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Phase II Eagle Project Geochemistry Study

REPORT OF INVESTIGATIONS

EAGLE PROJECT
MARQUETTE COUNTY, MICHIGAN

GEOCHEMISTRY -- PHASE II

Prepared for:

Kennecott Minerals Company
1004 Harbor Hills Drive, Suite 103
Marquette, Michigan 49855

Prepared by:

Geochimica, Inc.
9045 Soquel Drive, Suite 2
Aptos, California 95003

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EXECUTIVE SUMMARY

Background and Basis for Study

The Eagle Project, located on the Yellow Dog plains in Michigamme Township of Marquette County, Michigan, U.S.A., is a small, magmatic segregation Ni-Cu sulfide deposit. The sulfide mineralization is hosted in intrusive igneous rocks, called peridotite and gabbro, composed chiefly of the silicate minerals olivine, pyroxene, and calcic plagioclase. The principal sulfide minerals are pyrrhotite [$Fe_{1-x}S$], chalcopyrite [$CuFeS_2$], and pentlandite [$(Ni,Fe)_9S_8$]. The peridotites and gabbros intrude siltstones and sandstones, referred to as the country rock. The country rocks also contain low concentrations of iron sulfide minerals. If exposed to atmospheric oxygen and water, sulfides can oxidize and dissolve, releasing sulfate and metals into solution and generating acidity. Both silicate and carbonate minerals in the intrusive and in country rock can react with acidity to neutralize effluents and reduce concentrations of certain trace metals potentially mobilized in runoff or effluent.

Kennecott Minerals Company (Kennecott Minerals) will develop the Ni-Cu ores of the Eagle Project as an underground mine, with direct shipment of ore with or without on-site processing. The economically valuable minerals lie in the massive and semi-massive ore zones, and underground mining allows quite precise extraction of ore. After mining, there would be essentially no massive sulfide mineralization remaining underground. The rock that will be moved to and temporarily stored on the ground surface will be "development" country rocks. The evolving mine plans call for the development rock to be backfilled into the mine voids during the latter parts and after mining, probably using a cement additive for strength and additional alkalinity. After mining, the backfilled workings will re-flood, controlling and limiting the availability of oxygen needed to initiate sulfide oxidation.

Kennecott Minerals has initiated a geochemical testing program to evaluate the risks of acid rock drainage (ARD), metals leaching, and other geochemical concerns associated with mining of the Eagle deposit. The program is intended to be modular, building geochemical data sets as the project progresses. The objective of the Phase I and Phase II testing programs is an initial evaluation of the spatial distribution of the geochemical characteristics of the Eagle deposit that could cause ARD and metals leaching. Geochemical testing includes whole-rock chemistry, acid-base accounting (ABA), short-term metal leaching, long-term kinetic column testing and mineralogical analysis. The combined programs analyze whole-rock chemistry and ABA characteristics of 108 samples, Net Acid Generation testing of 68 samples, short-term leaching of 10 samples, and the detailed mineralogy of 30 samples. Long-term kinetic leach tests are ongoing on five Phase I samples (50 weeks) and 10 additional Phase II samples (25 weeks) to simulate weathering under surface conditions, to determine reaction rates, and to evaluate the leachability of trace metals and other constituents of potential environmental concern. The results of the kinetic tests have been used together with current data on hydrogeology and engineering plans to generate preliminary estimates of water quality that could be expected from the short-term development-rock stockpile and the underground mine at the end of mining.

Data-quality objectives for the Project guide all test work. Qualified geologists selected the samples, and qualified analytical laboratories, operating under quality assurance/quality

control (QA/QC) programs consistent with U.S. Environmental Protection Agency guidance, conducted all geochemical tests and analyses.

Results

Sulfide-bearing ultramafic intrusive rocks (peridotite and gabbro) contain concentrations of Cd, Co, Cu, Fe, Pb, Ni, Se, Ag, S, and Zn that are elevated with respect to common crustal rocks. The metals are not bio-available in the rock, which must be oxidized and acidified before the metals would be released and mobilized.

Mineralogical analysis and ABA testing show that sulfides are pervasive in all rock types, and the ultimate acid generation potential of all rock types generally exceeds their neutralization potential (NP). Olivine and lizardite in the intrusive rocks and calcite and dolomite in all rock types contribute to NP. Electron microprobe analyses show that the calcite and dolomite contain almost no iron or manganese and therefore would provide readily available acid-neutralizing capacity. Kinetic tests show that olivine and lizardite (and perhaps some of the calcic plagioclase) weather at a rate fast enough to be effective, too, as acid-neutralizing minerals. Net Acid Generation (NAG) testing in Phase II confirms the implications of ABA testing that up to 80% of all samples that have been tested are potentially acid generating.

Kinetic tests conducted to date indicate that metal-leaching rates are low to moderate for most siltstone and peridotite/gabbro. Some high-sulfur samples of both intrusive and country rocks tested in Phase II show the initial stages of acidification, with elevated leaching of sulfate, As, Co, Cu, Ni, Sb, Se, and Zn. These trends and their implications in terms of proportions of reactive rock to be mined will be evaluated further during the Feasibility Study, when a block model can be developed and the engineering plans more closely evaluated. Massive and semi-massive sulfide samples do generate metals, but these rocks will not be stored at surface.

Preliminary estimates of water quality expected from meteoric water (rainfall or snowmelt) infiltrating into a 379,000 tonne development-rock stockpile are summarized in Table ES-1. After mining ends, water levels controlled by pumping during operations will rebound, and groundwater will flow through the wall rock into backfilled mine voids. Preliminary estimates of incremental leachability of wall rock from the underground mine are summarized in Table ES-2. Because the values at this time represent estimates of the leachability of wall-rocks rinsed by de-ionized water, values shown in Table ES-2 need to be added to the expected inflow chemistry of groundwater at the end of mining.

The QA/QC assessment of analytical data indicates good analytical accuracy and precision. The data are adequate for the current evaluation.

Conclusions

The intrusive and country rocks of the Eagle project contain sulfide minerals and elevated concentrations of some trace metals. Static testing results indicate a need for active management of all rock types.

Phase I and II kinetic tests, except for the Massive and Semi-Massive Sulfide Unit, have not generated acidic effluent or high concentrations of dissolved metals. Sulfide oxidation and

NP depletion rates indicate that development rock could be stored at surface for extended periods, probably on the order of decades, without becoming acid-generating.

Recommendations for Phase III

During Phase III, kinetic testing of existing samples will continue, and additional samples will be included in the kinetic testing program to confirm ABA results and to expand data on metal-leaching rates, with a special focus on cemented backfill behavior. To assess potential impacts to water quality, metal-leaching rates updated from the continuing kinetic tests will be integrated with both the engineering designs of waste rock management and site hydrological conditions to improve current estimates of potential water-quality impacts. To ensure high-quality data, Phase III testing will continue to implement appropriate QA/QC protocols.

Table ES-1 Key Results: Preliminary Water-Quality for 379 Kt Development-Rock Stockpile (mg/L except pH in su and Alkalinity in mg $CaCO_3$/L)

PARAMETER	VALUE
pH	7.4
Alkalinity	20
Total Dissolved Solids	584
Calcium	61
Magnesium	52
Sodium	17
Potassium	27
Bicarbonate	17
Chloride	40
Sulfate	357
Fluoride	2

PARAMETER	VALUE
Aluminum	0.001
Arsenic	0.07
Boron	1.8
Copper	0.18
Iron	0.003
Manganese	0.003
Mercury	0.0004
Nickel	1.95
Selenium	0.15
Uranium	<0.0001
Zinc	1.17

Table ES-2 Key Results: Preliminary Water-Quality for Unbackfilled Underground Workings at End of Mining[1] (mg/L except pH in su and Alkalinity in mg $CaCO_3$/L)

PARAMETER	VALUE
PH	7.4
Alkalinity	8
Total Dissolved Solids	71
Calcium	4
Magnesium	7
Sodium	1
Potassium	2
Bicarbonate	10
Chloride	10
Sulfate	25
Fluoride	0.05

PARAMETER	VALUE
Aluminum	0.003
Arsenic	<0.0001
Boron	0.06
Copper	0.002
Iron	0.78
Manganese	0.001
Mercury	0.0004
Nickel	1.77
Selenium	0.0006
Uranium	<0.0001
Zinc	0.002

[1] The reported values are incremental concentrations due to wall-rock leaching. Background concentrations of groundwater infiltrating the workings (evaluated by others) would be additive to these.

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1.0 INTRODUCTION

1.1 Project Description

This report presents the results of the Eagle Project Phase II Acid Rock Drainage (ARD) characterization study conducted by Geochimica, Inc. (Geochimica) in co-ordination with Kennecott Minerals Company (KMC). The project, a nickel-mineralized peridotite occurrence, is located on the Yellow Dog plains in the Michigamme Township of Marquette County in the Upper Peninsula, Michigan, U.S.A.

The Ni-Cu ores of the Eagle project are a magmatic sulfide deposit hosted in ultramafic intrusive body. The ultramafic igneous rock intruded into pre-existing, Precambrian sedimentary rocks called sandstones and siltstone; locally the sedimentary rocks have been thermally metamorphosed to a rock called hornfels. In standard geological nomenclature, one can distinguish two general rock types, intrusives and "country rock", the pre-existing rocks into which the peridotite intruded. Mineralogical analyses by Kennecott and this project characterization have identified the following principal sulfide minerals in the intrusive rocks: pyrrhotite [$Fe_{1-x}S$], chalcopyrite [$CuFeS_2$], and pentlandite [$(Ni,Fe)_9S_8$]. Country rock also contains discernible concentrations of pyrrhotite and also the iron disulfide, pyrite (FeS_2). If exposed to atmospheric oxygen and modest fluxes of water, these sulfides will oxidize and dissolve, releasing sulfate and metals into solution and generating acidity. Unless there is adequate, readily-available neutralization potential in the rocks, the net effluent from surficial weathering could become acidic. Under low-pH conditions, most metals (e.g., Fe, Cu and Ni) and metalloids (e.g., As) are soluble, and so subject to leaching and transport as dissolved species. Thus, the acidity generated by oxidation of primary sulfides also may leach metals and metalloids from non-sulfide phases, including potentially from ferromagnesian silicates or even under extreme conditions from primary oxides.

The Eagle Project will be developed as an underground mine. To reach the ore zones, KMC will advance a tunnel from the surface toward the ore zones. The rock removed along the route of the tunnel is called "development rock" to recognize that it is not ore, but rather the unmineralized rock that must be developed to reach the ore. KMC anticipates that the mine life will be approximately 8 years, preceded by about 2 years of pre-mining development. After the ten years of mining, there would be about two years of active mine-closure activities, for a Project life of approximately 12 years; environmental monitoring would continue beyond that period as may be required by permits and other regulations. The development rock, most of which has to be removed for access tunnels prior to any mining of ore, will be placed on an engineered pad to allow active water management for up to approximately 7 years. After the mine development is sufficiently advanced, the development rock at the surface will be returned to the underground workings to backfill mined voids, basically in the inverse sequence of its mining. Thus, KMC expects that all development rock would be removed from the surface by Project Year 7, or three years before the end of mining and five years before closure of the Project. Most or all of the backfill will be amended with cement to provide additional strength and some available alkalinity. Ore will be directly loaded onto trains for transport to an off-site processing facility. There will be no ore processing or disposal of tailing at the site. During operations and for as long as necessary at closure, Eagle will operate a water-treatment plant to ensure

that discharged waters meet all applicable regulatory standards. At the end of the closure phase, there will be no surface facilities, and specifically no mine waste on the ground.

1.2 Geologic Description

The geology of the deposit is described in *Report on the Geology of the Eagle Nickel-Copper Deposit* (Rossell and Coombes, 2004). The deposit is hosted by two peridotitic intrusions. Peridotites are intrusive, ultramafic igneous rocks composed chiefly of pyroxene and olivine. The rocks also contain variable amounts of plagioclase feldspar, accessory minerals such as biotite, amphibole, magnetite, ilmenite, and trace minerals such as sulfides, calcite, quartz, or clays. Depending on the local proportions of the major minerals, rocks may be called peridotite, feldspathic peridotite, pyroxenite, gabbro, or olivine gabbro. All six designations are very closely related rock types, and unless a specific point needs to be made, this report will call the intrusive rocks "peridotite", the dominant lithology. During intrusion to relatively shallow crustal depths, late-stage crystallization produced magmatic H_2O, which together with interactions with shallow meteoric waters typically altered some of the primary silicate minerals to hydrated secondary minerals called serpentine and talc, and iron and other metals in the original minerals partially converted to oxides such as magnetite (Fe_3O_4) and ilmenite (TiO_2). There is no "hydrothermal alteration" in the sense usually used for sulfide ore deposits in intermediate to acidic igneous rocks, such as porphyry or epithermal systems. Chemically, peridotites are low in silica (SiO_2) and alumina (Al_2O_3), but elevated in ferrous iron (FeO) and, particularly magnesia (MgO). Some ultramafic rocks develop immiscible iron, nickel and copper sulfides that can concentrate locally near the margins of the intrusions. The eastern and western intrusions are referred to as the East Eagle and Eagle deposits, respectively (Figure 1-1). Drilling at East Eagle to date has not identified economic grades of nickel and copper.

Three distinct types of sulfide mineralization occur in the Eagle deposit: massive, semi-massive (or net-textured) and disseminated. At the time of the Phase 0 and I studies, it appeared that there were two sulfide zones, but continued exploration has shown that these are continuous as a single, ore-grade mineralized zone.

1.3 Previous Geochemical Characterization

In Summer 2003, Kennecott Exploration Company (KEX) submitted twelve drill core samples to ALS Chemex (Chemex) of North Vancouver, British Columbia (BC) for geochemical characterization (i.e., acid-base accounting (ABA) and trace metal analysis). The results of this testing, referred to in this report as the "Phase 0" testing, were considered in the current evaluation. Testing procedures and results are discussed in Sections 2 and 3. During early 2004, KEX commissioned an additional geochemical study that extended the static-test database to 42 samples, added detailed mineralogical analysis of 15 samples, and initiated kinetic testing on 5 samples that had been evaluated in the Phase 0 evaluation. Results of the Phase I ("order-of-magnitude") evaluations are presented in Report on *Phase I Eagle Project Acid Rock Drainage Study* (Geochimica, 2004a). This report discusses all the geochemical characterization that has been completed to date.

1.4 Purpose and Objectives

The components of the ARD testing program were outlined in the *Proposal for Phase I/ARD Geochemical Characterization* (Geochimica, 2003). The ARD testing program was designed to evaluate, in a phased manner, the spatial distribution (x, y, z), by lithology, of the geochemical characteristics of the Eagle deposit that could affect the reactive geochemistry of waste materials during surficial weathering. The overall purpose of the geochemical characterization program is to produce the information and analyses necessary and sufficient to describe the environmental impacts to land and water that are related to geochemical reactivity and the environmental mineralogy of the deposit. The principal goal of the Phase II study is to expand the scale of testing, with respect to (a) numbers and lithologic range of samples and their spatial distribution around the mined rock and (b) duration of kinetic testing, to a level that would meet current Rio Tinto guidance for ARD evaluations appropriate for a pre-feasibility study. In addition, the Phase II program addresses some specific, technical issues identified in Phase I and initiates coordination with the Project's baseline water-quality and background hydrogeologic investigations and mine planning to ensure that the geochemical behavior of the mined rock and the underground workings can be related properly to the larger-scale local and regional water-resource systems.

Specific objectives of the Phase II program include:

- Coordinating the geochemical database with the evolving geologic models and mine plans for the Eagle project.
- Increasing the total database of static geochemical testing to about 100 samples, selected to be representative of the three-dimensional range of all lithologies that will be involved in the waste-management program.
- Continuing kinetic testing of the five samples that were started in Phase I. The tests will be extended to at least 50 weeks, and probably longer for some or all of the five.
- Increasing the program of kinetic testing to include 10 additional samples of important lithologies and to increase the time period of testing for all samples under leach.
- Evaluating mineralogical controls on measured Neutralization Potential and on trace metals that can be identified in kinetic-test effluents.
- Determining the potential, if any, for asbestiform minerals in and adjacent to the ultramafic rocks.
- Developing initial conceptual models of waste-management units that are coupled to engineering plans and site hydrology in ways that allow initial quantification of water-quality impacts.

2.0 GEOCHEMICAL CHARACTERIZATION PROGRAM

2.1 Overview

This is the second phase of a program to develop geochemical information about the Eagle Project; the investigative phases are meant to track the project's overall development, becoming more detailed and complex as the probability of development as a mine increases. Because the phased approach builds on information already developed in earlier work, this report will consolidate all geochemical information into a current and comprehensive evaluation.

Like the earlier studies, the Phase II program focused on characterization of the deposit with the greatest economic potential (i.e., the Eagle deposit) (Figure 1-1). Based on extensive exploratory drilling, geophysical investigations, and geologic modeling, KMC anticipates that driving the access tunnel will require excavation of both country rocks and intrusives. Although the geochemical characterization program encompasses all material types, greater emphasis has been placed on testing of rock types, both intrusive and country rock, that will be part of the development rock for the project. We also have developed static and kinetic test results for representative samples of Massive Sulfide Unit and Semi-Massive Sulfide Unit ore types, so that we can understand the nature of their behavior were they to be allowed to oxidize.

The testing program included both static (short-term) and kinetic (long-term) testing. The objective of static testing is to describe the bulk chemical characteristics of a waste material. These tests are designed to evaluate the potential of a particular rock type to leach metals or generate acid. Static testing is typically the first phase of geochemical characterization, and usually is a precursor to kinetic testing. Although the results of static testing may indicate a potential for acid rock drainage and/or metal leaching (ARD/ML), kinetic testing is required to verify whether the various ARD/ML potentials identified will indeed be realized over time.

Data collected as part of the various phases of the geochemical characterization study may ultimately be used in environmental-impact evaluations, the results of which may be compared to regulatory or risk-based limits. Determination of the analyte suite and required reporting limits therefore considered all applicable and relevant state and federal water quality regulations. Relevant state (Michigan Department of Environmental Quality – MDEQ) and federal (Environmental Protection Agency – EPA) freshwater and drinking water criteria are summarized in Table 2-1. Analytical methods were selected to achieve (whenever technically possible) reporting limits below applicable state and federal water quality criteria.

This chapter describes the rationale for sample selection and the components of the static and kinetic testing programs.

2.2 Sample Selection

Rock samples for static and kinetic testing were selected from 2003-2004 drill core by Steven Coombes and Andrew Ware, KEX/KMC project geologists intimately familiar with the

deposit. The Eagle drill plan is shown in Figure 2-1. Figures 2-2 through 2-5 show the spatial distribution of the Phase I and Phase II samples selected for testing. Figures 2-2 and 2-3 also show the locations of the twelve samples previously characterized by KEX.

Sample selection considered the following criteria:

- **Lithology** – Individual samples selected for testing were representative of a single lithology.

- **Spatial Representation (x, y, z) –** Samples were selected to ensure good spatial representation (vertical and horizontal) of the area to be mined, focusing on the Eagle deposit (western deposit). Sample representation included both the mineralized (Sulfide Zone) and unmineralized portions of the Eagle intrusive rocks. Country-rock samples were selected from both the hanging wall and foot wall. ("Hanging wall" and "foot wall" refer to the locations of the sediment samples collected from above and below the intrusive, respectively.)

- **Compositional Representation –** Sample selection included all major material types including: massive sulfide (MSU), semi-massive sulfide (SMSU), peridotite (PER), sediments (siltstone (SLST) and sandstone (SDST)) and hornfels (HFL). Subsets of peridotite that have been tested include peridotite, feldspathic peridotite, pyroxenite, gabbro and olivine gabbro.

- For the sulfide samples from the MSU and SMSU, representation of a range of copper contents was also considered.

By ensuring good spatial representation, it was expected that compositional variability within distinct lithologies would be captured (e.g., carbonate veining observed in peridotite core and some country rocks near the contact).

2.3 Geochemical Characterization Program

The testing program included the following components: whole-rock chemistry, acid-base accounting (ABA), short-term metal leaching, Net Acid Generation (NAG) testing (phase II only), long-term column testing, and mineralogical analysis. A brief description of each of these components follows.

The primary laboratory for this study was Canadian Environmental Metallurgical Inc. (CEMI) of Vancouver, BC. CEMI contracted portions of the analytical testing to Chemex and ALS Environmental (ALS), as identified below. Analytical methods and procedures are (or are technically consistent with) those of the U.S. Environmental Protection Agency and other standard compilations of methods for analytical chemistry, as documented in Geochimica (2004a). The analytical laboratories hold standard certifications from provincial and federal agencies in Canada, using approaches that are consistent with those of equivalent agencies in the United States.

2.3.1 Static Testing

Appendix C of Geochimica 2004a provides formal descriptions of methods, as provided by the laboratories.

2.3.1.1 Whole-Rock Chemistry

ALS Chemex analyzed the chemical composition of rock samples in all phases of the study. Whole-rock chemical analysis for major elements (as oxides) was by X-Ray fluorescence spectroscopy (XRF) following decomposition in lithium tetraborate (Chemex method MEXRF-06). Results were presented as the total elemental weight percent composition of the sample as oxides for the major rock forming elements (i.e., Al_2O_3, BaO, CaO, Cr_2O_3, Fe_2O_3, MgO, MnO, P_2O_5, K_2O, SiO_2, Na_2O, SrO and TiO_2). The reporting limit for all elements was 0.01 wt. %.

The concentration of fifty elements was determined by inductively coupled plasma mass spectrometry (ICP-MS) or inductively coupled plasma atomic emission spectroscopy (ICP-AES) following an Aqua Regia digestion (Chemex method ME-MS41).

The 12 Phase 0 samples were also submitted to Chemex for chemical characterization; however, different analytical methods were applied. The concentrations of seven major rock forming elements (i.e., Al_2O_3, CaO, Fe_2O_3, MgO, MnO, SiO_2, and TiO_2) and eight trace metals (i.e., As, Co, Cr, Cu, Ni, Pb, S and Zn) were determined by ICP-AES following sodium peroxide fusion (Chemex method ME-ICP81). Precious metals analysis (i.e., Au, Pt and Pd) was also performed by ICP-AES following fire assay fusion (Chemex method PGM-ICP23 and PGM-1CP24). At the level of this study, the differences in analytical methods between Phase 0 and Phases I and II are not considered significant in evaluating the likely environmental behavior of rocks that may be handled at the Eagle Project.

2.3.1.2 Acid-Base Accounting

Acid-base accounting was performed on 108 samples (i.e., 12 Phase 0, 30 Phase I, and 68 Phase II samples). ABA testing is conducted to predict the acid neutralizing potential (NP) and acid generation potential (AP) of a material. ABA analysis included determination of the following:

- Bulk neutralization potential (NP) by modified Sobek;
- Carbonate neutralization potential (CaNP) by total inorganic carbon (TIC) analysis;
- Paste pH; and,
- Acid potential (AP) by sulfur determination (total sulfur (S_T) and sulfate sulfur (S_{SO4})).

Brief descriptions of each analysis are provided below; details and citations are included in Geochimica, 2004b, Appendix C.

The bulk NP of a material is determined by treating the sample with a known excess of hydrochloric acid, and back-titrating the amount of unconsumed acid with sodium hydroxide. The principal neutralizing minerals in most geologic materials are calcium and magnesium carbonates. Additional neutralizing minerals accounted for in the determination of bulk NP include basic silicates such as calcic feldspars, lizardite, olivine, amphiboles, and biotite. However, due to their generally slower dissolution rates, the contribution to the overall NP of most of these minerals is generally considered to be small under ambient conditions. However, as will be discussed in Section 3.1.2, olivine and lizardite are important sources of available NP in the Eagle rocks. Felsic silicates, such as sodic and potassic feldspars, muscovite, most clay minerals, and quartz, do not contribute significantly to the NP. The NP is expressed in conventional units of tonnes of calcium carbonate equivalent per 1,000 tonnes of material (t $CaCO_3$/ 1,000 t), representing the capacity of the solids to neutralize acid, but not necessarily implying that calcite ($CaCO_3$) is present.

The carbonate neutralization potential (CaNP) of a sample is determined from its total inorganic carbon content (TIC). TIC is determined by measuring the amount of carbon dioxide (CO_2) evolved from an acidified sample. CaNP is a measure of the neutralization capacity of a sample afforded by carbonate minerals only, while assuming all carbonates react like calcite. As noted earlier, only calcium and magnesium carbonates are the principal neutralizing minerals in most geologic materials. Iron and manganese carbonates (e.g., siderite [$FeCO_3$], ankerite [$CaFe(CO_3)_2$], and rhodochrosite [$MnCO_3$]) do not contribute buffering capacity since subsequent hydrolysis of the Fe and Mn tends to generate acidity. Therefore, if iron and manganese carbonates are present, CaNP will overestimate the neutralizing capacity of a material. The potential for overestimation can be addressed explicitly through careful mineralogical evaluations (see Section 3.1, below).

Paste pH is a qualitative corollary of the NP, and provides additional information on the current neutralizing capabilities of a material. It is determined by mixing the solid with a fixed amount of distilled water, and measuring the pH of the resulting slurry.

The AP of a material is derived from a sulfur determination. For the current study, total sulfur and sulfate sulfur were determined using Leco furnace and a hydrochloric acid (HCl) extraction, respectively. The most environmentally conservative approach to calculate AP is to make the assumption that all sulfur in a sample is potentially reactive and therefore capable of generating acid. However, this ignores the fact that not all sulfur will contribute acidity (e.g., sulfur in gypsum, barite, or chalcocite). For this study, AP was calculated using sulfide sulfur, and assuming that sulfide sulfur was equal to the difference between total sulfur and sulfate sulfur. As for NP, the AP is expressed as (t $CaCO_3$/ 1000 t). By convention in ABA studies, one assumes that the sulfide sulfur is present entirely as pyrite (FeS_2), and the stoichiometry of pyrite oxidation is used to calculate a theoretical amount of sulfuric acid that could be generated, then requiring neutralization by hypothetical $CaCO_3$.

For the current study, samples were submitted to CEMI who performed the paste pH and NP analyses in-house. Chemex was subcontracted to perform the sulfur speciation and TIC analyses. ABA testing on the twelve Phase 0 samples was conducted entirely by Chemex.

2.3.1.3 Short-Term Leach Testing

Ten of the thirty Phase I samples were selected for short-term metal leach testing following the Environmental Protection Agency's Synthetic Precipitation Leaching Procedure (SPLP) (EPA Method 1312). Leach test samples were selected following review of ABA, whole-rock and trace- metal analysis results. Sample selection considered the following:

1. Representation of all lithologies;

2. Representation of a range of total sulfur contents; and,

3. Spatial representation (i.e., mineralized and non-mineralized zones, hanging-wall and foot- wall).

SPLP tests were conducted on the minus-9.5 mm fraction for 22 hours at a solid to solution ratio of 1 to 20 by weight. A pH 4.2 lixiviant (60% sulfuric/40% nitric acid solution), which is considered representative of "acid rain" generated in industrialized areas, was applied.

The short-term nature of the SPLP test provides a snapshot in time of a material's environmental stability. Test results depend entirely on the present disposition of the sample (e.g., unoxidized vs. oxidized; oxidation products absent vs. present, etc.). For reactive rocks, the mechanisms that lead to changes in solution chemistry during water-rock interactions often develop over periods of time that are much greater than can be represented in a 22-hour extraction test. For this reason, kinetic testing is conducted to address chemical changes in the waste initiated by long-term microbiological and abiotic chemical processes. Because all materials currently available for testing are from fresh exploratory core, the SPLP tests are of limited utility, and they were not used in Phase II. The initial saturation ("week 0" data from the ten Phase II kinetic tests) provide effectively the same information as would be available from separate static-leach tests.

2.3.2 Kinetic Column-Leach Testing

Kinetic testing is conducted to verify whether the various ARD/ML potentials identified through static testing likely will be realized under surficial weathering conditions. These tests are also used to determine reaction rates and evaluate the leachability of trace metals.

Fifteen long-term, column-leach leach tests are currently being conducted by CEMI. Five kinetic testing samples were selected from the Phase 0 samples (sample locations identified in Figure 2-2). To provide the maximum information possible during the Phase I schedule, kinetic testing was initiated in advance of the Phase I static testing using the Phase 0 samples that already had preliminary static characterization. Sample breakdown by lithology is as follows:

- One massive sulfide,
- One semi-massive sulfide,
- One peridotite and
- Two siltstones.

Kinetic testing was initiated on February 20, 2004. This report presents results of those Phase I samples through 50 weeks of leaching. KMC intends ot continue leaching these samples at least through the Feasibility Study Phase. During Phase II, Geochimica and KMC selected an additional 10 samples, characterized in detail during Phase I for kinetic testing [semi-massive sulfide (1); intrusive rocks (4); country rocks (5)]. This report provides the results of the first 25 weeks of leaching for those ten, Phase II samples. KMC also intends to continue the kinetic leach testing of these samples, so at this time, 15 Eagle samples are under leach.

Testing columns were charged with approximately 2 to 4 kg of rock, crushed to minus $^{3}/_{8}$ inch with a jaw crusher. Prior to charging, a sieve analysis was conducted on each sample to allow for calculation of sample surface area, to be used in the determination of weathering rates. The pore volume of each column was determined by filling the column with lab-grade distilled water. Columns were drained and the leachate volume measured and analyzed (Week 0).

The column leach tests simulate weathering under surface conditions by subjecting each sample to alternate periods of moist and dry air. Once every week, the column is flushed with 500 mL of lab grade distilled water, and the solution is analyzed. The liquid to solid ratio used for this study varies from approximately 1:8 by weight for the semi-massive sulfide sample to 1:3 for one of the siltstone samples. The difference in ratios derives from both differences in the specific mass in the columns and also from the much higher grain density of the sulfides compared to the alumino-silicates that dominate the siltstones.

Leachates from each weekly cycle are analyzed for ARD indicator parameters including pH, redox, conductivity, alkalinity, acidity, calcium, magnesium, iron and sulfate. Leachate pH, acidity, iron and sulfate are used to assess the degree and rate of sulfide oxidation. Leachate alkalinity, calcium and magnesium provide information on the neutralization capacity of the rock and the mineral phases (e.g., calcite or dolomite) responsible for neutralization.

Leachate from Weeks 0, 1, 3, 5, 10, 15, 20, 25 and 30 are analyzed comprehensively including major ions, trace metals, metalloids and nutrients. After week 30, the analysis interval is extended to 10 weeks. With the exception of pH, redox, alkalinity, acidity and sulfate, chemical analyses are performed by ALS.

Kinetic testing is scheduled to be conducted for a minimum period of 50 weeks, compared to the 20-week period that generally is used in North America (Price, 1997). The results of kinetic testing may be applied to evaluate the following:

- The oxidation rate of sulfides from waste materials;
- The relative rates of acid generation and acid neutralization to assess the likelihood for acid generation from waste materials;
- The timing of the onset of acid generation; and,
- The composition of waste rock runoff and seepage (i.e., metal leaching under variable pH conditions).

2.3.3 Mineralogical Analysis

Dr. John Jambor of Leslie Investments Inc. Research and Consulting (LRC, Tsawwassen, BC) conducted the mineralogical analyses for phase I and II. During Phase I preliminary mineralogical analysis of the five kinetic testing samples was performed first. This set of initial samples was supplemented during the later part of Phase I with 10 additional samples from the additional 30 Phase I samples after their static testing was complete. These 15 samples are the 15 samples currently undergoing kinetic leach testing. During Phase II, Dr. Jambor analyzed an additional 15 samples, focusing on the carbonate and serpentine mineralogy.

Mineralogical analysis was conducted to confirm aspects of the current understanding of the mineralogy of the ore body, with particular reference to some of the possible environmental behavior of minerals during weathering. Analysis of intrusive and country-rock samples was intended to provide additional characterization of the development-rock mineralogy, including confirmation of mineral phases with neutralization potential. In addition, Dr. Jambor was asked to identify specific serpentine minerals and asbestiform characteristics, if present.

Mineralogical analysis included the following: optical (reflected and transmitted light) microscopy, x-ray diffractometry (XRD), clay-fraction XRD (including glycolization and heating), quantitative XRD using the Rietveld method, scanning electron microscopy with qualitative energy-dispersive analysis (SEM-EDS), and electron microprobe analyses to obtain quantitative data on single-crystal compositions.

2.3.4 Quality Assurance/Quality Control

A primary data quality objective (DQO) of the ARD characterization program is to provide analytical data that are of known and defensible quality. To ensure a defensible data set, the following protocols have been adhered to:

1. Careful selection of analytical laboratories following compilation and review of relevant information (e.g., laboratory QA/QC protocols, achievable reporting limits, analytical accreditation and colleague feedback).
2. Selection of appropriate analytical methods (e.g., selenium analysis by hydride vapour atomic absorption spectrometry (HVAAS) in addition to ICP-MS).
3. Inclusion of quality control samples in sample delivery groups (i.e., duplicate and equipment blank samples).
4. Data validation of analytical packages following guidelines presented in *USEPA Contract Laboratory Program Functional Guidelines for Inorganic Data Review* (EPA, 2002).
5. Data reduction on an ongoing basis to identify data anomalies (i.e., calculation of charge balance errors, plotting of kinetic testing results as received to identify anomalous concentration trends).

6. Coordination and follow-up with the testing laboratories when any data anomalies are identified

The results of data validation and data reduction pertaining to assessment of the quality of the analytical data generated in this study are provided in a separate QA/QC report (Appendix C).

3.0 CHARACTERIZATION RESULTS

This section presents the results of each component of the geochemical characterization program for Phases 0, I, and II. An overall assessment of the ARD/ML potential of waste materials based on the collective interpretation of all test results is provided in Section 4.0.

3.1 Mineralogy

Dr. Jambor's mineralogy reports are provided as Appendix D to this report (Jambor, 2004a, 2004b, 2005). Parts 1 and 2, issued in April 2004 and May 2004, present the results of the Phase I mineralogical analysis of the 15 samples that are undergoing kinetic leach testing. Part 3, issued in April, 2005, presents the analysis of an additional 15 samples evaluated during Phase II, focusing on the sources of neutralization potential and the physical nature of serpentine minerals in the Eagle rocks. This section summarizes the major findings of the mineralogical investigations to provide a basis for the interpretation of the kinetic testing results presented in Section 3.4. For detailed discussions of the thirty samples, the reader should consult the three mineralogy reports in Appendix E.

3.1.1 Sulfide Mineralogy

Sulfide mineralogy is of paramount environmental significance for a sulfide-ore body such as Eagle because after mining the sulfide minerals are subject to oxidation and dissolution, with potential for subsequent generation of acidity and leaching of metals. The potential for oxidation and release of metals depends on the specific sulfide minerals present in each rock type that may be mined. Because the Ni-Cu ore that is the economic target at Eagle is present in an intrusive rock, it is important to evaluate sulfide mineralogy in not only the ore zone, but also in the peridotitic country rock and in the sedimentary host rocks into which the peridotite intruded.

Sulfide ore zones in mafic to ultramafic rocks represent the accumulation of immiscible sulfide liquids that, because their density was so much greater than that of the general silicate magma, migrated under gravity during the intrusion and fractional crystallization of the rocks in which they are found now (Naldrett, 1989; Foose *et al.*, 1995). Well-known examples in North America include the Duluth Complex (MN) and the Stillwater Complex (MT). The currently observed sulfide mineralogy in such deposits reflects a complex, solid-state recrystallization history, and the specific locations within the ultramafic rock where the sulfides accumulate are a function of the individual physical conditions that occurred in each intrusive body where these are found. Because of fundamental, physico-chemical controls having to do with chemical bonding of the transition elements, the immiscible sulfide liquids concentrate some important trace metals, including Ni, Cu, and Co (Pauling, 1960; Burns,

1970; Cotton and Wilkinson, 1988). Iron (Fe) is less strongly partitioned to the sulfide phase, but because it is present in such high proportion in the original magma, Fe is typically the most important metal (by mass) in the immiscible fluid. During the crystallization (and subsequent recrystallization) process, these transition metals precipitate as sulfide minerals. Iron occurs in pyrrhotite [$Fe_{1-x}S$], often with substitution by Co and Ni that are preferentially partitioned to the sulfide liquids, as well as the pentlandite [$(Fe,Ni)_9S_8$] and chalcopyrite [$CuFeS_2$] that are the principal reservoirs of Ni and Cu, respectively. These magmatic sulfide minerals also may contain other trace metals and metalloids.

Six massive/semi-massive samples were submitted for mineralogical analysis during Phases I and II. In the Eagle deposit, the primary sulfide phases of the massive and semi-massive units identified by Dr. Jambor's mineralogical analysis (listed in order of typical abundance) were pyrrhotite [$Fe_{1-x}S$], chalcopyrite [$CuFeS_2$] and pentlandite [$(Fe,Ni)_9S_8$], in good accord with expectations for a massive sulfide of this sort. All three of the dominant sulfides have metal:sulfur ratios near 1:1. Pyrrhotite accounted for approximately half the total sulfide content of the kinetic-testing massive sulfide sample, for which the reported total sulfur content was 36.1 wt. %. Intergrowths of pentlandite and chalcopyrite were observed in pyrrhotite, but only in small amounts. The pyrrhotite in the kinetic-testing massive sulfide sample was described as smooth and uniform; whereas, in the kinetic-testing semi-massive sample, the pyrrhotite grains were fractured. Only pentlandite (not chalcopyrite) intergrowths in pyrrhotite were observed in the kinetic-testing semi-massive sample; however, such intergrowths were not common. Because of the simple dominant mineralogy, the massive and semi-massive units are highly elevated in transition metals compared to average crustal rocks and the surrounding, older country rocks, primarily in Fe, Ni, Cu and Co.

The total sulfur contents of the hanging-wall and foot-wall siltstone samples undergoing Phase I kinetic testing were similar at 1.23 wt. % (foot-wall) and 1.06 wt. % (hanging-wall), respectively. Most of the sulfide grains in siltstones were described as sub-millimetric, disseminated, and encapsulated by silicate or oxide minerals. The occurrence of fracture-controlled sulfides was inconclusive in the initial samples. Pyrrhotite was identified as the primary sulfide Phase in siltstone samples. Pyrite [FeS_2] was also identified in samples. The pyrite content of the hanging-wall sample returned by Rietveld analysis (3.9 wt. %) was noted by Jambor to be high based on optical review of polished thin sections. For reference, the pyrrhotite content of this sample was 3.0 wt. %. Pyrite was below quantifiable limits in the foot-wall sample. Small amounts of chalcopyrite and sphalerite [(Zn,Fe)S] were also identified in the hanging wall sample. Textures of chalcopyrite in the siltstone were very distinct from those in the sulfide ores, and pentlandite was not identified.

The total sulfur contents of the hanging-wall and foot-wall siltstone samples examined by Dr. Jambor were 0.77 and 1.39 wt. %, respectively. The major mineral assemblages of these siltstone samples were similar to the kinetic testing samples with regard to their environmental mineralogy. Pyrite and pyrrhotite were identified as the primary sulfides in the hanging-wall and foot-wall samples, respectively.

The total sulfur content of the Phase I peridotite kinetic-testing sample examined was relatively low (0.2 wt. %). Sulfides were not visible megascopically; however, microscopic evaluation identified pyrrhotite as the primary sulfide, accounting for 90% of the total sulfide

content. Pentlandite and chalcopyrite, listed in order of relative abundance, were also observed.

In addition to two ore-grade samples (discussed above), the Phase II mineralogy samples included six samples of gabbro, an ultramafic rock related to peridotite but composed predominatly of clinopyroxene and calcic plagioclase. Sulfides are limited in these samples which are from the upper part of the deposit, far from the sulfide mineralization. As in other ultramafic rocks at Eagle, the gabbros are characterized in terms of sulfide minerals by pyrrhotite with pentlandite and/or chalcopyrite in distinctly lesser amounts.

A single pyroxenite sample was examined. Pyrrhotite in this sample was converted to marcasite [FeS_2], making marcasite the most abundant sulfide (marcasite > chalcopyrite > pentlandite > pyrite > pyrrhotite). Trace cubanite [$CuFe_2S_3$] was also identified.

The two hornfels samples examined yielded total sulfur contents of 0.67 and 2.72 wt. %. Pyrite, pyrrhotite and chalcopyrite were present in both samples. Trace sphalerite was present in the higher-sulfur sample.

3.1.2 Minerals with Neutralization Potential

As with the sulfides, the mineralogical controls of neutralization potential must be considered with respect to the specific lithologies and their genetic and intrusive relationships in the area of the Eagle deposit.

The presence of phases with neutralization potential in the kinetic-testing massive sulfide sample is negligible because there is very little silicate or other gangue in these materials. Although the measured NP of the kinetic-testing semi-massive sulfide sample was 41 t $CaCO_3$/1,000 t, mineralogical analysis initially suggested that this value was anomalously high. Carbonates, if present, occurred in only trace amounts. Therefore, all NP was attributed to olivine and lizardite that, while neutralizing minerals, may react at rates slower than those for carbonate minerals. Although slower to react than carbonates, olivine and fine-grained, high-surface-area, Mg-rich lizardite are among the fastest reacting silicate minerals (Jambor, 2004a). Jambor (2004b, in Appendix D) presents results from other published studies for NP determinations on pure mineral phases using the Sobek method. The range of reported NP values (in t $CaCO_3$/ 1,000 t) for olivine (i.e., forsterite) and lizardite is as follows: 23.9 to 40.2 (olivine) and 16.1 to 22.5 (lizardite). NP determinations using the modified Sobek method (the method used in this study) yielded higher values for both olivine and lizardite. These experimental data are consistent for the Eagle samples with (a) the identification of Mg-rich olivine and (b) the observed kinetic behavior of samples during column testing.

The peridotite sample undergoing kinetic testing contained small amounts of calcite [$CaCO_3$], with the bulk of the NP attributed to olivine and lizardite. Calcite typically occurred as minute, polycrystalline aggregates. Mineralogical analysis of the SPLP samples also showed low carbonate contents for the peridotite and pyroxenite. Most of the measured NP was attributed to the presence of olivine and serpentine.

Calcite and dolomite [$CaMg(CO_3)_2$] were both identified in the siltstone samples undergoing kinetic testing. The iron and manganese contents of both carbonates were determined to be very low, so it seems likely that calculated values of CaNP can be taken as effective. Carbonate phases occurred as fill in fractures or in association with spotted alteration. Zones of spotted alteration, interpreted to be a thermal metamorphic effect, were the loci of deposition of carbonate phases, in addition to other minerals (i.e., chlorite, quartz and K-feldspar). Chlorite [most commonly $(Mg,Fe)_5Al(Si_3Al)O_{10}(OH)_8$] also contributed to the NP of the siltstones.

Part 2 of the Phase I mineralogical evaluation confirmed that carbonate (in secondary veins) is common in the country rocks near the intrusive, and Phase II investigations showed interstitial and amygmdoidal accumulations of carbonates, primarily calcite in intrusive rocks. Very recent summaries of carbonate contents of igneous rocks (White et al., 2005) suggest that such carbonates may be an intrinsic feature of intrusive rocks and do not necessarily require interaction with carbonate-bearing country rocks. Textural relations in the Eagle sample gabbros are consistent with the interpretation of White et al. Fracture-fill carbonates, both calcite and dolomite, were identified in the siltstone and hornfels samples. The iron and manganese contents of the calcite and dolomite were low, which means that the carbonate NP determinations indeed represent available NP. The presence of siderite [$FeCO_3$] was restricted to one massive sulfide sample. Additional evaluations in Phase II (Jambor, 2005, in Appendix D) confirm that the carbonates in the ultramafic rocks are end-member calcite and dolomite, with calcite >> dolomite.

3.1.3 Host Mineralogy

Olivine [Mg_2SiO_4], clinopyroxene [$(Ca,Na)(Mg,Fe,Al,Ti)(Si,Al)_2O_6$], and plagioclase [$NaAlSi_3O_8 - CaAl_2Si_2O_8$ solid solution] were the principal silicate minerals in the peridotitic. Gabbroic variants include orthopyroxene (enstatite, $Mg_2Si_2O_6$) also. They are primary minerals formed during crystallization of the silicate portion of the magma. As this ultramafic rock intruded into the shallow crust, it exsolved its own aqueous solution and also interacted with local waters, producing a so-called "deuteric" alteration in which both mafic and felsic minerals react with water to form secondary mineral phases. The role of water in the deuteric alteration can be identified mineralogically by the presence of low-temperature minerals containing hydroxyl (OH-) radicals, such as lizardite, talc, and chlorite.

Much of the olivine was altered to non-fibrous lizardite serpentine [$Mg_3Si_2O_5(OH)_4$]. The kinetic-testing semi-massive sample examined showed more alteration of olivine to lizardite than observed in the kinetic-testing peridotite sample. Whether this is a general feature, perhaps related to the smaller relative volume of silicate gangue in the net-textured rock, or is a specific feature of the individual sample cannot yet be determined. In one of the Part 2 peridotite samples, partial alteration of olivine to lizardite was observed, and the lizardite identification was confirmed by X-ray diffraction. No asbestiform serpentine was observed either macroscopically or microscopically, or identified by X-ray diffraction in any sample of the Phase I or II study. Because the high-sulfide zones are relatively close to the margins of the Eagle peridotite, it seems plausible that there was more convective circulation of meteoric water into the intrusion than in more interior parts of the peridotite, leading to greater deuteric alteration and hence a higher proportion of lizardite. The kinetic-testing peridotite sample also contained abundant chlorite (20.6 wt. %) and talc [$Mg_3Si_4O_{10}(OH)_2$]

(10.8 wt. %), with the talc occurring at the periphery of the altered olivine. These phases were not present in quantifiable amounts in the kinetic-testing semi-massive sulfide sample.

During deuteric alteration, it is common for a portion of the Fe and Ti content of the pyroxene to report to secondary iron oxides such as magnetite or ilmenite. Magnetite [Fe_2O_4] (~5 wt. %) was the fourth-important non-sulfide mineral Phase identified in the kinetic-testing massive sulfide sample. The magnetite contents of the kinetic-testing semi-massive and peridotite samples were quantified by XRD as 12 wt. % and 8.4 wt. %, respectively. The magnetite content of the peridotite sample was interpreted as high. Megascopic identification indicated ilmenite [$FeTiO_3$] as the more abundant iron oxide Phase in the kinetic-testing peridotite sample.

During Phase II, KMC submitted a suite of samples showing an apparently acicular mineral in veinlets that appear to be affected by slickensides. Dr. Jambor undertook a detailed analysis of these samples to determine the possible presence of fibrous, asbestos-like minerals. His detailed report is presented in Jambor, 2005 in Appendix D. Following detailed optical, X-ray, and electron beam (SEM and microprobe) examinations, Dr. Jambor concludes that there is no serpentine mineral in the slickenside samples. The best mineralogical match for the mineral using both standard powder and also the Reitveld refinement method for X-ray diffraction is the Fe-Mg silicate mineral, sepiolite [$(Mg,Fe)_4Si_6O_{15}(OH)_2.6H_2O$], and this was confirmed in follow-up analyses using the X-ray camera facilities at the Geological Survey of Canada laboratories in Ottawa. Based on the detailed analyses and discussions with Dr. Jambor, Geochimica considers that the presentation of this mineral as acicular is determined by deformation of microcrystalline aggregates during the formation of the slickensides, and that it may be a partially dehydrated form, resulting from elevated temperature and pressure during the deformation.

Quantitative mineralogical analysis of the siltstone samples yielded similar abundances between samples for the non-sulfide mineral phases as follows: quartz [SiO_2] (~28 wt. %), muscovite [$KAl_2AlSi_3O_{10}(OH)_2$] (~40 wt. %), chlorite (~19 wt. %), plagioclase (albite) [$NaAlSi_3O_8$] (~12 wt. %) and kaolinite [$Al_2Si_2O_5(OH)_4$](~ w2 t. %).

3.2 Rock Chemistry

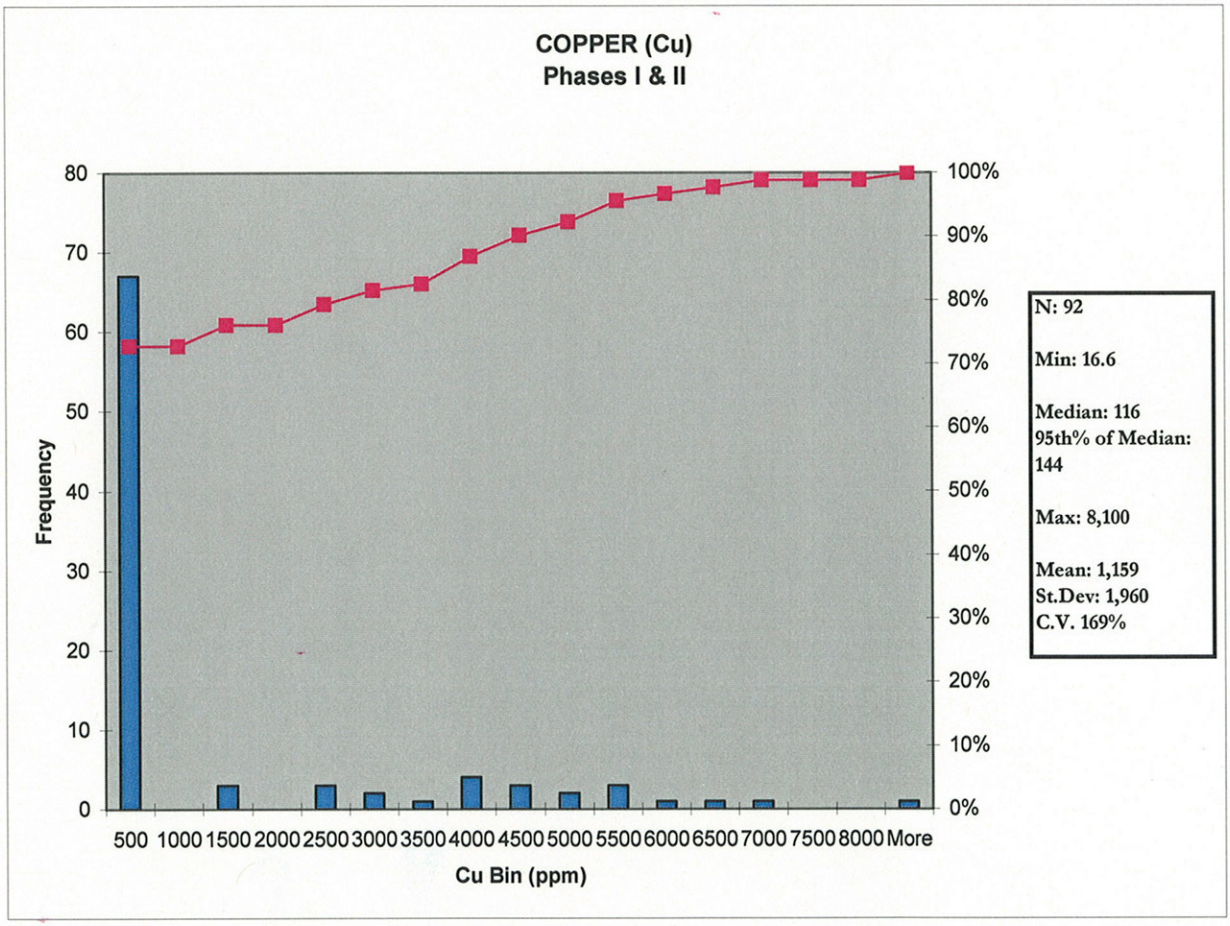
Whole-rock and trace-metal results for all 108 samples are presented in Appendix A. Concentrations of major-element oxides are consistent with our understanding of the ore and host rock mineralogy: Ultramafic rocks are depleted in SiO_2 and Al_2O_3 and enriched in MgO, CaO, FeO and TiO_2 compared to the sedimentary country rocks.

Although driving the access tunnel will generate rocks of different types, it is important to understand that the mining activity will generate an operational category called "development rock". Because the ore, which contains the high-grade metals, will be shipped from site without any processing or further generation of waste, it is this development rock that needs to be characterized for its potential environmental impact. The trace metal chemistry of development rock and ore samples are discussed in detail in Geochimica, 2005b and c, respectively, presented as Appendix E. The technical memoranda in Appendix E originally were developed to provide input to possible air-quality evaluations for the project.

We compiled the available data that meet the Eagle Project's data-quality objectives. From the Phase I and Phase II data, we separated developmenr-rock and ore-grade samples for specificc analyses by rock category. Within each data set, for each metal we computed (a) standard descriptive statistics and (b) a histogram with cumulative percentages (see Appendix E for full sets). These exploratory computations form the basis for selection of the most appropriate statistic for point estimation of development rock, given the empirical distribution of the data.

Figure 3.1 shows the histogram for Copper concentrations in 92 samples of development rock that have been vetted for QA/QC as of this analysis, including both intrusive and country- rock lithologies.

Figure 3.1 Copper Concentrations (ppm) in Development Rock at Eagle Project



Clearly, the empirical distribution is very far from normally distributed; non-normal distributions were seen in both the development-rock and ore samples. In fact, Figure 3.1 quite surely shows the superposition of at least two underlying distributions, one centered on low concentrations (73% of all samples have [Cu] < 500 ppm), and the other ranging from about 1,500 ppm to 8,100 ppm. The result is a highly skewed empirical distribution for which there is a very large difference between the median (116 ppm) and the mean (1,159

ppm). The sample standard deviation, 1960 ppm, greatly exceeds the mean, producing a coefficient of variation for the sample of 169%. The sort of empirical distribution shown in the histogram and the descriptive statistics means that the most common measure of descriptive statistics, the sample mean, is not an appropriate point estimator. For strongly skewed data, the best-unbiased estimator is the sample median (e.g., Wonnacott and Wonnacott, 1977; Tukey, 1977).

For strongly skewed data, the only theoretically sound basis for constructing a confidence interval around a point estimator is to use a simulation technique called "resampling", of which Monte Carlo simulation is a subset that can be used when a specific population distribution can be inferred (Efron, 1979; Thompson, 1989; Simon, 1997). The resampling technique best suited to this problem is called the "bootstrap" (Efron, 1979), in which one begins with the actual sample data, and then constructs a large number of equivalently sized data sets by selecting randomly (with replacement) from the original data, then ordering the outputs of those 're-sampled" data to calculate the confidence interval desired. For the purposes of this task, we have selected 10,000 as the number of repetitions for resampling; 10,000 repetitions are sufficient for almost any real-world sample when the goal is to produce a confidence interval around the median (Simon, 1997). For each metal, the size of the sub-samples is based on the size of the original sample, which varies from metal to metal, based on the currently available, QA-qualified sample set. The bootstrap procedure is compiled in a computer code called RESAMPLING STATS and was exercised for this task using version 5.0.2 (Simon, 1999). The calculations of the median and the upper 95th percentile of the median for each metal are summarized and discussed in Appendix E.

Table 3.1 compares the upper 95th percentile estimate for development-rock samples to the median with published values for average crustal rocks and average igneous rocks. Results for magnesium (Mg) are converted to parts per million for this comparison.

Table 3.2 presents an equivalent able of results for ore samples.

Table 3.1 Comparison of Estimated 95th Percentile Median Concentrations for 17 Metals in Eagle Development Rock with Average Crustal and Average Igneous Rocks

Metal	Upper 95th %-ile of Median (ppm)	Average Crustal(1) (ppm)	Average Igneous Rocks (2) (ppm)
Antimony (Sb)	0.54	0.2	0.51
Arsenic (As)	12.5	1.8	1.8
Barium (Ba)	40	425	595
Beryllium (Be)	0.38	2.8	3.6
Cadmium (Cd)	0.32	0.2	0.19
Chromium (Cr)	203	100	198
Cobalt (Co)	36.1	25	23
Copper (Cu)	144	55	97
Lead (Pb)	13.2	13	16
Magnesium (Mg)	31,500	20,900	17,600
Manganese (Mn)	365	950	937
Mercury (Hg)	0.11	0.080	0.33
Nickel (Ni)	264	75	94
Selenium (Se)	0.80	0.05	0.05
Silver (Ag)	0.19	0.07	0.15
Tin (Sn)	0.50	2	2.5
Zinc (Zn)	92	70	80

(1): Krauskopf and Bird, 1995, Appendix IV; (2): Hem, 1985, Table 1

Table 3.2 Comparison of Estimated 95th Percentile Median Concentrations for 17 Metals in Eagle Ore Samples with Average Crustal and Average Igneous Rocks

Metal	Upper 95th %-ile of Median (ppm)	Average Crustal(1) (ppm)	Average Igneous Rocks (2) (ppm)
Antimony (Sb)	0.40	0.2	0.51
Arsenic (As)	2.9	1.8	1.8
Barium (Ba)	20	425	595
Beryllium (Be)	0.10	2.8	3.6
Cadmium (Cd)	3.67	0.2	0.19
Chromium (Cr)	1,180	100	198
Cobalt (Co)	740	25	23
Copper (Cu)	31,110	55	97
Lead (Pb)	48	13	16
Magnesium (Mg)	95,600	20,900	17,600
Manganese (Mn)	1,020	950	937
Mercury (Hg)	0.04	0.080	0.33
Nickel (Ni)	31,500	75	94
Selenium (Se)	41	0.05	0.05
Silver (Ag)	9.66	0.07	0.15
Tin (Sn)	3.7	2	2.5
Zinc (Zn)	144	70	80

(1): Krauskopf and Bird, 1995, Appendix IV; (2): Hem, 1985, Table 1

The order of the concentrations for the upper 95th percentile of the median is reasonable for the rocks. Magnesium (Mg) is a major element in the Country Rock and Intrusives, including in the SMSU portion of the ores. The Eagle Project is a prospective nickel – copper (Ni-Cu) ore body, so it is reasonable that the upper control limit for estimates of Ni and Cu should be very high compared to world-wide rock averages, especially in the ore samples. Several of the so-called "siderophile" (those found characteristically with iron) and "chalcophile" elements (those that bond to sulfur in crustal rocks) are often associated with Ni-Cu ores, including cadmium (Cd), cobalt (Co), silver (Ag), and zinc (Zn). Chromium (Cr), a lithophile element, is commonly associated with oxide and alumino-silicate minerals in ultramafic rocks. Arsenic (As) and selenium (Se) (congeners for sulfur) are commonly found in sulfide minerals.

Barium (Ba) is common in rock-forming minerals and is common in some sulfide ore bodies, but in these samples is actually well below their crustal and igneous-rock averages, as also are beryllium (Be). Mercury (Hg) is low to distinctly low in the ores compared to crustal and igneous values, and near average value sin the development rocks. Antimony (Sb), lead (Pb), manganese (Mn), tin (Sn), and zinc (Zn) are close to their average crustal and igneous values in both sample sets, as is arsenic (As) in the ore samples. The source of the slightly elevated As is not known, but may be associated with the higher concentration of pyrite (FeS_2, in which As is a common trace substitute for S) in development rocks compared to ores.

In addition to this statistical evaluation, the right-hand tail of the skewed trace-metal contents was evaluated to identify potential metals of concern, although it should be understood that a high concentration of a particular element does not necessary imply that this element will indeed be mobilized in concentrations that may lead to environmental impacts. In addition to copper and nickel, elements show enrichment in the Eagle samples relative to the reference materials for one or more rock type include: arsenic (As), cadmium (Cd), cobalt (Co), selenium (Se), silver (Ag), and lead (Pb). The results are not surprising: Eagle is a sulfide ore deposit, and the chalcophile elements Cd, Co, Se, Ag and Pb all show significant correlation with total sulfur in Eagle samples; Jago (2002) showed that Eagle pyrrhotite has elevated Co, a siderophile element related to the high iron concentration of the ore body.

3.3 Acid-base Accounting (ABA) and Net Acid Generation (NAG) Testing

ABA and net acid generation NAG results from the Phase 0, I and II studies are shown in Appendix A. The NAG test was added to the program in Phase II to provide additional information on the likelihood of acid generation across a large number of samples. At the end of phase II, 110 samples (58 Country Rock; 41 Intrusives; 11 ores) have been tested for static ABA parameters and 60 samples (28 CR; 32 Intrusive) have been NAG tested. Because the samples are fresh core, there is almost no sulfate-sulfur present, so the acid-generation potential (AP) can be well estimated from total sulfur.

As discussed in the geologic description and mineralogy sections, all of the intrusives are ultramafic rocks and quite closely related petrologically and mineralogically. Similarly, the country rocks have a limited lithologic range from siltstone to sandstone; hornfels is a contact metamorphic form of those original country rocks, principally siltstone. To test the range of ABA characteristics, Geochimica organized the available test data by sub-lithologies and then tabulated the static ABA results as box-and-whisker plots that show the range and distribution of results. Figures 3-2 to 3-5 are box-and-whisker plots for total sulfur and Sobek Neutralization potential for the intrusive and the country rocks, respectively.

Figure 3-2 Total Sulfur Concentrations (wt% S) for Intrusive Rocks

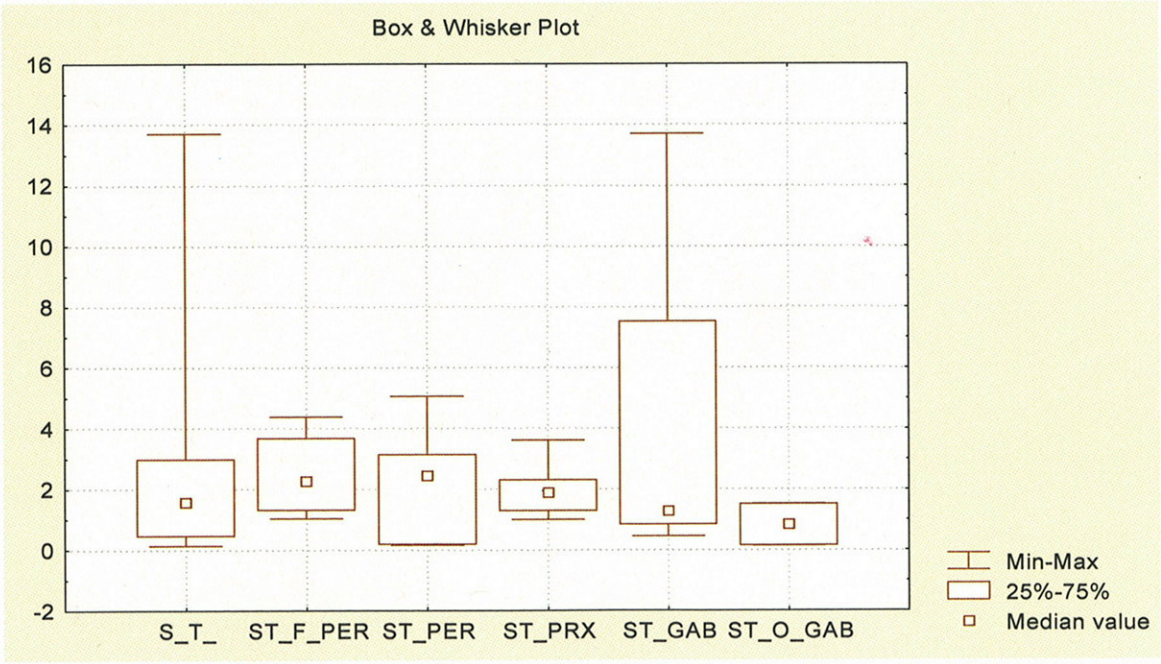


Figure 3-3 Neutralization Potential (t CaCO3eq/kt) for Intrusive Rocks

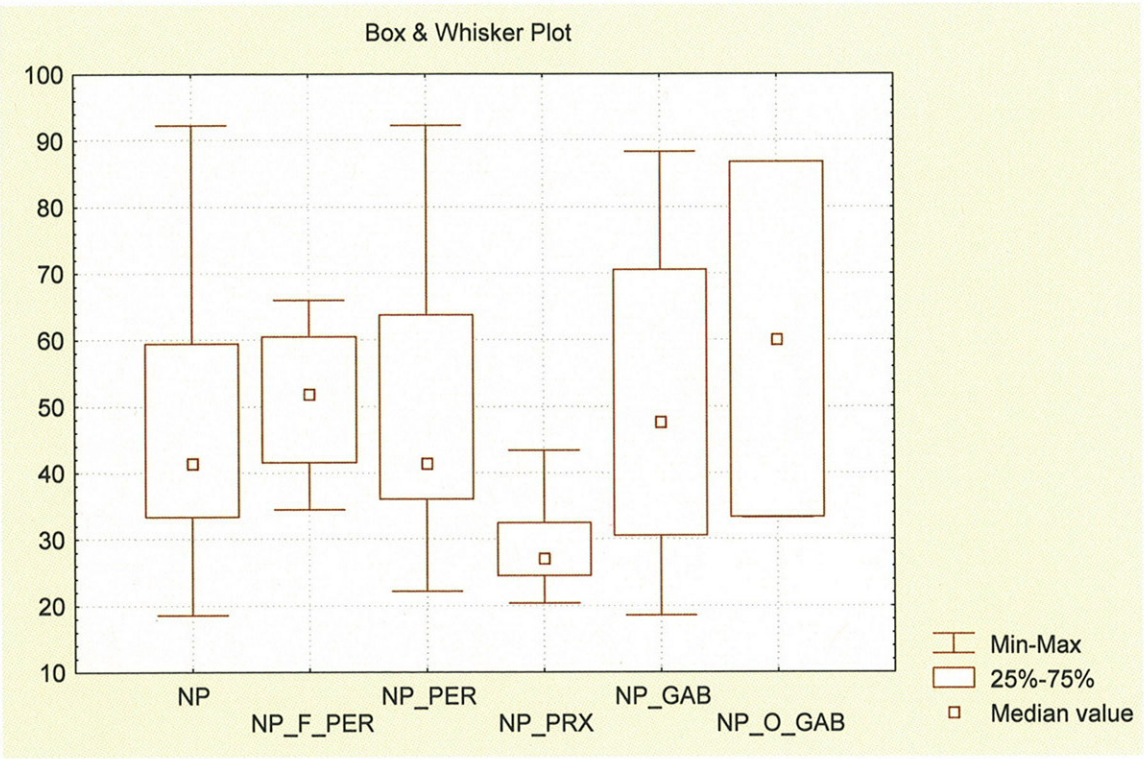


Figure 3-4 Total Sulfur Concentrations (wt% S) for Country Rocks

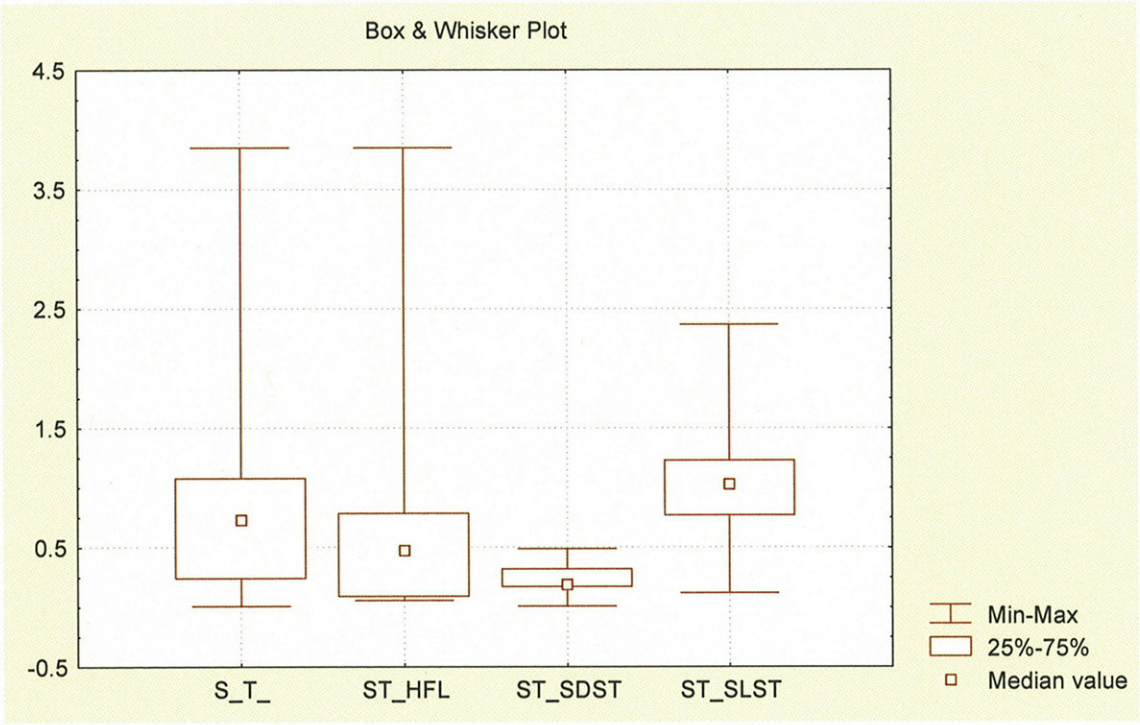
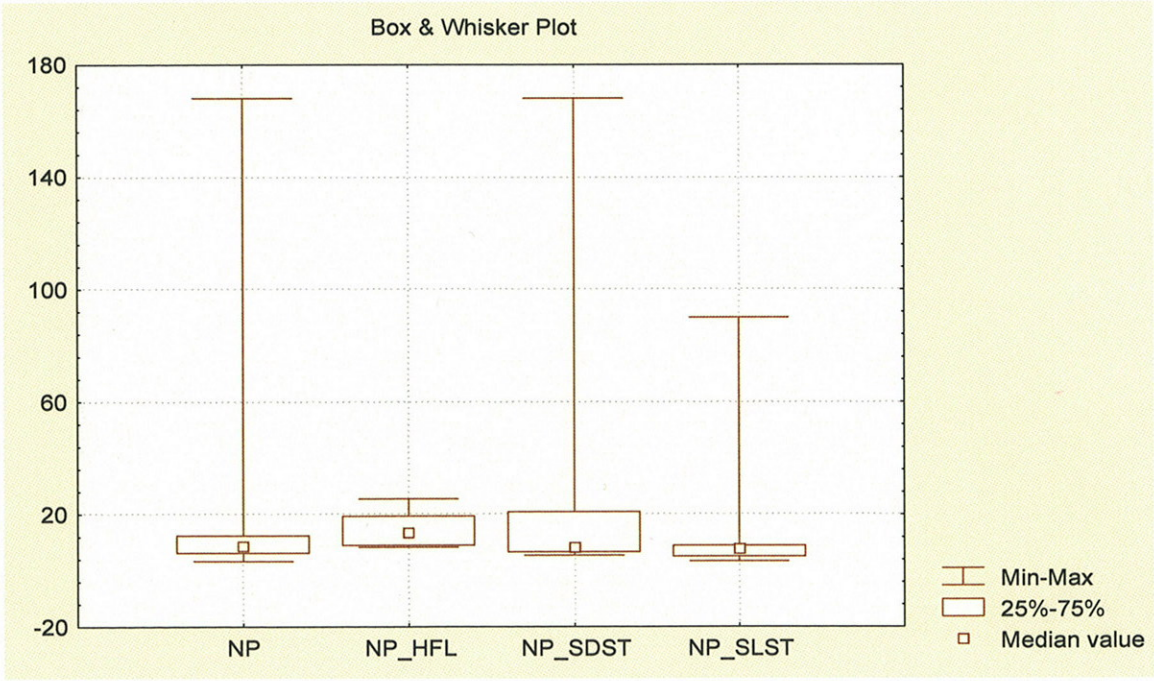


Figure 3-5 Neutralization Potential (t $CaCO_3$eq/kt) for Country Rocks



The box-and-whiskers plots show that, in terms of total sulfur and neutralization potential, the driving parameters for ABA, it is entirely reasonable to consider all sub-lithologies of intrusive rocks together and all lithologies of country rocks together.

