.8	80	#N/A	1.0	19	1.5	0.49	0.029	0.15	20	0.013	0.00020	0.0014	0.034	0.0000034	0.0000034	0.0018	0.0000025	5.8	0.000044	0.0000098	0.00026
6-May-15	45	500	500	8.0	73	#N/A	1.2	20	1.0	0.50	0.030	0.15	16	0.013	0.00015	0.0032	0.027	0.0000035	0.0000035	0.0023	0.0000015	4.6	0.000015	0.0000085	0.00017
13-May-15	46	500	490																						
20-May-15	47	490	480																						
27-May-15	48	480	475																						
3-Jun-15	49	475	470	8.2	161	#N/A	1.3	8.9	0.71	0.12	0.0071	0.035	8.9	0.0011	0.000071	0.00028	0.019	0.00000082	0.00000082	0.00048	0.00000035	2.6	0.000019	0.0000026	0.000040
10-Jun-15	50	500	480																						
17-Jun-15	51	480	470																						
24-Jun-15	52	470	460																						
1-Jul-15	53	460	465	8.1	166	#N/A	1.7	8.8	0.47	0.12	0.0070	0.035	7.7	0.0018	0.000058	0.00033	0.016	0.00000081	0.00000081	0.0017	0.00000035	2.2	0.000023	0.0000043	0.000041
8-Jul-15	54	500	490																						
15-Jul-15	55	490	480																						
22-Jul-15	56	480	480																						
29-Jul-15	57	480	470	8.1	161	#N/A	0.91	9.1	0.59	0.12	0.0071	0.035	8.2	0.0017	0.000059	0.00029	0.017	0.00000082	0.00000082	0.00087	0.00000035	2.3	0.000025	0.0000033	0.000026
5-Aug-15	58	500	495																						
12-Aug-15	59	495	490																						
19-Aug-15	60	490	480																						
26-Aug-15	61	480	470	8.0	158	#N/A	0.92	9.0	0.59	0.12	0.0071	0.035	8.2	0.0011	0.000071	0.00033	0.018	0.00000082	0.00000082	0.00073	0.00000094	2.4	0.000020	0.0000029	0.000054
2-Sep-15	62	500	495																						
9-Sep-15	63	495	490																						
16-Sep-15	64	490	490																						
23-Sep-15	65	490	470	8.1	163	#N/A	1.0	9.0	0.59	0.00	0.00	0.00	8.6	0.0012	0.000071	0.00033	0.019	0.00000082	0.00000082	0.00085	0.00000047	2.5	0.000024	0.0000029	0.000029
30-Sep-15	66	500	500																						
7-Oct-15	67	500	480																						
14-Oct-15	68	480	460																						
21-Oct-15	69	460	450	8.1	149	#N/A	0.70	8.5	0.56	0.00	0.00	0.00	7.9	0.0011	0.000056	0.00029	0.016	0.00000079	0.00000079	0.00074	0.0000039	2.2	0.000027	0.0000041	0.00018
28-Oct-15	70	500	490																						
4-Nov-15	71	490	470																						
11-Nov-15	72	470	460																						
18-Nov-15	73	460	460	8.0	138	#N/A	0.52	8.5	0.46	0.00	0.00	0.00	6.7	0.0022	0.000046	0.00023	0.015	0.00000081	0.00000081	0.00038	0.00000035	1.9	0.000026	0.0000092	0.000071
25-Nov-15	74	500	485	8.0	69	#N/A	0.20	19	0.97	0.00	0.00	0.00	16	0.015	0.00015	0.0012	0.030	0.0000034	0.0000034	0.0016	0.0000015	4.9	0.000078	0.000087	0.00038
2-Dec-15	75	500	495	8.0	68	#N/A	0.68	17	0.99	0.00	0.00	0.00	15	0.014	0.00015	0.0011	0.031	0.0000035	0.0000035	0.0014	0.0000035	4.3	0.000025	0.0000069	0.00028
9-Dec-15	76	500	505	8.1	67	#N/A	1.2	17	1.0	0.00	0.00	0.00	14	0.015	0.00020	0.0016	0.031	0.0000051	0.0000035	0.0045	0.0000066	4.2	0.000051	0.0000020	0.00018
16-Dec-15	77	500	495	7.9	63	#N/A	0.85	15	0.99	0.00	0.00	0.00	15	0.025	0.000099	0.0011	0.031	0.0000035	0.0000035	0.00099	0.0000020	4.4	0.000099	0.0000079	0.00021
23-Dec-15	78	500	500	7.9	71	-	0.75	15	1.2	0.00	0.00	0.00	14	0.019	0.000098	0.00091	0.030	0.0000034	0.0000034	0.0011	0.0000020	4.3	0.000074	0.0000049	0.00016
30-Dec-15	79	500	485	7.9	62	#N/A	0.65	15	1.5	0.00	0.00	0.00	14	0.013	0.000097	0.00073	0.029	0.0000034	0.0000034	0.0012	0.0000019	4.1	0.000049	0.0000019	0.00011
6-Jan-16	80	500	495	7.9	70	-	0.69	15	1.5	0.00	0.00	0.00	14	0.012	0.000098	0.00081	0.029	0.0000034	0.0000034	0.0018	0.0000017	4.2	0.000044	0.0000020	0.00011
13-Jan-16	81	500	495	7.8	68	#N/A	0.74	16	1.5	0.00	0.00	0.00	14	0.011	0.000099	0.00089	0.030	0.0000035	0.0000035	0.0025	0.0000015	4.2	0.000040	0.0000020	0.00012
20-Jan-16	82	500	495	7.9	80	-	0.97	17	1.2	0.00	0.00	0.00	15	0.012	0.000099	0.00098	0.033	0.0000034	0.0000034	0.0017	0.0000015	4.4	0.000039	0.0000054	0.00011
27-Jan-16	83	500	490	7.9	73	#N/A	1.2	17	0.98	0.00	0.00	0.00	15	0.012	0.000098	0.0011	0.036	0.0000034	0.0000034	0.00098	0.0000015	4.5	0.000039	0.0000088	0.000098
3-Feb-16	84	500	490	7.9	74	-	1.2	17	0.99	0.00	0.00	0.00	15	0.012	0.000099	0.0011	0.037	0.0000035	0.0000035	0.00099	0.0000015	4.5	0.000042	0.0000064	0.00024
10-Feb-16	85	500	500	7.8	70	#N/A	1.1	17	1.0	0.00	0.00	0.00	15	0.013	0.00010	0.0011	0.038	0.0000035	0.0000035	0.0010	0.0000015	4.5	0.000045	0.0000040	0.00038
17-Feb-16	86	500	500	7.8	73	-	1.1	17	1.0	0.00	0.00	0.00	15	0.013	0.00010	0.0011	0.037	0.0000035	0.0000035	0.0010	0.0000015	4.5	0.000030	0.0000030	0.00023
24-Feb-16	87	500	500	7.8	69	#N/A	1.1	16	1.0	0.00	0.00	0.00	15	0.014	0.00010	0.0010	0.035	0.0000035	0.0000035	0.0010	0.0000015	4.5	0.000015	0.0000020	0.000075

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Calculated Loading Rates for HC1 (ST)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
25-Jun-14	0	500	345	7.7	0.0031	0.0000035	0.0029	5.1	0.0038	0.0069	0.0050	0.0018	0.0086	3.3	0.0012	0.96	0.00000069	12	0.37	19	0.0000090	0.000045	0.000062	0.0042	0.00025	0.00069	0.00069
2-Jul-14	1	500	500	7.7	0.0010	0.0000050	0.0033	5.8	0.0081	0.0050	0.0048	0.0021	0.0045	3.9	0.00064	1.2	0.0000010	10	0.57	18	0.000011	0.0036	0.00010	0.0089	0.00024	0.00050	0.0010
9-Jul-14	2	500	485	7.9	0.0029	0.0000049	0.0022	2.9	0.0048	0.0049	0.0030	0.00092	0.0044	2.8	0.00016	0.98	0.00000097	4.3	0.40	6.7	0.0000063	0.0016	0.000073	0.0039	0.00023	0.00049	0.00097
16-Jul-14	3	500	485	7.8	0.0053	0.0000049	0.0017	2.3	0.0032	0.0049	0.0037	0.00058	0.0044	2.2	0.000087	0.72	0.0000029	2.7	0.36	3.6	0.0000087	0.00012	0.000044	0.0054	0.00018	0.00049	0.00097
23-Jul-14	4	500	485	7.8	0.00097	0.0000097	0.0013	1.8	0.0038	0.0049	0.0015	0.00034	0.0044	1.9	0.000053	0.61	0.0000019	1.7	0.32	2.5	0.0000044	0.0016	0.000039	0.0024	0.00016	0.00049	0.00097
30-Jul-14	5	500	480	8.1	0.0024	0.0000048	0.00089	1.2	0.0032	0.0048	0.0025	0.00019	0.0072	1.3	0.000043	0.40	0.00000096	0.85	0.25	1.4	0.0000053	0.00010	0.00011	0.0034	0.00014	0.00048	0.00096
6-Aug-14	6	500	485	7.8	0.0039	0.000015	0.00075	1.2	0.0028	0.0049	0.00091	0.000049	0.0053	1.4	0.000058	0.42	0.00000097	0.74	0.26	1.3	0.0000034	0.000053	0.00013	0.0018	0.00039	0.00097	0.00097
13-Aug-14	7	500	490	8.2	0.0088	0.0000098	0.0013	2.0	0.0030	0.0049	0.0017	0.00015	0.0049	2.1	0.000059	0.71	0.00000098	1.3	0.38	2.1	0.0000049	0.00060	0.00040	0.0029	0.00017	0.00049	0.00098
20-Aug-14	8	500	485	7.9	0.0029	0.000019	0.00092	1.5	0.0031	0.0049	0.0011	0.00015	0.0044	1.6	0.00015	0.52	0.00000097	0.72	0.32	1.4	0.0000029	0.00097	0.00018	0.0023	0.00018	0.00049	0.00097
27-Aug-14	9	500	500	8.1	0.0030	0.0000050	0.0013	2.1	0.0038	0.0050	0.0019	0.00015	0.0045	2.2	0.000055	0.73	0.0000010	1.1	0.43	1.8	0.0000080	0.00069	0.00016	0.0032	0.00020	0.00050	0.0010
3-Sep-14	10	500	490	7.8	0.0034	0.000020	0.0012	1.8	0.0029	0.0049	0.0015	0.00015	0.0025	2.2	0.00014	0.74	0.0000064	0.78	0.46	2.0	0.0000088	0.000093	0.000029	0.0026	0.00019	0.00049	0.00098
10-Sep-14	11	500	500	8.2	0.0050	0.0000050	0.00093	1.5	0.0030	0.0050	0.0013	0.00010	0.0015	1.8	0.000045	0.65	0.0000010	0.59	0.41	1.2	0.0000075	0.00073	0.00016	0.0023	0.00016	0.00050	0.0010
17-Sep-14	12	500	475	8.0	0.0033	0.0000048	0.00066	1.1	0.0025	0.0048	0.00081	0.000048	0.0014	1.4	0.000048	0.39	0.00000095	0.33	0.31	1.00	0.0000024	0.000043	0.000081	0.0016	0.00013	0.00048	0.00095
24-Sep-14	13	500	485	8.2	0.00097	0.0000049	0.00072	1.2	0.0022	0.0049	0.00081	0.000097	0.0044	1.4	0.000019	0.40	0.0000024	0.34	0.28	0.75	0.0000024	0.000049	0.000024	0.0017	0.00012	0.00049	0.00097
1-Oct-14	14	500	485	7.8	0.019	0.000019	0.00065	1.2	0.0053	0.0049	0.0010	0.000049	0.0044	1.4	0.000019	0.43	0.00000097	0.28	0.30	0.96	0.0000024	0.000029	0.00015	0.0016	0.00012	0.00097	0.00097
8-Oct-14	15	500	480	8.1	0.0048	0.0000096	0.00088	1.3	0.0027	0.0048	0.0016	0.000096	0.0014	1.6	0.000019	0.48	0.00000096	0.32	0.38	1.2	0.0000082	0.00023	0.00020	0.0020	0.00017	0.00048	0.00096
15-Oct-14	16	500	485	7.7	0.0034	0.0000049	0.0010	1.5	0.0023	0.0049	0.0011	0.000097	0.0015	1.9	0.000034	0.53	0.00000097	0.36	0.43	1.2	0.0000049	0.00066	0.000049	0.0022	0.00014	0.00049	0.00097
22-Oct-14	17	500	490	8.1	0.0049	0.0000049	0.00092	1.6	0.0027	0.0049	0.0011	0.000098	0.0015	2.0	0.000034	0.52	0.00000098	0.33	0.43	1.1	0.000011	0.000093	0.000039	0.0023	0.00013	0.00049	0.00098
29-Oct-14	18	500	495	7.8	0.0035	0.0000050	0.00089	1.5	0.0021	0.0050	0.00093	0.000050	0.0015	1.7	0.000030	0.51	0.00000099	0.26	0.41	0.89	0.0000069	0.00048	0.000025	0.0020	0.00013	0.00050	0.00099
5-Nov-14	19	500	490	7.9	0.0034	0.00015	0.00071	1.3	0.0019	0.0049	0.0012	0.000098	0.0015	1.5	0.000020	0.46	0.00000098	0.23	0.38	0.83	0.000011	0.00013	0.000064	0.0019	0.00011	0.00049	0.00098
12-Nov-14	20	500	485	7.6	0.0082	0.000019	0.00076	1.5	0.0024	0.0049	0.0013	0.000097	0.0015	1.6	0.000034	0.51	0.00000097	0.26	0.43	0.87	0.0000063	0.00050	0.00037	0.0021	0.00016	0.00049	0.00097
19-Nov-14	21	500	485	7.7	0.0034	0.000063	0.00077	1.4	0.0025	0.0049	0.00084	0.000097	0.0015	1.6	0.000039	0.45	0.00000097	0.21	0.44	0.78	0.000012	0.00026	0.000024	0.0020	0.00013	0.00097	0.00097
26-Nov-14	22	500	490	8.1	0.0034	0.0000049	0.00089	1.5	0.0021	0.0049	0.00092	0.000049	0.0049	1.7	0.00011	0.56	0.00000098	0.20	0.44	0.74	0.0000069	0.000064	0.000054	0.0021	0.00015	0.00049	0.00098
3-Dec-14	23	500	475	8.0	0.0033	0.0000048	0.00077	1.3	0.0023	0.0048	0.00076	0.000048	0.0014	1.5	0.000033	0.38	0.00000095	0.16	0.36	0.67	0.0000076	0.00046	0.000048	0.0019	0.00015	0.00048	0.00095
10-Dec-14	24	500	495	7.9	0.0035	0.0000050	0.00052	1.00	0.0019	0.0050	0.00063	0.000050	0.0015	1.1	0.000030	0.30	0.00000099	0.10	0.32	0.54	0.0000064	0.00029	0.000025	0.0014	0.000094	0.00050	0.00099
17-Dec-14	25	500	495	7.7	0.0035	0.0000050	0.00071	1.3	0.0022	0.0050	0.00058	0.000050	0.0015	1.5	0.000025	0.43	0.00000099	0.14	0.39	0.59	0.0000054	0.00042	0.00020	0.0017	0.00014	0.00050	0.00099
24-Dec-14	26	500	495	7.7	0.0035	0.0000050	0.00072	1.2	0.0019	0.0050	0.00069	0.000050	0.0015	1.4	0.000079	0.39	0.00000099	0.13	0.39	0.64	0.0000045	0.00037	0.000050	0.0017	0.00014	0.00050	0.00099
31-Dec-14	27	500	495	7.9	0.0035	0.0000050	0.00085	1.5	0.0021	0.0050	0.00098	0.000050	0.0015	1.7	0.00011	0.59	0.00000099	0.15	0.47	0.89	0.000010	0.00026	0.000030	0.0022	0.00014	0.00050	0.00099
7-Jan-15	28	500	485	7.5	0.0034	0.0000097	0.00061	1.2	0.0018	0.0049	0.00090	0.000049	0.0015	1.3	0.000058	0.34	0.00000097	0.10	0.37	0.44	0.000019	0.00017	0.000024	0.0015	0.00011	0.00049	0.00097
14-Jan-15	29	500	495	7.9	0.0035	0.0000099	0.00061	1.3	0.0018	0.0050	0.0011	0.000050	0.0015	1.4	0.000054	0.50	0.00000099	0.10	0.42	0.50	0.000014	0.00031	0.000025	0.0016	0.00011	0.00050	0.00099
21-Jan-15	30	500	485	7.8	0.0034	0.000015	0.00078	1.3	0.0019	0.0049	0.0011	0.000049	0.0015	1.6	0.000049	0.43	0.00000097	0.12	0.45	0.49	0.0000082	0.00033	0.000039	0.0021	0.00015	0.00049	0.00097
28-Jan-15	31	500	495	7.8	0.0035	0.0000050	0.00052	1.3	0.0018	0.0050	0.0032	0.000050	0.0015	1.5	0.000069	0.44	0.0000020	0.099	0.34	0.79	0.0000045	0.00012	0.000054	0.0016	0.00012	0.00050	0.00099
4-Feb-15	32	500	490	7.8	0.0034	0.000015	0.00070	1.3	0.0019	0.0049	0.00066	0.000049	0.0015	1.4	0.000029	0.41	0.00000098	0.088	0.38	0.64	0.0000044	0.00025	0.000025	0.0016	0.00012	0.00049	0.00098
11-Feb-15	33	500	490	8.0	0.0034	0.0000049	0.00057	1.1	0.0016	0.0049	0.00083	0.000049	0.0015	1.4	0.00049	0.38	0.00000098	0.078	0.38	0.54	0.0000064	0.00049	0.000044	0.0014	0.00012	0.00049	0.00098
18-Feb-15	34	500	485	7.8	0.0034	0.0000049	0.00067	1.2	0.0017	0.0049	0.00053	0.000049	0.0015	1.5	0.00049	0.39	0.0000015	0.087	0.45	0.53	0.0000058	0.00029	0.000034	0.0016	0.00013	0.00049	0.00097
25-Feb-15	35	500	490	7.8	0.0034	0.0000098	0.00061	1.2	0.0015	0.0049	0.00061	0.000049	0.0015	1.5	0.00049	0.41	0.00000098	0.069	0.40	0.29	0.0000069	0.00025	0.000064	0.0018	0.00011	0.00049	0.00098
4-Mar-15	36	500	480	7.7	0.0034	0.0000096	0.00048	0.83	0.0017	0.0048	0.00044	0.000048	0.0014	1.0	0.00048	0.31	0.00000096	0.053	0.27	0.48	0.0000024	0.00028	0.000038	0.0013	0.00010	0.00048	0.00096
11-Mar-15	37	500	480	8.0	0.0034	0.000024	0.00050	0.95	0.0017	0.0048	0.00040	0.000048	0.0014	1.1	0.00048	0.26	0.0000034	0.038	0.29	0.048	0.0000034	0.00031	0.000024	0.0012	0.000091	0.00048	0.00096
18-Mar-15	38	500	500	7.8	0.0065	0.0000050	0.00049	0.91	0.0019	0.0050	0.00043	0.000050	0.0015	1.2	0.00050	0.29	0.0000010	0.050	0.33	0.50	0.0000025	0.00042	0.00010	0.0012	0.000090	0.00050	0.0010
25-Mar-15	39	500	485	7.8	0.0034	0.000015	0.00041	1.0	0.0017	0.0049	0.0010	0.000097	0.0015	1.2	0.00049	0.32	0.00000097	0.087	0.31	0.49	0.0000024	0.00040	0.000044	0.0013	0.00015	0.00049	0.00097
1-Apr-15	40	500	500	7.7	0.0035	0.0000050	0.00040	0.92	0.0057	0.0050	0.00036	0.000050	0.0015	1.3	0.00050	0.22	0.0000010	0.40	0.33	0.25	0.0000050	0.00028	0.000025	0.0016	0.000085	0.00050	0.0010
8-Apr-15	41	500	490	7.9	0.0034	0.0000049	0.00053	0.98	0.0015	0.0049	0.00064	0.000049	0.0015	1.4	0.00049	0.36	0.00000098	0.054	0.37	0.29	0.0000025	0.00037	0.000025	0.0013	0.00011	0.00049	0.00098
15-Apr-15	42	500	485	7.7	0.0049	0.0000049	0.00048	0.89	0.0014	0.0049	0.00059	0.000049	0.0015	1.2	0.00049	0.28	0.0000019	0.063	0.32	0.44	0.0000024	0.00050	0.000024	0.0011	0.00013	0.00049	0.00097
22-Apr-15	43	500	490	7.6	0.0034	0.0000098	0.00043	0.83	0.0016	0.0049	0.00038	0.000049	0.0015	1.1	0.00049	0.27	0.0000054	0.034	0.30	0.29	0.0000083	0.00047	0.000044	0.00100	0.000093	0.00049	0.00098
29-Apr-15	44	500	490	7.8	0.0034	0.000049	0.00063	1.2	0.0016	0.0049	0.00065	0.000049	0.0015	1.7	0.00049	0.41	0.00000098	0.059	0.41	0.54	0.0000039	0.00035	0.000025	0.0016	0.00012	0.00049	0.00098
6-May-15	45	500	500	8.0	0.0035	0.0000050	0.00060	1.1	0.0016	0.0050	0.00077	0.000050	0.0015	1.5	0.00050	0.40	0.0000010	0.070	0.37	0.45	0.0000025	0.00029	0.000060	0.0017	0.00013	0.00050	0.0010
13-May-15	46	500	490																								
20-May-15	47	490	480																								
27-May-15	48	480	475																								
3-Jun-15	49	475	470	8.2	0.00082	0.0000012	0.00031	0.59	0.00053	0.0012	0.00028	0.000024	0.00035	0.65	0.000013	0.22	0.00000024	0.025	0.22	0.29	0.0000025	0.00014	0.0000082	0.00082	0.000022	0.00012	0.00024
10-Jun-15	50	500	480																								
17-Jun-15	51	480	470																								
24-Jun-15	52	470	460																								
1-Jul-15	53	460	465	8.1	0.0013	0.0000012	0.00028	0.55	0.00055	0.0012	0.00023	0.000035	0.00035	0.56	0.000045	0.19	0.00000047	0.026	0.19	0.38	0.0000020	0.00012	0.000029	0.00078	0.000026	0.00012	0.00023
8-Jul-15	54	500	490																								
15-Jul-15	55	490	480																								
22-Jul-15	56	480	480																								
29-Jul-15	57	480	470	8.1	0.00082	0.0000012	0.00032	0.60	0.00046	0.0012	0.00029	0.000035	0.00035	0.60	0.000015	0.20	0.00000024	0.027	0.21	0.29	0.00000059	0.000093	0.000022	0.00082	0.000031	0.00012	0.00024
5-Aug-15	58	500	495																								
12-Aug-15	59	495	490																								
19-Aug-15	60	490	480																								
26-Aug-15	61	480	470	8.0	0.00082	0.000013	0.00031	0.56	0.00043	0.0012	0.00032	0.000024	0.00035	0.59	0.000015	0.21	0.00000024	0.025	0.21	0.26	0.0000016	0.00011	0.0000082	0.00076	0.000033	0.00012	0.00024
2-Sep-15	62	500	495																								
9-Sep-15	63	495	490																								
16-Sep-15	64	490	490																								
23-Sep-15	65	490	470	8.1	0.00082	0.0000012	0.00029	0.61	0.00033	0.0012	0.00036	0.000035	0.00035	0.63	0.000018	0.22	0.00000024	0.026	0.21	0.29	0.0000020	0.00016	0.000015	0.00072	0.000027	0.00012	0.00024
30-Sep-15	66	500	500																								
7-Oct-15	67	500	480																								
14-Oct-15	68	480	460																								
21-Oct-15	69	460	450	8.1	0.00079	0.0000090	0.00027	0.55	0.00042	0.0011	0.00020	0.000023	0.00034	0.59	0.000059	0.18	0.000012	0.045	0.18	0.28	0.0000023	0.00015	0.000014	0.00064	0.000020	0.00011	0.00023
28-Oct-15	70	500	490																								
4-Nov-15	71	490	470																								
11-Nov-15	72	470	460																								
18-Nov-15	73	460	460	8.0	0.00092	0.0000023	0.00020	0.45	0.00058	0.0012	0.00035	0.000012	0.00035	0.52	0.000028	0.14	0.0000015	0.023	0.15	0.16	0.0000086	0.00013	0.000055	0.00056	0.000024	0.00023	0.00023
25-Nov-15	74	500	485	8.0	0.0034	0.00011	0.00048	0.89	0.0013	0.0049	0.00063	0.000049	0.0097	1.3	0.00041	0.32	0.00023	0.068	0.32	0.44	0.000039	0.00018	0.000044	0.0011	0.00015	0.00049	0.00097
2-Dec-15	75	500	495	8.0	0.0035	0.00019	0.00047	0.98	0.0017	0.0050	0.00063	0.000050	0.0015	1.5	0.00011	0.35	0.00000099	0.054	0.32	0.40	0.0000025	0.00021	0.000050	0.0012	0.00011	0.00050	0.00099
9-Dec-15	76	500	505	8.1	0.0035	0.0000051	0.00049	0.91	0.0014	0.0051	0.00047	0.000051	0.0015	1.3	0.00017	0.31	0.0000045	0.045	0.32	0.35	0.000010	0.00021	0.000051	0.0012	0.00013	0.00051	0.0010
16-Dec-15	77	500	495	7.9	0.0074	0.000059	0.00047	0.89	0.0016	0.0050	0.00030	0.000050	0.0020	1.4	0.000020	0.35	0.00000099	0.050	0.32	0.25	0.0000069	0.00017	0.00020	0.0011	0.00013	0.00050	0.00099
23-Dec-15	78	500	500	7.9	0.0054	0.000032	0.00045	0.87	0.0016	0.0049	0.00028	0.000049	0.0017	1.3	0.000022	0.31	0.0000012	0.051	0.30	0.39	0.0000047	0.00014	0.00014	0.0010	0.00013	0.00049	0.00098
30-Dec-15	79	500	485	7.9	0.0034	0.0000049	0.00042	0.84	0.0016	0.0049	0.00025	0.000049	0.0015	1.2	0.000024	0.27	0.0000015	0.053	0.28	0.53	0.0000024	0.00012	0.000078	0.00098	0.00012	0.00049	0.00097
6-Jan-16	80	500	495	7.9	0.0034	0.0000049	0.00043	0.87	0.0017	0.0049	0.00050	0.000049	0.0015	1.2	0.000072	0.29	0.0000012	0.044	0.30	0.37	0.0000025	0.00013	0.000051	0.0011	0.00010	0.00049	0.00098
13-Jan-16	81	500	495	7.8	0.0035	0.0000050	0.00044	0.89	0.0018	0.0050	0.00075	0.000050	0.0015	1.3	0.00012	0.31	0.00000099	0.035	0.31	0.20	0.0000025	0.00014	0.000025	0.0013	0.000084	0.00050	0.00099
20-Jan-16	82	500	495	7.9	0.0034	0.0000049	0.00048	0.96	0.0017	0.0049	0.00053	0.000049	0.0015	1.4	0.000069	0.33	0.00000099	0.037	0.34	0.22	0.0000039	0.00017	0.000052	0.0014	0.000091	0.00049	0.00099
27-Jan-16	83	500	490	7.9	0.0034	0.0000049	0.00051	1.0	0.0016	0.0049	0.00031	0.000049	0.0015	1.5	0.000020	0.34	0.00000098	0.039	0.37	0.25	0.0000054	0.00021	0.000078	0.0014	0.000098	0.00049	0.00098
3-Feb-16	84	500	490	7.9	0.0035	0.0000050	0.00047	0.97	0.0018	0.0050	0.00030	0.000050	0.0015	1.4	0.000032	0.32	0.00000099	0.047	0.35	0.40	0.0000049	0.00022	0.000064	0.0012	0.000094	0.00050	0.00099
10-Feb-16	85	500	500	7.8	0.0035	0.0000050	0.00043	0.93	0.0019	0.0050	0.00029	0.000050	0.0015	1.3	0.000045	0.30	0.0000010	0.055	0.34	0.55	0.0000045	0.00023	0.000050	0.00095	0.000090	0.00050	0.0010
17-Feb-16	86	500	500	7.8	0.0035	0.0000050	0.00046	0.95	0.0018	0.0050	0.00039	0.000050	0.0015	1.4	0.000065	0.26	0.0000040	0.048	0.35	0.48	0.0000035	0.00018	0.000050	0.00098	0.000093	0.00050	0.0010
24-Feb-16	87	500	500	7.8	0.0035	0.0000050	0.00048	0.98	0.0017	0.0050	0.00048	0.000050	0.0015	1.5	0.000085	0.23	0.0000070	0.040	0.35	0.40	0.0000025	0.00013	0.000050	0.0010	0.000095	0.00050	0.0010

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for HC2 (SS)

Date	**Cycle**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**	**Cu**
	No.	Input	Output		umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
25-Jun-14	0	500	330	8.0	464	#N/A	6.8	88	101	3.3	0.59	< 0.3	126	0.038	0.032	0.064	0.034	0.0000080	< 0.000007	0.019	0.0000090	24	0.00021	0.00044	0.0060
2-Jul-14	1	500	485	8.0	255	#N/A	8.2	74	49	0.80	0.29	< 0.3	83	0.036	0.028	0.063	0.043	< 0.000007	< 0.000007	0.012	< 0.000003	16	0.000040	0.00031	0.0017
9-Jul-14	2	500	490	8.0	220	#N/A	2.4	77	27	< 0.2	0.28	< 0.3	72	0.043	0.031	0.048	0.068	< 0.000007	< 0.000007	0.013	0.0000030	14	< 0.00003	0.00013	0.00092
16-Jul-14	3	500	480	8.0	177	#N/A	2.4	69	12	< 0.2	0.20	< 0.3	64	0.043	0.025	0.036	0.063	< 0.000007	< 0.000007	0.0085	< 0.000003	13	0.00019	0.00046	0.00073
23-Jul-14	4	500	500	8.0	118	#N/A	2.1	50	7.0	< 0.2	0.10	< 0.3	50	0.069	0.015	0.025	0.081	< 0.000007	< 0.000007	0.0059	0.0000030	11	< 0.00003	0.00016	0.0010
30-Jul-14	5	500	485	8.1	160	#N/A	1.9	77	9.0	< 0.2	0.18	< 0.3	66	0.051	0.025	0.034	0.074	< 0.000007	< 0.000007	0.0079	< 0.000003	13	0.00020	0.00020	0.0015
6-Aug-14	6	500	480	8.0	142	#N/A	2.6	64	5.0	< 0.2	0.15	< 0.3	60	0.050	0.021	0.028	0.069	< 0.000007	< 0.000007	0.0070	< 0.000003	12	< 0.00003	0.000088	0.00035
13-Aug-14	7	500	490	8.0	125	#N/A	2.4	58	7.0	< 0.2	0.11	< 0.3	55	0.045	0.018	0.020	0.082	< 0.000007	< 0.000007	0.0060	< 0.000003	12	0.000050	0.000084	0.00035
20-Aug-14	8	500	490	8.0	103	#N/A	1.9	48	6.0	< 0.2	0.070	< 0.3	48	0.057	0.012	0.016	0.074	< 0.000007	< 0.000007	0.0046	< 0.000003	11	< 0.00003	0.000084	0.00038
27-Aug-14	9	500	495	8.0	130	#N/A	4.5	58	5.0	< 0.2	0.10	< 0.3	56	0.045	0.017	0.020	0.080	< 0.000007	< 0.000007	0.010	< 0.000003	12	< 0.00003	0.000068	0.00027
3-Sep-14	10	500	490	7.9	121	#N/A	4.6	54	7.0	< 0.2	0.070	< 0.3	68	0.060	0.018	0.022	0.098	< 0.000007	< 0.000007	0.0052	< 0.000003	18	< 0.00003	0.000066	0.00033
10-Sep-14	11	500	500	8.0	111	#N/A	3.3	50	5.0	< 0.2	0.060	< 0.3	54	0.057	0.014	0.015	0.081	< 0.000007	< 0.000007	0.0062	0.000021	14	< 0.00003	0.000050	0.00029
17-Sep-14	12	500	495	7.9	112	#N/A	8.3	53	6.0	< 0.2	0.060	< 0.3	47	0.058	0.016	0.014	0.076	< 0.000007	< 0.000007	0.0047	< 0.000003	11	0.000040	0.000059	0.00041
24-Sep-14	13	500	480	8.0	95	#N/A	3.7	45	8.0	< 0.2	< 0.06	< 0.3	42	0.048	0.015	0.010	0.068	< 0.000007	< 0.000007	0.0036	0.0000060	9.6	< 0.00003	0.00014	0.00018
1-Oct-14	14	500	470	7.9	96	#N/A	6.7	48	6.0	< 0.2	< 0.06	< 0.3	42	0.052	0.020	0.0097	0.061	< 0.000007	< 0.000007	0.0027	0.0000030	9.8	< 0.00003	0.00	< 0.00002
8-Oct-14	15	500	490	7.9	90	#N/A	3.0	37	4.0	< 0.2	< 0.06	< 0.3	46	0.048	0.012	0.0099	0.059	< 0.000007	< 0.000007	0.016	< 0.000003	13	< 0.00003	0.000040	0.00019
15-Oct-14	16	500	495	7.9	110	#N/A	5.4	43	7.0	< 0.2	< 0.06	< 0.3	57	0.051	0.016	0.012	0.077	< 0.000007	< 0.000007	0.0051	< 0.000003	16	< 0.00003	0.000055	0.00026
22-Oct-14	17	500	505	8.0	102	#N/A	5.0	46	5.0	< 0.2	< 0.06	< 0.3	44	0.049	0.016	0.012	0.071	< 0.000007	< 0.000007	0.011	0.0000050	10	0.00015	0.000058	0.00037
29-Oct-14	18	500	490	7.9	84	#N/A	8.4	39	3.0	< 0.2	< 0.06	< 0.3	37	0.037	0.011	0.0079	0.053	< 0.000007	< 0.000007	0.0075	< 0.000003	9.2	0.000040	0.000040	0.00037
5-Nov-14	19	500	485	7.7	85	#N/A	#N/A	48	3.0	< 0.2	< 0.06	< 0.3	37	0.053	0.011	0.0093	0.062	< 0.000007	< 0.000007	0.0035	0.000019	8.8	< 0.00003	0.000045	0.00052
12-Nov-14	20	500	495	7.6	89	#N/A	6.7	34	2.0	< 0.2	< 0.06	< 0.3	41	0.058	0.012	0.011	0.066	< 0.000007	< 0.000007	0.0048	< 0.000003	10	0.000050	0.000054	0.00043
19-Nov-14	21	500	475	7.6	93	#N/A	6.5	34	2.0	< 0.2	< 0.06	< 0.3	40	0.052	0.013	0.010	0.070	< 0.000007	< 0.000007	0.0027	0.000013	9.8	< 0.00003	0.000052	0.00057
26-Nov-14	22	500	500	7.9	78	#N/A	1.8	35	2.0	< 0.2	< 0.06	< 0.3	35	0.051	0.010	0.0090	0.059	< 0.000007	< 0.000007	0.0021	< 0.000003	8.5	< 0.00003	0.000042	0.00014
3-Dec-14	23	500	495	7.8	71	#N/A	3.0	34	< 2	< 0.2	< 0.06	< 0.3	36	0.047	0.0089	0.0088	0.061	< 0.000007	< 0.000007	0.0032	< 0.000003	9.5	< 0.00003	0.000034	0.00023
10-Dec-14	24	500	495	7.9	71	#N/A	5.1	37	2.0	< 0.2	< 0.06	< 0.3	34	0.051	0.0087	0.0079	0.061	< 0.000007	< 0.000007	0.0023	0.0000030	8.7	< 0.00003	0.000030	0.00035
17-Dec-14	25	500	500	8.0	91	#N/A	3.9	42	3.0	< 0.2	< 0.06	< 0.3	41	0.075	0.012	0.010	0.077	< 0.000007	< 0.000007	0.0023	0.0000030	10	< 0.00003	0.000076	0.00026
24-Dec-14	26	500	495	7.9	87	#N/A	3.3	42	< 2	< 0.2	< 0.06	< 0.3	39	0.057	0.012	0.0092	0.079	< 0.000007	< 0.000007	0.0017	0.0000040	9.9	< 0.00003	0.000048	0.00024
31-Dec-14	27	500	495	7.9	88	#N/A	1.3	30	3.0	< 0.2	< 0.06	< 0.3	41	0.046	0.012	0.0094	0.074	< 0.000007	< 0.000007	0.0016	0.0000030	11	< 0.00003	0.000040	0.00018
7-Jan-15	28	500	500	7.8	68	#N/A	2.7	34	2.0	< 1	< 0.06	< 0.3	33	0.040	0.0073	0.0059	0.056	< 0.000007	< 0.000007	0.0028	< 0.000003	9.0	< 0.00003	0.000038	0.00027
14-Jan-15	29	500	480	7.8	68	#N/A	2.7	34	2.0	< 1	< 0.06	< 0.3	32	0.037	0.0081	0.0057	0.057	< 0.000007	< 0.000007	0.0028	0.0000070	8.5	< 0.00003	0.000035	0.00019
21-Jan-15	30	500	485	8.0	75	#N/A	4.3	42	2.0	< 1	< 0.06	< 0.3	34	0.052	0.0096	0.0076	0.064	< 0.000007	< 0.000007	0.0020	< 0.000003	8.9	< 0.00003	0.000037	0.00031
28-Jan-15	31	500	495	7.9	76	#N/A	1.7	36	2.0	< 1	< 0.06	< 0.3	36	0.050	0.0082	0.0068	0.066	< 0.000007	< 0.000007	0.0032	0.000025	9.0	< 0.00003	0.000035	0.00021
4-Feb-15	32	500	495	7.9	72	#N/A	2.3	34	< 2	< 1	< 0.06	< 0.3	32	0.041	0.0079	0.0063	0.061	< 0.000007	< 0.000007	0.0027	0.0000040	8.0	0.00	0.000028	0.00032
11-Feb-15	33	500	490	7.9	76	#N/A	2.1	36	3.0	< 1	< 0.06	< 0.3	34	0.045	0.0094	0.0066	0.065	< 0.000007	< 0.000007	0.0029	0.0000070	8.6	< 0.00003	0.000039	0.000030
18-Feb-15	34	500	485	7.9	67	#N/A	2.2	35	2.0	< 1	< 0.06	< 0.3	32	0.043	0.0077	0.0058	0.057	< 0.000007	< 0.000007	0.0026	< 0.000003	8.6	< 0.00003	0.000040	0.00036
25-Feb-15	35	500	480	7.9	80	#N/A	3.0	40	< 2	< 1	< 0.06	< 0.3	37	0.033	0.0086	0.0053	0.062	< 0.000007	< 0.000007	0.00090	0.0000050	9.7	0.000030	0.000045	0.00049
4-Mar-15	36	500	490	7.8	68	#N/A	2.0	34	2.0	< 1	< 0.06	< 0.3	33	0.035	0.0070	0.0047	0.054	< 0.000007	< 0.000007	0.0014	< 0.000003	9.4	0.000060	0.000036	0.00019
11-Mar-15	37	500	490	7.9	73	#N/A	1.7	38	< 2	< 1	< 0.06	< 0.3	33	0.029	0.0073	0.0048	0.063	< 0.000007	< 0.000007	0.0024	< 0.000003	9.0	0.000050	0.000037	0.00061
18-Mar-15	38	500	490	7.9	68	#N/A	2.5	37	2.0	< 1	< 0.06	< 0.3	33	0.028	0.0066	0.0038	0.056	< 0.000007	< 0.000007	0.0014	< 0.000003	9.3	< 0.00003	0.000040	0.00031
25-Mar-15	39	500	485	7.8	73	#N/A	3.0	37	< 2	< 1	< 0.06	< 0.3	34	0.029	0.0091	0.0050	0.071	< 0.000007	< 0.000007	0.0040	0.0000040	8.9	0.000080	0.000045	0.00044
1-Apr-15	40	500	490	7.8	64	#N/A	3.7	36	< 2	< 1	< 0.06	< 0.3	24	0.028	0.0064	0.0034	0.062	0.000013	< 0.000007	0.0018	< 0.000003	6.3	< 0.00003	0.000021	0.00088
8-Apr-15	41	500	485	7.8	78	#N/A	2.8	41	< 2	< 1	< 0.06	< 0.3	35	0.032	0.011	0.0051	0.068	< 0.000007	< 0.000007	0.0022	< 0.000003	9.5	< 0.00003	0.000054	0.00074
15-Apr-15	42	500	495	7.8	66	#N/A	3.9	37	< 2	< 1	< 0.06	< 0.3	30	0.029	0.0067	0.0043	0.055	< 0.000007	< 0.000007	0.0042	< 0.000003	8.0	< 0.00003	0.000012	0.00099
22-Apr-15	43	500	485	7.8	53	#N/A	3.4	31	3.0	< 1	< 0.06	< 0.3	25	0.026	0.0043	0.0034	0.047	< 0.000007	< 0.000007	0.0047	< 0.000003	7.0	0.000060	0.000028	0.00082
29-Apr-15	44	500	490	7.9	80	#N/A	2.2	42	< 2	< 1	< 0.06	< 0.3	40	0.047	0.0082	0.0055	0.083	< 0.000007	< 0.000007	0.0030	< 0.000003	11	0.000040	0.000054	0.00048
6-May-15	45	500	495	7.9	73	#N/A	2.8	41	< 2	< 1	< 0.06	< 0.3	34	0.040	0.0074	0.0067	0.067	< 0.000007	< 0.000007	0.0015	< 0.000003	9.1	< 0.00003	0.000048	0.00041
13-May-15	46	500	505	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-May-15	47	505	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-May-15	48	480	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	49	480	490	8.1	181	#N/A	4.0	87	5.0	< 1	< 0.06	< 0.3	88	0.014	0.017	0.0047	0.21	< 0.000007	< 0.000007	0.0042	< 0.000003	23	< 0.00003	0.00015	0.00069
10-Jun-15	50	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-15	51	490	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Jun-15	52	485	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	53	480	480	8.0	192	#N/A	4.5	89	4.0	< 1	< 0.06	< 0.3	83	0.012	0.018	0.0051	0.19	< 0.000007	< 0.000007	0.0067	< 0.000003	22	< 0.00003	0.00018	0.00032
8-Jul-15	54	500	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-Jul-15	55	485	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jul-15	56	480	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	57	480	470	8.1	176	#N/A	2.7	89	4.0	< 1	< 0.06	< 0.3	83	0.016	0.014	0.0045	0.16	0.0000090	< 0.000007	0.0056	0.0000070	22	< 0.00003	0.00016	0.00035
5-Aug-15	58	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	59	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Aug-15	60	495	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	61	480	470	8.0	172	#N/A	1.9	87	4.0	< 1	< 0.06	< 0.3	83	0.016	0.014	0.0037	0.19	< 0.000007	< 0.000007	0.0050	< 0.000003	22	< 0.00003	0.00020	0.00040
2-Sep-15	62	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	63	490	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Sep-15	64	480	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	65	470	460	8.1	167	#N/A	2.4	81	4.0				81	0.013	0.013	0.0043	0.18	< 0.000007	< 0.000007	0.0059	< 0.000003	22	< 0.00003	0.00015	0.00045
30-Sep-15	66	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	67	495	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14-Oct-15	68	485	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	69	475	455	8.1	155	#N/A	1.3	81	4.0				78	0.012	0.012	0.0031	0.17	< 0.000007	< 0.000007	0.0043	0.0000050	20	< 0.00003	0.00016	0.00080
28-Oct-15	70	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	71	495	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Nov-15	72	485	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	73	470	450	8.1	172	#N/A	1.2	97	4.0				79	0.011	0.011	0.0032	0.20	< 0.000007	< 0.000007	0.0024	< 0.000003	21	0.000030	0.00018	0.0011
25-Nov-15	74	500	500	8.1	92	#N/A	0.80	52	2.0				46	0.059	0.0066	0.0041	0.092	< 0.000007	< 0.000007	0.0027	0.0000090	13	0.00011	0.00011	0.00058
2-Dec-15	75	500	490	8.0	85	#N/A	1.6	44	2.0				41	0.056	0.0058	0.0041	0.087	< 0.000007	< 0.000007	0.0024	< 0.000003	11	0.000060	0.000067	0.00044
9-Dec-15	76	500	500	8.1	76	#N/A	2.5	40	2.0				35	0.045	0.0049	0.0039	0.079	0.000031	0.000031	0.0053	0.000017	9.8	0.000060	0.000059	0.00027
16-Dec-15	77	500	495	8.0	76	#N/A	2.0	38	2.0				40	0.048	0.0053	0.0043	0.089	0.000013	< 0.000007	0.0023	0.0000050	11	0.000070	0.000064	0.00037
23-Dec-15	78	500	485	8.2	65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	79	500	495	7.9	70	#N/A	1.3	34	3.0				34	0.035	0.0039	0.0027	0.069	< 0.000007	< 0.000007	0.0020	< 0.000003	9.2	0.000070	0.000036	0.00020
6-Jan-16	80	500	490	7.8	67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	81	500	490	7.8	75	#N/A	1.5	36	2.0				35	0.033	0.0042	0.0029	0.073	< 0.000007	< 0.000007	0.0020	< 0.000003	9.5	< 0.00003	0.000025	0.00034
20-Jan-16	82	500	490	8.0	77	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	83	500	495	7.9	78	#N/A	2.7	38	2.0				37	0.036	0.0044	0.0028	0.087	< 0.000007	< 0.000007	< 0.002	0.0000050	10	< 0.00003	0.000054	0.00031
3-Feb-16	84	500	490	8.0	85	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	85	500	500	7.9	78	#N/A	2.2	39	2.0				36	0.031	0.0040	0.0028	0.086	< 0.000007	< 0.000007	< 0.002	< 0.000003	10.0	< 0.00003	0.000046	0.00014
17-Feb-16	86	500	490	7.8	66	-	-	-	< 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	87	500	500	7.8	74	#N/A	2.1	35	< 2				35	0.037	0.0036	0.0024	0.079	< 0.000007	< 0.000007	< 0.002	< 0.000003	9.5	< 0.00003	0.000039	0.00013

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for HC2 (SS)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
25-Jun-14	0	500	330	8.0	0.0080	0.000020	0.010	16	0.0097	< 0.01	0.0068	0.014	0.020	21	0.0012	2.2	0.0000090	34	1.1	37	0.000044	0.00011	0.00022	0.023	0.0024	0.0040	< 0.002
2-Jul-14	1	500	485	8.0	< 0.002	< 0.00001	0.0057	11	0.010	< 0.01	0.0040	0.0084	< 0.009	12	0.00049	1.7	< 0.000002	12	1.1	17	0.000019	0.00034	0.000060	0.024	0.0014	< 0.001	< 0.002
9-Jul-14	2	500	490	8.0	< 0.002	< 0.00001	0.0049	8.9	0.0091	< 0.01	0.0024	0.0041	< 0.009	9.9	0.00011	1.8	< 0.000002	7.4	1.0	9.6	0.000014	0.00018	0.000090	0.018	0.0013	0.0010	< 0.002
16-Jul-14	3	500	480	8.0	0.0080	< 0.00001	0.0038	7.8	0.0072	< 0.01	0.0022	0.0025	< 0.009	7.7	0.000050	1.5	0.0000040	3.5	1.00	5.3	0.000018	0.000050	0.000090	0.015	0.0010	< 0.001	< 0.002
23-Jul-14	4	500	500	8.0	0.0050	0.000040	0.0022	5.6	0.010	< 0.01	0.00087	0.0011	< 0.009	4.8	0.000080	1.0	0.0000020	1.5	0.74	3.5	0.0000080	0.00024	0.00036	0.0097	0.00071	< 0.001	< 0.002
30-Jul-14	5	500	485	8.1	0.0020	< 0.00001	0.0039	7.9	0.0089	< 0.01	0.0016	0.0019	0.0090	7.3	0.000060	1.5	< 0.000002	1.8	1.1	4.3	0.000016	< 0.00001	0.00021	0.013	0.00099	< 0.001	< 0.002
6-Aug-14	6	500	480	8.0	< 0.002	< 0.00001	0.0030	7.2	0.0078	< 0.01	0.00053	0.0010	< 0.009	6.9	< 0.00004	1.5	< 0.000002	1.0	1.0	3.3	0.000010	0.000030	0.000060	0.012	0.0012	< 0.001	< 0.002
13-Aug-14	7	500	490	8.0	< 0.002	< 0.00001	0.0024	6.3	0.0092	< 0.01	0.00059	0.0010	< 0.009	5.4	0.000040	1.2	< 0.000002	0.68	0.87	2.8	0.0000070	0.00021	0.000060	0.010	0.00057	< 0.001	< 0.002
20-Aug-14	8	500	490	8.0	< 0.002	< 0.00001	0.0017	5.1	0.011	< 0.01	0.00041	0.00070	< 0.009	3.9	0.000050	0.90	< 0.000002	0.42	0.75	2.2	0.0000060	0.00013	0.000090	0.0093	0.00064	0.0010	< 0.002
27-Aug-14	9	500	495	8.0	< 0.002	< 0.00001	0.0022	6.1	0.011	< 0.01	0.00046	0.0010	0.010	5.0	0.000060	1.2	< 0.000002	0.47	0.90	2.6	0.000010	0.00011	< 0.00005	0.011	0.00071	< 0.001	< 0.002
3-Sep-14	10	500	490	7.9	< 0.007	0.000010	0.0019	5.8	0.012	< 0.01	0.00034	0.00090	0.0060	4.8	0.00020	1.3	0.000017	0.39	1.0	3.7	0.000012	0.000020	< 0.00005	0.012	0.00079	< 0.001	< 0.002
10-Sep-14	11	500	500	8.0	< 0.007	0.000010	0.0015	4.5	0.011	< 0.01	0.00027	0.00070	< 0.003	3.6	0.000060	1.0	< 0.000002	0.28	0.85	2.3	0.000012	0.00015	0.00011	0.0096	0.00061	< 0.001	< 0.002
17-Sep-14	12	500	495	7.9	< 0.007	0.000020	0.0015	4.9	0.010	< 0.01	0.00028	0.00080	< 0.003	3.7	0.00014	0.89	< 0.000002	0.27	0.94	3.1	< 0.000005	0.000040	0.00019	0.010	0.00055	< 0.001	< 0.002
24-Sep-14	13	500	480	8.0	< 0.002	0.000020	0.0013	4.3	0.010	< 0.01	0.00032	0.00020	< 0.009	2.9	< 0.00004	0.73	0.0000040	0.27	0.66	2.1	< 0.000005	0.000020	< 0.00005	0.0088	0.00044	< 0.001	< 0.002
1-Oct-14	14	500	470	7.9	0.026	< 0.00001	0.0012	4.4	0.015	< 0.01	0.0010	< 0.0001	< 0.009	3.0	< 0.00004	0.80	< 0.000002	0.19	0.70	2.6	< 0.000005	0.000070	0.00034	0.0088	0.00046	< 0.002	< 0.002
8-Oct-14	15	500	490	7.9	< 0.007	0.000040	0.0011	3.5	0.010	< 0.01	0.00045	0.00050	< 0.003	2.4	< 0.00004	0.60	< 0.000002	0.16	0.65	2.5	0.0000080	0.000080	< 0.00005	0.0078	0.00045	< 0.001	< 0.002
15-Oct-14	16	500	495	7.9	< 0.007	0.000010	0.0015	4.5	0.012	< 0.01	0.00032	0.00070	< 0.003	3.2	0.000050	0.82	< 0.000002	0.22	0.84	2.8	0.0000090	0.00010	< 0.00005	0.0094	0.00046	< 0.001	< 0.002
22-Oct-14	17	500	505	8.0	< 0.007	0.000050	0.0012	4.3	0.012	< 0.01	0.00030	0.00080	< 0.003	3.3	0.000050	0.79	< 0.000002	0.21	0.78	2.5	0.000010	0.000040	0.00026	0.0092	0.00045	< 0.001	< 0.002
29-Oct-14	18	500	490	7.9	< 0.007	0.000010	0.00092	3.3	0.010	< 0.01	0.00024	0.00050	< 0.003	2.0	< 0.00004	0.55	< 0.000002	0.14	0.60	1.7	0.000010	0.000090	0.000090	0.0064	0.00030	< 0.001	< 0.002
5-Nov-14	19	500	485	7.7	< 0.007	0.000040	0.00089	3.5	0.0099	< 0.01	0.00042	0.00040	< 0.003	2.1	< 0.00004	0.61	< 0.000002	0.16	0.63	1.8	0.000023	0.000040	0.00019	0.0069	0.00039	< 0.001	< 0.002
12-Nov-14	20	500	495	7.6	< 0.007	0.000020	0.00096	3.7	0.012	< 0.01	0.00069	0.00060	< 0.003	2.3	0.000040	0.65	< 0.000002	0.19	0.70	1.8	0.0000080	0.00014	0.00020	0.0074	0.00044	< 0.001	< 0.002
19-Nov-14	21	500	475	7.6	< 0.007	0.000030	0.0010	3.7	0.012	< 0.01	0.00082	0.00060	< 0.003	2.3	0.000060	0.64	< 0.000002	0.16	0.72	1.7	0.000032	0.00019	< 0.00005	0.0071	0.00042	0.0020	< 0.002
26-Nov-14	22	500	500	7.9	< 0.007	< 0.00001	0.00092	3.3	0.010	< 0.01	0.00034	0.00040	0.0080	2.0	< 0.00004	0.57	< 0.000002	0.13	0.59	1.4	0.0000080	0.000050	0.00017	0.0066	0.00039	0.0020	< 0.002
3-Dec-14	23	500	495	7.8	< 0.007	0.000020	0.00078	2.9	0.011	< 0.01	0.00025	0.00040	< 0.003	1.6	0.000050	0.47	< 0.000002	0.12	0.50	1.3	0.0000070	0.000050	0.000080	0.0062	0.00042	< 0.001	< 0.002
10-Dec-14	24	500	495	7.9	< 0.007	< 0.00001	0.00077	2.8	0.011	< 0.01	0.00029	0.00030	< 0.003	1.7	< 0.00004	0.46	< 0.000002	0.12	0.56	1.4	0.0000070	0.00010	0.000060	0.0057	0.00034	< 0.001	< 0.002
17-Dec-14	25	500	500	8.0	0.0070	0.000020	0.0012	3.7	0.014	< 0.01	0.00023	0.00060	< 0.003	2.5	< 0.00004	0.74	< 0.000002	0.13	0.74	1.5	0.0000070	0.00017	0.00067	0.0075	0.00046	< 0.001	< 0.002
24-Dec-14	26	500	495	7.9	< 0.007	0.000010	0.0010	3.5	0.013	< 0.01	0.00013	0.00050	< 0.003	2.0	< 0.00004	0.59	< 0.000002	0.14	0.68	1.5	0.0000070	0.000030	< 0.00005	0.0071	0.00043	< 0.001	< 0.002
31-Dec-14	27	500	495	7.9	< 0.007	< 0.00001	0.00097	3.5	0.012	< 0.01	0.00026	0.00050	< 0.003	2.1	< 0.00004	0.68	< 0.000002	0.13	0.69	1.5	0.0000090	0.000050	0.00016	0.0073	0.00038	< 0.001	< 0.002
7-Jan-15	28	500	500	7.8	< 0.007	0.000030	0.00067	2.5	0.011	< 0.01	0.00025	0.00040	< 0.003	1.4	< 0.00004	0.39	< 0.000002	0.090	0.51	0.80	0.000026	0.000040	0.00012	0.0051	0.00032	< 0.001	< 0.002
14-Jan-15	29	500	480	7.8	< 0.007	0.000010	0.00059	2.6	0.011	< 0.01	0.00086	0.00040	< 0.003	1.4	0.000070	0.42	< 0.000002	0.090	0.52	0.80	0.000017	0.000060	0.000070	0.0046	0.00028	< 0.001	< 0.002
21-Jan-15	30	500	485	8.0	< 0.007	0.000040	0.00080	2.9	0.012	< 0.01	0.00031	0.00040	< 0.003	1.7	0.000040	0.48	< 0.000002	0.11	0.57	0.90	0.0000050	0.000040	0.000090	0.0059	0.00043	< 0.001	< 0.002
28-Jan-15	31	500	495	7.9	< 0.007	< 0.00001	0.00063	3.2	0.012	< 0.01	0.0011	0.00040	< 0.003	1.8	0.000090	0.53	< 0.000002	0.11	0.49	1.5	0.000028	0.000080	0.00011	0.0054	0.00032	< 0.001	< 0.002
4-Feb-15	32	500	495	7.9	< 0.007	0.000020	0.00077	2.8	0.010	< 0.01	0.00039	0.00040	< 0.003	1.6	< 0.00004	0.47	< 0.000002	0.10	0.57	1.2	0.0000050	0.00014	0.000080	0.0048	0.00032	< 0.001	< 0.002
11-Feb-15	33	500	490	7.9	< 0.007	0.000030	0.00076	3.0	0.012	< 0.01	0.00053	0.00040	< 0.003	1.7	< 0.001	0.47	< 0.000002	0.10	0.59	1.0	0.000028	0.00042	0.000070	0.0054	0.00035	< 0.001	< 0.002
18-Feb-15	34	500	485	7.9	< 0.007	< 0.00001	0.00078	2.6	0.011	< 0.01	0.00016	0.00040	< 0.003	1.5	< 0.001	0.44	0.0000020	0.090	0.59	1.0	0.0000060	0.000050	0.000060	0.0051	0.00033	< 0.001	< 0.002
25-Feb-15	35	500	480	7.9	< 0.007	0.00048	0.00077	3.0	0.012	< 0.01	0.00018	0.00050	< 0.003	2.0	< 0.001	0.53	< 0.000002	0.10	0.63	0.90	0.000010	0.00017	< 0.00005	0.0057	0.00028	< 0.001	< 0.002
4-Mar-15	36	500	490	7.8	< 0.007	0.000010	0.00071	2.4	0.011	< 0.01	0.000080	0.00050	< 0.003	1.4	< 0.001	0.48	< 0.000002	0.080	0.48	1.2	< 0.000005	0.000060	0.00010	0.0051	0.00029	< 0.001	< 0.002
11-Mar-15	37	500	490	7.9	< 0.007	0.000060	0.00074	2.7	0.012	< 0.01	0.00014	0.00040	< 0.003	1.5	< 0.001	0.40	< 0.000002	0.080	0.55	0.20	< 0.000005	0.00011	< 0.00005	0.0048	0.00030	< 0.001	< 0.002
18-Mar-15	38	500	490	7.9	< 0.007	0.000010	0.00067	2.4	0.012	< 0.01	0.00011	0.00040	< 0.003	1.5	< 0.001	0.38	< 0.000002	0.070	0.54	0.90	< 0.000005	0.000070	0.000060	0.0046	0.00024	< 0.001	< 0.002
25-Mar-15	39	500	485	7.8	< 0.007	< 0.00001	0.00072	3.0	0.013	< 0.01	0.00035	0.00060	< 0.003	1.6	< 0.001	0.45	< 0.000002	0.16	0.58	1.0	< 0.000005	0.00054	0.000090	0.0062	0.00034	< 0.001	< 0.002
1-Apr-15	40	500	490	7.8	< 0.007	0.000040	0.00048	2.1	0.019	< 0.01	0.000080	0.00040	< 0.003	1.2	< 0.001	0.24	< 0.000002	0.72	0.47	0.30	< 0.000005	0.00015	0.000080	0.0053	0.00020	< 0.001	< 0.002
8-Apr-15	41	500	485	7.8	< 0.007	< 0.00001	0.00076	2.8	0.012	< 0.01	0.00026	0.00050	< 0.003	1.8	< 0.001	0.54	< 0.000002	0.080	0.62	0.60	< 0.000005	0.00030	0.00011	0.0052	0.00031	< 0.001	< 0.002
15-Apr-15	42	500	495	7.8	< 0.007	< 0.00001	0.00063	2.5	0.011	< 0.01	0.00026	0.00040	< 0.003	1.4	< 0.001	0.39	0.0000020	0.090	0.53	0.80	< 0.000005	0.00026	< 0.00005	0.0044	0.00026	< 0.001	< 0.002
22-Apr-15	43	500	485	7.8	< 0.007	0.000030	0.00044	1.7	0.011	< 0.01	0.00012	0.00030	< 0.003	0.93	< 0.001	0.29	0.0000040	0.050	0.37	0.40	0.0000090	0.00032	0.000070	0.0029	0.00020	< 0.001	< 0.002
29-Apr-15	44	500	490	7.9	< 0.007	0.00013	0.00083	3.0	0.015	< 0.01	0.00021	0.00040	< 0.003	1.9	< 0.001	0.48	< 0.000002	0.10	0.60	1.3	< 0.000005	0.000080	0.000090	0.0060	0.00032	< 0.001	< 0.002
6-May-15	45	500	495	7.9	< 0.007	0.000020	0.00074	2.7	0.013	< 0.01	0.00010	0.00040	< 0.003	1.6	< 0.001	0.47	0.0000020	0.080	0.53	0.80	< 0.000005	0.00063	0.000050	0.0051	0.00030	0.0030	< 0.002
13-May-15	46	500	505	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-May-15	47	505	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-May-15	48	480	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	49	480	490	8.1	< 0.007	< 0.00001	0.0017	7.1	0.032	< 0.01	0.00034	0.0017	< 0.003	3.6	< 0.00004	1.2	< 0.000002	0.18	1.5	2.6	0.0000050	0.000090	0.000080	0.012	0.00025	< 0.001	< 0.002
10-Jun-15	50	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-15	51	490	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Jun-15	52	485	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	53	480	480	8.0	< 0.007	< 0.00001	0.0016	7.0	0.031	0.010	0.00028	0.0019	< 0.003	3.0	0.000090	1.1	< 0.000002	0.22	1.5	2.2	0.000011	0.00020	< 0.00005	0.013	0.00024	0.0010	< 0.002
8-Jul-15	54	500	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-Jul-15	55	485	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jul-15	56	480	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	57	480	470	8.1	< 0.007	0.000020	0.0016	7.1	0.032	< 0.01	0.00044	0.0017	< 0.003	3.0	< 0.00004	0.99	< 0.000002	0.20	1.5	2.1	< 0.000005	0.000050	0.00013	0.011	0.00025	0.0010	< 0.002
5-Aug-15	58	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	59	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Aug-15	60	495	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	61	480	470	8.0	< 0.007	0.00013	0.0015	7.2	0.038	0.010	0.00077	0.0019	< 0.003	3.1	0.000050	1.0	0.0000020	0.19	1.5	2.6	0.0000080	0.00012	< 0.00005	0.011	0.00027	0.0020	< 0.002
2-Sep-15	62	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	63	490	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Sep-15	64	480	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	65	470	460	8.1	< 0.007	< 0.00001	0.0014	6.6	0.028	< 0.01	0.0011	0.0017	< 0.003	2.9	0.000060	1.0	< 0.000002	0.26	1.3	2.1	0.0000080	0.000030	< 0.00005	0.010	0.00022	< 0.001	< 0.002
30-Sep-15	66	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	67	495	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14-Oct-15	68	485	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	69	475	455	8.1	< 0.007	0.000050	0.0013	6.6	0.030	< 0.01	0.00024	0.0016	< 0.003	2.9	0.00020	0.89	0.000040	0.27	1.2	2.0	0.000011	0.00016	0.000050	0.0096	0.00018	< 0.001	< 0.002
28-Oct-15	70	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	71	495	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Nov-15	72	485	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	73	470	450	8.1	0.040	0.000040	0.0012	6.7	0.030	< 0.01	0.0015	0.0015	< 0.003	2.9	0.00011	0.91	0.0000030	0.19	1.3	1.2	0.000029	0.00013	0.00013	0.011	0.00017	0.0020	< 0.002
25-Nov-15	74	500	500	8.1	0.0070	0.000090	0.00092	3.5	0.017	< 0.01	0.00037	0.00060	0.0070	2.1	0.00050	0.56	0.00028	0.12	0.71	1.0	0.000013	< 0.00001	0.00047	0.0059	0.00030	< 0.001	< 0.002
2-Dec-15	75	500	490	8.0	0.0090	0.000080	0.00082	3.5	0.015	< 0.01	0.00039	0.00060	< 0.003	1.9	0.000040	0.57	< 0.000002	0.11	0.63	0.90	< 0.000005	0.000080	0.00049	0.0056	0.00029	< 0.001	< 0.002
9-Dec-15	76	500	500	8.1	< 0.007	0.000030	0.00073	2.7	0.013	< 0.01	0.00033	0.00050	0.0080	1.6	0.000090	0.43	0.000017	0.090	0.56	0.80	0.000035	0.00014	0.00017	0.0050	0.00028	< 0.001	< 0.002
16-Dec-15	77	500	495	8.0	< 0.007	0.00017	0.00079	3.2	0.016	< 0.01	0.00018	0.00050	0.0040	1.9	< 0.00004	0.50	0.0000040	0.10	0.61	0.80	0.0000070	0.00016	< 0.00005	0.0054	0.00028	< 0.001	< 0.002
23-Dec-15	78	500	485	8.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	79	500	495	7.9	< 0.007	< 0.00001	0.00065	2.6	0.013	0.010	0.00014	0.00040	< 0.003	1.4	< 0.00004	0.35	0.0000030	0.12	0.52	1.1	< 0.000005	< 0.00001	0.00015	0.0041	0.00020	< 0.001	< 0.002
6-Jan-16	80	500	490	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	81	500	490	7.8	< 0.007	< 0.00001	0.00061	2.7	0.013	< 0.01	0.00044	0.00040	< 0.003	1.5	0.00015	0.40	0.0000020	0.060	0.50	0.40	< 0.000005	0.000060	0.00025	0.0041	0.00019	< 0.001	< 0.002
20-Jan-16	82	500	490	8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	83	500	495	7.9	< 0.007	< 0.00001	0.00066	2.8	0.015	< 0.01	0.000070	0.00050	< 0.003	1.6	< 0.00004	0.43	< 0.000002	0.070	0.55	0.40	< 0.000005	0.00011	0.00014	0.0049	0.00019	0.0010	< 0.002
3-Feb-16	84	500	490	8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	85	500	500	7.9	< 0.007	< 0.00001	0.00064	2.6	0.015	< 0.01	0.000090	0.00040	< 0.003	1.4	0.000090	0.37	< 0.000002	0.090	0.54	1.3	< 0.000005	0.000030	< 0.00005	0.0040	0.00017	< 0.001	< 0.002
17-Feb-16	86	500	490	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	87	500	500	7.8	< 0.007	< 0.00001	0.00064	2.8	0.014	< 0.01	0.00011	0.00040	< 0.003	1.5	< 0.00004	0.14	0.0000030	0.040	0.52	0.80	< 0.000005	0.000020	< 0.00005	0.0037	0.00018	< 0.001	< 0.002

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Calculated Loading Rates for HC2 (SS)																									
Date	**Cycle**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**	**Cu**
	No.	Input	Output		umhos/cm	$mgCaCO_3$/kg/wk	$mgCaCO_3$/kg/wk	$mgCaCO_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
25-Jun-14	0	500	330	8.0	464	#N/A	2.2	29	33	1.1	0.19	0.099	42	0.013	0.011	0.021	0.011	0.0000026	0.0000023	0.0062	0.0000030	7.9	0.000069	0.00014	0.0020
2-Jul-14	1	500	485	8.0	255	#N/A	4.0	36	24	0.39	0.14	0.15	40	0.017	0.013	0.031	0.021	0.0000034	0.0000034	0.0058	0.0000015	7.8	0.000019	0.00015	0.00080
9-Jul-14	2	500	490	8.0	220	#N/A	1.2	37	13	0.098	0.14	0.15	35	0.021	0.015	0.023	0.033	0.0000034	0.0000034	0.0061	0.0000015	7.0	0.000015	0.000064	0.00045
16-Jul-14	3	500	480	8.0	177	#N/A	1.1	33	5.8	0.096	0.096	0.14	31	0.020	0.012	0.017	0.030	0.0000034	0.0000034	0.0041	0.0000014	6.2	0.000091	0.00022	0.00035
23-Jul-14	4	500	500	8.0	118	#N/A	1.1	25	3.5	0.10	0.050	0.15	25	0.035	0.0076	0.013	0.040	0.0000035	0.0000035	0.0030	0.0000015	5.5	0.000015	0.000082	0.00051
30-Jul-14	5	500	485	8.1	160	#N/A	0.90	37	4.4	0.097	0.087	0.15	32	0.025	0.012	0.016	0.036	0.0000034	0.0000034	0.0038	0.0000015	6.4	0.000097	0.000097	0.00071
6-Aug-14	6	500	480	8.0	142	#N/A	1.3	31	2.4	0.096	0.072	0.14	29	0.024	0.010	0.014	0.033	0.0000034	0.0000034	0.0034	0.0000014	5.8	0.000014	0.000042	0.00017
13-Aug-14	7	500	490	8.0	125	#N/A	1.2	28	3.4	0.098	0.054	0.15	27	0.022	0.0088	0.0100	0.040	0.0000034	0.0000034	0.0029	0.0000015	5.7	0.000025	0.000041	0.00017
20-Aug-14	8	500	490	8.0	103	#N/A	0.94	24	2.9	0.098	0.034	0.15	23	0.028	0.0057	0.0078	0.036	0.0000034	0.0000034	0.0023	0.0000015	5.2	0.000015	0.000041	0.00019
27-Aug-14	9	500	495	8.0	130	#N/A	2.2	29	2.5	0.099	0.050	0.15	28	0.022	0.0084	0.0099	0.040	0.0000035	0.0000035	0.0050	0.0000015	6.0	0.000015	0.000034	0.00013
3-Sep-14	10	500	490	7.9	121	#N/A	2.3	26	3.4	0.098	0.034	0.15	33	0.029	0.0088	0.011	0.048	0.0000034	0.0000034	0.0025	0.0000015	8.6	0.000015	0.000032	0.00016
10-Sep-14	11	500	500	8.0	111	#N/A	1.7	25	2.5	0.10	0.030	0.15	27	0.029	0.0072	0.0077	0.041	0.0000035	0.0000035	0.0031	0.000011	7.1	0.000015	0.000025	0.00015
17-Sep-14	12	500	495	7.9	112	#N/A	4.1	26	3.0	0.099	0.030	0.15	23	0.028	0.0077	0.0070	0.038	0.0000035	0.0000035	0.0023	0.0000015	5.3	0.000020	0.000029	0.00020
24-Sep-14	13	500	480	8.0	95	#N/A	1.8	21	3.8	0.096	0.029	0.14	20	0.023	0.0072	0.0049	0.033	0.0000034	0.0000034	0.0017	0.0000029	4.6	0.000014	0.000068	0.000086
1-Oct-14	14	500	470	7.9	96	#N/A	3.1	23	2.8	0.094	0.028	0.14	20	0.024	0.0093	0.0046	0.029	0.0000033	0.0000033	0.0013	0.0000014	4.6	0.000014	0.00	0.0000094
8-Oct-14	15	500	490	7.9	90	#N/A	1.5	18	2.0	0.098	0.029	0.15	23	0.024	0.0059	0.0049	0.029	0.0000034	0.0000034	0.0076	0.0000015	6.3	0.000015	0.000020	0.000093
15-Oct-14	16	500	495	7.9	110	#N/A	2.7	21	3.5	0.099	0.030	0.15	28	0.025	0.0081	0.0060	0.038	0.0000035	0.0000035	0.0025	0.0000015	7.7	0.000015	0.000027	0.00013
22-Oct-14	17	500	505	8.0	102	#N/A	2.5	23	2.5	0.10	0.030	0.15	22	0.025	0.0079	0.0060	0.036	0.0000035	0.0000035	0.0055	0.0000025	5.3	0.000076	0.000029	0.00019
29-Oct-14	18	500	490	7.9	84	#N/A	4.1	19	1.5	0.098	0.029	0.15	18	0.018	0.0054	0.0039	0.026	0.0000034	0.0000034	0.0037	0.0000015	4.5	0.000020	0.000020	0.00018
5-Nov-14	19	500	485	7.7	85	#N/A	#N/A	23	1.5	0.097	0.029	0.15	18	0.025	0.0055	0.0045	0.030	0.0000034	0.0000034	0.0017	0.0000092	4.3	0.000015	0.000022	0.00025
12-Nov-14	20	500	495	7.6	89	#N/A	3.3	17	0.99	0.099	0.030	0.15	20	0.029	0.0061	0.0054	0.033	0.0000035	0.0000035	0.0024	0.0000015	5.0	0.000025	0.000027	0.00021
19-Nov-14	21	500	475	7.6	93	#N/A	3.1	16	0.95	0.095	0.029	0.14	19	0.025	0.0060	0.0048	0.033	0.0000033	0.0000033	0.0013	0.0000062	4.6	0.000014	0.000025	0.00027
26-Nov-14	22	500	500	7.9	78	#N/A	0.91	18	1.0	0.10	0.030	0.15	17	0.025	0.0051	0.0045	0.030	0.0000035	0.0000035	0.0011	0.0000015	4.2	0.000015	0.000021	0.000070
3-Dec-14	23	500	495	7.8	71	#N/A	1.5	17	0.99	0.099	0.030	0.15	18	0.023	0.0044	0.0044	0.030	0.0000035	0.0000035	0.0016	0.0000015	4.7	0.000015	0.000017	0.00011
10-Dec-14	24	500	495	7.9	71	#N/A	2.5	18	0.99	0.099	0.030	0.15	17	0.025	0.0043	0.0039	0.030	0.0000035	0.0000035	0.0011	0.0000015	4.3	0.000015	0.000015	0.00017
17-Dec-14	25	500	500	8.0	91	#N/A	2.0	21	1.5	0.10	0.030	0.15	20	0.037	0.0060	0.0052	0.039	0.0000035	0.0000035	0.0012	0.0000015	5.1	0.000015	0.000038	0.00013
24-Dec-14	26	500	495	7.9	87	#N/A	1.6	21	0.99	0.099	0.030	0.15	19	0.028	0.0057	0.0046	0.039	0.0000035	0.0000035	0.00084	0.0000020	4.9	0.000015	0.000024	0.00012
31-Dec-14	27	500	495	7.9	88	#N/A	0.66	15	1.5	0.099	0.030	0.15	20	0.023	0.0058	0.0047	0.036	0.0000035	0.0000035	0.00079	0.0000015	5.2	0.000015	0.000020	0.000089
7-Jan-15	28	500	500	7.8	68	#N/A	1.3	17	1.0	0.50	0.030	0.15	16	0.020	0.0037	0.0030	0.028	0.0000035	0.0000035	0.0014	0.0000015	4.5	0.000015	0.000019	0.00014
14-Jan-15	29	500	480	7.8	68	#N/A	1.3	16	0.96	0.48	0.029	0.14	15	0.018	0.0039	0.0027	0.027	0.0000034	0.0000034	0.0013	0.0000034	4.1	0.000014	0.000017	0.000091
21-Jan-15	30	500	485	8.0	75	#N/A	2.1	20	0.97	0.49	0.029	0.15	16	0.025	0.0047	0.0037	0.031	0.0000034	0.0000034	0.00097	0.0000015	4.3	0.000015	0.000018	0.00015
28-Jan-15	31	500	495	7.9	76	#N/A	0.82	18	0.99	0.50	0.030	0.15	18	0.025	0.0041	0.0034	0.032	0.0000035	0.0000035	0.0016	0.000012	4.5	0.000015	0.000017	0.00010
4-Feb-15	32	500	495	7.9	72	#N/A	1.1	17	0.99	0.50	0.030	0.15	16	0.020	0.0039	0.0031	0.030	0.0000035	0.0000035	0.0013	0.0000020	4.0	0.00	0.000014	0.00016
11-Feb-15	33	500	490	7.9	76	#N/A	1.0	18	1.5	0.49	0.029	0.15	17	0.022	0.0046	0.0032	0.032	0.0000034	0.0000034	0.0014	0.0000034	4.2	0.000015	0.000019	0.000015
18-Feb-15	34	500	485	7.9	67	#N/A	1.0	17	0.97	0.49	0.029	0.15	16	0.021	0.0037	0.0028	0.028	0.0000034	0.0000034	0.0013	0.0000015	4.2	0.000015	0.000019	0.00017
25-Feb-15	35	500	480	7.9	80	#N/A	1.4	19	0.96	0.48	0.029	0.14	18	0.016	0.0041	0.0025	0.030	0.0000034	0.0000034	0.00043	0.0000024	4.7	0.000014	0.000022	0.00024
4-Mar-15	36	500	490	7.8	68	#N/A	0.98	17	0.98	0.49	0.029	0.15	16	0.017	0.0034	0.0023	0.027	0.0000034	0.0000034	0.00069	0.0000015	4.6	0.000029	0.000018	0.000093
11-Mar-15	37	500	490	7.9	73	#N/A	0.85	18	0.98	0.49	0.029	0.15	16	0.014	0.0036	0.0024	0.031	0.0000034	0.0000034	0.0012	0.0000015	4.4	0.000025	0.000018	0.00030
18-Mar-15	38	500	490	7.9	68	#N/A	1.2	18	0.98	0.49	0.029	0.15	16	0.014	0.0032	0.0019	0.027	0.0000034	0.0000034	0.00069	0.0000015	4.6	0.000015	0.000020	0.00015
25-Mar-15	39	500	485	7.8	73	#N/A	1.5	18	0.97	0.49	0.029	0.15	17	0.014	0.0044	0.0024	0.034	0.0000034	0.0000034	0.0019	0.0000019	4.3	0.000039	0.000022	0.00021
1-Apr-15	40	500	490	7.8	64	#N/A	1.8	18	0.98	0.49	0.029	0.15	12	0.014	0.0031	0.0017	0.030	0.0000064	0.0000034	0.00088	0.0000015	3.1	0.000015	0.000010	0.00043
8-Apr-15	41	500	485	7.8	78	#N/A	1.3	20	0.97	0.49	0.029	0.15	17	0.016	0.0052	0.0025	0.033	0.0000034	0.0000034	0.0011	0.0000015	4.6	0.000015	0.000026	0.00036
15-Apr-15	42	500	495	7.8	66	#N/A	1.9	18	0.99	0.50	0.030	0.15	15	0.014	0.0033	0.0021	0.027	0.0000035	0.0000035	0.0021	0.0000015	4.0	0.000015	0.0000059	0.00049
22-Apr-15	43	500	485	7.8	53	#N/A	1.7	15	1.5	0.49	0.029	0.15	12	0.013	0.0021	0.0016	0.023	0.0000034	0.0000034	0.0023	0.0000015	3.4	0.000029	0.000014	0.00040
29-Apr-15	44	500	490	7.9	80	#N/A	1.1	21	0.98	0.49	0.029	0.15	20	0.023	0.0040	0.0027	0.041	0.0000034	0.0000034	0.0015	0.0000015	5.5	0.000020	0.000026	0.00024
6-May-15	45	500	495	7.9	73	#N/A	1.4	20	0.99	0.50	0.030	0.15	17	0.020	0.0037	0.0033	0.033	0.0000035	0.0000035	0.00074	0.0000015	4.5	0.000015	0.000024	0.00020
13-May-15	46	500	505																						
20-May-15	47	505	480																						
27-May-15	48	480	480																						
3-Jun-15	49	480	490	8.1	181	#N/A	0.49	11	0.61	0.12	0.0074	0.037	11	0.0017	0.0021	0.00058	0.025	0.00000086	0.00000086	0.00051	0.00000037	2.9	0.0000037	0.000018	0.000085
10-Jun-15	50	500	490																						
17-Jun-15	51	490	485																						
24-Jun-15	52	485	480																						
1-Jul-15	53	480	480	8.0	192	#N/A	0.54	11	0.48	0.12	0.0072	0.036	9.9	0.0015	0.0021	0.00061	0.022	0.00000084	0.00000084	0.00080	0.00000036	2.6	0.0000036	0.000021	0.000038
8-Jul-15	54	500	485																						
15-Jul-15	55	485	480																						
22-Jul-15	56	480	480																						
29-Jul-15	57	480	470	8.1	176	#N/A	0.31	10	0.47	0.12	0.0071	0.035	9.8	0.0018	0.0016	0.00053	0.019	0.0000011	0.00000082	0.00066	0.00000082	2.5	0.0000035	0.000019	0.000041
5-Aug-15	58	500	500																						
12-Aug-15	59	500	495																						
19-Aug-15	60	495	480																						
26-Aug-15	61	480	470	8.0	172	#N/A	0.23	10	0.47	0.12	0.0071	0.035	9.8	0.0019	0.0016	0.00043	0.022	0.00000082	0.00000082	0.00059	0.00000035	2.5	0.0000035	0.000023	0.000047
2-Sep-15	62	500	490																						
9-Sep-15	63	490	480																						
16-Sep-15	64	480	470																						
23-Sep-15	65	470	460	8.1	167	#N/A	0.27	9.3	0.46				9.3	0.0014	0.0015	0.00049	0.020	0.00000081	0.00000081	0.00068	0.00000035	2.5	0.0000035	0.000018	0.000052
30-Sep-15	66	500	495																						
7-Oct-15	67	495	485																						
14-Oct-15	68	485	475																						
21-Oct-15	69	475	455	8.1	155	#N/A	0.15	9.2	0.46				8.9	0.0014	0.0014	0.00035	0.019	0.00000080	0.00000080	0.00049	0.00000057	2.3	0.0000034	0.000018	0.000091
28-Oct-15	70	500	495																						
4-Nov-15	71	495	485																						
11-Nov-15	72	485	470																						
18-Nov-15	73	470	450	8.1	172	#N/A	0.14	11	0.45				8.9	0.0012	0.0012	0.00036	0.023	0.00000079	0.00000079	0.00027	0.00000034	2.3	0.0000034	0.000020	0.00012
25-Nov-15	74	500	500	8.1	92	#N/A	0.41	26	1.0				23	0.030	0.0033	0.0021	0.046	0.0000035	0.0000035	0.0014	0.0000045	6.4	0.000055	0.000055	0.00029
2-Dec-15	75	500	490	8.0	85	#N/A	0.78	21	0.98				20	0.028	0.0028	0.0020	0.042	0.0000034	0.0000034	0.0012	0.0000015	5.3	0.000029	0.000033	0.00022
9-Dec-15	76	500	500	8.1	76	#N/A	1.2	20	1.0				18	0.022	0.0025	0.0020	0.039	0.000016	0.000016	0.0027	0.0000085	4.9	0.000030	0.000030	0.00014
16-Dec-15	77	500	495	8.0	76	#N/A	0.97	19	0.99				20	0.024	0.0026	0.0021	0.044	0.0000064	0.0000035	0.0011	0.0000025	5.4	0.000035	0.000032	0.00018
23-Dec-15	78	500	485	8.2	65	#N/A	0.79	18	1.2				18	0.021	0.0023	0.0017	0.039	0.0000050	0.0000035	0.0011	0.0000020	5.0	0.000035	0.000025	0.00014
30-Dec-15	79	500	495	7.9	70	#N/A	0.62	17	1.5				17	0.018	0.0019	0.0013	0.034	0.0000035	0.0000035	0.00099	0.0000015	4.6	0.000035	0.000018	0.000099
6-Jan-16	80	500	490	7.8	67	#N/A	0.68	17	1.2				17	0.017	0.0020	0.0014	0.035	0.0000034	0.0000034	0.00099	0.0000015	4.6	0.000025	0.000015	0.00013
13-Jan-16	81	500	490	7.8	75	#N/A	0.74	17	0.98				17	0.016	0.0021	0.0014	0.036	0.0000034	0.0000034	0.00098	0.0000015	4.7	0.000015	0.000012	0.00017
20-Jan-16	82	500	490	8.0	77	#N/A	1.0	18	0.99				18	0.017	0.0021	0.0014	0.039	0.0000034	0.0000034	0.00099	0.0000020	4.8	0.000015	0.000019	0.00016
27-Jan-16	83	500	495	7.9	78	#N/A	1.3	19	0.99				18	0.018	0.0022	0.0014	0.043	0.0000035	0.0000035	0.00099	0.0000025	5.0	0.000015	0.000027	0.00015
3-Feb-16	84	500	490	8.0	85	#N/A	1.2	19	1.00				18	0.017	0.0021	0.0014	0.043	0.0000035	0.0000035	0.00100	0.0000020	5.0	0.000015	0.000025	0.00011
10-Feb-16	85	500	500	7.9	78	#N/A	1.1	19	1.0				18	0.016	0.0020	0.0014	0.043	0.0000035	0.0000035	0.0010	0.0000015	5.0	0.000015	0.000023	0.000070
17-Feb-16	86	500	490	7.8	66	#N/A	1.1	19	0.98				18	0.017	0.0019	0.0013	0.041	0.0000035	0.0000035	0.0010	0.0000015	4.9	0.000015	0.000021	0.000068
24-Feb-16	87	500	500	7.8	74	#N/A	1.1	18	1.0				18	0.018	0.0018	0.0012	0.040	0.0000035	0.0000035	0.0010	0.0000015	4.8	0.000015	0.000020	0.000065