The massive sulfide samples were the only samples to report acidic paste pH values, ranging from 3.7 to 6.4. All other rock types reported paste pH values from neutral to distinctly alkaline (i.e., 7.6 to 9.7). Because the samples are from recently drilled core, the alkaline nature of most samples in terms of paste-pH is entirely reasonable, and the acidic paste-pH of the MSU samples shows the high intrinsic oxidation rate of these very sulfide-rich (32 to 38 wt. %) samples.

Total sulfur values for the intrusive samples are summarized in Figure 3-6; those for country rock samples in Figure 3-7. Neutralization potentials for intrusives and country rocks are summarized in Figures 3-8 and 3-9, respectively.

Figure 3-6 Empirical Distribution of Total Sulfur in Intrusive Rocks

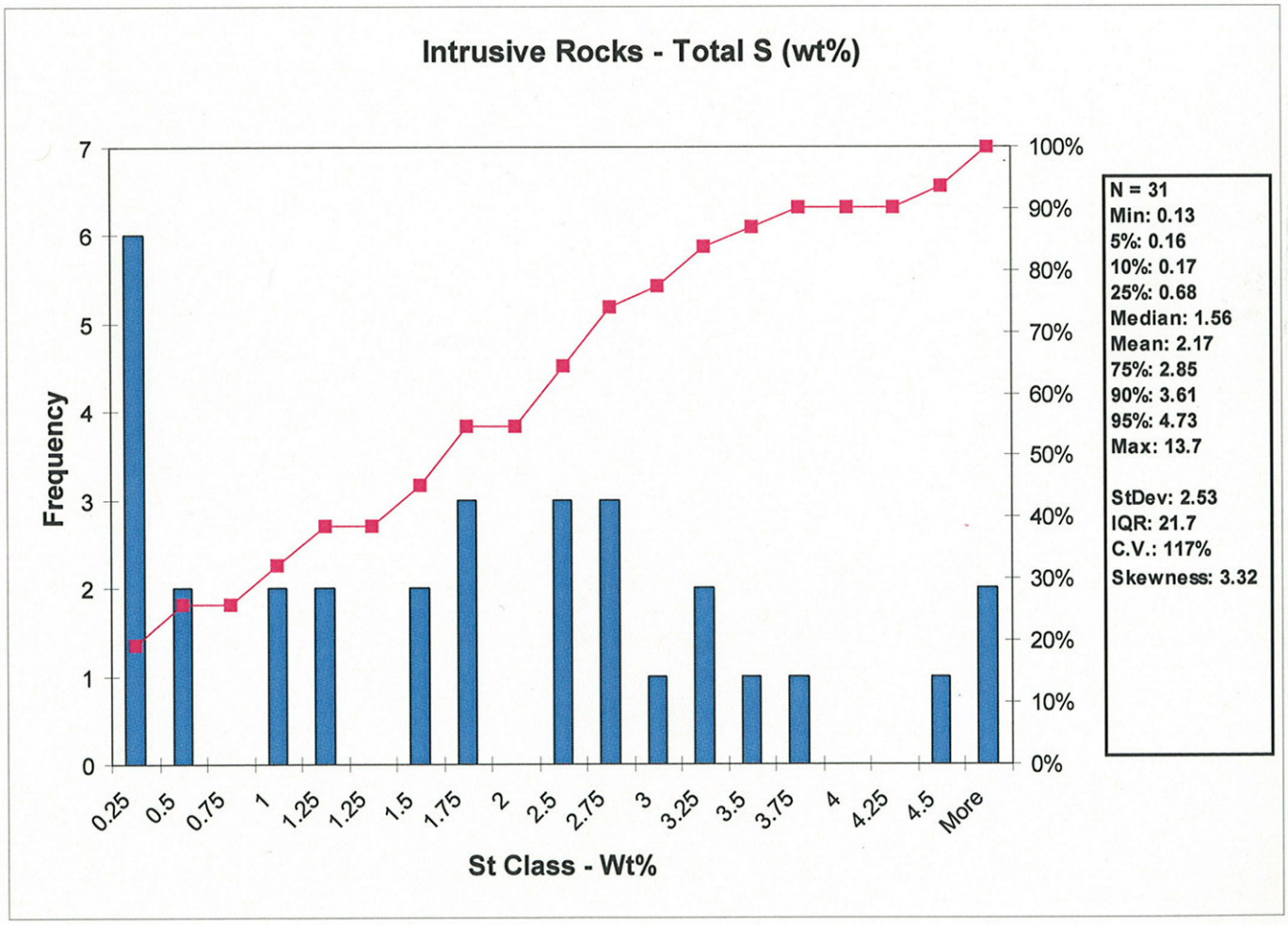


Figure 3-7 Empirical Distribution of Total Sulfur in Country Rocks

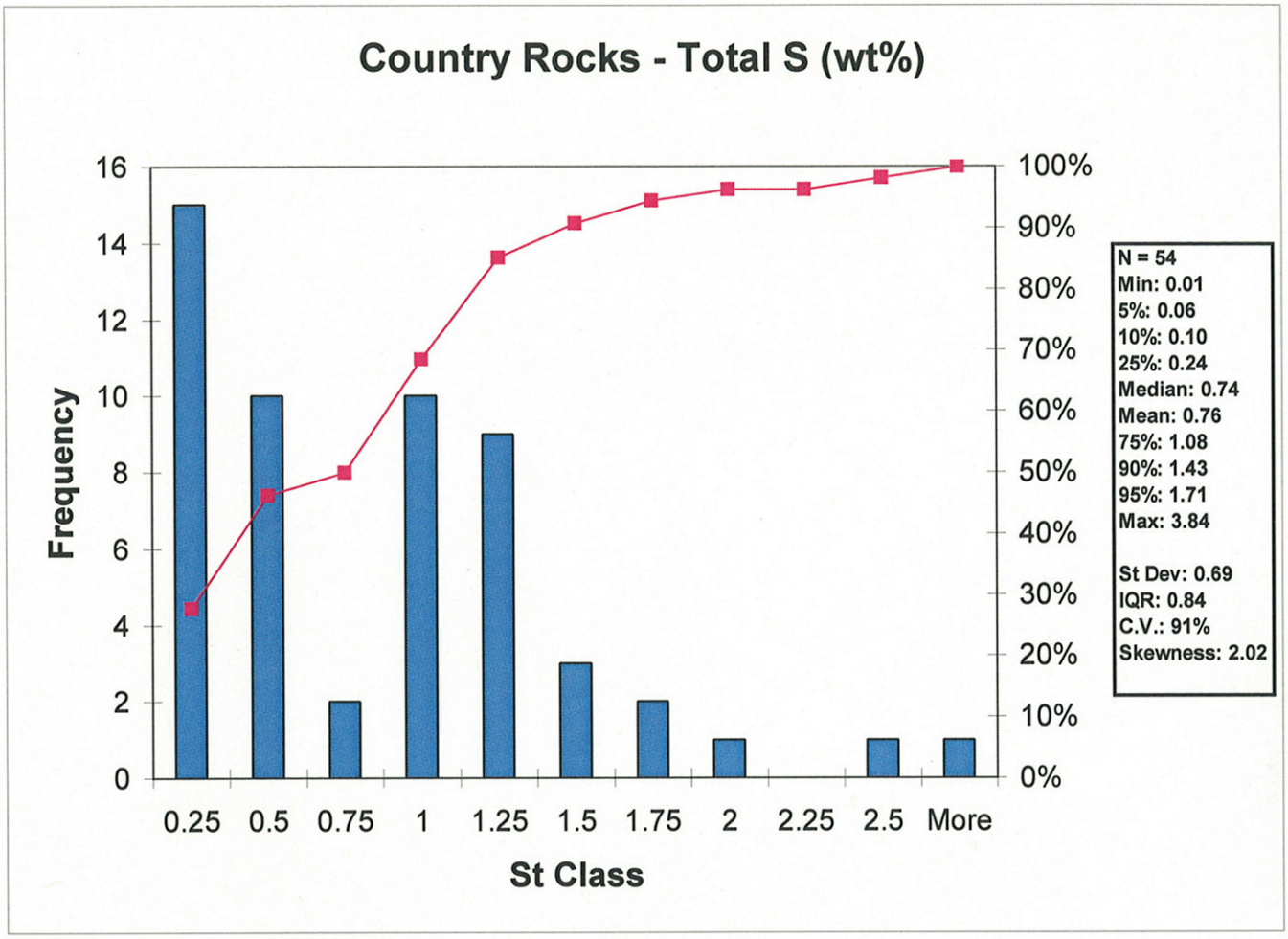
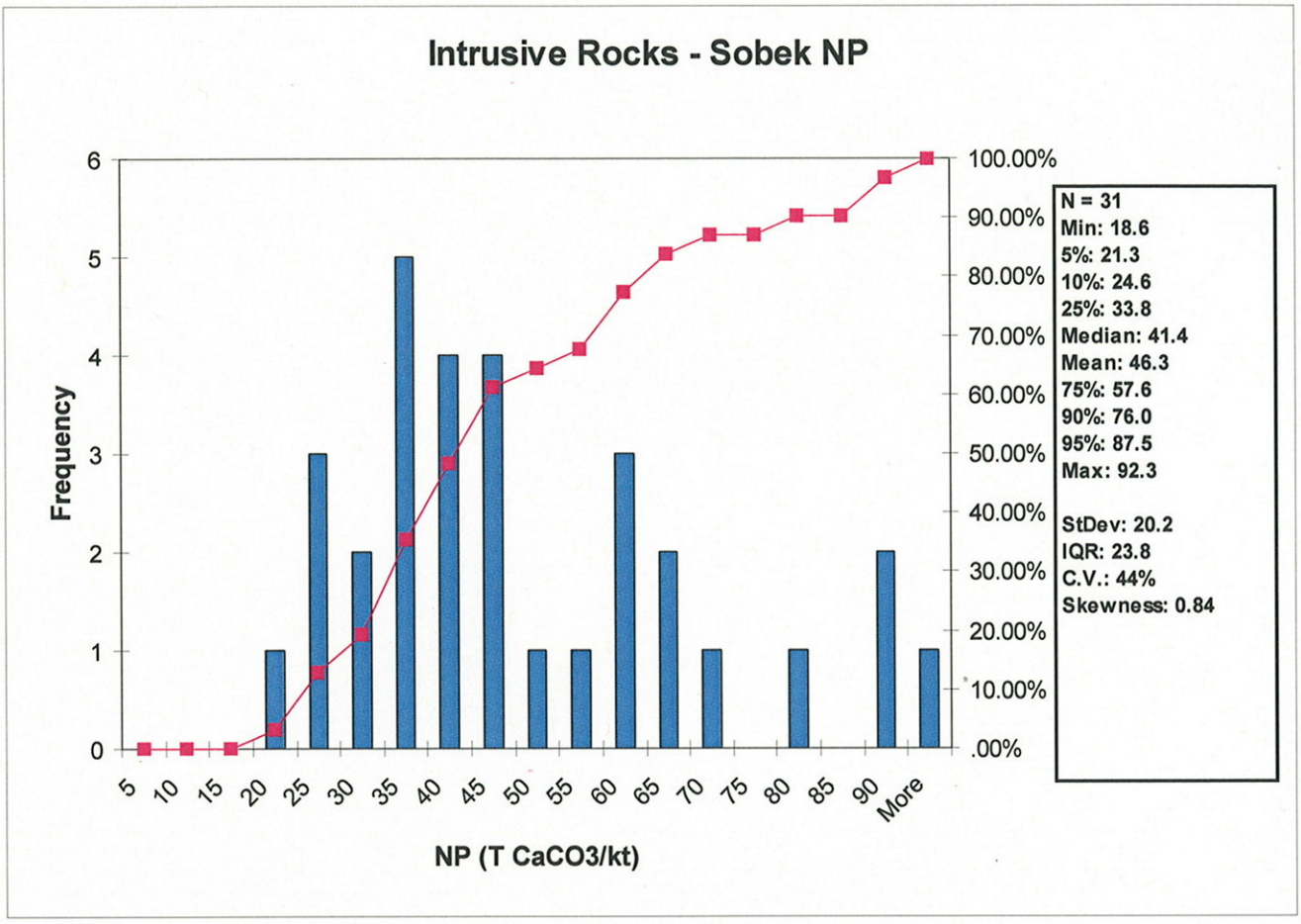
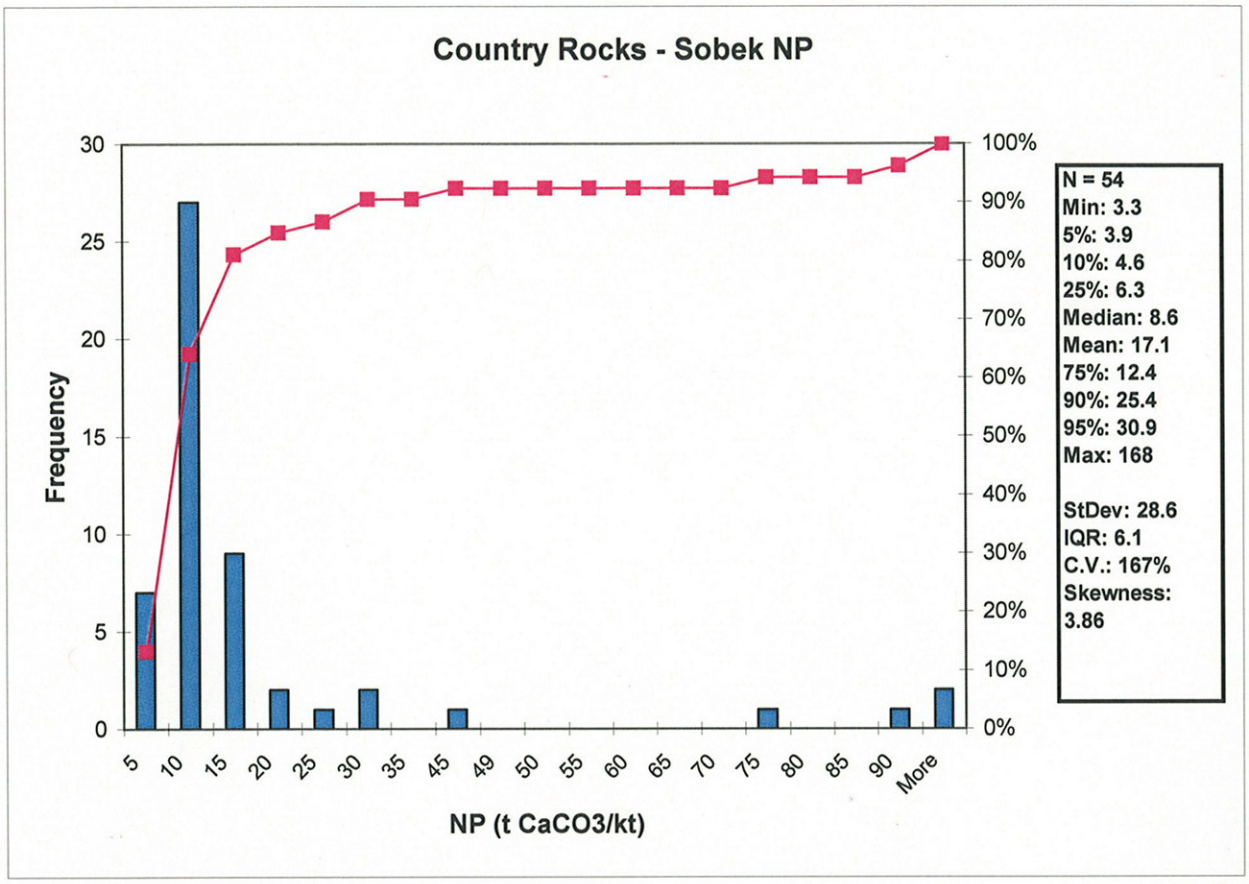


Figure 3-8 Empirical Distribution of Sobek Neutralization Potential in Intrusive Rocks



3-9 Empirical Distribution of Sobek Neutralization Potential in Country Rocks



Compared to the Phase I data set, the range of total sulfur in country rocks (i.e., siltstones, sandstones, and their thermally metamorphosed equivalents, hornfels) has expanded. The current range is 0.01 to 3.84 wt%, with a median value of 0.74 wt%; 75% of the samples have total sulfur concentrations greater than 0.24 wt%, and 90% of the samples are greater than 0.1 wt%, a value at which the maximum potential acidity might be considered sufficiently low that it would likely not be problematic. There is some mobilization of the sulfide mineralization into the country rock in the form of veins near the peridotitic intrusive, reflected in the upper "whisker" of sulfur seen in Figure 3-4 and the right-hand tail of the histogram (Figure 3-7). The sedimentary rocks outside of the zone of influence of the mineralization generally contain relatively low concentrations of iron sulfides. Sandstone samples have total sulfur contents at the low end of the country-rock range (Figure 3-4), as expected given their relatively distal location to the sulfide zones. However, the spatial distribution in siltstones is not so obviously related to the instrusion, and correlation between total sulfur content and proximity to the ore body is therefore not apparent from the current data set.

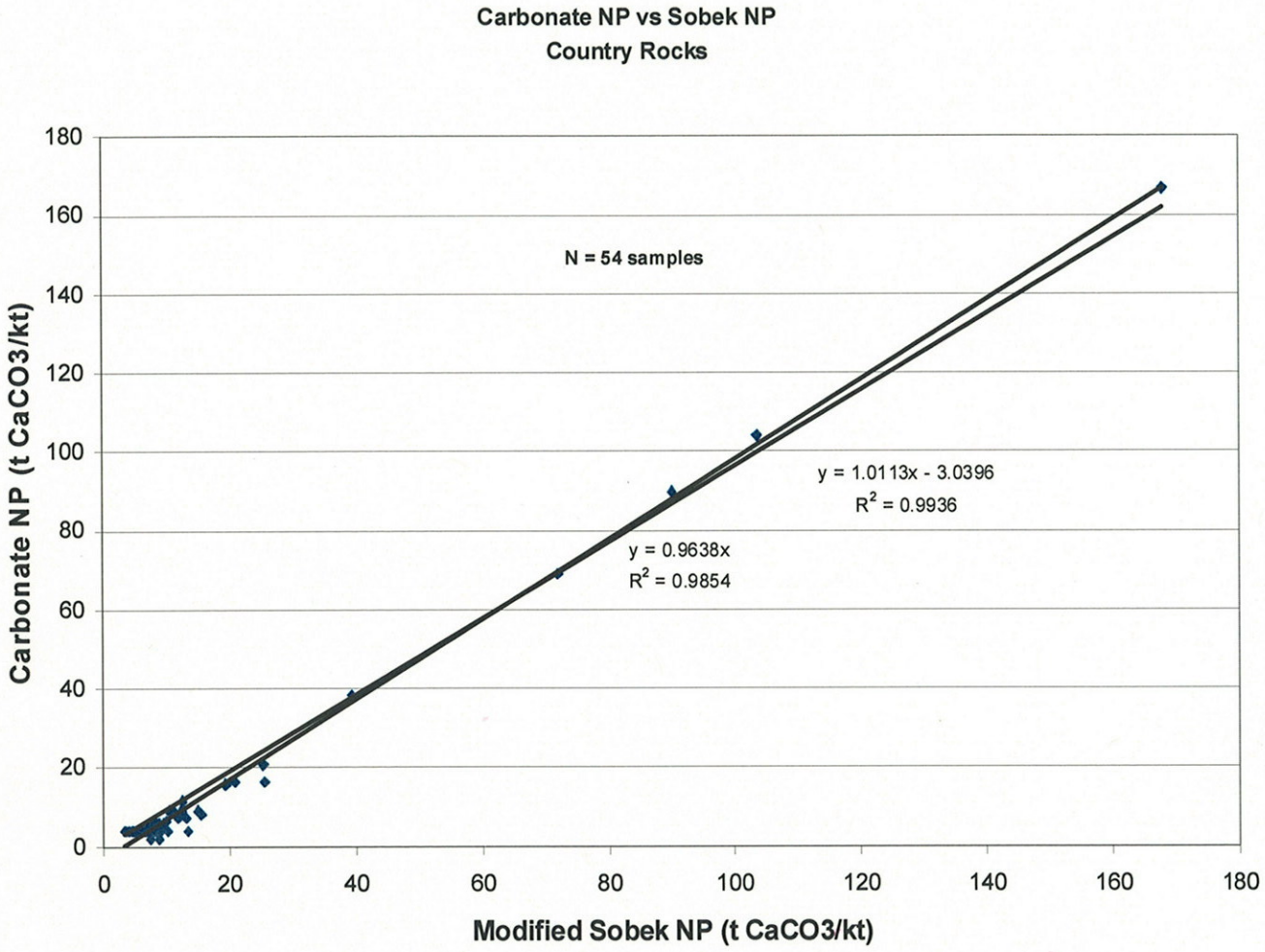
As expected petrogenetically, the intrusive rocks have much higher overall sulfur contents. At the end of Phase II, the range of total sulfur in intrusive rocks extends from 0.13 to 13.7 wt%, with a sample median of 1.56 wt%. The histogram of these values shows two clear

populations. Firstly, there are low-sulfur intrusives (25% of the samples analyzed have total sulfur less than approximately 0.5 wt%). Secondly, there is a nearly uniform range, amounting to 75% of the samples tested, of higher sulfur rocks, extending from 0.68 to 13.7 wt%. The entire distribution of sulfur values shows that the sampling program has effectively sampled across a wide range of intrusives. The only intrusive rock that is noticeably lower in sulfur distribution than the others, is pyroxenite, a minor ultramafic variant.

In order to evaluate the ARD potential, one also must consider the neutralization potential (also called acid neutralization capacity). Using the USEPA's Sobek methodology, the neutralization potentials of intrusive and country rocks are obviously different (Figure 3-8 and 3-9). Both groups have high-end values that are very high, 168 t CaCO3 eq/kt for the maximum country-rock sample and 92.3 t CaCO3eq/kt for the highest intrusive sample. Mineralogical evaluations show is due to the presence of late-stage carbonate, as vein filling in the country rock and as veinlets and open-space fillings in late-stage peridotites and gabbros. However the central tendencies of the distributions are very different. The median value for country rocks is 8.6 t CaCO3eq/kt and 75% of the samples have NP values < 12.4 t CaCO3eq/kt. In contrast, the median value for the intrusive rock samples is 41.4 t CaCO3 eq/kt, and 75% of the samples have values > 25 tons CaCO3eq/kt. In most ARD studies, Sobek NP values less than 10 t CaCO3eq/kt are considered minimal to negligible, probably reflecting for the most part slow-reacting alumino-silicate reactions. Because stoichiometric calcite would produce an NP value of 1000 t CaCO3eq/kt, values of Sobek NP < 10 t CaCO3eq/kt can indicate only trace levels of carbonates, even if all the NP were derived from such carbonates.

The nature of the mineralogical controls on neutralization potential are important to evaluating field-scale behavior because the kinetics of carbonate dissolution by strong acid are orders of magnitude greater than those for most aluminosilicates (e.g., Jambor, 2000). The mineralogical analyses for Eagle have confirmed the presence of fast-reacting carbonates (calcite and dolomite) and the Phase I and Phase II studies show that there is a good correlation between the Sobek NP values and the observed carbonate mineralogy (Jambor 2004 a,b, 2005; Appendix D). To extend this detailed evaluation to a much larger dataset, the static ABA program for Eagle also evaluated the inorganic carbon concentration of all samples, and calculated a "Carbonate Neutralization Potential" (CaNP) based on those results (Appendix B). Figure 3-10 presents the correlation analysis for Sobek NP and CaNP for the country-rock samples.

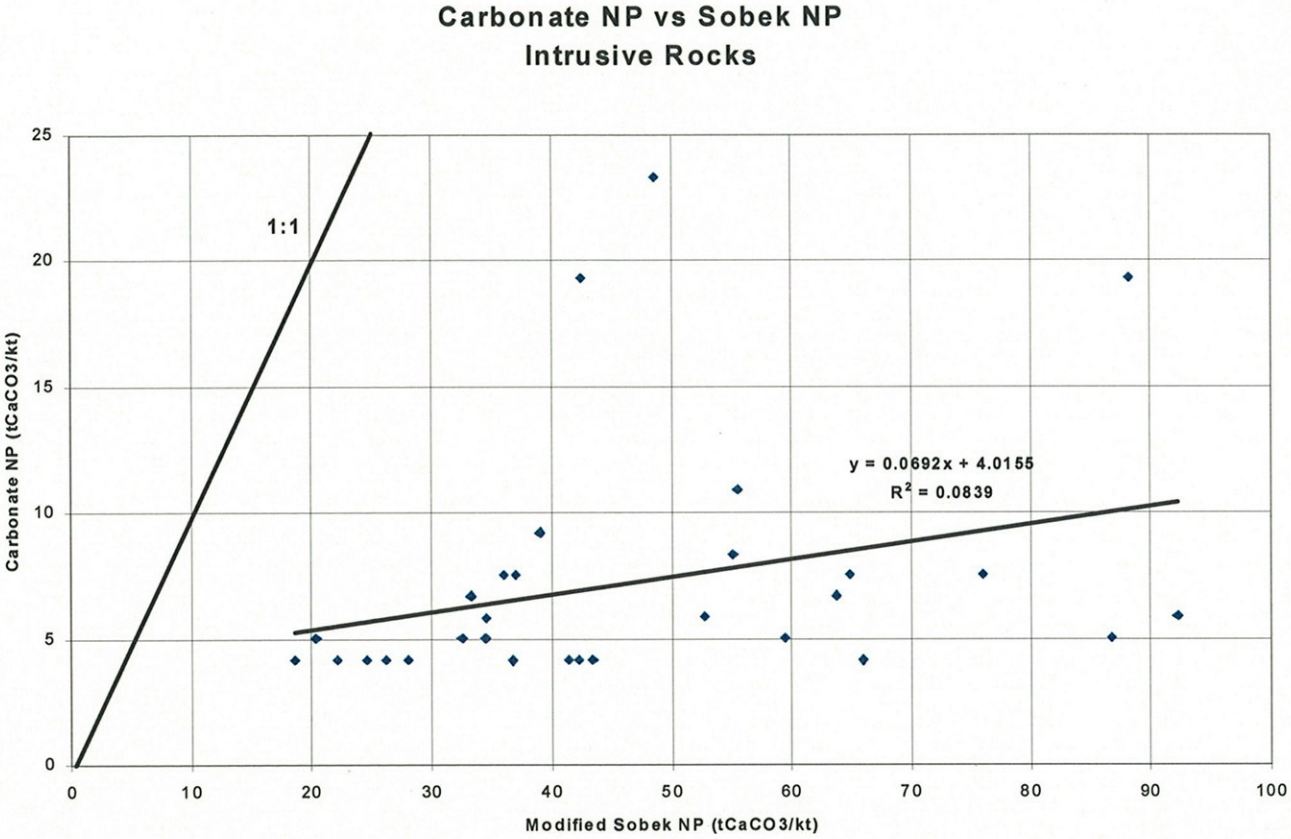
Figure 3-10 Relationship of Carbonate Neutralization Potential (CaNP) to Sobek Neutralization Potential (Sobek NP) in Country Rocks



The correlation is very strong ($r^2 > 0.99$) and cluster around the 1:1 slope, and the distribution of points in the scatter plot shows the basically bi-modal distribution of values that also can be seen in the histogram for Sobek NP alone. The spatial distribution of carbonate veining in the sedimentary units has not been well defined; however, it has been suggested that carbonate veining may be strongest proximal to the peridotite intrusions (S. Coombes (KEX), personal communication).

The relationship of CaNP to Sobek NP in intrusive rocks (Figure 3-11) is very different, but also important.

Figure 3-11 Relationship of Carbonate Neutralization Potential (CaNP) to Sobek Neutralization Potential (Sobek NP) in Intrusive Rocks



Unlike the country rocks, the correlation coefficient for CaNP against Sobek NP in intrusive rocks is very poor ($r^2 = 0.08$), although the mineralogical examination shows that carbonates are, in fact, present and that they are end-member calcite and dolomite outside the ore zones. The difference between CaNP and Sobek NP must, therefore, be due to silicate minerals. Jambor (e.g., 2000) has shown by testing single-mineral samples that olivine and its common deuteric reaction product lizardite – common to ubiquitous in the peridotitic intrusive rocks - can provide significant neutralization potential, up to 40 t $CaCO_3$eq/kt, when tested by the Sobek-style methods. The kinetic tests of intrusive rocks (discussed below) show that the neutralization potential in the intrusive rocks, including semi-massive sulfide ore zones, is substantial. Not only do acidic conditions strongly lag the onset of oxidation in Phase I and Phase II intrusive rocks across a range of total sulfur concentrations, but the kinetic-test effluents include significant concentrations of dissolved Mg, which cannot be accounted for by the observed contents of dolomite and must, therefore be derived from the Mg silicates.

The NAG test, developed over some fifteen years of research and development by Environmental Geochemistry International Pty., Ltd (Balmain, NSW, Australia), treats a crushed rock sample with hydrogen peroxide, a strong oxidant. The notion is to use the hydrogen peroxide to rapidly oxidize amenable sulfides, then allow the bulk acid-

neutralization capacity of the rock sample to neutralize as much of the acidity generated by sulfide oxidation as it is able to do. A rapid assessment of the results is the final pH of the test solution, called "NAGpH". Conventionally, samples with a NAGpH less than 4.5 are considered to be probably net acid generating, whereas those with NAGpH greater than 4.5 are viewed as unlikely to generate net acidity. (The break point for NAGpH is based on the distribution of species for aqueous carbonate alkalinity. Solutions with pH greater than 4.5 have discernible levels of titratable alkalinity; those below 4.5 have titratable acidity.)

Figures 3-12 and 3-13 present histograms for NAGpH results from single-addition NAG tests on intrusives (32 samples) and country rock (28 samples), respectively.

Figure 3-12 Empirical Distribution of NAGpH for Intrusive Rocks

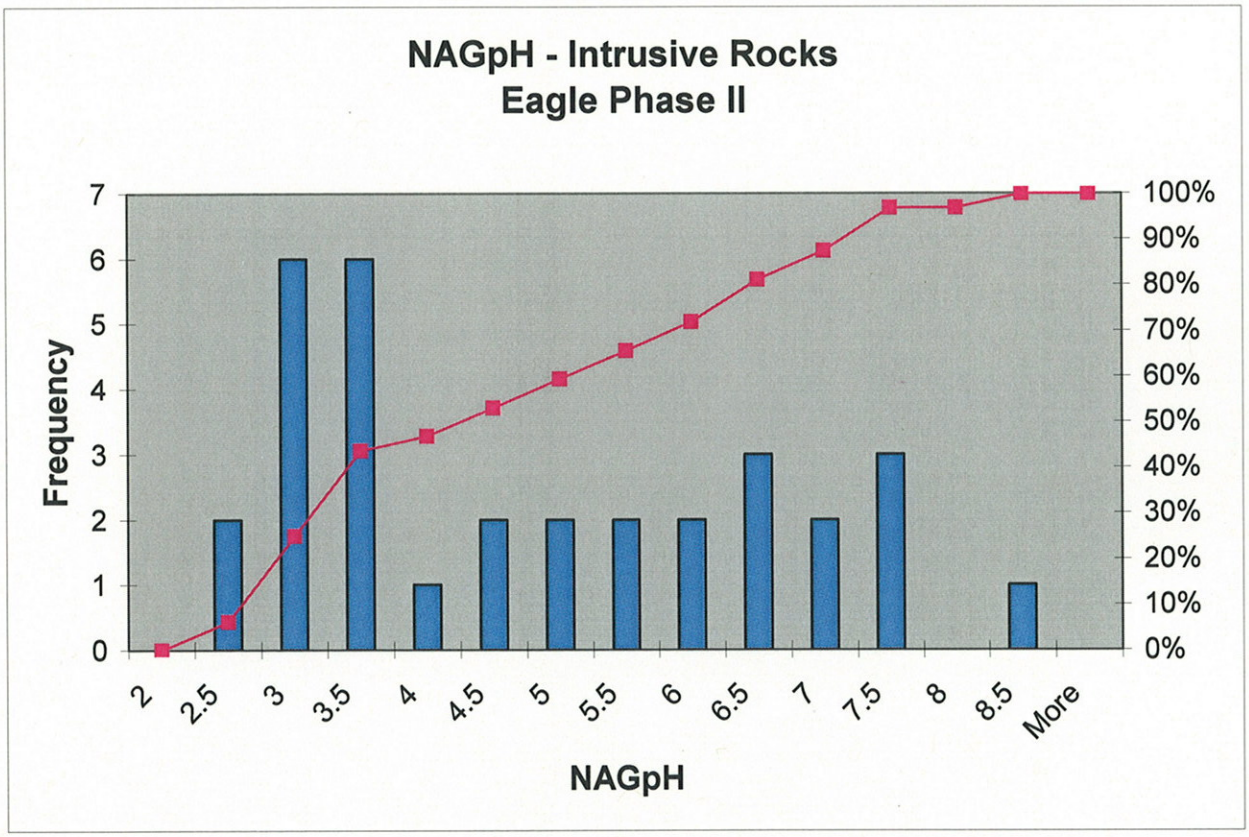
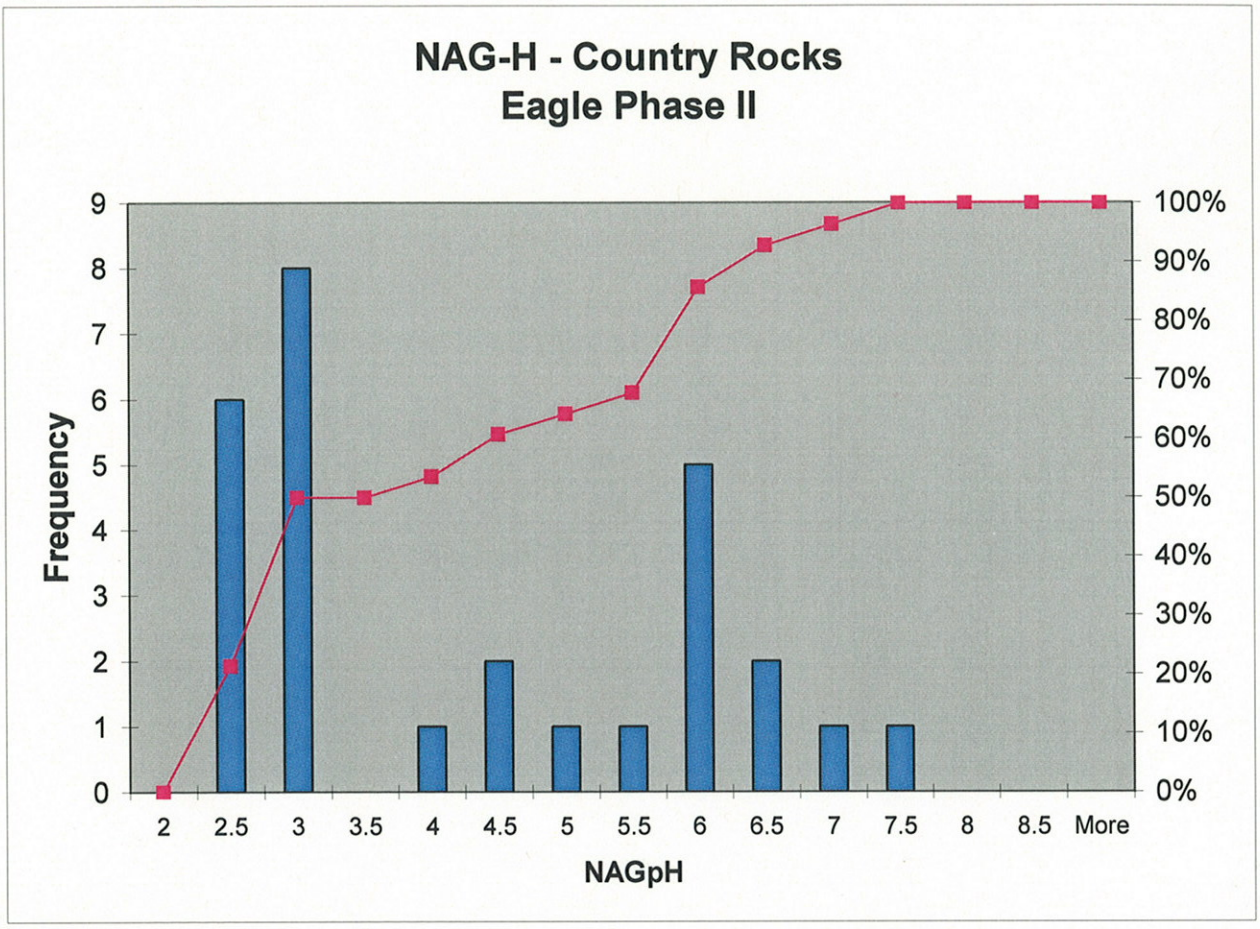


Figure 3-12 Empirical Distribution of NAGpH for Country Rocks



Fifty-three percent (53%) of the tested Phase II intrusive rocks produced NAGpH values less than 4.5 during the single addition tests. Sixty-one percent (61%) of the Phase II country rocks had NAGpH < 4.5. The further significance of these results will be discussed in Section 4.

4.0 DISCUSSION

4.1 ARD and Metals-Leaching Risk

4.1.1 Magnitude of the Hazard for Country Rock and Intrusives

A number of criteria have been proposed for assigning an ARD potential to a material using ABA results. The most common approaches in North America are those based on use of the neutralization potential ratio (NPR = NP/AP) and the net neutralization potential (NNP = NP - AP). For several reasons, no single ratio or NNP value has been identified to have universal applicability in terms of predicting acid generation. The actual threshold values for a particular solid are material-specific, and depend on many factors, including the amounts and types of acid generating and neutralizing minerals, their morphology, their grain size,

their crystallinity, their chemical composition, their paragenesis, the material's texture, and the site-specific exposure conditions.

Guidelines widely used in North America are summarized below:

Potential for ARD	**Criteria**	**Comments**
Likely	NPR <1	Likely acid generating, unless sulfide minerals are non-reactive, because the acid-generating potential is greater than the acid-neutralizing potential.
Uncertain	1< NPR <3	Possibly acid generating if NP is insufficiently reactive or is depleted at a rate faster than sulfides.
Low to Negligible	NPR > 3	Not potentially acid generating unless significant preferential exposure of sulfides along fractures planes, or extremely reactive sulfides in combination with insufficiently reactive NP.

Scatter plots of NP versus AP for country rock and intrusives are shown in Figure 4-1 and 4-2, respectively, with the 1:1 and 3:1 ratios superimposed in the figure.

Figure 4-1 Relationship of Neutralization Potential (Sobek NP) to Acid-Producing Potential (MPA) for Country Rocks

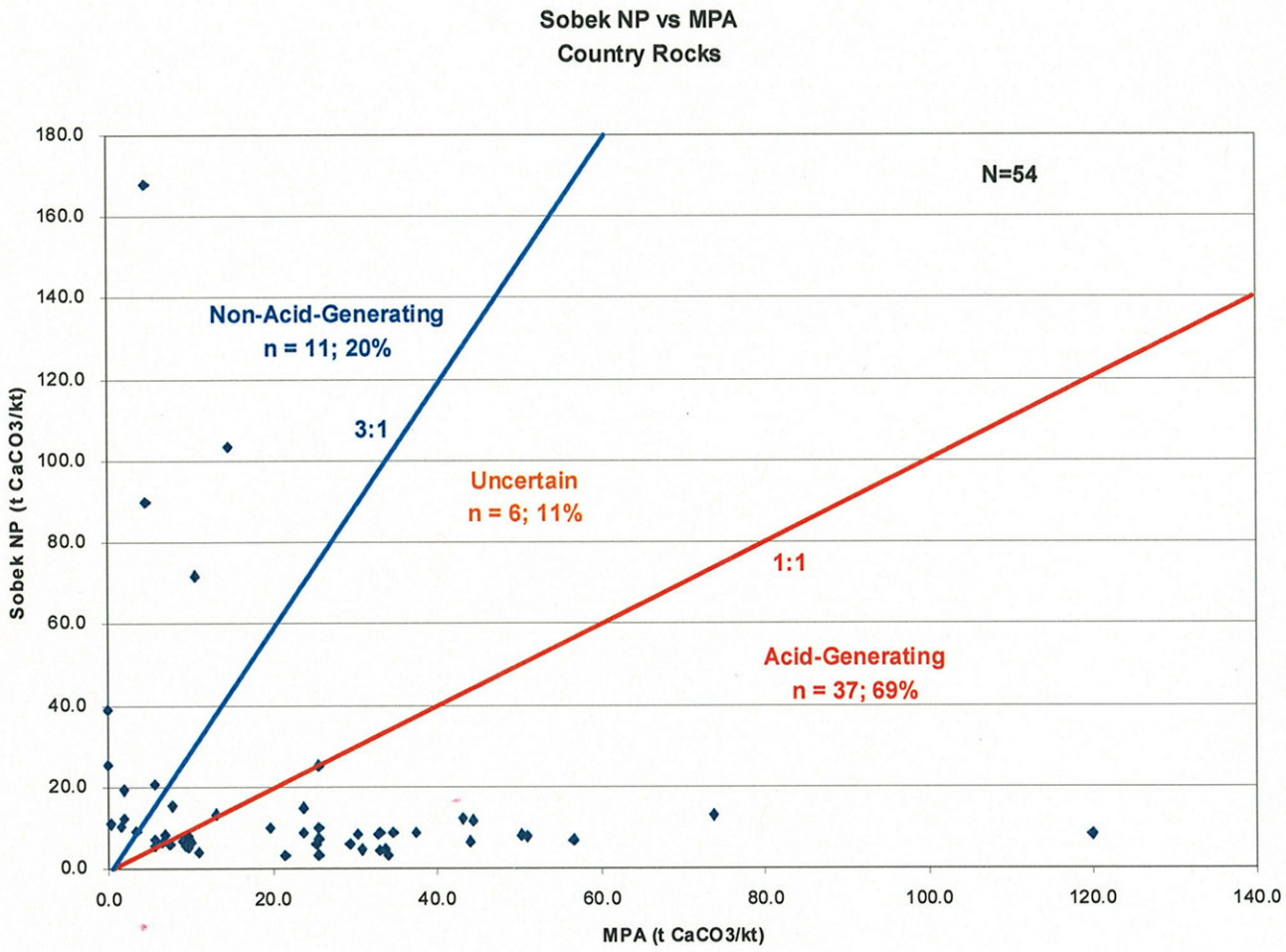
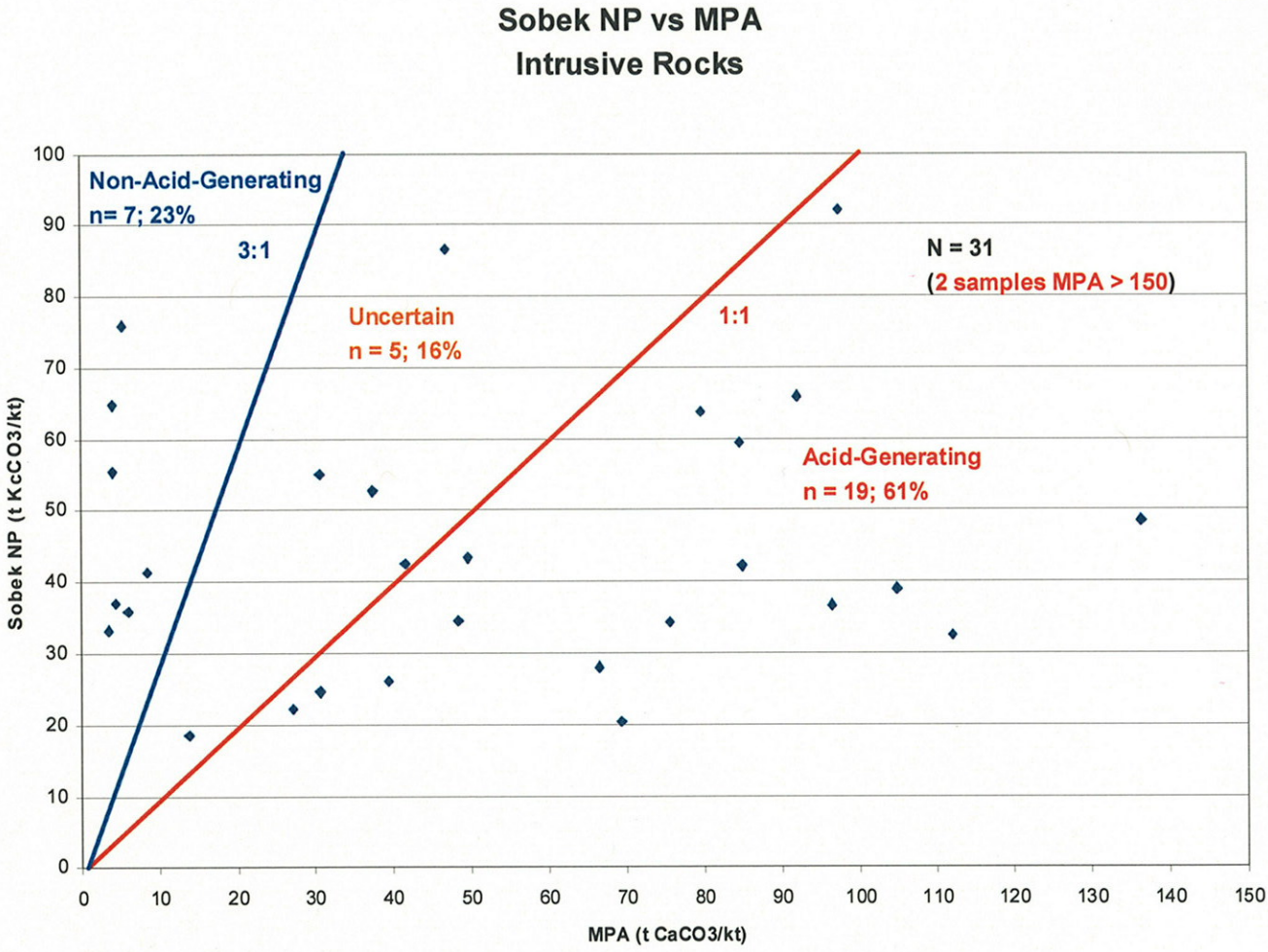


Figure 4-2 Relationship of Neutralization Potential (Sobek NP) to Acid-Producing Potential (MPA) for Intrusive Rocks



Figures 4-1 and 4-2 show that, using the North American NP/AP ratio, more than 75% of all tested non-ore samples are either likely acid-generating or uncertain, and that 60% (Intrusives) to 70% (Country Rock) of the tested samples are likely to be acid generating.

It is possible to combine the standard ABA results with the NAG testing to produce a combined diagram, using two completely independent lines of analysis, that further evaluates the likelihood of acid generation from sets of samples. The method, modified slightly from a suggestion by Environmental Geochemistry International, plots Net Neutralization Potential (analogous, but inversely, to Acid-Producing Potential, as defined in Australia) against NAGpH. The results are shown in Figures 4-3 and 4-4 for the Phase II samples that have NAGpH values.

Figure 4-3 Comparison of Net Neutralization Potential (calculated using CaNP) and NAGpH - Phase II Country Rocks

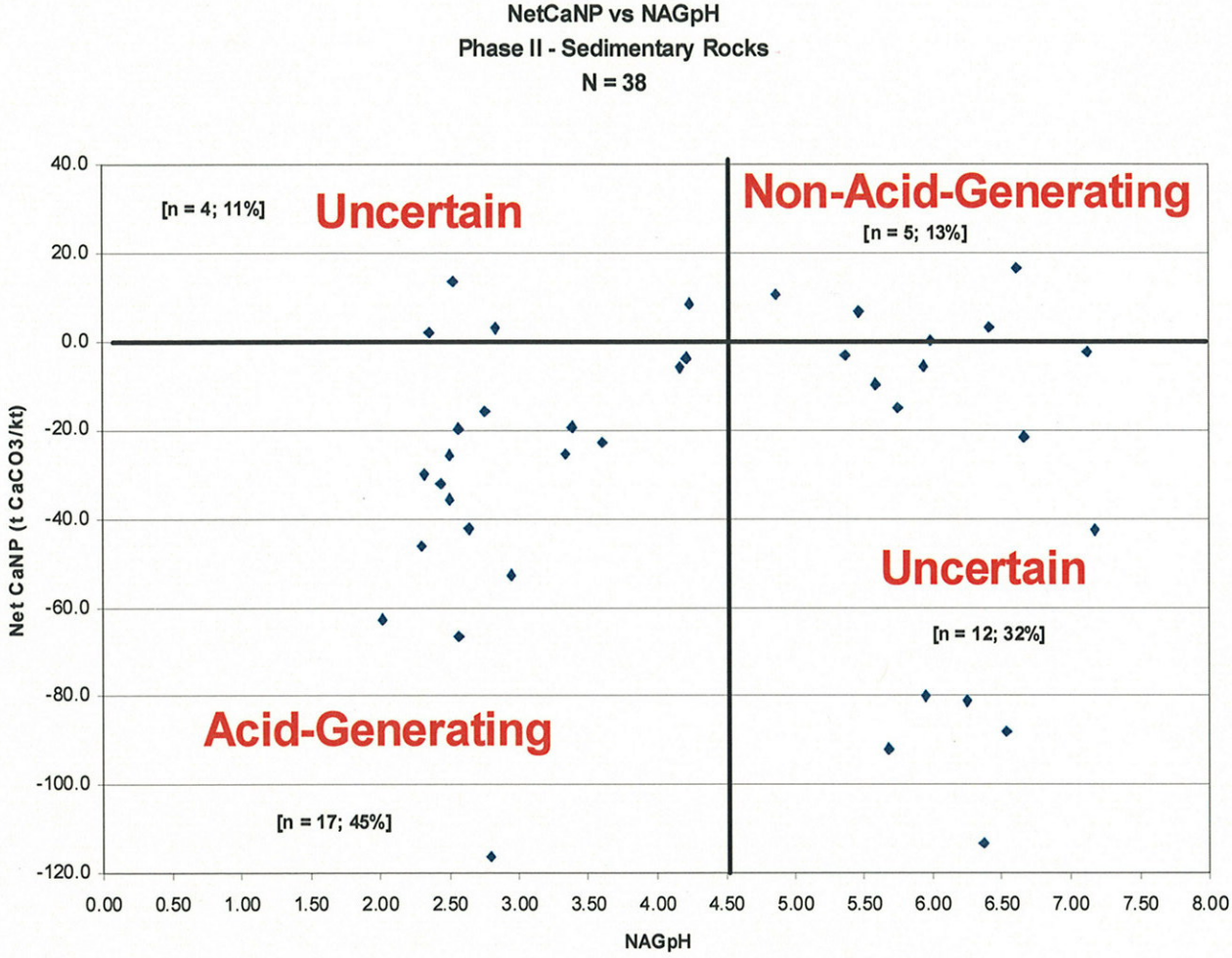
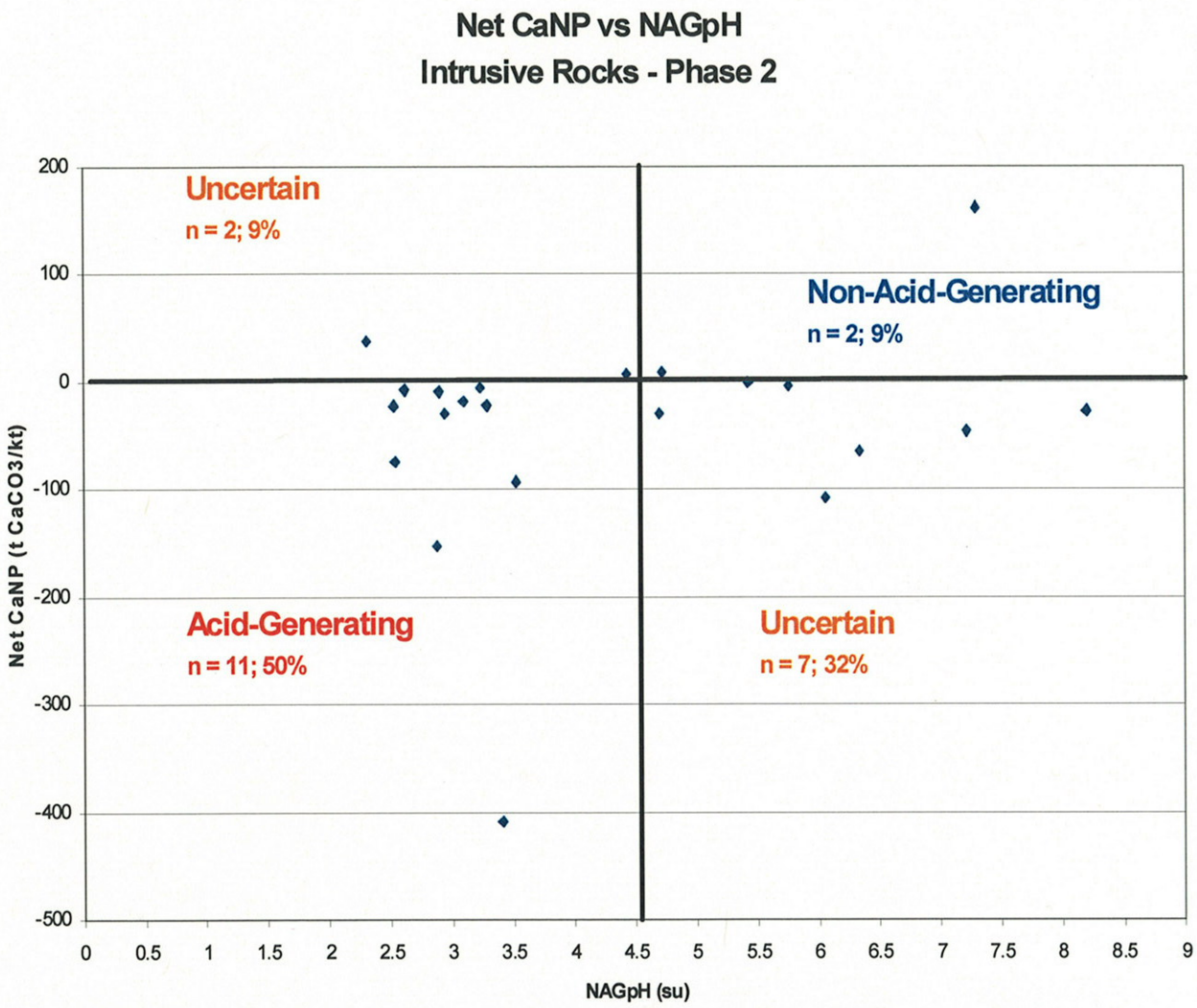


Figure 4-4 Comparison of Net Neutralization Potential (calculated using CaNP) and NAGpH - Phase II Intrusive Rocks



As discussed in Section 3.3 above, the NAG tests predicted about 50% to 60% of the tested samples would be acid generating. When the NAGpH data are combined with the NNP values, somewhat more samples are predicted to be non-acid generating than using the NP/AP ratio, but more samples, proportionally, are also uncertain on the basis of static testing alone. When the likely and uncertain categories are combined, both Country Rocks and Intrusives show about 80% that cannot be determined to be likely non-acid generating based on current test data. Samples that are classified as "Uncertain" require additional testing, usually kinetic testing, to qualify as non-acid-generating, a procedure than cannot be accomplished operationally.

As discussed in Section 3.2 above, the Development Rock, and certainly mineralized peridotite left underground, is expected to contain concentrations of metals, including Co, Cu, Fe, Ni, and Zn that are elevated with respect to world-wide rocks and that could be

mobilized if the rocks leach. These potentials fore metals leaching are observed to occur in some samples under kinetic leach tests that are ongoing (Section 3.5 above).

Therefore, based on two independent lines of testing, more than ¾ of all rocks tested – which we and KMC consider to be a representative suite of both intrusive and country-rock lithologies across the spatial domain of the project – must be managed as special-handling waste rock in order to manage risk of ARD and metals leaching.

4.1.2 Mitigation of ARD/ML Risk

Mineralogical investigations confirm that there are end-member carbonates present in all samples evaluated to date. The end-member calcites and dolomites are considered to provide fast-reacting, available neutralization potential. These results are consistent with the inorganic carbon results from the static testing program. Kinetic tests during both Phases I and II show that, except for the Massive Sulfide ores, there is an effective lag to onset of acidification in all rock types, although the length of the lag varies under testing conditions from a few weeks to at least a year.

ARD and ML risks to the environment can also be mitigated by mine planning and operational decisions. KMC will manage all ores for direct shipment, so they will not be exposed to surficial weathering for extended periods. (It also should be noted that weathering of sulfides can adversely affect metals recoveries in common metallurgical processes, so there also is an incentive for KMC to properly manage the most reactive materials.) Development rock will be stockpiled on an engineered pad that is lined and dressed to allow capture of runoff and infiltration. Contact waters will be managed through an active water-treatment system designed by qualified engineers to ensure that no discharges outside permitted levels will be allowed. Before the end of mining, KMC will remove all waste rock from the surface and, after amending it with cement (to provide both alkalinity and strength), place the development rock back underground. This will prevent any long-term risk to surface or shallow groundwater from development rock. KMC is undertaking long-term water management studies for the underground mine to evaluate the hydrogeology and hydrogeochemistry of such waters at the end of mining. The principal mitigation for long-term ARD is that the underground workings will re-saturate after mining, controlling the flux of O_2 to the sulfides to the solubility limit of O_2 in water (less than 10 ppm).

4.2 Asbestiform Minerals

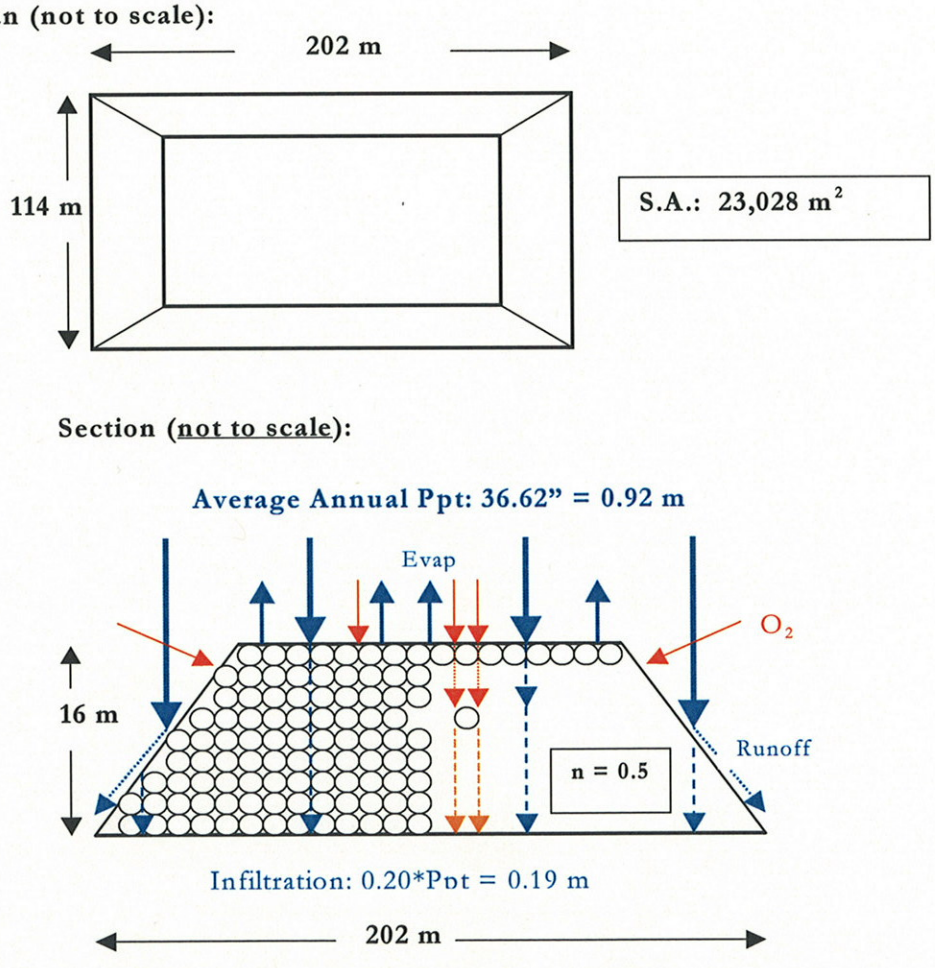
Careful and extensive mineralogical studies of 30 samples of intrusive rocks, covering all varieties of the peridotitic rocks have shown that all deuteric alteration produces lizardite, a non-asbestiform member of the serpentine family, talc, or clay minerals like sepiolite. No minerals (e.g., chrysotile, anthophyllite) with the fibrous form and characteristics of regulated asbestos have been identified, nor have any of the "fibrous" amphiboles. During subsequent stages, KMC will submit sample splits to a testing laboratory that is qualified to analyze "asbestos" using the EPA-approved protocols. At this stage, there is a strong mineralogical basis to expect that the EPA protocols will confirm the analyses already completed.

4.3 Preliminary Water-Quality Model for Development Rock Stockpile

Based on current mine planning, KMC will produce a total of approximately 379,000 tonnes of development rock that will be stored on a rectangular pad with plan dimensions of approximately 200 m by 100 m for periods of up to seven years at the surface. Mid-way through the mine life (beginning about Mine Year 4), development rock will be returned to the underground workings as cemented backfill, and by Mine Year 7 all development will be backfilled into the deep underground.

At this stage of the geochemical investigations, one can develop a simple model of a development rock stockpile undergoing surficial weathering in the vadose zones with rinsing by infiltrating meteoric waters (rain and snowmelt) typical of average annual precipitation in the Upper Peninsula. One uses the results of the ongoing kinetic tests and available data on site hydrology. The basic conceptual model for a development-rock stockpile undergoing surficial weathering is illustrated in Figure 4-5.

Figure 4-5 Conceptual Model for a 379,000-tonne Development-Rock Stockpile



The model assumes that the development rock stockpile would be an equal mixture of Intrusive and Country Rock that has been well represented by the Phase I and Phase II kinetic tests. For each rock group, we have considered a high-sulfur and a low-sulfur sample from the kinetic tests. In this most recent version, we have used data from both the Phase I and II tests because Phase II samples represent a higher-sulfur range and show more sign of reactivity. Sulfide oxidation in the stockpile occurs because O_2 migrates into the pile; this model does not depend on the specific mechanism of gas transport, but does assume that oxygen is not limiting. Water needed for the reactions and also for transport through the pile comes from annual precipitation that is intercepted on the plan surface area of the pile. The average-annual precipitation value, 36.6 inches (0.92 m) per year is the long-term average from Weather Service records at Marquette. For the calculation, we assume that 20% of average annual precipitation infiltrates through the pile on a steady-state basis. The bulk permeability of the pile is assumed to be 50%, and the mean diameter of rock particles in the pile is assumed to be 10 cm (0.1 m). Leach rates for weighted average country-rock and intrusives are calculated in terms of mass per unit surface area per unit time from the kinetic column tests, with the surface areas calculated from the sieve analyses of samples at head. The leach rates are then scaled to field conditions for surface area of the total pad. The spreadsheet model used to calculate expected water quality is provided in Appendix F, which also includes a thermodynamically-based geochemical model of the estimated solution to account for precipitation and sorption reactions that could be expected within the pile prior to discharge.

The basis for the mass-balance calculation is as follows:

- Compile basic data on the column tests (mass of charge; particle-size distribution of the fragments; weekly effluent volumes)

- Compile column test effluent chemistries for a representative period over which chemistries are essentially constant (weeks 40-50 for Phase I or Weeks 20-25 for Phase II). Because natural rain water is compositionally close to de-ionized water, the conceptual model of the column tests is apt, and the effluent chemistries can be taken as representative.

- Convert the observed concentrations to release rates in units of mass/unit surface area/unit time.

- Calculate the total surface area for rock in the stockpile based on a model of particle size distribution for the rock.

- Calculate the equivalent annual mass released from weathering of the full stockpile, assuming that release rates per unit surface area in the columns is equivalent to release rates per unit surface area of the full-scale pile.

- Calculate the volume of infiltration expected to report through the pile on an annual basis.

- Divide the mass released by the amount of water available to carry the mass. This has units of concentration (Mass solute/Volume solvent).

- Evaluate the mass-balanced chemistry in terms of equilibrium with geochemically credible phases (e.g., gypsum; ferrihydrite), and the pH is calculated for the resultant solution as controlled with atmospheric CO_2.

Table 4.1 Key Results: Preliminary Water-Quality for 379Kt Development-Rock Stockpile (mg/L except pH in su and Alkalinity in mg $CaCO_3$/L)

PARAMETER	VALUE
pH	7.4
Alkalinity	20
Total Dissolved Solids	584
Calcium	61
Magnesium	52
Sodium	17
Potassium	27
Bicarbonate	17
Chloride	40
Sulfate	357
Fluoride	2

PARAMETER	VALUE
Aluminum	0.001
Arsenic	0.07
Boron	1.8
Copper	0.18
Iron	0.003
Manganese	0.003
Mercury	0.0004
Nickel	1.95
Selenium	0.15
Uranium	<0.0001
Zinc	1.17

The mass-balanced values were adjusted in the geochemical model REACT (Bethke, 2004) for solubility controls. Geochemically credible phases that affect the solution chemistry included barite [Ba], fluorite [F], ferrihydrite [Fe], gibbsite [Al], manganite [Mn], malachite [Cu], and amorphous silica [Si]. The model considered the solution for solubility with gypsum [$CaSO_4.2H_2O$], but found the waters somewhat undersaturated. The geochemical model predicts extremely low values (<0.001 mg/L for Al, Fe and Mn). We have adjusted them slightly upward to account for sub-part per million levels of these metals observed in almost all natural groundwaters that have TDS values greater than a few hundred mg/L.

No pure-metal solubility controls in low-temperature waters were found for As, Sb, B, Cd, Cr, Pb, Hg, Ni, Se, or Zn. It is expected that there could be sorption controls on some of these metals and metalloids, especially As, Cd, Cr, and Hg, and we have estimated concentrations for As and Hg in this list on that basis. Near pH 7, sorption of B, Cd, Ni, Se and Zn would be slight; relatively little is known about the sorption behavior of Sb. Although the model solution is saturated in ferrihydrite, the amount of ferric hydroxide precipitated (0.0002 mol/L) is so small that sorption onto the ferric hydroxide precipitated

would be minimally effective at pH near 7. In order to develop a quantitative model for sorption, Eagle would need to estimate the ferric oxide/hydroxide concentration of the rock to see if additional attenuation is actually achievable.

4.4 Preliminary Water-Quality Model for Underground Workings

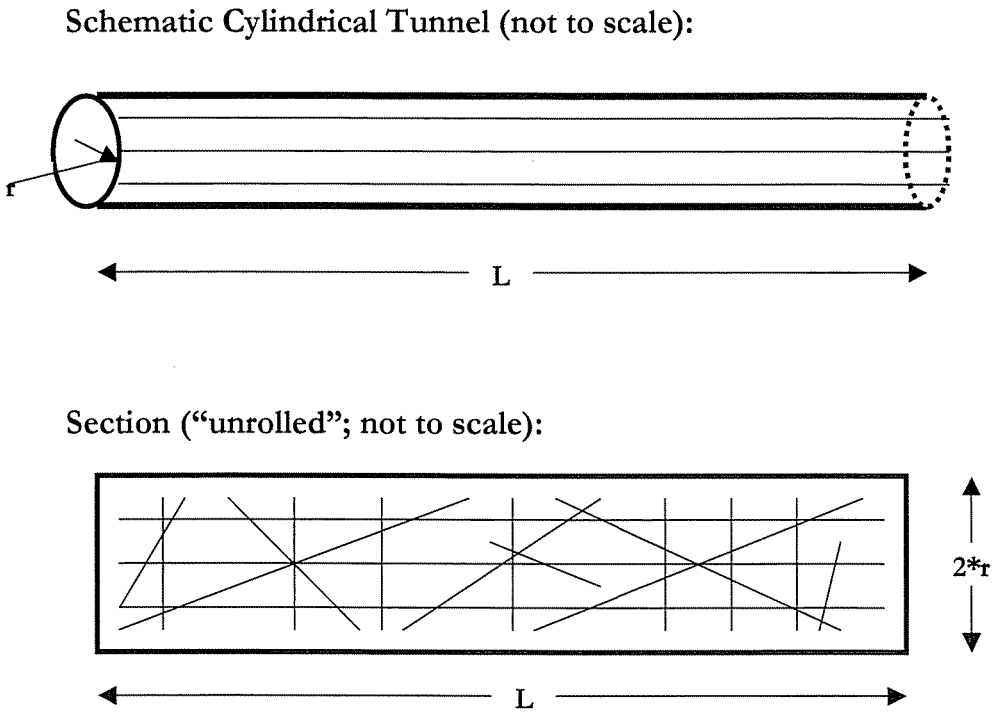
The initial model for water quality in the underground mine has been coordinated with the current hydrogeological investigations in order to develop a common basis for wall-rock surface area and total mine inflows. Both the hydrogeological model and the geochemical calculations are for the fully-developed mine at Mine Year 10, and both models assume that there has been no backfilling. It is assumed that KMC will actively manage water during operations, using the water-treatment plant at surface to treat any underground waters that need to be discharged. The crucial concern, then, is what will be the impacts of mine walls on water quality at the end of mining. This is the problem addressed by this preliminary evaluation.

The conceptual model for the physical system can be considered in terms of a unit portion of tunnel. The open workings have some geometric surface area that can be calculated simply from the dimensions of the working. For the purposes of illustration, the tunnel is shown as circular in cross-section, but this is not essential. Because of natural fracturing and faulting and the effects of blasting, the total available surface area of the mine walls will be much greater than the apparent geometric surface area. Morin and Hutt (1997) have compiled data showing that available surface area on mine walls may vary from about 20 to about 125 times the apparent geometric surface area. At this time, there are no data on blasting effects, so we have made a reasonably conservative assumption that the actual surface area will be 100 times the apparent geometric surface area. The basic conceptual model is illustrated in Figure 4-6.

The approach to developing a geochemical estimate is the same as for the surface stockpile, except that the total surface area is calculated as described above and the diluent water volume is taken from the hydrogeologic model and then adjusted to account for surface roughness and fracturing. Based on the 15-Feb-05 mine plan, Golder Associates Ltd. developed surface areas for the exposed walls and calculated mine-water inflow. Based on their results, the total geometric[2] surface area exposed in the underground will be 1.29 E+05 m^2, and the long-term inflow for the entire open workings will be 981 m^3/d (180 USgpm).

[2] As explained in Figure 4-6, the total surface area exposed to weathering is assumed at this stage to be 100 times the geometric area to account for roughness and fracturing (Morin and Hutt, 1994). Therefore, the surface area used for calculations of water-quality impacts is 1.29 E+07 m^2.

Figure 4-6 Conceptual Model for Controls on Leaching in Underground Workings



There is one significant difference in the modeling for the underground waters at this stage. The groundwater flowing into the workings will have reacted with bedrock over thousands of years and will already have a solute load that makes it different chemically from de-ionized water used in the column tests. Therefore, the outcomes from this modeling exercise need to be understood as incremental concentrations, the values of which need to be added to the likely groundwater chemistry in order to estimate the water that actually would report to sumps in the underground at the end of mining. Results for the incremental water chemistry are compiled in Table 4.2.

Table 4.2 Key Results: Preliminary Water-Quality for Unbackfilled Underground Workings at End of Mining[3] (mg/L except pH in su and Alkalinity in mg $CaCO_3$/L)

PARAMETER	VALUE
pH	7.4
Alkalinity	10
Total Dissolved Solids	71
Calcium	4
Magnesium	7
Sodium	1
Potassium	2
Bicarbonate	8
Chloride	10
Sulfate	25
Fluoride	0.05

PARAMETER	VALUE
Aluminum	0.003
Arsenic	<0.0001
Boron	0.06
Copper	0.002
Iron	0.78
Manganese	0.001
Mercury	0.0004
Nickel	1.77
Selenium	0.0006
Uranium	<0.0001
Zinc	0.002

The only adjustment in chemistry for the incremental underground waters is the adjustment of pH based on equilibrium with atmosphere. These estimated values are less than the values calculated for the development-rock pad because they do not include the high leachate for kinetic testing of the Phase II country rock (almost all underground rock surface will be intrusive) and because of the high inflow value.

4.5 Uncertainty Analysis

The preliminary water-quality models are based on three important assumptions that need to be clarified during further studies. Firstly, they are based on current leach data only. The Phase II results have shown much higher reactivity in some samples than did the Phase I samples. The leach rates are expected to continue to evolve, and model assumptions will need to be adjusted as they do. In a related matter, these initial estimates are based on averaging single low-sulfur and high-sulfur samples for each major lithologic group. In subsequent calculations, it will be necessary to develop a geochemical block model that will allow the analysts to consider all tested lithologies and to weight their contributions appropriately in both the stockpile and the underground evaluations. Finally, the current underground model, in a manner consistent with the current hydrogeologic modeling, assumes no backfilling. In actuality, the leachability of the backfill also needs to be considered. It has been omitted at this stage because KMC anticipate using cemented

[3] Values in Table 4.2 represent incremental concentrations, beyond those in the background groundwater, due to leaching of wall rock

backfill, which may significantly alter the leachability of the materials. To accurately assess the effects of backfill, the Eagle project will need to develop a kinetic test basis for cemented backfill (see Section 5 below).

5.0 CONCLUSIONS AND RECOMMENDATIONS

The Phase II program significantly expanded the database of geochemical and mineralogical testing from that available in June 2004. Static testing has been completed on 108 samples (compared to 40 for Phase I), including more than 10 tests on each major lithology in the deposit. The sulfur range of the development rock samples was very greatly extended, based on new drilling available in the past year. The mineralogical database doubled from 15 to 30 samples examined. The kinetic testing increased from 5 samples (with a reported 7 weeks of testing in June 2004) to 15 samples with 25 to 50 weeks of leaching reported. The project has begun to coordinate the geochemical test work with the mine planning and hydrogeology programs, to a level that allows an initial evaluation of potential water quality from development rock and the natural leaching of the underground mine surfaces when the water starts to re-saturate the workings at the end of mining. Quality assurance and quality control reviews show that the additional data meets all project data-quality objectives.

Major finding of the combined Phase I and Phase II geochemical evaluations include:

- Up to 80% of the development rock that is produced should be expected to be potentially acid generating. There may be variable lag periods to the onset of net acidification, but sulfate and nickel leaching can begin quite early in the leaching process.
- High-sulfur intrusive and country rocks can react quickly – in 10 to 20 weeks of column leaching.
- When the leach rates of the high-sulfur country rock and intrusives are considered, effluent chemistry for the development rock stockpile may contain elevated levels of sulfate (approximately 2,000 mg/L), TDS (approximately 3,000 mg/L), and some metals and metalloids that are not solubility controlled at circum-neutral pH (e.g., Co, Ni, Se and Zn expected to be present at low part-per-million range). The solubility of aqueous sulfate is enhanced in the effluents by substantial concentrations of dissolved Mg.
- Incremental leaching from the wall rocks of the mine is expected, based on current test data, to be limited, primarily because much of the intrusive rock has a substantial lag period before significant leaching occurs. The principal modeled constituent of concern would be Ni, which the initial calculations show could be present in these waters too at part-per-million level.
- There are reactive carbonate minerals, primarily end-member calcite, present in all rock types. The ultramafic rocks also provide available neutralization potential due to reactivity of olivine and lizardite, leading to relatively high concentrations of dissolved Mg.
- There is no evidence in the 30 samples examined to date for fibrous serpentine minerals that would be classified as "asbestos"

Based on the status of the Phase II program, Geochimica recommends the following geochemical activities if Rio Tinto and KMC determine to proceed to a Feasibility Study:

- Kinetic testing of the Phase I and II samples should continue, as is currently planned, at least until samples have conclusively shown that they are past any reactive period. KMC may wish to consider continuing some samples even longer, so that there is a minimal extrapolation in time for the expected seven-year period of stockpiling for development rock. Phase III kinetic testing should focus on tests of cemented backfill. The selection of samples and design of such tests should be coordinated between KMC mine planning and geology departments and Geochimica.
- If KMC elects to collect a bulk sample for metallurgical analysis, KMC may wish to consider establishing one or more geochemical test pad at site so that field-scale testing under ambient weather conditions can be initiated.
- The water-quality models should be updated regularly (probably semi-annually) to reflect additional kinetic-test results and better understanding of the designs for both the development-rock stockpile and the underground mine. The results of such modeling should be closely coordinated with KMC's water-treatment engineering team.
- KMC should send a suite of samples to an EPA-qualified "asbestos" testing laboratory for a definitive regulatory analysis of its serpentine minerals.

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APPENDICES

A. Static Testing
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   A.2 Graphs
B. Kinetic Testing
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   B.2 Phase II (Data and Graphs)
C. QA/QC Reports
D. LRC Mineralogy Reports (I-III)
E. Total Metals Analyses
   E.1 Development Rock
   E.2 Ores

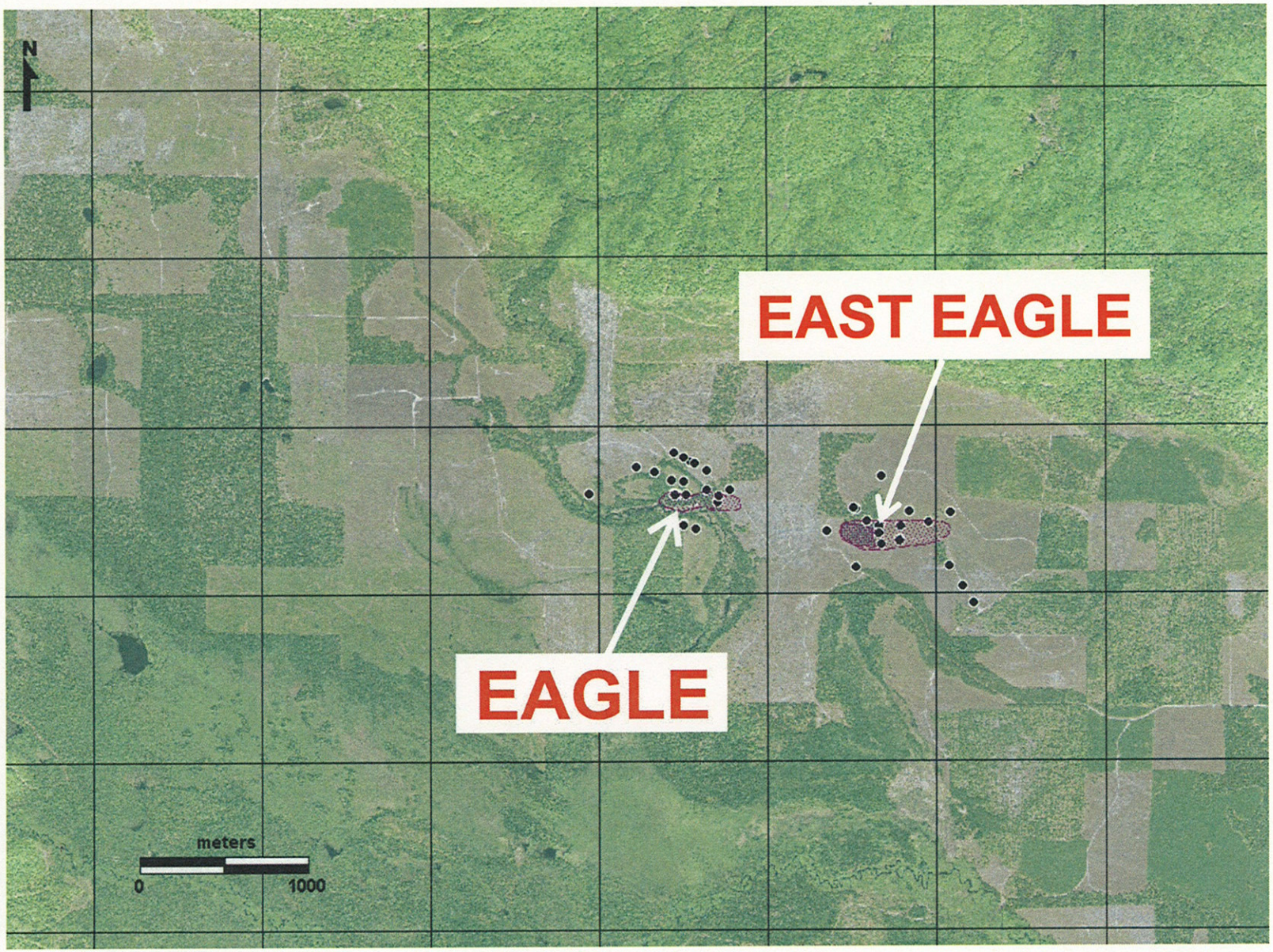


Figure 1-1
Site Map

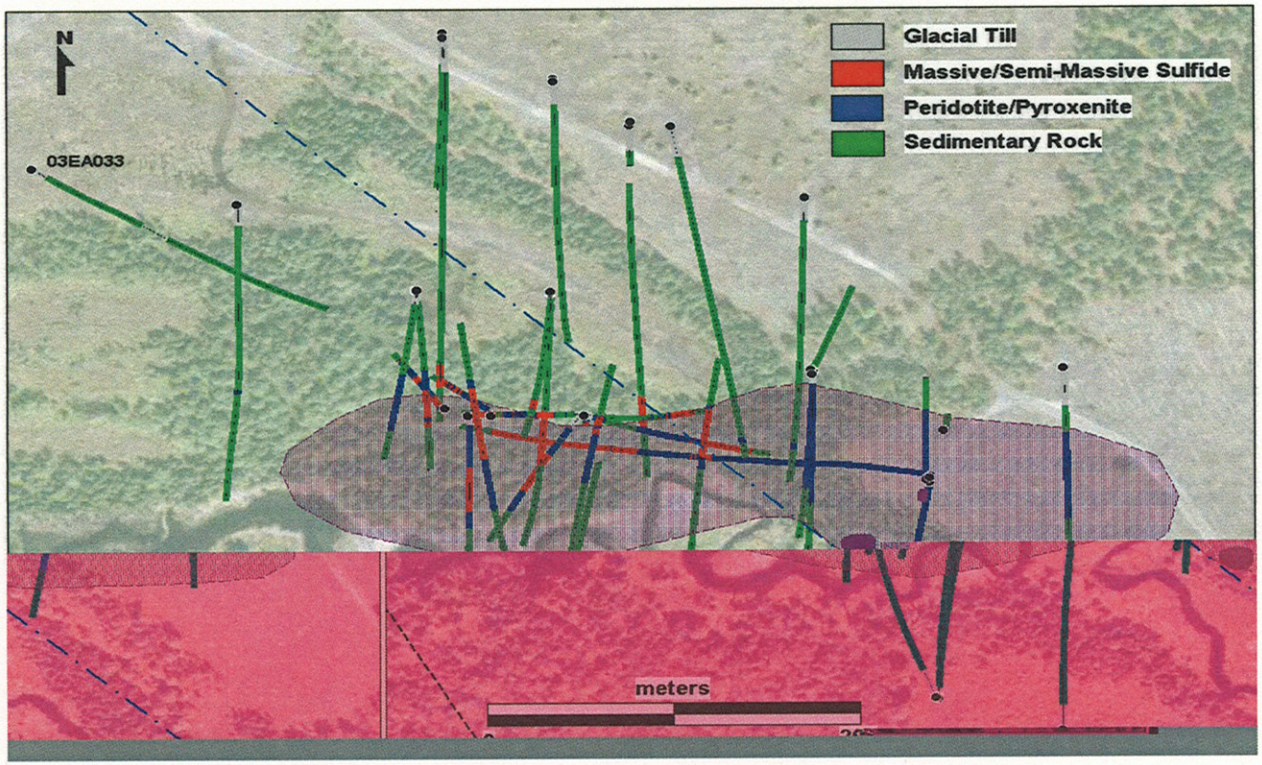

N
03EA033
Glacial Till
Massive/Semi-Massive Sulfide
Peridotite/Pyroxenite
Sedimentary Rock
meters

Figure 2-1

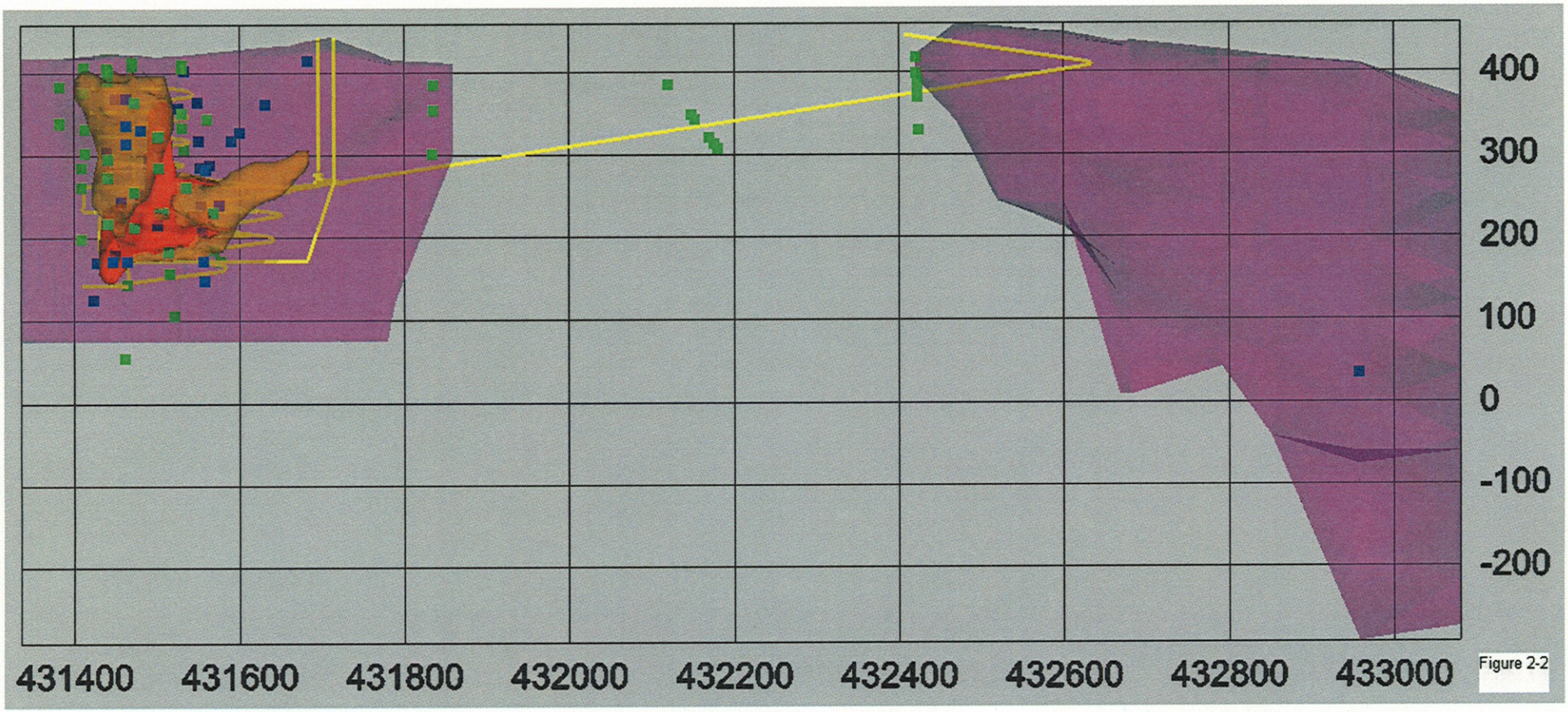

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Figure 2-2

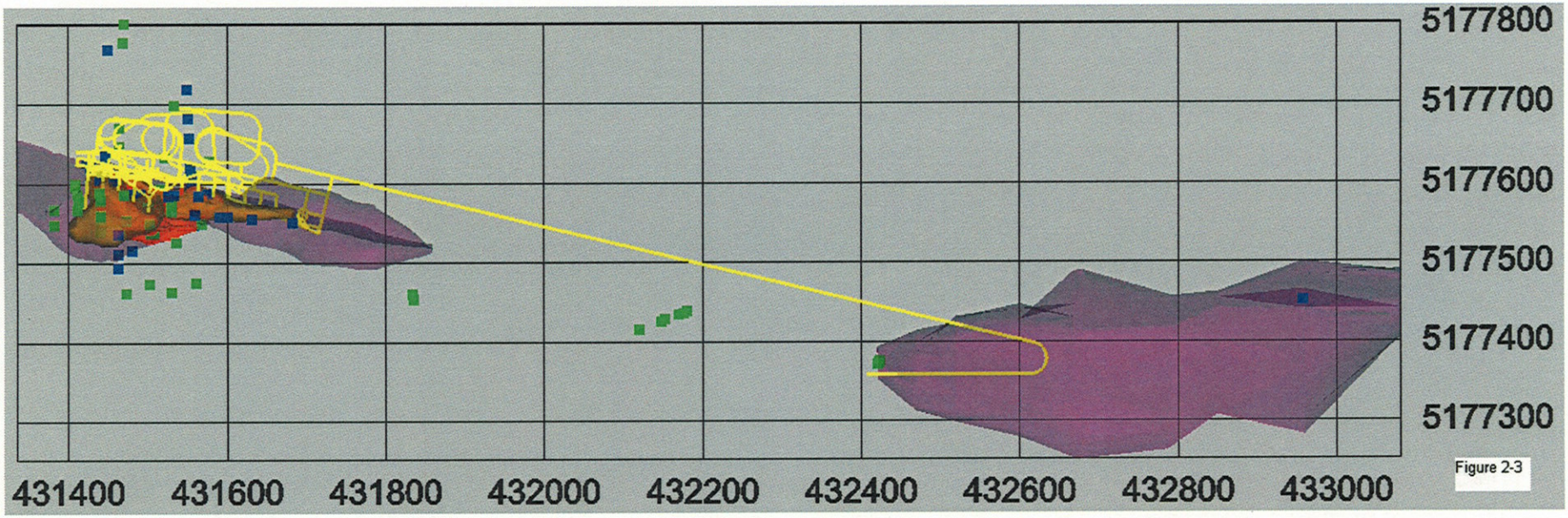

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Figure 2-3

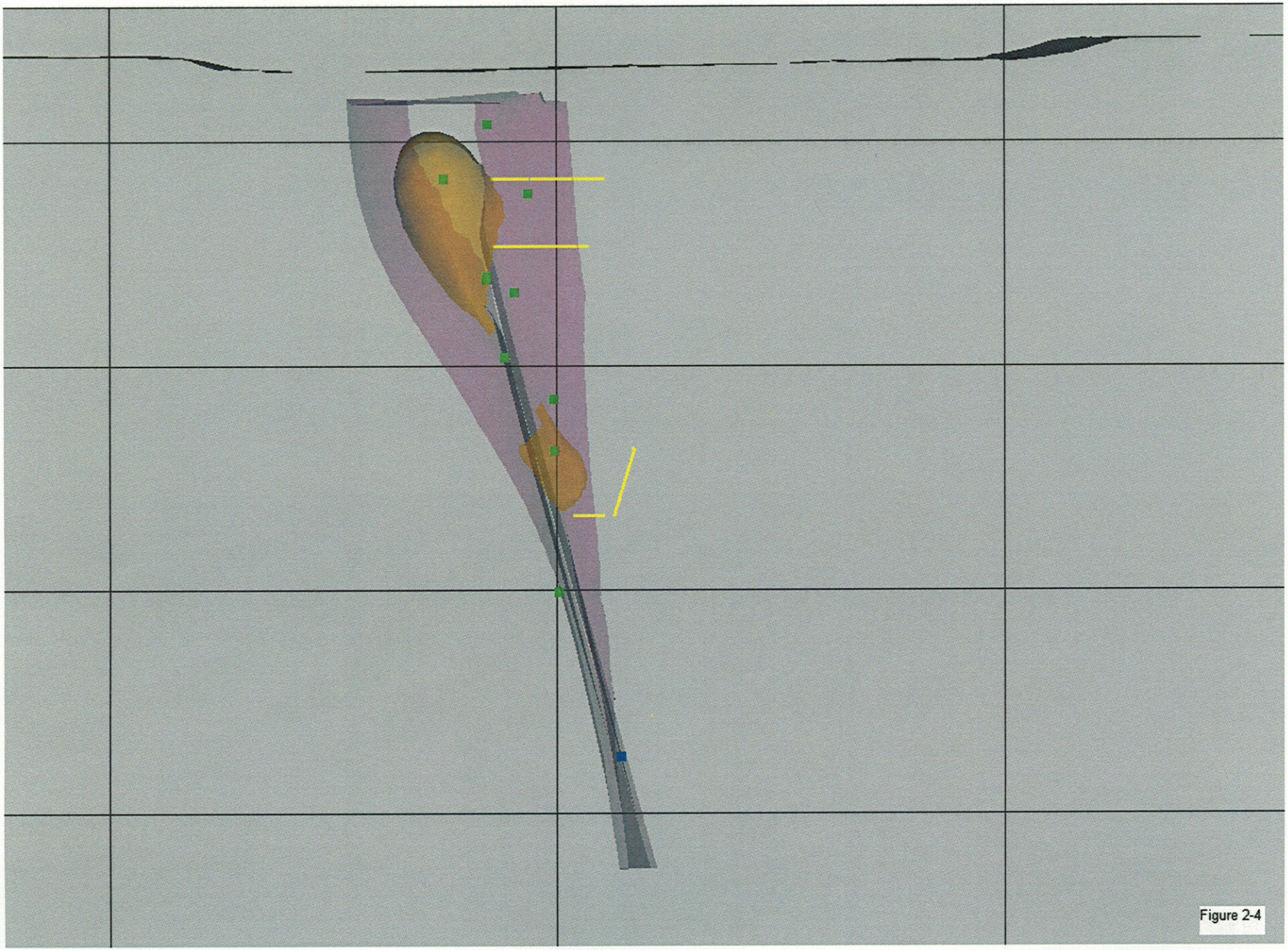


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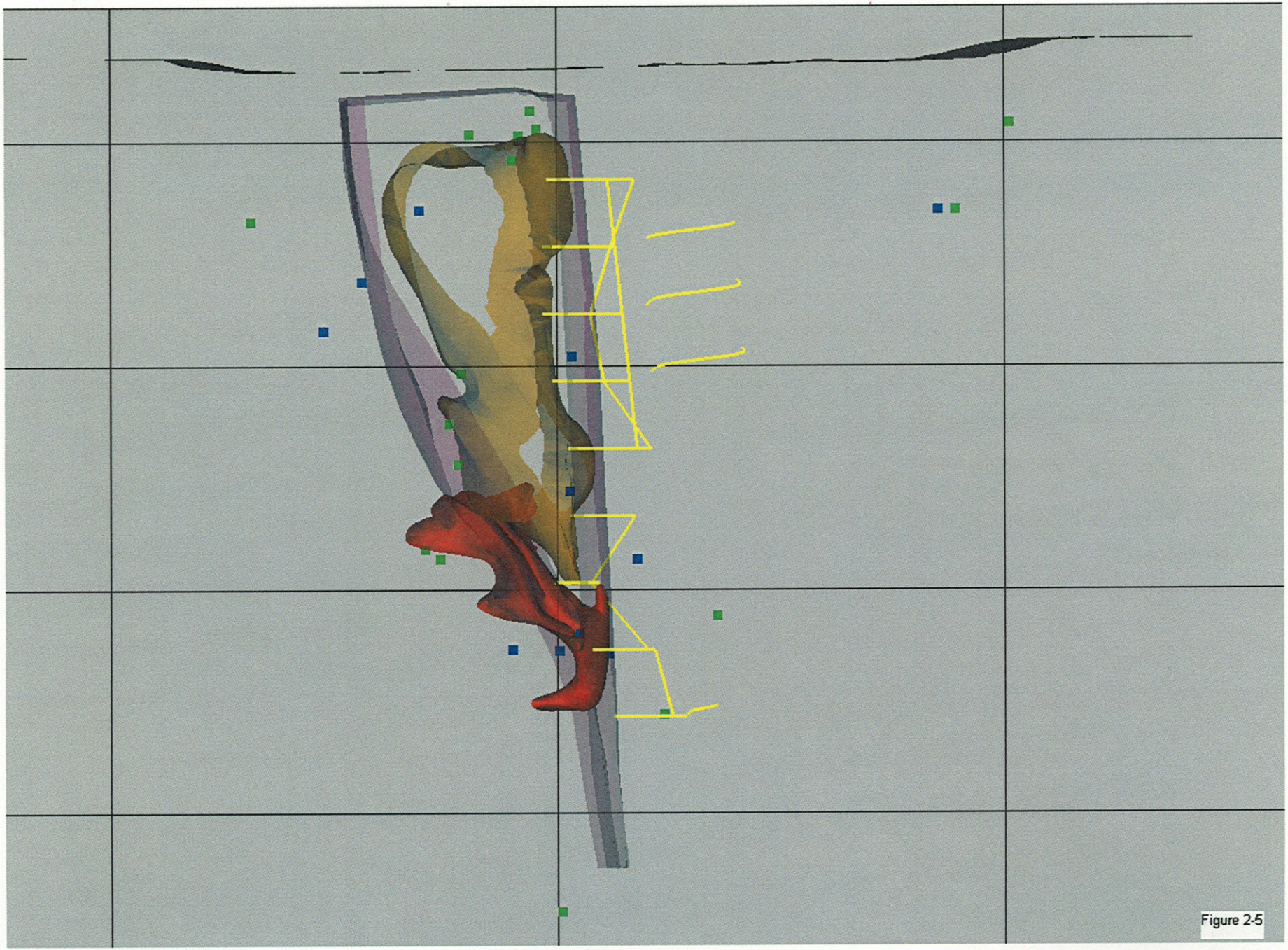


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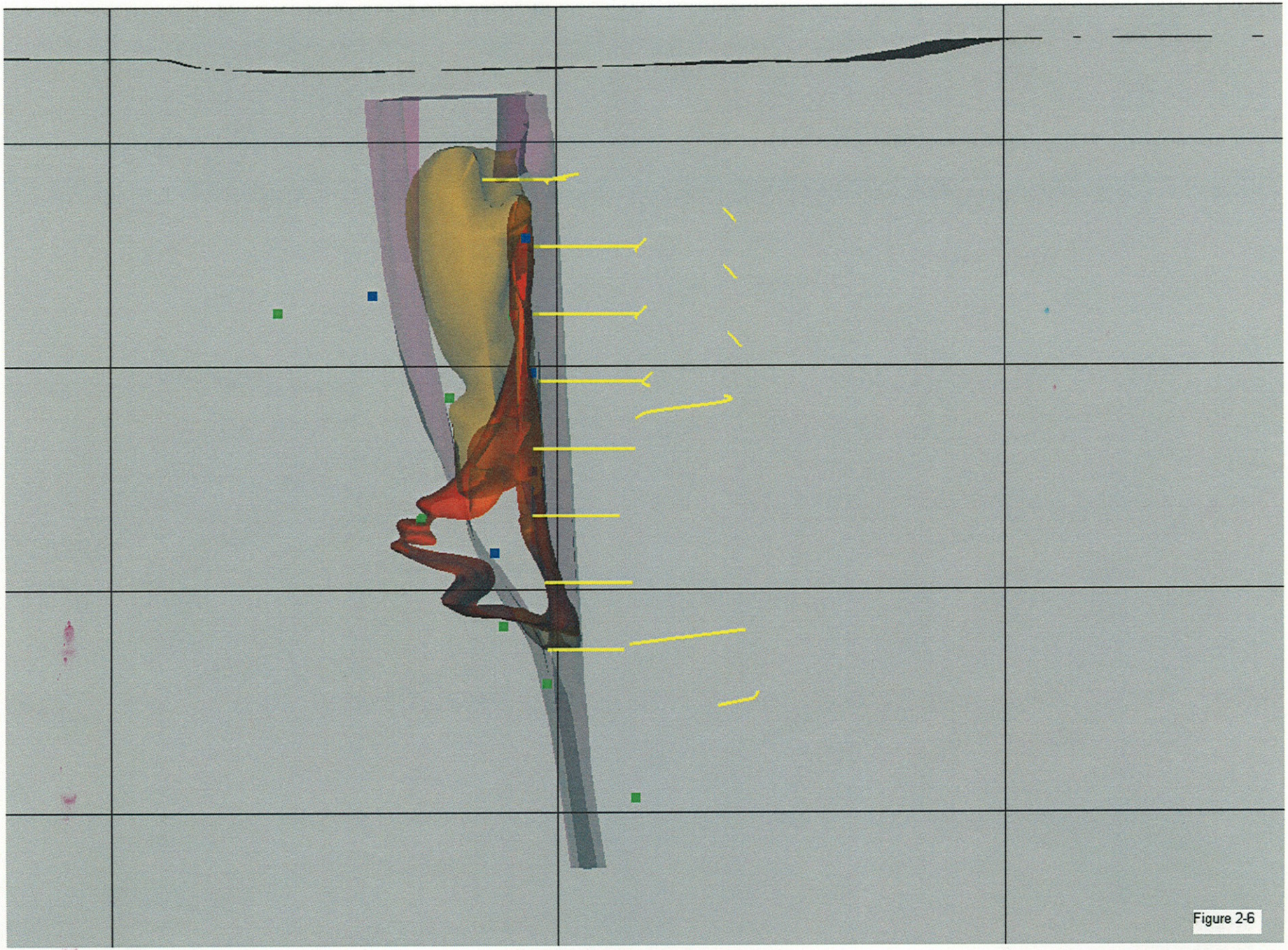


Figure 2-6

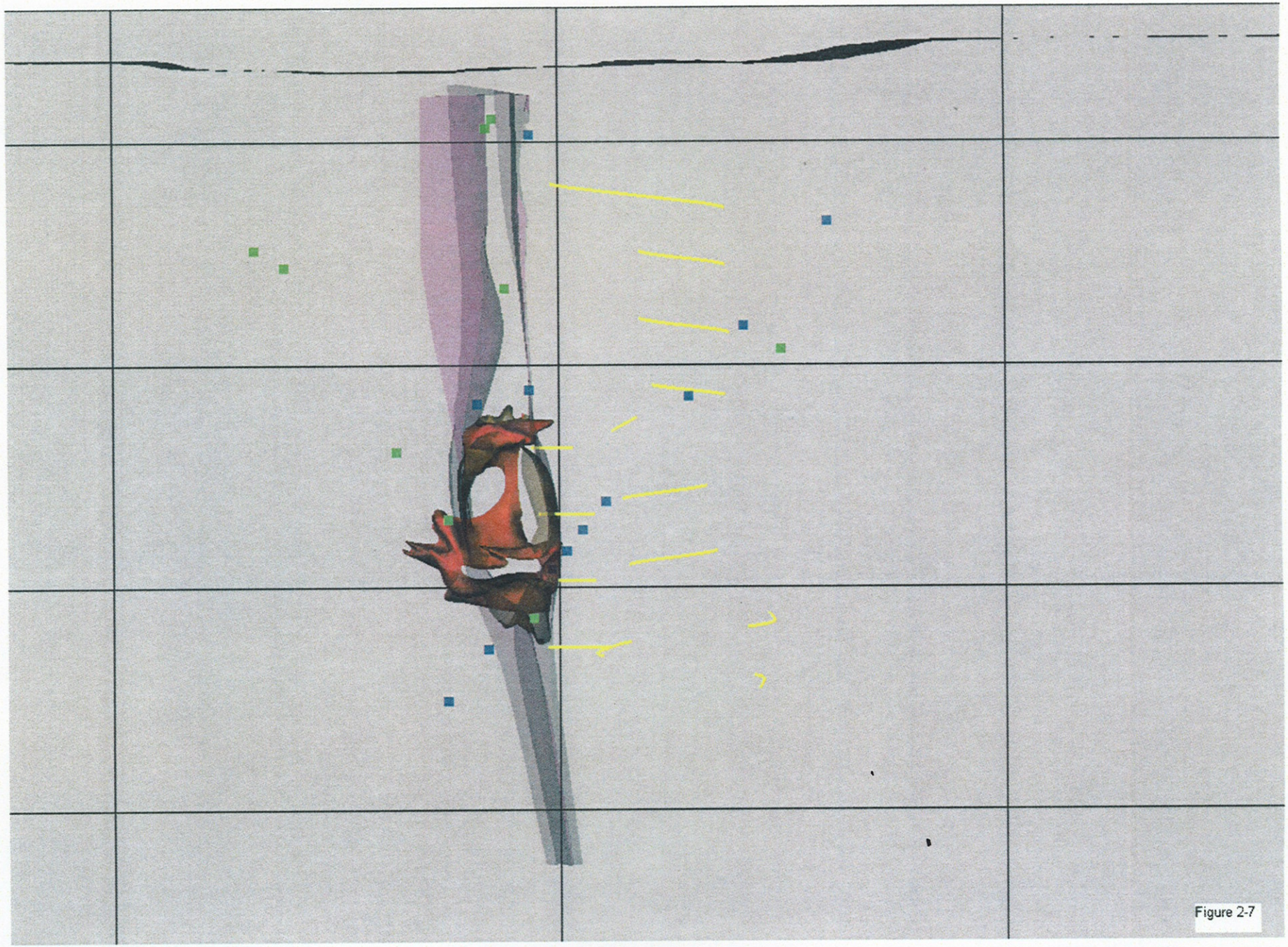


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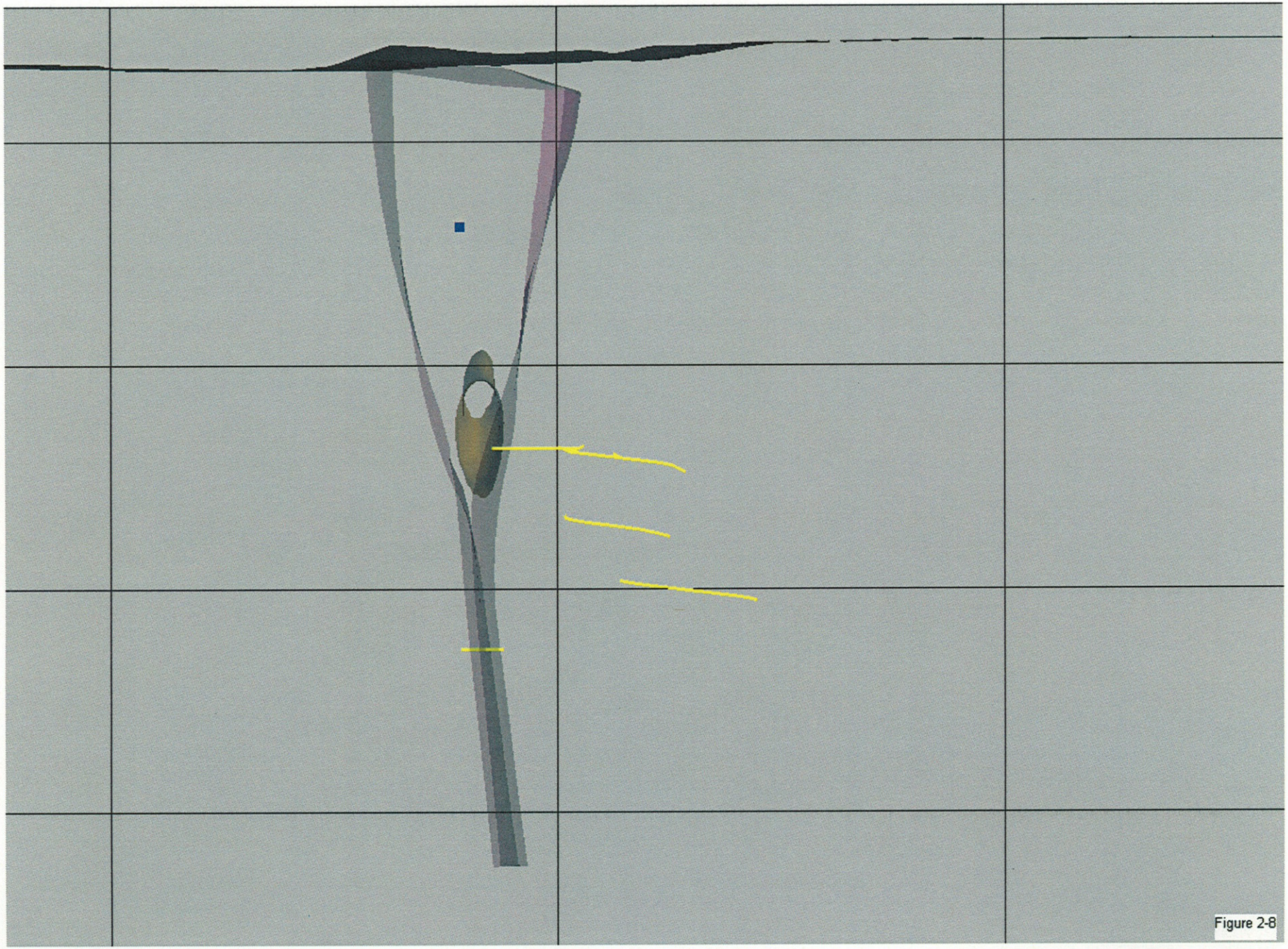


Figure 2-8

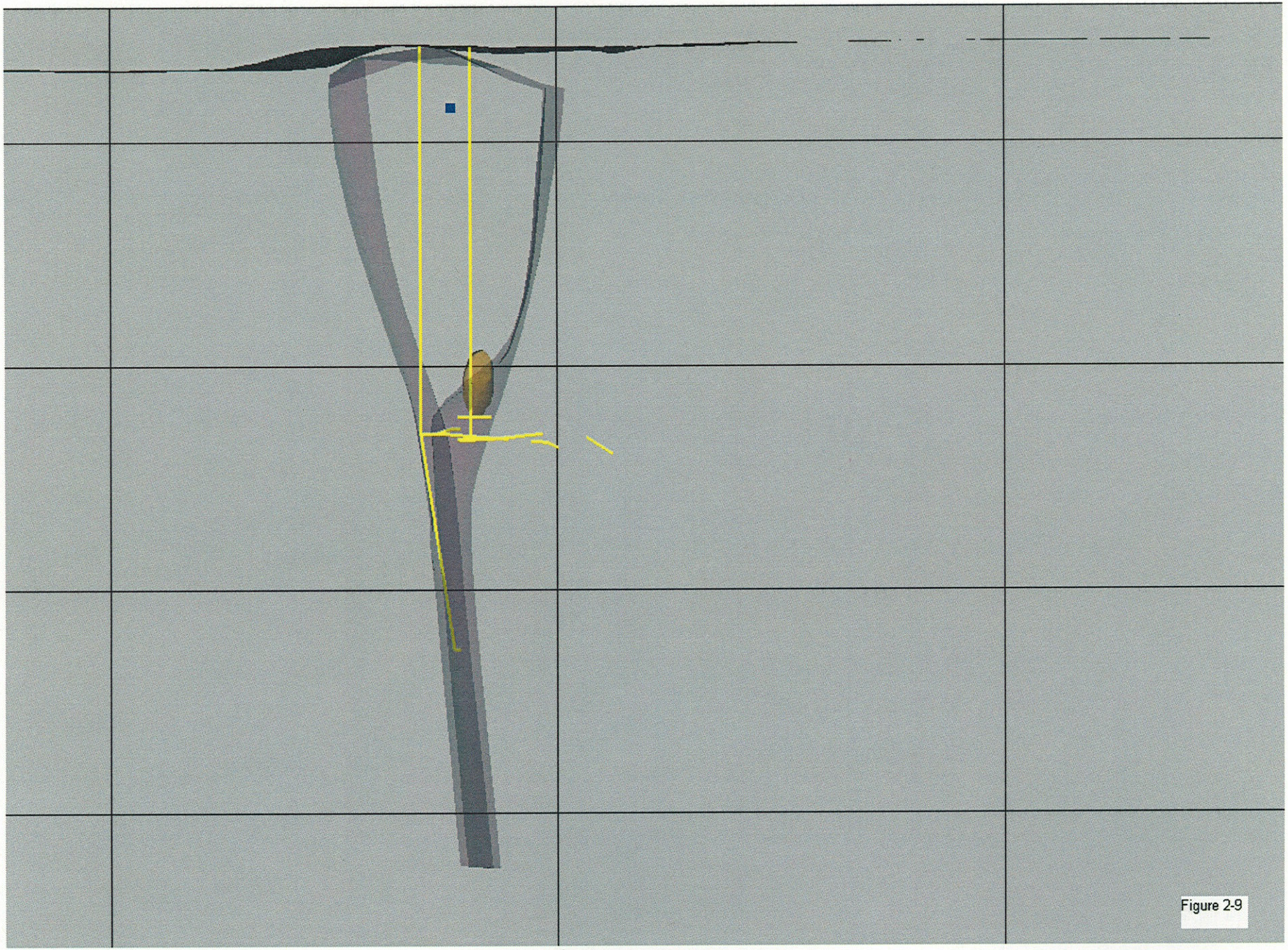


Figure 2-9

APPENDIX A

STATIC TESTING DATA

Eagle Project Acid Rock Drainage Study
Phases 0, I, and II

TABLE A-2
Acid-Base Accounting
Phase 0 Eagle Project

SampleID	CerTificateAB	Drillhole	From	To	Lith	C-GAS05	CO2-GAS05	Fizz Rating	MPA	NNP	NP	Paste pH	NP:MPA	S-IR08	S-GRA06	S-GRA06	S-CAL06
			m	m		%	%	1 to 4		T CaCO3 /1000T ore				%	%	%	%
VR71062A	TB03037357	03EA030	329.75	331.25	MSU	0.15	0.6	1	1165	-1170	-2	5.3	0	37.3	0.32	0.28	37
VR71120A	TB03037357	03EA032	299.64	301.14	MSU	0.06	0.2	1	1130	-1130	-4	3.7	0	36.1	0.46	0.16	35.6
VR71388A	TB03037358	03EA034	238.6	240.1	MSU	0.11	0.4	1	1170	-1170	3	6.4	0	37.5	0.07	-0.01	37.4
VR71134A	TB03037357	03EA032	315.31	316.81	SMSU	0.12	0.5	1	475	-441	34	8.3	0.07	15.2	0.03	0.03	15.15
VR71325A	TB03037358	03EA034	173	174.5	SMSU	0.07	0.3	1	402	-361	41	8.9	0.1	12.85	0.02	0.02	12.85
VR71418A	TB03037358	03EA034	271.7	273.2	SMSU	0.1	0.4	1	478	-445	33	8.6	0.07	15.3	0.02	0.03	15.3
VR71348A	TB03037358	03EA034	193.9	195.4	PER-M	0.09	0.3	1	114.5	-77	38	9	0.33	3.67	0.02	0.02	3.65
VR71375A	TB03037358	03EA034	222.2	223.4	PER-M	0.12	0.4	1	91.9	-54	38	9.1	0.41	2.94	0.01	0.01	2.93
VR71192A	TB03037358	03EA034	15	16.5	PER	0.09	0.3	1	5.6	70	76	8.8	13.51	0.18	0.01	0.01	0.17
VR71213A	TB03037358	03EA034	39	40.5	PER	0.09	0.3	1	6.3	36	42	8.8	6.72	0.2	0.01	0.01	0.19
VR71100A	TB03037357	03EA032	276.82	278.32	SLST	0.06	0.2	2	33.1	-19	14	8.6	0.42	1.06	0.01	0.01	1.05
VR71499A	TB03037358	03EA034	366.6	368.1	SLST	0.07	0.3	1	38.4	-27	11	8.8	0.29	1.23	0.01	0.03	1.22

Notes:

MPA	**Maximum Potential Acidity**	Tonnes CaCO3 equivalent per 1000 tonnes of material: Using % Total S (by Leco S analyser) x 31.25
NP	**Neutralizing potential**	Tonnes CaCO3 per 1000 tonnes material
NNP	**Net Neutralizing Potential**	Tonnes CaCO3 per 1000 tonnes material
S-IR08	**Total Sulphur**: Leco Analyser to 1350C, SO2 measure by IR, (+/- 5%)	
S-GRA06	**Total Sulphate** (Carbonate Leach), bioled Na2CO3 30 mins, filtered, Fe3+ reduced, Filtrate S-ate ppted, ignited, weighed (+/- 5%)	
S-GRA06a	HCl **Leachable Sulphate**: ss heated, 30mins, insolubles filtered, Fe3+ reduced, Filtrate S-ate ppted, ignited, weighed (+/- 5%)	
S-CAL06	**Sulphide Sulphur**: Total Sulphur (S-IR08) - HCl leachable Sulphate (S-GRA06a)	
Fizz:	.5g ss: **Scale 1 to 4**, (1:3 HCl) 1 = None, .1N acid, 2 = slight, .1N, 3 = mod, .5N, 4 = strong, .5N	
C-GAS05	**Inorganic Carbon (as C)**: ss leached HCl, CO2 released in O, vol of mixture, CO2 dissolved out, O vol measured: diff = inorg C (+/- 5%)	
CO2-GAS05	**Inorganic Carbon (as CO2)**: ss leached HCl, CO2 released in O, vol of mixture, CO2 dissolved out, O vol measured: diff = inorg C (+/- 5%)	

TABLE A-1
Whole Rock Analyses
Phase 0 Eagle Project

	Al	As	Ba	Bi	Cd	Co	Cr	Cu	Fe	Ga	Ge	Hg	Ni	Pb	Sb	Sn	Te	Th	Tl	U	W	Zn
	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Crust		1.8	425	0.17	0.2	25	100	55	3.5	15	1.5	80	75	0.004	0.2	0.07	0.001	10	0.45	2.7	1.5	70
Arenites		0.5	250	0.3		1	70	10	0.97			400	5	10		0.4		2	2	0.4		15
Argillites		20	450	1	0.2	18	450	140	0.46	20	1.5	800	44	22	1	250	0.01	12	2	4	3	200
Gabbro		1.7	220	0.4	0.15	46	225	90	0.365	12	1.5	50	135	6	0.2	0.1	0.001	3	0.3	0.6	0.9	100
Ultramafic Rx		1.1	2	1	0.1	140	2700	40	0.943	1	1	8	2000	1.2	0.1	0.06	0.001	0.004	0.02	0.02	0.3	56
Eagle Peridotite																						
Ultramafic Rx		1.1	2	1	0.1	140	2700	40	0.943	1	1	8	2000	1.2	0.1	0.06	0.001	0.004	0.02	0.02	0.3	56
Mean	3.33	0.80	84.54	0.13	0.25	113.07	1271.06	709.53	9.91	11.73	0.26	21.22	1388.16	4.57	0.20	0.95	0.09	1.36	0.20	0.45	0.10	104.49
High Value	8.26	16.60	307.00	0.66	0.96	153.80	1870.00	2700.00	11.60	22.75	0.35	300.00	2230.00	42.00	1.35	2.00	0.65	8.60	0.70	4.20	0.90	156.00
Low Value	0.91	-0.20	9.50	0.03	0.10	36.40	193.00	108.00	4.83	7.40	0.15	-10.00	173.00	1.50	-0.05	0.60	-0.05	0.80	0.04	0.20	-0.10	68.00
Std. Dev.	1.09	2.46	41.52	0.10	0.12	20.14	345.44	451.30	1.04	3.11	0.06	51.31	392.74	4.89	0.27	0.35	0.12	0.90	0.16	0.44	0.17	15.24
Count	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82
Eagle Pyroxenite																						
Mean	4.31	0.14	77.14	0.09	0.21	91.06	666.29	487.50	9.71	18.98	0.27	67.14	917.00	2.00	-0.01	1.00	0.02	1.51	0.31	0.44	-0.04	118.29
High Value	5.20	1.00	110.50	0.16	0.30	103.00	1370.00	1155.00	10.95	23.65	0.35	190.00	1695.00	3.50	0.15	1.40	0.15	2.00	0.56	0.60	0.10	154.00
Low Value	2.82	-0.20	48.00	-0.01	0.12	71.70	335.00	130.80	8.68	10.00	0.20	10.00	468.00	0.50	-0.05	0.60	-0.05	1.00	0.14	0.30	-0.10	78.00
Std. Dev.	0.90	0.49	19.42	0.06	0.06	11.42	418.76	433.50	0.84	5.59	0.05	64.48	460.66	1.26	0.08	0.33	0.10	0.36	0.15	0.10	0.10	27.34
Count	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Eagle Sediments																						
Argillites		20	450	1	0.2	18	450	140	0.46	20	1.5	800	44	22	1	250	0.01	12	2	4	3	200
Mean	8.61	16.11	400.74	0.33	0.62	27.17	123.31	359.38	5.74	21.81	0.24	185.33	226.42	20.79	1.28	2.00	0.03	9.79	1.11	4.84	0.95	163.24
High Value	10.70	47.00	675.20	1.50	3.70	70.70	312.00	2570.00	9.50	27.95	0.40	620.00	1240.00	91.50	3.85	3.20	0.65	13.40	2.64	10.80	5.90	516.00
Low Value	5.52	1.40	131.50	0.08	-0.02	15.30	81.00	28.20	3.10	8.60	0.15	20.00	53.00	4.50	0.20	0.80	-0.05	3.80	0.18	1.40	-0.10	42.00
Std. Dev.	1.19	10.04	109.92	0.28	0.88	11.29	37.04	603.51	1.33	4.38	0.05	152.70	257.38	16.43	0.91	0.50	0.13	1.99	0.61	2.31	0.85	120.83
Count	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
East Eagle Peridotite																						
Mean	3.29	1.50	102.26	0.07	0.36	112.70	1499.00	465.92	9.37	10.95	0.23	79.52	1432.01	8.11	0.09	0.76	0.05	1.50	0.21	0.56	-0.02	119.52
High Value	9.09	44.60	614.60	0.29	8.56	149.20	2980.00	1795.00	11.45	22.50	0.35	1400.00	2200.00	201.00	0.75	1.40	0.25	9.80	1.02	4.60	0.30	856.00
Low Value	0.92	-0.20	2.00	0.01	0.08	17.20	122.00	93.10	4.68	3.65	0.05	10.00	176.50	1.00	-0.05	0.40	-0.05	0.20	0.02	0.10	-0.10	62.00
Std. Dev.	1.34	6.95	96.52	0.07	1.30	23.79	539.77	370.96	1.16	2.99	0.08	218.44	366.28	30.67	0.21	0.19	0.09	1.49	0.22	0.77	0.11	117.21
Count	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00
East Eagle Pyroxenite																						
Mean	4.59	6.67	104.50	0.11	0.16	68.07	496.67	132.87	8.92	17.90	0.23	206.67	549.00	7.33	0.33	1.13	-0.05	1.80	1.07	0.57	-0.10	115.33
High Value	4.96	8.80	182.50	0.15	0.18	74.80	686.00	145.20	9.12	18.30	0.25	340.00	646.00	8.50	1.10	1.40	-0.05	2.00	1.38	0.70	-0.10	124.00
Low Value	4.00	4.80	18.50	0.05	0.14	64.10	386.00	124.50	8.72	17.15	0.20	110.00	494.00	5.00	-0.05	1.00	-0.05	1.40	0.82	0.40	-0.10	104.00
Std. Dev.	0.52	2.01	82.29	0.06	0.02	5.86	164.75	10.91	0.20	0.65	0.03	119.30	84.26	2.02	0.66	0.23	0.00	0.35	0.28	0.15	0.00	10.26
Count	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
East Eagle Sediments																						
Mean	8.29	18.06	262.80	0.43	2.03	33.88	193.79	266.15	6.24	21.47	0.24	360.53	401.87	30.76	1.06	1.89	0.03	9.07	1.27	5.57	0.71	352.26
High Value	9.98	58.20	519.70	1.35	12.60	85.70	964.00	1555.00	8.44	26.55	0.45	1070.00	3000.00	209.00	3.80	4.40	0.20	10.80	2.38	10.10	4.50	1035.00
Low Value	4.70	0.80	84.50	0.12	0.02	19.40	93.00	73.60	4.94	13.55	0.15	30.00	91.50	4.50	-0.05	0.80	-0.05	4.40	0.24	1.70	0.10	52.00
Std. Dev.	1.20	14.76	132.22	0.33	2.89	21.20	243.10	371.09	0.93	2.83	0.06	259.67	679.76	46.14	1.22	0.72	0.08	1.88	0.65	2.59	0.96	313.02
Count	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00

TABLE A-3
Whole Rock Metals Scan
Phase 1 Eagle Project

Sample:		VR91618A	VR71043A	VR71087A	VR91619A	VR91620A	VR91621A	VR91622A	VR71109A	VR71161A	VR91623A	VR71275A	VR71314A	VR71373A	VR71450A	VR91624A	VR71821A	VR71938A	VR91625A
Element																			
Ag	ppm	0.13	0.06	5.32	0.13	0.17	0.11	0.13	0.10	0.11	0.09	0.51	0.21	1.30	12.35	0.09	2.51	4.36	0.31
Al	%	2.27	1.24	2.35	2.53	1.68	1.86	2.48	2.76	2.39	1.83	1.91	1.53	1.61	0.24	1.46	1.50	2.09	2.26
As	ppm	19.4	13.0	19.4	14.9	13.6	13.8	15.3	12.5	13.8	16.4	0.7	0.8	1.4	6.4	0.2	1.5	1.5	30.8
B	ppm	10	<10	10	10	<10	10	<10	10	10	<10	30	70	50	<10	10	50	10	<10
Ba	ppm	30	20	50	40	30	30	50	40	50	30	20	40	30	10	30	30	30	40
Be	ppm	0.33	0.19	0.70	0.38	0.25	0.38	0.38	0.88	0.51	0.27	0.16	0.23	0.16	0.06	0.16	0.13	0.33	0.37
Bi	ppm	0.34	0.12	0.82	0.29	0.12	0.14	0.26	0.26	0.41	0.17	0.23	0.09	0.79	4.24	0.03	1.02	1.58	0.47
Ca	%	0.11	3.43	0.12	0.14	0.14	2.21	0.36	0.63	0.17	2.69	0.56	0.63	0.59	0.03	0.74	0.60	1.52	0.40
Cd	ppm	0.40	0.10	1.43	0.60	0.11	0.13	0.26	0.25	0.90	0.13	0.26	0.15	0.54	4.19	0.09	1.29	1.70	0.92
Ce	ppm	57.2	36.4	59.8	61.6	35.6	41.2	60.8	68.5	61.4	44.9	8.87	12.70	10.20	1.74	10.40	8.41	20.3	60.4
Co	ppm	22.9	10.6	23.4	24.2	13.8	14.4	23.9	20.2	24.8	14.8	88.3	86.6	187.5	1340	101.5	217	113.0	25.9
Cr	ppm	72	150	104	96	166	142	96	124	108	166	976	242	305	61	677	971	298	80
Cs	ppm	0.74	0.38	2.46	0.51	0.44	0.42	0.55	1.81	0.65	0.46	1.50	1.17	2.02	0.46	0.49	1.40	3.75	0.57
Cu	ppm	59.2	23.4	4340	78.4	78.5	36.7	69.2	70.1	80.1	37.1	1135	479	3720	>10000	214	5250	5760	112.0
Cu	%														4.76				
Fe	%	4.97	2.54	5.66	5.42	3.52	3.74	5.88	5.22	5.51	3.64	5.42	7.04	9.24	>15	7.51	10.55	7.91	5.79
Ga	ppm	7.10	3.80	6.88	7.23	5.32	5.46	7.29	8.58	7.45	5.71	6.93	5.89	5.87	1.24	5.16	5.52	10.60	6.41
Ge	ppm	0.12	0.08	0.13	0.12	0.07	0.09	0.13	0.12	0.11	0.09	0.20	0.18	0.33	2.02	0.21	0.36	0.27	0.12
Hf	ppm	0.68	0.39	1.24	0.77	0.61	0.57	0.67	1.07	1.02	0.39	0.14	0.16	0.14	0.06	0.11	0.15	0.48	0.53
Hg	ppm	0.13	0.04	0.15	0.15	0.08	0.07	0.16	0.20	0.12	0.10	0.03	0.01	0.02	0.12	0.02	0.04	0.12	0.22
In	ppm	0.020	0.009	0.043	0.023	0.009	0.010	0.015	0.019	0.031	0.013	0.03	0.020	0.051	0.406	0.015	0.087	0.100	0.036
K	%	0.18	0.11	0.39	0.23	0.15	0.20	0.30	0.36	0.29	0.18	0.10	0.20	0.16	0.08	0.15	0.12	0.21	0.21
La	ppm	29.7	18.4	32.5	31.4	16.8	20.4	31.7	34.8	31.7	22.5	4.1	5.9	4.7	0.8	4.8	3.9	8.8	31.4
Li	ppm	46.5	18.2	51.6	50.3	33.6	34.2	45.5	82.4	38.5	28.1	30.7	13.9	12.2	5.7	5.00	18.8	16.8	42.0
Mg	%	1.37	0.63	1.36	1.46	0.91	2.15	1.45	1.84	1.22	0.96	5.24	7.68	7.91	0.09	10.10	6.32	3.35	1.48
Mn	ppm	233	541	285	269	190	782	279	451	219	510	423	618	507	465	860	689	486	277
Mo	ppm	2.40	2.23	5.48	3.77	2.60	2.80	5.95	4.12	8.03	2.78	0.68	1.02	1.14	3.59	0.77	1.10	1.33	11.45
Na	%	<0.01	0.01	0.01	<0.01	0.01	0.02	0.01	0.02	<0.01	0.02	0.09	0.14	0.12	<0.01	0.18	0.13	0.12	0.01
Nb	ppm	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.06	0.36	0.07	0.06	0.05	<0.05
Ni	ppm	89.4	39.4	168.0	100.0	57.4	57.3	106.5	94.2	109.0	62.0	1590	1080	5870	>10000	1325	6230	3390	147.5
P	ppm	470	370	490	570	450	430	560	480	500	450	300	450	380	10	350	300	930	530
Pb	ppm	18.6	10.6	43.8	17.8	8.1	10.6	17.9	5.5	25.4	15.1	4.1	3.1	5.4	69.6	2.3	12.5	18.2	23.5
Rb	ppm	9.2	6.1	31.5	11.5	8.3	9.5	15.4	20.3	15.6	9.1	7.5	10.2	10.5	4.9	6.5	6.9	16.2	10.2
Re	ppm	0.002	<0.001	0.004	0.003	<0.001	<0.001	0.002	0.003	0.007	<0.001	0.005	0.001	0.012	0.064	0.001	0.015	0.004	0.007
S	%	1.00	0.16	1.39	1.09	0.30	0.51	1.47	0.67	0.83	0.36	1.02	0.30	2.26	6.79	0.17	3.58	1.58	1.36
Sb	ppm	1.52	0.57	0.87	1.68	0.38	0.60	2.52	0.75	0.56	0.68	0.06	<0.05	0.14	0.38	<0.05	0.10	0.08	1.54
Sc	ppm	3.1	2.5	5.1	3.4	3.1	3.8	3.9	6.2	4.2	3.8	12.3	4.7	5.5	1.1	6.7	9.0	7.5	3.4
Se	ppm	0.6	0.3	0.9	0.5	0.3	0.5	0.7	0.6	0.9	0.4	2.3	0.9	5.9	84.2	0.5	9.7	6.2	0.8
Sn	ppm	0.6	0.2	0.9	0.2	0.3	0.2	0.3	0.7	0.3	0.2	0.3	0.4	0.8	4.5	0.3	1.0	1.4	0.2
Sr	ppm	14.6	217	12.0	17.5	11.4	18.7	21.1	19.8	14.9	182.0	47.1	30.9	32.8	2.4	50.3	48.6	66.9	25.2
Ta	ppm	<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	<0.01	<0.01
Te	ppm	0.03	0.02	0.05	0.03	0.01	0.01	0.02	0.02	0.05	0.01	0.17	0.07	0.54	6.78	0.03	1.02	1.66	0.07
Th	ppm	6.7	4.4	7.5	6.8	4.7	4.6	6.5	7.3	6.8	4.9	0.8	1.2	1.0	0.3	0.8	0.7	1.2	5.5
Ti	%	0.005	<0.005	0.023	0.005	<0.005	<0.005	0.006	0.017	0.006	0.005	0.102	0.120	0.108	0.025	0.105	0.111	0.222	0.006
Tl	ppm	0.14	0.07	0.45	0.16	0.08	0.10	0.19	0.23	0.13	0.10	0.15	0.10	0.31	0.74	0.05	0.16	0.34	0.11
U	ppm	1.94	0.91	3.61	1.98	1.22	1.14	1.84	3.03	3.30	0.90	0.19	0.29	0.21	0.11	0.22	0.18	0.23	2.05
V	ppm	27	18	60	32	24	25	32	74	36	28	88	69	62	33	57	82	133	34
W	ppm	0.05	0.15	0.09	0.13	0.08	0.19	0.05	0.12	0.07	0.15	<0.05	0.11	0.05	0.10	0.06	0.07	0.06	0.10
Y	ppm	8.18	7.70	14.30	9.10	6.45	10.75	9.14	15.10	13.10	6.84	5.74	6.89	6.87	0.54	5.20	5.25	12.60	7.87
Zn	ppm	166	69	155	188	77	92	138	83	231	87	58	87	70	123	85	67	66	222
Zr	ppm	25.2	14.1	49.2	29.8	23.0	22.0	26.7	41.4	38.4	14.8	5.1	7.0	5.6	2.9	4.7	5.4	15.7	18.9

Analyses by ICP-MS/AES
Samples Collected March 23, 2004

TABLE A-3
Whole Rock Metals Scan
Phase 1 Eagle Project

Sample:		VR90125A	VR90181A	VR90257A	VR91626A	VR90425A	VR90457A	VR91267A	VR91306A	VR91482A	VR91542A	VR91579A	VR91627A	VR91623A DUP	VR90181A DUP	VR91627A DUP
Element																
Ag	ppm	4.56	27.7	0.13	0.23	0.09	5.13	0.47	4.06	0.13	6.54	0.13	0.25	0.10	28.4	0.20
Al	%	0.60	0.02	1.45	2.86	3.09	0.40	2.20	2.90	2.60	0.45	3.17	2.54	1.80	0.02	2.48
As	ppm	1.2	5.9	9.2	16.4	15.8	2.9	0.7	38.6	15.5	2.6	11.9	14.4	15.1	5.3	14.6
B	ppm	70	<10	10	20	10	<10	20	10	10	140	10	<10	<10	<10	<10
Ba	ppm	20	<10	20	50	40	10	40	10	40	10	50	40	30	<10	30
Be	ppm	0.10	<0.05	0.19	0.75	0.94	0.07	0.18	0.59	0.80	0.09	0.77	0.42	0.28	<0.05	0.35
Bi	ppm	1.33	5.73	0.07	0.33	0.20	1.41	0.19	1.13	0.33	1.63	0.33	0.57	0.17	6.12	0.54
Ca	%	0.24	<0.01	0.09	0.17	0.13	0.14	0.81	0.27	0.17	0.39	0.12	0.17	2.62	<0.01	0.17
Cd	ppm	1.46	9.93	0.05	0.80	0.06	2.01	0.23	1.21	0.47	2.16	0.06	0.88	0.10	10.3	0.89
Ce	ppm	5.86	0.48	35.8	57.6	63.8	2.92	12.90	42.0	55.9	4.38	60.9	59.8	45.5	0.42	59.0
Co	ppm	392	1110	13.6	22.4	23.8	651	76.8	93.7	23.5	585	23.7	25.3	13.7	1120	22.8
Cr	ppm	494	<1	295	92	132	379	557	189	104	202	110	85	152	<1	75
Cs	ppm	1.37	0.05	0.57	1.20	2.25	0.18	5.52	0.53	1.14	0.42	1.60	0.49	0.46	0.05	0.41
Cu	ppm	9810	>10000	230	315	48	>10000	1090	>10000	98	>10000	79.5	192.0	38.2	>10000	86.5
Cu	%		5.62				1.78		1.50		2.26				5.87	
Fe	%	14.85	>15	2.99	5.39	5.59	>15	5.98	8.00	5.39	>15	6.23	5.72	3.58	>15	5.76
Ga	ppm	2.43	1.03	6.50	7.62	9.85	1.62	8.22	10.80	7.46	1.71	8.73	6.73	5.36	0.96	6.58
Ge	ppm	0.58	1.99	0.09	0.13	0.13	1.09	0.18	0.23	0.13	1.00	0.12	0.12	0.09	2.06	0.14
Hf	ppm	0.13	0.02	0.62	0.80	1.15	0.11	0.17	0.77	1.00	0.11	0.96	0.86	0.40	0.05	0.81
Hg	ppm	0.04	0.25	0.02	0.23	0.04	0.06	0.01	0.17	0.14	0.08	0.08	0.19	0.10	0.27	0.17
In	ppm	0.100	0.653	0.014	0.020	0.024	0.171	0.030	0.116	0.029	0.198	0.027	0.049	0.012	0.659	0.042
K	%	0.11	0.01	0.12	0.41	0.48	0.07	0.29	0.13	0.30	0.05	0.37	0.27	0.17	<0.01	0.20
La	ppm	2.6	0.2	16.0	28.3	30.9	1.4	5.7	19.6	27.6	2.0	29.8	29.4	21.7	0.2	29.6
Li	ppm	7.9	1.1	33.5	70.2	105.0	2.4	20.9	59.0	58.1	7.3	69.1	45.8	27.5	2.0	45.1
Mg	%	6.29	0.04	1.06	1.94	2.05	8.84	3.61	2.66	1.68	10.00	2.03	1.62	0.96	0.03	1.58
Mn	ppm	532	286	236	310	303	811	378	491	266	795	320	269	497	255	270
Mo	ppm	1.30	3.19	3.96	3.65	2.06	1.94	1.09	2.58	8.36	1.63	4.46	7.23	2.64	3.29	7.17
Na	%	0.04	<0.01	0.05	<0.01	0.02	0.04	0.22	0.04	0.01	0.03	0.02	0.01	0.02	<0.01	0.01
Nb	ppm	0.09	0.39	<0.05	<0.05	0.07	0.18	<0.05	0.05	<0.05	0.15	<0.05	<0.05	<0.05	0.33	<0.05
Ni	ppm	>10000	>10000	197.5	269	104.0	>10000	1395	2970	113.0	>10000	115.5	219	62.5	>10000	122.0
P	ppm	190	<10	320	510	470	100	480	370	540	110	490	580	430	10	590
Pb	ppm	20.8	64.4	2.8	22.1	6.8	21.2	3.7	10.5	34.1	20.7	16.0	32.6	15.8	62.3	33.7
Rb	ppm	6.9	0.3	4.9	19.6	30.9	3.7	21.7	4.2	15.7	2.4	17.8	12.8	8.6	0.3	10.0
Re	ppm	0.054	0.058	0.001	0.005	0.002	0.040	0.005	0.003	0.004	0.031	0.003	0.003	<0.001	0.061	0.003
S	%	4.70	6.89	0.20	1.04	0.76	6.51	0.89	2.89	1.06	6.94	1.51	1.41	0.37	7.26	1.39
Sb	ppm	0.09	0.46	0.40	1.27	0.54	0.12	<0.05	3.16	1.52	3.90	0.98	1.71	0.63	0.38	1.75
Sc	ppm	4.3	1.0	5.6	4.9	7.8	4.7	6.6	9.1	5.7	4.8	7.6	3.8	3.8	1.1	3.3
Se	ppm	17.1	83.9	0.4	0.8	0.4	34.1	2.1	6.9	0.6	35.2	0.8	0.8	0.4	86.8	0.7
Sn	ppm	0.9	12.2	0.8	0.5	0.6	1.3	0.5	2.9	0.6	2.0	1.3	0.3	0.3	11.7	0.2
Sr	ppm	13.0	1.4	13.0	26.0	17.7	9.3	59.6	19.6	16.4	18.2	18.8	15.4	178.0	1.4	15.2
Ta	ppm	<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
Te	ppm	1.46	11.60	0.02	0.06	0.03	2.03	0.13	0.39	0.04	2.00	0.04	0.06	0.02	11.85	0.05
Th	ppm	0.6	<0.2	5.4	5.1	7.3	0.3	1.2	5.3	5.6	0.4	6.3	6.5	4.3	<0.2	6.0
Ti	%	0.074	0.009	0.007	0.017	0.038	0.078	0.174	0.009	0.009	0.050	0.007	0.005	0.005	0.007	0.005
Tl	ppm	0.24	0.70	0.05	0.28	0.31	0.18	0.34	0.36	0.20	0.19	0.19	0.16	0.09	0.57	0.13
U	ppm	0.13	<0.05	1.36	1.99	2.74	0.12	0.26	1.49	2.75	0.10	2.87	2.34	0.85	<0.05	2.06
V	ppm	44	62	46	50	80.00	46.00	124	77	54	38	69	32	26	55	30
W	ppm	0.05	0.21	0.12	0.08	0.10	0.07	0.05	0.13	0.07	0.05	0.07	0.07	0.06	0.13	<0.05
Y	ppm	2.85	0.11	7.98	9.72	12.50	1.53	7.06	7.48	11.35	2.69	12.45	9.97	6.44	0.12	9.30
Zn	ppm	59.0	186	30	128	61	108	39	158	140	108	49	210	78	184	209
Zr	ppm	4.0	0.9	21.5	29.6	46.2	4.9	6.3	26.8	40.3	4.7	41.6	34.6	14.7	1.8	33.1

Analyses by ICP-MS/AES
Samples Collected March 23, 2004

TABLE A-4
Whole Rock Analyes
Phase I Eagle Project

		VR91618A	VR71043A	VR71087A	VR91619A	VR91620A	VR91621A	VR91622A	VR71109A	VR71161A	VR91623A	VR71275A	VR71314A	VR71373A	VR71450A	VR91624A	VR71821A	VR71938A
SiO2	%	57.85	69.34	57.86	58.65	71.19	62.81	57.76	57.72	58.63	64.52	46.42	42.75	39.95	1.24	40.75	40.36	43.72
Al2O3	%	18.05	10.44	17.23	17.48	12.81	12.05	17.33	17.41	17.64	13.24	5.05	6.26	5.74	0.51	5.09	4.63	7.45
Fe2O3	%	8.83	4.11	9.21	8.88	5.50	6.02	9.29	8.26	9.18	5.95	14.50	16.73	19.17	73.62	16.09	21.42	18.85
CaO	%	0.19	4.85	0.24	0.21	0.25	3.14	0.52	0.92	0.28	3.84	6.17	4.78	4.60	0.08	4.56	3.38	7.46
MgO	%	3.38	1.22	3.19	3.28	1.73	3.89	3.11	3.71	2.77	1.93	19.50	22.05	21.11	0.28	25.80	20.85	12.89
Na2O	%	0.85	2.45	1.02	1.13	2.77	1.89	1.43	0.79	1.59	2.47	0.49	0.91	0.63	<0.01	0.76	0.45	0.73
K2O	%	4.06	1.24	3.97	3.72	1.50	2.00	3.56	4.43	3.45	1.73	0.19	0.34	0.26	0.11	0.24	0.18	0.39
Cr2O3	%	0.02	0.03	0.03	0.03	0.02	0.03	0.02	0.02	0.03	0.09	0.37	0.15	0.16	0.02	0.32	0.33	0.15
TiO2	%	0.90	0.48	0.89	0.91	0.55	0.61	0.92	0.88	0.89	0.62	1.11	1.30	1.16	0.11	0.94	0.96	2.33
MnO	%	0.03	0.06	0.04	0.04	0.01	0.10	0.03	0.06	0.02	0.06	0.20	0.20	0.18	0.07	0.20	0.21	0.19
P2O5	%	0.11	0.09	0.13	0.13	0.10	0.09	0.13	0.13	0.11	0.09	0.07	0.10	0.09	<0.01	0.07	0.06	0.21
SrO	%	0.01	0.04	0.01	<0.01	0.01	0.01	0.01	0.01	0.01	0.04	<0.01	0.01	<0.01	0.02	0.02	0.01	0.02
BaO	%	0.07	0.04	0.07	0.06	0.03	0.03	0.07	0.07	0.07	0.03	0.02	0.03	0.02	<0.01	0.02	0.01	0.03
LOI	%	4.77	4.04	4.21	4.58	2.44	5.71	4.31	4.33	4.84	3.80	5.76	4.26	5.33	10.80	4.90	6.33	3.70
Total	%	99.12	98.44	98.10	99.11	98.92	98.39	98.48	98.76	99.51	98.41	99.86	99.86	98.40	86.87	99.76	99.17	98.13

		VR91625A	VR90125A	VR90181A	VR90257A	VR91626A	VR90425A	VR90457A	VR91267A	VR91306A	VR91482A	VR91542A	VR91579A	VR91627A	VR91623A DUP	VR90181A DUP	VR91627A DUP
SiO2	%	57.70	34.36	0.61	75.05	57.35	57.54	19.52	46.37	56.91	58.69	21.38	57.73	57.50	64.25	0.57	57.79
Al2O3	%	17.39	3.40	0.13	11.1	17.60	17.81	1.37	8.39	12.28	17.29	1.12	17.45	17.49	12.99	0.12	17.63
Fe2O3	%	9.42	28.57	73.77	4.59	8.94	8.95	44.96	15.87	12.68	8.83	38.67	9.43	9.50	5.86	73.67	8.97
CaO	%	0.58	4.07	0.02	0.28	0.26	0.23	0.84	6.39	0.43	0.28	0.75	0.2	0.25	3.81	0.02	0.24
MgO	%	3.12	18.24	0.20	1.78	3.97	4.02	16.23	15.41	4.30	3.56	18.40	3.63	3.43	1.90	0.18	3.25
Na2O	%	1.53	0.25	<0.01	2.81	0.29	0.63	<0.01	1.07	1.48	1.20	<0.01	0.78	1.19	2.49	<0.01	1.23
K2O	%	3.38	0.2	0.04	1.55	4.36	4.59	0.14	0.50	2.16	3.39	0.10	3.94	3.73	1.73	0.04	3.78
Cr2O3	%	0.02	0.37	<0.01	0.04	0.02	0.03	0.18	0.20	0.03	0.03	0.09	0.02	0.03	0.03	<0.01	0.02
TiO2	%	0.90	0.69	0.05	0.50	0.88	0.92	0.36	1.48	0.71	0.92	0.35	0.92	0.91	0.63	0.07	0.92
MnO	%	0.03	0.18	0.04	0.02	0.04	0.04	0.14	0.18	0.06	0.03	0.16	0.04	0.03	0.06	0.04	0.03
P2O5	%	0.12	0.05	0.01	0.09	0.12	0.11	0.04	0.12	0.08	0.12	0.03	0.13	0.13	0.11	0.02	0.14
SrO	%	0.01	0.02	<0.01	0.04	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.04	0.02	0.02
BaO	%	0.06	<0.01	0.01	0.03	0.06	0.07	0.01	0.03	0.03	0.06	0.01	0.07	0.07	0.04	0.01	0.05
LOI	%	5.15	6.08	11.80	1.74	4.90	4.27	10.95	3.34	4.62	4.52	12.70	4.73	4.85	4.29	11.80	4.72
Total	%	99.42	96.48	86.68	99.62	98.81	99.21	94.76	99.36	95.77	98.92	93.77	99.08	99.12	98.21	86.57	98.78

TABLE A-5
Modified Sobek Method Acid-Base Accounting
Phase I Eagle Project

Sample	Paste pH	S(T) %	S(SO4) %	AP	NP	Net NP	NP/AP	TIC %	Carbonate NP
VR91618A	7.6	1.09	0.01	33.8	4.9	-28.9	0.1	<0.05	4.2
VR71043A	9.2	0.16	<0.01	5.0	90.0	85.0	18.0	1.08	90.0
VR71087A	9.0	1.42	0.01	44.1	6.6	-37.5	0.1	<0.05	4.2
VR91619A	8.7	1.09	0.01	33.8	4.6	-29.1	0.1	<0.05	4.2
VR91620A	9.0	0.31	0.01	9.4	5.6	-3.8	0.6	<0.05	4.2
VR91621A	9.1	0.49	0.02	14.7	103.6	88.9	7.1	1.25	104.2
VR91622A	9.0	1.44	0.02	44.4	11.8	-32.6	0.3	0.09	7.5
VR71109A	9.2	0.67	0.02	20.3	25.3	4.9	1.2	0.25	20.8
VR71161A	9.1	0.83	0.01	25.6	7.4	-18.3	0.3	<0.05	4.2
VR91623A	9.4	0.35	0.01	10.6	71.9	61.3	6.8	0.83	69.2
VR71275A	9.4	0.99	0.01	30.6	24.6	-6.0	0.8	<0.05	4.2
VR71314A	9.6	0.30	0.03	8.4	41.4	32.9	4.9	0.05	4.2
VR71373A	9.6	2.44	0.02	75.6	34.4	-41.3	0.5	0.06	5.0
VR71450A	6.1	35.0	0.08	1091.3	2.8	-1088.4	<0.1	<0.05	4.2
VR91624A	9.1	0.16	0.03	4.1	64.9	60.8	16.0	0.09	7.5
VR71821A	9.5	3.37	0.01	105.0	39.0	-66.0	0.4	0.11	9.2
VR71938A	9.7	1.60	0.01	49.7	43.4	-6.3	0.9	0.31	25.8
VR91625A	9.2	1.39	0.01	43.1	12.3	-30.9	0.3	0.11	9.2
VR90125A	9.3	8.13	0.02	253.4	23.9	-229.6	0.1	0.05	4.2
VR90181A	4.6	32.4	<0.01	1012.5	0.9	-1011.6	<0.1	<0.05	4.2
VR90257A	9.1	0.19	0.01	5.6	5.6	0.0	1.0	<0.05	4.2
VR91626A	8.2	1.08	0.02	33.1	8.8	-24.3	0.3	<0.05	4.2
VR90425A	9.2	0.77	0.01	23.8	8.8	-15.0	0.4	<0.05	4.2
VR90457A	8.9	15.45	0.01	482.5	44.0	-438.5	0.1	0.06	5.0
VR91267A	9.7	0.89	0.02	27.2	22.2	-5.0	0.8	0.05	4.2
VR91306A	8.8	2.72	0.02	84.4	20.6	-63.8	0.2	0.11	9.2
VR91482A	9.0	1.09	0.01	33.8	8.6	-25.2	0.3	<0.05	4.2
VR91542A	9.1	13.65	0.04	425.3	67.2	-358.1	0.2	0.23	19.2
VR91579A	8.7	1.38	0.02	42.5	8.1	-34.4	0.2	<0.05	4.2
VR91627A	9.1	1.40	0.03	42.8	8.6	-34.2	0.2	<0.05	4.2
RE VR91623A	9.5	0.36	0.03	10.3	72.3	61.9	7.0	0.79	65.8
RE VR90181A	4.5	31.7	0.01	990.3	0.8	-989.6	<0.1	<0.05	4.2
RE VR91627A	9.0	1.37	0.01	42.5	8.8	-33.8	0.2	<0.05	4.2

AP: Acid potential in tonnes CaCO3 equivalent per 1000 tonnes of material; determined from the calculated suphide sulphur content: S(T) - S(SO4), assuming total conversion of sulphide to sulphate.
NP: Neutralization potential in tonnes CaCO3 equivalent per 1000 tonnes of material.
NET NP: Net neutralization potential = Tonnes CaCO3 equivalent per 1000 tonnes of material.
RE: Replicate sample
TIC: Total Inorganic Carbon as %C.