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Calculated Loading Rates for HC2 (SS)

Date	**Cycle**	**Volume** (mL)		**pH**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.	Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
25-Jun-14	0	500	330	8.0	0.0026	0.0000066	0.0034	5.3	0.0032	0.0033	0.0022	0.0046	0.0066	7.0	0.00040	0.72	0.0000030	11	0.35	12	0.000015	0.000036	0.000073	0.0075	0.00078	0.0013	0.00066
2-Jul-14	1	500	485	8.0	0.00097	0.0000049	0.0028	5.1	0.0049	0.0049	0.0019	0.0041	0.0044	5.6	0.00024	0.82	0.00000097	6.0	0.51	8.4	0.0000092	0.00016	0.000029	0.012	0.00070	0.00049	0.00097
9-Jul-14	2	500	490	8.0	0.00098	0.0000049	0.0024	4.4	0.0045	0.0049	0.0012	0.0020	0.0044	4.9	0.000054	0.90	0.00000098	3.6	0.51	4.7	0.0000069	0.000088	0.000044	0.0087	0.00064	0.00049	0.00098
16-Jul-14	3	500	480	8.0	0.0038	0.0000048	0.0018	3.8	0.0035	0.0048	0.0011	0.0012	0.0043	3.7	0.000024	0.70	0.0000019	1.7	0.48	2.5	0.0000086	0.000024	0.000043	0.0074	0.00050	0.00048	0.00096
23-Jul-14	4	500	500	8.0	0.0025	0.000020	0.0011	2.8	0.0052	0.0050	0.00044	0.00055	0.0045	2.4	0.000040	0.51	0.0000010	0.74	0.37	1.7	0.0000040	0.00012	0.00018	0.0049	0.00036	0.00050	0.0010
30-Jul-14	5	500	485	8.1	0.00097	0.0000049	0.0019	3.8	0.0043	0.0049	0.00078	0.00092	0.0044	3.6	0.000029	0.74	0.00000097	0.86	0.52	2.1	0.0000078	0.0000049	0.00010	0.0063	0.00048	0.00049	0.00097
6-Aug-14	6	500	480	8.0	0.00096	0.0000048	0.0014	3.5	0.0037	0.0048	0.00025	0.00048	0.0043	3.3	0.000019	0.70	0.00000096	0.50	0.48	1.6	0.0000048	0.000014	0.000029	0.0055	0.00056	0.00048	0.00096
13-Aug-14	7	500	490	8.0	0.00098	0.0000049	0.0012	3.1	0.0045	0.0049	0.00029	0.00049	0.0044	2.6	0.000020	0.56	0.00000098	0.33	0.42	1.3	0.0000034	0.00010	0.000029	0.0050	0.00028	0.00049	0.00098
20-Aug-14	8	500	490	8.0	0.00098	0.0000049	0.00082	2.5	0.0054	0.0049	0.00020	0.00034	0.0044	1.9	0.000025	0.44	0.00000098	0.21	0.37	1.1	0.0000029	0.000064	0.000044	0.0046	0.00031	0.00049	0.00098
27-Aug-14	9	500	495	8.0	0.00099	0.0000050	0.0011	3.0	0.0055	0.0050	0.00023	0.00050	0.0050	2.5	0.000030	0.58	0.00000099	0.23	0.45	1.3	0.0000050	0.000054	0.000025	0.0054	0.00035	0.00050	0.00099
3-Sep-14	10	500	490	7.9	0.0034	0.0000049	0.00093	2.8	0.0059	0.0049	0.00017	0.00044	0.0029	2.3	0.000098	0.62	0.0000083	0.19	0.51	1.8	0.0000059	0.0000098	0.000025	0.0056	0.00039	0.00049	0.00098
10-Sep-14	11	500	500	8.0	0.0035	0.0000050	0.00073	2.2	0.0056	0.0050	0.00014	0.00035	0.0015	1.8	0.000030	0.50	0.0000010	0.14	0.43	1.2	0.0000060	0.000075	0.000055	0.0048	0.00031	0.00050	0.0010
17-Sep-14	12	500	495	7.9	0.0035	0.0000099	0.00074	2.4	0.0051	0.0050	0.00014	0.00040	0.0015	1.8	0.000069	0.44	0.00000099	0.13	0.47	1.5	0.0000025	0.000020	0.000094	0.0050	0.00027	0.00050	0.00099
24-Sep-14	13	500	480	8.0	0.00096	0.0000096	0.00063	2.0	0.0049	0.0048	0.00015	0.000096	0.0043	1.4	0.000019	0.35	0.0000019	0.13	0.31	0.99	0.0000024	0.0000096	0.000024	0.0042	0.00021	0.00048	0.00096
1-Oct-14	14	500	470	7.9	0.012	0.0000047	0.00054	2.0	0.0069	0.0047	0.00047	0.000047	0.0042	1.4	0.000019	0.38	0.00000094	0.089	0.33	1.2	0.0000024	0.000033	0.00016	0.0041	0.00022	0.00094	0.00094
8-Oct-14	15	500	490	7.9	0.0034	0.000020	0.00053	1.7	0.0050	0.0049	0.00022	0.00025	0.0015	1.2	0.000020	0.29	0.00000098	0.078	0.32	1.2	0.0000039	0.000039	0.000025	0.0038	0.00022	0.00049	0.00098
15-Oct-14	16	500	495	7.9	0.0035	0.0000050	0.00073	2.2	0.0060	0.0050	0.00016	0.00035	0.0015	1.6	0.000025	0.41	0.00000099	0.11	0.42	1.4	0.0000045	0.000050	0.000025	0.0046	0.00023	0.00050	0.00099
22-Oct-14	17	500	505	8.0	0.0035	0.000025	0.00060	2.2	0.0062	0.0051	0.00015	0.00040	0.0015	1.7	0.000025	0.40	0.0000010	0.11	0.39	1.3	0.0000051	0.000020	0.00013	0.0046	0.00023	0.00051	0.0010
29-Oct-14	18	500	490	7.9	0.0034	0.0000049	0.00045	1.6	0.0050	0.0049	0.00012	0.00025	0.0015	1.00	0.000020	0.27	0.00000098	0.069	0.29	0.83	0.0000049	0.000044	0.000044	0.0031	0.00015	0.00049	0.00098
5-Nov-14	19	500	485	7.7	0.0034	0.000019	0.00043	1.7	0.0048	0.0049	0.00020	0.00019	0.0015	1.0	0.000019	0.30	0.00000097	0.078	0.31	0.87	0.000011	0.000019	0.000092	0.0033	0.00019	0.00049	0.00097
12-Nov-14	20	500	495	7.6	0.0035	0.0000099	0.00048	1.8	0.0058	0.0050	0.00034	0.00030	0.0015	1.1	0.000020	0.32	0.00000099	0.094	0.35	0.89	0.0000040	0.000069	0.000099	0.0037	0.00022	0.00050	0.00099
19-Nov-14	21	500	475	7.6	0.0033	0.000014	0.00048	1.8	0.0055	0.0048	0.00039	0.00029	0.0014	1.1	0.000029	0.30	0.00000095	0.076	0.34	0.81	0.000015	0.000090	0.000024	0.0034	0.00020	0.00095	0.00095
26-Nov-14	22	500	500	7.9	0.0035	0.0000050	0.00046	1.6	0.0052	0.0050	0.00017	0.00020	0.0040	0.98	0.000020	0.29	0.0000010	0.065	0.30	0.70	0.0000040	0.000025	0.000085	0.0033	0.00020	0.0010	0.0010
3-Dec-14	23	500	495	7.8	0.0035	0.0000099	0.00039	1.4	0.0054	0.0050	0.00012	0.00020	0.0015	0.81	0.000025	0.23	0.00000099	0.059	0.25	0.64	0.0000035	0.000025	0.000040	0.0031	0.00021	0.00050	0.00099
10-Dec-14	24	500	495	7.9	0.0035	0.0000050	0.00038	1.4	0.0054	0.0050	0.00014	0.00015	0.0015	0.82	0.000020	0.23	0.00000099	0.059	0.28	0.69	0.0000035	0.000050	0.000030	0.0028	0.00017	0.00050	0.00099
17-Dec-14	25	500	500	8.0	0.0035	0.000010	0.00058	1.9	0.0070	0.0050	0.00012	0.00030	0.0015	1.2	0.000020	0.37	0.0000010	0.065	0.37	0.75	0.0000035	0.000085	0.00034	0.0037	0.00023	0.00050	0.0010
24-Dec-14	26	500	495	7.9	0.0035	0.0000050	0.00051	1.7	0.0066	0.0050	0.000064	0.00025	0.0015	0.99	0.000020	0.29	0.00000099	0.069	0.34	0.74	0.0000035	0.000015	0.000025	0.0035	0.00021	0.00050	0.00099
31-Dec-14	27	500	495	7.9	0.0035	0.0000050	0.00048	1.7	0.0061	0.0050	0.00013	0.00025	0.0015	1.0	0.000020	0.34	0.00000099	0.064	0.34	0.74	0.0000045	0.000025	0.000079	0.0036	0.00019	0.00050	0.00099
7-Jan-15	28	500	500	7.8	0.0035	0.000015	0.00033	1.3	0.0055	0.0050	0.00013	0.00020	0.0015	0.70	0.000020	0.20	0.0000010	0.045	0.25	0.40	0.000013	0.000020	0.000060	0.0026	0.00016	0.00050	0.0010
14-Jan-15	29	500	480	7.8	0.0034	0.0000048	0.00029	1.2	0.0052	0.0048	0.00041	0.00019	0.0014	0.67	0.000034	0.20	0.00000096	0.043	0.25	0.38	0.0000082	0.000029	0.000034	0.0022	0.00013	0.00048	0.00096
21-Jan-15	30	500	485	8.0	0.0034	0.000019	0.00039	1.4	0.0056	0.0049	0.00015	0.00019	0.0015	0.81	0.000019	0.23	0.00000097	0.053	0.27	0.44	0.0000024	0.000019	0.000044	0.0029	0.00021	0.00049	0.00097
28-Jan-15	31	500	495	7.9	0.0035	0.0000050	0.00031	1.6	0.0059	0.0050	0.00056	0.00020	0.0015	0.87	0.000045	0.26	0.00000099	0.054	0.24	0.74	0.000014	0.000040	0.000054	0.0027	0.00016	0.00050	0.00099
4-Feb-15	32	500	495	7.9	0.0035	0.0000099	0.00038	1.4	0.0051	0.0050	0.00019	0.00020	0.0015	0.78	0.000020	0.23	0.00000099	0.050	0.28	0.59	0.0000025	0.000069	0.000040	0.0024	0.00016	0.00050	0.00099
11-Feb-15	33	500	490	7.9	0.0034	0.000015	0.00037	1.5	0.0056	0.0049	0.00026	0.00020	0.0015	0.81	0.00049	0.23	0.00000098	0.049	0.29	0.49	0.000014	0.00021	0.000034	0.0026	0.00017	0.00049	0.00098
18-Feb-15	34	500	485	7.9	0.0034	0.0000049	0.00038	1.3	0.0053	0.0049	0.000078	0.00019	0.0015	0.74	0.00049	0.21	0.00000097	0.044	0.29	0.49	0.0000029	0.000024	0.000029	0.0025	0.00016	0.00049	0.00097
25-Feb-15	35	500	480	7.9	0.0034	0.00023	0.00037	1.4	0.0056	0.0048	0.000086	0.00024	0.0014	0.96	0.00048	0.25	0.00000096	0.048	0.30	0.43	0.0000048	0.000082	0.000024	0.0027	0.00013	0.00048	0.00096
4-Mar-15	36	500	490	7.8	0.0034	0.0000049	0.00035	1.2	0.0052	0.0049	0.000039	0.00025	0.0015	0.67	0.00049	0.24	0.00000098	0.039	0.23	0.59	0.0000025	0.000029	0.000049	0.0025	0.00014	0.00049	0.00098
11-Mar-15	37	500	490	7.9	0.0034	0.000029	0.00036	1.3	0.0059	0.0049	0.000069	0.00020	0.0015	0.73	0.00049	0.20	0.00000098	0.039	0.27	0.098	0.0000025	0.000054	0.000025	0.0023	0.00015	0.00049	0.00098
18-Mar-15	38	500	490	7.9	0.0034	0.0000049	0.00033	1.2	0.0060	0.0049	0.000054	0.00020	0.0015	0.72	0.00049	0.19	0.00000098	0.034	0.26	0.44	0.0000025	0.000034	0.000029	0.0022	0.00012	0.00049	0.00098
25-Mar-15	39	500	485	7.8	0.0034	0.0000049	0.00035	1.4	0.0063	0.0049	0.00017	0.00029	0.0015	0.79	0.00049	0.22	0.00000097	0.078	0.28	0.49	0.0000024	0.00026	0.000044	0.0030	0.00016	0.00049	0.00097
1-Apr-15	40	500	490	7.8	0.0034	0.000020	0.00024	1.0	0.0093	0.0049	0.000039	0.00020	0.0015	0.60	0.00049	0.12	0.00000098	0.35	0.23	0.15	0.0000025	0.000074	0.000039	0.0026	0.000098	0.00049	0.00098
8-Apr-15	41	500	485	7.8	0.0034	0.0000049	0.00037	1.3	0.0059	0.0049	0.00013	0.00024	0.0015	0.85	0.00049	0.26	0.00000097	0.039	0.30	0.29	0.0000024	0.00015	0.000053	0.0025	0.00015	0.00049	0.00097
15-Apr-15	42	500	495	7.8	0.0035	0.0000050	0.00031	1.2	0.0053	0.0050	0.00013	0.00020	0.0015	0.70	0.00050	0.19	0.00000099	0.045	0.26	0.40	0.0000025	0.00013	0.000025	0.0022	0.00013	0.00050	0.00099
22-Apr-15	43	500	485	7.8	0.0034	0.000015	0.00021	0.83	0.0053	0.0049	0.000058	0.00015	0.0015	0.45	0.00049	0.14	0.0000019	0.024	0.18	0.19	0.0000044	0.00016	0.000034	0.0014	0.000097	0.00049	0.00097
29-Apr-15	44	500	490	7.9	0.0034	0.000064	0.00040	1.5	0.0073	0.0049	0.00010	0.00020	0.0015	0.91	0.00049	0.24	0.00000098	0.049	0.29	0.64	0.0000025	0.000039	0.000044	0.0030	0.00016	0.00049	0.00098
6-May-15	45	500	495	7.9	0.0035	0.0000099	0.00037	1.3	0.0064	0.0050	0.000050	0.00020	0.0015	0.81	0.00050	0.23	0.00000099	0.040	0.26	0.40	0.0000025	0.00031	0.000025	0.0025	0.00015	0.0015	0.00099
13-May-15	46	500	505																								
20-May-15	47	505	480																								
27-May-15	48	480	480																								
3-Jun-15	49	480	490	8.1	0.00086	0.0000012	0.00021	0.87	0.0039	0.0012	0.000042	0.00021	0.00037	0.44	0.0000049	0.14	0.00000025	0.022	0.19	0.32	0.00000061	0.000011	0.0000098	0.0014	0.000031	0.00012	0.00025
10-Jun-15	50	500	490																								
17-Jun-15	51	490	485																								
24-Jun-15	52	485	480																								
1-Jul-15	53	480	480	8.0	0.00084	0.0000012	0.00019	0.84	0.0038	0.0012	0.000034	0.00023	0.00036	0.36	0.000011	0.14	0.00000024	0.026	0.18	0.26	0.0000013	0.000024	0.0000060	0.0016	0.000029	0.00012	0.00024
8-Jul-15	54	500	485																								
15-Jul-15	55	485	480																								
22-Jul-15	56	480	480																								
29-Jul-15	57	480	470	8.1	0.00082	0.0000024	0.00018	0.84	0.0037	0.0012	0.000052	0.00020	0.00035	0.35	0.0000047	0.12	0.00000024	0.024	0.18	0.25	0.00000059	0.0000059	0.000015	0.0013	0.000029	0.00012	0.00024
5-Aug-15	58	500	500																								
12-Aug-15	59	500	495																								
19-Aug-15	60	495	480																								
26-Aug-15	61	480	470	8.0	0.00082	0.000015	0.00017	0.84	0.0045	0.0012	0.000090	0.00022	0.00035	0.36	0.0000059	0.12	0.00000024	0.022	0.18	0.31	0.00000094	0.000014	0.0000059	0.0013	0.000032	0.00024	0.00024
2-Sep-15	62	500	490																								
9-Sep-15	63	490	480																								
16-Sep-15	64	480	470																								
23-Sep-15	65	470	460	8.1	0.00081	0.0000012	0.00016	0.76	0.0033	0.0012	0.00013	0.00020	0.00035	0.33	0.0000069	0.12	0.00000023	0.030	0.15	0.24	0.00000092	0.0000035	0.0000058	0.0012	0.000025	0.00012	0.00023
30-Sep-15	66	500	495																								
7-Oct-15	67	495	485																								
14-Oct-15	68	485	475																								
21-Oct-15	69	475	455	8.1	0.00080	0.0000057	0.00015	0.75	0.0034	0.0011	0.000027	0.00018	0.00034	0.33	0.000023	0.10	0.0000046	0.031	0.14	0.23	0.0000013	0.000018	0.0000057	0.0011	0.000020	0.00011	0.00023
28-Oct-15	70	500	495																								
4-Nov-15	71	495	485																								
11-Nov-15	72	485	470																								
18-Nov-15	73	470	450	8.1	0.0045	0.0000045	0.00013	0.75	0.0034	0.0011	0.00017	0.00017	0.00034	0.33	0.000012	0.10	0.00000034	0.021	0.15	0.14	0.0000033	0.000015	0.000015	0.0012	0.000019	0.00023	0.00023
25-Nov-15	74	500	500	8.1	0.0035	0.000045	0.00046	1.8	0.0083	0.0050	0.00019	0.00030	0.0035	1.0	0.00025	0.28	0.00014	0.060	0.35	0.50	0.0000065	0.0000050	0.00024	0.0030	0.00015	0.00050	0.0010
2-Dec-15	75	500	490	8.0	0.0044	0.000039	0.00040	1.7	0.0074	0.0049	0.00019	0.00029	0.0015	0.94	0.000020	0.28	0.00000098	0.054	0.31	0.44	0.0000025	0.000039	0.00024	0.0028	0.00014	0.00049	0.00098
9-Dec-15	76	500	500	8.1	0.0035	0.000015	0.00037	1.3	0.0067	0.0050	0.00017	0.00025	0.0040	0.80	0.000045	0.22	0.0000085	0.045	0.28	0.40	0.000018	0.000070	0.000085	0.0025	0.00014	0.00050	0.0010
16-Dec-15	77	500	495	8.0	0.0035	0.000084	0.00039	1.6	0.0081	0.0050	0.000089	0.00025	0.0020	0.92	0.000020	0.25	0.0000020	0.050	0.30	0.40	0.0000035	0.000079	0.000025	0.0027	0.00014	0.00050	0.00099
23-Dec-15	78	500	485	8.2	0.0035	0.000045	0.00036	1.4	0.0073	0.0050	0.000079	0.00022	0.0017	0.81	0.000020	0.21	0.0000017	0.054	0.28	0.47	0.0000030	0.000042	0.000050	0.0023	0.00012	0.00050	0.00099
30-Dec-15	79	500	495	7.9	0.0035	0.0000050	0.00032	1.3	0.0065	0.0050	0.000069	0.00020	0.0015	0.70	0.000020	0.17	0.0000015	0.059	0.26	0.54	0.0000025	0.0000050	0.000074	0.0020	0.000099	0.00050	0.00099
6-Jan-16	80	500	490	7.8	0.0034	0.0000049	0.00031	1.3	0.0065	0.0049	0.00014	0.00020	0.0015	0.73	0.000047	0.18	0.0000012	0.044	0.25	0.37	0.0000025	0.000017	0.000098	0.0020	0.000096	0.00049	0.00099
13-Jan-16	81	500	490	7.8	0.0034	0.0000049	0.00030	1.3	0.0064	0.0049	0.00022	0.00020	0.0015	0.75	0.000074	0.20	0.00000098	0.029	0.25	0.20	0.0000025	0.000029	0.00012	0.0020	0.000093	0.00049	0.00098
20-Jan-16	82	500	490	8.0	0.0034	0.0000049	0.00031	1.4	0.0068	0.0049	0.00013	0.00022	0.0015	0.77	0.000047	0.20	0.00000099	0.032	0.26	0.20	0.0000025	0.000042	0.000096	0.0022	0.000094	0.00049	0.00099
27-Jan-16	83	500	495	7.9	0.0035	0.0000050	0.00032	1.4	0.0072	0.0050	0.000035	0.00025	0.0015	0.79	0.000020	0.21	0.00000099	0.035	0.27	0.20	0.0000025	0.000054	0.000069	0.0024	0.000094	0.00050	0.00099
3-Feb-16	84	500	490	8.0	0.0035	0.0000050	0.00032	1.4	0.0072	0.0050	0.000040	0.00022	0.0015	0.75	0.000032	0.20	0.00000100	0.040	0.27	0.42	0.0000025	0.000035	0.000047	0.0022	0.000090	0.00050	0.00100
10-Feb-16	85	500	500	7.9	0.0035	0.0000050	0.00032	1.3	0.0073	0.0050	0.000045	0.00020	0.0015	0.71	0.000045	0.19	0.0000010	0.045	0.27	0.65	0.0000025	0.000015	0.000025	0.0020	0.000085	0.00050	0.0010
17-Feb-16	86	500	490	7.8	0.0035	0.0000050	0.00032	1.3	0.0072	0.0050	0.000050	0.00020	0.0015	0.72	0.000033	0.13	0.0000013	0.033	0.27	0.53	0.0000025	0.000013	0.000025	0.0019	0.000088	0.00050	0.0010
24-Feb-16	87	500	500	7.8	0.0035	0.0000050	0.00032	1.4	0.0071	0.0050	0.000055	0.00020	0.0015	0.74	0.000020	0.070	0.0000015	0.020	0.26	0.40	0.0000025	0.000010	0.000025	0.0018	0.000090	0.00050	0.0010

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for HC3 (GT)

Date	Cycle	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu
	No.	Input	Output		umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
25-Jun-14	0	500	400	8.1	121	#N/A	4.8	34	5.0	1.3	0.24	< 0.3	25	0.065	0.0032	0.066	0.042	0.0000080	< 0.000007	0.011	0.0000060	6.5	0.000080	0.00017	0.0021
2-Jul-14	1	500	480	7.9	107	#N/A	5.7	40	13	0.70	0.13	< 0.3	29	0.044	0.0025	0.043	0.045	< 0.000007	< 0.000007	0.0081	< 0.000003	7.5	0.000050	0.00016	0.0012
9-Jul-14	2	500	495	7.9	91	#N/A	1.7	35	8.0	0.30	0.11	< 0.3	26	0.034	0.0024	0.034	0.045	< 0.000007	< 0.000007	0.0075	< 0.000003	6.8	< 0.00003	0.000054	0.00066
16-Jul-14	3	500	485	7.9	80	#N/A	2.0	34	5.0	< 0.2	0.10	< 0.3	26	0.048	0.0025	0.031	0.055	< 0.000007	< 0.000007	0.0069	< 0.000003	6.7	0.00018	0.00029	0.00076
23-Jul-14	4	500	500	7.9	67	#N/A	2.1	32	4.0	< 0.2	0.080	< 0.3	26	0.055	0.0019	0.027	0.069	< 0.000007	< 0.000007	0.0064	< 0.000003	6.9	0.000080	0.00014	0.0012
30-Jul-14	5	500	490	7.8	60	#N/A	2.4	31	4.0	< 0.2	0.060	< 0.3	23	0.052	0.0019	0.022	0.051	< 0.000007	< 0.000007	0.0047	0.0000030	5.8	0.00010	0.00010	0.0013
6-Aug-14	6	500	490	7.8	60	#N/A	2.1	29	3.0	< 0.2	0.070	< 0.3	24	0.030	0.0018	0.020	0.047	< 0.000007	< 0.000007	0.0050	< 0.000003	6.1	< 0.00003	0.000038	0.00029
13-Aug-14	7	500	480	7.8	55	#N/A	2.5	29	5.0	< 0.2	0.070	< 0.3	23	0.061	0.0015	0.018	0.053	< 0.000007	< 0.000007	0.0053	< 0.000003	5.9	0.000070	0.000048	0.00032
20-Aug-14	8	500	500	7.8	52	#N/A	1.8	29	4.0	< 0.2	0.060	< 0.3	24	0.026	0.0012	0.016	0.050	< 0.000007	< 0.000007	0.0055	< 0.000003	6.3	0.000040	0.000063	0.00033
27-Aug-14	9	500	505	7.9	59	#N/A	4.3	31	2.0	< 0.2	< 0.06	< 0.3	25	0.023	0.0013	0.014	0.065	< 0.000007	< 0.000007	0.011	< 0.000003	6.9	< 0.00003	0.000030	0.00029
3-Sep-14	10	500	480	7.8	50	#N/A	4.2	27	5.0	< 0.2	< 0.06	< 0.3	23	0.026	0.0014	0.015	0.050	< 0.000007	< 0.000007	0.0041	0.0000030	6.2	< 0.00003	0.000032	0.00068
10-Sep-14	11	500	515	7.9	54	#N/A	3.2	28	3.0	< 0.2	< 0.06	< 0.3	22	0.046	0.0011	0.013	0.065	< 0.000007	< 0.000007	0.0058	< 0.000003	6.1	< 0.00003	0.000035	0.00041
17-Sep-14	12	500	490	7.9	49	#N/A	6.4	28	4.0	< 0.2	< 0.06	< 0.3	20	0.025	0.0011	0.011	0.043	< 0.000007	< 0.000007	0.0046	0.0000090	5.1	< 0.00003	0.000034	0.00014
24-Sep-14	13	500	480	7.9	48	#N/A	3.7	27	3.0	< 0.2	< 0.06	< 0.3	20	0.034	0.0012	0.012	0.041	< 0.000007	< 0.000007	0.0032	0.0000030	5.3	< 0.00003	0.00010	0.00015
1-Oct-14	14	500	480	7.9	42	#N/A	6.1	28	< 2	< 0.2	< 0.06	< 0.3	19	0.032	0.0012	0.0098	0.038	< 0.000007	< 0.000007	0.0030	0.000051	4.9	< 0.00003	0.00010	< 0.00002
8-Oct-14	15	500	500	7.7	47	#N/A	3.1	23	< 2	< 0.2	< 0.06	< 0.3	20	0.021	0.0010	0.0096	0.047	< 0.000007	< 0.000007	0.013	< 0.000003	5.5	< 0.00003	0.000029	0.00013
15-Oct-14	16	500	490	7.9	52	#N/A	4.6	26	3.0	< 0.2	< 0.06	< 0.3	23	0.051	0.0010	0.013	0.057	< 0.000007	< 0.000007	0.0049	0.000012	6.2	< 0.00003	0.000025	0.00022
22-Oct-14	17	500	510	7.8	52	#N/A	4.1	27	< 2	< 0.2	< 0.06	< 0.3	23	0.024	0.0010	0.0096	0.059	< 0.000007	< 0.000007	0.0059	0.000010	6.3	< 0.00003	0.000027	0.000080
29-Oct-14	18	500	490	7.9	42	#N/A	6.9	27	< 2	< 0.2	< 0.06	< 0.3	19	0.024	0.0010	0.0089	0.044	< 0.000007	< 0.000007	0.0062	< 0.000003	5.1	< 0.00003	0.000020	0.00024
5-Nov-14	19	500	505	7.9	45	#N/A	#N/A	32	< 2	< 0.2	< 0.06	< 0.3	20	0.019	0.00090	0.0081	0.049	< 0.000007	< 0.000007	0.0038	0.000012	5.3	< 0.00003	0.000027	0.00055
12-Nov-14	20	500	505	7.4	48	#N/A	6.8	34	< 2	< 0.2	< 0.06	< 0.3	22	0.024	0.00090	0.0088	0.056	< 0.000007	< 0.000007	0.0045	< 0.000003	6.2	< 0.00003	0.000031	0.00025
19-Nov-14	21	500	490	7.6	57	#N/A	6.6	34	2.0	< 0.2	< 0.06	< 0.3	20	0.034	0.00090	0.0077	0.052	< 0.000007	< 0.000007	0.0031	0.0000040	5.2	< 0.00003	0.000041	0.00031
26-Nov-14	22	500	505	7.7	43	#N/A	2.0	23	2.0	< 0.2	< 0.06	< 0.3	20	0.022	0.00090	0.0081	0.050	< 0.000007	< 0.000007	0.0025	< 0.000003	5.1	< 0.00003	0.000030	0.00012
3-Dec-14	23	500	500	7.8	71	#N/A	3.0	34	< 2	< 0.2	< 0.06	< 0.3	21	0.017	0.00090	0.0081	0.052	< 0.000007	< 0.000007	0.0034	< 0.000003	5.5	< 0.00003	0.000031	0.00015
10-Dec-14	24	500	485	7.8	37	#N/A	4.6	22	2.0	< 0.2	< 0.06	< 0.3	21	0.017	0.00070	0.0066	0.045	< 0.000007	< 0.000007	0.0025	< 0.000003	6.2	< 0.00003	0.000026	0.00021
17-Dec-14	25	500	500	7.8	41	#N/A	3.8	24	< 2	< 0.2	< 0.06	< 0.3	19	0.033	0.00080	0.0079	0.058	< 0.000007	< 0.000007	0.0025	< 0.000003	5.1	< 0.00003	0.000016	0.00016
24-Dec-14	26	500	485	7.8	39	#N/A	3.1	22	< 2	< 0.2	< 0.06	< 0.3	18	0.030	0.00080	0.0063	0.051	< 0.000007	< 0.000007	0.0017	< 0.000003	5.0	< 0.00003	0.000021	0.00017
31-Dec-14	27	500	505	7.6	44	#N/A	1.5	27	< 2	< 0.2	< 0.06	< 0.3	20	0.019	0.00090	0.0067	0.055	< 0.000007	< 0.000007	0.0018	< 0.000003	5.6	< 0.00003	0.000018	0.00015
7-Jan-15	28	500	505	7.7	40	#N/A	2.6	23	< 2	< 1	< 0.06	< 0.3	21	0.016	0.00090	0.0058	0.050	< 0.000007	< 0.000007	0.0021	< 0.000003	5.6	< 0.00003	0.000032	0.00035
14-Jan-15	29	500	495	7.7	36	#N/A	2.2	21	< 2	< 1	< 0.06	< 0.3	17	0.018	0.00080	0.0063	0.042	< 0.000007	< 0.000007	0.0024	< 0.000003	4.7	< 0.00003	0.000020	0.0012
21-Jan-15	30	500	500	8.0	37	#N/A	4.2	26	< 2	< 1	< 0.06	< 0.3	18	0.020	0.00080	0.0052	0.044	< 0.000007	< 0.000007	0.0018	0.0000040	4.8	< 0.00003	0.000024	0.00031
28-Jan-15	31	500	490	7.6	38	#N/A	1.6	21	< 2	< 1	< 0.06	< 0.3	19	0.020	0.0010	0.0059	0.047	< 0.000007	< 0.000007	0.0027	0.0000030	5.0	< 0.00003	0.000019	0.00022
4-Feb-15	32	500	485	7.7	35	#N/A	2.2	20	< 2	< 1	< 0.06	< 0.3	16	0.018	0.00080	0.0053	0.039	< 0.000007	< 0.000007	0.0024	< 0.000003	4.0	< 0.00003	0.000015	0.00074
11-Feb-15	33	500	500	7.6	36	#N/A	1.9	20	< 2	< 1	< 0.06	< 0.3	18	0.020	0.00090	0.0052	0.041	< 0.000007	< 0.000007	0.0025	< 0.000003	4.8	< 0.00003	0.000023	0.00016
18-Feb-15	34	500	485	7.7	35	#N/A	2.3	21	< 2	< 1	< 0.06	< 0.3	17	0.019	0.00090	0.0052	0.042	< 0.000007	< 0.000007	0.0026	< 0.000003	4.7	< 0.00003	0.000024	0.00031
25-Feb-15	35	500	475	7.9	37	#N/A	3.1	23	< 2	< 1	< 0.06	< 0.3	16	0.013	0.00090	0.0047	0.040	< 0.000007	< 0.000007	0.0011	0.0000090	4.2	< 0.00003	0.000023	0.00055
4-Mar-15	36	500	485	7.6	36	#N/A	2.3	22	< 2	< 1	< 0.06	< 0.3	16	0.015	0.00070	0.0046	0.039	< 0.000007	< 0.000007	0.0013	< 0.000003	4.3	0.000050	0.000014	0.00033
11-Mar-15	37	500	510	7.6	35	#N/A	1.9	21	< 2	< 1	< 0.06	< 0.3	16	0.013	0.00080	0.0042	0.041	< 0.000007	< 0.000007	0.0021	0.000036	4.4	0.000060	0.000035	0.0015
18-Mar-15	38	500	490	7.7	37	#N/A	2.5	22	< 2	< 1	< 0.06	< 0.3	17	0.019	0.00080	0.0040	0.039	< 0.000007	< 0.000007	0.0013	0.0000030	4.7	< 0.00003	0.000024	0.00017
25-Mar-15	39	500	485	7.7	37	#N/A	2.7	23	< 2	< 1	< 0.06	< 0.3	19	0.014	0.00090	0.0049	0.043	< 0.000007	< 0.000007	0.0024	< 0.000003	4.8	0.000080	0.000013	0.0013
1-Apr-15	40	500	495	7.8	35	#N/A	3.5	24	< 2	< 1	< 0.06	< 0.3	14	0.016	0.00080	0.0036	0.044	0.000013	< 0.000007	0.0020	0.0000060	3.5	< 0.00003	0.0000060	0.00032
8-Apr-15	41	500	475	7.6	38	#N/A	2.7	23	< 2	< 1	< 0.06	< 0.3	17	0.018	0.0011	0.0044	0.042	< 0.000007	< 0.000007	0.0015	< 0.000003	4.6	< 0.00003	0.000032	0.00042
15-Apr-15	42	500	480	7.8	37	#N/A	4.0	26	< 2	< 1	< 0.06	< 0.3	17	0.016	0.00080	0.0041	0.041	< 0.000007	< 0.000007	0.0041	< 0.000003	4.4	< 0.00003	< 0.000004	0.00099
22-Apr-15	43	500	495	7.7	37	#N/A	3.3	23	3.0	< 1	< 0.06	< 0.3	17	0.016	0.00070	0.0039	0.040	< 0.000007	< 0.000007	0.0035	< 0.000003	4.4	< 0.00003	0.000015	0.00051
29-Apr-15	44	500	500	7.6	34	#N/A	2.1	21	< 2	< 1	< 0.06	< 0.3	16	0.019	0.00080	0.0036	0.041	< 0.000007	< 0.000007	0.0024	< 0.000003	4.4	< 0.00003	0.000021	0.00027
6-May-15	45	500	510	7.7	38	#N/A	2.4	24	< 2	< 1	< 0.06	< 0.3	17	0.019	0.00090	0.0058	0.041	< 0.000007	< 0.000007	0.0017	< 0.000003	4.5	< 0.00003	0.000017	0.00064
13-May-15	46	500	505	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-May-15	47	505	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-May-15	48	490	510	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	49	510	500	7.9	106	#N/A	3.1	54	< 2	< 1	< 0.06	< 0.3	52	0.011	0.0015	0.0049	0.12	< 0.000007	< 0.000007	0.0049	< 0.000003	15	< 0.00003	0.000042	0.0022
10-Jun-15	50	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-15	51	490	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Jun-15	52	500	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	53	480	495	7.9	116	#N/A	3.6	56	< 2	< 1	< 0.06	< 0.3	50	0.015	0.0018	0.0063	0.12	< 0.000007	< 0.000007	0.0047	< 0.000003	14	< 0.00003	0.000041	0.00050
8-Jul-15	54	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-Jul-15	55	490	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jul-15	56	490	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	57	490	485	8.0	108	#N/A	2.3	56																	
5-Aug-15	58	500	510	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	59	510	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Aug-15	60	495	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	61	485	490	8.0	106	#N/A	1.7	54	< 2	< 1	< 0.06	< 0.3	50	0.015	0.0015	0.0049	0.13	< 0.000007	< 0.000007	0.0049	0.000010	14	0.000060	0.000045	0.00067
2-Sep-15	62	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	63	490	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Sep-15	64	485	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	65	460	460	7.9	109	#N/A	2.0	52	< 2				52	0.011	0.0016	0.0050	0.13	< 0.000007	< 0.000007	0.0051	< 0.000003	15	< 0.00003	0.000040	0.00037
30-Sep-15	66	500	505	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	67	505	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14-Oct-15	68	495	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	69	490	470	8.0	99	#N/A	1.4	52	2.0				49	0.012	0.0014	0.0043	0.12	< 0.000007	< 0.000007	0.0041	< 0.000003	14	< 0.00003	0.000036	0.00033
28-Oct-15	70	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	71	490	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Nov-15	72	490	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	73	485	485	8.0	98	#N/A	1.2	55	2.0				44	0.012	0.0014	0.0041	0.094	< 0.000007	< 0.000007	0.0022	< 0.000003	12	0.000050	0.000052	0.00039
25-Nov-15	74	500	500	7.7	37	#N/A	0.70	24	2.0				18	0.021	0.00070	0.0041	0.045	< 0.000007	< 0.000007	0.0021	< 0.000003	4.9	< 0.00003	0.000047	0.00038
2-Dec-15	75	500	500	7.5	36	#N/A	2.4	21	< 2				18	0.017	0.00070	0.0036	0.046	< 0.000007	< 0.000007	0.0019	< 0.000003	4.8	< 0.00003	0.000018	0.00022
9-Dec-15	76	500	505	7.7	36	#N/A	3.0	22	2.0				17	0.021	0.00070	0.0036	0.047	0.000015	0.0000090	0.0039	0.0000070	4.7	< 0.00003	0.000023	0.00032
16-Dec-15	77	500	500	7.7	35	#N/A	2.6	17	2.0				19	0.024	0.00060	0.0042	0.051	< 0.000007	< 0.000007	0.0023	0.000026	5.3	0.000050	0.000017	0.00046
23-Dec-15	78	500	505	8.1	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	79	500	505	7.5	33	#N/A	1.6	17	2.0				17	0.014	0.00050	0.0031	0.044	< 0.000007	< 0.000007	0.0017	< 0.000003	4.6	< 0.00003	0.0000080	0.00023
6-Jan-16	80	500	505	7.4	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	81	500	505	7.4	34	#N/A	1.8	17	2.0				16	0.014	0.00060	0.0030	0.042	< 0.000007	< 0.000007	< 0.002	< 0.000003	4.4	< 0.00003	< 0.000004	0.00036
20-Jan-16	82	500	500	7.6	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	83	500	505	7.6	34	#N/A	3.1	18	2.0				16	0.014	0.00050	0.0031	0.046	< 0.000007	< 0.000007	< 0.002	0.0000030	4.6	< 0.00003	0.000016	0.00024
3-Feb-16	84	500	505	7.7	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	85	500	500	7.5	38	#N/A	2.4	20	2.0				17	0.015	0.00060	0.0032	0.051	< 0.000007	< 0.000007	< 0.002	< 0.000003	4.7	< 0.00003	0.000019	0.00027
17-Feb-16	86	500	505	7.7	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	87	500	500	7.5	32	#N/A	2.4	17	< 2				16	0.014	0.00050	0.0028	0.044	< 0.000007	< 0.000007	< 0.002	< 0.000003	4.3	< 0.00003	0.0000090	0.00012

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for HC3 (GT)

Date	**Cycle**	**Volume** (mL)		**pH**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.	Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
25-Jun-14	0	500	400	8.1	0.012	0.000030	0.0021	2.2	0.0063	0.030	0.013	0.0010	0.028	5.0	0.00042	1.4	< 0.000002	11	0.041	8.2	0.000084	0.00010	0.00033	0.0096	0.00035	0.0020	< 0.002
2-Jul-14	1	500	480	7.9	0.0060	0.000010	0.0019	2.5	0.010	0.020	0.0070	0.0010	0.012	3.8	0.00023	1.1	< 0.000002	7.9	0.046	5.8	0.000059	0.0038	0.00019	0.029	0.00025	< 0.001	< 0.002
9-Jul-14	2	500	495	7.9	< 0.002	< 0.00001	0.0016	2.2	0.0086	< 0.01	0.0058	0.00060	0.016	3.3	0.000090	1.0	< 0.000002	5.2	0.040	3.6	0.000050	0.00090	< 0.00005	0.032	0.00019	< 0.001	< 0.002
16-Jul-14	3	500	485	7.9	0.016	0.000010	0.0014	2.2	0.0075	< 0.01	0.0056	0.00050	< 0.009	2.9	0.000060	0.98	0.0000020	3.7	0.041	2.4	0.000050	0.00014	0.00026	0.032	0.00021	< 0.001	< 0.002
23-Jul-14	4	500	500	7.9	0.024	0.000050	0.0012	2.1	0.0095	< 0.01	0.0036	0.00030	< 0.009	2.4	< 0.00004	0.96	< 0.000002	2.3	0.042	1.5	0.000043	0.0021	0.00031	0.028	0.00018	< 0.001	< 0.002
30-Jul-14	5	500	490	7.8	0.015	0.000020	0.0011	1.9	0.0092	< 0.01	0.0036	0.00020	< 0.009	2.1	< 0.00004	0.83	< 0.000002	1.8	0.036	1.1	0.000041	0.00011	0.00049	0.028	0.00023	< 0.001	< 0.002
6-Aug-14	6	500	490	7.8	0.0020	< 0.00001	0.0011	2.1	0.0078	< 0.01	0.0034	0.00020	0.0090	2.2	< 0.00004	0.87	< 0.000002	1.5	0.039	1.0	0.000039	0.00017	0.000060	0.031	0.00024	< 0.001	< 0.002
13-Aug-14	7	500	480	7.8	0.010	0.000020	0.00099	1.9	0.0084	< 0.01	0.0030	0.00020	0.015	1.9	< 0.00004	0.85	< 0.000002	1.1	0.036	0.78	0.000037	0.00086	0.00048	0.030	0.000080	< 0.001	< 0.002
20-Aug-14	8	500	500	7.8	< 0.002	0.000010	0.00087	2.0	0.0092	< 0.01	0.0026	0.00010	< 0.009	1.9	< 0.00004	0.79	< 0.000002	0.88	0.040	0.69	0.000030	0.0012	< 0.00005	0.031	0.00015	0.0010	< 0.002
27-Aug-14	9	500	505	7.9	< 0.002	< 0.00001	0.00076	1.8	0.011	< 0.01	0.0025	< 0.0001	< 0.009	1.7	< 0.00004	0.74	< 0.000002	0.60	0.039	0.63	0.000037	0.00095	0.00011	0.030	0.00014	< 0.001	< 0.002
3-Sep-14	10	500	480	7.8	< 0.007	0.000050	0.00077	1.8	0.0093	< 0.01	0.0023	0.00010	0.010	1.8	0.000090	0.82	0.000019	0.57	0.036	1.2	0.000039	0.00010	0.00037	0.030	0.00016	< 0.001	< 0.002
10-Sep-14	11	500	515	7.9	0.011	0.000060	0.00067	1.7	0.0099	< 0.01	0.0018	< 0.0001	< 0.003	1.6	< 0.00004	0.77	< 0.000002	0.44	0.035	0.50	0.000038	0.00077	0.00031	0.026	0.00016	< 0.001	< 0.002
17-Sep-14	12	500	490	7.9	< 0.007	< 0.00001	0.00068	1.7	0.0086	< 0.01	0.0019	< 0.0001	< 0.003	1.5	0.000040	0.68	< 0.000002	0.42	0.032	0.90	0.000025	0.00014	0.000050	0.029	0.00013	< 0.001	< 0.002
24-Sep-14	13	500	480	7.9	0.0020	0.000020	0.00066	1.7	0.0061	< 0.01	0.0019	0.00010	< 0.009	1.4	< 0.00004	0.65	0.0000050	0.35	0.033	0.46	0.000025	0.000080	< 0.00005	0.032	0.00014	< 0.001	< 0.002
1-Oct-14	14	500	480	7.9	0.022	< 0.00001	0.00049	1.6	0.012	< 0.01	0.0016	< 0.0001	< 0.009	1.4	< 0.00004	0.69	< 0.000002	0.27	0.032	0.72	0.000010	0.00015	0.00019	0.027	0.00013	< 0.002	< 0.002
8-Oct-14	15	500	500	7.7	< 0.007	< 0.00001	0.00062	1.6	0.0086	< 0.01	0.0015	< 0.0001	< 0.003	1.4	< 0.00004	0.59	< 0.000002	0.25	0.032	0.90	0.000026	0.00048	< 0.00005	0.026	0.00014	< 0.001	< 0.002
15-Oct-14	16	500	490	7.9	0.0080	0.00031	0.00064	1.7	0.0072	< 0.01	0.0016	< 0.0001	< 0.003	1.4	< 0.00004	0.66	< 0.000002	0.28	0.034	0.70	0.000032	0.00040	0.00024	0.030	0.00017	0.0020	< 0.002
22-Oct-14	17	500	510	7.8	< 0.007	0.000020	0.00054	1.9	0.0092	< 0.01	0.0015	< 0.0001	< 0.003	1.4	< 0.00004	0.69	< 0.000002	0.23	0.035	0.60	0.000037	0.00034	0.000050	0.030	0.00011	< 0.001	< 0.002
29-Oct-14	18	500	490	7.9	< 0.007	0.00014	0.00051	1.5	0.0071	< 0.01	0.0013	< 0.0001	< 0.003	1.1	< 0.00004	0.55	< 0.000002	0.18	0.029	0.30	0.000030	0.00026	0.000080	0.026	0.00010	< 0.001	< 0.002
5-Nov-14	19	500	505	7.9	< 0.007	0.000020	0.00045	1.6	0.0069	< 0.01	0.0015	< 0.0001	< 0.003	1.1	< 0.00004	0.59	< 0.000002	0.20	0.030	0.40	0.000038	0.0010	0.00012	0.028	0.000090	< 0.001	< 0.002
12-Nov-14	20	500	505	7.4	< 0.007	< 0.00001	0.00044	1.6	0.0094	< 0.01	0.0016	< 0.0001	< 0.003	1.1	< 0.00004	0.59	< 0.000002	0.17	0.043	0.40	0.000029	0.00096	0.000080	0.028	0.00011	< 0.001	< 0.002
19-Nov-14	21	500	490	7.6	0.010	0.000030	0.00047	1.6	0.0091	< 0.01	0.0012	< 0.0001	< 0.003	1.1	< 0.00004	0.56	< 0.000002	0.17	0.031	0.30	0.000029	0.00055	0.00031	0.026	0.00011	0.0010	< 0.002
26-Nov-14	22	500	505	7.7	< 0.007	< 0.00001	0.00050	1.7	0.0089	< 0.01	0.0012	< 0.0001	0.010	1.1	< 0.00004	0.60	< 0.000002	0.15	0.031	0.40	0.000028	0.00029	0.00010	0.027	0.00010	< 0.001	< 0.002
3-Dec-14	23	500	500	7.8	< 0.007	< 0.00001	0.00048	1.7	0.0084	< 0.01	0.0011	< 0.0001	< 0.003	1.1	< 0.00004	0.51	< 0.000002	0.16	0.029	0.40	0.000026	0.00016	0.000060	0.028	0.00011	0.0010	< 0.002
10-Dec-14	24	500	485	7.8	< 0.007	< 0.00001	0.00037	1.4	0.0081	< 0.01	0.0010	< 0.0001	< 0.003	0.89	< 0.00004	0.57	< 0.000002	0.12	0.026	0.60	0.000023	0.00029	0.000050	0.024	0.000070	0.0010	< 0.002
17-Dec-14	25	500	500	7.8	< 0.007	< 0.00001	0.00043	1.5	0.0089	< 0.01	0.0011	< 0.0001	< 0.003	1.00	< 0.00004	0.50	< 0.000002	0.12	0.030	0.30	0.000026	0.00048	0.000090	0.023	0.00014	< 0.001	< 0.002
24-Dec-14	26	500	485	7.8	< 0.007	< 0.00001	0.00037	1.4	0.0077	< 0.01	0.00087	< 0.0001	< 0.003	0.90	< 0.00004	0.47	< 0.000002	0.11	0.028	0.30	0.000023	0.00021	0.000080	0.024	0.00013	< 0.001	< 0.002
31-Dec-14	27	500	505	7.6	< 0.007	< 0.00001	0.00041	1.6	0.0077	< 0.01	0.00092	< 0.0001	< 0.003	1.0	< 0.00004	0.59	< 0.000002	0.11	0.032	0.40	0.000022	0.00019	0.000060	0.029	0.000090	< 0.001	< 0.002
7-Jan-15	28	500	505	7.7	< 0.007	0.000010	0.00038	1.6	0.0079	< 0.01	0.00090	< 0.0001	< 0.003	0.97	< 0.00004	0.49	< 0.000002	0.10	0.031	0.20	0.000024	0.00021	< 0.00005	0.024	0.00010	< 0.001	< 0.002
14-Jan-15	29	500	495	7.7	< 0.007	0.00013	0.00031	1.4	0.0069	< 0.01	0.00094	< 0.0001	< 0.003	0.87	< 0.00004	0.46	0.0000040	0.090	0.026	0.10	0.000019	0.00018	< 0.00005	0.022	0.00010	0.0010	< 0.002
21-Jan-15	30	500	500	8.0	< 0.007	0.000060	0.00033	1.3	0.0066	< 0.01	0.00088	< 0.0001	< 0.003	0.85	< 0.00004	0.45	< 0.000002	0.090	0.026	< 0.1	0.000019	0.00012	0.000080	0.022	0.00010	< 0.001	< 0.002
28-Jan-15	31	500	490	7.6	< 0.007	< 0.00001	0.00030	1.6	0.0069	< 0.01	0.0017	< 0.0001	< 0.003	0.99	0.000080	0.55	0.0000020	0.10	0.024	0.80	0.000027	0.00019	0.000070	0.025	0.000090	< 0.001	< 0.002
4-Feb-15	32	500	485	7.7	< 0.007	0.000020	0.00035	1.4	0.0060	< 0.01	0.00088	< 0.0001	< 0.003	0.83	< 0.00004	0.43	< 0.000002	0.090	0.028	0.50	0.000019	0.00020	0.000070	0.021	0.000090	0.0010	< 0.002
11-Feb-15	33	500	500	7.6	< 0.007	< 0.00001	0.00031	1.4	0.0065	< 0.01	0.00099	< 0.0001	< 0.003	0.86	< 0.001	0.44	< 0.000002	0.080	0.026	0.20	0.000022	0.00026	0.000050	0.022	0.00014	< 0.001	< 0.002
18-Feb-15	34	500	485	7.7	< 0.007	< 0.00001	0.00037	1.4	0.0069	< 0.01	0.00075	< 0.0001	< 0.003	0.86	< 0.001	0.46	< 0.000002	0.080	0.028	0.20	0.000024	0.00023	0.000060	0.024	0.000090	< 0.001	< 0.002
25-Feb-15	35	500	475	7.9	< 0.007	0.00012	0.00029	1.4	0.0057	< 0.01	0.00080	< 0.0001	< 0.003	0.84	< 0.001	0.43	< 0.000002	0.080	0.026	0.10	0.000032	0.00021	< 0.00005	0.023	0.000070	0.0030	< 0.002
4-Mar-15	36	500	485	7.6	< 0.007	< 0.00001	0.00032	1.3	0.0054	< 0.01	0.00079	< 0.0001	< 0.003	0.79	< 0.001	0.49	< 0.000002	0.070	0.025	0.70	0.000019	0.00020	< 0.00005	0.023	0.000080	< 0.001	< 0.002
11-Mar-15	37	500	510	7.6	0.011	0.00013	0.00037	1.3	0.0060	< 0.01	0.00072	< 0.0001	< 0.003	0.72	< 0.001	0.37	< 0.000002	0.050	0.024	< 0.1	0.000012	0.00036	< 0.00005	0.020	0.00010	0.016	< 0.002
18-Mar-15	38	500	490	7.7	< 0.007	< 0.00001	0.00030	1.3	0.0067	< 0.01	0.00071	< 0.0001	< 0.003	0.80	< 0.001	0.43	< 0.000002	0.060	0.026	0.60	0.000015	0.00018	0.000070	0.021	0.000080	< 0.001	< 0.002
25-Mar-15	39	500	485	7.7	< 0.007	< 0.00001	0.00025	1.6	0.0063	< 0.01	0.00089	< 0.0001	< 0.003	0.86	< 0.001	0.46	< 0.000002	0.15	0.029	0.60	0.000010	0.00042	0.00020	0.024	0.00018	0.0010	< 0.002
1-Apr-15	40	500	495	7.8	< 0.007	0.000020	0.00022	1.2	0.014	< 0.01	0.00060	< 0.0001	< 0.003	0.77	< 0.001	0.28	< 0.000002	0.72	0.025	0.10	0.000015	0.00023	< 0.00005	0.028	0.000060	< 0.001	< 0.002
8-Apr-15	41	500	475	7.6	< 0.007	< 0.00001	0.00027	1.3	0.0066	< 0.01	0.00071	< 0.0001	< 0.003	0.75	< 0.001	0.49	< 0.000002	0.070	0.026	< 0.1	0.000011	0.00031	< 0.00005	0.022	0.00010	< 0.001	< 0.002
15-Apr-15	42	500	480	7.8	< 0.007	< 0.00001	0.00026	1.4	0.0059	< 0.01	0.00069	< 0.0001	< 0.003	0.78	< 0.001	0.40	0.0000020	0.070	0.026	0.30	0.0000060	0.00064	0.00013	0.022	0.000090	< 0.001	< 0.002
22-Apr-15	43	500	495	7.7	< 0.007	0.000040	0.00027	1.4	0.0057	< 0.01	0.00056	< 0.0001	< 0.003	0.76	< 0.001	0.43	0.0000040	0.050	0.025	0.40	0.000025	0.00054	< 0.00005	0.021	0.00010	< 0.001	< 0.002
29-Apr-15	44	500	500	7.6	< 0.007	0.000020	0.00027	1.3	0.0068	< 0.01	0.00061	< 0.0001	< 0.003	0.77	< 0.001	0.38	< 0.000002	0.040	0.024	0.60	0.000017	0.00027	0.000080	0.019	0.000070	< 0.001	< 0.002
6-May-15	45	500	510	7.7	< 0.007	0.000020	0.00026	1.3	0.0066	< 0.01	0.00060	< 0.0001	< 0.003	0.78	< 0.001	0.44	< 0.000002	0.060	0.025	0.30	0.000016	0.00028	0.00010	0.021	0.00012	0.0020	< 0.002
13-May-15	46	500	505	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-May-15	47	505	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-May-15	48	490	510	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	49	510	500	7.9	< 0.007	0.000030	0.00056	3.9	0.016	< 0.01	0.0014	< 0.0001	< 0.003	1.8	< 0.00004	1.1	< 0.000002	0.14	0.073	0.80	0.000033	0.0015	< 0.00005	0.059	0.00014	0.0020	< 0.002
10-Jun-15	50	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-15	51	490	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Jun-15	52	500	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	53	480	495	7.9	< 0.007	< 0.00001	0.00059	3.9	0.016	< 0.01	0.0015	< 0.0001	< 0.003	1.7	0.000050	1.2	< 0.000002	0.16	0.076	0.80	0.000041	0.00076	< 0.00005	0.062	0.00010	0.0010	< 0.002
8-Jul-15	54	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-Jul-15	55	490	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jul-15	56	490	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	57	490	485	8.0																							
5-Aug-15	58	500	510	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	59	510	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Aug-15	60	495	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	61	485	490	8.0	< 0.007	0.00013	0.00056	3.8	0.014	< 0.01	0.0017	< 0.0001	< 0.003	1.7	< 0.00004	1.1	< 0.000002	0.11	0.074	1.0	0.000042	0.00051	< 0.00005	0.059	0.00012	0.0020	< 0.002
2-Sep-15	62	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	63	490	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Sep-15	64	485	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	65	460	460	7.9	< 0.007	< 0.00001	0.00051	3.7	0.013	< 0.01	0.0017	< 0.0001	< 0.003	1.7	< 0.00004	1.2	< 0.000002	0.14	0.069	0.80	0.000032	0.0010	< 0.00005	0.051	0.000080	< 0.001	< 0.002
30-Sep-15	66	500	505	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	67	505	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14-Oct-15	68	495	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	69	490	470	8.0	< 0.007	0.000020	0.00052	3.8	0.011	< 0.01	0.0010	< 0.0001	< 0.003	1.8	0.00010	1.1	0.000028	0.21	0.066	0.80	0.000034	0.00075	0.000070	0.050	0.000090	< 0.001	< 0.002
28-Oct-15	70	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	71	490	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Nov-15	72	490	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	73	485	485	8.0	0.018	< 0.00001	0.00045	3.5	0.012	< 0.01	0.0020	< 0.0001	< 0.003	1.6	0.00014	0.95	0.0000030	0.15	0.060	0.60	0.000033	0.00072	0.000070	0.042	0.000090	0.0010	< 0.002
25-Nov-15	74	500	500	7.7	< 0.007	0.000020	0.00025	1.3	0.0071	< 0.01	0.00079	< 0.0001	< 0.003	0.91	0.00032	0.41	0.0081	0.070	0.025	0.40	0.000023	0.00024	0.00010	0.017	0.000080	< 0.001	< 0.002
2-Dec-15	75	500	500	7.5	< 0.007	0.000030	0.00025	1.4	0.0061	< 0.01	0.00042	< 0.0001	< 0.003	0.85	0.000040	0.44	< 0.000002	0.050	0.024	0.50	< 0.000005	0.00023	< 0.00005	0.018	0.000070	< 0.001	< 0.002
9-Dec-15	76	500	505	7.7	< 0.007	< 0.00001	0.00024	1.3	0.0067	< 0.01	0.00059	< 0.0001	0.0030	0.80	0.000060	0.38	0.0000070	0.050	0.024	0.30	0.000037	0.00026	0.000060	0.018	0.000090	< 0.001	< 0.002
16-Dec-15	77	500	500	7.7	< 0.007	0.00017	0.00027	1.4	0.0073	< 0.01	0.00052	< 0.0001	< 0.003	0.90	< 0.00004	0.45	< 0.000002	0.050	0.026	0.20	0.000024	0.00026	< 0.00005	0.019	0.00011	0.0060	< 0.002
23-Dec-15	78	500	505	8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	79	500	505	7.5	< 0.007	< 0.00001	0.00022	1.3	0.0055	< 0.01	0.00036	< 0.0001	< 0.003	0.74	< 0.00004	0.34	< 0.000002	0.10	0.022	0.70	0.0000060	0.00011	< 0.00005	0.016	0.000070	< 0.001	< 0.002
6-Jan-16	80	500	505	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	81	500	505	7.4	< 0.007	< 0.00001	0.00020	1.2	0.0059	< 0.01	0.00054	< 0.0001	< 0.003	0.75	0.00013	0.36	0.0000020	0.040	0.021	< 0.1	< 0.000005	0.00020	< 0.00005	0.015	0.000040	< 0.001	< 0.002
20-Jan-16	82	500	500	7.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	83	500	505	7.6	< 0.007	< 0.00001	0.00019	1.2	0.0062	< 0.01	0.00040	< 0.0001	< 0.003	0.72	< 0.00004	0.38	< 0.000002	0.040	0.024	< 0.1	0.000019	0.00018	< 0.00005	0.017	0.000070	< 0.001	< 0.002
3-Feb-16	84	500	505	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	85	500	500	7.5	< 0.007	< 0.00001	0.00020	1.4	0.0070	< 0.01	0.00043	< 0.0001	< 0.003	0.76	0.000060	0.37	0.000051	0.070	0.025	0.80	0.000022	0.00021	0.000090	0.016	0.000070	< 0.001	< 0.002
17-Feb-16	86	500	505	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	87	500	500	7.5	< 0.007	< 0.00001	0.00019	1.2	0.0059	0.010	0.00037	< 0.0001	< 0.003	0.66	< 0.00004	0.13	0.0000020	0.020	0.021	0.50	0.000012	0.00014	< 0.00005	0.013	0.000050	< 0.001	< 0.002

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Calculated Loading Rates for HC3 (GT)

Date	**Cycle**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**	**Cu**
	No.	Input	Output		umhos/cm	$mgCaCO_3$/kg/wk	$mgCaCO_3$/kg/wk	$mgCaCO_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
25-Jun-14	0	500	400	8.1	121	#N/A	1.9	14	2.0	0.52	0.096	0.12	10	0.026	0.0013	0.026	0.017	0.0000032	0.0000028	0.0044	0.0000024	2.6	0.000032	0.000067	0.00084
2-Jul-14	1	500	480	7.9	107	#N/A	2.7	19	6.2	0.34	0.062	0.14	14	0.021	0.0012	0.021	0.022	0.0000034	0.0000034	0.0039	0.0000014	3.6	0.000024	0.000076	0.00055
9-Jul-14	2	500	495	7.9	91	#N/A	0.82	17	4.0	0.15	0.054	0.15	13	0.017	0.0012	0.017	0.022	0.0000035	0.0000035	0.0037	0.0000015	3.4	0.000015	0.000027	0.00033
16-Jul-14	3	500	485	7.9	80	#N/A	0.96	16	2.4	0.097	0.049	0.15	13	0.023	0.0012	0.015	0.027	0.0000034	0.0000034	0.0033	0.0000015	3.3	0.000087	0.00014	0.00037
23-Jul-14	4	500	500	7.9	67	#N/A	1.0	16	2.0	0.10	0.040	0.15	13	0.027	0.00095	0.014	0.034	0.0000035	0.0000035	0.0032	0.0000015	3.5	0.000040	0.000071	0.00059
30-Jul-14	5	500	490	7.8	60	#N/A	1.2	15	2.0	0.098	0.029	0.15	11	0.025	0.00093	0.011	0.025	0.0000034	0.0000034	0.0023	0.0000015	2.8	0.000049	0.000049	0.00064
6-Aug-14	6	500	490	7.8	60	#N/A	1.0	14	1.5	0.098	0.034	0.15	12	0.015	0.00088	0.0099	0.023	0.0000034	0.0000034	0.0025	0.0000015	3.0	0.000015	0.000019	0.00014
13-Aug-14	7	500	480	7.8	55	#N/A	1.2	14	2.4	0.096	0.034	0.14	11	0.029	0.00072	0.0085	0.025	0.0000034	0.0000034	0.0025	0.0000014	2.8	0.000034	0.000023	0.00015
20-Aug-14	8	500	500	7.8	52	#N/A	0.91	14	2.0	0.10	0.030	0.15	12	0.013	0.00060	0.0081	0.025	0.0000035	0.0000035	0.0028	0.0000015	3.1	0.000020	0.000032	0.00017
27-Aug-14	9	500	505	7.9	59	#N/A	2.2	16	1.0	0.10	0.030	0.15	13	0.012	0.00066	0.0072	0.033	0.0000035	0.0000035	0.0054	0.0000015	3.5	0.000015	0.000015	0.00015
3-Sep-14	10	500	480	7.8	50	#N/A	2.0	13	2.4	0.096	0.029	0.14	11	0.013	0.00067	0.0070	0.024	0.0000034	0.0000034	0.0020	0.0000014	3.0	0.000014	0.000015	0.00033
10-Sep-14	11	500	515	7.9	54	#N/A	1.6	14	1.5	0.10	0.031	0.15	11	0.023	0.00057	0.0068	0.033	0.0000036	0.0000036	0.0030	0.0000015	3.1	0.000015	0.000018	0.00021
17-Sep-14	12	500	490	7.9	49	#N/A	3.2	13	2.0	0.098	0.029	0.15	9.6	0.012	0.00054	0.0055	0.021	0.0000034	0.0000034	0.0023	0.0000044	2.5	0.000015	0.000017	0.000069
24-Sep-14	13	500	480	7.9	48	#N/A	1.8	13	1.4	0.096	0.029	0.14	9.6	0.016	0.00058	0.0059	0.020	0.0000034	0.0000034	0.0015	0.0000014	2.5	0.000014	0.000048	0.000072
1-Oct-14	14	500	480	7.9	42	#N/A	2.9	13	0.96	0.096	0.029	0.14	9.1	0.015	0.00058	0.0047	0.018	0.0000034	0.0000034	0.0014	0.000024	2.4	0.000014	0.000048	0.0000096
8-Oct-14	15	500	500	7.7	47	#N/A	1.6	12	1.0	0.10	0.030	0.15	10	0.011	0.00050	0.0048	0.024	0.0000035	0.0000035	0.0066	0.0000015	2.7	0.000015	0.000015	0.000065
15-Oct-14	16	500	490	7.9	52	#N/A	2.3	13	1.5	0.098	0.029	0.15	11	0.025	0.00049	0.0065	0.028	0.0000034	0.0000034	0.0024	0.0000059	3.0	0.000015	0.000012	0.00011
22-Oct-14	17	500	510	7.8	52	#N/A	2.1	14	1.0	0.10	0.031	0.15	12	0.012	0.00051	0.0049	0.030	0.0000036	0.0000036	0.0030	0.0000051	3.2	0.000015	0.000014	0.000041
29-Oct-14	18	500	490	7.9	42	#N/A	3.4	13	0.98	0.098	0.029	0.15	9.2	0.012	0.00049	0.0044	0.022	0.0000034	0.0000034	0.0030	0.0000015	2.5	0.000015	0.0000098	0.00012
5-Nov-14	19	500	505	7.9	45	#N/A	#N/A	16	1.0	0.10	0.030	0.15	9.9	0.0097	0.00045	0.0041	0.025	0.0000035	0.0000035	0.0019	0.0000061	2.7	0.000015	0.000014	0.00028
12-Nov-14	20	500	505	7.4	48	#N/A	3.4	17	1.0	0.10	0.030	0.15	11	0.012	0.00045	0.0044	0.028	0.0000035	0.0000035	0.0023	0.0000015	3.1	0.000015	0.000016	0.00013
19-Nov-14	21	500	490	7.6	57	#N/A	3.2	16	0.98	0.098	0.029	0.15	9.6	0.016	0.00044	0.0038	0.026	0.0000034	0.0000034	0.0015	0.0000020	2.5	0.000015	0.000020	0.00015
26-Nov-14	22	500	505	7.7	43	#N/A	0.99	12	1.0	0.10	0.030	0.15	9.8	0.011	0.00045	0.0041	0.025	0.0000035	0.0000035	0.0013	0.0000015	2.6	0.000015	0.000015	0.000061
3-Dec-14	23	500	500	7.8	71	#N/A	1.5	17	1.0	0.10	0.030	0.15	10	0.0083	0.00045	0.0041	0.026	0.0000035	0.0000035	0.0017	0.0000015	2.7	0.000015	0.000016	0.000075
10-Dec-14	24	500	485	7.8	37	#N/A	2.2	11	0.97	0.097	0.029	0.15	10	0.0084	0.00034	0.0032	0.022	0.0000034	0.0000034	0.0012	0.0000015	3.0	0.000015	0.000013	0.00010
17-Dec-14	25	500	500	7.8	41	#N/A	1.9	12	1.0	0.10	0.030	0.15	9.5	0.017	0.00040	0.0040	0.029	0.0000035	0.0000035	0.0013	0.0000015	2.6	0.000015	0.0000080	0.000080
24-Dec-14	26	500	485	7.8	39	#N/A	1.5	11	0.97	0.097	0.029	0.15	8.9	0.015	0.00039	0.0031	0.025	0.0000034	0.0000034	0.00082	0.0000015	2.4	0.000015	0.000010	0.000082
31-Dec-14	27	500	505	7.6	44	#N/A	0.77	14	1.0	0.10	0.030	0.15	10	0.0095	0.00045	0.0034	0.028	0.0000035	0.0000035	0.00091	0.0000015	2.8	0.000015	0.0000091	0.000076
7-Jan-15	28	500	505	7.7	40	#N/A	1.3	12	1.0	0.51	0.030	0.15	10	0.0079	0.00045	0.0029	0.025	0.0000035	0.0000035	0.0011	0.0000015	2.8	0.000015	0.000016	0.00018
14-Jan-15	29	500	495	7.7	36	#N/A	1.1	11	0.99	0.50	0.030	0.15	8.6	0.0090	0.00040	0.0031	0.021	0.0000035	0.0000035	0.0012	0.0000015	2.3	0.000015	0.0000099	0.00057
21-Jan-15	30	500	500	8.0	37	#N/A	2.1	13	1.0	0.50	0.030	0.15	8.8	0.0099	0.00040	0.0026	0.022	0.0000035	0.0000035	0.00090	0.0000020	2.4	0.000015	0.000012	0.00016
28-Jan-15	31	500	490	7.6	38	#N/A	0.77	10	0.98	0.49	0.029	0.15	9.3	0.0099	0.00049	0.0029	0.023	0.0000034	0.0000034	0.0013	0.0000015	2.4	0.000015	0.0000093	0.00011
4-Feb-15	32	500	485	7.7	35	#N/A	1.1	9.8	0.97	0.49	0.029	0.15	7.6	0.0085	0.00039	0.0026	0.019	0.0000034	0.0000034	0.0012	0.0000015	1.9	0.000015	0.0000073	0.00036
11-Feb-15	33	500	500	7.6	36	#N/A	0.94	10	1.0	0.50	0.030	0.15	8.9	0.0098	0.00045	0.0026	0.020	0.0000035	0.0000035	0.0013	0.0000015	2.4	0.000015	0.000012	0.000080
18-Feb-15	34	500	485	7.7	35	#N/A	1.1	10	0.97	0.49	0.029	0.15	8.4	0.0092	0.00044	0.0025	0.020	0.0000034	0.0000034	0.0013	0.0000015	2.3	0.000015	0.000012	0.00015
25-Feb-15	35	500	475	7.9	37	#N/A	1.5	11	0.95	0.48	0.029	0.14	7.6	0.0063	0.00043	0.0022	0.019	0.0000033	0.0000033	0.00052	0.0000043	2.0	0.000014	0.000011	0.00026
4-Mar-15	36	500	485	7.6	36	#N/A	1.1	11	0.97	0.49	0.029	0.15	7.8	0.0075	0.00034	0.0022	0.019	0.0000034	0.0000034	0.00063	0.0000015	2.1	0.000024	0.0000068	0.00016
11-Mar-15	37	500	510	7.6	35	#N/A	0.96	11	1.0	0.51	0.031	0.15	8.2	0.0068	0.00041	0.0021	0.021	0.0000036	0.0000036	0.0011	0.000018	2.2	0.000031	0.000018	0.00079
18-Mar-15	38	500	490	7.7	37	#N/A	1.2	11	0.98	0.49	0.029	0.15	8.4	0.0095	0.00039	0.0020	0.019	0.0000034	0.0000034	0.00064	0.0000015	2.3	0.000015	0.000012	0.000083
25-Mar-15	39	500	485	7.7	37	#N/A	1.3	11	0.97	0.49	0.029	0.15	9.0	0.0068	0.00044	0.0024	0.021	0.0000034	0.0000034	0.0012	0.0000015	2.3	0.000039	0.0000063	0.00065
1-Apr-15	40	500	495	7.8	35	#N/A	1.7	12	0.99	0.50	0.030	0.15	6.8	0.0081	0.00040	0.0018	0.022	0.0000064	0.0000035	0.00099	0.0000030	1.7	0.000015	0.0000030	0.00016
8-Apr-15	41	500	475	7.6	38	#N/A	1.3	11	0.95	0.48	0.029	0.14	7.9	0.0087	0.00052	0.0021	0.020	0.0000033	0.0000033	0.00071	0.0000014	2.2	0.000014	0.000015	0.00020
15-Apr-15	42	500	480	7.8	37	#N/A	1.9	12	0.96	0.48	0.029	0.14	8.1	0.0078	0.00038	0.0020	0.019	0.0000034	0.0000034	0.0020	0.0000014	2.1	0.000014	0.0000019	0.00048
22-Apr-15	43	500	495	7.7	37	#N/A	1.6	12	1.5	0.50	0.030	0.15	8.3	0.0080	0.00035	0.0019	0.020	0.0000035	0.0000035	0.0017	0.0000015	2.2	0.000015	0.0000074	0.00025
29-Apr-15	44	500	500	7.6	34	#N/A	1.0	10	1.0	0.50	0.030	0.15	8.2	0.0097	0.00040	0.0018	0.021	0.0000035	0.0000035	0.0012	0.0000015	2.2	0.000015	0.000011	0.00014
6-May-15	45	500	510	7.7	38	#N/A	1.2	12	1.0	0.51	0.031	0.15	8.4	0.0096	0.00046	0.0030	0.021	0.0000036	0.0000036	0.00087	0.0000015	2.3	0.000015	0.0000087	0.00033
13-May-15	46	500	505																						
20-May-15	47	505	490																						
27-May-15	48	490	510																						
3-Jun-15	49	510	500	7.9	106	#N/A	1.6	6.8	0.25	0.13	0.0075	0.038	6.5	0.0014	0.00019	0.00061	0.015	0.00000088	0.00000088	0.00061	0.00000038	1.8	0.0000038	0.0000053	0.00028
10-Jun-15	50	500	490																						
17-Jun-15	51	490	500																						
24-Jun-15	52	500	480																						
1-Jul-15	53	480	495	7.9	116	#N/A	1.8	7.0	0.25	0.12	0.0074	0.037	6.2	0.0019	0.00022	0.00078	0.015	0.00000087	0.00000087	0.00058	0.00000037	1.7	0.0000037	0.0000051	0.000062
8-Jul-15	54	500	490																						
15-Jul-15	55	490	490																						
22-Jul-15	56	490	490																						
29-Jul-15	57	490	485	8.0	108	#N/A	1.1	6.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5-Aug-15	58	500	510																						
12-Aug-15	59	510	495																						
19-Aug-15	60	495	485																						
26-Aug-15	61	485	490	8.0	106	#N/A	0.83	6.7	0.25	0.12	0.0074	0.037	6.1	0.0018	0.00018	0.00060	0.016	0.00000086	0.00000086	0.00060	0.0000012	1.7	0.0000074	0.0000055	0.000082
2-Sep-15	62	500	490																						
9-Sep-15	63	490	485																						
16-Sep-15	64	485	460																						
23-Sep-15	65	460	460	7.9	109	#N/A	0.92	6.0	0.23				5.9	0.0012	0.00018	0.00058	0.015	0.00000081	0.00000081	0.00059	0.00000035	1.7	0.0000035	0.0000046	0.000043
30-Sep-15	66	500	505																						
7-Oct-15	67	505	495																						
14-Oct-15	68	495	490																						
21-Oct-15	69	490	470	8.0	99	#N/A	0.63	6.1	0.24				5.8	0.0014	0.00016	0.00051	0.014	0.00000082	0.00000082	0.00048	0.00000035	1.6	0.0000035	0.0000042	0.000039
28-Oct-15	70	500	490																						
4-Nov-15	71	490	490																						
11-Nov-15	72	490	485																						
18-Nov-15	73	485	485	8.0	98	#N/A	0.60	6.7	0.24				5.3	0.0015	0.00017	0.00050	0.011	0.00000085	0.00000085	0.00027	0.00000036	1.4	0.0000061	0.0000063	0.000047
25-Nov-15	74	500	500	7.7	37	#N/A	0.34	12	1.0				8.8	0.011	0.00035	0.0021	0.023	0.0000035	0.0000035	0.0011	0.0000015	2.4	0.000015	0.000024	0.00019
2-Dec-15	75	500	500	7.5	36	#N/A	1.2	10	1.0				8.9	0.0085	0.00035	0.0018	0.023	0.0000035	0.0000035	0.00095	0.0000015	2.4	0.000015	0.0000090	0.00011
9-Dec-15	76	500	505	7.7	36	#N/A	1.5	11	1.0				8.6	0.011	0.00035	0.0018	0.024	0.0000076	0.0000045	0.0020	0.0000035	2.4	0.000015	0.000012	0.00016
16-Dec-15	77	500	500	7.7	35	#N/A	1.3	8.6	1.0				9.5	0.012	0.00030	0.0021	0.025	0.0000035	0.0000035	0.0012	0.000013	2.6	0.000025	0.0000085	0.00023
23-Dec-15	78	500	505	8.1	34	#N/A	1.1	8.5	1.0				8.9	0.0096	0.00028	0.0018	0.024	0.0000035	0.0000035	0.0010	0.0000073	2.5	0.000020	0.0000063	0.00017
30-Dec-15	79	500	505	7.5	33	#N/A	0.83	8.5	1.0				8.4	0.0072	0.00025	0.0016	0.022	0.0000035	0.0000035	0.00086	0.0000015	2.3	0.000015	0.0000040	0.00012
6-Jan-16	80	500	505	7.4	36	#N/A	0.86	8.6	1.0				8.2	0.0071	0.00028	0.0015	0.022	0.0000035	0.0000035	0.00093	0.0000015	2.3	0.000015	0.0000030	0.00015
13-Jan-16	81	500	505	7.4	34	#N/A	0.89	8.7	1.0				8.0	0.0071	0.00030	0.0015	0.021	0.0000035	0.0000035	0.0010	0.0000015	2.2	0.000015	0.0000020	0.00018
20-Jan-16	82	500	500	7.6	37	#N/A	1.2	9.0	1.0				8.2	0.0071	0.00028	0.0015	0.022	0.0000035	0.0000035	0.0010	0.0000015	2.3	0.000015	0.0000051	0.00015
27-Jan-16	83	500	505	7.6	34	#N/A	1.6	9.2	1.0				8.3	0.0072	0.00025	0.0016	0.023	0.0000035	0.0000035	0.0010	0.0000015	2.3	0.000015	0.0000081	0.00012
3-Feb-16	84	500	505	7.7	38	#N/A	1.4	9.6	1.0				8.5	0.0074	0.00028	0.0016	0.024	0.0000035	0.0000035	0.0010	0.0000015	2.3	0.000015	0.0000088	0.00013
10-Feb-16	85	500	500	7.5	38	#N/A	1.2	10	1.0				8.7	0.0076	0.00030	0.0016	0.025	0.0000035	0.0000035	0.0010	0.0000015	2.3	0.000015	0.0000095	0.00014
17-Feb-16	86	500	505	7.7	39	#N/A	1.2	9.3	1.0				8.2	0.0073	0.00028	0.0015	0.024	0.0000035	0.0000035	0.0010	0.0000015	2.3	0.000015	0.0000070	0.000098
24-Feb-16	87	500	500	7.5	32	#N/A	1.2	8.5	1.0				7.8	0.0070	0.00025	0.0014	0.022	0.0000035	0.0000035	0.0010	0.0000015	2.2	0.000015	0.0000045	0.000060