NOTE: Where S(T) is reported as <0.01%, a S(T) value of 0.01% is used for the AP calculation.
Where S(SO4) is reported as <0.01%, it is assumed to be zero for the AP calculation (ie. if S(SO4) is less than 0.01% or is not analyzed, AP is calculated from S(T) only).
Carbonate NP calculated from total inorganic carbon (TIC) assay. TIC value of 0.05 is used in calculation if TIC <0.05%.
Date: March 15, 2004

TABLE A-6
Whole Rock Metals Scan by ICP-MS/AES
Phase II Eagle Project

Sample:		Ag ppm	Al %	As ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm	Mo ppm
VR93404	04EA046 @205 M	0.4	1.15	7	<10	20	<0.5	<2	0.09	0.5	9	423	2850	2.75	<10	<1	0.07	10	0.59	471	7
VR93405	04EA045 @28 M	2.3	2.32	11	50	40	<0.5	<2	0.64	<0.5	221	546	5780	11.65	<10	<1	0.16	<10	8.15	593	1
VR93406	04EA045 @32 M	<0.2	3.91	31	10	30	0.7	<2	0.2	<0.5	29	202	255	7.2	10	<1	0.33	20	3.2	415	3
VR93407	04EA046 @150 M	2	1.48	2	10	30	<0.5	3	0.79	0.8	137	565	4070	6.41	<10	<1	0.17	<10	2.78	331	1
VR93408	04EA047 @20 M	0.5	1.68	<2	70	40	<0.5	2	0.77	<0.5	118	442	1305	8.13	<10	<1	0.17	10	9.49	719	1
VR93409	04EA047 @180 M	4.2	1.18	3	20	30	<0.5	9	0.56	1.7	207	538	6410	9.46	<10	<1	0.18	<10	4.63	441	1
VR93410	04EA047 @224 M	<0.2	0.89	12	<10	10	<0.5	<2	0.49	<0.5	8	341	30	2.18	<10	<1	0.06	10	0.54	261	5
VR93411	04EA048 @167M	<0.2	1.22	10	<10	20	<0.5	<2	0.16	<0.5	10	288	18	2.7	<10	<1	0.11	10	0.68	206	5
VR93412	04EA049 @26M	<0.2	1.26	2	110	20	<0.5	2	0.69	<0.5	85	488	180	6.26	<10	<1	0.1	<10	8.73	719	1
VR93413	04EA049 @45 M	2.2	2.2	14	40	20	<0.5	8	0.6	<0.5	258	992	5790	10.5	<10	1	0.11	10	9.53	647	1
VR93414	04EA049 @ 53M	<0.2	3.79	3	20	30	0.7	2	0.48	<0.5	35	164	396	6.48	10	<1	0.34	20	3.55	433	1
VR93415	04EA049 @58M	<0.2	2.1	2	<10	30	<0.5	<2	0.32	<0.5	14	206	44	4.03	10	<1	0.27	20	1.24	200	2
VR93416	04EA049 @63M	<0.2	2.43	3	20	60	0.5	<2	0.18	<0.5	15	197	61	4.31	10	<1	0.49	20	1.47	210	2
VR93417	04EA049 @75M	0.3	2.99	10	<10	50	0.8	<2	0.29	<0.5	35	126	137	6.49	10	<1	0.3	30	1.91	353	8
VR93418	04EA049 @115M	<0.2	2.61	9	<10	40	<0.5	<2	0.35	0.7	20	131	44	5.49	10	<1	0.25	30	1.56	337	3
VR93419	04EA050 @75M	<0.2	2.74	27	10	40	<0.5	<2	0.15	0.6	25	91	41	5.7	10	<1	0.28	30	1.6	267	4
VR93420	04EA050 @122M	0.2	2.73	31	<10	30	<0.5	<2	0.15	<0.5	24	107	65	5.63	10	<1	0.2	30	1.54	293	2
VR93421	04EA050 @130 M	0.2	2.42	21	<10	40	<0.5	2	0.12	0.5	24	82	87	5.51	10	<1	0.21	30	1.39	243	2
VR93422	04EA050 @158M	<0.2	1.23	13	<10	20	<0.5	2	6.54	<0.5	10	99	20	2.44	<10	<1	0.14	10	0.6	1330	2
VR93423	04EA050 @168M	<0.2	1.02	9	<10	20	<0.5	<2	0.34	<0.5	10	179	22	2.35	<10	<1	0.12	10	0.52	150	4
VR93424	04EA050 @175M	<0.2	2.46	13	<10	50	<0.5	<2	0.14	<0.5	20	91	71	5.48	10	<1	0.29	30	1.39	236	3
VR93425	04EA051 @57M	0.2	2.8	20	20	40	<0.5	<2	0.17	1.2	22	101	61	5.66	10	1	0.34	30	1.66	284	3
VR93426	04EA051 @88M	<0.2	2.78	26	<10	40	<0.5	<2	0.14	0.7	25	87	59	5.87	10	<1	0.26	30	1.64	276	2
VR93427	04EA051 @140M	<0.2	2.7	16	<10	50	<0.5	<2	0.27	0.5	24	99	72	5.77	10	<1	0.31	30	1.57	308	3
VR93428	04EA052 @44M	<0.2	3.34	4	10	30	<0.5	<2	0.95	<0.5	17	124	45	5.59	10	<1	0.21	30	2.96	587	1
VR93429	04EA052 @90M	<0.2	2.68	8	<10	50	<0.5	<2	0.15	<0.5	20	102	52	5.53	10	<1	0.28	30	1.61	281	2
VR93430	04EA052 @300M	<0.2	1.46	17	<10	20	<0.5	<2	0.4	<0.5	13	245	25	3.24	<10	<1	0.12	20	0.75	199	4
VR93431	04EA052 @350M	0.2	2.25	16	<10	50	<0.5	2	0.24	1.8	23	84	87	5.91	10	<1	0.29	30	1.37	261	11
VR93432	04EA052 @450M	0.2	2.93	50	<10	40	<0.5	<2	0.13	<0.5	26	95	53	6.21	10	<1	0.21	30	1.68	280	1
VR93433	04EA053 @31M	1.7	1.84	<2	170	30	<0.5	3	0.76	0.5	186	301	3840	10.35	<10	<1	0.1	10	10.95	794	1
VR93434	04EA053 @42M	2.9	0.58	2	150	10	<0.5	12	0.48	2.4	589	154	>10000	22.5	<10	<1	0.06	<10	9.27	727	1

TABLE A-6
Whole Rock Metals Scan by ICP-MS/AES
Phase II Eagle Project

Sample:		Ag ppm	Al %	As ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm	Mo ppm
VR93435	04EA053 @140M	4.5	1.04	2	10	30	<0.5	6	0.59	1.8	244	559	7570	10.3	<10	<1	0.15	<10	3.36	381	1
VR93436	04EA053 @163M	0.9	2.44	42	<10	30	<0.5	<2	0.35	<0.5	48	198	3720	5.29	10	<1	0.24	20	1.51	321	4
VR93437	04EA053 @221M	<0.2	1.34	16	<10	20	<0.5	2	0.76	<0.5	11	241	43	3.02	<10	<1	0.09	20	0.75	223	4
VR93438	04EA054 @27M	2	1.52	<2	90	30	<0.5	<2	0.5	0.6	198	808	4100	10.4	<10	<1	0.12	<10	9.85	665	1
VR93439	04EA055 @40M	1.7	1	<2	220	20	<0.5	2	0.51	1	219	299	4250	11.4	<10	<1	0.06	<10	11.1	768	1
VR93440	04EA056 @52M	1.7	3.23	7	10	10	<0.5	2	0.8	0.7	86	1065	2610	7.63	10	<1	0.09	10	6.67	834	1
VR93441	04EA056 @100M	0.9	1.42	<2	40	30	<0.5	2	0.8	<0.5	132	703	2110	8.1	<10	<1	0.12	<10	5.67	532	1
VR93442	04EA056 @130M	<0.2	2.4	7	10	70	<0.5	<2	1.02	<0.5	37	206	278	4.86	10	<1	0.39	10	1.77	250	3
VR93443	04EA057 @35M	1.5	1.45	3	80	20	<0.5	3	0.56	0.6	208	694	3790	10.85	<10	<1	0.12	<10	9.26	706	1
VR93444	04EA058 @70M	2.9	1.18	4	40	10	<0.5	2	0.68	0.7	275	789	4990	11.25	<10	<1	0.05	<10	6.44	794	1
VR93445	04EA059 @97.4M	<0.2	2.09	3	10	20	<0.5	<2	1.19	<0.5	51	214	119	4.97	10	<1	0.18	10	3.17	340	2
VR93446	04EA059 @99M	<0.2	2.78	<2	10	20	<0.5	<2	1.27	<0.5	57	412	147	6.4	10	<1	0.2	10	4.34	390	1
VR93447	04EA061 @130M	0.2	2.48	52	<10	50	<0.5	2	0.13	0.7	22	86	70	5.9	10	<1	0.31	30	1.51	266	5
VR93448	04EA061 @242M	<0.2	1.6	17	<10	50	<0.5	<2	0.59	<0.5	11	328	260	3.45	10	<1	0.18	20	0.89	441	5
VR93449	04EA061 @302M	<0.2	2.64	28	10	70	0.7	<2	0.15	<0.5	28	133	85	5.39	10	<1	0.47	30	1.37	300	2
VR93450	04EA061 @335M	0.7	1.4	<2	30	30	<0.5	<2	0.78	<0.5	116	346	2090	8.64	10	<1	0.15	10	5.98	520	1
VR93451	04EA061 @400M	0.5	2.09	47	<10	50	<0.5	2	0.41	1.1	32	76	89	6.22	10	<1	0.27	30	1.36	284	10
VR93452	04EA062 @147M	<0.2	3.42	32	<10	40	0.6	<2	0.17	1.5	31	205	60	6.67	10	<1	0.23	20	2.63	441	8
VR93453	04EA062 @170M	1	1.2	<2	<10	40	<0.5	<2	0.66	<0.5	134	471	2230	7.91	<10	<1	0.19	10	7.83	628	1
VR93454	04EA062 @233M	11.4	2.31	172	<10	80	0.6	2	0.14	4.5	182	134	>10000	8.52	10	1	0.34	20	1.52	284	11
VR93455	04EA064 @110M	1.8	1.64	<2	10	30	<0.5	2	0.76	0.6	80	825	2950	5.88	10	<1	0.3	<10	2.98	358	1
VR93456	04EA066 @100M	<0.2	2.61	11	<10	50	<0.5	<2	0.12	0.7	19	89	80	5.16	10	<1	0.28	30	1.59	272	3
VR93457	04EA066 @210M	<0.2	2.07	60	<10	40	<0.5	<2	0.18	0.5	24	83	56	5.5	10	1	0.23	30	1.35	260	2
VR93458	04EA067 @100M	1.7	2.06	4	30	50	<0.5	3	0.76	0.9	147	501	3540	7.84	10	<1	0.24	10	5.3	446	1
VR93459	04EA070 @120M	<0.2	2.33	10	<10	40	<0.5	<2	0.13	1.1	19	79	61	4.65	10	<1	0.24	30	1.42	250	2
VR93460	04EA070 @350M	0.2	1.62	20	<10	30	<0.5	<2	0.3	<0.5	15	172	28	3.5	<10	<1	0.17	20	0.85	186	3
VR93461	04EA072 @255M	<0.2	2.59	23	10	40	0.6	<2	0.15	<0.5	19	158	23	5.05	10	<1	0.32	20	1.4	320	2
VR93462	04EA072 @314M	0.4	3.46	46	10	50	0.8	2	0.48	<0.5	28	148	75	6.89	10	1	0.37	30	2.07	406	2
VR93463	04EA074 @90M	<0.2	2.45	10	<10	40	<0.5	<2	0.13	<0.5	22	103	57	5.58	10	<1	0.22	30	1.53	267	2

TABLE A-6
Whole Rock Metals Scan by ICP-MS/AES
Phase II Eagle Project

Sample:		Na %	Ni ppm	P ppm	Pb ppm	S %	Sb ppm	Sc ppm	Sr ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Zn ppm	Cu %
VR93404	04EA046 @205 M	0.1	68	330	3	0.32	<2	4	16	0.02	<10	<10	41	<10	33	
VR93405	04EA045 @28 M	0.16	6090	450	5	3.63	<2	7	89	0.11	<10	<10	69	<10	70	
VR93406	04EA045 @32 M	0.02	268	500	22	0.51	<2	9	24	0.02	<10	<10	103	<10	125	
VR93407	04EA046 @150 M	0.16	5100	290	11	2.46	<2	5	39	0.13	<10	<10	91	<10	45	
VR93408	04EA047 @20 M	0.18	2770	370	6	1.08	<2	5	48	0.1	<10	<10	55	<10	82	
VR93409	04EA047 @180 M	0.11	6380	320	22	4.01	<2	4	30	0.13	<10	<10	68	<10	60	
VR93410	04EA047 @224 M	0.06	50	340	7	0.08	<2	2	18	0.01	<10	<10	32	<10	50	
VR93411	04EA048 @167M	0.05	41	320	8	0.19	<2	2	9	<0.01	<10	<10	26	<10	40	
VR93412	04EA049 @26M	0.1	1080	270	<2	0.16	<2	4	31	0.08	<10	<10	45	<10	62	
VR93413	04EA049 @45 M	0.1	8450	370	23	2.72	<2	13	112	0.07	<10	<10	89	<10	40	
VR93414	04EA049 @ 53M	0.02	729	470	2	0.05	<2	6	34	0.01	<10	<10	64	<10	91	
VR93415	04EA049 @58M	0.01	59	460	<2	0.01	<2	4	17	0.01	<10	<10	41	<10	56	
VR93416	04EA049 @63M	0.01	69	500	4	0.26	<2	6	21	0.02	<10	<10	57	<10	343	
VR93417	04EA049 @75M	0.02	125	560	30	1.04	<2	4	20	0.01	<10	<10	71	<10	202	
VR93418	04EA049 @115M	0.01	99	630	22	0.84	<2	2	17	<0.01	<10	<10	36	<10	162	
VR93419	04EA050 @75M	<0.01	89	610	19	1.16	<2	2	20	<0.01	<10	<10	32	<10	244	
VR93420	04EA050 @122M	0.01	95	670	56	0.32	<2	3	15	<0.01	<10	<10	33	<10	143	
VR93421	04EA050 @130 M	0.01	106	530	31	0.84	<2	2	13	<0.01	<10	<10	32	<10	157	
VR93422	04EA050 @158M	0.03	36	310	6	0.18	<2	2	436	<0.01	<10	<10	18	<10	48	
VR93423	04EA050 @168M	0.03	40	380	5	0.31	<2	1	16	<0.01	<10	<10	14	<10	52	
VR93424	04EA050 @175M	0.01	102	570	13	1.08	<2	3	13	0.01	<10	<10	32	<10	120	
VR93425	04EA051 @57M	<0.01	93	620	17	1.03	<2	3	25	<0.01	<10	<10	33	<10	330	
VR93426	04EA051 @88M	0.01	99	610	31	0.74	<2	3	15	0.01	<10	<10	35	<10	157	
VR93427	04EA051 @140M	0.02	102	530	12	1.18	<2	3	16	0.01	<10	<10	34	<10	168	
VR93428	04EA052 @44M	<0.01	83	600	2	0.01	<2	2	28	<0.01	<10	<10	35	<10	124	
VR93429	04EA052 @90M	0.01	103	680	9	0.82	<2	3	16	0.01	<10	<10	32	<10	144	
VR93430	04EA052 @300M	0.03	50	350	13	0.06	<2	2	23	<0.01	<10	<10	30	<10	54	
VR93431	04EA052 @350M	0.02	129	570	18	1.6	<2	3	20	0.01	<10	<10	39	<10	318	
VR93432	04EA052 @450M	0.01	105	580	14	0.36	<2	3	14	0.01	<10	<10	39	<10	128	
VR93433	04EA053 @31M	0.17	5260	300	11	2.72	<2	5	58	0.08	<10	<10	45	<10	83	
VR93434	04EA053 @42M	0.05	>10000	100	19	8.15	<2	4	39	0.05	<10	<10	28	<10	180	1.26

TABLE A-6
Whole Rock Metals Scan by ICP-MS/AES
Phase II Eagle Project

Sample:		Na %	Ni ppm	P ppm	Pb ppm	S %	Sb ppm	Sc ppm	Sr ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Zn ppm	Cu %
VR93435	04EA053 @140M	0.12	7880	250	23	4.8	<2	4	30	0.11	<10	<10	77	<10	54	
VR93436	04EA053 @163M	0.03	635	420	4	0.76	<2	7	14	0.01	<10	<10	73	<10	90	
VR93437	04EA053 @221M	0.04	56	440	16	0.19	<2	2	35	<0.01	<10	<10	25	<10	88	
VR93438	04EA054 @27M	0.12	5500	300	12	2.89	<2	6	47	0.09	<10	<10	55	<10	77	
VR93439	04EA055 @40M	0.08	6220	190	10	2.92	<2	4	26	0.06	<10	<10	33	<10	82	
VR93440	04EA056 @52M	0.05	2200	300	7	1.35	<2	15	42	0.15	<10	<10	197	<10	72	
VR93441	04EA056 @100M	0.15	3210	320	6	1.62	<2	7	48	0.11	<10	<10	88	<10	60	
VR93442	04EA056 @130M	0.23	371	940	4	0.46	<2	8	114	0.23	<10	<10	128	<10	78	
VR93443	04EA057 @35M	0.1	6220	260	14	3.07	<2	11	48	0.08	<10	<10	66	<10	75	
VR93444	04EA058 @70M	0.04	9050	170	9	4.6	<2	9	42	0.05	<10	<10	56	<10	47	
VR93445	04EA059 @97.4M	0.19	460	900	<2	0.13	<2	6	69	0.21	<10	<10	86	<10	64	
VR93446	04EA059 @99M	0.19	415	1080	<2	0.14	<2	13	93	0.29	<10	<10	170	<10	97	
VR93447	04EA061 @130M	0.01	98	570	25	1.91	<2	3	14	0.01	<10	<10	36	<10	159	
VR93448	04EA061 @242M	0.07	47	380	9	0.07	<2	4	20	0.01	<10	<10	49	<10	36	
VR93449	04EA061 @302M	0.03	118	430	7	0.78	<2	5	15	0.04	<10	<10	65	<10	120	
VR93450	04EA061 @335M	0.12	2040	790	5	1.22	<2	6	48	0.23	<10	<10	134	<10	59	
VR93451	04EA061 @400M	0.02	148	510	44	2.57	5	2	41	0.01	<10	<10	32	<10	234	
VR93452	04EA062 @147M	0.03	144	510	24	0.65	<2	9	14	0.01	<10	<10	138	<10	335	
VR93453	04EA062 @170M	0.12	3480	380	5	1.48	<2	3	36	0.11	<10	<10	63	<10	68	
VR93454	04EA062 @233M	0.03	3340	490	9	4.14	3	8	12	0.04	<10	<10	92	<10	644	2.19
VR93455	04EA064 @110M	0.13	2920	370	19	1.28	<2	6	40	0.16	<10	<10	116	<10	39	
VR93456	04EA066 @100M	0.01	113	560	9	0.35	<2	3	14	0.01	<10	<10	35	<10	150	
VR93457	04EA066 @210M	0.01	103	560	23	1.66	2	2	13	<0.01	<10	<10	26	<10	120	
VR93458	04EA067 @100M	0.18	4520	290	4	2.21	<2	5	45	0.11	<10	<10	66	<10	62	
VR93459	04EA070 @120M	0.01	105	490	106	0.25	<2	2	12	0.01	<10	<10	29	<10	294	
VR93460	04EA070 @350M	0.03	59	410	11	0.12	<2	2	20	<0.01	<10	<10	27	<10	71	
VR93461	04EA072 @255M	0.03	76	420	3	0.24	<2	5	12	0.02	<10	<10	63	<10	52	
VR93462	04EA072 @314M	0.03	112	550	70	0.28	<2	6	18	0.01	<10	<10	84	<10	152	
VR93463	04EA074 @90M	0.01	116	570	15	0.97	<2	2	14	<0.01	<10	<10	30	<10	136	

TABLE A-7
Whole Rock Analysis
Phase II Eagle Mine

Sample		SiO2 %	Al2O3 %	Fe2O3 %	CaO %	MgO %	Na2O %	K2O %	Cr2O3 %	TiO2 %	MnO %	P2O5 %	SrO %	BaO %	LOI %	Total %
VR93404	04EA046 @205 M	78	9.88	4.07	0.27	0.97	3.59	0.92	0.08	0.4	0.06	0.09	0.03	0.03	1.38	99.77
VR93405	04EA045 @28 M	39.1	5.52	21.43	2.67	19.42	0.45	0.4	0.28	1.04	0.15	0.11	0.01	0.03	9.11	99.71
VR93406	04EA045 @32 M	54.85	16.85	10.94	0.35	5.93	0.75	4.04	0.03	0.92	0.06	0.12	0.01	0.06	4.95	99.86
VR93407	04EA046 @150 M	47.03	6.04	17.01	6.33	17.12	0.8	0.37	0.26	1.01	0.18	0.07	0.02	0.02	3.07	99.34
VR93408	04EA047 @20 M	41.2	5.26	16.93	4.23	23.36	0.84	0.31	0.21	0.9	0.17	0.08	<0.01	0.02	6.3	99.82
VR93409	04EA047 @180 M	42.76	5.11	21.21	4.68	19.06	0.57	0.31	0.29	0.91	0.19	0.08	<0.01	0.02	4.09	99.28
VR93410	04EA047 @224 M	79.25	9.08	3.18	0.73	0.94	3.78	0.52	0.07	0.38	0.03	0.07	0.02	0.02	1.69	99.75
VR93411	04EA048 @167M	74.47	11.01	4	0.26	1.25	4.07	0.87	0.06	0.46	0.02	0.08	0.03	0.03	1.89	98.49
VR93412	04EA049 @26M	42.2	5.08	14.84	5.85	24.44	0.75	0.24	0.34	0.8	0.18	0.08	0.02	0.02	4.94	99.78
VR93413	04EA049 @45 M	38.18	5.38	19.91	2.3	20.34	0.36	0.22	0.21	1.04	0.15	0.09	0.04	0.02	10.9	99.13
VR93414	04EA049 @ 53M	57.24	15.01	10.21	0.64	6.42	0.12	3.08	0.03	0.79	0.05	0.11	0.01	0.05	5.69	99.46
VR93415	04EA049 @58M	68.42	13.45	6.13	0.65	2.39	1.05	3.79	0.04	0.61	0.02	0.11	0.01	0.05	2.81	99.52
VR93416	04EA049 @63M	62.94	15.87	6.7	0.25	3.17	0.35	5.58	0.03	0.78	0.02	0.13	<0.01	0.05	3.61	99.48
VR93417	04EA049 @75M	56.62	17.64	9.87	0.39	3.8	0.96	3.86	0.03	0.85	0.04	0.13	0.01	0.07	5.24	99.5
VR93418	04EA049 @115M	59.06	17.23	8.76	0.48	3.4	0.51	4.67	0.04	0.89	0.04	0.13	<0.01	0.07	4.3	99.57
VR93419	04EA050 @75M	54.96	19.1	9.24	0.21	3.7	0.18	4.94	0.03	0.98	0.03	0.13	<0.01	0.08	5.72	99.29
VR93420	04EA050 @122M	59.1	17.19	8.83	0.33	3.1	1.86	3.18	0.02	0.85	0.03	0.17	0.01	0.06	3.85	98.59
VR93421	04EA050 @130 M	56.93	18.65	8.75	0.41	3.28	1.36	4.02	0.02	1.04	0.03	0.13	0.01	0.07	4.42	99.13
VR93422	04EA050 @158M	61.99	10.32	3.93	9.04	1.47	2.75	0.98	0.02	0.43	0.18	0.08	0.06	0.03	8.4	99.66
VR93423	04EA050 @168M	76.41	10.93	3.72	0.66	1.12	3.03	1.12	0.04	0.44	0.02	0.09	0.02	0.03	2.02	99.64
VR93424	04EA050 @175M	58.11	18	8.91	0.24	3.12	1.34	3.93	0.02	1.01	0.03	0.14	0.01	0.08	4.22	99.16
VR93425	04EA051 @57M	57.21	18.32	8.94	0.22	3.65	0.07	4.49	0.03	0.95	0.03	0.12	0.01	0.07	5.5	99.61
VR93426	04EA051 @88M	56.78	17.64	9.06	0.2	3.46	1.22	4.24	0.02	0.97	0.03	0.13	0.02	0.07	4.36	98.19
VR93427	04EA051 @140M	58.5	16.59	8.69	0.4	3.17	1.41	3.67	0.02	0.87	0.03	0.12	0.01	0.07	4.77	98.32
VR93428	04EA052 @44M	54.9	16.88	9.32	1.32	5.93	0.08	3.72	0.03	0.88	0.08	0.13	0.01	0.07	6.08	99.43
VR93429	04EA052 @90M	57.89	17.17	8.54	0.31	3.36	1.2	3.94	0.02	0.93	0.03	0.17	0.01	0.07	4.46	98.11
VR93430	04EA052 @300M	73.57	10.96	4.83	0.56	1.4	3.14	1.06	0.05	0.55	0.02	0.07	0.02	0.04	2.47	98.74
VR93431	04EA052 @350M	57.04	17.64	9.49	0.33	3.15	1.45	3.85	0.02	0.9	0.03	0.12	0.01	0.07	5.45	99.55
VR93432	04EA052 @450M	58.07	18.09	9.96	0.2	3.5	1.61	3.24	0.02	0.98	0.03	0.13	0.01	0.08	4.05	99.97
VR93433	04EA053 @31M	37.7	4.56	19.6	2.46	24.77	0.44	0.19	0.13	0.72	0.15	0.07	0.02	0.01	8.98	99.78
VR93434	04EA053 @42M	24.26	1.43	39.24	0.93	18.52	0.03	0.1	0.09	0.45	0.13	0.03	<0.01	0.02	13.05	98.26
VR93435	04EA053 @140M	41.34	5	22.51	6.41	17.17	0.63	0.31	0.29	0.82	0.17	0.06	<0.01	0.02	3.67	98.4

TABLE A-7
Whole Rock Analysis
Phase II Eagle Mine

Sample		SiO2 %	Al2O3 %	Fe2O3 %	CaO %	MgO %	Na2O %	K2O %	Cr2O3 %	TiO2 %	MnO %	P2O5 %	SrO %	BaO %	LOI %	Total %
VR93436	04EA053 @163M	63.01	14.79	8.19	0.54	2.84	2.49	2.48	0.03	0.81	0.04	0.1	0.02	0.04	3.3	98.69
VR93437	04EA053 @221M	73.09	11.48	4.49	1.06	1.39	3.94	0.83	0.05	0.45	0.02	0.09	0.03	0.03	2.72	99.67
VR93438	04EA054 @27M	38.17	4.44	20.12	2.79	23.7	0.56	0.21	0.37	0.74	0.14	0.07	0.02	0.02	8.42	99.79
VR93439	04EA055 @40M	35.67	2.92	22.05	3.39	26.61	0.21	0.12	0.22	0.6	0.16	0.05	0.01	0.01	7.84	99.87
VR93440	04EA056 @52M	47.19	6.81	16.28	1.6	18.38	0.22	0.17	0.23	0.92	0.17	0.07	0.01	0.02	7.25	99.31
VR93441	04EA056 @100M	43.7	5.74	17.94	5.9	19.62	0.66	0.21	0.32	0.93	0.18	0.07	0.01	0.02	4.64	99.94
VR93442	04EA056 @130M	49.7	12.06	14.87	6.65	9.02	1.88	1.04	0.06	2.54	0.14	0.2	0.03	0.04	1.65	99.88
VR93443	04EA057 @35M	39.95	4.57	20.22	3.03	21.68	0.47	0.26	0.21	0.71	0.14	0.07	0.03	0.02	8.55	99.92
VR93444	04EA058 @70M	42.7	2.71	22.27	1.3	19.74	0.05	0.12	0.37	0.49	0.16	0.04	<0.01	0.01	9.21	99.15
VR93445	04EA059 @97.4M	46.33	8	16.38	8.35	13.7	0.98	0.31	0.11	2.53	0.18	0.2	0.02	0.02	2.69	99.8
VR93446	04EA059 @99M	45.38	9.5	16.41	6.93	12.06	1	0.31	0.08	3.12	0.19	0.25	0.03	0.02	4.56	99.85
VR93447	04EA061 @130M	56.22	18.49	9.45	0.21	3.38	1.6	3.95	0.02	0.9	0.03	0.13	0.01	0.07	4.83	99.29
VR93448	04EA061 @242M	72	11.36	5.07	0.92	1.6	3.02	1.95	0.06	0.5	0.05	0.09	0.04	0.07	2.44	99.16
VR93449	04EA061 @302M	61.7	16.46	8.61	0.26	3.02	0.9	3.8	0.03	0.92	0.04	0.1	0.01	0.08	3.81	99.73
VR93450	04EA061 @335M	40.8	6.12	21.07	6.1	17.98	0.81	0.28	0.12	2.36	0.2	0.18	0.01	0.02	3.77	99.82
VR93451	04EA061 @400M	57.42	16.15	9.57	0.68	3.32	1.27	3.55	0.03	0.84	0.04	0.1	0.01	0.07	6.46	99.5
VR93452	04EA062 @147M	58	16.49	10.04	0.33	4.84	2.31	2.4	0.04	0.84	0.05	0.12	0.02	0.05	4.37	99.91
VR93453	04EA062 @170M	41.25	5.75	18.34	5.08	22.99	0.86	0.35	0.3	1.04	0.18	0.08	0.01	0.03	3.56	99.82
VR93454	04EA062 @233M	52.75	16.26	12.9	0.49	3.04	2.15	2.71	0.03	0.87	0.03	0.13	0.02	0.06	4.79	96.25
VR93455	04EA064 @110M	46.65	7.41	15.15	8.11	14.49	1.25	0.64	0.29	1	0.17	0.09	0.02	0.02	3.1	98.37
VR93456	04EA066 @100M	58.53	18.43	8.05	0.18	3.45	1.28	4.19	0.03	0.96	0.03	0.11	<0.01	0.08	4.07	99.4
VR93457	04EA066 @210M	59.15	17.32	8.8	0.26	3.04	1.43	3.89	0.02	0.91	0.03	0.12	0.01	0.07	4.42	99.47
VR93458	04EA067 @100M	44.6	6.12	18.18	3.4	20.27	0.62	0.39	0.23	0.8	0.16	0.06	0.01	0.02	4.92	99.79
VR93459	04EA070 @120M	60.21	18.01	7.53	0.19	3.29	1.39	4.01	0.02	0.94	0.03	0.11	0.01	0.06	3.9	99.71
VR93460	04EA070 @350M	71.25	12.75	5.28	0.45	1.68	3.13	1.55	0.04	0.57	0.02	0.09	0.01	0.04	2.62	99.47
VR93461	04EA072 @255M	63	16.43	7.72	0.3	2.75	2.02	3.04	0.03	0.88	0.04	0.1	0.02	0.07	3.23	99.62
VR93462	04EA072 @314M	52.04	19.42	10.52	0.72	4.06	1.45	3.93	0.03	1.16	0.05	0.11	0.04	0.07	4.6	98.19
VR93463	04EA074 @90M	58.67	18.1	8.53	0.18	3.44	1.17	4.15	0.02	1	0.03	0.14	0.03	0.07	4.3	99.82

Date: November 26, 2004

TABLE A-8
Modified Sobek Acid-Base Accounting
Phase II Eagle Project

Sample		Paste pH	S(T) %	S(SO4) %	AP	HCl Norm.	NaOH Norm.	HCl Volume mL	NaOH Volume mL	Sample Weight g	NP	Net NP	NP/AP	TIC %	Carbonate NP
VR93404	04EA046 @205 M	9.2	0.33	0.04	9.1	0.100	0.100	20	17.30	2.00	6.8	-2.3	0.7	<0.05	4.2
VR93405	04EA045 @28 M	9.2	3.16	0.07	96.6	0.050	0.050	70	40.60	2.00	36.8	-59.8	0.4	0.05	4.2
VR93406	04EA045 @32 M	9.2	0.48	0.06	13.1	0.050	0.050	50	39.30	2.00	13.4	0.3	1.0	0.05	4.2
VR93407	04EA046 @150 M	9.3	2.30	0.08	69.4	0.050	0.050	60	43.70	2.00	20.4	-49.0	0.3	0.06	5.0
VR93408	04EA047 @20 M	9.5	1.02	0.04	30.6	0.050	0.050	100	55.90	2.00	55.1	24.5	1.8	0.10	8.3
VR93409	04EA047 @180 M	9.8	3.61	0.02	112.2	0.050	0.050	70	44.00	2.00	32.5	-79.7	0.3	0.06	5.0
VR93410	04EA047 @224 M	9.4	0.09	0.03	1.9	0.050	0.050	40	30.05	2.00	12.4	10.6	6.6	0.14	11.7
VR93411	04EA048 @167M	9.1	0.19	<0.01	5.9	0.050	0.050	40	34.15	2.00	7.3	1.4	1.2	0.07	5.8
VR93412	04EA049 @26M	9.6	0.16	0.03	4.1	0.050	0.050	100	55.60	2.00	55.5	51.4	13.7	0.13	10.8
VR93413	04EA049 @45 M	9.1	2.73	<0.01	85.3	0.050	0.050	110	76.20	2.00	42.3	-43.1	0.5	0.05	4.2
VR93414	04EA049 @ 53M	9.2	0.06	0.06	<0.3	0.050	0.050	60	39.60	2.00	25.5	25.5	>85.0	0.20	16.7
VR93415	04EA049 @58M	9.5	0.02	<0.01	0.6	0.050	0.050	40	31.10	2.00	11.1	10.5	17.8	0.11	9.2
VR93416	04EA049 @63M	9.3	0.24	0.03	6.6	0.050	0.050	30	24.80	2.00	6.5	-0.1	1.0	<0.05	4.2
VR93417	04EA049 @75M	8.8	1.01	0.04	30.3	0.050	0.050	40	33.20	2.00	8.5	-21.8	0.3	0.06	5.0
VR93418	04EA049 @115M	9.2	0.83	<0.01	25.9	0.050	0.050	40	32.05	2.00	9.9	-16.0	0.4	0.08	6.7
VR93419	04EA050 @75M	9.3	1.15	0.06	34.1	0.050	0.050	30	27.30	2.00	3.4	-30.7	0.1	<0.05	4.2
VR93420	04EA050 @122M	9.3	0.32	0.01	9.7	0.050	0.050	30	25.80	2.00	5.3	-4.4	0.5	<0.05	4.2
VR93421	04EA050 @130 M	8.9	0.85	0.03	25.6	0.050	0.050	30	27.20	2.00	3.5	-22.1	0.1	<0.05	4.2
VR93422	04EA050 @158M	9.3	0.17	0.02	4.7	0.100	0.100	90	22.80	2.00	168.0	163.3	35.8	2.00	166.7
VR93423	04EA050 @168M	9.5	0.32	<0.01	10.0	0.050	0.050	40	33.55	2.00	8.1	-1.9	0.8	0.08	6.7
VR93424	04EA050 @175M	9.0	1.07	<0.01	33.4	0.050	0.050	30	26.40	2.00	4.5	-28.9	0.1	<0.05	4.2
VR93425	04EA051 @57M	8.0	1.00	0.01	30.9	0.050	0.050	30	26.20	2.00	4.8	-26.2	0.2	<0.05	4.2
VR93426	04EA051 @88M	8.5	0.70	<0.01	21.9	0.050	0.050	30	27.40	2.00	3.3	-18.6	0.1	<0.05	4.2
VR93427	04EA051 @140M	9.0	1.12	<0.01	35.0	0.050	0.050	40	33.00	2.00	8.8	-26.3	0.3	0.07	5.8
VR93428	04EA052 @44M	8.8	0.01	<0.01	0.3	0.050	0.050	70	38.60	2.00	39.3	38.9	125.6	0.46	38.3
VR93429	04EA052 @90M	9.1	0.82	<0.01	25.6	0.050	0.050	35	30.10	2.00	6.1	-19.5	0.2	<0.05	4.2
VR93430	04EA052 @300M	9.5	0.06	<0.01	1.9	0.050	0.050	30	21.70	2.00	10.4	8.5	5.5	0.11	9.2
VR93431	04EA052 @350M	9.3	1.64	0.01	50.9	0.050	0.050	30	23.65	2.00	7.9	-43.0	0.2	0.06	5.0
VR93432	04EA052 @450M	9.5	0.36	<0.01	11.3	0.050	0.050	30	26.70	2.00	4.1	-7.1	0.4	<0.05	4.2
VR93433	04EA053 @31M	9.4	2.56	<0.01	80.0	0.100	0.100	45	19.50	2.00	63.8	-16.3	0.8	0.08	6.7
VR93434	04EA053 @42M	9.3	13.70	0.01	427.8	0.100	0.100	65	29.70	2.00	88.3	-339.6	0.2	0.23	19.2
VR93435	04EA053 @140M	9.7	5.06	0.01	157.8	0.100	0.100	30	16.20	2.00	34.5	-123.3	0.2	0.06	5.0
VR93436	04EA053 @163M	9.5	0.77	<0.01	24.1	0.050	0.050	50	38.10	2.00	14.9	-9.2	0.6	0.11	9.2
VR93437	04EA053 @221M	9.6	0.19	<0.01	5.9	0.100	0.100	20	11.70	2.00	20.8	14.8	3.5	0.20	16.7
VR93438	04EA054 @27M	9.5	2.72	<0.01	85.0	0.100	0.100	45	21.20	2.00	59.5	-25.5	0.7	0.06	5.0
VR93439	04EA055 @40M	9.5	3.13	<0.01	97.8	0.100	0.100	65	28.10	2.00	92.3	-5.6	0.9	0.07	5.8
VR93440	04EA056 @52M	9.5	1.34	<0.01	41.9	0.050	0.050	80	46.00	2.00	42.5	0.6	1.0	0.23	19.2
VR93441	04EA056 @100M	9.8	1.56	0.01	48.4	0.100	0.100	30	16.20	2.00	34.5	-13.9	0.7	0.07	5.8
VR93442	04EA056 @130M	9.8	0.45	0.01	13.8	0.050	0.050	60	45.15	2.00	18.6	4.8	1.4	<0.05	4.2
VR93443	04EA057 @35M	9.6	2.97	0.02	92.2	0.100	0.100	50	23.60	2.00	66.0	-26.2	0.7	0.05	4.2
VR93444	04EA058 @70M	9.5	4.38	0.01	136.6	0.050	0.050	90	51.10	2.00	48.6	-87.9	0.4	0.28	23.3
VR93445	04EA059 @97.4M	9.9	0.13	0.02	3.4	0.050	0.050	70	43.40	2.00	33.3	29.8	9.7	0.08	6.7
VR93446	04EA059 @99M	9.6	0.15	0.01	4.4	0.100	0.100	40	25.20	2.00	37.0	32.6	8.5	0.09	7.5

TABLE A-8
Modified Sobek Acid-Base Accounting
Phase II Eagle Project

Sample		Paste pH	S(T) %	S(SO4) %	AP	HCl Norm.	NaOH Norm.	HCl Volume mL	NaOH Volume mL	Sample Weight g	NP	Net NP	NP/AP	TIC %	Carbonate NP
VR93447	04EA061 @130M	9.1	1.82	<0.01	56.9	0.050	0.050	40	34.40	2.00	7.0	-49.9	0.1	<0.05	4.2
VR93448	04EA061 @242M	9.7	0.07	<0.01	2.2	0.050	0.050	60	44.50	2.00	19.4	17.2	8.9	0.19	15.8
VR93449	04EA061 @302M	9.3	0.79	0.03	23.8	0.050	0.050	50	42.90	2.00	8.9	-14.9	0.4	<0.05	4.2
VR93450	04EA061 @335M	9.7	1.21	<0.01	37.8	0.100	0.100	40	18.90	2.00	52.8	14.9	1.4	0.07	5.8
VR93451	04EA061 @400M	9.3	2.37	<0.01	74.1	0.050	0.050	50	39.60	2.00	13.0	-61.1	0.2	0.09	7.5
VR93452	04EA062 @147M	9.2	0.64	<0.01	20.0	0.050	0.050	40	31.90	2.00	10.1	-9.9	0.5	<0.05	4.2
VR93453	04EA062 @170M	9.4	1.51	<0.01	47.2	0.100	0.100	65	30.30	2.00	86.8	39.6	1.8	0.06	5.0
VR93454	04EA062 @233M	8.6	3.85	<0.01	120.3	0.050	0.050	40	33.35	2.00	8.3	-112.0	0.1	<0.05	4.2
VR93455	04EA064 @110M	9.7	1.27	<0.01	39.7	0.050	0.050	70	49.05	2.00	26.2	-13.5	0.7	<0.05	4.2
VR93456	04EA066 @100M	9.3	0.34	0.02	10.0	0.050	0.050	30	24.65	2.00	6.7	-3.3	0.7	<0.05	4.2
VR93457	04EA066 @210M	9.4	1.62	0.01	50.3	0.050	0.050	30	23.50	2.00	8.1	-42.2	0.2	<0.05	4.2
VR93458	04EA067 @100M	9.6	2.14	<0.01	66.9	0.050	0.050	60	37.60	2.00	28.0	-38.9	0.4	<0.05	4.2
VR93459	04EA070 @120M	9.5	0.25	<0.01	7.8	0.050	0.050	30	25.05	2.00	6.2	-1.6	0.8	<0.05	4.2
VR93460	04EA070 @350M	9.6	0.12	<0.01	3.8	0.050	0.050	30	22.55	2.00	9.3	5.6	2.5	0.07	5.8
VR93461	04EA072 @255M	9.5	0.23	<0.01	7.2	0.050	0.050	40	33.40	2.00	8.3	1.1	1.1	<0.05	4.2
VR93462	04EA072 @314M	9.4	0.26	<0.01	8.1	0.050	0.050	50	37.60	2.00	15.5	7.4	1.9	0.10	8.3
VR93463	04EA074 @90M	8.2	0.95	<0.01	29.7	0.050	0.050	30	25.20	2.00	6.0	-23.7	0.2	<0.05	4.2
DUPLICATES															
VR93404	04EA046 @205 M	9.3	-	-	-	0.050	0.050	30	25.50	2.00	5.6	-	-	-	-
VR93423	04EA050 @168M	9.3	-	-	-	0.050	0.050	30	23.05	2.00	8.7	-	-	-	-
VR93428	04EA052 @44M	8.8	-	-	-	0.050	0.050	70	36.55	2.00	41.8	-	-	-	-
VR93447	04EA061 @130M	9.1	-	-	-	0.050	0.050	40	34.30	2.00	7.1	-	-	-	-
VR93452	04EA062 @147M	9.2	-	-	-	0.050	0.050	40	31.90	2.00	10.1	-	-	-	-
VR93461	04EA072 @255M	9.5	-	-	-	0.050	0.050	40	33.95	2.00	7.6	-	-	-	-

AP: Acid potential in tonnes CaCO3 equivalent per 1000 tonnes of material. AP is determined from calculated sulphide sulphur content: S(T) - S(SO4) assuming total conversion of sulphide to sulphate. The calcuated sulphide content is multiplied by 31.25 to get an AP value. If S(T) -S(SO4) is 0, then AP is reported as <0.3

NP/AP: If AP is <0.3, then NP value is divided by 0.3 and reported as >(NP/.3) value.

NP: Neutralization potential in tonnes CaCO3 equivalent per 1000 tonnes of material.

NET NP: Net neutralization potential = Tonnes CaCO3 equivalent per 1000 tonnes of material.

TIC: Total Inorganic Carbon as %C.

NOTE: Where S(T) is reported as <0.01%, a S(T) value of 0.01% is used for the AP calculation.

Where S(SO4) is reported as <0.01%, it is assumed to be zero for the AP calculation (ie. if S(SO4) is less than 0.01% or is not analyzed, AP is calculated from S(T) only).

Carbonate NP calculated from total inorganic carbon (TIC) assay. NP is calculated by multiplying TIC% value to (100.09/12.01)*10. TIC value of 0.05 is used in calculation if TIC <0.05%.

Test Date: November 8. 2004

TABLE A-9
Net Acid Generation Testing
Phase II Eagle Project

SAMPLE		NAG pH	NaOH Molarity	NaOH Vol. (mL)		SAMPLE WT (g)	NAG pH 4.5 (kg H_2SO_4/tonne)	NAG pH 7.0 (kg H_2SO_4/tonne)
				to pH 4.5	to pH 7			
VR93404	04EA046 @205 M	5.75	0.100	0.00	0.85	2.50	0.0	1.7
VR93405	04EA045 @28 M	2.95	0.100	5.90	14.60	2.50	11.6	28.6
VR93406	04EA045 @32 M	5.47	0.100	0.00	0.35	2.50	0.0	0.7
VR93407	04EA046 @150 M	2.62	0.100	8.65	16.00	2.50	17.0	31.4
VR93408	04EA047 @20 M	6.34	0.100	0.00	0.35	2.50	0.0	0.7
VR93409	04EA047 @180 M	2.54	0.100	12.30	21.40	2.50	24.1	41.9
VR93410	04EA047 @224 M	6.25	0.100	0.00	2.15	2.50	0.0	4.2
VR93411	04EA048 @167M	4.87	0.100	0.00	3.40	2.50	0.0	6.7
VR93412	04EA049 @26M	8.20	0.100	0.00	0.00	2.50	0.0	0.0
VR93413	04EA049 @45 M	3.10	0.100	4.70	13.10	2.50	9.2	25.7
VR93414	04EA049 @ 53M	6.62	0.100	0.00	0.70	2.50	0.0	1.4
VR93415	04EA049 @58M	5.95	0.100	0.00	3.00	2.50	0.0	5.9
VR93416	04EA049 @63M	5.68	0.100	0.00	0.60	2.50	0.0	1.2
VR93417	04EA049 @75M	2.84	0.100	4.90	7.90	2.50	9.6	15.5
VR93418	04EA049 @115M	2.95	0.100	3.20	5.40	2.50	6.3	10.6
VR93419	04EA050 @75M	2.53	0.100	8.80	12.15	2.50	17.2	23.8
VR93420	04EA050 @122M	3.61	0.100	1.05	3.40	2.50	2.1	6.7
VR93421	04EA050 @130 M	2.57	0.100	6.60	8.90	2.50	12.9	17.4
VR93422	04EA050 @158M	7.18	0.100	0.00	0.00	2.50	0.0	0.0
VR93423	04EA050 @168M	5.59	0.100	0.00	0.90	2.50	0.0	1.8
VR93424	04EA050 @175M	2.44	0.100	8.20	11.10	2.50	16.1	21.8
VR93425	04EA051 @57M	2.57	0.100	7.05	9.30	2.50	13.8	18.2
VR93426	04EA051 @88M	2.76	0.100	4.80	7.10	2.50	9.4	13.9
VR93427	04EA051 @140M	2.64	0.100	5.70	8.55	2.50	11.2	16.8
VR93428	04EA052 @44M	6.42	0.100	0.00	0.90	2.50	0.0	1.8
VR93429	04EA052 @90M	2.80	0.100	4.35	6.60	2.50	8.5	12.9
VR93430	04EA052 @300M	6.54	0.100	0.00	0.50	2.50	0.0	1.0
VR93431	04EA052 @350M	2.50	0.100	10.50	15.60	2.50	20.6	30.6
VR93432	04EA052 @450M	4.17	0.100	0.40	1.45	2.50	0.8	2.8
VR93433	04EA053 @31M	4.70	0.100	0.00	2.10	2.50	0.0	4.1
VR93434	04EA053 @42M	2.53	0.100	13.65	26.70	2.50	26.8	52.3
VR93435	04EA053 @140M	2.31	0.100	21.10	33.40	2.50	41.4	65.5
VR93436	04EA053 @163M	4.24	0.100	0.30	2.30	2.50	0.6	4.5
VR93437	04EA053 @221M	6.37	0.100	0.00	0.75	2.50	0.0	1.5

TABLE A-9
Net Acid Generation Testing
Phase II Eagle Project

SAMPLE		NAG pH	NaOH Molarity	NaOH Vol. (mL)		SAMPLE WT (g)	NAG pH 4.5 (kg H_2SO_4/tonne)	NAG pH 7.0 (kg H_2SO_4/tonne)
				to pH 4.5	to pH 7			
VR93438	04EA054 @27M	3.29	0.100	2.10	7.10	2.50	4.1	13.9
VR93439	04EA055 @40M	4.43	0.100	0.05	3.60	2.50	0.1	7.1
VR93440	04EA056 @52M	5.43	0.100	0.00	1.00	2.50	0.0	2.0
VR93441	04EA056 @100M	3.24	0.100	1.85	4.20	2.50	3.6	8.2
VR93442	04EA056 @130M	6.06	0.100	0.00	0.50	2.50	0.0	1.0
VR93443	04EA057 @35M	3.53	0.100	2.00	7.70	2.50	3.9	15.1
VR93444	04EA058 @70M	2.90	0.100	5.40	23.20	2.50	10.6	45.5
VR93445	04EA059 @97.4M	7.30	0.100	0.00	0.00	2.50	0.0	0.0
VR93446	04EA059 @99M	7.22	0.100	0.00	0.00	2.50	0.0	0.0
VR93447	04EA061 @130M	2.30	0.100	17.00	21.60	2.50	33.3	42.3
VR93448	04EA061 @242M	7.13	0.100	0.00	0.00	2.50	0.0	0.0
VR93449	04EA061 @302M	3.34	0.100	1.85	4.60	2.50	3.6	9.0
VR93450	04EA061 @335M	4.72	0.100	0.00	1.85	2.50	0.0	3.6
VR93451	04EA061 @400M	2.02	0.100	22.00	26.90	2.50	43.1	52.7
VR93452	04EA062 @147M	3.39	0.100	1.10	2.25	2.50	2.2	4.4
VR93453	04EA062 @170M	5.76	0.100	0.00	0.75	2.50	0.0	1.5
VR93454	04EA062 @233M	2.32	0.100	17.80	0.00	2.50	34.9	0.0
VR93455	04EA064 @110M	3.41	0.100	1.40	5.80	2.50	2.7	11.4
VR93456	04EA066 @100M	4.22	0.100	0.05	1.10	2.50	0.1	2.2
VR93457	04EA066 @210M	2.36	0.100	13.40	18.30	2.50	26.3	35.9
VR93458	04EA067 @100M	2.88	0.100	5.70	12.40	2.50	11.2	24.3
VR93459	04EA070 @120M	5.37	0.100	0.00	1.10	2.50	0.0	2.2
VR93460	04EA070 @350M	5.99	0.100	0.00	1.45	2.50	0.0	2.8
VR93461	04EA072 @255M	5.94	0.100	0.00	0.60	2.50	0.0	1.2
VR93462	04EA072 @314M	6.67	0.100	0.00	0.30	2.50	0.0	0.6
VR93463	04EA074 @90M	2.50	0.100	6.70	9.55	2.50	13.1	18.7

APPENDIX B

EAGLE PROJECT ACID ROCK DRAINAGE STUDY

PHASE I AND II KINETIC TESTING
DATA AND GRAPHS

APPENDIX B.1

EAGLE PROJECT ACID ROCK DRAINAGE STUDY

PHASE I KINETIC TESTING
DATA AND GRAPHS

APPENDIX B.1
PHASE I KINETIC DATA

PHASE I COLUMN 1

WEEK	DATE	WATER ADDED (L)	pH WATER ADDED	LEACHATE COLLECTED (L)	LEACHATE pH	REDOX (mV)	CONDUCTIVITY (µS/cm)	ACIDITY (pH 4.5) (mg CaCO3/L)	ACIDITY (pH 8.3) (mg CaCO3/L)	ALKALINITY (mg CaCO3/L)	SULPHATE (mg/L)
0	20-Feb-04	0.570	5.41	0.470	9.02	217	102	0.0	0.0	55.0	29
1	24-Feb-04	0.500	5.62	0.430	7.88	267	155	0.0	9.0	63.0	14
2	2-Mar-04	0.500	5.54	0.445	7.58	260	103	0.0	6.5	30.5	13
3	9-Mar-04	0.500	5.31	0.450	7.56	265	89	0.0	6.0	26.0	15
4	16-Mar-04	0.500	5.44	0.450	7.24	282	82	0.0	10.5	21.5	22
5	23-Mar-04	0.500	5.20	0.445	7.20	282	96	0.0	9.5	21.0	25
6	30-Mar-04	0.500	5.38	0.445	7.41	283	101	0.0	10.5	22.0	26
7	6-Apr-04	0.500	5.41	0.445	7.43	281	91	0.0	11.0	21.0	21
8	13-Apr-04	0.500	5.55	0.450	7.24	287	88	0.0	7.0	19.5	23
9	20-Apr-04	0.500	5.34	0.445	7.46	210	81	0.0	7.5	19.0	23
10	27-Apr-04	0.500	5.42	0.405	7.51	269	87	0.0	12.5	18.5	21
11	4-May-04	0.500	5.61	0.445	7.46	283	82	0.0	6.0	19.5	22
12	11-May-04	0.500	5.48	0.445	7.57	284	83	0.0	16.0	20.0	25
13	18-May-04	0.500	5.56	0.450	7.48	271	86	0.0	8.0	18.0	27
14	25-May-04	0.500	5.64	0.445	7.49	281	89	0.0	9.5	16.5	28
15	1-Jun-04	0.500	5.63	0.465	7.54	284	89	0.0	10.5	18.0	28
16	8-Jun-04	0.500	5.56	0.450	7.45	280	88	0.0	9.0	16.5	26
17	15-Jun-04	0.500	5.56	0.450	7.33	315	91	0.0	16.0	16.0	30
18	22-Jun-04	0.500	5.50	0.450	7.43	335	93	0.0	8.5	16.5	34
19	29-Jun-04	0.500	5.57	0.450	7.44	329	93	0.0	5.5	16.0	33
20	6-Jul-04	0.500	5.81	0.445	7.48	339	115	0.0	8.0	16.0	35
21	13-Jul-04	0.500	5.60	0.450	7.38	305	115	0.0	5.0	15.0	38
22	20-Jul-04	0.500	5.50	0.450	7.55	308	119	0.0	12.5	15.5	34
23	27-Jul-04	0.500	5.54	0.450	7.12	-	120	0.0	3.3	14.0	38
24	3-Aug-04	0.500	5.60	0.450	7.36	315	125	0.0	4.0	14.5	43
25	10-Aug-04	0.500	5.76	0.455	7.32	310	140	0.0	5.0	14.5	46
26	17-Aug-04	0.500	5.62	0.455	7.38	313	142	0.0	7.5	13.5	50
27	24-Aug-04	0.500	5.70	0.475	7.47	350	153	0.0	4.0	13.5	58
28	31-Aug-04	0.500	5.44	0.460	7.68	332	142	0.0	3.5	13.5	48
29	7-Sep-04	0.500	5.52	0.485	7.52	320	163	0.0	3.0	16.0	64
30	14-Sep-04	0.500	5.58	0.490	7.58	315	179	0.0	2.0	17.5	66
31	21-Sep-04	0.500	5.62	0.455	7.42	328	115	0.0	3.3	15.0	41
32	28-Sep-04	0.500	5.61	0.455	7.25	315	98	0.0	2.8	8.8	39
33	5-Oct-04	0.500	5.66	0.455	7.15	291	112	0.0	4.8	9.0	43
34	12-Oct-04	0.500	5.46	0.460	7.20	343	109	0.0	3.3	8.3	43
35	19-Oct-04	0.500	5.40	0.455	7.19	288	105	0.0	7.0	8.3	40
36	26-Oct-04	0.500	5.43	0.475	7.14	329	140	0.0	4.3	8.8	54
37	2-Nov-04	0.500	5.50	0.455	6.92	365	83	0.0	4.0	6.0	32
38	9-Nov-04	0.500	5.45	0.470	7.06	384	158	0.0	6.0	9.5	62
39	16-Nov-04	0.500	5.45	0.500	7.29	360	182	0.0	4.3	11.0	74
40	23-Nov-04	0.500	5.50	0.465	7.15	378	120	0.0	17.0	9.0	47
41	30-Nov-04	0.500	5.29	0.465	6.92	393	110	0.0	19.0	6.5	43
42	7-Dec-04	0.500	5.31	0.465	7.12	386	128	0.0	17.0	8.0	51
43	14-Dec-04	0.500	5.52	0.475	7.05	373	115	0.0	13.0	8.0	46
44	21-Dec-04	0.500	5.52	0.465	7.01	388	121	0.0	14.5	7.0	49
45	28-Dec-04	0.500	5.18	0.450	6.57	387	116	0.0	21.5	6.0	45
46	4-Jan-05	0.500	5.43	0.445	6.95	416	126	0.0	13.0	7.0	46
47	11-Jan-05	0.500	5.50	0.425	7.02	482	130	0.0	16.0	6.5	49
48	18-Jan-05	0.500	5.53	0.470	7.03	479	144	0.0	10.0	6.5	61
49	25-Jan-05	0.500	5.58	0.480	6.85	485	158	0.0	12.0	6.0	69
50	1-Feb-05	0.500	5.81	0.465	6.89	483	131	0.0	13.0	6.0	61
51	8-Feb-05	0.500	5.51	0.455	6.68	465	122	0.0	12.5	5.5	52
52	15-Feb-05	0.500	5.41	0.505	7.00	421	203	0.0	14.5	7.0	IP

APPENDIX B.1
PHASE I KINETIC DATA

PHASE I COLUMN 2

WEEK	DATE	WATER ADDED (L)	pH WATER ADDED	LEACHATE COLLECTED (L)	LEACHATE pH	REDOX (mV)	CONDUCTIVITY (µS/cm)	ACIDITY (pH 4.5) (mg CaCO3/L)	ACIDITY (pH 8.3) (mg CaCO3/L)	ALKALINITY (mg CaCO3/L)	SULPHATE (mg/L)
0	20-Feb-04	0.340	5.41	0.275	5.81	1	730	0.0	361.0	3.5	542
1	24-Feb-04	0.500	5.62	0.400	4.14	218	1074	4.0	765.0	0.0	837
2	2-Mar-04	0.500	5.54	0.410	3.81	244	1325	9.0	949.0	0.0	1120
3	9-Mar-04	0.500	5.31	0.410	3.61	257	1484	6.0	1067.0	0.0	1220
4	16-Mar-04	0.500	5.44	0.425	3.62	273	1358	13.0	1072.0	0.0	1100
5	23-Mar-04	0.500	5.20	0.420	3.75	261	1360	13.0	953.0	0.0	991
6	30-Mar-04	0.500	5.38	0.415	3.75	271	1270	12.0	889.0	0.0	942
7	6-Apr-04	0.500	5.41	0.420	3.70	267	1167	12.0	781.0	0.0	885
8	13-Apr-04	0.500	5.55	0.475	3.98	227	1322	6.0	991.0	0.0	1110
9	20-Apr-04	0.500	5.34	0.440	4.27	233	1109	2.0	848.0	0.0	651
10	27-Apr-04	0.500	5.42	0.400	4.17	217	1008	2.5	612.0	0.0	629
11	4-May-04	0.500	5.61	0.445	4.21	213	893	2.0	572.0	0.0	543
12	11-May-04	0.500	5.48	0.440	4.21	214	892	2.0	462.0	0.0	508
13	18-May-04	0.500	5.56	0.445	4.15	208	895	2.0	510.0	0.0	470
14	25-May-04	0.500	5.64	0.440	4.21	204	760	2.0	470.0	0.0	410
15	1-Jun-04	0.500	5.63	0.445	4.31	197	720	1.0	360.0	0.0	374
16	8-Jun-04	0.500	5.56	0.445	4.30	200	687	1.0	817.0	0.0	347
17	15-Jun-04	0.500	5.56	0.445	4.19	250	657	3.0	401.0	0.0	366
18	22-Jun-04	0.500	5.50	0.440	4.16	267	767	2.0	477.0	0.0	409
19	29-Jun-04	0.500	5.57	0.440	4.41	253	659	1.0	370.0	0.0	326
20	6-Jul-04	0.500	5.81	0.435	4.30	262	751	2.0	419.0	0.0	383
21	13-Jul-04	0.500	5.60	0.440	4.24	-	684	0.0	0.0	0.0	-
22	20-Jul-04	0.500	5.50	0.435	4.20	-	745	0.0	0.0	0.0	-
23	27-Jul-04	0.500	5.54	0.440	4.12	-	714	0.0	0.0	0.0	-
24	3-Aug-04	0.500	5.60	0.435	4.14	-	778	0.0	0.0	0.0	-
25	10-Aug-04	0.500	5.76	0.460	4.21	-	577	0.0	0.0	0.0	-
26	17-Aug-04	0.500	5.62	0.445	4.18	-	636	0.0	0.0	0.0	-
27	24-Aug-04	0.500	5.70	0.440	4.19	-	667	0.0	0.0	0.0	-
28	31-Aug-04	0.500	5.44	0.445	4.15	-	588	0.0	0.0	0.0	-
29	7-Sep-04	0.500	5.52	0.445	4.22	-	660	0.0	0.0	0.0	-
30	14-Sep-04	0.500	5.58	0.485	4.33	-	546	0.0	0.0	0.0	-
31	21-Sep-04	0.500	5.62	0.445	4.52	-	469	0.0	0.0	0.0	-
32	28-Sep-04	0.500	5.61	0.440	4.17	-	395	0.0	0.0	0.0	-
33	5-Oct-04	0.500	5.66	0.450	4.14	-	458	0.0	0.0	0.0	-
34	12-Oct-04	0.500	5.46	0.440	4.05	-	519	0.0	0.0	0.0	-
35	19-Oct-04	0.500	5.40	0.435	4.23	-	576	0.0	0.0	0.0	-
36	26-Oct-04	0.500	5.43	0.435	4.05	-	634	0.0	0.0	0.0	-
37	2-Nov-04	0.500	5.50	0.440	3.64	-	658	0.0	0.0	0.0	-
38	9-Nov-04	0.500	5.45	0.425	4.05	-	1070	0.0	0.0	0.0	-
39	16-Nov-04	0.500	5.45	0.490	4.18	-	974	0.0	0.0	0.0	-
40	23-Nov-04	0.500	5.50	0.445	4.15	-	489	0.0	0.0	0.0	-
41	30-Nov-04	0.500	5.29	0.425	3.95	-	649	0.0	0.0	0.0	-
42	7-Dec-04	0.500	5.31	0.440	4.09	-	997	0.0	0.0	0.0	-
43	14-Dec-04	0.500	5.52	0.440	4.05	-	761	0.0	0.0	0.0	-
44	21-Dec-04	0.500	5.52	0.430	4.03	-	867	0.0	0.0	0.0	-
45	28-Dec-04	0.500	5.18	0.430	4.02	-	702	0.0	0.0	0.0	-
46	4-Jan-05	0.500	5.43	0.405	3.97	-	699	0.0	0.0	0.0	-
47	11-Jan-05	0.500	5.50	0.385	3.96	-	761	0.0	0.0	0.0	-
48	18-Jan-05	0.500	5.53	0.440	4.06	-	785	0.0	0.0	0.0	-
49	25-Jan-05	0.500	5.58	0.445	3.99	-	660	0.0	0.0	0.0	-
50	1-Feb-05	0.500	5.81	0.435	3.89	-	563	0.0	0.0	0.0	-
51	8-Feb-05	0.500	5.51	0.430	3.81	-	712	0.0	0.0	0.0	-
52	15-Feb-05	0.500	5.41	0.445	4.02	-	872	0.0	0.0	0.0	-