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Calculated Loading Rates for HC3 (GT)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
25-Jun-14	0	500	400	8.1	0.0048	0.000012	0.00083	0.87	0.0025	0.012	0.0053	0.00040	0.011	2.0	0.00017	0.57	0.00000080	4.4	0.016	3.3	0.000034	0.000040	0.00013	0.0038	0.00014	0.00080	0.00080
2-Jul-14	1	500	480	7.9	0.0029	0.0000048	0.00089	1.2	0.0049	0.0096	0.0034	0.00048	0.0058	1.8	0.00011	0.52	0.00000096	3.8	0.022	2.8	0.000028	0.0018	0.000091	0.014	0.00012	0.00048	0.00096
9-Jul-14	2	500	495	7.9	0.00099	0.0000050	0.00079	1.1	0.0043	0.0050	0.0029	0.00030	0.0079	1.6	0.000045	0.51	0.00000099	2.6	0.020	1.8	0.000025	0.00045	0.000025	0.016	0.000094	0.00050	0.00099
16-Jul-14	3	500	485	7.9	0.0078	0.0000049	0.00068	1.1	0.0036	0.0049	0.0027	0.00024	0.0044	1.4	0.000029	0.48	0.00000097	1.8	0.020	1.1	0.000024	0.000068	0.00013	0.015	0.00010	0.00049	0.00097
23-Jul-14	4	500	500	7.9	0.012	0.000025	0.00062	1.0	0.0048	0.0050	0.0018	0.00015	0.0045	1.2	0.000020	0.48	0.0000010	1.2	0.021	0.76	0.000022	0.0010	0.00016	0.014	0.000090	0.00050	0.0010
30-Jul-14	5	500	490	7.8	0.0074	0.0000098	0.00056	0.95	0.0045	0.0049	0.0018	0.000098	0.0044	1.0	0.000020	0.41	0.00000098	0.86	0.018	0.56	0.000020	0.000054	0.00024	0.014	0.00011	0.00049	0.00098
6-Aug-14	6	500	490	7.8	0.00098	0.0000049	0.00051	1.0	0.0038	0.0049	0.0016	0.000098	0.0044	1.1	0.000020	0.43	0.00000098	0.72	0.019	0.49	0.000019	0.000083	0.000029	0.015	0.00012	0.00049	0.00098
13-Aug-14	7	500	480	7.8	0.0048	0.0000096	0.00048	0.93	0.0040	0.0048	0.0015	0.000096	0.0072	0.92	0.000019	0.41	0.00000096	0.52	0.017	0.37	0.000018	0.00041	0.00023	0.014	0.000038	0.00048	0.00096
20-Aug-14	8	500	500	7.8	0.0010	0.0000050	0.00044	1.0	0.0046	0.0050	0.0013	0.000050	0.0045	0.96	0.000020	0.40	0.0000010	0.44	0.020	0.35	0.000015	0.00062	0.000025	0.016	0.000075	0.00050	0.0010
27-Aug-14	9	500	505	7.9	0.0010	0.0000051	0.00038	0.93	0.0057	0.0051	0.0013	0.000051	0.0045	0.83	0.000020	0.37	0.0000010	0.30	0.020	0.32	0.000019	0.00048	0.000056	0.015	0.000071	0.00051	0.0010
3-Sep-14	10	500	480	7.8	0.0034	0.000024	0.00037	0.87	0.0045	0.0048	0.0011	0.000048	0.0048	0.85	0.000043	0.39	0.0000091	0.27	0.017	0.58	0.000019	0.000048	0.00018	0.014	0.000077	0.00048	0.00096
10-Sep-14	11	500	515	7.9	0.0057	0.000031	0.00035	0.88	0.0051	0.0052	0.00093	0.000052	0.0015	0.80	0.000021	0.40	0.0000010	0.23	0.018	0.26	0.000020	0.00040	0.00016	0.013	0.000082	0.00052	0.0010
17-Sep-14	12	500	490	7.9	0.0034	0.0000049	0.00033	0.81	0.0042	0.0049	0.00092	0.000049	0.0015	0.73	0.000020	0.33	0.00000098	0.21	0.016	0.44	0.000012	0.000069	0.000025	0.014	0.000064	0.00049	0.00098
24-Sep-14	13	500	480	7.9	0.00096	0.0000096	0.00032	0.81	0.0029	0.0048	0.00091	0.000048	0.0043	0.69	0.000019	0.31	0.0000024	0.17	0.016	0.22	0.000012	0.000038	0.000024	0.015	0.000067	0.00048	0.00096
1-Oct-14	14	500	480	7.9	0.011	0.0000048	0.00024	0.78	0.0057	0.0048	0.00077	0.000048	0.0043	0.65	0.000019	0.33	0.00000096	0.13	0.015	0.35	0.0000048	0.000072	0.000091	0.013	0.000062	0.00096	0.00096
8-Oct-14	15	500	500	7.7	0.0035	0.0000050	0.00031	0.81	0.0043	0.0050	0.00075	0.000050	0.0015	0.68	0.000020	0.30	0.0000010	0.13	0.016	0.45	0.000013	0.00024	0.000025	0.013	0.000070	0.00050	0.0010
15-Oct-14	16	500	490	7.9	0.0039	0.00015	0.00031	0.83	0.0035	0.0049	0.00077	0.000049	0.0015	0.66	0.000020	0.32	0.00000098	0.14	0.017	0.34	0.000016	0.00020	0.00012	0.015	0.000083	0.00098	0.00098
22-Oct-14	17	500	510	7.8	0.0036	0.000010	0.00028	0.95	0.0047	0.0051	0.00077	0.000051	0.0015	0.69	0.000020	0.35	0.0000010	0.12	0.018	0.31	0.000019	0.00017	0.000026	0.016	0.000056	0.00051	0.0010
29-Oct-14	18	500	490	7.9	0.0034	0.000069	0.00025	0.73	0.0035	0.0049	0.00063	0.000049	0.0015	0.55	0.000020	0.27	0.00000098	0.088	0.014	0.15	0.000015	0.00013	0.000039	0.013	0.000049	0.00049	0.00098
5-Nov-14	19	500	505	7.9	0.0035	0.000010	0.00023	0.80	0.0035	0.0051	0.00074	0.000051	0.0015	0.56	0.000020	0.30	0.0000010	0.10	0.015	0.20	0.000019	0.00052	0.000061	0.014	0.000045	0.00051	0.0010
12-Nov-14	20	500	505	7.4	0.0035	0.0000051	0.00022	0.83	0.0048	0.0051	0.00080	0.000051	0.0015	0.57	0.000020	0.30	0.0000010	0.086	0.022	0.20	0.000015	0.00048	0.000040	0.014	0.000056	0.00051	0.0010
19-Nov-14	21	500	490	7.6	0.0049	0.000015	0.00023	0.80	0.0044	0.0049	0.00059	0.000049	0.0015	0.54	0.000020	0.27	0.00000098	0.083	0.015	0.15	0.000014	0.00027	0.00015	0.013	0.000054	0.00049	0.00098
26-Nov-14	22	500	505	7.7	0.0035	0.0000051	0.00025	0.83	0.0045	0.0051	0.00058	0.000051	0.0051	0.55	0.000020	0.30	0.0000010	0.076	0.016	0.20	0.000014	0.00015	0.000051	0.013	0.000051	0.00051	0.0010
3-Dec-14	23	500	500	7.8	0.0035	0.0000050	0.00024	0.86	0.0042	0.0050	0.00057	0.000050	0.0015	0.53	0.000020	0.26	0.0000010	0.080	0.015	0.20	0.000013	0.000080	0.000030	0.014	0.000055	0.00050	0.0010
10-Dec-14	24	500	485	7.8	0.0034	0.0000049	0.00018	0.67	0.0039	0.0049	0.00049	0.000049	0.0015	0.43	0.000019	0.28	0.00000097	0.058	0.013	0.29	0.000011	0.00014	0.000024	0.011	0.000034	0.00049	0.00097
17-Dec-14	25	500	500	7.8	0.0035	0.0000050	0.00022	0.75	0.0044	0.0050	0.00053	0.000050	0.0015	0.50	0.000020	0.25	0.0000010	0.060	0.015	0.15	0.000013	0.00024	0.000045	0.012	0.000070	0.00050	0.0010
24-Dec-14	26	500	485	7.8	0.0034	0.0000049	0.00018	0.70	0.0037	0.0049	0.00042	0.000049	0.0015	0.44	0.000019	0.23	0.00000097	0.053	0.013	0.15	0.000011	0.00010	0.000039	0.011	0.000063	0.00049	0.00097
31-Dec-14	27	500	505	7.6	0.0035	0.0000051	0.00021	0.80	0.0039	0.0051	0.00046	0.000051	0.0015	0.52	0.000020	0.30	0.0000010	0.056	0.016	0.20	0.000011	0.000096	0.000030	0.014	0.000045	0.00051	0.0010
7-Jan-15	28	500	505	7.7	0.0035	0.0000051	0.00019	0.81	0.0040	0.0051	0.00045	0.000051	0.0015	0.49	0.000020	0.25	0.0000010	0.051	0.016	0.10	0.000012	0.00011	0.000025	0.012	0.000051	0.00051	0.0010
14-Jan-15	29	500	495	7.7	0.0035	0.000064	0.00015	0.69	0.0034	0.0050	0.00047	0.000050	0.0015	0.43	0.000020	0.23	0.0000020	0.045	0.013	0.050	0.0000094	0.000089	0.000025	0.011	0.000050	0.00050	0.00099
21-Jan-15	30	500	500	8.0	0.0035	0.000030	0.00016	0.67	0.0033	0.0050	0.00044	0.000050	0.0015	0.43	0.000020	0.23	0.0000010	0.045	0.013	0.050	0.0000095	0.000060	0.000040	0.011	0.000050	0.00050	0.0010
28-Jan-15	31	500	490	7.6	0.0034	0.0000049	0.00015	0.78	0.0034	0.0049	0.00084	0.000049	0.0015	0.48	0.000039	0.27	0.00000098	0.049	0.012	0.39	0.000013	0.000093	0.000034	0.012	0.000044	0.00049	0.00098
4-Feb-15	32	500	485	7.7	0.0034	0.0000097	0.00017	0.66	0.0029	0.0049	0.00043	0.000049	0.0015	0.40	0.000019	0.21	0.00000097	0.044	0.013	0.24	0.0000092	0.000097	0.000034	0.010	0.000044	0.00049	0.00097
11-Feb-15	33	500	500	7.6	0.0035	0.0000050	0.00016	0.69	0.0032	0.0050	0.00050	0.000050	0.0015	0.43	0.00050	0.22	0.0000010	0.040	0.013	0.10	0.000011	0.00013	0.000025	0.011	0.000070	0.00050	0.0010
18-Feb-15	34	500	485	7.7	0.0034	0.0000049	0.00018	0.67	0.0033	0.0049	0.00036	0.000049	0.0015	0.42	0.00049	0.22	0.00000097	0.039	0.014	0.097	0.000012	0.00011	0.000029	0.012	0.000044	0.00049	0.00097
25-Feb-15	35	500	475	7.9	0.0033	0.000057	0.00014	0.64	0.0027	0.0048	0.00038	0.000048	0.0014	0.40	0.00048	0.20	0.00000095	0.038	0.012	0.048	0.000015	0.000100	0.000024	0.011	0.000033	0.0014	0.00095
4-Mar-15	36	500	485	7.6	0.0034	0.0000049	0.00015	0.61	0.0026	0.0049	0.00038	0.000049	0.0015	0.38	0.00049	0.24	0.00000097	0.034	0.012	0.34	0.0000092	0.000097	0.000024	0.011	0.000039	0.00049	0.00097
11-Mar-15	37	500	510	7.6	0.0056	0.000066	0.00019	0.64	0.0031	0.0051	0.00037	0.000051	0.0015	0.37	0.00051	0.19	0.0000010	0.026	0.012	0.051	0.0000061	0.00018	0.000026	0.010	0.000051	0.0082	0.0010
18-Mar-15	38	500	490	7.7	0.0034	0.0000049	0.00015	0.66	0.0033	0.0049	0.00035	0.000049	0.0015	0.39	0.00049	0.21	0.00000098	0.029	0.013	0.29	0.0000074	0.000088	0.000034	0.010	0.000039	0.00049	0.00098
25-Mar-15	39	500	485	7.7	0.0034	0.0000049	0.00012	0.77	0.0030	0.0049	0.00043	0.000049	0.0015	0.42	0.00049	0.22	0.00000097	0.073	0.014	0.29	0.0000049	0.00020	0.000097	0.012	0.000087	0.00049	0.00097
1-Apr-15	40	500	495	7.8	0.0035	0.0000099	0.00011	0.61	0.0067	0.0050	0.00030	0.000050	0.0015	0.38	0.00050	0.14	0.00000099	0.36	0.012	0.050	0.0000074	0.00011	0.000025	0.014	0.000030	0.00050	0.00099
8-Apr-15	41	500	475	7.6	0.0033	0.0000048	0.00013	0.60	0.0031	0.0048	0.00034	0.000048	0.0014	0.36	0.00048	0.23	0.00000095	0.033	0.012	0.048	0.0000052	0.00015	0.000024	0.010	0.000048	0.00048	0.00095
15-Apr-15	42	500	480	7.8	0.0034	0.0000048	0.00013	0.69	0.0028	0.0048	0.00033	0.000048	0.0014	0.37	0.00048	0.19	0.00000096	0.034	0.013	0.14	0.0000029	0.00031	0.000062	0.011	0.000043	0.00048	0.00096
22-Apr-15	43	500	495	7.7	0.0035	0.000020	0.00013	0.68	0.0028	0.0050	0.00028	0.000050	0.0015	0.37	0.00050	0.21	0.0000020	0.025	0.013	0.20	0.000012	0.00027	0.000025	0.010	0.000050	0.00050	0.00099
29-Apr-15	44	500	500	7.6	0.0035	0.000010	0.00014	0.67	0.0034	0.0050	0.00031	0.000050	0.0015	0.39	0.00050	0.19	0.0000010	0.020	0.012	0.30	0.0000085	0.00014	0.000040	0.0093	0.000035	0.00050	0.0010
6-May-15	45	500	510	7.7	0.0036	0.000010	0.00013	0.67	0.0034	0.0051	0.00031	0.000051	0.0015	0.40	0.00051	0.22	0.0000010	0.031	0.013	0.15	0.0000082	0.00014	0.000051	0.010	0.000061	0.0010	0.0010
13-May-15	46	500	505																								
20-May-15	47	505	490																								
27-May-15	48	490	510																								
3-Jun-15	49	510	500	7.9	0.00088	0.0000038	0.000070	0.48	0.0020	0.0013	0.00017	0.000013	0.00038	0.23	0.0000050	0.14	0.00000025	0.018	0.0091	0.10	0.0000041	0.00019	0.0000063	0.0074	0.000018	0.00025	0.00025
10-Jun-15	50	500	490																								
17-Jun-15	51	490	500																								
24-Jun-15	52	500	480																								
1-Jul-15	53	480	495	7.9	0.00087	0.0000012	0.000073	0.48	0.0019	0.0012	0.00019	0.000012	0.00037	0.21	0.0000062	0.14	0.00000025	0.020	0.0094	0.099	0.0000051	0.000094	0.0000062	0.0076	0.000012	0.00012	0.00025
8-Jul-15	54	500	490																								
15-Jul-15	55	490	490																								
22-Jul-15	56	490	490																								
29-Jul-15	57	490	485	8.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5-Aug-15	58	500	510																								
12-Aug-15	59	510	495																								
19-Aug-15	60	495	485																								
26-Aug-15	61	485	490	8.0	0.00086	0.000016	0.000068	0.46	0.0017	0.0012	0.00021	0.000012	0.00037	0.21	0.0000049	0.14	0.00000025	0.013	0.0091	0.12	0.0000051	0.000062	0.0000061	0.0073	0.000015	0.00025	0.00025
2-Sep-15	62	500	490																								
9-Sep-15	63	490	485																								
16-Sep-15	64	485	460																								
23-Sep-15	65	460	460	7.9	0.00081	0.0000012	0.000059	0.43	0.0015	0.0012	0.00020	0.000012	0.00035	0.20	0.0000046	0.13	0.00000023	0.016	0.0079	0.092	0.0000037	0.00012	0.0000058	0.0059	0.0000092	0.00012	0.00023
30-Sep-15	66	500	505																								
7-Oct-15	67	505	495																								
14-Oct-15	68	495	490																								
21-Oct-15	69	490	470	8.0	0.00082	0.0000024	0.000061	0.45	0.0013	0.0012	0.00012	0.000012	0.00035	0.21	0.000012	0.13	0.0000033	0.025	0.0078	0.094	0.0000040	0.000088	0.0000082	0.0059	0.000011	0.00012	0.00024
28-Oct-15	70	500	490																								
4-Nov-15	71	490	490																								
11-Nov-15	72	490	485																								
18-Nov-15	73	485	485	8.0	0.0022	0.0000012	0.000055	0.42	0.0015	0.0012	0.00024	0.000012	0.00036	0.20	0.000017	0.12	0.00000036	0.018	0.0073	0.073	0.0000040	0.000087	0.0000085	0.0051	0.000011	0.00012	0.00024
25-Nov-15	74	500	500	7.7	0.0035	0.000010	0.00013	0.67	0.0036	0.0050	0.00040	0.000050	0.0015	0.46	0.00016	0.21	0.0040	0.035	0.013	0.20	0.000012	0.00012	0.000050	0.0085	0.000040	0.00050	0.0010
2-Dec-15	75	500	500	7.5	0.0035	0.000015	0.00013	0.68	0.0031	0.0050	0.00021	0.000050	0.0015	0.43	0.000020	0.22	0.0000010	0.025	0.012	0.25	0.0000025	0.00012	0.000025	0.0090	0.000035	0.00050	0.0010
9-Dec-15	76	500	505	7.7	0.0035	0.0000051	0.00012	0.65	0.0034	0.0051	0.00030	0.000051	0.0015	0.41	0.000030	0.19	0.0000035	0.025	0.012	0.15	0.000019	0.00013	0.000030	0.0091	0.000045	0.00051	0.0010
16-Dec-15	77	500	500	7.7	0.0035	0.000085	0.00014	0.71	0.0036	0.0050	0.00026	0.000050	0.0015	0.45	0.000020	0.23	0.0000010	0.025	0.013	0.10	0.000012	0.00013	0.000025	0.0097	0.000055	0.0030	0.0010
23-Dec-15	78	500	505	8.1	0.0035	0.000045	0.00012	0.67	0.0032	0.0050	0.00022	0.000050	0.0015	0.41	0.000020	0.20	0.0000010	0.038	0.012	0.23	0.0000075	0.000093	0.000025	0.0089	0.000045	0.0018	0.0010
30-Dec-15	79	500	505	7.5	0.0035	0.0000051	0.00011	0.63	0.0028	0.0051	0.00018	0.000051	0.0015	0.37	0.000020	0.17	0.0000010	0.051	0.011	0.35	0.0000030	0.000056	0.000025	0.0080	0.000035	0.00051	0.0010
6-Jan-16	80	500	505	7.4	0.0035	0.0000051	0.00011	0.62	0.0029	0.0051	0.00023	0.000051	0.0015	0.38	0.000043	0.18	0.0000010	0.035	0.011	0.20	0.0000028	0.000078	0.000025	0.0078	0.000028	0.00051	0.0010
13-Jan-16	81	500	505	7.4	0.0035	0.0000051	0.00010	0.61	0.0030	0.0051	0.00027	0.000051	0.0015	0.38	0.000066	0.18	0.0000010	0.020	0.011	0.051	0.0000025	0.00010	0.000025	0.0076	0.000020	0.00051	0.0010
20-Jan-16	82	500	500	7.6	0.0035	0.0000051	0.000099	0.61	0.0030	0.0051	0.00024	0.000051	0.0015	0.37	0.000043	0.19	0.0000010	0.020	0.011	0.051	0.0000061	0.000096	0.000025	0.0080	0.000028	0.00051	0.0010
27-Jan-16	83	500	505	7.6	0.0035	0.0000051	0.000096	0.62	0.0031	0.0051	0.00020	0.000051	0.0015	0.36	0.000020	0.19	0.0000010	0.020	0.012	0.051	0.0000096	0.000091	0.000025	0.0083	0.000035	0.00051	0.0010
3-Feb-16	84	500	505	7.7	0.0035	0.0000050	0.000099	0.65	0.0033	0.0050	0.00021	0.000050	0.0015	0.37	0.000025	0.19	0.000013	0.028	0.012	0.23	0.000010	0.000098	0.000035	0.0081	0.000035	0.00050	0.0010
10-Feb-16	85	500	500	7.5	0.0035	0.0000050	0.00010	0.69	0.0035	0.0050	0.00022	0.000050	0.0015	0.38	0.000030	0.19	0.000026	0.035	0.012	0.40	0.000011	0.00011	0.000045	0.0079	0.000035	0.00050	0.0010
17-Feb-16	86	500	505	7.7	0.0035	0.0000050	0.000098	0.64	0.0032	0.0050	0.00020	0.000050	0.0015	0.35	0.000025	0.13	0.000013	0.023	0.012	0.33	0.0000085	0.000088	0.000035	0.0072	0.000030	0.00050	0.0010
24-Feb-16	87	500	500	7.5	0.0035	0.0000050	0.000095	0.58	0.0030	0.0050	0.00019	0.000050	0.0015	0.33	0.000020	0.065	0.0000010	0.010	0.011	0.25	0.0000060	0.000070	0.000025	0.0066	0.000025	0.00050	0.0010

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for HC4 (GS)

Date	Cycle	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu
	No.	Input	Output		umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
25-Jun-14	0	500	335	7.8	547	#N/A	7.1	53	163	1.7	0.19	< 0.3	194	0.029	0.0045	0.028	0.020	< 0.000007	< 0.000007	0.011	< 0.000003	39	0.000080	0.00025	0.0031
2-Jul-14	1	500	505	7.8	446	#N/A	7.8	59	144	0.60	0.16	< 0.3	168	0.024	0.0066	0.032	0.015	< 0.000007	< 0.000007	0.0093	< 0.000003	34	< 0.00003	0.00022	0.0015
9-Jul-14	2	500	475	7.9	258	#N/A	2.1	60	58	< 0.2	0.16	< 0.3	93	0.031	0.0074	0.023	0.019	< 0.000007	< 0.000007	0.0096	< 0.000003	19	< 0.00003	0.000098	0.00079
16-Jul-14	3	500	500	8.0	176	#N/A	2.6	60	17	< 0.2	0.12	< 0.3	67	0.037	0.0068	0.019	0.018	< 0.000007	< 0.000007	0.0067	< 0.000003	14	0.00020	0.00027	0.00065
23-Jul-14	4	500	495	8.0	124	#N/A	2.3	50	9.0	< 0.2	0.10	< 0.3	53	0.044	0.0054	0.018	0.018	< 0.000007	< 0.000007	0.0059	< 0.000003	11	0.000090	0.00014	0.00045
30-Jul-14	5	500	480	8.0	121	#N/A	1.7	59	8.0	< 0.2	0.090	< 0.3	51	0.050	0.0055	0.017	0.018	< 0.000007	< 0.000007	0.0053	< 0.000003	11	0.00010	0.00010	0.0013
6-Aug-14	6	500	485	7.9	104	#N/A	2.0	47	5.0	< 0.2	0.080	< 0.3	46	0.048	0.0048	0.013	0.017	< 0.000007	< 0.000007	0.0044	< 0.000003	9.9	< 0.00003	0.000041	0.00048
13-Aug-14	7	500	485	7.9	85	#N/A	2.3	41	6.0	< 0.2	< 0.06	< 0.3	38	0.058	0.0035	0.011	0.017	< 0.000007	< 0.000007	0.0039	< 0.000003	8.5	0.000050	0.000043	0.00047
20-Aug-14	8	500	480	7.9	78	#N/A	1.9	38	5.0	< 0.2	< 0.06	< 0.3	36	0.055	0.0029	0.011	0.015	< 0.000007	< 0.000007	0.0036	< 0.000003	8.2	0.000070	0.000053	0.00042
27-Aug-14	9	500	500	7.9	103	#N/A	5.3	46	4.0	< 0.2	0.060	< 0.3	44	0.049	0.0041	0.011	0.020	< 0.000007	< 0.000007	0.0075	< 0.000003	10	< 0.00003	0.000025	0.00023
3-Sep-14	10	500	475	7.8	99	#N/A	4.8	45	5.0	< 0.2	< 0.06	< 0.3	44	0.051	0.0040	0.013	0.021	< 0.000007	< 0.000007	0.0033	< 0.000003	11	< 0.00003	0.000027	0.00077
10-Sep-14	11	500	505	7.9	93	#N/A	3.7	42	4.0	< 0.2	< 0.06	< 0.3	38	0.057	0.0038	0.011	0.019	< 0.000007	< 0.000007	0.0040	< 0.000003	9.2	< 0.00003	0.000021	0.00040
17-Sep-14	12	500	490	7.9	93	#N/A	7.3	45	5.0	< 0.2	< 0.06	< 0.3	38	0.057	0.0039	0.010	0.020	< 0.000007	< 0.000007	0.0037	0.0000040	9.0	< 0.00003	0.000021	0.00016
24-Sep-14	13	500	485	7.9	78	#N/A	3.4	38	6.0	< 0.2	< 0.06	< 0.3	34	0.054	0.0040	0.0082	0.016	< 0.000007	< 0.000007	0.0025	< 0.000003	8.0	< 0.00003	0.00011	0.00017
1-Oct-14	14	500	480	7.8	63	#N/A	6.2	35	3.0	< 0.2	< 0.06	< 0.3	29	0.047	0.0038	0.0063	0.014	< 0.000007	< 0.000007	0.0019	< 0.000003	7.0	< 0.00003	0.00	< 0.00002
8-Oct-14	15	500	490	7.7	65	#N/A	3.0	27	< 2	< 0.2	< 0.06	< 0.3	28	0.041	0.0028	0.0065	0.013	< 0.000007	< 0.000007	0.0098	< 0.000003	6.9	< 0.00003	0.000015	0.00014
15-Oct-14	16	500	480	7.8	68	#N/A	4.9	29	3.0	< 0.2	< 0.06	< 0.3	29	0.045	0.0032	0.0068	0.014	< 0.000007	< 0.000007	0.0042	< 0.000003	7.3	< 0.00003	0.000017	0.00012
22-Oct-14	17	500	500	7.8	87	#N/A	5.0	39	4.0	< 0.2	< 0.06	< 0.3	38	0.047	0.0047	0.0083	0.022	< 0.000007	< 0.000007	0.0050	< 0.000003	9.2	< 0.00003	0.000025	0.00011
29-Oct-14	18	500	490	7.7	63	#N/A	7.5	31	2.0	< 0.2	< 0.06	< 0.3	28	0.046	0.0030	0.0055	0.013	< 0.000007	< 0.000007	0.0047	< 0.000003	6.9	< 0.00003	0.000016	0.00055
5-Nov-14	19	500	475	7.8	57	#N/A	#N/A	36	< 2	< 0.2	< 0.06	< 0.3	25	0.036	0.0027	0.0050	0.013	< 0.000007	< 0.000007	0.0026	0.000016	6.3	< 0.00003	0.000019	0.00052
12-Nov-14	20	500	505	7.8	89	#N/A	6.5	34	2.0	< 0.2	< 0.06	< 0.3	41	0.048	0.0049	0.0089	0.020	< 0.000007	< 0.000007	0.0033	< 0.000003	10	< 0.00003	0.000022	0.00028
19-Nov-14	21	500	480	7.9	94	#N/A	6.5	34	< 2	< 0.2	< 0.06	< 0.3	29	0.052	0.0029	0.0064	0.014	< 0.000007	< 0.000007	0.0021	< 0.000003	7.4	< 0.00003	0.000020	0.00033
26-Nov-14	22	500	490	7.8	62	#N/A	2.0	29	< 2	< 0.2	< 0.06	< 0.3	28	0.045	0.0031	0.0061	0.017	< 0.000007	< 0.000007	0.0023	0.0000030	7.1	< 0.00003	0.000018	0.00029
3-Dec-14	23	500	485	7.7	59	#N/A	2.9	29	< 2	< 0.2	< 0.06	< 0.3	29	0.049	0.0029	0.0064	0.015	< 0.000007	< 0.000007	0.0027	< 0.000003	7.5	< 0.00003	0.000014	0.00016
10-Dec-14	24	500	500	7.8	56	#N/A	4.9	29	< 2	< 0.2	< 0.06	< 0.3	26	0.043	0.0029	0.0054	0.013	< 0.000007	< 0.000007	0.0021	0.0000030	6.7	< 0.00003	0.000012	0.00024
17-Dec-14	25	500	485	7.8	64	#N/A	3.8	31	< 2	< 0.2	< 0.06	< 0.3	30	0.061	0.0032	0.0078	0.016	< 0.000007	< 0.000007	0.0019	< 0.000003	7.7	< 0.00003	0.000011	0.00029
24-Dec-14	26	500	480	7.8	74	#N/A	3.3	36	< 2	< 0.2	< 0.06	< 0.3	34	0.060	0.0041	0.0078	0.020	< 0.000007	< 0.000007	0.0016	< 0.000003	8.8	< 0.00003	0.000015	0.00020
31-Dec-14	27	500	500	7.8	71	#N/A	1.4	48	< 2	< 0.2	< 0.06	< 0.3	35	0.047	0.0040	0.0067	0.020	< 0.000007	< 0.000007	0.0015	< 0.000003	9.0	< 0.00003	0.000010	0.00047
7-Jan-15	28	500	495	7.7	69	#N/A	2.7	34	2.0	< 1	< 0.06	< 0.3	31	0.039	0.0038	0.0058	0.018	< 0.000007	< 0.000007	0.0023	< 0.000003	7.9	< 0.00003	0.000021	0.00016
14-Jan-15	29	500	490	7.7	72	#N/A	2.8	37	< 2	< 1	< 0.06	< 0.3	34	0.039	0.0046	0.0069	0.019	< 0.000007	< 0.000007	0.0024	0.0000030	8.6	< 0.00003	0.000015	0.00046
21-Jan-15	30	500	485	7.9	62	#N/A	5.5	36	< 2	< 1	< 0.06	< 0.3	30	0.047	0.0033	0.0054	0.016	< 0.000007	< 0.000007	0.0016	< 0.000003	7.9	< 0.00003	0.000013	0.00037
28-Jan-15	31	500	485	7.7	61	#N/A	1.5	31	< 2	< 1	< 0.06	< 0.3	28	0.045	0.0033	0.0052	0.017	< 0.000007	< 0.000007	0.0025	< 0.000003	7.0	0.00010	0.000010	0.00017
4-Feb-15	32	500	485	7.8	59	#N/A	2.2	30	< 2	< 1	< 0.06	< 0.3	27	0.036	0.0031	0.0045	0.018	< 0.000007	< 0.000007	0.0021	< 0.000003	6.7	< 0.00003	0.0000090	0.00038
11-Feb-15	33	500	475	7.7	55	#N/A	2.2	29	2.0	< 1	< 0.06	< 0.3	25	0.041	0.0028	0.0043	0.014	< 0.000007	< 0.000007	0.0021	< 0.000003	6.6	< 0.00003	0.000014	0.00025
18-Feb-15	34	500	500	7.7	61	#N/A	2.2	31	< 2	< 1	< 0.06	< 0.3	30	0.036	0.0033	0.0048	0.017	< 0.000007	< 0.000007	0.0024	< 0.000003	7.8	< 0.00003	0.000014	0.00051
25-Feb-15	35	500	480	7.8	72	#N/A	3.5	37	< 2	< 1	< 0.06	< 0.3	31	0.036	0.0036	0.0048	0.021	< 0.000007	< 0.000007	0.00080	0.0000040	7.9	0.000060	0.000016	0.00059
4-Mar-15	36	500	490	7.7	58	#N/A	2.3	30	< 2	< 1	< 0.06	< 0.3	26	0.041	0.0024	0.0042	0.015	< 0.000007	< 0.000007	0.00080	< 0.000003	6.8	0.000060	0.000012	0.00014
11-Mar-15	37	500	485	7.7	54	#N/A	1.8	29	2.0	< 1	< 0.06	< 0.3	24	0.031	0.0026	0.0036	0.014	0.0000070	< 0.000007	0.0016	0.000020	6.5	0.000060	0.000026	0.00088
18-Mar-15	38	500	490	7.7	50	#N/A	2.4	27	< 2	< 1	< 0.06	< 0.3	23	0.032	0.0021	0.0030	0.015	< 0.000007	< 0.000007	0.0011	< 0.000003	6.1	< 0.00003	0.000017	0.00037
25-Mar-15	39	500	490	7.7	45	#N/A	2.7	26	< 2	< 1	< 0.06	< 0.3	22	0.030	0.0022	0.0032	0.013	< 0.000007	< 0.000007	0.00090	< 0.000003	5.7	0.000090	0.0000060	0.00076
1-Apr-15	40	500	485	7.9	44	#N/A	4.0	27	< 2	< 1	< 0.06	< 0.3	18	0.028	0.0021	0.0022	0.015	0.000012	< 0.000007	0.0016	0.0000040	4.4	< 0.00003	< 0.000004	0.00026
8-Apr-15	41	500	485	7.6	45	#N/A	2.6	26	< 2	< 1	< 0.06	< 0.3	20	0.026	0.0026	0.0028	0.013	< 0.000007	< 0.000007	0.00080	< 0.000003	5.4	< 0.00003	0.000019	0.00022
15-Apr-15	42	500	475	7.7	57	#N/A	3.7	32	< 2	< 1	< 0.06	< 0.3	26	0.035	0.0026	0.0040	0.016	< 0.000007	< 0.000007	0.0034	< 0.000003	6.9	< 0.00003	< 0.000004	0.0027
22-Apr-15	43	500	505	7.8	65	#N/A	3.2	35	3.0	< 1	< 0.06	< 0.3	29	0.045	0.0029	0.0053	0.019	< 0.000007	< 0.000007	0.0029	< 0.000003	7.7	0.000050	0.000010	0.00095
29-Apr-15	44	500	495	7.8	68	#N/A	2.1	36	< 2	< 1	< 0.06	< 0.3	32	0.049	0.0031	0.0053	0.021	< 0.000007	< 0.000007	0.0021	< 0.000003	8.3	< 0.00003	0.000022	0.00066
6-May-15	45	500	495	7.7	62	#N/A	2.6	34	< 2	< 1	< 0.06	< 0.3	28	0.043	0.0030	0.0063	0.017	< 0.000007	< 0.000007	0.0019	< 0.000003	7.3	< 0.00003	0.000018	0.00040
13-May-15	46	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-May-15	47	495	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-May-15	48	480	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	49	475	475	8.0	172	#N/A	3.8	85	4.0	< 1	0.060	< 0.3	84	0.014	0.0082	0.0068	0.063	< 0.000007	< 0.000007	0.0036	< 0.000003	22	< 0.00003	0.000033	0.00017
10-Jun-15	50	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-15	51	490	482	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Jun-15	52	480	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	53	450	445	8.0	186	#N/A	5.0	89	3.0	< 1	< 0.06	< 0.3	83	0.013	0.0070	0.0062	0.069	< 0.000007	< 0.000007	0.0035	< 0.000003	21	< 0.00003	0.000047	0.00037
8-Jul-15	54	500	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-Jul-15	55	485	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jul-15	56	470	455	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	57	455	445	8.0	175	#N/A	2.8	90	3.0	< 1	< 0.06	< 0.3	86	0.011	0.0064	0.0049	0.066	< 0.000007	< 0.000007	0.0034	0.000010	22	0.000040	0.000038	0.000080
5-Aug-15	58	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	59	490	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Aug-15	60	475	465	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	61	465	445	8.1	177	#N/A	1.8	92	3.0	< 1	< 0.06	< 0.3	94	0.014	0.0063	0.0047	0.073	< 0.000007	< 0.000007	0.0037	0.0000090	26	0.00011	0.000041	0.00061
2-Sep-15	62	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	63	500	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Sep-15	64	480	465	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	65	465	465	8.1	171	#N/A	2.2	86	3.0				86	0.012	0.0064	0.0055	0.073	< 0.000007	< 0.000007	0.0040	< 0.000003	22	< 0.00003	0.000038	0.00024
30-Sep-15	66	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	67	495	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14-Oct-15	68	475	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	69	470	455	8.1	156	#N/A	1.3	82	3.0				80	0.014	0.0049	0.0037	0.066	< 0.000007	< 0.000007	0.0036	< 0.000003	21	< 0.00003	0.000041	0.00035
28-Oct-15	70	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	71	490	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Nov-15	72	480	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	73	470	455	8.1	145	#N/A	1.2	84	2.0	-	-	-	68	0.012	0.0040	0.0039	0.049	< 0.000007	< 0.000007	0.0016	< 0.000003	18	0.000070	0.000072	0.00038
25-Nov-15	74	500	490	7.9	72	#N/A	0.90	43	2.0	-	-	-	34	0.041	0.0021	0.0039	0.030	< 0.000007	< 0.000007	0.0014	< 0.000003	9.1	< 0.00003	0.000023	0.00021
2-Dec-15	75	500	490	8.0	85	#N/A	1.7	44	2.0	-	-	-	43	0.037	0.0028	0.0041	0.036	< 0.000007	< 0.000007	0.00090	0.0000030	11	< 0.00003	0.000016	0.00034
9-Dec-15	76	500	495	7.9	70	#N/A	2.8	37	2.0	-	-	-	33	0.037	0.0020	0.0039	0.030	0.0000090	< 0.000007	0.0030	0.000012	8.6	< 0.00003	0.000015	0.00034
16-Dec-15	77	500	495	8.1	77	#N/A	1.5	38	2.0	-	-	-	38	0.051	0.0023	0.0046	0.034	0.0000070	< 0.000007	0.0021	< 0.000003	10.0	0.000050	0.000020	0.00035
23-Dec-15	78	500	485	8.1	62	-	-	-	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	79	500	490	7.8	55	#N/A	1.3	29	2.0	-	-	-	28	0.034	0.0012	0.0025	0.024	< 0.000007	< 0.000007	0.0014	< 0.000003	7.4	0.000050	0.0000060	0.00022
6-Jan-16	80	500	490	7.6	53	-	-	-	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	81	500	495	7.6	55	#N/A	1.7	29	2.0	-	-	-	26	0.033	0.0013	0.0024	0.022	< 0.000007	< 0.000007	< 0.002	< 0.000003	7.0	< 0.00003	< 0.000004	0.00048
20-Jan-16	82	500	495	7.8	71	-	-	-	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	83	500	495	7.8	62	#N/A	2.8	33	2.0	-	-	-	30	0.036	0.0014	0.0027	0.029	< 0.000007	< 0.000007	< 0.002	0.000010	8.2	< 0.00003	0.000024	0.00052
3-Feb-16	84	500	495	7.8	70	-	-	-	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	85	500	480	7.7	67	#N/A	2.6	34	2.0	-	-	-	32	0.028	0.0015	0.0028	0.030	< 0.000007	< 0.000007	< 0.002	< 0.000003	8.8	< 0.00003	0.000016	0.000090
17-Feb-16	86	500	505	7.7	64	-	-	-	< 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	87	500	480	7.8	70	#N/A	2.3	35	< 2	-	-	-	34	0.034	0.0016	0.0028	0.030	< 0.000007	< 0.000007	< 0.002	< 0.000003	9.0	< 0.00003	0.000010	0.000080

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for HC4 (GS)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
25-Jun-14	0	500	335	7.8	0.0050	< 0.00001	0.0064	23	0.022	< 0.01	0.0061	0.0012	0.015	11	0.00082	1.9	< 0.000002	24	0.30	65	0.000036	0.00017	0.00011	0.032	0.00044	0.0020	< 0.002
2-Jul-14	1	500	505	7.8	< 0.002	< 0.00001	0.0051	21	0.028	< 0.01	0.0046	0.0023	< 0.009	8.2	0.00054	2.1	< 0.000002	16	0.26	52	0.000022	0.0012	0.000060	0.060	0.00033	0.0020	< 0.002
9-Jul-14	2	500	475	7.9	< 0.002	< 0.00001	0.0038	11	0.015	< 0.01	0.0047	0.0010	0.020	6.3	0.00015	2.2	< 0.000002	7.9	0.14	20	0.000017	0.0029	0.000080	0.034	0.00043	< 0.001	< 0.002
16-Jul-14	3	500	500	8.0	0.0070	< 0.00001	0.0028	7.8	0.011	< 0.01	0.0037	0.00080	< 0.009	4.6	0.000050	1.7	0.0000020	4.1	0.11	7.8	0.000015	0.00015	0.000070	0.019	0.00040	< 0.001	< 0.002
23-Jul-14	4	500	495	8.0	0.013	< 0.00001	0.0022	6.1	0.010	< 0.01	0.0024	0.00040	< 0.009	3.8	< 0.00004	1.5	< 0.000002	2.4	0.085	4.6	0.000010	0.0016	0.000080	0.012	0.00037	< 0.001	< 0.002
30-Jul-14	5	500	480	8.0	< 0.002	< 0.00001	0.0023	5.8	0.0083	< 0.01	0.0024	0.00050	< 0.009	3.6	0.000070	1.5	0.0000020	1.8	0.083	3.3	0.000018	0.000040	0.00015	0.011	0.00043	< 0.001	< 0.002
6-Aug-14	6	500	485	7.9	0.0020	0.000050	0.0018	5.2	0.0072	< 0.01	0.0015	< 0.0001	< 0.009	3.3	0.000050	1.4	< 0.000002	1.3	0.075	2.4	0.0000080	0.000030	0.000060	0.0094	0.00039	< 0.001	< 0.002
13-Aug-14	7	500	485	7.9	0.0020	< 0.00001	0.0013	4.1	0.0083	< 0.01	0.0011	0.00020	< 0.009	2.5	< 0.00004	1.0	< 0.000002	0.76	0.060	1.6	0.0000050	0.000010	0.00018	0.0074	0.00019	< 0.001	< 0.002
20-Aug-14	8	500	480	7.9	< 0.002	< 0.00001	0.0012	3.8	0.0078	< 0.01	0.0011	0.00020	0.0090	2.4	0.000060	0.98	< 0.000002	0.65	0.058	1.6	< 0.000005	0.0013	0.00017	0.0078	0.00036	< 0.001	< 0.002
27-Aug-14	9	500	500	7.9	< 0.002	0.000010	0.0013	4.7	0.0086	< 0.01	0.0012	0.00020	0.012	2.7	0.000050	1.2	< 0.000002	0.72	0.071	1.9	0.000012	0.000090	0.000080	0.0096	0.00034	< 0.001	< 0.002
3-Sep-14	10	500	475	7.8	< 0.007	0.000060	0.0013	4.3	0.0096	< 0.01	0.0010	0.00010	0.0060	2.7	0.000090	1.4	0.000018	0.58	0.071	2.4	0.000013	0.00020	< 0.00005	0.0092	0.00036	< 0.001	< 0.002
10-Sep-14	11	500	505	7.9	< 0.007	0.000010	0.0011	3.7	0.0087	< 0.01	0.00084	0.00010	< 0.003	2.4	0.000050	1.2	< 0.000002	0.45	0.063	1.5	0.000010	0.000060	0.000090	0.0087	0.00034	< 0.001	< 0.002
17-Sep-14	12	500	490	7.9	< 0.007	< 0.00001	0.0012	3.9	0.0071	< 0.01	0.00084	0.00010	< 0.003	2.6	0.000050	1.1	< 0.000002	0.45	0.063	2.1	< 0.000005	0.000020	0.00015	0.0097	0.00036	0.0010	< 0.002
24-Sep-14	13	500	485	7.9	< 0.002	0.000010	0.00099	3.5	0.0065	< 0.01	0.00076	0.00020	< 0.009	2.1	< 0.00004	0.94	0.0000050	0.35	0.055	1.4	< 0.000005	0.000020	< 0.00005	0.0087	0.00029	0.0010	< 0.002
1-Oct-14	14	500	480	7.8	0.0090	< 0.00001	0.00066	2.8	0.012	< 0.01	0.00080	< 0.0001	< 0.009	1.7	< 0.00004	0.78	< 0.000002	0.23	0.047	1.5	< 0.000005	0.000030	0.000060	0.0071	0.00026	< 0.002	< 0.002
8-Oct-14	15	500	490	7.7	< 0.007	< 0.00001	0.00072	2.5	0.0075	< 0.01	0.00056	< 0.0001	< 0.003	1.7	< 0.00004	0.70	< 0.000002	0.23	0.043	1.8	0.0000080	0.0011	< 0.00005	0.0072	0.00026	< 0.001	< 0.002
15-Oct-14	16	500	480	7.8	< 0.007	< 0.00001	0.00087	2.7	0.0081	< 0.01	0.00064	< 0.0001	< 0.003	1.8	< 0.00004	0.74	< 0.000002	0.24	0.045	1.8	0.0000090	0.00075	0.00016	0.0076	0.00024	< 0.001	< 0.002
22-Oct-14	17	500	500	7.8	< 0.007	0.000060	0.0010	3.7	0.011	< 0.01	0.00091	0.00010	< 0.003	2.2	< 0.00004	1.0	< 0.000002	0.29	0.058	2.1	0.000011	0.000040	< 0.00005	0.011	0.00028	< 0.001	< 0.002
29-Oct-14	18	500	490	7.7	< 0.007	< 0.00001	0.00062	2.5	0.0087	< 0.01	0.00055	< 0.0001	< 0.003	1.4	< 0.00004	0.60	< 0.000002	0.18	0.040	1.2	0.0000080	0.00089	0.000060	0.0065	0.00018	< 0.001	< 0.002
5-Nov-14	19	500	475	7.8	< 0.007	0.000010	0.00056	2.3	0.0085	< 0.01	0.00063	< 0.0001	< 0.003	1.3	< 0.00004	0.60	< 0.000002	0.18	0.038	1.2	0.000011	0.00094	0.000070	0.0063	0.00018	< 0.001	< 0.002
12-Nov-14	20	500	505	7.8	< 0.007	< 0.00001	0.00088	3.8	0.0093	< 0.01	0.0013	0.00010	< 0.003	2.1	0.000050	0.99	< 0.000002	0.33	0.063	1.9	0.000011	0.00011	< 0.00005	0.011	0.00030	< 0.001	< 0.002
19-Nov-14	21	500	480	7.9	< 0.007	0.000020	0.00062	2.6	0.0083	< 0.01	0.00062	< 0.0001	< 0.003	1.4	< 0.00004	0.65	< 0.000002	0.17	0.045	1.0	0.0000090	0.00030	< 0.00005	0.0066	0.00025	0.0010	< 0.002
26-Nov-14	22	500	490	7.8	< 0.007	< 0.00001	0.00064	2.6	0.0100	< 0.01	0.00069	< 0.0001	0.0090	1.4	< 0.00004	0.67	< 0.000002	0.17	0.044	1.1	0.000016	0.00079	0.00013	0.0074	0.00025	< 0.001	< 0.002
3-Dec-14	23	500	485	7.7	< 0.007	0.000040	0.00057	2.4	0.011	0.010	0.00072	< 0.0001	< 0.003	1.3	< 0.00004	0.57	< 0.000002	0.18	0.038	1.1	0.0000060	0.00026	< 0.00005	0.0073	0.00030	< 0.001	< 0.002
10-Dec-14	24	500	500	7.8	< 0.007	< 0.00001	0.00056	2.3	0.0094	< 0.01	0.00079	< 0.0001	< 0.003	1.3	< 0.00004	0.57	< 0.000002	0.14	0.040	1.1	0.000010	0.00038	0.000070	0.0065	0.00021	< 0.001	< 0.002
17-Dec-14	25	500	485	7.8	< 0.007	< 0.00001	0.00067	2.6	0.011	< 0.01	0.00074	< 0.0001	< 0.003	1.4	< 0.00004	0.73	< 0.000002	0.16	0.045	0.90	0.0000090	0.00074	< 0.00005	0.0081	0.00029	< 0.001	< 0.002
24-Dec-14	26	500	480	7.8	< 0.007	< 0.00001	0.00079	2.9	0.011	< 0.01	0.00090	< 0.0001	< 0.003	1.7	0.000080	0.80	< 0.000002	0.18	0.052	1.1	0.000012	0.00041	0.00018	0.0088	0.00033	< 0.001	< 0.002
31-Dec-14	27	500	500	7.8	< 0.007	0.00011	0.00072	3.0	0.011	< 0.01	0.00095	< 0.0001	< 0.003	1.6	< 0.00004	0.92	< 0.000002	0.17	0.053	1.2	0.000010	0.00035	< 0.00005	0.0090	0.00025	< 0.001	< 0.002
7-Jan-15	28	500	495	7.7	< 0.007	0.000020	0.00069	2.8	0.011	< 0.01	0.00094	< 0.0001	< 0.003	1.5	< 0.00004	0.71	< 0.000002	0.15	0.049	0.80	0.000010	0.00054	0.000080	0.0081	0.00024	< 0.001	< 0.002
14-Jan-15	29	500	490	7.7	< 0.007	0.000020	0.00067	3.1	0.0087	< 0.01	0.0011	< 0.0001	< 0.003	1.7	< 0.00004	0.89	< 0.000002	0.18	0.051	0.80	0.0000090	0.00017	0.000070	0.0079	0.00026	< 0.001	< 0.002
21-Jan-15	30	500	485	7.9	< 0.007	0.000030	0.00057	2.5	0.0094	< 0.01	0.0011	< 0.0001	< 0.003	1.3	< 0.00004	0.66	< 0.000002	0.12	0.043	0.50	< 0.000005	0.00026	0.00018	0.0071	0.00025	< 0.001	< 0.002
28-Jan-15	31	500	485	7.7	< 0.007	< 0.00001	0.00051	2.6	0.0081	< 0.01	0.0010	< 0.0001	< 0.003	1.4	0.000080	0.70	< 0.000002	0.16	0.036	1.1	0.0000060	0.00012	0.000060	0.0072	0.00026	< 0.001	< 0.002
4-Feb-15	32	500	485	7.8	< 0.007	0.000020	0.00060	2.5	0.0086	< 0.01	0.00086	< 0.0001	< 0.003	1.3	< 0.00004	0.66	< 0.000002	0.14	0.045	1.0	< 0.000005	0.00024	0.00014	0.0062	0.00022	< 0.001	< 0.002
11-Feb-15	33	500	475	7.7	< 0.007	< 0.00001	0.00049	2.1	0.0090	< 0.01	0.00079	< 0.0001	< 0.003	1.2	< 0.001	0.58	< 0.000002	0.11	0.037	0.50	0.0000060	0.00045	0.00034	0.0054	0.00026	< 0.001	< 0.002
18-Feb-15	34	500	500	7.7	< 0.007	< 0.00001	0.00064	2.5	0.0081	< 0.01	0.00076	< 0.0001	< 0.003	1.4	< 0.001	0.70	< 0.000002	0.12	0.048	0.70	0.0000080	0.00013	0.000060	0.0072	0.00025	< 0.001	< 0.002
25-Feb-15	35	500	480	7.8	< 0.007	0.000020	0.00064	2.9	0.0076	< 0.01	0.00083	< 0.0001	< 0.003	1.7	< 0.001	0.71	< 0.000002	0.14	0.051	0.70	0.0000080	0.00011	< 0.00005	0.0084	0.00024	< 0.001	< 0.002
4-Mar-15	36	500	490	7.7	< 0.007	< 0.00001	0.00052	2.2	0.0077	< 0.01	0.00063	< 0.0001	< 0.003	1.2	< 0.001	0.68	< 0.000002	0.11	0.039	0.90	< 0.000005	0.000030	0.000090	0.0065	0.00023	< 0.001	< 0.002
11-Mar-15	37	500	485	7.7	0.010	0.00010	0.00050	2.0	0.0083	< 0.01	0.00060	< 0.0001	< 0.003	1.0	< 0.001	0.49	< 0.000002	0.070	0.037	< 0.1	< 0.000005	0.00057	0.000090	0.0057	0.00020	0.012	< 0.002
18-Mar-15	38	500	490	7.7	< 0.007	< 0.00001	0.00047	1.9	0.0094	< 0.01	0.00056	< 0.0001	< 0.003	1.1	< 0.001	0.50	< 0.000002	0.080	0.035	0.90	< 0.000005	0.00041	0.00021	0.0051	0.00016	< 0.001	< 0.002
25-Mar-15	39	500	490	7.7	< 0.007	< 0.00001	0.00033	2.0	0.0088	< 0.01	0.00058	0.00010	< 0.003	1.0	< 0.001	0.49	< 0.000002	0.13	0.034	0.70	< 0.000005	0.00048	0.000080	0.0052	0.00025	0.0010	< 0.002
1-Apr-15	40	500	485	7.9	< 0.007	< 0.00001	0.00032	1.6	0.016	< 0.01	0.00042	< 0.0001	< 0.003	0.90	< 0.001	0.30	< 0.000002	0.68	0.030	< 0.1	< 0.000005	0.00047	< 0.00005	0.0062	0.00014	< 0.001	< 0.002
8-Apr-15	41	500	485	7.6	< 0.007	< 0.00001	0.00037	1.6	0.0085	< 0.01	0.00049	< 0.0001	< 0.003	0.93	< 0.001	0.53	< 0.000002	0.070	0.031	0.10	< 0.000005	0.00039	0.000050	0.0046	0.00018	< 0.001	< 0.002
15-Apr-15	42	500	475	7.7	< 0.007	< 0.00001	0.00050	2.2	0.0090	< 0.01	0.00062	< 0.0001	< 0.003	1.2	< 0.001	0.58	< 0.000002	0.10	0.039	0.70	< 0.000005	0.00098	0.00012	0.0065	0.00025	0.0010	< 0.002
22-Apr-15	43	500	505	7.8	< 0.007	0.000060	0.00055	2.4	0.0090	< 0.01	0.00067	< 0.0001	< 0.003	1.4	< 0.001	0.71	0.0000040	0.11	0.044	0.60	0.000013	0.00036	0.000050	0.0076	0.00027	< 0.001	< 0.002
29-Apr-15	44	500	495	7.8	< 0.007	0.000020	0.00054	2.7	0.010	< 0.01	0.00077	< 0.0001	< 0.003	1.6	< 0.001	0.69	< 0.000002	0.090	0.047	0.80	< 0.000005	0.00038	0.000080	0.0078	0.00027	< 0.001	< 0.002
6-May-15	45	500	495	7.7	< 0.007	0.000010	0.00054	2.3	0.0095	< 0.01	0.00064	< 0.0001	< 0.003	1.3	< 0.001	0.70	0.0000020	0.090	0.041	0.70	< 0.000005	0.00055	0.00010	0.0069	0.00024	< 0.001	< 0.002
13-May-15	46	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-May-15	47	495	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-May-15	48	480	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jun-15	49	475	475	8.0	< 0.007	< 0.00001	0.0014	7.2	0.012	< 0.01	0.0022	0.00020	< 0.003	3.6	< 0.00004	2.1	< 0.000002	0.25	0.13	1.8	0.000010	0.00038	0.000090	0.022	0.00031	< 0.001	< 0.002
10-Jun-15	50	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jun-15	51	490	482	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Jun-15	52	480	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jul-15	53	450	445	8.0	< 0.007	< 0.00001	0.0012	7.2	0.017	0.010	0.0020	0.00020	< 0.003	2.9	0.000080	1.9	0.0000020	0.26	0.13	1.6	0.000013	0.00090	< 0.00005	0.024	0.00027	0.0010	< 0.002
8-Jul-15	54	500	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-Jul-15	55	485	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22-Jul-15	56	470	455	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	57	455	445	8.0	< 0.007	< 0.00001	0.0013	7.6	0.018	< 0.01	0.0013	0.00020	< 0.003	2.9	0.000060	1.8	0.000013	0.25	0.14	1.6	< 0.000005	0.00042	< 0.00005	0.012	0.00018	< 0.001	< 0.002
5-Aug-15	58	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	59	490	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Aug-15	60	475	465	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	61	465	445	8.1	< 0.007	0.00011	0.0012	7.4	0.017	< 0.01	0.0021	0.00020	< 0.003	3.0	0.000070	2.2	< 0.000002	0.22	0.14	1.6	0.000015	0.00097	< 0.00005	0.024	0.00029	0.0020	< 0.002
2-Sep-15	62	500	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	63	500	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Sep-15	64	480	465	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	65	465	465	8.1	< 0.007	< 0.00001	0.0012	7.5	0.013	< 0.01	0.0016	0.00020	< 0.003	3.1	0.000080	1.9	0.000015	0.24	0.14	1.7	0.0000080	0.00081	0.000070	0.020	0.00023	< 0.001	< 0.002
30-Sep-15	66	500	495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	67	495	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14-Oct-15	68	475	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	69	470	455	8.1	< 0.007	0.000020	0.0010	6.8	0.014	< 0.01	0.0012	0.00020	< 0.003	2.7	0.000090	1.6	0.000024	0.25	0.11	1.3	0.000014	0.0012	< 0.00005	0.019	0.00019	< 0.001	< 0.002
28-Oct-15	70	500	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	71	490	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Nov-15	72	480	470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	73	470	455	8.1	0.022	< 0.00001	0.00083	5.8	0.016	< 0.01	0.0022	< 0.0001	< 0.003	2.4	0.00018	1.3	< 0.000002	0.21	0.099	0.90	0.000016	0.0011	< 0.00005	0.016	0.00020	< 0.001	< 0.002
25-Nov-15	74	500	490	7.9	< 0.007	0.000020	0.00054	2.7	0.0083	< 0.01	0.00081	< 0.0001	< 0.003	1.5	0.00029	0.71	0.00014	0.12	0.049	0.50	0.0000050	0.00047	< 0.00005	0.0095	0.00027	< 0.001	< 0.002
2-Dec-15	75	500	490	8.0	< 0.007	0.000030	0.00059	3.9	0.0090	< 0.01	0.00088	0.00010	< 0.003	1.9	0.000040	0.96	0.0000020	0.12	0.062	0.80	< 0.000005	0.00041	0.000080	0.011	0.00025	< 0.001	< 0.002
9-Dec-15	76	500	495	7.9	< 0.007	< 0.00001	0.00055	2.7	0.0063	< 0.01	0.00062	< 0.0001	< 0.003	1.5	0.000050	0.69	0.0000040	0.080	0.049	0.30	0.000020	0.00040	0.00014	0.0089	0.00024	< 0.001	< 0.002
16-Dec-15	77	500	495	8.1	< 0.007	0.00013	0.00064	3.3	0.0075	< 0.01	0.00058	< 0.0001	0.012	1.8	< 0.00004	0.88	< 0.000002	0.10	0.058	0.20	0.0000070	0.00064	0.00014	0.011	0.00029	< 0.001	< 0.002
23-Dec-15	78	500	485	8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	79	500	490	7.8	< 0.007	< 0.00001	0.00047	2.2	0.0062	< 0.01	0.00035	< 0.0001	< 0.003	1.2	< 0.00004	0.52	< 0.000002	0.10	0.040	0.80	< 0.000005	0.00022	0.00012	0.0069	0.00019	< 0.001	< 0.002
6-Jan-16	80	500	490	7.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	81	500	495	7.6	< 0.007	0.000020	0.00036	2.1	0.0064	< 0.01	0.00049	< 0.0001	< 0.003	1.2	0.00013	0.55	< 0.000002	0.060	0.036	< 0.1	< 0.000005	0.00028	0.00012	0.0060	0.00015	< 0.001	< 0.002
20-Jan-16	82	500	495	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	83	500	495	7.8	< 0.007	< 0.00001	0.00044	2.4	0.0074	< 0.01	0.00036	< 0.0001	< 0.003	1.2	< 0.00004	0.63	< 0.000002	0.070	0.044	< 0.1	0.0000050	0.00049	0.00011	0.0080	0.00018	< 0.001	< 0.002
3-Feb-16	84	500	495	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	85	500	480	7.7	< 0.007	< 0.00001	0.00042	2.5	0.0085	< 0.01	0.00037	< 0.0001	< 0.003	1.2	0.000070	0.59	< 0.000002	0.10	0.045	0.60	0.0000070	0.00034	0.00014	0.0069	0.00016	< 0.001	< 0.002
17-Feb-16	86	500	505	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	87	500	480	7.8	< 0.007	< 0.00001	0.00048	2.7	0.0068	< 0.01	0.00042	< 0.0001	< 0.003	1.4	< 0.00004	0.47	< 0.000002	0.050	0.047	0.50	0.0000050	0.00030	0.00014	0.0079	0.00017	< 0.001	< 0.002

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Calculated Loading Rates for HC4 (GS)

Date	**Cycle**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**	**Cu**
	No.	Input	Output		umhos/cm	$mgCaCO_3$/kg/wk	$mgCaCO_3$/kg/wk	$mgCaCO_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
25-Jun-14	0	500	335	7.8	547	#N/A	2.4	18	55	0.57	0.064	0.10	65	0.0098	0.0015	0.0094	0.0066	0.0000023	0.0000023	0.0036	0.0000010	13	0.000027	0.000083	0.0010
2-Jul-14	1	500	505	7.8	446	#N/A	4.0	30	73	0.30	0.081	0.15	85	0.012	0.0033	0.016	0.0077	0.0000035	0.0000035	0.0047	0.0000015	17	0.000015	0.00011	0.00074
9-Jul-14	2	500	475	7.9	258	#N/A	1.0	28	28	0.095	0.076	0.14	44	0.015	0.0035	0.011	0.0088	0.0000033	0.0000033	0.0046	0.0000014	9.0	0.000014	0.000047	0.00038
16-Jul-14	3	500	500	8.0	176	#N/A	1.3	30	8.5	0.10	0.060	0.15	33	0.018	0.0034	0.0094	0.0089	0.0000035	0.0000035	0.0034	0.0000015	7.0	0.00010	0.00014	0.00033
23-Jul-14	4	500	495	8.0	124	#N/A	1.1	25	4.5	0.099	0.050	0.15	26	0.022	0.0027	0.0087	0.0089	0.0000035	0.0000035	0.0029	0.0000015	5.6	0.000045	0.000068	0.00022
30-Jul-14	5	500	480	8.0	121	#N/A	0.81	28	3.8	0.096	0.043	0.14	24	0.024	0.0026	0.0081	0.0087	0.0000034	0.0000034	0.0025	0.0000014	5.2	0.000048	0.000048	0.00062
6-Aug-14	6	500	485	7.9	104	#N/A	0.97	23	2.4	0.097	0.039	0.15	22	0.023	0.0023	0.0065	0.0084	0.0000034	0.0000034	0.0021	0.0000015	4.8	0.000015	0.000020	0.00023
13-Aug-14	7	500	485	7.9	85	#N/A	1.1	20	2.9	0.097	0.029	0.15	18	0.028	0.0017	0.0053	0.0081	0.0000034	0.0000034	0.0019	0.0000015	4.1	0.000024	0.000021	0.00023
20-Aug-14	8	500	480	7.9	78	#N/A	0.90	18	2.4	0.096	0.029	0.14	17	0.026	0.0014	0.0054	0.0072	0.0000034	0.0000034	0.0017	0.0000014	3.9	0.000034	0.000025	0.00020
27-Aug-14	9	500	500	7.9	103	#N/A	2.6	23	2.0	0.10	0.030	0.15	22	0.024	0.0021	0.0054	0.010	0.0000035	0.0000035	0.0038	0.0000015	5.0	0.000015	0.000013	0.00012
3-Sep-14	10	500	475	7.8	99	#N/A	2.3	21	2.4	0.095	0.029	0.14	21	0.024	0.0019	0.0060	0.010	0.0000033	0.0000033	0.0016	0.0000014	5.0	0.000014	0.000013	0.00037
10-Sep-14	11	500	505	7.9	93	#N/A	1.8	21	2.0	0.10	0.030	0.15	19	0.029	0.0019	0.0054	0.0096	0.0000035	0.0000035	0.0020	0.0000015	4.6	0.000015	0.000011	0.00020
17-Sep-14	12	500	490	7.9	93	#N/A	3.6	22	2.5	0.098	0.029	0.15	19	0.028	0.0019	0.0050	0.0096	0.0000034	0.0000034	0.0018	0.0000020	4.4	0.000015	0.000010	0.000078
24-Sep-14	13	500	485	7.9	78	#N/A	1.7	18	2.9	0.097	0.029	0.15	17	0.026	0.0019	0.0040	0.0078	0.0000034	0.0000034	0.0012	0.0000015	3.9	0.000015	0.000053	0.000082
1-Oct-14	14	500	480	7.8	63	#N/A	3.0	17	1.4	0.096	0.029	0.14	14	0.023	0.0018	0.0030	0.0065	0.0000034	0.0000034	0.00091	0.0000014	3.3	0.000014	0.00	0.0000096
8-Oct-14	15	500	490	7.7	65	#N/A	1.5	13	0.98	0.098	0.029	0.15	14	0.020	0.0014	0.0032	0.0064	0.0000034	0.0000034	0.0048	0.0000015	3.4	0.000015	0.0000074	0.000069
15-Oct-14	16	500	480	7.8	68	#N/A	2.3	14	1.4	0.096	0.029	0.14	14	0.022	0.0015	0.0033	0.0067	0.0000034	0.0000034	0.0020	0.0000014	3.5	0.000014	0.0000082	0.000058
22-Oct-14	17	500	500	7.8	87	#N/A	2.5	19	2.0	0.10	0.030	0.15	19	0.023	0.0024	0.0042	0.011	0.0000035	0.0000035	0.0025	0.0000015	4.6	0.000015	0.000013	0.000055
29-Oct-14	18	500	490	7.7	63	#N/A	3.7	15	0.98	0.098	0.029	0.15	14	0.022	0.0015	0.0027	0.0064	0.0000034	0.0000034	0.0023	0.0000015	3.4	0.000015	0.0000078	0.00027
5-Nov-14	19	500	475	7.8	57	#N/A	#N/A	17	0.95	0.095	0.029	0.14	12	0.017	0.0013	0.0024	0.0063	0.0000033	0.0000033	0.0012	0.0000076	3.0	0.000014	0.0000090	0.00025
12-Nov-14	20	500	505	7.8	89	#N/A	3.3	17	1.0	0.10	0.030	0.15	21	0.024	0.0025	0.0045	0.0099	0.0000035	0.0000035	0.0017	0.0000015	5.1	0.000015	0.000011	0.00014
19-Nov-14	21	500	480	7.9	94	#N/A	3.1	16	0.96	0.096	0.029	0.14	14	0.025	0.0014	0.0031	0.0069	0.0000034	0.0000034	0.0010	0.0000014	3.6	0.000014	0.0000096	0.00016
26-Nov-14	22	500	490	7.8	62	#N/A	0.96	14	0.98	0.098	0.029	0.15	14	0.022	0.0015	0.0030	0.0085	0.0000034	0.0000034	0.0011	0.0000015	3.5	0.000015	0.0000088	0.00014
3-Dec-14	23	500	485	7.7	59	#N/A	1.4	14	0.97	0.097	0.029	0.15	14	0.024	0.0014	0.0031	0.0072	0.0000034	0.0000034	0.0013	0.0000015	3.6	0.000015	0.0000068	0.000078
10-Dec-14	24	500	500	7.8	56	#N/A	2.4	14	1.0	0.10	0.030	0.15	13	0.022	0.0015	0.0027	0.0067	0.0000035	0.0000035	0.0011	0.0000015	3.3	0.000015	0.0000060	0.00012
17-Dec-14	25	500	485	7.8	64	#N/A	1.8	15	0.97	0.097	0.029	0.15	14	0.030	0.0016	0.0038	0.0078	0.0000034	0.0000034	0.00092	0.0000015	3.7	0.000015	0.0000053	0.00014
24-Dec-14	26	500	480	7.8	74	#N/A	1.6	17	0.96	0.096	0.029	0.14	16	0.029	0.0020	0.0037	0.0096	0.0000034	0.0000034	0.00077	0.0000014	4.2	0.000014	0.0000072	0.000096
31-Dec-14	27	500	500	7.8	71	#N/A	0.72	24	1.0	0.10	0.030	0.15	17	0.024	0.0020	0.0034	0.0099	0.0000035	0.0000035	0.00075	0.0000015	4.5	0.000015	0.0000050	0.00024
7-Jan-15	28	500	495	7.7	69	#N/A	1.3	17	0.99	0.50	0.030	0.15	16	0.019	0.0019	0.0029	0.0089	0.0000035	0.0000035	0.0011	0.0000015	3.9	0.000015	0.000010	0.000079
14-Jan-15	29	500	490	7.7	72	#N/A	1.4	18	0.98	0.49	0.029	0.15	17	0.019	0.0023	0.0034	0.0095	0.0000034	0.0000034	0.0012	0.0000015	4.2	0.000015	0.0000074	0.00023
21-Jan-15	30	500	485	7.9	62	#N/A	2.7	17	0.97	0.49	0.029	0.15	15	0.023	0.0016	0.0026	0.0078	0.0000034	0.0000034	0.00078	0.0000015	3.8	0.000015	0.0000063	0.00018
28-Jan-15	31	500	485	7.7	61	#N/A	0.71	15	0.97	0.49	0.029	0.15	14	0.022	0.0016	0.0025	0.0083	0.0000034	0.0000034	0.0012	0.0000015	3.4	0.000049	0.0000049	0.000082
4-Feb-15	32	500	485	7.8	59	#N/A	1.1	15	0.97	0.49	0.029	0.15	13	0.017	0.0015	0.0022	0.0088	0.0000034	0.0000034	0.0010	0.0000015	3.3	0.000015	0.0000044	0.00018
11-Feb-15	33	500	475	7.7	55	#N/A	1.0	14	0.95	0.48	0.029	0.14	12	0.020	0.0013	0.0020	0.0067	0.0000033	0.0000033	0.00100	0.0000014	3.1	0.000014	0.0000067	0.00012
18-Feb-15	34	500	500	7.7	61	#N/A	1.1	16	1.0	0.50	0.030	0.15	15	0.018	0.0017	0.0024	0.0086	0.0000035	0.0000035	0.0012	0.0000015	3.9	0.000015	0.0000070	0.00026
25-Feb-15	35	500	480	7.8	72	#N/A	1.7	18	0.96	0.48	0.029	0.14	15	0.017	0.0017	0.0023	0.0098	0.0000034	0.0000034	0.00038	0.0000019	3.8	0.000029	0.0000077	0.00028
4-Mar-15	36	500	490	7.7	58	#N/A	1.1	15	0.98	0.49	0.029	0.15	13	0.020	0.0012	0.0021	0.0072	0.0000034	0.0000034	0.00039	0.0000015	3.3	0.000029	0.0000059	0.000069
11-Mar-15	37	500	485	7.7	54	#N/A	0.88	14	0.97	0.49	0.029	0.15	12	0.015	0.0013	0.0017	0.0070	0.0000034	0.0000034	0.00078	0.0000097	3.1	0.000029	0.000013	0.00043
18-Mar-15	38	500	490	7.7	50	#N/A	1.2	13	0.98	0.49	0.029	0.15	11	0.015	0.0010	0.0015	0.0071	0.0000034	0.0000034	0.00054	0.0000015	3.0	0.000015	0.0000083	0.00018
25-Mar-15	39	500	490	7.7	45	#N/A	1.3	13	0.98	0.49	0.029	0.15	11	0.015	0.0011	0.0016	0.0065	0.0000034	0.0000034	0.00044	0.0000015	2.8	0.000044	0.0000029	0.00037
1-Apr-15	40	500	485	7.9	44	#N/A	1.9	13	0.97	0.49	0.029	0.15	8.5	0.014	0.0010	0.0011	0.0071	0.0000058	0.0000034	0.00078	0.0000019	2.2	0.000015	0.0000019	0.00013
8-Apr-15	41	500	485	7.6	45	#N/A	1.3	12	0.97	0.49	0.029	0.15	9.7	0.013	0.0013	0.0014	0.0065	0.0000034	0.0000034	0.00039	0.0000015	2.6	0.000015	0.0000092	0.00011
15-Apr-15	42	500	475	7.7	57	#N/A	1.8	15	0.95	0.48	0.029	0.14	12	0.017	0.0012	0.0019	0.0076	0.0000033	0.0000033	0.0016	0.0000014	3.3	0.000014	0.0000019	0.0013
22-Apr-15	43	500	505	7.8	65	#N/A	1.6	18	1.5	0.51	0.030	0.15	15	0.023	0.0015	0.0027	0.0095	0.0000035	0.0000035	0.0015	0.0000015	3.9	0.000025	0.0000051	0.00048
29-Apr-15	44	500	495	7.8	68	#N/A	1.0	18	0.99	0.50	0.030	0.15	16	0.024	0.0015	0.0026	0.010	0.0000035	0.0000035	0.0010	0.0000015	4.1	0.000015	0.000011	0.00033
6-May-15	45	500	495	7.7	62	#N/A	1.3	17	0.99	0.50	0.030	0.15	14	0.021	0.0015	0.0031	0.0083	0.0000035	0.0000035	0.00094	0.0000015	3.6	0.000015	0.0000089	0.00020
13-May-15	46	500	495																						
20-May-15	47	495	480																						
27-May-15	48	480	475																						
3-Jun-15	49	475	475	8.0	172	#N/A	1.8	10	0.48	0.12	0.0071	0.036	10.0	0.0017	0.00097	0.00081	0.0075	0.00000083	0.00000083	0.00043	0.00000036	2.6	0.0000036	0.0000039	0.000020
10-Jun-15	50	500	490																						
17-Jun-15	51	490	482																						
24-Jun-15	52	480	450																						
1-Jul-15	53	450	445	8.0	186	#N/A	2.2	9.9	0.33	0.11	0.0067	0.033	9.3	0.0015	0.00078	0.00069	0.0076	0.00000078	0.00000078	0.00039	0.00000033	2.4	0.0000033	0.0000052	0.000041
8-Jul-15	54	500	485																						
15-Jul-15	55	485	470																						
22-Jul-15	56	470	455																						
29-Jul-15	57	455	445	8.0	175	#N/A	1.2	10	0.33	0.11	0.0067	0.033	9.5	0.0012	0.00071	0.00055	0.0073	0.00000078	0.00000078	0.00038	0.0000011	2.4	0.0000045	0.0000042	0.0000089
5-Aug-15	58	500	490																						
12-Aug-15	59	490	475																						
19-Aug-15	60	475	465																						
26-Aug-15	61	465	445	8.1	177	#N/A	0.79	10	0.33	0.11	0.0067	0.033	10	0.0015	0.00070	0.00052	0.0081	0.00000078	0.00000078	0.00041	0.0000010	2.8	0.000012	0.0000046	0.000068
2-Sep-15	62	500	500																						
9-Sep-15	63	500	480																						
16-Sep-15	64	480	465																						
23-Sep-15	65	465	465	8.1	171	#N/A	1.0	9.9	0.35				10	0.0014	0.00074	0.00064	0.0085	0.00000081	0.00000081	0.00047	0.00000035	2.6	0.0000035	0.0000044	0.000028
30-Sep-15	66	500	495																						
7-Oct-15	67	495	475																						
14-Oct-15	68	475	470																						
21-Oct-15	69	470	455	8.1	156	#N/A	0.59	9.3	0.34				9.1	0.0016	0.00056	0.00042	0.0075	0.00000080	0.00000080	0.00041	0.00000034	2.4	0.0000034	0.0000047	0.000040
28-Oct-15	70	500	490																						
4-Nov-15	71	490	480																						
11-Nov-15	72	480	470																						
18-Nov-15	73	470	455	8.1	145	#N/A	0.54	9.5	0.23				7.7	0.0014	0.00046	0.00044	0.0055	0.00000080	0.00000080	0.00018	0.00000034	2.0	0.0000080	0.0000082	0.000043
25-Nov-15	74	500	490	7.9	72	#N/A	0.42	21	0.98				16	0.020	0.0010	0.0019	0.015	0.0000034	0.0000034	0.00069	0.0000015	4.4	0.000015	0.000011	0.00010
2-Dec-15	75	500	490	8.0	85	#N/A	0.82	21	0.98				21	0.018	0.0014	0.0020	0.018	0.0000034	0.0000034	0.00044	0.0000015	5.2	0.000015	0.0000078	0.00017
9-Dec-15	76	500	495	7.9	70	#N/A	1.4	18	0.99				16	0.018	0.00099	0.0019	0.015	0.0000045	0.0000035	0.0015	0.0000059	4.3	0.000015	0.0000074	0.00017
16-Dec-15	77	500	495	8.1	77	#N/A	0.73	19	0.99				19	0.025	0.0011	0.0023	0.017	0.0000035	0.0000035	0.0010	0.0000015	4.9	0.000025	0.0000099	0.00017
23-Dec-15	78	500	485	8.1	62	#N/A	0.69	16	0.97				16	0.021	0.00086	0.0018	0.014	0.0000034	0.0000034	0.00086	0.0000015	4.3	0.000025	0.0000064	0.00014
30-Dec-15	79	500	490	7.8	55	#N/A	0.66	14	0.98				14	0.017	0.00059	0.0012	0.012	0.0000034	0.0000034	0.00069	0.0000015	3.6	0.000025	0.0000029	0.00011
6-Jan-16	80	500	490	7.6	53	#N/A	0.75	14	0.98				13	0.016	0.00062	0.0012	0.011	0.0000034	0.0000034	0.00084	0.0000015	3.5	0.000020	0.0000025	0.00017
13-Jan-16	81	500	495	7.6	55	#N/A	0.84	14	0.99				13	0.016	0.00064	0.0012	0.011	0.0000035	0.0000035	0.00099	0.0000015	3.5	0.000015	0.0000020	0.00024
20-Jan-16	82	500	495	7.8	71	#N/A	1.1	15	0.99				14	0.017	0.00067	0.0013	0.013	0.0000035	0.0000035	0.00099	0.0000032	3.7	0.000015	0.0000069	0.00025
27-Jan-16	83	500	495	7.8	62	#N/A	1.4	16	0.99				15	0.018	0.00069	0.0013	0.014	0.0000035	0.0000035	0.00099	0.0000050	4.0	0.000015	0.000012	0.00026
3-Feb-16	84	500	495	7.8	70	#N/A	1.3	16	0.99				15	0.016	0.00071	0.0013	0.014	0.0000034	0.0000034	0.00098	0.0000032	4.1	0.000015	0.0000098	0.00015
10-Feb-16	85	500	480	7.7	67	#N/A	1.2	16	0.96				15	0.014	0.00072	0.0013	0.014	0.0000034	0.0000034	0.00096	0.0000014	4.2	0.000014	0.0000077	0.000043
17-Feb-16	86	500	505	7.7	64	#N/A	1.2	17	1.0				16	0.015	0.00074	0.0013	0.014	0.0000034	0.0000034	0.00096	0.0000014	4.3	0.000014	0.0000062	0.000041
24-Feb-16	87	500	480	7.8	70	#N/A	1.1	17	0.96				16	0.016	0.00077	0.0013	0.014	0.0000034	0.0000034	0.00096	0.0000014	4.3	0.000014	0.0000048	0.000038