APPENDIX B.1
PHASE I KINETIC DATA

PHASE I COLUMN 3

WEEK	DATE	WATER ADDED (L)	pH WATER ADDED	LEACHATE COLLECTED (L)	LEACHATE pH	REDOX (mV)	CONDUCTIVITY (µS/cm)	ACIDITY (pH 4.5) (mg CaCO3/L)	ACIDITY (pH 8.3) (mg CaCO3/L)	ALKALINITY (mg CaCO3/L)	SULPHATE (mg/L)
0	20-Feb-04	0.580	5.41	0.425	8.30	234	545	0.0	0.0	29.5	<3
1	24-Feb-04	0.500	5.62	0.360	8.23	181	629	0.0	1.0	122.5	6
2	2-Mar-04	0.500	5.54	0.420	8.04	252	358	0.0	2.0	73.0	5
3	9-Mar-04	0.500	5.31	0.415	8.03	248	284	0.0	2.0	67.0	7
4	16-Mar-04	0.500	5.44	0.425	7.80	268	225	0.0	5.5	53.5	5
5	23-Mar-04	0.500	5.20	0.420	7.79	263	245	0.0	3.5	61.0	4
6	30-Mar-04	0.500	5.38	0.420	8.02	252	241	0.0	3.5	68.0	4
7	6-Apr-04	0.500	5.41	0.415	7.92	250	234	0.0	4.5	68.0	5
8	13-Apr-04	0.500	5.55	0.420	7.88	254	201	0.0	3.5	53.5	4
9	20-Apr-04	0.500	5.34	0.425	7.93	263	196	0.0	8.0	60.5	4
10	27-Apr-04	0.500	5.42	0.375	7.97	250	190	0.0	2.5	58.5	4
11	4-May-04	0.500	5.61	0.420	7.89	260	188	0.0	2.5	61.5	5
12	11-May-04	0.500	5.48	0.420	7.97	262	174	0.0	4.0	56.5	5
13	18-May-04	0.500	5.56	0.420	8.16	258	179	0.0	2.0	57.0	4
14	25-May-04	0.500	5.64	0.420	8.00	263	166	0.0	3.5	54.0	4
15	1-Jun-04	0.500	5.63	0.415	8.04	268	166	0.0	2.5	55.5	5
16	8-Jun-04	0.500	5.56	0.420	7.86	280	157	0.0	4.5	51.5	5
17	15-Jun-04	0.500	5.56	0.420	7.86	295	155	0.0	4.5	53.0	<3
18	22-Jun-04	0.500	5.50	0.420	7.88	311	152	0.0	4.0	54.0	4
19	29-Jun-04	0.500	5.57	0.415	7.96	312	142	0.0	2.0	49.0	3
20	6-Jul-04	0.500	5.81	0.420	7.94	318	174	0.0	4.0	51.0	<3
21	13-Jul-04	0.500	5.60	0.420	7.91	302	167	0.0	5.5	48.0	4
22	20-Jul-04	0.500	5.50	0.420	7.94	289	169	0.0	4.5	49.0	<3
23	27-Jul-04	0.500	5.54	0.420	7.92	-	163	0.0	4.0	48.0	<3
24	3-Aug-04	0.500	5.60	0.420	7.89	307	159	0.0	2.5	45.5	4
25	10-Aug-04	0.500	5.76	0.425	7.80	304	145	0.0	3.0	39.5	3
26	17-Aug-04	0.500	5.62	0.420	7.96	294	149	0.0	2.5	44.0	4
27	24-Aug-04	0.500	5.70	0.415	7.89	330	134	0.0	2.0	39.5	3
28	31-Aug-04	0.500	5.44	0.420	7.92	316	137	0.0	2.0	39.0	4
29	7-Sep-04	0.500	5.52	0.380	8.07	305	184	0.0	2.5	55.5	3
30	14-Sep-04	0.500	5.58	0.485	7.92	313	188	0.0	2.5	40.5	6
31	21-Sep-04	0.500	5.62	0.420	7.99	319	144	0.0	1.8	50.3	<3
32	28-Sep-04	0.500	5.61	0.420	7.90	297	93	0.0	2.3	35.0	<3
33	5-Oct-04	0.500	5.66	0.435	7.66	277	109	0.0	4.5	28.0	4
34	12-Oct-04	0.500	5.46	0.420	7.86	254	109	0.0	2.8	35.5	<3
35	19-Oct-04	0.500	5.40	0.425	7.75	309	98	0.0	4.0	28.0	<3
36	26-Oct-04	0.500	5.43	0.415	7.88	269	105	0.0	3.5	36.0	<3
37	2-Nov-04	0.500	5.50	0.420	7.72	333	69	0.0	2.8	26.3	<3
38	9-Nov-04	0.500	5.45	0.420	7.89	338	124	0.0	3.0	39.5	4
39	16-Nov-04	0.500	5.45	0.455	7.81	341	144	0.0	6.8	32.8	5
40	23-Nov-04	0.500	5.50	0.430	7.67	351	100	0.0	7.5	27.0	4
41	30-Nov-04	0.500	5.29	0.420	7.71	345	98	0.0	12.0	34.5	<3
42	7-Dec-04	0.500	5.31	0.375	7.90	346	115	0.0	10.0	40.0	<3
43	14-Dec-04	0.500	5.52	0.435	7.86	347	106	0.0	10.0	40.0	<3
44	21-Dec-04	0.500	5.52	0.425	7.89	371	106	0.0	8.0	39.5	<3
45	28-Dec-04	0.500	5.18	0.420	7.89	360	104	0.0	6.0	38.5	<3
46	4-Jan-05	0.500	5.43	0.425	7.92	384	112	0.0	8.5	40.5	<3
47	11-Jan-05	0.500	5.50	0.420	7.85	443	113	0.0	9.5	41.5	<3
48	18-Jan-05	0.500	5.53	0.430	7.89	425	112	0.0	5.5	41.5	<3
49	25-Jan-05	0.500	5.58	0.430	7.70	441	105	0.0	7.5	38.0	<3
50	1-Feb-05	0.500	5.81	0.420	7.82	436	107	0.0	7.0	40.5	<3
51	8-Feb-05	0.500	5.51	0.420	7.73	432	107	0.0	9.5	41.5	<3
52	15-Feb-05	0.500	5.41	0.430	7.67	410	102	0.0	12.5	29.5	IP

APPENDIX B.1
PHASE I KINETIC DATA

PHASE I COLUMN 4

WEEK	DATE	WATER ADDED (L)	pH WATER ADDED	LEACHATE COLLECTED (L)	LEACHATE pH	REDOX (mV)	CONDUCTIVITY (µS/cm)	ACIDITY (pH 4.5) (mg CaCO3/L)	ACIDITY (pH 8.3) (mg CaCO3/L)	ALKALINITY (mg CaCO3/L)	SULPHATE (mg/L)
0	20-Feb-04	0.860	5.41	0.685	9.05	187	368	0.0	0.0	61.0	40
1	24-Feb-04	0.500	5.62	0.395	8.28	188	789	0.0	1.5	159.0	112
2	2-Mar-04	0.500	5.54	0.445	7.64	252	687	0.0	6.5	65.5	155
3	9-Mar-04	0.500	5.31	0.435	7.67	240	573	0.0	5.0	58.0	106
4	16-Mar-04	0.500	5.44	0.395	7.56	263	433	0.0	7.0	51.0	105
5	23-Mar-04	0.500	5.20	0.450	7.64	257	605	0.0	5.0	46.0	119
6	30-Mar-04	0.500	5.38	0.430	7.88	256	543	0.0	9.0	44.0	116
7	6-Apr-04	0.500	5.41	0.425	7.59	251	558	0.0	5.0	36.5	120
8	13-Apr-04	0.500	5.55	0.390	7.64	255	472	0.0	8.5	44.0	110
9	20-Apr-04	0.500	5.34	0.415	7.48	272	521	0.0	7.5	26.5	146
10	27-Apr-04	0.500	5.42	0.380	7.50	192	497	0.0	7.5	26.0	122
11	4-May-04	0.500	5.61	0.440	7.44	273	508	0.0	13.0	21.0	161
12	11-May-04	0.500	5.48	0.415	7.38	276	484	0.0	6.0	18.5	151
13	18-May-04	0.500	5.56	0.410	7.35	268	521	0.0	5.0	15.0	185
14	25-May-04	0.500	5.64	0.405	7.25	281	483	0.0	5.5	12.0	191
15	1-Jun-04	0.500	5.63	0.420	7.38	284	500	0.0	5.0	12.5	187
16	8-Jun-04	0.500	5.56	0.435	7.06	302	525	0.0	7.0	11.0	189
17	15-Jun-04	0.500	5.56	0.425	7.10	307	527	0.0	8.5	11.5	237
18	22-Jun-04	0.500	5.50	0.405	7.12	339	548	0.0	8.5	8.0	225
19	29-Jun-04	0.500	5.57	0.410	6.98	334	603	0.0	6.5	7.5	267
20	6-Jul-04	0.500	5.81	0.400	6.98	339	675	0.0	10.5	7.0	288
21	13-Jul-04	0.500	5.60	0.425	6.87	301	662	0.0	11.5	6.0	282
22	20-Jul-04	0.500	5.50	0.405	6.72	321	714	0.0	10.5	4.5	291
23	27-Jul-04	0.500	5.54	0.415	6.61	-	757	0.0	11.5	3.5	346
24	3-Aug-04	0.500	5.60	0.415	6.51	336	868	0.0	6.0	4.5	378
25	10-Aug-04	0.500	5.76	0.415	6.80	326	717	0.0	10.0	5.0	332
26	17-Aug-04	0.500	5.62	0.415	6.46	333	790	0.0	6.0	3.5	341
27	24-Aug-04	0.500	5.70	0.405	6.10	355	811	0.0	9.5	2.5	377
28	31-Aug-04	0.500	5.44	0.415	5.95	352	904	0.0	7.0	2.0	380
29	7-Sep-04	0.500	5.52	0.430	5.86	350	882	0.0	5.0	2.5	395
30	14-Sep-04	0.500	5.58	0.475	6.73	343	752	0.0	5.5	4.0	332
31	21-Sep-04	0.500	5.62	0.385	6.27	344	737	0.0	12.5	2.8	357
32	28-Sep-04	0.500	5.61	0.390	6.28	341	693	0.0	4.3	2.5	315
33	5-Oct-04	0.500	5.66	0.430	5.94	314	892	0.0	9.5	2.0	432
34	12-Oct-04	0.500	5.46	0.390	5.83	305	743	0.0	4.3	2.5	362
35	19-Oct-04	0.500	5.40	0.420	5.25	365	837	0.0	10.0	1.8	366
36	26-Oct-04	0.500	5.43	0.400	5.30	354	743	0.0	11.5	1.5	315
37	2-Nov-04	0.500	5.50	0.415	5.14	397	742	0.0	5.8	1.3	330
38	9-Nov-04	0.500	5.45	0.400	4.97	435	945	0.0	8.8	1.3	428
39	16-Nov-04	0.500	5.45	0.425	5.39	420	738	0.0	5.5	1.8	327
40	23-Nov-04	0.500	5.50	0.445	5.15	429	831	0.0	16.0	1.0	341
41	30-Nov-04	0.500	5.29	0.405	4.81	448	871	0.0	12.5	1.0	375
42	7-Dec-04	0.500	5.31	0.410	4.72	450	936	0.0	25.0	0.5	431
43	14-Dec-04	0.500	5.52	0.410	4.78	454	939	0.0	25.0	0.5	421
44	21-Dec-04	0.500	5.52	0.415	4.70	469	844	0.0	25.0	1.5	470
45	28-Dec-04	0.500	5.18	0.440	4.79	450	862	0.0	21.0	1.0	420
46	4-Jan-05	0.500	5.43	0.410	4.76	490	937	0.0	23.0	1.0	443
47	11-Jan-05	0.500	5.50	0.395	4.77	535	963	0.0	33.0	0.5	424
48	18-Jan-05	0.500	5.53	0.400	4.75	550	973	0.0	20.0	1.0	456
49	25-Jan-05	0.500	5.58	0.400	4.79	550	936	0.0	21.0	1.0	454
50	1-Feb-05	0.500	5.81	0.395	4.67	520	969	0.0	22.5	1.0	460
51	8-Feb-05	0.500	5.51	0.410	4.57	454	974	0.0	31.0	0.5	422
52	15-Feb-05	0.500	5.41	0.425	4.60	477	1077	0.0	26.5	0.5	487

APPENDIX B.1
PHASE I KINETIC DATA

PHASE I COLUMN 5

WEEK	DATE	WATER ADDED (L)	pH WATER ADDED	LEACHATE COLLECTED (L)	LEACHATE pH	REDOX (mV)	CONDUCTIVITY (µS/cm)	ACIDITY (pH 4.5) (mg CaCO3/L)	ACIDITY (pH 8.3) (mg CaCO3/L)	ALKALINITY (mg CaCO3/L)	SULPHATE (mg/L)
0	20-Feb-04	0.630	5.41	0.505	9.37	216	215	0.0	0.0	74.0	11
1	24-Feb-04	0.500	5.62	0.405	8.14	203	200	0.0	2.0	98.0	6
2	2-Mar-04	0.500	5.54	0.425	7.98	249	127	0.0	4.0	49.5	<3
3	9-Mar-04	0.500	5.31	0.430	7.78	243	114	0.0	9.5	40.5	10
4	16-Mar-04	0.500	5.44	0.430	7.50	272	96	0.0	11.0	35.5	9
5	23-Mar-04	0.500	5.20	0.425	7.54	269	102	0.0	10.5	34.5	15
6	30-Mar-04	0.500	5.38	0.430	7.67	270	106	0.0	4.0	33.0	17
7	6-Apr-04	0.500	5.41	0.425	7.50	264	108	0.0	17.5	32.0	21
8	13-Apr-04	0.500	5.55	0.475	7.72	270	157	0.0	5.5	32.5	39
9	20-Apr-04	0.500	5.34	0.430	7.60	278	102	0.0	4.5	29.5	20
10	27-Apr-04	0.500	5.42	0.380	7.59	200	100	0.0	7.5	28.5	20
11	4-May-04	0.500	5.61	0.420	7.78	274	94	0.0	10.0	29.0	20
12	11-May-04	0.500	5.48	0.420	7.63	274	88	0.0	9.5	26.0	21
13	18-May-04	0.500	5.56	0.445	7.72	264	121	0.0	10.0	24.5	34
14	25-May-04	0.500	5.64	0.425	7.65	278	79	0.0	5.0	23.5	21
15	1-Jun-04	0.500	5.63	0.425	7.65	276	85	0.0	6.0	23.5	20
16	8-Jun-04	0.500	5.56	0.425	7.57	297	87	0.0	7.0	21.5	17
17	15-Jun-04	0.500	5.56	0.425	7.48	190	83	0.0	6.0	20.5	23
18	22-Jun-04	0.500	5.50	0.445	7.47	258	107	0.0	8.0	21.5	37
19	29-Jun-04	0.500	5.57	0.445	7.56	319	106	0.0	7.5	20.0	34
20	6-Jul-04	0.500	5.81	0.440	7.50	250	104	0.0	10.5	18.5	31
21	13-Jul-04	0.500	5.60	0.435	7.48	294	102	0.0	7.0	18.0	26
22	20-Jul-04	0.500	5.50	0.435	7.50	301	111	0.0	10.5	18.0	30
23	27-Jul-04	0.500	5.54	0.435	7.48	-	102	0.0	6.0	16.5	32
24	3-Aug-04	0.500	5.60	0.430	7.51	314	94	0.0	3.5	17.0	25
25	10-Aug-04	0.500	5.76	0.440	7.50	306	105	0.0	8.0	16.5	30
26	17-Aug-04	0.500	5.62	0.435	7.48	314	92	0.0	7.5	15.0	25
27	24-Aug-04	0.500	5.70	0.435	7.55	334	84	0.0	3.5	15.5	24
28	31-Aug-04	0.500	5.44	0.435	7.36	313	82	0.0	5.0	14.5	20
29	7-Sep-04	0.500	5.52	0.415	7.61	308	103	0.0	2.5	17.5	26
30	14-Sep-04	0.500	5.58	0.475	7.59	306	136	0.0	2.5	17.0	46
31	21-Sep-04	0.500	5.62	0.430	7.50	337	83	0.0	5.5	16.0	24
32	28-Sep-04	0.500	5.61	0.435	7.34	238	53	0.0	5.3	12.0	15
33	5-Oct-04	0.500	5.66	0.435	7.28	286	69	0.0	2.5	12.5	23
34	12-Oct-04	0.500	5.46	0.440	7.38	285	66	0.0	3.0	11.8	19
35	19-Oct-04	0.500	5.40	0.440	7.29	297	64	0.0	4.3	11.5	20
36	26-Oct-04	0.500	5.43	0.440	7.31	320	61	0.0	5.0	11.3	15
37	2-Nov-04	0.500	5.50	0.430	7.18	367	45	0.0	10.3	9.8	13
38	9-Nov-04	0.500	5.45	0.440	7.34	373	86	0.0	11.0	12.5	25
39	16-Nov-04	0.500	5.45	0.445	7.38	371	125	0.0	10.8	13.3	42
40	23-Nov-04	0.500	5.50	0.435	7.16	392	73	0.0	11.5	11.0	23
41	30-Nov-04	0.500	5.29	0.440	7.06	399	68	0.0	20.5	10.0	20
42	7-Dec-04	0.500	5.31	0.475	7.25	387	64	0.0	11.5	11.0	17
43	14-Dec-04	0.500	5.52	0.445	7.25	397	62	0.0	11.0	11.0	17
44	21-Dec-04	0.500	5.52	0.450	7.22	418	64	0.0	14.5	10.5	22
45	28-Dec-04	0.500	5.18	0.445	7.33	405	62	0.0	13.0	10.5	18
46	4-Jan-05	0.500	5.43	0.430	7.33	429	68	0.0	14.5	5.5	18
47	11-Jan-05	0.500	5.50	0.440	7.16	483	65	0.0	13.5	10.0	18
48	18-Jan-05	0.500	5.53	0.450	7.15	480	72	0.0	20.0	9.0	22
49	25-Jan-05	0.500	5.58	0.450	7.09	491	70	0.0	11.5	9.0	28
50	1-Feb-05	0.500	5.81	0.435	7.25	491	66	0.0	18.0	9.0	19
51	8-Feb-05	0.500	5.51	0.435	7.15	432	62	0.0	16.5	10.0	18
52	15-Feb-05	0.500	5.41	0.435	7.06	427	84	0.0	14.0	7.5	IP

APPENDIX B.1
PHASE I KINETIC DATA

PHASE I COLUMN 1

Dissolved Metals	(mg/L)	Week 0	Week 0 HVAAS	Week 1	Week 1 HVAAS	Week 2	Week 2 DUP	Week 3	Week 3 HVAAS	Week 4	Week 5	Week 5 HVAAS	Week 6	Week 7	Week 8	Week 9	Week 10
Aluminum	Al	0.978		0.303		0.22	0.21	0.162		<0.20	0.0873		<0.20	<0.20	<0.20	<0.20	0.0572
Antimony	Sb	0.0117	0.0112	0.00783	0.0085	<0.20	<0.20	0.00596	0.00594	<0.20	0.00487	0.0044	<0.20	<0.20	<0.20	<0.20	0.00300
Arsenic	As	0.0486	0.0528	0.0237	0.0266	<0.20	<0.20	0.0257	0.0243	<0.20	0.0233	0.0329	<0.20	<0.20	<0.20	<0.20	0.0170
Barium	Ba	0.00160		0.00143		<0.010	<0.010	0.000638		<0.010	0.000681		<0.010	<0.010	<0.010	<0.010	0.000741
Beryllium	Be	<0.00050		<0.0010		<0.0050	<0.0050	<0.00050		<0.0050	<0.00050		<0.0050	<0.0050	<0.0050	<0.0050	<0.00050
Bismuth	Bi	<0.00050		<0.0010		<0.20	<0.20	<0.00050		<0.20	<0.00050		<0.20	<0.20	<0.20	<0.20	<0.00050
Boron	B	0.419		0.222		0.18	0.16	0.120		0.11	0.099		<0.10	<0.10	0.11	0.10	0.060
Cadmium	Cd	0.000066		<0.00010		<0.010	<0.010	<0.000050		<0.010	<0.000050		<0.010	<0.010	<0.010	<0.010	<0.000050
Calcium	Ca	0.528		1.19		1.50	1.45	2.75		3.90	4.62		5.19	5.47	5.82	5.65	5.78
Chromium	Cr	0.00080		<0.0010		<0.010	<0.010	<0.00050		<0.010	<0.00050		<0.010	<0.010	<0.010	<0.010	<0.00050
Cobalt	Co	0.00023		<0.00020		<0.010	<0.010	0.00013		<0.010	0.00021		<0.010	<0.010	<0.010	<0.010	0.00035
Copper	Cu	0.00808		0.00225		<0.010	<0.010	0.00149		<0.010	0.00079		<0.010	<0.010	<0.010	<0.010	0.00205
Iron	Fe	0.21		0.062		<0.030	<0.030	<0.030		<0.030	<0.030		0.055	<0.030	<0.030	<0.030	<0.030
Lead	Pb	0.000748		0.00030		<0.050	<0.050	0.000323		<0.050	0.000070		<0.050	<0.050	<0.050	<0.050	<0.000050
Lithium	Li	<0.0050		<0.010		<0.010	<0.010	0.0095		0.013	0.0086		0.012	0.010	<0.010	<0.010	0.0054
Magnesium	Mg	0.52		0.72		0.89	0.86	1.62		2.41	2.89		3.31	3.47	3.66	3.83	3.73
Manganese	Mn	0.00245		0.00258		<0.0050	<0.0050	0.00379		0.0062	0.00745		0.0081	0.0098	0.0112	0.0151	0.0143
Mercury	Hg	0.000065		<0.000050				<0.000050			<0.000050						<0.000050
Molybdenum	Mo	0.0846		0.0295		<0.030	<0.030	0.0159		<0.030	0.0121		<0.030	<0.030	<0.030	<0.030	0.00667
Nickel	Ni	0.00098		<0.0010		<0.050	<0.050	<0.00050		<0.050	0.00063		<0.050	<0.050	<0.050	<0.050	0.00086
Phosphorous	P	<0.30		<0.30		<0.30	<0.30	<0.30		<0.30	<0.30		<0.30	<0.30	<0.30	<0.30	<0.30
Potassium	K	5.5		8.3		7.7	8.1	6.9		5.4	4.4		3.7	3.9	2.6	3.4	2.5
Selenium	Se	0.0021	0.00199	<0.0020	0.00100	<0.20	<0.20	<0.0010	<0.00050	<0.20	<0.0010	0.00066	<0.20	<0.20	<0.20	<0.20	<0.0010
Silicon	Si	3.12		2.39		2.31	2.28	2.31		2.23	2.16		2.24	2.28	2.32	2.17	2.14
Silver	Ag	0.000595		0.000126		<0.010	<0.010	0.000139		<0.010	0.000022		<0.010	<0.010	<0.010	<0.010	0.000211
Sodium	Na	40.6		29.5		15.7	15.3	10.7		9.2	8.2		9.0	6.4	5.5	4.8	4.5
Strontium	Sr	0.00915		0.0227		0.0371	0.0365	0.0530		0.0769	0.0878		0.0973	0.100	0.105	0.102	0.0855
Thallium	Tl	0.00013		<0.00020		<0.20	<0.20	<0.00010		<0.20	<0.00010		<0.20	<0.20	<0.20	<0.20	<0.00010
Tin	Sn	0.00053		0.00032		<0.030	<0.030	0.00019		<0.030	0.00010		<0.030	<0.030	<0.030	<0.030	<0.00010
Titanium	Ti	<0.010		<0.010		<0.010	<0.010	<0.010		<0.010	<0.010		<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	U	0.000201		0.000195				0.000091			0.000115						0.000097
Vanadium	V	0.0123		0.0033		<0.030	<0.030	0.0022		<0.030	0.0016		<0.030	<0.030	<0.030	<0.030	<0.0010
Zinc	Zn	0.0040		<0.0020		<0.0050	<0.0050	<0.0010		0.0063	0.0015		0.0145	0.0067	<0.0050	<0.0050	<0.0010
Dissolved Anions	**(mg/L)**																
Chloride	Cl	12.2		0.84				<0.50			<0.50						<0.50
Fluoride	F	0.520		0.254				0.094			0.053						0.073
Sulphate	SO4												29.7				
Nutrients	**(mg/L)**																
Ammonia	N	0.260		0.096				0.081			0.033						<0.020
Nitrite/Nitrate	N	0.147		0.0389				0.0231			0.0130						0.0115
Total Dissolved Solids	(mg/L)	318		336				50			66						34

APPENDIX B.1
PHASE I KINETIC DATA

PHASE I COLUMN 1

Dissolved Metals	(mg/L)	Week 10 HVAAS	Week 10 DUP	Week 11	Week 12	Week 13	Week 14	Week 15	Week 15 HVAAS	Week 16	Week 16 DUP	Week 17	Week 18	Week 19	Week 20	Week 20 HVAAS	Week 21
Aluminum	Al			<0.20	<0.20	<0.20	<0.20	0.039		<0.20	<0.20	<0.20	<0.20	<0.20	0.0312		<0.20
Antimony	Sb			<0.20	<0.20	<0.20	<0.20	0.00194		<0.20	<0.20	<0.20	<0.20	<0.20	0.00145		<0.20
Arsenic	As			<0.20	<0.20	<0.20	<0.20	0.0121		<0.20	<0.20	<0.20	<0.20	<0.20	0.00816		<0.20
Barium	Ba			<0.010	<0.010	<0.010	<0.010	0.000689		<0.010	<0.010	<0.010	<0.010	<0.010	0.00120		<0.010
Beryllium	Be			<0.0050	<0.0050	<0.0050	<0.0050	<0.00050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.00050		<0.0050
Bismuth	Bi			<0.20	<0.20	<0.20	<0.20	<0.00050		<0.20	<0.20	<0.20	<0.20	<0.20	<0.00050		<0.20
Boron	B			<0.10	<0.10	<0.10	<0.10	0.047		<0.10	<0.10	<0.10	<0.10	<0.10	0.043		<0.10
Cadmium	Cd			<0.010	<0.010	<0.010	<0.010	<0.000050		<0.010	<0.010	<0.010	<0.010	<0.010	<0.000050		<0.010
Calcium	Ca			6.44	6.27	6.53	6.97	6.87		6.92	6.89	7.09	8.17	8.29	7.71		8.74
Chromium	Cr			<0.010	0.011	<0.010	<0.010	<0.00050		<0.010	<0.010	<0.010	<0.010	<0.010	<0.00050		<0.010
Cobalt	Co			<0.010	<0.010	0.011	<0.010	0.00072		<0.010	<0.010	<0.010	<0.010	<0.010	0.00150		<0.010
Copper	Cu			<0.010	<0.010	<0.010	<0.010	0.00099		<0.010	<0.010	<0.010	<0.010	<0.010	0.00898		<0.010
Iron	Fe			<0.030	<0.030	<0.030	<0.030	<0.030		<0.030	<0.030	<0.030	<0.030	<0.030	<0.030		<0.030
Lead	Pb			<0.050	<0.050	<0.050	<0.050	<0.000050		<0.050	<0.050	<0.050	<0.050	<0.050	<0.000050		<0.050
Lithium	Li			<0.010	<0.010	<0.010	<0.010	<0.0050		<0.010	<0.010	<0.010	0.011	<0.010	<0.0050		<0.010
Magnesium	Mg			4.17	4.18	4.36	4.63	4.43		5.22	5.21	4.70	5.30	5.82	5.18		5.63
Manganese	Mn			0.0202	0.0195	0.0234	0.0246	0.0245		0.0320	0.0319	0.0308	0.0379	0.0381	0.0419		0.0452
Mercury	Hg							<0.000050							<0.000050		
Molybdenum	Mo			<0.030	<0.030	<0.030	<0.030	0.00440		<0.030	<0.030	<0.030	<0.030	<0.030	0.00319		<0.030
Nickel	Ni			<0.050	<0.050	<0.050	<0.050	0.00158		<0.050	<0.050	<0.050	<0.050	<0.050	0.00251		<0.050
Phosphorous	P			<0.30	<0.30	<0.30	<0.30	<0.30		<0.30	<0.30	<0.30	<0.30	<0.30	<0.30		<0.30
Potassium	K			<2.0	2.4	3.3	2.7	2.3		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0		<2.0
Selenium	Se	<0.00050		<0.20	<0.20	<0.20	<0.20	<0.0010	0.00065	<0.20	<0.20	<0.20	<0.20	<0.20	<0.0010	0.0007	<0.20
Silicon	Si			2.21	2.18	2.11	2.18	2.10		1.96	1.94	1.94	2.24	2.17	2.00		2.14
Silver	Ag			<0.010	<0.010	<0.010	<0.010	<0.000010		<0.010	<0.010	<0.010	<0.010	<0.010	<0.000010		<0.010
Sodium	Na			3.9	3.6	2.9	3.2	2.8		2.6	2.6	2.2	2.6	2.2	2.2		<2.0
Strontium	Sr			0.107	0.103	0.104	0.106	0.0941		0.110	0.109	0.103	0.113	0.112	0.0948		0.111
Thallium	Tl			<0.20	<0.20	<0.20	<0.20	<0.00010		<0.20	<0.20	<0.20	<0.20	<0.30	<0.00010		<0.20
Tin	Sn			<0.030	<0.030	<0.030	<0.030	0.00024		<0.030	<0.030	<0.030	<0.030	<0.030	<0.00010		<0.030
Titanium	Ti			<0.010	<0.010	<0.010	<0.010	<0.010		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010		<0.010
Uranium	U							0.000107							0.000062		
Vanadium	V			<0.030	<0.030	<0.030	<0.030	<0.0010		<0.030	<0.030	<0.030	<0.030	<0.030	<0.0010		<0.030
Zinc	Zn			0.0095	<0.0050	<0.0050	<0.0050	0.0011		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0042		<0.0050
Dissolved Anions	**(mg/L)**																
Chloride	Cl		0.75					0.57							<0.50		
Fluoride	F		0.056					0.030							0.027		
Sulphate	SO4																
Nutrients	**(mg/L)**																
Ammonia	N							0.022							0.038		
Nitrite/Nitrate	N							0.027							0.019		
Total Dissolved Solids	(mg/L)							43							63		

APPENDIX B.1
PHASE I KINETIC DATA

PHASE I COLUMN 1

Dissolved Metals	(mg/L)	Week 22	Week 23	Week 24	Week 25	Week 25 DUP	Week 26	Week 27	Week 28	Week 29	Week 30	Week 30 DUP	Week 40	Week 40 DUP	Week 50	Week 50 DUP
Aluminum	Al	<0.20	<0.20	<0.20	0.0309	0.0277	<0.20	<0.20	<0.20	<0.20	0.0309		0.0089	0.0086	0.0087	
Antimony	Sb	<0.20	<0.20	<0.20	0.00113	0.00110	<0.20	<0.20	<0.20	<0.20	0.00098		0.00042	0.00042	0.00016	
Arsenic	As	<0.20	<0.20	<0.20	0.00613	0.00602	<0.20	<0.20	<0.20	<0.20	0.00395		0.00135	0.00133	0.00049	
Barium	Ba	<0.010	<0.010	<0.010	0.00190	0.00348	<0.010	<0.010	<0.010	<0.010	0.00132		0.000872	0.000877	0.00119	
Beryllium	Be	<0.0050	<0.0050	<0.0050	<0.00050	<0.00050	<0.0050	<0.0050	<0.0050	<0.0050	<0.00050		<0.00050	<0.00050	<0.00050	
Bismuth	Bi	<0.20	<0.20	<0.20	<0.00050	<0.00050	<0.20	<0.20	<0.20	<0.20	<0.00050		<0.00050	<0.00050	<0.00050	
Boron	B	<0.10	<0.10	<0.10	0.046	0.046	<0.10	<0.10	<0.10	<0.10	0.060		0.034	0.033	0.020	
Cadmium	Cd	<0.010	<0.010	<0.010	<0.000050	<0.000050	<0.010	<0.010	<0.010	<0.010	<0.000050		0.000154	0.000084	0.000365	
Calcium	Ca	8.29	8.94	9.65	9.88	10.2	10.9	11.0	10.4	12.4	13.6		9.03	9.33	9.89	
Chromium	Cr	<0.010	<0.010	<0.010	<0.00050	<0.00050	<0.010	<0.010	<0.010	<0.010	<0.00050		<0.00050	<0.00050	<0.00050	
Cobalt	Co	<0.010	<0.010	<0.010	0.00214	0.00213	<0.010	<0.010	<0.010	<0.010	0.00191		0.00613	0.00626	0.0265	
Copper	Cu	<0.010	<0.010	<0.010	0.00040	0.00047	<0.010	<0.010	<0.010	<0.010	0.00056		0.00032	0.00032	0.00093	
Iron	Fe	<0.030	0.264	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030		<0.030	<0.030	<0.030	
Lead	Pb	<0.050	<0.050	<0.050	0.000108	<0.000050	<0.050	<0.050	<0.050	<0.050	0.000055		<0.000050	<0.000050	0.000082	
Lithium	Li	<0.010	<0.010	<0.010	<0.0050	<0.0050	<0.010	0.012	0.010	0.012	<0.0050		0.0053	0.0059	<0.0050	
Magnesium	Mg	5.53	6.05	6.33	6.67	6.86	7.94	8.28	7.71	9.42	10.0		6.82	7.02	7.99	
Manganese	Mn	0.0490	0.0617	0.0650	0.0642	0.0650	0.0731	0.0710	0.0771	0.107	0.101		0.183	0.189	0.353	
Mercury	Hg				<0.000050	<0.000050					<0.000050		<0.000050	<0.000050	0.000060	
Molybdenum	Mo	<0.030	<0.030	<0.030	0.00294	0.00293	<0.030	<0.030	<0.030	<0.030	0.00193		0.000653	0.000664	0.000177	
Nickel	Ni	<0.050	0.126	<0.050	0.00344	0.00341	<0.050	<0.050	<0.050	<0.050	0.00307		0.0111	0.0120	0.0484	
Phosphorous	P	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30		<0.30	<0.30	<0.30	
Potassium	K	<2.0	<2.0	2.4	<2.0	<2.0	<2.0	2.7	<2.0	<2.0	2.2		<2.0	<2.0	<2.0	
Selenium	Se	<0.20	<0.20	<0.20	<0.0010	<0.0010	<0.20	<0.20	<0.20	<0.20	<0.0010		<0.0010	<0.0010	<0.0010	
Silicon	Si	2.09	2.11	2.04	1.85	1.92	2.07	1.97	1.84	2.07	1.73		1.18	1.24	1.22	
Silver	Ag	<0.010	<0.010	<0.010	<0.000010	<0.000010	<0.010	<0.010	<0.010	<0.010	<0.000010		<0.000010	<0.000010	<0.000010	
Sodium	Na	<2.0	<2.0	<2.0	2.1	2.1	<2.0	2.3	<2.0	<2.0	<2.0		<2.0	<2.0	<2.0	
Strontium	Sr	0.106	0.106	0.115	0.118	0.121	0.129	0.138	0.125	0.142	0.146		0.0982	0.0984	0.0710	
Thallium	Tl	<0.20	<0.20	<0.20	<0.00010	<0.00010	<0.20	<0.20	<0.20	<0.20	<0.00010		<0.00010	<0.00010	<0.00010	
Tin	Sn	<0.030	<0.030	<0.030	0.00020	<0.00010	<0.030	<0.030	<0.030	<0.030	0.00049		<0.00010	<0.00010	<0.00010	
Titanium	Ti	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010		<0.010	<0.010	<0.010	
Uranium	U				0.000070	0.000061					0.000106		0.000024	0.000020	0.000015	
Vanadium	V	<0.030	<0.030	<0.030	<0.0010	<0.0010	<0.030	<0.030	<0.030	<0.030	<0.0010		<0.0010	<0.0010	<0.0010	
Zinc	Zn	<0.0050	0.0050	<0.0050	0.0033	0.0063	<0.0050	<0.0050	<0.0050	<0.0050	0.0027		0.0120	0.0080	0.0296	
Dissolved Anions	**(mg/L)**															
Chloride	Cl				0.57						<0.50		<0.50		<0.50	<0.50
Fluoride	F				0.061						0.038		0.038		0.048	0.044
Sulphate	SO4															
Nutrients	**(mg/L)**															
Ammonia	N				0.030						<0.020	0.022	0.0053		<0.0050	
Nitrite/Nitrate	N				0.017						0.018	0.013	<0.050		<0.050	
Total Dissolved Solids	(mg/L)				125						139		66		112	

APPENDIX B.1
PHASE I KINETIC DATA

PHASE I COLUMN 2

Dissolved Metals	(mg/L)	Week 0	Week 0 HVAAS	Week 1	Week 1 HVAAS	Week 2	Week 3	Week 3 HVAAS	Week 3 DUP	Week 3 HVAAS-DUP	Week 4	Week 5	Week 5 HVAAS	Week 6	Week 7
Aluminum	Al	<0.050		0.121		<0.40	0.12		<0.10		<0.40	0.30		<0.20	<0.20
Antimony	Sb	<0.0050	<0.00020	<0.0050	<0.0020	<0.40	<0.010	0.00252	<0.010	0.00254	<0.40	<0.010	<0.0020	<0.30	<0.30
Arsenic	As	<0.0050	0.00527	<0.0050	0.0184	<0.40	<0.010	0.0120	<0.010	0.0123	<0.40	<0.010	0.00635	<0.20	<0.20
Barium	Ba	0.0582		0.0431		0.025	0.0214		0.0196		0.024	0.0147		<0.010	0.013
Beryllium	Be	<0.025		<0.025		<0.010	<0.050		<0.050		<0.010	<0.050		<0.0050	<0.0050
Bismuth	Bi	<0.025		<0.025		<0.40	<0.050		<0.050		<0.40	<0.050		<0.20	<0.20
Boron	B	0.52		<0.50		<0.20	<1.0		<1.0		<0.20	<1.0		<0.10	<0.10
Cadmium	Cd	<0.0025		0.0773		<0.20	0.0612		0.0533		<0.10	0.0254		<0.10	<0.20
Calcium	Ca	19.0		21.3		5.69	4.08		4.11		3.85	2.08		1.92	1.39
Chromium	Cr	<0.025		<0.025		<0.10	<0.050		<0.050		<0.10	<0.050		<0.10	<0.10
Cobalt	Co	0.464		4.81		6.99	8.21		7.57		8.95	6.78		6.31	5.46
Copper	Cu	0.0539		0.0752		0.108	0.818		0.754		0.794	0.634		0.405	0.585
Iron	Fe	97.6		176		219	290		293		246	232		209	197
Lead	Pb	0.0032		0.0140		0.17	0.0525		0.0462		<0.10	0.0490		<0.050	<0.050
Lithium	Li	<0.25		<0.25		<0.020	<0.50		<0.50		<0.020	<0.50		<0.010	<0.010
Magnesium	Mg	16.9		22.3		9.75	9.42		9.57		9.35	6.53		6.15	5.22
Manganese	Mn	10.2		9.81		7.77	9.20		8.47		10.9	7.82		7.43	6.81
Mercury	Hg	0.000125		<0.000050			<0.000050		<0.000050			0.000190			
Molybdenum	Mo	0.0114		<0.0025		<0.060	0.0060		<0.0050		<0.060	<0.0050		<0.030	<0.030
Nickel	Ni	148		276		380	405		377		427	338		320	287
Phosphorous	P	<0.30		<0.60		<0.60	<0.60		<0.60		<0.60	<0.60		<0.30	<0.30
Potassium	K	5.2		<4.0		<4.0	<4.0		<4.0		<4.0	<4.0		<2.0	<2.0
Selenium	Se	<0.050	0.00553	<0.025	0.0170	<0.40	<0.10	0.0497	<0.10	0.0503	<0.40	<0.10	0.0365	<0.20	<0.20
Silicon	Si	1.77		2.56		1.97	1.95		1.99		2.01	2.00		2.10	2.27
Silver	Ag	<0.00050		<0.00050		<0.020	<0.0010		<0.0010		<0.020	<0.0010		<0.010	<0.010
Sodium	Na	33.2		18.1		<4.0	<4.0		<4.0		<4.0	<4.0		<2.0	<2.0
Strontium	Sr	0.378		0.301		0.046	0.029		0.026		0.031	0.015		0.0160	0.0118
Thallium	Tl	<0.0050		<0.0050		<0.40	<0.010		<0.010		<0.40	<0.010		<0.20	<0.20
Tin	Sn	<0.0050		<0.0050		<0.060	<0.010		<0.010		<0.060	<0.010		<0.030	<0.040
Titanium	Ti	<0.010		<0.020		<0.020	<0.020		<0.020		<0.020	<0.020		<0.010	<0.010
Uranium	U	<0.00050		<0.00050			<0.0010		<0.0010			<0.0010			
Vanadium	V	<0.050		<0.050		<0.060	<0.10		<0.10		<0.060	<0.10		<0.030	<0.030
Zinc	Zn	0.537		2.48		1.09	0.89		0.84		1.01	0.32		<0.31	<0.30
Dissolved Anions	**(mg/L)**														
Chloride	Cl	124		29.6			3.82					12.3			
Fluoride	F	0.024		<0.020			2.6					0.025			
Sulphate	SO4													1060	
Nutrients	**(mg/L)**														
Ammonia	N	0.486		0.392			0.090					0.042			
Nitrite/Nitrate	N	0.388		0.0814			0.059					0.0801			
Total Dissolved Solids	(mg/L)	1240		1600			2180					1900			

APPENDIX B.1
PHASE I KINETIC DATA

PHASE I COLUMN 2

Dissolved Metals	(mg/L)	Week 8	Week 9	Week 10	Week 10 HVAAS	Week 10 DUP	Week 11	Week 12	Week 12 DUP	Week 13	Week 14	Week 15	Week 15 HVAAS	Week 16	Week 17
Aluminum	Al	<0.20	<0.20	<0.020			<0.20	<0.20	<0.20	<0.20	<0.20	<0.020		<0.20	<0.20
Antimony	Sb	<0.30	<0.20	<0.0020	0.00181		<0.20	<0.20	<0.20	<0.20	<0.20	<0.0020	0.00092	<0.20	<0.20
Arsenic	As	<0.20	<0.20	0.0026	0.00826		<0.20	<0.20	<0.30	<0.30	<0.20	<0.0020	0.00629	<0.20	<0.20
Barium	Ba	0.011	<0.010	0.0079			<0.010	<0.010	<0.010	<0.010	<0.010	0.0074		<0.010	<0.010
Beryllium	Be	<0.0050	<0.0050	<0.010			<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010		<0.0050	<0.0050
Bismuth	Bi	<0.20	<0.20	<0.010			<0.20	<0.20	<0.20	<0.20	<0.20	<0.010		<0.20	<0.20
Boron	B	0.12	<0.10	<0.20			<0.10	<0.10	0.10	<0.10	<0.10	<0.20		<0.10	<0.10
Cadmium	Cd	<0.15	<0.050	0.0073			<0.20	<0.20	<0.20	<0.20	<0.15	0.0028		<0.010	<0.10
Calcium	Ca	3.55	1.73	1.65			1.55	1.40	1.47	1.53	1.28	1.21		1.15	1.15
Chromium	Cr	<0.10	<0.050	<0.010			<0.10	<0.10	<0.10	<0.10	<0.10	<0.010		<0.010	<0.050
Cobalt	Co	6.95	3.79	2.27			2.11	1.56	1.62	1.35	1.09	0.939		0.843	0.744
Copper	Cu	<0.030	<0.010	0.0039			<0.010	<0.050	<0.050	<0.010	0.013	0.0200		<0.010	<0.010
Iron	Fe	262	183	165			158	141	148	162	138	128		123	106
Lead	Pb	<0.050	<0.050	0.0061			<0.050	<0.050	<0.080	<0.050	<0.050	0.0038		<0.050	<0.050
Lithium	Li	<0.010	<0.010	<0.10			<0.020	<0.010	<0.010	<0.010	<0.010	<0.10		<0.010	<0.010
Magnesium	Mg	9.59	6.81	6.01			5.86	5.42	5.55	5.54	4.68	4.14		4.45	3.63
Manganese	Mn	12.9	7.19	5.29			5.34	4.58	4.78	4.78	3.88	3.28		3.15	2.98
Mercury	Hg			<0.000050								0.000054			
Molybdenum	Mo	<0.030	<0.030	<0.0010			<0.030	<0.030	<0.030	<0.030	<0.030	<0.0010		<0.030	<0.030
Nickel	Ni	347	223	141			152	121	128	118	98.0	83.9		73.3	75.6
Phosphorous	P	<0.30	<0.30	<0.30			<0.30	<0.30	<0.30	<0.30	<0.30	<0.30		<0.30	<0.30
Potassium	K	<2.0	<2.0	<2.0			<2.0	<2.0	<2.0	<2.0	<2.0	<2.0		<2.0	<2.0
Selenium	Se	<0.20	<0.20	0.034	0.0248		<0.20	<0.20	<0.20	<0.20	<0.20	<0.020	0.0130	<0.20	<0.20
Silicon	Si	2.76	2.27	2.24			2.24	2.16	2.23	2.25	2.16	2.04		1.87	1.87
Silver	Ag	<0.010	<0.010	<0.00020			<0.010	<0.010	<0.010	<0.010	<0.010	<0.00020		<0.010	<0.010
Sodium	Na	<2.0	<2.0	<2.0			<2.0	<2.0	<2.0	<2.0	<2.0	<2.0		<2.0	<2.0
Strontium	Sr	0.0312	0.0164	0.0179			0.0184	0.0131	0.0182	0.0185	0.0171	0.0156		0.0164	0.0145
Thallium	Tl	<0.20	<0.20	<0.0020			<0.20	<0.20	<0.20	<0.20	<0.20	<0.0020		<0.20	<0.20
Tin	Sn	<0.050	<0.030	<0.0020			<0.030	<0.040	<0.030	<0.030	<0.030	<0.0020		<0.030	<0.030
Titanium	Ti	<0.010	<0.010	<0.010			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010		<0.010	<0.010
Uranium	U			<0.00020								<0.00020			
Vanadium	V	<0.030	<0.030	<0.020			<0.030	<0.030	<0.030	<0.030	<0.030	<0.020		<0.030	<0.030
Zinc	Zn	<0.60	0.046	0.051			<0.10	<0.20	<0.20	<0.10	<0.10	0.030		0.0273	<0.10
Dissolved Anions	**(mg/L)**														
Chloride	Cl			10.7								12.4			
Fluoride	F			0.042								<0.020			
Sulphate	SO4														
Nutrients	**(mg/L)**														
Ammonia	N			<0.020		<0.020						<0.020			
Nitrite/Nitrate	N			0.584		0.0482						0.034			
Total Dissolved Solids	(mg/L)			1200								768			

APPENDIX B.1
PHASE I KINETIC DATA

PHASE I COLUMN 2

Dissolved Metals	(mg/L)	Week 18	Week 19	Week 20	Week 20 HVAAS	Week 40
Aluminum	Al	<0.20	<0.20	<0.020		0.0052
Antimony	Sb	<0.20	<0.20	<0.0020	0.00045	<0.00010
Arsenic	As	<0.20	<0.20	<0.0020	0.00367	0.00013
Barium	Ba	<0.010	<0.010	0.0067		0.00226
Beryllium	Be	<0.0050	<0.0050	<0.010		<0.00050
Bismuth	Bi	<0.20	<0.20	<0.010		<0.00050
Boron	B	<0.10	<0.10	<0.20		0.012
Cadmium	Cd	<0.20	<0.15	0.0024		0.000846
Calcium	Ca	1.49	1.03	1.13		0.430
Chromium	Cr	<0.050	<0.010	<0.010		<0.00050
Cobalt	Co	0.845	0.648	0.674		0.363
Copper	Cu	<0.010	<0.010	0.0124		0.00482
Iron	Fe	146	124	138		89.5
Lead	Pb	<0.050	<0.050	0.0066		0.00236
Lithium	Li	<0.010	<0.010	<0.10		<0.0050
Magnesium	Mg	4.46	4.01	3.85		1.56
Manganese	Mn	3.71	2.77	2.72		1.59
Mercury	Hg			0.000058		0.000055
Molybdenum	Mo	<0.030	<0.030	<0.0010		<0.000050
Nickel	Ni	88.5	72.3	67.7		39.9
Phosphorous	P	<0.30	<0.30	<0.30		<0.30
Potassium	K	<2.0	<2.0	<2.0		<2.0
Selenium	Se	<0.20	<0.20	<0.020	0.00854	0.0045
Silicon	Si	2.17	2.08	1.93		0.667
Silver	Ag	<0.010	<0.010	<0.00020		0.000019
Sodium	Na	<2.0	<2.0	<2.0		<2.0
Strontium	Sr	0.0186	0.0140	0.0161		0.00492
Thallium	Tl	<0.20	<0.20	<0.0020		<0.00010
Tin	Sn	<0.030	<0.030	<0.0020		<0.00010
Titanium	Ti	<0.010	<0.010	<0.010		<0.010
Uranium	U			<0.00020		0.000013
Vanadium	V	<0.030	<0.030	<0.020		<0.0010
Zinc	Zn	<0.060	<0.050	0.031		0.0127
Dissolved Anions	**(mg/L)**					
Chloride	Cl			1.82		<0.50
Fluoride	F			<0.020		<0.020
Sulphate	SO4					
Nutrients	**(mg/L)**					
Ammonia	N			0.040		0.023
Nitrite/Nitrate	N			0.022		<0.050
Total Dissolved Solids	(mg/L)			759		391

APPENDIX B.1
PHASE I KINETIC DATA

PHASE I COLUMN 3

Dissolved Metals	(mg/L)	Week 0	Week 0 HVAAS	Week 1	Week 1 HVAAS	Week 2	Week 3	Week 3 HVAAS	Week 4	Week 5	Week 5 HVAAS	Week 6	Week 6 DUP	Week 7	Week 8	Week 9	Week 10	Week 10 HVAAS
Aluminum	Al	0.0035		0.0066		<0.20	0.0031		<0.20	0.0026		<0.20	<0.20	<0.20	<0.20	<0.20	0.0067	
Antimony	Sb	0.00101	0.00100	0.00145	<0.0020	<0.20	0.00100	0.00080	<0.20	0.00064	<0.0020	<0.20	<0.20	<0.20	<0.20	<0.20	0.00046	
Arsenic	As	<0.0020	<0.00020	0.00135	0.00090	<0.20	0.00323	N/A	<0.20	0.00048	0.0006	<0.20	<0.20	<0.20	<0.20	<0.20	0.00066	
Barium	Ba	0.0674		0.0537		0.035	0.0360		0.034	0.0336		0.033	0.039	0.044	0.043	0.034	0.0386	
Beryllium	Be	<0.00050		<0.0010		<0.0050	<0.00050		<0.0050	<0.00050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.00050	
Bismuth	Bi	<0.00050		<0.0010		<0.20	<0.00050		<0.20	<0.00050		<0.20	<0.20	<0.20	<0.20	<0.20	<0.00050	
Boron	B	0.013		0.025		<0.10	0.012		<0.10	0.010		<0.10	<0.10	<0.10	<0.10	<0.10	<0.010	
Cadmium	Cd	<0.000050		<0.00010		<0.010	<0.000050		<0.010	<0.000050		<0.010	<0.010	<0.010	<0.010	<0.010	<0.000050	
Calcium	Ca	20.2		14.1		9.75	9.87		9.68	10.3		10.9	10.8	12.0	11.2	11.1	11.0	
Chromium	Cr	<0.00050		<0.0010		<0.010	<0.00050		<0.010	<0.00050		<0.010	<0.010	<0.010	<0.010	<0.010	<0.00050	
Cobalt	Co	0.00027		0.00044		<0.010	0.00014		<0.010	<0.00010		<0.010	<0.010	<0.010	<0.010	<0.010	<0.00010	
Copper	Cu	0.00209		0.00577		<0.010	0.00104		<0.010	0.00094		<0.010	<0.010	<0.010	<0.010	<0.010	0.00226	
Iron	Fe	<0.030		<0.030		<0.030	<0.030		<0.030	<0.030		<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	
Lead	Pb	0.000121		0.00020		<0.050	0.000156		<0.050	0.000104		<0.050	<0.050	<0.050	<0.050	<0.050	0.000239	
Lithium	Li	<0.0050		<0.010		<0.010	<0.0050		<0.010	<0.0050		<0.010	<0.010	<0.010	<0.010	<0.010	<0.0050	
Magnesium	Mg	38.9		58.7		26.3	19.2		14.9	14.4		14.7	14.6	14.0	11.1	11.7	10.2	
Manganese	Mn	0.00458		0.00848		0.0052	0.00336		<0.0050	0.00283		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00311	
Mercury	Hg	<0.000050		<0.000050			<0.000050			<0.000050							<0.000050	
Molybdenum	Mo	0.000541		0.00157		<0.030	0.00106		<0.030	0.000687		<0.030	<0.030	<0.030	<0.030	<0.030	0.000408	
Nickel	Ni	0.00926		0.0169		<0.050	0.00401		<0.050	0.00205		<0.050	<0.050	<0.050	<0.050	<0.050	0.00337	
Phosphorous	P	<0.30		<0.30		<0.30	<0.30		<0.30	<0.30		<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	
Potassium	K	25.5		34.7		22.9	18.7		16.1	15.3		15.4	14.1	12.9	11.9	11.2	10.7	
Selenium	Se	<0.0020	<0.00050	<0.0020	<0.00050	<0.20	<0.0010	<0.00050	<0.20	<0.0010	<0.00050	<0.20	<0.20	<0.20	<0.20	<0.20	<0.0010	<0.00050
Silicon	Si	3.66		4.70		4.23	4.07		3.64	3.70		4.04	4.01	4.27	3.88	3.91	3.87	
Silver	Ag	<0.000010		<0.000020		<0.010	<0.000010		<0.010	0.000218		<0.010	<0.010	<0.010	<0.010	<0.010	0.000047	
Sodium	Na	26.4		29.6		14.6	10.7		8.7	7.9		7.4	7.3	6.2	6.1	5.3	5.0	
Strontium	Sr	0.160		0.0921		0.0631	0.0518		0.0504	0.0469		0.0511	0.0500	0.0503	0.0482	0.0471	0.0433	
Thallium	Tl	<0.00010		<0.00020		<0.20	<0.00010		<0.20	<0.00010		<0.20	<0.20	<0.20	<0.20	<0.20	<0.00010	
Tin	Sn	0.00016		0.00052		<0.030	0.00039		<0.030	0.00164		<0.030	<0.030	<0.030	<0.030	<0.030	0.00015	
Titanium	Ti	<0.010		<0.010		<0.010	<0.010		<0.010	<0.010		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Uranium	U	<0.000010		<0.000020			<0.000010			<0.000010							0.000035	
Vanadium	V	<0.0010		<0.0020		<0.030	<0.0010		<0.030	<0.0010		<0.030	<0.030	<0.030	<0.030	<0.030	<0.0010	
Zinc	Zn	0.0017		0.0025		<0.0050	<0.0010		0.0053	0.0011		0.0114	0.0104	0.0096	<0.0050	<0.0050	<0.0010	
Dissolved Anions	**(mg/L)**																	
Chloride	Cl	203		198			54.9			38.4							23.5	
Fluoride	F	0.025		0.022			<0.020			0.050							0.037	
Sulphate	SO4											7.5						
Nutrients	**(mg/L)**																	
Ammonia	N	0.154		0.03			0.022			<0.020							<0.020	
Nitrite/Nitrate	N	0.0688		<0.0050			<0.0050			0.0054							0.0144	
Total Dissolved Solids	(mg/L)	754		2090			186			139							91	

APPENDIX B.1
PHASE I KINETIC DATA

PHASE I COLUMN 3

Dissolved Metals	(mg/L)	Week 11	Week 12	Week 13	Week 14	Week 15	Week 15 HVAAS	Week 16	Week 17	Week 18	Week 18 DUP	Week 19	Week 20	Week 20 HVAAS	Week 20 DUP	Week 21	Week 22	Week 23
Aluminum	Al	<0.20	<0.20	<0.20	<0.20	0.0036		<0.20	<0.20	<0.20	<0.20	<0.20	0.0035			<0.20	<0.20	<0.20
Antimony	Sb	<0.20	<0.20	<0.20	<0.20	0.00035		<0.20	<0.20	<0.20	<0.20	<0.20	0.00028			<0.20	<0.20	<0.20
Arsenic	As	<0.20	<0.20	<0.20	<0.20	0.00073		<0.20	<0.20	<0.20	<0.20	<0.20	0.00029			<0.20	<0.20	<0.20
Barium	Ba	0.045	0.044	0.047	0.045	0.0412		0.047	0.040	0.049	0.043	0.046	0.0445			0.045	0.044	0.047
Beryllium	Be	<0.0050	<0.0050	<0.0050	<0.0050	<0.00050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.00050			<0.0050	<0.0050	<0.0050
Bismuth	Bi	<0.20	<0.20	<0.20	<0.20	<0.00050		<0.20	<0.20	<0.20	<0.20	<0.20	<0.00050			<0.20	<0.20	<0.20
Boron	B	<0.10	<0.10	<0.10	<0.10	<0.010		<0.10	<0.10	<0.10	<0.10	<0.10	<0.010			<0.10	<0.10	<0.10
Cadmium	Cd	<0.010	<0.010	<0.010	<0.010	<0.000050		<0.010	<0.010	<0.010	<0.010	<0.010	<0.000050			<0.010	<0.010	<0.010
Calcium	Ca	11.7	10.9	11.7	11.3	10.8		10.6	11.0	12.1	11.6	11.3	11.0			11.3	11.0	11.1
Chromium	Cr	<0.010	<0.010	<0.010	<0.010	<0.00050		<0.010	<0.010	<0.010	<0.010	<0.010	<0.00050			<0.010	<0.010	<0.010
Cobalt	Co	<0.010	<0.010	0.011	<0.010	<0.00010		<0.010	<0.010	<0.010	<0.010	<0.010	<0.00010			<0.010	<0.010	<0.010
Copper	Cu	<0.010	<0.010	<0.010	<0.010	0.00086		<0.010	<0.010	<0.010	<0.010	<0.010	0.00764			<0.010	<0.010	<0.010
Iron	Fe	<0.030	<0.030	<0.030	<0.030	<0.030		<0.030	<0.030	<0.030	<0.030	<0.030	<0.030			<0.030	<0.030	<0.030
Lead	Pb	<0.050	<0.050	<0.050	<0.050	<0.000050		<0.050	<0.050	<0.050	<0.050	<0.050	0.000061			<0.050	<0.050	<0.050
Lithium	Li	<0.010	<0.020	<0.010	0.015	<0.0050		<0.010	<0.010	0.014	<0.010	0.014	<0.0050			<0.010	<0.010	<0.010
Magnesium	Mg	10.8	9.82	9.99	9.19	8.54		9.35	8.28	8.73	8.44	8.57	7.90			7.74	7.67	7.75
Manganese	Mn	<0.0050	<0.0050	<0.0050	<0.0050	0.00343		<0.0050	<0.0050	<0.0050	<0.0050	0.0050	0.00368			<0.0050	<0.0050	0.0060
Mercury	Hg					<0.000050							<0.000050					
Molybdenum	Mo	<0.030	<0.030	<0.030	<0.030	0.000261		<0.030	<0.030	<0.030	<0.030	<0.030	0.000245			<0.030	<0.030	<0.030
Nickel	Ni	<0.050	<0.050	<0.050	<0.050	0.00206		<0.050	<0.050	<0.050	<0.050	<0.050	0.00242			<0.050	<0.050	<0.050
Phosphorous	P	<0.30	<0.30	<0.30	<0.30	<0.30		<0.30	<0.30	<0.30	<0.30	<0.30	<0.30			<0.30	<0.30	<0.30
Potassium	K	10.3	9.3	9.4	10.2	8.7		9.2	8.5	8.6	9.0	8.4	7.3			6.6	6.3	7.7
Selenium	Se	<0.20	<0.20	<0.20	<0.20	<0.0010	<0.00050	<0.20	<0.20	<0.20	<0.20	<0.20	<0.0010	<0.00050		<0.20	<0.20	<0.20
Silicon	Si	4.03	3.88	4.05	4.00	3.74		3.56	3.61	4.17	4.05	3.94	3.76			3.90	4.05	3.89
Silver	Ag	<0.010	<0.010	<0.010	<0.010	<0.000010		<0.010	<0.010	<0.010	<0.010	<0.010	<0.000010			<0.010	<0.010	<0.010
Sodium	Na	4.4	4.3	4.1	4.0	3.5		4.2	3.4	3.7	3.7	3.4	3.4			3.1	3.3	3.1
Strontium	Sr	0.0473	0.0429	0.0451	0.0440	0.0397		0.0452	0.0405	0.0425	0.0408	0.0363	0.0373			0.0382	0.0382	0.0345
Thallium	Tl	<0.20	<0.20	<0.20	<0.20	<0.00010		<0.20	<0.20	<0.20	<0.20	<0.20	<0.00010			<0.20	<0.20	<0.20
Tin	Sn	<0.030	<0.030	<0.030	<0.030	0.00018		<0.030	<0.030	<0.030	<0.030	<0.030	0.00016			<0.030	<0.030	<0.030
Titanium	Ti	<0.010	<0.010	<0.010	<0.010	<0.010		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010			<0.010	<0.010	<0.010
Uranium	U					0.000088							<0.000010					
Vanadium	V	<0.030	<0.030	<0.030	<0.030	<0.0010		<0.030	<0.030	<0.030	<0.030	<0.030	<0.0010			<0.030	<0.030	<0.030
Zinc	Zn	<0.0050	<0.0050	<0.0050	<0.0050	<0.0010		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0016			<0.0050	<0.0050	<0.0050
Dissolved Anions	**(mg/L)**																	
Chloride	Cl					18.8							18.4					
Fluoride	F					<0.020							<0.020					
Sulphate	SO4																	
Nutrients	**(mg/L)**																	
Ammonia	N					<0.020							0.035		0.029			
Nitrite/Nitrate	N					0.022							0.012		0.016			
Total Dissolved Solids	(mg/L)					84							100					

APPENDIX B.1
PHASE I KINETIC DATA

PHASE I COLUMN 3

Dissolved Metals	(mg/L)	Week 24	Week 25	Week 25 DUP	Week 26	Week 27	Week 28	Week 28 DUP	Week 29	Week 30	Week 30 DUP	Week 40	Week 40 DUP	Week 50	Week 50 DUP
Aluminum	Al	<0.20	0.0035		<0.20	<0.20	<0.20	<0.20	<0.20	0.0031	0.0025	0.0033		0.0067	
Antimony	Sb	<0.20	0.00025		<0.20	<0.20	<0.20	<0.20	<0.20	0.00033	0.00032	0.00017		0.00011	
Arsenic	As	<0.20	0.00026		<0.20	<0.20	<0.20	<0.20	<0.20	0.00039	0.00038	0.00014		<0.00010	
Barium	Ba	0.042	0.0361		0.041	0.037	0.036	0.033	0.051	0.0421	0.0430	0.0232		0.0308	
Beryllium	Be	<0.0050	<0.00050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.00050	<0.00050	<0.00050		<0.00050	
Bismuth	Bi	<0.20	<0.00050		<0.20	<0.20	<0.20	<0.20	<0.20	<0.00050	<0.00050	<0.00050		<0.00050	
Boron	B	<0.10	<0.010		<0.10	<0.10	<0.10	<0.10	<0.10	<0.010	<0.010	<0.010		<0.010	
Cadmium	Cd	<0.010	<0.000050		<0.010	<0.010	<0.010	<0.010	<0.010	<0.000050	<0.000050	<0.000050		<0.000050	
Calcium	Ca	10.9	9.26		11.0	9.53	9.48	9.45	13.1	12.7	12.3	7.07		7.63	
Chromium	Cr	<0.010	<0.00050		<0.010	<0.010	<0.010	<0.010	<0.010	<0.00050	<0.00050	<0.00050		<0.00050	
Cobalt	Co	<0.010	0.00017		<0.010	<0.010	<0.010	<0.010	<0.010	<0.00010	<0.00010	<0.00010		<0.00010	
Copper	Cu	<0.010	0.00070		<0.010	<0.010	<0.010	<0.010	<0.010	0.00034	0.00035	0.00250		0.00062	
Iron	Fe	<0.030	<0.030		<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030		<0.030	
Lead	Pb	<0.050	<0.000050		<0.050	<0.050	<0.050	<0.050	<0.050	<0.000050	<0.000050	<0.000050		<0.000050	
Lithium	Li	<0.010	<0.0050		<0.010	<0.010	<0.010	<0.010	<0.010	<0.0050	<0.0050	<0.0050		<0.0050	
Magnesium	Mg	7.30	5.99		7.53	6.37	6.30	6.27	9.05	8.32	7.97	4.71		5.77	
Manganese	Mn	<0.0050	0.00400		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00265	0.00267	0.00270		0.00377	
Mercury	Hg		<0.000050							<0.000050	<0.000050	<0.000050		<0.000050	
Molybdenum	Mo	<0.030	0.000217		<0.030	<0.030	<0.030	<0.030	<0.030	0.000232	0.000204	0.000265		0.000066	
Nickel	Ni	<0.050	0.0131		<0.050	<0.050	<0.050	<0.050	<0.050	0.00180	0.00166	0.00310		0.00141	
Phosphorous	P	<0.30	<0.30		<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30		<0.30	
Potassium	K	8.6	6.1		7.7	6.1	6.8	6.8	7.9	7.9	7.9	3.6		4.0	
Selenium	Se	<0.20	<0.0010		<0.20	<0.20	<0.20	<0.20	<0.20	<0.0010	<0.0010	<0.0010		<0.0010	
Silicon	Si	3.76	3.38		3.74	3.23	3.13	3.14	4.09	3.54	3.42	2.40		2.57	
Silver	Ag	<0.010	<0.000010		<0.010	<0.010	<0.010	<0.010	<0.010	<0.000010	<0.000010	<0.000010		<0.000010	
Sodium	Na	3.2	2.9		2.8	2.8	2.5	2.5	3.4	3.8	3.5	<2.0		<2.0	
Strontium	Sr	0.0369	0.0312		0.0354	0.0313	0.0302	0.0303	0.0405	0.0394	0.0392	0.0216		0.0223	
Thallium	Tl	<0.20	<0.00010		<0.20	<0.20	<0.20	<0.20	<0.20	<0.00010	<0.00010	<0.00010		<0.00010	
Tin	Sn	<0.030	0.00011		<0.030	<0.030	<0.030	<0.030	<0.030	<0.00010	<0.00010	<0.00010		<0.00010	
Titanium	Ti	<0.010	<0.010		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010		<0.010	
Uranium	U		<0.000010							<0.000010	<0.000010	<0.000010		<0.000010	
Vanadium	V	<0.030	<0.0010		<0.030	<0.030	<0.030	<0.030	<0.030	<0.0010	<0.0010	<0.0010		<0.0010	
Zinc	Zn	<0.0050	0.0035		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0010		0.0014	
Dissolved Anions	**(mg/L)**														
Chloride	Cl		17.1	16.5						28.8		11.3	11.4	8.36	
Fluoride	F		<0.020	0.028						<0.020		<0.020	<0.020	<0.020	
Sulphate	SO4														
Nutrients	**(mg/L)**														
Ammonia	N		<0.020							<0.020		<0.0050		<0.0050	<0.0050
Nitrite/Nitrate	N		<0.010							0.011		<0.050		<0.050	<0.050
Total Dissolved Solids	(mg/L)		100							136		55		97	

APPENDIX B.1
PHASE I KINETIC DATA

PHASE I COLUMN 4

Dissolved Metals	(mg/L)	Week 0	Week 0 HVAAS	Week 1	Week 1 HVAAS	Week 2	Week 3	Week 3 HVAAS	Week 4	Week 5	Week 5 HVAAS	Week 6	Week 7	Week 8	Week 8 DUP	Week 9	Week 10
Aluminum	Al	<0.0050		<0.0050		<0.20	<0.0050		<0.20	0.0022		<0.20	<0.20	<0.20	<0.20	<0.20	0.0012
Antimony	Sb	0.00086	0.00100	0.00129	<0.0020	<0.20	<0.0010	0.00130	<0.20	0.00059	<0.0020	<0.20	<0.20	<0.20	<0.20	<0.20	0.00021
Arsenic	As	0.00071	0.00156	0.00111	0.00150	<0.20	<0.0020	0.00242	<0.20	0.00053	0.0012	<0.20	<0.20	<0.20	<0.20	<0.20	0.00036
Barium	Ba	0.00736		0.0182		0.021	0.0196		0.023	0.0186		0.022	0.025	0.025	0.024	0.021	0.0237
Beryllium	Be	<0.0025		<0.0025		<0.0050	<0.0025		<0.0050	<0.00050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.00050
Bismuth	Bi	<0.0025		<0.0025		<0.20	<0.0025		<0.20	<0.00050		<0.20	<0.20	<0.20	<0.20	<0.20	<0.00050
Boron	B	1.16		2.50		2.22	1.77		1.76	1.42		1.64	1.35	1.34	1.33	1.19	0.859
Cadmium	Cd	<0.00025		<0.00025		<0.010	<0.00025		<0.010	<0.000050		<0.010	<0.010	<0.010	<0.010	<0.010	0.000051
Calcium	Ca	5.58		11.8		21.1	20.3		20.7	22.9		22.9	24.7	23.3	23.6	23.5	21.5
Chromium	Cr	<0.0025		<0.0025		<0.010	<0.0025		<0.010	<0.00050		<0.010	<0.010	<0.010	<0.010	<0.010	<0.00050
Cobalt	Co	<0.00050		0.00184		<0.010	0.00226		<0.010	0.00178		<0.010	<0.010	<0.010	<0.010	<0.010	0.00255
Copper	Cu	0.00514		0.0594		0.020	0.0128		0.022	0.0118		0.016	0.018	0.014	0.012	0.011	0.0185
Iron	Fe	<0.030		<0.030		<0.030	<0.030		<0.030	<0.030		<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	Pb	<0.00025		<0.00025		<0.050	0.00051		<0.050	<0.000050		<0.050	<0.050	<0.050	<0.050	<0.050	<0.000050
Lithium	Li	<0.025		<0.025		<0.010	<0.025		<0.010	<0.0050		<0.010	<0.010	<0.010	<0.010	<0.010	<0.0050
Magnesium	Mg	15.5		68.8		64.6	47.1		38.4	40.2		37.7	37.2	31.5	31.4	38.1	34.4
Manganese	Mn	0.00122		0.0105		0.0142	0.0121		0.0135	0.0149		0.0183	0.0228	0.0293	0.0251	0.0286	0.0285
Mercury	Hg	<0.000050		0.000079			0.000052			0.000166							0.000904
Molybdenum	Mo	0.0021		0.00194		<0.030	0.00054		<0.030	0.000516		<0.030	<0.030	<0.030	<0.030	<0.030	0.000130
Nickel	Ni	0.0224		0.121		0.109	0.101		0.070	0.0703		0.072	0.093	0.086	0.112	0.118	0.0877
Phosphorous	P	<0.30		<0.30		<0.30	<0.30		<0.30	<0.30		<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium	K	12.5		43.2		39.3	32.3		27.1	27.4		24.9	23.4	21.7	22.4	21.1	18.4
Selenium	Se	<0.0050	0.00129	<0.0050	0.00230	<0.20	<0.0050	0.00216	<0.20	0.0025	0.00236	<0.20	<0.20	<0.20	<0.20	<0.20	0.0024
Silicon	Si	3.44		3.84		2.72	2.57		2.59	2.33		2.34	2.34	2.92	2.90	2.35	2.36
Silver	Ag	<0.000050		0.000899		<0.010	0.000388		<0.010	0.000406		<0.010	<0.010	<0.010	<0.010	<0.010	0.000311
Sodium	Na	42.2		79.4		48.7	29.8		19.8	20.0		16.3	13.0	9.5	9.3	10.9	9.6
Strontium	Sr	0.0721		0.162		0.234	0.160		0.138	0.113		0.100	0.0975	0.0876	0.0866	0.0895	0.0647
Thallium	Tl	<0.00050		<0.00050		<0.20	<0.00050		<0.20	<0.00010		<0.20	<0.20	<0.20	<0.20	<0.20	<0.00010
Tin	Sn	<0.00050		<0.00050		<0.030	0.00056		<0.030	0.00019		<0.030	<0.030	<0.030	<0.030	<0.030	0.00013
Titanium	Ti	<0.010		<0.010		<0.010	<0.010		<0.010	<0.010		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	U	<0.000050		<0.000050			<0.000050			<0.000010							<0.000010
Vanadium	V	<0.0050		<0.0050		<0.030	<0.0050		<0.030	<0.0010		<0.030	<0.030	<0.030	<0.030	<0.030	<0.0010
Zinc	Zn	<0.0050		<0.0050		<0.0050	<0.0050		0.0124	0.0035		0.0175	0.0096	0.0059	<0.0050	0.0058	0.0029
Dissolved Anions	**(mg/L)**																
Chloride	Cl	96.8		34.0			7.07			130							85.7
Fluoride	F	0.026		0.022			<0.020			0.025							0.032
Sulphate	SO4											121					
Nutrients	**(mg/L)**																
Ammonia	N	0.104		0.051			<0.020			<0.020							<0.020
Nitrite/Nitrate	N	0.0839		<0.0050			<0.0050			0.0076							0.0167
Total Dissolved Solids	(mg/L)	262		2870			512			448							362