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Calculated Loading Rates for HC4 (GS)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
25-Jun-14	0	500	335	7.8	0.0017	0.0000034	0.0021	7.8	0.0072	0.0034	0.0020	0.00040	0.0050	3.7	0.00027	0.64	0.00000067	8.0	0.10	22	0.000012	0.000057	0.000037	0.011	0.00015	0.00067	0.00067
2-Jul-14	1	500	505	7.8	0.0010	0.0000051	0.0026	10	0.014	0.0051	0.0023	0.0012	0.0045	4.1	0.00027	1.0	0.0000010	7.8	0.13	26	0.000011	0.00059	0.000030	0.031	0.00017	0.0010	0.0010
9-Jul-14	2	500	475	7.9	0.00095	0.0000048	0.0018	5.3	0.0070	0.0048	0.0022	0.00048	0.0095	3.0	0.000071	1.0	0.00000095	3.7	0.067	9.6	0.0000081	0.0014	0.000038	0.016	0.00020	0.00048	0.00095
16-Jul-14	3	500	500	8.0	0.0035	0.0000050	0.0014	3.9	0.0054	0.0050	0.0019	0.00040	0.0045	2.3	0.000025	0.87	0.0000010	2.1	0.053	3.9	0.0000075	0.000075	0.000035	0.0096	0.00020	0.00050	0.0010
23-Jul-14	4	500	495	8.0	0.0064	0.0000050	0.0011	3.0	0.0051	0.0050	0.0012	0.00020	0.0045	1.9	0.000020	0.75	0.00000099	1.2	0.042	2.3	0.0000050	0.00081	0.000040	0.0057	0.00018	0.00050	0.00099
30-Jul-14	5	500	480	8.0	0.00096	0.0000048	0.0011	2.8	0.0040	0.0048	0.0012	0.00024	0.0043	1.7	0.000034	0.70	0.00000096	0.84	0.040	1.6	0.0000086	0.000019	0.000072	0.0051	0.00021	0.00048	0.00096
6-Aug-14	6	500	485	7.9	0.00097	0.000024	0.00086	2.5	0.0035	0.0049	0.00074	0.000049	0.0044	1.6	0.000024	0.67	0.00000097	0.61	0.036	1.2	0.0000039	0.000015	0.000029	0.0045	0.00019	0.00049	0.00097
13-Aug-14	7	500	485	7.9	0.00097	0.0000049	0.00065	2.0	0.0040	0.0049	0.00054	0.000097	0.0044	1.2	0.000019	0.50	0.00000097	0.37	0.029	0.78	0.0000024	0.0000049	0.000087	0.0036	0.000092	0.00049	0.00097
20-Aug-14	8	500	480	7.9	0.00096	0.0000048	0.00058	1.8	0.0037	0.0048	0.00050	0.000096	0.0043	1.2	0.000029	0.47	0.00000096	0.31	0.028	0.75	0.0000024	0.00064	0.000082	0.0037	0.00017	0.00048	0.00096
27-Aug-14	9	500	500	7.9	0.0010	0.0000050	0.00067	2.3	0.0043	0.0050	0.00058	0.00010	0.0060	1.4	0.000025	0.62	0.0000010	0.36	0.035	0.95	0.0000060	0.000045	0.000040	0.0048	0.00017	0.00050	0.0010
3-Sep-14	10	500	475	7.8	0.0033	0.000029	0.00062	2.1	0.0045	0.0048	0.00049	0.000048	0.0029	1.3	0.000043	0.67	0.0000086	0.28	0.034	1.1	0.0000062	0.000095	0.000024	0.0044	0.00017	0.00048	0.00095
10-Sep-14	11	500	505	7.9	0.0035	0.0000051	0.00057	1.9	0.0044	0.0051	0.00042	0.000051	0.0015	1.2	0.000025	0.61	0.0000010	0.23	0.032	0.76	0.0000051	0.000030	0.000045	0.0044	0.00017	0.00051	0.0010
17-Sep-14	12	500	490	7.9	0.0034	0.0000049	0.00057	1.9	0.0035	0.0049	0.00041	0.000049	0.0015	1.3	0.000025	0.54	0.00000098	0.22	0.031	1.0	0.0000025	0.0000098	0.000074	0.0048	0.00018	0.00049	0.00098
24-Sep-14	13	500	485	7.9	0.00097	0.0000049	0.00048	1.7	0.0032	0.0049	0.00037	0.000097	0.0044	1.0	0.000019	0.46	0.0000024	0.17	0.027	0.68	0.0000024	0.0000097	0.000024	0.0042	0.00014	0.00049	0.00097
1-Oct-14	14	500	480	7.8	0.0043	0.0000048	0.00032	1.3	0.0056	0.0048	0.00038	0.000048	0.0043	0.83	0.000019	0.37	0.00000096	0.11	0.023	0.73	0.0000024	0.000014	0.000029	0.0034	0.00012	0.00096	0.00096
8-Oct-14	15	500	490	7.7	0.0034	0.0000049	0.00035	1.2	0.0037	0.0049	0.00027	0.000049	0.0015	0.81	0.000020	0.34	0.00000098	0.11	0.021	0.88	0.0000039	0.00052	0.000025	0.0035	0.00013	0.00049	0.00098
15-Oct-14	16	500	480	7.8	0.0034	0.0000048	0.00042	1.3	0.0039	0.0048	0.00031	0.000048	0.0014	0.84	0.000019	0.36	0.00000096	0.12	0.022	0.86	0.0000043	0.00036	0.000077	0.0036	0.00012	0.00048	0.00096
22-Oct-14	17	500	500	7.8	0.0035	0.000030	0.00050	1.9	0.0053	0.0050	0.00046	0.000050	0.0015	1.1	0.000020	0.52	0.0000010	0.15	0.029	1.1	0.0000055	0.000020	0.000025	0.0054	0.00014	0.00050	0.0010
29-Oct-14	18	500	490	7.7	0.0034	0.0000049	0.00030	1.2	0.0043	0.0049	0.00027	0.000049	0.0015	0.69	0.000020	0.29	0.00000098	0.088	0.020	0.59	0.0000039	0.00044	0.000029	0.0032	0.000088	0.00049	0.00098
5-Nov-14	19	500	475	7.8	0.0033	0.0000048	0.00027	1.1	0.0040	0.0048	0.00030	0.000048	0.0014	0.59	0.000019	0.29	0.00000095	0.086	0.018	0.57	0.0000052	0.00045	0.000033	0.0030	0.000086	0.00048	0.00095
12-Nov-14	20	500	505	7.8	0.0035	0.0000051	0.00044	1.9	0.0047	0.0051	0.00067	0.000051	0.0015	1.0	0.000025	0.50	0.0000010	0.17	0.032	0.96	0.0000056	0.000056	0.000025	0.0054	0.00015	0.00051	0.0010
19-Nov-14	21	500	480	7.9	0.0034	0.0000096	0.00030	1.2	0.0040	0.0048	0.00030	0.000048	0.0014	0.68	0.000019	0.31	0.00000096	0.082	0.022	0.48	0.0000043	0.00014	0.000024	0.0032	0.00012	0.00048	0.00096
26-Nov-14	22	500	490	7.8	0.0034	0.0000049	0.00031	1.3	0.0049	0.0049	0.00034	0.000049	0.0044	0.69	0.000020	0.33	0.00000098	0.083	0.022	0.54	0.0000078	0.00039	0.000064	0.0036	0.00012	0.00049	0.00098
3-Dec-14	23	500	485	7.7	0.0034	0.000019	0.00028	1.2	0.0053	0.0049	0.00035	0.000049	0.0015	0.61	0.000019	0.28	0.00000097	0.087	0.018	0.53	0.0000029	0.00013	0.000024	0.0036	0.00015	0.00049	0.00097
10-Dec-14	24	500	500	7.8	0.0035	0.0000050	0.00028	1.1	0.0047	0.0050	0.00040	0.000050	0.0015	0.66	0.000020	0.29	0.0000010	0.070	0.020	0.55	0.0000050	0.00019	0.000035	0.0033	0.00011	0.00050	0.0010
17-Dec-14	25	500	485	7.8	0.0034	0.0000049	0.00032	1.2	0.0052	0.0049	0.00036	0.000049	0.0015	0.68	0.000019	0.35	0.00000097	0.078	0.022	0.44	0.0000044	0.00036	0.000024	0.0039	0.00014	0.00049	0.00097
24-Dec-14	26	500	480	7.8	0.0034	0.0000048	0.00038	1.4	0.0054	0.0048	0.00043	0.000048	0.0014	0.80	0.000038	0.38	0.00000096	0.086	0.025	0.53	0.0000058	0.00020	0.000086	0.0042	0.00016	0.00048	0.00096
31-Dec-14	27	500	500	7.8	0.0035	0.000055	0.00036	1.5	0.0053	0.0050	0.00048	0.000050	0.0015	0.81	0.000020	0.46	0.0000010	0.085	0.027	0.60	0.0000050	0.00018	0.000025	0.0045	0.00013	0.00050	0.0010
7-Jan-15	28	500	495	7.7	0.0035	0.0000099	0.00034	1.4	0.0052	0.0050	0.00047	0.000050	0.0015	0.76	0.000020	0.35	0.00000099	0.074	0.024	0.40	0.0000050	0.00027	0.000040	0.0040	0.00012	0.00050	0.00099
14-Jan-15	29	500	490	7.7	0.0034	0.0000098	0.00033	1.5	0.0043	0.0049	0.00053	0.000049	0.0015	0.85	0.000020	0.44	0.00000098	0.088	0.025	0.39	0.0000044	0.000083	0.000034	0.0039	0.00013	0.00049	0.00098
21-Jan-15	30	500	485	7.9	0.0034	0.000015	0.00028	1.2	0.0046	0.0049	0.00052	0.000049	0.0015	0.65	0.000019	0.32	0.00000097	0.058	0.021	0.24	0.0000024	0.00013	0.000087	0.0035	0.00012	0.00049	0.00097
28-Jan-15	31	500	485	7.7	0.0034	0.0000049	0.00025	1.3	0.0039	0.0049	0.00049	0.000049	0.0015	0.67	0.000039	0.34	0.00000097	0.078	0.017	0.53	0.0000029	0.000058	0.000029	0.0035	0.00013	0.00049	0.00097
4-Feb-15	32	500	485	7.8	0.0034	0.0000097	0.00029	1.2	0.0042	0.0049	0.00042	0.000049	0.0015	0.64	0.000019	0.32	0.00000097	0.068	0.022	0.49	0.0000024	0.00012	0.000068	0.0030	0.00011	0.00049	0.00097
11-Feb-15	33	500	475	7.7	0.0033	0.0000048	0.00023	1.0	0.0043	0.0048	0.00038	0.000048	0.0014	0.57	0.00048	0.28	0.00000095	0.052	0.018	0.24	0.0000029	0.00021	0.00016	0.0026	0.00012	0.00048	0.00095
18-Feb-15	34	500	500	7.7	0.0035	0.0000050	0.00032	1.3	0.0040	0.0050	0.00038	0.000050	0.0015	0.69	0.00050	0.35	0.0000010	0.060	0.024	0.35	0.0000040	0.000065	0.000030	0.0036	0.00013	0.00050	0.0010
25-Feb-15	35	500	480	7.8	0.0034	0.0000096	0.00030	1.4	0.0036	0.0048	0.00040	0.000048	0.0014	0.82	0.00048	0.34	0.00000096	0.067	0.025	0.34	0.0000038	0.000053	0.000024	0.0040	0.00012	0.00048	0.00096
4-Mar-15	36	500	490	7.7	0.0034	0.0000049	0.00026	1.1	0.0038	0.0049	0.00031	0.000049	0.0015	0.61	0.00049	0.33	0.00000098	0.054	0.019	0.44	0.0000025	0.000015	0.000044	0.0032	0.00011	0.00049	0.00098
11-Mar-15	37	500	485	7.7	0.0049	0.000049	0.00024	0.96	0.0040	0.0049	0.00029	0.000049	0.0015	0.50	0.00049	0.24	0.00000097	0.034	0.018	0.049	0.0000024	0.00028	0.000044	0.0028	0.000097	0.0058	0.00097
18-Mar-15	38	500	490	7.7	0.0034	0.0000049	0.00023	0.94	0.0046	0.0049	0.00027	0.000049	0.0015	0.53	0.00049	0.25	0.00000098	0.039	0.017	0.44	0.0000025	0.00020	0.00010	0.0025	0.000078	0.00049	0.00098
25-Mar-15	39	500	490	7.7	0.0034	0.0000049	0.00016	0.98	0.0043	0.0049	0.00028	0.000049	0.0015	0.51	0.00049	0.24	0.00000098	0.064	0.017	0.34	0.0000025	0.00024	0.000039	0.0025	0.00012	0.00049	0.00098
1-Apr-15	40	500	485	7.9	0.0034	0.0000049	0.00015	0.76	0.0080	0.0049	0.00020	0.000049	0.0015	0.44	0.00049	0.15	0.00000097	0.33	0.014	0.049	0.0000024	0.00023	0.000024	0.0030	0.000068	0.00049	0.00097
8-Apr-15	41	500	485	7.6	0.0034	0.0000049	0.00018	0.79	0.0041	0.0049	0.00024	0.000049	0.0015	0.45	0.00049	0.26	0.00000097	0.034	0.015	0.049	0.0000024	0.00019	0.000024	0.0022	0.000087	0.00049	0.00097
15-Apr-15	42	500	475	7.7	0.0033	0.0000048	0.00024	1.0	0.0043	0.0048	0.00029	0.000048	0.0014	0.58	0.00048	0.28	0.00000095	0.048	0.019	0.33	0.0000024	0.00047	0.000057	0.0031	0.00012	0.00048	0.00095
22-Apr-15	43	500	505	7.8	0.0035	0.000030	0.00028	1.2	0.0045	0.0051	0.00034	0.000051	0.0015	0.69	0.00051	0.36	0.0000020	0.056	0.022	0.30	0.0000066	0.00018	0.000025	0.0038	0.00014	0.00051	0.0010
29-Apr-15	44	500	495	7.8	0.0035	0.0000099	0.00027	1.3	0.0050	0.0050	0.00038	0.000050	0.0015	0.77	0.00050	0.34	0.00000099	0.045	0.023	0.40	0.0000025	0.00019	0.000040	0.0038	0.00013	0.00050	0.00099
6-May-15	45	500	495	7.7	0.0035	0.0000050	0.00027	1.1	0.0047	0.0050	0.00032	0.000050	0.0015	0.66	0.00050	0.35	0.00000099	0.045	0.020	0.35	0.0000025	0.00027	0.000050	0.0034	0.00012	0.00050	0.00099
13-May-15	46	500	495																								
20-May-15	47	495	480																								
27-May-15	48	480	475																								
3-Jun-15	49	475	475	8.0	0.00083	0.0000012	0.00016	0.86	0.0014	0.0012	0.00026	0.000024	0.00036	0.42	0.0000048	0.25	0.00000024	0.030	0.015	0.21	0.0000012	0.000045	0.000011	0.0026	0.000037	0.00012	0.00024
10-Jun-15	50	500	490																								
17-Jun-15	51	490	482																								
24-Jun-15	52	480	450																								
1-Jul-15	53	450	445	8.0	0.00078	0.0000011	0.00014	0.81	0.0019	0.0011	0.00022	0.000022	0.00033	0.32	0.0000089	0.21	0.00000022	0.029	0.015	0.18	0.0000014	0.00010	0.0000056	0.0026	0.000030	0.00011	0.00022
8-Jul-15	54	500	485																								
15-Jul-15	55	485	470																								
22-Jul-15	56	470	455																								
29-Jul-15	57	455	445	8.0	0.00078	0.0000011	0.00014	0.85	0.0020	0.0011	0.00015	0.000022	0.00033	0.32	0.0000067	0.20	0.0000014	0.028	0.016	0.18	0.00000056	0.000047	0.0000056	0.0013	0.000020	0.00011	0.00022
5-Aug-15	58	500	490																								
12-Aug-15	59	490	475																								
19-Aug-15	60	475	465																								
26-Aug-15	61	465	445	8.1	0.00078	0.000012	0.00013	0.82	0.0019	0.0011	0.00024	0.000022	0.00033	0.33	0.0000078	0.25	0.00000022	0.024	0.015	0.18	0.0000017	0.00011	0.0000056	0.0027	0.000032	0.00022	0.00022
2-Sep-15	62	500	500																								
9-Sep-15	63	500	480																								
16-Sep-15	64	480	465																								
23-Sep-15	65	465	465	8.1	0.00081	0.0000012	0.00014	0.88	0.0015	0.0012	0.00018	0.000023	0.00035	0.36	0.0000093	0.22	0.0000017	0.028	0.016	0.20	0.00000093	0.000094	0.0000081	0.0023	0.000027	0.00012	0.00023
30-Sep-15	66	500	495																								
7-Oct-15	67	495	475																								
14-Oct-15	68	475	470																								
21-Oct-15	69	470	455	8.1	0.00080	0.0000023	0.00012	0.77	0.0016	0.0011	0.00014	0.000023	0.00034	0.31	0.000010	0.19	0.0000027	0.028	0.013	0.15	0.0000016	0.00014	0.0000057	0.0022	0.000022	0.00011	0.00023
28-Oct-15	70	500	490																								
4-Nov-15	71	490	480																								
11-Nov-15	72	480	470																								
18-Nov-15	73	470	455	8.1	0.0025	0.0000011	0.000094	0.66	0.0018	0.0011	0.00025	0.000011	0.00034	0.27	0.000020	0.15	0.00000023	0.024	0.011	0.10	0.0000018	0.00013	0.0000057	0.0018	0.000023	0.00011	0.00023
25-Nov-15	74	500	490	7.9	0.0034	0.0000098	0.00027	1.3	0.0041	0.0049	0.00040	0.000049	0.0015	0.73	0.00014	0.35	0.000068	0.059	0.024	0.25	0.0000025	0.00023	0.000025	0.0047	0.00013	0.00049	0.00098
2-Dec-15	75	500	490	8.0	0.0034	0.000015	0.00029	1.9	0.0044	0.0049	0.00043	0.000049	0.0015	0.95	0.000020	0.47	0.00000098	0.059	0.030	0.39	0.0000025	0.00020	0.000039	0.0055	0.00012	0.00049	0.00098
9-Dec-15	76	500	495	7.9	0.0035	0.0000050	0.00027	1.3	0.0031	0.0050	0.00031	0.000050	0.0015	0.73	0.000025	0.34	0.0000020	0.040	0.024	0.15	0.0000099	0.00020	0.000069	0.0044	0.00012	0.00050	0.00099
16-Dec-15	77	500	495	8.1	0.0035	0.000064	0.00032	1.6	0.0037	0.0050	0.00029	0.000050	0.0059	0.88	0.000020	0.44	0.00000099	0.050	0.028	0.099	0.0000035	0.00032	0.000069	0.0052	0.00014	0.00050	0.00099
23-Dec-15	78	500	485	8.1	0.0034	0.000035	0.00027	1.4	0.0034	0.0049	0.00023	0.000049	0.0037	0.72	0.000020	0.35	0.00000099	0.049	0.024	0.25	0.0000030	0.00021	0.000064	0.0043	0.00012	0.00049	0.00099
30-Dec-15	79	500	490	7.8	0.0034	0.0000049	0.00023	1.1	0.0030	0.0049	0.00017	0.000049	0.0015	0.57	0.000020	0.25	0.00000098	0.049	0.019	0.39	0.0000025	0.00011	0.000059	0.0034	0.000093	0.00049	0.00098
6-Jan-16	80	500	490	7.6	0.0034	0.0000074	0.00020	1.1	0.0031	0.0049	0.00021	0.000049	0.0015	0.58	0.000042	0.26	0.00000099	0.039	0.019	0.22	0.0000025	0.00012	0.000059	0.0032	0.000084	0.00049	0.00099
13-Jan-16	81	500	495	7.6	0.0035	0.0000099	0.00018	1.0	0.0031	0.0050	0.00024	0.000050	0.0015	0.58	0.000064	0.27	0.00000099	0.030	0.018	0.050	0.0000025	0.00014	0.000059	0.0030	0.000074	0.00050	0.00099
20-Jan-16	82	500	495	7.8	0.0035	0.0000074	0.00020	1.1	0.0034	0.0050	0.00021	0.000050	0.0015	0.60	0.000042	0.29	0.00000099	0.032	0.020	0.050	0.0000025	0.00019	0.000057	0.0035	0.000082	0.00050	0.00099
27-Jan-16	83	500	495	7.8	0.0035	0.0000050	0.00022	1.2	0.0036	0.0050	0.00018	0.000050	0.0015	0.61	0.000020	0.31	0.00000099	0.035	0.022	0.050	0.0000025	0.00024	0.000054	0.0040	0.000089	0.00050	0.00099
3-Feb-16	84	500	495	7.8	0.0034	0.0000049	0.00021	1.2	0.0039	0.0049	0.00018	0.000049	0.0015	0.60	0.000027	0.30	0.00000098	0.041	0.022	0.17	0.0000029	0.00020	0.000061	0.0036	0.000083	0.00049	0.00098
10-Feb-16	85	500	480	7.7	0.0034	0.0000048	0.00020	1.2	0.0041	0.0048	0.00018	0.000048	0.0014	0.59	0.000034	0.28	0.00000096	0.048	0.022	0.29	0.0000034	0.00016	0.000067	0.0033	0.000077	0.00048	0.00096
17-Feb-16	86	500	505	7.7	0.0034	0.0000048	0.00022	1.2	0.0037	0.0048	0.00019	0.000048	0.0014	0.62	0.000026	0.25	0.00000096	0.036	0.022	0.26	0.0000029	0.00015	0.000067	0.0035	0.000079	0.00048	0.00096
24-Feb-16	87	500	480	7.8	0.0034	0.0000048	0.00023	1.3	0.0033	0.0048	0.00020	0.000048	0.0014	0.66	0.000019	0.23	0.00000096	0.024	0.022	0.24	0.0000024	0.00014	0.000067	0.0038	0.000082	0.00048	0.00096

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for HC5 (OKY Master)

Date	**Cycle**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**	**Cu**
	No.	Input	Output		umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
6-May-15	0	500	290	7.5	232	#N/A	4.4	26	57	5.0	0.23	< 0.3	28	0.14	0.010	0.093	0.0064	0.000028	< 0.000007	0.075	0.000019	7.9	< 0.00003	0.0026	0.0029
13-May-15	1	500	485	7.6	70	#N/A	5.0	17	10	1.0	0.54	< 0.3	3.2	0.50	0.015	0.24	0.0050	0.000037	0.000013	0.053	< 0.000003	0.87	0.000050	0.00049	0.0017
20-May-15	2	500	495	7.4	35	#N/A	3.5	9.7	3.0	1.0	0.82	< 0.3	1.0	0.20	0.011	0.29	0.0018	0.000018	< 0.000007	0.022	< 0.000003	0.28	< 0.00003	0.00014	0.0010
27-May-15	3	500	435	7.3	31	#N/A	2.5	9.2	4.0	1.0	0.72	< 0.3	1.1	0.24	0.010	0.27	0.0018	0.000012	< 0.000007	0.019	< 0.000003	0.29	< 0.00003	0.00012	0.00037
3-Jun-15	4	500	520	7.4	25	#N/A	2.8	7.7	2.0	< 1	0.70	< 0.3	0.87	0.37	0.0078	0.29	0.0029	0.000019	< 0.000007	0.011	0.0000040	0.24	< 0.00003	0.00010	0.00048
10-Jun-15	5	500	495	7.3	23	#N/A	3.0	8.2	3.0	< 1	0.55	< 0.3	0.74	0.052	0.0059	0.27	0.00060	< 0.000007	< 0.000007	0.013	< 0.000003	0.21	< 0.00003	0.000096	0.00089
17-Jun-15	6	500	490	7.4	19	#N/A	3.0	7.3	3.0	< 1	0.41	< 0.3	0.78	0.28	0.0056	0.30	0.0025	0.000019	< 0.000007	0.014	0.0000060	0.22	< 0.00003	0.00011	0.00047
24-Jun-15	7	500	490	7.2	19	#N/A	3.2	5.8	< 2	< 1	0.40	< 0.3	0.76	0.20	0.0053	0.27	0.0015	0.000015	< 0.000007	0.0083	< 0.000003	0.20	< 0.00003	0.00011	0.00029
1-Jul-15	8	500	480	7.6	16	#N/A	3.1	6.5	< 2	< 1	0.33	< 0.3	0.72	0.21	0.0044	0.25	0.0017	0.000015	< 0.000007	0.0049	< 0.000003	0.19	0.000040	0.00010	0.00074
8-Jul-15	9	500	495	7.5	15	#N/A	2.6	5.8	3.0	< 1	0.33	< 0.3	0.70	0.046	0.0039	0.22	0.00049	< 0.000007	< 0.000007	0.0065	< 0.000003	0.20	< 0.00003	0.000091	0.00032
15-Jul-15	10	500	490	7.2	12	#N/A	3.4	5.1	2.0	< 1	0.25	< 0.3	0.61	0.088	0.0032	0.22	0.00072	< 0.000007	< 0.000007	0.0093	< 0.000003	0.16	0.000030	0.000096	0.00052
22-Jul-15	11	500	495	7.0	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	12	500	495	7.3	12	#N/A	2.3	5.1	< 2	< 1	0.18	< 0.3	0.59	0.031	0.0026	0.17	0.00032	0.0000070	< 0.000007	0.0038	< 0.000003	0.16	< 0.00003	0.000073	0.00075
5-Aug-15	13	500	490	6.9	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	14	500	495	6.8	10	#N/A	1.7	3.9	< 2	< 1	0.15	< 0.3	0.76	0.088	0.0022	0.14	0.00067	< 0.000007	0.0000070	0.0090	< 0.000003	0.20	0.000030	0.000090	0.00028
19-Aug-15	15	500	475	7.0	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	16	500	515	7.4	11	#N/A	2.6	4.6	2.0	< 1	0.12	< 0.3	0.88	0.068	0.0020	0.11	0.00050	< 0.000007	< 0.000007	0.0032	0.0000060	0.24	< 0.00003	0.00011	0.00012
2-Sep-15	17	500	490	7.0	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	18	500	500	7.0	10	#N/A	1.9	3.4	< 2	< 1	0.11	< 0.3	0.87	0.034	0.0016	0.100	0.00033	< 0.000007	< 0.000007	0.0040	< 0.000003	0.24	0.000040	0.000092	0.00044
16-Sep-15	19	500	495	6.9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	20	500	500	7.1	8.0	#N/A	1.5	3.8	< 2		0.060		0.85	0.020	0.0012	0.065	0.00024	< 0.000007	< 0.000007	0.0022	0.000018	0.23	< 0.00003	0.000079	0.000070
30-Sep-15	21	500	490	6.9	5.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	22	500	495	7.4	10	#N/A	2.0	5.2	< 2		0.070		1.5	0.041	0.0014	0.052	0.00040	< 0.000007	< 0.000007	0.0027	< 0.000003	0.42	0.000040	0.00011	0.00042
14-Oct-15	23	500	500	7.1	8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	24	500	505	7.3	7.0	#N/A	0.80	4.0	2.0		0.070		1.1	0.029	0.0011	0.054	0.00090	< 0.000007	< 0.000007	0.0023	< 0.000003	0.29	< 0.00003	0.00011	0.00040
28-Oct-15	25	500	490	7.3	8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	26	500	475	7.3	8.0	#N/A	1.2	4.4	2.0		< 0.06		1.1	0.046	0.0011	0.049	0.00044	< 0.000007	< 0.000007	0.0042	0.0000050	0.30	< 0.00003	0.00011	0.00043
11-Nov-15	27	500	500	7.3	6.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	28	500	500	7.2	8.0	#N/A	1.4	4.7	2.0		< 0.06		1.1	0.019	0.0010	0.045	0.00021	< 0.000007	< 0.000007	0.00050	< 0.000003	0.31	0.000040	0.00012	0.00048
25-Nov-15	29	500	490	7.1	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Dec-15	30	500	490	6.8	8.0	#N/A	3.0	4.0	2.0		0.070		1.2	0.11	0.0011	0.059	0.00090	< 0.000007	< 0.000007	0.0010	< 0.000003	0.34	< 0.00003	0.00012	0.00015
9-Dec-15	31	500	490	7.3	5.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	32	500	495	7.3	7.0	#N/A	3.2	3.5	2.0		< 0.06		1.4	0.056	0.00090	0.058	0.00075	0.000017	0.000012	0.0020	0.000030	0.39	0.00024	0.00014	0.00052
23-Dec-15	33	500	490	7.9	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	34	500	505	6.7	4.0	#N/A	2.3	3.6	2.0		< 0.06		1.1	0.040	0.00080	0.045	0.00043	< 0.000007	< 0.000007	0.0016	< 0.000003	0.31	0.000060	0.000094	0.0015
6-Jan-16	35	500	485	6.6	6.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	36	500	490	6.4	5.0	#N/A	2.4	2.7	2.0		< 0.06		1.2	0.024	0.00060	0.025	0.00036	< 0.000007	< 0.000007	< 0.002	< 0.000003	0.33	< 0.00003	0.000096	0.00044
20-Jan-16	37	500	485	7.3	8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	38	500	505	7.2	6.0	#N/A	3.3	3.5	2.0		< 0.06		1.1	0.014	0.00060	0.029	0.00064	< 0.000007	< 0.000007	< 0.002	0.000023	0.30	< 0.00003	0.00013	0.00058
3-Feb-16	39	500	480	7.2	3.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	40	500	505	6.6	5.0	#N/A	2.5	3.0	2.0		< 0.06		0.98	0.0063	0.00050	0.026	0.00017	< 0.000007	< 0.000007	< 0.002	< 0.000003	0.27	0.000040	0.000097	0.00080
17-Feb-16	41	500	490	7.5	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	42	500	490	6.9	4.0	#N/A	2.4	3.3	< 2		< 0.06		1.2	0.0071	0.00060	0.029	0.00031	< 0.000007	< 0.000007	< 0.002	0.0000050	0.32	< 0.00003	0.00010	0.000060
2-Mar-16	43	500	495	6.7	6.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Mar-16	44	500	495	6.9	6.0	#N/A	3.3	4.5	< 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Calculated Loading Rates for HC5 (OKY Master)

Date	**Cycle**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**	**Cu**
	No.	Input	Output		umhos/cm	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
6-May-15	0	500	290	7.5	232	#N/A	1.3	7.5	17	1.5	0.067	0.087	8.0	0.039	0.0030	0.027	0.0019	0.0000081	0.0000020	0.022	0.0000055	2.3	0.0000087	0.00074	0.00083
13-May-15	1	500	485	7.6	70	#N/A	2.4	8.2	4.9	0.49	0.26	0.15	1.6	0.24	0.0071	0.12	0.0024	0.000018	0.0000063	0.025	0.0000015	0.42	0.000024	0.00024	0.00082
20-May-15	2	500	495	7.4	35	#N/A	1.8	4.8	1.5	0.50	0.41	0.15	0.50	0.098	0.0052	0.14	0.00091	0.0000089	0.0000035	0.011	0.0000015	0.14	0.000015	0.000070	0.00051
27-May-15	3	500	435	7.3	31	#N/A	1.1	4.0	1.7	0.44	0.31	0.13	0.48	0.10	0.0044	0.12	0.00078	0.0000052	0.0000030	0.0081	0.0000013	0.13	0.000013	0.000053	0.00016
3-Jun-15	4	500	520	7.4	25	#N/A	1.4	4.0	1.0	0.52	0.36	0.16	0.45	0.19	0.0041	0.15	0.0015	0.0000099	0.0000036	0.0059	0.0000021	0.12	0.000016	0.000053	0.00025
10-Jun-15	5	500	495	7.3	23	#N/A	1.5	4.0	1.5	0.50	0.27	0.15	0.37	0.026	0.0029	0.13	0.00030	0.0000035	0.0000035	0.0063	0.0000015	0.10	0.000015	0.000048	0.00044
17-Jun-15	6	500	490	7.4	19	#N/A	1.5	3.6	1.5	0.49	0.20	0.15	0.38	0.14	0.0027	0.15	0.0012	0.0000093	0.0000034	0.0069	0.0000029	0.11	0.000015	0.000055	0.00023
24-Jun-15	7	500	490	7.2	19	#N/A	1.6	2.8	0.98	0.49	0.20	0.15	0.37	0.098	0.0026	0.13	0.00073	0.0000074	0.0000034	0.0041	0.0000015	0.098	0.000015	0.000052	0.00014
1-Jul-15	8	500	480	7.6	16	#N/A	1.5	3.1	0.96	0.48	0.16	0.14	0.35	0.10	0.0021	0.12	0.00080	0.0000072	0.0000034	0.0024	0.0000014	0.091	0.000019	0.000049	0.00036
8-Jul-15	9	500	495	7.5	15	#N/A	1.3	2.9	1.5	0.50	0.16	0.15	0.35	0.023	0.0019	0.11	0.00024	0.0000035	0.0000035	0.0032	0.0000015	0.099	0.000015	0.000045	0.00016
15-Jul-15	10	500	490	7.2	12	#N/A	1.7	2.5	0.98	0.49	0.12	0.15	0.30	0.043	0.0016	0.11	0.00035	0.0000034	0.0000034	0.0046	0.0000015	0.078	0.000015	0.000047	0.00025
22-Jul-15	11	500	495	7.0	12	#N/A	1.4	2.5	0.99	0.49	0.11	0.15	0.30	0.029	0.0014	0.095	0.00026	0.0000034	0.0000034	0.0032	0.0000015	0.079	0.000015	0.000042	0.00031
29-Jul-15	12	500	495	7.3	12	#N/A	1.1	2.5	0.99	0.50	0.089	0.15	0.29	0.015	0.0013	0.082	0.00016	0.0000035	0.0000035	0.0019	0.0000015	0.079	0.000015	0.000036	0.00037
5-Aug-15	13	500	490	6.9	11	#N/A	0.99	2.2	0.99	0.50	0.082	0.15	0.33	0.029	0.0012	0.076	0.00025	0.0000035	0.0000035	0.0032	0.0000015	0.089	0.000015	0.000040	0.00025
12-Aug-15	14	500	495	6.8	10	#N/A	0.85	1.9	0.99	0.50	0.074	0.15	0.38	0.043	0.0011	0.070	0.00033	0.0000035	0.0000035	0.0045	0.0000015	0.099	0.000015	0.000045	0.00014
19-Aug-15	15	500	475	7.0	10	#N/A	1.1	2.1	1.0	0.51	0.068	0.15	0.41	0.039	0.0011	0.064	0.00029	0.0000035	0.0000035	0.0031	0.0000023	0.11	0.000015	0.000050	0.00010
26-Aug-15	16	500	515	7.4	11	#N/A	1.3	2.4	1.0	0.52	0.062	0.15	0.45	0.035	0.0010	0.059	0.00026	0.0000036	0.0000036	0.0016	0.0000031	0.12	0.000015	0.000055	0.000062
2-Sep-15	17	500	490	7.0	10	#N/A	1.1	2.0	1.0	0.51	0.058	0.15	0.44	0.026	0.00092	0.054	0.00021	0.0000036	0.0000036	0.0018	0.0000023	0.12	0.000018	0.000050	0.00014
9-Sep-15	18	500	500	7.0	10	#N/A	0.95	1.7	1.0	0.50	0.055	0.15	0.44	0.017	0.00080	0.050	0.00017	0.0000035	0.0000035	0.0020	0.0000015	0.12	0.000020	0.000046	0.00022
16-Sep-15	19	500	495	6.9	9.7	#N/A	0.84	1.8	1.0	0.25	0.043	0.075	0.43	0.014	0.00070	0.041	0.00014	0.0000035	0.0000035	0.0016	0.0000053	0.12	0.000018	0.000043	0.00013
23-Sep-15	20	500	500	7.1	8.0	#N/A	0.74	1.9	1.0	0.00	0.030	0.00	0.43	0.010	0.00060	0.033	0.00012	0.0000035	0.0000035	0.0011	0.0000090	0.12	0.000015	0.000040	0.000035
30-Sep-15	21	500	490	6.9	4.9	#N/A	0.86	2.2	1.00	0.00	0.032	0.00	0.58	0.015	0.00065	0.029	0.00016	0.0000035	0.0000035	0.0012	0.0000052	0.16	0.000017	0.000047	0.00012
7-Oct-15	22	500	495	7.4	10	#N/A	0.98	2.6	0.99	0.00	0.035	0.00	0.74	0.020	0.00069	0.026	0.00020	0.0000035	0.0000035	0.0013	0.0000015	0.21	0.000020	0.000055	0.00021
14-Oct-15	23	500	500	7.1	7.8	#N/A	0.68	2.3	1.0	0.00	0.035	0.00	0.65	0.017	0.00062	0.026	0.00033	0.0000035	0.0000035	0.0012	0.0000015	0.18	0.000017	0.000057	0.00020
21-Oct-15	24	500	505	7.3	7.1	#N/A	0.38	2.0	1.0	0.00	0.035	0.00	0.56	0.015	0.00056	0.027	0.00045	0.0000035	0.0000035	0.0012	0.0000015	0.15	0.000015	0.000058	0.00020
28-Oct-15	25	500	490	7.3	8.4	#N/A	0.47	2.1	0.98	0.00	0.032	0.00	0.54	0.018	0.00054	0.025	0.00033	0.0000034	0.0000034	0.0016	0.0000019	0.14	0.000015	0.000056	0.00020
4-Nov-15	26	500	475	7.3	8.0	#N/A	0.55	2.1	0.95	0.00	0.029	0.00	0.52	0.022	0.00052	0.023	0.00021	0.0000033	0.0000033	0.0020	0.0000024	0.14	0.000014	0.000054	0.00020
11-Nov-15	27	500	500	7.3	5.8	#N/A	0.62	2.2	0.98	0.00	0.029	0.00	0.53	0.016	0.00051	0.023	0.00016	0.0000034	0.0000034	0.0011	0.0000019	0.15	0.000017	0.000057	0.00022
18-Nov-15	28	500	500	7.2	7.8	#N/A	0.69	2.3	1.0	0.00	0.030	0.00	0.55	0.0095	0.00050	0.022	0.00011	0.0000035	0.0000035	0.00025	0.0000015	0.16	0.000020	0.000061	0.00024
25-Nov-15	29	500	490	7.1	8.7	#N/A	1.1	2.1	0.99	0.00	0.032	0.00	0.57	0.033	0.00052	0.026	0.00027	0.0000035	0.0000035	0.00037	0.0000015	0.16	0.000017	0.000060	0.00016
2-Dec-15	30	500	490	6.8	7.5	#N/A	1.5	2.0	0.98	0.00	0.034	0.00	0.59	0.056	0.00054	0.029	0.00044	0.0000034	0.0000034	0.00049	0.0000015	0.17	0.000015	0.000059	0.000074
9-Dec-15	31	500	490	7.3	5.3	#N/A	1.5	1.9	0.99	0.00	0.032	0.00	0.64	0.042	0.00049	0.029	0.00041	0.0000059	0.0000047	0.00074	0.0000082	0.18	0.000067	0.000064	0.00017
16-Dec-15	32	500	495	7.3	6.6	#N/A	1.6	1.7	0.99	0.00	0.030	0.00	0.69	0.028	0.00045	0.029	0.00037	0.0000084	0.0000059	0.00099	0.000015	0.19	0.00012	0.000068	0.00026
23-Dec-15	33	500	490	7.9	4.5	#N/A	1.4	1.8	1.0	0.00	0.030	0.00	0.62	0.024	0.00042	0.026	0.00029	0.0000060	0.0000047	0.00090	0.0000082	0.17	0.000075	0.000058	0.00051
30-Dec-15	34	500	505	6.7	4.5	#N/A	1.1	1.8	1.0	0.00	0.030	0.00	0.56	0.020	0.00040	0.023	0.00022	0.0000035	0.0000035	0.00081	0.0000015	0.16	0.000030	0.000047	0.00076
6-Jan-16	35	500	485	6.6	6.5	#N/A	1.2	1.6	1.00	0.00	0.030	0.00	0.57	0.016	0.00035	0.017	0.00020	0.0000035	0.0000035	0.00089	0.0000015	0.16	0.000023	0.000047	0.00049
13-Jan-16	36	500	490	6.4	5.2	#N/A	1.2	1.3	0.98	0.00	0.029	0.00	0.58	0.012	0.00029	0.012	0.00018	0.0000034	0.0000034	0.00098	0.0000015	0.16	0.000015	0.000047	0.00022
20-Jan-16	37	500	485	7.3	8.0	#N/A	1.4	1.5	1.00	0.00	0.030	0.00	0.57	0.0095	0.00030	0.013	0.00025	0.0000035	0.0000035	0.00100	0.0000065	0.16	0.000015	0.000057	0.00025
27-Jan-16	38	500	505	7.2	5.8	#N/A	1.7	1.7	1.0	0.00	0.030	0.00	0.56	0.0072	0.00030	0.015	0.00032	0.0000035	0.0000035	0.0010	0.000012	0.15	0.000015	0.000067	0.00029
3-Feb-16	39	500	480	7.2	2.7	#N/A	1.5	1.6	1.0	0.00	0.030	0.00	0.53	0.0052	0.00028	0.014	0.00020	0.0000035	0.0000035	0.0010	0.0000066	0.14	0.000018	0.000058	0.00035
10-Feb-16	40	500	505	6.6	4.6	#N/A	1.3	1.5	1.0	0.00	0.030	0.00	0.49	0.0032	0.00025	0.013	0.000086	0.0000035	0.0000035	0.0010	0.0000015	0.14	0.000020	0.000049	0.00040
17-Feb-16	41	500	490	7.5	4.5	#N/A	1.2	1.6	1.00	0.00	0.030	0.00	0.54	0.0033	0.00027	0.014	0.00012	0.0000035	0.0000035	0.00100	0.0000020	0.15	0.000017	0.000049	0.00022
24-Feb-16	42	500	490	6.9	3.6	#N/A	1.2	1.6	0.98	0.00	0.029	0.00	0.59	0.0035	0.00029	0.014	0.00015	0.0000034	0.0000034	0.00098	0.0000025	0.16	0.000015	0.000050	0.000029

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for HC5 (OKY Master)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
6-May-15	0	500	290	7.5	0.042	0.00041	0.0086	1.9	0.27	0.040	0.0012	0.00060	0.022	9.5	< 0.001	11	0.000046	28	0.034	20	0.000085	0.000080	0.0018	0.00074	0.00021	0.019	< 0.002
13-May-15	1	500	485	7.6	0.26	0.0023	0.0032	0.26	0.082	0.020	0.0044	0.00020	0.036	4.2	< 0.001	11	0.000011	11	0.0048	2.7	0.000037	0.000070	0.0068	0.0010	0.00039	0.0040	< 0.002
20-May-15	2	500	495	7.4	0.098	0.0012	0.0016	0.082	0.031	0.010	0.0066	< 0.0001	0.044	2.3	0.000050	9.4	0.0000030	5.1	0.0015	1.6	0.000016	0.00011	0.0024	0.00086	0.00028	0.0010	< 0.002
27-May-15	3	500	435	7.3	0.11	0.00062	0.0014	0.083	0.030	< 0.01	0.0058	< 0.0001	0.038	2.1	< 0.001	11	0.0000040	4.8	0.0015	0.90	0.000010	0.00013	0.0037	0.00038	0.00032	0.0020	< 0.002
3-Jun-15	4	500	520	7.4	0.17	0.0012	0.0012	0.067	0.026	< 0.01	0.0060	< 0.0001	0.046	2.0	< 0.00004	8.7	0.000011	3.7	0.0015	1.1	0.000012	< 0.00001	0.0060	0.00053	0.00038	0.0010	< 0.002
10-Jun-15	5	500	495	7.3	0.026	0.00044	0.0010	0.052	0.024	< 0.01	0.0050	< 0.0001	0.038	1.9	0.000060	7.2	< 0.000002	3.1	0.00087	0.90	0.0000070	0.000080	0.00071	0.00030	0.00022	0.0020	< 0.002
17-Jun-15	6	500	490	7.4	0.15	0.0011	0.0010	0.057	0.026	< 0.01	0.0048	< 0.0001	0.048	1.8	0.000050	7.4	0.0000030	2.5	0.0011	1.0	0.000017	0.000040	0.0048	0.00073	0.00031	0.0020	< 0.002
24-Jun-15	7	500	490	7.2	0.095	0.00066	0.00098	0.062	0.027	< 0.01	0.0033	< 0.0001	0.037	1.9	< 0.00004	6.9	0.0000030	2.4	0.0012	0.80	0.000011	0.000060	0.0031	0.00033	0.00027	0.0010	< 0.002
1-Jul-15	8	500	480	7.6	0.11	0.00072	0.00091	0.057	0.025	0.020	0.0030	< 0.0001	0.032	1.7	< 0.00004	6.7	0.0000050	1.9	0.0012	0.60	0.000011	0.00013	0.0026	0.00045	0.00028	0.0020	< 0.002
8-Jul-15	9	500	495	7.5	0.025	0.00029	0.00080	0.051	0.024	< 0.01	0.0024	< 0.0001	0.026	1.6	0.000060	7.0	0.0000040	1.6	0.00098	1.2	0.000013	0.000040	0.00054	0.00019	0.00016	< 0.001	< 0.002
15-Jul-15	10	500	490	7.2	0.035	0.00023	0.00089	0.051	0.023	< 0.01	0.0029	< 0.0001	0.023	1.4	< 0.00004	5.7	< 0.000002	1.5	0.00091	0.20	0.0000090	0.00014	0.00075	0.00086	0.00021	0.0010	< 0.002
22-Jul-15	11	500	495	7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	12	500	495	7.3	0.011	0.000080	0.00078	0.047	0.023	< 0.01	0.0017	< 0.0001	0.024	1.5	< 0.00004	4.9	0.000015	1.0	0.00087	0.50	< 0.000005	0.000050	0.00017	0.0022	0.00017	0.0010	< 0.002
5-Aug-15	13	500	490	6.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	14	500	495	6.8	0.033	0.00021	0.00070	0.060	0.028	< 0.01	0.0023	< 0.0001	0.022	1.7	< 0.00004	4.9	< 0.000002	0.87	0.0011	0.50	0.000017	0.000040	0.0015	0.0012	0.00018	0.0010	< 0.002
19-Aug-15	15	500	475	7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	16	500	515	7.4	0.023	0.00023	0.00075	0.068	0.034	< 0.01	0.0013	< 0.0001	0.016	1.7	< 0.00004	4.4	< 0.000002	0.61	0.0012	0.70	0.0000090	< 0.00001	0.00036	0.00038	0.00014	< 0.001	< 0.002
2-Sep-15	17	500	490	7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	18	500	500	7.0	0.011	0.000080	0.00068	0.067	0.032	< 0.01	0.0029	< 0.0001	0.013	1.6	< 0.00004	3.5	0.0000020	0.60	0.0010	3.3	0.000013	0.00016	0.00035	0.0012	0.00016	< 0.001	< 0.002
16-Sep-15	19	500	495	6.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	20	500	500	7.1	0.0080	0.000040	0.00056	0.064	0.032	< 0.01	0.00070	< 0.0001	0.0050	1.4	< 0.00004	2.8	0.000013	0.38	0.0010	0.50	0.0000070	< 0.00001	0.00025	0.00055	0.000090	< 0.001	< 0.002
30-Sep-15	21	500	490	6.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	22	500	495	7.4	0.013	0.00010	0.00061	0.10	0.047	< 0.01	0.0024	< 0.0001	0.0090	1.5	< 0.00004	3.4	< 0.000002	0.46	0.0016	0.40	0.0000060	0.000080	0.00033	0.0029	0.00010	< 0.001	< 0.002
14-Oct-15	23	500	500	7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	24	500	505	7.3	0.012	0.000090	0.00055	0.080	0.040	< 0.01	0.0036	< 0.0001	0.0090	1.4	0.000040	3.1	0.000019	0.35	0.0015	0.40	0.000010	0.000060	0.00046	0.00045	0.00010	< 0.001	< 0.002
28-Oct-15	25	500	490	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	26	500	475	7.3	0.018	0.00011	0.00048	0.083	0.042	< 0.01	0.013	< 0.0001	0.0040	1.4	< 0.00004	2.9	< 0.000002	0.31	0.0014	0.30	0.0000050	0.000050	0.00061	0.00018	0.00014	0.0010	< 0.002
11-Nov-15	27	500	500	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	28	500	500	7.2	0.033	0.000030	0.00044	0.084	0.042	< 0.01	0.0013	< 0.0001	< 0.003	1.2	0.00013	2.8	< 0.000002	0.30	0.0016	0.20	0.0000080	0.000080	0.00049	0.00032	0.000080	0.0020	< 0.002
25-Nov-15	29	500	490	7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Dec-15	30	500	490	6.8	0.047	0.00019	0.00047	0.097	0.049	< 0.01	0.00065	< 0.0001	0.0050	1.5	< 0.00004	3.2	< 0.000002	0.30	0.0016	0.70	< 0.000005	< 0.00001	0.00079	0.00033	0.00013	< 0.001	< 0.002
9-Dec-15	31	500	490	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	32	500	495	7.3	0.023	0.00024	0.00053	0.12	0.046	< 0.01	0.00054	0.00010	0.010	1.3	0.00012	2.8	0.000019	0.26	0.0022	0.50	0.000016	0.00012	0.00034	0.00046	0.00012	0.0090	< 0.002
23-Dec-15	33	500	490	7.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	34	500	505	6.7	0.020	0.00016	0.00052	0.087	0.047	< 0.01	0.00037	< 0.0001	0.0040	1.3	< 0.00004	2.3	< 0.000002	0.25	0.0016	0.80	< 0.000005	0.00039	0.00032	0.00060	0.000090	0.0020	< 0.002
6-Jan-16	35	500	485	6.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	36	500	490	6.4	0.0090	0.00011	0.00037	0.088	0.049	< 0.01	0.00036	< 0.0001	< 0.003	0.95	0.00011	2.0	0.0000020	0.15	0.0015	< 0.1	< 0.000005	0.000040	0.00058	0.00029	0.000040	< 0.001	< 0.002
20-Jan-16	37	500	485	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	38	500	505	7.2	< 0.007	0.000050	0.00038	0.077	0.044	< 0.01	0.00024	0.00010	< 0.003	0.89	< 0.00004	2.1	< 0.000002	0.24	0.0015	< 0.1	< 0.000005	0.000070	0.00013	0.00021	0.00010	0.010	< 0.002
3-Feb-16	39	500	480	7.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	40	500	505	6.6	< 0.007	0.000040	0.00032	0.074	0.045	< 0.01	0.00022	< 0.0001	< 0.003	0.78	0.000050	1.5	< 0.000002	0.17	0.0013	0.60	0.0000050	0.000040	0.000070	0.00032	0.000030	0.0010	< 0.002
17-Feb-16	41	500	490	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	42	500	490	6.9	< 0.007	0.000020	0.00034	0.087	0.051	0.030	0.00027	0.00020	< 0.003	0.92	< 0.00004	1.8	< 0.000002	0.13	0.0015	0.50	< 0.000005	< 0.00001	< 0.00005	0.00027	0.000040	0.0020	< 0.002
2-Mar-16	43	500	495	6.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Mar-16	44	500	495	6.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Calculated Loading Rates for HC5 (OKY Master)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
6-May-15	0	500	290	7.5	0.012	0.00012	0.0025	0.55	0.077	0.012	0.00036	0.00017	0.0064	2.7	0.00029	3.1	0.000013	8.1	0.0097	5.8	0.000025	0.000023	0.00052	0.00021	0.000061	0.0055	0.00058
13-May-15	1	500	485	7.6	0.12	0.0011	0.0015	0.12	0.040	0.0097	0.0021	0.000097	0.017	2.0	0.00049	5.4	0.0000053	5.2	0.0023	1.3	0.000018	0.000034	0.0033	0.00049	0.00019	0.0019	0.00097
20-May-15	2	500	495	7.4	0.049	0.00058	0.00080	0.041	0.015	0.0050	0.0033	0.000050	0.022	1.1	0.000025	4.6	0.0000015	2.5	0.00076	0.79	0.0000079	0.000054	0.0012	0.00042	0.00014	0.00050	0.00099
27-May-15	3	500	435	7.3	0.046	0.00027	0.00061	0.036	0.013	0.0044	0.0025	0.000044	0.017	0.91	0.00044	4.6	0.0000017	2.1	0.00065	0.39	0.0000044	0.000057	0.0016	0.00017	0.00014	0.00087	0.00087
3-Jun-15	4	500	520	7.4	0.088	0.00060	0.00063	0.035	0.014	0.0052	0.0031	0.000052	0.024	1.1	0.000021	4.5	0.0000057	1.9	0.00077	0.57	0.0000062	0.0000052	0.0031	0.00027	0.00020	0.00052	0.0010
10-Jun-15	5	500	495	7.3	0.013	0.00022	0.00051	0.026	0.012	0.0050	0.0025	0.000050	0.019	0.94	0.000030	3.6	0.00000099	1.5	0.00043	0.45	0.0000035	0.000040	0.00035	0.00015	0.00011	0.00099	0.00099
17-Jun-15	6	500	490	7.4	0.073	0.00054	0.00049	0.028	0.013	0.0049	0.0024	0.000049	0.024	0.90	0.000025	3.6	0.0000015	1.2	0.00055	0.49	0.0000083	0.000020	0.0024	0.00036	0.00015	0.00098	0.00098
24-Jun-15	7	500	490	7.2	0.047	0.00032	0.00048	0.030	0.013	0.0049	0.0016	0.000049	0.018	0.91	0.000020	3.4	0.0000015	1.2	0.00057	0.39	0.0000054	0.000029	0.0015	0.00016	0.00013	0.00049	0.00098
1-Jul-15	8	500	480	7.6	0.052	0.00035	0.00044	0.027	0.012	0.0096	0.0014	0.000048	0.015	0.80	0.000019	3.2	0.0000024	0.91	0.00056	0.29	0.0000053	0.000062	0.0013	0.00022	0.00013	0.00096	0.00096
8-Jul-15	9	500	495	7.5	0.012	0.00014	0.00040	0.025	0.012	0.0050	0.0012	0.000050	0.013	0.81	0.000030	3.4	0.0000020	0.80	0.00049	0.59	0.0000064	0.000020	0.00027	0.000095	0.000079	0.00050	0.00099
15-Jul-15	10	500	490	7.2	0.017	0.00011	0.00044	0.025	0.011	0.0049	0.0014	0.000049	0.011	0.70	0.000020	2.8	0.00000098	0.74	0.00045	0.098	0.0000044	0.000069	0.00037	0.00042	0.00010	0.00049	0.00098
22-Jul-15	11	500	495	7.0	0.011	0.000076	0.00041	0.024	0.011	0.0049	0.0011	0.000049	0.012	0.71	0.000020	2.6	0.0000042	0.63	0.00044	0.17	0.0000034	0.000047	0.00023	0.00076	0.000094	0.00049	0.00099
29-Jul-15	12	500	495	7.3	0.0054	0.000040	0.00039	0.023	0.011	0.0050	0.00083	0.000050	0.012	0.73	0.000020	2.4	0.0000074	0.51	0.00043	0.25	0.0000025	0.000025	0.000084	0.0011	0.000084	0.00050	0.00099
5-Aug-15	13	500	490	6.9	0.011	0.000072	0.00037	0.026	0.012	0.0050	0.00098	0.000050	0.011	0.79	0.000020	2.4	0.0000042	0.47	0.00048	0.25	0.0000054	0.000022	0.00041	0.00085	0.000087	0.00050	0.00099
12-Aug-15	14	500	495	6.8	0.016	0.00010	0.00035	0.030	0.014	0.0050	0.0011	0.000050	0.011	0.85	0.000020	2.4	0.00000099	0.43	0.00052	0.25	0.0000084	0.000020	0.00074	0.00060	0.000089	0.00050	0.00099
19-Aug-15	15	500	475	7.0	0.014	0.00011	0.00037	0.032	0.016	0.0051	0.00090	0.000051	0.0096	0.85	0.000020	2.4	0.0000010	0.37	0.00056	0.30	0.0000065	0.000012	0.00046	0.00040	0.000081	0.00051	0.0010
26-Aug-15	16	500	515	7.4	0.012	0.00012	0.00039	0.035	0.018	0.0052	0.00066	0.000052	0.0082	0.85	0.000021	2.3	0.0000010	0.31	0.00060	0.36	0.0000046	0.0000052	0.00019	0.00020	0.000072	0.00052	0.0010
2-Sep-15	17	500	490	7.0	0.0087	0.000079	0.00036	0.034	0.017	0.0051	0.0010	0.000051	0.0074	0.82	0.000020	2.0	0.0000010	0.31	0.00056	1.0	0.0000056	0.000043	0.00018	0.00040	0.000076	0.00051	0.0010
9-Sep-15	18	500	500	7.0	0.0055	0.000040	0.00034	0.034	0.016	0.0050	0.0014	0.000050	0.0065	0.79	0.000020	1.8	0.0000010	0.30	0.00052	1.7	0.0000065	0.000080	0.00018	0.00060	0.000080	0.00050	0.0010
16-Sep-15	19	500	495	6.9	0.0048	0.000030	0.00031	0.033	0.016	0.0050	0.00089	0.000050	0.0045	0.74	0.000020	1.6	0.0000038	0.25	0.00052	0.95	0.0000050	0.000043	0.00015	0.00044	0.000063	0.00050	0.0010
23-Sep-15	20	500	500	7.1	0.0040	0.000020	0.00028	0.032	0.016	0.0050	0.00035	0.000050	0.0025	0.70	0.000020	1.4	0.0000065	0.19	0.00051	0.25	0.0000035	0.0000050	0.00013	0.00027	0.000045	0.00050	0.0010
30-Sep-15	21	500	490	6.9	0.0052	0.000035	0.00029	0.041	0.019	0.0050	0.00077	0.000050	0.0035	0.73	0.000020	1.6	0.0000037	0.21	0.00066	0.22	0.0000032	0.000022	0.00014	0.00086	0.000047	0.00050	0.00100
7-Oct-15	22	500	495	7.4	0.0064	0.000050	0.00030	0.050	0.023	0.0050	0.0012	0.000050	0.0045	0.76	0.000020	1.7	0.00000099	0.23	0.00081	0.20	0.0000030	0.000040	0.00016	0.0014	0.000050	0.00050	0.00099
14-Oct-15	23	500	500	7.1	0.0062	0.000047	0.00029	0.045	0.022	0.0050	0.0015	0.000050	0.0044	0.73	0.000020	1.6	0.0000053	0.20	0.00079	0.20	0.0000040	0.000035	0.00020	0.00083	0.000050	0.00050	0.0010
21-Oct-15	24	500	505	7.3	0.0061	0.000045	0.00028	0.040	0.020	0.0051	0.0018	0.000051	0.0044	0.71	0.000020	1.6	0.0000096	0.18	0.00078	0.20	0.0000051	0.000030	0.00023	0.00023	0.000051	0.00051	0.0010
28-Oct-15	25	500	490	7.3	0.0073	0.000049	0.00025	0.040	0.020	0.0049	0.0039	0.000049	0.0031	0.68	0.000020	1.5	0.0000053	0.16	0.00072	0.17	0.0000037	0.000027	0.00026	0.00016	0.000059	0.00049	0.00098
4-Nov-15	26	500	475	7.3	0.0086	0.000052	0.00023	0.039	0.020	0.0048	0.0061	0.000048	0.0019	0.65	0.000019	1.4	0.00000095	0.15	0.00066	0.14	0.0000024	0.000024	0.00029	0.000084	0.000067	0.00048	0.00095
11-Nov-15	27	500	500	7.3	0.013	0.000034	0.00022	0.041	0.020	0.0049	0.0034	0.000049	0.0017	0.63	0.000042	1.4	0.00000098	0.15	0.00073	0.12	0.0000032	0.000032	0.00027	0.00012	0.000053	0.00074	0.00098
18-Nov-15	28	500	500	7.2	0.017	0.000015	0.00022	0.042	0.021	0.0050	0.00066	0.000050	0.0015	0.61	0.000065	1.4	0.0000010	0.15	0.00081	0.10	0.0000040	0.000040	0.00025	0.00016	0.000040	0.0010	0.0010
25-Nov-15	29	500	490	7.1	0.020	0.000054	0.00023	0.045	0.023	0.0050	0.00049	0.000050	0.0020	0.66	0.000042	1.5	0.00000099	0.15	0.00079	0.22	0.0000032	0.000022	0.00032	0.00016	0.000052	0.00075	0.00099
2-Dec-15	30	500	490	6.8	0.023	0.000093	0.00023	0.048	0.024	0.0049	0.00032	0.000049	0.0025	0.71	0.000020	1.5	0.00000098	0.15	0.00077	0.34	0.0000025	0.0000049	0.00039	0.00016	0.000064	0.00049	0.00098
9-Dec-15	31	500	490	7.3	0.017	0.00011	0.00025	0.052	0.023	0.0049	0.00029	0.000049	0.0037	0.69	0.000040	1.5	0.0000052	0.14	0.00094	0.30	0.0000052	0.000032	0.00028	0.00020	0.000062	0.0025	0.00099
16-Dec-15	32	500	495	7.3	0.011	0.00012	0.00026	0.057	0.023	0.0050	0.00027	0.000050	0.0050	0.66	0.000059	1.4	0.0000094	0.13	0.0011	0.25	0.0000079	0.000059	0.00017	0.00023	0.000059	0.0045	0.00099
23-Dec-15	33	500	490	7.9	0.011	0.000100	0.00026	0.051	0.023	0.0050	0.00023	0.000050	0.0035	0.65	0.000040	1.3	0.0000052	0.13	0.00095	0.33	0.0000052	0.00013	0.00016	0.00026	0.000052	0.0027	0.0010
30-Dec-15	34	500	505	6.7	0.010	0.000081	0.00026	0.044	0.024	0.0051	0.00019	0.000051	0.0020	0.63	0.000020	1.2	0.0000010	0.13	0.00078	0.40	0.0000025	0.00020	0.00016	0.00030	0.000045	0.0010	0.0010
6-Jan-16	35	500	485	6.6	0.0073	0.000067	0.00022	0.044	0.024	0.0050	0.00018	0.000050	0.0017	0.55	0.000037	1.1	0.00000100	0.100	0.00075	0.23	0.0000025	0.00011	0.00022	0.00022	0.000033	0.00075	0.00100
13-Jan-16	36	500	490	6.4	0.0044	0.000054	0.00018	0.043	0.024	0.0049	0.00018	0.000049	0.0015	0.47	0.000054	0.97	0.00000098	0.074	0.00072	0.049	0.0000025	0.000020	0.00028	0.00014	0.000020	0.00049	0.00098
20-Jan-16	37	500	485	7.3	0.0040	0.000040	0.00019	0.041	0.023	0.0050	0.00015	0.000050	0.0015	0.46	0.000037	1.0	0.00000100	0.097	0.00073	0.050	0.0000025	0.000027	0.00017	0.00012	0.000035	0.0028	0.00100
27-Jan-16	38	500	505	7.2	0.0035	0.000025	0.00019	0.039	0.022	0.0051	0.00012	0.000051	0.0015	0.45	0.000020	1.0	0.0000010	0.12	0.00073	0.051	0.0000025	0.000035	0.000066	0.00010	0.000051	0.0051	0.0010
3-Feb-16	39	500	480	7.2	0.0035	0.000023	0.00018	0.038	0.022	0.0051	0.00012	0.000051	0.0015	0.42	0.000023	0.90	0.0000010	0.10	0.00068	0.18	0.0000025	0.000028	0.000051	0.00013	0.000033	0.0028	0.0010
10-Feb-16	40	500	505	6.6	0.0035	0.000020	0.00016	0.037	0.023	0.0051	0.00011	0.000051	0.0015	0.39	0.000025	0.76	0.0000010	0.086	0.00063	0.30	0.0000025	0.000020	0.000035	0.00016	0.000015	0.00051	0.0010
17-Feb-16	41	500	490	7.5	0.0035	0.000015	0.00016	0.040	0.024	0.0099	0.00012	0.000074	0.0015	0.42	0.000022	0.82	0.00000100	0.075	0.00067	0.27	0.0000025	0.000013	0.000030	0.00015	0.000017	0.00074	0.00100
24-Feb-16	42	500	490	6.9	0.0034	0.0000098	0.00016	0.043	0.025	0.015	0.00013	0.000098	0.0015	0.45	0.000020	0.89	0.00000098	0.064	0.00072	0.25	0.0000025	0.0000049	0.000025	0.00013	0.000020	0.00098	0.00098

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for HC6 (OKY Master (Fresh))

Date	**Cycle**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**	**Cu**
	No.	Input	Output		umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
6-May-15	0	500	320	7.9	385	#N/A	3.6	96	77	7.0	1.8	< 0.3	85	0.021	0.0056	0.061	0.015	0.0000080	< 0.000007	0.041	0.0000070	26	< 0.00003	0.0014	0.0020
13-May-15	1	500	495	7.6	146	#N/A	6.6	48	13	2.0	1.1	< 0.3	34	0.023	0.0049	0.064	0.0075	< 0.000007	< 0.000007	0.030	0.0000030	10	0.000050	0.00034	0.00080
20-May-15	2	500	490	7.5	95	#N/A	3.7	34	3.0	2.0	0.65	< 0.3	27	0.025	0.0034	0.082	0.0062	< 0.000007	< 0.000007	0.015	< 0.000003	8.4	< 0.00003	0.00014	0.00050
27-May-15	3	500	490	7.6	73	#N/A	2.6	29	3.0	1.0	0.37	< 0.3	23	0.12	0.0030	0.096	0.0062	< 0.000007	< 0.000007	0.012	< 0.000003	7.0	< 0.00003	0.00011	0.00025
3-Jun-15	4	500	490	7.4	65	#N/A	3.3	27	3.0	< 1	0.26	< 0.3	21	0.047	0.0024	0.091	0.0049	< 0.000007	< 0.000007	0.0085	< 0.000003	6.4	0.000030	0.000089	0.00021
10-Jun-15	5	500	495	7.4	59	#N/A	3.6	26	3.0	< 1	0.22	< 0.3	21	0.044	0.0020	0.087	0.0046	< 0.000007	< 0.000007	0.0080	< 0.000003	6.5	< 0.00003	0.000077	0.00017
17-Jun-15	6	500	490	7.3	52	#N/A	3.7	25	3.0	< 1	0.17	< 0.3	18	0.052	0.0020	0.092	0.0044	< 0.000007	< 0.000007	0.0090	< 0.000003	5.7	< 0.00003	0.000075	0.00016
24-Jun-15	7	500	485	7.5	52	#N/A	3.2	22	< 2	< 1	0.16	< 0.3	17	0.041	0.0018	0.083	0.0040	< 0.000007	< 0.000007	0.0060	< 0.000003	5.4	< 0.00003	0.000076	0.00015
1-Jul-15	8	500	485	7.3	43	#N/A	3.8	17	2.0	< 1	0.12	< 0.3	14	0.058	0.0015	0.079	0.0034	< 0.000007	< 0.000007	0.0024	0.0000030	4.2	< 0.00003	0.000065	0.00044
8-Jul-15	9	500	485	7.4	41	#N/A	2.5	17	2.0	< 1	< 0.06	< 0.3	15	0.055	0.0014	0.060	0.0034	< 0.000007	< 0.000007	0.0049	< 0.000003	4.6	< 0.00003	0.000065	0.00066
15-Jul-15	10	500	490	7.3	34	#N/A	3.6	16	< 2	< 1	0.10	< 0.3	12	0.072	0.0012	0.059	0.0030	< 0.000007	< 0.000007	0.0059	< 0.000003	3.8	< 0.00003	0.000059	0.00020
22-Jul-15	11	500	485	7.4	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	12	500	490	7.3	32	#N/A	2.0	14	< 2	< 1	0.090	< 0.3	12	0.068	0.0011	0.043	0.0026	< 0.000007	< 0.000007	0.0029	< 0.000003	3.6	< 0.00003	0.000049	0.00014
5-Aug-15	13	500	480	7.3	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	14	500	495	7.3	28	#N/A	1.7	12	< 2	< 1	0.080	< 0.3	11	0.067	0.00090	0.042	0.0026	< 0.000007	< 0.000007	0.0047	< 0.000003	3.3	< 0.00003	0.000051	0.00033
19-Aug-15	15	500	505	7.3	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	16	500	500	7.5	28	#N/A	1.5	13	< 2	< 1	0.070	< 0.3	10	0.052	0.00090	0.028	0.0025	< 0.000007	< 0.000007	0.0022	0.0000060	3.3	< 0.00003	0.000054	0.00013
2-Sep-15	17	500	490	7.3	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	18	500	485	7.3	28	#N/A	2.0	12	< 2	< 1	0.070	< 0.3	11	0.045	0.00080	0.023	0.0025	< 0.000007	< 0.000007	0.0020	< 0.000003	3.4	< 0.00003	0.000049	0.00025
16-Sep-15	19	500	495	7.3	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	20	500	490	7.3	26	#N/A	1.4	11	< 2		0.070		9.7	0.043	0.0010	0.025	0.0022	< 0.000007	< 0.000007	0.0019	< 0.000003	3.1	0.000050	0.000045	0.000090
30-Sep-15	21	500	495	7.2	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	22	500	495	7.4	23	#N/A	2.1	12	< 2		0.060		8.8	0.032	0.00070	0.014	0.0019	< 0.000007	< 0.000007	0.0015	< 0.000003	2.8	< 0.00003	0.000043	0.00036
14-Oct-15	23	500	505	7.4	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	24	500	505	7.3	20	#N/A	1.2	9.5	2.0		0.060		8.3	0.059	0.00070	0.016	0.0025	0.0000070	< 0.000007	0.0016	0.0000050	2.6	< 0.00003	0.000068	0.00042
28-Oct-15	25	500	510	7.4	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	26	500	485	7.4	26	#N/A	1.6	12	2.0		0.060		10	0.026	0.00080	0.016	0.0023	< 0.000007	< 0.000007	0.0023	< 0.000003	3.3	< 0.00003	0.000046	0.00033
11-Nov-15	27	500	485	7.3	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	28	500	505	7.3	19	#N/A	1.5	10	2.0		< 0.06		7.3	0.024	0.00070	0.013	0.0014	< 0.000007	< 0.000007	< 0.0002	< 0.000003	2.3	< 0.00003	0.000050	0.00061
25-Nov-15	29	500	485	7.3	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Dec-15	30	500	485	7.2	23	#N/A	3.0	12	2.0		0.060		9.6	0.12	0.00090	0.017	0.0035	0.0000070	< 0.000007	0.00080	0.0000030	3.0	< 0.00003	0.000071	0.00025
9-Dec-15	31	500	485	7.2	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	32	500	495	7.1	17	#N/A	2.6	9.0	2.0		< 0.06		8.1	0.017	0.00060	0.014	0.0031	0.000010	< 0.000007	0.0016	0.000014	2.5	0.000070	0.000076	0.00023
23-Dec-15	33	500	490	7.5	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	34	500	490	7.1	18	#N/A	1.9	9.9	3.0		< 0.06		8.4	0.023	0.00050	0.012	0.0021	< 0.000007	< 0.000007	0.0010	0.0000040	2.6	< 0.00003	0.000061	0.00026
6-Jan-16	35	500	490	7.1	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	36	500	495	7.0	19	#N/A	2.2	9.9	2.0		< 0.06		7.8	0.011	0.00050	0.0067	0.0021	< 0.000007	< 0.000007	< 0.002	< 0.000003	2.5	< 0.00003	0.000043	0.00033
20-Jan-16	37	500	490	7.1	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	38	500	485	7.1	21	#N/A	3.1	10	2.0		< 0.06		8.6	0.019	0.00050	0.0096	0.0027	< 0.000007	< 0.000007	< 0.002	0.0000030	2.7	< 0.00003	0.000077	0.00045
3-Feb-16	39	500	485	7.0	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	40	500	490	6.9	16	#N/A	2.5	9.3	2.0		< 0.06		6.6	0.032	0.00050	0.0079	0.0021	< 0.000007	< 0.000007	< 0.002	< 0.000003	2.1	< 0.00003	0.000067	0.00015
17-Feb-16	41	500	495	7.2	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	42	500	490	7.0	16	#N/A	2.7	8.3	2.0		< 0.06		6.7	0.016	0.00060	0.011	0.0019	< 0.000007	< 0.000007	< 0.002	0.000011	2.1	< 0.00003	0.000066	0.000040
2-Mar-16	43	500	485	7.0	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Mar-16	44	500	490	7.1	16	#N/A	3.1	8.8	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Calculated Loading Rates for HC6 (OKY Master (Fresh))

Date	**Cycle**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**	**Cu**
	No.	Input	Output		umhos/cm	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
6-May-15	0	500	320	7.9	385	#N/A	1.2	31	25	2.2	0.59	0.096	27	0.0068	0.0018	0.020	0.0049	0.0000026	0.0000022	0.013	0.0000022	8.3	0.0000096	0.00044	0.00063
13-May-15	1	500	495	7.6	146	#N/A	3.3	24	6.4	0.99	0.56	0.15	17	0.012	0.0024	0.032	0.0037	0.0000035	0.0000035	0.015	0.0000015	5.1	0.000025	0.00017	0.00040
20-May-15	2	500	490	7.5	95	#N/A	1.8	17	1.5	0.98	0.32	0.15	13	0.012	0.0017	0.040	0.0030	0.0000034	0.0000034	0.0071	0.0000015	4.1	0.000015	0.000071	0.00025
27-May-15	3	500	490	7.6	73	#N/A	1.3	14	1.5	0.49	0.18	0.15	11	0.056	0.0015	0.047	0.0030	0.0000034	0.0000034	0.0059	0.0000015	3.4	0.000015	0.000052	0.00012
3-Jun-15	4	500	490	7.4	65	#N/A	1.6	13	1.5	0.49	0.13	0.15	10	0.023	0.0012	0.045	0.0024	0.0000034	0.0000034	0.0042	0.0000015	3.1	0.000015	0.000044	0.00010
10-Jun-15	5	500	495	7.4	59	#N/A	1.8	13	1.5	0.50	0.11	0.15	10	0.022	0.00099	0.043	0.0023	0.0000035	0.0000035	0.0040	0.0000015	3.2	0.000015	0.000038	0.000084
17-Jun-15	6	500	490	7.3	52	#N/A	1.8	12	1.5	0.49	0.083	0.15	8.9	0.025	0.00098	0.045	0.0022	0.0000034	0.0000034	0.0044	0.0000015	2.8	0.000015	0.000037	0.000078
24-Jun-15	7	500	485	7.5	52	#N/A	1.5	11	0.97	0.49	0.078	0.15	8.4	0.020	0.00087	0.040	0.0019	0.0000034	0.0000034	0.0029	0.0000015	2.6	0.000015	0.000037	0.000073
1-Jul-15	8	500	485	7.3	43	#N/A	1.8	8.2	0.97	0.49	0.058	0.15	6.7	0.028	0.00073	0.038	0.0016	0.0000034	0.0000034	0.0012	0.0000015	2.1	0.000015	0.000032	0.00021
8-Jul-15	9	500	485	7.4	41	#N/A	1.2	8.2	0.97	0.49	0.029	0.15	7.2	0.027	0.00068	0.029	0.0017	0.0000034	0.0000034	0.0024	0.0000015	2.2	0.000015	0.000032	0.00032
15-Jul-15	10	500	490	7.3	34	#N/A	1.8	7.8	0.98	0.49	0.049	0.15	6.0	0.035	0.00059	0.029	0.0015	0.0000034	0.0000034	0.0029	0.0000015	1.9	0.000015	0.000029	0.000098
22-Jul-15	11	500	485	7.4	36	#N/A	1.4	7.3	0.98	0.49	0.047	0.15	5.9	0.034	0.00056	0.025	0.0014	0.0000034	0.0000034	0.0022	0.0000015	1.8	0.000015	0.000026	0.000083
29-Jul-15	12	500	490	7.3	32	#N/A	0.98	6.9	0.98	0.49	0.044	0.15	5.7	0.033	0.00054	0.021	0.0013	0.0000034	0.0000034	0.0014	0.0000015	1.8	0.000015	0.000024	0.000069
5-Aug-15	13	500	480	7.3	31	#N/A	0.91	6.4	0.99	0.49	0.042	0.15	5.4	0.033	0.00049	0.021	0.0013	0.0000034	0.0000034	0.0019	0.0000015	1.7	0.000015	0.000025	0.00012
12-Aug-15	14	500	495	7.3	28	#N/A	0.83	6.0	0.99	0.50	0.040	0.15	5.2	0.033	0.00045	0.021	0.0013	0.0000035	0.0000035	0.0023	0.0000015	1.6	0.000015	0.000025	0.00016
19-Aug-15	15	500	505	7.3	29	#N/A	0.80	6.2	1.00	0.50	0.037	0.15	5.2	0.030	0.00045	0.017	0.0012	0.0000035	0.0000035	0.0017	0.0000022	1.6	0.000015	0.000026	0.00011
26-Aug-15	16	500	500	7.5	28	#N/A	0.76	6.4	1.0	0.50	0.035	0.15	5.2	0.026	0.00045	0.014	0.0012	0.0000035	0.0000035	0.0011	0.0000030	1.7	0.000015	0.000027	0.000065
2-Sep-15	17	500	490	7.3	32	#N/A	0.86	6.2	0.99	0.49	0.034	0.15	5.2	0.024	0.00042	0.013	0.0012	0.0000034	0.0000034	0.0010	0.0000022	1.7	0.000015	0.000025	0.000093
9-Sep-15	18	500	485	7.3	28	#N/A	0.95	6.0	0.97	0.49	0.034	0.15	5.2	0.022	0.00039	0.011	0.0012	0.0000034	0.0000034	0.00097	0.0000015	1.6	0.000015	0.000024	0.00012
16-Sep-15	19	500	495	7.3	27	#N/A	0.82	5.7	0.98	0.24	0.034	0.073	5.0	0.022	0.00044	0.012	0.0012	0.0000034	0.0000034	0.00095	0.0000015	1.6	0.000020	0.000023	0.000083
23-Sep-15	20	500	490	7.3	26	#N/A	0.68	5.3	0.98	0.00	0.034	0.00	4.8	0.021	0.00049	0.012	0.0011	0.0000034	0.0000034	0.00093	0.0000015	1.5	0.000025	0.000022	0.000044
30-Sep-15	21	500	495	7.2	24	#N/A	0.87	5.6	0.99	0.00	0.032	0.00	4.6	0.019	0.00042	0.0097	0.0010	0.0000034	0.0000034	0.00084	0.0000015	1.4	0.000020	0.000022	0.00011
7-Oct-15	22	500	495	7.4	23	#N/A	1.1	5.9	0.99	0.00	0.030	0.00	4.4	0.016	0.00035	0.0071	0.00093	0.0000035	0.0000035	0.00074	0.0000015	1.4	0.000015	0.000021	0.00018
14-Oct-15	23	500	505	7.4	24	#N/A	0.83	5.4	1.0	0.00	0.030	0.00	4.3	0.023	0.00035	0.0075	0.0011	0.0000035	0.0000035	0.00078	0.0000020	1.3	0.000015	0.000028	0.00020
21-Oct-15	24	500	505	7.3	20	#N/A	0.60	4.8	1.0	0.00	0.030	0.00	4.2	0.030	0.00035	0.0079	0.0012	0.0000035	0.0000035	0.00081	0.0000025	1.3	0.000015	0.000034	0.00021
28-Oct-15	25	500	510	7.4	22	#N/A	0.69	5.4	0.99	0.00	0.030	0.00	4.6	0.021	0.00037	0.0077	0.0012	0.0000035	0.0000035	0.00096	0.0000020	1.5	0.000015	0.000028	0.00019
4-Nov-15	26	500	485	7.4	26	#N/A	0.79	5.9	0.97	0.00	0.029	0.00	5.0	0.013	0.00039	0.0076	0.0011	0.0000034	0.0000034	0.0011	0.0000015	1.6	0.000015	0.000022	0.00016
11-Nov-15	27	500	485	7.3	23	#N/A	0.77	5.6	0.99	0.00	0.030	0.00	4.4	0.012	0.00037	0.0070	0.00092	0.0000035	0.0000035	0.00061	0.0000015	1.4	0.000015	0.000024	0.00023
18-Nov-15	28	500	505	7.3	19	#N/A	0.76	5.2	1.0	0.00	0.030	0.00	3.7	0.012	0.00035	0.0064	0.00072	0.0000035	0.0000035	0.00010	0.0000015	1.2	0.000015	0.000025	0.00031
25-Nov-15	29	500	485	7.3	27	#N/A	1.1	5.5	0.99	0.00	0.030	0.00	4.2	0.036	0.00040	0.0074	0.0012	0.0000035	0.0000035	0.00024	0.0000015	1.3	0.000015	0.000030	0.00021
2-Dec-15	30	500	485	7.2	23	#N/A	1.4	5.8	0.97	0.00	0.029	0.00	4.7	0.060	0.00044	0.0084	0.0017	0.0000034	0.0000034	0.00039	0.0000015	1.5	0.000015	0.000034	0.00012
9-Dec-15	31	500	485	7.2	20	#N/A	1.4	5.1	0.98	0.00	0.029	0.00	4.3	0.034	0.00037	0.0076	0.0016	0.0000042	0.0000034	0.00059	0.0000042	1.4	0.000025	0.000036	0.00012
16-Dec-15	32	500	495	7.1	17	#N/A	1.3	4.5	0.99	0.00	0.030	0.00	4.0	0.0086	0.00030	0.0067	0.0015	0.0000050	0.0000035	0.00079	0.0000069	1.3	0.000035	0.000038	0.00011
23-Dec-15	33	500	490	7.5	19	#N/A	1.1	4.6	1.2	0.00	0.030	0.00	4.1	0.0099	0.00027	0.0064	0.0013	0.0000042	0.0000034	0.00064	0.0000044	1.3	0.000025	0.000034	0.00012
30-Dec-15	34	500	490	7.1	18	#N/A	0.92	4.8	1.5	0.00	0.029	0.00	4.1	0.011	0.00025	0.0061	0.0010	0.0000034	0.0000034	0.00049	0.0000020	1.3	0.000015	0.000030	0.00013
6-Jan-16	35	500	490	7.1	21	#N/A	1.00	4.9	1.2	0.00	0.030	0.00	4.0	0.0083	0.00025	0.0047	0.0010	0.0000034	0.0000034	0.00074	0.0000017	1.3	0.000015	0.000026	0.00015
13-Jan-16	36	500	495	7.0	19	#N/A	1.1	4.9	0.99	0.00	0.030	0.00	3.9	0.0054	0.00025	0.0033	0.0010	0.0000035	0.0000035	0.00099	0.0000015	1.2	0.000015	0.000021	0.00016
20-Jan-16	37	500	490	7.1	17	#N/A	1.3	4.9	0.98	0.00	0.029	0.00	4.0	0.0074	0.00025	0.0040	0.0012	0.0000034	0.0000034	0.00098	0.0000015	1.3	0.000015	0.000029	0.00019
27-Jan-16	38	500	485	7.1	21	#N/A	1.5	5.0	0.97	0.00	0.029	0.00	4.2	0.0094	0.00024	0.0047	0.0013	0.0000034	0.0000034	0.00097	0.0000015	1.3	0.000015	0.000037	0.00022
3-Feb-16	39	500	485	7.0	17	#N/A	1.4	4.8	0.98	0.00	0.029	0.00	3.7	0.012	0.00024	0.0043	0.0012	0.0000034	0.0000034	0.00098	0.0000015	1.2	0.000015	0.000035	0.00015
10-Feb-16	40	500	490	6.9	16	#N/A	1.2	4.6	0.98	0.00	0.029	0.00	3.2	0.016	0.00025	0.0039	0.0010	0.0000034	0.0000034	0.00098	0.0000015	1.0	0.000015	0.000033	0.000074
17-Feb-16	41	500	495	7.2	16	#N/A	1.3	4.3	0.98	0.00	0.029	0.00	3.3	0.012	0.00027	0.0045	0.00097	0.0000034	0.0000034	0.00098	0.0000034	1.0	0.000015	0.000033	0.000047
24-Feb-16	42	500	490	7.0	16	#N/A	1.3	4.1	0.98	0.00	0.029	0.00	3.3	0.0080	0.00029	0.0051	0.00092	0.0000034	0.0000034	0.00098	0.0000054	1.0	0.000015	0.000032	0.000020

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for HC6 (OKY Master (Fresh))

Date	**Cycle**	**Volume** (mL)		**pH**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.	Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
6-May-15	0	500	320	7.9	< 0.007	0.000030	0.026	4.9	0.24	0.020	0.014	0.00050	0.028	16	< 0.001	5.3	0.000033	35	0.065	26	0.000070	0.000080	0.000090	0.026	0.00059	0.0040	< 0.002
13-May-15	1	500	495	7.6	0.011	0.000030	0.011	2.1	0.11	0.010	0.011	0.00030	0.022	8.9	< 0.001	4.6	0.000017	11	0.027	4.9	0.000033	0.000090	0.00034	0.0080	0.00066	0.0010	< 0.002
20-May-15	2	500	490	7.5	0.0070	0.000020	0.0063	1.4	0.074	< 0.01	0.0060	< 0.0001	0.025	6.3	< 0.00004	5.1	0.0000090	3.9	0.020	2.9	0.000022	0.000090	0.00044	0.0020	0.00087	< 0.001	< 0.002
27-May-15	3	500	490	7.6	0.043	0.00011	0.0042	1.3	0.067	0.010	0.0035	< 0.0001	0.030	4.7	< 0.001	5.1	0.0000050	2.4	0.017	1.6	0.000016	0.000080	0.0017	0.0019	0.0010	< 0.001	< 0.002
3-Jun-15	4	500	490	7.4	0.021	0.000070	0.0034	1.2	0.062	< 0.01	0.0024	< 0.0001	0.032	4.6	< 0.00004	4.3	0.0000030	1.7	0.016	1.8	0.000012	< 0.00001	0.00072	0.0022	0.0011	< 0.001	< 0.002
10-Jun-15	5	500	495	7.4	0.021	0.000070	0.0028	1.1	0.061	< 0.01	0.0019	< 0.0001	0.028	4.2	< 0.00004	4.0	< 0.000002	1.3	0.015	1.5	0.000013	0.000020	0.00072	0.0022	0.0011	< 0.001	< 0.002
17-Jun-15	6	500	490	7.3	0.020	0.000070	0.0024	0.95	0.056	< 0.01	0.0016	< 0.0001	0.028	3.4	0.000040	3.9	0.0000020	0.97	0.014	1.6	0.000018	0.000050	0.00078	0.0022	0.0011	< 0.001	< 0.002
24-Jun-15	7	500	485	7.5	0.018	0.000080	0.0022	0.94	0.059	< 0.01	0.0012	< 0.0001	0.026	3.0	< 0.00004	3.7	< 0.000002	0.89	0.013	1.1	0.000014	0.000050	0.00032	0.0020	0.0010	< 0.001	< 0.002
1-Jul-15	8	500	485	7.3	0.018	0.000050	0.0019	0.79	0.053	0.020	0.00093	< 0.0001	0.025	2.4	< 0.00004	3.3	0.0000020	0.73	0.012	1.0	0.000010	0.00015	0.00048	0.0017	0.0010	< 0.001	< 0.002
8-Jul-15	9	500	485	7.4	0.020	0.000090	0.0018	0.82	0.054	< 0.01	0.00085	< 0.0001	0.017	2.4	< 0.00004	3.7	< 0.000002	0.63	0.011	1.6	0.000012	0.00023	0.00046	0.0016	0.00098	< 0.001	< 0.002
15-Jul-15	10	500	490	7.3	0.022	0.000080	0.0016	0.69	0.051	< 0.01	0.00089	< 0.0001	0.013	1.9	< 0.00004	3.2	< 0.000002	0.62	0.0096	0.70	0.000013	0.000070	0.00085	0.0016	0.0010	< 0.001	< 0.002
22-Jul-15	11	500	485	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Jul-15	12	500	490	7.3	0.019	0.000080	0.0014	0.61	0.048	< 0.01	0.00061	< 0.0001	0.0090	1.7	< 0.00004	2.7	0.0000050	0.46	0.0091	0.70	< 0.000005	0.000020	0.00067	0.0013	0.00078	< 0.001	< 0.002
5-Aug-15	13	500	480	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Aug-15	14	500	495	7.3	0.015	0.000090	0.0011	0.56	0.044	< 0.01	0.00071	< 0.0001	0.012	1.6	< 0.00004	2.9	< 0.000002	0.42	0.0081	0.50	0.000013	0.000080	0.00057	0.0010	0.00077	< 0.001	< 0.002
19-Aug-15	15	500	505	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Aug-15	16	500	500	7.5	0.011	0.00013	0.0011	0.52	0.053	< 0.01	0.00058	< 0.0001	0.012	1.3	< 0.00004	2.8	0.0000020	0.34	0.0079	0.70	0.000010	< 0.00001	0.00030	0.00092	0.00057	< 0.001	< 0.002
2-Sep-15	17	500	490	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Sep-15	18	500	485	7.3	0.0080	0.000040	0.00098	0.56	0.058	< 0.01	0.00097	< 0.0001	0.0080	1.3	< 0.00004	2.4	0.0000030	0.40	0.0077	3.2	0.000011	0.00013	0.00026	0.00095	0.00047	< 0.001	< 0.002
16-Sep-15	19	500	495	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Sep-15	20	500	490	7.3	0.010	< 0.00001	0.00089	0.49	0.057	< 0.01	0.00044	< 0.0001	0.0030	1.1	< 0.00004	2.8	0.000010	0.38	0.0072	0.70	0.0000060	< 0.00001	0.00035	0.00082	0.00044	< 0.001	< 0.002
30-Sep-15	21	500	495	7.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Oct-15	22	500	495	7.4	0.0080	0.000050	0.00066	0.45	0.058	< 0.01	0.0011	< 0.0001	0.0030	0.84	< 0.00004	1.9	< 0.000002	0.31	0.0066	0.30	< 0.000005	0.00012	0.00030	0.0012	0.00031	< 0.001	< 0.002
14-Oct-15	23	500	505	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Oct-15	24	500	505	7.3	0.029	0.00017	0.00072	0.44	0.063	< 0.01	0.0025	< 0.0001	0.0060	0.95	< 0.00004	2.3	0.000018	0.31	0.0061	0.50	0.000011	0.000070	0.00064	0.00081	0.00036	0.0020	< 0.002
28-Oct-15	25	500	510	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	26	500	485	7.4	0.0080	0.000040	0.00076	0.54	0.074	0.010	0.0035	< 0.0001	0.0080	1.1	< 0.00004	2.4	< 0.000002	0.33	0.0079	0.60	0.0000090	0.000080	0.00021	0.00084	0.00038	< 0.001	< 0.002
11-Nov-15	27	500	485	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	28	500	505	7.3	0.019	0.000020	0.00052	0.38	0.058	< 0.01	0.00090	< 0.0001	< 0.003	0.81	0.00010	2.1	< 0.000002	0.28	0.0056	0.30	0.0000070	0.000090	0.00022	0.00060	0.00028	0.0010	< 0.002
25-Nov-15	29	500	485	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Dec-15	30	500	485	7.2	0.042	0.00018	0.00064	0.53	0.080	< 0.01	0.00051	< 0.0001	< 0.003	1.1	< 0.00004	3.0	< 0.000002	0.34	0.0073	0.90	< 0.000005	0.000030	0.0013	0.00079	0.00038	0.0020	< 0.002
9-Dec-15	31	500	485	7.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	32	500	495	7.1	< 0.007	0.00017	0.00057	0.43	0.076	< 0.01	0.00031	< 0.0001	< 0.003	0.87	< 0.00004	2.4	0.0000040	0.29	0.0067	0.60	0.000012	0.00013	0.0010	0.00089	0.00027	< 0.001	< 0.002
23-Dec-15	33	500	490	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	34	500	490	7.1	0.0070	0.000030	0.00058	0.44	0.078	0.010	0.00021	< 0.0001	< 0.003	0.83	< 0.00004	2.2	0.0000020	0.30	0.0067	0.70	< 0.000005	< 0.00001	0.00011	0.00072	0.00026	< 0.001	< 0.002
6-Jan-16	35	500	490	7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	36	500	495	7.0	< 0.007	0.000020	0.00048	0.42	0.082	< 0.01	0.00025	< 0.0001	< 0.003	0.74	0.00011	1.8	0.0000020	0.22	0.0057	0.20	< 0.000005	0.000040	< 0.00005	0.00061	0.00014	< 0.001	< 0.002
20-Jan-16	37	500	490	7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	38	500	485	7.1	< 0.007	0.000020	0.00051	0.45	0.088	< 0.01	0.00021	< 0.0001	< 0.003	0.80	< 0.00004	2.5	< 0.000002	0.25	0.0069	0.40	0.0000050	0.000040	0.000090	0.00081	0.00020	< 0.001	< 0.002
3-Feb-16	39	500	485	7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	40	500	490	6.9	0.014	0.00012	0.00038	0.36	0.079	< 0.01	0.00019	< 0.0001	< 0.003	0.64	0.000050	1.7	< 0.000002	0.25	0.0052	0.90	0.0000060	0.000020	0.00045	0.00060	0.00015	0.0010	< 0.002
17-Feb-16	41	500	495	7.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	42	500	490	7.0	< 0.007	0.000020	0.00044	0.35	0.075	0.030	0.00020	0.00020	< 0.003	0.72	< 0.00004	2.1	< 0.000002	0.19	0.0052	0.60	0.0000050	0.000040	0.00010	0.00063	0.00019	0.0010	< 0.002
2-Mar-16	43	500	485	7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Mar-16	44	500	490	7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Calculated Loading Rates for HC6 (OKY Master (Fresh))

Date	**Cycle**	**Volume** (mL)		**pH**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
	No.	Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
6-May-15	0	500	320	7.9	0.0022	0.0000096	0.0082	1.6	0.077	0.0064	0.0045	0.00016	0.0090	5.0	0.00032	1.7	0.000011	11	0.021	8.3	0.000022	0.000026	0.000029	0.0082	0.00019	0.0013	0.00064
13-May-15	1	500	495	7.6	0.0054	0.000015	0.0054	1.0	0.053	0.0050	0.0056	0.00015	0.011	4.4	0.00050	2.3	0.0000084	5.2	0.014	2.4	0.000016	0.000045	0.00017	0.0039	0.00033	0.00050	0.00099
20-May-15	2	500	490	7.5	0.0034	0.0000098	0.0031	0.71	0.036	0.0049	0.0029	0.000049	0.012	3.1	0.000020	2.5	0.0000044	1.9	0.0096	1.4	0.000011	0.000044	0.00022	0.00099	0.00043	0.00049	0.00098
27-May-15	3	500	490	7.6	0.021	0.000054	0.0021	0.61	0.033	0.0049	0.0017	0.000049	0.015	2.3	0.00049	2.5	0.0000025	1.2	0.0082	0.78	0.0000078	0.000039	0.00082	0.00091	0.00050	0.00049	0.00098
3-Jun-15	4	500	490	7.4	0.010	0.000034	0.0017	0.56	0.030	0.0049	0.0012	0.000049	0.016	2.3	0.000020	2.1	0.0000015	0.81	0.0077	0.88	0.0000059	0.0000049	0.00035	0.0011	0.00054	0.00049	0.00098
10-Jun-15	5	500	495	7.4	0.010	0.000035	0.0014	0.54	0.030	0.0050	0.00094	0.000050	0.014	2.1	0.000020	2.0	0.00000099	0.62	0.0072	0.74	0.0000064	0.0000099	0.00036	0.0011	0.00053	0.00050	0.00099
17-Jun-15	6	500	490	7.3	0.0098	0.000034	0.0012	0.47	0.027	0.0049	0.00079	0.000049	0.014	1.7	0.000020	1.9	0.00000098	0.48	0.0067	0.78	0.0000088	0.000025	0.00038	0.0011	0.00053	0.00049	0.00098
24-Jun-15	7	500	485	7.5	0.0087	0.000039	0.0011	0.46	0.029	0.0049	0.00060	0.000049	0.013	1.4	0.000019	1.8	0.00000097	0.43	0.0065	0.53	0.0000068	0.000024	0.00016	0.00098	0.00050	0.00049	0.00097
1-Jul-15	8	500	485	7.3	0.0087	0.000024	0.00094	0.39	0.026	0.0097	0.00045	0.000049	0.012	1.2	0.000019	1.6	0.00000097	0.35	0.0056	0.49	0.0000049	0.000073	0.00023	0.00083	0.00050	0.00049	0.00097
8-Jul-15	9	500	485	7.4	0.0097	0.000044	0.00085	0.40	0.026	0.0049	0.00041	0.000049	0.0082	1.1	0.000019	1.8	0.00000097	0.31	0.0055	0.78	0.0000058	0.00011	0.00022	0.00077	0.00048	0.00049	0.00097
15-Jul-15	10	500	490	7.3	0.011	0.000039	0.00077	0.34	0.025	0.0049	0.00044	0.000049	0.0064	0.91	0.000020	1.5	0.00000098	0.30	0.0047	0.34	0.0000064	0.000034	0.00042	0.00076	0.00050	0.00049	0.00098
22-Jul-15	11	500	485	7.4	0.010	0.000039	0.00074	0.32	0.024	0.0049	0.00037	0.000049	0.0054	0.86	0.000020	1.4	0.0000017	0.26	0.0046	0.34	0.0000044	0.000022	0.00037	0.00070	0.00044	0.00049	0.00098
29-Jul-15	12	500	490	7.3	0.0093	0.000039	0.00070	0.30	0.024	0.0049	0.00030	0.000049	0.0044	0.81	0.000020	1.3	0.0000025	0.23	0.0044	0.34	0.0000025	0.0000098	0.00033	0.00064	0.00038	0.00049	0.00098
5-Aug-15	13	500	480	7.3	0.0084	0.000042	0.00063	0.29	0.023	0.0049	0.00033	0.000049	0.0052	0.80	0.000020	1.4	0.0000017	0.22	0.0042	0.30	0.0000044	0.000025	0.00031	0.00058	0.00038	0.00049	0.00099
12-Aug-15	14	500	495	7.3	0.0074	0.000045	0.00055	0.28	0.022	0.0050	0.00035	0.000050	0.0059	0.79	0.000020	1.4	0.00000099	0.21	0.0040	0.25	0.0000064	0.000040	0.00028	0.00051	0.00038	0.00050	0.00099
19-Aug-15	15	500	505	7.3	0.0065	0.000055	0.00054	0.27	0.024	0.0050	0.00032	0.000050	0.0060	0.72	0.000020	1.4	0.00000100	0.19	0.0040	0.30	0.0000057	0.000022	0.00022	0.00048	0.00033	0.00050	0.00100
26-Aug-15	16	500	500	7.5	0.0055	0.000065	0.00053	0.26	0.027	0.0050	0.00029	0.000050	0.0060	0.65	0.000020	1.4	0.0000010	0.17	0.0040	0.35	0.0000050	0.0000050	0.00015	0.00046	0.00029	0.00050	0.0010
2-Sep-15	17	500	490	7.3	0.0047	0.000042	0.00050	0.27	0.027	0.0049	0.00038	0.000049	0.0049	0.64	0.000020	1.3	0.0000012	0.18	0.0038	0.95	0.0000052	0.000034	0.00014	0.00046	0.00026	0.00049	0.00099
9-Sep-15	18	500	485	7.3	0.0039	0.000019	0.00048	0.27	0.028	0.0049	0.00047	0.000049	0.0039	0.63	0.000019	1.2	0.0000015	0.19	0.0037	1.6	0.0000053	0.000063	0.00013	0.00046	0.00023	0.00049	0.00097
16-Sep-15	19	500	495	7.3	0.0044	0.000012	0.00046	0.26	0.028	0.0049	0.00034	0.000049	0.0027	0.59	0.000020	1.3	0.0000032	0.19	0.0036	0.95	0.0000041	0.000034	0.00015	0.00043	0.00022	0.00049	0.00098
23-Sep-15	20	500	490	7.3	0.0049	0.0000049	0.00043	0.24	0.028	0.0049	0.00022	0.000049	0.0015	0.55	0.000020	1.4	0.0000049	0.19	0.0035	0.34	0.0000029	0.0000049	0.00017	0.00040	0.00022	0.00049	0.00098
30-Sep-15	21	500	495	7.2	0.0044	0.000015	0.00038	0.23	0.028	0.0049	0.00039	0.000049	0.0015	0.48	0.000020	1.1	0.0000029	0.17	0.0034	0.25	0.0000027	0.000032	0.00016	0.00050	0.00018	0.00049	0.00099
7-Oct-15	22	500	495	7.4	0.0040	0.000025	0.00033	0.22	0.029	0.0050	0.00056	0.000050	0.0015	0.42	0.000020	0.94	0.00000099	0.15	0.0033	0.15	0.0000025	0.000059	0.00015	0.00061	0.00015	0.00050	0.00099
14-Oct-15	23	500	505	7.4	0.0093	0.000055	0.00034	0.22	0.030	0.0050	0.00092	0.000050	0.0022	0.45	0.000020	1.0	0.0000050	0.16	0.0032	0.20	0.0000040	0.000047	0.00024	0.00051	0.00017	0.00075	0.0010
21-Oct-15	24	500	505	7.3	0.015	0.000086	0.00036	0.22	0.032	0.0051	0.0013	0.000051	0.0029	0.48	0.000020	1.1	0.0000091	0.16	0.0031	0.25	0.0000056	0.000035	0.00032	0.00041	0.00018	0.0010	0.0010
28-Oct-15	25	500	510	7.4	0.0093	0.000053	0.00036	0.24	0.034	0.0050	0.0015	0.000050	0.0034	0.50	0.000020	1.2	0.0000050	0.16	0.0035	0.27	0.0000050	0.000037	0.00021	0.00041	0.00018	0.00075	0.00099
4-Nov-15	26	500	485	7.4	0.0039	0.000019	0.00037	0.26	0.036	0.0049	0.0017	0.000049	0.0039	0.52	0.000019	1.2	0.00000097	0.16	0.0038	0.29	0.0000044	0.000039	0.00010	0.00041	0.00018	0.00049	0.00097
11-Nov-15	27	500	485	7.3	0.0067	0.000015	0.00032	0.23	0.033	0.0050	0.0011	0.000050	0.0027	0.46	0.000035	1.1	0.00000099	0.15	0.0033	0.22	0.0000040	0.000042	0.00011	0.00035	0.00016	0.00050	0.00099
18-Nov-15	28	500	505	7.3	0.0096	0.000010	0.00026	0.19	0.029	0.0051	0.00045	0.000051	0.0015	0.41	0.000051	1.1	0.0000010	0.14	0.0028	0.15	0.0000035	0.000045	0.00011	0.00030	0.00014	0.00051	0.0010
25-Nov-15	29	500	485	7.3	0.015	0.000049	0.00029	0.22	0.034	0.0050	0.00035	0.000050	0.0015	0.46	0.000035	1.3	0.00000099	0.15	0.0032	0.29	0.0000030	0.000030	0.00037	0.00034	0.00016	0.00074	0.00099
2-Dec-15	30	500	485	7.2	0.020	0.000087	0.00031	0.26	0.039	0.0049	0.00025	0.000049	0.0015	0.52	0.000019	1.5	0.00000097	0.16	0.0036	0.44	0.0000024	0.000015	0.00064	0.00038	0.00018	0.00097	0.00097
9-Dec-15	31	500	485	7.2	0.012	0.000086	0.00030	0.23	0.038	0.0049	0.00020	0.000049	0.0015	0.48	0.000020	1.3	0.0000015	0.15	0.0034	0.37	0.0000042	0.000039	0.00057	0.00041	0.00016	0.00073	0.00098
16-Dec-15	32	500	495	7.1	0.0035	0.000084	0.00028	0.21	0.038	0.0050	0.00015	0.000050	0.0015	0.43	0.000020	1.2	0.0000020	0.14	0.0033	0.30	0.0000059	0.000064	0.00050	0.00044	0.00013	0.00050	0.00099
23-Dec-15	33	500	490	7.5	0.0034	0.000049	0.00028	0.21	0.038	0.0049	0.00013	0.000049	0.0015	0.42	0.000020	1.1	0.0000015	0.15	0.0033	0.32	0.0000042	0.000035	0.00028	0.00040	0.00013	0.00049	0.00099
30-Dec-15	34	500	490	7.1	0.0034	0.000015	0.00028	0.21	0.038	0.0049	0.00010	0.000049	0.0015	0.41	0.000020	1.1	0.00000098	0.15	0.0033	0.34	0.0000025	0.0000049	0.000054	0.00035	0.00013	0.00049	0.00098
6-Jan-16	35	500	490	7.1	0.0034	0.000012	0.00026	0.21	0.039	0.0049	0.00011	0.000049	0.0015	0.39	0.000037	1.0	0.00000099	0.13	0.0031	0.22	0.0000025	0.000012	0.000039	0.00033	0.000098	0.00049	0.00099
13-Jan-16	36	500	495	7.0	0.0035	0.0000099	0.00024	0.21	0.040	0.0050	0.00012	0.000050	0.0015	0.37	0.000054	0.91	0.00000099	0.11	0.0028	0.099	0.0000025	0.000020	0.000025	0.00030	0.000069	0.00050	0.00099
20-Jan-16	37	500	490	7.1	0.0034	0.0000098	0.00024	0.21	0.042	0.0049	0.00011	0.000049	0.0015	0.38	0.000037	1.1	0.00000098	0.12	0.0031	0.15	0.0000025	0.000020	0.000034	0.00035	0.000083	0.00049	0.00098
27-Jan-16	38	500	485	7.1	0.0034	0.0000097	0.00024	0.22	0.043	0.0049	0.00010	0.000049	0.0015	0.39	0.000019	1.2	0.00000097	0.12	0.0033	0.19	0.0000024	0.000019	0.000044	0.00039	0.000097	0.00049	0.00097
3-Feb-16	39	500	485	7.0	0.0051	0.000034	0.00021	0.20	0.041	0.0049	0.000097	0.000049	0.0015	0.35	0.000022	1.0	0.00000098	0.12	0.0030	0.32	0.0000027	0.000015	0.00013	0.00034	0.000085	0.00049	0.00098
10-Feb-16	40	500	490	6.9	0.0069	0.000059	0.00018	0.18	0.039	0.0049	0.000093	0.000049	0.0015	0.31	0.000025	0.84	0.00000098	0.12	0.0026	0.44	0.0000029	0.0000098	0.00022	0.00029	0.000074	0.00049	0.00098
17-Feb-16	41	500	495	7.2	0.0051	0.000034	0.00020	0.17	0.038	0.0098	0.000096	0.000074	0.0015	0.33	0.000022	0.94	0.00000098	0.11	0.0026	0.37	0.0000027	0.000015	0.00013	0.00030	0.000083	0.00049	0.00098
24-Feb-16	42	500	490	7.0	0.0034	0.0000098	0.00022	0.17	0.037	0.015	0.000098	0.000098	0.0015	0.35	0.000020	1.0	0.00000098	0.093	0.0025	0.29	0.0000025	0.000020	0.000049	0.00031	0.000093	0.00049	0.00098

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for HC7 (KAM036824)

Date	**Cycle**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**	**Cu**
	No.	Input	Output		umhos/cm	mgCaCO$_3$/L	mgCaCO$_3$/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
12-Aug-15	0	500	415	7.4	598	#N/A	3.7	32	244	3.0	0.11	< 0.3	247	0.0092	0.016	0.038	0.013	< 0.000007	0.000010	0.0062	0.0000080	59	0.000060	0.0048	0.0044
19-Aug-15	1	500	495	7.4	219	#N/A	1.9	17	83	1.0	< 0.06	< 0.3	79	0.014	0.0092	0.033	0.011	< 0.000007	< 0.000007	0.0040	< 0.000003	18	< 0.00003	0.0014	0.00064
26-Aug-15	2	500	505	7.5	138	#N/A	1.6	17	42	1.0	< 0.06	< 0.3	51	0.016	0.0090	0.036	0.011	< 0.000007	< 0.000007	0.0022	0.0000070	12	< 0.00003	0.00089	0.00049
2-Sep-15	3	500	475	7.5	109	#N/A	1.7	16	32	< 1	0.060	< 0.3	40	0.037	0.0084	0.036	0.011	< 0.000007	< 0.000007	0.0019	0.0000040	9.6	0.000050	0.00059	0.00061
9-Sep-15	4	500	490	7.9	93	#N/A	1.5	23	21	< 1	0.060	< 0.3	32	0.017	0.0085	0.041	0.0073	< 0.000007	< 0.000007	0.0018	< 0.000003	7.5	< 0.00003	0.00058	0.00056
16-Sep-15	5	500	480	7.5	81	#N/A	1.5	18	17	< 1	0.060	< 0.3	30	0.019	0.0085	0.036	0.0067	< 0.000007	< 0.000007	0.0017	< 0.000003	7.4	0.000060	0.00045	0.00041
23-Sep-15	6	500	495	7.5	76	#N/A	1.6	20	13	< 1	< 0.06	< 0.3	30	0.017	0.0086	0.033	0.0068	< 0.000007	< 0.000007	0.0014	< 0.000003	7.1	< 0.00003	0.00049	0.00045
30-Sep-15	7	500	485	7.5	65	#N/A	1.9	21	12	< 1	0.060	< 0.3	26	0.017	0.0079	0.034	0.0052	< 0.000007	< 0.000007	0.0026	0.0000050	6.1	< 0.00003	0.00040	0.00033
7-Oct-15	8	500	480	7.6	56	#N/A	1.9	17	7.0	< 1	< 0.06	< 0.3	22	0.016	0.0071	0.023	0.0052	< 0.000007	< 0.000007	0.00090	< 0.000003	5.1	< 0.00003	0.00037	0.00019
14-Oct-15	9	500	475	7.7	64	#N/A	1.7	23	8.0	< 1	0.060	< 0.3	25	0.021	0.0078	0.029	0.0069	< 0.000007	< 0.000007	0.0038	< 0.000003	5.8	< 0.00003	0.00027	0.00038
21-Oct-15	10	500	495	7.6	63	#N/A	1.2	23	8.0	< 1	0.060	< 0.3	28	0.019	0.0084	0.022	0.0071	< 0.000007	< 0.000007	0.0014	< 0.000003	6.6	< 0.00003	0.00042	0.00050
28-Oct-15	11	500	505	7.7	59	#N/A	2.3	26	7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	12	500	480	7.6	51	#N/A	1.1	18	5.0	< 1	< 0.06	< 0.3	22	0.020	0.0066	0.021	0.0053	< 0.000007	< 0.000007	0.00090	< 0.000003	5.1	< 0.00003	0.00030	0.00037
11-Nov-15	13	500	465	7.6	52	#N/A	1.5	20	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	14	500	495	7.7	58	#N/A	1.0	28	5.0	< 1	< 0.06	< 0.3	24	0.017	0.0073	0.022	0.0064	< 0.000007	< 0.000007	< 0.0002	< 0.000003	5.8	0.000030	0.00034	0.00041
25-Nov-15	15	500	465	7.6	46	#N/A	1.0	22	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Dec-15	16	500	485	7.5	51	#N/A	2.4	23	4.0	< 1	< 0.06	< 0.3	24	0.020	0.0069	0.021	0.0076	< 0.000007	< 0.000007	0.00030	0.0000070	5.7	< 0.00003	0.00034	0.00044
9-Dec-15	17	500	470	7.7	45	#N/A	2.9	21	3.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	18	500	500	7.6	50	#N/A	2.4	22	4.0	< 1	< 0.06	< 0.3	25	0.017	0.0073	0.021	0.0088	0.0000080	< 0.000007	0.0012	0.0000040	6.0	0.000040	0.00034	0.00032
23-Dec-15	19	500	485	8.0	43	#N/A	3.5	21	3.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	20	500	490	7.5	43	#N/A	1.6	18	4.0	< 1	< 0.06	< 0.3	21	0.015	0.0054	0.017	0.0074	< 0.000007	< 0.000007	0.00070	0.0000030	5.1	0.000040	0.00026	0.00019
6-Jan-16	21	500	465	7.4	43	#N/A	1.7	17	3.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	22	500	490	7.5	48	#N/A	1.6	22	4.0	< 1	< 0.06	< 0.3	23	0.014	0.0062	0.015	0.0077	< 0.000007	< 0.000007	< 0.002	< 0.000003	5.4	< 0.00003	0.00028	0.00016
20-Jan-16	23	500	475	7.5	42	#N/A	2.6	17	3.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	24	500	490	7.6	49	#N/A	2.8	23	3.0	< 1	< 0.06	< 0.3	23	0.013	0.0062	0.015	0.0085	< 0.000007	< 0.000007	< 0.002	< 0.000003	5.5	< 0.00003	0.00027	0.00030
3-Feb-16	25	500	480	7.5	41	#N/A	2.9	18	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	26	500	495	7.5	52	#N/A	2.4	24	3.0	< 1	< 0.06	< 0.3	24	0.010	0.0061	0.016	0.0091	< 0.000007	< 0.000007	< 0.002	< 0.000003	5.7	< 0.00003	0.00033	0.00011
17-Feb-16	27	500	490	7.6	45	#N/A	4.6	22	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	28	500	490	7.6	49	#N/A	2.2	22	2.0	< 1	< 0.06	< 0.3	24	0.014	0.0059	0.015	0.0090	< 0.000007	< 0.000007	< 0.002	< 0.000003	5.6	< 0.00003	0.00028	0.000080
2-Mar-16	29	500	485	7.5	46	#N/A	2.1	22	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Mar-16	30	500	495	7.5	48	#N/A	2.5	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Calculated Loading Rates for HC7 (KAM036824)

Date	**Cycle**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**	**Cu**
	No.	Input	Output		umhos/cm	mgCaCO$_3$/kg/wk	mgCaCO$_3$/kg/wk	mgCaCO$_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mgCaCO$_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
12-Aug-15	0	500	415	7.4	598	#N/A	1.6	13	101	1.2	0.046	0.12	103	0.0038	0.0067	0.016	0.0054	0.0000029	0.0000042	0.0026	0.0000033	24	0.000025	0.0020	0.0018
19-Aug-15	1	500	495	7.4	219	#N/A	0.96	8.3	41	0.50	0.030	0.15	39	0.0068	0.0046	0.016	0.0054	0.0000035	0.0000035	0.0020	0.0000015	8.9	0.000015	0.00070	0.00032
26-Aug-15	2	500	505	7.5	138	#N/A	0.81	8.5	21	0.51	0.030	0.15	26	0.0083	0.0045	0.018	0.0057	0.0000035	0.0000035	0.0011	0.0000035	6.3	0.000015	0.00045	0.00025
2-Sep-15	3	500	475	7.5	109	#N/A	0.80	7.8	15	0.48	0.029	0.14	19	0.017	0.0040	0.017	0.0050	0.0000033	0.0000033	0.00090	0.0000019	4.5	0.000024	0.00028	0.00029
9-Sep-15	4	500	490	7.9	93	#N/A	0.72	11	10	0.49	0.029	0.15	16	0.0081	0.0042	0.020	0.0036	0.0000034	0.0000034	0.00088	0.0000015	3.7	0.000015	0.00029	0.00027
16-Sep-15	5	500	480	7.5	81	#N/A	0.74	8.4	8.2	0.48	0.029	0.14	15	0.0091	0.0041	0.017	0.0032	0.0000034	0.0000034	0.00082	0.0000014	3.6	0.000029	0.00021	0.00020
23-Sep-15	6	500	495	7.5	76	#N/A	0.79	10.0	6.4	0.50	0.030	0.15	15	0.0086	0.0043	0.016	0.0034	0.0000035	0.0000035	0.00069	0.0000015	3.5	0.000015	0.00024	0.00022
30-Sep-15	7	500	485	7.5	65	#N/A	0.93	10	5.8	0.49	0.029	0.15	13	0.0081	0.0038	0.016	0.0025	0.0000034	0.0000034	0.0013	0.0000024	3.0	0.000015	0.00019	0.00016
7-Oct-15	8	500	480	7.6	56	#N/A	0.92	8.3	3.4	0.48	0.029	0.14	10	0.0075	0.0034	0.011	0.0025	0.0000034	0.0000034	0.00043	0.0000014	2.4	0.000014	0.00018	0.000091
14-Oct-15	9	500	475	7.7	64	#N/A	0.81	11	3.8	0.48	0.029	0.14	12	0.0099	0.0037	0.014	0.0033	0.0000033	0.0000033	0.0018	0.0000014	2.7	0.000014	0.00013	0.00018
21-Oct-15	10	500	495	7.6	63	#N/A	0.57	11	4.0	0.50	0.030	0.15	14	0.0094	0.0042	0.011	0.0035	0.0000035	0.0000035	0.00069	0.0000015	3.3	0.000015	0.00021	0.00025
28-Oct-15	11	500	505	7.7	59	#N/A	1.2	13	3.5	0.49	0.029	0.15	12	0.0096	0.0037	0.011	0.0030	0.0000034	0.0000034	0.00056	0.0000015	2.9	0.000015	0.00017	0.00021
4-Nov-15	12	500	480	7.6	51	#N/A	0.54	8.5	2.4	0.48	0.029	0.14	10	0.0097	0.0032	0.010	0.0025	0.0000034	0.0000034	0.00043	0.0000014	2.4	0.000014	0.00014	0.00018
11-Nov-15	13	500	465	7.6	52	#N/A	0.70	9.4	1.9	0.49	0.029	0.15	11	0.0091	0.0034	0.010	0.0029	0.0000034	0.0000034	0.00027	0.0000015	2.6	0.000015	0.00015	0.00019
18-Nov-15	14	500	495	7.7	58	#N/A	0.48	14	2.5	0.50	0.030	0.15	12	0.0086	0.0036	0.011	0.0032	0.0000035	0.0000035	0.000099	0.0000015	2.9	0.000015	0.00017	0.00020
25-Nov-15	15	500	465	7.6	46	#N/A	0.48	10	1.9	0.49	0.029	0.15	12	0.0092	0.0035	0.010	0.0034	0.0000034	0.0000034	0.00012	0.0000024	2.8	0.000015	0.00017	0.00021
2-Dec-15	16	500	485	7.5	51	#N/A	1.2	11	1.9	0.49	0.029	0.15	12	0.0097	0.0033	0.010	0.0037	0.0000034	0.0000034	0.00015	0.0000034	2.7	0.000015	0.00016	0.00021
9-Dec-15	17	500	470	7.7	45	#N/A	1.4	9.8	1.4	0.49	0.030	0.15	12	0.0090	0.0035	0.010	0.0040	0.0000037	0.0000034	0.00037	0.0000027	2.9	0.000017	0.00017	0.00019
16-Dec-15	18	500	500	7.6	50	#N/A	1.2	11	2.0	0.50	0.030	0.15	13	0.0084	0.0037	0.010	0.0044	0.0000040	0.0000035	0.00060	0.0000020	3.0	0.000020	0.00017	0.00016
23-Dec-15	19	500	485	8.0	43	#N/A	1.7	10	1.5	0.50	0.030	0.15	11	0.0078	0.0031	0.0093	0.0040	0.0000037	0.0000035	0.00047	0.0000017	2.7	0.000020	0.00015	0.00013
30-Dec-15	20	500	490	7.5	43	#N/A	0.77	8.7	2.0	0.49	0.029	0.15	10	0.0072	0.0026	0.0081	0.0036	0.0000034	0.0000034	0.00034	0.0000015	2.5	0.000020	0.00013	0.000093
6-Jan-16	21	500	465	7.4	43	#N/A	0.77	8.0	1.4	0.49	0.029	0.15	11	0.0070	0.0028	0.0078	0.0037	0.0000034	0.0000034	0.00066	0.0000015	2.6	0.000017	0.00013	0.000086
13-Jan-16	22	500	490	7.5	48	#N/A	0.79	11	2.0	0.49	0.029	0.15	11	0.0068	0.0030	0.0075	0.0038	0.0000034	0.0000034	0.00098	0.0000015	2.6	0.000015	0.00014	0.000078
20-Jan-16	23	500	475	7.5	42	#N/A	1.2	8.2	1.4	0.49	0.029	0.15	11	0.0066	0.0030	0.0075	0.0040	0.0000034	0.0000034	0.00098	0.0000015	2.7	0.000015	0.00014	0.00011
27-Jan-16	24	500	490	7.6	49	#N/A	1.4	11	1.5	0.49	0.029	0.15	11	0.0064	0.0030	0.0075	0.0042	0.0000034	0.0000034	0.00098	0.0000015	2.7	0.000015	0.00013	0.00015
3-Feb-16	25	500	480	7.5	41	#N/A	1.4	8.6	0.96	0.49	0.030	0.15	12	0.0058	0.0030	0.0077	0.0043	0.0000034	0.0000034	0.00099	0.0000015	2.8	0.000015	0.00015	0.00010
10-Feb-16	26	500	495	7.5	52	#N/A	1.2	12	1.5	0.50	0.030	0.15	12	0.0051	0.0030	0.0078	0.0045	0.0000035	0.0000035	0.00099	0.0000015	2.8	0.000015	0.00016	0.000054
17-Feb-16	27	500	490	7.6	45	#N/A	2.2	11	0.98	0.49	0.030	0.15	12	0.0060	0.0030	0.0075	0.0045	0.0000034	0.0000034	0.00099	0.0000015	2.8	0.000015	0.00015	0.000047
24-Feb-16	28	500	490	7.6	49	#N/A	1.1	11	0.98	0.49	0.029	0.15	12	0.0069	0.0029	0.0072	0.0044	0.0000034	0.0000034	0.00098	0.0000015	2.7	0.000015	0.00014	0.000039

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests

Leachate Concentrations for HC7 (KAM036824)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
12-Aug-15	0	500	415	7.4	0.0070	0.00011	0.0050	24	0.10	< 0.01	0.0020	0.036	0.0080	6.1	0.00020	0.67	0.000016	18	0.30	86	0.000035	0.0022	< 0.00005	0.024	0.00027	0.0040	< 0.002
19-Aug-15	1	500	495	7.4	0.034	0.000020	0.0020	8.4	0.031	< 0.01	0.00066	0.012	< 0.003	2.7	< 0.00004	0.42	< 0.000002	5.6	0.095	26	0.0000080	< 0.00001	0.00023	0.0097	0.00030	< 0.001	< 0.002
26-Aug-15	2	500	505	7.5	< 0.007	0.00012	0.0016	4.8	0.022	< 0.01	0.00055	0.0075	0.0040	2.1	0.000080	0.40	0.0000030	3.2	0.058	15	0.0000080	0.000020	< 0.00005	0.0097	0.00035	< 0.001	< 0.002
2-Sep-15	3	500	475	7.5	0.012	0.00012	0.0013	3.8	0.014	< 0.01	0.00031	0.0049	< 0.003	1.8	< 0.00004	0.36	0.0000040	2.2	0.044	12	0.0000070	< 0.00001	0.00018	0.0077	0.00038	< 0.001	< 0.002
9-Sep-15	4	500	490	7.9	< 0.007	0.000030	0.0011	3.2	0.014	< 0.01	0.0022	0.0039	< 0.003	1.7	0.000070	0.35	0.0000050	1.7	0.035	11	0.000011	0.000080	0.000070	0.0090	0.00033	< 0.001	< 0.002
16-Sep-15	5	500	480	7.5	< 0.007	0.000080	0.0013	2.9	0.011	< 0.01	0.00023	0.0028	< 0.003	1.6	< 0.00004	0.34	0.0000050	1.4	0.030	7.0	0.0000070	0.000060	< 0.00005	0.0066	0.00033	< 0.001	< 0.002
23-Sep-15	6	500	495	7.5	< 0.007	< 0.00001	0.0010	2.9	0.013	< 0.01	0.00033	0.0032	< 0.003	1.5	< 0.00004	0.39	0.000020	1.1	0.030	5.2	< 0.000005	< 0.00001	0.000080	0.0062	0.00031	< 0.001	< 0.002
30-Sep-15	7	500	485	7.5	0.0070	0.000040	0.00093	2.6	0.011	< 0.01	0.00027	0.0032	< 0.003	1.4	< 0.00004	0.27	< 0.000002	0.91	0.027	4.4	< 0.000005	0.000070	0.00010	0.0055	0.00034	0.0040	< 0.002
7-Oct-15	8	500	480	7.6	< 0.007	0.000020	0.00081	2.2	0.0095	< 0.01	0.00047	0.0023	< 0.003	1.1	< 0.00004	0.26	< 0.000002	0.60	0.022	3.5	< 0.000005	0.000040	< 0.00005	0.0048	0.00025	< 0.001	< 0.002
14-Oct-15	9	500	475	7.7	< 0.007	0.000010	0.00099	2.5	0.0097	< 0.01	0.00046	0.0018	< 0.003	1.4	< 0.00004	0.35	0.0000020	0.66	0.026	4.2	0.0000060	0.000090	< 0.00005	0.0055	0.00040	< 0.001	< 0.002
21-Oct-15	10	500	495	7.6	< 0.007	0.000040	0.00094	2.8	0.012	< 0.01	0.0019	0.0023	< 0.003	1.4	0.000040	0.37	0.000013	0.60	0.029	3.4	0.0000070	0.00013	0.00037	0.0064	0.00027	< 0.001	< 0.002
28-Oct-15	11	500	505	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	12	500	480	7.6	< 0.007	0.000020	0.00072	2.2	0.0089	< 0.01	0.0014	0.0017	0.0080	1.2	< 0.00004	0.27	< 0.000002	0.39	0.023	2.4	< 0.000005	< 0.00001	< 0.00005	0.0052	0.00025	< 0.001	< 0.002
11-Nov-15	13	500	465	7.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	14	500	495	7.7	0.019	0.000030	0.00072	2.4	0.012	< 0.01	0.00068	0.0016	< 0.003	1.1	0.00013	0.32	< 0.000002	0.35	0.026	2.2	< 0.000005	0.000050	< 0.00005	0.0042	0.00026	< 0.001	< 0.002
25-Nov-15	15	500	465	7.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Dec-15	16	500	485	7.5	< 0.007	0.000080	0.00066	2.4	0.010	< 0.01	0.00028	0.0018	< 0.003	1.1	< 0.00004	0.31	< 0.000002	0.27	0.024	2.2	< 0.000005	0.000060	0.00022	0.0053	0.00031	< 0.001	< 0.002
9-Dec-15	17	500	470	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	18	500	500	7.6	< 0.007	0.00012	0.00070	2.5	0.012	< 0.01	0.00013	0.0017	< 0.003	1.1	< 0.00004	0.34	0.0000030	0.23	0.026	1.8	< 0.000005	0.000070	0.00010	0.0052	0.00025	< 0.001	< 0.002
23-Dec-15	19	500	485	8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	20	500	490	7.5	< 0.007	0.000030	0.00062	2.1	0.010	0.010	0.00036	0.0014	< 0.003	0.92	< 0.00004	0.24	< 0.000002	0.20	0.021	1.9	< 0.000005	< 0.00001	0.00010	0.0040	0.00022	< 0.001	< 0.002
6-Jan-16	21	500	465	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	22	500	490	7.5	< 0.007	0.000030	0.00056	2.2	0.011	< 0.01	0.00018	0.0013	< 0.003	0.95	0.00017	0.28	0.0000030	0.15	0.021	1.1	< 0.000005	0.000030	< 0.00005	0.0043	0.00021	< 0.001	< 0.002
20-Jan-16	23	500	475	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	24	500	490	7.6	< 0.007	< 0.00001	0.00054	2.2	0.012	< 0.01	0.000060	0.0013	< 0.003	0.89	< 0.00004	0.27	< 0.000002	0.16	0.023	1.2	< 0.000005	0.000030	< 0.00005	0.0049	0.00026	< 0.001	< 0.002
3-Feb-16	25	500	480	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	26	500	495	7.5	< 0.007	0.000040	0.00053	2.4	0.013	< 0.01	0.000080	0.0015	< 0.003	0.86	0.000050	0.26	< 0.000002	0.15	0.024	1.6	< 0.000005	< 0.00001	< 0.00005	0.0041	0.00017	< 0.001	< 0.002
17-Feb-16	27	500	490	7.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	28	500	490	7.6	< 0.007	0.000030	0.00055	2.4	0.013	0.020	0.000090	0.0013	< 0.003	0.83	< 0.00004	0.040	< 0.000002	0.070	0.022	1.3	< 0.000005	0.000090	0.000070	0.0039	0.00020	< 0.001	< 0.002
2-Mar-16	29	500	485	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Mar-16	30	500	495	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Calculated Loading Rates for HC7 (KAM036824)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
12-Aug-15	0	500	415	7.4	0.0029	0.000046	0.0021	10	0.042	0.0042	0.00084	0.015	0.0033	2.5	0.000083	0.28	0.0000066	7.4	0.12	35	0.000015	0.00092	0.000021	0.0098	0.00011	0.0017	0.00083
19-Aug-15	1	500	495	7.4	0.017	0.0000099	0.00098	4.1	0.016	0.0050	0.00033	0.0060	0.0015	1.4	0.000020	0.21	0.00000099	2.8	0.047	13	0.0000040	0.0000050	0.00011	0.0048	0.00015	0.00050	0.00099
26-Aug-15	2	500	505	7.5	0.0035	0.000061	0.00082	2.4	0.011	0.0051	0.00028	0.0038	0.0020	1.1	0.000040	0.20	0.0000015	1.6	0.029	7.4	0.0000040	0.000010	0.000025	0.0049	0.00018	0.00051	0.0010
2-Sep-15	3	500	475	7.5	0.0057	0.000057	0.00062	1.8	0.0068	0.0048	0.00015	0.0023	0.0014	0.87	0.000019	0.17	0.0000019	1.0	0.021	5.9	0.0000033	0.0000048	0.000086	0.0036	0.00018	0.00048	0.00095
9-Sep-15	4	500	490	7.9	0.0034	0.000015	0.00056	1.6	0.0070	0.0049	0.0011	0.0019	0.0015	0.82	0.000034	0.17	0.0000025	0.82	0.017	5.2	0.0000054	0.000039	0.000034	0.0044	0.00016	0.00049	0.00098
16-Sep-15	5	500	480	7.5	0.0034	0.000038	0.00064	1.4	0.0054	0.0048	0.00011	0.0013	0.0014	0.76	0.000019	0.16	0.0000024	0.65	0.014	3.4	0.0000034	0.000029	0.000024	0.0032	0.00016	0.00048	0.00096
23-Sep-15	6	500	495	7.5	0.0035	0.0000050	0.00050	1.4	0.0065	0.0050	0.00016	0.0016	0.0015	0.74	0.000020	0.19	0.0000099	0.55	0.015	2.6	0.0000025	0.0000050	0.000040	0.0031	0.00015	0.00050	0.00099
30-Sep-15	7	500	485	7.5	0.0034	0.000019	0.00045	1.2	0.0051	0.0049	0.00013	0.0016	0.0015	0.69	0.000019	0.13	0.00000097	0.44	0.013	2.1	0.0000024	0.000034	0.000049	0.0026	0.00016	0.0019	0.00097
7-Oct-15	8	500	480	7.6	0.0034	0.0000096	0.00039	1.1	0.0046	0.0048	0.00023	0.0011	0.0014	0.55	0.000019	0.12	0.00000096	0.29	0.011	1.7	0.0000024	0.000019	0.000024	0.0023	0.00012	0.00048	0.00096
14-Oct-15	9	500	475	7.7	0.0033	0.0000048	0.00047	1.2	0.0046	0.0048	0.00022	0.00086	0.0014	0.65	0.000019	0.17	0.00000095	0.31	0.012	2.0	0.0000029	0.000043	0.000024	0.0026	0.00019	0.00048	0.00095
21-Oct-15	10	500	495	7.6	0.0035	0.000020	0.00046	1.4	0.0061	0.0050	0.00096	0.0011	0.0015	0.68	0.000020	0.18	0.0000064	0.30	0.014	1.7	0.0000035	0.000064	0.00018	0.0032	0.00013	0.00050	0.00099
28-Oct-15	11	500	505	7.7	0.0034	0.000015	0.00040	1.2	0.0052	0.0049	0.00081	0.00098	0.0027	0.62	0.000020	0.16	0.0000037	0.24	0.013	1.4	0.0000029	0.000035	0.00010	0.0028	0.00013	0.00049	0.00098
4-Nov-15	12	500	480	7.6	0.0034	0.0000096	0.00034	1.0	0.0042	0.0048	0.00065	0.00082	0.0038	0.55	0.000019	0.13	0.00000096	0.19	0.011	1.2	0.0000024	0.0000048	0.000024	0.0025	0.00012	0.00048	0.00096
11-Nov-15	13	500	465	7.6	0.0064	0.000012	0.00035	1.1	0.0050	0.0049	0.00049	0.00080	0.0027	0.55	0.000042	0.14	0.00000098	0.18	0.012	1.1	0.0000024	0.000015	0.000024	0.0023	0.00012	0.00049	0.00098
18-Nov-15	14	500	495	7.7	0.0094	0.000015	0.00036	1.2	0.0057	0.0050	0.00034	0.00079	0.0015	0.55	0.000064	0.16	0.00000099	0.17	0.013	1.1	0.0000025	0.000025	0.000025	0.0021	0.00013	0.00050	0.00099
25-Nov-15	15	500	465	7.6	0.0064	0.000027	0.00034	1.2	0.0054	0.0049	0.00024	0.00083	0.0015	0.55	0.000042	0.15	0.00000098	0.15	0.012	1.1	0.0000025	0.000027	0.000066	0.0023	0.00014	0.00049	0.00098
2-Dec-15	16	500	485	7.5	0.0034	0.000039	0.00032	1.2	0.0050	0.0049	0.00014	0.00087	0.0015	0.55	0.000019	0.15	0.00000097	0.13	0.011	1.1	0.0000024	0.000029	0.00011	0.0026	0.00015	0.00049	0.00097
9-Dec-15	17	500	470	7.7	0.0034	0.000049	0.00034	1.2	0.0056	0.0049	0.00010	0.00086	0.0015	0.55	0.000020	0.16	0.0000012	0.12	0.012	0.98	0.0000025	0.000032	0.000078	0.0026	0.00014	0.00049	0.00099
16-Dec-15	18	500	500	7.6	0.0035	0.000060	0.00035	1.2	0.0061	0.0050	0.000065	0.00085	0.0015	0.56	0.000020	0.17	0.0000015	0.12	0.013	0.90	0.0000025	0.000035	0.000050	0.0026	0.00013	0.00050	0.0010
23-Dec-15	19	500	485	8.0	0.0035	0.000037	0.00033	1.1	0.0055	0.0050	0.00012	0.00077	0.0015	0.50	0.000020	0.14	0.0000012	0.11	0.012	0.92	0.0000025	0.000020	0.000050	0.0023	0.00012	0.00050	0.00099
30-Dec-15	20	500	490	7.5	0.0034	0.000015	0.00030	1.0	0.0050	0.0049	0.00018	0.00069	0.0015	0.45	0.000020	0.12	0.00000098	0.098	0.010	0.93	0.0000025	0.0000049	0.000049	0.0020	0.00011	0.00049	0.00098
6-Jan-16	21	500	465	7.4	0.0034	0.000015	0.00029	1.1	0.0052	0.0049	0.00013	0.00066	0.0015	0.46	0.000051	0.13	0.0000012	0.086	0.010	0.74	0.0000025	0.0000098	0.000037	0.0020	0.00011	0.00049	0.00098
13-Jan-16	22	500	490	7.5	0.0034	0.000015	0.00027	1.1	0.0054	0.0049	0.000088	0.00064	0.0015	0.47	0.000083	0.14	0.0000015	0.074	0.010	0.54	0.0000025	0.000015	0.000025	0.0021	0.00010	0.00049	0.00098
20-Jan-16	23	500	475	7.5	0.0034	0.0000098	0.00027	1.1	0.0055	0.0049	0.000059	0.00064	0.0015	0.45	0.000051	0.13	0.0000012	0.076	0.011	0.56	0.0000025	0.000015	0.000025	0.0023	0.00012	0.00049	0.00098
27-Jan-16	24	500	490	7.6	0.0034	0.0000049	0.00026	1.1	0.0057	0.0049	0.000029	0.00064	0.0015	0.44	0.000020	0.13	0.00000098	0.078	0.011	0.59	0.0000025	0.000015	0.000025	0.0024	0.00013	0.00049	0.00098
3-Feb-16	25	500	480	7.5	0.0034	0.000012	0.00026	1.1	0.0061	0.0049	0.000035	0.00069	0.0015	0.43	0.000022	0.13	0.00000099	0.076	0.011	0.69	0.0000025	0.0000098	0.000025	0.0022	0.00011	0.00049	0.00099
10-Feb-16	26	500	495	7.5	0.0035	0.000020	0.00026	1.2	0.0066	0.0050	0.000040	0.00074	0.0015	0.42	0.000025	0.13	0.00000099	0.074	0.012	0.79	0.0000025	0.0000050	0.000025	0.0020	0.000084	0.00050	0.00099
17-Feb-16	27	500	490	7.6	0.0034	0.000017	0.00026	1.2	0.0064	0.0074	0.000042	0.00069	0.0015	0.42	0.000022	0.074	0.00000099	0.054	0.011	0.71	0.0000025	0.000025	0.000030	0.0020	0.000091	0.00049	0.00099
24-Feb-16	28	500	490	7.6	0.0034	0.000015	0.00027	1.2	0.0062	0.0098	0.000044	0.00064	0.0015	0.41	0.000020	0.020	0.00000098	0.034	0.011	0.64	0.0000025	0.000044	0.000034	0.0019	0.000098	0.00049	0.00098

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for HC8 (KAM092488)

Date	**Cycle**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**	**Cu**
	No.	Input	Output		umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
12-Aug-15	0	500	410	7.6	128	#N/A	2.5	22	29	*< 1*	0.080	*< 0.3*	24	0.075	0.0037	0.13	0.0077	0.000014	0.000010	0.016	0.000025	5.7	0.00011	0.00031	0.016
19-Aug-15	1	500	505	7.5	68	#N/A	1.9	15	13	*< 1*	*< 0.06*	*< 0.3*	16	0.024	0.0030	0.063	0.0084	*< 0.000007*	*< 0.000007*	0.0084	0.0000040	3.8	*< 0.00003*	0.00017	0.0032
26-Aug-15	2	500	495	7.5	38	#N/A	1.3	12	3.0	*< 1*	*< 0.06*	*< 0.3*	9.3	0.021	0.0025	0.050	0.0049	*< 0.000007*	*< 0.000007*	0.0053	0.0000090	2.3	*< 0.00003*	0.000070	0.0020
2-Sep-15	3	500	500	7.5	32	#N/A	1.6	12	*< 2*	*< 1*	*< 0.06*	*< 0.3*	8.5	0.018	0.0025	0.043	0.0045	*< 0.000007*	*< 0.000007*	0.0047	0.0000060	2.1	*< 0.00003*	0.000053	0.0014
9-Sep-15	4	500	495	7.5	25	#N/A	1.6	11	*< 2*	*< 1*	*< 0.06*	*< 0.3*	8.2	0.019	0.0021	0.038	0.0045	*< 0.000007*	*< 0.000007*	0.0039	*< 0.000003*	1.9	*< 0.00003*	0.000048	0.0011
16-Sep-15	5	500	495	7.4	24	#N/A	1.5	11	*< 2*	*< 1*	*< 0.06*	*< 0.3*	8.3	0.017	0.0021	0.038	0.0049	*< 0.000007*	*< 0.000007*	0.0037	0.0000060	2.0	*< 0.00003*	0.000030	0.00082
23-Sep-15	6	500	495	7.4	24	#N/A	1.4	12	*< 2*	*< 1*	*< 0.06*	*< 0.3*	8.9	0.014	0.0021	0.035	0.0056	*< 0.000007*	*< 0.000007*	0.0030	*< 0.000003*	2.1	*< 0.00003*	0.000034	0.00081
30-Sep-15	7	500	490	7.4	21	#N/A	1.5	12	*< 2*	*< 1*	*< 0.06*	*< 0.3*	8.7	0.012	0.0018	0.032	0.0054	*< 0.000007*	*< 0.000007*	0.0032	0.0000050	2.0	*< 0.00003*	0.000037	0.00086
7-Oct-15	8	500	500	7.5	19	#N/A	1.5	10	2.0	*< 1*	*< 0.06*	*< 0.3*	8.0	0.011	0.0016	0.022	0.0052	*< 0.000007*	*< 0.000007*	0.0018	*< 0.000003*	1.9	*< 0.00003*	0.000024	0.00059
14-Oct-15	9	500	490	7.6	19	#N/A	1.5	11	2.0	*< 1*	*< 0.06*	*< 0.3*	8.1	0.012	0.0016	0.027	0.0052	*< 0.000007*	*< 0.000007*	0.0031	*< 0.000003*	1.9	*< 0.00003*	0.000027	0.00052
21-Oct-15	10	500	495	7.5	21	#N/A	1.2	11	2.0	*< 1*	*< 0.06*	*< 0.3*	9.4	0.014	0.0016	0.022	0.0065	*< 0.000007*	*< 0.000007*	0.0022	0.0000050	2.2	*< 0.00003*	0.000025	0.00065
28-Oct-15	11	500	510	7.7	21	#N/A	2.4	13	3.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	12	500	495	7.4	20	#N/A	1.1	11	*< 2*	*< 1*	*< 0.06*	*< 0.3*	8.4	0.012	0.0013	0.018	0.0061	*< 0.000007*	*< 0.000007*	0.00080	*< 0.000003*	2.0	0.000040	0.000017	0.00045
11-Nov-15	13	500	480	7.4	19	#N/A	1.6	10	*< 2*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	14	500	505	7.5	22	#N/A	0.80	13	2.0	*< 1*	*< 0.06*	*< 0.3*	9.6	0.013	0.0014	0.020	0.0069	*< 0.000007*	*< 0.000007*	*< 0.0002*	*< 0.000003*	2.3	*< 0.00003*	0.000024	0.00055
25-Nov-15	15	500	475	7.3	17	#N/A	1.0	9.7	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Dec-15	16	500	490	7.1	18	#N/A	2.8	11	2.0	*< 1*	*< 0.06*	*< 0.3*	8.7	0.017	0.0013	0.018	0.0056	*< 0.000007*	*< 0.000007*	0.00060	0.0000050	2.1	*< 0.00003*	0.000016	0.00059
9-Dec-15	17	500	495	7.6	19	#N/A	3.1	11	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	18	500	490	7.6	18	#N/A	2.7	9.9	2.0	*< 1*	*< 0.06*	*< 0.3*	9.3	0.015	0.0013	0.018	0.0061	0.0000080	*< 0.000007*	0.0015	0.0000060	2.3	0.00012	0.000027	0.00065
23-Dec-15	19	500	495	8.1	15	#N/A	3.9	11	*< 2*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	20	500	495	7.2	16	#N/A	1.3	9.5	2.0	*< 1*	*< 0.06*	*< 0.3*	8.7	0.0091	0.0011	0.013	0.0062	*< 0.000007*	*< 0.000007*	0.0010	*< 0.000003*	2.1	*< 0.00003*	0.000017	0.00021
6-Jan-16	21	500	485	7.1	17	#N/A	1.7	9.2	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	22	500	490	7.2	19	#N/A	1.8	10	2.0	*< 1*	*< 0.06*	*< 0.3*	8.9	0.011	0.0013	0.014	0.0061	*< 0.000007*	*< 0.000007*	*< 0.002*	*< 0.000003*	2.2	*< 0.00003*	0.0000040	0.00027
20-Jan-16	23	500	485	7.4	17	#N/A	2.5	9.6	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	24	500	490	7.5	20	#N/A	2.8	11	2.0	*< 1*	*< 0.06*	*< 0.3*	8.8	0.012	0.0013	0.016	0.0060	*< 0.000007*	*< 0.000007*	*< 0.002*	0.0000050	2.1	*< 0.00003*	0.000016	0.00034
3-Feb-16	25	500	500	7.4	18	#N/A	3.5	10	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	26	500	495	7.3	20	#N/A	2.0	11	2.0	*< 1*	*< 0.06*	*< 0.3*	9.3	0.0080	0.0014	0.017	0.0057	*< 0.000007*	*< 0.000007*	*< 0.002*	*< 0.000003*	2.3	*< 0.00003*	0.000023	0.00024
17-Feb-16	27	500	490	7.6	15	#N/A	4.0	11	*< 2*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	28	500	500	7.4	17	#N/A	2.6	11	2.0	*< 1*	*< 0.06*	*< 0.3*	9.1	0.013	0.0013	0.016	0.0061	*< 0.000007*	*< 0.000007*	*< 0.002*	*< 0.000003*	2.3	*< 0.00003*	0.0000080	0.0020
2-Mar-16	29	500	500	7.2	19	#N/A	2.2	11	*< 2*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Mar-16	30	500	500	7.4	19	#N/A	2.5	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Calculated Loading Rates for HC8 (KAM092488)

Date	**Cycle**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**	**Cu**
	No.	Input	Output		umhos/cm	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
12-Aug-15	0	500	410	7.6	128	#N/A	1.0	9.2	12	0.41	0.033	0.12	9.7	0.031	0.0015	0.055	0.0031	0.0000057	0.0000041	0.0066	0.000010	2.3	0.000045	0.00013	0.0064
19-Aug-15	1	500	505	7.5	68	#N/A	0.94	7.7	6.6	0.51	0.030	0.15	8.1	0.012	0.0015	0.032	0.0042	0.0000035	0.0000035	0.0042	0.0000020	1.9	0.000015	0.000085	0.0016
26-Aug-15	2	500	495	7.5	38	#N/A	0.66	6.2	1.5	0.50	0.030	0.15	4.6	0.010	0.0012	0.025	0.0024	0.0000035	0.0000035	0.0026	0.0000045	1.1	0.000015	0.000035	0.0010
2-Sep-15	3	500	500	7.5	32	#N/A	0.82	6.1	1.0	0.50	0.030	0.15	4.3	0.0090	0.0013	0.022	0.0023	0.0000035	0.0000035	0.0024	0.0000030	1.0	0.000015	0.000027	0.00069
9-Sep-15	4	500	495	7.5	25	#N/A	0.78	5.4	0.99	0.50	0.030	0.15	4.1	0.0094	0.0010	0.019	0.0022	0.0000035	0.0000035	0.0019	0.0000015	0.96	0.000015	0.000024	0.00052
16-Sep-15	5	500	495	7.4	24	#N/A	0.72	5.6	0.99	0.50	0.030	0.15	4.1	0.0086	0.0010	0.019	0.0024	0.0000035	0.0000035	0.0018	0.0000030	0.99	0.000015	0.000015	0.00041
23-Sep-15	6	500	495	7.4	24	#N/A	0.67	5.7	0.99	0.50	0.030	0.15	4.4	0.0067	0.0010	0.017	0.0028	0.0000035	0.0000035	0.0015	0.0000015	1.0	0.000015	0.000017	0.00040
30-Sep-15	7	500	490	7.4	21	#N/A	0.74	5.8	0.98	0.49	0.029	0.15	4.2	0.0060	0.00088	0.016	0.0026	0.0000034	0.0000034	0.0016	0.0000025	0.98	0.000015	0.000018	0.00042
7-Oct-15	8	500	500	7.5	19	#N/A	0.77	5.2	1.0	0.50	0.030	0.15	4.0	0.0057	0.00080	0.011	0.0026	0.0000035	0.0000035	0.00090	0.0000015	0.96	0.000015	0.000012	0.00030
14-Oct-15	9	500	490	7.6	19	#N/A	0.75	5.4	0.98	0.49	0.029	0.15	4.0	0.0058	0.00078	0.013	0.0026	0.0000034	0.0000034	0.0015	0.0000015	0.93	0.000015	0.000013	0.00025
21-Oct-15	10	500	495	7.5	21	#N/A	0.59	5.6	0.99	0.50	0.030	0.15	4.7	0.0068	0.00079	0.011	0.0032	0.0000035	0.0000035	0.0011	0.0000025	1.1	0.000015	0.000012	0.00032
28-Oct-15	11	500	510	7.7	21	#N/A	1.2	6.8	1.5	0.50	0.030	0.15	4.4	0.0064	0.00072	0.0097	0.0031	0.0000035	0.0000035	0.00074	0.0000020	1.0	0.000017	0.000010	0.00027
4-Nov-15	12	500	495	7.4	20	#N/A	0.52	5.2	0.99	0.50	0.030	0.15	4.2	0.0060	0.00064	0.0087	0.0030	0.0000035	0.0000035	0.00040	0.0000015	0.99	0.000020	0.0000084	0.00022
11-Nov-15	13	500	480	7.4	19	#N/A	0.77	4.9	0.96	0.50	0.030	0.15	4.5	0.0063	0.00068	0.0093	0.0033	0.0000035	0.0000035	0.00025	0.0000015	1.1	0.000017	0.000010	0.00025
18-Nov-15	14	500	505	7.5	22	#N/A	0.40	6.6	1.0	0.51	0.030	0.15	4.8	0.0066	0.00071	0.0098	0.0035	0.0000035	0.0000035	0.00010	0.0000015	1.2	0.000015	0.000012	0.00028
25-Nov-15	15	500	475	7.3	17	#N/A	0.48	4.6	0.95	0.50	0.030	0.15	4.6	0.0074	0.00067	0.0093	0.0031	0.0000035	0.0000035	0.00020	0.0000020	1.1	0.000015	0.0000100	0.00028
2-Dec-15	16	500	490	7.1	18	#N/A	1.4	5.2	0.98	0.49	0.029	0.15	4.3	0.0081	0.00064	0.0088	0.0027	0.0000034	0.0000034	0.00029	0.0000025	1.0	0.000015	0.0000078	0.00029
9-Dec-15	17	500	495	7.6	19	#N/A	1.5	5.6	0.99	0.49	0.029	0.15	4.4	0.0076	0.00064	0.0089	0.0029	0.0000037	0.0000034	0.00051	0.0000027	1.1	0.000037	0.000011	0.00030
16-Dec-15	18	500	490	7.6	18	#N/A	1.3	4.8	0.98	0.49	0.029	0.15	4.6	0.0072	0.00064	0.0090	0.0030	0.0000039	0.0000034	0.00074	0.0000029	1.1	0.000059	0.000013	0.00032
23-Dec-15	19	500	495	8.1	15	#N/A	1.9	5.3	0.99	0.49	0.030	0.15	4.4	0.0059	0.00059	0.0078	0.0030	0.0000037	0.0000034	0.00062	0.0000022	1.1	0.000037	0.000011	0.00021
30-Dec-15	20	500	495	7.2	16	#N/A	0.65	4.7	0.99	0.50	0.030	0.15	4.3	0.0045	0.00054	0.0066	0.0030	0.0000035	0.0000035	0.00050	0.0000015	1.0	0.000015	0.0000084	0.00010
6-Jan-16	21	500	485	7.1	17	#N/A	0.84	4.5	0.97	0.49	0.030	0.15	4.3	0.0049	0.00059	0.0067	0.0030	0.0000034	0.0000034	0.00074	0.0000015	1.1	0.000015	0.0000052	0.00012
13-Jan-16	22	500	490	7.2	19	#N/A	0.87	5.0	0.98	0.49	0.029	0.15	4.4	0.0054	0.00064	0.0069	0.0030	0.0000034	0.0000034	0.00098	0.0000015	1.1	0.000015	0.0000020	0.00013
20-Jan-16	23	500	485	7.4	17	#N/A	1.2	4.6	0.97	0.49	0.029	0.15	4.3	0.0057	0.00064	0.0073	0.0030	0.0000034	0.0000034	0.00098	0.0000020	1.1	0.000015	0.0000049	0.00015
27-Jan-16	24	500	490	7.5	20	#N/A	1.4	5.3	0.98	0.49	0.029	0.15	4.3	0.0059	0.00064	0.0076	0.0029	0.0000034	0.0000034	0.00098	0.0000025	1.0	0.000015	0.0000078	0.00017
3-Feb-16	25	500	500	7.4	18	#N/A	1.7	5.1	1.0	0.49	0.030	0.15	4.5	0.0049	0.00067	0.0080	0.0029	0.0000034	0.0000034	0.00099	0.0000020	1.1	0.000015	0.0000096	0.00014
10-Feb-16	26	500	495	7.3	20	#N/A	0.98	5.4	0.99	0.50	0.030	0.15	4.6	0.0040	0.00069	0.0084	0.0028	0.0000035	0.0000035	0.00099	0.0000015	1.1	0.000015	0.000011	0.00012
17-Feb-16	27	500	490	7.6	15	#N/A	1.9	5.3	0.98	0.50	0.030	0.15	4.6	0.0051	0.00067	0.0081	0.0029	0.0000035	0.0000035	0.00100	0.0000015	1.1	0.000015	0.0000077	0.00057
24-Feb-16	28	500	500	7.4	17	#N/A	1.3	5.3	1.0	0.50	0.030	0.15	4.6	0.0063	0.00065	0.0079	0.0031	0.0000035	0.0000035	0.0010	0.0000015	1.1	0.000015	0.0000040	0.0010

Notes:

Values in grey italics are below the analytical detection limit

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for HC8 (KAM092488)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
12-Aug-15	0	500	410	7.6	0.021	0.00061	0.0049	2.3	0.012	*< 0.01*	0.0033	0.0018	0.025	3.7	0.00067	0.92	0.0000040	14	0.096	10	0.000017	0.0021	0.00063	0.024	0.00038	0.0070	*< 0.002*
19-Aug-15	1	500	505	7.5	0.013	0.000070	0.0019	1.6	0.013	*< 0.01*	0.0015	0.0011	*< 0.003*	2.4	0.00024	0.60	*< 0.000002*	5.2	0.062	4.1	0.0000070	*< 0.00001*	0.00015	0.017	0.00014	*< 0.001*	*< 0.002*
26-Aug-15	2	500	495	7.5	*< 0.007*	0.00014	0.0013	0.88	0.0082	*< 0.01*	0.0011	0.00060	*< 0.003*	1.6	0.00014	0.45	0.0000050	2.5	0.036	1.9	0.0000060	0.000020	*< 0.00005*	0.021	0.00012	*< 0.001*	*< 0.002*
2-Sep-15	3	500	500	7.5	*< 0.007*	0.000090	0.0012	0.84	0.0063	*< 0.01*	0.00074	0.00040	*< 0.003*	1.5	0.000080	0.43	0.0000020	1.7	0.033	1.5	0.0000050	*< 0.00001*	*< 0.00005*	0.022	0.00011	*< 0.001*	*< 0.002*
9-Sep-15	4	500	495	7.5	*< 0.007*	0.000020	0.00096	0.82	0.0056	*< 0.01*	0.0016	0.00030	*< 0.003*	1.3	0.000080	0.40	0.0000040	1.1	0.031	4.0	0.0000080	0.00010	*< 0.00005*	0.020	0.00011	*< 0.001*	*< 0.002*
16-Sep-15	5	500	495	7.4	*< 0.007*	0.000020	0.0012	0.80	0.0048	*< 0.01*	0.00037	*< 0.0001*	*< 0.003*	1.3	0.000060	0.45	0.0000020	0.81	0.030	1.3	*< 0.000005*	0.000050	*< 0.00005*	0.020	0.000090	*< 0.001*	*< 0.002*
23-Sep-15	6	500	495	7.4	*< 0.007*	*< 0.00001*	0.00088	0.89	0.0051	0.010	0.00037	0.00020	*< 0.003*	1.2	*< 0.00004*	0.43	0.0000070	0.56	0.033	0.50	*< 0.000005*	*< 0.00001*	0.000060	0.019	0.000090	*< 0.001*	*< 0.002*
30-Sep-15	7	500	490	7.4	*< 0.007*	0.000010	0.00077	0.89	0.0047	*< 0.01*	0.00032	0.00030	*< 0.003*	1.1	*< 0.00004*	0.32	*< 0.000002*	0.43	0.030	0.90	*< 0.000005*	0.000080	0.000060	0.018	0.000080	*< 0.001*	*< 0.002*
7-Oct-15	8	500	500	7.5	*< 0.007*	0.000010	0.00067	0.79	0.0046	*< 0.01*	0.00042	0.00020	*< 0.003*	0.92	*< 0.00004*	0.31	*< 0.000002*	0.25	0.029	0.50	*< 0.000005*	0.000050	0.000070	0.017	0.000080	*< 0.001*	*< 0.002*
14-Oct-15	9	500	490	7.6	*< 0.007*	0.000060	0.00071	0.81	0.0042	*< 0.01*	0.00043	0.00020	*< 0.003*	0.90	*< 0.00004*	0.36	*< 0.000002*	0.21	0.029	0.40	*< 0.000005*	0.000050	*< 0.00005*	0.018	0.000070	0.0010	*< 0.002*
21-Oct-15	10	500	495	7.5	*< 0.007*	0.000050	0.00072	0.94	0.0046	*< 0.01*	0.0014	0.00020	*< 0.003*	0.93	*< 0.00004*	0.39	0.000010	0.19	0.033	0.40	*< 0.000005*	0.00013	0.000050	0.020	0.000070	*< 0.001*	*< 0.002*
28-Oct-15	11	500	510	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nov-15	12	500	495	7.4	*< 0.007*	0.000010	0.00054	0.84	0.0045	0.020	0.00088	0.00020	0.0030	0.79	*< 0.00004*	0.30	*< 0.000002*	0.11	0.030	0.30	*< 0.000005*	0.000020	*< 0.00005*	0.019	0.000070	*< 0.001*	*< 0.002*
11-Nov-15	13	500	480	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Nov-15	14	500	505	7.5	0.0090	0.000010	0.00053	0.94	0.0053	*< 0.01*	0.00055	*< 0.0001*	*< 0.003*	0.74	0.00012	0.34	*< 0.000002*	0.090	0.034	0.10	*< 0.000005*	0.000030	0.000050	0.021	0.000050	*< 0.001*	*< 0.002*
25-Nov-15	15	500	475	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Dec-15	16	500	490	7.1	*< 0.007*	0.000060	0.00044	0.87	0.0049	*< 0.01*	0.00026	0.00020	*< 0.003*	0.64	*< 0.00004*	0.31	*< 0.000002*	0.050	0.029	0.70	*< 0.000005*	0.000040	*< 0.00005*	0.021	0.000070	*< 0.001*	*< 0.002*
9-Dec-15	17	500	495	7.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Dec-15	18	500	490	7.6	*< 0.007*	0.00023	0.00050	0.89	0.0054	*< 0.01*	0.00015	0.00020	*< 0.003*	0.61	*< 0.00004*	0.31	*< 0.000002*	0.060	0.032	0.20	*< 0.000005*	0.000080	*< 0.00005*	0.022	0.000080	0.0010	*< 0.002*
23-Dec-15	19	500	495	8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Dec-15	20	500	495	7.2	*< 0.007*	0.000050	0.00043	0.84	0.0054	0.010	0.00032	*< 0.0001*	*< 0.003*	0.50	*< 0.00004*	0.26	0.0000020	0.060	0.029	0.80	*< 0.000005*	*< 0.00001*	*< 0.00005*	0.019	0.000050	*< 0.001*	*< 0.002*
6-Jan-16	21	500	485	7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-16	22	500	490	7.2	*< 0.007*	0.000040	0.00035	0.84	0.0055	*< 0.01*	0.00016	*< 0.0001*	*< 0.003*	0.48	0.00013	0.27	*< 0.000002*	0.030	0.028	*< 0.1*	*< 0.000005*	0.000030	*< 0.00005*	0.019	0.000040	*< 0.001*	*< 0.002*
20-Jan-16	23	500	485	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jan-16	24	500	490	7.5	*< 0.007*	*< 0.00001*	0.00034	0.85	0.0060	*< 0.01*	0.000060	*< 0.0001*	*< 0.003*	0.43	*< 0.00004*	0.27	*< 0.000002*	0.050	0.029	0.10	*< 0.000005*	0.000040	*< 0.00005*	0.021	0.000060	*< 0.001*	*< 0.002*
3-Feb-16	25	500	500	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Feb-16	26	500	495	7.3	*< 0.007*	0.000010	0.00033	0.88	0.0066	*< 0.01*	0.00010	*< 0.0001*	*< 0.003*	0.40	0.000050	0.26	*< 0.000002*	0.050	0.030	0.70	*< 0.000005*	*< 0.00001*	*< 0.00005*	0.019	0.000030	*< 0.001*	*< 0.002*
17-Feb-16	27	500	490	7.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Feb-16	28	500	500	7.4	*< 0.007*	0.000020	0.00032	0.84	0.0059	0.030	0.00011	*< 0.0001*	*< 0.003*	0.36	*< 0.00004*	0.040	*< 0.000002*	*< 0.01*	0.027	0.50	*< 0.000005*	0.000070	*< 0.00005*	0.020	0.000020	*< 0.001*	*< 0.002*
2-Mar-16	29	500	500	7.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Mar-16	30	500	500	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Calculated Loading Rates for HC8 (KAM092488)

Date	Cycle	Volume (mL)		pH	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.	Input	Output		mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
12-Aug-15	0	500	410	7.6	0.0086	0.00025	0.0020	0.95	0.0048	0.0041	0.0014	0.00074	0.010	1.5	0.00027	0.38	0.0000016	5.5	0.039	4.2	0.0000070	0.00087	0.00026	0.0096	0.00016	0.0029	0.00082
19-Aug-15	1	500	505	7.5	0.0066	0.000035	0.00095	0.80	0.0066	0.0051	0.00075	0.00056	0.0015	1.2	0.00012	0.30	0.0000010	2.6	0.031	2.1	0.0000035	0.0000051	0.000076	0.0085	0.000071	0.00051	0.0010
26-Aug-15	2	500	495	7.5	0.0035	0.000069	0.00065	0.43	0.0040	0.0050	0.00052	0.00030	0.0015	0.81	0.000069	0.22	0.0000025	1.3	0.018	0.94	0.0000030	0.0000099	0.000025	0.010	0.000059	0.00050	0.00099
2-Sep-15	3	500	500	7.5	0.0035	0.000045	0.00058	0.42	0.0031	0.0050	0.00037	0.00020	0.0015	0.73	0.000040	0.22	0.0000010	0.83	0.016	0.75	0.0000025	0.0000050	0.000025	0.011	0.000055	0.00050	0.0010
9-Sep-15	4	500	495	7.5	0.0035	0.0000099	0.00048	0.41	0.0028	0.0050	0.00081	0.00015	0.0015	0.66	0.000040	0.20	0.0000020	0.54	0.015	2.0	0.0000040	0.000050	0.000025	0.010	0.000054	0.00050	0.00099
16-Sep-15	5	500	495	7.4	0.0035	0.0000099	0.00057	0.40	0.0024	0.0050	0.00018	0.000050	0.0015	0.65	0.000030	0.22	0.00000099	0.40	0.015	0.64	0.0000025	0.000025	0.000025	0.0097	0.000045	0.00050	0.00099
23-Sep-15	6	500	495	7.4	0.0035	0.0000050	0.00044	0.44	0.0025	0.0050	0.00018	0.000099	0.0015	0.58	0.000020	0.21	0.0000035	0.28	0.016	0.25	0.0000025	0.0000050	0.000030	0.0092	0.000045	0.00050	0.00099
30-Sep-15	7	500	490	7.4	0.0034	0.0000049	0.00038	0.44	0.0023	0.0049	0.00016	0.00015	0.0015	0.56	0.000020	0.16	0.00000098	0.21	0.015	0.44	0.0000025	0.000039	0.000029	0.0090	0.000039	0.00049	0.00098
7-Oct-15	8	500	500	7.5	0.0035	0.0000050	0.00034	0.40	0.0023	0.0050	0.00021	0.00010	0.0015	0.46	0.000020	0.16	0.0000010	0.13	0.015	0.25	0.0000025	0.000025	0.000035	0.0087	0.000040	0.00050	0.0010
14-Oct-15	9	500	490	7.6	0.0034	0.000029	0.00035	0.40	0.0021	0.0049	0.00021	0.000098	0.0015	0.44	0.000020	0.18	0.00000098	0.10	0.014	0.20	0.0000025	0.000025	0.000025	0.0090	0.000034	0.00049	0.00098
21-Oct-15	10	500	495	7.5	0.0035	0.000025	0.00035	0.46	0.0023	0.0050	0.00071	0.000099	0.0015	0.46	0.000020	0.19	0.0000050	0.094	0.016	0.20	0.0000025	0.000064	0.000025	0.0100	0.000035	0.00050	0.00099
28-Oct-15	11	500	510	7.7	0.0035	0.000015	0.00031	0.44	0.0022	0.0074	0.00057	0.000099	0.0015	0.42	0.000020	0.17	0.0000030	0.074	0.016	0.17	0.0000025	0.000037	0.000025	0.0097	0.000035	0.00050	0.00099
4-Nov-15	12	500	495	7.4	0.0035	0.0000050	0.00027	0.41	0.0022	0.0099	0.00044	0.000099	0.0015	0.39	0.000020	0.15	0.00000099	0.054	0.015	0.15	0.0000025	0.0000099	0.000025	0.0095	0.000035	0.00050	0.00099
11-Nov-15	13	500	480	7.4	0.0040	0.0000050	0.00027	0.44	0.0024	0.0075	0.00036	0.000075	0.0015	0.38	0.000040	0.16	0.0000010	0.050	0.016	0.100	0.0000025	0.000013	0.000025	0.0100	0.000030	0.00050	0.0010
18-Nov-15	14	500	505	7.5	0.0045	0.0000051	0.00027	0.47	0.0027	0.0051	0.00028	0.000051	0.0015	0.37	0.000061	0.17	0.0000010	0.045	0.017	0.051	0.0000025	0.000015	0.000025	0.011	0.000025	0.00051	0.0010
25-Nov-15	15	500	475	7.3	0.0040	0.000017	0.00024	0.45	0.0025	0.0050	0.00020	0.000074	0.0015	0.34	0.000040	0.16	0.00000100	0.035	0.016	0.20	0.0000025	0.000017	0.000025	0.010	0.000030	0.00050	0.00100
2-Dec-15	16	500	490	7.1	0.0034	0.000029	0.00021	0.43	0.0024	0.0049	0.00013	0.000098	0.0015	0.31	0.000020	0.15	0.00000098	0.025	0.014	0.34	0.0000025	0.000020	0.000025	0.010	0.000034	0.00049	0.00098
9-Dec-15	17	500	495	7.6	0.0034	0.000071	0.00023	0.43	0.0025	0.0049	0.00010	0.000098	0.0015	0.31	0.000020	0.15	0.00000098	0.027	0.015	0.22	0.0000025	0.000029	0.000025	0.010	0.000037	0.00049	0.00098
16-Dec-15	18	500	490	7.6	0.0034	0.00011	0.00025	0.44	0.0026	0.0049	0.000074	0.000098	0.0015	0.30	0.000020	0.15	0.00000098	0.029	0.016	0.098	0.0000025	0.000039	0.000025	0.011	0.000039	0.00049	0.00098
23-Dec-15	19	500	495	8.1	0.0034	0.000069	0.00023	0.43	0.0026	0.0049	0.00012	0.000074	0.0015	0.27	0.000020	0.14	0.00000099	0.030	0.015	0.25	0.0000025	0.000022	0.000025	0.0100	0.000032	0.00049	0.00099
30-Dec-15	20	500	495	7.2	0.0035	0.000025	0.00021	0.41	0.0026	0.0050	0.00016	0.000050	0.0015	0.25	0.000020	0.13	0.00000099	0.030	0.014	0.40	0.0000025	0.0000050	0.000025	0.0094	0.000025	0.00050	0.00099
6-Jan-16	21	500	485	7.1	0.0034	0.000022	0.00019	0.41	0.0027	0.0049	0.00012	0.000049	0.0015	0.24	0.000042	0.13	0.00000099	0.022	0.014	0.22	0.0000025	0.0000098	0.000025	0.0093	0.000022	0.00049	0.00099
13-Jan-16	22	500	490	7.2	0.0034	0.000020	0.00017	0.41	0.0027	0.0049	0.000078	0.000049	0.0015	0.24	0.000064	0.13	0.00000098	0.015	0.014	0.049	0.0000025	0.000015	0.000025	0.0093	0.000020	0.00049	0.00098
20-Jan-16	23	500	485	7.4	0.0034	0.000012	0.00017	0.41	0.0028	0.0049	0.000054	0.000049	0.0015	0.22	0.000042	0.13	0.00000098	0.020	0.014	0.049	0.0000025	0.000017	0.000025	0.0099	0.000025	0.00049	0.00098
27-Jan-16	24	500	490	7.5	0.0034	0.0000049	0.00017	0.42	0.0029	0.0049	0.000029	0.000049	0.0015	0.21	0.000020	0.13	0.00000098	0.025	0.014	0.049	0.0000025	0.000020	0.000025	0.010	0.000029	0.00049	0.00098
3-Feb-16	25	500	500	7.4	0.0034	0.0000049	0.00016	0.43	0.0031	0.0049	0.000039	0.000049	0.0015	0.20	0.000022	0.13	0.00000099	0.025	0.015	0.20	0.0000025	0.000012	0.000025	0.0099	0.000022	0.00049	0.00099
10-Feb-16	26	500	495	7.3	0.0035	0.0000050	0.00016	0.43	0.0033	0.0050	0.000050	0.000050	0.0015	0.20	0.000025	0.13	0.00000099	0.025	0.015	0.35	0.0000025	0.0000050	0.000025	0.0094	0.000015	0.00050	0.00099
17-Feb-16	27	500	490	7.6	0.0035	0.0000075	0.00016	0.43	0.0031	0.0100	0.000052	0.000050	0.0015	0.19	0.000022	0.074	0.00000100	0.015	0.014	0.30	0.0000025	0.000020	0.000025	0.0097	0.000012	0.00050	0.00100
24-Feb-16	28	500	500	7.4	0.0035	0.000010	0.00016	0.42	0.0029	0.015	0.000055	0.000050	0.0015	0.18	0.000020	0.020	0.0000010	0.0050	0.014	0.25	0.0000025	0.000035	0.000025	0.0099	0.000010	0.00050	0.0010

Notes:
Values in grey italics are below the analytical detection limit

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for Waste Rock Field Kinetic Tests

Sample ID		**FB-GO**				**FB-GT**				**FB-GS**				**FB-SO**				**FB-ST**				**FB-SS**				**FB-GGT**		**FB-GGS**	
Date Sampled		**17-Jun-14**	**25-Sep-14**	**4-Jun-15**	**22-Oct-15**	**17-Jun-14**	**6-Oct-14**	**4-Jun-15**	**22-Oct-15**	**17-Jun-14**	**6-Oct-14**	**4-Jun-15**	**22-Oct-15**	**17-Jun-14**	**25-Sep-14**	**4-Jun-15**	**22-Oct-15**	**17-Jun-14**	**25-Sep-14**	**4-Jun-15**	**22-Oct-15**	**17-Jun-14**	**25-Sep-14**	**4-Jun-15**	**22-Oct-15**	**17-Jun-15**	**22-Oct-15**	**17-Jun-15**	**22-Oct-15**
Weeks		**0**	**14**	**50**	**70**	**0**	**16**	**50**	**70**	**0**	**16**	**50**	**70**	**0**	**14**	**50**	**70**	**0**	**14**	**50**	**70**	**0**	**14**	**50**	**70**	**0**	**18**	**0**	**18**
Volume	L	4	0.55	8.2	5	4	1.5	3.8	4	4	1.5	8	4	4	2	7.8	4	4	2	6.2	3	4	2	7.8	3	1.5	5	4	6
Conductivity	uS/cm	1000	633	323	304	1100	1250	781	1230	1920	3310	1970	2110	2360	382	516	412	1130	1260	924	1200	1370	2810	1320	1710	991	1450	1530	1090
Hardness (as CaCO3)	mg/L	222		34.5	45.3	299	428	227	527	1160	2070	1090	1200	927	96	87.3	122	518	598	399	571	629		614	892	230	-	643	448
pH		7.8	8.19	8.34	8.18	7.68	8.06	8.04	7.89	7.61	7.66	7.94	7.97	7.86	7.68	8.19	8.13	7.77	7.75	8.02	7.88	7.65	7.81	8.07	8.08	7.94	6.43	8.27	7.69
TDS	mg/L	978		234	211	734	963	552	909	2060	3540	1730	1750	2380	294	330	265	874	1040	677	909	1300		1030	1350	758	1110	1210	785
Anions and Nutrients																													
T-Alkalinity (as CaCO3)	mg/L	339	148	114	75.6	243	91	69	62.7	251	97.4	61.8	75.7	499	41	88.9	84.5	118	45.6	70.1	50.7	294	146	78.6	91.4	123	1.2	227	41.4
T-Ammonia-N	mg/L	0.0261		0.01	*< 0.005*	0.0086	0.0254	0.0097	*< 0.005*	0.167	0.0117	0.0366	*< 0.005*	0.166	*< 0.005*	*< 0.005*	*< 0.005*	0.0444	*< 0.005*	*< 0.005*	*< 0.005*	0.293		0.0211	-	1.58	0.725	0.417	0.185
Nitrate-N	mg/L	3.62	0.0839	0.0081	0.218	0.431	*< 0.05*	*< 0.005*	0.041	2.43	1.53	0.722	1.08	3.15	*< 0.005*	*< 0.005*	*< 0.005*	0.97	*< 0.05*	*< 0.005*	0.26	0.947	*< 0.1*	*< 0.025*	0.025 *	1.23	0.015	0.403	0.066
Nitrite-N	mg/L	0.141		*< 0.001*	0.0011	0.023		0.0012	0.0020 *	0.045		*< 0.01*	0.0050 *	0.219		*< 0.001*	*< 0.001*	0.014		*< 0.001*	0.0020 *	0.013		*< 0.005*	0.0050 *	0.165	0.0020 *	0.0296	0.0698
Br	mg/L	*< 0.5*		*< 0.05*	*< 0.05*	*< 0.5*		*< 0.1*	*< 0.25*	*< 1*		*< 0.5*	*< 0.5*	*< 1*		*< 0.05*	*< 0.05*	*< 0.5*		*< 0.1*	*< 0.25*	*< 0.5*		*< 0.25*	*< 0.25*	*< 0.1*	*< 0.25*	*< 0.25*	*< 0.25*
Cl	mg/L	44.2	13.5	2.34	2.37	19.6	12.8	5.29	5.4	17	17	*< 5*	2.8	68	5.94	3.82	2.89	15	5.5	1.68	4.4	23.6	24	3.8	6.9	26.4	6	24.4	5
F	mg/L	0.7		0.581	0.868	0.51		0.373	0.345	*< 0.4*		0.43	0.19	0.69		0.471	0.52	0.5		0.409	0.217	0.83		0.36	0.25	*< 0.2*	0.095	*< 0.8*	0.861
S(6)	mg/L	109	150	51.8	63.9	301	572	310	570	1060	2280	1120	1180	732	133	158	109	516	633	416	575	451	1660	679	882	317	708	597	497
Cyanides																													
WAD Cyanide	mg/L	-	-	-	-	-	0.005	-	-	-	0.005	-	-	-	0.005	-	-	-	0.0148	-	-	-	-	-	-	-	-	-	-
T-Cyanide	mg/L	-	-	-	-	-	0.005	-	-	-	0.005	-	-	-	0.005	-	-	-	0.016	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																													
DOC	mg/L	147	-	-	6.61	54	9.5	-	7.13	109	8.23	-	2.7	350	27.2	-	5.41	45.6	15.9	-	-	161	-	-	-	-	4.68	-	3.27
Total Metals																													
Al	mg/L	-	-	-	-	-	0.155	-	-	-	0.0252	-	-	-	0.198	-	-	-	0.128	-	-	-	-	-	-	-	-	-	-
Sb	mg/L	-	-	-	-	-	0.0103	-	-	-	0.0123	-	-	-	0.00336	-	-	-	0.00152	-	-	-	-	-	-	-	-	-	-
As	mg/L	-	-	-	-	-	0.0487	-	-	-	0.0147	-	-	-	0.0229	-	-	-	0.00301	-	-	-	-	-	-	-	-	-	-
Ba	mg/L	-	-	-	-	-	0.037	-	-	-	*< 0.02*	-	-	-	0.058	-	-	-	0.033	-	-	-	-	-	-	-	-	-	-
Be	mg/L	-	-	-	-	-	*< 0.001*	-	-	-	*< 0.001*	-	-	-	*< 0.001*	-	-	-	*< 0.001*	-	-	-	-	-	-	-	-	-	-
B	mg/L	-	-	-	-	-	*< 0.1*	-	-	-	*< 0.1*	-	-	-	*< 0.1*	-	-	-	*< 0.1*	-	-	-	-	-	-	-	-	-	-
Cd	mg/L	-	-	-	-	-	0.000015	-	-	-	*< 2E-05*	-	-	-	0.000041	-	-	-	0.000021	-	-	-	-	-	-	-	-	-	-
Ca	mg/L	-	-	-	-	-	96.3	-	-	-	376	-	-	-	22.9	-	-	-	124	-	-	-	-	-	-	-	-	-	-
Cr	mg/L	-	-	-	-	-	*< 0.001*	-	-	-	*< 0.001*	-	-	-	0.0019	-	-	-	0.0012	-	-	-	-	-	-	-	-	-	-
Co	mg/L	-	-	-	-	-	0.00071	-	-	-	0.00144	-	-	-	0.00116	-	-	-	0.00046	-	-	-	-	-	-	-	-	-	-
Cu	mg/L	-	-	-	-	-	0.0027	-	-	-	0.0023	-	-	-	0.004	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-
Fe	mg/L	-	-	-	-	-	0.236	-	-	-	0.032	-	-	-	1.07	-	-	-	0.206	-	-	-	-	-	-	-	-	-	-
Pb	mg/L	-	-	-	-	-	*< 0.0005*	-	-	-	*< 0.0005*	-	-	-	0.00307	-	-	-	0.00114	-	-	-	-	-	-	-	-	-	-
Li	mg/L	-	-	-	-	-	0.0058	-	-	-	0.0125	-	-	-	*< 0.005*	-	-	-	0.012	-	-	-	-	-	-	-	-	-	-
Mg	mg/L	-	-	-	-	-	43.9	-	-	-	265	-	-	-	9.02	-	-	-	67.7	-	-	-	-	-	-	-	-	-	-
Mn	mg/L	-	-	-	-	-	0.0259	-	-	-	0.0449	-	-	-	0.118	-	-	-	0.0406	-	-	-	-	-	-	-	-	-	-
Hg	mg/L	0.000261	-	-	-	0.000211	0.000016	-	-	*< 0.00005*	*< 1E-05*	-	-	0.000365	0.000189	-	-	*< 0.00005*	*< 0.00001*	-	-	*< 0.00005*	-	-	-	-	-	-	-
Mo	mg/L	-	-	-	-	-	0.0512	-	-	-	0.0169	-	-	-	0.0014	-	-	-	0.0156	-	-	-	-	-	-	-	-	-	-
Ni	mg/L	-	-	-	-	-	0.0014	-	-	-	0.008	-	-	-	0.0019	-	-	-	0.0029	-	-	-	-	-	-	-	-	-	-
K	mg/L	-	-	-	-	-	22.1	-	-	-	28	-	-	-	4.4	-	-	-	15.5	-	-	-	-	-	-	-	-	-	-
Se	mg/L	-	-	-	-	-	0.00216	-	-	-	0.00625	-	-	-	0.00109	-	-	-	0.00695	-	-	-	-	-	-	-	-	-	-
Ag	mg/L	-	-	-	-	-	*< 2E-05*	-	-	-	*< 2E-05*	-	-	-	*< 0.00002*	-	-	-	*< 0.00002*	-	-	-	-	-	-	-	-	-	-
Na	mg/L	-	-	-	-	-	120	-	-	-	165	-	-	-	39.9	-	-	-	63	-	-	-	-	-	-	-	-	-	-
Tl	mg/L	-	-	-	-	-	0.00029	-	-	-	*< 0.0002*	-	-	-	*< 0.0002*	-	-	-	*< 0.0002*	-	-	-	-	-	-	-	-	-	-
Sn	mg/L	-	-	-	-	-	*< 0.0005*	-	-	-	*< 0.0005*	-	-	-	*< 0.0005*	-	-	-	*< 0.0005*	-	-	-	-	-	-	-	-	-	-
Ti	mg/L	-	-	-	-	-	0.019	-	-	-	0.03	-	-	-	*< 0.01*	-	-	-	0.025	-	-	-	-	-	-	-	-	-	-
U	mg/L	-	-	-	-	-	0.601	-	-	-	0.773	-	-	-	0.00394	-	-	-	0.0647	-	-	-	-	-	-	-	-	-	-
V	mg/L	-	-	-	-	-	*< 0.001*	-	-	-	*< 0.002*	-	-	-	0.0015	-	-	-	*< 0.001*	-	-	-	-	-	-	-	-	-	-
Zn	mg/L	-	-	-	-	-	0.0116	-	-	-	*< 0.005*	-	-	-	0.557	-	-	-	0.216	-	-	-	-	-	-	-	-	-	-