APPENDIX B.1
PHASE I KINETIC DATA

PHASE I COLUMN 4

Dissolved Metals	(mg/L)	Week 10 HVAAS	Week 11	Week 12	Week 13	Week 14	Week 15	Week 15 HVAAS	Week 16	Week 17	Week 18	Week 19	Week 20	Week 20 HVAAS	Week 20 DUP	Week 21	Week 22
Aluminum	Al		<0.20	<0.20	<0.20	<0.20	<0.0010		<0.20	<0.20	<0.20	<0.20	<0.0010		<0.0010	<0.20	<0.20
Antimony	Sb		<0.20	<0.20	<0.20	<0.20	0.00014		<0.20	<0.20	<0.20	<0.20	0.00015		0.00015	<0.20	<0.20
Arsenic	As		<0.20	<0.20	<0.20	<0.20	0.00046		<0.20	<0.20	<0.20	<0.20	0.00034		0.00034	<0.20	<0.20
Barium	Ba		0.030	0.026	0.029	0.030	0.0355		0.045	0.040	0.048	0.047	0.0458		0.0459	0.05	0.056
Beryllium	Be		<0.0050	<0.0050	<0.0050	<0.0050	<0.00050		<0.0050	<0.0050	<0.0050	<0.0050	<0.00050		<0.00050	<0.0050	<0.0050
Bismuth	Bi		<0.20	<0.20	<0.20	<0.20	<0.00050		<0.20	<0.20	<0.20	<0.20	<0.00050		<0.00050	<0.20	<0.20
Boron	B		1.23	0.99	1.17	1.08	0.892		0.99	0.98	1.09	1.04	0.847		0.852	1.08	1.13
Cadmium	Cd		<0.010	<0.020	<0.010	<0.010	0.000063		<0.010	<0.010	<0.010	<0.010	0.00018		0.000174	<0.010	<0.010
Calcium	Ca		22.4	19.0	20.9	18.7	18.0		17.2	17.0	17.6	18.6	16.4		16.3	16.9	16.1
Chromium	Cr		<0.010	<0.010	<0.010	<0.010	<0.00050		<0.010	<0.010	<0.010	<0.010	<0.00050		<0.00050	<0.010	<0.010
Cobalt	Co		<0.010	<0.010	<0.010	<0.010	0.00595		<0.010	<0.010	0.014	0.015	0.0142		0.0145	0.025	0.022
Copper	Cu		<0.010	<0.010	<0.010	<0.010	0.00450		<0.010	0.013	0.019	<0.010	0.0318		0.0312	<0.010	<0.010
Iron	Fe		<0.030	<0.030	<0.030	<0.030	<0.030		<0.030	<0.030	<0.030	<0.030	<0.030		<0.030	<0.030	<0.030
Lead	Pb		<0.050	<0.050	<0.050	<0.050	<0.000050		<0.050	<0.050	<0.050	<0.050	<0.000050		<0.000050	<0.050	<0.050
Lithium	Li		<0.010	<0.010	<0.010	<0.010	<0.0050		<0.010	<0.010	0.014	<0.010	<0.0050		<0.0050	<0.010	0.014
Magnesium	Mg		38.4	37.0	42.2	39.2	40.4		46.8	44.7	49.2	62.8	59.0		59.2	62.6	67.6
Manganese	Mn		0.0377	0.0455	0.0620	0.0708	0.0847		0.107	0.114	0.150	0.193	0.179		0.183	0.265	0.314
Mercury	Hg						0.00205						0.000702		0.000702		
Molybdenum	Mo		<0.030	<0.030	<0.030	<0.030	0.000150		<0.030	<0.030	<0.030	<0.030	0.000052		0.000070	<0.030	<0.030
Nickel	Ni		0.140	0.165	0.261	0.270	0.341		0.494	0.585	0.855	1.24	1.21		1.24	1.99	2.59
Phosphorous	P		<0.30	<0.30	<0.30	<0.30	<0.30		<0.30	<0.30	<0.30	<0.30	<0.30		<0.30	<0.30	<0.30
Potassium	K		20.4	16.7	19.7	17.2	17.8		18.9	17.1	17.8	17.8	16.5		18.1	18.7	17.9
Selenium	Se	0.00196	<0.20	<0.20	<0.20	<0.20	0.0038	0.00355	<0.20	<0.20	<0.20	<0.20	0.0074	0.00643	0.0073	<0.20	<0.20
Silicon	Si		2.32	2.31	2.54	2.62	2.59		2.55	2.66	3.11	3.30	3.11		3.13	3.49	3.71
Silver	Ag		<0.010	<0.010	<0.010	<0.010	0.000101		<0.010	<0.010	<0.010	<0.010	0.000240		0.000237	<0.010	<0.010
Sodium	Na		9.7	7.8	8.2	6.8	6.8		7.8	6.7	6.5	6.8	6.3		5.9	6.2	6.0
Strontium	Sr		0.0850	0.0747	0.0881	0.0832	0.0761		0.0912	0.0812	0.0845	0.0954	0.0738		0.0743	0.0887	0.0919
Thallium	Tl		<0.20	<0.20	<0.20	<0.20	<0.00010		<0.20	<0.20	<0.20	<0.20	0.00015		0.00016	<0.20	<0.20
Tin	Sn		<0.030	<0.030	<0.030	<0.030	<0.00010		<0.030	<0.030	<0.030	<0.030	0.00016		0.00022	<0.030	<0.030
Titanium	Ti		<0.010	<0.010	<0.010	<0.010	<0.010		<0.010	<0.010	<0.010	<0.010	<0.010		<0.010	<0.010	<0.010
Uranium	U						<0.000010						<0.000010		<0.000010		
Vanadium	V		<0.030	<0.030	<0.030	<0.030	<0.0010		<0.030	<0.030	<0.030	<0.030	<0.0010		<0.0010	<0.030	<0.030
Zinc	Zn		<0.0050	<0.0050	<0.0050	0.0051	0.0076		0.0072	0.0077	0.0127	0.0160	0.0181		0.0181	0.0192	0.0191
Dissolved Anions	**(mg/L)**																
Chloride	Cl						54.7						2.33				
Fluoride	F						<0.020						<0.020				
Sulphate	SO4																
Nutrients	**(mg/L)**																
Ammonia	N						<0.020						0.034				
Nitrite/Nitrate	N						0.026						0.016				
Total Dissolved Solids	(mg/L)						398						540				

APPENDIX B.1
PHASE I KINETIC DATA

PHASE I COLUMN 4

Dissolved Metals	(mg/L)	Week 22 DUP	Week 23	Week 24	Week 25	Week 26	Week 27	Week 28	Week 29	Week 30	Week 30 DUP	Week 40	Week 40 DUP	Week 50
Aluminum	Al	<0.20	<0.20	<0.20	<0.0010	<0.20	<0.20	<0.20	<0.20	<0.0020		<0.010		0.027
Antimony	Sb	<0.20	<0.20	<0.20	0.00014	<0.20	<0.20	<0.20	<0.20	<0.00020		<0.0010		<0.0020
Arsenic	As	<0.20	<0.20	<0.20	0.00040	<0.20	<0.20	<0.20	<0.20	0.00058		<0.0010		<0.0020
Barium	Ba	0.051	0.047	0.047	0.0390	0.044	0.048	0.040	0.035	0.0309		0.0314		0.0287
Beryllium	Be	<0.0050	<0.0050	<0.0050	<0.00050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0010		<0.0050		<0.010
Bismuth	Bi	<0.20	<0.20	<0.20	<0.00050	<0.20	<0.20	<0.20	<0.20	<0.0010		<0.0050		<0.010
Boron	B	1.13	0.99	0.95	0.844	0.97	0.95	0.90	0.79	0.673		0.65		0.67
Cadmium	Cd	<0.010	<0.010	<0.010	0.000252	<0.010	<0.020	<0.030	<0.020	0.00050		0.00119		0.0048
Calcium	Ca	16.1	16.1	17.3	12.4	14.9	14.6	15.2	13.6	11.0		9.51		8.34
Chromium	Cr	<0.010	<0.010	<0.010	<0.00050	<0.010	<0.010	<0.010	<0.020	<0.0010		<0.0050		<0.010
Cobalt	Co	0.019	0.019	0.025	0.0293	0.046	0.079	0.089	0.101	0.0463		0.492		0.950
Copper	Cu	<0.010	<0.010	0.010	0.00286	<0.010	<0.010	<0.010	<0.010	0.00357		0.0133		0.0207
Iron	Fe	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030		0.066		0.650
Lead	Pb	<0.050	<0.050	<0.050	<0.000050	<0.050	<0.050	<0.050	<0.050	<0.00010		<0.00050		<0.0010
Lithium	Li	0.013	<0.010	<0.010	<0.0050	<0.010	<0.010	<0.010	<0.010	<0.010		<0.050		<0.10
Magnesium	Mg	67.2	75.7	88.5	65.6	87.2	85.8	95.4	96.4	75.0		76.2		87.8
Manganese	Mn	0.314	0.341	0.417	0.365	0.519	0.972	1.01	1.03	0.549		0.850		1.56
Mercury	Hg				<0.000050					0.000107		0.00017		0.00103
Molybdenum	Mo	<0.030	<0.030	<0.030	<0.000050	<0.030	<0.030	<0.030	<0.030	<0.00010		0.00086		<0.0010
Nickel	Ni	2.60	3.18	4.36	4.16	6.10	12.1	14.1	15.8	9.98		54.7		81.7
Phosphorous	P	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30		<0.30		<0.30
Potassium	K	18.6	18.1	20.5	16.2	18.5	17.5	17.4	17.9	16.2		12.0		12.2
Selenium	Se	<0.20	<0.20	<0.20	0.0107	<0.20	<0.20	<0.20	<0.20	0.0119		0.012		<0.020
Silicon	Si	3.65	3.62	3.58	3.35	3.74	4.32	4.10	4.29	3.34		2.76		4.73
Silver	Ag	<0.010	<0.010	<0.010	0.000028	<0.010	<0.010	<0.010	<0.010	0.000040		<0.00010		<0.00020
Sodium	Na	5.9	6.1	6.9	5.4	5.3	4.8	5.5	5.2	5.1		3.5		3.1
Strontium	Sr	0.0890	0.0895	0.0982	0.0779	0.0897	0.0999	0.0948	0.0871	0.0626		0.0612		0.0592
Thallium	Tl	<0.20	<0.20	<0.20	0.00021	<0.20	<0.20	<0.20	<0.20	<0.00020		<0.0010		<0.0020
Tin	Sn	<0.030	<0.030	<0.030	<0.00010	<0.030	<0.030	<0.030	<0.030	<0.00020		<0.0010		<0.0020
Titanium	Ti	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010		<0.010		<0.010
Uranium	U				<0.000010					<0.000020		<0.00010		<0.00020
Vanadium	V	<0.030	<0.030	<0.030	<0.0010	<0.030	<0.030	<0.030	<0.030	<0.0020		<0.010		<0.020
Zinc	Zn	0.0194	0.0218	0.0199	0.0231	0.0273	0.047	<0.040	<0.050	0.0270		0.040		0.080
Dissolved Anions	**(mg/L)**													
Chloride	Cl				43.1					2.93	2.94	2.18		<5.0
Fluoride	F				<0.020					<0.020	<0.020	<0.020		<0.20
Sulphate	SO4													
Nutrients	**(mg/L)**													
Ammonia	N				<0.020					<0.020		<0.0050	<0.0050	0.0053
Nitrite/Nitrate	N				0.013					0.025		<0.050	<0.050	<0.050
Total Dissolved Solids	(mg/L)				677					584		684		859

APPENDIX B.1
PHASE I KINETIC DATA

PHASE I COLUMN 5

Dissolved Metals	(mg/L)	Week 0	Week 0 HVAAS	Week 1	Week 1 HVAAS	Week 2	Week 3	Week 3 HVAAS	Week 4	Week 5	Week 5 HVAAS	Week 6	Week 7	Week 8	Week 9	Week 10	Week 10 HVAAS
Aluminum	Al	1.20		0.196		0.33	0.296		0.21	0.155		<0.20	<0.20	<0.20	<0.20	0.152	
Antimony	Sb	0.0179	0.0165	0.00940	0.0095	<0.20	0.00530	0.00530	<0.20	0.00332	0.0024	<0.20	<0.20	<0.20	<0.20	0.00207	
Arsenic	As	0.0240	0.0269	0.0132	0.0132	<0.20	0.0253	0.0233	<0.20	0.0200	0.0264	<0.20	<0.20	<0.20	<0.20	0.0109	
Barium	Ba	0.00161		0.00232		<0.010	0.00115		<0.010	0.00176		<0.010	<0.010	<0.010	<0.010	0.00142	
Beryllium	Be	<0.00050		<0.00050		<0.0050	<0.00050		<0.0050	<0.00050		<0.0050	<0.0050	<0.0050	<0.0050	<0.00050	
Bismuth	Bi	<0.00050		<0.00050		<0.20	<0.00050		<0.20	<0.00050		<0.20	<0.20	<0.20	<0.20	<0.00050	
Boron	B	0.417		0.258		0.21	0.170		0.15	0.133		<0.10	<0.10	0.23	0.10	0.081	
Cadmium	Cd	<0.000050		<0.000050		<0.010	<0.000050		<0.010	<0.000050		<0.010	<0.010	<0.010	<0.010	<0.000050	
Calcium	Ca	0.993		4.38		2.98	4.33		5.22	6.58		7.79	9.42	13.6	9.81	9.72	
Chromium	Cr	0.00076		<0.00050		<0.010	<0.00050		<0.010	<0.00050		<0.010	<0.010	<0.010	<0.010	<0.00050	
Cobalt	Co	0.00013		<0.00010		<0.010	<0.00010		<0.010	<0.00010		<0.010	<0.010	<0.010	<0.010	<0.00010	
Copper	Cu	0.00511		0.00149		<0.010	0.00163		<0.010	0.00122		<0.010	<0.010	<0.010	<0.010	0.00306	
Iron	Fe	0.095		<0.030		<0.030	<0.030		<0.030	<0.030		<0.030	<0.030	<0.030	<0.030	<0.030	
Lead	Pb	0.000643		0.000195		<0.050	0.000177		<0.050	0.000055		<0.050	<0.050	<0.050	<0.050	<0.000050	
Lithium	Li	<0.0050		0.0129		<0.010	0.0090		<0.010	0.0092		0.016	<0.010	0.012	0.022	0.0068	
Magnesium	Mg	0.34		1.92		1.22	1.61		1.82	2.10		2.31	2.48	3.38	2.65	2.40	
Manganese	Mn	0.000797		0.00335		<0.0050	0.00151		<0.0050	0.00239		<0.0050	0.0057	0.0064	<0.0050	0.00485	
Mercury	Hg	<0.000050		<0.000050			<0.000050			<0.000050						<0.000050	
Molybdenum	Mo	0.0253		0.0105		<0.030	0.00871		<0.030	0.00567		<0.030	<0.030	<0.030	<0.030	0.00366	
Nickel	Ni	0.00060		0.00056		<0.050	<0.00050		<0.050	<0.00050		<0.050	<0.050	<0.050	<0.050	0.00140	
Phosphorous	P	<0.30		<0.30		<0.30	<0.30		<0.30	<0.30		<0.30	<0.30	<0.30	<0.30	<0.30	
Potassium	K	7.5		14.7		9.1	8.5		6.6	6.7		6.4	5.3	5.3	5.2	2.9	
Selenium	Se	0.0022	0.00200	0.00097	0.00100	<0.20	0.0014	0.00137	<0.20	<0.0010	0.00126	<0.20	<0.20	<0.20	<0.20	<0.0010	<0.00050
Silicon	Si	3.04		2.54		2.56	2.54		2.43	2.36		2.38	2.51	2.68	2.56	2.51	
Silver	Ag	0.000017		0.000038		<0.010	0.000070		<0.010	<0.000010		<0.010	<0.010	<0.010	<0.010	0.000021	
Sodium	Na	39.1		33.0		17.4	13.1		10.3	8.7		7.8	6.9	11.2	5.7	4.9	
Strontium	Sr	0.0121		0.0647		0.0491	0.0540		0.0607	0.0665		0.0760	0.0828	0.120	0.0825	0.0685	
Thallium	Tl	<0.00010		<0.00010		<0.20	<0.00010		<0.20	<0.00010		<0.20	<0.20	<0.20	<0.20	<0.00010	
Tin	Sn	0.00098		0.00049		<0.030	0.00053		<0.030	0.00017		<0.030	<0.030	<0.030	<0.030	0.00027	
Titanium	Ti	<0.010		<0.010		<0.010	<0.010		<0.010	<0.010		<0.010	<0.010	<0.010	<0.010	<0.010	
Uranium	U	0.000157		0.000239			0.000142			0.000194						0.000189	
Vanadium	V	0.0190		0.0035		<0.030	0.0062		<0.030	0.0033		<0.030	<0.030	<0.030	<0.030	0.0023	
Zinc	Zn	0.0016		<0.0010		<0.0050	<0.0010		0.0083	0.0012		0.0074	0.0067	<0.0050	<0.0050	0.0011	
Dissolved Anions	**(mg/L)**																
Chloride	Cl	12.4		1.82			0.89			1.55						1.27	
Fluoride	F	0.745		0.248			0.191			0.067						0.075	
Sulphate	SO4											22					
Nutrients	**(mg/L)**																
Ammonia	N	0.415		0.154			0.060			<0.020						<0.020	
Nitrite/Nitrate	N	0.118		0.0404			0.0359			0.0174						0.0156	
Total Dissolved Solids	(mg/L)	497		120			78			66						52	

APPENDIX B.1
PHASE I KINETIC DATA

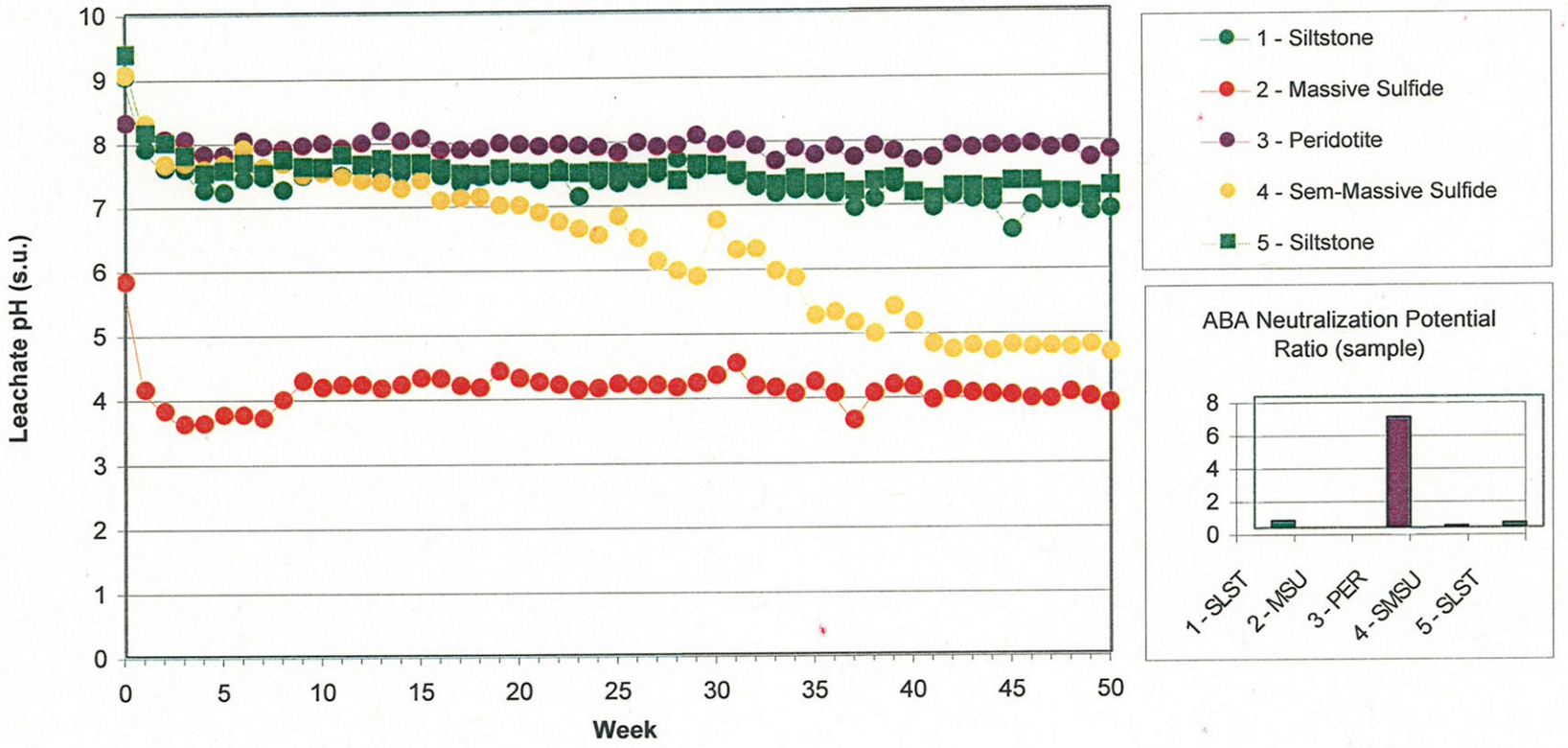
PHASE I COLUMN 5

Dissolved Metals	(mg/L)	Week 10 DUP	Week 10 HVAAS-DUP	Week 11	Week 12	Week 13	Week 14	Week 14	Week 15	Week 15 HVAAS	Week 16	Week 17	Week 18	Week 19	Week 20	Week 20 HVAAS	Week 20 DUP
Aluminum	Al	0.153		<0.20	<0.20	<0.20	<0.20	<0.20	0.122		<0.20	<0.20	<0.20	<0.20	0.0980		
Antimony	Sb	0.00208		<0.20	<0.20	<0.20	<0.20	<0.20	0.00135		<0.20	<0.20	<0.20	<0.20	0.00133		
Arsenic	As	0.0111		<0.20	<0.20	<0.20	<0.20	<0.20	0.00717		<0.20	<0.20	<0.20	<0.20	0.00511		
Barium	Ba	0.00144		<0.010	<0.010	<0.010	<0.010	<0.010	0.00166		<0.010	<0.010	<0.010	<0.010	0.00143		
Beryllium	Be	<0.00050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.00050		<0.0050	<0.0050	<0.0050	<0.0050	<0.00050		
Bismuth	Bi	<0.00050		<0.20	<0.20	<0.20	<0.20	<0.20	<0.00050		<0.20	<0.20	<0.20	<0.20	<0.00050		
Boron	B	0.084		<0.10	<0.10	0.17	<0.10	<0.10	0.062		<0.10	<0.10	<0.10	<0.10	0.065		
Cadmium	Cd	<0.000050		<0.010	<0.010	<0.010	<0.010	<0.010	<0.000050		<0.010	<0.010	<0.010	<0.010	<0.000050		
Calcium	Ca	9.44		10.3	9.80	13.7	10.1	10.1	9.99		10.7	9.85	14.5	15.1	11.1		
Chromium	Cr	<0.00050		<0.010	<0.010	<0.010	<0.010	<0.010	<0.00050		<0.010	<0.010	<0.010	<0.010	<0.00050		
Cobalt	Co	<0.00010		<0.010	<0.010	<0.010	<0.010	<0.010	<0.00010		<0.010	<0.010	<0.010	<0.010	<0.00010		
Copper	Cu	0.00322		<0.010	<0.010	<0.010	<0.010	<0.010	0.00177		<0.010	<0.010	<0.010	<0.010	0.00672		
Iron	Fe	<0.030		<0.030	<0.030	<0.030	<0.030	<0.030	<0.030		<0.030	<0.030	<0.030	<0.030	<0.030		
Lead	Pb	<0.000050		<0.050	<0.050	<0.050	<0.050	<0.050	<0.000050		<0.050	<0.050	<0.050	<0.050	<0.000050		
Lithium	Li	0.0069		<0.010	<0.010	<0.010	<0.010	<0.010	<0.0050		<0.010	<0.010	<0.010	0.019	<0.0050		
Magnesium	Mg	2.38		2.33	2.14	2.88	2.05	2.02	1.91		2.43	1.89	2.77	3.18	2.31		
Manganese	Mn	0.00487		<0.0050	0.0057	0.0086	0.0064	0.0065	0.00632		0.0078	0.0063	0.0101	0.0083	0.00871		
Mercury	Hg	<0.000050							<0.000050						<0.000050		
Molybdenum	Mo	0.00359		<0.030	<0.030	<0.030	<0.030	<0.030	0.00254		<0.030	<0.030	<0.030	<0.030	0.00221		
Nickel	Ni	<0.00050		<0.050	<0.050	<0.050	<0.050	<0.050	<0.00050		<0.050	<0.050	<0.050	<0.050	0.00276		
Phosphorous	P	<0.30		<0.30	<0.30	<0.30	<0.30	<0.30	<0.30		<0.30	<0.30	<0.30	<0.30	<0.30		
Potassium	K	2.5		3.9	3.8	2.9	3.0	2.2	2.3		2.9	2.8	2.8	2.5	3.6		
Selenium	Se	<0.0010	0.00054	<0.20	<0.20	<0.20	<0.20	<0.20	<0.0010	0.00054	<0.20	<0.20	<0.20	<0.20	<0.0010	0.00064	
Silicon	Si	2.44		2.49	2.45	2.79	2.61	2.62	2.45		2.44	2.35	2.96	3.07	2.73		
Silver	Ag	0.000013		<0.010	<0.010	<0.010	<0.010	<0.010	<0.000010		<0.010	<0.010	<0.010	<0.010	<0.000010		
Sodium	Na	4.4		3.9	3.7	4.8	2.9	3.2	2.5		3.0	2.1	3.3	3	<2.0		
Strontium	Sr	0.0689		0.0860	0.0738	0.104	0.0748	0.0760	0.0671		0.0855	0.0717	0.0995	0.105	0.0677		
Thallium	Tl	<0.00010		<0.20	<0.20	<0.20	<0.20	<0.20	<0.00010		<0.20	<0.20	<0.20	<0.20	<0.00010		
Tin	Sn	0.00016		<0.030	<0.030	<0.030	<0.030	<0.030	0.00019		<0.030	<0.030	<0.030	<0.030	0.00026		
Titanium	Ti	<0.010		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010		<0.010	<0.010	<0.010	<0.010	<0.010		
Uranium	U	0.000195							0.000155						0.000116		
Vanadium	V	0.0023		<0.030	<0.030	<0.030	<0.030	<0.030	0.0017		<0.030	<0.030	<0.030	<0.030	0.0015		
Zinc	Zn	<0.0010		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0010		<0.0050	<0.0050	<0.0050	<0.0050	0.0014		
Dissolved Anions	**(mg/L)**																
Chloride	Cl								0.90						<0.50		<0.50
Fluoride	F								0.034						0.051		0.058
Sulphate	SO4																
Nutrients	**(mg/L)**																
Ammonia	N								<0.020						0.031		
Nitrite/Nitrate	N								0.028						0.010		
Total Dissolved Solids	(mg/L)								40						74		

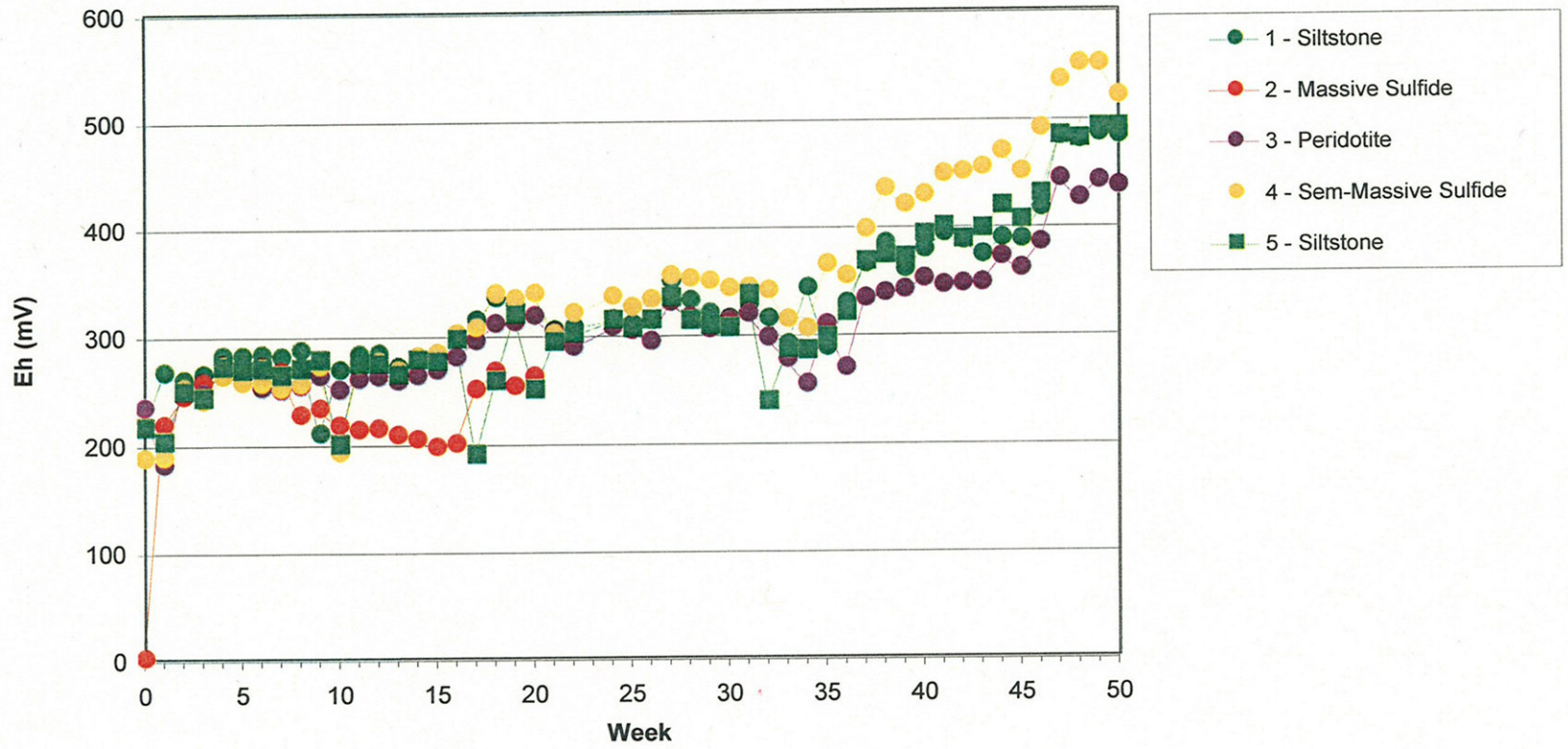
APPENDIX B.1
PHASE I KINETIC DATA

PHASE I COLUMN 5

Dissolved Metals	(mg/L)	Week 21	Week 22	Week 23	Week 24	Week 25	Week 25 DUP	Week 26	Week 26 DUP	Week 27	Week 28	Week 29	Week 30	Week 40	Week 50	Week 50 DUP
Aluminum	Al	<0.20	<0.20	<0.20	<0.20	0.0743		<0.20	<0.20	<0.20	<0.20	<0.20	0.0666	0.0337	0.0159	0.0152
Antimony	Sb	<0.20	<0.20	<0.20	<0.20	0.00102		<0.20	<0.20	<0.20	<0.20	<0.20	0.00104	0.00057	0.00045	0.00043
Arsenic	As	<0.20	<0.20	<0.20	<0.20	0.00355		<0.20	<0.20	<0.20	<0.20	<0.20	0.00255	0.00151	0.00104	0.00105
Barium	Ba	<0.010	<0.010	<0.010	<0.010	0.00166		<0.010	<0.010	<0.010	<0.010	<0.010	0.00169	0.000917	0.000871	0.000956
Beryllium	Be	<0.0050	<0.0050	<0.0050	<0.0050	<0.00050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth	Bi	<0.20	<0.20	<0.20	<0.20	<0.00050		<0.20	<0.20	<0.20	<0.20	<0.20	<0.00050	<0.00050	<0.00050	<0.00050
Boron	B	<0.10	<0.10	<0.10	<0.10	0.055		<0.10	<0.10	<0.10	<0.10	<0.10	0.060	0.028	0.025	0.023
Cadmium	Cd	<0.010	<0.010	<0.010	<0.010	<0.000050		<0.010	<0.010	<0.010	<0.010	<0.010	<0.000050	<0.000050	<0.000050	<0.000050
Calcium	Ca	11.9	11.8	11.5	11.1	11.2		11.0	11.1	10.2	9.65	11.9	15.4	8.96	7.77	7.68
Chromium	Cr	<0.010	<0.010	<0.010	<0.010	<0.00050		<0.010	<0.010	<0.010	<0.010	<0.010	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	Co	<0.010	<0.010	<0.010	<0.010	0.00013		<0.010	<0.010	<0.010	<0.010	<0.010	<0.00010	0.00011	0.00015	0.00013
Copper	Cu	<0.010	<0.010	<0.010	<0.010	0.00037		<0.010	<0.010	<0.010	<0.010	<0.010	0.00055	0.00488	0.00082	0.00498
Iron	Fe	<0.030	<0.030	<0.030	<0.030	<0.030		<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	Pb	<0.050	<0.050	<0.050	<0.050	<0.000050		<0.050	<0.050	<0.050	<0.050	<0.050	<0.000050	<0.000050	<0.000050	0.000068
Lithium	Li	<0.010	<0.010	<0.010	<0.010	<0.0050		<0.010	<0.010	<0.010	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium	Mg	2.23	2.47	2.36	2.12	2.26		2.35	2.40	2.19	1.99	2.65	3.18	2.12	2.36	2.29
Manganese	Mn	0.0100	0.0124	0.0123	0.0114	0.0125		0.0120	0.0130	0.0090	0.0111	0.0141	0.0164	0.0230	0.0455	0.0454
Mercury	Hg					<0.000050							<0.000050	<0.000050	<0.000050	<0.000050
Molybdenum	Mo	<0.030	<0.030	<0.030	<0.030	0.00177		<0.030	<0.030	<0.030	<0.030	<0.030	0.00162	0.000701	0.000376	0.000389
Nickel	Ni	<0.050	<0.050	<0.050	<0.050	0.00894		<0.050	<0.050	<0.050	<0.050	<0.050	0.00230	0.00320	0.00114	<0.00050
Phosphorous	P	<0.30	<0.30	<0.30	<0.30	<0.30		<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium	K	2.1	2.7	<2.0	2.3	<2.0		<2.0	<2.0	<2.0	2.4	3.0	<2.0	<2.0	<2.0	<2.0
Selenium	Se	<0.20	<0.20	<0.20	<0.20	<0.0010		<0.20	<0.20	<0.20	<0.20	<0.20	<0.0010	<0.0010	<0.0010	<0.0010
Silicon	Si	2.94	2.97	2.86	2.81	2.59		2.76	2.78	2.59	2.41	2.73	2.34	1.93	1.70	1.70
Silver	Ag	<0.010	<0.010	<0.010	<0.010	<0.000010		<0.010	<0.010	<0.010	<0.010	<0.010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	Na	<2.0	<2.0	<2.0	<2.0	<2.0		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium	Sr	0.0796	0.0847	0.0771	0.0770	0.0811		0.0740	0.0750	0.0696	0.0647	0.0815	0.101	0.0660	0.0529	0.0518
Thallium	Tl	<0.20	<0.20	<0.20	<0.20	<0.00010		<0.20	<0.20	<0.20	<0.20	<0.20	<0.00010	<0.00010	<0.00010	<0.00010
Tin	Sn	<0.030	<0.030	<0.030	<0.030	0.00011		<0.030	<0.030	<0.030	<0.030	<0.030	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	Ti	<0.010	<0.010	<0.010	<0.010	<0.010		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	U					0.000071							0.000161	0.000031	0.000016	0.000016
Vanadium	V	<0.030	<0.030	<0.030	<0.030	0.0012		<0.030	<0.030	<0.030	<0.030	<0.030	0.0010	<0.0010	<0.0010	<0.0010
Zinc	Zn	<0.0050	<0.0050	<0.0050	<0.0050	0.0018		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0029	0.0017	0.0025	0.0024
Dissolved Anions	**(mg/L)**															
Chloride	Cl					0.99							<0.50	<0.50	<0.50	
Fluoride	F					0.048							0.035	0.040	0.047	
Sulphate	SO4															
Nutrients	**(mg/L)**															
Ammonia	N					<0.020	<0.020						<0.020	<0.0050	<0.0050	
Nitrite/Nitrate	N					0.015	0.011						0.013	<0.050	<0.050	
Total Dissolved Solids	(mg/L)					108							95	53	67	



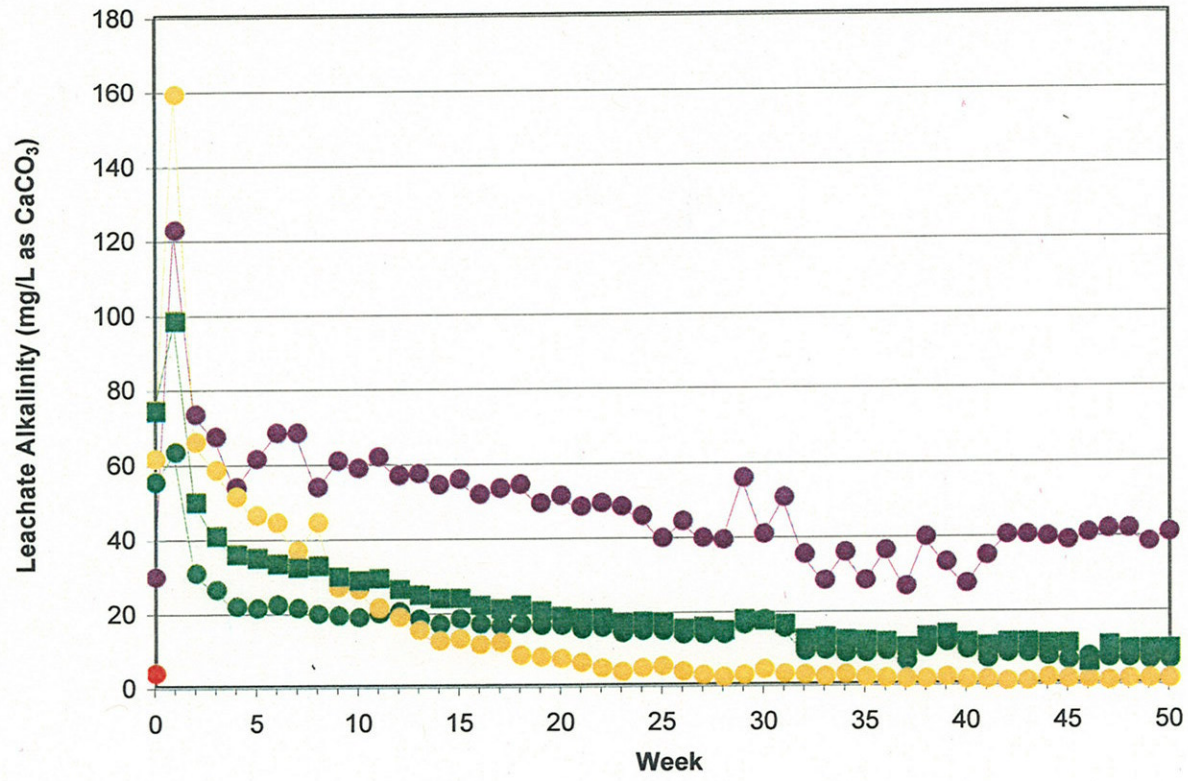
Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - pH**		
	DRAWN	CR	DATE	February 2005	JOB NO.	043-1055
	CHECKED	TB	SCALE	na	DWG. NO.	
	REVIEWED	ML	FILE NO.	Phase I - Kinetic Testing Cells.xls	FIGURE NO.	B.1-1

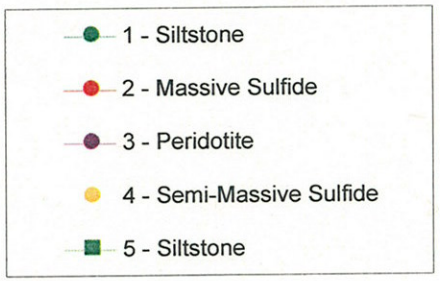


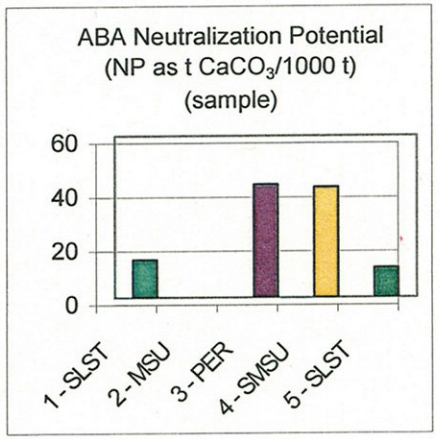
Eagle Mine
Phase I Kinetic Testing

TITLE: **Kinetic Testing Results - Redox**

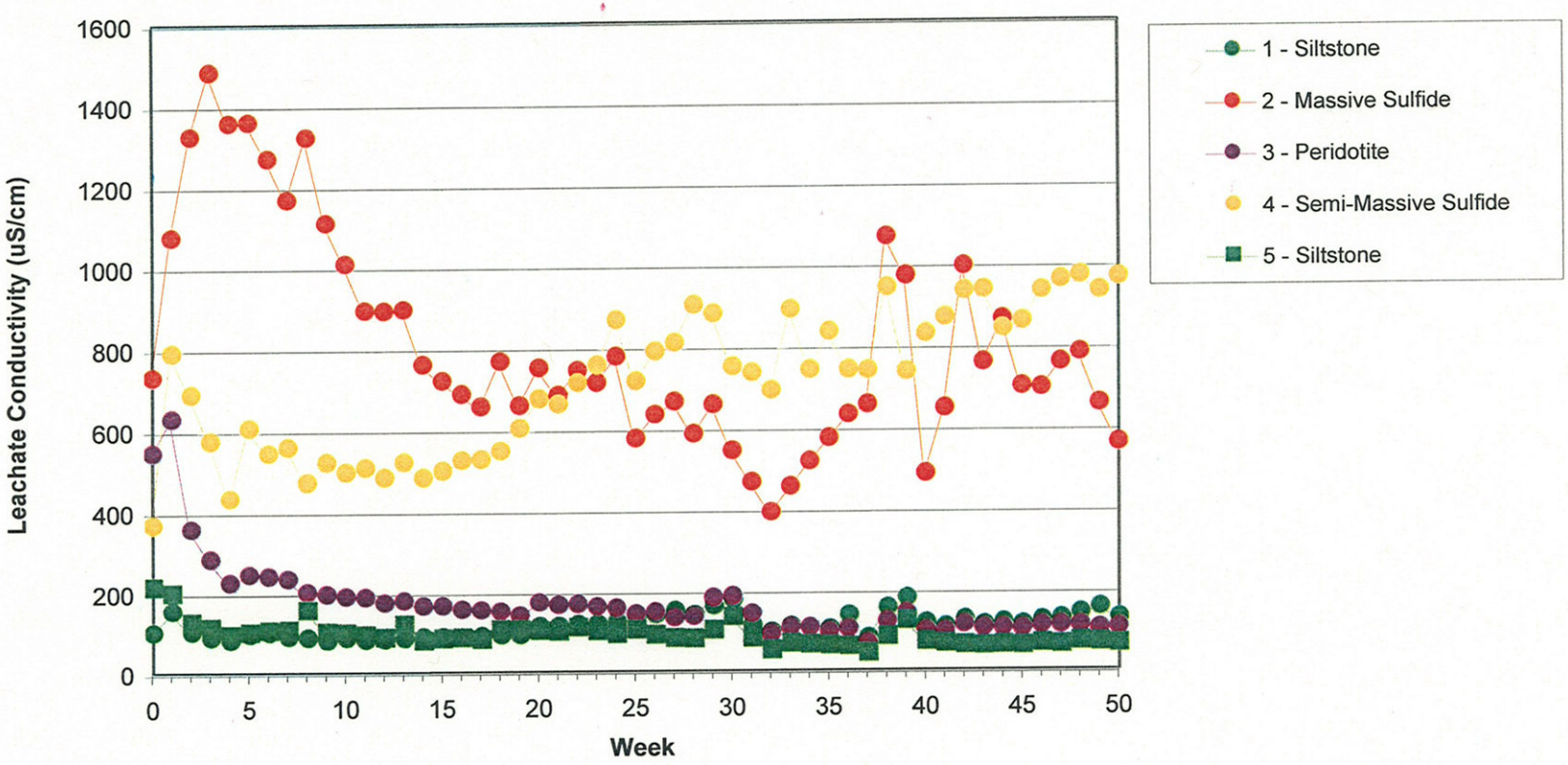
DRAWN	CR	DATE	February 2005	JOB NO.	043-1055
CHECKED	TB	SCALE	na	DWG. NO.	
REVIEWED	ML	FILE NO.	Phase I - Kinetic Testing Cells.xls	FIGURE NO.	B.1-1b



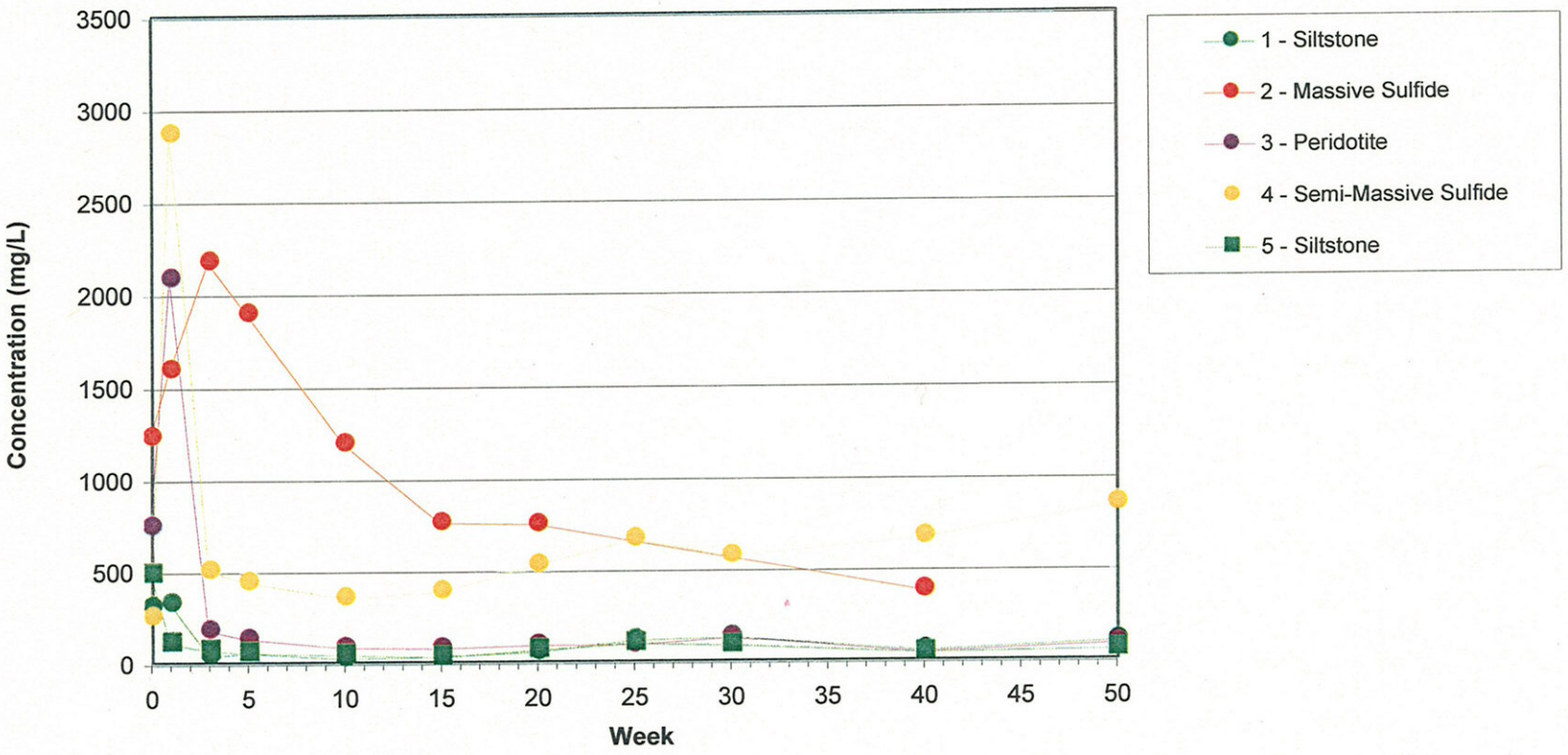




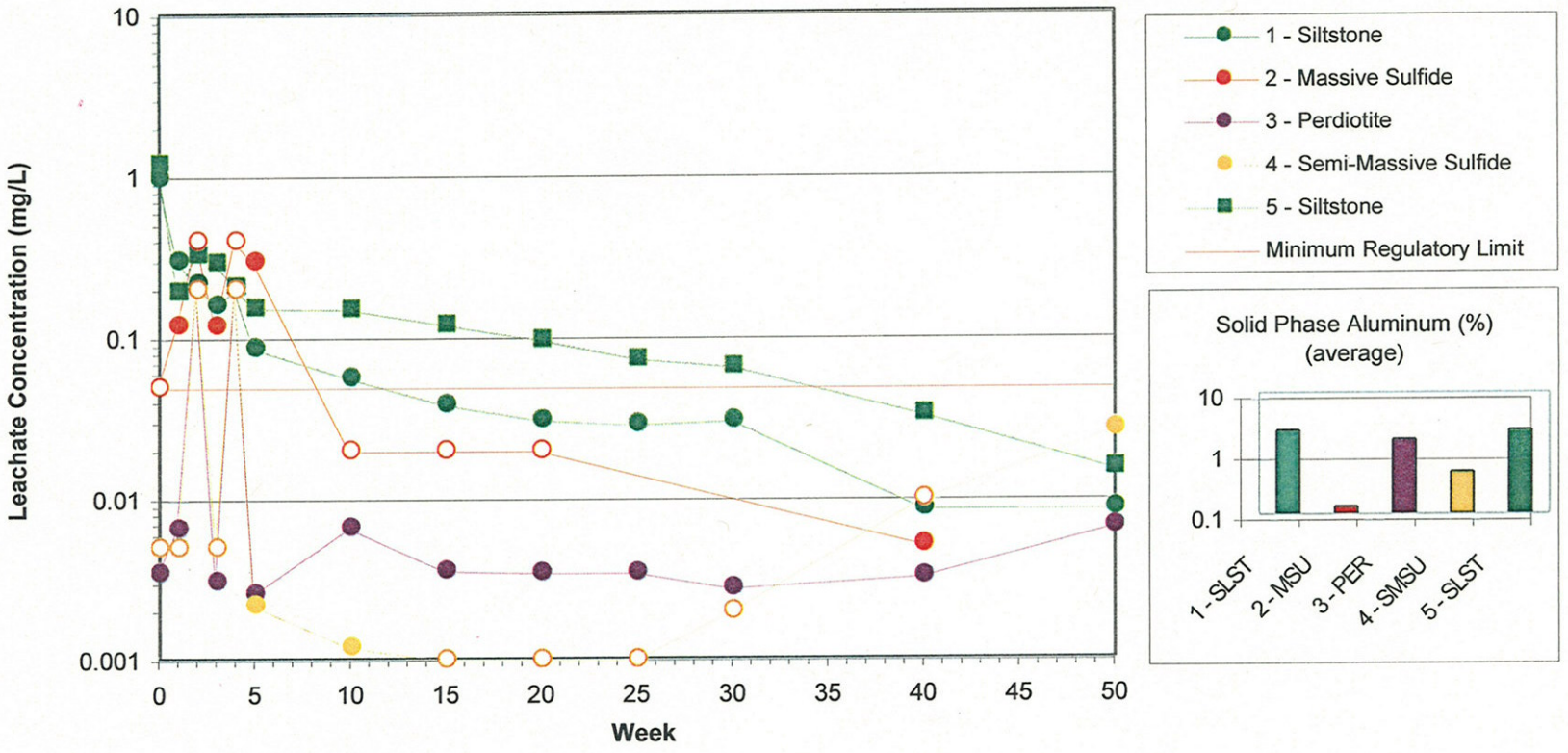
Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Alkalinity**		
	DRAWN	CR	DATE February 2005	JOB NO. 043-1055
	CHECKED	TB	SCALE na	DWG. NO.
	REVIEWED	ML	FILE NO. Phase I - Kinetic Testing Cells.xls	FIGURE NO. **B.1-2**



Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Conductivity**		
	DRAWN	CR	DATE February 2005	JOB NO. 043-1055
	CHECKED	TB	SCALE na	DWG. NO.
	REVIEWED	ML	FILE NO. Phase I - Kinetic Testing Cells.xls	FIGURE NO. **B.1-3**

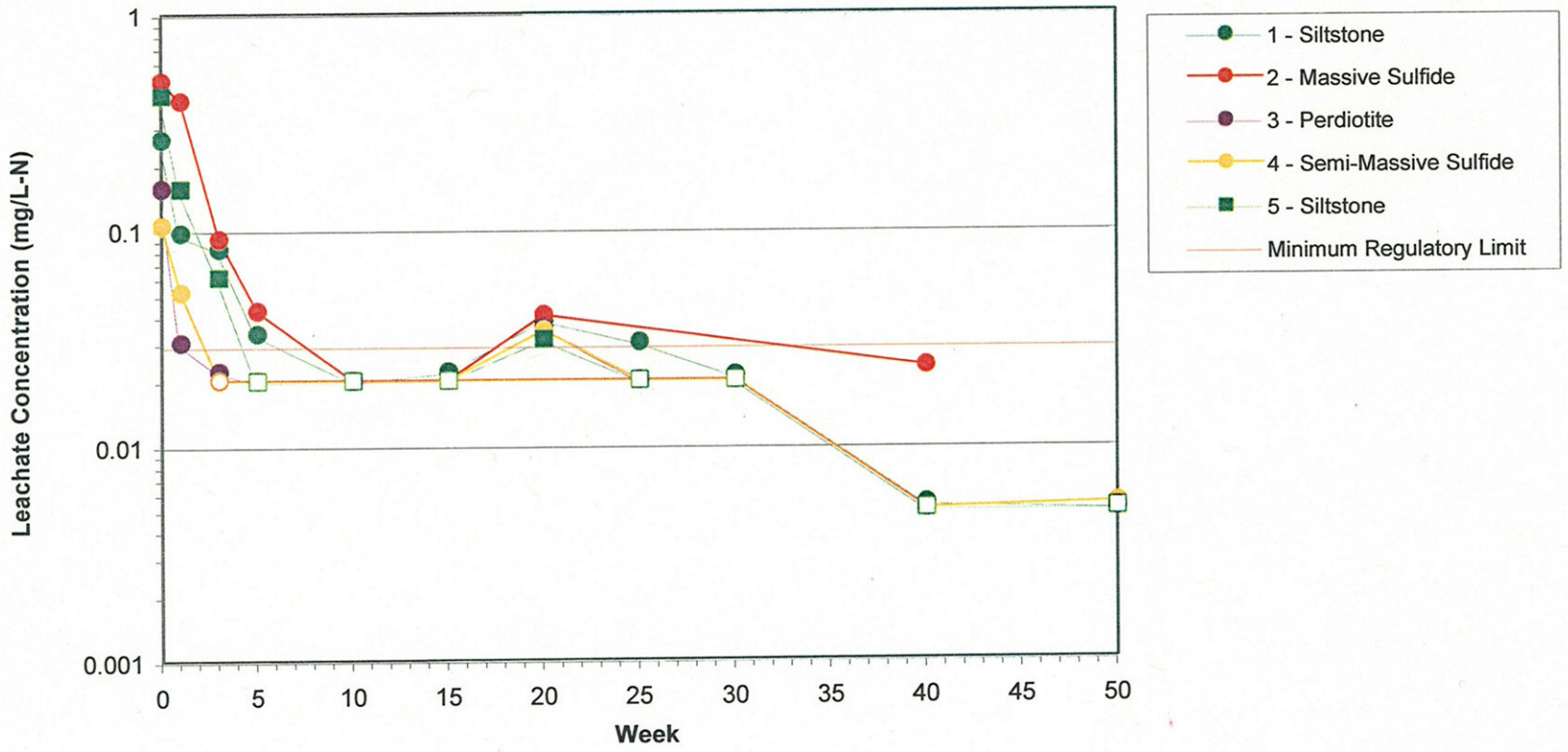


Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Total Dissolved Solids**		
	DRAWN	CR	DATE	February 2005	JOB NO.	043-1055
	CHECKED	TB	SCALE	na	DWG. NO.	
	REVIEWED	ML	FILE NO.	Phase I - Kinetic Testing Cells.xls	FIGURE NO.	**B.1-4**



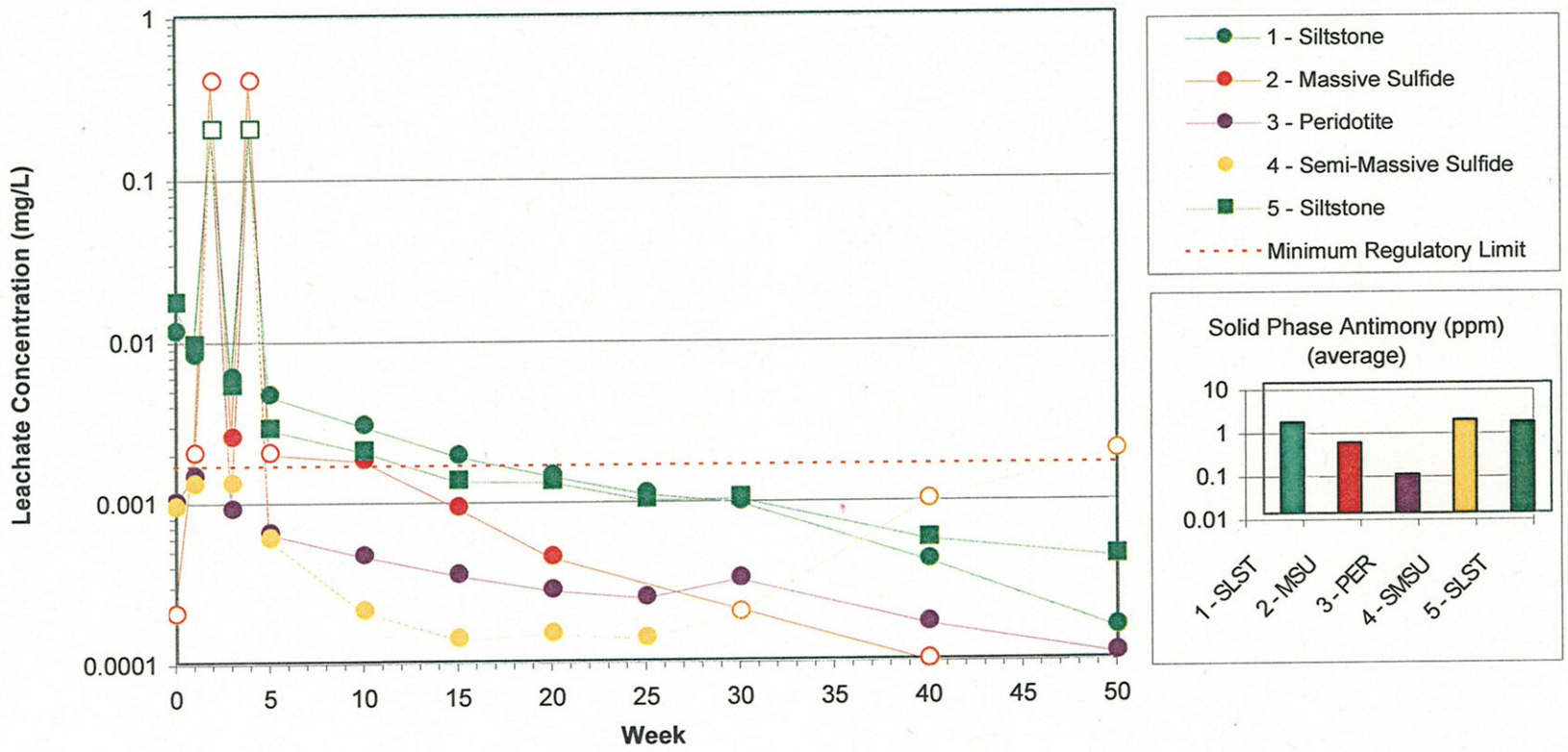
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Aluminum**		
	DRAWN	CR	DATE	February 2005	JOB NO.	043-1055
	CHECKED	TB	SCALE	na	DWG. NO.	
	REVIEWED	ML	FILE NO.	Phase I - Kinetic Testing Cells.xls	FIGURE NO.	B.1-5



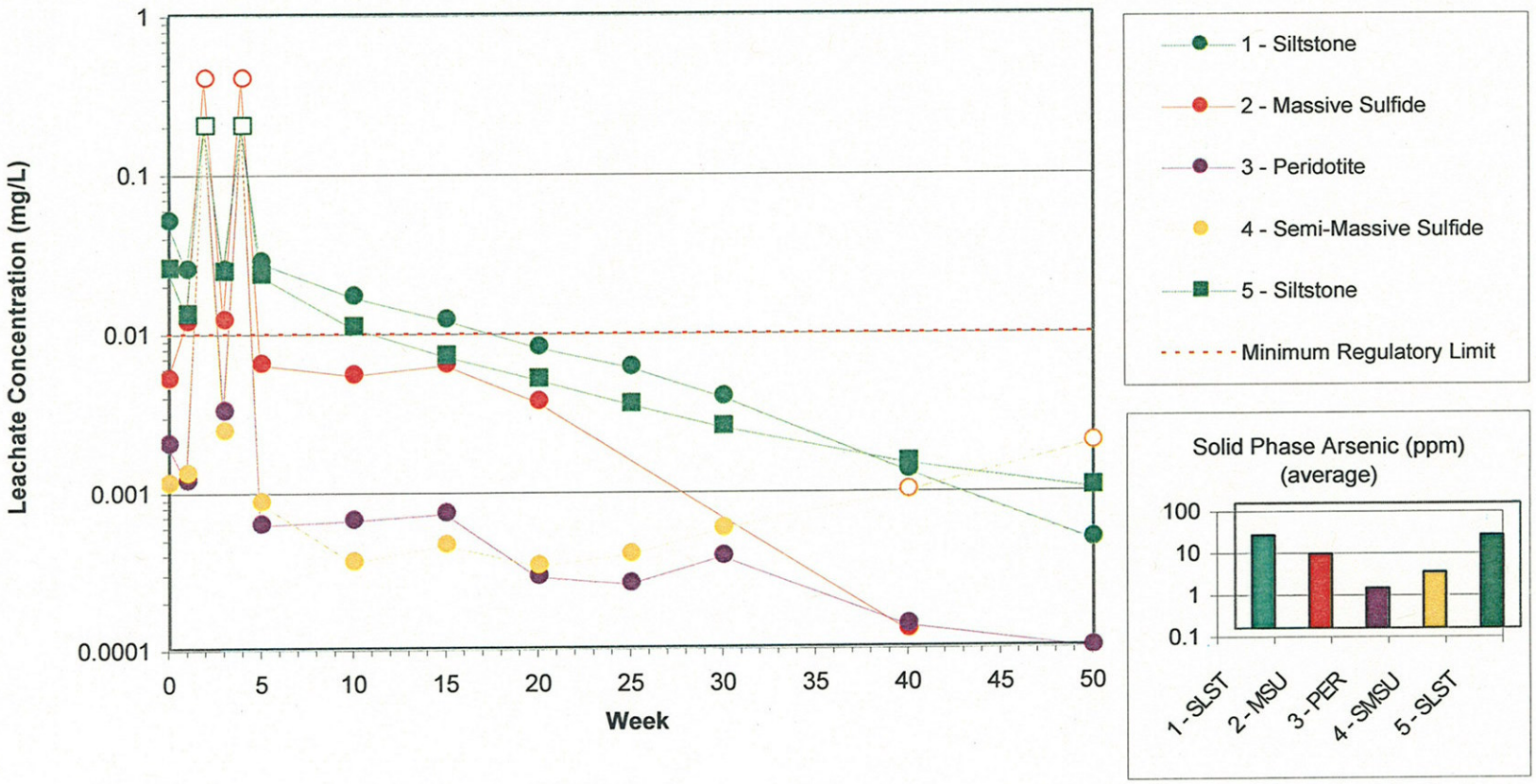
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Ammonia**		
	DRAWN CR	DATE February 2005	JOB NO. 043-1055	
	CHECKED TB	SCALE na	DWG. NO.	
	REVIEWED ML	FILE NO. Phase I - Kinetic Testing Cells.xls	FIGURE NO. **B.1-6**	



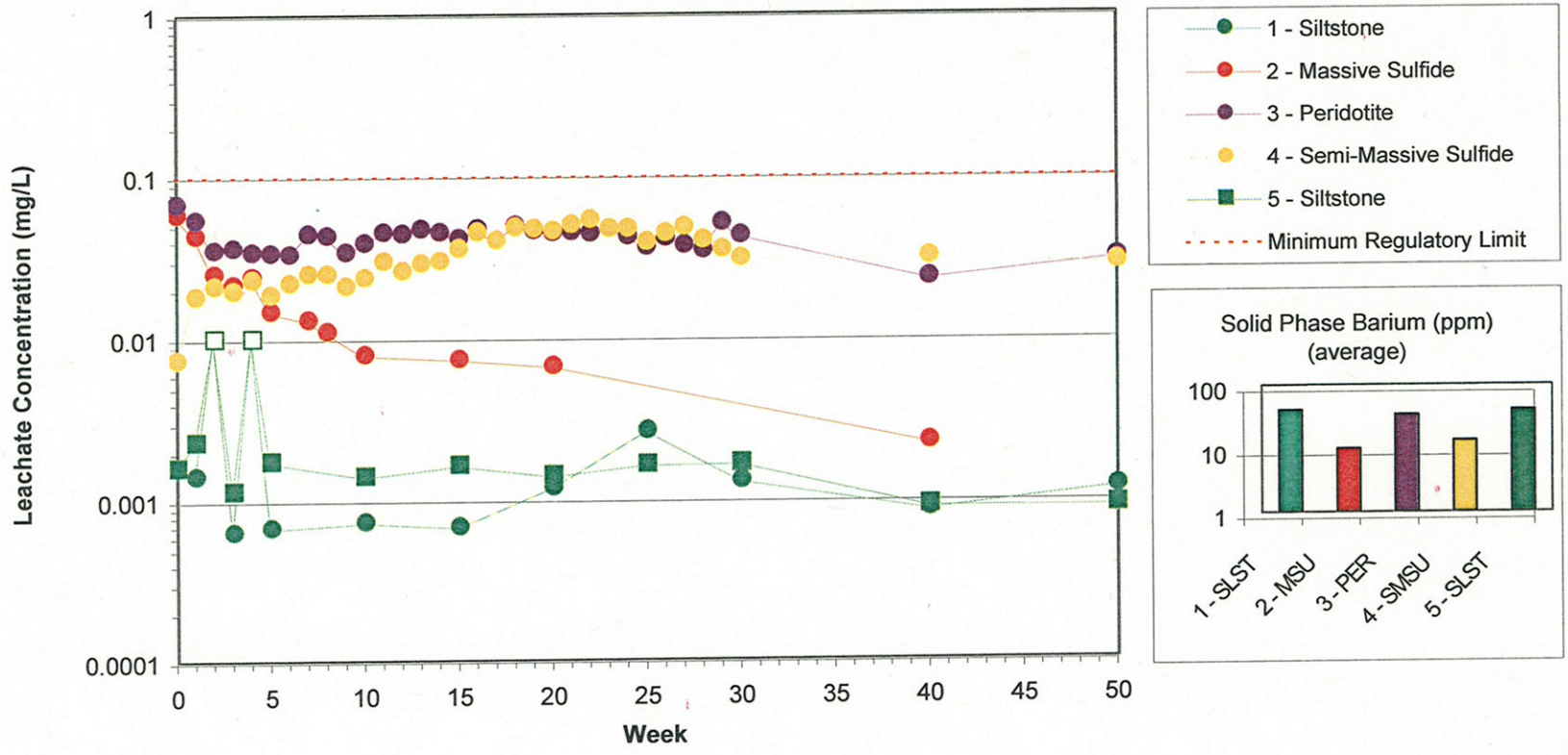
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Antimony**		
	DRAWN	CR	DATE	February 2005	JOB NO.	043-1055
	CHECKED	TB	SCALE	na	DWG. NO.	
	REVIEWED	ML	FILE NO.	Phase I - Kinetic Testing Cells.xls	FIGURE NO.	B.1-7



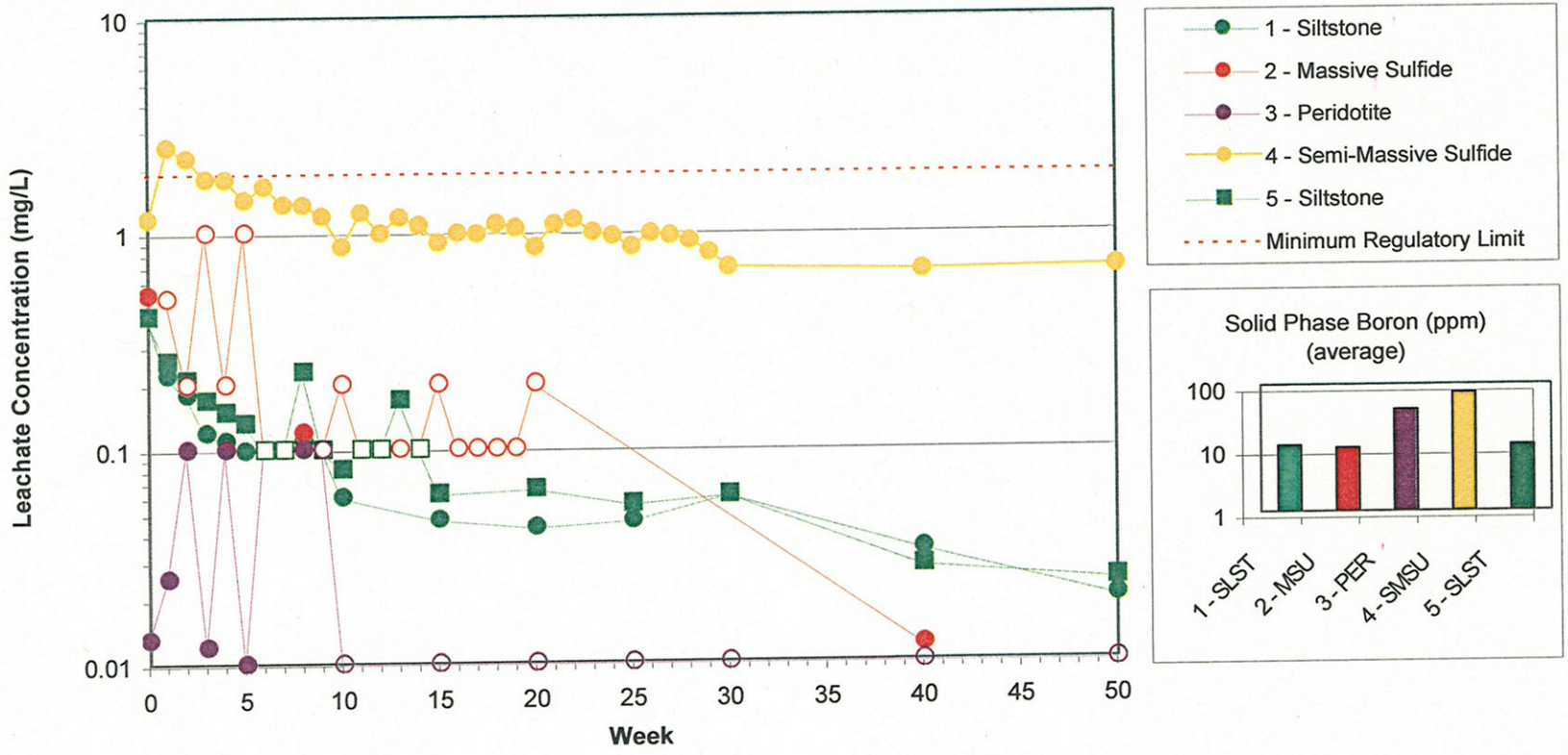
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Arsenic**		
	DRAWN	CR	DATE February 2005	JOB NO. 043-1055
	CHECKED	TB	SCALE na	DWG. NO.
	REVIEWED	ML	FILE NO. Phase I - Kinetic Testing Cells.xls	FIGURE NO. **B.1-8**



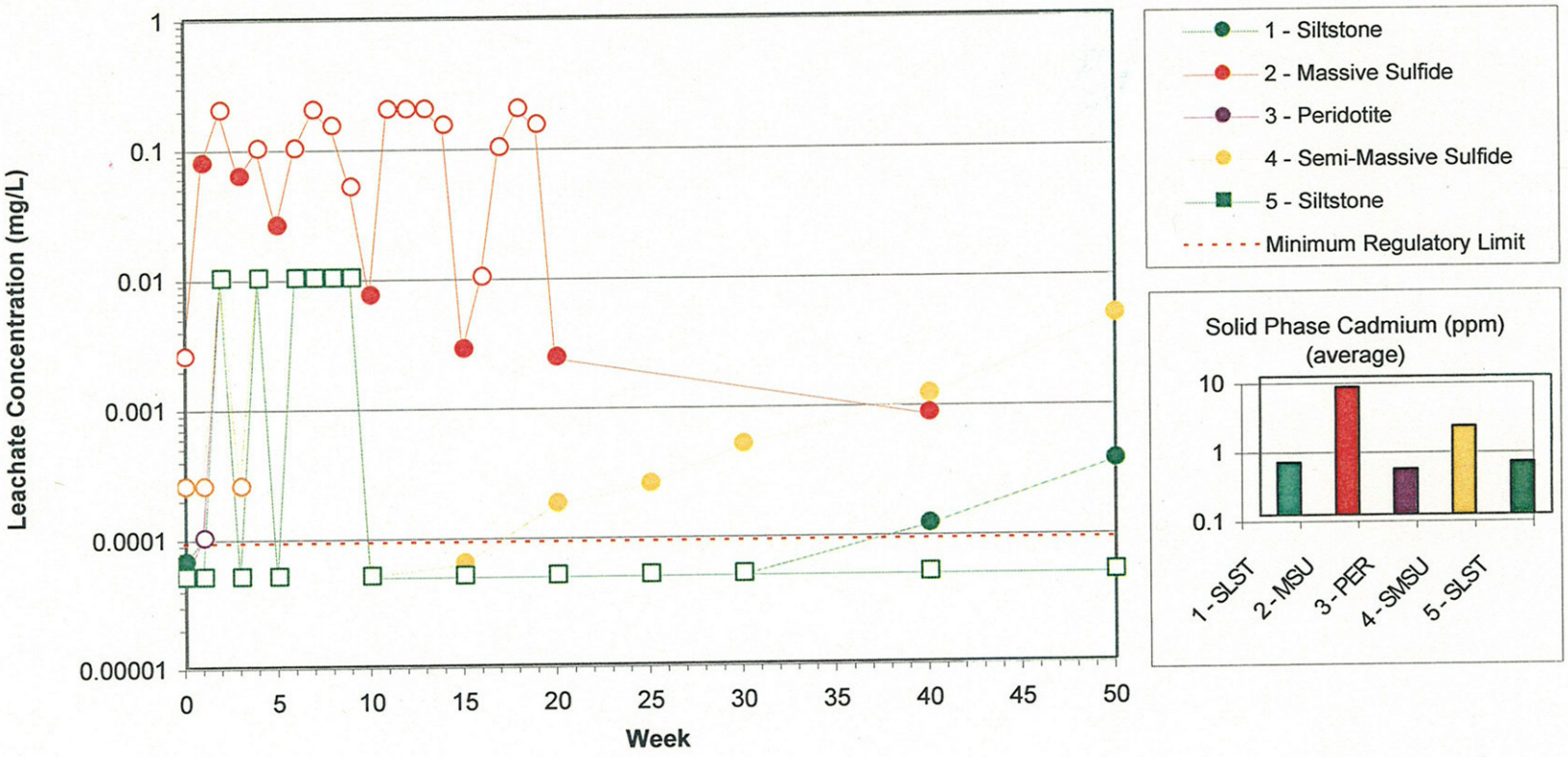
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Barium**		
	DRAWN CR	DATE February 2005	JOB NO. 043-1055	
	CHECKED TB	SCALE na	DWG. NO.	
	REVIEWED ML	FILE NO. Phase I - Kinetic Testing Cells.xls	FIGURE NO. **B.1-9**	



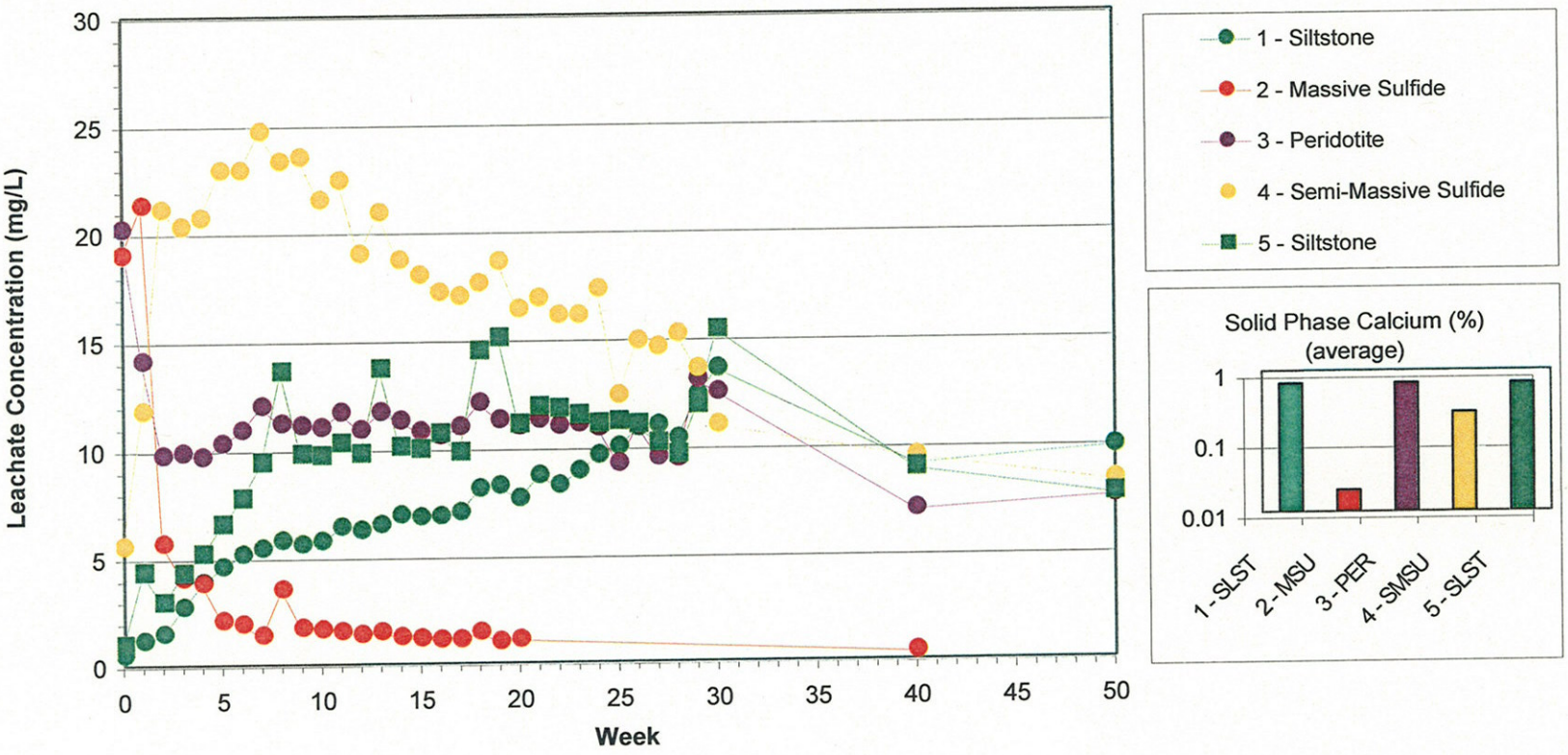
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Boron**		
	DRAWN CR	DATE February 2005	JOB NO. 043-1055	
	CHECKED TB	SCALE na	DWG. NO.	
	REVIEWED ML	FILE NO. Phase I - Kinetic Testing Cells.xls	FIGURE NO. **B.1-10**	



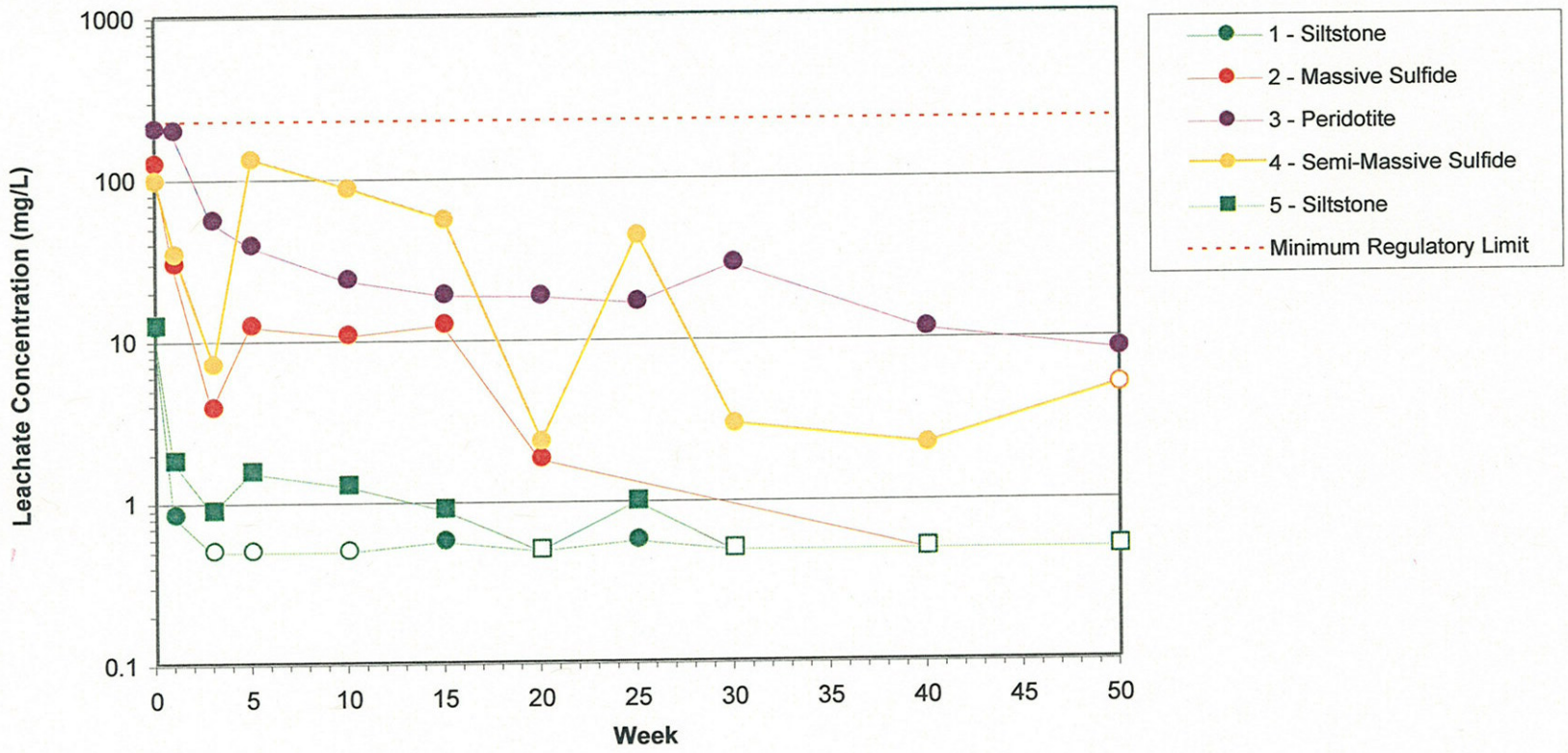
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Cadmium**		
	DRAWN	CR	DATE	February 2005	JOB NO.	043-1055
	CHECKED	TB	SCALE	na	DWG. NO.	
	REVIEWED	ML	FILE NO.	Phase I - Kinetic Testing Cells.xls	FIGURE NO.	B.1-11



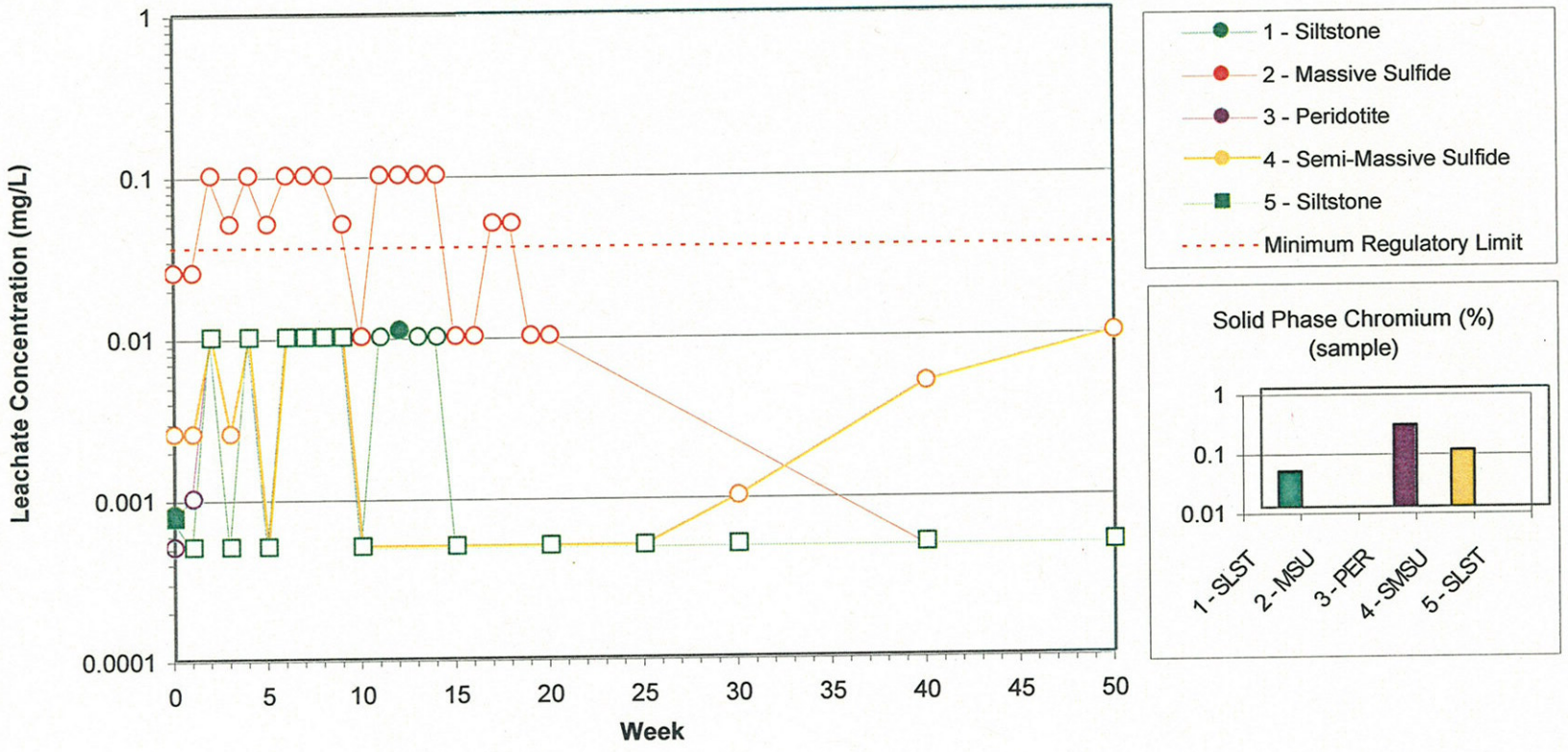
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Calcium**		
	DRAWN	CR	DATE February 2005	JOB NO. 043-1055
	CHECKED	TB	SCALE na	DWG. NO.
	REVIEWED	ML	FILE NO. Phase I - Kinetic Testing Cells.xls	FIGURE NO. B.1-12



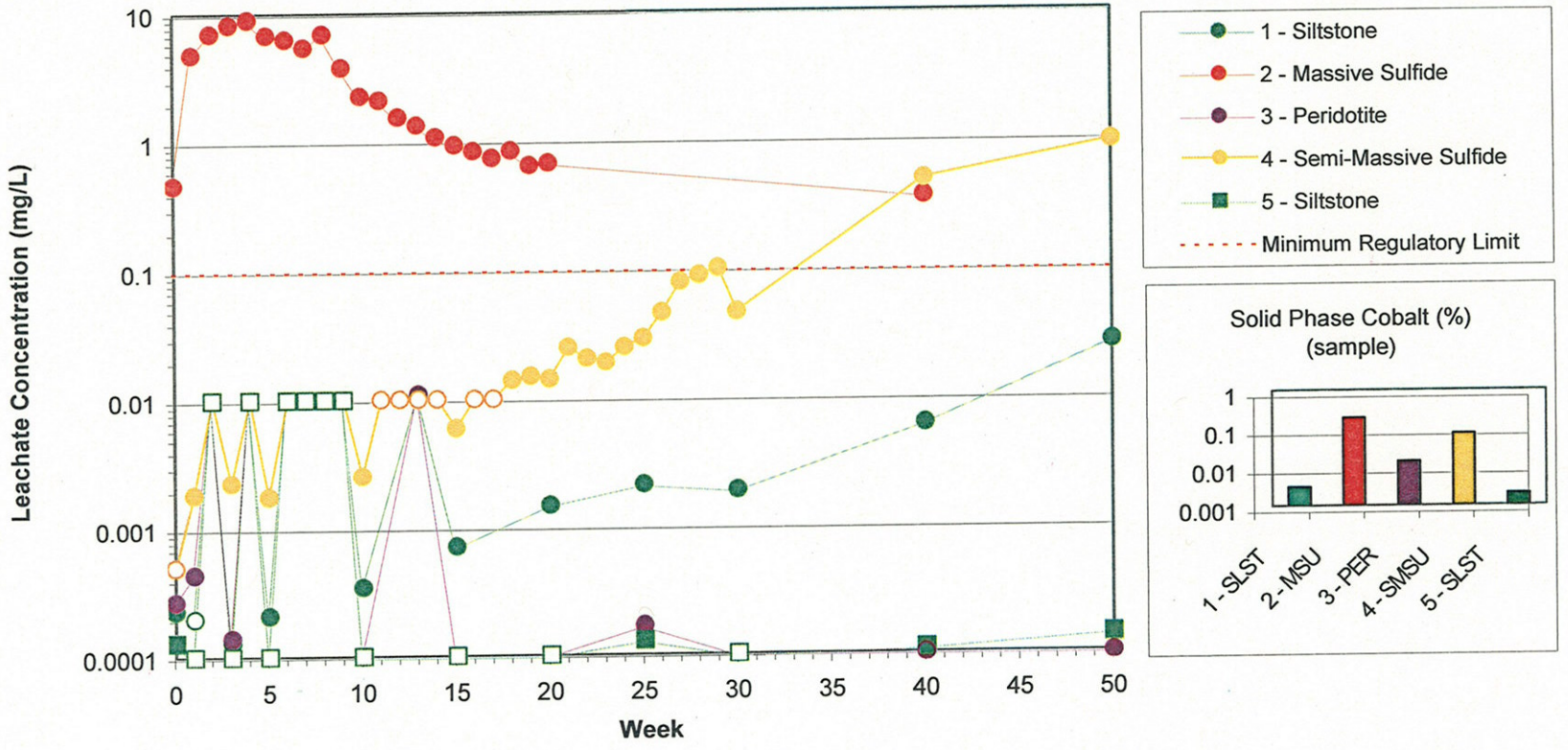
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Chloride**		
	DRAWN	CR	DATE	February 2005	JOB NO.	043-1055
	CHECKED	TB	SCALE	na	DWG. NO.	
	REVIEWED	ML	FILE NO.	Phase I - Kinetic Testing Cells.xls	FIGURE NO.	B.1-13



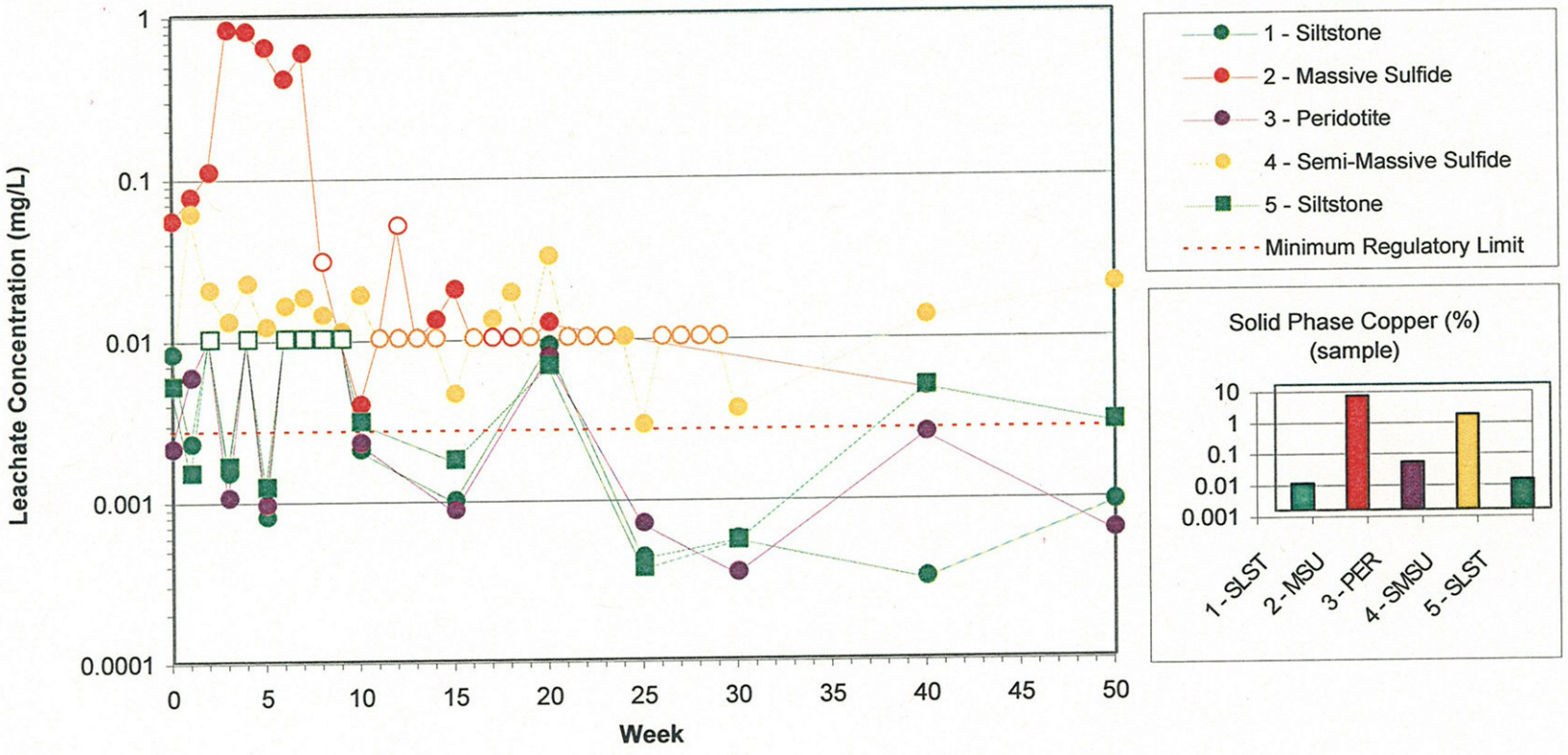
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Chromium**		
	DRAWN CR	DATE February 2005	JOB NO. 043-1055	
	CHECKED TB	SCALE na	DWG. NO.	
	REVIEWED ML	FILE NO. Phase I - Kinetic Testing Cells.xls	FIGURE NO. **B.1-14**	



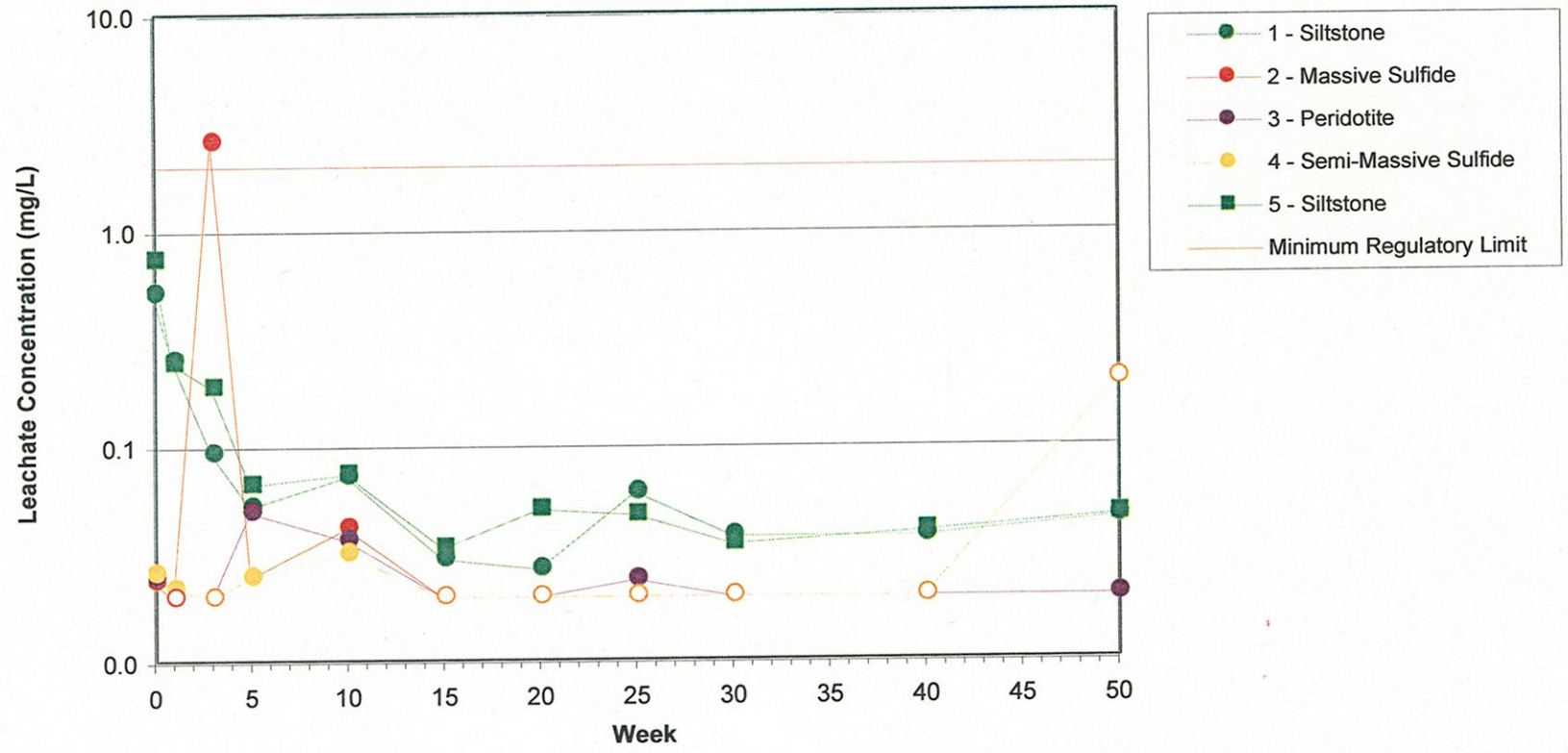
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Cobalt**		
	DRAWN CR	DATE February 2005	JOB NO. 043-1055	
	CHECKED TB	SCALE na	DWG. NO.	
	REVIEWED ML	FILE NO. Phase I - Kinetic Testing Cells.xls	FIGURE NO. **B.1-15**	



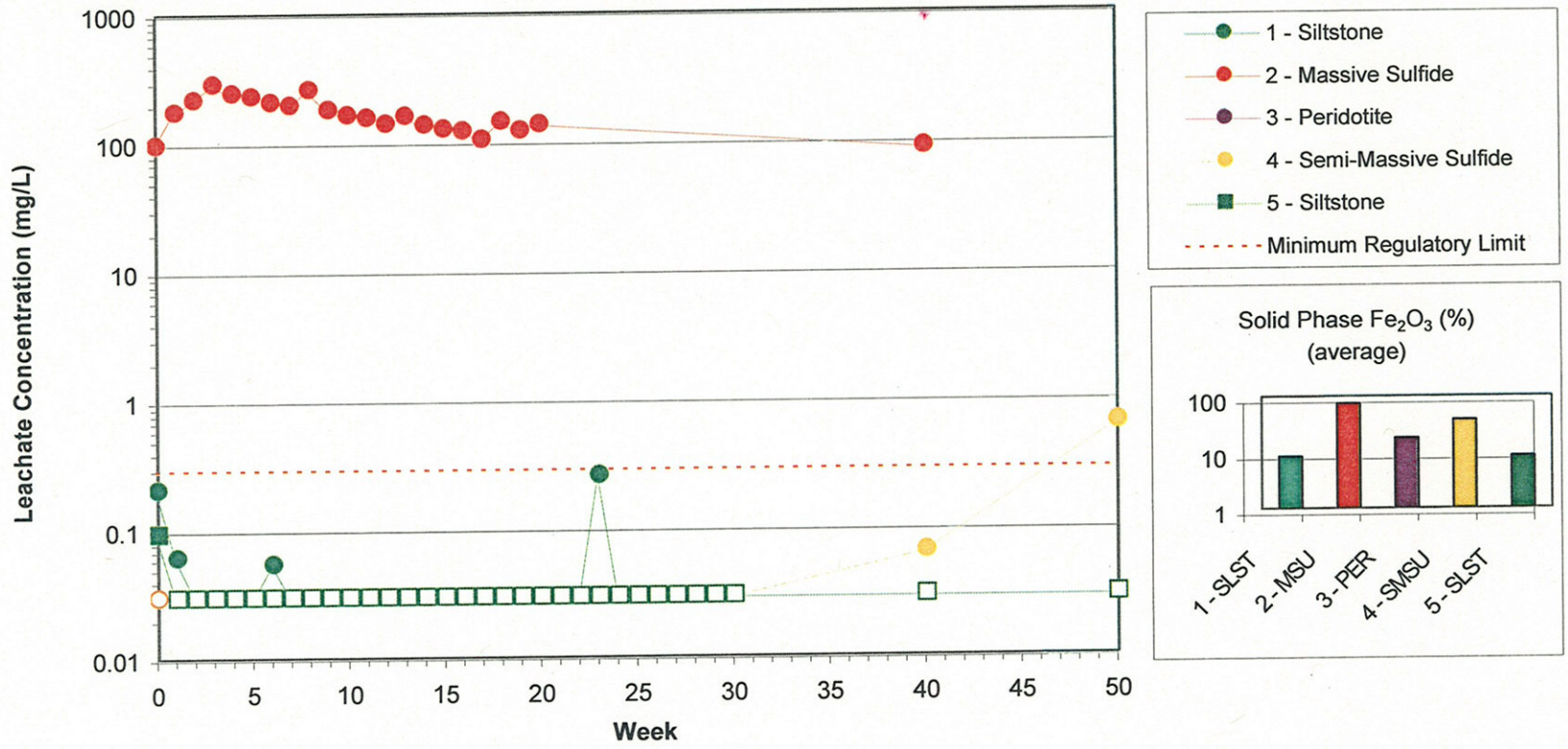
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Copper**		
	DRAWN CR	DATE February 2005	JOB NO. 043-1055	
	CHECKED TB	SCALE na	DWG. NO.	
	REVIEWED ML	FILE NO. Phase I - Kinetic Testing Cells.xls	FIGURE NO. **B.1-16**	



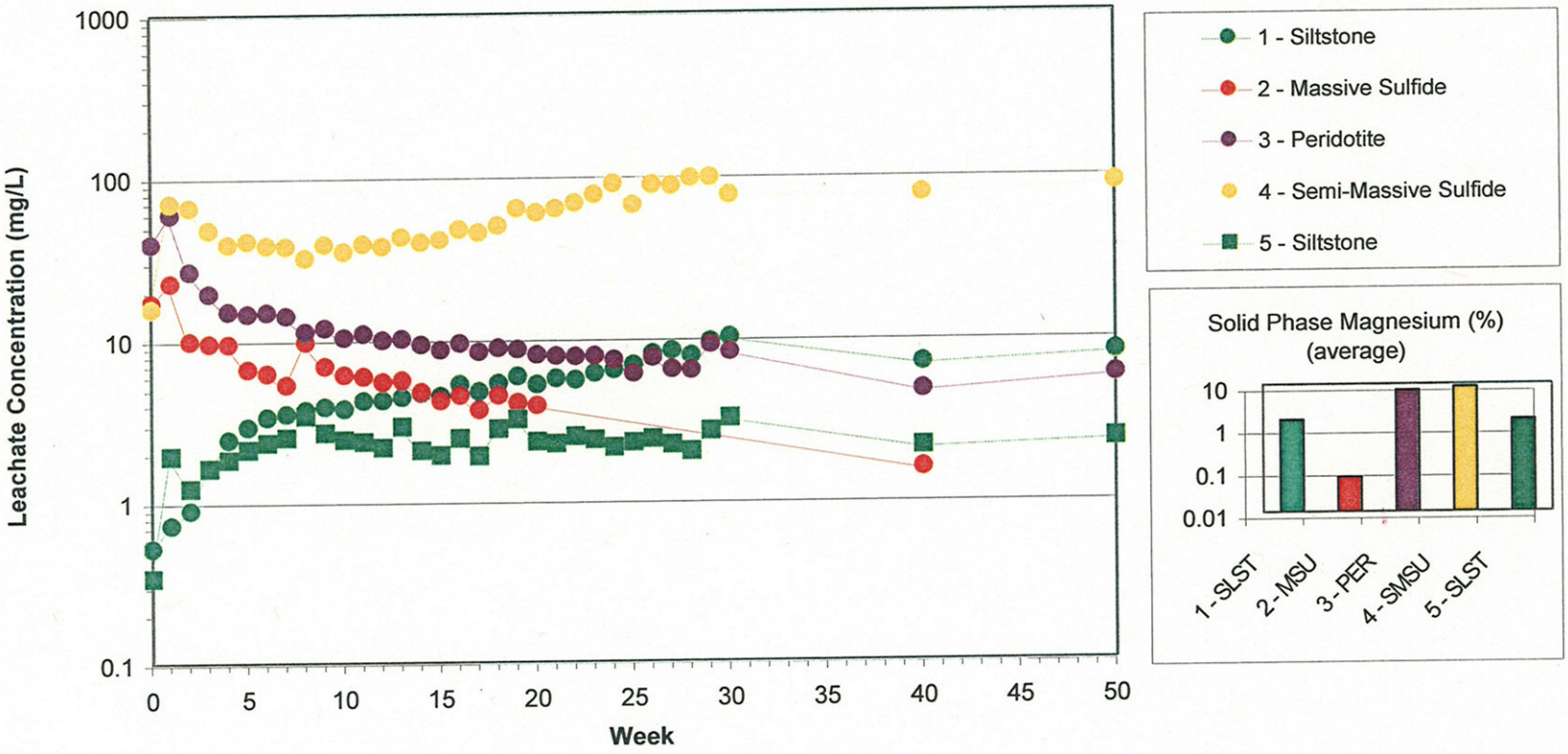
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Fluoride**		
	DRAWN CR	DATE February 2005	JOB NO. 043-1055	
	CHECKED TB	SCALE na	DWG. NO.	
	REVIEWED ML	FILE NO. Phase I - Kinetic Testing Cells.xls	FIGURE NO. **B.1-17**	



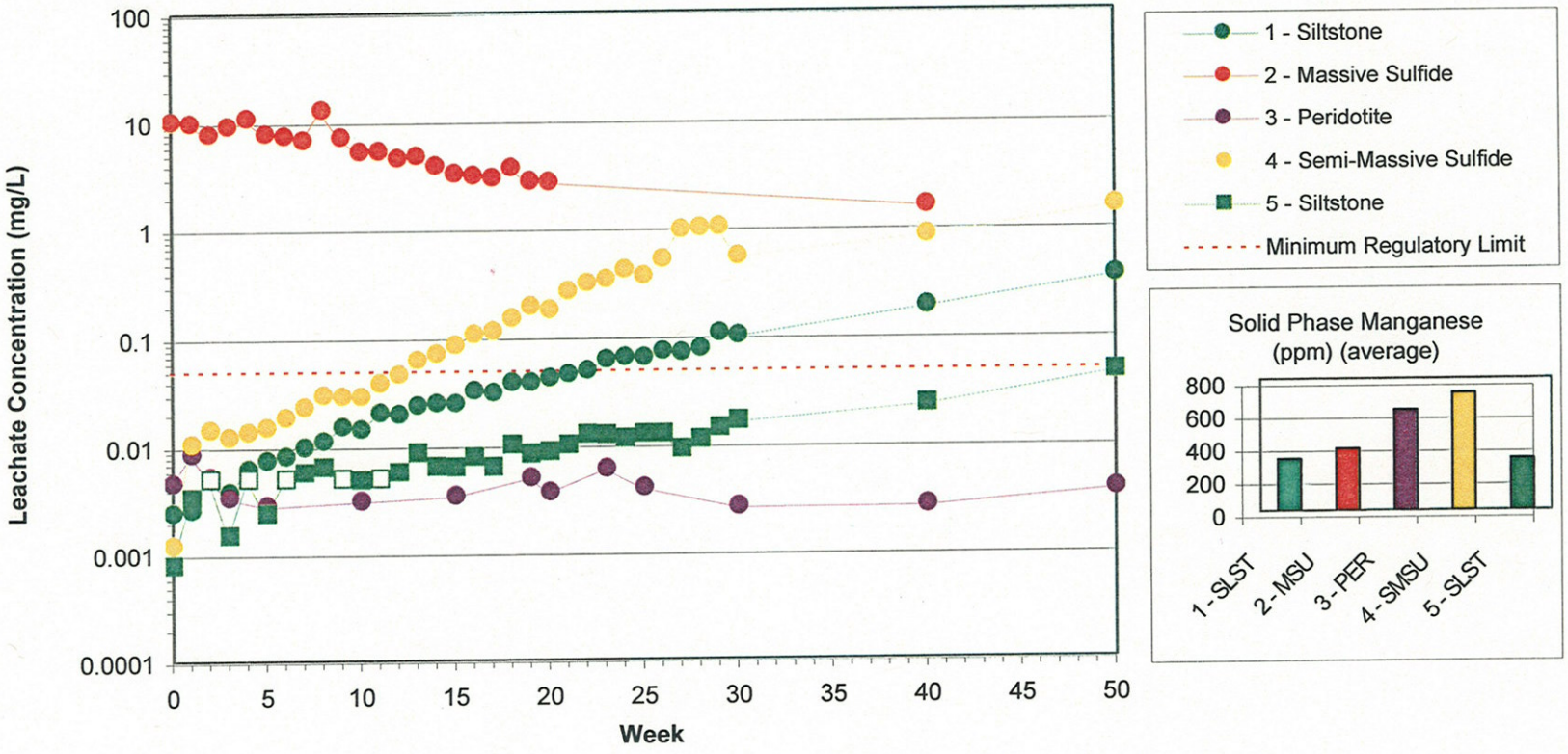
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Iron**		
	DRAWN CR	DATE February 2005	JOB NO. 043-1055	
	CHECKED TB	SCALE na	DWG. NO.	
	REVIEWED ML	FILE NO. Phase I - Kinetic Testing Cells.xls	FIGURE NO. **B.1-18**	



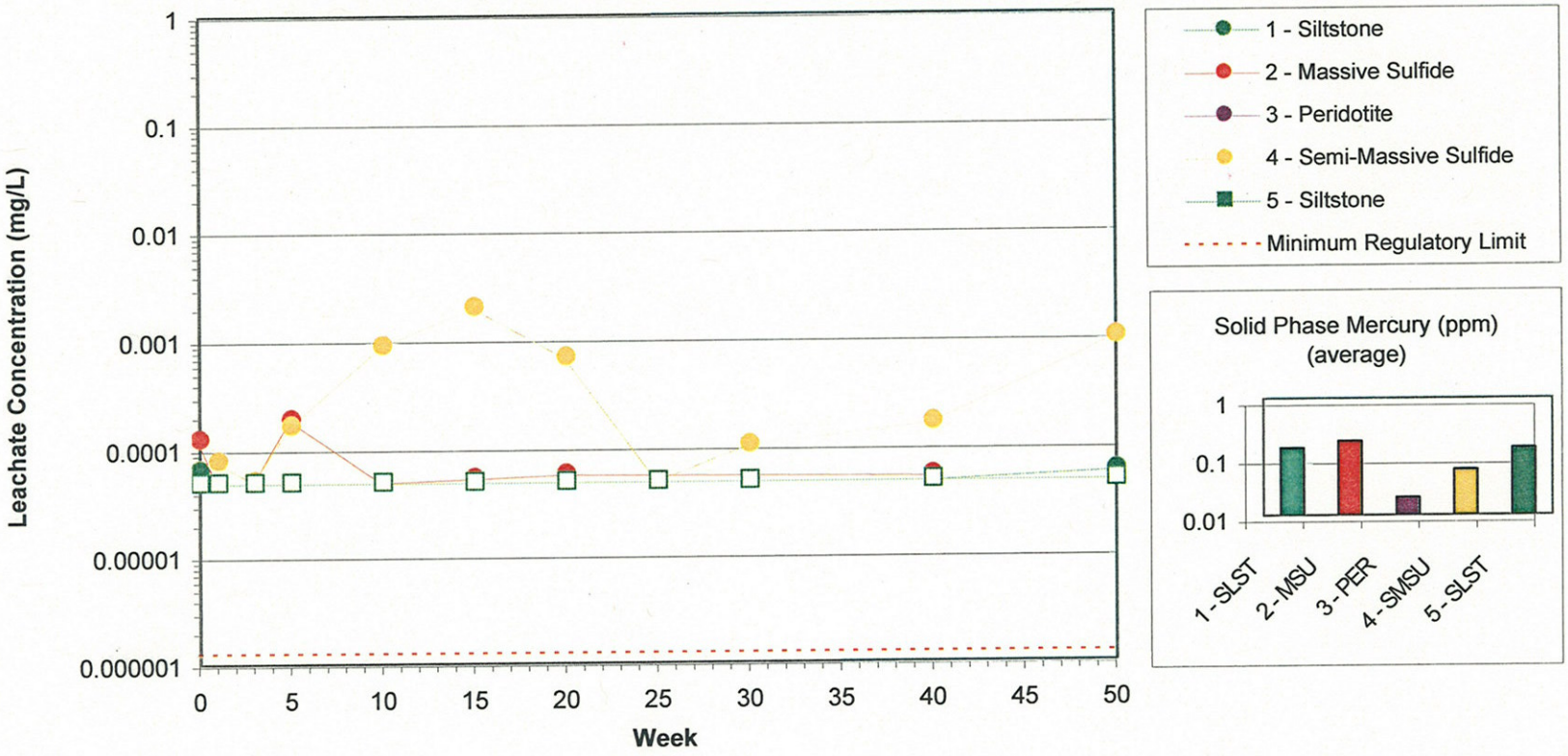
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Magnesium**		
	DRAWN	CR	DATE February 2005	JOB NO. 043-1055
	CHECKED	TB	SCALE na	DWG. NO.
	REVIEWED	ML	FILE NO. Phase I - Kinetic Testing Cells.xls	FIGURE NO. **B.1-19**



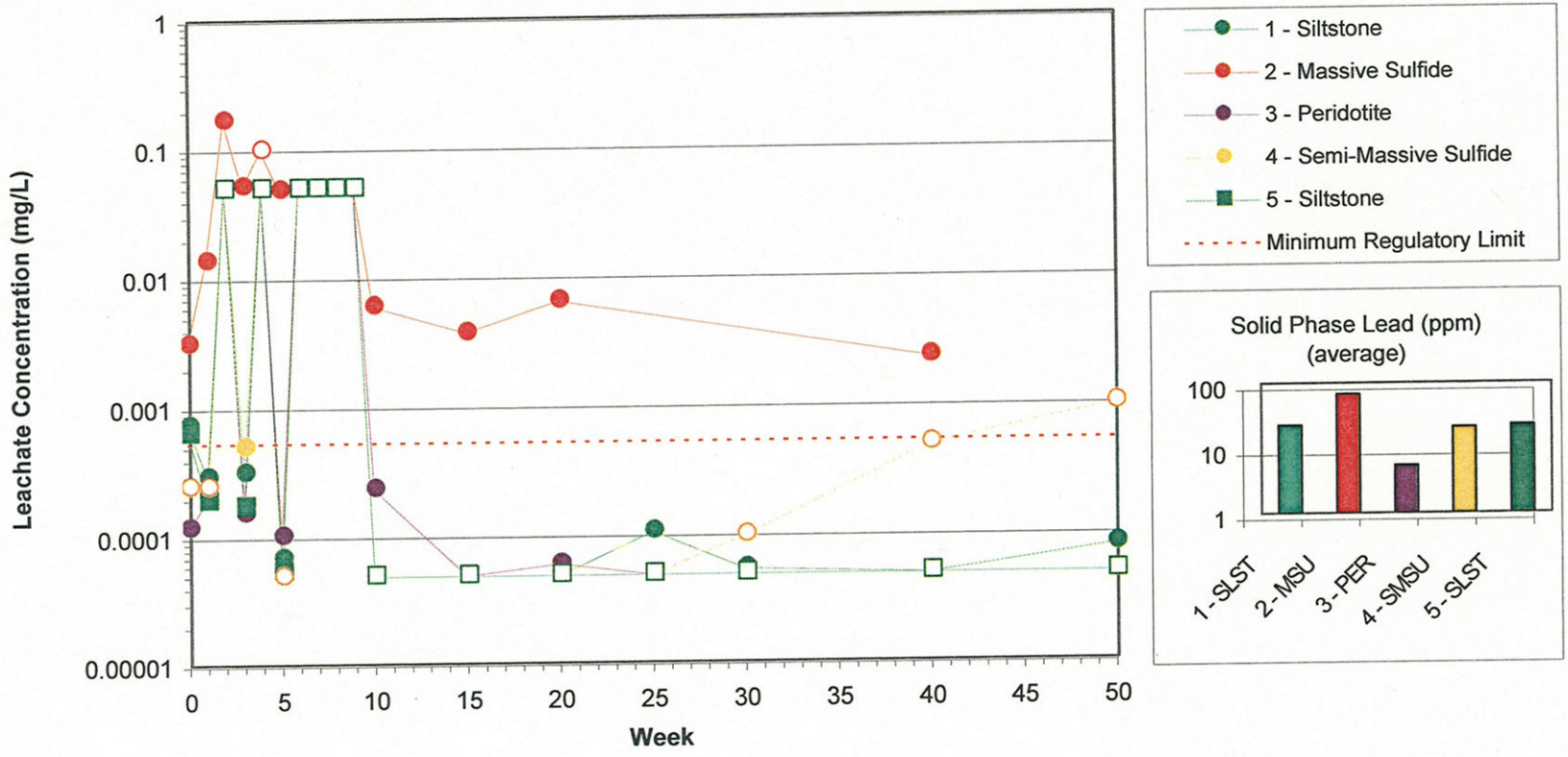
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Manganese**		
	DRAWN CR	DATE February 2005	JOB NO. 043-1055	
	CHECKED TB	SCALE na	DWG. NO.	
	REVIEWED ML	FILE NO. Phase I - Kinetic Testing Cells.xls	FIGURE NO. **B.1-20**	



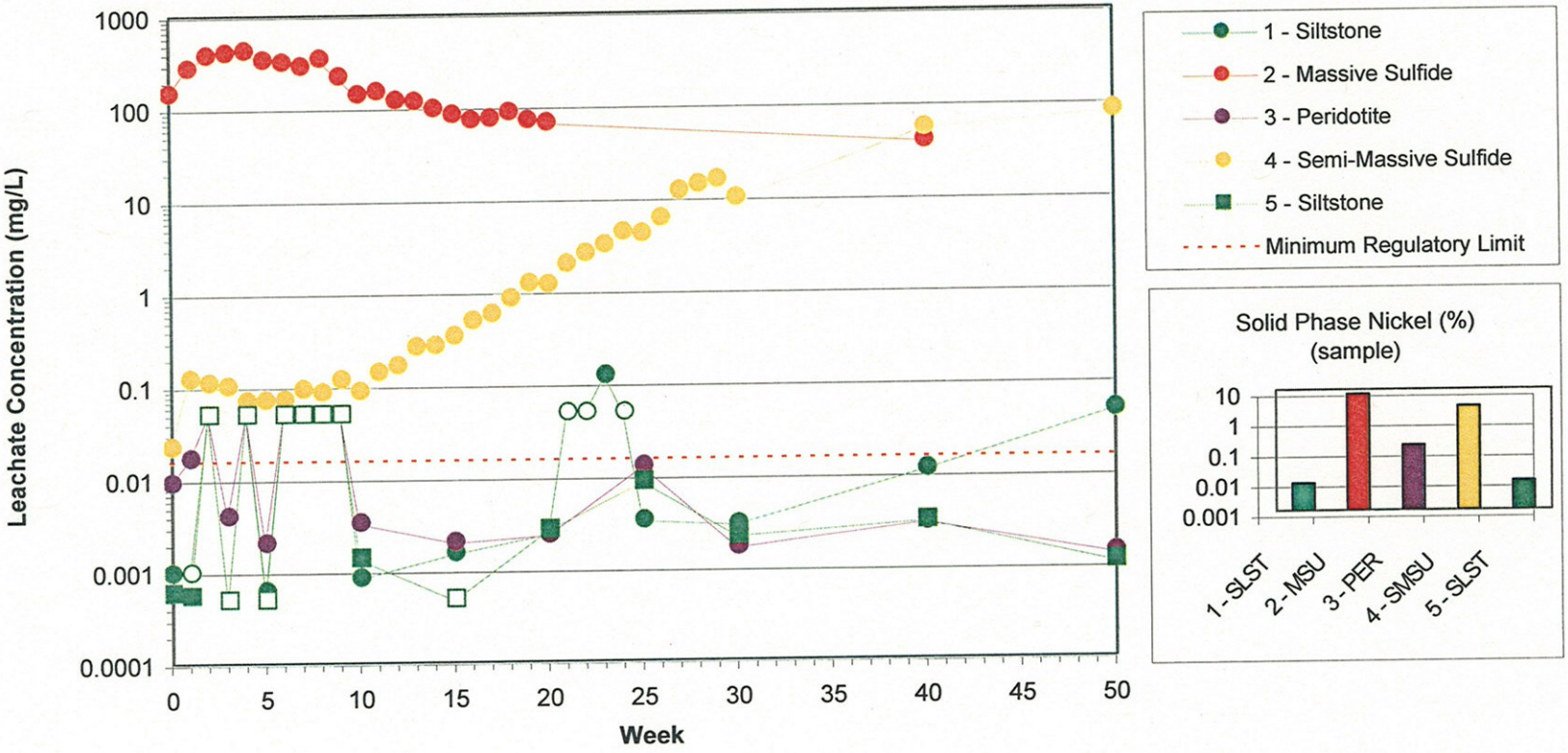
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Mercury**		
	DRAWN CR	DATE February 2005	JOB NO. 043-1055	
	CHECKED TB	SCALE na	DWG. NO.	
	REVIEWED ML	FILE NO. Phase I - Kinetic Testing Cells.xls	FIGURE NO. **B.1-21**	



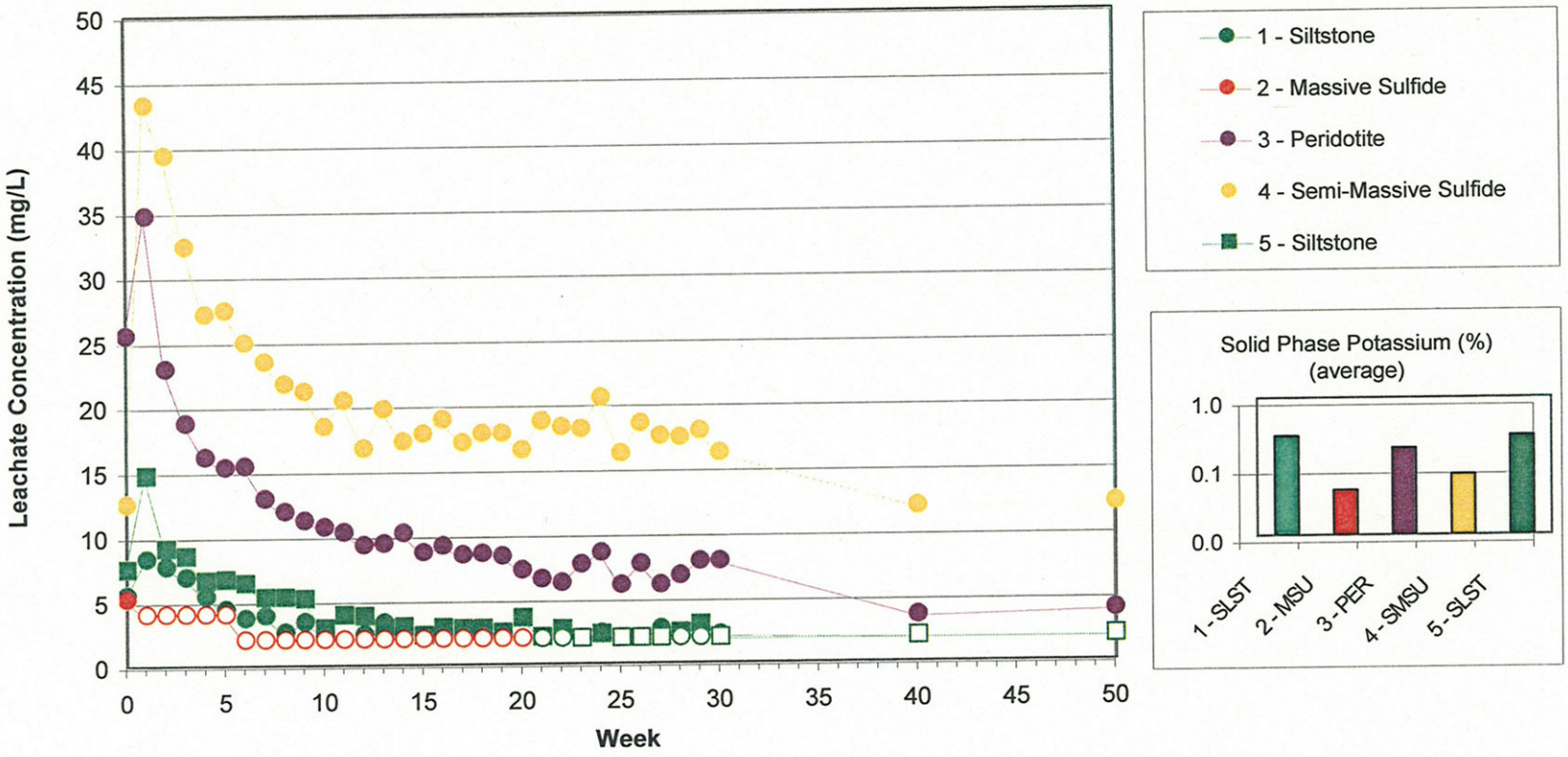
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Lead**		
	DRAWN CR	DATE February 2005	JOB NO. 043-1055	
	CHECKED TB	SCALE na	DWG. NO.	
	REVIEWED ML	FILE NO. Phase I - Kinetic Testing Cells.xls	FIGURE NO. **B.1-22**	



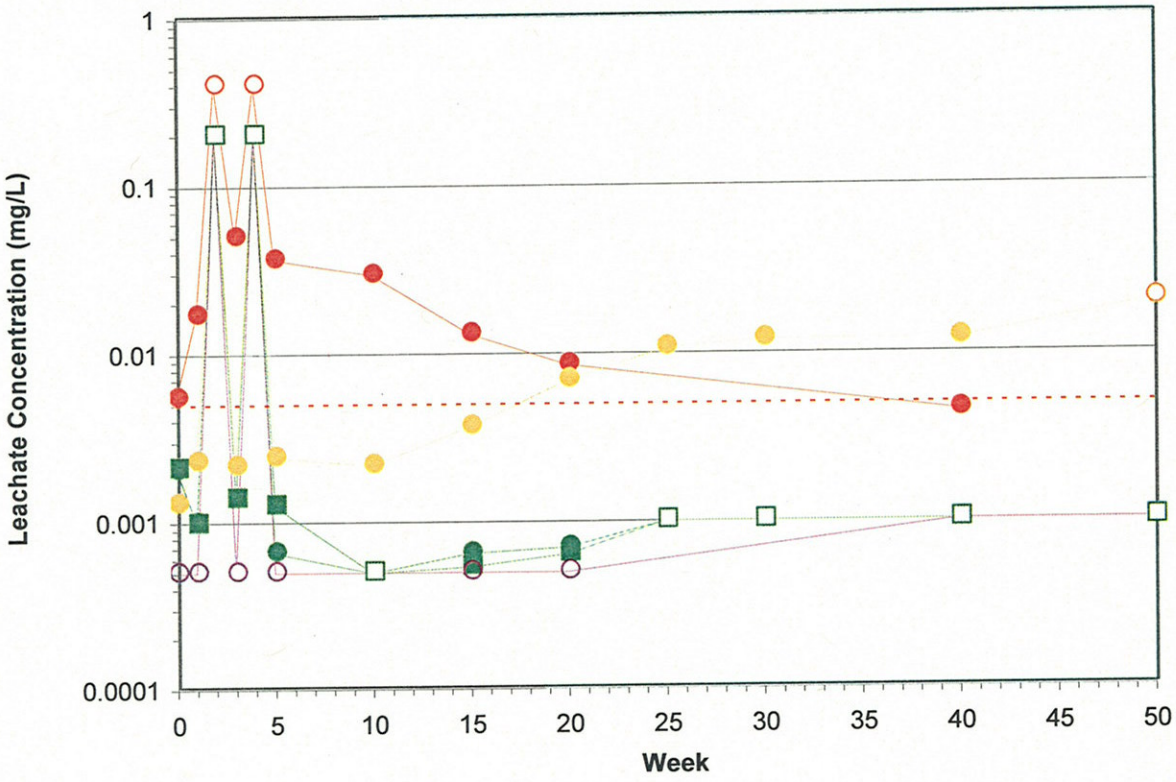
Non-detect concentrations plotted at the detection limit (shown as open symbols).

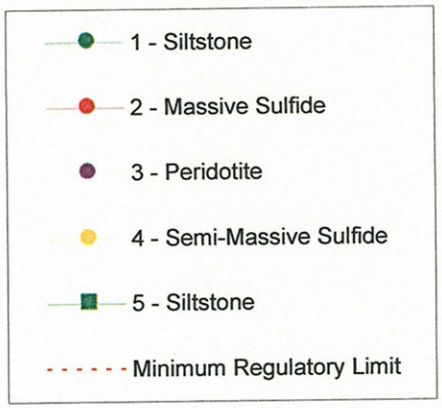
Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Nickel**		
	DRAWN CR	DATE February 2005	JOB NO. 043-1055	
	CHECKED TB	SCALE na	DWG. NO.	
	REVIEWED ML	FILE NO. Phase I - Kinetic Testing Cells.xls	FIGURE NO. **B.1-23**	

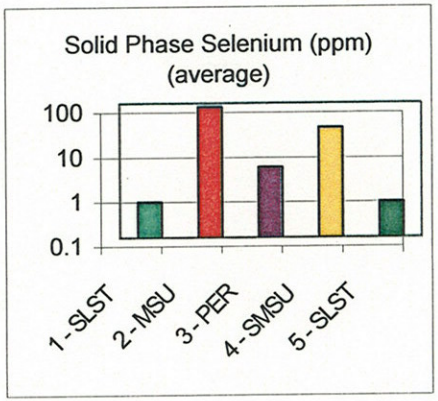


Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE: **Kinetic Testing Results - Potassium**			
	DRAWN: CR	DATE: February 2005	JOB NO.: 043-1055	
	CHECKED: TB	SCALE: na	DWG. NO.:	
	REVIEWED: ML	FILE NO.: Phase I - Kinetic Testing Cells.xls	FIGURE NO.: **B.1-24**	

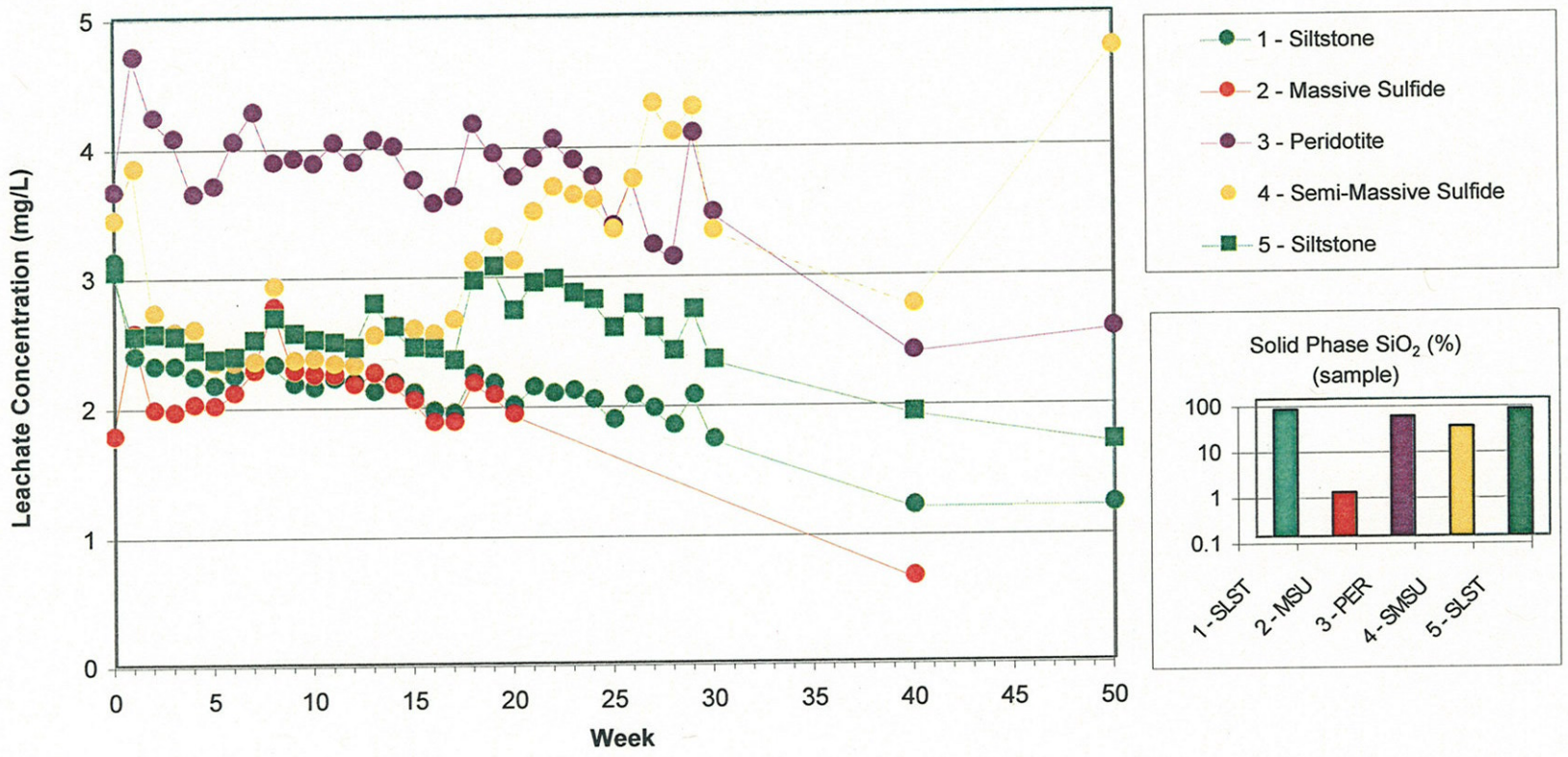






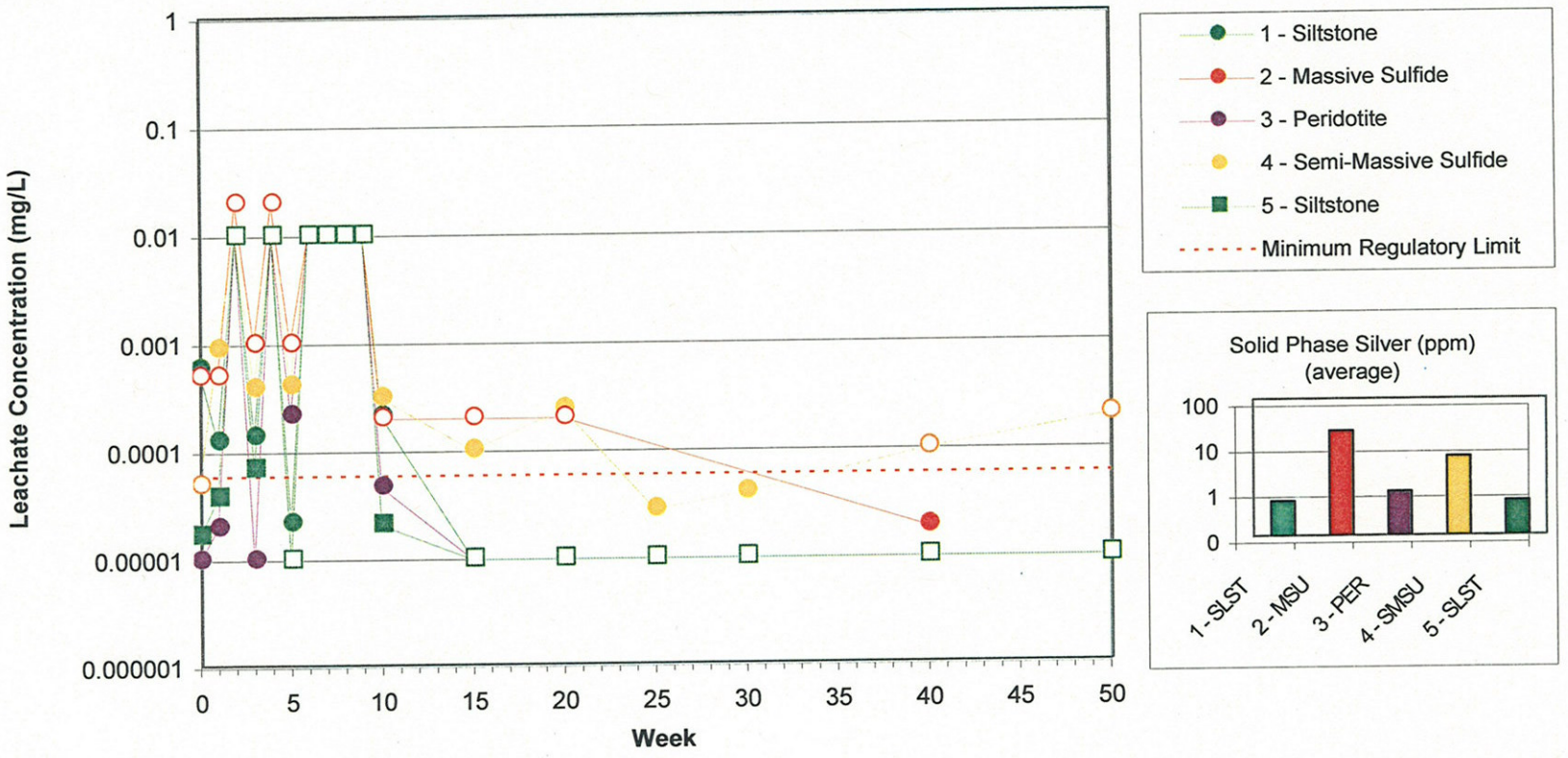
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Selenium**		
	DRAWN	CR	DATE February 2005	JOB NO. 043-1055
	CHECKED	TB	SCALE na	DWG. NO.
	REVIEWED	ML	FILE NO. Phase I - Kinetic Testing Cells.xls	FIGURE NO. **B.1-25**