Appendix D.1-3: Leachate Concentrations and Calculated Loading Rates for Kinetic Tests
Leachate Concentrations for Waste Rock Field Kinetic Tests

Sample ID		FB-GO				FB-GT				FB-GS				FB-SO				FB-ST				FB-SS				FB-GGT		FB-GGS	
Dissolved Metals																													
Al	mg/L	0.008	0.006	0.017	0.0479	0.009	0.005	0.003	0.0049	0.009	0.005	0.002	0.0091	0.006	0.024	0.003	0.003	0.011	0.014	0.003	0.0023	0.013	< 0.005	0.002	0.0037	0.012	0.0284	0.006	0.0037
Sb	mg/L	0.008	0.004	0.004	0.0041	0.018	0.01	0.01	0.00727	0.017	0.012	0.012	0.0102	0.009	0.001	0.003	0.00296	0.002	0.001	0.002	0.0013	0.059	0.043	0.041	0.0248	0.016	0.00887	0.009	0.0073
As	mg/L	0.047	0.032	0.041	0.0663	0.088	0.045	0.043	0.0354	0.066	0.015	0.013	0.0117	0.031	0.004	0.01	0.00915	0.013	0.003	0.003	0.00215	0.088	0.019	0.014	0.00924	0.639	0.154	0.126	0.0806
Ba	mg/L	0.107	0.044	0.015	0.0289	0.077	0.03	0.02	0.0262	0.049	< 0.02	0.011	0.0294	0.089	0.03	0.013	0.0541	0.052	0.029	0.023	0.0336	0.055	0.025	0.015	0.0229	0.049	0.0266	0.083	0.03
Be	mg/L	< 0.0001	< 0.001	< 0.00002	< 0.00002	< 0.0001	< 0.001	< 0.00002	< 0.00002	< 0.0001	< 0.001	< 0.00002	< 0.00002	< 0.0001	< 0.001	< 0.00002	< 0.00002	< 0.0001	< 0.001	< 0.00002	< 0.00002	< 0.0001	< 0.001	< 0.00002	< 0.00002	0	0.00014	< 0.00002	< 0.00002
Bi	mg/L	< 0.0005	-	< 0.00005	< 0.00005	< 0.0005	-	< 0.00005	< 0.00005	< 0.0005	-	< 0.00005	< 0.00005	< 0.0005	-	< 0.00005	< 0.00005	< 0.0005	-	< 0.00005	< 0.00005	< 0.0005	-	< 0.00005	< 0.00005	< 0.00005	0.00025 *	< 0.00005	< 0.00005
B	mg/L	0.077	< 0.1	0.023	0.02	0.068	< 0.1	0.026	0.021	0.036	< 0.1	0.022	0.038	0.044	< 0.1	0.012	< 0.01	0.035	< 0.1	0.029	0.021	0.033	< 0.1	0.018	0.015	0.225	0.171	0.105	0.064
Cd	mg/L	< 0.00002	< 0.00001	< 5E-06	< 5E-06	< 0.00002	0.000014	< 5E-06	0.0000185	0.000012	< 2E-05	< 5E-06	0.0000073	0.000013	0.000023	< 5E-06	0.0000061	< 0.00001	0.000021	< 5E-06	0.0000134	0.000011	< 0.00002	< 5E-06	< 5E-06	0.000111	0.000201	0.000091	0.0000728
Ca	mg/L	55.7	26.3	7.92	11.6	67.6	97.4	46.3	122	218	384	194	239	215	23.3	15.4	28.4	112	127	79	124	118	271	104	168	66.5	139	187	140
Cr	mg/L	0.001	0.002	0	0.00332	0	< 0.001	< 0.0001	0.00022	< 0.0001	< 0.001	0	< 0.0001	0.002	< 0.001	0.001	0.00229	< 0.0001	< 0.001	0	0.00052	0	< 0.001	< 0.0001	< 0.0001	< 0.0001	0.00050 *	< 0.0001	< 0.0001
Co	mg/L	0.001	< 0.0003	0	0.00016	0.001	0.001	0	0.00029	0.002	0.001	0	0.00035	0.001	0.001	< 0.0001	0.00012	0.001	0	0	0.00018	0.002	0.004	0.001	0.00114	0.021	0.0739	0.029	0.00535
Cu	mg/L	0.007	0.003	0.001	0.00216	0.01	0.002	0.001	0.00178	0.007	0.002	0.001	0.00126	0.006	0.003	0.001	0.00063	0.006	0.002	0.001	0.00087	0.011	0.003	0.001	0.00096	0.001	0.0011	0.003	0.00048
Fe	mg/L	< 0.01	< 0.03	< 0.01	0.044	< 0.01	< 0.03	< 0.01	< 0.01	< 0.01	< 0.03	< 0.01	< 0.01	< 0.01	0.07	< 0.01	< 0.01	< 0.01	0.03	< 0.01	< 0.01	< 0.01	< 0.03	< 0.01	< 0.01	< 0.01	0.013	< 0.01	< 0.01
Pb	mg/L	< 0.00005	< 0.0005	< 0.00005	0.000155	< 0.00005	< 0.0005	< 0.00005	0.000085	< 0.00005	< 0.0005	< 0.00005	< 0.00005	< 0.00005	0.00084	< 0.00005	0.000126	< 0.00005	0.00067	< 0.00005	0.000053	< 0.00005	< 0.0005	< 0.00005	< 0.00005	< 0.00005	< 0.00025	0.000053	< 0.00005
Li	mg/L	0.017	< 0.005	0.002	< 0.001	0.024	0.006	0.005	0.0034	0.023	0.012	0.008	0.0072	0.04	< 0.005	0.005	0.003	0.026	0.012	0.014	0.0115	0.025	0.015	0.011	0.009	0.028	0.0315	0.072	0.0184
Mg	mg/L	20.2	9.45	3.58	3.98	31.5	44.8	26.9	54	150	270	147	146	95	9.16	11.8	12.3	57.9	67.9	49	63.4	81.4	195	85.7	115	15.5	32.1	42.4	23.8
Mn	mg/L	0.027	0.007	0	0.00583	0.065	0.016	0.001	0.00753	0.141	0.044	0.006	0.0131	0.036	0.096	0.001	0.0114	0.049	0.036	0.002	0.0195	0.053	0.149	0.014	0.0527	3.73	24.8	3.73	3.09
Hg	mg/L	0.000232	0.000021	0.000008	0.000011	0.000195	< 1E-05	< 5E-06	0.000007	0.00002	< 1E-05	< 5E-06	< 5E-06	0.000309	0.000059	0.000009	0.0000052	0.000019	< 0.00001	< 5E-06	< 5E-06	< 0.00001	< 0.00001	< 5E-06	< 5E-06	0.000046	< 5E-06	< 5E-06	< 5E-06
Mo	mg/L	0.036	0.056	0.058	0.155	0.044	0.049	0.046	0.049	0.017	0.016	0.013	0.023	0.004	0.001	0.005	0.0059	0.023	0.015	0.022	0.0162	0.012	0.017	0.008	0.00719	0.001	0.00045	0.02	0.0195
Ni	mg/L	0.004	0.001	< 0.0005	< 0.0005	0.007	0.001	0.001	0.00071	0.011	0.008	0.004	0.00284	0.005	< 0.001	< 0.0005	< 0.0005	0.012	0.002	0.001	0.00131	0.063	0.058	0.021	0.0153	0.005	0.02	0.003	0.00068
P	mg/L	< 0.05	-	< 0.05	< 0.05	< 0.05	-	< 0.05	< 0.05	< 0.05	-	< 0.05	< 0.05	< 0.05	-	< 0.05	< 0.05	< 0.05	-	< 0.05	< 0.05	< 0.05	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
K	mg/L	20.1	8	5.1	5.64	30.8	22.3	16.6	21.6	29.2	28.6	19	22.3	30.3	4.5	6.7	6.53	21.1	15.9	16.1	18.5	40.8	40.9	26.6	32.9	28.3	40.6	44.6	25.6
Se	mg/L	0.005	0.002	0	0.00033	0.004	0.002	0.001	0.000441	0.005	0.006	0.001	0.000603	0.008	0.001	0.001	0.000314	0.013	0.007	0.002	0.00236	0.005	0.006	0.001	0.000487	0.001	0.00049	0.001	0.000186
Si	mg/L	7.1	-	4.1	4.48	5.5	-	3.67	3.36	4.83	-	2.93	3.01	6.17	-	3.12	2.93	4.61	-	3.85	2.74	3.72	-	2.09	1.52	16.4	19.9	7.89	6.78
Ag	mg/L	< 0.00001	< 0.00002	< 0.00001	< 0.00001	< 0.00001	< 2E-05	< 0.00001	< 0.00001	< 0.00001	< 2E-05	< 0.00001	< 0.00001	< 0.00001	< 0.00002	< 0.00001	< 0.00001	< 0.00001	< 0.00002	< 0.00001	< 0.00001	0	< 0.00002	< 0.00001	< 0.00001	< 0.00001	< 0.00005	< 0.00001	< 0.00001
Na	mg/L	142	98.2	56.2	43.6	118	120	74.1	71.3	104	168	83.7	70	241	41	71.3	38.5	68.2	64.7	52.1	49.8	95.5	148	64.3	60.7	105	94.5	89.4	59.3
Sr	mg/L	0.291	-	0.046	0.0609	0.374	-	0.258	0.578	1.67	-	1.49	1.72	1.27	-	0.127	0.183	3.04	-	3.67	7.37	4.01	-	5.92	9.87	0.259	0.498	0.586	0.318
Tl	mg/L	0	< 0.0002	0	0.000018	0	0	0	0.000157	0	< 0.0002	0	0.000054	0	< 0.0002	0	0.000066	0	< 0.0002	0	0.000014	0	< 0.0002	0	0.00005	0	0.000362	0	0.000063
Sn	mg/L	< 0.0001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0001	< 0.0001	0	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0001	< 0.0001	0	< 0.0005	< 0.0001	< 0.0001
Ti	mg/L	< 0.01	< 0.01	< 0.0003	0.00104	< 0.01	0.017	< 0.0003	< 0.0003	< 0.01	0.028	< 0.0003	< 0.0003	< 0.01	< 0.01	< 0.0003	< 0.0003	< 0.01	0.019	< 0.0003	< 0.0003	< 0.01	0.026	< 0.0003	< 0.0003	< 0.0003	< 0.0015	< 0.0003	< 0.0003
U	mg/L	0.133	0.164	0.075	0.0674	0.439	0.591	0.39	0.572	0.402	0.752	0.433	0.491	0.032	0.004	0.005	0.00624	0.047	0.064	0.044	0.0454	0.132	0.573	0.223	0.245	0.006	0.000797	0.526	0.123
V	mg/L	< 0.001	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.002	< 0.0005	< 0.0005	< 0.001	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.001	< 0.0005	< 0.0005	0.001	< 0.002	< 0.0005	< 0.0005	< 0.0005	< 0.0025	< 0.0005	< 0.0005
Zn	mg/L	0.004	0.019	< 0.001	0.0091	0.005	0.01	0.005	0.105	0.001	< 0.005	0.002	0.0762	0.003	0.56	0.024	0.152	< 0.001	0.214	0.03	0.107	0.002	0.012	0.001	0.0878	0.141	0.247	0.007	0.0075
Radioisotopes																													
Ra-226	Bq/L	-	-	0.026	0.026	-	-	0.026	0.026	-	-	0.06	0.057	-	-	<0.0100	0.011	-	-	0.025	0.023	-	-	0.016	0.028	-	0.028	0.39	0.099

Notes:
Values in grey italics are below the analytical detection limit

Appendix D.1-4: Shake Flask Extraction Results for Waste Rock Kinetic Test Samples

Sample ID	Kinetic Test IDs	Volume Nanopure Water	Sample Weight	pH	Redox	Conductivity	Acidity (to pH 4.5)	Total Acidity (to pH 8.3)	Alkalinity	Sulphate
				meter	meter	meter	titration	titration	titration	Turbidity
		mL	g		mV	uS/cm	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L
GO	FB-GO, Col 5	750	250	7.88	384.27	101.19	#N/A	2.35	47.85	3
GS	FB-GS, HC3	750	250	7.84	375	198.51	#N/A	2.61	44.06	36
GT	FB-GT, Col6, HC3	750	250	7.76	381.34	89.22	#N/A	2.59	35.63	5
SO	FB-SO, Col3	750	250	7.96	371.58	142.46	#N/A	2.33	52.46	12
SS	FB-SS, HC2	750	250	7.98	368.65	156.94	#N/A	2.29	54.15	14
ST	FB-ST, HC1, Col 3	750	250	7.98	372.07	196.53	#N/A	2.3	47.91	36
KAM036824	HC7	750	250	7.65	364.74	204.91	#N/A	3.05	39.83	60
OKY Master	Col 13, HC5, FB-GGT	750	250	7.49	292.96	41.26	#N/A	2.63	9.69	6
OKY Master Sulphide	Col 14, HC6, FB-GGS	750	250	7.55	294.92	98.09	#N/A	3.02	34.85	11
KAM092488	HC8- No SFE performed due to limited sample size									

Appendix D.1-4: Shake Flask Extraction Results for Waste Rock Kinetic Test Samples

Sample ID	Ion Balance	Major Anions	Major Cations	Difference	Balance (%)	Dissolved Metals	Hardness CaCO3	Aluminum Al	Antimony Sb	Arsenic As	Barium Ba	Beryllium Be	Bismuth Bi
		Calc	Calc	Calc	Calc			ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
		meq/L	meq/L	meq/L	%		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
GO		1.0195	1.022534239	-0.003034239	-0.001485891		24.2	0.119	0.0039	0.0615	0.027	< 0.000007	< 0.000007
GS		1.6312	1.87800014	-0.24680014	-0.070329457		72.2	0.072	0.0076	0.0379	0.0324	< 0.000007	< 0.000007
GT		0.816766667	0.871236699	-0.054470032	-0.032268912		28.4	0.155	0.0038	0.0757	0.0999	< 0.000007	< 0.000007
SO		1.2992	1.4093294	-0.1101294	-0.040660219		48	0.0541	0.0086	0.0257	0.0906	< 0.000007	< 0.000007
SS		1.374666667	1.534757719	-0.160091052	-0.055024991		51.8	0.115	0.0297	0.0674	0.113	< 0.000007	< 0.000007
ST		1.7082	1.829127954	-0.120927954	-0.034186243		61	0.053	0.0016	0.0157	0.0759	< 0.000007	< 0.000007
KAM036824		2.0466	1.913945841	0.132654159	0.033493908		77.5	0.105	0.0221	0.0655	0.0232	0.000008	< 0.000007
OKY Master		0.321219355	0.403744358	-0.082525003	-0.113833288		0.89	0.183	0.0071	0.167	0.00162	0.000012	< 0.000007
OKY Master Sulphide		0.927424731	0.933909099	-0.006484368	-0.003483721		25.1	0.108	0.003	0.0423	0.0077	0.000008	< 0.000007
KAM092488													

Appendix D.1-4: Shake Flask Extraction Results for Waste Rock Kinetic Test Samples

Sample ID	Boron B	Cadmium Cd	Calcium Ca	Chromium Cr	Cobalt Co	Copper Cu	Iron Fe	Lead Pb	Lithium Li	Magnesium Mg	Manganese Mn	Mercury Hg	Molybdenum Mo	Nickel Ni
	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L
GO	0.0173	0.000009	6.96	0.00025	0.000099	0.0017	0.033	0.00005	0.00156	1.65	0.0022	0.02	0.0146	0.0009
GS	0.0081	0.000006	16.3	< 0.00003	0.000072	0.00109	< 0.002	< 0.00001	0.00292	7.67	0.0092	< 0.01	0.00359	0.0006
GT	0.0095	0.000007	7.5	< 0.00003	0.000091	0.00114	0.012	0.00003	0.00164	2.36	0.0036	0.01	0.00709	0.0007
SO	0.0095	0.000004	13.9	0.00027	0.000079	0.00094	0.006	0.00001	0.00283	3.23	0.0019	0.02	0.00494	0.0006
SS	0.0086	0.000004	11.5	0.00009	0.000077	0.00126	0.004	0.00002	0.00324	5.6	0.0049	< 0.01	0.00149	0.0024
ST	0.0132	0.000004	15.2	0.00017	0.000115	0.00203	0.01	0.00001	0.00363	5.6	0.0041	< 0.01	0.0076	0.0022
KAM036824	0.0093	< 0.000003	18.4	0.00017	0.000587	0.00085	0.024	0.0001	0.00337	7.64	0.0233	< 0.01	0.00063	0.0067
OKY Master	0.0246	0.000005	0.24	0.00005	0.00009	0.00162	0.103	0.00075	0.00281	0.069	0.0215	0.01	0.00282	< 0.0001
OKY Master Sulphide	0.021	< 0.000003	7.82	0.00004	0.000122	0.00074	0.033	0.0001	0.00744	1.35	0.0814	< 0.01	0.00513	< 0.0001
KAM092488														

Appendix D.1-4: Shake Flask Extraction Results for Waste Rock Kinetic Test Samples

Sample ID	Phosphorus P	Potassium K	Selenium Se	Silicon Si	Silver Ag	Sodium Na	Strontium Sr	Sulphur (S)	Thallium Tl	Tin Sn	Titanium Ti	Uranium U	Vanadium V	Zinc Zn	Zirconium Zr
	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
	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
GO	0.044	3.51	0.00012	3.97	< 0.000002	9.83	0.0345	1.26	0.000026	0.00009	0.00091	0.0106	0.00079	< 0.001	< 0.002
GS	< 0.009	5.73	0.00007	2.59	< 0.000002	6.35	0.119	16.5	0.00002	0.00003	0.00012	0.0101	0.00083	0.001	< 0.002
GT	0.018	3.65	0.00014	2.4	< 0.000002	4.42	0.0504	3.01	0.000087	0.0001	0.0003	0.0108	0.00053	< 0.001	< 0.002
SO	< 0.009	3.67	0.00026	2.82	< 0.000002	8.05	0.0803	5.63	0.000071	0.00007	0.00021	0.00125	0.00028	< 0.001	< 0.002
SS	< 0.009	8.23	0.00021	2.2	< 0.000002	5.97	0.68	6.98	0.000022	0.00007	0.00039	0.0072	0.00304	< 0.001	< 0.002
ST	< 0.009	6.54	0.00075	3.45	< 0.000002	9.55	0.936	15.1	0.00002	0.00005	0.00064	0.00453	0.00098	0.001	< 0.002
KAM036824	< 0.003	4.68	0.0001	1.19	0.000033	5.26	0.0945	19.3	0.000038	0.00004	0.00039	0.00766	0.00102	< 0.001	< 0.002
OKY Master	0.025	3.98	< 0.001	7.14	0.000003	5.79	0.00119	2.5	0.000033	0.00004	0.00327	0.000469	0.00037	0.001	< 0.002
OKY Master Sulphide	0.013	6.16	< 0.001	5.26	0.000002	5.97	0.0185	3.9	0.000044	< 0.00001	0.0011	0.00191	0.00103	< 0.001	< 0.002
KAM092488															

Appendix D.2: Kinetic Test Results for Ore

Appendix D.2-1: Overview of Operating Procedures for the Coffee Gold Mine Ore Kinetic Tests

Kinetic Test ID	Test Sample ID	Sample Description	Type of Test	Lithology	Weathering Facies	Column Dimensions		Dry Wt. of Sample (kg)	Temp (°C)	Operation Procedure	Sampling Frequency	Total Volume of Initial Flushings (mL)	Flushing Rate/ Weekly Input* (mL)	Start Date	Test Status	Cycles/ Weeks
						Inner Diameter (cm)	Length (cm)									
Col 7	72139B	Kona Oxide Ore	Unsaturated Column	Granite	Oxide	21.0	20.5	4.39	4°	Trickle Leach	Biweekly	750	variable	22-Apr-15	active	45
Col 8	72140B	Kona Transition Ore	Unsaturated Column	Granite	Transition	21.0	20.5	4.35	4°	Trickle Leach	Biweekly	700	variable	22-Apr-15	active	45
Col 9	50% 72135B, 50% 72136B	Latte Oxide Ore	Unsaturated Column	Schist	Oxide	21.0	20.5	5	4°	Trickle Leach	Biweekly	700	variable	22-Apr-15	active	45
Col 10	50% 72137B, 50% 72138B	Latte Transition Ore	Unsaturated Column	Schist	Transition	21.0	20.5	5	4°	Trickle Leach	Biweekly	700	variable	22-Apr-15	active	45
Col 11	50% 72144B, 50% 72145B	Supremo Oxide Ore	Unsaturated Column	Gneiss	Oxide	21.0	20.5	5	4°	Trickle Leach	Biweekly	700	variable	22-Apr-15	active	45
Col 12	72146B	Supremo Transition Ore	Unsaturated Column	Gneiss	Transition	21.0	20.5	4.33	4°	Trickle Leach	Biweekly	750	variable	22-Apr-15	active	45

Notes:
Columns and humidity cells are composed of Plexiglas with an acrylic perforated disk & nylon mesh
No sample preparation was conducted prior to leachate sampling for any tests
* generally 400-500 mL, see individual leachate results in Appendix D.2-3 for specific input volumes

Appendix D.2-2 Static Test Results for Ore Kinetic Test Samples

Acid-Base Accounting Results

Kinetic Tests	Description	Test Sample ID	Lithology	Weathering Facies	Rinse pH	Paste pH	TIC	CaNP	Total C	Total S	S(SO4)	S(S-2)	Insoluble S	AP	Sobek NP	Siderite NP	Sobek NNP	Siderite NNP	Fizz Test
					s.u.	s.u.	%	kg $CaCO_3$/t	%	%	%	%	%	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	
				Method Code	*Sobek*	*Sobek*	*CSB02V*	*Calc.*	*CSA06V*	*CSA06V*	*CSA07V*	*CSA08D*	*Calc.*	*Calc.*	*Sobek*	*Siderite Corr.*	*Calc.*	*Calc.*	*Sobek*
				Limit of Detection	*0.20*	*0.20*	*0.01*	*#N/A*	*0.005*	*0.005*	*0.01*	*0.01*	*#N/A*	*#N/A*	*0.5*	*0.5*	*#N/A*	*#N/A*	*#N/A*
Col 7	Kona Oxide	72139B	Granite	Oxide	5.7	5.9	0.020	1.7	0.024	0.027	*<0.01*	0.010	0.017	0.31	0.73	7.1	0.41	6.8	none
Col 8	Kona 80% CN	72140B	Granite	Transition	4.4	4.9	0.020	1.7	0.039	0.15	0.020	0.11	0.021	3.4	0.48	7.0	-3.0	3.6	none
Col 9	Latte Oxide Ore	50% 72135B, 50% 72136B	Schist	Oxide	7.4	7.5	1.5	125	1.6	0.14	0.035	0.090	0.017	2.8	79	105	76	102	moderate
Col 10	Latte Transition Ore	50% 72137B, 50% 72138B	Schist	Transition	7.4	7.4	1.8	148	1.8	0.54	0.050	0.44	0.052	14	100	129	86	115	moderate
Col 11	Supremo Oxide Ore	50% 72144B, 50% 72145B	Gneiss	Oxide	7.4	7.3	0.060	5.0	0.082	0.024	*<0.01*	*<0.01*	0.024	0.31	8.5	15	8.5	15	none
Col 12	Supremo 80%	72146B	Gneiss	Transition	7.3	7.5	0.40	33	0.44	0.13	0.020	0.090	0.018	2.8	38	44	35	42	slight

Notes:
Values in grey italics are below the analytical detection limit
CaNP = carbonate NP calculated from total inorganic carbon (TIC)
NNP = net neutralization potential, derived by subtracting acid potential (AP) from NP

Appendix D.2-2 Static Test Results for Ore Kinetic Test Samples

Solid Phase Elements by Aqua Regia Digestion

Kinetic Tests	Description	Test Sample ID	Lithology	Weathering Facies	Ag	Al	As	B	Ba	Be	Bi	Ca	Flushing Rate/ Weekly Input* (mL)	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hf	Hg	In	K	La	Li	Lu	Mg	Mn
					ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	%	ppm
				Method Code	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*
				Limit of Detection	*0.01*	*0.01*	*1*	*10*	*5*	*0.1*	*0.02*	*0.01*	*0.01*	*0.05*	*0.1*	*1*	*0.05*	*0.5*	*0.01*	*0.1*	*0.1*	*0.05*	*0.01*	*0.02*	*0.01*	*0.1*	*1*	*0.01*	*0.01*	*2*
Col 7	Kona Oxide	72139B	Granite	Oxide	0.080	0.41	3080	*<10*	64	0.50	0.080	0.050	0.060	26	1.2	77	1.5	0.80	1.3	1.4	*<0.1*	0.32	0.83	*<0.02*	0.13	15	*<1*	0.13	0.020	114
Col 8	Kona 80% CN	72140B	Granite	Transition	0.090	0.34	5770	*<10*	44	0.40	0.10	0.050	0.040	24	1.9	76	1.4	3.8	1.5	1.2	*<0.1*	0.27	4.0	*<0.02*	0.12	14	*<1*	0.11	0.010	217
Col 9	Latte Oxide Ore	50% 72135B, 50% 72136B	Schist	Oxide	0.25	0.44	1265	*<10*	548	1.1	0.52	3.9	0.10	52	11	86	2.1	20	2.7	1.5	*<0.1*	0.13	0.48	0.020	0.21	28	1.0	0.20	0.73	545
Col 10	Latte Transition Ore	50% 72137B, 50% 72138B	Schist	Transition	0.29	0.65	1215	*<10*	313	0.85	0.48	4.0	0.090	52	11	83	2.5	21	2.6	2.2	*<0.1*	0.11	0.47	0.020	0.27	29	2.5	0.20	1.2	502
Col 11	Supremo Oxide Ore	50% 72144B, 50% 72145B	Gneiss	Oxide	0.11	0.43	940	*<10*	198	0.95	0.21	0.32	0.060	54	5.6	84	1.9	4.1	1.6	1.3	*<0.1*	0.17	0.96	*<0.02*	0.20	32	1.0	0.17	0.10	300
Col 12	Supremo 80%	72146B	Gneiss	Transition	0.16	0.56	1700	*<10*	191	0.90	0.30	1.1	0.040	57	6.6	107	2.4	3.5	1.8	1.9	*<0.1*	0.17	1.2	*<0.02*	0.26	34	2.0	0.17	0.42	396

Notes:

Values in grey italics are below the analytical detection limit

Appendix D.2-2 Static Test Results for Ore Kinetic Test Samples

Solid Phase Elements by Aqua Regia Digestion

Kinetic Tests	Description	Test Sample ID	Lithology	Weathering Facies	Mo	Na	Nb	Ni	P	Pb	Rb	S	Sb	Sc	Se	Sn	Sr	Ta	Tb	Te	Th	Ti	Tl	U	V	W	Y	Yb	Zn	Zr
					ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
				Method Code	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*	*ICM14B*
				Limit of Detection	*0.05*	*0.01*	*0.05*	*0.5*	*0.005*	*0.2*	*0.2*	*0.01*	*0.05*	*0.1*	*1*	*0.3*	*0.5*	*0.05*	*0.02*	*0.05*	*0.1*	*0.01*	*0.02*	*0.05*	*1*	*0.1*	*0.05*	*0.1*	*1*	*0.5*
Col 7	Kona Oxide	72139B	Granite	Oxide	1.9	*<0.01*	0.41	1.9	0.013	15	11	0.020	37	2.5	*<1*	*<0.3*	18	*<0.05*	0.24	*<0.05*	18	*<0.01*	0.56	9.6	10	0.20	7.2	0.80	18	12
Col 8	Kona 80% CN	72140B	Granite	Transition	2.3	*<0.01*	0.34	2.3	0.014	16	8.8	0.14	128	2.3	*<1*	0.30	21	*<0.05*	0.22	*<0.05*	17	*<0.01*	1.2	9.7	8.0	0.10	6.3	0.70	19	11
Col 9	Latte Oxide Ore	50% 72135B, 50% 72136B	Schist	Oxide	1.5	0.010	*<0.05*	52	0.043	17	12	0.14	21	4.8	*<1*	0.40	135	*<0.05*	0.50	0.060	12	*<0.01*	0.33	2.8	18	0.70	14	1.3	55	4.4
Col 10	Latte Transition Ore	50% 72137B, 50% 72138B	Schist	Transition	2.8	0.015	0.070	44	0.043	17	16	0.54	36	5.2	*<1*	0.45	165	*<0.05*	0.51	0.070	12	0.010	0.57	2.6	23	0.25	14	1.4	48	3.4
Col 11	Supremo Oxide Ore	50% 72144B, 50% 72145B	Gneiss	Oxide	2.0	0.010	*<0.05*	17	0.026	13	12	0.010	40	2.9	*<1*	0.55	24	*<0.05*	0.38	*<0.05*	25	*<0.01*	0.68	13	15	0.45	11	1.1	26	5.7
Col 12	Supremo 80%	72146B	Gneiss	Transition	3.1	0.010	0.070	12	0.030	14	17	0.12	20	2.8	*<1*	0.30	49	*<0.05*	0.40	0.060	25	*<0.01*	1.2	11	14	0.20	11	1.1	27	6.1

Notes:

Values in grey italics are below the analytical detection limit

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 7 (Kona Granite Oxide Ore)

Date	Cycle	Week	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Flushing Rate/ Weekly Input* (mL)	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
	No.		Input	Output		umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	750	300	7.6	622	#N/A	5.9	43	242	23	0.090	< 0.3	159	0.0084	0.028	0.30	0.00032	< 7E-06	< 7E-06	0.028	0.000011	45	0.000040	0.0080
6-May-15	2	3	400	350	7.6	281	#N/A	3.0	20	96	6.0	0.18	< 0.3	49	0.10	0.029	0.28	0.00088	< 7E-06	< 7E-06	0.019	< 3E-06	14	< 3E-05	0.0013
20-May-15	3	5	400	390	7.7	167	#N/A	2.9	16	45	3.0	0.23	< 0.3	22	0.052	0.028	0.41	0.00024	< 7E-06	< 7E-06	0.018	< 3E-06	6.0	< 3E-05	0.00040
3-Jun-15	4	7	400	270	7.7	128	#N/A	3.3	21	32	2.0	0.25	< 0.3	16	0.24	0.030	0.47	0.00086	0.0000070	< 7E-06	0.021	< 3E-06	4.4	0.000040	0.00024
17-Jun-15	5	9	500	470	7.5	85	#N/A	3.2	18	18	1.2	0.25	< 0.3	9.0	0.11	0.032	0.70	0.00043	< 7E-06	< 7E-06	0.018	0.0000050	2.5	0.000030	0.00016
1-Jul-15	6	11	500	475	7.8	69	#N/A	3.0	18	11	< 1	0.26	< 0.3	7.0	0.16	0.031	0.71	0.00050	< 7E-06	< 7E-06	0.015	< 3E-06	2.0	< 3E-05	0.00011
15-Jul-15	7	13	500	460	7.5	61	#N/A	3.2	21	8.0	< 1	0.25	< 0.3	7.5	0.20	0.027	0.59	0.00063	< 7E-06	< 7E-06	0.017	< 3E-06	2.0	0.000030	0.00014
29-Jul-15	8	15	400	375	7.6	60	#N/A	2.0	17	9.0	1.0	0.44	< 0.3	6.8	0.34	0.027	0.55	0.0011	0.000015	0.000012	0.020	< 3E-06	1.9	0.00011	0.00020
12-Aug-15	9	17	400	405	7.4	56	#N/A	1.9	16	8.0	< 1	0.24	< 0.3	7.4	0.12	0.025	0.53	0.00037	< 7E-06	< 7E-06	0.016	< 3E-06	2.1	0.000040	0.000096
26-Aug-15	10	19	500	470	7.4	53	#N/A	2.0	14	7.0	1.0	0.25	0.30	6.9	0.26	0.025	0.54	0.0010	0.000012	0.0000070	0.015	0.0000030	1.9	0.000055	0.000093
9-Sep-15	11	21	500	485	7.4	46	#N/A	2.1	13	6.0	< 1	0.25	< 0.3	6.3	0.41	0.025	0.56	0.0017	0.000016	< 7E-06	0.014	< 3E-06	1.8	0.000070	0.000089
23-Sep-15	12	23	500	475	7.4	49	#N/A	1.5	14	5.0	1.0	0.24	0.30	6.7	0.26	0.024	0.51	0.0010	0.000012	0.0000070	0.012	0.0000030	1.9	0.000065	0.000074
7-Oct-15	13	25	500	385	7.6	46	#N/A	1.8	16	5.0	< 1	0.23	-	7.1	0.10	0.024	0.46	0.00033	< 7E-06	< 7E-06	0.011	< 3E-06	2.0	0.000060	0.000059
21-Oct-15	14	27	400	400	7.5	42	#N/A	1.4	12	5.0	< 1	0.23	-	6.9	0.017	0.022	0.44	0.00018	< 7E-06	< 7E-06	0.014	< 3E-06	1.9	0.000070	0.000075
4-Nov-15	15	29	400	385	7.4	42	#N/A	1.8	11	5.0	< 1	0.22	-	7.1	0.024	0.017	0.43	0.00018	< 7E-06	< 7E-06	0.0067	< 3E-06	2.0	0.000040	0.0000050
18-Nov-15	16	31	400	385	7.7	42	#N/A	0.90	13	5.0	< 1	0.22	-	7.3	0.16	0.018	0.44	0.00065	< 7E-06	< 7E-06	0.0084	< 3E-06	2.0	0.000040	0.000080
2-Dec-15	17	33	400	380	7.1	45	#N/A	2.9	11	4.0	< 1	0.20	-	9.2	0.055	0.018	0.42	0.00095	< 7E-06	< 7E-06	0.011	0.0000030	2.6	0.000050	0.00041
16-Dec-15	18	35	400	370	8.1	43	#N/A	3.1	13	4.0	< 1	0.19	-	9.0	0.36	0.019	0.42	0.0012	0.000017	< 7E-06	0.012	< 3E-06	2.5	0.000060	0.000082
30-Dec-15	19	37	400	375	7.1	41	#N/A	2.1	9.1	4.0	< 1	0.20	-	8.8	0.12	0.016	0.37	0.00046	< 7E-06	< 7E-06	0.0086	0.0000050	2.4	0.000070	0.000082
13-Jan-16	20	39	400	360	7.0	46	#N/A	2.2	9.0	4.0	< 1	0.18	-	9.5	0.067	0.016	0.31	0.00031	0.000031	< 7E-06	0.015	0.000010	2.6	0.000050	0.00010
27-Jan-16	21	41	400	370	6.9	44	#N/A	3.6	9.6	3.0	< 1	0.19	-	9.6	0.068	0.016	0.35	0.00063	< 7E-06	< 7E-06	0.0090	0.0000040	2.6	< 3E-05	0.000081
10-Feb-16	22	43	400	400	7.0	43	#N/A	2.7	9.8	3.0	< 1	0.16	-	9.4	0.10	0.016	0.37	0.00061	< 7E-06	< 7E-06	0.0070	0.0000050	2.6	< 3E-05	0.000069
24-Feb-16	23	45	400	355	7.1	44	#N/A	3.0	9.0	3.0															
9-Mar-16	24	47	400	375	7.1	40	#N/A	3.0	9.4	3.0															

Calculated Loading Rates for Col 7

Date	Cycle	Week	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
-	No.	-	Input	Output	-	umhos/cm	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	750	300	7.6	622	#N/A	0.40	2.9	17	1.6	0.0062	0.021	11	0.00057	0.0019	0.021	0.000022	0.00000048	0.00000048	0.0019	0.00000075	3.1	0.0000027	0.00055
6-May-15	2	3	400	350	7.6	281	#N/A	0.12	0.81	3.8	0.24	0.0072	0.012	1.9	0.0041	0.0012	0.011	0.000035	0.00000028	0.00000028	0.00077	0.00000012	0.55	0.0000012	0.000050
20-May-15	3	5	400	390	7.7	167	#N/A	0.13	0.70	2.0	0.13	0.010	0.013	0.96	0.0023	0.0013	0.018	0.000011	0.00000031	0.00000031	0.00080	0.00000013	0.27	0.0000013	0.000018
3-Jun-15	4	7	400	270	7.7	128	#N/A	0.10	0.66	0.98	0.062	0.0077	0.0092	0.49	0.0075	0.00093	0.014	0.000026	0.00000022	0.00000022	0.00065	0.000000092	0.14	0.0000012	0.0000073
17-Jun-15	5	9	500	470	7.5	85	#N/A	0.17	0.95	0.96	0.064	0.013	0.016	0.48	0.0056	0.0017	0.037	0.000023	0.00000037	0.00000037	0.00098	0.00000027	0.14	0.0000016	0.0000086
1-Jul-15	6	11	500	475	7.8	69	#N/A	0.16	0.95	0.60	0.054	0.014	0.016	0.38	0.0084	0.0017	0.038	0.000027	0.00000038	0.00000038	0.00080	0.00000016	0.11	0.0000016	0.0000062
15-Jul-15	7	13	500	460	7.5	61	#N/A	0.17	1.1	0.42	0.052	0.013	0.016	0.39	0.011	0.0014	0.031	0.000033	0.00000037	0.00000037	0.00091	0.00000016	0.11	0.0000016	0.0000075
29-Jul-15	8	15	400	375	7.6	60	#N/A	0.085	0.73	0.38	0.043	0.019	0.013	0.29	0.015	0.0011	0.024	0.000046	0.00000064	0.00000051	0.00086	0.00000013	0.081	0.0000047	0.0000085
12-Aug-15	9	17	400	405	7.4	56	#N/A	0.089	0.74	0.37	0.046	0.011	0.014	0.34	0.0053	0.0011	0.024	0.000017	0.00000032	0.00000032	0.00076	0.00000014	0.095	0.0000018	0.0000044
26-Aug-15	10	19	500	470	7.4	53	0.00	0.11	0.77	0.37	0.054	0.013	0.016	0.37	0.014	0.0013	0.029	0.000056	0.00000062	0.00000037	0.00082	0.00000016	0.10	0.0000029	0.0000050
9-Sep-15	11	21	500	485	7.4	46	#N/A	0.11	0.70	0.33	0.055	0.014	0.017	0.35	0.023	0.0014	0.031	0.000095	0.00000088	0.00000039	0.00078	0.00000017	0.097	0.0000039	0.0000049
23-Sep-15	12	23	500	475	7.4	49	#N/A	0.083	0.74	0.27	0.054	0.013	0.016	0.36	0.014	0.0013	0.028	0.000055	0.00000062	0.00000038	0.00067	0.00000016	0.10	0.0000035	0.0000040
7-Oct-15	13	25	500	385	7.6	46	#N/A	0.079	0.68	0.22	0.044	0.010		0.31	0.0046	0.0010	0.020	0.000014	0.00000031	0.00000031	0.00047	0.00000013	0.086	0.0000026	0.0000026
21-Oct-15	14	27	400	400	7.5	42	#N/A	0.063	0.56	0.23	0.046	0.010		0.31	0.00076	0.00099	0.020	0.0000082	0.00000032	0.00000032	0.00062	0.00000014	0.087	0.0000032	0.0000034
4-Nov-15	15	29	400	385	7.4	42	#N/A	0.081	0.49	0.22	0.044	0.0096		0.31	0.0010	0.00076	0.019	0.0000079	0.00000031	0.00000031	0.00029	0.00000013	0.086	0.0000018	0.00000022
18-Nov-15	16	31	400	385	7.7	42	#N/A	0.040	0.56	0.22	0.044	0.0096		0.32	0.0070	0.00079	0.019	0.000029	0.00000031	0.00000031	0.00037	0.00000013	0.087	0.0000018	0.0000035
2-Dec-15	17	33	400	380	7.1	45	#N/A	0.12	0.49	0.17	0.043	0.0087		0.40	0.0024	0.00079	0.018	0.000041	0.00000030	0.00000030	0.00047	0.00000013	0.11	0.0000022	0.000018
16-Dec-15	18	35	400	370	8.1	43	#N/A	0.13	0.55	0.17	0.042	0.0080		0.38	0.015	0.00078	0.018	0.000048	0.00000072	0.00000029	0.00052	0.00000013	0.10	0.0000025	0.0000035
30-Dec-15	19	37	400	375	7.1	41	#N/A	0.090	0.39	0.17	0.043	0.0085		0.38	0.0051	0.00066	0.016	0.000020	0.00000030	0.00000030	0.00037	0.00000021	0.10	0.0000030	0.0000035
13-Jan-16	20	39	400	360	7.0	46	#N/A	0.090	0.37	0.16	0.041	0.0074		0.39	0.0027	0.00064	0.013	0.000013	0.0000013	0.00000029	0.00062	0.00000041	0.11	0.0000021	0.0000042
27-Jan-16	21	41	400	370	6.9	44	#N/A	0.15	0.40	0.13	0.042	0.0080		0.40	0.0028	0.00067	0.015	0.000027	0.00000029	0.00000029	0.00038	0.00000017	0.11	0.0000013	0.0000034
10-Feb-16	22	43	400	400	7.0	43	#N/A	0.12	0.44	0.14	0.046	0.0073		0.43	0.0047	0.00071	0.017	0.000028	0.00000032	0.00000032	0.00032	0.00000023	0.12	0.0000014	0.0000031
24-Feb-16	23	45	400	355	7.1	44	#N/A	0.12	0.36	0.12															
9-Mar-16	24	47	400	375	7.1	40	#N/A	0.13	0.40	0.13															

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 7 (Kona Granite Oxide Ore)

Date	Cycle	Week	Volume (mL)		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
	No.		Input	Output	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	750	300	0.0069	< 0.007	0.00018	0.0035	11	0.75	0.28	0.00044	0.0039	0.015	7.4	0.0019	5.7	0.000088	67	0.36	85	0.00025	0.00014	0.000080	0.0015	0.00014	0.0080	< 0.002
6-May-15	2	3	400	350	0.0039	0.0090	0.000020	0.0011	3.4	0.15	0.030	0.0020	0.0013	0.0050	3.8	< 0.001	2.7	0.000014	32	0.091	35	0.000094	< 1E-05	0.00020	0.00096	0.00015	0.0030	< 0.002
20-May-15	3	5	400	390	0.0028	< 0.007	0.000020	0.00066	1.6	0.058	0.020	0.0071	0.00080	0.010	2.5	0.00029	2.4	0.000017	19	0.040	15	0.000066	0.000060	0.00016	0.00050	0.00012	< 0.001	< 0.002
3-Jun-15	4	7	400	270	0.0031	0.028	0.00013	0.00061	1.2	0.035	0.020	0.0032	0.00050	0.010	2.2	0.00018	2.6	0.000013	16	0.029	11	0.000056	0.00034	0.00063	0.0012	0.00033	0.0020	< 0.002
17-Jun-15	5	9	500	470	0.0012	0.013	0.000030	0.00044	0.65	0.021	0.010	0.0075	0.00030	0.025	1.6	0.00022	2.2	0.000011	12	0.017	6.9	0.000054	0.000030	0.00025	0.00041	0.00018	< 0.001	< 0.002
1-Jul-15	6	11	500	475	0.00091	0.016	0.000020	0.00041	0.52	0.015	0.030	0.0034	0.00020	0.027	1.4	0.00010	2.2	0.0000040	9.8	0.013	4.0	0.000048	0.000060	0.00098	0.0013	0.00018	< 0.001	< 0.002
15-Jul-15	7	13	500	460	0.0014	0.025	0.00012	0.00039	0.59	0.019	0.020	0.0021	0.00020	0.019	1.4	0.000070	2.3	0.000010	9.8	0.014	3.1	0.000053	0.000060	0.00065	0.00049	0.00020	< 0.001	< 0.002
29-Jul-15	8	15	400	375	0.0011	0.046	0.00015	0.00045	0.50	0.015	0.010	0.0024	0.00020	0.024	1.4	0.00011	2.5	0.0000040	8.5	0.013	3.3	0.000048	0.000070	0.00086	0.00043	0.00029	< 0.001	< 0.002
12-Aug-15	9	17	400	405	0.0012	0.013	0.000040	0.00040	0.56	0.015	0.010	0.0025	0.00020	0.020	1.5	0.00010	2.3	0.0000050	8.3	0.014	2.9	0.000055	0.00010	0.00032	0.00042	0.00020	< 0.001	< 0.002
26-Aug-15	10	19	500	470	0.0014	0.033	0.00011	0.00038	0.52	0.014	0.015	0.0023	0.00020	0.021	1.5	0.000085	2.4	0.0000070	7.3	0.012	4.0	0.000051	0.00011	0.00069	0.00040	0.00024	0.0015	0.0020
9-Sep-15	11	21	500	485	0.0015	0.053	0.00017	0.00037	0.47	0.012	0.020	0.0021	0.00020	0.022	1.4	0.000070	2.5	0.0000090	6.4	0.011	5.1	0.000046	0.00012	0.0011	0.00037	0.00028	0.0020	< 0.002
23-Sep-15	12	23	500	475	0.0012	0.033	0.00013	0.00034	0.50	0.013	0.015	0.0017	0.00015	0.018	1.4	0.000055	2.3	0.0000060	6.2	0.012	3.7	0.000036	0.00010	0.00064	0.00056	0.00022	0.0015	0.0020
7-Oct-15	13	25	500	385	0.00076	0.012	0.000080	0.00031	0.54	0.014	0.010	0.0014	0.00010	0.013	1.3	< 4E-05	2.1	0.0000030	6.1	0.013	2.3	0.000026	0.000080	0.00022	0.00075	0.00015	< 0.001	< 0.002
21-Oct-15	14	27	400	400	0.0023	< 0.007	0.000060	0.00032	0.52	0.015	< 0.01	0.0040	0.00010	0.011	1.2	0.000060	2.1	0.0000040	5.0	0.012	1.8	0.000046	0.00058	< 5E-05	0.00029	0.00014	< 0.001	< 0.002
4-Nov-15	15	29	400	385	0.0018	0.0090	0.000050	0.00022	0.52	0.012	0.010	0.0012	0.00010	0.0090	1.3	< 4E-05	1.8	< 2E-06	4.9	0.012	1.7	0.000049	0.00021	< 5E-05	0.00024	0.00019	0.0010	< 0.002
18-Nov-15	16	31	400	385	0.00059	0.028	0.000070	0.00032	0.56	0.013	0.030	0.0031	< 0.0001	0.010	1.3	0.00013	2.1	0.0000040	4.9	0.015	1.6	0.000040	0.000020	0.00091	0.0027	0.00018	< 0.001	< 0.002
2-Dec-15	17	33	400	380	0.0014	0.010	0.000020	0.00029	0.67	0.021	< 0.01	0.0023	0.00080	0.013	1.4	0.00014	2.1	0.0000030	5.4	0.016	2.4	0.000023	0.000050	0.000070	0.00023	0.00016	0.0090	< 0.002
16-Dec-15	18	35	400	370	0.0011	0.051	0.00011	0.00037	0.68	0.021	0.020	0.0015	0.00020	0.015	1.5	0.000080	2.7	0.0000020	5.0	0.016	1.3	0.000028	0.000070	0.0011	0.00027	0.00027	0.0030	< 0.002
30-Dec-15	19	37	400	375	0.0010	0.020	0.000070	0.00034	0.69	0.019	0.020	0.0012	0.00020	0.0060	1.3	< 4E-05	2.0	0.0000050	4.5	0.016	2.0	0.000027	< 1E-05	0.00033	0.0012	0.00016	0.0020	< 0.002
13-Jan-16	20	39	400	360	0.00070	0.011	0.000030	0.00033	0.73	0.022	0.010	0.0020	0.00010	0.0040	1.4	0.00019	2.2	0.0000020	4.4	0.015	1.3	< 5E-06	0.000060	0.00024	0.00019	0.00011	0.0010	< 0.002
27-Jan-16	21	41	400	370	0.00063	0.012	< 1E-05	0.00033	0.74	0.023	0.010	0.00092	0.00010	0.011	1.4	< 4E-05	2.2	0.0000020	4.0	0.017	1.4	0.000035	0.000050	0.000070	0.00041	0.00011	0.0010	< 0.002
10-Feb-16	22	43	400	400	0.00076	0.014	0.00011	0.00033	0.72	0.019	0.020	0.00080	0.00020	0.0060	1.3	0.000060	2.2	< 2E-06	3.6	0.016	1.9	0.000037	0.00029	0.00018	0.00075	0.00013	0.0010	< 0.002
24-Feb-16	23	45	400	355																								
9-Mar-16	24	47	400	375																								

Calculated Loading Rates for Col 7

Date	Cycle	Week	Volume (mL)		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
-	No.	-	Input	Output	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	750	300	0.00047	0.00048	0.000012	0.00024	0.77	0.051	0.019	0.000030	0.00027	0.0010	0.51	0.00013	0.39	0.0000060	4.6	0.025	5.8	0.000017	0.0000096	0.0000055	0.00011	0.0000096	0.00055	0.00014
6-May-15	2	3	400	350	0.00015	0.00036	0.00000080	0.000043	0.13	0.0059	0.0012	0.000078	0.000052	0.00020	0.15	0.000040	0.11	0.00000056	1.3	0.0036	1.4	0.0000037	0.00000040	0.0000080	0.000038	0.0000060	0.00012	0.000080
20-May-15	3	5	400	390	0.00012	0.00031	0.00000089	0.000029	0.069	0.0026	0.00089	0.00032	0.000036	0.00044	0.11	0.000013	0.11	0.00000076	0.85	0.0018	0.67	0.0000029	0.0000027	0.0000071	0.000022	0.0000053	0.000044	0.000089
3-Jun-15	4	7	400	270	0.000096	0.00086	0.0000040	0.000019	0.036	0.0011	0.00062	0.000097	0.000015	0.00031	0.068	0.0000055	0.079	0.00000040	0.50	0.00090	0.34	0.0000017	0.000010	0.000019	0.000038	0.000010	0.000062	0.000062
17-Jun-15	5	9	500	470	0.000065	0.00070	0.0000016	0.000023	0.035	0.0011	0.00054	0.00040	0.000016	0.0013	0.086	0.000012	0.12	0.00000059	0.64	0.00090	0.37	0.0000029	0.0000016	0.000013	0.000022	0.0000096	0.000054	0.00011
1-Jul-15	6	11	500	475	0.000049	0.00087	0.0000011	0.000022	0.028	0.00083	0.0016	0.00018	0.000011	0.0015	0.074	0.0000054	0.12	0.00000022	0.53	0.00072	0.22	0.0000026	0.0000032	0.000053	0.000070	0.0000097	0.000054	0.00011
15-Jul-15	7	13	500	460	0.000073	0.0013	0.0000063	0.000020	0.031	0.0010	0.0010	0.00011	0.000010	0.00100	0.074	0.0000037	0.12	0.00000052	0.51	0.00075	0.16	0.0000028	0.0000031	0.000034	0.000026	0.000010	0.000052	0.00010
29-Jul-15	8	15	400	375	0.000046	0.0020	0.0000064	0.000019	0.021	0.00063	0.00043	0.00010	0.0000085	0.0010	0.058	0.0000047	0.10	0.00000017	0.36	0.00054	0.14	0.0000021	0.0000030	0.000037	0.000019	0.000012	0.000043	0.000085
12-Aug-15	9	17	400	405	0.000056	0.00060	0.0000018	0.000019	0.026	0.00069	0.00046	0.00012	0.0000092	0.00092	0.069	0.0000046	0.10	0.00000023	0.38	0.00062	0.13	0.0000025	0.0000046	0.000015	0.000020	0.0000092	0.000046	0.000092
26-Aug-15	10	19	500	470	0.000074	0.0018	0.0000056	0.000021	0.028	0.00073	0.00080	0.00012	0.000011	0.0011	0.079	0.0000046	0.13	0.00000037	0.39	0.00067	0.21	0.0000027	0.0000059	0.000037	0.000021	0.000013	0.000080	0.00011
9-Sep-15	11	21	500	485	0.000085	0.0029	0.0000094	0.000020	0.026	0.00067	0.0011	0.00011	0.000011	0.0012	0.080	0.0000039	0.14	0.00000050	0.35	0.00063	0.28	0.0000025	0.0000066	0.000059	0.000020	0.000015	0.00011	0.00011
23-Sep-15	12	23	500	475	0.000062	0.0018	0.0000068	0.000018	0.027	0.00071	0.00081	0.000093	0.0000081	0.00095	0.074	0.0000030	0.12	0.00000032	0.34	0.00066	0.20	0.0000019	0.0000054	0.000035	0.000030	0.000012	0.000081	0.00011
7-Oct-15	13	25	500	385	0.000033	0.00053	0.0000035	0.000013	0.024	0.00062	0.00044	0.000061	0.0000044	0.00057	0.057	0.0000018	0.091	0.00000013	0.27	0.00057	0.10	0.0000011	0.0000035	0.0000096	0.000033	0.0000066	0.000044	0.000088
21-Oct-15	14	27	400	400	0.00010	0.00032	0.0000027	0.000014	0.024	0.00067	0.00046	0.00018	0.0000046	0.00050	0.056	0.0000027	0.094	0.00000018	0.23	0.00055	0.082	0.0000021	0.000026	0.0000023	0.000013	0.0000064	0.000046	0.000091
4-Nov-15	15	29	400	385	0.000078	0.00039	0.0000022	0.0000097	0.023	0.00053	0.00044	0.000054	0.0000044	0.00039	0.055	0.0000018	0.081	0.000000088	0.22	0.00052	0.075	0.0000021	0.0000092	0.0000022	0.000011	0.0000083	0.000044	0.000088
18-Nov-15	16	31	400	385	0.000026	0.0012	0.0000031	0.000014	0.025	0.00057	0.0013	0.00014	0.0000044	0.00044	0.058	0.0000057	0.093	0.00000018	0.21	0.00064	0.070	0.0000018	0.00000088	0.000040	0.00012	0.0000079	0.000044	0.000088
2-Dec-15	17	33	400	380	0.000062	0.00043	0.00000087	0.000013	0.029	0.00090	0.00043	0.00010	0.000035	0.00056	0.061	0.0000061	0.093	0.00000013	0.23	0.00068	0.10	0.00000100	0.0000022	0.0000030	0.000010	0.0000069	0.00039	0.000087
16-Dec-15	18	35	400	370	0.000046	0.0021	0.0000046	0.000016	0.029	0.00086	0.00084	0.000064	0.0000084	0.00063	0.062	0.0000034	0.11	0.000000084	0.21	0.00068	0.055	0.0000012	0.0000029	0.000046	0.000011	0.000011	0.00013	0.000084
30-Dec-15	19	37	400	375	0.000044	0.00085	0.0000030	0.000014	0.029	0.00083	0.00085	0.000049	0.0000085	0.00026	0.057	0.0000017	0.086	0.00000021	0.19	0.00067	0.085	0.0000012	0.00000043	0.000014	0.000050	0.0000068	0.000085	0.000085
13-Jan-16	20	39	400	360	0.000029	0.00045	0.0000012	0.000014	0.030	0.00089	0.00041	0.000083	0.0000041	0.00016	0.055	0.0000078	0.089	0.000000082	0.18	0.00063	0.053	0.00000021	0.0000025	0.0000098	0.0000079	0.0000045	0.000041	0.000082
27-Jan-16	21	41	400	370	0.000027	0.00051	0.00000042	0.000014	0.031	0.00097	0.00042	0.000039	0.0000042	0.00046	0.057	0.0000017	0.092	0.000000084	0.17	0.00073	0.059	0.0000015	0.0000021	0.0000029	0.000017	0.0000046	0.000042	0.000084
10-Feb-16	22	43	400	400	0.000035	0.00064	0.0000050	0.000015	0.033	0.00086	0.00091	0.000036	0.0000091	0.00027	0.058	0.0000027	0.10	0.000000091	0.16	0.00074	0.087	0.0000017	0.000013	0.0000082	0.000034	0.0000059	0.000046	0.000091
24-Feb-16	23	45	400	355																								
9-Mar-16	24	47	400	375																								

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 8 (Kona Granite Transition Ore)

Date	**Cycle**	**Week**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
-	No.	-	Input	Output	-	umhos/cm	mgCaCO$_3$/L	mgCaCO$_3$/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	700	375	4.7	1588	#N/A	50	< 0.1	1056	17	0.59	< 0.3	739	6.6	0.0090	5.4	0.0040	0.0035	< 7E-06	0.055	0.00051	216	0.00051	0.83
6-May-15	2	3	400	370	4.8	1162	#N/A	38	< 0.1	641	11	0.48	< 0.3	454	2.9	0.0067	53	0.0016	0.0021	< 7E-06	0.047	0.00028	129	0.00013	0.55
20-May-15	3	5	400	380	5.1	666	#N/A	27	0.30	307	13	0.23	< 0.3	226	0.97	0.0051	65	0.00069	0.0011	< 7E-06	0.036	0.00015	65	0.000090	0.28
3-Jun-15	4	7	400	290	5.2	499	#N/A	21	0.80	230	12	0.18	< 0.3	163	0.61	0.0054	65	0.00066	0.00088	< 7E-06	0.039	0.00011	47	0.000060	0.20
17-Jun-15	5	9	500	450	5.1	360	#N/A	19	0.40	164	< 1	0.13	< 0.3	123	0.45	0.0057	63	0.00035	0.00077	< 7E-06	0.026	0.00010	35	0.000060	0.15
1-Jul-15	6	11	500	470	5.5	281	#N/A	14	0.90	121	< 1	0.10	< 0.3	85	0.30	0.0066	45	0.00031	0.00065	< 7E-06	0.019	0.000076	24	0.000040	0.11
15-Jul-15	7	13	500	465	5.2	247	#N/A	16	0.30	95	< 1	0.090	< 0.3	74	0.28	0.0073	28	0.00030	0.00055	< 7E-06	0.020	0.000065	20	0.000050	0.10
29-Jul-15	8	15	400	385	5.2	238	#N/A	8.8	0.60	99	< 1	0.11	< 0.3	77	0.27	0.0075	19	0.00077	0.00059	< 7E-06	0.020	0.000059	22	0.000080	0.100
12-Aug-15	9	17	400	405	4.8	227	#N/A	10	< 0.1	89	1.0	0.10	< 0.3	74	0.26	0.0072	15	0.00021	0.00056	< 7E-06	0.017	0.000069	21	0.000060	0.093
26-Aug-15	10	19	500	455	5.2	223	-	9.6	0.10	79	1.0	0.090	0.30	68	0.24	0.0075	13	0.00063	0.00053	0.0000070	0.015	0.000066	20	0.000055	0.088
9-Sep-15	11	21	500	495	4.9	186	#N/A	9.1	< 0.1	74	< 1	0.080	< 0.3	63	0.22	0.0078	12	0.0011	0.00049	< 7E-06	0.013	0.000063	18	0.000050	0.082
23-Sep-15	12	23	500	480	5.1	176	#N/A	8.5	0.070	68	1.0	0.080	-	60	0.20	0.0076	12	0.00065	0.00047	0.0000070	0.012	0.000062	17	0.000070	0.074
7-Oct-15	13	25	400	390	5.1	180	#N/A	8.2	0.50	65	< 1	0.080	-	57	0.19	0.0074	12	0.00025	0.00045	< 7E-06	0.0096	0.000060	16	0.000090	0.065
21-Oct-15	14	27	400	400	5.0	177	#N/A	8.6	< 0.1	59	< 1	0.080	-	56	0.21	0.0075	12	0.00023	0.00048	< 7E-06	0.011	0.000054	16	0.000090	0.074
4-Nov-15	15	29	400	405	4.7	181	#N/A	9.3	< 0.1	63	< 1	0.090	-	60	0.21	0.0065	11	0.00021	0.00043	< 7E-06	0.0076	0.000076	17	0.000040	0.073
18-Nov-15	16	31	400	385	5.2	178	#N/A	7.8	< 0.1	56	< 1	0.080	-	53	0.18	0.0066	11	0.0011	0.00043	< 7E-06	0.0069	0.000094	15	0.000060	0.065
2-Dec-15	17	33	401	385	4.5	168	#N/A	14	0.10	58	< 1	0.080	-	57	0.19	0.0071	11	0.00035	0.00044	< 7E-06	0.0089	0.000078	16	0.000080	0.071
16-Dec-15	18	35	401	380	4.6	165	#N/A	14	< 0.1	64	< 1	0.080	-	58	0.20	0.0070	11	0.00027	0.00049	< 7E-06	0.0096	0.00012	16	0.000040	0.073
30-Dec-15	19	37	402	395	4.5	161	#N/A	12	< 0.1	59	< 1	0.080	-	54	0.19	0.0064	9.7	0.00031	0.00049	< 7E-06	0.0075	0.000067	16	0.00010	0.066
13-Jan-16	20	39	402	375	4.4	160	0.90	12	0.10	60	< 1	0.080	-	52	0.17	0.0067	11	0.00083	0.00044	< 7E-06	0.010	0.000072	15	0.000040	0.061
27-Jan-16	21	41	403	405	4.5	155	#N/A	14	< 0.1	52	< 1	0.080	-	49	0.17	0.0068	10	0.00092	0.00045	< 7E-06	0.0070	0.000063	14	0.000060	0.061
10-Feb-16	22	43	404	400	4.5	149	0.90	14	0.10	52	< 1	0.080	-	47	0.16	0.0069	9.7	0.00028	0.00045	< 7E-06	0.0050	0.000056	13	0.000040	0.059
24-Feb-16	23	45	405	375	4.5	158	#N/A	13	< 0.1	54	< 1	0.11	-	53	0.18	0.0066	10	0.00094	0.00050	< 7E-06	0.0050	0.000067	15	0.000050	0.061
9-Mar-16	24	47	405	385	4.5	151	#N/A	13	< 0.1	57															

Calculated Loading Rates for Col 8

Date	**Cycle**	**Week**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
-	No.	-	Input	Output	-	umhos/cm	mgCaCO$_3$/kg/wk	mgCaCO$_3$/kg/wk	mgCaCO$_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mgCaCO$_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	700	375	4.7	1588	#N/A	4.3	0.0086	91	1.5	0.051	0.026	64	0.57	0.00078	0.47	0.00034	0.00030	0.00000060	0.0047	0.000044	19	0.000044	0.071
6-May-15	2	3	400	370	4.8	1162	#N/A	1.6	0.0043	27	0.47	0.020	0.013	19	0.12	0.00028	2.3	0.000066	0.000091	0.00000030	0.0020	0.000012	5.5	0.0000055	0.024
20-May-15	3	5	400	380	5.1	666	#N/A	1.2	0.014	13	0.57	0.010	0.013	9.9	0.042	0.00022	2.8	0.000030	0.000050	0.00000031	0.0016	0.0000067	2.8	0.0000039	0.012
3-Jun-15	4	7	400	290	5.2	499	#N/A	0.71	0.028	7.7	0.40	0.0060	0.010	5.4	0.020	0.00018	2.2	0.000022	0.000029	0.00000023	0.0013	0.0000035	1.6	0.0000020	0.0067
17-Jun-15	5	9	500	450	5.1	360	#N/A	0.97	0.018	8.5	0.052	0.0067	0.016	6.4	0.023	0.00029	3.2	0.000018	0.000040	0.00000036	0.0013	0.0000053	1.8	0.0000031	0.0078
1-Jul-15	6	11	500	470	5.5	281	#N/A	0.75	0.046	6.5	0.054	0.0054	0.016	4.6	0.016	0.00036	2.4	0.000017	0.000035	0.00000038	0.0010	0.0000041	1.3	0.0000022	0.0058
15-Jul-15	7	13	500	465	5.2	247	#N/A	0.83	0.016	5.1	0.053	0.0048	0.016	3.9	0.015	0.00039	1.5	0.000016	0.000029	0.00000037	0.0011	0.0000035	1.1	0.0000027	0.0054
29-Jul-15	8	15	400	385	5.2	238	#N/A	0.39	0.026	4.4	0.044	0.0049	0.013	3.4	0.012	0.00033	0.83	0.000034	0.000026	0.00000031	0.00089	0.0000026	0.97	0.0000035	0.0044
12-Aug-15	9	17	400	405	4.8	227	#N/A	0.47	0.0047	4.1	0.047	0.0047	0.014	3.4	0.012	0.00034	0.68	0.0000098	0.000026	0.00000033	0.00077	0.0000032	0.98	0.0000028	0.0043
26-Aug-15	10	19	500	455	5.2	223	#N/A	0.50	0.0052	4.1	0.052	0.0047	0.016	3.6	0.012	0.00039	0.70	0.000033	0.000028	0.00000037	0.00078	0.0000035	1.0	0.0000029	0.0046
9-Sep-15	11	21	500	495	4.9	186	#N/A	0.52	0.0057	4.2	0.057	0.0046	0.017	3.6	0.012	0.00044	0.69	0.000060	0.000028	0.00000040	0.00076	0.0000036	1.0	0.0000028	0.0047
23-Sep-15	12	23	500	480	5.1	176	#N/A	0.47	0.0039	3.8	0.055	0.0044		3.3	0.011	0.00042	0.67	0.000036	0.000026	0.00000039	0.00063	0.0000034	0.95	0.0000039	0.0041
7-Oct-15	13	25	400	390	5.1	180	#N/A	0.37	0.020	2.9	0.045	0.0036		2.6	0.0084	0.00033	0.55	0.000011	0.000020	0.00000031	0.00043	0.0000027	0.74	0.0000040	0.0029
21-Oct-15	14	27	400	400	5.0	177	#N/A	0.40	0.0046	2.7	0.046	0.0037		2.6	0.0096	0.00034	0.53	0.000011	0.000022	0.00000032	0.00052	0.0000025	0.74	0.0000041	0.0034
4-Nov-15	15	29	400	405	4.7	181	#N/A	0.43	0.0047	2.9	0.047	0.0042		2.8	0.0096	0.00030	0.50	0.0000098	0.000020	0.00000033	0.00035	0.0000035	0.81	0.0000019	0.0034
18-Nov-15	16	31	400	385	5.2	178	#N/A	0.34	0.0044	2.5	0.044	0.0035		2.4	0.0079	0.00029	0.50	0.000047	0.000019	0.00000031	0.00031	0.0000042	0.66	0.0000027	0.0029
2-Dec-15	17	33	401	385	4.5	168	#N/A	0.60	0.0044	2.6	0.044	0.0035		2.5	0.0083	0.00031	0.48	0.000015	0.000019	0.00000031	0.00039	0.0000035	0.70	0.0000035	0.0032
16-Dec-15	18	35	401	380	4.6	165	#N/A	0.63	0.0044	2.8	0.044	0.0035		2.5	0.0088	0.00031	0.47	0.000012	0.000021	0.00000031	0.00042	0.0000050	0.71	0.0000017	0.0032
30-Dec-15	19	37	402	395	4.5	161	#N/A	0.56	0.0045	2.7	0.045	0.0036		2.5	0.0084	0.00029	0.44	0.000014	0.000022	0.00000032	0.00034	0.0000030	0.70	0.0000045	0.0030
13-Jan-16	20	39	402	375	4.4	160	0.86	0.53	0.0043	2.6	0.043	0.0034		2.2	0.0072	0.00029	0.48	0.000036	0.000019	0.00000030	0.00043	0.0000031	0.63	0.0000017	0.0026
27-Jan-16	21	41	403	405	4.5	155	#N/A	0.63	0.0047	2.4	0.047	0.0037		2.3	0.0078	0.00032	0.48	0.000043	0.000021	0.00000033	0.00033	0.0000029	0.65	0.0000028	0.0028
10-Feb-16	22	43	404	400	4.5	149	0.89	0.64	0.0046	2.4	0.046	0.0037		2.2	0.0073	0.00032	0.45	0.000013	0.000021	0.00000032	0.00023	0.0000026	0.62	0.0000018	0.0027
24-Feb-16	23	45	405	375	4.5	158	#N/A	0.54	0.0043	2.3	0.043	0.0047		2.3	0.0078	0.00028	0.44	0.000041	0.000021	0.00000030	0.00022	0.0000029	0.66	0.0000022	0.0026
9-Mar-16	24	47	405	385	4.5	151	#N/A	0.58	0.0044	2.5															

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 8 (Kona Granite Transition Ore)

Date	Cycle	Week	Volume (mL)		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
-	No.	-	Input	Output	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	700	375	0.17	11	0.00030	0.076	49	25	0.43	0.000040	0.19	0.0070	26	0.0092	8.5	0.000035	62	1.1	337	0.0030	0.000080	0.00010	0.033	0.00014	0.78	< 0.002
6-May-15	2	3	400	370	0.060	7.6	0.00012	0.046	32	17	0.11	0.00031	0.13	< 0.003	18	0.0050	14	0.000011	29	0.73	234	0.0016	0.000070	0.00012	0.018	0.000070	0.50	< 0.002
20-May-15	3	5	400	380	0.028	3.2	0.000040	0.026	15	8.5	0.080	0.0012	0.064	< 0.003	12	0.0027	13	0.000010	13	0.37	110	0.0011	0.000090	0.00023	0.0084	0.000050	0.26	< 0.002
3-Jun-15	4	7	400	290	0.021	2.1	0.000030	0.019	11	6.1	0.080	0.00036	0.046	< 0.003	10	0.0020	12	0.0000040	8.4	0.27	86	0.00092	0.000010	0.00013	0.0054	0.000090	0.19	< 0.002
17-Jun-15	5	9	500	450	0.019	1.4	0.000040	0.012	8.6	4.9	0.050	0.0011	0.037	< 0.003	8.3	0.0018	10	0.0000060	5.4	0.19	62	0.00073	0.00014	0.00016	0.0040	0.000080	0.18	< 0.002
1-Jul-15	6	11	500	470	0.015	0.85	< 1E-05	0.0091	6.0	3.6	0.040	0.000050	0.027	0.0050	6.4	0.0013	8.8	0.0000020	3.2	0.14	37	0.00057	0.000040	0.00013	0.0022	0.00010	0.13	< 0.002
15-Jul-15	7	13	500	465	0.016	0.61	0.000030	0.0074	5.6	3.3	0.020	0.00016	0.024	0.0040	5.6	0.00094	8.7	0.0000050	2.4	0.11	31	0.00056	0.000050	0.00017	0.0018	0.00010	0.12	< 0.002
29-Jul-15	8	15	400	385	0.016	0.43	0.00015	0.0074	5.3	3.5	< 0.01	0.00023	0.023	0.0080	5.7	0.00086	8.7	0.0000020	1.8	0.12	32	0.00053	< 1E-05	< 5E-05	0.0017	0.00010	0.11	< 0.002
12-Aug-15	9	17	400	405	0.016	0.35	0.000030	0.0061	5.2	3.3	0.020	0.00039	0.023	0.014	5.8	0.00080	9.2	< 2E-06	1.5	0.11	28	0.00044	0.000060	0.000050	0.0015	0.00010	0.12	< 0.002
26-Aug-15	10	19	500	455	0.015	0.28	0.000025	0.0053	4.8	3.1	0.015	0.00042	0.021	0.016	5.6	0.00071	8.1	0.0000030	1.2	0.10	28	0.00042	0.000050	0.000050	0.0013	0.00013	0.11	0.0020
9-Sep-15	11	21	500	495	0.015	0.21	0.000020	0.0045	4.4	2.9	0.010	0.00045	0.020	0.018	5.3	0.00062	7.0	0.0000040	0.99	0.090	29	0.00039	0.000040	< 5E-05	0.0012	0.00015	0.098	< 0.002
23-Sep-15	12	23	500	480	0.014	0.18	0.000020	0.0041	4.2	2.7	0.010	0.00027	0.018	0.019	4.9	0.00060	6.8	0.0000050	0.83	0.085	25	0.00035	0.000030	0.000050	0.0011	0.00012	0.094	0.0020
7-Oct-15	13	25	400	390	0.012	0.14	0.000020	0.0036	4.0	2.5	< 0.01	0.000090	0.016	0.020	4.4	0.00057	6.5	0.0000060	0.66	0.079	22	0.00030	0.000020	< 5E-05	0.0011	0.000080	0.090	< 0.002
21-Oct-15	14	27	400	400	0.015	0.15	0.000030	0.0035	3.7	2.5	< 0.01	0.0013	0.019	0.014	4.3	0.00050	6.6	0.0000020	0.61	0.083	22	0.00041	0.000050	0.000080	0.0013	0.00012	0.099	< 0.002
4-Nov-15	15	29	400	405	0.015	0.15	0.000050	0.0028	4.1	2.6	0.010	0.00016	0.020	0.018	4.5	0.00050	6.4	0.0000030	0.55	0.080	22	0.00038	0.000080	< 5E-05	0.0012	0.00015	0.097	< 0.002
18-Nov-15	16	31	400	385	0.015	0.13	0.00032	0.0030	3.8	2.6	< 0.01	0.00098	0.016	0.018	4.2	0.00060	5.9	< 2E-06	0.48	0.078	22	0.00027	0.000020	< 5E-05	0.0013	0.00013	0.10	< 0.002
2-Dec-15	17	33	401	385	0.020	0.13	0.0011	0.0028	4.3	2.6	< 0.01	0.00095	0.019	0.020	4.4	0.00059	5.7	< 2E-06	0.49	0.083	22	0.00033	0.000050	0.000060	0.0012	0.00011	0.11	< 0.002
16-Dec-15	18	35	401	380	0.024	0.12	0.0028	0.0029	4.1	2.8	< 0.01	0.00044	0.019	0.022	4.4	0.00047	6.3	< 2E-06	0.42	0.084	22	0.00033	0.000060	< 5E-05	0.0012	0.00010	0.11	< 0.002
30-Dec-15	19	37	402	395	0.015	0.11	0.00056	0.0027	3.8	2.5	0.020	0.00034	0.017	0.019	3.9	0.00042	5.4	0.0000070	0.43	0.076	18	0.00033	< 1E-05	< 5E-05	0.0013	0.00012	0.096	< 0.002
13-Jan-16	20	39	402	375	0.013	0.10	0.00015	0.0024	3.7	2.5	< 0.01	0.00057	0.016	0.022	4.0	0.00056	5.8	0.0000020	0.37	0.070	19	0.00026	0.000060	< 5E-05	0.0011	0.000090	0.093	< 0.002
27-Jan-16	21	41	403	405	0.014	0.11	0.00013	0.0022	3.5	2.4	< 0.01	0.000080	0.015	0.022	3.9	0.00032	5.2	< 2E-06	0.32	0.075	20	0.00034	0.000020	< 5E-05	0.0012	0.000090	0.092	< 0.002
10-Feb-16	22	43	404	400	0.015	0.096	0.000090	0.0020	3.3	2.4	< 0.01	0.000070	0.015	0.023	3.7	0.00037	4.8	< 2E-06	0.31	0.070	19	0.00030	0.000070	< 5E-05	0.0012	0.000090	0.10	< 0.002
24-Feb-16	23	45	405	375	0.015	0.10	0.000040	0.0020	3.7	2.5	0.020	0.000070	0.016	0.025	3.8	0.00035	5.2	< 2E-06	0.25	0.072	18	0.00030	0.000080	< 5E-05	0.0011	0.000070	0.11	< 0.002
9-Mar-16	24	47	405	385																								

Calculated Loading Rates for Col 8

Date	Cycle	Week	Volume (mL)		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
-	No.	-	Input	Output	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	700	375	0.014	0.92	0.000026	0.0066	4.2	2.1	0.037	0.0000034	0.016	0.00060	2.2	0.00079	0.73	0.0000030	5.4	0.091	29	0.00026	0.0000069	0.0000086	0.0029	0.000012	0.068	0.00017
6-May-15	2	3	400	370	0.0025	0.32	0.0000051	0.0020	1.4	0.72	0.0047	0.000013	0.0057	0.00013	0.76	0.00021	0.58	0.00000047	1.2	0.031	10.0	0.000069	0.0000030	0.0000051	0.00077	0.0000030	0.021	0.000085
20-May-15	3	5	400	380	0.0012	0.14	0.0000017	0.0011	0.67	0.37	0.0035	0.000051	0.0028	0.00013	0.52	0.00012	0.55	0.00000044	0.56	0.016	4.8	0.000048	0.0000039	0.000010	0.00037	0.0000022	0.011	0.000087
3-Jun-15	4	7	400	290	0.00070	0.068	0.0000010	0.00064	0.37	0.20	0.0027	0.000012	0.0015	0.00010	0.34	0.000067	0.40	0.00000013	0.28	0.0090	2.9	0.000031	0.00000033	0.0000043	0.00018	0.0000030	0.0063	0.000067
17-Jun-15	5	9	500	450	0.00098	0.074	0.0000021	0.00064	0.45	0.25	0.0026	0.000058	0.0019	0.00016	0.43	0.000092	0.52	0.00000031	0.28	0.010	3.2	0.000038	0.0000072	0.0000083	0.00021	0.0000041	0.0091	0.00010
1-Jul-15	6	11	500	470	0.00079	0.046	0.00000054	0.00049	0.32	0.20	0.0022	0.0000027	0.0015	0.00027	0.34	0.000069	0.48	0.00000011	0.17	0.0075	2.0	0.000031	0.0000022	0.0000070	0.00012	0.0000054	0.0072	0.00011
15-Jul-15	7	13	500	465	0.00084	0.032	0.0000016	0.00040	0.30	0.18	0.0011	0.0000086	0.0013	0.00021	0.30	0.000050	0.46	0.00000027	0.13	0.0060	1.7	0.000030	0.0000027	0.0000091	0.000094	0.0000053	0.0062	0.00011
29-Jul-15	8	15	400	385	0.00070	0.019	0.0000066	0.00033	0.23	0.15	0.00044	0.000010	0.0010	0.00035	0.25	0.000038	0.38	0.000000089	0.080	0.0053	1.4	0.000023	0.00000044	0.0000022	0.000073	0.0000044	0.0050	0.000089
12-Aug-15	9	17	400	405	0.00073	0.016	0.0000014	0.00029	0.24	0.15	0.00093	0.000018	0.0011	0.00065	0.27	0.000037	0.43	0.000000093	0.068	0.0052	1.3	0.000021	0.0000028	0.0000023	0.000069	0.0000047	0.0054	0.000093
26-Aug-15	10	19	500	455	0.00079	0.015	0.0000013	0.00028	0.25	0.16	0.00078	0.000022	0.0011	0.00084	0.29	0.000037	0.42	0.00000016	0.064	0.0053	1.5	0.000022	0.0000026	0.0000026	0.000070	0.0000065	0.0056	0.00010
9-Sep-15	11	21	500	495	0.00084	0.012	0.0000011	0.00026	0.25	0.17	0.00057	0.000026	0.0011	0.0010	0.30	0.000035	0.40	0.00000023	0.056	0.0051	1.6	0.000022	0.0000023	0.0000028	0.000067	0.0000085	0.0056	0.00011
23-Sep-15	12	23	500	480	0.00075	0.0097	0.0000011	0.00022	0.23	0.15	0.00055	0.000015	0.00100	0.0010	0.27	0.000033	0.37	0.00000028	0.046	0.0047	1.4	0.000019	0.0000017	0.0000028	0.000062	0.0000063	0.0052	0.00011
7-Oct-15	13	25	400	390	0.00056	0.0063	0.00000090	0.00016	0.18	0.11	0.00045	0.0000040	0.00074	0.00090	0.20	0.000026	0.29	0.00000027	0.030	0.0036	0.98	0.000014	0.00000090	0.0000022	0.000048	0.0000036	0.0040	0.000090
21-Oct-15	14	27	400	400	0.00070	0.0070	0.0000014	0.00016	0.17	0.11	0.00046	0.000057	0.00089	0.00064	0.20	0.000023	0.30	0.000000092	0.028	0.0038	1.00	0.000019	0.0000023	0.0000037	0.000058	0.0000055	0.0046	0.000092
4-Nov-15	15	29	400	405	0.00069	0.0070	0.0000023	0.00013	0.19	0.12	0.00047	0.0000074	0.00092	0.00084	0.21	0.000023	0.30	0.00000014	0.026	0.0037	1.0	0.000018	0.0000037	0.0000023	0.000054	0.0000070	0.0045	0.000093
18-Nov-15	16	31	400	385	0.00065	0.0055	0.000014	0.00013	0.17	0.12	0.00044	0.000043	0.00069	0.00080	0.19	0.000027	0.26	0.000000089	0.021	0.0034	0.96	0.000012	0.00000089	0.0000022	0.000057	0.0000058	0.0044	0.000089
2-Dec-15	17	33	401	385	0.00087	0.0058	0.000049	0.00012	0.19	0.12	0.00044	0.000042	0.00084	0.00089	0.20	0.000026	0.25	0.000000089	0.022	0.0037	0.96	0.000015	0.0000022	0.0000027	0.000052	0.0000049	0.0049	0.000089
16-Dec-15	18	35	401	380	0.0010	0.0051	0.00012	0.00013	0.18	0.12	0.00044	0.000019	0.00085	0.00096	0.19	0.000021	0.28	0.000000087	0.018	0.0037	0.95	0.000014	0.0000026	0.0000022	0.000051	0.0000044	0.0048	0.000087
30-Dec-15	19	37	402	395	0.00069	0.0050	0.000025	0.00012	0.17	0.12	0.00091	0.000015	0.00076	0.00086	0.18	0.000019	0.24	0.00000032	0.020	0.0034	0.81	0.000015	0.00000045	0.0000023	0.000059	0.0000054	0.0044	0.000091
13-Jan-16	20	39	402	375	0.00056	0.0045	0.0000065	0.00010	0.16	0.11	0.00043	0.000025	0.00068	0.00095	0.17	0.000024	0.25	0.000000086	0.016	0.0030	0.81	0.000011	0.0000026	0.0000022	0.000045	0.0000039	0.0040	0.000086
27-Jan-16	21	41	403	405	0.00064	0.0050	0.0000061	0.00010	0.16	0.11	0.00047	0.0000037	0.00071	0.0010	0.18	0.000015	0.24	0.000000093	0.015	0.0035	0.92	0.000016	0.00000093	0.0000023	0.000056	0.0000042	0.0043	0.000093
10-Feb-16	22	43	404	400	0.00070	0.0044	0.0000041	0.000091	0.15	0.11	0.00046	0.0000032	0.00071	0.0011	0.17	0.000017	0.22	0.000000092	0.014	0.0032	0.85	0.000014	0.0000032	0.0000023	0.000054	0.0000041	0.0047	0.000092
24-Feb-16	23	45	405	375	0.00064	0.0044	0.0000017	0.000088	0.16	0.11	0.00086	0.0000030	0.00069	0.0011	0.16	0.000015	0.23	0.000000086	0.011	0.0031	0.79	0.000013	0.0000034	0.0000022	0.000049	0.0000030	0.0045	0.000086
9-Mar-16	24	47	405	385																								