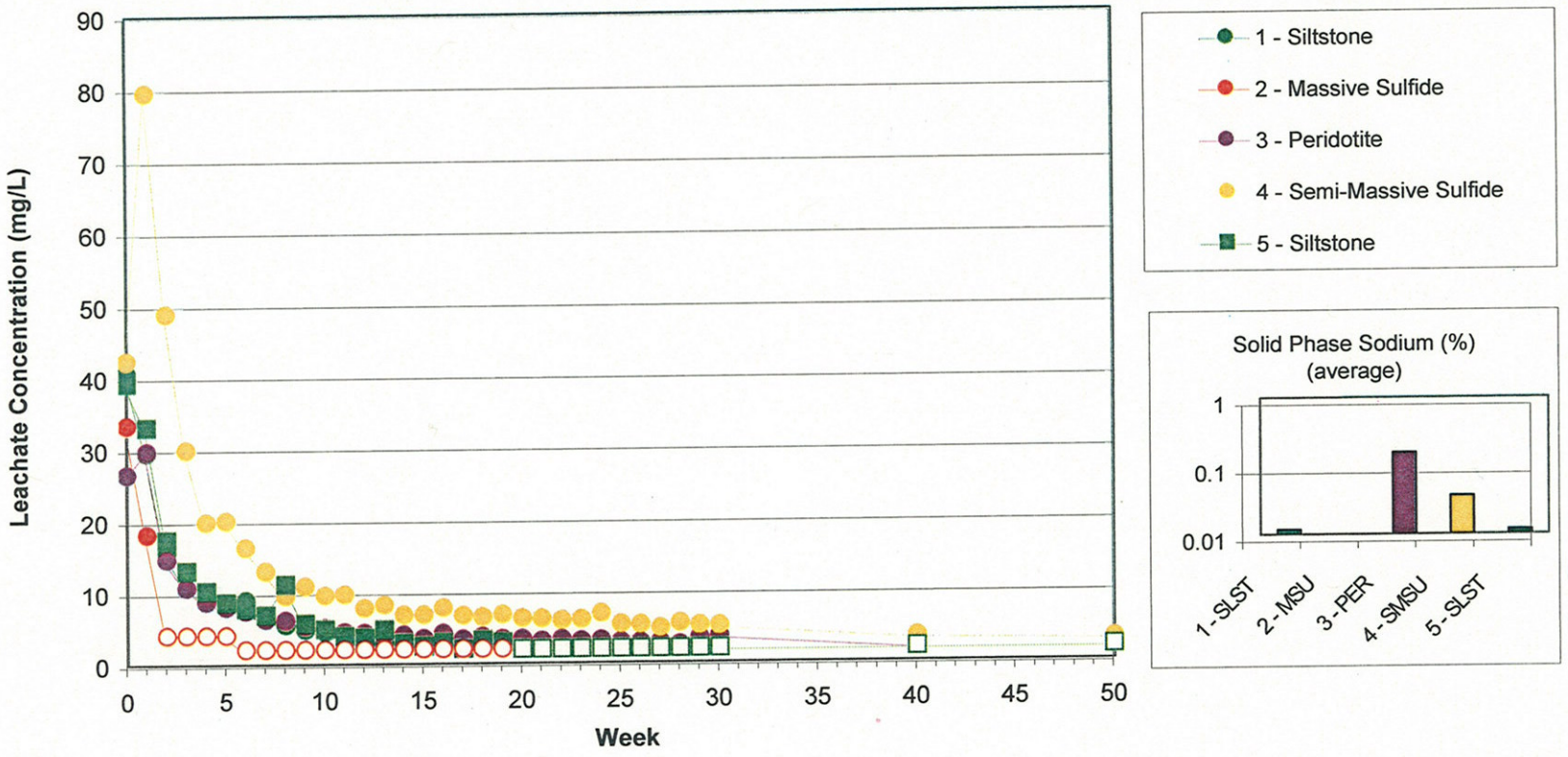
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE: **Kinetic Testing Results - Silicon**			
	DRAWN: CR	DATE: February 2005	JOB NO.: 043-1055	
	CHECKED: TB	SCALE: na	DWG. NO.:	
	REVIEWED: ML	FILE NO.: Phase I - Kinetic Testing Cells.xls	FIGURE NO.: **B.1-26**	



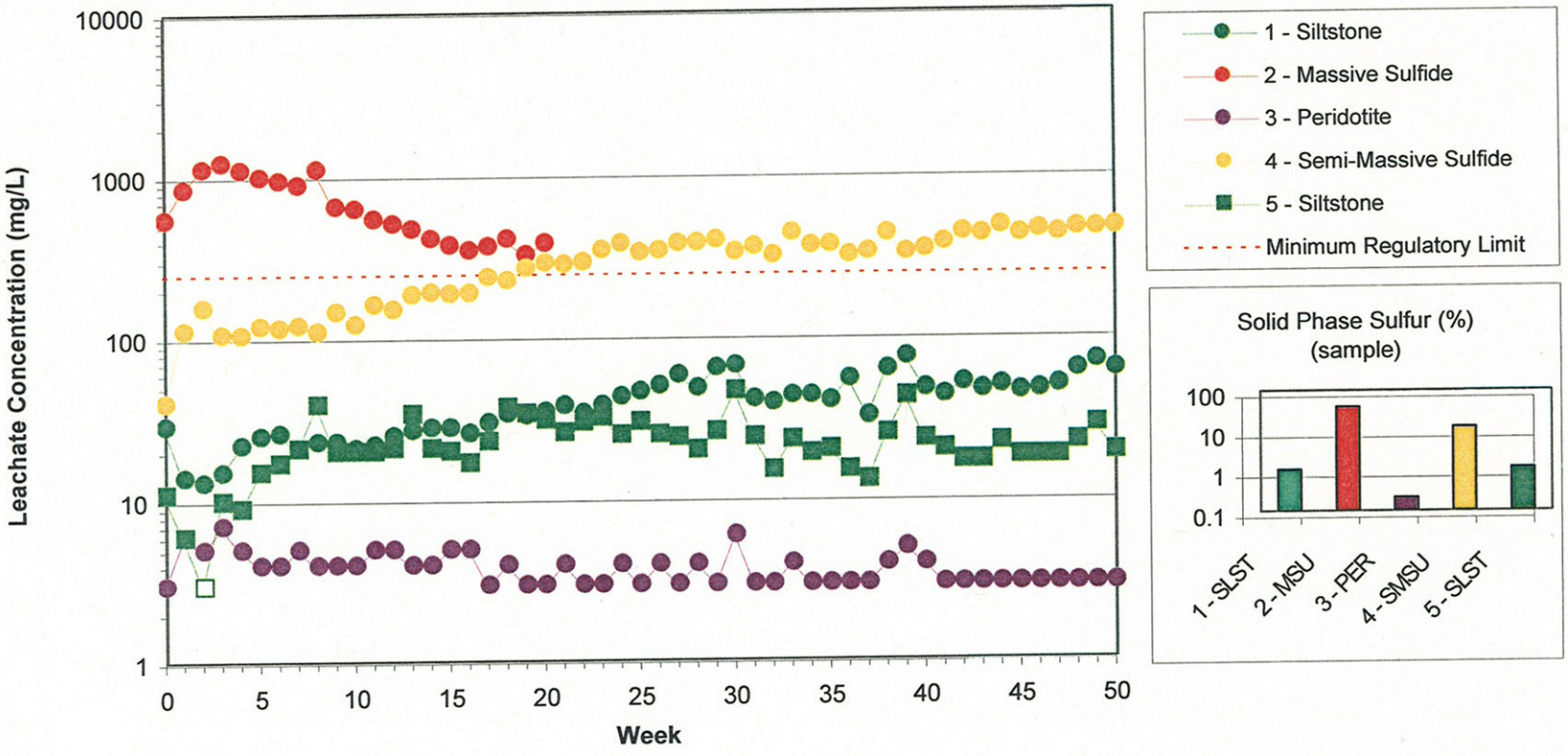
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE: **Kinetic Testing Results - Silver**			
	DRAWN: CR	DATE: February 2005	JOB NO.: 043-1055	
	CHECKED: TB	SCALE: na	DWG. NO.	
	REVIEWED: ML	FILE NO.: Phase I - Kinetic Testing Cells.xls	FIGURE NO.: **B.1-27**	



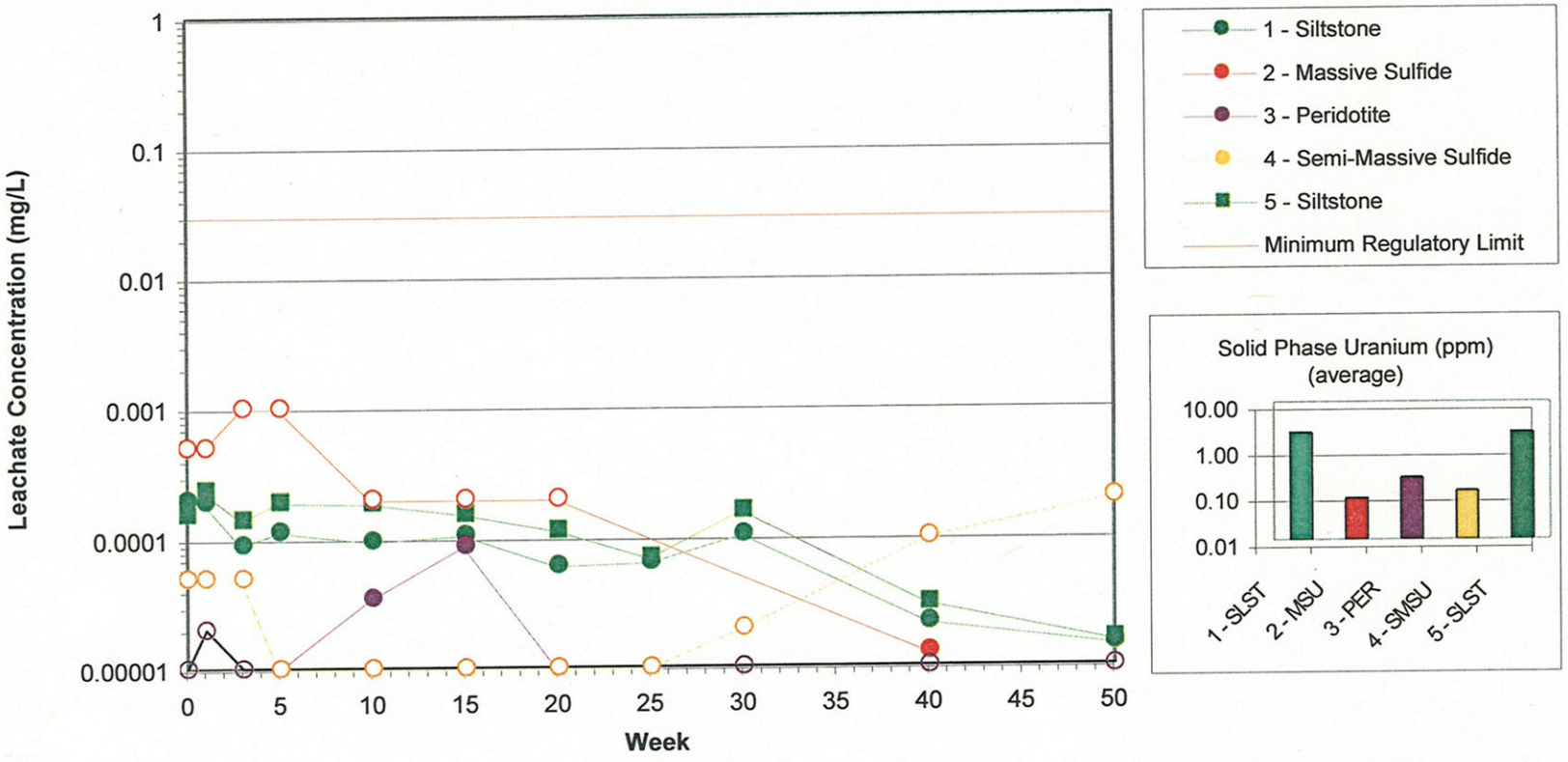
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Sodium**		
	DRAWN CR	DATE February 2005	JOB NO. 043-1055	
	CHECKED TB	SCALE na	DWG. NO.	
	REVIEWED ML	FILE NO. Phase I - Kinetic Testing Cells.xls	FIGURE NO. **B.1-28**	



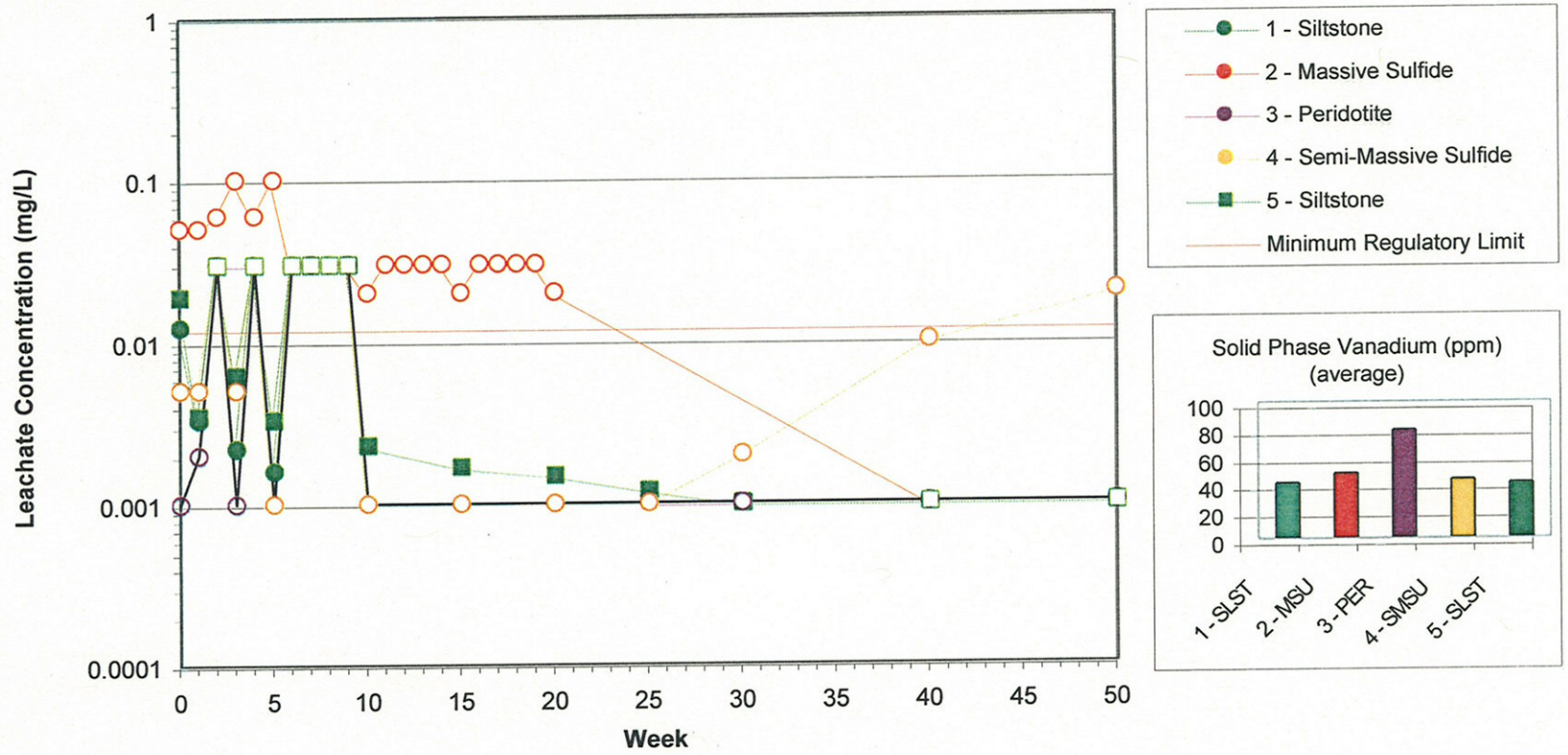
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Sulfate**		
	DRAWN	CR	DATE	February 2005	JOB NO.	043-1055
	CHECKED	TB	SCALE	na	DWG. NO.	
	REVIEWED	ML	FILE NO.	Phase I - Kinetic Testing Cells.xls	FIGURE NO.	B.1-29



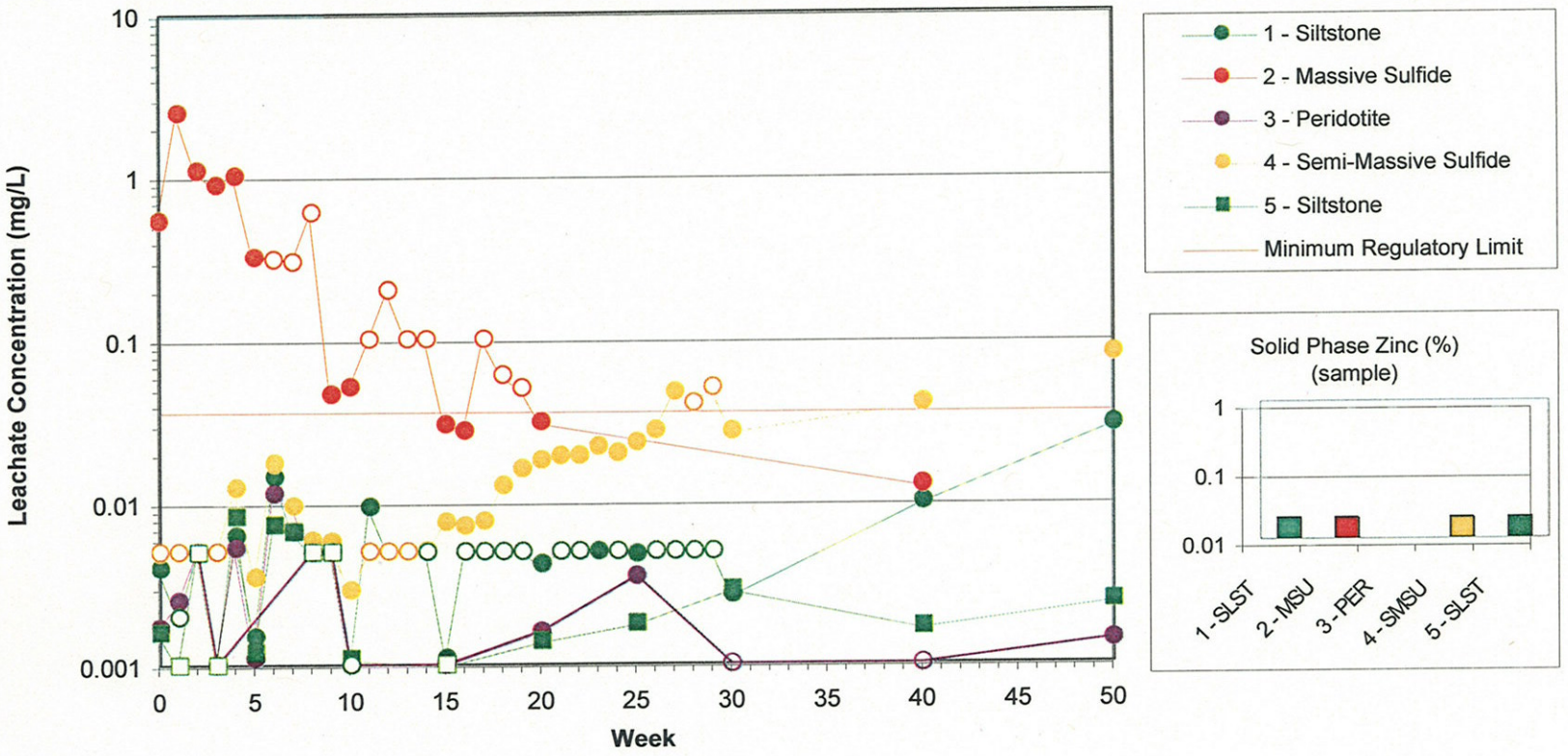
Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Uranium**		
	DRAWN CR	DATE February 2005	JOB NO. 043-1055	
	CHECKED TB	SCALE na	DWG. NO.	
	REVIEWED ML	FILE NO. Phase I - Kinetic Testing Cells.xls	FIGURE NO. **B.1-30**	



Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Vanadium**		
	DRAWN CR	DATE February 2005	JOB NO. 043-1055	
	CHECKED TB	SCALE na	DWG. NO.	
	REVIEWED ML	FILE NO. Phase I - Kinetic Testing Cells.xls	FIGURE NO. **B.1-31**	



Non-detect concentrations plotted at the detection limit (shown as open symbols).

Eagle Mine **Phase I Kinetic Testing**	TITLE	**Kinetic Testing Results - Zinc**		
	DRAWN CR	DATE February 2005	JOB NO. 043-1055	
	CHECKED TB	SCALE na	DWG. NO.	
	REVIEWED ML	FILE NO. Phase I - Kinetic Testing Cells.xls	FIGURE NO. **B.1-32**	

APPENDIX B.2

EAGLE PROJECT ACID ROCK DRAINAGE STUDY

PHASE II KINETIC TESTING
DATA AND GRAPHS

APPENDIX B.2
PHASE II KINETIC DATA

COLUMN 1

WEEK	DATE	WATER ADDED (L)	pH WATER ADDED	LEACHATE COLLECTED (L)	LEACHATE pH	REDOX (mV)	CONDUCTIVITY (µS/cm)	ACIDITY (pH 4.5) (mg CaCO3/L)	ACIDITY (pH 8.3) (mg CaCO3/L)	ALKALINITY (mg CaCO3/L)	SULPHATE (mg/L)
0	27-Sep-04	0.500	5.61	0.400	8.03	270	367	0.0	2.0	62.0	111
1	4-Oct-04	0.500	5.66	0.515	7.87	193	215	0.0	1.5	47.5	57
2	11-Oct-04	0.500	5.46	0.505	7.94	238	151	0.0	1.8	38.3	36
3	19-Oct-04	0.500	5.40	0.485	7.43	294	108	0.0	10.5	21.5	30
4	25-Oct-04	0.500	5.43	0.450	7.75	297	110	0.0	3.8	33.3	21
5	1-Nov-04	0.500	5.50	0.500	7.52	316	86	0.0	5.0	18.0	22
6	8-Nov-04	0.500	5.45	0.490	7.60	366	95	0.0	1.8	18.0	26
7	15-Nov-04	0.500	5.45	0.485	7.56	348	65	0.0	4.5	17.5	12
8	22-Nov-04	0.500	5.50	0.515	7.57	368	84	0.0	10.0	15.0	16
9	29-Nov-04	0.500	5.29	0.520	7.46	379	48	0.0	8.0	14.5	8
10	6-Dec-04	0.500	5.31	0.495	7.17	373	62	0.0	11.5	11.5	18
11	13-Dec-04	0.500	5.52	0.475	7.33	371	56	0.0	12.0	11.0	13
12	20-Dec-04	0.500	5.52	0.495	7.34	377	62	0.0	9.0	12.5	15
13	27-Dec-04	0.500	5.18	0.500	7.29	379	57	0.0	8.0	11.5	15
14	3-Jan-05	0.500	5.43	0.520	7.36	392	55	0.0	8.5	11.5	13
15	10-Jan-05	0.500	5.50	0.435	7.13	445	34	0.0	10.0	9.5	8
16	17-Jan-05	0.500	5.53	0.470	7.24	463	63	0.0	11.0	9.5	19
17	24-Jan-05	0.500	5.58	0.500	7.39	434	61	0.0	12.0	12.0	18
18	31-Jan-05	0.500	5.81	0.515	7.33	457	48	0.0	10.0	6.0	12
19	7-Feb-05	0.500	5.51	0.500	7.23	452	51	0.0	10.5	11.5	13
20	14-Feb-05	0.500	5.41	0.520	7.27	423	50	0.0	7.0	11.0	13
21	21-Feb-05	0.500	5.36	0.500	7.18	378	57	0.0	9.0	11.0	16
22	28-Feb-05	0.500	5.45	0.500	7.20	441	51	0.0	11.0	10.0	14
23	7-Mar-05	0.500	5.47	0.470	7.26	462	52	0.0	11.5	9.0	15
24	14-Mar-05	0.500	5.50	0.505	7.21	461	57	0.0	10.0	10.5	17
25	21-Mar-05	0.500	5.56	0.435	7.29	442	34	0.0	10.5	8.5	6
26	28-Mar-05	0.500	5.63	0.475	7.15	452	65	0.0	14.5	8.5	IP

APPENDIX B.2
PHASE II KINETIC DATA

COLUMN 2

WEEK	DATE	WATER ADDED (L)	pH WATER ADDED	LEACHATE COLLECTED (L)	LEACHATE pH	REDOX (mV)	CONDUCTIVITY (µS/cm)	ACIDITY (pH 4.5) (mg CaCO3/L)	ACIDITY (pH 8.3) (mg CaCO3/L)	ALKALINITY (mg CaCO3/L)	SULPHATE (mg/L)
0	27-Sep-04	0.500	5.61	0.430	8.48	244	353	0.0	0.0	81.5	73
1	4-Oct-04	0.500	5.66	0.415	8.09	140	217	0.0	8.0	62.0	38
2	11-Oct-04	0.500	5.46	0.405	8.28	169	164	0.0	1.0	52.8	24
3	19-Oct-04	0.500	5.40	0.420	7.76	219	126	0.0	11.0	40.5	17
4	25-Oct-04	0.500	5.43	0.370	7.89	246	142	0.0	3.3	45.5	22
5	1-Nov-04	0.500	5.50	0.415	7.85	269	115	0.0	7.0	36.0	17
6	8-Nov-04	0.500	5.45	0.405	7.98	289	122	0.0	8.5	36.5	18
7	15-Nov-04	0.500	5.45	0.420	7.92	326	120	0.0	6.5	35.5	20
8	22-Nov-04	0.500	5.50	0.450	7.75	350	107	0.0	9.0	31.0	18
9	29-Nov-04	0.500	5.29	0.445	7.85	342	97	0.0	7.0	29.5	15
10	6-Dec-04	0.500	5.31	0.455	8.01	345	98	0.0	3.0	30.0	17
11	13-Dec-04	0.500	5.52	0.445	7.82	346	92	0.0	6.0	30.0	13
12	20-Dec-04	0.500	5.52	0.425	7.68	352	90	0.0	10.0	32.0	15
13	27-Dec-04	0.500	5.18	0.440	7.69	377	100	0.0	9.5	27.0	20
14	3-Jan-05	0.500	5.43	0.435	7.62	366	99	0.0	12.5	28.0	20
15	10-Jan-05	0.500	5.50	0.430	7.74	431	92	0.0	11.5	28.0	15
16	17-Jan-05	0.500	5.53	0.450	7.75	435	99	0.0	8.0	28.0	19
17	24-Jan-05	0.500	5.58	0.435	7.72	409	91	0.0	7.0	28.0	16
18	31-Jan-05	0.500	5.81	0.440	7.72	439	88	0.0	8.5	27.0	16
19	7-Feb-05	0.500	5.51	0.430	7.78	410	85	0.0	6.5	27.5	13
20	14-Feb-05	0.500	5.41	0.455	7.66	382	118	0.0	10.5	26.5	29
21	21-Feb-05	0.500	5.36	0.465	7.64	315	110	0.0	9.5	28.0	25
22	28-Feb-05	0.500	5.45	0.470	7.68	414	105	0.0	10.0	28.0	23
23	7-Mar-05	0.500	5.47	0.480	7.73	361	102	0.0	9.0	29.0	20
24	14-Mar-05	0.500	5.50	0.480	7.63	388	102	0.0	10.5	28.0	23
25	21-Mar-05	0.500	5.56	0.445	7.77	428	91	0.0	6.0	25.5	15
26	28-Mar-05	0.500	5.63	0.475	7.70	407	100	0.0	7.5	24.0	IP

APPENDIX B.2
PHASE II KINETIC DATA

COLUMN 3

WEEK	DATE	WATER ADDED (L)	pH WATER ADDED	LEACHATE COLLECTED (L)	LEACHATE pH	REDOX (mV)	CONDUCTIVITY (µS/cm)	ACIDITY (pH 4.5) (mg CaCO3/L)	ACIDITY (pH 8.3) (mg CaCO3/L)	ALKALINITY (mg CaCO3/L)	SULPHATE (mg/L)
0	27-Sep-04	0.500	5.61	0.400	8.81	225	370	0.0	0.0	78.0	26
1	4-Oct-04	0.500	5.66	0.455	9.28	147	261	0.0	0.0	80.0	15
2	11-Oct-04	0.500	5.46	0.435	9.14	185	272	0.0	0.0	111.3	10
3	19-Oct-04	0.500	5.40	0.425	8.31	205	176	0.0	0.0	82.0	<3
4	25-Oct-04	0.500	5.43	0.410	8.50	170	193	0.0	0.0	89.0	<3
5	1-Nov-04	0.500	5.50	0.415	8.62	252	134	0.0	0.0	64.0	<3
6	8-Nov-04	0.500	5.45	0.425	8.18	294	136	0.0	2.0	61.0	<3
7	15-Nov-04	0.500	5.45	0.425	8.18	297	140	0.0	3.5	60.0	<3
8	22-Nov-04	0.500	5.50	0.430	8.15	313	129	0.0	4.5	57.5	<3
9	29-Nov-04	0.500	5.29	0.440	8.04	334	106	0.0	4.0	50.0	<3
10	6-Dec-04	0.500	5.31	0.400	8.30	333	104	0.0	0.0	48.0	<3
11	13-Dec-04	0.500	5.52	0.430	8.03	339	104	0.0	5.5	48.0	<3
12	20-Dec-04	0.500	5.52	0.430	7.96	342	99	0.0	7.0	46.0	<3
13	27-Dec-04	0.500	5.18	0.400	8.03	340	114	0.0	4.5	48.5	<3
14	3-Jan-05	0.500	5.43	0.415	7.96	360	101	0.0	6.0	46.0	<3
15	10-Jan-05	0.500	5.50	0.425	7.97	416	95	0.0	8.0	45.5	<3
16	17-Jan-05	0.500	5.53	0.430	7.96	424	96	0.0	7.0	45.0	<3
17	24-Jan-05	0.500	5.58	0.430	7.84	410	91	0.0	6.0	43.0	4
18	31-Jan-05	0.500	5.81	0.430	7.96	434	88	0.0	8.0	48.0	<3
19	7-Feb-05	0.500	5.51	0.465	7.70	408	93	0.0	11.5	34.5	<3
20	14-Feb-05	0.500	5.41	0.480	7.68	377	106	0.0	7.0	38.5	7
21	21-Feb-05	0.500	5.36	0.485	7.82	331	104	0.0	8.0	38.5	8
22	28-Feb-05	0.500	5.45	0.500	7.80	397	102	0.0	11.0	38.5	8
23	7-Mar-05	0.500	5.47	0.465	7.84	392	97	0.0	8.5	35.5	10
24	14-Mar-05	0.500	5.50	0.435	7.75	345	100	0.0	8.5	35.0	11
25	21-Mar-05	0.500	5.56	0.420	7.84	418	98	0.0	7.0	33.0	8
26	28-Mar-05	0.500	5.63	0.500	7.92	376	100	0.0	5.0	35.5	IP

APPENDIX B.2
PHASE II KINETIC DATA

COLUMN 4

WEEK	DATE	WATER ADDED (L)	pH WATER ADDED	LEACHATE COLLECTED (L)	LEACHATE pH	REDOX (mV)	CONDUCTIVITY (µS/cm)	ACIDITY (pH 4.5) (mg CaCO3/L)	ACIDITY (pH 8.3) (mg CaCO3/L)	ALKALINITY (mg CaCO3/L)	SULPHATE (mg/L)
0	27-Sep-04	0.500	5.61	0.430	7.67	256	968	0.0	6.5	31.5	415
1	4-Oct-04	0.500	5.66	0.460	7.72	243	512	0.0	7.5	31.0	198
2	11-Oct-04	0.500	5.46	0.415	7.80	308	322	0.0	2.0	21.8	132
3	19-Oct-04	0.500	5.40	0.430	7.18	298	376	0.0	15.0	11.5	168
4	25-Oct-04	0.500	5.43	0.415	7.20	279	234	0.0	7.8	10.0	99
5	1-Nov-04	0.500	5.50	0.420	7.05	326	229	0.0	9.0	6.0	95
6	8-Nov-04	0.500	5.45	0.470	6.89	328	244	0.0	6.5	6.0	101
7	15-Nov-04	0.500	5.45	0.420	6.77	338	240	0.0	9.0	4.5	106
8	22-Nov-04	0.500	5.50	0.430	6.70	368	205	0.0	14.5	3.5	86
9	29-Nov-04	0.500	5.29	0.450	6.49	392	203	0.0	15.0	3.5	91
10	6-Dec-04	0.500	5.31	0.460	6.34	387	205	0.0	17.5	2.5	86
11	13-Dec-04	0.500	5.52	0.480	6.57	381	198	0.0	12.0	4.0	82
12	20-Dec-04	0.500	5.52	0.465	6.43	395	193	0.0	12.0	2.5	82
13	27-Dec-04	0.500	5.18	0.475	6.35	412	194	0.0	12.0	3.0	86
14	3-Jan-05	0.500	5.43	0.460	6.17	444	199	0.0	18.5	2.0	84
15	10-Jan-05	0.500	5.50	0.470	6.08	499	192	0.0	22.0	3.0	86
16	17-Jan-05	0.500	5.53	0.430	5.71	525	165	0.0	13.0	1.5	71
17	24-Jan-05	0.500	5.58	0.430	5.60	521	147	0.0	14.0	2.0	59
18	31-Jan-05	0.500	5.81	0.430	5.64	536	138	0.0	17.0	2.0	59
19	7-Feb-05	0.500	5.51	0.430	5.35	488	133	0.0	14.0	2.0	54
20	14-Feb-05	0.500	5.41	0.475	5.26	471	202	0.0	22.5	1.5	89
21	21-Feb-05	0.500	5.36	0.475	5.08	437	207	0.0	27.5	1.5	87
22	28-Feb-05	0.500	5.45	0.480	4.87	460	209	0.0	34.0	1.0	88
23	7-Mar-05	0.500	5.47	0.485	4.67	515	214	0.0	40.0	0.5	101
24	14-Mar-05	0.500	5.50	0.465	4.64	505	216	0.0	40.0	0.5	104
25	21-Mar-05	0.500	5.56	0.440	4.63	526	177	0.0	41.5	0.5	73
26	28-Mar-05	0.500	5.63	0.480	4.59	501	221	0.0	47.5	0.5	IP

APPENDIX B.2
PHASE II KINETIC DATA

COLUMN 5

WEEK	DATE	WATER ADDED (L)	pH WATER ADDED	LEACHATE COLLECTED (L)	LEACHATE pH	REDOX (mV)	CONDUCTIVITY (µS/cm)	ACIDITY (pH 4.5) (mg CaCO3/L)	ACIDITY (pH 8.3) (mg CaCO3/L)	ALKALINITY (mg CaCO3/L)	SULPHATE (mg/L)
0	27-Sep-04	0.500	5.61	0.425	8.17	360	544	0.0	1.5	73.5	178
1	4-Oct-04	0.500	5.66	0.435	8.20	195	296	0.0	2.0	71.5	53
2	11-Oct-04	0.500	5.46	0.440	8.69	302	213	0.0	0.0	63.8	29
3	19-Oct-04	0.500	5.40	0.440	8.06	280	171	0.0	6.5	45.0	27
4	25-Oct-04	0.500	5.43	0.430	8.11	251	148	0.0	2.8	51.0	20
5	1-Nov-04	0.500	5.50	0.440	7.95	304	148	0.0	7.0	40.5	23
6	8-Nov-04	0.500	5.45	0.440	7.90	334	169	0.0	4.0	33.0	40
7	15-Nov-04	0.500	5.45	0.435	7.93	328	186	0.0	7.0	34.0	50
8	22-Nov-04	0.500	5.50	0.445	7.94	350	149	0.0	11.0	34.5	37
9	29-Nov-04	0.500	5.29	0.445	7.80	344	126	0.0	4.0	30.5	31
10	6-Dec-04	0.500	5.31	0.445	7.99	345	126	0.0	4.0	28.0	34
11	13-Dec-04	0.500	5.52	0.445	7.70	355	120	0.0	11.5	25.0	29
12	20-Dec-04	0.500	5.52	0.445	7.76	359	114	0.0	12.5	30.5	25
13	27-Dec-04	0.500	5.18	0.445	7.66	370	106	0.0	9.5	25.0	29
14	3-Jan-05	0.500	5.43	0.435	7.69	377	111	0.0	10.0	25.0	27
15	10-Jan-05	0.500	5.50	0.445	7.58	459	116	0.0	13.0	19.0	36
16	17-Jan-05	0.500	5.53	0.440	7.72	454	103	0.0	11.0	26.0	22
17	24-Jan-05	0.500	5.58	0.445	7.55	455	110	0.0	12.0	20.0	31
18	31-Jan-05	0.500	5.81	0.445	7.37	477	112	0.0	10.0	17.0	36
19	7-Feb-05	0.500	5.51	0.445	7.56	443	98	0.0	13.0	21.5	21
20	14-Feb-05	0.500	5.41	0.465	7.53	417	142	0.0	13.0	17.0	49
21	21-Feb-05	0.500	5.36	0.475	7.38	317	159	0.0	11.0	15.0	58
22	28-Feb-05	0.500	5.45	0.470	7.35	398	175	0.0	13.0	14.0	71
23	7-Mar-05	0.500	5.47	0.440	7.49	430	114	0.0	12.5	17.5	41
24	14-Mar-05	0.500	5.50	0.455	7.26	410	163	0.0	14.0	12.5	66
25	21-Mar-05	0.500	5.56	0.450	7.33	460	114	0.0	11.0	13.0	46
26	28-Mar-05	0.500	5.63	0.485	7.51	428	163	0.0	6.5	13.5	IP

APPENDIX B.2
PHASE II KINETIC DATA

COLUMN 6

WEEK	DATE	WATER ADDED (L)	pH WATER ADDED	LEACHATE COLLECTED (L)	LEACHATE pH	REDOX (mV)	CONDUCTIVITY (µS/cm)	ACIDITY (pH 4.5) (mg CaCO3/L)	ACIDITY (pH 8.3) (mg CaCO3/L)	ALKALINITY (mg CaCO3/L)	SULPHATE (mg/L)
0	27-Sep-04	0.500	5.61	0.440	7.95	284	189	0.0	7.0	26.5	36
1	4-Oct-04	0.500	5.66	0.425	8.27	202	400	0.0	1.0	70.0	86
2	11-Oct-04	0.500	5.46	0.410	8.39	260	384	0.0	0.0	64.0	93
3	19-Oct-04	0.500	5.40	0.420	8.04	238	308	0.0	5.0	45.0	83
4	25-Oct-04	0.500	5.43	0.390	8.08	237	286	0.0	2.5	55.3	58
5	1-Nov-04	0.500	5.50	0.425	7.91	290	241	0.0	6.0	38.0	56
6	8-Nov-04	0.500	5.45	0.420	7.90	308	269	0.0	6.5	33.0	107
7	15-Nov-04	0.500	5.45	0.425	7.86	324	331	0.0	7.5	29.5	136
8	22-Nov-04	0.500	5.50	0.425	7.81	330	246	0.0	7.0	31.5	87
9	29-Nov-04	0.500	5.29	0.435	7.70	343	226	0.0	10.0	21.0	78
10	6-Dec-04	0.500	5.31	0.445	7.41	342	326	0.0	9.5	16.0	143
11	13-Dec-04	0.500	5.52	0.505	7.75	355	417	0.0	8.0	22.5	190
12	20-Dec-04	0.500	5.52	0.500	7.75	365	476	0.0	10.0	22.5	223
13	27-Dec-04	0.500	5.18	0.505	7.66	363	464	0.0	7.5	18.5	211
14	3-Jan-05	0.500	5.43	0.495	7.54	374	463	0.0	12.5	19.0	215
15	10-Jan-05	0.500	5.50	0.500	7.53	439	429	0.0	17.0	18.0	201
16	17-Jan-05	0.500	5.53	0.435	7.33	448	410	0.0	8.5	11.5	200
17	24-Jan-05	0.500	5.58	0.445	7.27	440	433	0.0	10.0	11.0	202
18	31-Jan-05	0.500	5.81	0.450	7.39	449	425	0.0	8.5	13.0	202
19	7-Feb-05	0.500	5.51	0.430	7.40	421	321	0.0	8.5	13.0	122
20	14-Feb-05	0.500	5.41	0.420	7.33	399	358	0.0	13.0	14.0	159
21	21-Feb-05	0.500	5.36	0.430	7.12	318	364	0.0	11.5	10.0	158
22	28-Feb-05	0.500	5.45	0.435	7.17	367	358	0.0	12.0	9.5	170
23	7-Mar-05	0.500	5.47	0.450	7.02	435	427	0.0	13.0	7.5	218
24	14-Mar-05	0.500	5.50	0.475	7.13	387	448	0.0	13.0	10.0	240
25	21-Mar-05	0.500	5.56	0.435	7.05	467	347	0.0	11.0	7.5	178
26	28-Mar-05	0.500	5.63	0.455	7.04	434	402	0.0	4.5	6.0	IP

APPENDIX B.2
PHASE II KINETIC DATA

COLUMN 7

WEEK	DATE	WATER ADDED (L)	pH WATER ADDED	LEACHATE COLLECTED (L)	LEACHATE pH	REDOX (mV)	CONDUCTIVITY (µS/cm)	ACIDITY (pH 4.5) (mg CaCO3/L)	ACIDITY (pH 8.3) (mg CaCO3/L)	ALKALINITY (mg CaCO3/L)	SULPHATE (mg/L)
0	27-Sep-04	0.500	5.61	0.420	8.36	190	281	0.0	0.0	73.0	43
1	4-Oct-04	0.500	5.66	0.405	8.15	208	168	0.0	1.0	59.5	17
2	11-Oct-04	0.500	5.46	0.405	8.46	271	134	0.0	0.0	51.5	10
3	19-Oct-04	0.500	5.40	0.410	7.63	240	104	0.0	9.0	42.0	7
4	25-Oct-04	0.500	5.43	0.405	7.98	243	119	0.0	3.3	47.0	5
5	1-Nov-04	0.500	5.50	0.490	8.04	303	118	0.0	5.5	55.0	4
6	8-Nov-04	0.500	5.45	0.410	7.93	306	90	0.0	4.5	39.5	4
7	15-Nov-04	0.500	5.45	0.405	7.99	322	94	0.0	2.5	39.5	5
8	22-Nov-04	0.500	5.50	0.415	7.92	330	87	0.0	6.5	38.5	4
9	29-Nov-04	0.500	5.29	0.415	8.17	340	74	0.0	0.5	37.0	3
10	6-Dec-04	0.500	5.31	0.400	8.19	338	79	0.0	0.5	40.0	5
11	13-Dec-04	0.500	5.52	0.415	7.89	340	78	0.0	9.0	37.0	3
12	20-Dec-04	0.500	5.52	0.410	7.94	351	81	0.0	8.5	38.0	5
13	27-Dec-04	0.500	5.18	0.405	7.34	353	79	0.0	12.0	37.5	5
14	3-Jan-05	0.500	5.43	0.405	7.95	360	80	0.0	8.0	36.5	4
15	10-Jan-05	0.500	5.50	0.405	7.89	416	83	0.0	8.0	40.5	4
16	17-Jan-05	0.500	5.53	0.420	7.80	429	77	0.0	10.0	37.0	4
17	24-Jan-05	0.500	5.58	0.410	7.78	423	77	0.0	8.0	36.0	6
18	31-Jan-05	0.500	5.81	0.410	7.75	437	73	0.0	7.0	36.0	5
19	7-Feb-05	0.500	5.51	0.415	7.80	401	76	0.0	9.5	36.5	5
20	14-Feb-05	0.500	5.41	0.455	7.73	379	97	0.0	6.5	38.5	13
21	21-Feb-05	0.500	5.36	0.465	7.80	368	96	0.0	8.5	36.5	14
22	28-Feb-05	0.500	5.45	0.465	7.82	361	95	0.0	7.5	37.0	12
23	7-Mar-05	0.500	5.47	0.450	7.82	388	93	0.0	7.5	36.5	13
24	14-Mar-05	0.500	5.50	0.475	7.74	344	95	0.0	9.5	38.0	13
25	21-Mar-05	0.500	5.56	0.430	7.88	430	80	0.0	7.5	34.0	5
26	28-Mar-05	0.500	5.63	0.460	8.00	404	97	0.0	2.5	35.0	IP

APPENDIX B.2
PHASE II KINETIC DATA

COLUMN 8

WEEK	DATE	WATER ADDED (L)	pH WATER ADDED	LEACHATE COLLECTED (L)	LEACHATE pH	REDOX (mV)	CONDUCTIVITY (µS/cm)	ACIDITY (pH 4.5) (mg CaCO3/L)	ACIDITY (pH 8.3) (mg CaCO3/L)	ALKALINITY (mg CaCO3/L)	SULPHATE (mg/L)
0	27-Sep-04	0.500	5.61	0.480	7.32	281	333	0.0	6.5	14.0	137
1	4-Oct-04	0.500	5.66	0.475	7.26	318	147	0.0	6.0	10.5	56
2	11-Oct-04	0.500	5.46	0.460	7.11	358	97	0.0	3.3	8.0	34
3	19-Oct-04	0.500	5.40	0.460	6.79	297	78	0.0	18.0	5.5	29
4	25-Oct-04	0.500	5.43	0.460	6.76	314	37	0.0	7.3	5.5	9
5	1-Nov-04	0.500	5.50	0.480	6.95	351	39	0.0	4.0	6.0	9
6	8-Nov-04	0.500	5.45	0.465	6.95	339	56	0.0	4.5	5.5	19
7	15-Nov-04	0.500	5.45	0.460	6.80	347	58	0.0	4.0	3.5	20
8	22-Nov-04	0.500	5.50	0.520	6.96	369	57	0.0	11.5	4.5	19
9	29-Nov-04	0.500	5.29	0.470	6.59	381	39	0.0	23.0	4.0	14
10	6-Dec-04	0.500	5.31	0.470	6.44	386	44	0.0	14.5	3.5	16
11	13-Dec-04	0.500	5.52	0.470	6.77	371	43	0.0	12.0	4.0	15
12	20-Dec-04	0.500	5.52	0.470	6.67	396	42	0.0	12.0	3.0	16
13	27-Dec-04	0.500	5.18	0.765	6.60	401	41	0.0	14.5	2.5	14
14	3-Jan-05	0.500	5.43	0.450	6.36	404	42	0.0	13.5	3.0	15
15	10-Jan-05	0.500	5.50	0.465	6.36	485	40	0.0	13.5	3.5	14
16	17-Jan-05	0.500	5.53	0.465	6.20	478	41	0.0	12.0	2.0	17
17	24-Jan-05	0.500	5.58	0.470	6.14	477	44	0.0	12.0	2.5	16
18	31-Jan-05	0.500	5.81	0.470	6.27	494	43	0.0	13.0	3. 0	17
19	7-Feb-05	0.500	5.51	0.470	6.02	468	56	0.0	8.5	2.0	21
20	14-Feb-05	0.500	5.41	0.475	5.86	448	108	0.0	14.0	1.5	44
21	21-Feb-05	0.500	5.36	0.485	5.66	385	115	0.0	16.0	1.5	49
22	28-Feb-05	0.500	5.45	0.495	5.44	391	126	0.0	15.5	1.0	54
23	7-Mar-05	0.500	5.47	0.465	5.35	501	80	0.0	13.0	1.5	35
24	14-Mar-05	0.500	5.50	0.475	5.38	465	118	0.0	15.5	1.0	51
25	21-Mar-05	0.500	5.56	0.475	5.41	520	99	0.0	13.5	1.5	40
26	28-Mar-05	0.500	5.63	0.490	5.24	518	139	0.0	6.5	2.0	IP

APPENDIX B.2
PHASE II KINETIC DATA

COLUMN 9

WEEK	DATE	WATER ADDED (L)	pH WATER ADDED	LEACHATE COLLECTED (L)	LEACHATE pH	REDOX (mV)	CONDUCTIVITY (µS/cm)	ACIDITY (pH 4.5) (mg CaCO3/L)	ACIDITY (pH 8.3) (mg CaCO3/L)	ALKALINITY (mg CaCO3/L)	SULPHATE (mg/L)
0	27-Sep-04	0.500	5.61	0.460	8.22	251	254	0.0	1.0	75.0	52
1	4-Oct-04	0.500	5.66	0.480	7.95	169	111	0.0	5.0	39.0	19
2	11-Oct-04	0.500	5.46	0.445	9.04	271	184	0.0	0.0	70.8	16
3	19-Oct-04	0.500	5.40	0.450	9.09	165	176	0.0	0.0	69.0	15
4	25-Oct-04	0.500	5.43	0.440	8.65	201	181	0.0	0.0	79.0	12
5	1-Nov-04	0.500	5.50	0.450	8.38	235	130	0.0	0.0	63.0	3
6	8-Nov-04	0.500	5.45	0.455	8.55	253	169	0.0	0.0	73.0	14
7	15-Nov-04	0.500	5.45	0.455	8.73	249	190	0.0	0.0	79.0	17
8	22-Nov-04	0.500	5.50	0.455	8.56	299	182	0.0	0.0	84.5	10
9	29-Nov-04	0.500	5.29	0.500	8.41	281	95	0.0	0.0	49.0	5
10	6-Dec-04	0.500	5.31	0.475	8.32	321	127	0.0	0.0	49.0	15
11	13-Dec-04	0.500	5.52	0.470	8.06	321	128	0.0	4.5	47.0	17
12	20-Dec-04	0.500	5.52	0.455	8.05	339	125	0.0	5.0	55.0	11
13	27-Dec-04	0.500	5.18	0.460	7.24	346	116	0.0	10.5	45.5	11
14	3-Jan-05	0.500	5.43	0.445	7.99	373	111	0.0	5.0	41.0	13
15	10-Jan-05	0.500	5.50	0.455	7.75	427	104	0.0	10.0	42.0	11
16	17-Jan-05	0.500	5.53	0.460	7.90	413	107	0.0	8.0	42.5	10
17	24-Jan-05	0.500	5.58	0.460	7.76	407	105	0.0	8.0	44.5	10
18	31-Jan-05	0.500	5.81	0.460	7.88	435	97	0.0	8.0	41.5	9
19	7-Feb-05	0.500	5.51	0.465	7.84	383	98	0.0	9.5	42.0	7
20	14-Feb-05	0.500	5.41	0.475	7.70	379	135	0.0	8.5	39.0	25
21	21-Feb-05	0.500	5.36	0.475	7.80	302	136	0.0	8.5	39.0	29
22	28-Feb-05	0.500	5.45	0.475	7.78	303	133	0.0	8.5	38.5	28
23	7-Mar-05	0.500	5.47	0.465	7.89	411	110	0.0	8.0	38.0	17
24	14-Mar-05	0.500	5.50	0.460	7.71	344	118	0.0	9.0	35.5	26
25	21-Mar-05	0.500	5.56	0.460	7.92	434	114	0.0	7.0	45.0	10
26	28-Mar-05	0.500	5.63	0.475	7.97	415	133	0.0	2.0	37.0	IP

APPENDIX B.2
PHASE II KINETIC DATA

COLUMN 10

WEEK	DATE	WATER ADDED (L)	pH WATER ADDED	LEACHATE COLLECTED (L)	LEACHATE pH	REDOX (mV)	CONDUCTIVITY (µS/cm)	ACIDITY (pH 4.5) (mg CaCO3/L)	ACIDITY (pH 8.3) (mg CaCO3/L)	ALKALINITY (mg CaCO3/L)	SULPHATE (mg/L)
0	27-Sep-04	0.500	5.61	0.465	8.16	268	198	0.0	1.0	64.5	25
1	4-Oct-04	0.500	5.66	0.465	8.29	187	123	0.0	2.5	54.0	9
2	11-Oct-04	0.500	5.46	0.440	7.91	301	82	0.0	3.0	37.5	8
3	19-Oct-04	0.500	5.40	0.455	7.46	267	55	0.0	14.5	23.5	6
4	25-Oct-04	0.500	5.43	0.440	7.77	264	96	0.0	4.8	37.3	7
5	1-Nov-04	0.500	5.50	0.450	7.55	346	48	0.0	14.0	23.0	4
6	8-Nov-04	0.500	5.45	0.455	7.60	327	54	0.0	9.0	22.5	4
7	15-Nov-04	0.500	5.45	0.450	7.54	326	58	0.0	14.5	22.0	4
8	22-Nov-04	0.500	5.50	0.460	7.53	360	46	0.0	16.0	19.0	<3
9	29-Nov-04	0.500	5.29	0.460	7.75	356	34	0.0	9.5	17.5	4
10	6-Dec-04	0.500	5.31	0.475	7.66	355	42	0.0	8.0	13.5	9
11	13-Dec-04	0.500	5.52	0.460	7.65	376	43	0.0	9.0	15.5	6
12	20-Dec-04	0.500	5.52	0.455	7.50	361	40	0.0	12.0	17.0	5
13	27-Dec-04	0.500	5.18	0.455	7.57	378	36	0.0	8.0	14.5	4
14	3-Jan-05	0.500	5.43	0.450	7.37	403	32	0.0	11.5	11.5	5
15	10-Jan-05	0.500	5.50	0.460	7.14	432	28	0.0	13.5	10.5	5
16	17-Jan-05	0.500	5.53	0.455	7.22	439	34	0.0	10.5	12.5	6
17	24-Jan-05	0.500	5.58	0.455	7.12	453	41	0.0	11.5	12.5	9
18	31-Jan-05	0.500	5.81	0.460	7.33	454	44	0.0	10.0	14.0	9
19	7-Feb-05	0.500	5.51	0.450	7.21	431	42	0.0	11.0	13.5	7
20	14-Feb-05	0.500	5.41	0.470	7.34	392	86	0.0	13.0	15.0	22
21	21-Feb-05	0.500	5.36	0.485	7.35	290	73	0.0	12.5	14.5	19
22	28-Feb-05	0.500	5.45	0.480	7.31	322	66	0.0	12.0	14.5	14
23	7-Mar-05	0.500	5.47	0.465	7.28	421	46	0.0	12.0	12.5	10
24	14-Mar-05	0.500	5.50	0.465	7.15	377	55	0.0	13.0	11.0	14
25	21-Mar-05	0.500	5.56	0.465	7.20	437	35	0.0	11.5	9.5	7
26	28-Mar-05	0.500	5.63	0.480	7.34	441	54	0.0	5.5	10.5	IP

APPENDIX B.2
PHASE II ICP-MS AND ICP-OES DATA

COLUMN 1

Dissolved Metals	(mg/L)	Week 0	Week 1	Week 2	Week 3	Week 4	Week 4 DUP	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14
Aluminum	Al	0.0523	0.0481	<0.20	0.110	<0.20	<0.20	0.121	<0.20	<0.20	<0.20	<0.20	0.0664	<0.20	<0.20	<0.20	<0.20
Antimony	Sb	0.00588	0.00528	<0.20	0.00252	<0.20	<0.20	0.00207	<0.20	<0.20	<0.20	<0.20	0.00096	<0.20	<0.20	<0.20	<0.20
Arsenic	As	0.0220	0.0328	<0.20	0.0488	<0.20	<0.20	0.0707	<0.20	<0.20	<0.20	<0.30	0.0606	<0.20	<0.20	<0.20	<0.20
Barium	Ba	0.00464	0.00293	<0.010	0.00167	<0.010	<0.010	0.00103	<0.010	<0.010	<0.010	<0.010	0.000927	<0.010	<0.010	<0.010	<0.010
Beryllium	Be	<0.00050	<0.00050	<0.0050	<0.00050	<0.0050	<0.0050	<0.00050	<0.0050	<0.0050	<0.0050	<0.0050	<0.00050	<0.0050	<0.0050	<0.0050	<0.0050
Bismuth	Bi	<0.00050	<0.00050	<0.20	<0.00050	<0.20	<0.20	<0.00050	<0.20	<0.20	<0.20	<0.20	<0.00050	<0.20	<0.20	<0.20	<0.20
Boron	B	0.309	0.278	0.18	0.104	<0.10	<0.10	0.062	<0.10	<0.10	<0.10	<0.10	0.030	<0.10	<0.10	<0.10	<0.10
Cadmium	Cd	<0.000050	0.000051	<0.010	<0.000050	<0.010	<0.010	<0.000050	<0.010	<0.010	<0.010	<0.010	<0.000050	<0.010	<0.010	<0.010	<0.010
Calcium	Ca	9.74	12.7	12.0	9.91	11.2	11.6	9.04	9.86	7.63	9.36	5.91	7.16	6.75	7.52	6.79	6.61
Chromium	Cr	<0.00050	<0.00050	<0.010	0.00151	<0.010	<0.010	<0.00050	<0.010	<0.010	<0.010	<0.010	<0.00050	<0.010	<0.010	<0.010	<0.010
Cobalt	Co	0.00046	0.00045	<0.010	0.00045	<0.010	<0.010	0.00055	<0.010	<0.010	<0.010	<0.010	0.00093	<0.010	<0.010	<0.010	<0.010
Copper	Cu	0.00425	0.00454	<0.010	0.00077	<0.010	<0.010	0.00226	<0.010	<0.010	<0.010	<0.010	0.00132	<0.010	<0.010	<0.010	<0.010
Iron	Fe	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	Pb	0.000071	0.000121	<0.050	0.000076	<0.050	<0.050	0.000057	<0.050	<0.050	<0.050	<0.050	0.000092	<0.050	<0.050	<0.050	<0.050
Lithium	Li	0.0117	0.0132	0.018	0.0084	0.010	0.012	0.0060	<0.010	<0.010	<0.010	<0.010	<0.0050	<0.010	<0.010	<0.010	<0.010
Magnesium	Mg	4.53	4.98	4.28	3.41	3.64	3.68	2.99	3.15	2.27	2.82	1.91	2.28	2.25	2.58	2.36	2.18
Manganese	Mn	0.0101	0.0126	0.0137	0.00995	0.0132	0.0136	0.0108	0.0132	0.0152	0.0128	0.0126	0.0142	0.0144	0.0171	0.0173	0.0179
Mercury	Hg	<0.000050	<0.000050		<0.000050			<0.000050					<0.000050				
Molybdenum	Mo	0.108	0.0449	<0.030	0.0198	<0.030	<0.030	0.0142	<0.030	<0.030	<0.030	<0.030	0.00602	<0.030	<0.030	<0.030	<0.030
Nickel	Ni	0.00752	0.00271	<0.050	0.00158	<0.050	<0.050	0.00132	<0.050	<0.050	<0.050	<0.050	0.00176	<0.050	<0.050	<0.050	<0.050
Phosphorous	P	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium	K	20.0	11.4	7.0	4.0	4.1	3.8	2.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Selenium	Se	0.0028	0.0018	<0.20	0.0011	<0.20	<0.20	<0.0010	<0.20	<0.20	<0.20	<0.20	<0.0010	<0.20	<0.20	<0.20	<0.20
Silicon	Si	3.90	3.21	3.05	2.32	2.63	2.67	2.20	2.41	1.78	1.91	1.53	1.60	1.71	1.79	1.72	1.63
Silver	Ag	<0.000010	0.000057	<0.010	<0.000010	<0.010	<0.010	<0.000010	<0.010	<0.010	<0.010	<0.020	0.000042	<0.010	<0.010	<0.010	<0.010
Sodium	Na	48.5	16.9	6.2	3.1	2.5	2.5	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium	Sr	0.196	0.196	0.179	0.120	0.140	0.142	0.118	0.114	0.0845	0.100	0.0678	0.0688	0.0689	0.0801	0.0652	0.0637
Thallium	Tl	<0.00010	<0.00010	<0.20	<0.00010	<0.20	<0.20	<0.00010	<0.20	<0.20	<0.20	<0.20	<0.00010	<0.20	<0.20	<0.20	<0.20
Tin	Sn	0.00012	<0.00010	<0.030	<0.00010	<0.030	<0.030	<0.00010	<0.030	<0.030	<0.030	<0.030	<0.00010	<0.030	<0.030	<0.030	<0.030
Titanium	Ti	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	U	0.000601	0.00107		0.00106			0.00107					0.000382				
Vanadium	V	0.0014	0.0014	<0.030	0.0019	<0.030	<0.030	0.0019	<0.030	<0.030	<0.030	<0.030	0.0011	<0.030	<0.030	<0.030	<0.030
Zinc	Zn	0.0014	0.0058	<0.0050	0.0027	<0.0050	<0.0050	0.0023	<0.0050	0.0109	<0.0050	<0.0050	0.0017	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Anions	**(mg/L)**																
Chloride	Cl	4.20	1.42		<0.50			0.50					<0.50				
Fluoride	F	0.424	0.222		0.100			0.038					0.028				
Nutrients	**(mg/L)**																
Ammonia	N	0.416	0.055		<0.020			<0.020					0.024				
Nitrite/Nitrate	N	0.060	0.054		<0.050			<0.050					<0.050				
Total Dissolved Solids	(mg/L)	192	130		46			86					<40				

Note: Detection limits are mg/L unless specified otherwise.
Column 1

APPENDIX B.2
PHASE II ICP-MS AND ICP-OES DATA

COLUMN 1

Dissolved Metals	**(mg/L)**	Week 14 DUP	Week 15	Week 16	Week 17	Week 18	Week 19	Week 20	Week 21	Week 22	Week 23	Week 24	Week 25	Week 25 DUP	Week 26
Aluminum	Al	<0.20	0.0661	<0.20	<0.20	<0.20	<0.20	0.0516	<0.20	<0.20	<0.20	<0.20	0.0582		<0.20
Antimony	Sb	<0.20	0.00059	<0.20	<0.20	<0.20	<0.20	0.00073	<0.20	<0.20	<0.20	<0.20	0.00042		<0.20
Arsenic	As	<0.20	0.0520	<0.20	<0.20	<0.20	<0.20	0.0731	<0.20	<0.20	<0.20	<0.20	0.0516		<0.20
Barium	Ba	<0.010	0.000631	<0.010	<0.010	<0.010	<0.010	0.000956	<0.010	<0.010	<0.010	<0.010	0.000505		<0.010
Beryllium	Be	<0.0050	<0.00050	<0.0050	<0.0050	<0.0050	<0.0050	<0.00050	<0.0050	<0.0050	<0.0050	<0.0050	<0.00050		<0.0050
Bismuth	Bi	<0.20	<0.00050	<0.20	<0.20	<0.20	<0.20	<0.00050	<0.20	<0.20	<0.20	<0.20	<0.00050		<0.20
Boron	B	<0.10	0.014	<0.10	<0.10	<0.10	<0.10	0.017	<0.10	<0.10	<0.10	<0.10	<0.010		<0.10
Cadmium	Cd	<0.010	<0.000050	<0.010	<0.010	<0.010	<0.010	<0.000050	<0.010	<0.010	<0.010	<0.010	<0.000050		<0.010
Calcium	Ca	6.64	4.49	8.21	7.54	5.84	6.76	8.04	6.73	6.77	6.45	7.09	3.94		7.53
Chromium	Cr	<0.010	<0.00050	<0.010	<0.010	<0.010	<0.010	<0.00050	<0.010	<0.010	<0.010	<0.010	<0.00050		<0.010
Cobalt	Co	<0.010	0.00081	<0.010	<0.010	<0.010	<0.010	0.00114	<0.010	<0.010	<0.010	<0.010	0.00085		<0.010
Copper	Cu	<0.010	0.00305	<0.010	<0.010	<0.010	<0.010	0.00099	<0.010	<0.010	<0.010	<0.010	0.00041		<0.010
Iron	Fe	<0.030	<0.030	<0.030	<0.030	0.032	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030		<0.030
Lead	Pb	<0.050	<0.000050	<0.050	<0.050	<0.050	<0.050	<0.000050	<0.050	<0.050	<0.050	<0.050	<0.000050		<0.050
Lithium	Li	<0.010	<0.0050	<0.010	<0.010	<0.010	<0.010	<0.0050	<0.010	0.011	<0.010	<0.010	<0.0050		<0.010
Magnesium	Mg	2.36	1.48	2.81	2.68	2.07	2.18	2.57	2.43	2.32	3.23	2.54	1.41		2.76
Manganese	Mn	0.0180	0.0111	0.0218	0.0195	0.0165	0.0213	0.0214	0.0248	0.0249	0.0254	0.0296	0.102		0.0323
Mercury	Hg		<0.000050					<0.000050					<0.000050		
Molybdenum	Mo	<0.030	0.00243	<0.030	<0.030	<0.030	<0.030	0.00460	<0.030	<0.030	<0.030	<0.030	0.00264		<0.030
Nickel	Ni	<0.050	0.00170	<0.050	<0.050	<0.050	<0.050	0.00177	<0.050	<0.050	<0.050	<0.050	0.00115		<0.050
Phosphorous	P	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30		<0.30
Potassium	K	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0		<2.0
Selenium	Se	<0.20	<0.0010	<0.20	<0.20	<0.20	<0.20	<0.0010	<0.20	<0.20	<0.20	<0.20	<0.0010		<0.20
Silicon	Si	1.68	1.59	1.96	1.73	1.71	1.89	1.94	1.97	2.04	1.75	1.91	1.58		1.85
Silver	Ag	<0.010	<0.000010	<0.010	<0.010	<0.010	<0.010	<0.000010	<0.010	<0.010	<0.010	<0.010	<0.000010		<0.010
Sodium	Na	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0		<2.0
Strontium	Sr	0.0650	0.0393	0.0806	0.0714	0.0521	0.0610	0.0507	0.0582	0.0525	0.179	0.0545	0.0302		0.0585
Thallium	Tl	<0.20	<0.00010	<0.20	<0.20	<0.20	<0.20	<0.00010	<0.50	<0.20	<0.20	<0.20	<0.00010		<0.20
Tin	Sn	<0.030	<0.00010	<0.030	<0.030	<0.030	<0.030	<0.00010	<0.030	<0.030	<0.030	<0.030	<0.00010		<0.030
Titanium	Ti	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010		<0.010
Uranium	U		0.000133	<0.030				0.000212					0.000098		
Vanadium	V	<0.030	<0.0010	<0.030	<0.030	<0.030	<0.030	0.0010	<0.030	<0.030	<0.030	<0.030	<0.0010		<0.030
Zinc	Zn	<0.0050	<0.0010	<0.0050	<0.0050	<0.0050	<0.0050	0.0023	<0.0050	0.0071	<0.0050	<0.0050	<0.0010		<0.0050
Dissolved Anions	**(mg/L)**														
Chloride	Cl		<0.50					<0.50					<0.50		
Fluoride	F		<0.020					<0.020					<0.020		
Nutrients	**(mg/L)**														
Ammonia	N		<0.020					<0.020					0.030	<0.020	
Nitrite/Nitrate	N		0.0355					0.0055					0.0063	<0.10	
Total Dissolved Solids	(mg/L)		<57					31					<33		

Note: Detection limits are mg/L ur
Column 1

APPENDIX B.2
PHASE II ICP-MS AND ICP-OES DATA

COLUMN 2

Dissolved Metals	(mg/L)	Week 0	Week 1	Week 2	Week 3	Week 4	Week 5	Week 5 DUP	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14
Aluminum	Al	0.158	0.172	<0.20	0.112	<0.20	0.136	0.121	<0.20	<0.20	<0.20	<0.20	0.137	<0.20	<0.20	<0.20	<0.20
Antimony	Sb	0.0145	0.0137	<0.20	0.00452	<0.20	0.00331	0.00327	<0.20	<0.20	<0.20	<0.20	0.00209	<0.20	<0.20	<0.20	<0.20
Arsenic	As	0.00596	0.00620	<0.20	0.00299	<0.20	0.00273	0.00267	<0.20	<0.20	<0.20	<0.20	0.00208	<0.20	<0.20	<0.20	<0.20
Barium	Ba	0.00125	0.000863	<0.010	0.00110	<0.010	0.00112	0.00112	<0.010	<0.010	<0.010	<0.010	0.00101	<0.010	<0.010	<0.010	<0.010
Beryllium	Be	<0.00050	<0.00050	<0.0050	<0.00050	<0.0050	<0.00050	<0.00050	<0.0050	<0.0050	<0.0050	<0.0050	<0.00050	<0.0050	<0.0050	<0.0050	<0.0050
Bismuth	Bi	<0.00050	<0.00050	<0.20	<0.00050	<0.20	<0.00050	<0.00050	<0.20	<0.20	<0.20	<0.20	<0.00050	<0.20	<0.20	<0.20	<0.20
Boron	B	0.707	0.644	0.53	0.312	0.37	0.231	0.229	0.22	0.23	0.18	0.13	0.161	0.16	0.12	0.12	0.12
Cadmium	Cd	<0.000050	<0.000050	<0.010	<0.000050	<0.010	<0.000050	<0.000050	<0.010	<0.010	<0.010	<0.010	<0.000050	<0.010	<0.010	<0.010	<0.010
Calcium	Ca	2.40	2.97	5.04	7.03	10.8	9.18	8.95	10.8	11.5	10.8	9.93	10.3	10.5	10.8	11.9	11.8
Chromium	Cr	<0.00050	<0.00050	<0.010	0.00125	<0.010	<0.00050	<0.00050	<0.010	<0.010	<0.010	<0.010	<0.00050	<0.010	<0.010	<0.010	<0.010
Cobalt	Co	<0.00010	<0.00010	<0.010	<0.00010	<0.010	<0.00010	<0.00010	<0.010	<0.010	<0.010	<0.010	<0.00010	<0.010	<0.010	<0.010	<0.010
Copper	Cu	0.00172	0.00314	<0.010	0.00043	<0.010	0.00082	0.00038	<0.010	<0.010	<0.010	<0.010	0.00088	<0.010	<0.010	<0.010	<0.010
Iron	Fe	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.081	<0.030
Lead	Pb	0.000222	0.000123	<0.050	<0.000050	<0.050	0.000076	0.000106	<0.050	<0.050	<0.050	<0.050	0.000052	<0.050	<0.050	<0.050	<0.050
Lithium	Li	<0.0050	0.0055	<0.010	0.0081	<0.010	0.0081	0.0082	<0.010	0.020	<0.010	<0.010	0.0062	<0.010	<0.010	<0.010	<0.010
Magnesium	Mg	1.25	1.46	2.28	2.95	4.35	3.74	3.63	4.08	4.36	3.61	3.58	3.64	3.82	3.54	3.63	3.24
Manganese	Mn	0.00404	0.00117	<0.0050	0.00263	0.0054	0.00415	0.00401	0.0059	0.0056	0.0051	0.0058	0.00533	0.0059	0.0057	0.0066	0.0069
Mercury	Hg	<0.000050	<0.000050		<0.000050		<0.000050	<0.000050					<0.000050				
Molybdenum	Mo	0.289	0.122	0.051	0.0363	0.032	0.0241	0.0238	<0.030	<0.030	<0.030	<0.030	0.0113	<0.030	<0.030	<0.030	<0.030
Nickel	Ni	0.00063	<0.00050	<0.050	0.00056	<0.050	0.00093	0.00080	<0.050	<0.050	<0.050	<0.050	0.00062	<0.050	<0.050	<0.050	<0.050
Phosphorous	P	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium	K	17.0	13.8	13.3	10.1	10.2	6.1	5.9	6.3	6.5	4.2	3.8	3.2	2.6	2.6	2.3	2.1
Selenium	Se	0.0042	0.0043	<0.20	0.0022	<0.20	0.0015	0.0015	<0.20	<0.20	<0.20	<0.20	<0.0010	<0.20	<0.20	<0.20	<0.20
Silicon	Si	2.58	2.39	2.31	1.87	2.29	1.84	1.80	1.77	1.70	1.61	1.46	1.37	1.45	1.38	1.32	1.30
Silver	Ag	0.000046	0.000013	<0.010	<0.000010	<0.010	<0.000010	<0.000010	<0.010	<0.010	<0.010	<0.010	0.000062	<0.010	<0.010	<0.010	<0.010
Sodium	Na	60.0	31.8	16.3	7.8	7.1	4.0	3.9	3.0	2.7	2.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium	Sr	0.0442	0.0553	0.0926	0.103	0.164	0.149	0.149	0.155	0.157	0.130	0.131	0.118	0.126	0.134	0.126	0.125
Thallium	Tl	<0.00010	<0.00010	<0.20	<0.00010	<0.20	<0.00010	<0.00010	<0.20	<0.20	<0.20	<0.20	0.00038	<0.20	<0.20	<0.20	<0.20
Tin	Sn	0.00011	0.00012	<0.030	<0.00010	<0.030	<0.00010	<0.00010	<0.030	<0.030	<0.030	<0.030	<0.00010	<0.030	<0.030	<0.030	<0.030
Titanium	Ti	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	U	0.00140	0.000665		0.000434		0.000425	0.000415					0.000369				
Vanadium	V	0.0053	0.0047	<0.030	0.0018	<0.030	0.0015	0.0015	<0.030	<0.030	<0.030	<0.030	0.0012	<0.030	<0.030	<0.030	<0.030
Zinc	Zn	0.0096	0.0014	<0.0050	0.0011	<0.0050	<0.0010	<0.0010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0010	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Anions	**(mg/L)**																
Chloride	Cl	4.52	2.75		0.88		<0.50						0.53				
Fluoride	F	0.563	0.370		0.116		0.044						0.038				
Nutrients	**(mg/L)**																
Ammonia	N	0.533	0.218		0.085		0.021						<0.020				
Nitrite/Nitrate	N	0.079	0.056		<0.050		<0.050						<0.050				
Total Dissolved Solids	(mg/L)	200	125		60		123						<40				

Note: Detection limits are mg/L unless specified otherwise.
Column 2