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 9 (Latte Schist Oxide Ore)

Date	**Cycle**	**Week**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
-	No.	-	Input	Output	-	umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	700	360	7.6	3083	#N/A	12	139	2100	33	0.34	< 0.3	1890	0.0037	0.0070	0.11	0.024	< 7E-06	< 7E-06	0.022	0.000018	442	0.00029	0.0027
6-May-15	2	3	400	355	7.7	1878	#N/A	7.0	80	1352	10	0.37	< 0.3	1200	0.0028	0.0044	0.095	0.011	< 7E-06	< 7E-06	0.017	0.000010	293	< 3E-05	0.0015
20-May-15	3	5	400	375	7.8	1274	#N/A	7.1	73	720	2.0	0.37	< 0.3	712	0.0014	0.0031	0.081	0.0079	< 7E-06	< 7E-06	0.013	0.0000040	183	0.00011	0.00081
3-Jun-15	4	7	400	255	7.8	1162	#N/A	6.7	82	560	1.0	0.43	< 0.3	542	0.0053	0.0032	0.087	0.0086	< 7E-06	< 7E-06	0.017	0.0000030	137	0.000060	0.00055
17-Jun-15	5	9	500	445	7.9	776	#N/A	7.0	85	353	< 1	0.42	< 0.3	374	0.0048	0.0032	0.096	0.0081	< 7E-06	< 7E-06	0.014	0.0000030	96	0.000060	0.00034
1-Jul-15	6	11	500	390	7.9	687	#N/A	7.0	90	235	< 1	0.47	< 0.3	276	0.0038	0.0030	0.097	0.0097	< 7E-06	< 7E-06	0.011	< 3E-06	68	0.000080	0.00023
15-Jul-15	7	13	500	455	7.9	521	#N/A	5.8	93	182	< 1	0.50	< 0.3	230	0.0047	0.0031	0.093	0.011	< 7E-06	< 7E-06	0.015	< 3E-06	54	0.000090	0.00021
29-Jul-15	8	15	400	375	7.9	490	#N/A	3.9	93	155	< 1	0.51	< 0.3	219	0.0036	0.0033	0.085	0.011	< 7E-06	< 7E-06	0.014	0.0000080	54	0.000080	0.00015
12-Aug-15	9	17	400	395	7.9	440	#N/A	4.4	94	122	< 1	0.50	< 0.3	197	0.0025	0.0032	0.079	0.012	< 7E-06	< 7E-06	0.010	< 3E-06	48	0.000070	0.00011
26-Aug-15	10	19	500	460	7.6	408	#N/A	4.2	94	100	1.0	0.51	0.30	189	0.0039	0.0033	0.086	0.014	0.0000070	0.0000070	0.010	0.0000040	45	0.000075	0.00010
9-Sep-15	11	21	500	450	7.9	374	#N/A	4.0	94	89	-	0.52	-	180	0.0050	0.0034	0.10	0.016	< 7E-06	< 7E-06	0.011	0.0000050	43	0.000080	0.00010
23-Sep-15	12	23	500	465	8.0	346	#N/A	3.4	98	79	-	0.51	-	171	0.0046	0.0036	0.11	0.016	0.0000070	0.0000070	0.0098	0.0000045	41	0.000095	0.000080
7-Oct-15	13	25	400	370	7.9	349	#N/A	3.2	107	70	-	0.49	-	161	0.0038	0.0037	0.12	0.016	< 7E-06	< 7E-06	0.0091	0.0000040	40	0.00011	0.000066
21-Oct-15	14	27	400	385	8.1	321	#N/A	2.1	102	56	-	0.47	-	150	0.0051	0.0037	0.11	0.018	< 7E-06	< 7E-06	0.010	< 3E-06	38	0.00010	0.000058
4-Nov-15	15	29	400	385	8.0	316	#N/A	2.3	107	54	-	0.48	-	155	0.0097	0.0031	0.12	0.019	< 7E-06	< 7E-06	0.0068	0.000011	39	0.000070	0.000042
18-Nov-15	16	31	400	370	8.1	316	#N/A	1.4	117	49	-	0.48	-	149	0.0036	0.0032	0.12	0.015	< 7E-06	< 7E-06	0.0066	< 3E-06	37	0.00011	0.000055
2-Dec-15	17	33	400	375	8.2	306	#N/A	1.8	105	46	-	0.48	-	158	0.0036	0.0033	0.11	0.021	< 7E-06	< 7E-06	0.0077	0.0000070	39	0.000080	0.000091
16-Dec-15	18	35	400	360	8.2	296	#N/A	2.1	97	44	-	0.46	-	155	0.0030	0.0035	0.14	0.022	< 7E-06	< 7E-06	0.0092	0.0000080	38	0.000060	0.000076
30-Dec-15	19	37	400	385	8.2	288	#N/A	1.4	95	45	-	0.47	-	146	0.0052	0.0030	0.12	0.022	< 7E-06	< 7E-06	0.0078	0.000011	36	0.00014	0.000054
13-Jan-16	20	39	400	355	8.2	285	#N/A	1.5	98	46	-	0.45	-	143	0.0022	0.0032	0.11	0.021	< 7E-06	< 7E-06	0.0090	< 3E-06	35	0.00015	0.000082
27-Jan-16	21	41	400	370	8.1	276	#N/A	2.8	98	44	-	0.47	-	136	0.0030	0.0033	0.088	0.024	< 7E-06	< 7E-06	0.0070	0.000010	33	0.000070	0.000058
10-Feb-16	22	43	400	385	8.1	276	#N/A	2.4	101	38	-	0.42	-	139	0.0031	0.0033	0.083	0.025	0.000011	< 7E-06	0.0060	< 3E-06	34	0.000070	0.000045
24-Feb-16	23	45	400	360	8.1	285	#N/A	2.2	101	38	-	0.41	-	148	0.0012	0.0032	0.094	0.026	< 7E-06	< 7E-06	0.0050	0.0000040	36	0.00012	0.000058
9-Mar-16	24	47	400	365	8.1	270	#N/A	2.0	97	33															

Calculated Loading Rates for Col 9

Date	**Cycle**	**Week**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
-	No.	-	Input	Output	-	umhos/cm	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	700	360	7.6	3083	#N/A	0.88	10	151	2.4	0.024	0.022	136	0.00027	0.00050	0.0079	0.0017	0.00000050	0.00000050	0.0015	0.0000013	32	0.000021	0.00020
6-May-15	2	3	400	355	7.7	1878	#N/A	0.25	2.8	48	3.6	0.013	0.011	43	0.000099	0.00016	0.0034	0.00038	0.00000025	0.00000025	0.00061	0.00000036	10	0.0000011	0.000053
20-May-15	3	5	400	375	7.8	1274	#N/A	0.27	2.7	27	0.75	0.014	0.011	27	0.000053	0.00012	0.0030	0.00029	0.00000026	0.00000026	0.00049	0.00000015	6.9	0.0000041	0.000030
3-Jun-15	4	7	400	255	7.8	1162	#N/A	0.17	2.1	14	0.26	0.011	0.0077	14	0.00014	0.000082	0.0022	0.00022	0.00000018	0.00000018	0.00043	0.000000077	3.5	0.0000015	0.000014
17-Jun-15	5	9	500	445	7.9	776	#N/A	0.31	3.8	16	0.45	0.019	0.013	17	0.00021	0.00014	0.0043	0.00036	0.00000031	0.00000031	0.00061	0.00000013	4.3	0.0000027	0.000015
1-Jul-15	6	11	500	390	7.9	687	#N/A	0.27	3.5	9.2	0.39	0.018	0.012	11	0.00015	0.00012	0.0038	0.00038	0.00000027	0.00000027	0.00041	0.00000012	2.7	0.0000031	0.0000090
15-Jul-15	7	13	500	455	7.9	521	#N/A	0.26	4.2	8.3	0.46	0.023	0.014	10	0.00021	0.00014	0.0042	0.00049	0.00000032	0.00000032	0.00069	0.00000014	2.5	0.0000041	0.0000096
29-Jul-15	8	15	400	375	7.9	490	#N/A	0.15	3.5	5.8	0.38	0.019	0.011	8.2	0.00014	0.00012	0.0032	0.00041	0.00000026	0.00000026	0.00051	0.00000030	2.0	0.0000030	0.0000057
12-Aug-15	9	17	400	395	7.9	440	#N/A	0.18	3.7	4.8	0.40	0.020	0.012	7.8	0.000099	0.00013	0.0031	0.00047	0.00000028	0.00000028	0.00040	0.00000012	1.9	0.0000028	0.0000045
26-Aug-15	10	19	500	460	7.6	408	0.00	0.19	4.3	4.6	0.46	0.023	0.014	8.7	0.00018	0.00015	0.0040	0.00063	0.00000032	0.00000032	0.00048	0.00000018	2.1	0.0000035	0.0000048
9-Sep-15	11	21	500	450	7.9	374	#N/A	0.18	4.2	4.6	0.00	0.027	0.00	9.3	0.00027	0.00018	0.0048	0.00080	0.00000036	0.00000036	0.00054	0.00000026	2.2	0.0000041	0.0000049
23-Sep-15	12	23	500	465	8.0	346	#N/A	0.16	4.6	4.2	0.00	0.027		9.1	0.00024	0.00019	0.0056	0.00084	0.00000037	0.00000037	0.00052	0.00000024	2.2	0.0000051	0.0000043
7-Oct-15	13	25	400	370	7.9	349	#N/A	0.12	4.0	3.0	0.00	0.021		6.8	0.00016	0.00016	0.0050	0.00068	0.00000030	0.00000030	0.00039	0.00000017	1.7	0.0000047	0.0000028
21-Oct-15	14	27	400	385	8.1	321	#N/A	0.081	3.9	2.5	0.00	0.021		6.6	0.00023	0.00016	0.0050	0.00078	0.00000031	0.00000031	0.00044	0.00000013	1.7	0.0000044	0.0000026
4-Nov-15	15	29	400	385	8.0	316	#N/A	0.089	4.1	2.4	0.00	0.021		6.9	0.00043	0.00014	0.0054	0.00084	0.00000031	0.00000031	0.00030	0.00000049	1.7	0.0000031	0.0000019
18-Nov-15	16	31	400	370	8.1	316	#N/A	0.053	4.3	2.1	0.00	0.020		6.3	0.00015	0.00014	0.0049	0.00065	0.00000030	0.00000030	0.00028	0.00000013	1.6	0.0000047	0.0000023
2-Dec-15	17	33	400	375	8.2	306	#N/A	0.068	3.9	2.0	0.00	0.021		6.8	0.00016	0.00014	0.0048	0.00090	0.00000030	0.00000030	0.00033	0.00000030	1.7	0.0000034	0.0000039
16-Dec-15	18	35	400	360	8.2	296	#N/A	0.075	3.5	1.8	0.00	0.019		6.4	0.00012	0.00014	0.0056	0.00093	0.00000029	0.00000029	0.00038	0.00000033	1.6	0.0000025	0.0000031
30-Dec-15	19	37	400	385	8.2	288	#N/A	0.054	3.7	2.0	0.00	0.021		6.5	0.00023	0.00013	0.0054	0.00099	0.00000031	0.00000031	0.00035	0.00000049	1.6	0.0000062	0.0000024
13-Jan-16	20	39	400	355	8.2	285	#N/A	0.054	3.5	1.9	0.00	0.018		5.8	0.000090	0.00013	0.0045	0.00087	0.00000029	0.00000029	0.00037	0.00000012	1.4	0.0000061	0.0000033
27-Jan-16	21	41	400	370	8.1	276	#N/A	0.11	3.6	1.9	0.00	0.020		5.8	0.00013	0.00014	0.0037	0.0010	0.00000030	0.00000030	0.00030	0.00000043	1.4	0.0000030	0.0000025
10-Feb-16	22	43	400	385	8.1	276	#N/A	0.092	3.9	1.7	0.00	0.019		6.2	0.00014	0.00015	0.0037	0.0011	0.00000049	0.00000031	0.00027	0.00000013	1.5	0.0000031	0.0000020
24-Feb-16	23	45	400	360	8.1	285	#N/A	0.078	3.6	1.6	0.00	0.017		6.1	0.000050	0.00013	0.0039	0.0011	0.00000029	0.00000029	0.00021	0.00000017	1.5	0.0000050	0.0000024
9-Mar-16	24	47	400	365	8.1	270	#N/A	0.073	3.5	1.4															

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 9 (Latte Schist Oxide Ore)

Date	**Cycle**	**Week**	**Volume** (mL)		**Cu**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
-	No.	-	Input	Output	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	700	360	0.0087	< 0.007	< 1E-05	0.020	192	0.13	0.26	0.0030	0.029	0.017	17	0.019	4.8	0.000046	131	3.0	672	0.00033	0.00012	0.00013	0.069	0.00013	0.0030	< 0.002
6-May-15	2	3	400	355	0.0034	< 0.007	< 1E-05	0.012	114	0.094	0.050	0.0026	0.017	< 0.003	11	0.015	4.2	0.000014	67	1.8	467	0.00017	< 1E-05	0.000050	0.031	0.00010	0.0020	< 0.002
20-May-15	3	5	400	375	0.0020	0.010	< 1E-05	0.0088	62	0.049	0.010	0.0031	0.0084	< 0.003	7.8	0.0077	4.3	0.000015	34	1.1	237	0.00014	0.00018	0.000060	0.018	0.000040	0.0020	< 0.002
3-Jun-15	4	7	400	255	0.0012	< 0.007	< 1E-05	0.0078	48	0.029	< 0.01	0.0028	0.0061	< 0.003	7.2	0.0056	4.2	0.000011	26	0.85	189	0.00012	0.000050	< 5E-05	0.014	0.000080	0.0010	< 0.002
17-Jun-15	5	9	500	445	0.0011	< 0.007	< 1E-05	0.0059	33	0.016	< 0.01	0.0030	0.0039	< 0.003	5.7	0.0037	4.0	0.000010	16	0.56	121	0.00012	0.000090	0.00010	0.0099	0.00010	0.0010	< 0.002
1-Jul-15	6	11	500	390	0.0013	< 0.007	< 1E-05	0.0054	26	0.0093	0.020	0.0027	0.0027	< 0.003	4.9	0.0027	4.0	0.0000080	12	0.45	76	0.00010	0.000080	< 5E-05	0.0078	0.000060	0.0020	< 0.002
15-Jul-15	7	13	500	455	0.00074	< 0.007	0.000010	0.0049	23	0.010	< 0.01	0.0026	0.0021	< 0.003	4.4	0.0017	3.8	0.0000080	8.8	0.38	60	0.00011	0.000080	0.000090	0.0063	0.000090	0.0010	< 0.002
29-Jul-15	8	15	400	375	0.00074	< 0.007	0.000010	0.0047	21	0.0073	< 0.01	0.0028	0.0017	< 0.003	4.3	0.0013	3.5	< 2E-06	6.7	0.37	52	0.000090	0.000080	< 5E-05	0.0053	0.000070	0.0010	< 0.002
12-Aug-15	9	17	400	395	0.00049	< 0.007	< 1E-05	0.0041	19	0.0048	< 0.01	0.0026	0.0015	< 0.003	4.4	0.0010	3.7	0.000018	5.2	0.34	40	0.000064	0.000040	< 5E-05	0.0040	0.000060	0.0010	< 0.002
26-Aug-15	10	19	500	460	0.00065	0.0070	0.000015	0.0039	18	0.0048	0.010	0.0026	0.0015	0.0040	4.5	0.00093	3.6	0.000013	4.4	0.32	40	0.000066	0.000085	0.000050	0.0033	0.000070	0.0010	0.0020
9-Sep-15	11	21	500	450	0.00080	< 0.007	0.000020	0.0036	18	0.00	< 0.01	0.0027	0.0014	0.0050	4.5	0.00082	3.4	0.0000070	3.7	0.31	40	0.000068	0.00013	< 5E-05	0.0026	0.000080	0.0010	< 0.002
23-Sep-15	12	23	500	465	0.00073	0.0070	0.000015	0.0035	16	0.0039	0.010	0.0024	0.0013	0.0040	4.1	0.00075	3.4	0.0000065	3.0	0.28	32	0.000066	0.000080	0.000050	0.0023	0.000070	0.0010	0.0020
7-Oct-15	13	25	400	370	0.00064	< 0.007	< 1E-05	0.0033	15	0.0029	< 0.01	0.0021	0.0011	< 0.003	3.7	0.00067	3.4	0.0000060	2.3	0.26	25	0.000064	0.000030	< 5E-05	0.0021	0.000060	< 0.001	< 0.002
21-Oct-15	14	27	400	385	0.00067	< 0.007	< 1E-05	0.0030	13	0.0024	< 0.01	0.0029	0.0012	< 0.003	3.5	0.00059	3.5	0.0000030	1.9	0.24	22	0.000096	0.000060	< 5E-05	0.0021	0.000060	< 0.001	< 0.002
4-Nov-15	15	29	400	385	0.0031	< 0.007	0.00021	0.0025	14	0.0020	< 0.01	0.0027	0.0012	0.0050	3.5	0.00054	3.3	0.0000030	1.8	0.24	21	0.000095	0.00072	< 5E-05	0.0018	0.00017	0.0030	< 0.002
18-Nov-15	16	31	400	370	0.00066	0.013	0.00015	0.0028	14	0.0017	< 0.01	0.0027	0.00080	< 0.003	3.5	0.00066	3.3	< 2E-06	1.5	0.24	20	0.000066	0.000040	< 5E-05	0.0015	0.000080	0.0010	< 0.002
2-Dec-15	17	33	400	375	0.00069	< 0.007	0.000020	0.0027	15	0.0050	< 0.01	0.0029	0.0012	< 0.003	3.7	0.00066	3.3	< 2E-06	1.5	0.25	19	0.000059	0.000060	0.000070	0.0016	0.000060	0.0010	< 0.002
16-Dec-15	18	35	400	360	0.00077	< 0.007	0.000060	0.0028	15	0.0054	< 0.01	0.0025	0.0011	< 0.003	3.7	0.00056	3.5	< 2E-06	1.3	0.25	18	0.000082	0.00013	0.000070	0.0016	0.000040	< 0.001	< 0.002
30-Dec-15	19	37	400	385	0.00060	0.0070	0.00013	0.0028	14	0.0046	0.010	0.0025	0.0010	< 0.003	3.4	0.00050	3.0	0.0000040	1.2	0.24	15	0.000076	0.000020	0.000060	0.0015	0.000080	0.0010	< 0.002
13-Jan-16	20	39	400	355	0.00089	< 0.007	0.000050	0.0026	14	0.0055	< 0.01	0.0025	0.00090	< 0.003	3.5	0.00064	3.4	0.0000030	1.0	0.22	15	0.000038	0.000060	< 5E-05	0.0012	0.000050	< 0.001	< 0.002
27-Jan-16	21	41	400	370	0.00069	< 0.007	0.000010	0.0026	13	0.0027	< 0.01	0.0024	0.00080	< 0.003	3.5	0.00043	3.3	< 2E-06	0.93	0.24	15	0.000064	0.000060	< 5E-05	0.0013	0.000050	0.0020	< 0.002
10-Feb-16	22	43	400	385	0.00053	< 0.007	0.000060	0.0025	13	0.0018	< 0.01	0.0023	0.00090	< 0.003	3.4	0.00049	3.2	< 2E-06	0.88	0.23	14	0.000057	0.000040	< 5E-05	0.0011	0.000050	< 0.001	< 0.002
24-Feb-16	23	45	400	360	0.00035	< 0.007	< 1E-05	0.0026	14	0.0033	0.020	0.0023	0.00090	< 0.003	3.5	0.00045	3.2	< 2E-06	0.73	0.23	13	0.000060	0.000010	< 5E-05	0.0011	0.000040	0.0010	< 0.002
9-Mar-16	24	47	400	365																								

Calculated Loading Rates for Col 9

Date	**Cycle**	**Week**	**Volume** (mL)		**Cu**	**Fe**	**Pb**	**Li**	**Mg**	**Mn**	**Hg**	**Mo**	**Ni**	**P**	**K**	**Se**	**Si**	**Ag**	**Na**	**Sr**	**S**	**Tl**	**Sn**	**Ti**	**U**	**V**	**Zn**	**Zr**
-	No.	-	Input	Output	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	700	360	0.00063	0.00050	0.00000072	0.0014	14	0.0093	0.019	0.00021	0.0021	0.0012	1.2	0.0014	0.34	0.0000033	9.4	0.21	48	0.000024	0.0000086	0.0000094	0.0049	0.0000094	0.00022	0.00014
6-May-15	2	3	400	355	0.00012	0.00025	0.00000036	0.00043	4.0	0.0033	0.0018	0.000092	0.00062	0.00011	0.39	0.00053	0.15	0.00000050	2.4	0.062	17	0.0000061	0.00000036	0.0000018	0.0011	0.0000036	0.000071	0.000071
20-May-15	3	5	400	375	0.000075	0.00038	0.00000038	0.00033	2.3	0.0018	0.00038	0.00012	0.00032	0.00011	0.29	0.00029	0.16	0.00000056	1.3	0.040	8.9	0.0000053	0.0000068	0.0000023	0.00068	0.0000015	0.000075	0.000075
3-Jun-15	4	7	400	255	0.000031	0.00018	0.00000026	0.00020	1.2	0.00073	0.00026	0.000071	0.00016	0.000077	0.18	0.00014	0.11	0.00000028	0.65	0.022	4.8	0.0000031	0.0000013	0.0000013	0.00036	0.0000020	0.000026	0.000051
17-Jun-15	5	9	500	445	0.000047	0.00031	0.00000045	0.00026	1.5	0.00071	0.00045	0.00013	0.00017	0.00013	0.25	0.00017	0.18	0.00000045	0.73	0.025	5.4	0.0000052	0.0000040	0.0000045	0.00044	0.0000045	0.000045	0.000089
1-Jul-15	6	11	500	390	0.000052	0.00027	0.00000039	0.00021	1.0	0.00036	0.00078	0.00010	0.00011	0.00012	0.19	0.00011	0.16	0.00000031	0.46	0.018	3.0	0.0000040	0.0000031	0.0000020	0.00030	0.0000023	0.000078	0.000078
15-Jul-15	7	13	500	455	0.000034	0.00032	0.00000046	0.00022	1.0	0.00046	0.00046	0.00012	0.000096	0.00014	0.20	0.000078	0.17	0.00000036	0.40	0.017	2.7	0.0000049	0.0000036	0.0000041	0.00029	0.0000041	0.000046	0.000091
29-Jul-15	8	15	400	375	0.000028	0.00026	0.00000038	0.00018	0.77	0.00027	0.00038	0.00010	0.000064	0.00011	0.16	0.000047	0.13	0.000000075	0.25	0.014	2.0	0.0000034	0.0000030	0.0000019	0.00020	0.0000026	0.000038	0.000075
12-Aug-15	9	17	400	395	0.000019	0.00028	0.00000040	0.00016	0.73	0.00019	0.00040	0.00010	0.000059	0.00012	0.17	0.000041	0.14	0.00000071	0.20	0.013	1.6	0.0000025	0.0000016	0.0000020	0.00016	0.0000024	0.000040	0.000079
26-Aug-15	10	19	500	460	0.000030	0.00032	0.00000069	0.00018	0.84	0.00022	0.00046	0.00012	0.000067	0.00018	0.21	0.000043	0.16	0.00000058	0.20	0.015	1.8	0.0000030	0.0000039	0.0000023	0.00015	0.0000032	0.000046	0.000092
9-Sep-15	11	21	500	450	0.000042	0.00036	0.0000010	0.00019	0.93	0.00025	0.00052	0.00014	0.000072	0.00026	0.23	0.000042	0.18	0.00000036	0.19	0.016	2.1	0.0000035	0.0000067	0.0000026	0.00013	0.0000041	0.000052	0.00010
23-Sep-15	12	23	500	465	0.000039	0.00037	0.00000080	0.00019	0.88	0.00021	0.00053	0.00013	0.000067	0.00021	0.22	0.000040	0.18	0.00000035	0.16	0.015	1.7	0.0000035	0.0000043	0.0000027	0.00013	0.0000037	0.000053	0.00011
7-Oct-15	13	25	400	370	0.000027	0.00030	0.00000043	0.00014	0.64	0.00013	0.00043	0.000087	0.000047	0.00013	0.16	0.000028	0.14	0.00000026	0.097	0.011	1.1	0.0000027	0.0000013	0.0000021	0.000089	0.0000026	0.000043	0.000085
21-Oct-15	14	27	400	385	0.000030	0.00031	0.00000044	0.00013	0.59	0.00011	0.00044	0.00013	0.000053	0.00013	0.16	0.000026	0.15	0.00000013	0.085	0.011	0.98	0.0000042	0.0000027	0.0000022	0.000093	0.0000027	0.000044	0.000089
4-Nov-15	15	29	400	385	0.00014	0.00031	0.0000093	0.00011	0.62	0.000090	0.00044	0.00012	0.000053	0.00022	0.16	0.000024	0.15	0.00000013	0.079	0.010	0.92	0.0000042	0.000032	0.0000022	0.000081	0.0000075	0.00013	0.000089
18-Nov-15	16	31	400	370	0.000028	0.00055	0.0000064	0.00012	0.59	0.000072	0.00043	0.00011	0.000034	0.00013	0.15	0.000028	0.14	0.000000085	0.065	0.0100	0.84	0.0000028	0.0000017	0.0000021	0.000065	0.0000034	0.000043	0.000085
2-Dec-15	17	33	400	375	0.000030	0.00030	0.00000086	0.00012	0.64	0.00022	0.00043	0.00012	0.000052	0.00013	0.16	0.000028	0.14	0.000000086	0.066	0.011	0.81	0.0000025	0.0000026	0.0000030	0.000070	0.0000026	0.000043	0.000086
16-Dec-15	18	35	400	360	0.000032	0.00029	0.0000025	0.00012	0.60	0.00022	0.00041	0.00010	0.000046	0.00012	0.15	0.000023	0.14	0.000000083	0.055	0.010	0.74	0.0000034	0.0000054	0.0000029	0.000067	0.0000017	0.000041	0.000083
30-Dec-15	19	37	400	385	0.000027	0.00031	0.0000058	0.00012	0.61	0.00020	0.00044	0.00011	0.000044	0.00013	0.15	0.000022	0.13	0.00000018	0.054	0.011	0.66	0.0000034	0.00000089	0.0000027	0.000065	0.0000035	0.000044	0.000089
13-Jan-16	20	39	400	355	0.000036	0.00029	0.0000020	0.00011	0.55	0.00022	0.00041	0.00010	0.000037	0.00012	0.14	0.000026	0.14	0.00000012	0.042	0.0090	0.59	0.0000016	0.0000024	0.0000020	0.000050	0.0000020	0.000041	0.000082
27-Jan-16	21	41	400	370	0.000029	0.00030	0.00000043	0.00011	0.54	0.00011	0.00043	0.00010	0.000034	0.00013	0.15	0.000018	0.14	0.000000085	0.040	0.010	0.62	0.0000027	0.0000026	0.0000021	0.000056	0.0000021	0.000085	0.000085
10-Feb-16	22	43	400	385	0.000023	0.00031	0.0000027	0.00011	0.58	0.000077	0.00044	0.00010	0.000040	0.00013	0.15	0.000022	0.14	0.000000089	0.039	0.010	0.61	0.0000025	0.0000018	0.0000022	0.000050	0.0000022	0.000044	0.000089
24-Feb-16	23	45	400	360	0.000014	0.00029	0.00000041	0.00011	0.58	0.00013	0.00083	0.000097	0.000037	0.00012	0.15	0.000019	0.13	0.000000083	0.030	0.0096	0.54	0.0000025	0.00000041	0.0000021	0.000047	0.0000017	0.000041	0.000083
9-Mar-16	24	47	400	365																								

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 10 (Latte Schist Transition Ore)

Date	Cycle	Week	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
-	No.	-	Input	Output	-	umhos/cm	$mgCaCO_3/L$	$mgCaCO_3/L$	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	$mgCaCO_3/L$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	700	435	7.7	3558	#N/A	13	142	2538	31	0.31	< 0.3	2390	0.0027	0.027	0.18	0.013	< 7E-06	< 7E-06	0.014	0.000018	507	0.000050	0.0069
6-May-15	2	3	400	355	7.6	2779	#N/A	7.8	70	1837	14	0.33	< 0.3	1740	0.0026	0.018	0.14	0.0054	< 7E-06	< 7E-06	0.010	0.0000080	425	< 3E-05	0.0041
20-May-15	3	5	400	360	7.7	2305	#N/A	9.0	60	1421	1.0	0.34	< 0.3	1340	0.0052	0.014	0.12	0.0046	< 7E-06	< 7E-06	0.0070	0.0000040	351	0.000050	0.0030
3-Jun-15	4	7	400	270	7.7	2125	#N/A	8.2	63	1280	< 1	0.36	< 0.3	1277	0.0049	0.015	0.12	0.0048	< 7E-06	< 7E-06	0.011	0.0000040	348	0.000040	0.0026
17-Jun-15	5	9	500	455	7.8	1396	#N/A	8.1	65	848	< 1	0.37	< 0.3	826	0.0044	0.014	0.12	0.0041	< 7E-06	< 7E-06	0.0084	0.0000040	229	0.000080	0.0017
1-Jul-15	6	11	500	470	7.8	873	#N/A	7.1	66	639	< 1	0.38	< 0.3	611	0.0040	0.014	0.12	0.0043	< 7E-06	< 7E-06	0.0053	< 3E-06	168	< 3E-05	0.0013
15-Jul-15	7	13	500	450	7.8	825	#N/A	5.6	69	521	< 1	0.41	< 0.3	530	0.0060	0.014	0.11	0.0046	< 7E-06	0.0000070	0.0097	< 3E-06	140	< 3E-05	0.0013
29-Jul-15	8	15	400	365	7.8	988	#N/A	4.6	69	485	< 1	0.41	< 0.3	516	0.0051	0.014	0.10	0.0051	< 7E-06	< 7E-06	0.0089	< 3E-06	141	0.00013	0.0010
12-Aug-15	9	17	400	375	7.8	788	#N/A	4.8	71	396	< 1	0.39	< 0.3	448	0.0047	0.014	0.11	0.0051	< 7E-06	< 7E-06	0.0063	0.0000050	123	0.00014	0.00082
26-Aug-15	10	19	500	445	7.7	788	#N/A	4.5	70	343	1.0	0.41	0.30	396	0.0048	0.015	0.11	0.0056	0.0000070	0.0000070	0.0061	0.0000040	109	0.000085	0.00070
9-Sep-15	11	21	500	450	7.9	602	#N/A	4.2	70	283	< 1	0.42	< 0.3	344	0.0049	0.017	0.11	0.0062	< 7E-06	< 7E-06	0.0058	< 3E-06	96	< 3E-05	0.00058
23-Sep-15	12	23	500	465	7.9	586	#N/A	3.6	74	251	-	0.41	-	322	0.0043	0.017	0.11	0.0063	0.0000070	0.0000070	0.0054	0.0000030	89	0.000055	0.00052
7-Oct-15	13	25	400	360	7.9	630	#N/A	3.9	81	241	-	0.39	-	299	0.0036	0.018	0.11	0.0065	< 7E-06	< 7E-06	0.0050	< 3E-06	83	0.000080	0.00045
21-Oct-15	14	27	400	360	8.0	583	#N/A	2.1	79	178	-	0.39	-	267	0.0060	0.018	0.12	0.0076	< 7E-06	< 7E-06	0.0064	0.0000030	76	0.000050	0.00041
4-Nov-15	15	29	400	375	8.0	585	#N/A	2.9	84	225	-	0.38	-	284	0.0051	0.016	0.12	0.0085	< 7E-06	< 7E-06	0.0043	< 3E-06	80	< 3E-05	0.00036
18-Nov-15	16	31	400	360	8.1	534	#N/A	1.7	90	168	-	0.39	-	244	0.0037	0.015	0.12	0.0056	< 7E-06	< 7E-06	0.0029	< 3E-06	69	0.000040	0.00032
2-Dec-15	17	33	400	375	8.1	492	#N/A	2.4	81	136	-	0.39	-	250	0.0048	0.017	0.12	0.0086	< 7E-06	< 7E-06	0.0050	0.0000070	69	0.000040	0.00049
16-Dec-15	18	35	400	355	8.1	438	#N/A	2.3	75	144	-	0.37	-	246	0.0037	0.017	0.14	0.0099	< 7E-06	< 7E-06	0.0056	0.0000050	69	< 3E-05	0.00043
30-Dec-15	19	37	400	345	8.1	443	#N/A	1.8	77	120	-	0.37	-	222	0.0043	0.016	0.13	0.0094	< 7E-06	< 7E-06	0.0047	< 3E-06	62	0.000070	0.00039
13-Jan-16	20	39	400	365	8.1	403	#N/A	1.7	77	112	-	0.36	-	196	0.0032	0.016	0.12	0.0095	< 7E-06	< 7E-06	0.0060	< 3E-06	54	< 3E-05	0.00031
27-Jan-16	21	41	400	365	8.0	386	#N/A	3.4	77	108	-	0.42	-	188	0.0040	0.017	0.13	0.011	< 7E-06	< 7E-06	0.0040	0.0000030	53	< 3E-05	0.00032
10-Feb-16	22	43	401	375	8.1	380	#N/A	2.5	81	103	-	0.36	-	183	0.0049	0.017	0.14	0.011	< 7E-06	< 7E-06	0.0030	< 3E-06	51	< 3E-05	0.00028
24-Feb-16	23	45	402	350	8.1	397	#N/A	2.5	82	103	-	0.37	-	201	0.0020	0.017	0.14	0.011	< 7E-06	< 7E-06	0.0020	0.0000040	56	< 3E-05	0.00031
9-Mar-16	24	47	403	370	8.1	379	#N/A	2.3	78	79															

Calculated Loading Rates for Col 10

Date	Cycle	Week	Volume (mL)		pH	Cond.	Acidity (pH 4.5)	Acidity (pH 8.3)	Alkalinity	Sulphate	Chloride	Fluoride	Bromide	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
-	No.	-	Input	Output	-	umhos/cm	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	$mgCaCO_3/kg/wk$	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	700	435	7.7	3558	#N/A	1.1	12	221	2.7	0.027	0.026	208	0.00023	0.0024	0.015	0.0011	0.00000061	0.00000061	0.0012	0.0000016	44	0.0000044	0.00060
6-May-15	2	3	400	355	7.6	2779	#N/A	0.28	2.5	65	0.50	0.012	0.011	62	0.000092	0.00063	0.0049	0.00019	0.00000025	0.00000025	0.00036	0.00000028	15	0.0000011	0.00015
20-May-15	3	5	400	360	7.7	2305	#N/A	0.33	2.1	51	0.036	0.012	0.011	48	0.00019	0.00050	0.0043	0.00016	0.00000025	0.00000025	0.00025	0.00000014	13	0.0000018	0.00011
3-Jun-15	4	7	400	270	7.7	2125	#N/A	0.22	1.7	35	0.027	0.0097	0.0081	34	0.00013	0.00040	0.0032	0.00013	0.00000019	0.00000019	0.00030	0.00000011	9.4	0.0000011	0.000070
17-Jun-15	5	9	500	455	7.8	1396	#N/A	0.37	3.0	39	0.046	0.017	0.014	38	0.00020	0.00065	0.0056	0.00018	0.00000032	0.00000032	0.00038	0.00000018	10	0.0000036	0.000077
1-Jul-15	6	11	500	470	7.8	873	#N/A	0.33	3.1	30	0.047	0.018	0.014	29	0.00019	0.00067	0.0055	0.00020	0.00000033	0.00000033	0.00025	0.00000014	7.9	0.0000014	0.000062
15-Jul-15	7	13	500	450	7.8	825	#N/A	0.25	3.1	23	0.045	0.018	0.014	24	0.00027	0.00063	0.0051	0.00021	0.00000032	0.00000032	0.00044	0.00000014	6.3	0.0000014	0.000057
29-Jul-15	8	15	400	365	7.8	988	#N/A	0.17	2.5	18	0.037	0.015	0.011	19	0.00019	0.00051	0.0037	0.00019	0.00000026	0.00000026	0.00032	0.00000011	5.1	0.0000047	0.000038
12-Aug-15	9	17	400	375	7.8	788	#N/A	0.18	2.7	15	0.038	0.015	0.011	17	0.00018	0.00053	0.0039	0.00019	0.00000026	0.00000026	0.00024	0.00000019	4.6	0.0000053	0.000031
26-Aug-15	10	19	500	445	7.7	788	0.00	0.20	3.1	15	0.045	0.018	0.013	18	0.00021	0.00068	0.0048	0.00025	0.00000031	0.00000031	0.00027	0.00000018	4.9	0.0000038	0.000031
9-Sep-15	11	21	500	450	7.9	602	#N/A	0.19	3.1	15	0.045	0.022	0.016	18	0.00025	0.00086	0.0056	0.00032	0.00000036	0.00000036	0.00030	0.00000016	5.0	0.0000016	0.000030
23-Sep-15	12	23	500	465	7.9	586	#N/A	0.17	3.4	13	0.00	0.022		17	0.00023	0.00092	0.0060	0.00034	0.00000037	0.00000037	0.00029	0.00000016	4.8	0.0000029	0.000028
7-Oct-15	13	25	400	360	7.9	630	#N/A	0.14	2.9	10.0	0.00	0.016		12	0.00015	0.00074	0.0047	0.00027	0.00000029	0.00000029	0.00021	0.00000012	3.4	0.0000033	0.000019
21-Oct-15	14	27	400	360	8.0	583	#N/A	0.077	2.8	7.4	0.00	0.016		11	0.00025	0.00072	0.0050	0.00031	0.00000029	0.00000029	0.00026	0.00000012	3.1	0.0000021	0.000017
4-Nov-15	15	29	400	375	8.0	585	#N/A	0.11	3.2	9.7	0.00	0.016		12	0.00022	0.00067	0.0053	0.00037	0.00000030	0.00000030	0.00019	0.00000013	3.4	0.0000013	0.000015
18-Nov-15	16	31	400	360	8.1	534	#N/A	0.060	3.3	7.0	0.00	0.016		10	0.00015	0.00064	0.0050	0.00023	0.00000029	0.00000029	0.00012	0.00000012	2.8	0.0000017	0.000013
2-Dec-15	17	33	400	375	8.1	492	#N/A	0.088	3.0	5.9	0.00	0.017		11	0.00021	0.00073	0.0050	0.00037	0.00000030	0.00000030	0.00022	0.00000030	3.0	0.0000017	0.000021
16-Dec-15	18	35	400	355	8.1	438	#N/A	0.082	2.6	5.9	0.00	0.015		10	0.00015	0.00071	0.0056	0.00041	0.00000029	0.00000029	0.00023	0.00000020	2.8	0.0000012	0.000017
30-Dec-15	19	37	400	345	8.1	443	#N/A	0.062	2.6	4.8	0.00	0.015		8.8	0.00017	0.00063	0.0051	0.00037	0.00000028	0.00000028	0.00019	0.00000012	2.5	0.0000028	0.000015
13-Jan-16	20	39	400	365	8.1	403	#N/A	0.062	2.8	4.7	0.00	0.015		8.2	0.00013	0.00068	0.0048	0.00040	0.00000029	0.00000029	0.00025	0.00000013	2.3	0.0000013	0.000013
27-Jan-16	21	41	400	365	8.0	386	#N/A	0.12	2.8	4.5	0.00	0.018		7.9	0.00017	0.00070	0.0053	0.00044	0.00000029	0.00000029	0.00017	0.00000013	2.2	0.0000013	0.000013
10-Feb-16	22	43	401	375	8.1	380	#N/A	0.095	3.0	4.4	0.00	0.016		7.9	0.00021	0.00073	0.0060	0.00046	0.00000030	0.00000030	0.00013	0.00000013	2.2	0.0000013	0.000012
24-Feb-16	23	45	402	350	8.1	397	#N/A	0.088	2.9	4.1	0.00	0.015		8.1	0.000080	0.00069	0.0055	0.00046	0.00000028	0.00000028	0.000080	0.00000016	2.2	0.0000012	0.000012
9-Mar-16	24	47	403	370	8.1	379	#N/A	0.084	2.9	3.4	0.00														

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 10 (Latte Schist Transition Ore)

Date	Cycle	Week	Volume (mL)		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
-	No.	-	Input	Output	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	700	435	0.0085	< 0.007	< 1E-05	0.020	272	0.41	0.26	0.0049	0.048	0.014	21	0.028	3.9	0.00020	68	3.8	807	0.00065	0.000080	0.000060	0.065	0.00015	0.0020	< 0.002
6-May-15	2	3	400	355	0.0037	< 0.007	0.000020	0.011	164	0.33	0.040	0.0047	0.033	< 0.003	14	0.018	3.1	0.000012	31	2.6	720	0.00042	< 1E-05	< 5E-05	0.042	0.00013	0.0030	< 0.002
20-May-15	3	5	400	360	0.0018	< 0.007	0.000010	0.0088	112	0.27	< 0.01	0.0046	0.022	< 0.003	11	0.0089	3.3	0.0000060	17	2.0	447	0.00039	0.00013	0.00012	0.031	0.00014	0.0010	< 0.002
3-Jun-15	4	7	400	270	0.010	< 0.007	0.00016	0.0085	99	0.23	< 0.01	0.0051	0.019	< 0.003	11	0.0064	3.3	0.0000060	13	1.9	434	0.00036	0.0020	< 5E-05	0.029	0.00013	0.0090	< 0.002
17-Jun-15	5	9	500	455	0.0012	< 0.007	< 1E-05	0.0062	62	0.13	< 0.01	0.0039	0.013	< 0.003	8.1	0.0042	3.0	0.0000060	7.5	1.2	285	0.00029	0.000050	0.000060	0.018	0.00011	0.0010	< 0.002
1-Jul-15	6	11	500	470	0.00093	< 0.007	< 1E-05	0.0054	47	0.10	< 0.01	0.0036	0.0098	< 0.003	6.8	0.0032	2.9	0.0000030	5.0	0.91	195	0.00025	0.000050	< 5E-05	0.015	0.00011	0.0010	< 0.002
15-Jul-15	7	13	500	450	0.0011	< 0.007	0.000020	0.0051	44	0.099	< 0.01	0.0034	0.0087	< 0.003	5.9	0.0024	3.1	0.0000030	4.2	0.77	171	0.00024	0.000070	< 5E-05	0.014	0.00014	0.0010	< 0.002
29-Jul-15	8	15	400	365	0.0014	< 0.007	0.000030	0.0049	40	0.082	< 0.01	0.0038	0.0068	< 0.003	6.2	0.0019	2.6	< 2E-06	3.3	0.78	167	0.00021	0.00015	< 5E-05	0.014	0.00013	< 0.001	< 0.002
12-Aug-15	9	17	400	375	0.00043	< 0.007	< 1E-05	0.0042	34	0.067	< 0.01	0.0036	0.0060	< 0.003	6.0	0.0015	2.9	0.0000080	2.7	0.68	130	0.00018	0.000040	0.000080	0.011	0.00012	< 0.001	< 0.002
26-Aug-15	10	19	500	445	0.00056	0.0070	0.000010	0.0038	30	0.057	0.010	0.0033	0.0051	0.0030	5.6	0.0014	2.7	0.0000055	2.2	0.59	118	0.00017	0.000085	0.000065	0.0096	0.00015	0.0010	0.0020
9-Sep-15	11	21	500	450	0.00068	< 0.007	< 1E-05	0.0035	26	0.047	< 0.01	0.0031	0.0042	< 0.003	5.2	0.0012	2.5	0.0000030	1.8	0.50	105	0.00016	0.00013	< 5E-05	0.0082	0.00018	< 0.001	< 0.002
23-Sep-15	12	23	500	465	0.00060	0.0070	0.000010	0.0033	24	0.044	0.010	0.0028	0.0040	0.0030	4.9	0.0012	2.4	0.0000025	1.6	0.48	94	0.00014	0.000070	0.000050	0.0080	0.00014	0.0010	0.0020
7-Oct-15	13	25	400	360	0.00051	< 0.007	< 1E-05	0.0031	22	0.041	< 0.01	0.0025	0.0037	< 0.003	4.5	0.0012	2.4	0.0000020	1.4	0.46	83	0.00012	0.000010	< 5E-05	0.0077	0.00010	0.0010	< 0.002
21-Oct-15	14	27	400	360	0.00060	< 0.007	0.000010	0.0030	19	0.037	< 0.01	0.0034	0.0036	< 0.003	4.2	0.0011	2.5	< 2E-06	1.3	0.40	74	0.00016	0.000040	< 5E-05	0.0079	0.00011	0.0080	< 0.002
4-Nov-15	15	29	400	375	0.0013	< 0.007	0.000070	0.0025	21	0.036	< 0.01	0.0030	0.0039	< 0.003	4.4	0.0010	2.4	< 2E-06	1.2	0.40	74	0.00017	0.000070	< 5E-05	0.0081	0.00012	0.0010	< 0.002
18-Nov-15	16	31	400	360	0.00035	< 0.007	< 1E-05	0.0027	18	0.030	< 0.01	0.0032	0.0028	< 0.003	4.0	0.0012	2.3	< 2E-06	0.98	0.36	63	0.00012	0.000030	< 5E-05	0.0050	0.00011	< 0.001	< 0.002
2-Dec-15	17	33	400	375	0.00089	< 0.007	0.000040	0.0026	19	0.038	< 0.01	0.0033	0.0033	< 0.003	4.3	0.0011	2.4	< 2E-06	1.0	0.35	58	0.00012	0.000040	< 5E-05	0.0061	0.00012	0.0020	< 0.002
16-Dec-15	18	35	400	355	0.00048	< 0.007	< 1E-05	0.0027	18	0.042	< 0.01	0.0032	0.0032	< 0.003	4.2	0.0010	2.5	< 2E-06	0.89	0.36	57	0.00013	0.000040	< 5E-05	0.0062	0.00012	< 0.001	< 0.002
30-Dec-15	19	37	400	345	0.00071	< 0.007	0.000040	0.0027	16	0.035	0.010	0.0031	0.0029	< 0.003	3.9	0.00090	2.2	0.0000030	0.85	0.32	44	0.00012	0.000020	0.000050	0.0053	0.00017	0.0010	< 0.002
13-Jan-16	20	39	400	365	0.00064	< 0.007	0.000070	0.0024	15	0.031	< 0.01	0.0028	0.0025	< 0.003	3.8	0.0010	2.3	0.0000020	0.69	0.28	41	0.000085	0.000040	< 5E-05	0.0043	0.00011	< 0.001	< 0.002
27-Jan-16	21	41	400	365	0.00035	< 0.007	0.00020	0.0023	14	0.028	< 0.01	0.0027	0.0022	< 0.003	3.8	0.00078	2.2	< 2E-06	0.63	0.29	41	0.00012	0.000040	< 5E-05	0.0045	0.00011	< 0.001	< 0.002
10-Feb-16	22	43	401	375	0.00044	< 0.007	0.000080	0.0023	14	0.025	< 0.01	0.0027	0.0023	< 0.003	3.6	0.00088	2.2	< 2E-06	0.61	0.28	37	0.00012	0.000030	< 5E-05	0.0039	0.00013	< 0.001	< 0.002
24-Feb-16	23	45	402	350	0.00037	< 0.007	0.000030	0.0025	15	0.027	0.020	0.0029	0.0024	< 0.003	4.0	0.00091	2.2	< 2E-06	0.52	0.29	37	0.00011	0.000010	< 5E-05	0.0043	0.00011	< 0.001	< 0.002
9-Mar-16	24	47	403	370																								

Calculated Loading Rates for Col 10

Date	Cycle	Week	Volume (mL)		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
-	No.	-	Input	Output	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	700	435	0.00074	0.00061	0.00000087	0.0017	24	0.036	0.023	0.00043	0.0042	0.0012	1.8	0.0024	0.34	0.000017	6.0	0.33	70	0.000057	0.0000070	0.0000052	0.0056	0.000013	0.00017	0.00017
6-May-15	2	3	400	355	0.00013	0.00025	0.00000071	0.00039	5.8	0.012	0.0014	0.00017	0.0012	0.00011	0.48	0.00064	0.11	0.00000043	1.1	0.091	26	0.000015	0.00000036	0.0000018	0.0015	0.0000046	0.00011	0.000071
20-May-15	3	5	400	360	0.000063	0.00025	0.00000036	0.00032	4.0	0.0096	0.00036	0.00016	0.00077	0.00011	0.40	0.00032	0.12	0.00000022	0.63	0.071	16	0.000014	0.0000047	0.0000043	0.0011	0.0000050	0.000036	0.000072
3-Jun-15	4	7	400	270	0.00028	0.00019	0.0000043	0.00023	2.7	0.0062	0.00027	0.00014	0.00050	0.000081	0.29	0.00017	0.090	0.00000016	0.35	0.050	12	0.0000097	0.000054	0.0000014	0.00077	0.0000035	0.00024	0.000054
17-Jun-15	5	9	500	455	0.000053	0.00032	0.00000046	0.00028	2.8	0.0060	0.00046	0.00018	0.00057	0.00014	0.37	0.00019	0.14	0.00000027	0.34	0.052	13	0.000013	0.0000023	0.0000027	0.00084	0.0000050	0.000046	0.000091
1-Jul-15	6	11	500	470	0.000044	0.00033	0.00000047	0.00025	2.2	0.0048	0.00047	0.00017	0.00046	0.00014	0.32	0.00015	0.14	0.00000014	0.23	0.043	9.2	0.000012	0.0000024	0.0000024	0.00072	0.0000052	0.000047	0.000094
15-Jul-15	7	13	500	450	0.000047	0.00032	0.00000090	0.00023	2.0	0.0045	0.00045	0.00015	0.00039	0.00014	0.27	0.00011	0.14	0.00000014	0.19	0.035	7.7	0.000011	0.0000032	0.0000023	0.00063	0.0000063	0.000045	0.000090
29-Jul-15	8	15	400	365	0.000050	0.00026	0.0000011	0.00018	1.5	0.0030	0.00037	0.00014	0.00025	0.00011	0.23	0.000069	0.096	0.000000073	0.12	0.028	6.1	0.0000078	0.0000055	0.0000018	0.00050	0.0000047	0.000037	0.000073
12-Aug-15	9	17	400	375	0.000016	0.00026	0.00000038	0.00016	1.3	0.0025	0.00038	0.00013	0.00023	0.00011	0.22	0.000057	0.11	0.00000030	0.10	0.026	4.9	0.0000069	0.0000015	0.0000030	0.00041	0.0000045	0.000038	0.000075
26-Aug-15	10	19	500	445	0.000025	0.00031	0.00000045	0.00017	1.3	0.0025	0.00045	0.00015	0.00023	0.00013	0.25	0.000061	0.12	0.00000024	0.100	0.026	5.2	0.0000077	0.0000038	0.0000029	0.00043	0.0000067	0.000045	0.000089
9-Sep-15	11	21	500	450	0.000035	0.00036	0.00000052	0.00018	1.3	0.0024	0.00052	0.00016	0.00022	0.00016	0.27	0.000063	0.13	0.00000016	0.094	0.026	5.4	0.0000083	0.0000067	0.0000026	0.00042	0.0000093	0.000052	0.00010
23-Sep-15	12	23	500	465	0.000032	0.00037	0.00000053	0.00018	1.3	0.0023	0.00053	0.00015	0.00021	0.00016	0.26	0.000065	0.13	0.00000013	0.086	0.026	5.0	0.0000075	0.0000037	0.0000027	0.00043	0.0000075	0.000053	0.00011
7-Oct-15	13	25	400	360	0.000021	0.00029	0.00000041	0.00013	0.92	0.0017	0.00041	0.00010	0.00015	0.00012	0.19	0.000050	0.100	0.000000083	0.057	0.019	3.5	0.0000050	0.00000041	0.0000021	0.00032	0.0000041	0.000041	0.000083
21-Oct-15	14	27	400	360	0.000025	0.00029	0.00000041	0.00012	0.79	0.0015	0.00041	0.00014	0.00015	0.00012	0.17	0.000044	0.11	0.000000083	0.053	0.016	3.0	0.0000067	0.0000017	0.0000021	0.00032	0.0000046	0.00033	0.000083
4-Nov-15	15	29	400	375	0.000054	0.00030	0.0000030	0.00011	0.89	0.0016	0.00043	0.00013	0.00017	0.00013	0.19	0.000044	0.10	0.000000086	0.050	0.017	3.2	0.0000072	0.0000030	0.0000022	0.00035	0.0000052	0.000043	0.000086
18-Nov-15	16	31	400	360	0.000014	0.00029	0.00000041	0.00011	0.73	0.0012	0.00041	0.00013	0.00012	0.00012	0.17	0.000048	0.095	0.000000083	0.041	0.015	2.6	0.0000048	0.0000012	0.0000021	0.00021	0.0000046	0.000041	0.000083
2-Dec-15	17	33	400	375	0.000038	0.00030	0.0000017	0.00011	0.81	0.0016	0.00043	0.00014	0.00014	0.00013	0.19	0.000046	0.10	0.000000086	0.044	0.015	2.5	0.0000053	0.0000017	0.0000022	0.00026	0.0000052	0.000086	0.000086
16-Dec-15	18	35	400	355	0.000020	0.00029	0.00000041	0.00011	0.73	0.0017	0.00041	0.00013	0.00013	0.00012	0.17	0.000041	0.10	0.000000082	0.036	0.015	2.3	0.0000054	0.0000016	0.0000020	0.00025	0.0000049	0.000041	0.000082
30-Dec-15	19	37	400	345	0.000028	0.00028	0.0000016	0.00011	0.64	0.0014	0.00040	0.00012	0.00012	0.00012	0.15	0.000036	0.089	0.00000012	0.034	0.013	1.7	0.0000049	0.00000079	0.0000020	0.00021	0.0000067	0.000040	0.000079
13-Jan-16	20	39	400	365	0.000027	0.00029	0.0000029	0.00010	0.62	0.0013	0.00042	0.00012	0.00010	0.00013	0.16	0.000043	0.095	0.000000084	0.029	0.012	1.7	0.0000036	0.0000017	0.0000021	0.00018	0.0000046	0.000042	0.000084
27-Jan-16	21	41	400	365	0.000015	0.00029	0.0000084	0.000096	0.58	0.0012	0.00042	0.00011	0.000092	0.00013	0.16	0.000033	0.094	0.000000084	0.026	0.012	1.7	0.0000050	0.0000017	0.0000021	0.00019	0.0000046	0.000042	0.000084
10-Feb-16	22	43	401	375	0.000019	0.00030	0.0000034	0.000100	0.58	0.0011	0.00043	0.00012	0.000099	0.00013	0.16	0.000038	0.093	0.000000086	0.026	0.012	1.6	0.0000050	0.0000013	0.0000022	0.00017	0.0000056	0.000043	0.000086
24-Feb-16	23	45	402	350	0.000015	0.00028	0.0000012	0.00010	0.60	0.0011	0.00080	0.00012	0.000097	0.00012	0.16	0.000037	0.088	0.000000080	0.021	0.012	1.5	0.0000044	0.00000040	0.0000020	0.00017	0.0000044	0.000040	0.000080
9-Mar-16	24	47	403	370																								

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 11 (Supremo Gneiss Oxide Ore)

Date	**Cycle**	**Week**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
-	No.	-	Input	Output	-	umhos/cm	mgCaCO$_3$/L	mgCaCO$_3$/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	700	360	8.0	538	#N/A	6.0	165	54	14	0.20	< 0.3	178	0.0060	0.010	0.082	0.15	< 7E-06	< 7E-06	0.019	0.0000030	49	0.00027	0.0022
6-May-15	2	3	400	335	8.0	301	#N/A	4.4	98	51	4.0	0.33	< 0.3	88	0.0029	0.0092	0.13	0.048	< 7E-06	< 7E-06	0.013	0.0000030	23	0.000060	0.00097
20-May-15	3	5	400	380	8.1	269	#N/A	4.2	86	37	1.0	0.35	< 0.3	80	0.0040	0.0067	0.13	0.041	< 7E-06	< 7E-06	0.0097	0.0000070	22	0.00023	0.00050
3-Jun-15	4	7	400	275	8.0	242	#N/A	4.4	94	28	< 1	0.35	< 0.3	80	0.0054	0.0068	0.14	0.045	< 7E-06	< 7E-06	0.014	0.0000070	22	0.00016	0.00030
17-Jun-15	5	9	500	465	8.1	212	#N/A	4.5	87	21	< 1	0.32	< 0.3	70	0.0043	0.0066	0.15	0.037	< 7E-06	< 7E-06	0.012	0.000015	19	0.00015	0.00022
1-Jul-15	6	11	500	475	8.0	206	#N/A	4.8	84	16	< 1	0.34	< 0.3	69	0.0040	0.0064	0.15	0.040	< 7E-06	< 7E-06	0.0088	0.0000030	19	0.00016	0.00014
15-Jul-15	7	13	500	475	8.0	184	#N/A	4.2	86	14	< 1	0.34	< 0.3	72	0.0041	0.0059	0.14	0.044	< 7E-06	< 7E-06	0.013	0.0000060	19	0.00016	0.00014
29-Jul-15	8	15	400	380	8.0	188	#N/A	3.5	86	12	< 1	0.33	< 0.3	75	0.0043	0.0054	0.13	0.043	< 7E-06	< 7E-06	0.012	< 3E-06	21	0.00015	0.000093
12-Aug-15	9	17	400	390	8.0	186	#N/A	3.1	86	10	< 1	0.31	< 0.3	77	0.0025	0.0053	0.13	0.045	< 7E-06	< 7E-06	0.0092	0.0000090	21	0.00016	0.000073
26-Aug-15	10	19	500	465	7.5	184	#N/A	3.0	83	10	1.0	0.32	0.30	76	0.0034	0.0055	0.13	0.046	0.0000070	0.0000070	0.0090	0.0000060	21	0.00015	0.000069
9-Sep-15	11	21	500	475	8.0	175	#N/A	3.0	80	8.0	< 1	0.32	< 0.3	75	0.0043	0.0057	0.13	0.046	< 7E-06	< 7E-06	0.0087	< 3E-06	21	0.00014	0.000064
23-Sep-15	12	23	500	470	8.0	176	#N/A	2.4	82	8.0	-	0.30	-	79	0.0041	0.0058	0.13	0.046	0.0000070	0.0000070	0.0079	0.0000040	22	0.00013	0.000056
7-Oct-15	13	25	400	380	8.0	186	#N/A	3.1	89	7.0	-	0.28	-	82	0.0038	0.0058	0.12	0.046	< 7E-06	< 7E-06	0.0071	0.0000050	23	0.00012	0.000047
21-Oct-15	14	27	400	390	8.1	173	#N/A	1.4	84	7.0	-	0.27	-	76	0.0036	0.0058	0.13	0.053	< 7E-06	< 7E-06	0.0083	0.0000040	21	0.00017	0.000049
4-Nov-15	15	29	400	390	8.1	177	#N/A	2.3	88	7.0	-	0.28	-	83	0.0039	0.0049	0.12	0.055	< 7E-06	< 7E-06	0.0055	0.0000070	23	0.00029	< 4E-06
18-Nov-15	16	31	400	380	8.2	176	#N/A	1.0	95	7.0	-	0.27	-	79	0.0030	0.0047	0.13	0.042	< 7E-06	< 7E-06	0.0046	< 3E-06	21	0.00012	0.000067
2-Dec-15	17	33	400	380	8.1	178	#N/A	2.0	83	6.0	-	0.26	-	87	0.0032	0.0051	0.11	0.057	< 7E-06	< 7E-06	0.0061	< 3E-06	23	0.00017	0.000050
16-Dec-15	18	35	400	360	8.1	174	#N/A	2.0	77	7.0	-	0.26	-	87	0.0032	0.0054	0.13	0.059	< 7E-06	< 7E-06	0.0075	< 3E-06	24	0.00014	0.000053
30-Dec-15	19	37	400	385	8.1	170	#N/A	1.7	74	5.0	-	0.25	-	88	0.0030	0.0047	0.13	0.056	< 7E-06	< 7E-06	0.0062	0.0000030	24	0.00022	0.000048
13-Jan-16	20	39	400	370	8.1	172	#N/A	1.7	78	7.0	-	0.23	-	83	0.0022	0.0050	0.11	0.052	< 7E-06	< 7E-06	0.0070	< 3E-06	23	0.00013	0.000021
27-Jan-16	21	41	400	385	8.0	171	#N/A	2.8	77	6.0	-	0.28	-	84	0.013	0.0051	0.12	0.059	< 7E-06	< 7E-06	0.0060	0.0000040	23	0.00018	0.000042
10-Feb-16	22	43	400	350	8.1	173	#N/A	2.4	77	7.0	-	0.23	-	80	0.0029	0.0051	0.12	0.057	< 7E-06	< 7E-06	0.0040	< 3E-06	22	0.00014	0.000055
24-Feb-16	23	45	400	380	8.1	178	#N/A	2.1	77	4.0	-	0.25	-	90	0.0015	0.0049	0.12	0.060	< 7E-06	< 7E-06	0.0030	< 3E-06	25	0.00019	0.000038
9-Mar-16	24	47	400	380	8.1	172	#N/A	2.0	74	4.0															

Calculated Loading Rates for Col 11

Date	**Cycle**	**Week**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
-	No.	-	Input	Output	-	umhos/cm	mgCaCO$_3$/kg/wk	mgCaCO$_3$/kg/wk	mgCaCO$_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mgCaCO$_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	700	360	8.0	538	#N/A	0.43	12	3.9	1.0	0.014	0.022	13	0.00043	0.00073	0.0059	0.011	0.00000050	0.00000050	0.0014	0.00000022	3.5	0.000019	0.00015
6-May-15	2	3	400	335	8.0	301	#N/A	0.15	3.3	1.7	0.13	0.011	0.010	2.9	0.000097	0.00031	0.0042	0.0016	0.00000023	0.00000023	0.00044	0.00000010	0.78	0.0000020	0.000033
20-May-15	3	5	400	380	8.1	269	#N/A	0.16	3.3	1.4	0.038	0.013	0.011	3.0	0.00015	0.00025	0.0048	0.0016	0.00000027	0.00000027	0.00037	0.00000027	0.82	0.0000087	0.000019
3-Jun-15	4	7	400	275	8.0	242	#N/A	0.12	2.6	0.77	0.028	0.0096	0.0083	2.2	0.00015	0.00019	0.0037	0.0012	0.00000019	0.00000019	0.00039	0.00000019	0.59	0.0000044	0.0000082
17-Jun-15	5	9	500	465	8.1	212	#N/A	0.21	4.0	0.98	0.047	0.015	0.014	3.2	0.00020	0.00031	0.0068	0.0017	0.00000033	0.00000033	0.00053	0.00000070	0.89	0.0000070	0.000010
1-Jul-15	6	11	500	475	8.0	206	#N/A	0.23	4.0	0.76	0.048	0.016	0.014	3.3	0.00019	0.00030	0.0072	0.0019	0.00000033	0.00000033	0.00042	0.00000014	0.88	0.0000076	0.0000067
15-Jul-15	7	13	500	475	8.0	184	#N/A	0.20	4.1	0.67	0.048	0.016	0.014	3.4	0.00019	0.00028	0.0067	0.0021	0.00000033	0.00000033	0.00059	0.00000029	0.88	0.0000076	0.0000064
29-Jul-15	8	15	400	380	8.0	188	#N/A	0.13	3.3	0.46	0.038	0.013	0.011	2.9	0.00016	0.00021	0.0048	0.0016	0.00000027	0.00000027	0.00045	0.00000011	0.78	0.0000057	0.0000035
12-Aug-15	9	17	400	390	8.0	186	#N/A	0.12	3.4	0.39	0.039	0.012	0.012	3.0	0.000098	0.00021	0.0049	0.0018	0.00000027	0.00000027	0.00036	0.00000035	0.82	0.0000062	0.0000028
26-Aug-15	10	19	500	465	7.5	184	0.00	0.14	3.9	0.47	0.047	0.015	0.014	3.5	0.00016	0.00026	0.0060	0.0021	0.00000033	0.00000033	0.00042	0.00000028	0.96	0.0000070	0.0000032
9-Sep-15	11	21	500	475	8.0	175	#N/A	0.14	3.8	0.44	0.048	0.017	0.016	4.1	0.00023	0.00031	0.0072	0.0025	0.00000038	0.00000038	0.00048	0.00000016	1.1	0.0000076	0.0000035
23-Sep-15	12	23	500	470	8.0	176	#N/A	0.11	3.8	0.43	0.00	0.016		4.3	0.00022	0.00031	0.0068	0.0025	0.00000038	0.00000038	0.00043	0.00000022	1.2	0.0000070	0.0000030
7-Oct-15	13	25	400	380	8.0	186	#N/A	0.12	3.4	0.31	0.00	0.012		3.6	0.00017	0.00025	0.0052	0.0020	0.00000031	0.00000031	0.00031	0.00000022	1.00	0.0000052	0.0000021
21-Oct-15	14	27	400	390	8.1	173	#N/A	0.055	3.3	0.31	0.00	0.012		3.4	0.00016	0.00026	0.0057	0.0024	0.00000031	0.00000031	0.00037	0.00000018	0.95	0.0000076	0.0000022
4-Nov-15	15	29	400	390	8.1	177	#N/A	0.090	3.4	0.31	0.00	0.013		3.7	0.00017	0.00022	0.0055	0.0025	0.00000031	0.00000031	0.00025	0.00000031	1.0	0.000013	0.00000018
18-Nov-15	16	31	400	380	8.2	176	#N/A	0.040	3.6	0.31	0.00	0.012		3.4	0.00013	0.00021	0.0056	0.0018	0.00000031	0.00000031	0.00020	0.00000013	0.93	0.0000052	0.0000029
2-Dec-15	17	33	400	380	8.1	178	#N/A	0.076	3.2	0.26	0.00	0.011		3.8	0.00014	0.00022	0.0050	0.0025	0.00000031	0.00000031	0.00027	0.00000013	1.0	0.0000074	0.0000022
16-Dec-15	18	35	400	360	8.1	174	#N/A	0.071	2.8	0.29	0.00	0.011		3.6	0.00013	0.00022	0.0053	0.0024	0.00000029	0.00000029	0.00031	0.00000012	0.98	0.0000058	0.0000022
30-Dec-15	19	37	400	385	8.1	170	#N/A	0.065	2.9	0.22	0.00	0.011		3.9	0.00013	0.00021	0.0057	0.0025	0.00000031	0.00000031	0.00027	0.00000013	1.1	0.0000097	0.0000021
13-Jan-16	20	39	400	370	8.1	172	#N/A	0.062	2.9	0.30	0.00	0.0098		3.5	0.000094	0.00021	0.0046	0.0022	0.00000030	0.00000030	0.00030	0.00000013	0.97	0.0000055	0.00000089
27-Jan-16	21	41	400	385	8.0	171	#N/A	0.11	3.0	0.27	0.00	0.012		3.7	0.00058	0.00023	0.0052	0.0026	0.00000031	0.00000031	0.00027	0.00000018	1.0	0.0000080	0.0000019
10-Feb-16	22	43	400	350	8.1	173	#N/A	0.085	2.7	0.28	0.00	0.0093		3.2	0.00012	0.00021	0.0049	0.0023	0.00000028	0.00000028	0.00016	0.00000012	0.87	0.0000056	0.0000022
24-Feb-16	23	45	400	380	8.1	178	#N/A	0.080	2.9	0.17	0.00	0.011		3.9	0.000066	0.00021	0.0052	0.0026	0.00000031	0.00000031	0.00013	0.00000013	1.1	0.0000083	0.0000017
9-Mar-16	24	47	400	380	8.1	172	#N/A	0.077	2.8	0.17	0.00														

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 11 (Supremo Gneiss Oxide Ore)

Date	Cycle	Week	Volume (mL)		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
-	No.	-	Input	Output	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	700	360	0.0030	< 0.007	< 1E-05	0.018	14	0.041	9.2	0.0074	0.0015	0.019	7.7	0.00079	6.1	0.0000080	39	0.25	19	0.00031	0.00030	< 5E-05	0.11	0.00012	0.0020	< 0.002
6-May-15	2	3	400	335	0.0013	< 0.007	< 1E-05	0.0082	7.1	0.013	0.82	0.018	0.00080	0.023	4.9	< 0.001	4.8	0.0000050	26	0.11	18	0.00013	< 1E-05	0.000070	0.084	0.00010	< 0.001	< 0.002
20-May-15	3	5	400	380	0.00079	< 0.007	< 1E-05	0.0062	6.3	0.0014	0.10	0.018	0.00060	0.030	4.5	0.00038	5.2	0.0000050	19	0.098	12	0.00014	0.00016	0.00013	0.070	0.00012	< 0.001	< 0.002
3-Jun-15	4	7	400	275	0.00076	< 0.007	< 1E-05	0.0059	6.2	0.00032	0.040	0.018	0.00040	0.028	4.2	0.00020	4.9	0.0000060	16	0.10	9.4	0.00013	0.000040	0.000080	0.063	0.00012	0.0010	< 0.002
17-Jun-15	5	9	500	465	0.0016	< 0.007	0.00090	0.0046	5.4	0.0015	0.020	0.017	0.00040	0.080	4.2	0.00019	4.5	0.0000080	13	0.090	8.1	0.00014	0.00013	0.00011	0.046	0.000090	0.0040	< 0.002
1-Jul-15	6	11	500	475	0.0013	< 0.007	< 1E-05	0.0044	5.6	0.00051	0.030	0.016	0.00030	0.033	3.7	0.00012	4.5	0.0000060	10	0.093	5.3	0.00014	0.00021	0.000060	0.041	0.00012	< 0.001	< 0.002
15-Jul-15	7	13	500	475	0.00050	< 0.007	< 1E-05	0.0042	6.1	0.0026	0.020	0.014	0.00030	0.028	3.4	0.00011	4.6	0.0000050	8.9	0.095	4.7	0.00014	0.000030	0.00012	0.039	0.00013	0.0010	< 0.002
29-Jul-15	8	15	400	380	0.00049	< 0.007	< 1E-05	0.0043	5.9	0.00011	0.010	0.014	0.00020	0.035	3.6	0.000090	4.3	0.0000030	6.6	0.097	4.2	0.00013	0.000010	< 5E-05	0.040	0.00012	< 0.001	< 0.002
12-Aug-15	9	17	400	390	0.00043	< 0.007	0.000030	0.0036	6.0	0.00012	< 0.01	0.013	0.00020	0.032	3.7	0.000080	4.6	0.000010	5.6	0.098	3.7	0.00013	0.000030	< 5E-05	0.035	0.000090	< 0.001	< 0.002
26-Aug-15	10	19	500	465	0.00045	0.0070	0.000020	0.0034	5.9	0.00017	0.010	0.012	0.00020	0.033	3.7	0.000070	4.3	0.0000070	4.7	0.095	5.1	0.00013	0.000065	0.000050	0.033	0.00011	0.0010	0.0020
9-Sep-15	11	21	500	475	0.00046	< 0.007	< 1E-05	0.0031	5.8	0.00022	0.010	0.011	0.00020	0.033	3.6	0.000060	4.0	0.0000040	3.9	0.091	6.5	0.00012	0.00010	0.000050	0.030	0.00013	< 0.001	< 0.002
23-Sep-15	12	23	500	470	0.00040	0.0070	0.000010	0.0029	6.0	0.00027	0.010	0.010	0.00015	0.029	3.5	0.000065	4.0	0.0000040	3.3	0.095	4.7	0.00012	0.000075	0.000050	0.031	0.00011	0.0010	0.0020
7-Oct-15	13	25	400	380	0.00033	< 0.007	< 1E-05	0.0028	6.1	0.00031	< 0.01	0.0088	0.00010	0.024	3.3	0.000070	3.9	0.0000040	2.7	0.100	2.8	0.00011	0.000050	< 5E-05	0.031	0.000090	< 0.001	< 0.002
21-Oct-15	14	27	400	390	0.00062	< 0.007	< 1E-05	0.0027	5.6	0.00019	< 0.01	0.011	0.00020	0.020	3.3	0.000090	4.0	0.0000020	2.2	0.099	3.1	0.00013	0.000070	0.00012	0.030	0.00010	< 0.001	< 0.002
4-Nov-15	15	29	400	390	0.00054	< 0.007	< 1E-05	0.0022	6.0	0.00030	< 0.01	0.0100	0.00020	0.034	3.4	< 4E-05	3.9	< 2E-06	2.1	0.095	3.1	0.00013	0.000040	< 5E-05	0.029	0.000090	< 0.001	< 0.002
18-Nov-15	16	31	400	380	0.00027	< 0.007	< 1E-05	0.0024	6.3	0.00074	< 0.01	0.0099	< 0.0001	0.031	3.3	0.00013	3.9	< 2E-06	1.8	0.10	2.9	0.000097	0.000040	< 5E-05	0.025	0.000070	< 0.001	< 0.002
2-Dec-15	17	33	400	380	0.00058	< 0.007	< 1E-05	0.0023	7.0	0.0011	< 0.01	0.0096	0.00020	0.034	3.6	0.000080	3.7	< 2E-06	1.8	0.11	3.1	0.00010	0.000050	< 5E-05	0.032	0.000080	< 0.001	< 0.002
16-Dec-15	18	35	400	360	0.00048	< 0.007	< 1E-05	0.0025	6.7	0.0017	< 0.01	0.0097	0.00010	0.036	3.6	0.000080	4.0	0.0000020	1.6	0.11	2.9	0.00012	0.00011	< 5E-05	0.032	0.000070	< 0.001	< 0.002
30-Dec-15	19	37	400	385	0.00034	< 0.007	0.000030	0.0024	6.7	0.0014	0.020	0.0092	0.00010	0.028	3.4	< 4E-05	3.7	0.0000020	1.4	0.11	2.8	0.00011	< 1E-05	0.000070	0.030	0.000090	< 0.001	< 0.002
13-Jan-16	20	39	400	370	0.00047	< 0.007	0.000040	0.0022	6.2	0.0013	< 0.01	0.0083	0.00010	0.032	3.4	0.00020	3.8	0.0000020	1.2	0.098	2.3	0.000071	0.000050	< 5E-05	0.027	0.000070	< 0.001	< 0.002
27-Jan-16	21	41	400	385	0.00031	< 0.007	< 1E-05	0.0021	6.2	0.00078	< 0.01	0.0089	0.00010	0.035	3.3	< 4E-05	3.9	< 2E-06	1.1	0.11	2.5	0.00011	0.000050	< 5E-05	0.030	0.000070	< 0.001	< 0.002
10-Feb-16	22	43	400	350	0.00054	< 0.007	0.000070	0.0020	6.3	0.0020	< 0.01	0.0088	0.00010	0.044	3.4	0.000080	3.4	< 2E-06	1.1	0.11	2.8	0.00010	0.000060	< 5E-05	0.028	0.000090	< 0.001	< 0.002
24-Feb-16	23	45	400	380	0.00017	< 0.007	0.000030	0.0021	6.6	0.00093	< 0.01	0.0087	0.00010	0.036	3.4	< 4E-05	3.8	< 2E-06	0.83	0.11	2.6	0.00011	0.000040	< 5E-05	0.029	0.000040	0.0010	< 0.002
9-Mar-16	24	47	400	380																								

Calculated Loading Rates for Col 11

Date	Cycle	Week	Volume (mL)		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
-	No.	-	Input	Output	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	700	360	0.00021	0.00050	0.00000072	0.0013	0.99	0.0030	0.66	0.00053	0.00011	0.0014	0.56	0.000057	0.44	0.00000058	2.8	0.018	1.4	0.000022	0.000022	0.0000036	0.0076	0.0000086	0.00014	0.00014
6-May-15	2	3	400	335	0.000043	0.00023	0.00000034	0.00028	0.24	0.00044	0.027	0.00060	0.000027	0.00077	0.16	0.000034	0.16	0.00000017	0.87	0.0037	0.61	0.0000044	0.00000034	0.0000023	0.0028	0.0000034	0.000034	0.000067
20-May-15	3	5	400	380	0.000030	0.00027	0.00000038	0.00024	0.24	0.000052	0.0038	0.00067	0.000023	0.0011	0.17	0.000014	0.20	0.00000019	0.73	0.0037	0.44	0.0000051	0.0000061	0.0000049	0.0027	0.0000046	0.000038	0.000076
3-Jun-15	4	7	400	275	0.000021	0.00019	0.00000028	0.00016	0.17	0.0000088	0.0011	0.00048	0.000011	0.00077	0.12	0.0000055	0.14	0.00000017	0.44	0.0028	0.26	0.0000036	0.0000011	0.0000022	0.0017	0.0000033	0.000028	0.000055
17-Jun-15	5	9	500	465	0.000076	0.00033	0.000042	0.00021	0.25	0.000070	0.00093	0.00078	0.000019	0.0037	0.20	0.0000088	0.21	0.00000037	0.59	0.0042	0.38	0.0000064	0.0000060	0.0000051	0.0022	0.0000042	0.00019	0.000093
1-Jul-15	6	11	500	475	0.000059	0.00033	0.00000048	0.00021	0.27	0.000024	0.0014	0.00074	0.000014	0.0016	0.18	0.0000057	0.21	0.00000029	0.48	0.0044	0.25	0.0000066	0.0000100	0.0000029	0.0020	0.0000057	0.000048	0.000095
15-Jul-15	7	13	500	475	0.000024	0.00033	0.00000048	0.00020	0.29	0.00012	0.00095	0.00067	0.000014	0.0013	0.16	0.0000052	0.22	0.00000024	0.42	0.0045	0.22	0.0000066	0.0000014	0.0000057	0.0019	0.0000062	0.000048	0.000095
29-Jul-15	8	15	400	380	0.000019	0.00027	0.00000038	0.00016	0.22	0.0000042	0.00038	0.00052	0.0000076	0.0013	0.14	0.0000034	0.16	0.00000011	0.25	0.0037	0.16	0.0000049	0.00000038	0.0000019	0.0015	0.0000046	0.000038	0.000076
12-Aug-15	9	17	400	390	0.000017	0.00027	0.0000012	0.00014	0.23	0.0000047	0.00039	0.00051	0.0000078	0.0012	0.14	0.0000031	0.18	0.00000039	0.22	0.0038	0.14	0.0000050	0.0000012	0.0000020	0.0014	0.0000035	0.000039	0.000078
26-Aug-15	10	19	500	465	0.000021	0.00033	0.00000093	0.00016	0.27	0.0000079	0.00047	0.00057	0.0000093	0.0015	0.17	0.0000033	0.20	0.00000033	0.22	0.0044	0.24	0.0000059	0.0000030	0.0000023	0.0015	0.0000051	0.000047	0.000093
9-Sep-15	11	21	500	475	0.000025	0.00038	0.00000055	0.00017	0.32	0.000012	0.00055	0.00062	0.000011	0.0018	0.20	0.0000033	0.22	0.00000022	0.21	0.0050	0.35	0.0000067	0.0000055	0.0000027	0.0016	0.0000071	0.000055	0.00011
23-Sep-15	12	23	500	470	0.000021	0.00038	0.00000054	0.00016	0.32	0.000014	0.00054	0.00055	0.0000081	0.0015	0.19	0.0000035	0.21	0.00000022	0.18	0.0052	0.25	0.0000063	0.0000041	0.0000027	0.0017	0.0000059	0.000054	0.00011
7-Oct-15	13	25	400	380	0.000014	0.00031	0.00000044	0.00012	0.27	0.000014	0.00044	0.00039	0.0000044	0.0010	0.15	0.0000031	0.17	0.00000017	0.12	0.0044	0.12	0.0000049	0.0000022	0.0000022	0.0014	0.0000039	0.000044	0.000087
21-Oct-15	14	27	400	390	0.000028	0.00031	0.00000045	0.00012	0.25	0.0000085	0.00045	0.00049	0.0000090	0.00090	0.15	0.0000040	0.18	0.000000090	0.10	0.0044	0.14	0.0000059	0.0000031	0.0000054	0.0013	0.0000045	0.000045	0.000090
4-Nov-15	15	29	400	390	0.000024	0.00031	0.00000045	0.00010	0.27	0.000013	0.00045	0.00045	0.0000090	0.0015	0.15	0.0000018	0.17	0.000000090	0.094	0.0043	0.14	0.0000057	0.0000018	0.0000022	0.0013	0.0000040	0.000045	0.000090
18-Nov-15	16	31	400	380	0.000012	0.00031	0.00000044	0.00010	0.27	0.000032	0.00044	0.00043	0.0000044	0.0014	0.15	0.0000057	0.17	0.000000087	0.080	0.0044	0.13	0.0000042	0.0000017	0.0000022	0.0011	0.0000031	0.000044	0.000087
2-Dec-15	17	33	400	380	0.000025	0.00031	0.00000044	0.00010	0.31	0.000050	0.00044	0.00042	0.0000087	0.0015	0.16	0.0000035	0.16	0.000000087	0.079	0.0046	0.14	0.0000044	0.0000022	0.0000022	0.0014	0.0000035	0.000044	0.000087
16-Dec-15	18	35	400	360	0.000020	0.00029	0.00000041	0.00010	0.28	0.000072	0.00041	0.00040	0.0000041	0.0015	0.15	0.0000033	0.17	0.000000083	0.065	0.0044	0.12	0.0000051	0.0000046	0.0000021	0.0013	0.0000029	0.000041	0.000083
30-Dec-15	19	37	400	385	0.000015	0.00031	0.0000013	0.00011	0.30	0.000060	0.00089	0.00041	0.0000044	0.0012	0.15	0.0000018	0.16	0.000000089	0.062	0.0046	0.12	0.0000050	0.00000044	0.0000031	0.0013	0.0000040	0.000044	0.000089
13-Jan-16	20	39	400	370	0.000020	0.00030	0.0000017	0.000094	0.26	0.000056	0.00043	0.00035	0.0000043	0.0014	0.14	0.0000085	0.16	0.000000085	0.051	0.0042	0.098	0.0000030	0.0000021	0.0000021	0.0012	0.0000030	0.000043	0.000085
27-Jan-16	21	41	400	385	0.000014	0.00031	0.00000044	0.000092	0.28	0.000035	0.00044	0.00039	0.0000044	0.0015	0.15	0.0000018	0.17	0.000000089	0.048	0.0046	0.11	0.0000050	0.0000022	0.0000022	0.0013	0.0000031	0.000044	0.000089
10-Feb-16	22	43	400	350	0.000022	0.00028	0.0000028	0.000081	0.26	0.000080	0.00040	0.00036	0.0000040	0.0018	0.14	0.0000032	0.14	0.000000080	0.045	0.0042	0.11	0.0000041	0.0000024	0.0000020	0.0011	0.0000036	0.000040	0.000080
24-Feb-16	23	45	400	380	0.0000074	0.00031	0.0000013	0.000092	0.29	0.000041	0.00044	0.00038	0.0000044	0.0016	0.15	0.0000017	0.16	0.000000087	0.036	0.0047	0.11	0.0000047	0.0000017	0.0000022	0.0012	0.0000017	0.000044	0.000087
9-Mar-16	24	47	400	380																								

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 12 (Supremo Gneiss Transition Ore)

Date	**Cycle**	**Week**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
-	No.	-	Input	Output	-	umhos/cm	mgCaCO$_3$/L	mgCaCO$_3$/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mgCaCO$_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	750	305	7.8	2557	#N/A	11	145	1561	62	0.26	< 0.3	1450	0.0033	0.013	0.15	0.011	< 7E-06	< 7E-06	0.022	0.0000080	385	0.000040	0.011
6-May-15	2	3	400	365	7.6	1465	#N/A	7.5	75	816	22	0.36	< 0.3	751	0.0021	0.0087	0.14	0.0042	< 7E-06	< 7E-06	0.014	< 3E-06	199	< 3E-05	0.0026
20-May-15	3	5	400	375	7.8	915	#N/A	6.0	69	393	2.0	0.40	< 0.3	405	0.0022	0.0074	0.15	0.0036	< 7E-06	< 7E-06	0.011	0.0000080	109	0.000040	0.0013
3-Jun-15	4	7	400	260	7.8	704	#N/A	5.9	77	274	< 1	0.46	< 0.3	323	0.0051	0.0082	0.17	0.0049	< 7E-06	< 7E-06	0.015	0.0000030	88	0.000040	0.00088
17-Jun-15	5	9	500	485	7.8	555	#N/A	7.0	81	206	< 1	0.45	< 0.3	245	0.0051	0.0086	0.20	0.0036	< 7E-06	< 7E-06	0.012	0.0000080	67	0.000050	0.00062
1-Jul-15	6	11	500	485	7.9	395	#N/A	5.7	81	136	< 1	0.51	< 0.3	184	0.0047	0.0090	0.22	0.0039	< 7E-06	< 7E-06	0.010	0.000013	48	< 3E-05	0.00041
15-Jul-15	7	13	500	490	7.9	339	#N/A	5.4	87	103	< 1	0.54	< 0.3	162	0.0047	0.0091	0.22	0.0041	< 7E-06	< 7E-06	0.014	0.000010	42	0.000030	0.00039
29-Jul-15	8	15	400	390	7.9	347	#N/A	3.5	88	88	< 1	0.57	< 0.3	152	0.0038	0.0093	0.21	0.0042	< 7E-06	< 7E-06	0.013	0.0000070	40	0.000050	0.00025
12-Aug-15	9	17	400	400	7.9	334	#N/A	4.1	90	77	< 1	0.51	< 0.3	152	0.0041	0.0093	0.22	0.0043	< 7E-06	< 7E-06	0.011	< 3E-06	40	< 3E-05	0.00018
26-Aug-15	10	19	500	465	7.6	320	#N/A	3.7	89	72	1.0	0.53	0.30	147	0.0060	0.011	0.23	0.0047	0.0000070	0.0000070	0.011	0.0000040	39	0.000045	0.00016
9-Sep-15	11	21	500	470	7.9	307	#N/A	3.3	89	67	< 1	0.55	< 0.3	141	0.0079	0.013	0.23	0.0050	< 7E-06	< 7E-06	0.011	0.0000050	38	0.000060	0.00014
23-Sep-15	12	23	500	480	8.0	285	#N/A	3.3	89	57	1.0	0.52	0.30	135	0.0058	0.015	0.23	0.0047	0.0000070	0.0000070	0.0096	0.0000050	36	0.000055	0.00010
7-Oct-15	13	25	400	390	8.0	298	#N/A	3.5	96	54	-	0.49	-	128	0.0037	0.017	0.23	0.0043	< 7E-06	< 7E-06	0.0081	0.0000050	34	0.000050	0.000059
21-Oct-15	14	27	400	390	8.1	288	#N/A	1.6	92	44	-	0.49	-	128	0.0058	0.020	0.25	0.0049	< 7E-06	< 7E-06	0.0087	< 3E-06	35	< 3E-05	0.000075
4-Nov-15	15	29	400	400	8.1	287	#N/A	3.0	97	50	-	0.47	-	138	0.0085	0.022	0.25	0.0050	< 7E-06	< 7E-06	0.0063	< 3E-06	38	0.00011	0.000027
18-Nov-15	16	31	400	380	8.1	288	#N/A	1.1	103	50	-	0.47	-	131	0.0031	0.026	0.26	0.0036	< 7E-06	< 7E-06	0.0053	0.0000060	35	0.000030	0.000044
2-Dec-15	17	33	400	390	8.1	282	#N/A	2.0	91	46	-	0.46	-	143	0.0041	0.031	0.28	0.0054	< 7E-06	< 7E-06	0.0070	0.0000030	38	0.000030	0.00017
16-Dec-15	18	35	400	360	8.1	278	#N/A	2.0	85	50	-	0.44	-	138	0.0035	0.035	0.29	0.0054	< 7E-06	< 7E-06	0.0081	0.0000070	37	0.000090	0.00014
30-Dec-15	19	37	400	390	8.1	269	#N/A	1.8	83	38	-	0.46	-	137	0.0039	0.035	0.29	0.0052	< 7E-06	< 7E-06	0.0072	< 3E-06	37	0.000050	0.00011
13-Jan-16	20	39	400	365	8.1	268	#N/A	1.6	86	47	-	0.41	-	131	0.0034	0.039	0.26	0.0047	< 7E-06	< 7E-06	0.0080	< 3E-06	35	< 3E-05	0.000095
27-Jan-16	21	41	400	385	8.0	266	#N/A	3.1	85	46	-	0.44	-	126	0.0067	0.042	0.28	0.0054	< 7E-06	< 7E-06	0.0060	0.0000040	34	< 3E-05	0.000096
10-Feb-16	22	43	400	360	8.1	258	#N/A	2.6	88	42	-	0.40	-	127	0.0038	0.044	0.31	0.0054	< 7E-06	< 7E-06	0.0050	0.0000030	34	< 3E-05	0.000080
24-Feb-16	23	45	400	395	8.1	266	#N/A	2.3	86	42	-	0.36	-	136	0.0017	0.045	0.30	0.0053	< 7E-06	< 7E-06	0.0040	0.0000040	36	< 3E-05	0.00012
9-Mar-16	24	47	400	385	8.1	258	#N/A	2.3	85	34															

Calculated Loading Rates for Col 12

Date	**Cycle**	**Week**	**Volume** (mL)		**pH**	**Cond.**	**Acidity** (pH 4.5)	**Acidity** (pH 8.3)	**Alkalinity**	**Sulphate**	**Chloride**	**Fluoride**	**Bromide**	**Hardness**	**Al**	**Sb**	**As**	**Ba**	**Be**	**Bi**	**B**	**Cd**	**Ca**	**Cr**	**Co**
-	No.	-	Input	Output	-	umhos/cm	mgCaCO$_3$/kg/wk	mgCaCO$_3$/kg/wk	mgCaCO$_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mgCaCO$_3$/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	750	305	7.8	2557	#N/A	0.78	10	110	4.4	0.018	0.021	102	0.00023	0.00090	0.011	0.00075	0.00000049	0.00000049	0.0015	0.00000056	27	0.0000028	0.00076
6-May-15	2	3	400	365	7.6	1465	#N/A	0.32	3.1	34	0.93	0.015	0.013	32	0.000089	0.00037	0.0060	0.00018	0.00000030	0.00000030	0.00059	0.00000013	8.4	0.0000013	0.00011
20-May-15	3	5	400	375	7.8	915	#N/A	0.26	3.0	17	0.087	0.017	0.013	18	0.000095	0.00032	0.0063	0.00016	0.00000030	0.00000030	0.00047	0.00000035	4.7	0.0000017	0.000056
3-Jun-15	4	7	400	260	7.8	704	#N/A	0.18	2.3	8.2	0.030	0.014	0.0090	9.7	0.00015	0.00025	0.0051	0.00015	0.00000021	0.00000021	0.00045	0.000000090	2.6	0.0000012	0.000026
17-Jun-15	5	9	500	485	7.8	555	#N/A	0.39	4.5	12	0.056	0.025	0.017	14	0.00029	0.00048	0.011	0.00020	0.00000039	0.00000039	0.00068	0.00000045	3.8	0.0000028	0.000035
1-Jul-15	6	11	500	485	7.9	395	#N/A	0.32	4.5	7.6	0.056	0.029	0.017	10	0.00026	0.00050	0.012	0.00022	0.00000039	0.00000039	0.00058	0.00000073	2.7	0.0000017	0.000023
15-Jul-15	7	13	500	490	7.9	339	#N/A	0.31	4.9	5.8	0.057	0.031	0.017	9.2	0.00027	0.00051	0.013	0.00023	0.00000040	0.00000040	0.00076	0.00000057	2.4	0.0000017	0.000022
29-Jul-15	8	15	400	390	7.9	347	#N/A	0.16	3.9	4.0	0.045	0.026	0.014	6.8	0.00017	0.00042	0.0092	0.00019	0.00000032	0.00000032	0.00057	0.00000032	1.8	0.0000023	0.000011
12-Aug-15	9	17	400	400	7.9	334	#N/A	0.19	4.1	3.6	0.046	0.024	0.014	7.0	0.00019	0.00043	0.010	0.00020	0.00000032	0.00000032	0.00048	0.00000014	1.9	0.0000014	0.0000084
26-Aug-15	10	19	500	465	7.6	320	0.00	0.20	4.8	3.9	0.054	0.028	0.016	7.9	0.00032	0.00059	0.012	0.00025	0.00000038	0.00000038	0.00058	0.00000021	2.1	0.0000024	0.0000087
9-Sep-15	11	21	500	470	7.9	307	#N/A	0.18	4.8	3.6	0.054	0.030	0.016	7.6	0.00043	0.00068	0.012	0.00027	0.00000038	0.00000038	0.00059	0.00000027	2.0	0.0000032	0.0000078
23-Sep-15	12	23	500	480	8.0	285	#N/A	0.18	4.9	3.1	0.055	0.029		7.4	0.00032	0.00082	0.013	0.00026	0.00000039	0.00000039	0.00053	0.00000028	2.0	0.0000030	0.0000056
7-Oct-15	13	25	400	390	8.0	298	#N/A	0.16	4.3	2.4	0.00	0.022		5.7	0.00017	0.00078	0.010	0.00019	0.00000031	0.00000031	0.00036	0.00000022	1.5	0.0000022	0.0000026
21-Oct-15	14	27	400	390	8.1	288	#N/A	0.070	4.1	2.0	0.00	0.022		5.7	0.00026	0.00089	0.011	0.00022	0.00000031	0.00000031	0.00039	0.00000013	1.6	0.0000013	0.0000034
4-Nov-15	15	29	400	400	8.1	287	#N/A	0.14	4.5	2.3	0.00	0.022		6.3	0.00039	0.0010	0.011	0.00023	0.00000032	0.00000032	0.00029	0.00000014	1.7	0.0000051	0.0000012
18-Nov-15	16	31	400	380	8.1	288	#N/A	0.050	4.5	2.2	0.00	0.021		5.7	0.00014	0.0011	0.011	0.00016	0.00000031	0.00000031	0.00023	0.00000026	1.5	0.0000013	0.0000019
2-Dec-15	17	33	400	390	8.1	282	#N/A	0.091	4.1	2.1	0.00	0.021		6.4	0.00018	0.0014	0.013	0.00024	0.00000031	0.00000031	0.00031	0.00000013	1.7	0.0000013	0.0000075
16-Dec-15	18	35	400	360	8.1	278	#N/A	0.083	3.5	2.1	0.00	0.018		5.7	0.00014	0.0015	0.012	0.00022	0.00000029	0.00000029	0.00034	0.00000029	1.5	0.0000037	0.0000058
30-Dec-15	19	37	400	390	8.1	269	#N/A	0.082	3.7	1.7	0.00	0.021		6.1	0.00017	0.0016	0.013	0.00023	0.00000031	0.00000031	0.00032	0.00000013	1.6	0.0000022	0.0000047
13-Jan-16	20	39	400	365	8.1	268	#N/A	0.069	3.6	2.0	0.00	0.017		5.5	0.00014	0.0016	0.011	0.00020	0.00000029	0.00000029	0.00034	0.00000013	1.5	0.0000013	0.0000040
27-Jan-16	21	41	400	385	8.0	266	#N/A	0.14	3.8	2.0	0.00	0.019		5.6	0.00030	0.0018	0.012	0.00024	0.00000031	0.00000031	0.00027	0.00000018	1.5	0.0000013	0.0000042
10-Feb-16	22	43	400	360	8.1	258	#N/A	0.11	3.7	1.7	0.00	0.017		5.3	0.00016	0.0018	0.013	0.00022	0.00000029	0.00000029	0.00021	0.00000012	1.4	0.0000012	0.0000033
24-Feb-16	23	45	400	395	8.1	266	#N/A	0.11	3.9	1.9	0.00	0.016		6.2	0.000077	0.0020	0.014	0.00024	0.00000032	0.00000032	0.00018	0.00000018	1.6	0.0000014	0.0000053
9-Mar-16	24	47	400	385	8.1	258	#N/A	0.10	3.8	1.5	0.00														

Appendix D.2-3 Leachate Results and Calculated Loading Rates (Data Tables)

Leachate Concentrations for Col 12 (Supremo Gneiss Transition Ore)

Date	Cycle	Week	Volume (mL)		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
-	No.	-	Input	Output	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Apr-15	1	1	750	305	0.0046	*< 0.007*	*< 1E-05*	0.025	119	0.54	2.2	0.011	0.014	0.030	20	0.011	5.5	0.000089	61	1.8	475	0.00058	0.000080	0.00010	0.64	0.00011	0.0020	*< 0.002*
6-May-15	2	3	400	365	0.0016	*< 0.007*	*< 1E-05*	0.013	62	0.29	0.13	0.016	0.0038	*< 0.003*	13	0.0060	4.0	0.0000040	28	0.89	284	0.00029	*< 1E-05*	0.000070	0.24	0.000070	0.0020	*< 0.002*
20-May-15	3	5	400	375	0.00069	*< 0.007*	0.000050	0.0084	32	0.16	0.010	0.019	0.0018	*< 0.003*	9.7	0.0025	4.1	0.0000040	14	0.49	127	0.00024	0.00013	0.00011	0.15	0.000060	*< 0.001*	*< 0.002*
3-Jun-15	4	7	400	260	0.00072	*< 0.007*	*< 1E-05*	0.0070	25	0.11	*< 0.01*	0.021	0.0014	*< 0.003*	8.5	0.0016	4.1	0.0000050	11	0.41	97	0.00020	0.000040	0.000050	0.12	0.00010	0.0010	*< 0.002*
17-Jun-15	5	9	500	485	0.00072	*< 0.007*	*< 1E-05*	0.0055	19	0.083	*< 0.01*	0.019	0.0011	0.0060	7.1	0.0012	4.0	0.0000040	7.1	0.29	71	0.00019	0.000070	0.000070	0.081	0.000080	0.0010	*< 0.002*
1-Jul-15	6	11	500	485	0.00039	*< 0.007*	*< 1E-05*	0.0048	15	0.057	0.010	0.022	0.00090	*< 0.003*	6.2	0.00077	4.1	0.0000030	4.9	0.23	42	0.00016	0.000060	*< 5E-05*	0.056	0.000090	*< 0.001*	*< 0.002*
15-Jul-15	7	13	500	490	0.00038	*< 0.007*	*< 1E-05*	0.0044	14	0.059	*< 0.01*	0.020	0.00080	0.0040	5.5	0.00054	4.2	0.0000030	3.7	0.21	33	0.00016	0.000030	0.000090	0.047	0.00010	*< 0.001*	*< 0.002*
29-Jul-15	8	15	400	390	0.00032	*< 0.007*	*< 1E-05*	0.0045	13	0.039	*< 0.01*	0.020	0.00060	0.0050	5.5	0.00044	3.7	*< 2E-06*	2.6	0.20	29	0.00014	*< 1E-05*	*< 5E-05*	0.043	0.000070	*< 0.001*	*< 0.002*
12-Aug-15	9	17	400	400	0.00043	*< 0.007*	*< 1E-05*	0.0038	12	0.024	*< 0.01*	0.019	0.00050	0.0040	5.7	0.00040	4.1	0.0000050	2.2	0.19	25	0.00015	0.000060	0.000050	0.038	0.00010	*< 0.001*	*< 0.002*
26-Aug-15	10	19	500	465	0.00042	0.0070	0.000010	0.0036	12	0.023	0.010	0.018	0.00050	0.0040	5.6	0.00036	4.0	0.0000035	1.9	0.18	25	0.00015	0.000055	0.000050	0.033	0.000090	0.0010	0.0020
9-Sep-15	11	21	500	470	0.00040	*< 0.007*	*< 1E-05*	0.0035	11	0.023	*< 0.01*	0.017	0.00050	0.0040	5.4	0.00031	3.8	0.0000020	1.5	0.17	25	0.00014	0.000050	*< 5E-05*	0.029	0.000080	*< 0.001*	*< 0.002*
23-Sep-15	12	23	500	480	0.00044	0.0070	0.000015	0.0032	11	0.015	0.010	0.015	0.00055	0.0035	5.1	0.00028	3.7	0.0000020	1.3	0.16	22	0.00013	0.000080	0.000050	0.026	0.000065	0.0010	0.0020
7-Oct-15	13	25	400	390	0.00047	*< 0.007*	0.000020	0.0029	10	0.0081	*< 0.01*	0.013	0.00060	0.0030	4.8	0.00024	3.5	0.0000020	1.1	0.15	19	0.00011	0.00011	*< 5E-05*	0.024	0.000050	0.0010	*< 0.002*
21-Oct-15	14	27	400	390	0.00049	*< 0.007*	*< 1E-05*	0.0027	9.9	0.015	*< 0.01*	0.016	0.00050	*< 0.003*	4.7	0.00026	3.8	*< 2E-06*	0.98	0.16	19	0.00015	0.000060	0.000060	0.026	0.000080	*< 0.001*	*< 0.002*
4-Nov-15	15	29	400	400	0.00060	*< 0.007*	0.000010	0.0023	11	0.0094	*< 0.01*	0.016	0.00040	0.0050	5.0	0.00024	3.8	*< 2E-06*	0.88	0.15	19	0.00015	0.00028	0.00011	0.026	0.00010	0.0010	*< 0.002*
18-Nov-15	16	31	400	380	0.00017	*< 0.007*	*< 1E-05*	0.0026	11	0.0040	*< 0.01*	0.014	0.00010	*< 0.003*	4.8	0.00032	3.8	*< 2E-06*	0.76	0.15	18	0.00010	0.000020	*< 5E-05*	0.019	0.000080	*< 0.001*	*< 0.002*
2-Dec-15	17	33	400	390	0.00045	*< 0.007*	*< 1E-05*	0.0025	12	0.026	*< 0.01*	0.016	0.00040	0.011	5.3	0.00038	3.9	*< 2E-06*	0.80	0.17	19	0.00013	0.000050	*< 5E-05*	0.026	0.000090	*< 0.001*	*< 0.002*
16-Dec-15	18	35	400	360	0.00053	*< 0.007*	*< 1E-05*	0.0026	11	0.025	*< 0.01*	0.014	0.00040	0.012	5.0	0.00028	4.1	*< 2E-06*	0.69	0.17	18	0.00012	0.00014	*< 5E-05*	0.026	0.000060	*< 0.001*	*< 0.002*
30-Dec-15	19	37	400	390	0.00051	*< 0.007*	*< 1E-05*	0.0026	11	0.021	0.010	0.014	0.00030	0.0030	4.8	0.00024	3.8	*< 2E-06*	0.66	0.16	16	0.00013	*< 1E-05*	0.00010	0.024	0.000080	0.0010	*< 0.002*
13-Jan-16	20	39	400	365	0.00042	*< 0.007*	0.000020	0.0024	11	0.020	*< 0.01*	0.012	0.00030	0.0030	5.0	0.00045	4.0	0.0000020	0.57	0.15	16	0.000084	0.000080	*< 5E-05*	0.021	0.000050	0.0020	*< 0.002*
27-Jan-16	21	41	400	385	0.00044	*< 0.007*	*< 1E-05*	0.0021	10	0.017	*< 0.01*	0.012	0.00030	0.0080	4.7	0.00019	4.0	*< 2E-06*	0.50	0.15	16	0.00014	0.000050	*< 5E-05*	0.022	0.000070	*< 0.001*	*< 0.002*
10-Feb-16	22	43	400	360	0.00024	*< 0.007*	0.000070	0.0021	10	0.013	*< 0.01*	0.012	0.00030	0.0060	4.6	0.00026	3.8	*< 2E-06*	0.50	0.16	15	0.00013	0.000040	0.000080	0.020	0.000070	*< 0.001*	*< 0.002*
24-Feb-16	23	45	400	395	0.00022	*< 0.007*	0.000010	0.0023	11	0.020	0.010	0.012	0.00030	0.013	4.8	0.00025	3.9	*< 2E-06*	0.40	0.16	14	0.00012	0.000020	*< 5E-05*	0.022	0.000070	*< 0.001*	*< 0.002*
9-Mar-16	24	47	400	385																								

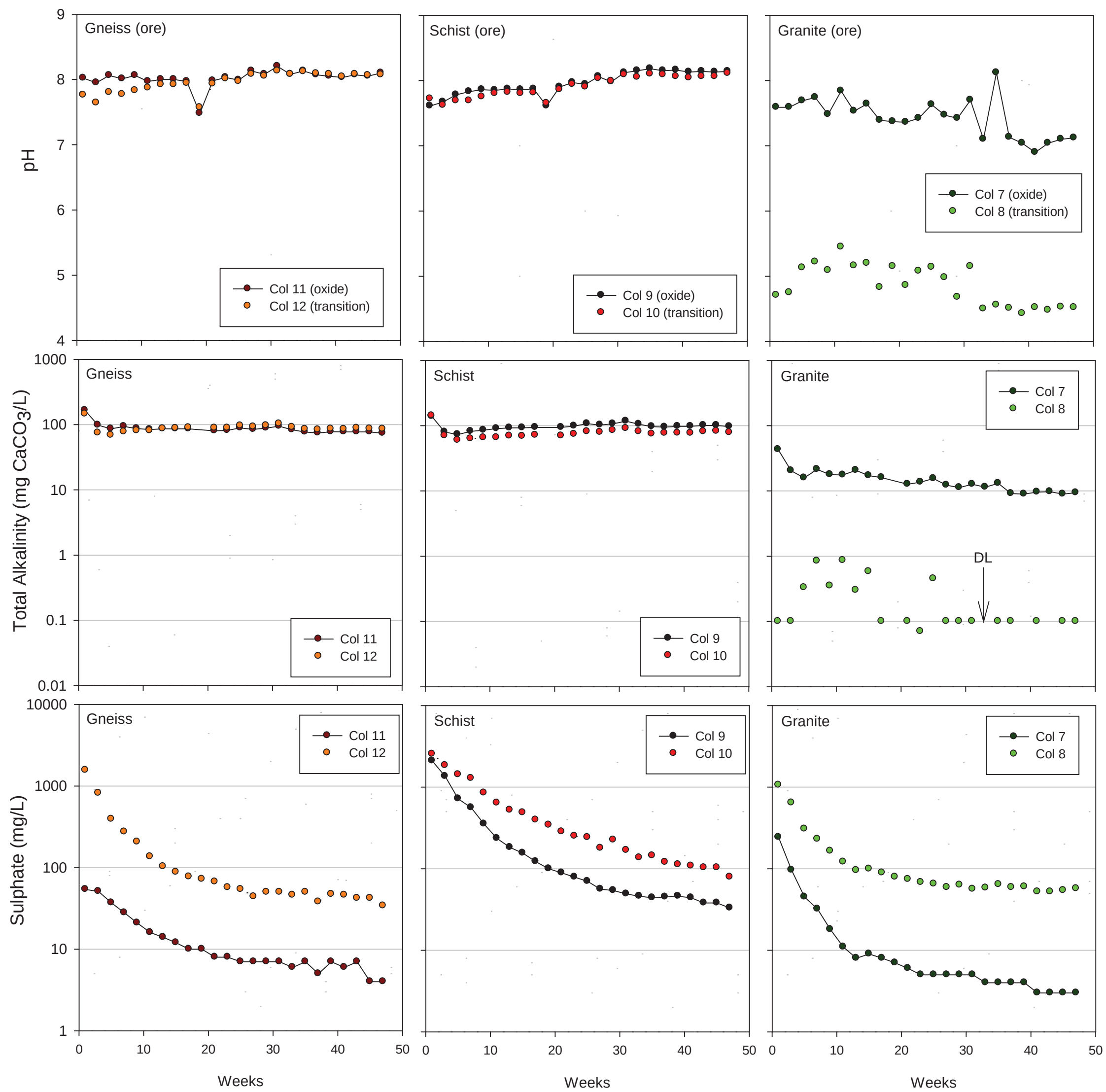
Calculated Loading Rates for Col 12

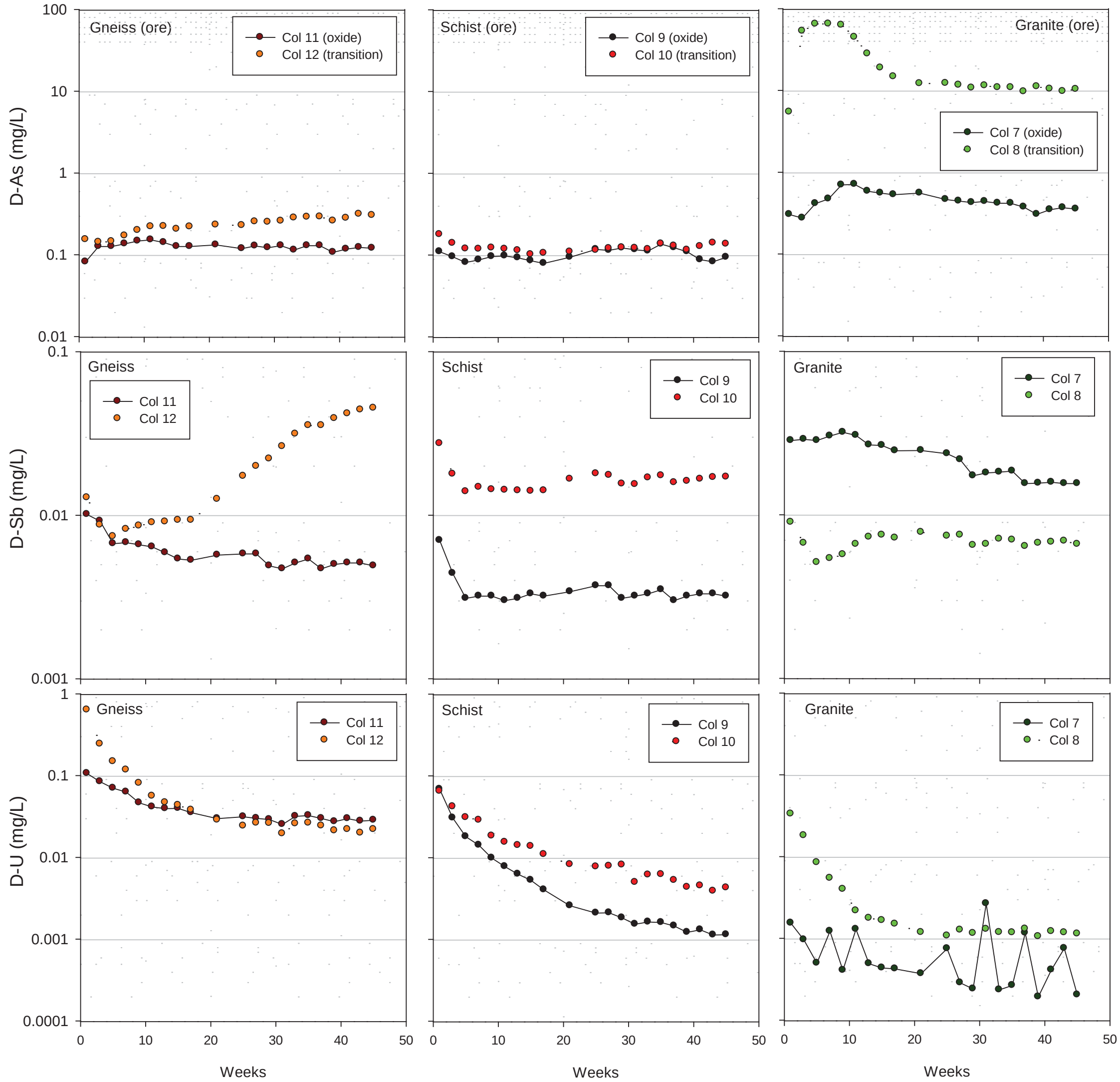
Date	Cycle	Week	Volume (mL)		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
-	No.	-	Input	Output	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk	mg/kg/wk
22-Apr-15	1	1	750	305	0.00033	0.00049	0.00000070	0.0018	8.4	0.038	0.16	0.00075	0.0010	0.0021	1.4	0.00078	0.39	0.0000063	4.3	0.13	33	0.000041	0.0000056	0.0000070	0.045	0.0000077	0.00014	0.00014
6-May-15	2	3	400	365	0.000067	0.00030	0.00000042	0.00053	2.6	0.012	0.0055	0.00068	0.00016	0.00013	0.56	0.00025	0.17	0.00000017	1.2	0.038	12	0.000012	0.00000042	0.0000030	0.010	0.0000030	0.000084	0.000084
20-May-15	3	5	400	375	0.000030	0.00030	0.0000022	0.00036	1.4	0.0068	0.00043	0.00081	0.000078	0.00013	0.42	0.00011	0.18	0.00000017	0.62	0.021	5.5	0.000010	0.0000056	0.0000048	0.0064	0.0000026	0.000043	0.000087
3-Jun-15	4	7	400	260	0.000022	0.00021	0.00000030	0.00021	0.76	0.0033	0.00030	0.00062	0.000042	0.000090	0.26	0.000049	0.12	0.00000015	0.32	0.012	2.9	0.0000061	0.0000012	0.0000015	0.0035	0.0000030	0.000030	0.000060
17-Jun-15	5	9	500	485	0.000040	0.00039	0.00000056	0.00031	1.1	0.0047	0.00056	0.0011	0.000062	0.00034	0.40	0.000067	0.23	0.00000022	0.40	0.016	4.0	0.000011	0.0000039	0.0000039	0.0045	0.0000045	0.000056	0.00011
1-Jul-15	6	11	500	485	0.000022	0.00039	0.00000056	0.00027	0.86	0.0032	0.00056	0.0012	0.000050	0.00017	0.35	0.000043	0.23	0.00000017	0.28	0.013	2.3	0.0000090	0.0000034	0.0000028	0.0031	0.0000050	0.000056	0.00011
15-Jul-15	7	13	500	490	0.000022	0.00040	0.00000057	0.00025	0.79	0.0034	0.00057	0.0011	0.000045	0.00023	0.31	0.000031	0.24	0.00000017	0.21	0.012	1.9	0.0000090	0.0000017	0.0000051	0.0026	0.0000057	0.000057	0.00011
29-Jul-15	8	15	400	390	0.000014	0.00032	0.00000045	0.00020	0.56	0.0017	0.00045	0.00088	0.000027	0.00023	0.25	0.000020	0.16	0.000000090	0.12	0.0091	1.3	0.0000063	0.00000045	0.0000023	0.0020	0.0000032	0.000045	0.000090
12-Aug-15	9	17	400	400	0.000020	0.00032	0.00000046	0.00017	0.57	0.0011	0.00046	0.00086	0.000023	0.00018	0.26	0.000018	0.19	0.00000023	0.10	0.0085	1.2	0.0000068	0.0000028	0.0000023	0.0017	0.0000046	0.000046	0.000092
26-Aug-15	10	19	500	465	0.000022	0.00038	0.00000054	0.00019	0.64	0.0012	0.00054	0.00096	0.000027	0.00021	0.30	0.000019	0.21	0.00000019	0.100	0.0096	1.4	0.0000078	0.0000030	0.0000027	0.0018	0.0000048	0.000054	0.00011
9-Sep-15	11	21	500	470	0.000022	0.00038	0.00000054	0.00019	0.61	0.0012	0.00054	0.00092	0.000027	0.00022	0.29	0.000017	0.21	0.00000011	0.083	0.0092	1.4	0.0000078	0.0000027	0.0000027	0.0015	0.0000043	0.000054	0.00011
23-Sep-15	12	23	500	480	0.000024	0.00039	0.00000083	0.00017	0.60	0.00085	0.00055	0.00083	0.000030	0.00019	0.28	0.000015	0.20	0.00000011	0.072	0.0090	1.2	0.0000070	0.0000044	0.0000028	0.0015	0.0000036	0.000055	0.00011
7-Oct-15	13	25	400	390	0.000021	0.00031	0.00000090	0.00013	0.47	0.00036	0.00045	0.00059	0.000027	0.00013	0.22	0.000011	0.16	0.000000090	0.048	0.0069	0.83	0.0000048	0.0000049	0.0000022	0.0011	0.0000022	0.000045	0.000090
21-Oct-15	14	27	400	390	0.000022	0.00031	0.00000045	0.00012	0.44	0.00069	0.00045	0.00073	0.000022	0.00013	0.21	0.000012	0.17	0.000000090	0.044	0.0071	0.84	0.0000068	0.0000027	0.0000027	0.0012	0.0000036	0.000045	0.000090
4-Nov-15	15	29	400	400	0.000028	0.00032	0.00000046	0.00011	0.50	0.00043	0.00046	0.00072	0.000018	0.00023	0.23	0.000011	0.17	0.000000092	0.040	0.0070	0.88	0.0000070	0.000013	0.0000051	0.0012	0.0000046	0.000046	0.000092
18-Nov-15	16	31	400	380	0.0000074	0.00031	0.00000044	0.00011	0.47	0.00018	0.00044	0.00061	0.0000044	0.00013	0.21	0.000014	0.17	0.000000087	0.033	0.0066	0.78	0.0000045	0.00000087	0.0000022	0.00085	0.0000035	0.000044	0.000087
2-Dec-15	17	33	400	390	0.000020	0.00031	0.00000045	0.00011	0.53	0.0012	0.00045	0.00071	0.000018	0.00049	0.24	0.000017	0.18	0.000000090	0.036	0.0074	0.85	0.0000059	0.0000022	0.0000022	0.0012	0.0000040	0.000045	0.000090
16-Dec-15	18	35	400	360	0.000022	0.00029	0.00000041	0.00011	0.45	0.0010	0.00041	0.00059	0.000017	0.00050	0.21	0.000012	0.17	0.000000083	0.029	0.0069	0.73	0.0000048	0.0000058	0.0000021	0.0011	0.0000025	0.000041	0.000083
30-Dec-15	19	37	400	390	0.000023	0.00031	0.00000045	0.00012	0.50	0.00095	0.00045	0.00064	0.000013	0.00013	0.21	0.000011	0.17	0.000000090	0.030	0.0074	0.70	0.0000058	0.00000045	0.0000045	0.0011	0.0000036	0.000045	0.000090
13-Jan-16	20	39	400	365	0.000018	0.00029	0.00000084	0.000099	0.45	0.00085	0.00042	0.00052	0.000013	0.00013	0.21	0.000019	0.17	0.000000084	0.024	0.0062	0.65	0.0000035	0.0000034	0.0000021	0.00089	0.0000021	0.000084	0.000084
27-Jan-16	21	41	400	385	0.000019	0.00031	0.00000044	0.000095	0.45	0.00077	0.00044	0.00054	0.000013	0.00035	0.21	0.0000084	0.18	0.000000089	0.022	0.0068	0.69	0.0000062	0.0000022	0.0000022	0.00097	0.0000031	0.000044	0.000089
10-Feb-16	22	43	400	360	0.0000099	0.00029	0.0000029	0.000087	0.42	0.00054	0.00041	0.00051	0.000012	0.00025	0.19	0.000011	0.16	0.000000083	0.021	0.0065	0.63	0.0000055	0.0000017	0.0000033	0.00082	0.0000029	0.000041	0.000083
24-Feb-16	23	45	400	395	0.0000100	0.00032	0.00000045	0.00010	0.49	0.00090	0.00045	0.00056	0.000014	0.00059	0.22	0.000011	0.18	0.000000091	0.018	0.0070	0.65	0.0000056	0.00000091	0.0000023	0.00099	0.0000032	0.000045	0.000091
9-Mar-16	24	47	400	385																								

Notes:
Values in grey italics are below the analytical detection limit

Appendix D.2-4:
Time Series Profiles for Ore Kinetic Tests Leachate Concentrations and Loading Rates

Leachate Concentrations for Ore Unsaturated Columns

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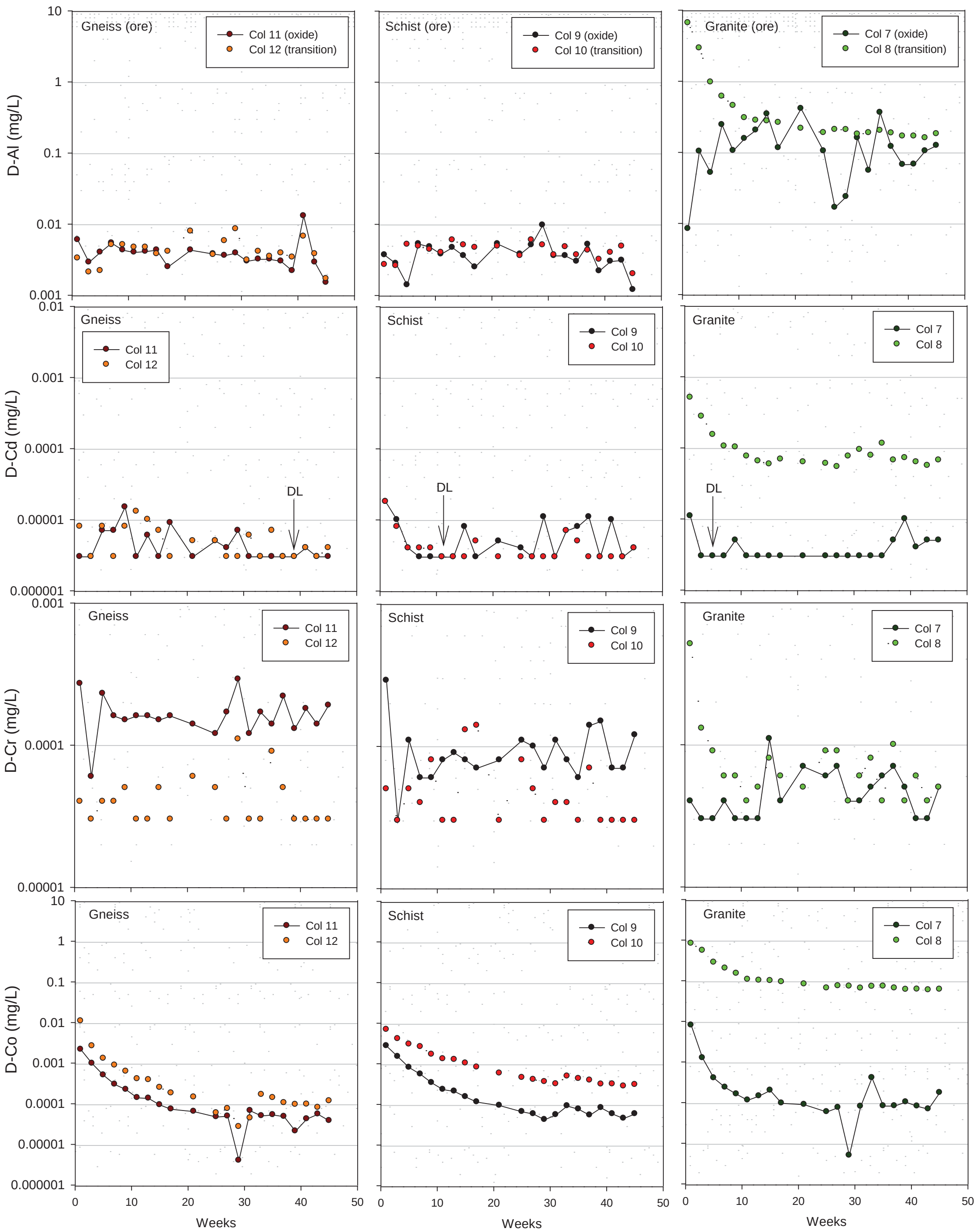
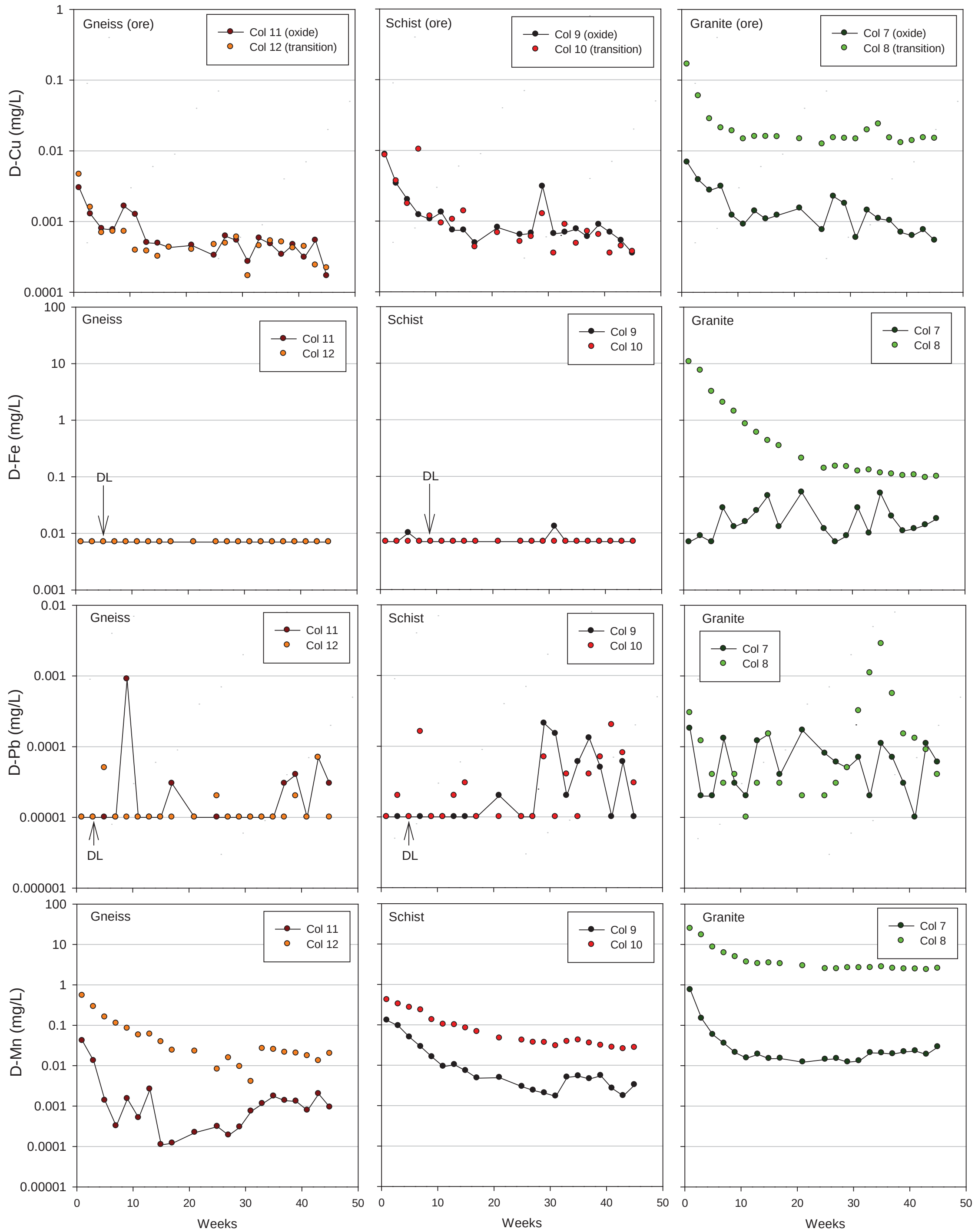
Col 11 (oxide)
Col 12 (transition)
Schist (ore)
Col 9 (oxide)
Col 10 (transition)
Granite (ore)
Col 7 (oxide)
Col 8 (transition)
D-As (mg/L)
100
10
1
0.1
0.01
Gneiss
Col 11
Col 12
Schist
Col 9
Col 10
Granite
Col 7
Col 8
D-Sb (mg/L)
0.1
0.01
0.001
D-U (mg/L)
1
0.1
0.01
0.001
0.0001
0
10
20
30
40
50
Weeks


Gneiss (ore)
Col 11 (oxide)
Col 12 (transition)
Schist (ore)
Col 9 (oxide)
Col 10 (transition)
Granite (ore)
Col 7 (oxide)
Col 8 (transition)
D-Al (mg/L)
D-Cd (mg/L)
D-Cr (mg/L)
D-Co (mg/L)
Gneiss
Schist
Granite
DL
Weeks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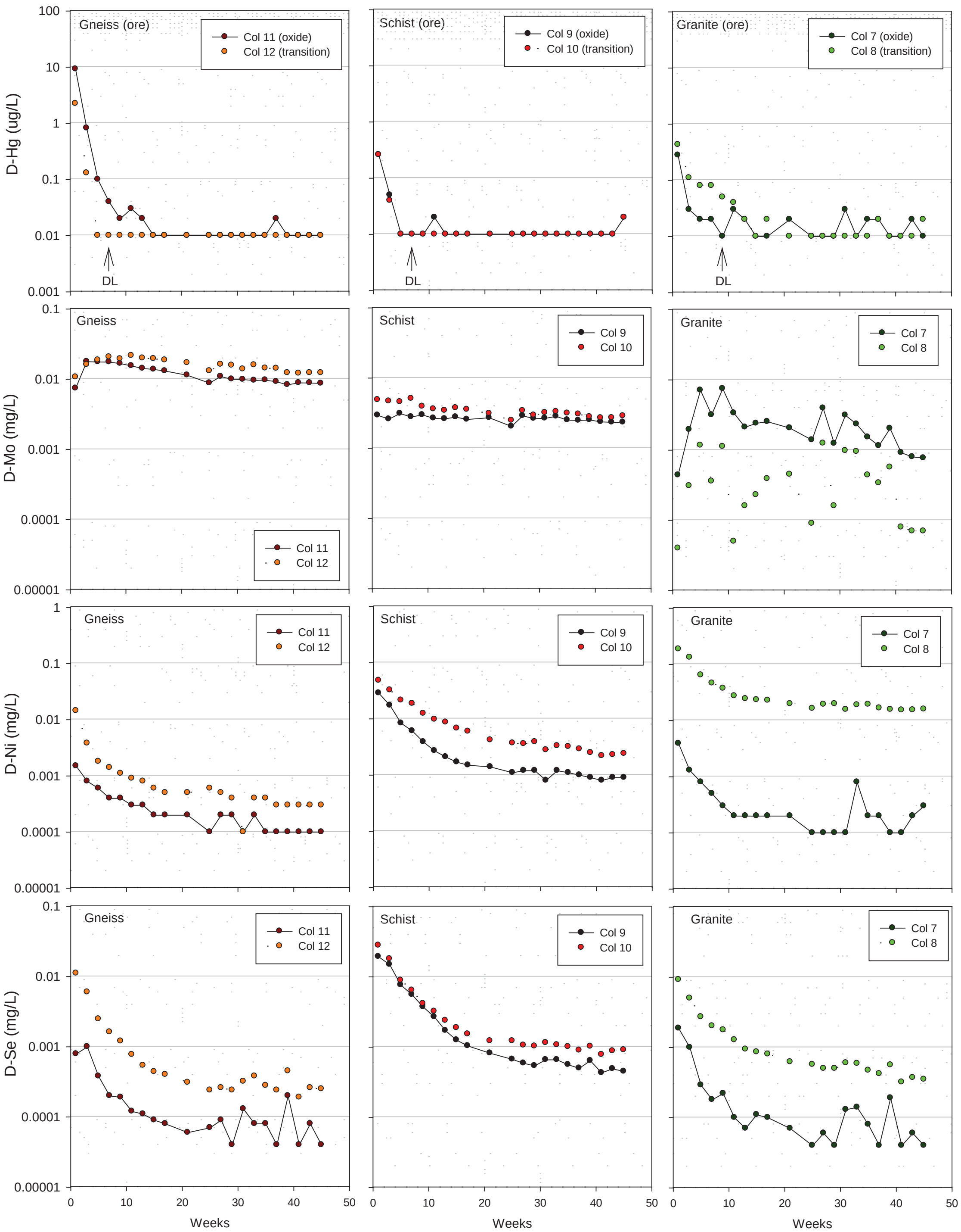
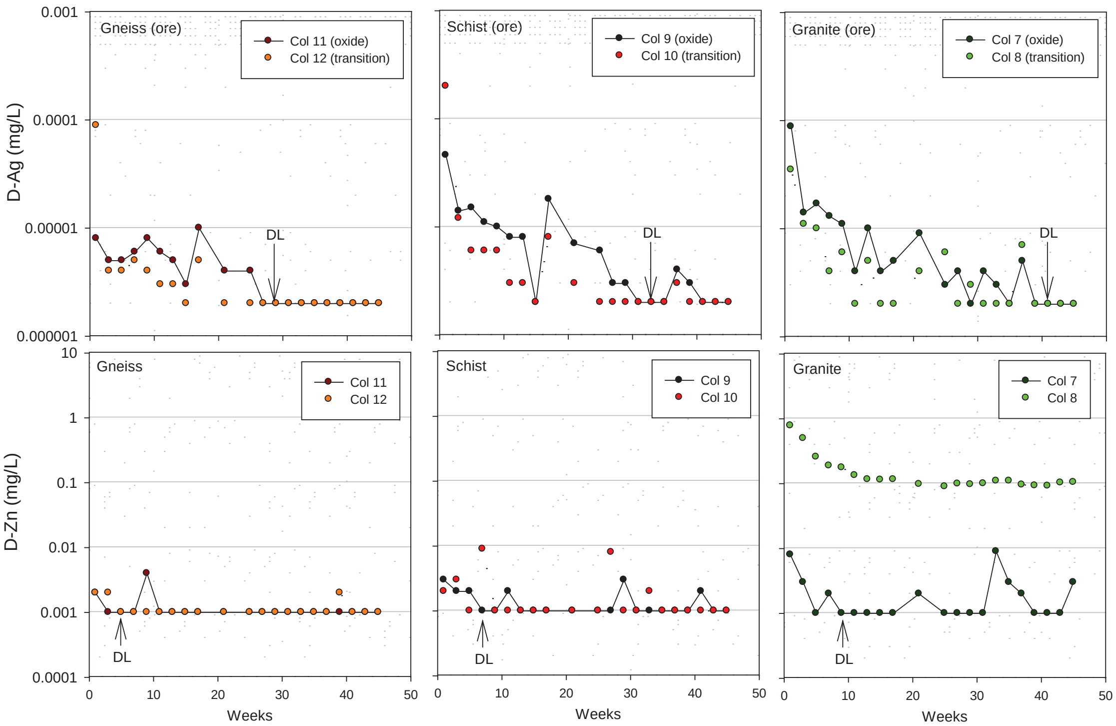
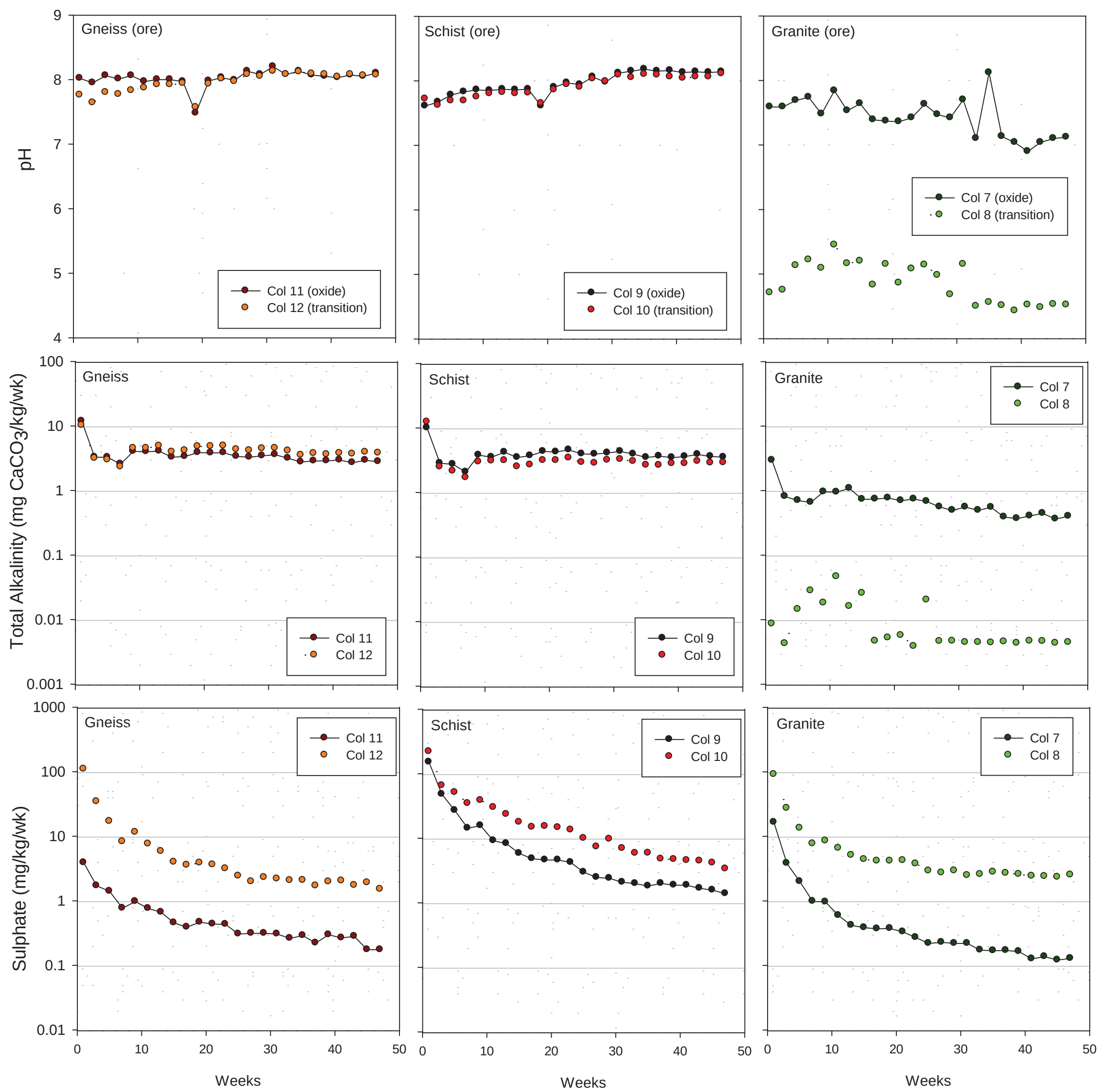
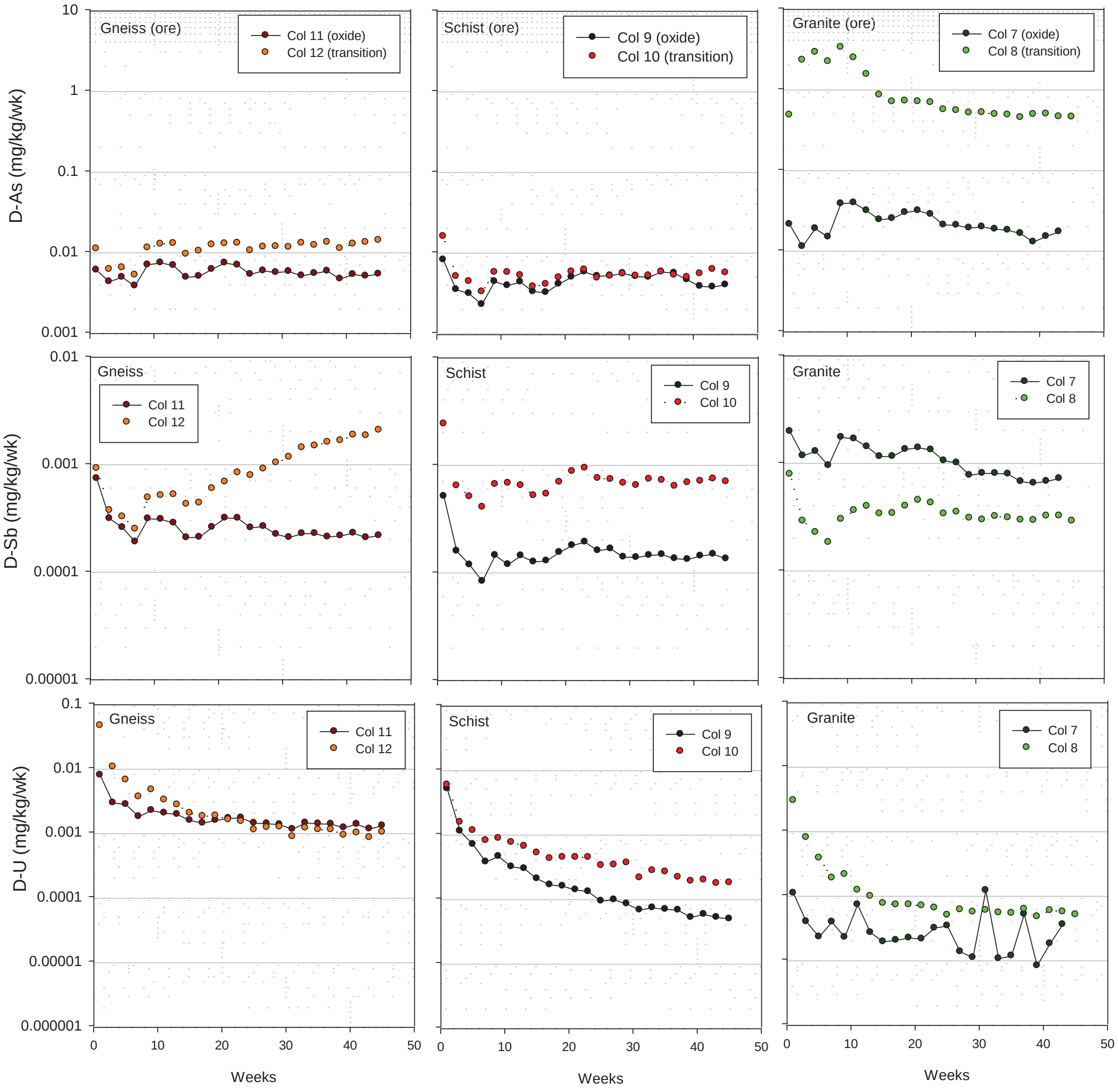
Col 11 (oxide)
Col 12 (transition)
Schist (ore)
Col 9 (oxide)
Col 10 (transition)
Granite (ore)
Col 7 (oxide)
Col 8 (transition)
D-Cu (mg/L)
D-Fe (mg/L)
D-Pb (mg/L)
D-Mn (mg/L)
Gneiss
Schist
Granite
Col 11
Col 12
Col 9
Col 10
Col 7
Col 8
DL
Weeks
1
0.1
0.01
0.001
0.0001
100
10
0.00001
0.000001
0
10
20
30
40
50


Gneiss (ore)
Col 11 (oxide)
Col 12 (transition)
DL
Schist (ore)
Col 9 (oxide)
Col 10 (transition)
Granite (ore)
Col 7 (oxide)
Col 8 (transition)
D-Hg (ug/L)
100
10
1
0.1
0.01
0.001
Gneiss
Col 11
Col 12
Schist
Col 9
Col 10
Granite
Col 7
Col 8
D-Mo (mg/L)
0.1
0.01
0.001
0.0001
0.00001
D-Ni (mg/L)
1
D-Se (mg/L)
0
10
20
30
40
50
Weeks


Gneiss (ore)
Col 11 (oxide)
Col 12 (transition)
Schist (ore)
Col 9 (oxide)
Col 10 (transition)
Granite (ore)
Col 7 (oxide)
Col 8 (transition)
D-Ag (mg/L)
0.001
0.0001
0.00001
0.000001
DL
Gneiss
Col 11
Col 12
Schist
Col 9
Col 10
Granite
Col 7
Col 8
D-Zn (mg/L)
10
1
0.1
0.01
0.001
0.0001
0
10
20
30
40
50
Weeks

Loading Rates for Ore Unsaturated Columns

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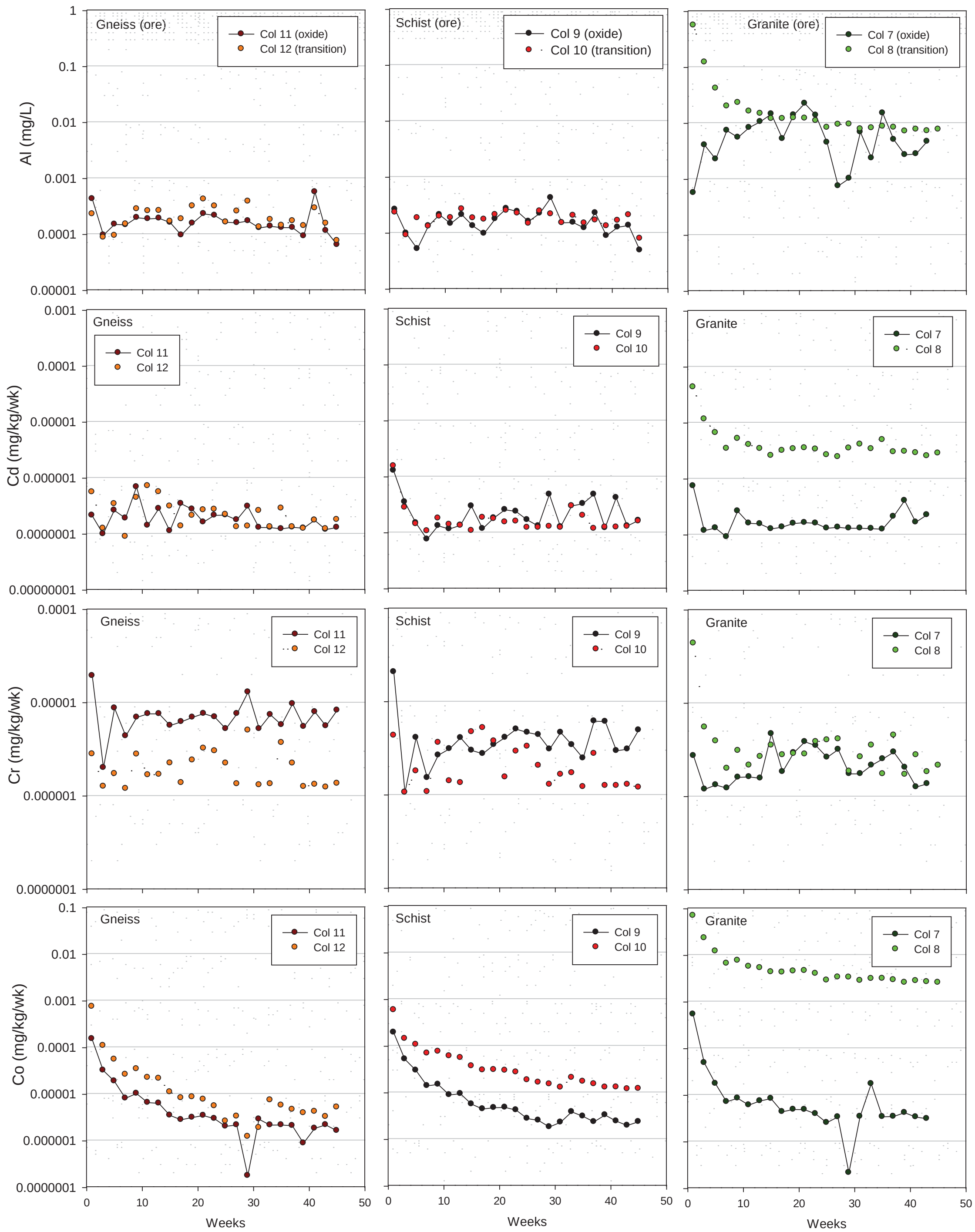
Col 11 (oxide)
Col 12 (transition)
Schist (ore)
Col 9 (oxide)
Col 10 (transition)
Granite (ore)
Col 7 (oxide)
Col 8 (transition)
D-As (mg/kg/wk)
D-Sb (mg/kg/wk)
D-U (mg/kg/wk)
Gneiss
Col 11
Col 12
Schist
Col 9
Col 10
Granite
Col 7
Col 8
Weeks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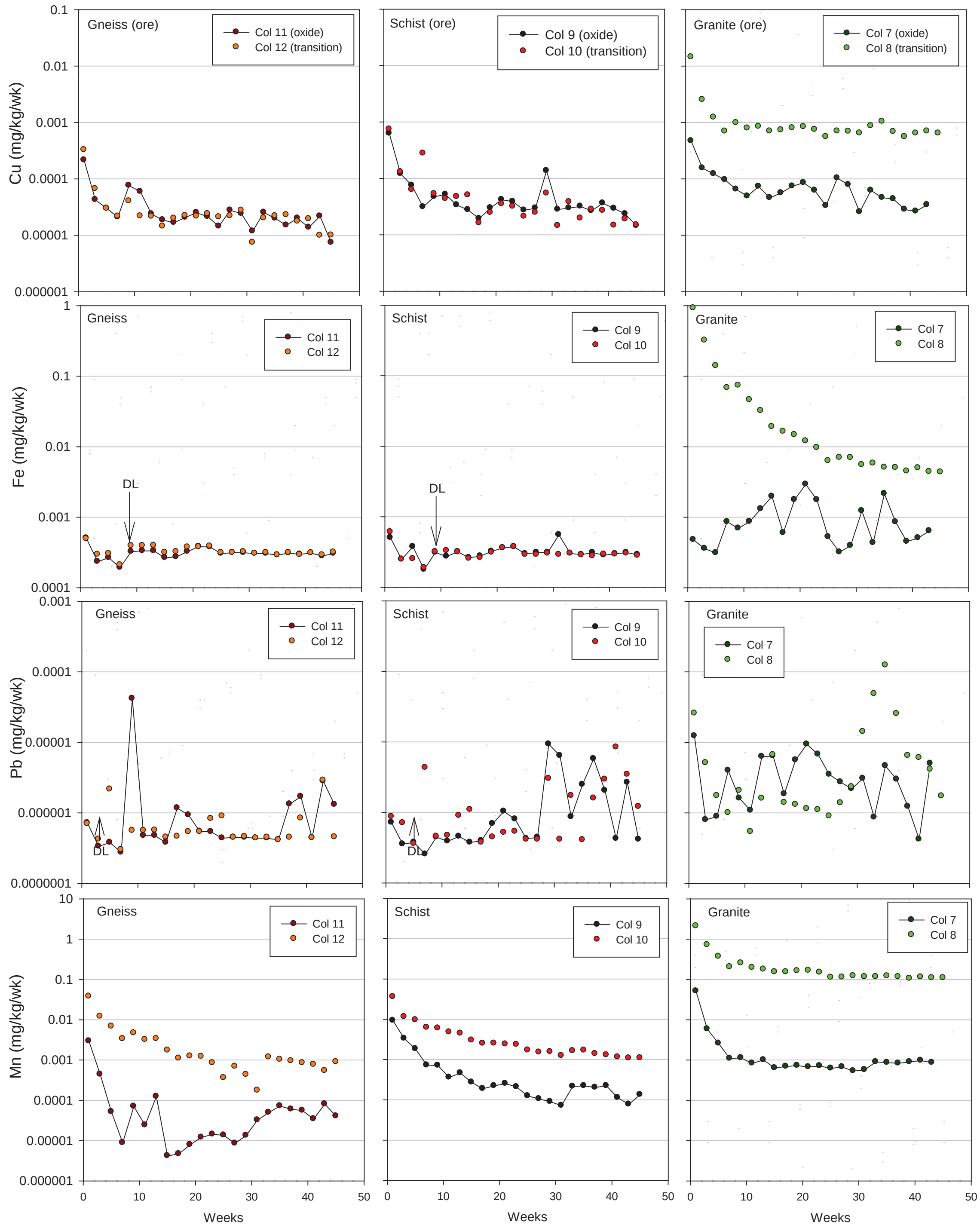
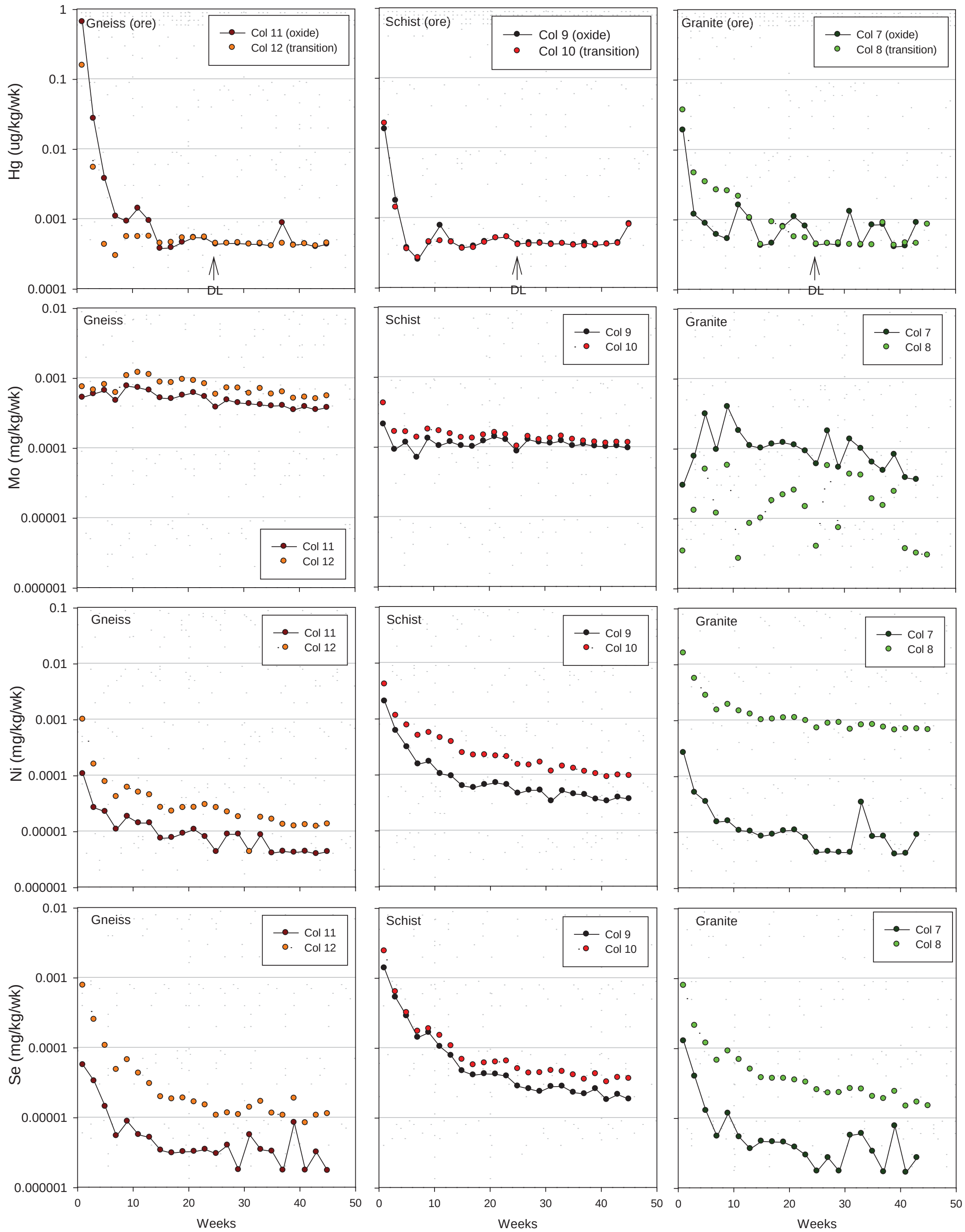
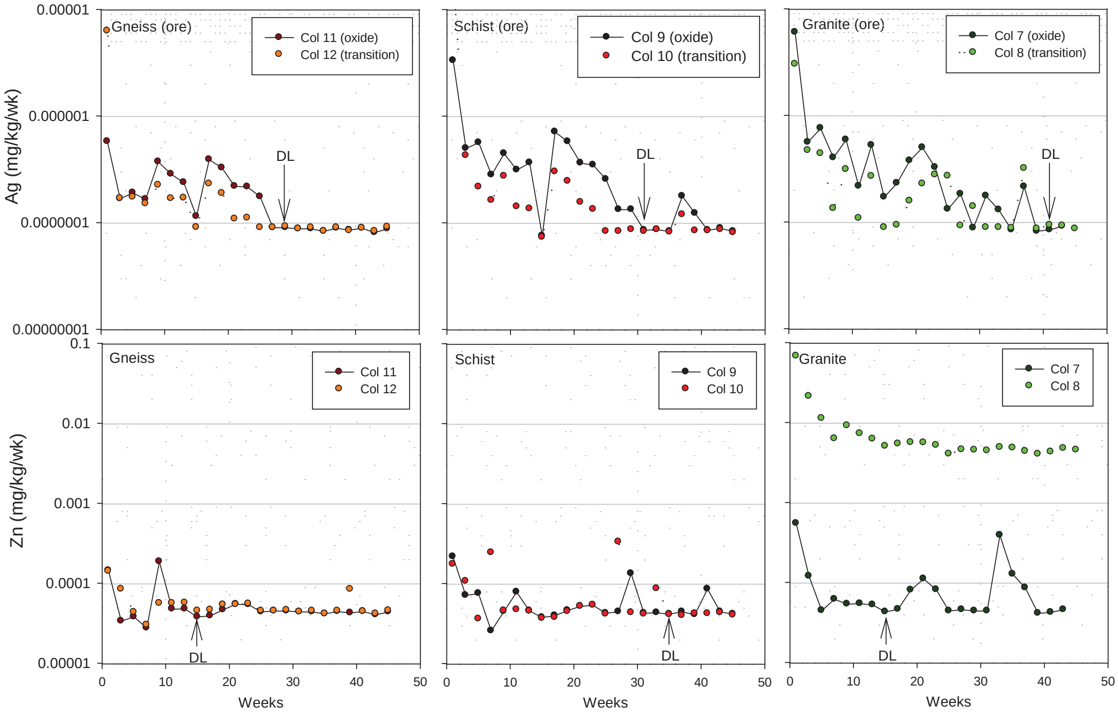
Col 11 (oxide)
Col 12 (transition)
Schist (ore)
Col 9 (oxide)
Col 10 (transition)
Granite (ore)
Col 7 (oxide)
Col 8 (transition)
Al (mg/L)
Cd (mg/kg/wk)
Cr (mg/kg/wk)
Co (mg/kg/wk)
Gneiss
Schist
Granite
Col 11
Col 12
Col 9
Col 10
Col 7
Col 8
Weeks


Gneiss (ore)
Col 11 (oxide)
Col 12 (transition)
Schist (ore)
Col 9 (oxide)
Col 10 (transition)
Granite (ore)
Col 7 (oxide)
Col 8 (transition)
Cu (mg/kg/wk)
Fe (mg/kg/wk)
Pb (mg/kg/wk)
Mn (mg/kg/wk)
Gneiss
Schist
Granite
Col 11
Col 12
Col 9
Col 10
Col 7
Col 8
DL
Weeks
0.1
0.01
0.001
0.0001
0.00001
0.000001
0.0000001
1
10
0
10
20
30
40
50


Gneiss (ore)
Col 11 (oxide)
Col 12 (transition)
Schist (ore)
Col 9 (oxide)
Col 10 (transition)
Granite (ore)
Col 7 (oxide)
Col 8 (transition)
DL
Hg (ug/kg/wk)
Mo (mg/kg/wk)
Ni (mg/kg/wk)
Se (mg/kg/wk)
Gneiss
Schist
Granite
Col 11
Col 12
Col 9
Col 10
Col 7
Col 8
1
0.1
0.01
0.001
0.0001
0.00001
0.000001
0
10
20
30
40
50
Weeks


Gneiss (ore)
Col 11 (oxide)
Col 12 (transition)
Schist (ore)
Col 9 (oxide)
Col 10 (transition)
Granite (ore)
Col 7 (oxide)
Col 8 (transition)
Ag (mg/kg/wk)
0.00001
0.000001
0.0000001
0.00000001
DL
Gneiss
Col 11
Col 12
Schist
Col 9
Col 10
Granite
Col 7
Col 8
Zn (mg/kg/wk)
0.1
0.01
0.001
0.0001
0.00001
0
10
20
30
40
50
Weeks

APPENDIX D3: KINETIC TEST RESULTS FOR LEACH TAILINGS

Appendix D.3-1: Overview of Operating Procedures for the Coffee Gold Mine Leach Tailings Kinetic Tests

Test ID	Test Sample Description	Duplicate Tests	Type of Test	Lithology	Weathering Facies	Metallurgical Column ID	Column Dimensions			Dry Wt. of Sample (kg)	Temp (°C)	Operation Procedure	Sampling Frequency	Total Volume of Initial Flushings (mL)	Flushing Rate/ Weekly Input* (mL)	Start Date	Test Status	Cycles/ Weeks	Recirculation Cycles
							Inner Diameter (cm)	Length (cm)	Height (cm)										
Col 1	"A" Bag		Unsaturated Column	82% Gneiss, 23% Schist	90% Oxide, 10% Transition	70340	10.5			10	4°	Trickle Leach	Biweekly	1210	variable	10-Apr-14	active	98	57-89
Col 2	"B" Bag	Col 1	Unsaturated Column	82% Gneiss, 23% Schist	90% Oxide, 10% Transition	70340	10.5			20	4°	Trickle Leach	Biweekly	2355	variable	10-Apr-14	active	98	57-89
Col 15	Latte Composite		Unsaturated Column	Schist	40% Oxide, 60% Transition	20%72162, 20% 72168, 30% 72150, 30% 72156	10.5			5	4°	Trickle Leach	Biweekly	700	variable	3-Jun-15	active	39	-
Col 16	Supremo Composite		Unsaturated Column	Gneiss	80% Oxide, 20% Transition	40% 73028, 40% 73034, 20% 73040	10.5			5	4°	Trickle Leach	Biweekly	700	variable	3-Jun-15	active	39	-
Col 17	Supremo/Kona Composite		Unsaturated Column	90% Gneiss, 10% Granite	80% Oxide, 20% Transition	35% 73028, 35% 73034, 18% 73040, 7% 72174, 3% 72180	10.5			5	4°	Trickle Leach	Biweekly	700	variable	3-Jun-15	active	39	-
FB-LT1		Col 1 & Col 2	Field Bin	82% Gneiss, 23% Schist	90% Oxide, 10% Transition	70340	45.0		80	76.3				7		17-Jun-14	active	70	-
FB-LT2			Field Bin	Schist	Oxide	50% 73007 50% 73016	45.0		80	200	site conditions	natural precipitation	3x's / field season	15	natural precipitation	10-Aug-15	active	10	-
FB-LT3			Field Bin	Gneiss	Oxide	50% 72108 50% 72111	45.0		80	200				19		10-Aug-15	active	10	-

Notes:
Columns and humidity cells are composed of Plexiglas with an acrylic perforated disk & nylon mesh
No sample preparation was conducted prior to leachate sampling for any tests
* generally 400-500 mL for columns, see individual leachate results in Appendix D.3-3 for specific input volumes

APPENDIX D.3-2: X-RAY DIFFRACTION ANALYSES FOR LEACH TAILINGS KINETIC TEST SUB-SAMPLE

SGS

Quantitative X-Ray Diffraction by Rietveld Refinement

Report Prepared for:	*SGS Canada Inc*
Project Number/ LIMS No.	*14094-101A/MI4512-APR14*
Batch No.	*1416 Kaminak Coffee Project*
Reporting Date:	*April 29, 2014*

Instrument:	BRUKER AXS D8 Advance Diffractometer
Test Conditions:	Co radiation, 40 kV, 35 mA Regular Scanning: Step: 0.02°, Step time: 1s, 2θ range: 3-80°
***Interpretations*:**	PDF2/PDF4 powder diffraction databases issued by the International Center for Diffraction Data (ICDD). DiffracPlus Eva and Topas software.
***Detection Limit*:**	0.5-2%. Strongly dependent on crystallinity.

Contents:

1) Method Summary
2) Summary of Mineral Asemblages
3) Semi-Quantitative XRD Results
4) XRD Pattern(s)

Signature REDACTED

Signature REDACTED

Bernie C. Yeung, B.Sc.
Mineralogist

Huyun Zhou, Ph.D., P.Geo.
Senior Mineralogist

Report Prepared by: Kim Gibbs

SGS

Method Summary

Mineral Identification and Interpretation:

Mineral identification and interpretation involves matching the diffraction pattern of an unknown material to patterns of single-phase reference materials. The reference patterns are compiled by the Joint Committee on Powder Diffraction Standards - International Center for Diffraction Data (JCPDS-ICDD) database and released on software as Powder Diffraction Files (PDF).

Interpretations do not reflect the presence of non-crystalline and/or amorphous compounds, except when internal standards have been added by request. Mineral proportions may be strongly influenced by crystallinity, crystal structure and preferred orientations. Mineral or compound identification and quantitative analysis results should be accompanied by supporting chemical assay data or other additional tests.

Quantitative Rietveld Analysis:

Quantitative Rietveld Analysis is performed by using Topas 4.2 (Bruker AXS), a graphics based profile analysis program built around a non-linear least squares fitting system, to determine the amount of different phases present in a multicomponent sample. Whole pattern analyses are predicated by the fact that the X-ray diffraction pattern is a total sum of both instrumental and specimen factors. Unlike other peak intensity-based methods, the Rietveld method uses a least squares approach to refine a theoretical line profile until it matches the obtained experimental patterns.

Rietveld refinement is completed with a set of minerals specifically identified for the sample. Zero values indicate that the mineral was included in the refinement calculations, but the calculated concentration was less than 0.05wt%. Minerals not identified by the analyst are not included in refinement calculations for specific samples and are indicated with a dash.

SGS Minerals
a division of SGS Canada Inc.
P.O. Box 4300, 185 Concession Street, Lakefield, Ontario, Canada K0L 2H0
Tel: (705) 652-2000 Fax: (705) 652-6365 www.sgs.com www.sgs.com/met
Member of the SGS Group (SGS SA)

SGS

SGS Canada Inc
14094-101A/MI4512-APR14
29-Apr-14

Summary of Rietveld Quantitative Analysis X-ray Diffraction Results

Quantitative X-ray Diffraction Results

Mineral/Compound	70340 A APR4512-01 (wt %)	70340 B APR4512-02 (wt %)
Quartz	56.3	55.7
Phlogopite	3.1	2.8
Dolomite	4.6	2.8
Kaolinite	6.8	9.0
Muscovite	14.8	17.9
Calcite	1.4	1.4
Anorthite	0.0	-
Biotite	0.5	0.7
Orthoclase	1.6	1.3
Chlorite	6.4	5.8
Albite	4.6	2.6
TOTAL	100	100

Zero values indicate that the mineral was included in the refinement, but the calculated concentration is below a measurable value.
Dashes indicate that the mineral was not identifed by the analyst and not included in the refinement calculation for the sample.

Mineral/Compound	Formula
Quartz	SiO_2
Phlogopite	$KMg_3(AlSi_3O_{10})(OH)$
Dolomite	$CaMg(CO_3)_2$
Kaolinite	$Al_2Si_2O_5(OH)_4$
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$
Calcite	$CaCO_3$
Anorthite	$CaAl_2Si_2O_8$
Biotite	$K(Mg,Fe)_3(AlSi_3O_{10})(OH)_2$
Orthoclase	$KAlSi_3O_8$
Chlorite	$(Fe,(Mg,Mn)_5,Al)(Si_3Al)O_{10}(OH)_8$
Albite	$NaAlSi_3O_8$